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# A Few Thoughts on the Early Plug-In Electric Vehicle Market

**Mark Duvall**

Director, Electric Transportation

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# Initial Impressions of Vehicles and Infrastructure

- **The Vehicles Work**
  - Rollout proceeding as planned
- **Infrastructure**
  - High proportion of Level 2 requests
  - Significant issues with multi-unit dwellings (condos, etc)
  - Public infrastructure just getting started
  - Probably will see increased emphasis on workplace charging



**Chevrolet Volt – Early Case Study**  
**50-mile roundtrip commute**

**Level 1 – Home Charging**  
**Level 2 – Workplace Charging**

**~88% Electricity Utilization**

# Plug-In EV Owner Economics

- **Cost ≠ Price**

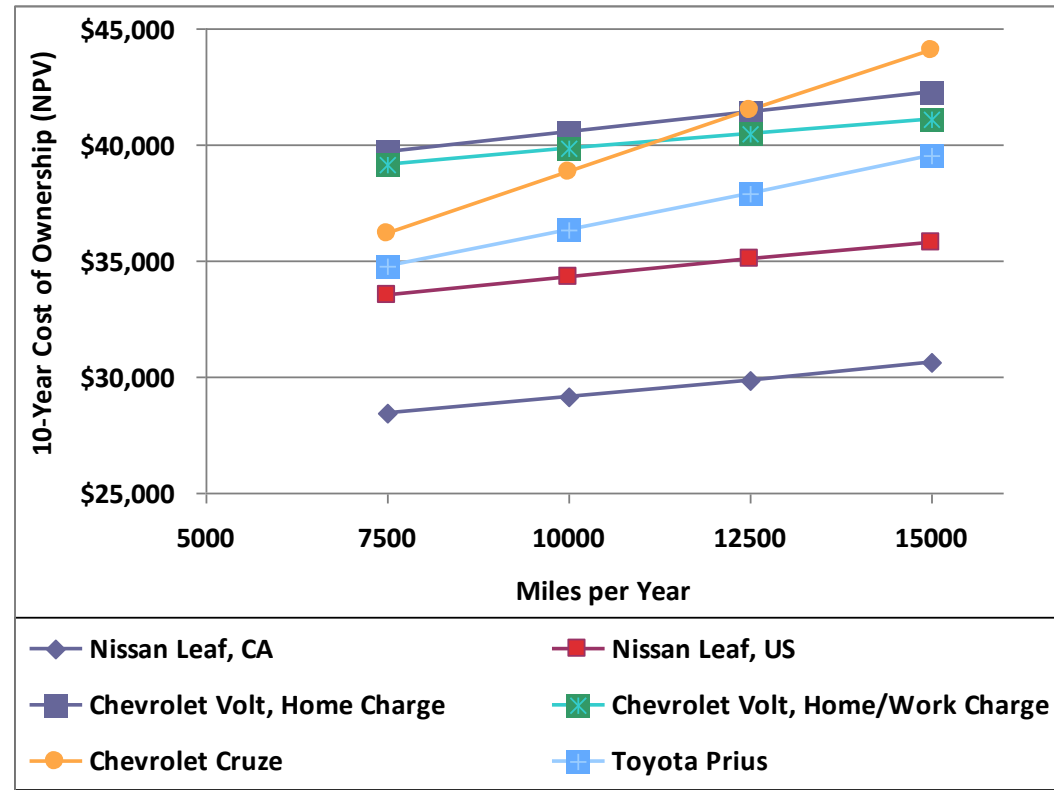
- Difficult to compare early market PEVs with gasoline vehicles – PEV pricing is not yet stable

- First generation PEVs are surprisingly competitive economically

- Cost reduction must equal, then exceed tax credits

- Comparable gasoline car fuel economy ~ 30 mpg

- 100k mile fuel costs ~ \$13,500
- 150k mile fuel costs ~ \$20,000



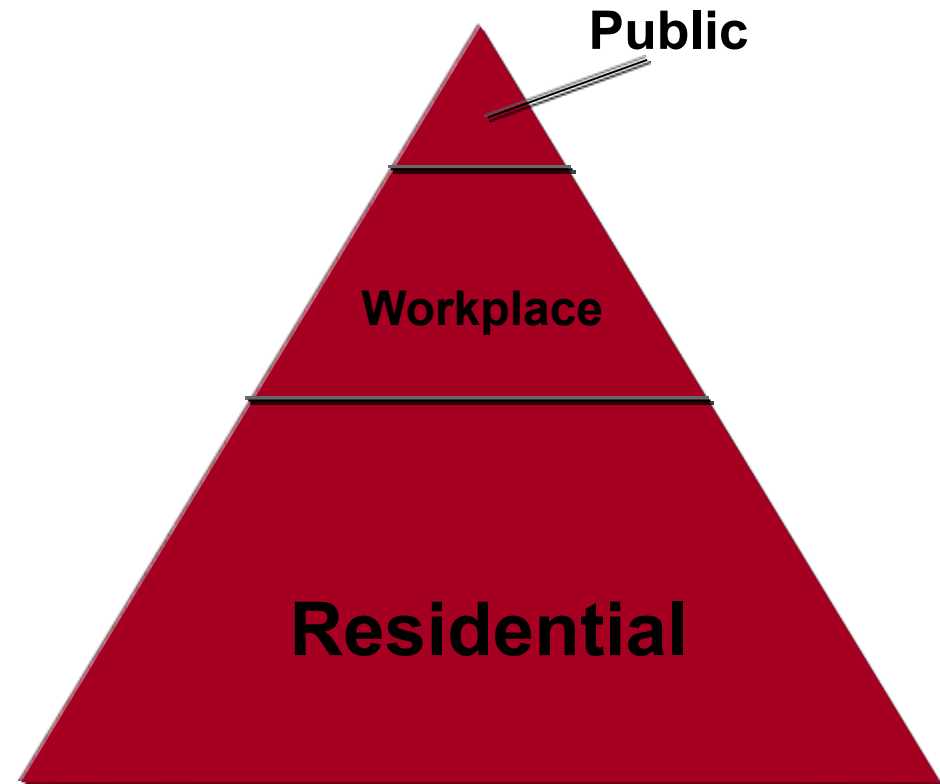
## Simple 10-Year Ownership Assumption

Electricity: \$0.11/kW      Gasoline: \$4.04/gal  
 Incentives: \$7500 federal, \$5000 state (Leaf only)  
 Level 2 Home Infrastructure = \$2000 (Leaf only)

# Build the Right Infrastructure

- **Build Today's Infrastructure Today**

- Infrastructure is expensive
  - ~ \$1500 home, \$2500+ public
- Focus on Residential
  - 95% of vehicles end day at home
  - Costs can exceed \$2200 - \$2500
  - Cost and lead time minimization
- Workplace
  - 2<sup>nd</sup> priority in terms of use
- Public Charging
  - Critical vs. convenience
  - **Understand DC Fast Charging**
  - Long-term sustaining of infrastructure



# Smart Charging is the Key to Reducing Grid Impacts

**Vision – By 2015, all new plug-in vehicles can communicate to the smart grid and charging is intelligently controlled**

- ‘Smart charging’ is a compact between utility and vehicle owner
  - Low in cost and convenient for vehicle operator
  - Minimize system impacts
- Implement with AMI, HAN, internet, telematics, etc.
- Vary time-of-day and charge power

