The Expanding Role of Energy Storage in the Regional Power System

2019 Annual NECPUC Symposium

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Storage Can Participate in All of New England’s Wholesale Electricity Markets and Services

**Energy Market**
- Market for purchasing and selling electricity using supply and demand to set price

**Ancillary Services**
- Services that ensure reliability of production and transmission of electricity
  - Reserve
  - Regulation
  - Voltage Support
  - Blackstart

**Forward Capacity Market**
- Resources compete to deliver capacity in three years’ time

**Day-Ahead Energy Market**

**Real-Time Energy Market**
Participation of Storage Is a Function of Many Factors Including the Size and Location of the Facility

• Larger storage resources (> 5 MW) generally participate directly in the wholesale markets as supply and/or demand

• Smaller storage resources can participate in different ways, including aggregating with other resources as demand response
Battery Storage Is Emerging in Large Quantities in New England’s Wholesale Electricity Markets

All Proposed Resources

- **Battery Storage**: 2,041 MW, 10%
- **Solar**: 3,082 MW, 16%
- **Natural Gas**: 3,160 MW, 16%
- **Hydro**: 74 MW, <1%
- **Biomass**: 39 MW, <1%
- **Fuel Cell**: 15 MW, <1%
- **Wind**: 11,315 MW, 57%

**TOTAL**: 19,725 MW

*Source: ISO Generator Interconnection Queue (April 2019); FERC and non-FERC jurisdictional proposals; nameplate capacity ratings. Some natural gas proposals include dual-fuel units (with oil backup); some natural gas, wind, and solar proposals include battery storage. Megawatts have been rounded.*
ISO New England Continually Evaluates Opportunities to Enhance the Market Design to Enable New Technologies

- Storage can participate in the markets today
- The ISO recently implemented rule changes to better integrate storage and other technologies into the markets
- The ISO is looking at further enhancements to better incorporate technologies into the markets and value reliability services
- The region will need flexible resources to help balance the quantities of wind and solar being added to the system
FOR MORE INFORMATION...

Subscribe to the *ISO Newswire*

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APPENDIX

Additional Background Information
Energy Market Values Vary with Fuel Prices While Capacity Market Values Vary with Changes in Supply

Annual Value of Wholesale Electricity Markets (in billions)

- Energy Market
- Ancillary Markets
- Forward Capacity Market

Source: 2018 Report of the Consumer Liaison Group; *2018 data is preliminary and subject to resettlement

Note: Forward Capacity Market values shown are based on auctions held roughly three years prior to each calendar year.
Ancillary Services Today Are a Relatively Small Part of the Wholesale Electricity Markets

Value of Wholesale Markets in 2018 (in $ Billions)

<table>
<thead>
<tr>
<th>Market Type</th>
<th>Value (in billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Market</td>
<td>6.0</td>
</tr>
<tr>
<td>Ancillary Markets</td>
<td>3.6</td>
</tr>
<tr>
<td>Capacity Market</td>
<td></td>
</tr>
</tbody>
</table>

Ancillary Service Markets in 2018 (in $ Millions)

<table>
<thead>
<tr>
<th>Service Type</th>
<th>Value (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage Support</td>
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<tr>
<td>Black Start</td>
<td>14</td>
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<tr>
<td>Regulation Service</td>
<td>35</td>
</tr>
<tr>
<td>Forward Reserves</td>
<td>41</td>
</tr>
<tr>
<td>Real-Time Reserves</td>
<td>30</td>
</tr>
</tbody>
</table>

Source: ISO New England Internal Market Monitor
ISO-NE Markets and Settlements Data