Grid Responsive Charging Networks

National Governors Association
Electric Vehicle Grid Integration Summit
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Clean + Modern Grid
Utility Business Models | Regulatory Innovation | Grid Integration | Transportation Electrification
Who Are We?

A membership organization

Staff of ~50
Budget of ~$10M

Based in Washington, D.C.

No Advocacy – 501c3

Founded in 1992

Research, Education, Collaboration & Standards

Unbiased

Technology Agnostic
The next generation of EV charging could have significant impacts on peak demand.

Impact of fleet electrification

Most utilities are not adequately preparing...

...even though ¾ of utilities expect >5 EV fleet projects of 5 MW+
Vehicle-Grid Integration Overview

Passive
Behavioral Load Control
- Choice
- User experience
- Timing is key
- Grid Operator Considerations

Active
Direct Load Control
- User experience
- Transport Layer
- Messaging Protocol/ Standard
- Grid Operator Considerations

Source: BMW of North America, 2016 with edits by Smart Electric Power Alliance, 2017

Note: The light blue area illustrates the impacts of a hypothetical TOU residential charging rate with the lowest rate period beginning at 11 pm. The dark blue area shows how managed charging could distribute charging loads with peaks in renewable energy generation.
Passive Load Management

Percent of Residential Customers in Each State with Access to Time-Varying EV Rates
(National Average = 25%)

<table>
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<th>28 investor-owned utilities, 12 municipal utilities, and 10 electric cooperatives</th>
<th>18 pilot programs, 46 fully implemented residential rates</th>
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<td>Of the 64 EV rates, <strong>58</strong> were TOU rates, <strong>1</strong> was a subscription rate with an on-peak adder, and <strong>5</strong> were off-peak credit programs.</td>
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How the rate applies to the home load:

- **35** rates apply to the **total household energy consumption**, including the EV charging load.
- **21** rates **apply strictly to EV charging**. These rates typically require the installation of a second meter or submeter, and two rates are metered from a submeter in the EV charger itself.
- **8** rates allowed customers to **choose between whole home or EV-only options**.

Source: Smart Electric Power Alliance & The Brattle Group, 2019.
Active Load Management

How a State Could Support
• Define value of managed charging
• Initiating a task force to discuss and define:
  • Communications protocols and standards
  • Pilots/demonstration projects that supports proof of concept for aggregation strategies
  • State goals for managed charging

Figure 3: Grid to EV Communications Architectures

Figure 4: Grid-EV Communications Architectures: Where Decisions Are Made

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HEADQUARTERS

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