What is Coming?

*Why State Commissioners Need to Adapt to a Changing Grid*

2016 NECPUC Symposium

Consumer Panel

June 7, 2016

Paul Peterson and Spencer Fields
E4 Group funded much of this research and analysis.

- Conservation Law Foundation
- Acadia Center
- Grid Solar
- Industrial Energy Consumer Group
- Maine Public Advocate
- Natural Resources Council of Maine
Three Current Trends

- Increasing costs for new T&D
- Increasing costs for FCM resources
- Increasing costs for RNS and LNS rates
Comparison of 90-10 forecasts to historical peak load: reconstituted weather normalized and actual
2015 CELT 50/50 forecast modified for energy efficiency (EE) and distributed generation (DG) compared to actual and weather normalized historical peak loads with compound annual growth rates (CAGR)

- Weather Normalized Peak Loads
- Actual Historical Peak Loads

CAGR: 1.3%
CAGR: 0.5%
2015 Synapse adjustments for EE and DG

Weather Normalized Peak Loads

CAGR: 1.30%
CAGR: 0.54%
CAGR: -0.06%

SUMMER PEAK DEMAND, MW


- CELT 2015 50/50 Gross
- Synapse EE & DG
- EE & DG
2016 Synapse adjustments for EE and DG

![Graph showing summer peak demand, MW]

- Weather Normalized Peak Loads
  - CAGR: 1.04%
  - CAGR: 0.17%
  - CAGR: -0.38%

- CELT 2016 50/50 Gross
- - EE & DG
- - Synapse EE & DG
<table>
<thead>
<tr>
<th>Year</th>
<th>CELT 50-50 Net PDR &amp; PV CAGR by year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999 CELT</td>
<td>1.79%</td>
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<td>2010 CELT</td>
<td>1.07%</td>
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<td>2011 CELT</td>
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<td>2014 CELT</td>
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<td>2015 CELT</td>
<td>0.54%</td>
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<tr>
<td>2016 Draft CELT</td>
<td>0.16%</td>
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Planning Horizon (from RTEP 2004)

- Load & Reserves
  - High Forecast
  - Reference Forecast
  - Low Forecast

- New Transmission Project
- Load Response/DG or New Generation
- Existing System Capability to Serve Load Generation plus Transmission

Year

Required Supply – MW
2011 ISO forecast and 2015 Actual

ISO-NE Summer Peak (MW)
Weather Normalized 1991-2010
RSP11 50/50 Forecast 2011-2020

- Weather Normal + Passive Demand Resources
- Weather Normal
- RSP11
- RSP11-Fed Appl Standards (CELT)
- RSP11-Fed Appl Standards- Passive Demand Resources (CELT-PDR)

Adj. Weather Normalized 2000-2020
CELT 2011 2000-2020
Horizon for fixing system needs

• For forty years, the electric grid has seen annual growth rates of 6 percent, declining to 2%. Since 2002, growth rates have been 2% or less.

• With those earlier compound annual growth rates (CAGR), the entire electric demand will double in 12 years (6%) to 36 years (2% CAGR).

• With 2015’s forecasted peak demand growth of 0.5 percent CAGR, the entire electric system would double in 144 years.

• The planning horizon for addressing system needs has expanded; system planners have substantially more time to plan and build solutions.

• Consistently over-stating peak load growth puts consumers at risk of paying for transmission upgrades that may never be needed.
Forward Capacity Auction trends

![Bar chart showing capacity clearing price, $/kW-month](chart)

- **Capacity supply obligation at clearing price by FCA**

- **FCA1** to **FCA10**

- **Rest-of-Pool**

- **Maine**
Forward Capacity Auction trends
## Regional Network Service rates

<table>
<thead>
<tr>
<th>Description</th>
<th>($) / kW-year</th>
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<tbody>
<tr>
<td><strong>RNS Rate at 6/1/14</strong> (a)</td>
<td>$90.28</td>
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<tr>
<td><strong>ROE Adjustment</strong> (b)</td>
<td>($2.93)</td>
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<td><strong>2015 Forecast</strong></td>
<td>$6.47</td>
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<td><strong>True-ups</strong></td>
<td>($0.54)</td>
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<td><strong>Load Impact</strong></td>
<td>$5.42</td>
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<tr>
<td><strong>RNS Rate at 6/1/15</strong></td>
<td>$98.70</td>
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</table>

“Primary drivers of the 6/1/15 RNE Rate increase are the 2015 forecast and the decreased 12CP loads.” - PTOAC
ISO under-forecasting distributed generation

![Graph showing PV Nameplate growth over time](image)
ISO under-forecasting energy efficiency

Synapse forecast

ISO-EE forecasts over time

FCM cleared EE
Challenges for State Commissions

- Get the best picture you can
  - Peak load and energy growth rates
  - Forecasts of new resources
  - Policy impacts on resources (retirements and new)

- Align rates with costs
  - Time-of-use mechanisms
  - Avoid static and fixed charges

- Allow competition
  - Third-party providers for all services
Questions?
## Forward Capacity Auction results

<table>
<thead>
<tr>
<th></th>
<th>Rest-of-Pool</th>
<th>Maine</th>
<th>NEMA</th>
<th>Connecticut</th>
<th>SEMA-RI</th>
<th>SNE</th>
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<tr>
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<td>Existing</td>
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<td>Existing</td>
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<td><strong>FCA 1</strong></td>
<td><strong>$4.50</strong></td>
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<td><strong>FCA 2</strong></td>
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<td><strong>FCA 4</strong></td>
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<td><strong>FCA 6</strong></td>
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<td><strong>FCA 8</strong></td>
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Diminishing growth expands horizon

Electricity Sales Growth Rate (5-year average)

- 6% – 12 years to double
- 3% – 24 yrs
- 2% – 36 yrs
- 1% – 72 yrs
2015 Synapse annual energy adjustments

Annual Net Energy for Load

- CELT 2015 50/50 Gross
- EE & DG
- Synapse EE & DG

CAGR: 1.04%
CAGR: -0.04%
CAGR: -1.43%
2016 Synapse annual energy adjustments

Annual net energy for load

- CELT 2016 50/50 Gross
- EE & DG
- Synapse EE & DG

CAGR: 0.95%
CAGR: -0.25%
CAGR: -1.58%
E4 E4 Group consists of the following organizations

Conservation Law Foundation is a nonprofit, member–supported public interest advocacy organization dedicated to solving environmental problems that threaten the people, communities, and natural resources of New England.

Acadia Center is a regional nonprofit organization incorporated in Maine that researches and advocates innovative policies that tackle our environmental challenges while promoting sustainable economies.

Grid Solar is a Maine company that utilizes “non-transmission” alternatives built around smart grid tools and new clean energy technologies to solve reliability concerns and provide new sources of clean, renewable energy – all at lower total costs and with less risk than major new transmission build-outs.
E4 Group consists of the following organizations

Industrial Energy Consumer Group is a Maine-based incorporated association of large energy consumers. The IECG participates in state, regional and federal energy regulatory proceedings, litigation, and legislative matters pertaining to the cost and supply of energy.

Maine Public Advocate is an agency of the State of Maine charged with representing the ratepayers of Maine’s regulated utilities.

Natural Resources Council of Maine is a nonprofit membership organization protecting, restoring, and conserving Maine’s environment, now and for future generations.