Grid-Interactive Efficient Buildings

Improving & Optimizing

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Questions & Challenges

- How do grid-interactive efficient buildings fit into larger grid modernization?
- What are the top priority benefits buildings provide the grid? And how well can building owners/operators/occupants capture those benefits?
- How critical are better Technologies? Analytics? Policies & programs?
- What are key barriers to adoption of advanced controls, technologies, practices?
  - Making the business/investment case?
  - Complexity of advanced controls and potential of obsolescence?
  - Cybersecurity (reality and/or perception)?
- Will efficiency get its “fair share” of benefits of advanced technologies?
- How is this issue faring among State governments? How can others help?
- For that matter, is this a “bridge too far” (at least today) for buildings, utilities, governments?
Not All Energy Efficiency is Equally Valuable

Massachusetts Case Study

Time-varying value of energy efficiency savings by load shape
(reflects publicly available data only)

Source: Time-Varying Value of Electric Energy Efficiency June 2017 N.Mims, T.Eckman & C.Goldman, LBNL, for BTO
The Modern – and thus Connected – Building
Grid-interactive Efficient Building Concept

1. Lowers total electricity demand
2. Flattens peak demand
3. Flexibly aligns with variable renewables (considers load net of renewables)
### Examples of grid-interactive efficient technologies

<table>
<thead>
<tr>
<th></th>
<th>Passive</th>
<th>Active</th>
<th>Connected</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lighting</strong></td>
<td>Daylighting</td>
<td>LED Lighting</td>
<td>Lighting Controls</td>
</tr>
<tr>
<td><strong>Storage/storage-like</strong></td>
<td>Phase Change Materials</td>
<td>H₂O-Based Thermal Storage</td>
<td>Controllable Multi-Speed HVAC</td>
</tr>
</tbody>
</table>

**Performance**

- **Optimized Lighting:**
  - Minimized Energy Consumption
  - High Occupant Comfort
  - Low Ability to Provide Grid Services

- **Optimized Comfort:**
  - Minimized Energy Consumption
  - High Occupant Comfort
  - High Ability to Provide Grid Services
Is Everything Working Right?

Smart Hotels & Smart Grid - Actual State

Source: Douglas Rath, Marriott International
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(If you have answers send them to david.nemtzow@ee.doe.gov!)
QUESTIONS? COMMENTS? LET’S WORK TOGETHER!

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