Boulder Smart Grid – Plug-In Electric / Hybrid Vehicles

$500,000 federally funded project to:

• Increase the use of alternative fueled vehicles

• Advanced technology vehicles as a means to reduce U.S. dependence on imported petroleum, increase fuel economy and improve emissions

• Collect data on the success of the project through collection of vehicle, infrastructure and training information

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November 2012
IBM Smarter Cities Challenge, May 2011 – Boulder PHEV Integration

- Test smart charging and billing infrastructure
- Test rate plans and gather learning from other EV pilots
- Assess integration of PHEVs with renewable storage
- Pursue EV pilot funding
APR 2012 TASKS TO PERFORM:

• Vehicles Procurement and Testing
• Charging Station Installations
• Smart Grid and Building Charging Integration
• Install battery storage systems
• Connect charging stations to solar PV systems on some facilities
• Outreach Campaign
• Monitoring
• Analysis and Report
BEFORE ENERGY EFFICIENCIES

North Boulder Rec. Ctr. - Meter# 59947171

- On-Peak Period
- Maximum
- Weekday Average
- Weekend Average
- Demand

The red line in the chart above updates to display the demand profile for the selected day. The green lines are static and represent the maximum and average demands for each interval over the last 18 months.

Max Demand
- 313 kW
- Average: 200 kW

Consumption
- 4,807 kWh
- On-Peak: 3,190 kWh (66%)
- Off-Peak: 1,617 kWh (34%)

Wednesday - 07/14/10
- Use the scrollbar above to scroll left or right to select which day to display in the chart.

Open Tabular Interval Data

http://www.enerGXpert.com
(800) 303-9890
support@enerGXpert.com
North Boulder Rec. Ctr. - Meter# 59947171

Before

After

Max Demand
259 kW
Average: 140 kW

Consumption
3,361 kWh
On-Peak: 2,122 kWh (63%)
Off-Peak: 1,239 kWh (37%)

The red line in the chart above updates to display the demand profile for the selected day. The green lines are static and represent the maximum and average demands for each interval over the last 18 months.

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Preliminary estimates are that 5 EV chargers could increase demand charges by as much as $750 a month ... need to control demand loads.
Solar is sold to Utility at $0.035/kWh (REC payment) and we pay, on average, $0.09/kWh – 3 times higher…store renewables and use it to reduce peak demands.
Aug 15, 2012, EV Charger installations for city fleet use (PHEV Escape and Nissan Leaf), will also include a battery storage system and BAS system. Facility already has a 22 kW solar PV system.

Aug 14, 2012, Nissan Leaf leased by city to eGo CarShare for one year, available for public use at Alfalfa’s.
Stand-alone Solar EV Charger

EV ARC™
Electric Vehicle Autonomous Renewable Charger Station

System Components

- PV Modules
- Structural Steel Canopy
- Custom Branding
- EnvisionTrak™
- Steel Column
- SunCharge™ Column Integrated Electric Vehicle Charging Station
- Battery Storage
- Ballasted Docking Pad
What’s Next

• Corroboration with:
  – Rocky Mountain Institute – data analysis and reporting
  – NREL, Center for Transportation Technologies and Systems – review of project for their research
  – Colorado Clean Cities and Project FEVER
  – Colorado Power Electronics Center (CoPEC) in the Electrical, Computer and Energy Engineering Department at the University of Colorado
    • technical analysis regarding how to connect EV chargers, PV arrays, stationary batteries, and building automation systems to provide simple but effective charging and V2G functionality
    • instrumentation to monitor electric vehicle driving and charging profiles

• May 2012: Audi, BMW, Chrysler, Daimler, Ford, General Motors, Porsche and Volkswagen agreed to support a new single-port fast-charging technology that will recharge EV batteries in 15 to 20 minutes

• Oct 2012: SAE approved a new standard in rapid EV charging systems that could cut plug-in times down to as short as 20 minutes.