Plugging In Transportation To Our Energy Future

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Felix Oduyemi
Senior Program Manager, Electric Transportation
Southern California Edison
SCE’s EV Technical Center

Unique facility in utility industry

DOE Recognition

Largest Fleet Of EVs In US- 300 vehicles, 16 million EV miles

Industry Leading Battery Testing (both Mobile and Stationary)

BEV/PHEV/FCEV testing, evaluation and maintenance capability
Plug-in Vehicles in the Pipeline

- Toyota Prius
- Ford Escape
- Saturn Vue
- Mitsubishi Miev
- Daimler Sprinter
- BMW Mini
- Daimler Smart

2010-2012
Economic Drivers

- Electricity is Cheaper than Gasoline or Diesel
- Reduced O&M, longer life.
- Initial cost of the vehicle is higher.

- Other benefits
  - Cleaner
  - Domestic
  - Near-term technology
  - Existing infrastructure and unused off-peak production
  - About 10 sources for electricity
Plugging- In To Changing Utility Customer

“Passive Customer ”
• Similar services to all customers
• Customers unaware of energy consumption until monthly bill
• Customers notify utility about outages, no accurate information when problem will be resolved
• Limited utility/customer partnering for load control

“Informed Customer”
• Advanced meters and price-based DR programs provide energy expenditure options
• Daily customer information about energy consumption
• Utility aware of power outages before customers and proactively notify them
• Broad range of load control options helping customers/utilities control end-use via HAN (smart appliances, thermostats, PV, PHEVs, energy storage.)

Part of the “Energy System”
• Different service offerings to specific segments based on,
  – Power quality needs
  – Customer energy usage
• Crew location/repair status automatically provided to custs.
• Customer part of the energy supply through microgrids
  – DER such as PV, PHEVs, home energy storage

Today
Grid Technology Innovation

System Fragmented
• Digital and analog/electro-mechanical devices
• Multiple communication protocols and incompatible technologies
• Manual processes and disparate information systems

Evolving Automation
• Some “islands of automation” – with some real-time control
• Increasing data from field devices (AMI, etc) increasing demands on IT and telecom infrastructure

Technology Integration
• Solid-state, digital devices are software programmable, open architecture and networked
• Intelligence and advanced visualization technology enables situational awareness and real time response
• Large-scale deployments of secure broadband communication, high speed computing and data storage
Edison’s Vision- Energy Efficiency & Environment

Total Integration of Information, Control and Energy Technologies Delivering Environmental Benefits

- Renewables & Clean Generation
- SmartGrid
- Edison SmartConnect™
- Connected Home
- Connected Plug-in Vehicle

Low Carbon Fuel Mix

Energy Management & Efficiency

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www.sce.com/powerandenvironment
By Empowering Customers

- Rate choices to manage costs
  - Time of Use and Tiered Rates
  - Critical Peak Pricing (CPP)
  - Peak Time Rebate (PTR)
  - Programmable Communicating Thermostats (PCT)
- Energy information and analysis
- Service automation-remote turn-on
- Billing & Payment options
- Communication w/ SmartGrid to detect, avoid & repair grid problems in seconds
To Reduce Energy Consumption & Demand

Improved Load Management through Edison Smart Connect™ Technologies

Customer enabled automated response thru energy smart appliances

Energy Information drives Energy Conservation and GHG Reductions
And Increase Distributed Energy Resources

Enable Net Metering, Discrete metering and Integrated energy management w/Solar Panel

Home Energy Storage Creates Opportunities for Increased Renewables

Disconnected Home

Discrete Metering, Incentive Programs, and Demand Response for PEVs
Near Term Evaluation Focus With Our Auto Partners

Same battery pack in both mobile & stationary applications could create early volume driving down costs

PHEV Bi-directional Connection
occasional emergency back-up
occasional peak shaving

Edison
SmartConnect™

PV with Home Energy Storage
reduced grid stress
addresses PV intermittency

Home Energy Storage
reduced grid stress
lower customer bill
Lithium-Ion Evaluation and Demonstration Programs

Mitsubishi Heavy Industries
1.5-3 kW residential/small commercial PSU

IP&L - Indiana PUC allowed economic development in battery maker
AEP - Several MW stationary battery storage project

AES 1 MW substation energy storage system

SCE Proposed CPUC Filing:
$3M Residential Stationary Battery Pilot Program

OBJECTIVES:
1. Assess Li-Ion technology (battery/controls) availability
2. Validate concept at SCE’s EV Technical Center
3. Evaluate customer response to dynamic pricing signals using home PSU
4. Partner w/ battery and controls manufacturers
5. Partner w/ wind and solar manufacturers
6. Assess volume potential and pricing impacts for advanced batteries
SCE’s “Future Garage” Systems Study

- 1-3 kW Photo Voltaic Panels
- Customer HAN Control Interface
- 11-3 kW Load Bank
- PHEV 120 & 240 V Charging
- PHEV Charging & Discharging
- Edison SmartConnect™ Advanced Meter
- Up to 9 kW Load Bank
- Home Energy Storage Device 6-10 kWh
Summary

• Many types of Electric Transportation are here today
• Both Plug-in Hybrids and Battery EVs are coming 2009 – 2014 from almost all large manufacturers
• Utilities and Automakers have many new partnerships that are working on the details
  – Both industries Need To Be Mindful Of The “Hype” - Get The Batteries Driving The Wheels First
  – Focus On Near Term Issues First (Vehicle Connection & Communication, Intelligent Charging, Energy Storage)
  – Generate Critical Data and Understanding Before We “Launch”
• Utilities are facing several potential new “game changers”
  – Stationary batteries may be a solution to our storage problem
  – Greenhouse gas reductions from ET and other benefits may lead to new business models or opportunities.
Thank You

Felix.oduyemi@sce.com