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Modeling PEV Mobility, Charging Behavior, Infrastructure Siting, and Grid Integration

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CEC Staff Workshop:
CA PEV Infrastructure Projections

May 23, 2018

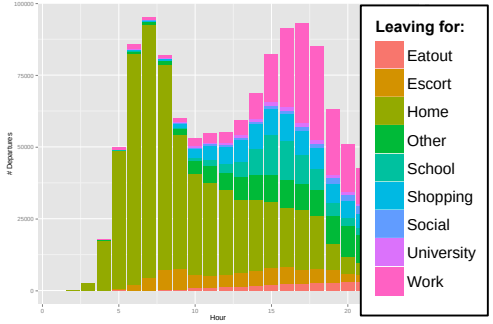
Overview

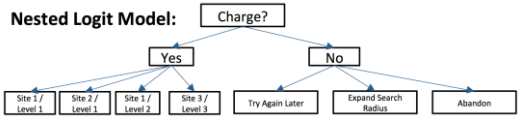
- Brief History of Modeling Efforts
- BEAM Intro / Key Features
- Optimization-based Approach to Regional Siting
- Utility-based Approach to Regional Siting
- New Mobility & Vehicle Grid Integration

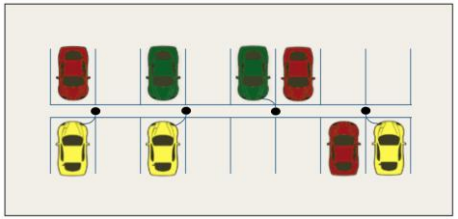
Brief History of Modeling PEVs

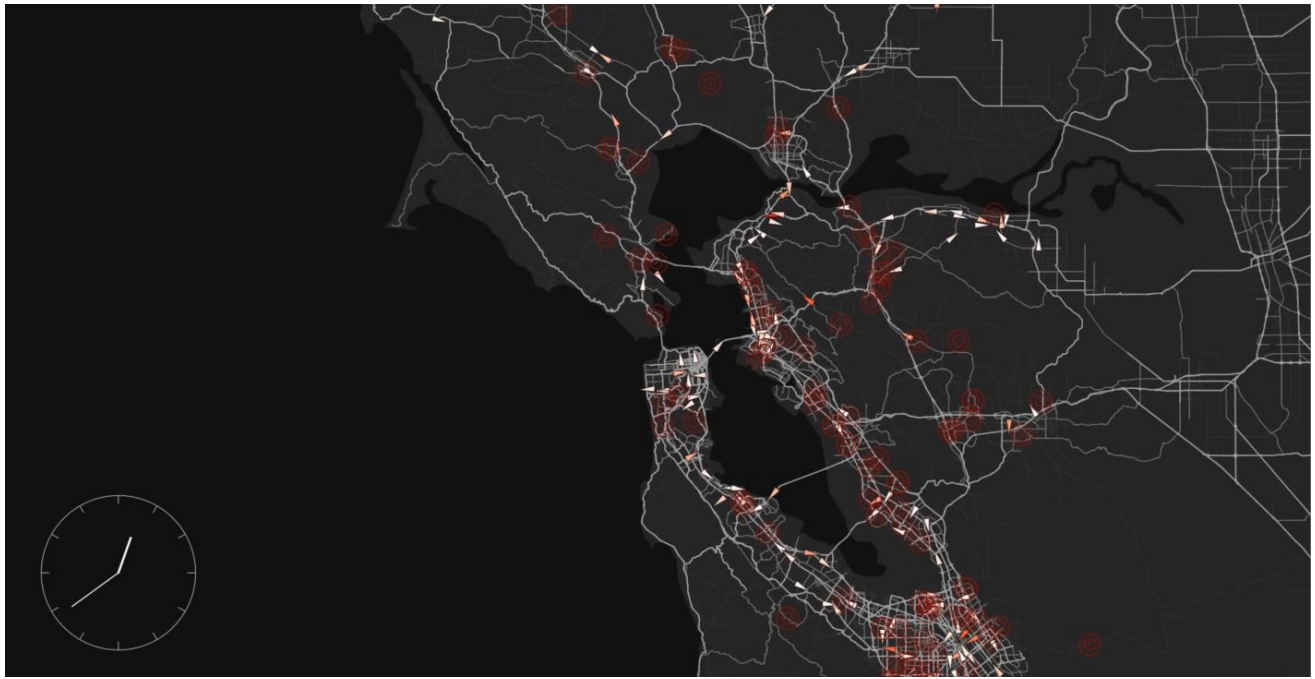
- PEVI – Plug-in Electric Vehicle Infrastructure Model
  - 2011-2015 – Used for infrastructure siting and grid impact assessment
  - Delhi, India and Counties of Humboldt, Siskiyou, Shasta, Tehama, Glenn, Colusa
- BEAM – Behavior, Energy, Autonomy, Mobility
  - 2016-Present
  - San Francisco Bay Area
  - Used for vehicle grid integration analysis

BEAM Model: Behavior Energy Autonomy Mobility





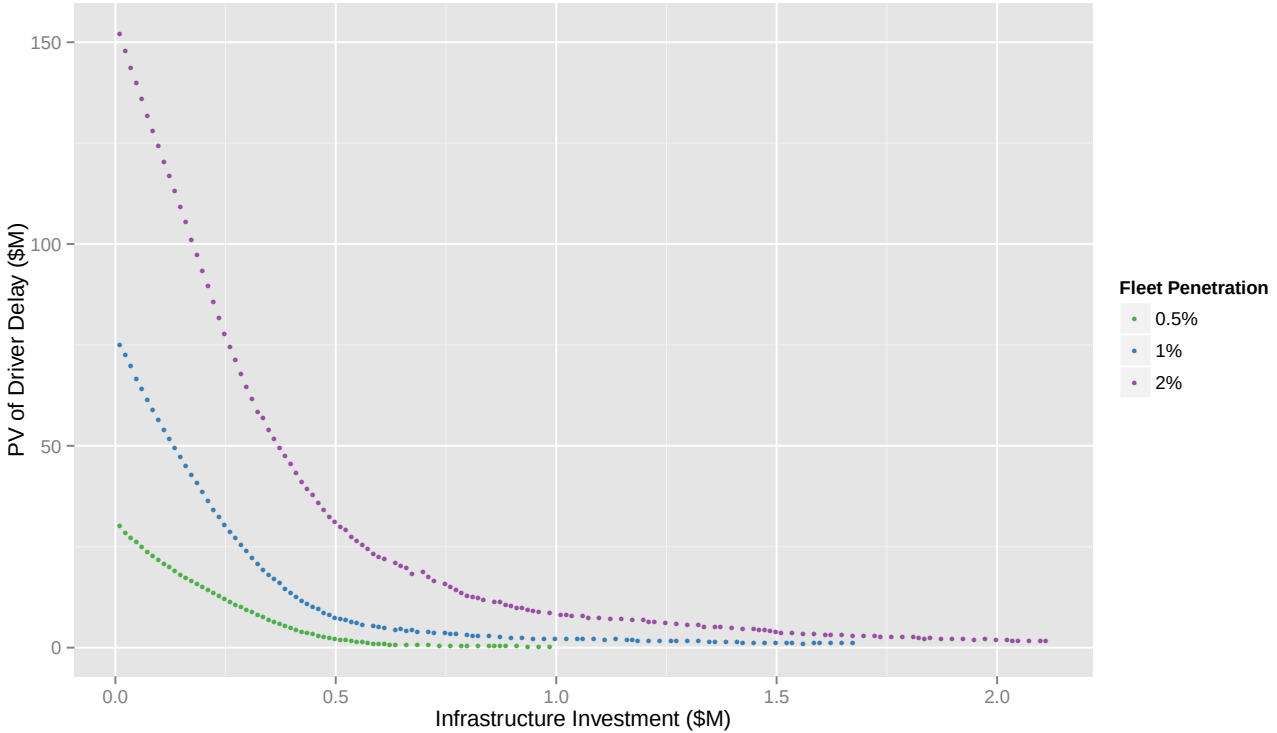




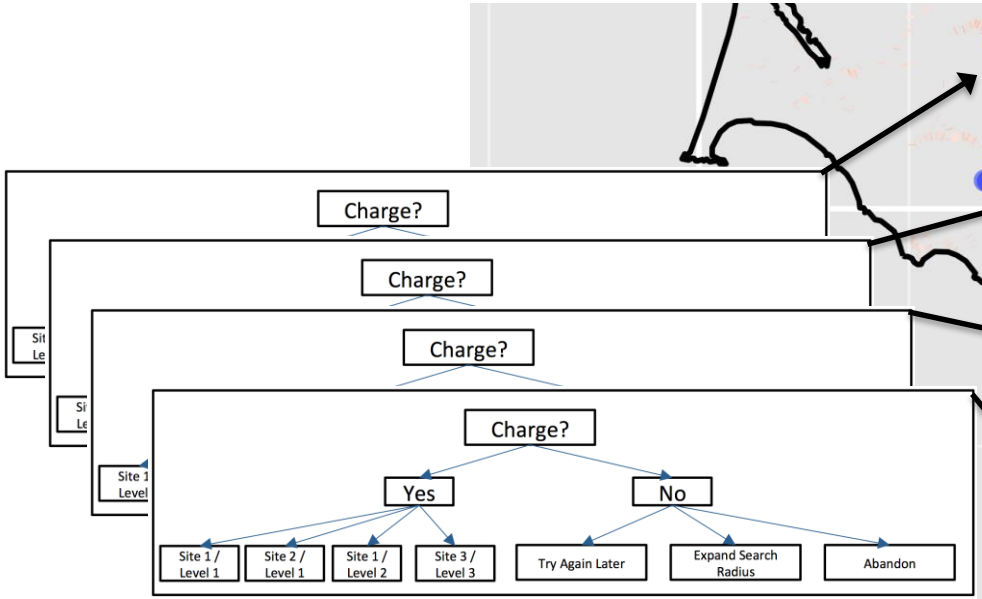
For visualizations and further information:
http://beam.lbl.gov/

Optimization-Based Approach to Siting

- PEVI
- Heuristic optimization
- Objective: minimize traveler delay (in $)
- Greedy siting algorithm yields approximate pareto optimal curve (guide for rollout and budge limited planners)



Utility-based Approach to Siting



BEAM Simulates New Mobility / Multimodal

U.S. DEPARTMENT OF ENERGY
SMARTMOBILITY
Systems and Modeling for Accelerated Research in Transportation

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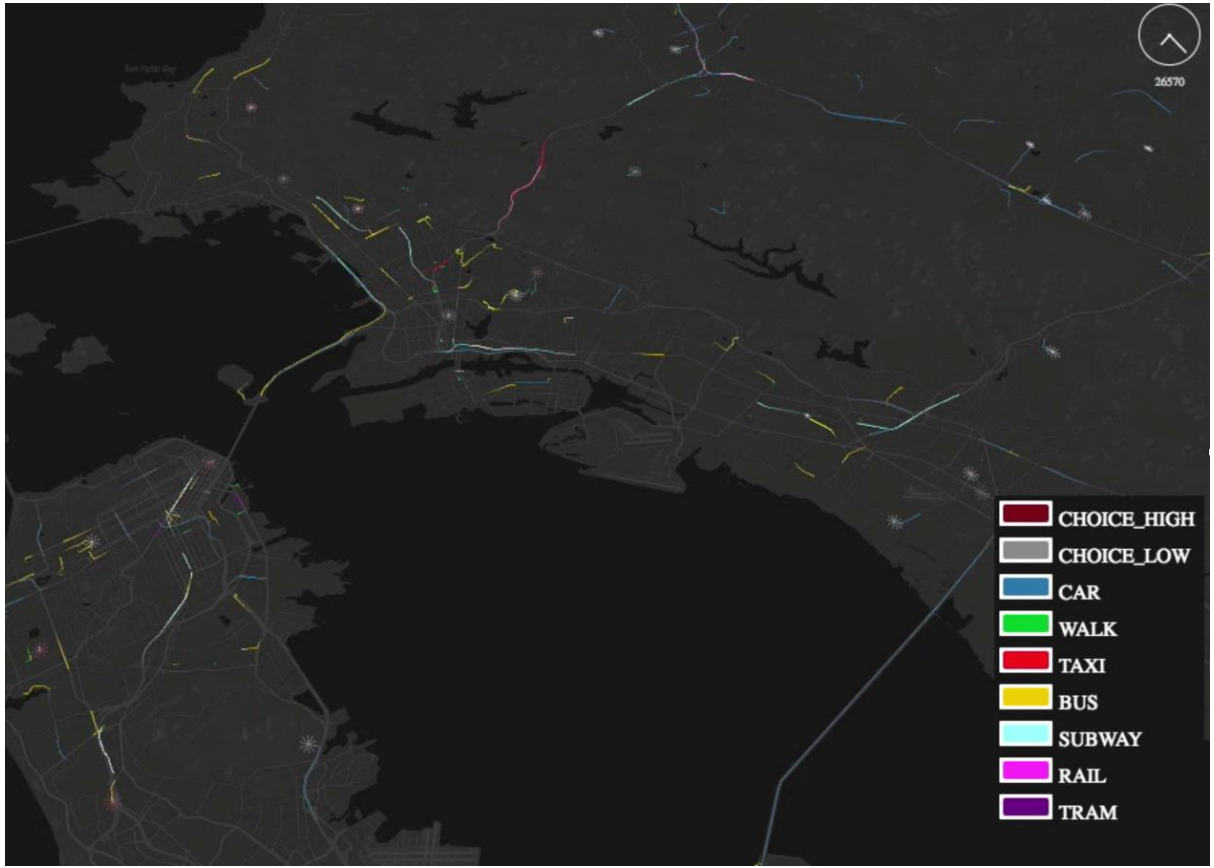
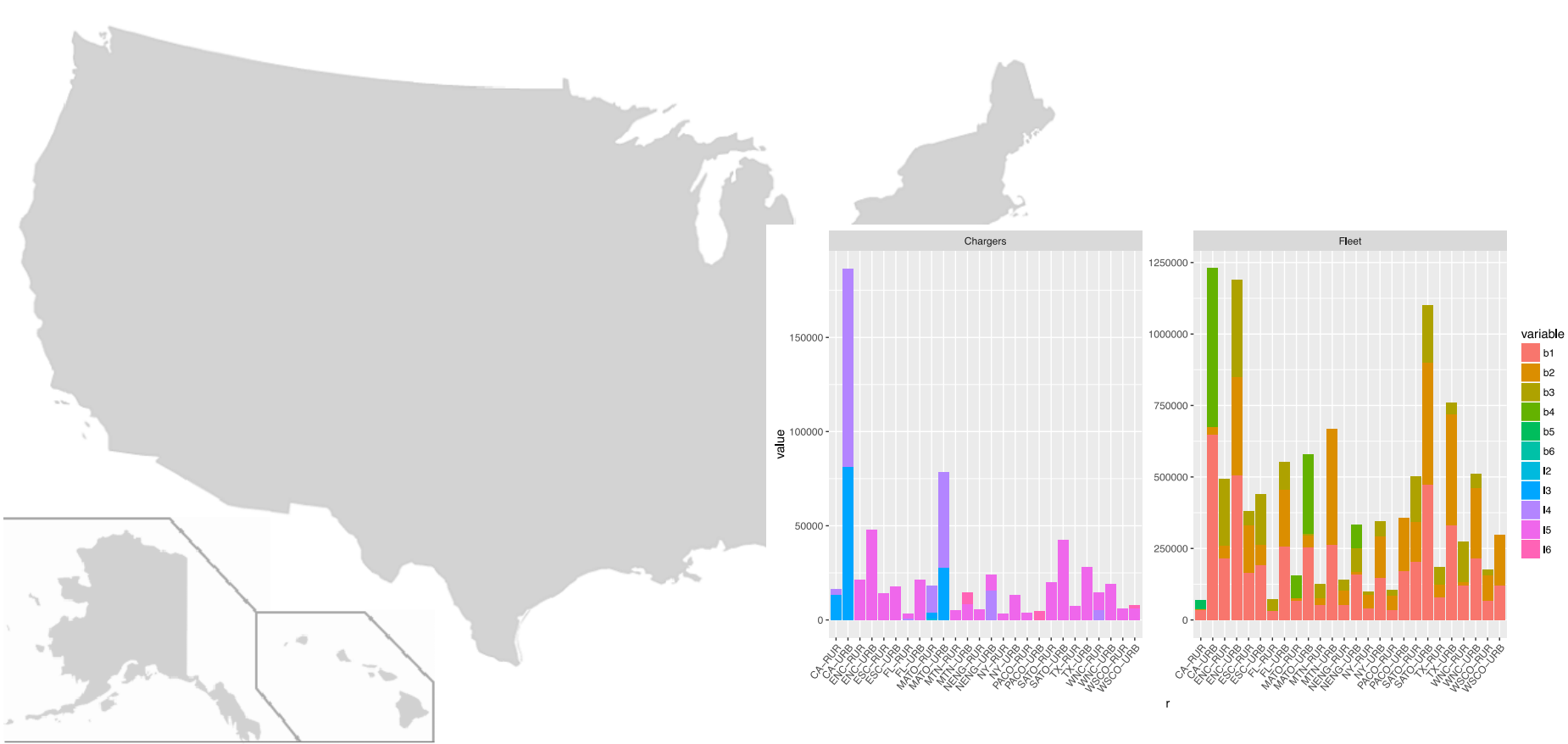
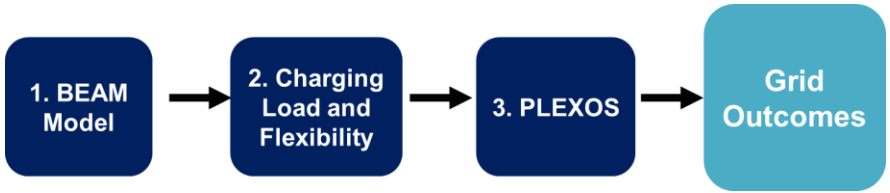
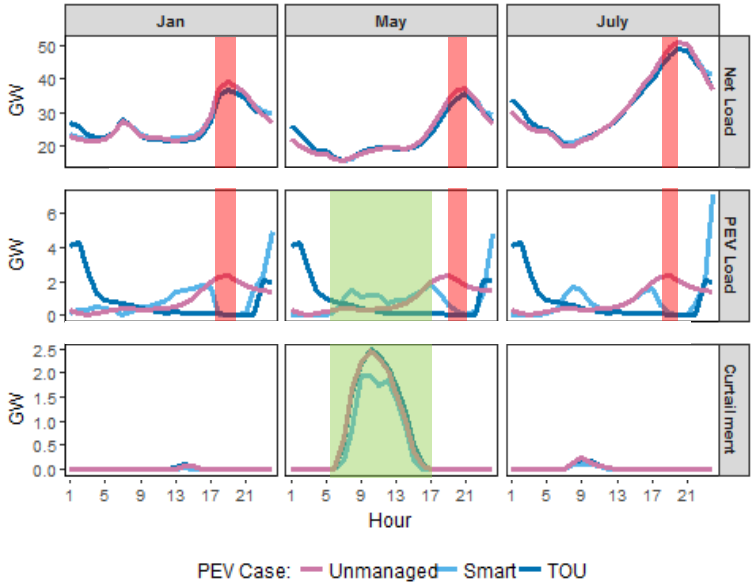


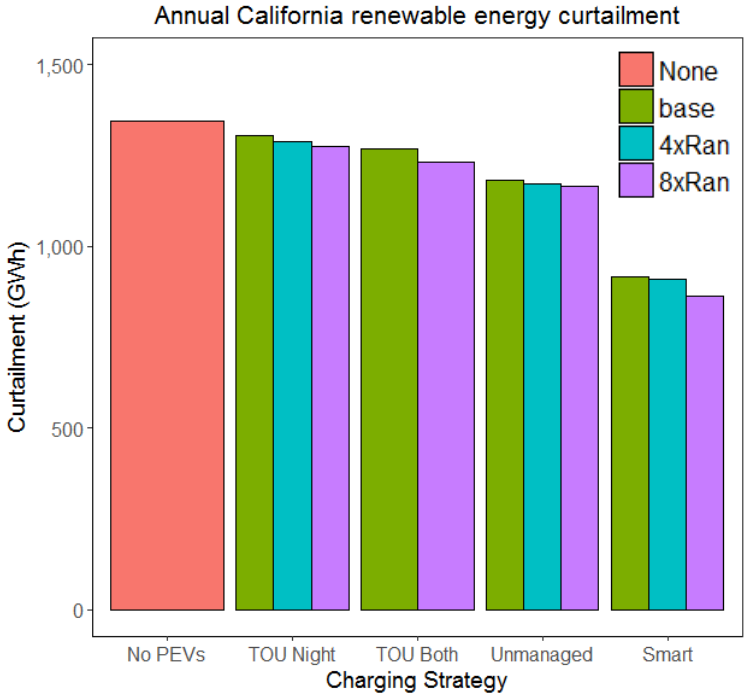
VGI for New Mobility



CA Vehicle Grid Integration Analysis







Increasing workplace chargers by 4x (blue) and 8x (purple) enhance ability to reduce renewable curtailment.