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LBNL EV Infrastructure and Grid-Integration Overview

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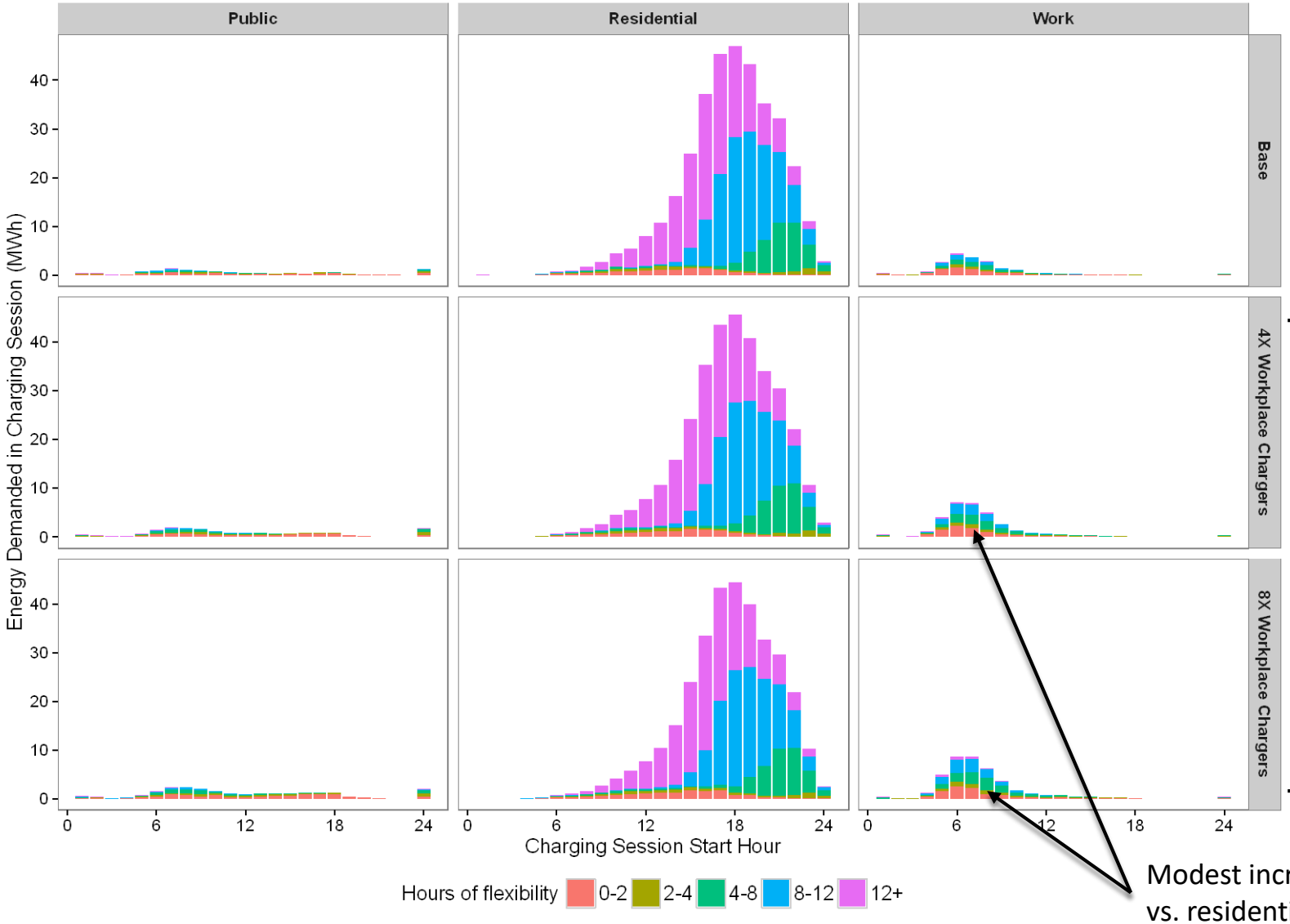
BEAM Agent-Based Travel Demand Model

PEV Load Flexibility with Increasing Workplace Charging

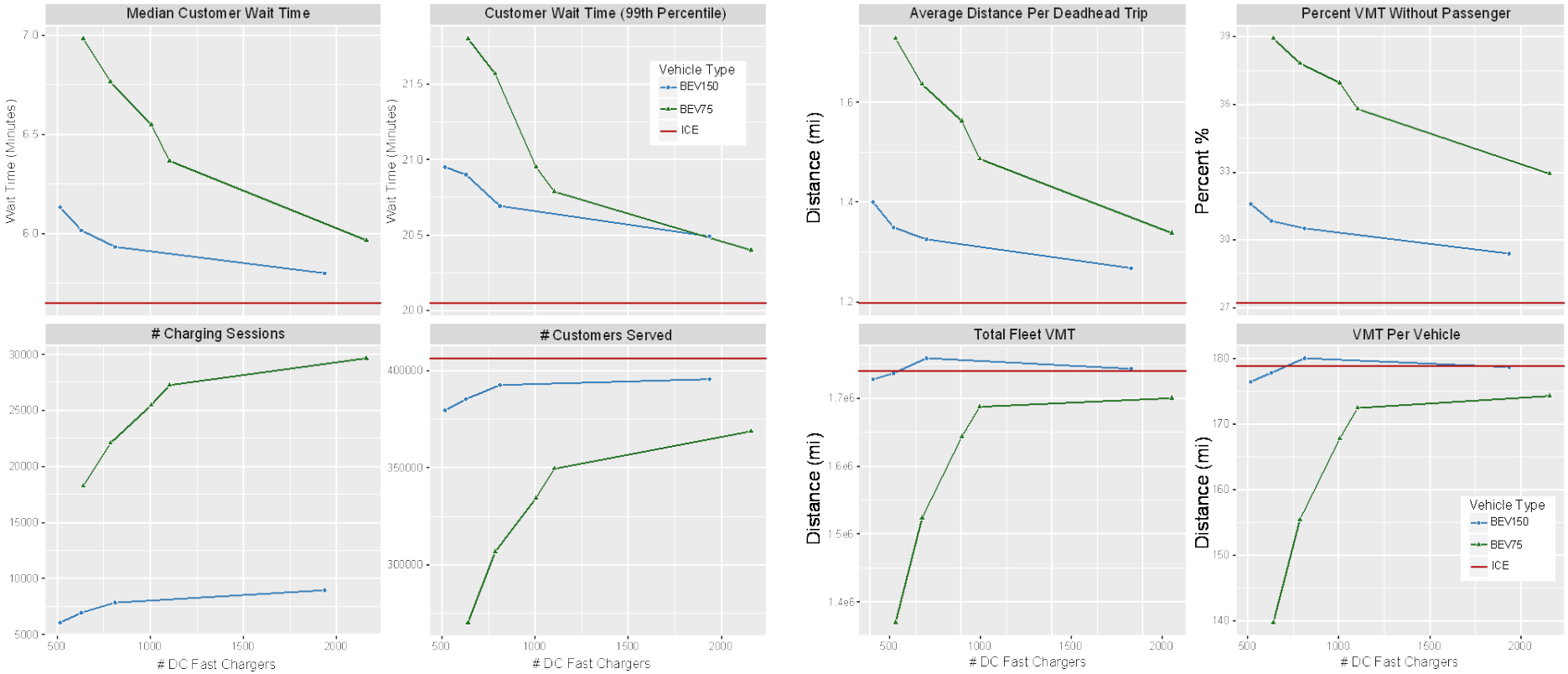


What if we installed more workplace chargers?

Modest increases in flexibility vs. residential sector

DC Fast Requirements for SAEV Ride Hail using BEAM

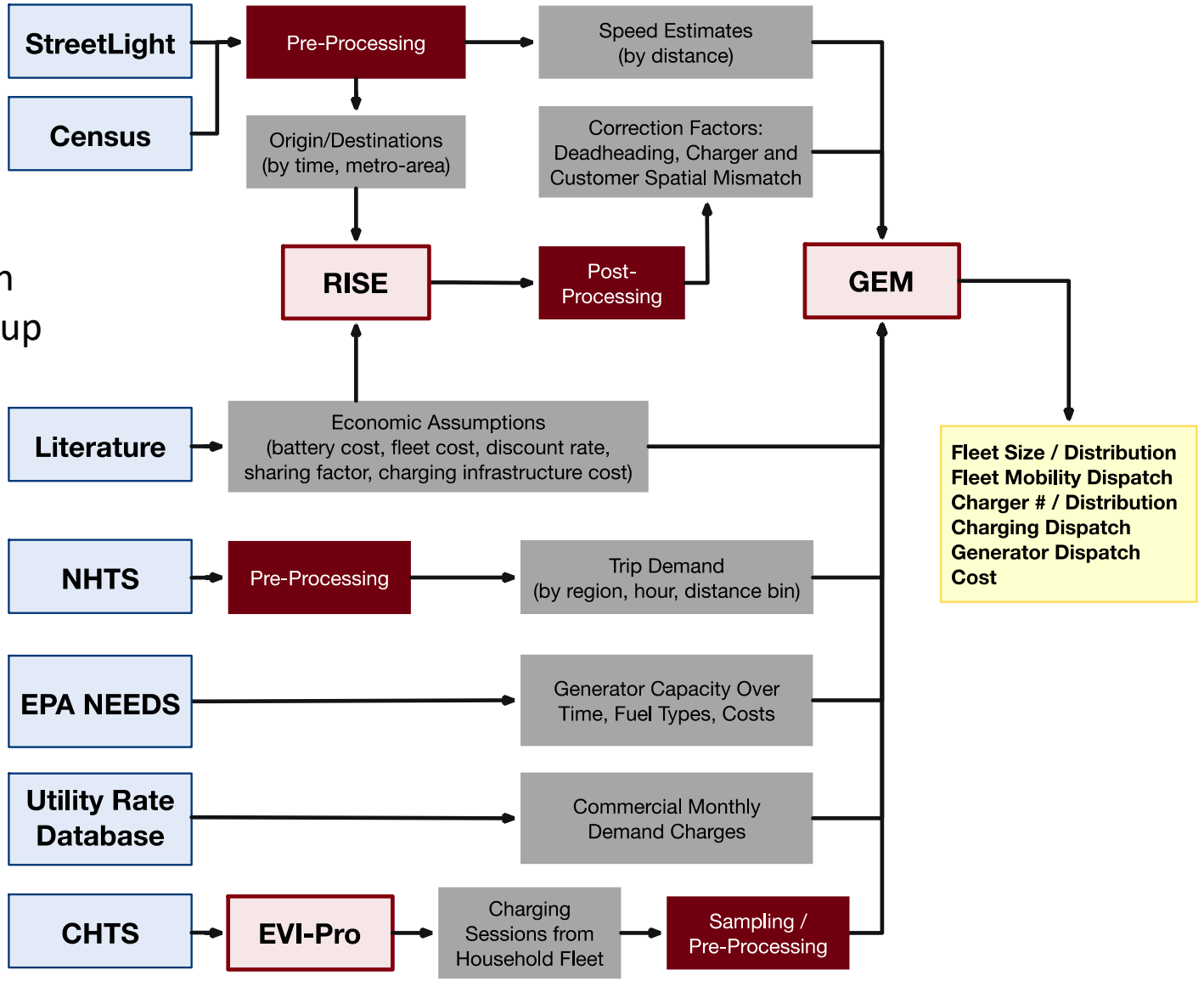
- Adopting the EV fleet for automated taxis leads to more waiting time, deadheading VMT, and less customers served compared with the same number of ICEVs
- Charging infrastructure can significantly affect the above metrics



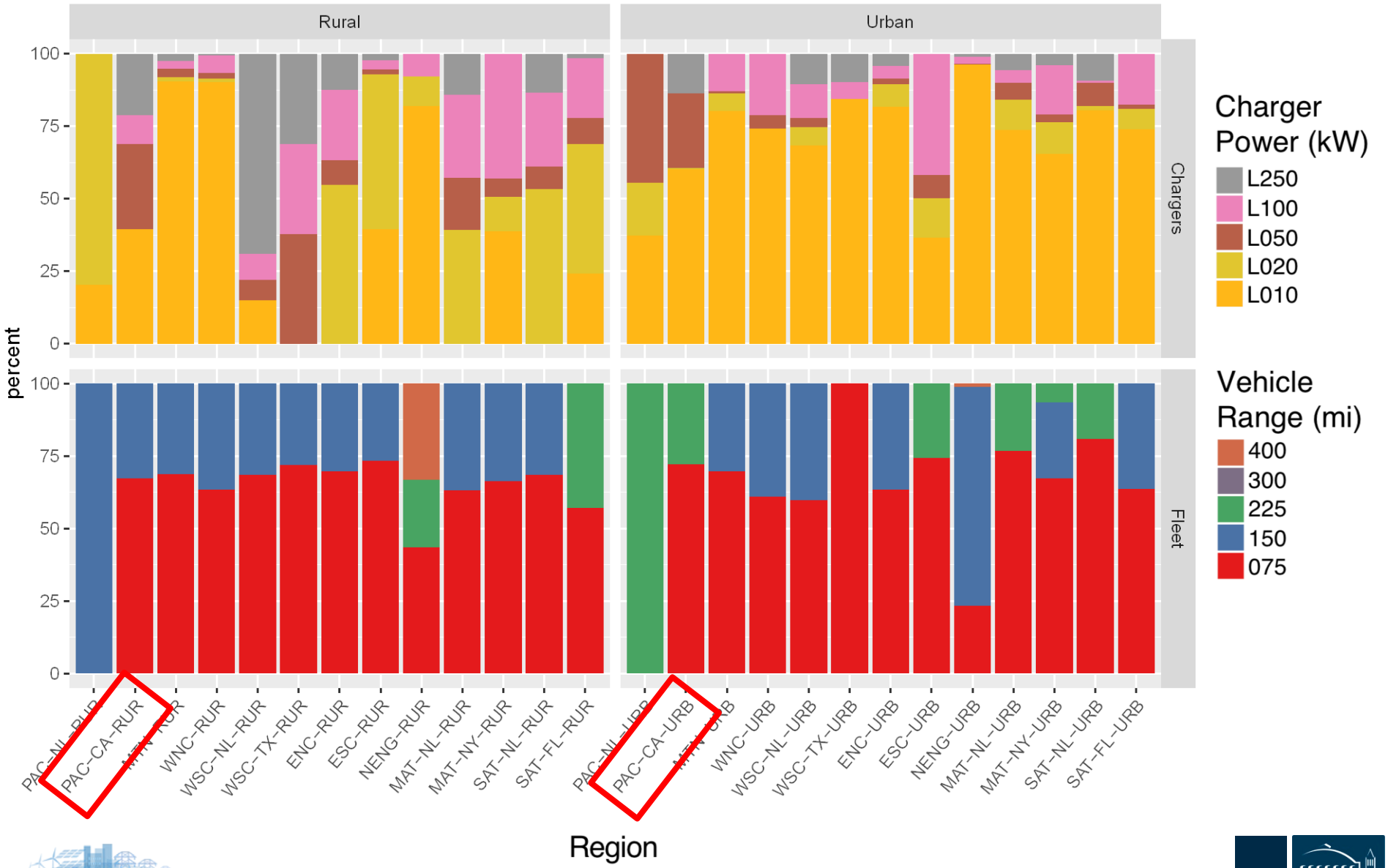
GEM Model

Grid-Integrated **E**lectric **M**obility Model:

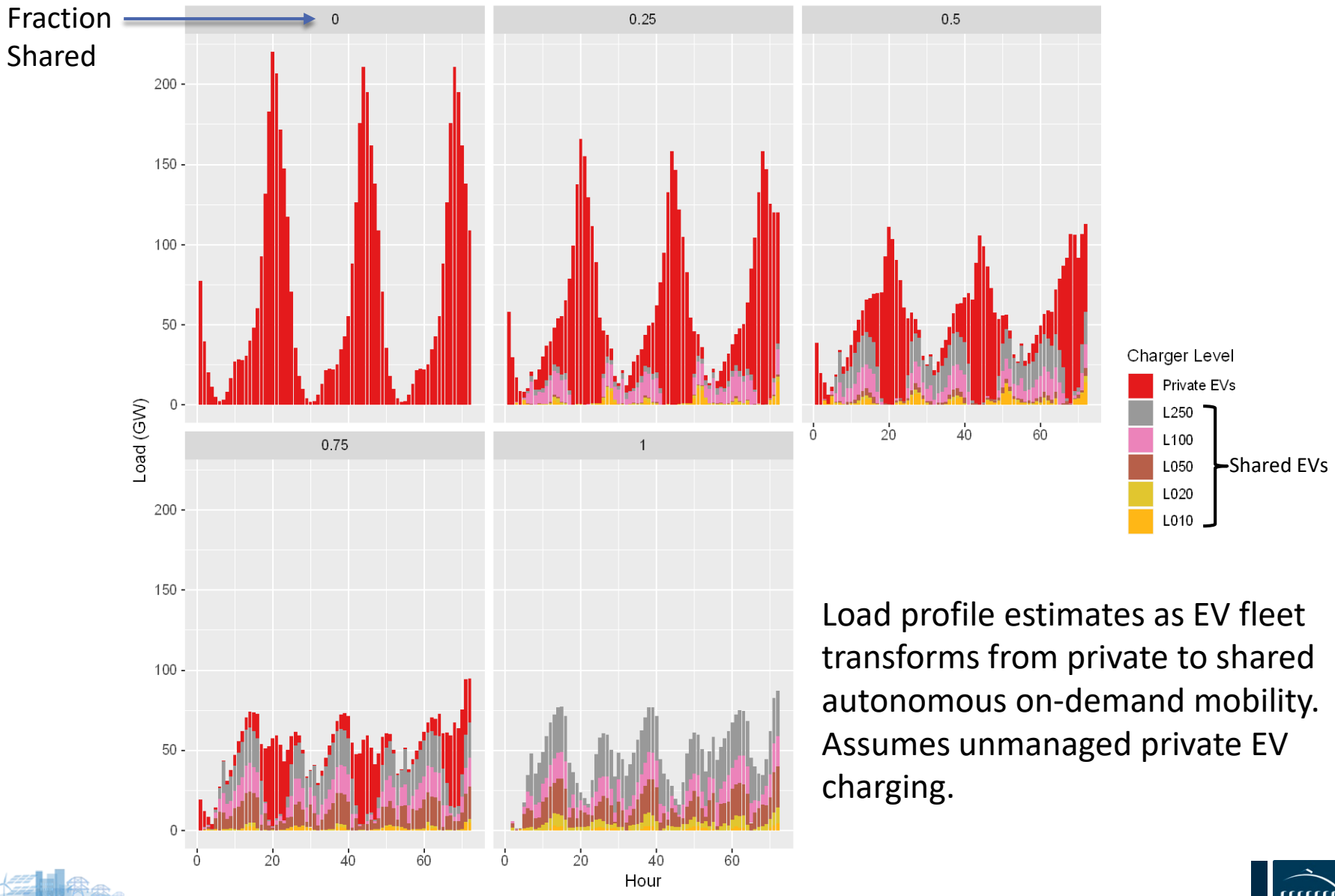
- LBNL, UC Davis partnership
- Top-down approach leveraging bottom-up models & studies
- Personal EV fleet load and flexibility assumptions derived from EVI-Pro outputs
- Top-down



GEM Results:
Charging Infrastructure and Fleet Composition by Region

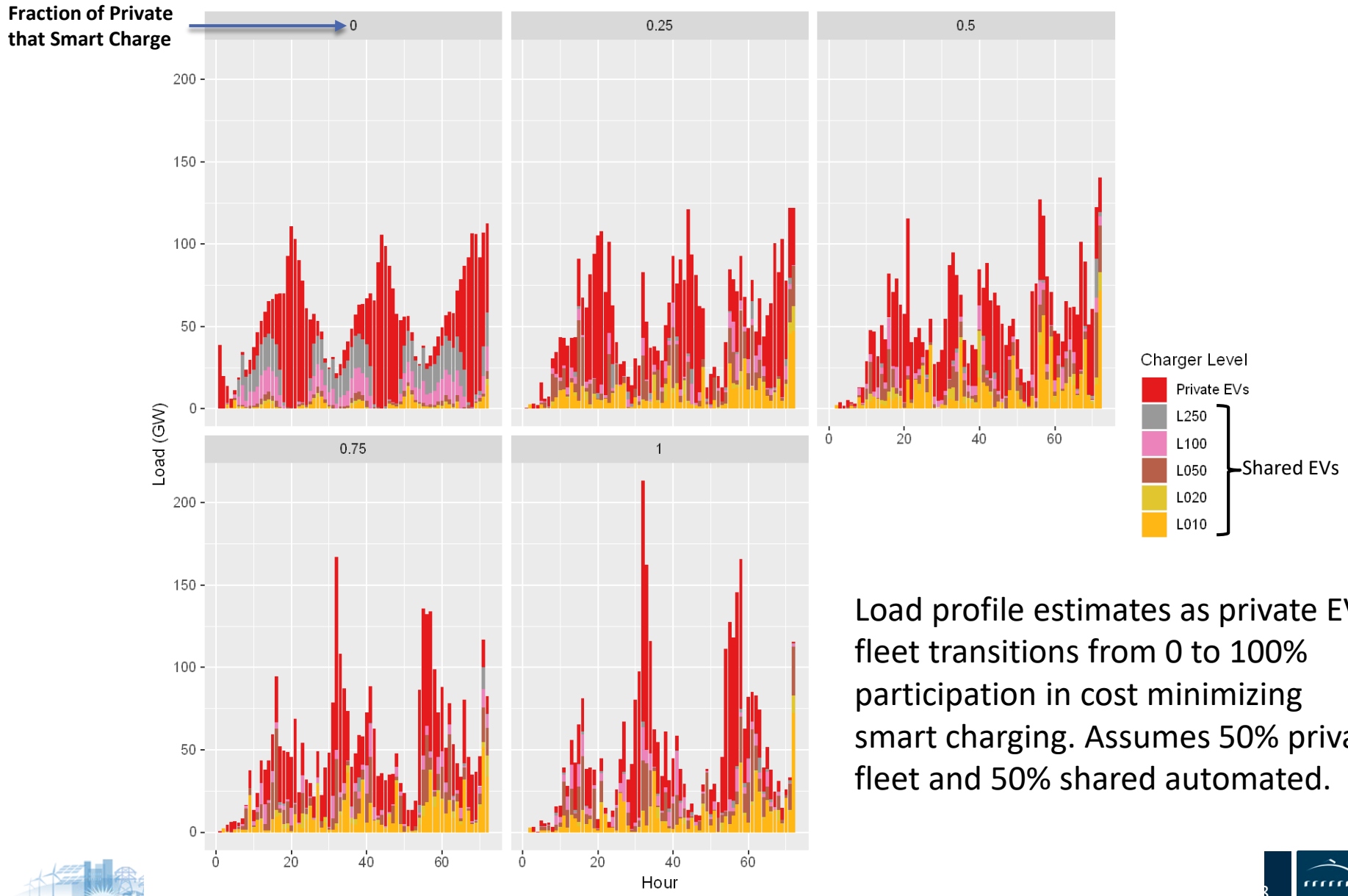


GEM Results: National EV Charging Load



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



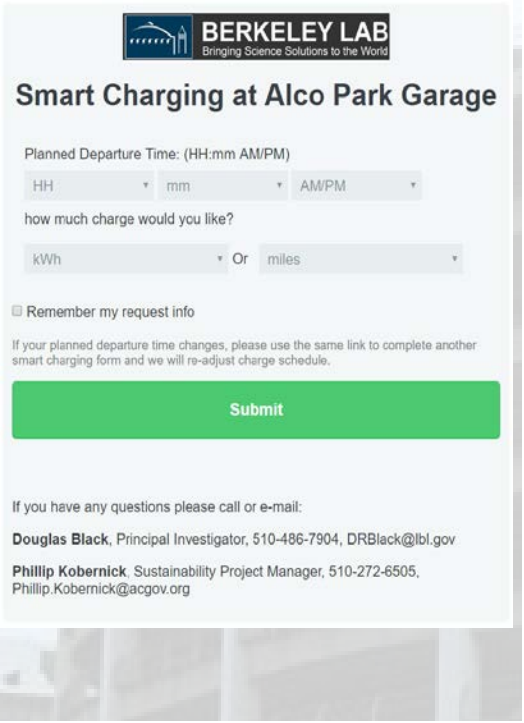
Load profile estimates as private EV fleet transitions from 0 to 100% participation in cost minimizing smart charging. Assumes 50% private fleet and 50% shared automated.

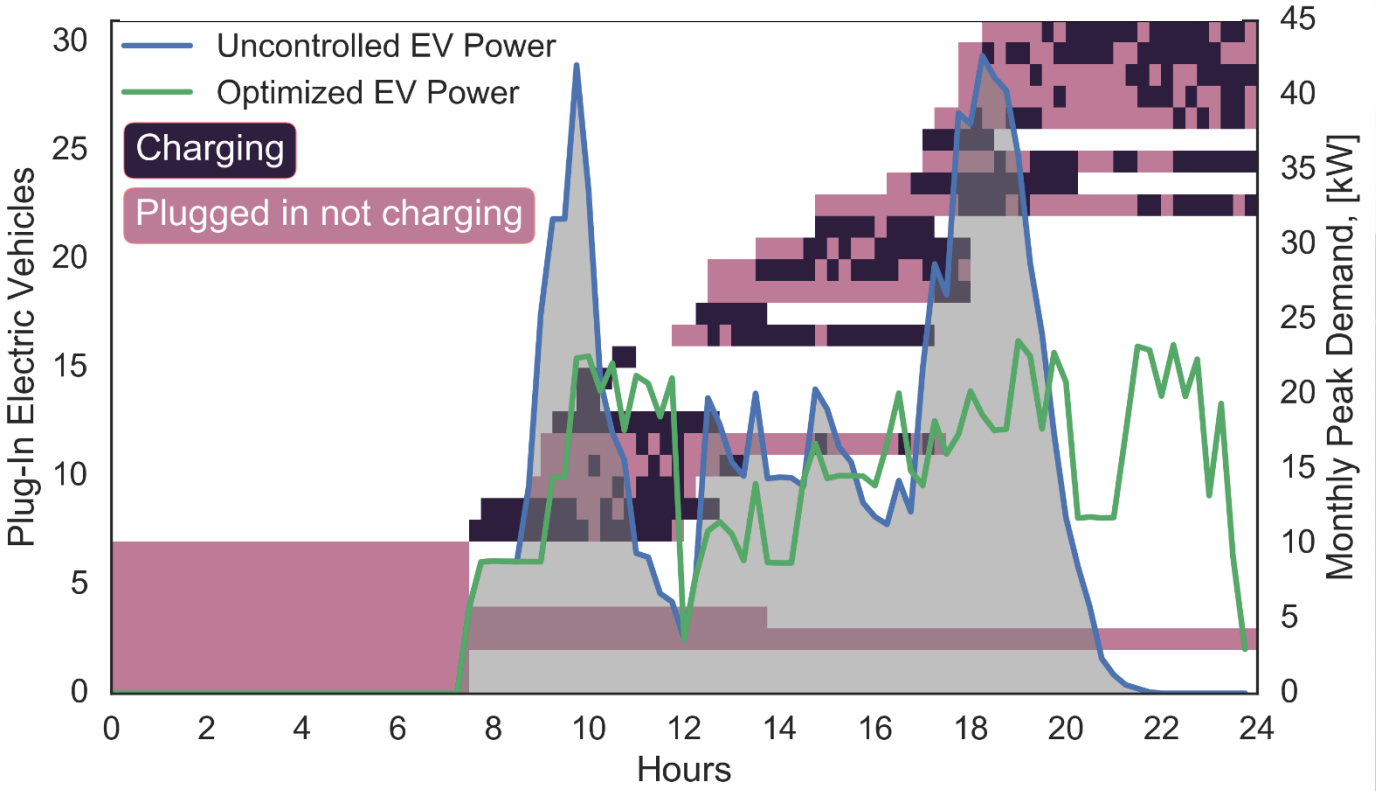
Results: Smart Charging

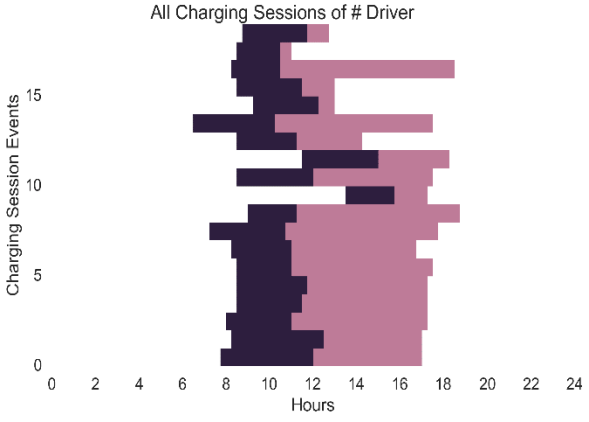
Without Smart Charging

With Smart Charging

AlCo Fleet and Public EV Smart Charging



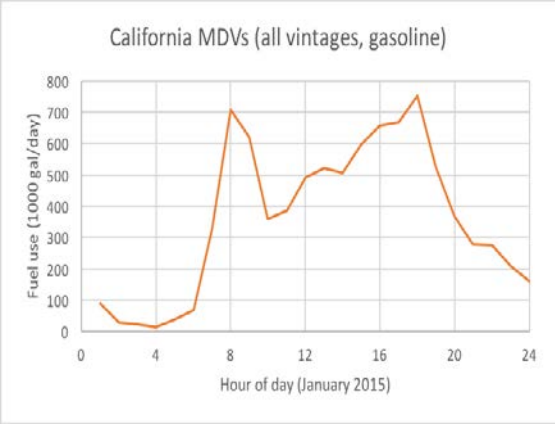




Examining LDV, MDV, HDV ZEV
Fueling Needs & Grid Integration Potential – Example for FCEVs

1. Hydrogen fuel demands

Non-LDV data from EMFAC
+ LDV data from travel survey data



Generate probabilistic simulations from aggregate data

2. HFCV scenarios

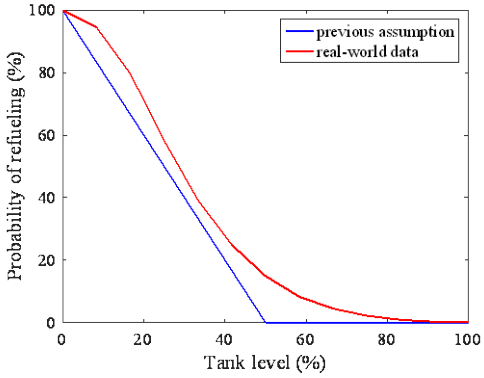
(Synthesis from CA modelers)

Number of FCEVs (fraction of total stock)
5.0 million LDVs (18%)
180,000 MDVs (15%)
22,000 HDVs (6%)
12,750 buses (17%)

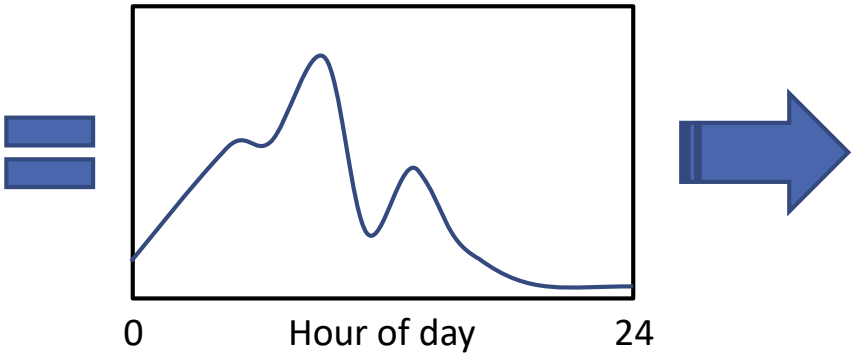
For 2030 reference year

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