ISO on Background

Energy-efficiency forecast

Anne George
VICE PRESIDENT, EXTERNAL AFFAIRS & CORPORATE COMMUNICATIONS

Stephen J. Rourke
VICE PRESIDENT, SYSTEM PLANNING
Agenda

11:00-11:05 a.m. Welcome and Introductions
Ellen Foley, Director, Corporate Communications

11:05-11:10 a.m. About ISO New England
Anne C. George, Vice President, External Affairs and Corporate Communications

11:10-11:40 a.m. ISO New England’s Energy-Efficiency Forecast
Stephen J. Rourke, Vice President, System Planning

11:40 a.m.-12:00 p.m. Question-and-Answer Session
About the ISO on Background Series

• Informal opportunity for media to learn more about trends affecting New England’s electricity industry
• Hosted by ISO New England senior management
• Content is on-the-record
• Please hold questions until the Q&A session at the end of the presentation
• Presentation and remarks will be posted at www.iso-ne.com>News & Issues>Press Releases after the session
About ISO New England

• Not-for-profit corporation
  – Created in 1997 to oversee New England’s restructured electric power system; regulated by Federal Energy Regulatory Commission

• Regional Transmission Organization
  – Independent of companies doing business in markets; no financial interest in companies participating in markets

• Major responsibilities
  – Maintain reliable operation of the electric grid
  – Administer wholesale electricity markets
  – Plan for future system needs
New England’s Electric Power Grid at a Glance

- 6.5 million households and businesses; population 14 million
- 350+ generators
- 8,000+ miles of high-voltage transmission lines (115 kV and above)
- 13 interconnections to electricity systems in New York and Canada
- 32,000 megawatts (MW) of supply
  - About 2,000+ MW are demand resources
- 28,130 MW all-time peak demand, on August 2, 2006
- Over 400 participants in the marketplace
- $5-11 billion annual wholesale electricity market value
Wholesale to Retail Connection

• **Bulk Power System**
  - Electricity is produced in New England by more than 350 generators dispatched by ISO-NE
  - Generators sell the electricity through either wholesale markets managed by ISO-NE or contracts with utilities and competitive suppliers
  - Region’s high-voltage transmission lines move power to substations where it is stepped down in voltage to feed into local distribution lines
  - Federal regulation (FERC)

• **Local Distribution System**
  - Region’s 6.5 million households and businesses create demand for electricity
  - Electric utilities and competitive suppliers buy electricity through markets or contracts with generators
  - Local utilities distribute the electricity to businesses and homes over lower-voltage lines
  - Customers’ bills include both wholesale and retail costs of producing and delivering electricity
  - State regulation (public utilities commissions)
ISO New England’s Core Responsibilities

**Operating the Power System**
Minute-to-minute reliable operation of region’s generation and transmission system

**Administering Wholesale Electric Markets**
Oversee region’s wholesale marketplace for energy, capacity and reserve supplies

**Power System Planning**
Ensure reliable and efficient power system to meet current and future power needs
Energy Efficiency Basics

• Energy efficiency (EE): Consuming less energy while achieving the same level of service
  – On the other hand, energy conservation is going without a service in order to use less energy

• Energy-efficiency measures are installed devices or processes that use less electricity
  – Common measures: lighting, building insulation, HVAC upgrades, more efficient appliances, and industrial process improvements

• Individual states set goals for reduced electricity use
  – Energy-efficiency programs funded directly

• ISO New England-administered Forward Capacity Market compensates EE as a resource, the same as power plants
  – With FCM auction results, the EE levels for the next three years are known
  – But long-term system plans look ahead 10 years
State-Sponsored Energy-Efficiency Programs

• New England’s state public utilities commissions generally responsible for EE programs
  – In 2012, 125+ EE programs in six states
  – Differing approaches to:
    • Funding sources
    • Budget periods
    • Program rules and duration
    • Performance reporting

• Funding sources:
  – Regional Greenhouse Gas Initiative (RGGI)
  – Forward Capacity Market (FCM)
  – System Benefit Charges (SBC)
    • Includes EE

Example of a retail bill
ENERGY-EFFICIENCY FORECAST

Background
Comprehensive, Long-term System Planning at ISO New England

- Develop 10-year forecast of electric energy use and peak demand
- Identify system needs, evaluate alternatives and develop transmission plan to meet needs
- Ensure electric grid meets reliability standards
- Manage interconnection of new resources
- Ensure resources providing capacity are qualified
Long-term Load Forecast Projects Demand 10 Years Out

- Baseline forecast developed with:
  - State and regional economic forecasts
  - 40 years of New England weather history
  - Other factors:
    - US Dept of Energy projections of average retail prices
    - New EE standards for household appliances

---

**Peak Demand Forecast**
2012-2021 (megawatts)

- +1.5% per year

**Annual Energy Consumption Forecast**
2012-2021 (gigawatt-hours)

- +0.9% per year
Energy Efficiency is a Priority in New England

State EE spending and electric energy savings, 2008-2011*

- Total NE states’ spending on EE in four-year period: $1.2 billion
  - Nearly $500 million spent on EE in 2010 (most recent year with complete data)
- Total reduction in electricity use: 3,502 gigawatt-hours (GWh)
  - Average annual reduction in electricity use: 876 GWh
  - About 1,300 GWh of electricity savings in 2010
- Total summer peak demand savings: 514 MW
  - Average annual summer peak demand reduction: 128 MW
- ISO collected data from EE programs back to 2008 or 2009; most programs are much older

*Not every state reported 2008 and/or 2011 data
EE in Forward Capacity Market

• Annual Forward Capacity Market (FCM) auction commits resources to be available three years in the future

• EE measures participate alongside generation
  – FCM provides a revenue stream that facilitates development of EE

• 2012 auction procured resources obligated for 2015-2016
  – 33,455 MW total capacity that will be needed
    • ~1,500 MW is EE
    • EE in FCM has more than doubled since 2008
ENERGY-EFFICIENCY FORECAST

Development
EE in the Long-term Load Forecast

- FCM auction results tell ISO-NE exactly how much EE savings can be counted on for years 1 through 3 of the 10-year forecast.
- Until now, the level of EE from the most recent auction was held constant for years 4 through 10 of the long-term planning horizon.
- States encouraged ISO-NE to forecast incremental growth in energy savings instead of holding EE constant beyond the three-year FCM timeframe.
Previously, no well-established metrics for determining how much electricity will *not* be consumed in the future

An EE forecast requires data on each program’s spending and level of energy savings achieved

- No aggregated data available; required collection of data on 125+ individual programs with different funding sources, goals, and reporting methods

ISO-NE developed a forecast of “EE savings”—how much electric energy will *not* be used—across a 10-year planning horizon by:

- Modifying New York ISO EE forecast model based on production costs (dollars spent per megawatt-hour of savings) and budgets of EE programs
- Factoring in uncertainty around future inflation, rising production costs as less-expensive EE measures are deployed first, changing technologies, state budget priorities

First multi-state, long-term forecast of energy-efficiency savings*

* Forecast does not include estimates of how much money was saved
ENERGY-EFFICIENCY FORECAST

Regional Results
First Regional EE Forecast Results
(*2015 to 2021*)

- Total projected spending on energy efficiency: **$5.7 billion**

- Annual electricity consumption remains flat
  - Average annual energy savings: **1,343 GWh**
  - Total projected reduction over seven years: **9,399 GWh**
  - RI and VT forecasts show declining annual electricity consumption

- Peak demand rises more slowly
  - Average annual reduction in peak demand: **206 MW**
  - Total projected reduction over seven years: **1,444 MW**
  - In VT, forecasted peak demand declines
New England Results: Lower Peak Demand Growth, Level Energy Demand

NEW ENGLAND: Summer Peak Demand (MW)

NEW ENGLAND: Annual Electric Energy Consumption (GWh)
New England Results: Long-term Forecast with EE Savings
*Annual average, 2012-2021*

- Annual growth in energy consumption is flat: 0.9% → 0.9% → 0.0%
- Peak demand grows at a slower rate: 1.5% → 0.9%
Impact of EE Forecast in Transmission Planning

- ISO-NE incorporated new information in its analysis of long-range reliability needs of the power system in Vermont and New Hampshire
  - EE forecast projects lower demand levels
  - New generation and demand resources added
  - Transmission upgrades

- Results:
  - Ten upgrades of transmission lines and other equipment can be deferred to years beyond 2020.
  - Deferring these upgrades saves the region about $260 million.
Conclusions

• States continue to make large investments in EE

• ISO-NE worked successfully with stakeholders to fully integrate EE into ISO’s planning and load forecast

• EE forecast shows the states’ investment in EE is having a significant impact on electric energy consumption and peak demand

• About $260 million in transmission expenses already deferred for New England customers

• Second EE Forecast (2016-2022) due out in February 2013
  – Preliminary results are consistent with those of first forecast
  – For more information see www.iso-ne.com/eefwg
For more information:

- ISO Newswire, our online newsletter
  www.isonewswire.com

- ISO Express data portal
  http://isoexpress.iso-ne.com/guest-hub

- ISO to Go mobile app
  — For iPhone and Android
  http://www.iso-ne.com/support/isotogo/

- @isonewengland on Twitter
  www.twitter.com/isonewengland

- ISO website
  www.iso-ne.com

- Northeast Energy Efficiency Partnerships
  http://neep.org/

- Database of State Incentives for Renewables & Efficiency
  http://www.dsireusa.org/
Questions
ENERGY-EFFICIENCY FORECAST

State-by-State Results
Connecticut: Energy Efficiency by the Numbers

• Energy-efficiency results, 2009-2011:
  – Total spending: $337.8 million
  – Total energy saved: 1,009 GWh
    • Annual average energy saved: 336.5 GWh
  – Total peak demand savings: 127 MW
    • Annual average: 42 MW

• Energy-efficiency forecast, 2015-2021:
  – Total spending: $775.5 million
  – Projected total reduction in energy consumption: 1,434 GWh
    • Annual average: 205 GWh
  – Projected total reduction in peak demand: 193 MW
    • Annual average: 28 MW

• CT program administrators:
  – United Illuminating Co.: https://www.uinet.com/
Connecticut Peak and Annual Energy Consumption Forecast, 2012-2021
Maine: Energy Efficiency by the Numbers

- Energy-efficiency results, 2009-2011:
  - Total spending: $53.5 million
  - Total energy saved: 282 GWh
    - Annual average: 94 GWh
  - Total peak demand savings: 32 MW
    - Annual average: 11 MW

- Energy-efficiency forecast, 2015-2021:
  - Total spending: $195.9 million
  - Projected total reduction in energy consumption: 499 GWh
    - Annual average: 71 GWh
  - Projected total reduction in peak demand: 55 MW
    - Annual average: 8 MW

- ME Program Administrators:
  - Efficiency Maine: [http://www.efficiencymaine.com/about](http://www.efficiencymaine.com/about)
Maine Peak and Annual Energy Consumption Forecast, 2012-2021

MAINE: Summer Peak Demand (MW)
- Base forecast
- Base minus EE in FCM
- Base minus FCM minus EE forecast savings

MAINE: Energy Consumption (GWh)
- Base forecast
- Base minus EE in FCM
- Base minus FCM minus EE forecast savings
Massachusetts: Energy Efficiency by the Numbers

- Energy-efficiency results, 2008-2010:
  - Total spending: $571.8 million
  - Total energy saved: 1,432 GWh
    - Annual average: 477.5 GWh
  - Total peak demand savings: 221 MW
    - Annual average: 74 MW

- Energy-efficiency forecast, 2015-2021
  - Total spending: $3.6 billion
  - Projected total reduction in energy consumption: 5,505 GWh
    - Annual average: 786 GWh
  - Projected total reduction in peak demand: 853 MW
    - Annual average: 122 MW

- MA program administrators:
  - Cape Light Compact: http://www.capelightcompact.org/
  - NSTAR: http://www.nstar.com/residential/
Massachusetts Peak and Annual Energy Consumption Forecast, 2012-2021
New Hampshire: Energy Efficiency by the Numbers

- Energy-efficiency results, 2008-2010:
  - Total spending: $57.9 million
  - Total energy saved: 194.6 GWh
    * Annual average: 64.9 GWh
  - Total peak demand savings: 43 MW
    * Annual average: 14 MW

- Energy-efficiency forecast, 2015-2021:
  - Total spending: $181.6 million
  - Projected total reduction in energy consumption: 393 GWh
    * Annual average: 56 GWh
  - Projected total reduction in peak demand: 65 MW
    * Annual average: 9 MW

- NH program administrators:
  - Granite State Electric Co.: [https://www1.nationalgridus.com/CorporateHub](https://www1.nationalgridus.com/CorporateHub)
Rhode Island: Energy Efficiency by the Numbers

• Energy-efficiency results, 2008-2010:
  – Total spending: $70 million
  – Total energy saved: 221.9 GWh
    • Annual average: 74.3 GWh
  – Total peak demand savings: 38 MW
    • Annual average: 13 MW

• Energy-efficiency forecast, 2015-2021:
  – Total spending: $550.5 million
  – Projected total reduction in energy consumption: 944 GWh
    • Annual average: 135 GWh
  – Projected total reduction in peak demand: 163 MW
    • Annual average: 23 MW

• RI program administrator:
  – Narragansett Electric Co.: 
    https://www1.nationalgridus.com/CorporateHub
Rhode Island Peak and Annual Energy Consumption Forecast, 2012-2021

**RHODE ISLAND: Summer Peak Demand (MW)**

- **Base forecast**
- **Base minus EE in FCM**
- **Base minus FCM minus EE forecast savings**

**RHODE ISLAND: Energy Consumption (GWh)**

- **Base forecast**
- **Base minus EE in FCM**
- **Base minus FCM minus EE forecast savings**
Vermont: Energy Efficiency by the Numbers

• Energy-efficiency results, 2008-2010:
  – Total spending: $95.4 million
  – Total energy saved: 357.9 GWh
    • Annual average: 119.3 GWh
  – Total megawatts of peak saved: 52 MW
    • Annual average: 17 MW

• Energy-efficiency forecast, 2015-2021:
  – Total spending: $321.3 million
  – Projected total reduction in energy consumption: 625 GWh
    • Annual average: 89 GWh
  – Projected total reduction in peak demand: 115 MW
    • Annual average: 16 MW

• VT program administrators:
Vermont Peak and Annual Energy Consumption Forecast, 2012-2021

**VERMONT: Summer Peak Demand (MW)**

- **Base forecast**
- **Base minus EE in FCM**
- **Base minus FCM minus EE forecast savings**

**VERMONT: Energy Consumption (GWh)**

- **Base forecast**
- **Base minus EE in FCM**
- **Base minus FCM minus EE forecast savings**