Better Buildings Alliance
Renewables Integration
Technical Research Team

Team Call - Utility Rate Structures & Opportunities to Incentivize Load Flexibility

April 28, 2020
1:00 – 2:00 PM EST
Welcome!

RENEWABLES INTEGRATION

https://betterbuildingsinitiative.energy.gov/alliance/technology-solution/renewables-integration

Strategic use of renewables can help businesses reduce energy costs and their environmental footprint. The Renewables Integration Technology Research Team is pleased to provide resources, information and guidance on integrating renewable energy into your building portfolio.

Have Questions on PV and Roofing?: View the PV Roofing Guide
Renewables Integration – Team Goals

- Strategic use of renewables
- Building load flexibility
- Grid coordination
- Provide resources, information, and guidance on these topics to building owners and managers
Call Agenda

- Introduction & Quick Announcements
  - Rois Langner, NREL

- Technical Presentations:
  - Chris Perry, ACEEE
  - Candice Tsay, ConEd

- Discussion and Q&A
  - Rois Langner, NREL
  - Theo Kassuga, Guidehouse
Technical Team Lead:

Rois Langner
Commercial Buildings Research Group, NREL
E: Rois.Langner@nrel.gov
P: 303-204-7026
Renewables Integration – Team Players

Technical Team Support:

Theo Kassuga
Managing Consultant, Energy Guidehouse

Bill Goetzler
Managing Director, Energy Guidehouse
Better Buildings Virtual Leadership Symposium

June 8-11, 2020

- Series of timely webinars & peer exchanges
- The full schedule can be viewed [here](#)
- Register for individual sessions, meet-ups, and workshops [here](#)
- All are free to attend
Announcements – Recent Publications

DOE GEB-site:

https://www.energy.gov/eere/buildings/grid-interactive-efficient-buildings
Announcements – Upcoming Team Calls

Better Buildings Alliance *Renewables Integration* Team

**Team Calls**

The BBA EMIS & Renewables Integration Team are jointly hosting a 2-part webinar series on behind the meter distributed energy resources:

- **Part 1**: May 6th, 2-3pm EST - The Value of Distributed Energy Resources to Owners: A Current Market Landscape [Register here]

- **Part 2**: End of June - Methods and Best Practices for Integrating DERs into Commercial Buildings

Have questions? Email us!

Rois Langner: [Rois.Langner@NREL.gov](mailto:Rois.Langner@NREL.gov)

Theo Kassuga: [Theo.Kassuga@Guidehouse.com](mailto:Theo.Kassuga@Guidehouse.com)
Announcements – Team Calls

Better Buildings Alliance *Renewables Integration* Team

**Team Calls**

- New topics every couple months

- Did you miss the last one?
  - Find it on the Better Buildings Solution Center:
    - April 9th: *Building Load Flexibility and Grid Coordination*
    - June 25th: *EV’s – Buildings as the New Gas Station*
    - Nov 5th: *Bridging the Gap Between Efficiency & Demand Response*

Have questions? Email us!

Rois Langner: 
*Rois.Langner@NREL.gov*

Theo Kassuga: 
*Theo.Kassuga@Guidehouse.com*
Today’s Presenters

Chris Perry, PE
Research Manager, Buildings Program
ACEEE

Candice Tsay, PhD
Sr. Planning Analyst
Con Edison
Technical Presentation:
Chris Perry
ACEEE
Grid-Interactive Efficient Buildings
Utility Program Trends and Impacts on Facility Managers

Better Buildings Alliance Renewables Integration Technology Research Team Call
April 28, 2020

Chris Perry, PE
cperry@aceee.org
Research Manager, Buildings Program
Agenda

Background
- ACEEE work
- Changes to the grid
- Impact on facility managers

Grid-interactive Efficient Buildings (GEBs)
- Defining GEBs
- Benefits of GEBs
- Utility GEB programs

Barriers, Recommendations, & Conclusions
- Barriers
- Recommendations
- Conclusions
Background
Since 2017, ACEEE has released reports on smart & connected buildings and energy storage.

**Smart Buildings**
- Smart Buildings: Using Smart Technologies to Save Energy in Existing Buildings (2017)
- Smart Buildings: A Deeper Dive into Market Segments (2017)

**Energy Storage**

**Grid-Interactive Efficient Buildings**
Historically, ACEEE’s research focused on kWh, however we are increasingly interested in kW.
Historically, ACEEE’s research focused on kWh, however we are increasingly interested in kW.
Rapid changes in technology adoption (e.g., solar and electric vehicles) and policies (e.g., electrification) can cause grid strain.

California ‘Duck’ Curve  Midwest ‘Gator’ Curve  Hawaii ‘Nessy’ Curve

Utilities are looking for ways to help manage electric grid loads...and buildings are a key resource.
Facility managers should be interested in these grid-interactive efficient building utility (GEB) programs trends.

- **Incentives**: New incentive program offerings may help you save money on advanced energy-saving equipment for your building.
- **Rates**: New electricity rate structures may incentivize GEB technologies by valuing energy efficiency + demand flexibility.
- **Skills**: Training your staff to use grid-interactive technologies now provides an increasingly valuable skillset in the marketplace.
- **Recognition**: Your site could be used for a pilot or demonstration project and earn recognition.
Grid-interactive Efficient Buildings (GEBs)
Two important definitions...

**Grid-interactive efficient buildings (GEBs)** are highly-efficient buildings that can communicate with and serve as a resource for the grid (e.g., shift or shed loads).

**GEB utility programs** accurately value and incentivize energy efficiency and load flexibility benefits of buildings and their efficient and connected technologies.
Key GEB technologies can save energy and/or interact with the grid.
GEBs benefit cities, utilities, and building owners.

- Reduce emissions
- Reduce grid strain
- Reduce bill costs
Smart, connected technologies in GEBs also add value to a building through nonenergy benefits.

- **Hotel**
  - Guest experience
  - Comfort
  - Security

- **Office**
  - Worker productivity
  - Asset value
  - Security

- **Hospital**
  - Health & safety
  - Patient satisfaction
  - Security
  - Resilience
Utility programs are starting to pave the way to GEBs by valuing both efficiency and demand response.
Barriers, Recommendations, & Conclusions
Top GEB barriers for facility managers include:

- Interoperability
- Cybersecurity
- Workforce
Utilities also face their own barriers:

- Organizational Silos
- Technology Expertise
- Policy Mandates
- Metrics & Valuation
Conclusion for utilities: taking steps to create holistic GEB programs now can help mitigate future grid strain.

• Some initial recommendations:
  • Include smart, grid-connected technologies in long-term plans
  • Break down silos and integrate EE and DR departments
  • Expand IT department to prepare for new data opportunities
  • Begin investigating your value of grid interactivity

ACEEE hosts a GEB working group for utilities and program administrators – contact Chris if interested! cperry@aceee.org
Conclusion for facility managers: preparing for GEBs now will give you and your facilities an advantage.

**Incentives**
New incentive program offerings may help you save money on advanced energy-saving equipment for your building.

**Rates**
New electricity rate structures may incentivize GEB technologies by valuing energy efficiency + demand flexibility.

**Skills**
Training your staff to use grid-interactive technologies now provides an increasingly valuable skillset in the marketplace.

**Recognition**
Your site could be used for a pilot or demonstration project and earn recognition.

**ACEEE**
American Council for an Energy-Efficient Economy
Thank you!

Chris Perry  
cperry@aceee.org  
Research Manager, Buildings Program

aceee.org/grid-interactive-efficient-buildings-gebs
Technical Presentation:
Candice Tsay
Con Edison
SMART HOME RATE DEMONSTRATION PROJECT
Rate approaches for flexible load response

Better Buildings Alliance Renewables Integration Technology Team Call
April 28, 2020

Candice Tsay
Sr. Planning Analyst, Con Edison
Innovative Pricing Pilot

- Test customer acceptance of innovative rate designs
- Determine customer behavioral changes
- Evaluate customer benefits

Value of DER

- Develop successor to net energy metering (“NEM”)
- NEM successor rates may form the basis for future mass market default rates

Smart Home Rate

- Test rate for homes with controllable load
- Allows customers to respond to price signals using home automation technology
Load flexibility for transformational change

To help reach these ambitious goals, we’ll need widespread behavioral change and rapid technology adoption, done at scale.

**New York Climate Leadership and Community Protection Act**

- 70% of electrical supply from renewables by 2030 / 100% by 2040
- Net zero greenhouse gas emissions by 2050
- Electrification of commercial and residential heating, and transportation sectors

**Utility approaches**

- Direct Load Control
- Demand Response
- Rates

Time-varying, dynamic rates can provide customers with direct price signals to encourage load flexibility

In the **Smart Home Rate Demo**, two key concepts tested together:

1. Design a rate that accurately reflects cost drivers
2. Provide in-home technology that enables price responsiveness
Rate pilot to evaluate impacts and customer perception/behavior

Program impacted and currently delayed by COVID-19 pandemic. Certain details subject to change.

Objectives
- Measure load response
- Measure bill impacts
- Gauge customer acceptance
Rate design approach

1. Unbundle cost components and reflect system cost drivers

2. Consider how design elements can be made user-friendly for customers
Rate design approach

1. Unbundle cost components and reflect system cost drivers

Total Bill (simplified)

Supply

- Energy

- Capacity

Delivery (Con Edison’s infrastructure assets and service delivery)

- Transmission

- Distribution

- Customer

Infrastructure costs that provide capacity to meet peak demand:

Rate component types

- Demand charge

- Critical peak event charge
## Rate design approach

2. Consider how design elements can be made user-friendly for customers

<table>
<thead>
<tr>
<th>Rate A</th>
<th>Rate B</th>
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<tbody>
<tr>
<td><strong>Day-Ahead Hourly NYISO Locational Marginal Price (LMP)</strong></td>
<td><strong>Day-Ahead Hourly NYISO LMP</strong></td>
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<tr>
<td><strong>Energy (per kWh)</strong></td>
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<tr>
<td><strong>Generation capacity charges</strong></td>
<td><strong>T&amp;D delivery charges</strong></td>
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<tr>
<td><strong>T&amp;D delivery charges</strong> (per kW)</td>
<td><strong>Daily Demand Charge (on max. 60-min interval between 12-8pm)</strong></td>
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<tr>
<td><strong>Critical peak G, T, and D event charges (on max. 60-min interval during event)</strong></td>
<td><strong>Critical peak G, T, and D event overage charges (on incremental demand above subscription level during event)</strong></td>
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### More details in “Rider AB” in Con Edison’s electric tariff

While rates are complex, customers will be provided with home automation technology to respond to prices.

Daily demand and subscription charges give a wide range of flexibility for customers and technologies to operate under.

Critical peak event charges designed to encourage demand reduction at peak times.
Summary

1. Innovative rates can drive load flexibility for transformational change.

2. Unbundled cost components provide accurate price signals, while design elements can be made user-friendly for customers.

3. We can derive much needed data on customer responses from rate pilots, and apply insights to scale up or modify approaches.
Comments? Questions?

Please share your thoughts!
Thank you!

Email: 
rois.langner@nrel.gov
theo.kassuga@guidehouse.com
to be added to our listserv.

Stay tuned for announcements on upcoming BBA Renewables Integration Team calls!