New England’s Evolving Energy Infrastructure: Grid Modernization

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Policy and Government Affairs

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Introduction

The New England Clean Energy Council’s and the NECEC Institute’s mission is to accelerate New England’s clean energy economy to global leadership by building an active community of stakeholders and a world-class cluster of clean energy companies.
Industry Context

- Changing energy landscape
  - Proliferation of distributed energy resources and increasing energy efficiency
  - Flat or declining deliveries/sales
  - Increasing investment needs
    - Replacement
    - Modernization
- Stresses utility business model and financial integrity
- Need to change regulatory framework
  - To align utility interests with interests of customers, stakeholders, and energy and environmental policy

Different Responses

Massachusetts Makes Smart Grid Mandatory

A new law requires smart meters, grid planning, and new models to value it all.

Jeff St. John
December 31, 2013
Massachusetts has joined a growing list of states demanding that its investor-owned utilities invest in the smart grid — and find new models for how those investments should be valued. Consider it the latest move in a state-by-state reconfiguration of utility business models, aimed at creating new rules for sharing the costs and benefits of grid modernization between utility shareholders and customers.

Monopoly Utilities Doomed Jim Rogers on the Pivot Ahead

BY MARTIN ROSENBERG EDITOR-IN-CHIEF, ENERGOBIZ 1-20-14
The many challenges ahead are going to fundamentally change this industry. Leaders in this industry in the future are going to have to run to the problems that they see on the horizon, embrace the problems, and then try to convert the problems and challenges they see into opportunities to create value for their customers as well as their investors.
**MA Grid Modernization Process**

- Massachusetts DPU 12-76 NOI, October 2012
- Established Grid Modernization Steering Committee and subcommittees
- Steering Committee met December 2012 to July 2013
- Steering Committee Report Filed with DPU July 2, 2013
- DPU Order with Straw Proposal, December 23, 2013
- Comments on Straw Proposal filed January 17, 2014
- Panel hearings February 24-27, 2014
- Reply comments due March 21, 2014

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**MA Grid Modernization Objectives**

**October 2012 NOI Objectives**

- Reduce frequency and duration of customer outages
- Empower customers; reduce costs
- Improve the operational efficiency of the grid,
- Reduce T &D operation/maintenance/construction costs
- Reduce system peaks
- Facilitate the integration of DER & new technologies
- Enhance the success of MA energy efficiency initiatives
- Reduce greenhouse gas emissions
Participants on the Grid Mod Steering Committee

Table 1-1: Steering Committee Member Organizations

<table>
<thead>
<tr>
<th>State Agencies (5)</th>
<th>Clean Energy Cluster (9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA Clean Energy Center</td>
<td>Bloom Energy &amp; ClearEdge Power (Fuel Cells)</td>
</tr>
<tr>
<td>MA Dept. Telecom/Cable (ex officio)</td>
<td>ChargePoint (EV Charging)</td>
</tr>
<tr>
<td>MA DOCR</td>
<td>Conservation Services Group (Energy Efficiency)</td>
</tr>
<tr>
<td>MA DEP (ex officio)</td>
<td>Electricity Storage Association &amp; AMI/RI (Storage)</td>
</tr>
<tr>
<td>Utilities (6)</td>
<td>New England Clean Energy Council</td>
</tr>
<tr>
<td>National Grid</td>
<td>Northeast Clean Heat &amp; Power Initiative (CHP)</td>
</tr>
<tr>
<td>NSTAR</td>
<td>Northeast Energy Efficiency Partnerships (EE)</td>
</tr>
<tr>
<td>Uniteil</td>
<td>SEBANE/SEIA (Solar)</td>
</tr>
<tr>
<td>WMAEDC</td>
<td>Environmental Groups (1)</td>
</tr>
<tr>
<td>Independent System Operator (1)</td>
<td>ENE</td>
</tr>
<tr>
<td>RIO New England</td>
<td>Competitive Suppliers (2)</td>
</tr>
</tbody>
</table>

Consumer Groups (3)

- Low Income Network: Direct Energy
- Cape Light Compact: Direct Energy
- MA Office of the Attorney General:

July 2, 2013 Report to DPU

- Ch. 1: Introduction, Process & Overview
- Ch. 2: Goals, Objectives & Barriers
- Ch. 3: Grid Modernization Taxonomy
- Ch. 4: Background Information & Joint Fact Finding Road-Map
- Ch. 5: Principles and Recommendations
- Ch. 6: Regulatory Framework Proposals
- Ch. 7: Cost-Effectiveness Frameworks
- Ch. 8: Next Steps for the Regulatory Framework
Grid Modernization Principles

- Participants had different goals
- NECEC brought together “Clean Energy Caucus” around set of principles, as well as regulatory framework
- Focused on integration of distributed energy resources to capture full value for customers and for utility system
- Requires utility to
  - Take into account variety of new distributed energy resources in distribution planning
  - Modernize grid to have visibility into status of system
  - Move toward time varying rates to provide information to customers

Clean Energy’s Grid Modernization Principles

*Integration of distributed energy resources into utility system to capture full value for customers and for utility*

- What this involves
  - Planning the distribution (and transmission) system to take into account variety of new distributed energy resources
  - Visibility into status of system (information to utilities)
  - Time varying rates (information to customers)
  - Evaluating benefits and costs broadly
  - Regulatory framework that supports needed investment
  - Customer education and protection
Planning for a Modern Grid

- Long-term focus
- Plans should keep options open
  - Be flexible, allow for updates and accommodate evolving technology
  - Account for long-term, multi-year objectives and investments and “right size” equipment to address expected needs and desired outcomes
- Assess effects on reliability, operations, usage, peak load, prices and bills
- Integrate distributed energy resources to benefit grid operations as well as provide customer service options

### MA Grid Mod Comprehensive Regulatory Frameworks

**Table 6.1: Summary of Comprehensive Regulatory Frameworks**

<table>
<thead>
<tr>
<th>Customer- grid, both</th>
<th>Enhanced Regulatory Model</th>
<th>GM Expansion - Present</th>
<th>GM Expansion - Post-approval</th>
<th>Future Test Year</th>
<th>Utility of the Future, Today</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid</td>
<td>Customer</td>
<td>Both</td>
<td>GM</td>
<td>Both</td>
<td>Both</td>
</tr>
<tr>
<td>Summary</td>
<td>Enhance reliability and facilitate DG</td>
<td>Investigate / facilitate T&amp;D, DG and metering</td>
<td>GM ready / grid expansion</td>
<td>GM plans</td>
<td>GM naïve / current planning / new AEMs, GM naïve / grid expansion, GM naïve / grid expansion with performance incentives</td>
</tr>
<tr>
<td>Pre-approved budgets</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Public cost effectiveness</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Test year</td>
<td>History</td>
<td>History</td>
<td>History</td>
<td>Future</td>
<td>Future</td>
</tr>
<tr>
<td>Cost recovery</td>
<td>Rate-based DG</td>
<td>Rate-based DG</td>
<td>Rate-based DG</td>
<td>Rate-based DG</td>
<td>Rate-based DG</td>
</tr>
<tr>
<td>Rate design</td>
<td>Traditional, enhanced TVA to be considered</td>
<td>Traditional, enhanced TVA to be considered</td>
<td>Traditional, enhanced TVA to be considered</td>
<td>Traditional, enhanced TVA to be considered</td>
<td>Traditional, enhanced TVA to be considered</td>
</tr>
<tr>
<td>Shareholder incentives</td>
<td>Traditional</td>
<td>Traditional</td>
<td>Write in GM plan proposal</td>
<td>Current</td>
<td>For current performance</td>
</tr>
<tr>
<td>Performance targets</td>
<td>SDI enhanced, with additional targets, MIB</td>
<td>SDI enhanced, with additional targets, MIB</td>
<td>SDI enhanced, with additional targets, MIB</td>
<td>SDI enhanced, with additional targets, MIB</td>
<td>SDI enhanced, with additional targets, MIB</td>
</tr>
</tbody>
</table>

Note: See source below for additional details.
Endorsers of Each Framework

Table 6-2: Support for Comprehensive Regulatory Frameworks

<table>
<thead>
<tr>
<th>Regulatory Model Option</th>
<th>First Choice</th>
<th>Acceptable (first choice and other choices can likely support if first choice not an option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GM Expansion - Pre-approval Process</td>
<td>NSTAR, WMECO, Unitil</td>
<td>NSTAR, WMECO, Unitil, National Grid, Cape Light Compact, General Electric, MA DOER</td>
</tr>
<tr>
<td>Expansion of Investment Caps</td>
<td>National Grid, Unitil</td>
<td>National Grid, Unitil</td>
</tr>
<tr>
<td>Expansion of Investment Caps with a Multi-Year Plan</td>
<td>National Grid, Unitil</td>
<td></td>
</tr>
<tr>
<td>Future Test Year Model</td>
<td>National Grid, Unitil</td>
<td>National Grid, Unitil</td>
</tr>
<tr>
<td>Future Test Year with Multi-Year Plan Model</td>
<td>National Grid, Unitil</td>
<td>National Grid, Unitil, EnerNOC, ENE, General Electric, NECEC, CSG</td>
</tr>
</tbody>
</table>

Utility of the Future, Today

- Forward looking and performance-based model
- For grid modernization and all capital investments
- Forecasted multi-year (3-5) rate case
- Capital investment plan consistent with grid modernization objectives
- Stakeholder input
- “Business case” for investment, taking into account benefits, costs, risks and uncertainty
- Symmetric performance metrics provide accountability
Evaluating Benefits and Costs

• Making the “Business Case”
• Accounting for benefits, costs, risk and uncertainty
• Benefits broadly defined
  ▪ Quantified, difficult to quantify and un-quantified
  ▪ Utility system, customer, participant, non-participant, policymaker, societal
• Costs, including opportunity costs (and costs of doing nothing)
• Risk and uncertainty
  ▪ (Some) technologies are new, shorter-lived, evolving
  ▪ Some haven’t been invented yet (innovation)

MA Grid Modernization
Cost-Effectiveness Proposals

Table 7-1: Summary of Cost-Effectiveness Proposals Submitted

<table>
<thead>
<tr>
<th>Issue</th>
<th>Office of the Attorney General, Law Enforcement (Option A)</th>
<th>Office of the Attorney General, Law Enforcement (Option B)</th>
<th>Office of the Attorney General, Law Enforcement (Option C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Which grid and activities should be subject to a public cost-effectiveness analysis?</td>
<td>All customer-facing activities, except those where service is only provided upon customer request, and where service causes the cost. (Note: grid-related investments will be evaluated as they are today.)</td>
<td>All activities for which/utilities seek approval.</td>
<td>Might be more appropriate for some activities than others. An issue for further consideration.</td>
</tr>
<tr>
<td>When should such grid and activities be subject to a public cost-effectiveness analysis?</td>
<td>For customer-facing, prior to implementation or as part of a rule change based on the actual costs and benefits.</td>
<td>Prior to implementation.</td>
<td>Prior to implementation. As part of rate-setting process.</td>
</tr>
<tr>
<td>Should all costs and benefits be quantified in dollar amounts in order to be included in the public cost-effectiveness analysis?</td>
<td>For customer-facing, yes. Costs or benefits that cannot be quantified in dollars should not be included in the analysis.</td>
<td>No. Quantity as many as possible, but include qualitative as well.</td>
<td>No. Quantity as many as possible, but include qualitative as well. Qualitative impacts may be weighted.</td>
</tr>
<tr>
<td>Which costs and benefits (i.e., impacts) should be included in the public cost-effectiveness analysis?</td>
<td>For customer-facing, quantifiable costs and benefits linked to the costs and rates paid by the utility customer should be included. No participant or societal impacts.</td>
<td>The impacts to the utility, plus qualitative impacts related to utility investments, including reliability and safety among others. No benefits or costs that accrue solely to private, participating third party included.</td>
<td>The impacts to the utility, plus qualitative impacts related to utility investments, including reliability and safety among others. No benefits or costs that accrue solely to private, participating third party included.</td>
</tr>
</tbody>
</table>

*For the purposes of this Chapter, “public cost-effectiveness” generally means a cost-benefit analysis that is reviewed by the Department and other stakeholders, as opposed to a cost-benefit evaluation that is developed internally by an LSE.*
Other Key Elements

- Time Varying Rates
- Distribution Services Pricing
- Stakeholder Engagement
- Data Access

Time Varying Rates (TVR)

- Certain periods of day and year require greater amounts of capacity at higher energy cost to serve
- Provide this information to customers through time varying rates (RTP, CPP, TOU)
- Customers can reduce need through energy efficiency, controlled demand response, self-generation
TVR and Enabling Technology

Complementary Regulatory Policies

Table 6-1: Summary of Complementary or Targeted Regulatory Policies

<table>
<thead>
<tr>
<th>Category</th>
<th>Distribution Services Pricing</th>
<th>O fenced</th>
<th>GM Advisory Council</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer, grossing, or both</td>
<td>CF</td>
<td>Both</td>
<td>CF or both</td>
</tr>
<tr>
<td>Ratemaking Summary of Model, rates designed for new cost goals</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Utility oversight and implementation (i.e., DPUs, regulatory incentives)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Utility retirement (i.e., DPUs, regulatory incentives)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Utility rates and budget flexibility requirements</td>
<td>Yes</td>
<td>Yes</td>
<td>Annual</td>
</tr>
<tr>
<td>Cost-effectiveness</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Epilogue, public cost-effectiveness analysis</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Ratemaking and Cost Recovery:

- Test year: historic or future
- Frequency of rate cases: Current or forward
- Cost recovery (base rate, revenue): Forward
- Cost allocation (among customers): ROR
- Cost assignment (e.g., to third-party): Case by case
- Rate design: Based on cost, yield
- Utility shareholder incentives: Case by case
- Performance Targets or Metrics:
  - Rate of return on equity: Case by case
  - Revenue adequacy: Case by case

Note: See sections below for additional detail.
Distribution Services Pricing

- Prices for distribution services should reflect costs and planning needs of the utility
- Distributed resources should be compensated for services they provide to utility
- Historically, distribution delivered power one way to the customer
- Greater amounts of customer generation will create two way power flow on the system
- Utility of the future will provide connection services to customers, both load and generation
- Grid will integrate and manage customer load and local generation for customer choice and benefit

Stakeholder Engagement

- Engaging stakeholders – policymakers, regulators, clean energy industry, business, technology, engineering consumer and environmental advocates – is important
  - To identify new technologies
  - To identify benefits and costs
  - To ensure diverse interests are addressed
  - To take comprehensive approach
  - To facilitate timely regulatory review
- Process can be formal or informal
Data Access

- Customers, 3rd parties (and utilities) must be able to access data easily in near real-time to realize full value of grid modernization
  - Enables customers to make informed decisions about energy usage
  - Enables utility visibility to behind the meter generation
- Open access, interoperable grid platform is key to unleashing innovation of service and product applications

MA DPU Straw Proposal

- Issued December 23, 2013
- Requires distribution companies to file 10-year Grid Modernization Plans (GMPs) and 3-year Comprehensive Advanced Metering Plans (CAMPs)
- Recognizes advanced metering as foundation of grid modernization
- Proposes “pre-approval” of CAMPs, cost recovery after investment made
- Adopts Business Case Analysis for evaluating benefits and costs
- DPU opens separate proceedings on EVs (13-182) and TVR (14-04)
Next Steps

• Massachusetts
  ▪ TVR comments filed March 10, 2014
  ▪ Grid Modernization Reply Comments due March 21, 2014

• Grid Modernization / Utility of Future / 21st Century Utility discussions expanding
  ▪ New York
  ▪ Rhode Island

Conclusion

• Pressure on current utility model will continue to increase
• Can utilities turn challenges into opportunities?
• Regulatory leadership in Northeast seeking
  ▪ To align utility and other stakeholder interests
  ▪ To provide reliability, resiliency, security, operational efficiency, reduced costs, enhanced capabilities, DER integration, greater customer choice and environmental improvement
Which way do we go?

Additional Information

- MA DPU 12-76 NOI, October 2, 2013
  [http://www.env.state.ma.us/dpu/docs/electric/12-76/10212dpvtord.pdf](http://www.env.state.ma.us/dpu/docs/electric/12-76/10212dpvtord.pdf)

- MA Grid Modernization Steering Committee Report to DPU, July 2, 2013
  See also stakeholder comments dated July 24, 2013

- MA DPU Order 12-76-A, December 23, 2013
  [http://www.mass.gov/eea/docs/dpu/electric/12-76-a-order.pdf](http://www.mass.gov/eea/docs/dpu/electric/12-76-a-order.pdf)
  See also Initial Comments dated January 17, 2014

- For additional information, contact Janet Gail Besser at [jbesser@cleanenergycouncil.org](mailto:jbesser@cleanenergycouncil.org)