The Role of Utilities in Transportation Electrification

2015 Bay Area Battery Summit

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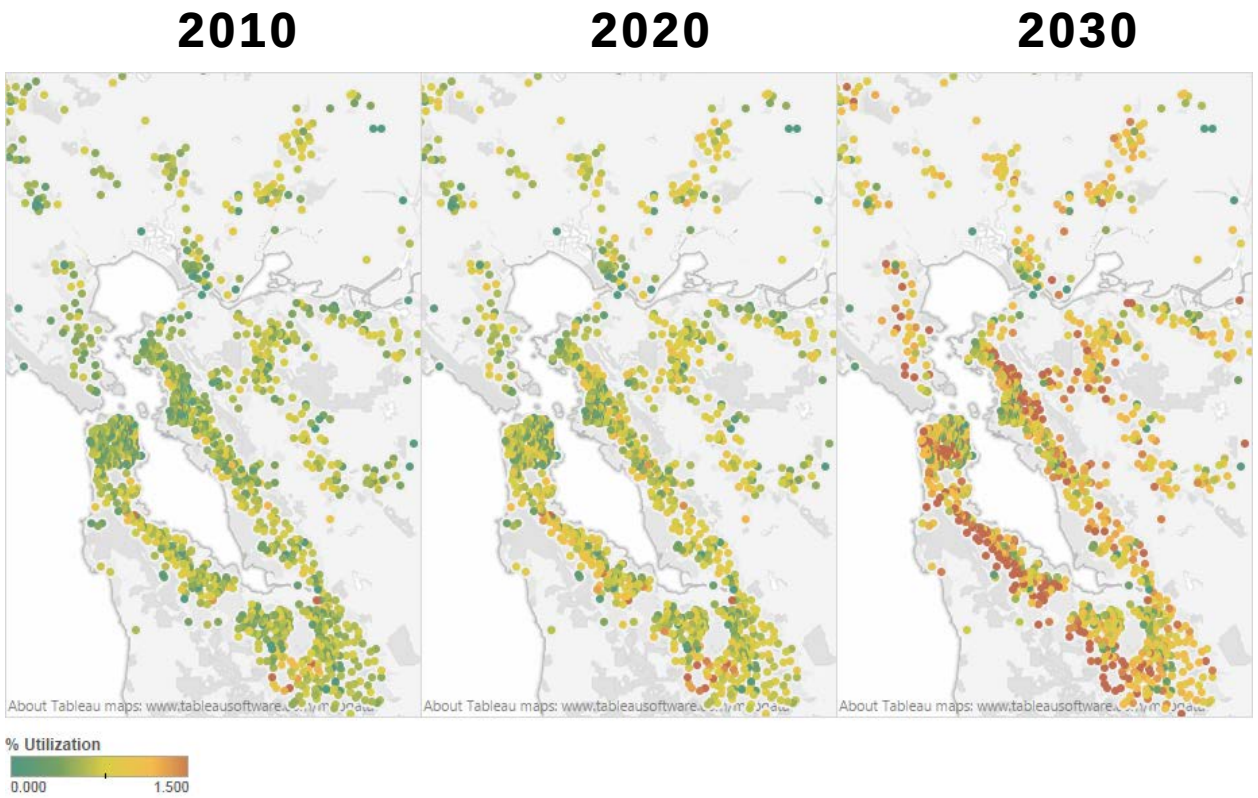
November 3, 2015

Grid Impact Overview

- Emphasis on quantifying distribution impacts
- Map PEV Clusters and load shapes to individual feeders and substations
- Utilities provided
  - equipment rating
  - peak day load shape
  - forecasted load growth
- Calculate upgrades required at each location
- Found minimal upgrade costs even at higher penetration scenarios



Market Gaps and Barriers		Potential Utility Role
Consumer Costs	• Upfront vehicle costs • Upfront charging infrastructure (EVSE) costs • Vehicle operating costs	• Support for vehicle incentives and other complementary policies • Utility investment in infrastructure and consumer education • Rate structures that reflect grid benefits and reduce costs to customers
Charging Infrastructure	• Lack of information on types and costs • Little progress made in deploying charging at multi-dwelling units and in low-income population centers • Lack of investment in workplace charging	• Provide unbiased information to consumers • Utility investment in equity programs, multi-unit dwellings and workplaces

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Market Gaps and Barriers		Potential Utility Role
Sustainability of Third-Party Ownership of EVSE Networks	•Sustainability of revenue model has not been convincingly demonstrated •Demand for non-home charging is unclear	•Alternatives to additional public investment •Revisiting the CPUC ruling
Consumer Education and Outreach	•General lack of PEV awareness •Total cost of vehicle ownership is poorly understood	•The utility acting as a trusted advisor in the PEV market •Educate consumers about the cost of electricity relative to gasoline
Research/Analysis	•Lack of understanding of grid impacts and the market for electric vehicles	•Analysis of grid impacts (utilities) •Jobs impacts (policy makers) •Market analysis (all)

Clean Energy = Clean Cars

- Vehicles get cleaner as they age, air, climate change and toxic pollutants goals benefit
- EVs can benefit grid safety, reliability, efficiency and affordability
- Transportation provides natural nexus with other electricity sector goals:
  - increasing renewable resources in the grid;
  - distributed generation; and
  - storage

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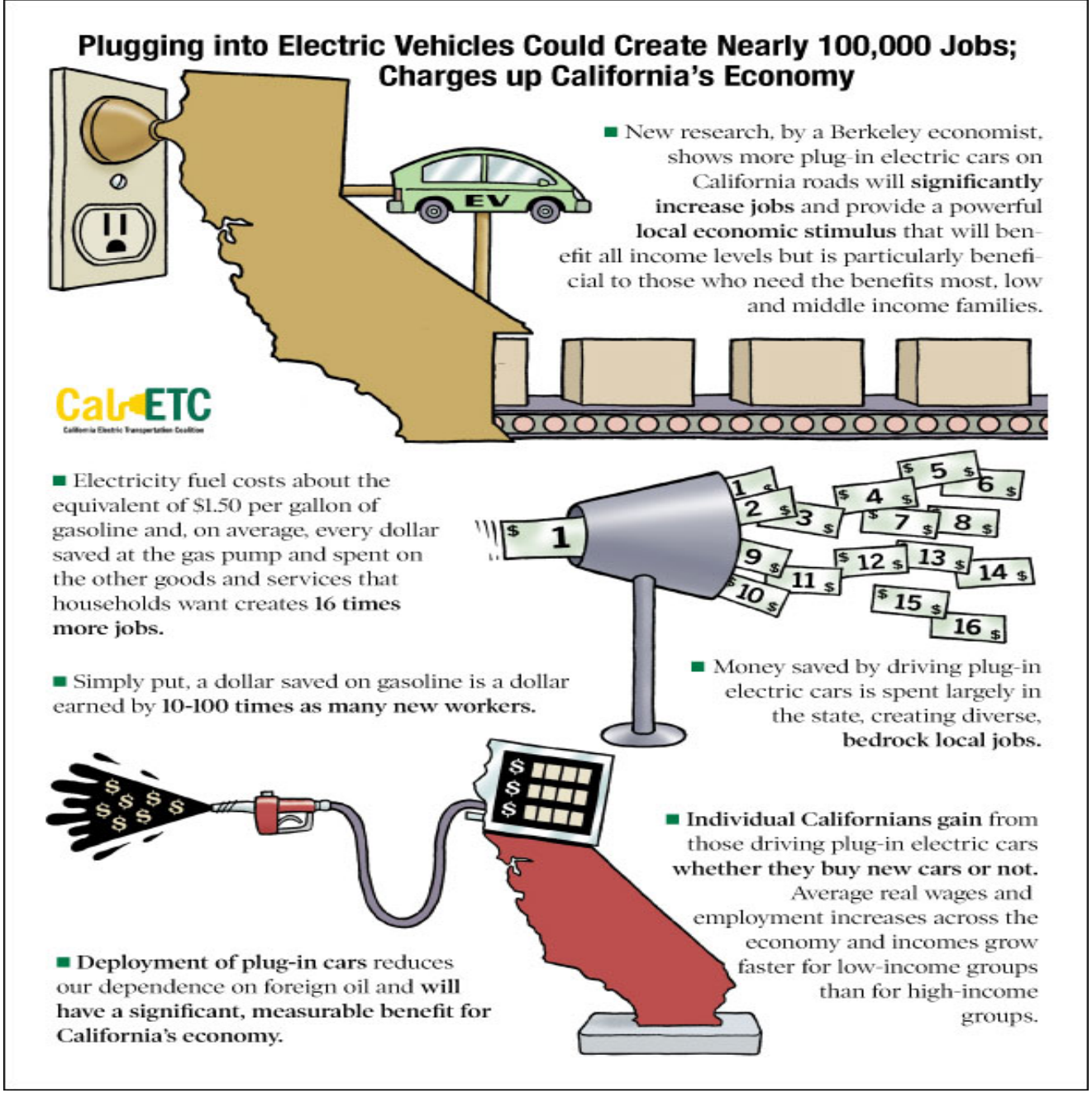
Why? Jobs



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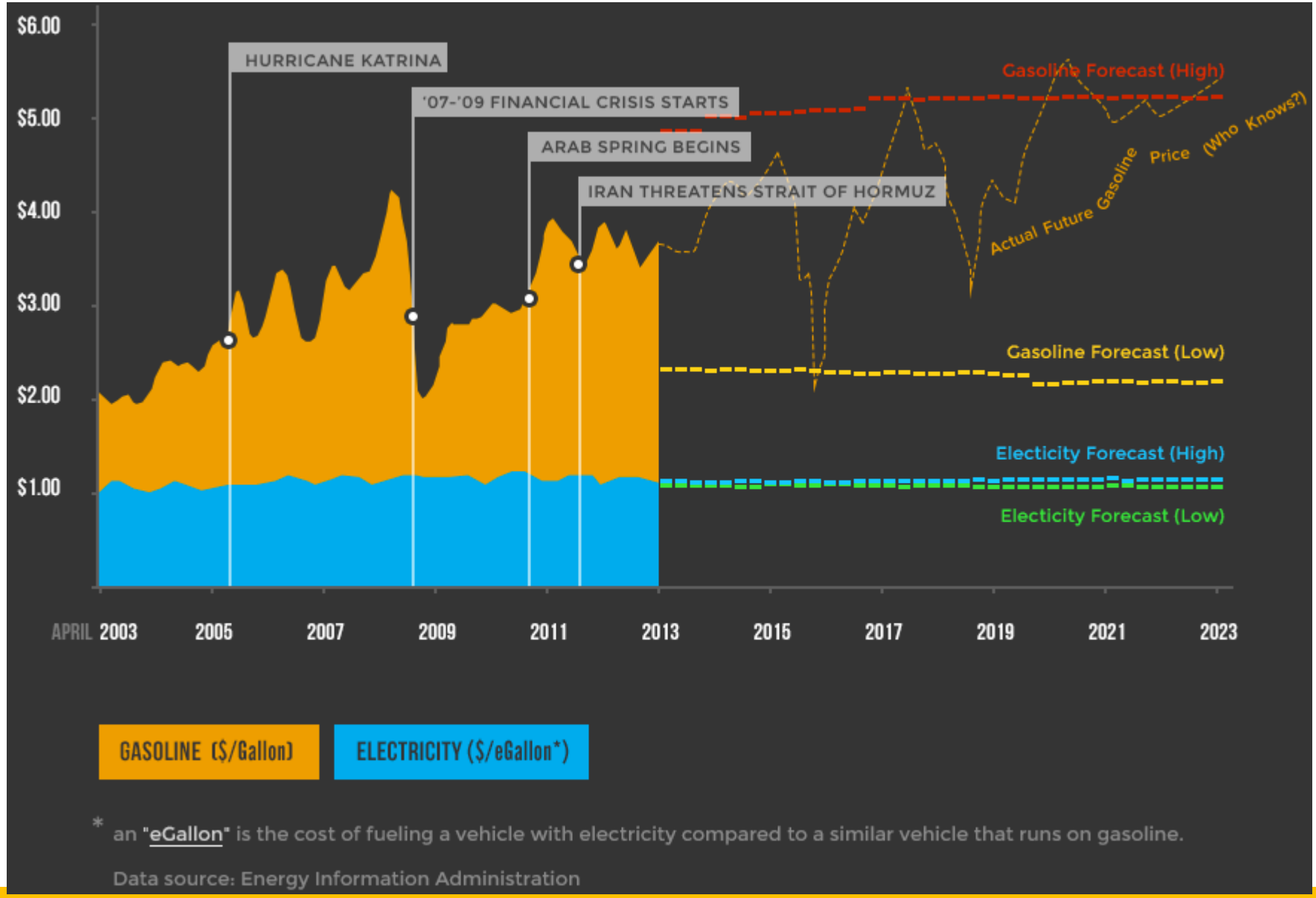

* an "eGallon" is the cost of fueling a vehicle with electricity compared to a similar vehicle that runs on gasoline.

Data source: Energy Information Administration

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Key Recommendations for Accelerating TE

- Invest: the state must invest
  - Direct vehicle incentives
  - Goods and people movement projects
  - Local government support
  - Infrastructure investment
- Recognize: TE supports multiple energy and transportation policy goals
  - Reduce climate change, air and toxic pollution
  - Support renewable electricity, storage, distributed generation
- Empower: utilities have a vital role
  - Leverage the existing infrastructure, the grid, and modernization of the grid
  - Invest in infrastructure
  - Consumer education
  - Purchase vehicles
  - Accelerate the TE market

Questions?

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