



Incorporating Load Response Into Demand and Reliability Forecasts

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ISO New England



- INDEPENDENT System Operator based in Holyoke, MA
- Private, not-for-profit corporation created according to FERC principles on July 1, 1997
- Responsible for system reliability, administration and oversight of wholesale electricity markets, regional transmission tariff, and regional planning
- 350 employees



A Simple Definition

- Customers reducing their electricity consumption in response to either **price** or **system reliability** events,
- Customers being **paid** for performance based on wholesale market prices.

Demand



Supply



Value of Demand Response

- **Reliability Benefits**
 - Demand Response is a resource to solve short-run planning and reliability problems.
 - 1 MW of Demand Response = 1 MW of Generation
- **Regional Economic Benefits**
 - Short-Term: Reduces spot market price spikes
 - Long-Term: Reduces price volatility, risk and lowers prices
 - Limits Supplier Market Power
 - Gives Customers Control
- **Environmental Benefits**



Real-Time Demand Response

Who?	Individual or Groups (Minimum 100 kW Reduction)
When?	Respond to ISO Control Room Request
How fast?	Within 30-Minutes or 2-Hours of ISO request.
How much?	Energy Payment: Greater of Real-Time Wholesale Price or Guaranteed Minimum \$0.50/kWh for 30-Minute Response and \$0.35/kWh for 2-Hour Response. Capacity Payment: Monthly payment (\$/kW) based on the monthly Supply Auction price.
How long?	Minimum 2-Hour guaranteed interruption
Metering?	5-Minute Usage data sent to ISO NE via the Internet



Real-Time Price Response

Who?	Individual or Group. Minimum 100 kW Reduction.
When?	Notified by ISO that wholesale prices are forecasted to exceed \$0.10/kWh either the night before or morning of the event day.
How fast?	Voluntary! Customer decides when and for how long.
How much?	Greater of Real-Time Wholesale Price or Guaranteed Minimum of \$0.10/kWh
How long?	Price response “window” open as early as 7AM and remains open until 6PM.
Metering?	Hourly Meter - Meter that records your usage every hour.



Four Pillars – The Foundation of a Reliable System

- Reliable system operation requires:
 - Efficient wholesale market structure
 - Adequate generation
 - Active participation by demand in the markets
 - Reliable transmission system to moves power where it is needed

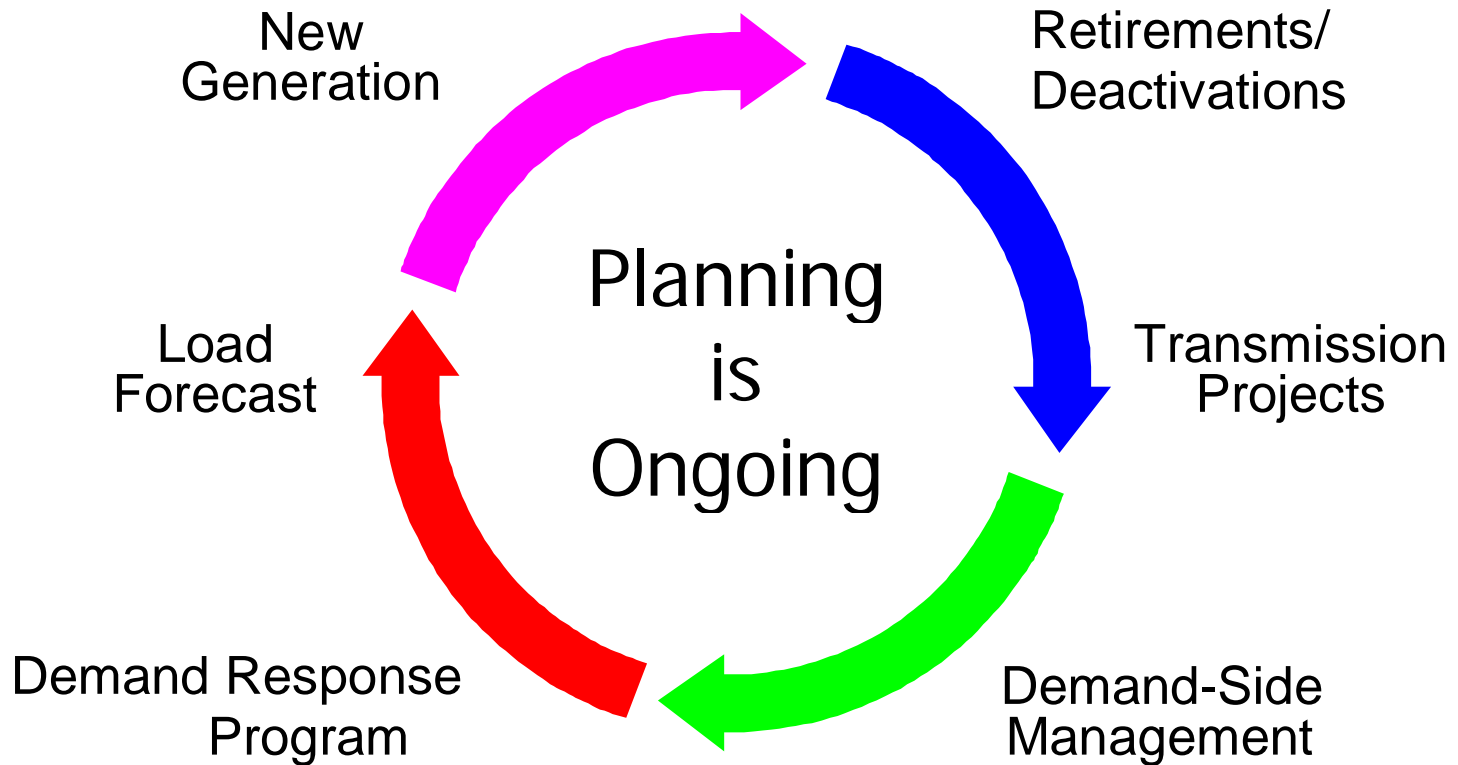


RTEP- Regional Transmission Expansion Plan

- Annual Process
- Addresses all aspects of planning
- Identify major issues effecting reliability
- Identify required actions necessary to ensure reliable and efficient operation of bulk electric power system

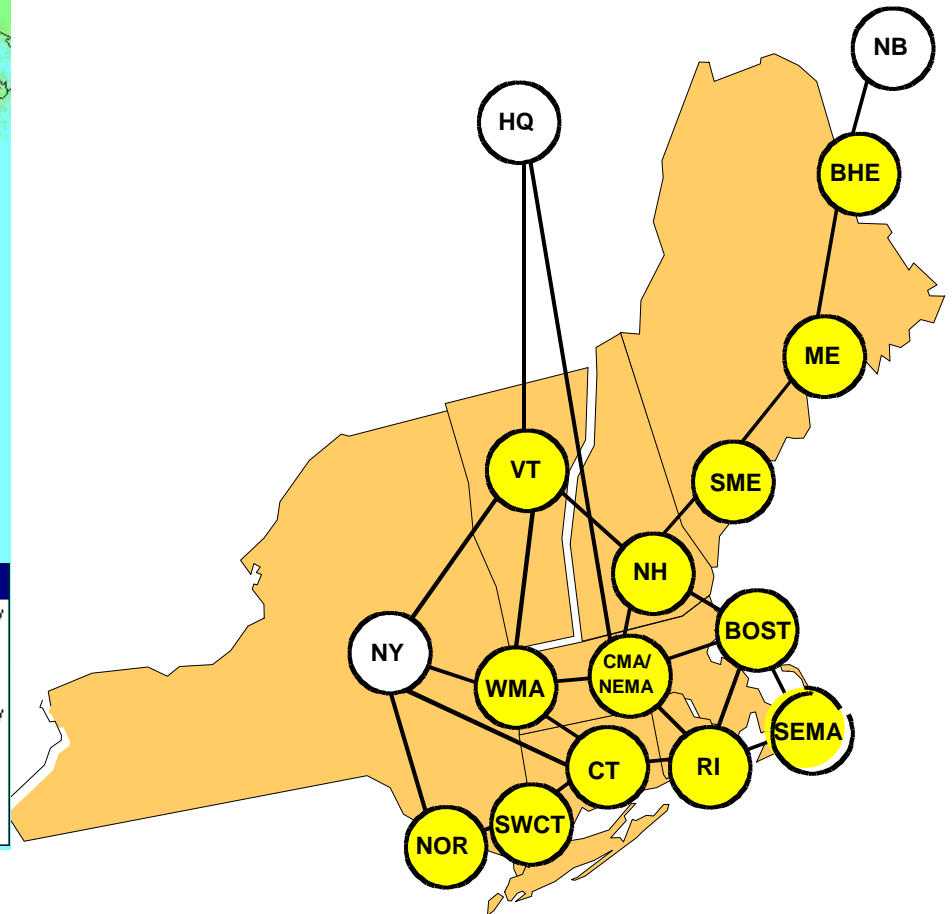
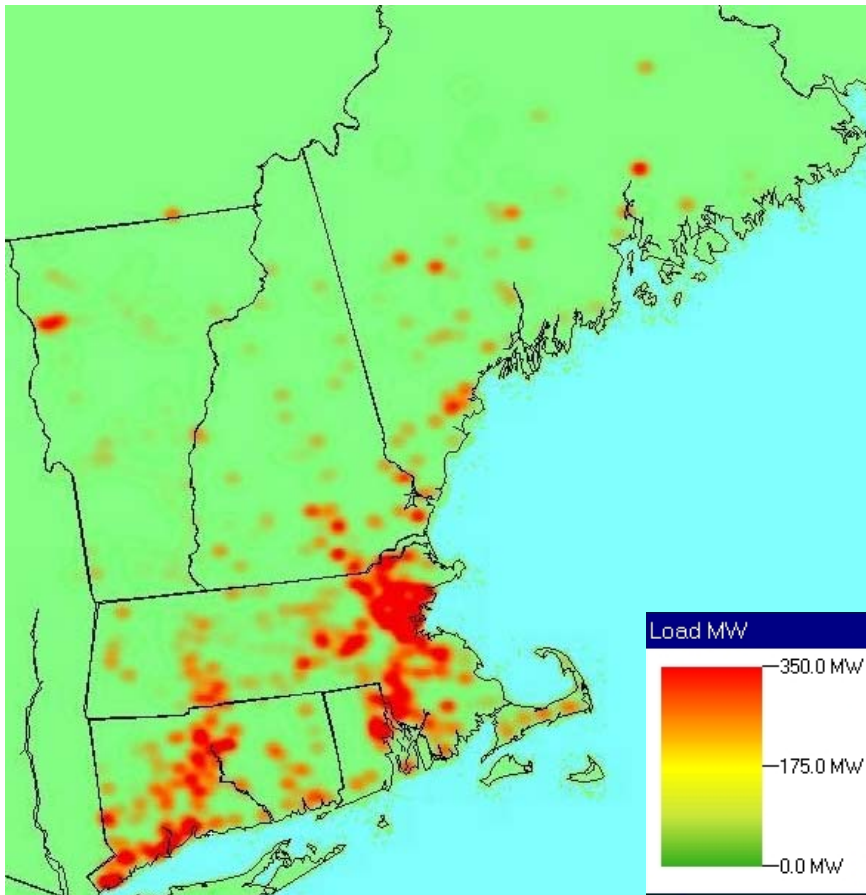


RTEP Planning Process





Load Concentration & RTEP Sub-Areas





RTEP04

- Conducted resource adequacy analysis by RTEP Sub-area
- Period 2004-2013
- Assessed adequacy of generating resources and transmission facilities to meet forecasted Sub-area loads for variety of scenarios based on planning assumptions
 - Included known demand response programs



Load Response Programs

- Demand Response Programs
 - Reliability Programs
 - Activated during operating reserve deficiencies
 - Forecast at present level
- Price Response Programs
 - Economic Program
 - Activated based upon forecast Zonal prices
 - Need to better incorporate into market



Load Response Factors To Examine

- Examine long-term potential of Real-Time Price Response
 - On zonal peaks and loads
 - Zonal market potential
 - Customer participation rate
 - Customer enrollment rate
 - Customer performance probability
 - Zonal supply curve



Active Participation by DR in Markets

- Critical role
 - Support system reliability, market efficiency and competition
- Increase reliability
 - Providing additional resources addressing short-run operating and reserve shortages
- Enable wholesale prices to be set more efficiently
 - Proper interaction of supply and demand
 - Ensure right amount of power produced and consumed at economic levels
 - Stabilize price fluctuations
 - Mitigating supplier market power
 - Reduce need for market interventions
 - Price caps
 - Price-mitigation



Load Pockets

- Southwest Connecticut (Norwalk & SWCT sub-areas)
 - Serious shortfall of required resources necessary to ensure reliability
 - Only 50-100 MW of quick-start peaking or emergency generation can be installed
 - Limited sites available due to transmission limitations
 - Demand Response and conservation most viable resources to cover long delay in transmission upgrades
- Connecticut
- Boston

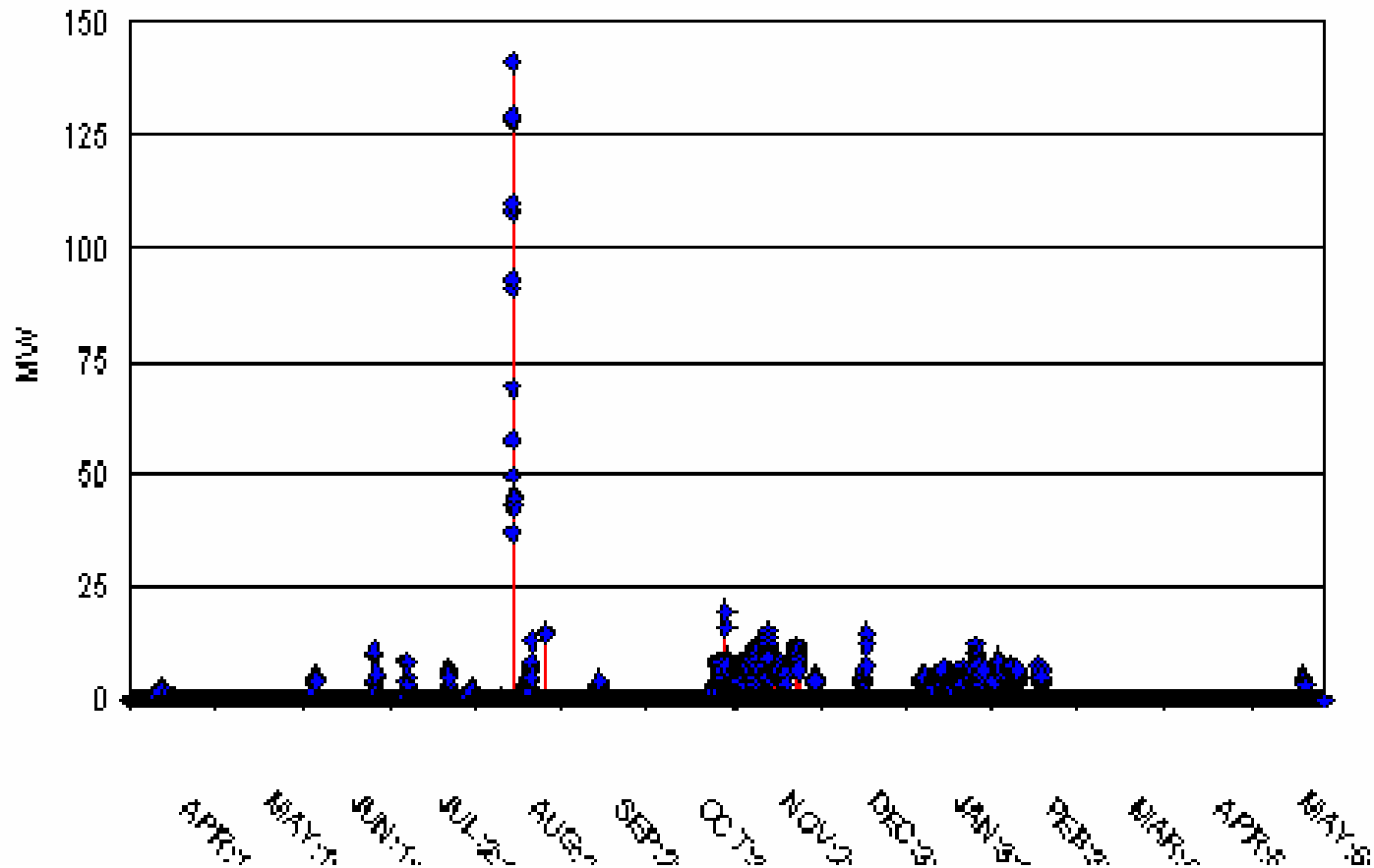


Boston – Load Pocket

- Adequate operable capacity in short-term
- New transmission infrastructure required to improve interrelated reliability problems
 - Limited access to regional supplies resulting from import restrictions
 - Inability to import power into separate load pockets (Downtown Boston and North Shore)
 - Reliance on up to 400 MW of emergency load shedding for second contingency
- Load Response could provide short-term relief



CT PRICE & DEMAND RESPONSE MW IMPACTS Apr 2003 - May 2004
637 HOURS OUT OF 10248 / Aug 15 Only Demand Response





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