

California Energy Commission

DOCKETED

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AUG 27 2013

SCE's PEV Forecast Methodology

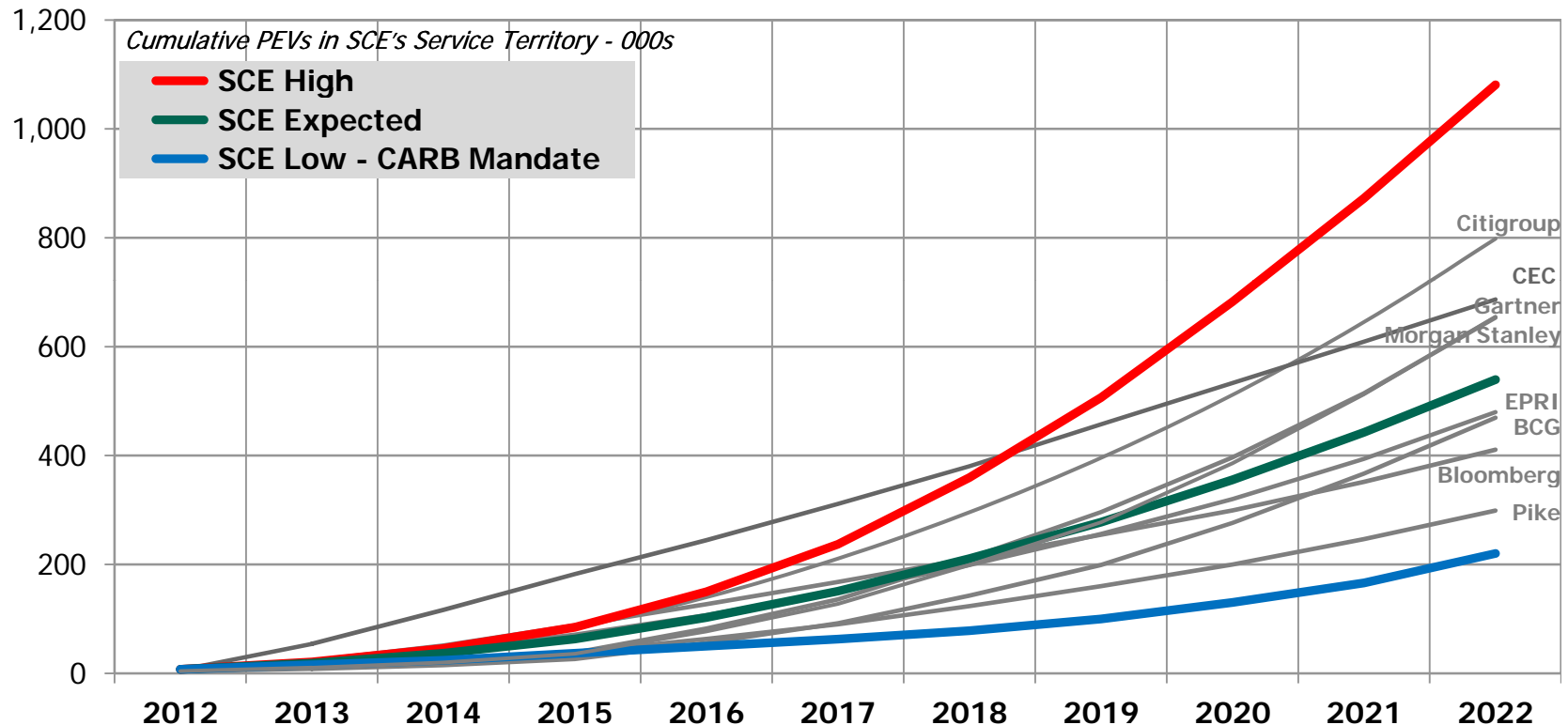
Overview

August 21, 2013

Dean Taylor, SCE

PEV Forecast Methodology

Expected Case based on eight independent studies



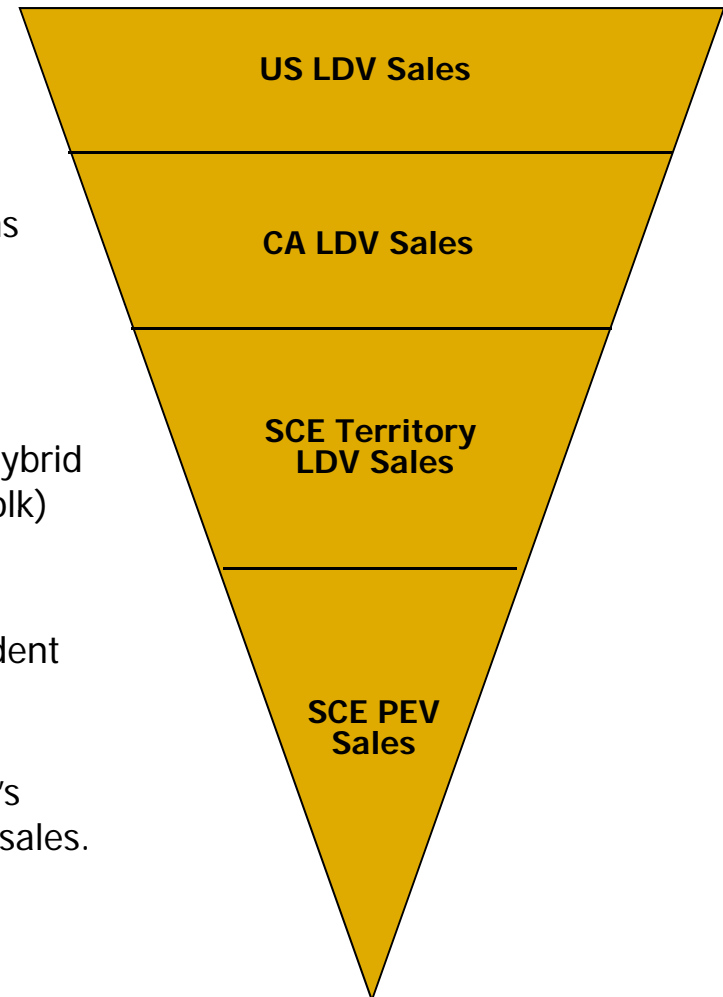
Low Case – Based on CARB's expected ZEV compliance scenario (as of Aug. '12)

High Case – 2x the expected case by 2020, 1.75 times by 2030. This is roughly the same ratio of high/expected as our original forecast. It is also slightly lower than the only "high" study currently available.

Over 10 PEVs on the market today. Over 30 expected by end of 2015. Several are selling at levels far more than mandated. Over 18 automakers will have product by 2018 due to the ZEV program.

Expected Case Methodology

- **Starts with Long Term US LDV sales forecasts**
 - DOE (2012 Annual Energy Outlook)
- **US LDV sales converted to CA LDV sales**
 - CA is ~12% of US, based on historical vehicle registrations (data from Auto News and the CA New Car Dealers Association)
- **CA LDV sales converted to SCE territory LDV sales**
 - SCE service territory is ~38% of CA, based on historical hybrid sales (from DMV data on historical HEV sales from R.L. Polk)
- **SCE territory LDV sales converted to SCE PEV sales**
 - % of LDV sales that will be PEVs based on eight independent studies. (very high studies were excluded - e.g., Black & Vetch, ID Tech EX, others)
 - National studies grossed up 2.2X to account for California's higher propensity to purchase, based on historical hybrid sales. (current PEV sales are currently at 3X)
 - Results reduced up to 25% in 2013-2016 based on SCE's market observations and in order to be conservative



Other Expected Case Backup

Independent Studies Used:

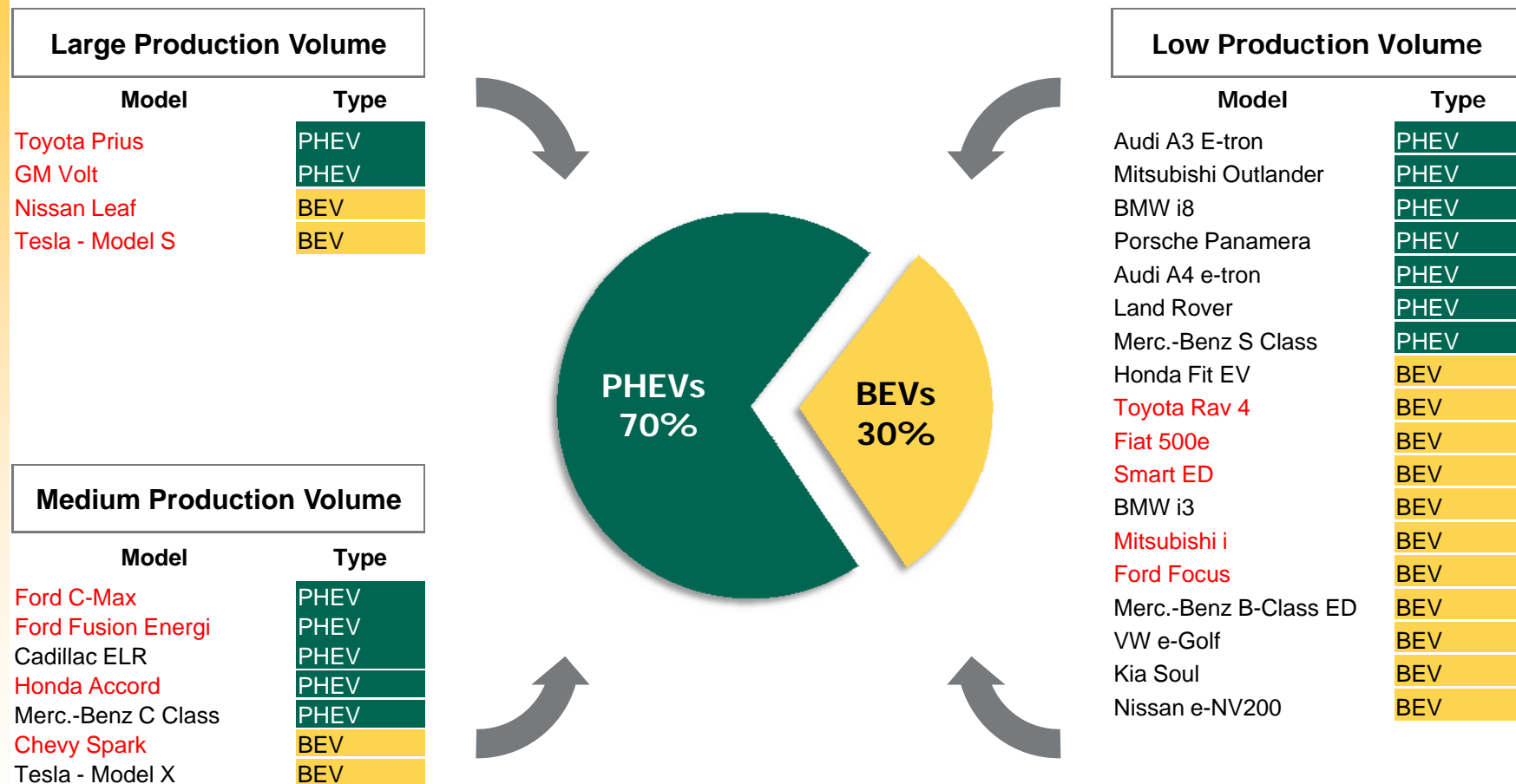
- **Citigroup Global Markets report** Feb 23, 2011 "US Autos and Auto Parts" page 18
- **Morgan Stanley Analyst report** March 3, 2011 p1
- **BCG report** July 2011 "Powering Autos to 2020 – The Era of the Electric Car?" p 18
- **EPRI report** July 2011 "Transportation Electrification: A Technology overview" p 4-10
- **Gartner Research** Jan 24, 2012
- **Bloomberg** May 11, 2012 "Q2 2012 Advanced Transportation Market Outlook" p 9
- **Pike report** Q2 2012 "Plug-in Electric Vehicles" table 6.13
- **CEC PEV sales forecast used for the 2012 IEPR** August 2012

Other Thoughts:

- **Current SCE territory PEV sales are tracking >3X higher than historical HEV sales at comparable stage** (3.1 based on DMV data from R.L. Polk)
- **To date current sales tracking within 1000 – 1500 units of Expected Case**
- **At current trends, sales volumes of just three automakers could account for all of the sales in our Low Case (based on ZEV mandate) in 2017**

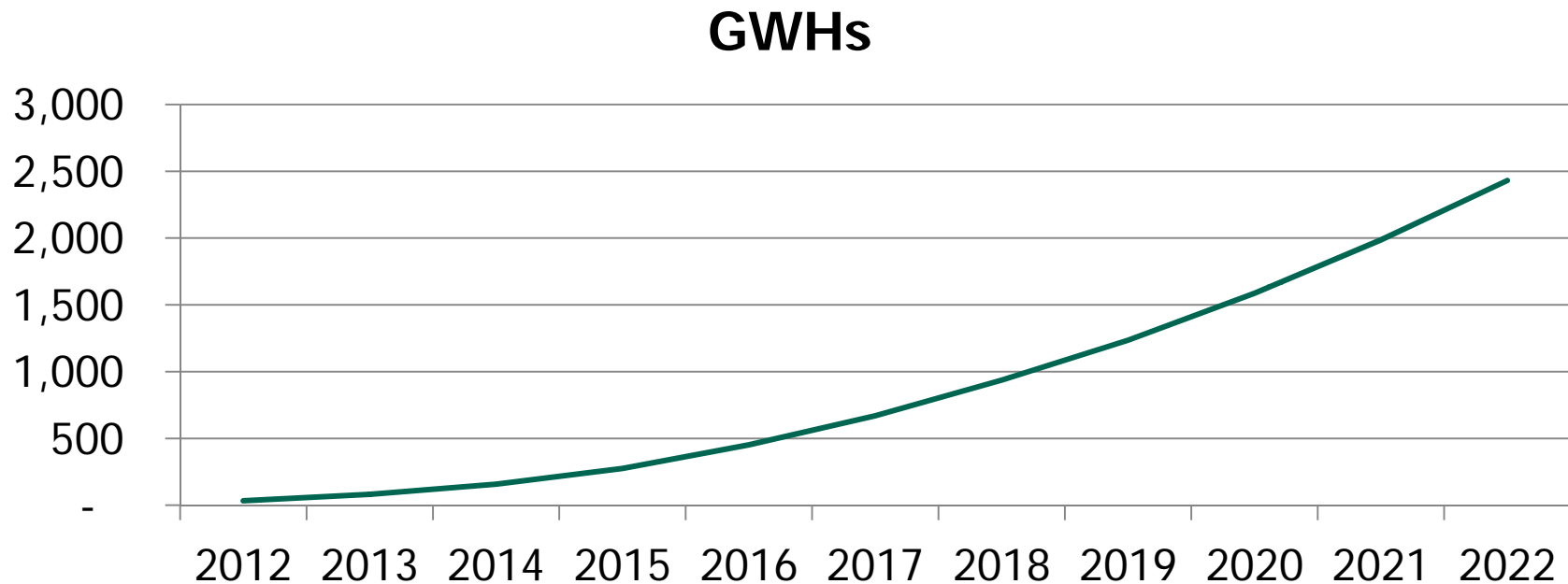
Anticipated 2015 Production Volume 2015

based on demand in SCE area



Not used in SCE's low, medium or high PEV forecasts. Not a complete list

PEV GWH Consumption (SCE expected case)



Key Assumptions

PEV KWh per year (through 2022)	4,400	Miles/kWh	2.9 Miles/kWh
PHEV/BEV Split (by 2015)	80%/20%	PHEV40/PHEV10 Split (by 2015)	75%/25%
Daily Electric Miles Driven (PHEV10)	10 Miles	Daily Electric Miles Driven (PHEV40 and all BEV)	35 Miles
Electric miles per year per PEV	11,000	Charger Efficiency (AC to DC Conversion)	90%

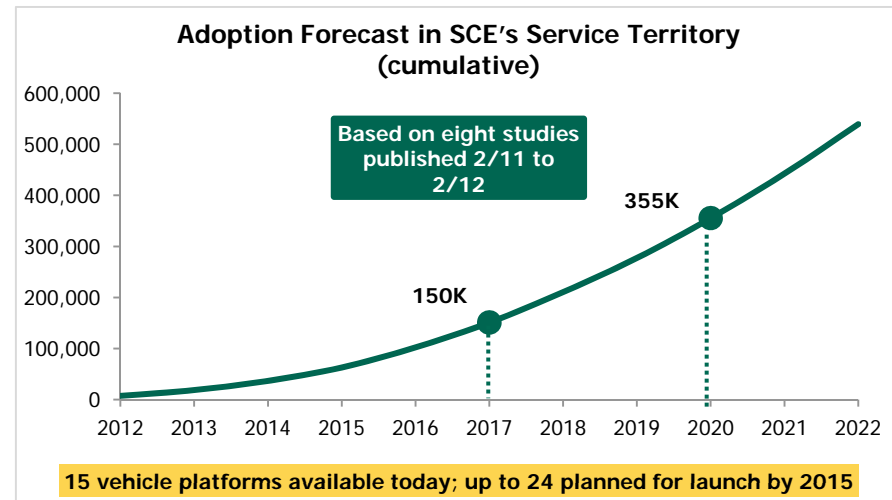
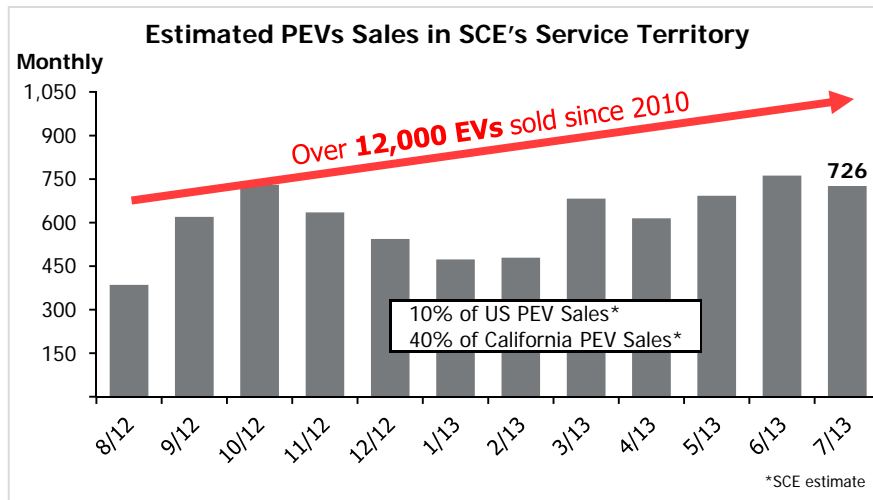
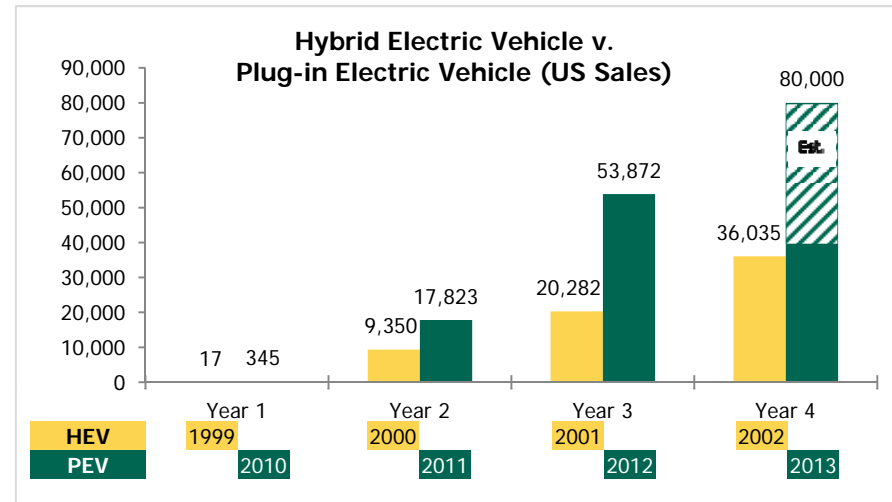
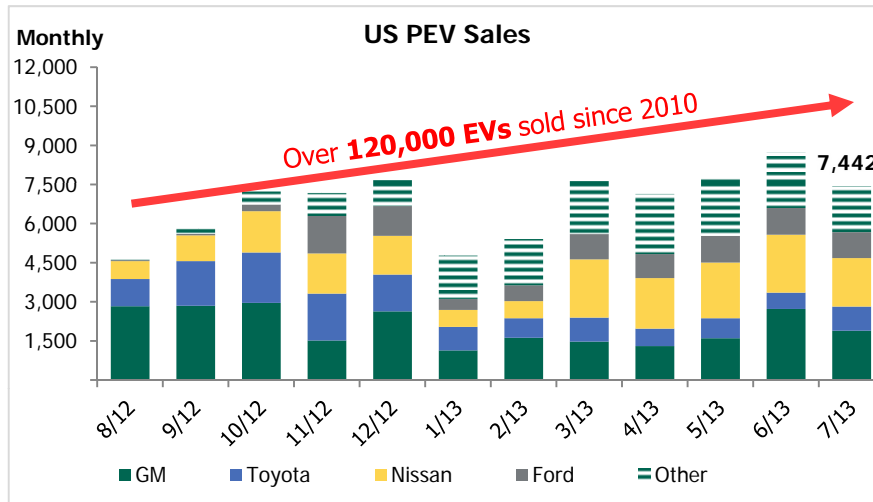
SCE's Key Learnings on PEVs, Customers and Grid Reliability

- **Our approach to managing PEV-grid impact is meeting our customers' needs:** Since 2010, of all the nearly 400 upgrades we made to (or identified for) circuits that serve PEV customers, only 1 percent of that work was required due to additional power demands from PEVs. The rest of the work was required under our regular infrastructure upgrade and maintenance schedule.
- **Using the "end charge" time programming feature is good for EV customers and their neighbors:** It's better for grid reliability and neighborhood circuits when drivers program their charging to be complete by a specific time. When customers set an "end charge" time for charging to be complete, they randomize the start time of their charging, which prevents a large number of vehicles from coming online at the same time — avoiding power-load spikes that potentially could affect the local distribution system.
- **What SCE customers want to know most about EVs:** When 15,000 SCE customers visit our EV website monthly, about 46 percent make their first stop with the Plug-In Car Rate Assistant Tool, which helps estimate charging costs. Customers also click to find out more about public charging station locations from our link to the U.S. Department of Energy's map, watch videos on EVs and read background materials on environmental benefits and home electric infrastructure requirements.
- **Initial findings show early adopters of battery-electric vehicle (BEV) technology demonstrate consistent and predictable behavior:** A sample of Nissan Leaf owners have indicated that any "range anxiety" had been eliminated after driving their new BEV over time. Most reported their overnight charging at 240 volts was sufficient to support their daily driving patterns.
- **Multi-unit residents may face complex challenges:** Despite high interest in EVs from condominium and apartment dwellers, fewer than 5 percent of building owners or condominium associations are even considering installing the necessary charging infrastructure. There are multiple rebates and incentives in the works to improve the situation.
- **SCE and the cities we serve are charged up and ready to go:** Virtually all of the 180 cities in SCE's service territory are committed to helping their residents plug in by streamlining permitting and inspection processes.

Back –up

PEV Adoption is on the Rise, Led by Strong California Sales, in Particular in SCE's Service Territory

LIGHT-DUTY PEV MARKET



Eight PEVs have a lease price of \$139 - \$285 per month for 36 months
(Honda Fit EV, Nissan Leaf, Fiat 500e, Chevy Spark, Ford Focus, Smart ED, Chevy Volt, and Mitsubishi i).