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<td><strong>Docket Number:</strong></td>
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<td>Presentation - Assessing Electric Vehicle Charging Infrastructure Needs in California</td>
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<td><strong>Description:</strong></td>
<td>UC Davis Plug-in Hybrid &amp; Electric Vehicle Research Center of the Institute of Transportation Studies - Presentation &quot;Assessing Electric Vehicle Charging Infrastructure Needs in California - Implementing AB 2127&quot; at March 11 IEPR Staff Workshop.</td>
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<td><strong>Filer:</strong></td>
<td>Denise Costa</td>
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<td><strong>Organization:</strong></td>
<td>UC Davis Plug-In Hybrid &amp; Electric Vehicle Research Center</td>
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Assessing Electric Vehicle Charging Infrastructure Needs In California
Implementing Assembly Bill (AB) 2127
CALIFORNIA ENERGY COMMISSION WORKSHOP

3/11/2019
Gil Tal
Alan Jenn
PLUG-IN HYBRID & ELECTRIC VEHICLE RESEARCH CENTER
of the Institute of Transportation Studies

Gil Tal, Director
Alan Jenn, Research Director
Dahlia Garas, Program Director
# PH&EV Center Data Collection

### Questionnaire Surveys
- Questionnaires with 30,000 PEV owners
- Non-EV buyer surveys with 25,000 car buyers in US

### On road data collection
- OBD data on 600+ vehicles
- GPS data on 54,000 PEVs from OEMs

### Infrastructure Data
- 9,000,000 Level 2 charging events
- 3,400,000 DC fast charging events
- Vehicle Reported Charging Events

### Registration Data
- 48,000,000 vehicles in 3 states
- 14,000,000 Households vehicle ownership

### TNC Data
- ~5000 PEVs used for TNC
- 1.6 million TNC trips
- ~15,000 DCFC charging events
Annual VMT of plug-in vehicles in California 2018

Fuel Type
- ICEVs
- PHEVs
- BEV
- Short range BEVs
- Long range BEVs

Data Sources:
- 2017 California NHTS
- Calif Survey PH&EV Center
- Nationwide Survey 2017
- Logged Vehicles-Calif PH&EV Center
Where and When PEVs Charge in a Week? (CA 2017)

Overall Proportion

Proportion of respondents in charging behavior groups

Home only  Work only  Other only  Home-work  Home-other  Work-other  All

Gil Tal • Vehicle Electrification
Can you plug in at home? (For those who are not doing so)

- No, we have no option to charge the car overnight
- No, but we can leave the car next to a public charger overnight
- Yes, but we will need to use an extension cord
- Yes, we can use a 120V regular plug
- Yes, we have a charger installed
Who is using DC Fast Chargers? once or more in the last 30 days (CA 2018)
• On board power electronics limits on rated kW between BEVs
Probability of Charging over vehicle use days

All BEVs:
Avg. Prob of Charging = 0.58
- Probability of home, workplace, and multi-location charging goes down with increasing range.
- Probability of public location charging goes up as range of vehicles increase.
Charging start time: California 2016-2018
Coordinating charger infrastructure development with the distribution grid

- Launched two year project to understand impacts of future PEV charging on distribution infrastructure:
  - Measuring the landscape of distribution infrastructure
    - Integration Capacity Analysis tool
    - Working with SMUD, later extending to other utilities
  - Coupling distribution infrastructure and charger installation
    - Integrating electric vehicle charging behavior
    - Spatial distribution system limitations and costs
  - Developing pricing and policy levers
Understanding TNC demand vs. infrastructure needs

• The demand for electric TNC services do not always align with the location of charging locations
• We are developing a model for building out DC fast charging infrastructure for TNC electric vehicle use
• Minimizing discrepancies between chargers and ride demand
  • Increases profitability for drivers
  • Decreases deadheading for charging
Thank You!

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