Massachusetts Restructuring Roundtable

*Bracing for Storms in New England*
Marcy L. Reed, President, MA
National Grid
December 21, 2012
Irene Makes Landfall near New York City on Sunday Morning August 28th
Major storms since August 2011

Storm Outage Comparison

- Irene
- Snowtober
- Superstorm Sandy

Outage Days

Customers Impacted

Day 1  Day 2  Day 3  Day 4  Day 5  Day 6  Day 7  Day 8
Reliability Enhancement Program

- Targeted asset replacement with defined expected reliability improvement
- Addition of over 300 reclosers
- Enhanced Hazard Tree removal
The Age of Convergence

SMART GRID
A vision for the future — a network of integrated microgrids that can monitor and heal itself.

- Solar panels
- Smart appliances
- Processors
- Sensors
- Storage
- Generators
- Offices
- Wind farm
- Houses
- Demand management
- Disturbance in the grid
- Central power plant
- Isolated microgrid

Smart appliances: Can shut off in response to frequency fluctuations.

Processors: Execute special protection schemes in microseconds.

Sensors: Detect fluctuations and disturbances, and can signal for areas to be isolated.

Storage: Energy generated at off-peak times could be stored in batteries for later use.

Generators: Energy from small generators and solar panels can reduce overall demand on the grid.
New technology provides better information
We’re Not Getting Any Younger

Age Distribution
Electric and Natural Gas Utilities

<table>
<thead>
<tr>
<th>Age</th>
<th>2006</th>
<th>2007</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23-27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28-32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33-37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38-42</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43-47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48-52</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>53-57</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>58-62</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>63-67</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>67+</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
STEM Education - Building the Future Workforce
An Opportunity to Review Policy

Partners

Rules

Customers
Start with the Customer and Work Backwards

The Cost of Electricity About Equal to a Cup of Coffee ...

2011 Daily Cost of Electricity – NG Basic Service Customers

<table>
<thead>
<tr>
<th></th>
<th>All Homes</th>
<th>Low Income</th>
<th>Electric Heat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MA</strong></td>
<td>$2.88</td>
<td>$2.01</td>
<td>$4.64</td>
</tr>
<tr>
<td></td>
<td>(642 kWh/mo)</td>
<td>(575 kWh/mo)</td>
<td>(878 kWh/mo)</td>
</tr>
</tbody>
</table>

Cost of Dunkin Donuts “Great One” Coffee: $2.62
Questions for consideration

- How fast do we modernize the grid?
- What technologies deliver the biggest value for our customers?
- Can we reshape the future workforce?
- Who pays for the modern grid and at what price?
- What regulatory framework changes might we envision?
- All of these questions must be evaluated with customers’ evolving expectations at the forefront of the discussion.