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<tr>
<td><strong>Document Title</strong></td>
<td>Presentation - LBNL EV Infrastructure and Grid-Integration Overview</td>
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<tr>
<td><strong>Description</strong></td>
<td>Lawrence Berkeley National Laboratory presentation at March 11 IEPR Staff Workshop</td>
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LBNL EV Infrastructure and Grid-Integration Overview

Colin Sheppard, Samveg Saxena, Doug Black
BEAM Agent-Based Travel Demand Model
What if we installed more workplace chargers?

Modest increases in flexibility vs. residential sector
DC Fast Requirements for SAEV Ride Hail using BEAM

- Adopting the EV fleet for automated taxis leads to more waiting time, deadheading VMT, and less customers served compared with the same number of ICEVs

- Charging infrastructure can significantly affect the above metrics
Grid-Integrated Electric Mobility Model:
• LBNL, UC Davis partnership
• Top-down approach leveraging bottom-up models & studies
• Personal EV fleet load and flexibility assumptions derived from EVI-Pro outputs
• Top-down
GEM Results:
Charging Infrastructure and Fleet Composition by Region

[Bar charts showing the distribution of charging infrastructure and fleet composition by region, with charging power in kW and vehicle range in miles represented in different colors and percentages.]
Load profile estimates as EV fleet transforms from private to shared autonomous on-demand mobility. Assumes unmanaged private EV charging.
GEM Results: National EV Load with Private Smart Charging

Load profile estimates as private EV fleet transitions from 0 to 100% participation in cost minimizing smart charging. Assumes 50% private fleet and 50% shared automated.
Results: Smart Charging

Without Smart Charging

With Smart Charging
Examine LDV, MDV, HDV ZEV
Fueling Needs & Grid Integration Potential – Example for FCEVs

1. Hydrogen fuel demands
   - Non-LDV data from EMFAC
   - LDV data from travel survey data

   Generate probabilistic simulations from aggregate data

2. HFCV scenarios
   - (Synthesis from CA modelers)
   - Number of FCEVs
     - (fraction of total stock)
     - 5.0 million LDVs (18%)
     - 180,000 MDVs (15%)
     - 22,000 HDVs (6%)
     - 12,750 buses (17%)

   For 2030 reference year

3. Refueling algorithms
   - MDVs and buses: End of shift
   - HDVs: refueling probability similar to LDVs (fuel tank level)

4. Hydrogen refueling profiles

Grid System Models
= System costs, renewables integration
Thank you