Electric Vehicles and the Grid

Maeve Vallely-Bartlett

Under Secretary, Executive Office of Energy and Environmental Affairs

May 6, 2011

Agenda

- EV Market Drivers in Massachusetts
- Massachusetts EV Strategy
- Challenges to the Grid
  - Variability - Different devices, charge operators, vehicles and vehicle owners
  - Power Generation, Distribution and On-Site
- Grid Support, Integration and Inter-operability Opportunities
- Further Considerations to meet 1M vehicles on the road in the U.S. by 2015

EV Market Drivers

Manufacturers

- Increased federal fuel efficiency and GHG standards
- Increased Massachusetts requirements
- Federal R&D $
- Improved battery technology and decreasing costs

Consumers

- Concern with environment and foreign oil
- Interest in cheaper alternative fuels and convenience
- Increasing urbanization and transportation needs
- Federal Tax Credits and government subsidies

MA EV Strategy

- Stakeholder involvement including utilities
- Ensure vehicles sold here
- Pilot new vehicles under development and support R&D on retrofits
- Training and outreach
- Support deployment of charging infrastructure that is convenient, open to all vehicles and can be integrated into the utility structure

Challenges to the Grid

- Multiple device manufacturers, types and communication methods; multiple vehicle demands; multiple types of vehicle owners
- Multiple charging station owners ("charge operators" include businesses, parking garages, utilities, municipalities and agencies
- Multiple payment methods

Power Generation, Distribution and On-Site Demands

- Generation and transmission impacts minimal even if full light-duty fleet electrification may only be at 7-8% of demand
- Distribution system may experience clustering problems (badly controlled charging may create 2-3x peak demand)
- On-site transformers that are old (no fuses) can blow and lose all power to a location, charging operators need to work with a utility to ensure on-site capacity.

Opportunities to Solve the Challenges

- Market variability is good – to a point
- “Managed Charging” and “Inter-operability” with common specifications can encourage open access to charging stations.
- Explore integration with renewables and after-market devices
- Distributed Generation/Storage
- Smart Grid real-time tracking

Further Considerations

- Incentives – rebates/grants, tax credit, reduced registration fees, HOV lanes, discounted/convenient parking, inspection exemptions, insurance discounts, hotel discounts, CO2 and oil-displacement credits
- Change tax credit to rebate (so non-tax paying entities can also reduce costs)
- Fuel tax reductions may lead to highway funding deficits in the future

For further information:

- Maeve Vallely- Bartlett, 617-626-1041
- Linda Benevides, 617-626-1197 or Linda.Benevides@state.ma.us
- Steven Russell, Clean Cities and Alternative Fuels Coordinator, 617-626-7325 or Steven.Russell@state.ma.us