

## DOCKETED

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# Analyzing Statewide EV Infrastructure Needs in California

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**6/6/2016**

**Funding Strategies for EV Infrastructure  
Workshop**

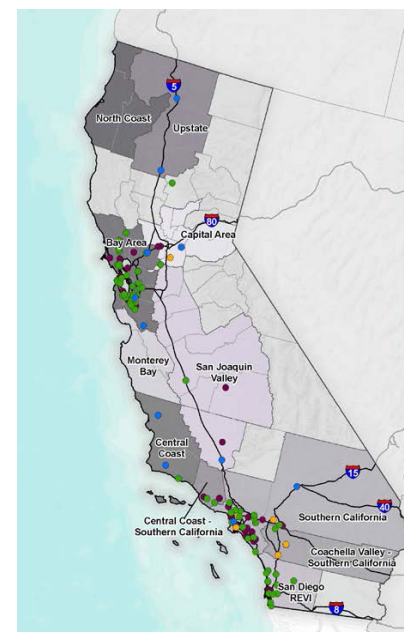
# “Analyzing Statewide EV Infrastructure Needs in California”

## Outline of the Talk

1. Our Motivation: Why Analyzing EV Infrastructure?
2. Scientific Literature on EV Infrastructure Planning
3. New Research Questions
4. Upcoming “EVSE Demand Model” by CEC&NREL



**Funding Strategies for EV Infrastructure  
Workshop – June, 2016**



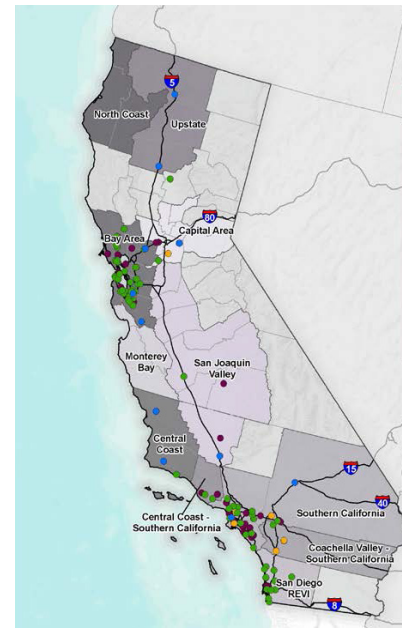
# “Analyzing Statewide EV Infrastructure Needs for California”

## Acronyms

- BEV: Battery Electric Vehicles
- EVSE: Electric Vehicle Supply Equipment
- NREL: National Renewable Energy Agency
- CVRP: Clean Vehicle Rebate Project
- DMV: Department of Motor Vehicles
- AFDC: Alternative Fuels Data Center
- MUD: Multi-Unit Dwelling

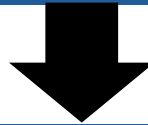


**Funding Strategies for EV Infrastructure  
Workshop – June, 2016**



# Our Motivation: Why Analyzing EV Infrastructure?

- To understand existing EVSE demand and future needs for different geographies in the State



- To understand the potential total cost needed for electrification of LDV transportation

- To understand variances in funding needs by region, and by type of destination



- To be able to formulate strategies to effectively allocate limited public funds



# Scientific Literature on Modeling EVSE Demand

**Nicholas et al. (2013) - UCDavis**

DC Fast Chargers in the Context of Bigger Batteries

**Nicholas et al. (2013) - UCDavis**

California Statewide Charging Assessment

**Melaina & Helwig (2014) - NREL**

California Statewide PEV Infrastructure Assessment

**Ji et al. (2015) - UCDavis**

DCFC Planning for Metropolitan Planning Organizations



# California Statewide PEV Infrastructure Assessment

## *Distribution of Charge Points in 2020 by Scenario and Planning Region from Melaina & Helwig (2014)*

Region & Scenario	Home			Work			Public			
	L1	L2	Total	L1	L2	Total	L1	L2	FC	FC Stns
<b>Home Dominant</b>										
Southern California	235,000	168,000	403,000	9,200	37,700	47,000	750	9,300	247	124
Bay Area	126,000	90,000	216,000	5,000	20,200	25,200	400	5,000	133	66
San Joaquin Valley	21,000	15,000	36,000	800	3,400	4,200	70	800	22	11
San Diego	46,000	33,000	79,000	1,800	7,400	9,200	150	1,800	49	24
Capital Area	26,000	19,000	45,000	1,000	4,200	5,200	80	1,000	27	14
Coachella Valley	22,000	16,000	38,000	900	3,600	4,500	70	900	23	12
Central Coast (S.)	15,000	11,000	26,000	600	2,400	3,000	50	600	16	8
Monterey Bay	7,600	5,500	13,100	300	1,200	1,500	20	300	12	6
Central Coast	7,800	5,600	13,300	300	1,200	1,600	20	310	12	6
Upstate	1,800	1,300	3,100	70	290	360	6	70	4	2
North Coast	1,100	800	1,900	40	180	220	4	40	5	2
<b>Total</b>	<b>511,000</b>	<b>365,000</b>	<b>876,000</b>	<b>20,100</b>	<b>82,000</b>	<b>102,000</b>	<b>1,620</b>	<b>20,100</b>	<b>551</b>	<b>275</b>
<b>High Public Access</b>										
Southern California	239,000	133,000	372,000	10,600	67,000	77,000	970	21,500	702	351
Bay Area	128,000	72,000	200,000	5,700	36,000	41,000	520	11,500	377	189
San Joaquin Valley	22,000	12,000	34,000	1,000	6,000	7,000	90	1,900	63	32
San Diego	47,000	26,000	73,000	2,100	13,000	15,000	190	4,200	138	69
Capital Area	26,000	15,000	41,000	1,200	7,000	9,000	110	2,400	78	39
Coachella Valley	23,000	13,000	35,000	1,000	6,000	7,000	90	2,000	67	33
Central Coast (S.)	15,000	9,000	24,000	700	4,000	5,000	60	1,400	45	23
Monterey Bay	7,700	4,300	12,100	300	2,000	3,000	30	700	34	17
Central Coast	7,900	4,400	12,300	300	2,200	2,500	30	710	35	17
Upstate	1,800	1,000	2,900	80	510	590	7	160	11	5
North Coast	1,100	600	1,800	50	310	360	5	100	13	7
<b>Total</b>	<b>517,000</b>	<b>289,000</b>	<b>806,200</b>	<b>22,900</b>	<b>144,000</b>	<b>167,000</b>	<b>2,100</b>	<b>46,500</b>	<b>1,550</b>	<b>775</b>



# New Research Questions in the Area of EV Infrastructure

- What are the breakdowns of EVSE needs for different location types such as MUDs, workplaces, fleets, and other destinations?
- What will be the fleets' role in California in accelerating PEV deployment?
- What are the financially sustainable business models for EVSE operation?
- Will there be any additional demand for interregional corridor charging from upcoming long-range BEVs?



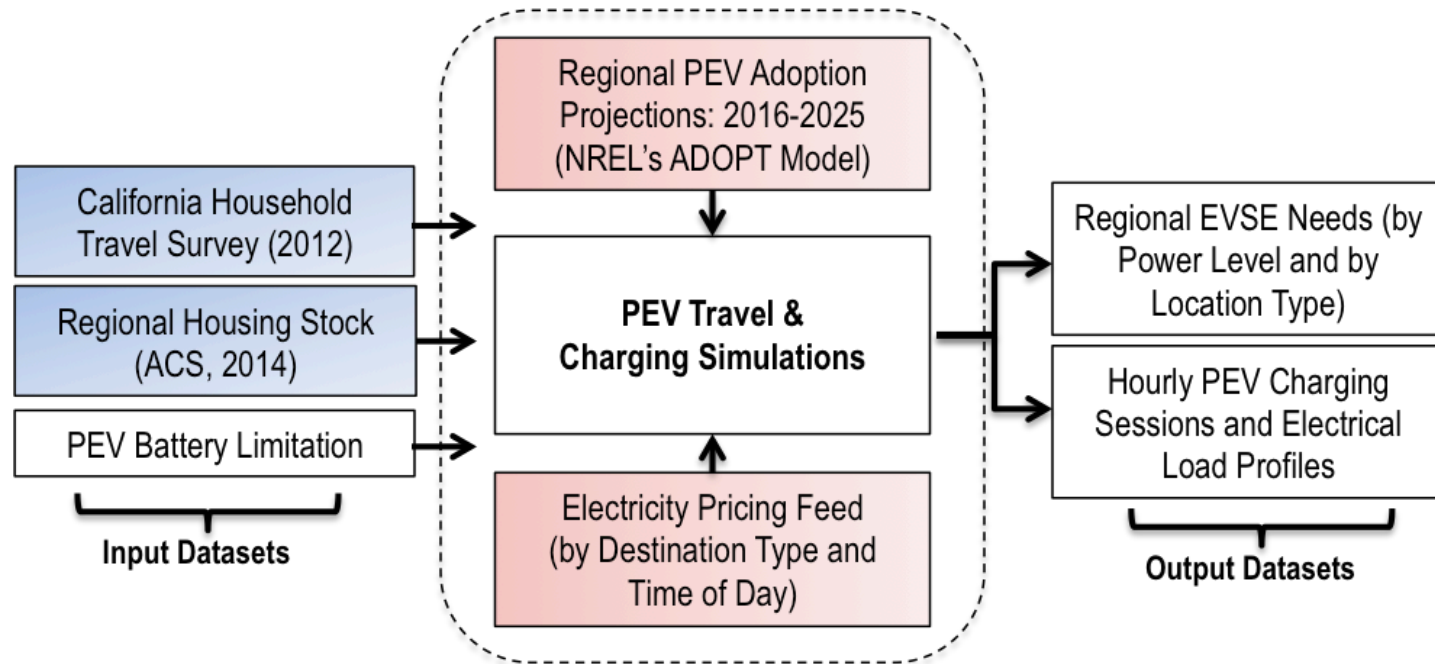


# Upcoming “EVSE Demand Model” by CEC-NREL Partnership

- The new model incorporates regional (county-level) LDV travel data, and considers consumer charging behavior with higher details.
- Results will include EVSE breakdowns by destination types, and by region.
- Project Timeline: March 2016 – Dec 2016 (9-months).



## A Conceptual Diagram for the Proposed EVSE Demand Model



## Some Challenges for the Upcoming Model:

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- Presenting variance and uncertainty in the overall “PEV-Driver-EVSE” system?
- Limited data on parking availability for MUDs and workplaces:
  - *Limited available data on whether being a curbside parking, shared lot, or an assigned space?*
- Plotting results for a peak-annual day, an average weekday, and for an average weekend?



## Summary & Next Steps:

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The ZEVIO staff will continue:

- To work with NREL to finalize EVSE demand model by December 2016.
- To monitor new vehicle buyers market through an internal DMV database.
- To monitor PEV and EVSE deployment through CEC, CVRP, AFDC, and PlugShare database.



## Questions for Stakeholders:

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- Are there any alternative methodologies for projecting EVSE demand by region, by charger type, and by location type?
- Are there any other travel behavior data that can be used by the CEC to improve EV infrastructure planning?
- What other sources can be used to monitor EV market and consumer attitudes toward EVs?



# THANKS FOR LISTENING!

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