PREPARING for the ARRIVAL of ELECTRIC VEHICLES

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DOE Technical Assistance Program
Team 4 – Program & Project Development & Implementation
Preparing for the Arrival of Electric Vehicles

Webinar Overview

- Technical Assistance Project (TAP) Overview

- Preparing for the Arrival of the Electric Vehicle
  - Elements of Developing an EV Infrastructure Plan

- Resources

- Q&A
Logistics

• Questions and discussion after presentation
  Have your questions ready

• To ask a question/make a comment
  – If you want facilitator to read your question – Type your question in “questions” box, specify speaker to address

  – If you want to speak – use “Raise hand” function and type question in “questions” box, when you are recognized you will be un-muted
What is TAP?

DOE’s Technical Assistance Program (TAP) supports the Energy Efficiency and Conservation Block Grant Program (EECBG), the State Energy Program (SEP) and the Better Buildings grantees by providing state, local, and tribal officials the tools and resources needed to implement successful and sustainable clean energy programs.
How Can TAP Help You?

TAP offers:

• One-on-one assistance
• Extensive online resource library, including:
  ➢ Webinars
  ➢ Events calendar
  ➢ TAP Blog
  ➢ Best practices and project resources
• Facilitation of peer exchange

On topics including:

• State and local capacity building
• Energy efficiency and renewable energy technologies
• Program design and implementation
• Financing
• Performance contracting
## Provider Network Resources

| State and Local Capacity Building | • Trainings  
• Workshops  
• Peer-to-peer matching |
|-----------------------------------|------------------------------------------------|
| Technical | • Renewable energy siting and development  
• Review of technical specs for RFPs  
• Strategic planning, energy management, and conservation strategies  
• Green building technologies  
• Building codes |
| Program Design and Implementation | • Policy and program development  
• Coordinating rate-payer funded dollars with ARRA projects and programs  
• Sustainable community and building design  
• State and regional EE and RE assessments and planning  
• EE and RE portfolio program design elements |
| Financial | Program design support and guidance on financing mechanisms such as:  
• Revolving loan funds (RLFs)  
• Property-assessed clean energy (PACE)  
• Loan loss reserves and enhanced credit mechanisms |
| Performance Contracting | • Designing and implementing a performance contract  
• Leveraging private investment  
• Reducing institutional barriers  
• Tracking and comparing programs |
Preparing for the Arrival of Electric Vehicles

Who We Are: Team 4

ACEEE, NRDC: National Support
Overview of EV Landscape

• **Government** - D.O.E. Initiatives and ARRA Funding
  – EV Project
  – Clean Cities
  – Smart Grid, FERC Definition
  – Federal and State Tax Credits
  – Battery R & D

• **Industry** – New Vehicles: Private and Commercial. Utilities, Google, Microsoft, GE, HSBC, On-Star, Synch, iPhone apps

• **Public and Private** – Advocacy Groups: environmental, technological, energy security focused
Developing an EV Infrastructure Plan

- Identify Stakeholders for Plan
- Review of Regulations and Permitting
- Long Range Plan
  - Short Range Plans to achieve Long Range Plan
- Where to Invest in EV Infrastructure
- Networking and Smart Charging
- Public Education
Identify Stakeholders to Include in Development of Plan

- Utility
- Local Government: mayor, fleet manager, city planners
- Local businesses including vehicle dealers
- EVSE suppliers
- Non-profits
- Local/Federal agencies – MPOs, RPCs, Air Quality staff
System of safety & standardization

- Mandatory safety
  - Federal mandates
  - Local statutes

- Voluntary standardization
  - Industry standards
• Applicable authorities
  – Occupational Health & Safety Regulations
  – National Electric Code
  – Underwriters Laboratories Standards
  – Society of Automotive Engineers Standards
Permitting

- Process of controlling building changes – including LEED certification, Locational Efficiency, Smart Growth synergies
  - Process required by International Building Code
  - Supports code compliance
  - Enforces local planning requirements
  - Maintains accurate tax base
  - Generates fee income
Permitting

• Permitting procedure varies by jurisdiction

  – Online permit
  – Over-the-counter permit
  – Plan check
  – Planning review
Permitting

• Inspection required
  – Authorized 3rd party
  – Authority Having Jurisdiction (AHJ)

• Expedited – Vehicle Dealer facilitation
• Residential EVSE permitting
  – Typically involves addition of a branch circuit
  – May involve service upgrade
  – May require a load calculation

• Residential process streamlining – 48 hour?
  – Online permitting using installation details
  – Self or 3rd party inspection using qualifications
Commercial EVSE permitting

– Requires one or more additional branch circuits

– Requires load calculation

– Requires planning review if outside
• Estimate where you think city will be in 10 years, where you want to get to
  – Forecasting number of EVs and demand for charging infrastructure

• Clean Cities Coalitions – D.O.E. emphasis on planning, e.g., National Household Travel Behavior Studies – EV Project “micro-climatting”

• FHWA/HUD/EPA “Sustainable Communities” initiatives and funding opportunities.
Types of Charging Infrastructure

- **Level 1: Standard 110 volt outlet**
  - Ubiquitous
  - 10-13 hours to charge 16 kWh battery (Volt)
  - Estimated cost: free

- **Level 2: 220 or 240 volt outlet**
  - Clothes Dryers
  - 4 hours to charge Volt
  - Estimated Cost: Residential-$2,000-$9,000

- **Level 3: 480+ volts**
  - Less than 30 minutes to charge Volt
  - Estimated Cost: $25,000-$75,000
Where to Invest in EV Infrastructure?

- **1st-Home charging**
  - 63% of potential EV users preferred charging at home (EPRI)
  - Level 1 may already exist for many homes

  - Determine number of homes with garage, carport with at least Level 1 charging capability (54% nationwide)

  - Level 2 may require upgrades, permitting

- Potential EV Project and vehicle manufacturer incentives
Where to Invest in EV Infrastructure?

• 2\textsuperscript{nd} - Work/Business
  – Places where vehicles will be parked for 6-8 hours during a day
    • Parking garages, park and ride, transit stations, on job sites

  – Level 2

  – Revenue and “good will” business attraction opportunities
Where to Invest in EV Infrastructure?

• **3rd – Public Charging**
  – Level 2: Shopping, restaurants, theatres etc…places vehicles will be left for a couple hours
  – Work with businesses to promote interest in hosting stations
  – Potential renewable generation opportunities
  – Level 3: Along major corridors
    • Spaced to reduce range anxiety
    • Electrical Infrastructure an issue, 480 volt
    • eTec and AeroVironment industry leaders

• **Data Collection and Analysis**
  – Define areas with high population/employment densities, high traffic volumes
    • Maybe not needed where people have easy access to home charging
Key Program Elements – Need for Coordination

• **Controlled or Uncontrolled Charging**: Grid-optimized System Approach or Unmanaged Grid consequences

• **Co-Benefits Potential**: Networking facilitates “cell phone model” = consumer and provider advantages
Need for Coordination

• Networking facilitates data collection for aggregation = eventual V2G and V2H, demand response, market participation, e.g. Ancillary Services

• Networking facilitates storage and capture of renewables; standardized battery architecture an eventual goal for end-of-life service as UPS

• Networking facilitates data collection for Renewable Portfolio Standards, RGGIs, Low Carbon Fuel Standards, Carbon Counting/Credit Trading, Climate Action Plans, Sustainable Communities, e.g., “Micro-Climating” – maximizing investment for future needs
Smart Charging

- **Charging scenarios with a Smart grid interface**
  - Staggered charging: discrete amounts over an identified interval
  - Off peak charging: benefits utility and consumer

- **Real time rates**

- **Time-of-use rates**

- **Demand response**
  - Grid critical peaks
  - Distribution overload
Public Education

• Public need education on EVs and EVSE so that reality matches expectations
  – How far will vehicles go without charge?
  – Difference between PHEV and EV
    • Prius (PHEV 10); Volt (PHEV 40); Leaf (EV)
      – Different charging requirements
      – Depending on driving distances, different vehicles for different drivers
  – Where are public charging stations?
  – Costs of Home Level 2 installation

• Ensuring technicians can repair and maintain vehicles
Related Resources

- EPA/HUD/FHWA Sustainable Communities  [http://www.epa.gov/dced/partnership/index.html](http://www.epa.gov/dced/partnership/index.html)
- EPA Smart Growth  [http://www.epa.gov/livability/codeexamples.htm](http://www.epa.gov/livability/codeexamples.htm)
- Department of Energy
  - Alternative Fuels Data Center  [http://www.afdc.energy.gov/afdc/fuels/electricity.html](http://www.afdc.energy.gov/afdc/fuels/electricity.html)
  - Smart Grid  [http://www.oe.energy.gov/smartgrid.htm](http://www.oe.energy.gov/smartgrid.htm)
  - The EV Project

We encourage you to:

1) Explore our online resources via the Solution Center

2) Submit a request via the Technical Assistance Center

3) Ask questions via our call center at 1-877-337-3827 or email us at solutioncenter@ee.doe.gov
Provides a platform for state, local, and tribal government officials and DOE’s network of technical and programmatic experts to connect and share best practices on a variety of topics.
Preparing for the Arrival of Electric Vehicles

Who We Are: Team 4

ACEEE, NRDC: National Support
CONTACTS

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Upcoming Webinars

Please join us again:

Title: Preparing for the Arrival of Electric Vehicles
Host: George Little, Mike Salisbury, and Bob Yuhnke, VEIC/SWEEP
Date: November 3, 2010
Time: 2:00-3:00 EDT

Title: Effective O&M Policy in Public Buildings
Host: Susy Jones, NEEP
Date: November 4, 2010
Time: 2:00-3:00 EDT

Title: Local Power Empowers: CHP and District Energy
Host: Jay Wrobel, MEEA
Date: November 8, 2010
Time: 2:00-3:00 EST

Title: Driving Demand: Working with and Learning from Contractors
Host: Merrian Fuller, LBNL
Date: November 9, 2010
Time: 2:00-3:15 EST

Title: EM&V101: General Approaches to Tracking Data and Estimating Savings
Host: Julie Michals, NEEP
Date: November 10, 2010
Time: 2:00-3:00 EST

Title: Energy Efficiency Rebate Programs 101
Host: Catul Kiti, Senior Manager Energy Efficiency Programs, ICF International
Date: November 15, 2010
Time: 12:00 - 2:00 PM EST

Title: State Clean Energy Policy Impact
Host: Liz Doris, NREL
Date: November 17, 2010
Time: 3:00 - 4:15 PM EST

Title: Negotiating and Entering Into an ESPC
Host: Meg Giuliano, ICF International and Sentech
Date: November 18, 2010
Time: 1:30 - 2:30 PM EST

For the most up-to-date information and registration links, please visit the Solution Center webcast page at www.wip.energy.gov/solutioncenter/webcasts