The Evolution of EV Load Management

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EV Roadmap 10
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The Evolution of EV Load Management

We are at the most exciting point of the EV adoption curve

EVs are coming. That is certain.

EVs will charge more often and faster.

Utilities need to be able to manage EV load.

Utilities will need to engage EV customers.
Utility Demand-Side Management Innovation Spectrum

1. Energy Usage Feedback
   - Whole Home
   - Least complex
   - Lower investment
   - Less control

2. Use of Price Signals
   - Disaggregated
   - Rebate/Reward
   - Rate/Tariff

3. Direct Load Control
   - BYOD
   - Utility-Supplied Device
   - Most complex
   - More investment
   - More control
1 Energy Usage Feedback
Home energy usage feedback

Providing energy usage feedback motivates behavior change
Case Study #1 – EV Energy Usage Feedback – Arizona, USA

- Monitor battery health (degradation overtime)
- Track, download, and analyze driving and charging data
- Understand how EV charging is impacting your bill
- Share and compare to other EV owners
2 Price Signals
Price Signals: Whole Household Time of Use Price

The Evolution of EV Load Management
Case Study #2 – SmartCharge New York

FleetCarma and Con Edison Charge Ahead with SmartCharge Rewards™ for Electric Vehicle Owners

www.fleetcarma.com/smartchargenewyork

NEW YORK CITY, April 19, 2017 /PRNewswire/ – FleetCarma, a connected car technology provider specializing in plug-in electric vehicle applications, and Con Edison have begun a program to incentivize off-peak charging of plug-in electric vehicles.
Disaggregated energy monitoring with TOU rates, rebates, or rewards

Sub-meter EV circuit

Drilling, wiring, electrical code, scheduling, install costs

Sub-meter the vehicle

Self install into the vehicle
Usage-based insurance. This use of telematics technology is on trend and growing.

Get paid by driving safely

https://www.progressive.com/auto/snapshot/
Utility-Specific EV Usage Feedback Portal

My Dashboard

Points Summary

1,233
Off-Peak reward points earned

Utility Service Territory Usage

SUMMER PEAK TIMES
2 pm to 6 pm weekdays, June 1 - Sept 30

OTHER TIMES

OFF-PEAK TIMES
12 midnight to 8 am all days, Year-round

Daily Charging Energy

This graph pertains to charging done within the utility service territory

The Evolution of EV Load Management
## Reward Points Summary

**Earnings Summary**

<table>
<thead>
<tr>
<th>Category</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>REWARDS POINTS EARNED</td>
<td>51,233</td>
</tr>
<tr>
<td>DOLLARS EARNED</td>
<td>$51.23</td>
</tr>
<tr>
<td>REDemption LINK</td>
<td></td>
</tr>
</tbody>
</table>

**Click here to redeem**

**Points Earned**

<table>
<thead>
<tr>
<th>Category</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF PEAK CHARGING REWARDS POINTS</td>
<td>1,233</td>
</tr>
<tr>
<td>GETTING STARTED POINTS</td>
<td>50,000</td>
</tr>
<tr>
<td>TOTAL POINTS</td>
<td>51,233</td>
</tr>
</tbody>
</table>
Share Your Achievements on Social Media

“I got paid $51.23 from my utility this month for charging my electric vehicle during off-peak times.”
Why SmartCharge Rewards?

Engagement

Ease of installation

Flexibility of rewards structure

Data for all charging, not just at the home

Increased enrollment and load management ability
3 Direct Load Control
Direct Utility Control. Smart T-Stats Doing Pre-cooling before DR Event.

Meet the 3rd generation Nest Learning Thermostat

The Nest Thermostat programs itself, automatically saves energy when you’re away and can be controlled from anywhere.

Watch video

Auto-Schedule
No more confusing programming. Nest learns the temperatures you like and builds a personalized schedule for your home.

Home/Away Assist
Don’t waste energy heating or cooling an empty home. Nest automatically saves energy when you’re away.

Energy History
The more you know, the more you can save. See how much energy you’ve used in the last 10 days.

Remote control
Change the temperature from anywhere with your phone, tablet or laptop.

The Nest Thermostat works in most homes with low voltage systems—make sure it’ll work in yours. Most people install it themselves in 30 minutes or less.
Case Study #3: Utility-controlled charging with guaranteed minimum SOC

Residential Smart Charging Projects

UTILITY PARTNERS

Workplace/Fleet Smart Charging Projects

The Evolution of EV Load Management
**Paired Smart Charging Architecture**

**EV Owner:**
Don’t ever slow me down if I’m below **30% SOC**. Get me fully charged by **6am**.

**Utility:**
Keep the total charging loads of this cluster of EVs to under **10kW**.

The system then manages EV load based on the criteria above. Helps manage EV clustering on single transformers.
Confidence for EV Owners to Protect their Mobility Needs

Would you have signed up if there was no SOC data?
(Vehicle-Side Data)

- Yes: 28%
- No: 72%

SOC Auto Opt-Out: 15%
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1. Energy usage feedback and measure EV load
2. Shape EV load with price signals
3. Direct control of EV load

Each step provides more sophistication for EV load management.
Contact Information

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