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Demand Resources in CT: Priority Issues and the Future

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## Several Demand Resource Strategies

### Demand Resource Policies and Strategies

<table>
<thead>
<tr>
<th>Demand reduction from EE programs</th>
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<tbody>
<tr>
<td>Demand response to reduce demand (actively) in specific time periods (ISO regional market, state efforts)</td>
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<tr>
<td>Demand management, direct load control, and load shifting, through strategies using controls, analytics, energy management systems, connected technologies</td>
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<td>Integrated approaches to the above (e.g., integrated EE and demand response using controls and software)</td>
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<td>Pricing and rate design (time-varying rates, demand charges)</td>
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Demand is important

- Capacity is purchased to meet the forecasted demand
- Demand reduction has multiple objectives
  - Reliability, cost mitigation and pricing, environment and climate, resiliency, customer empowerment
- System peak demand is in the summer
- Winter peak demand and energy prices also important
- Important *where* demand is reduced, for ISO zones and geo-targeting (e.g., Southwest CT in the past)
- Significant overlap with grid modernization and distributed energy resource (DER) efforts
ISO-NE: “Energy use is flat or declining, but peak demand continues to grow”

More effective (and possible) to focus on reducing peak demand rather than prices

<table>
<thead>
<tr>
<th>Top Ten Highest Hourly LMPs in 2015</th>
<th>Top Ten Highest System Loads in 2015</th>
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<tbody>
<tr>
<td>Date</td>
<td>Hour</td>
</tr>
<tr>
<td>5/10/15</td>
<td>21</td>
</tr>
<tr>
<td>8/15/15</td>
<td>17</td>
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<tr>
<td>2/21/15</td>
<td>19</td>
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<td>1/03/15</td>
<td>18</td>
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<td>9/07/15</td>
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<td>9/08/15</td>
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<tr>
<td>9/08/15</td>
<td>16</td>
</tr>
<tr>
<td>12/21/15</td>
<td>18</td>
</tr>
</tbody>
</table>

- Highest hourly LMPs (prices) can occur throughout the year
- Highest system loads are consistently in the summer and within consistent (predictable) time frames

Source: Analysis of MA PAs, presented to MA EEAC on 10/19/16
Some strategy options to obtain value from demand reductions

- System-level (regional system) and state-level options
- ISO market resource (bid into the markets) vs. a state resource or utility resource
- Some options:
  - **Price**: Forward Capacity Market (FCM). Bid into the FCM, receive FCM revenues (to fund programs), and put downward pressure on prices as part of FCA auctions
  - **Amount**: Installed Capacity Requirement (ICR) and forecast. Reduce the ICR, then states would need to buy less capacity (but note demand resources are reconstituted if bid in)
  - **Cost Allocation**: ICAP Tag. Reduce demand in peak hour, thereby reducing the share of capacity costs to the load serving entity and some larger customers (the total system cost doesn’t decrease but the share of system costs paid by CT would)
  - **Customer**: Reduce customer costs by reducing demand charges and provide other value
Not your parent’s demand response

- Not just:
  - Large customers
  - “Curtailment”
  - Noticed “events”

- Future opportunities
  - All sectors
  - New opportunities and considerations, due in large part to advanced technology and automation
  - Building/process management, not just energy management
  - Demand resources and demand reductions focused on multiple objectives, to provide multiple benefits – and not just focused on one objective or one benefit or one market

- More about demand management (within larger context of building and process automation/management) than about customer response to a noticed event
Building automation, energy management – software, controls, and automation

Building Automation and Energy Management
Integration of demand management and EE

▪ Many new opportunities can be leveraged by or layered on top of EE efforts – especially with advanced technology and automation.

▪ Not siloed into EE vs DR

▪ Examples:
  – Energy management systems, controls, and automation to manage lighting, HVAC, and process loads
  – Lighting and HVAC controls in commercial facilities
  – Process automation
  – Wifi thermostats to reduce energy use and manage peak demand (summer and winter opportunities)
  – Smart systems, smart controls and smart equipment
The Future - Dynamic Communication and Aggregation

ENABLE NEW MARKETS
Key information needs – why pilots?

- Technology and automation – what are the opportunities, how well will it work, will it perform as expected?
- Customer interaction and acceptance – how will customers interact with new technology and automated systems, and what will be the nature and degree of customers allowing others to manage their demand?
- Integration – what are the best opportunities to integrate active demand management and energy efficiency?
- Strategies – which strategies are most effective at delivering value, for the system and for customers?

*Pilots over next 1-2 years are crucial to address these key information needs and research questions*
The Companies should ensure that an adequate number of pilot sites across the key targeted customer segments covering the demand reduction strategies to be tested are installed and fully operational before the summer of 2017, considering the importance of the demand reduction pilots as a crucial step in addressing peak demand issues in Connecticut. The Board understands there is limited budget available for the pilots in 2017 and the Board is not recommending an increase in the pilot budgets. As one approach for stretching the available funding, the Board recommends that the Companies enroll additional customers that have existing infrastructure (i.e., controls, software, etc.) compatible with the design and focus of each pilot so that more customers can participate in the pilots and more results from the pilots are available. The Board also encourages the Companies to identify and pursue other opportunities for expanding the number of sites in the pilots, including through adding some recent participants in the energy efficiency programs to the pilots, where appropriate. All of the pilot sites focusing on summer peak demand should be fully installed in the field by mid-May 2017, in time for testing during the summer of 2017. This timing is critical, so that the Companies, the Board, DEEP, and others can review the results of the summer 2017 pilots in September-October 2017, and then the Companies and Board can complete the planning for demand reduction activities for 2018 as part of the 2018 Plan Update process.
Need for Electric Supply Changing with More Renewables

CAISO load, net load, and wind and solar output on example weekdays during 2014:
- April 22, 2014
- July 22, 2014
- October 22, 2014

Graphs showing load, net load, wind, and solar output over the course of a day for different dates in 2014.
Thank You

Questions?