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ComEd Electric Vehicle Strategy

November 13, 2009

Background

- All major vehicle manufacturers have plug-in hybrid electric vehicles (PHEVs) or all-electric vehicles (BEVs) in development
- Several vehicle launches announced as early as 2010-2011
- Collaboration across industries is unprecedented, including:
  - ✓ OEMs
  - ✓ Utilities
  - ✓ Charging equipment providers
  - ✓ Standards committees
  - ✓ Governmental entities
  - ✓ Research organizations
- There is much to be done to prepare the market for this very viable transportation alternative
  - ✓ Consumer education
  - ✓ Charging infrastructure
  - ✓ Codes and standards
  - ✓ Policy and rates

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ComEd's Green Fleet & EV Initiatives

- Green Fleet:
  - ✓ 141 hybrids, including cars, SUVs and bucket trucks
  - ✓ 10 converted Toyota Prius PHEVs
  - ✓ 2.1 million gallons of B20 biodiesel consumed annually
  - ✓ Our green fleet saves over 4,200 metric tons of CO2 emissions annually
    - Equal to taking 1,300 cars or 400 bucket trucks off the road for a year
- EV Initiatives
  - ✓ EPRI Electric Transportation Program
    - GM Collaboration
    - PHEV trouble truck demonstration
    - PHEV impacts on the electric grid
    - Infrastructure Working Council
  - ✓ PHEV demonstration
    - 10 Prius PHEVs in ComEd's fleet, 2 in I-Go car sharing fleet with integrated smart charging technology
    - Demonstrating advanced charge management methodology
  - ✓ Chicago Clean Cities Grant Project
    - Fleet electrification
    - Public charging infrastructure, including solar charging canopy
  - ✓ Chicago Electric Vehicle Consortium
    - Building and electric codes
    - Consumer outreach

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EV Challenges & Opportunities

- Consumer education
  - ✓ Understanding the technology choices (HEV, PHEV, EREV, BEV)
  - ✓ Costs and benefits of owning a plug-in vehicle
    - – Fuel savings
    - – “Where will I plug-in?”
    - – Home wiring upgrades
    - – Availability of “opportunity” charging facilities
- Design standards & codes
  - ✓ Code requirements
    - – NEC, municipal building codes
      - o Single vs. multi-resident
      - o Commercial fleets
      - o Workplace vehicle charging
      - o Public vehicle charging
  - ✓ Hardware design
    - – Plug (e.g., J1772)
    - – User interface
  - ✓ Communications
    - – Wired vs. wireless
    - – Messaging between vehicle and electric grid (e.g., J2847)

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EV Challenges & Opportunities

- Public charging infrastructure
  - ✓ Location, Location, Location!
  - ✓ Who should/can own it?
    - Utilities, 3rd party / private owner, both
  - ✓ How will vehicle owners pay for this service? (accounting, billing, reporting)
    - Subscription vs. “vending machine” service models
    - Potential resale/redistribution issues?
  - ✓ Safety & security
    - User authentication
    - Charging station integrity and user safeguards
- Electric grid impacts
  - ✓ Use of Smart charging and other Smart Grid technology
  - ✓ Impacts of fast-charging
  - ✓ V2G
    - How will utilities & grid operators leverage available capacity
    - Will EV owners participate?
- Policy and rates
  - ✓ Incentives and rebates
  - ✓ Advanced rates and metering
    - TOU, real-time pricing, V2G rates

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ComEd EV Strategy Overview

- There are four key objectives to ComEd's Electric Vehicle Strategy:
  - ✓ Gain **first-hand experience** with plug-in electric vehicle technology and charging requirements.
  - ✓ Study **system impacts** from electric vehicle charging and utilize advanced methods to mitigate those impacts
  - ✓ **Ready the Chicago EV market** through understanding factors that will affect consumer adoption, and leveraging stakeholder relationships to address those factors.
  - ✓ Assess the **future of EV technology** and the **enabling Smart Grid technologies**.

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ComEd's EV Strategy

Grid Impacts
- Local distribution
- System capacity
- Charge management
- Localized adoption rates

Policy & Rates
- Federal & state legislation
- Advanced rates & metering
- Incentives, rebates
- Public charging
- Load control

Outreach & Education
- Customers
- Policy makers
- Auto manufacturers
- Other stakeholders

Customer Experience
- In-home charging
- Workplace and public "Opportunity" charging

Electric Service
- Single vs. multi-unit
- Parking garages
- Public charging
- Local electric codes

Market Research
- Early adopters
- Focus groups
- Market segmentation

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