Energy Efficiency in Wholesale Markets

Capturing the Multiple Benefits of Energy Efficiency
Roundtable on Energy Provider and Consumer Benefits
16 October 2013
Doug Hurley
Energy System modeling, analysis, expert testimony, and stakeholder representation for...

- Consumer Advocates and Public Interest Groups in more than 25 states
- More than 20 PUCs and Attorneys General
- Over 40 Environmental Groups and Foundations

- Wholesale Market Representation for Consumer Advocates, Energy Efficiency, Renewable Generation, and Environmental Advocates
Agenda

- Impact on transmission planning
- Lower wholesale energy and capacity market prices
- Reduced price volatility and Can we target wholesale impact?
## New England Investment in EE

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual EE Budget ($m)</th>
<th>Approx. FCM Revenue ($m)</th>
<th>% extra from FCM</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>$353.4</td>
<td>$26.4</td>
<td>7%</td>
</tr>
<tr>
<td>2010</td>
<td>$535.2</td>
<td>$28.5</td>
<td>5%</td>
</tr>
<tr>
<td>2011</td>
<td>$886.3</td>
<td>$24.6</td>
<td>3%</td>
</tr>
<tr>
<td>2012</td>
<td>$1,029.4</td>
<td>$24.1</td>
<td>2%</td>
</tr>
</tbody>
</table>

**Notes:**
1. Annual Budget from ACEEE 2011 Scorecard, Table 4.
2. FCM = ISO New England Forward Capacity Market
3. Estimated FCM revenues from public data. Does not account for over/under delivery, proration, or multi-year prices.
<table>
<thead>
<tr>
<th>Year</th>
<th>Forecast of Summer Peak Savings Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>231 MW</td>
</tr>
<tr>
<td>2017</td>
<td>218 MW</td>
</tr>
<tr>
<td>2018</td>
<td>204 MW</td>
</tr>
<tr>
<td>2019</td>
<td>192 MW</td>
</tr>
<tr>
<td>2020</td>
<td>180 MW</td>
</tr>
<tr>
<td>2021</td>
<td>169 MW</td>
</tr>
<tr>
<td>2022</td>
<td>159 MW</td>
</tr>
<tr>
<td>Total</td>
<td>1,353 MW</td>
</tr>
<tr>
<td>Annual Average Growth</td>
<td>193 MW</td>
</tr>
</tbody>
</table>

Any savings from deferred or cancelled transmission projects accrue to ALL ratepayers!

Avoided Energy Supply Costs from EE

Components of Avoided Cost

Impact of EE on Wholesale Energy Market Price

Step 1 – Business as Usual (BAU) Energy; BAU Supply, BAU Price

1: BAU supply curve intersects average annual BAU demand curve at annual average energy price of $34.16/MWh**

**annual load weighted effect from regression fitted to hourly loads and prices

Step 2 – Lower Energy; BAU Supply; Lower Price

2. Annual energy reduction of **18,781 MWh** (10%) shifts annual average demand curve left

3. BAU supply curve intersects lower annual average demand curve at **$33.15/MWh**

**annual load weighted effect from regression fitted to hourly loads and prices

Notes on Price Impact

• Price impact savings accrue to ALL ratepayers, not just those who participate by installing measures at their own home or business.

• Impact can be very sensitive to market rules. This is especially true for capacity price impact.

• Important to analyze timing of EE install and other expected market need, entry, and retirement.

• Estimating the persistence of these reductions requires analyses of how wholesale markets will respond to lower prices over time.

• Estimating the resulting impact on retail rates requires analyses of how wholesale capacity and energy costs flow into retail rates.
Effect on Hourly Price

Reducing Price Volatility

ComEd Day-Ahead Energy Price
Calendar Year 2012
Northeast Energy Efficiency Partnerships EM&V Forum / KEMA
C&I HVAC Savings Tool
1 MW of Connected Load Reduction in Eastern Mass
www.synapse-energy.com

Doug Hurley
Paul Peterson
Sarah Jackson