The EV Project

EV 101 Workshop for Local Governments

ECOtality North America

Robert Dickens
Los Angeles Area Manager
rdickens@ecotality.com

December 9, 2010
The leader in clean electric transportation

- Leading EV (Electric Vehicle) Infrastructure Experience
  - Involved in every major N. American EV initiative since 1990’s
- Largest Deployment of EV Infrastructure in the World
  - ECOtality ranks #33 in the White House report on 100 Recovery Act projects changing America
  - Named one of the most Innovative and Effective projects nationwide
- Premier Battery Fast-Charge Systems, Minit-Charger
  - Industrial applications for forklifts and airport ground support equipment
  - 50+ US & International patents since 1990
  - Fortune 500 customer base
  - NASDAQ listed ECTY
- Advanced Transportation R & D, Engineering & Testing
  - Primary Contractor to U.S. Dept. of Energy in EV sector
  - 10+ million miles of testing on 200+ advanced fuel vehicles
$230 million project
  - $115 million grant from US Dept. of Energy
  - $115 million match

Purpose: To build and study mature electric vehicle charging infrastructure in six states plus the District of Columbia

Product: Lessons learned
Over 50 Project Partners
Geographic Areas

- Washington State (greater Seattle area)
- Oregon (Portland, Eugene, Corvallis, Salem)
- California (San Diego, Los Angeles)
- Arizona (Phoenix, Tucson)
- Tennessee (Chattanooga, Knoxville, Nashville)
- Texas (Dallas, Ft Worth, Houston)
- Washington, DC

Transportation Corridors
- I-5 Corridor Eugene to Canadian border
- I-5 San Diego to Los Angeles
- I-10 Phoenix to Tucson
- I-75 Chattanooga to Knoxville
- I-40 Knoxville to Nashville
- I-24 Nashville to Chattanooga
ECOtality’s EV Project Overview

- Plan Infrastructure Placement
  - EV Residential Customer Level 2 Equipment
  - Level 2 Publicly Available
  - DC Fast Charge

- Install Infrastructure
  - Develop Installation Processes
  - Identify Infrastructure Requirements

- Collect and Analyze Usage Data
  - ECOtality
  - Idaho National Lab, UC Davis, The Ohio State University

- Report Lessons Learned
Equipment Deployment
(Vehicle volumes are for The EV Project only and does not represent regional nor national production volumes)

- 5,700 Nissan Leafs in Market Areas included in EV Project
- 2,600 Chevrolet Volts in Market Areas included in EV Project
- 8,300 Level 2 (240 Volt AC, 30 Amp) residential and fleet EVSE
- 6,250 Level 2 Commercial/Public EVSE (Electric Vehicle Supply Equipment) in Market Area
- 125 additional Level 2 in ORNL (Oak Ridge Natl Lab) Solar Project
- 260 DC Fast Chargers (480 Volt AC, 30 – 60 kW) in Market Areas
- 50 DC Fast Charger for Corridors between major cities
ECOtality’s Blink Level 2 EVSE

- **Power**
  - 240 VAC, Single Phase, 40 Amp Circuit
  - 30 Amp Max current

- **Charge Control**
  - Vehicle Battery Management System

- **Communications**
  - Wireless IEEE 802.11g
  - Cellular
  - ZigBee SEP 1.0 capable
  - AMI Interface Capable

- **Connector** – J1772 compliant
- **Color Interactive Touch Screen**
- **Internal Energy Meter**
ECOtality’s Blink DC Fast Charger

- **Input Power**
  - 480 VAC, Three Phase, 60 kW
  - 206 Amp at 208 VAC

- **Charge Control**
  - Vehicle Battery Management System

- **Communications**
  - Wireless IEEE 802.11g
  - Cellular
  - ZigBee SEP 1.0 capable
  - AMI Interface Capable

- **Connector** – CHAdeMO compliant
Electric Vehicle Inlets

- Level 2
- DC Fast Charge
Micro-Climate Plan Approach

EV Micro-Climate

EV Infrastructure Deployment 10-Year Plan

EV Infrastructure Deployment Guidelines
Level 2 EVSE Deployment

- Where should they be installed?
  - Micro-Climate© process
  - Where people shop
  - Where people play
  - Where people gather
  - Target is 1 – 3 hours

- Expand effective operating range of the EV
  - Allows for unscheduled trips
  - Provides ‘comfort’ to new EV users: ‘Range Anxiety’

- Businesses want to install EVSE
  - Draws EV customers—they stay longer
  - Advertising Advantages
  - Revenue Collection Systems
DC Fast Charger Deployment

■ Where do they go?

■ Where energy is needed fast
  • Near highways or cross-town roads
  • Highway corridors between towns
  • Busy fleet locations

■ Where people stay a short time
  • Gasoline stations
  • Rest stops
  • Convenience Stores
  • 10 – 15 minute charge

■ What will it do?
  • Fast energy return— significant fill in 15 minutes
Lessons Learned

- **Charging Stations**
  - Location - did we select the correct locations?
  - Utilization - when and how long are they being used?
  - Electric Utility Impact - home use vs publicly available

- **Vehicles**
  - Utilization – how did vehicle use change over time?
  - Behavior Change – how did the behavior of drivers change?
  - EREV/PHEV vs BEV – what differences were noted between types?

- **Planning**
  - Effectiveness – how did the process work in diverse locations?
  - Structure – did the program deviate significantly between sites?
  - Transferability – how transferable is the process to markets?
### Schedule

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th></th>
<th>2011</th>
<th></th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td></td>
<td>Q1</td>
<td></td>
<td>Q1</td>
<td>Q1</td>
</tr>
<tr>
<td>Q2</td>
<td>Q2</td>
<td>Q2</td>
<td>Q2</td>
<td>Q2</td>
<td>Q2</td>
</tr>
<tr>
<td>Q3</td>
<td>Q3</td>
<td>Q3</td>
<td>Q3</td>
<td>Q3</td>
<td>Q3</td>
</tr>
<tr>
<td>Q4</td>
<td>Q4</td>
<td>Q4</td>
<td>Q4</td>
<td>Q4</td>
<td>Q4</td>
</tr>
</tbody>
</table>

**EV Micro-Climate© Planning**

**EV Infrastructure Build Out**

**Vehicle Delivery Starts**

**Evaluation & Research**

**Project Complete Q2 2013**
Thank You

For More Information

- www.TheEVProject.com
- www.ecotalityna.com
- www.blinknetwork.com

- Robert Dickens
  - Los Angeles Area Manager
  - rdickens@ecotality.com