



Henry Yoshimura
Manager of Demand Response
ISO New England Inc.

Remarks at the Federal Energy Regulatory Commission
Technical Conference on Demand Response in Wholesale Markets (AD07-11)
Demand Response in Grid Operation and Markets Panel
April 23, 2007
Washington, D.C.

Thank you for the opportunity to appear before the Commission. It is very important for demand to participate in the electricity markets, especially in New England.

Peak demand for electricity in the region is growing at a faster rate than overall consumption.¹ The result is that we need to build a lot of generation capacity to serve very high demand on a few days of the year. In 2006, New England set a record of over 28,000 MW for peak demand. Yet, there were fewer than 60 hours in the entire year when demand was over 25,500 MW. It's expensive and inefficient to build infrastructure that is only needed so few hours in a year.

As the Commission is aware, ISO New England has a strong track record of developing programs for customers to respond either to reliability events or high prices. Demand response resources produced more than 600 megawatts of demand reduction on August 2, 2006, when New England set the all-time record for peak demand. (The reduction included a combination of responses from customers in ISO's reliability programs (80%) and price programs (20%).)

ISO is currently implementing a Demand Response Reserves Pilot Program to determine if small generation and demand response resources (<5 MW) can provide a functionally equivalent reserves product.

There are currently more than 900 MW of demand response resources enrolled in ISO's programs, the vast majority of which can respond to reliability events within 30 minutes. We see significant potential, however, for demand resources in New England to exceed what's currently enrolled in ISO programs, and what's been developed by utility-sponsored demand-side management (DSM) programs. This potential is being demonstrated through the new Forward Capacity Market (FCM).

The Forward Capacity Market will use a competitive auction to procure capacity to meet New England's Installed Capacity Requirement (ICR) several years into the future. The FCM is the result of extensive stakeholder discussions that recognized the value of meeting the ICR either by increasing supply or reducing demand. As a result, both generation and demand resources will be eligible to participate and we expect a portfolio of supply and demand resources to be selected.

¹ RSP07: 1.8% peak, 1.2% energy.

Innovative market rules were developed to recognize the different characteristics of demand resources. Some are passive (energy efficiency), others are active (real-time demand response triggered by notice from the ISO). Some are weather-sensitive. Some are pure demand reduction while others rely on energy output (distributed generation). Accordingly, the FCM rules recognize five different types of demand resources that will have the opportunity to participate in the new market.

Pioneering measurement and verification arrangements will ensure that demand resources meet their capacity commitments. Like supply side resources, demand resources will have to perform to get paid. There will be specific performance hours when reductions from each of these resources will be measured and verified. The pay-for-performance provisions and the eligibility of demand resources to participate were priorities in developing this market.

The initial results of the Show-of-Interest for the first auction resulted in applications for more than 2,400 MW of new demand resources. This includes a combination of energy efficiency, load management, distributed generation and demand response resources. The majority of the resources are being proposed in Massachusetts and Connecticut, two areas that have long been identified as constrained areas of the region's power system. Eighty percent of the proposed MWs came from unregulated merchant providers.

Not all of the projects that submitted Show-of-Interest applications will qualify, clear or perform in the new market. However, in ISO's view, competitive transparent markets are showing strong potential to attract capital for new demand resources.

Efficient markets need demand-side participation. It helps protect against market power, expands the resources available to maintain reliability, and helps control costs. Establishing stronger linkages between wholesale and retail markets would enable further demand-side participation in the wholesale electricity markets. ISO has sponsored extensive analysis and participated in state retail rate design proceedings to encourage dynamic pricing to align retail prices with wholesale costs. This would allow customers to better control their electricity costs and reduce peak demand on the power system.

We believe that New England's market design provides a strong platform for the continued development of demand resources in the region.

Thank you.

Demand Resource Participation in New England's Forward Capacity Market

April 23, 2007

*The Federal Energy Regulatory Commission
Technical Conference on Demand Response in Wholesale Markets
Docket No. AD07-11-000*

*Henry Yoshimura
ISO New England*

Discussion Topics

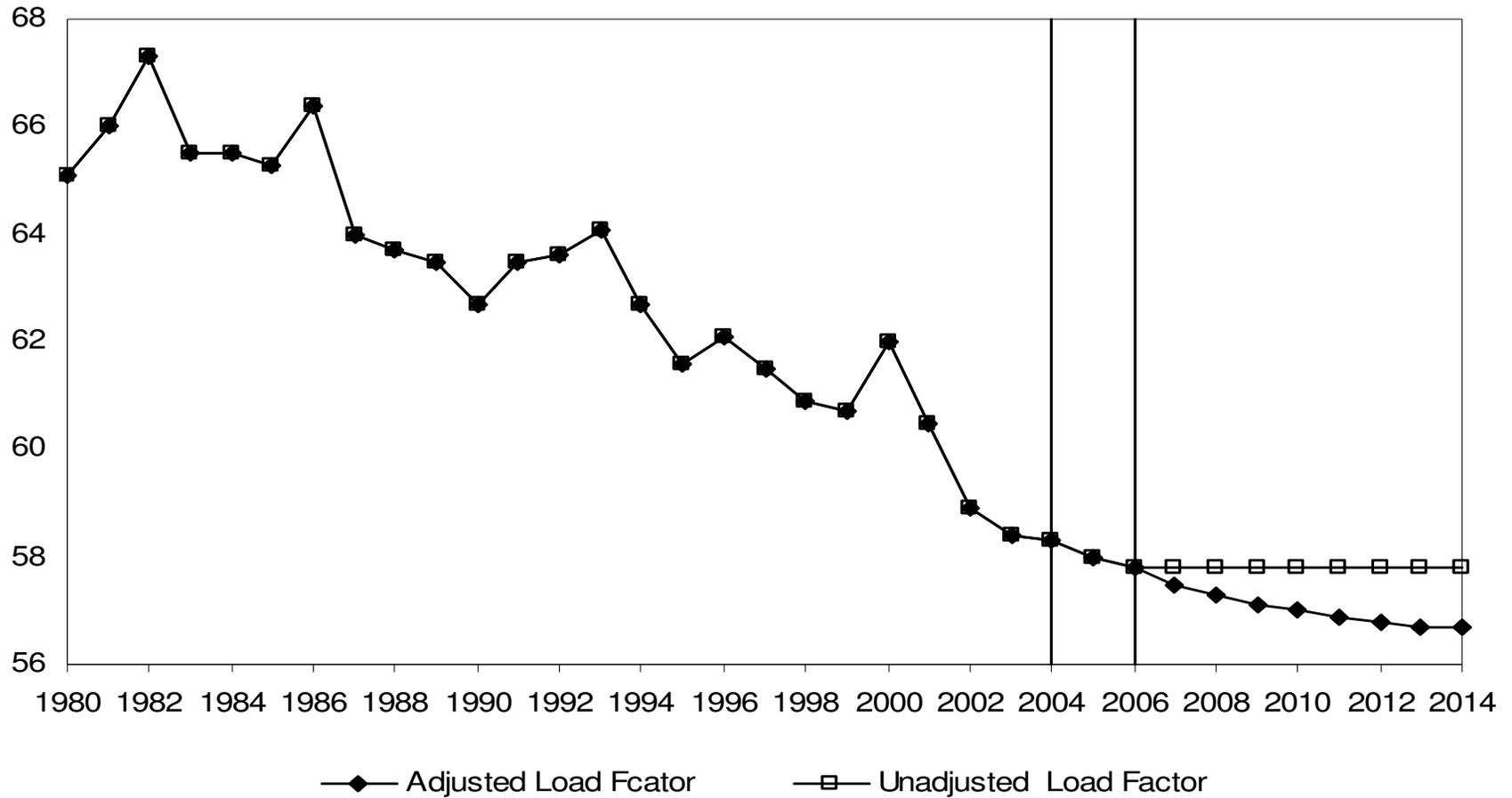
- Why is demand participation in the electricity market is needed?
- What is the Forward Capacity Market (FCM) and how does it work?
- What is a Demand Resource and what must it do to participate in the FCM?
- How do you measure and verify Demand Resource performance?
- What has been the interest in participating in the Forward Capacity Auction?

Demand Participation in Markets is Needed

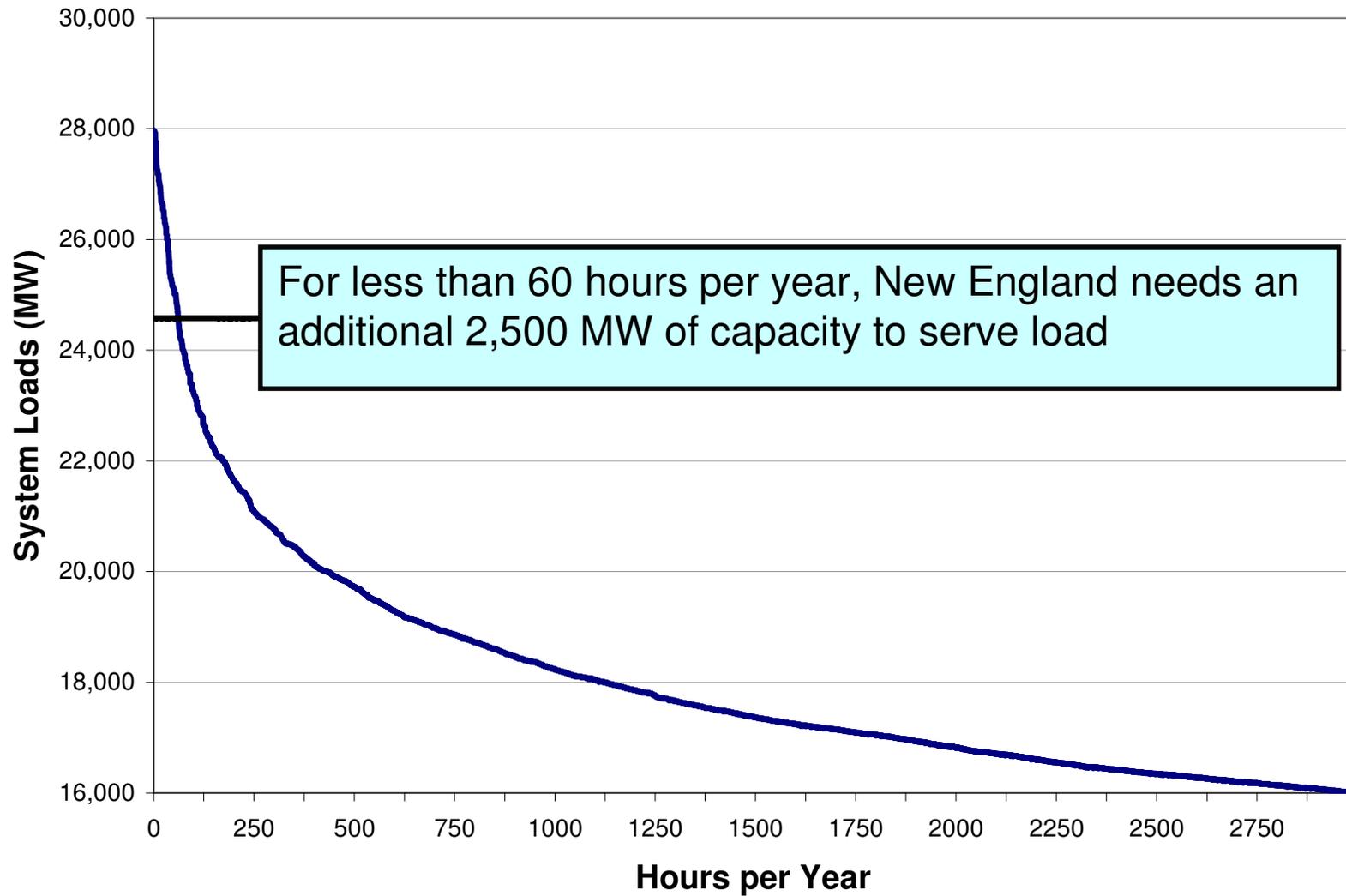
- The load factor of the New England electricity system has been steadily declining over time resulting in:
 - Peaky loads, higher energy and capacity costs, and higher average rates.
- A small amount of demand participation in markets can go a long way in mitigating peaks, lowering costs, and ultimately lowering electricity prices to final consumers.
- Markets are the best way to encourage the development of cost-effective Demand Resources.

2006 CELT and RSP Forecast

ISO Summer Peak Load Factors
History 1980-2004, SR Forecast 2005-2006, LR Forecast 2007-2014



Why Should Demand Resources Participate in the FCM? New England Load Duration Curve (2006)



Forward Capacity Market Background

- The Forward Capacity Market (FCM) will be used to procure capacity to meet New England's forecasted demand and reserve requirements three years into the future.
 - The design of the FCM resulted from a Settlement Agreement signed on March 6, 2006.
 - FERC approved the Settlement Agreement on June 16, 2006.
 - Detailed FCM Rules were filed with the FERC on February 15, 2007
 - FERC approved the qualification and auction process on April 16, 2007.
- Generation ***and Demand Resources*** may participate in the FCM.

Demand Resources in the FCM

- Stakeholders recognized that the Installed Capacity Requirement can be met by increasing supply or reducing demand.
- An extensive stakeholder process was used to develop the rules for Demand Resource participation in the FCM and to develop Measurement and Verification requirements.
- Demand Resources are installed measures (i.e., products, equipment, systems, services, practices and/or strategies) ***that result in additional and verifiable reductions in end-use demand on the electricity network in the New England Control Area.***
 - Such measures include Energy Efficiency, Load Management, and Distributed Generation.

Forward Capacity Auction Objectives

- The FCM uses a competitive ***Forward Capacity Auction (FCA)*** process to determine which resources to buy, how much to buy, and how much to pay.
- The FCA will be used to select a portfolio of Generation and Demand Resources to meet Installed Capacity Requirements.
- All resources that clear the auction are paid the market-clearing price (\$/kW-month), subject to performance incentives and penalties.
- To encourage investment, new resources can receive a long-term commitment (up to 5 years).

Demand Resource Performance

- Different technologies – i.e., Energy Efficiency, Load Management, and Distributed Generation – reduce load in different ways.
 - Passive versus active (i.e., dispatchable)
 - Weather sensitivity
 - Demand reduction versus energy output
- The FCM rules were developed to recognize the:
 - Differences among Demand Resource types, and
 - The needs of the system in meeting Installed Capacity Requirements.
- Each Demand Resource type must reduce load so as to reduce the need for generation capacity.
 - Each of five Demand Resource types has a specific set of performance hours across which load reductions would be measured and verified.

Demand Resource Types

- **On-Peak Demand Resources** – designed for non-weather sensitive measures that reduce demand across a fixed set of on-peak hours such as energy efficient commercial lighting.
- **Seasonal Peak Demand Resources** – designed for weather sensitive measures that reduce load during high-demand conditions such as energy efficient air conditioning.
- **Critical Peak Demand Resources** – designed for measures that can be “dispatched” by the Project Sponsor (e.g., load management or distributed generation) as needed.
- **Real-Time Demand Response Resources** – designed for measures that can be dispatched (e.g., load management or distributed generation) by the ISO as needed.
- **Real-Time Emergency Generation Resources** – designed for Distributed Generation measures whose state air quality permits limit their operation to limited “emergency” conditions – only 600 MW would be used to meet Installed Capacity Requirements.

Measurement & Verification (M&V) Needed to Determine Load Reduced During Performance Hours

- A project's M&V Plan describes the methods, assumptions, and measurements that will be used to determine monthly Demand Reduction Values.
- M&V Plans Address:
 - Project Description Requirements
 - Approved Methodologies
 - Baseline Calculations
 - Statistical Sampling
 - Calculations of Demand Reduction Value
 - Measurement Equipment Standards
 - Data Collection, Validation and Management
 - Data Reporting,
 - Independence and Auditing

Show of Interest Results

- To participate in the first FCA (scheduled for February 2008), Project Sponsors must submit an application called a “Show of Interest” form.
- ISO New England received more than 400 Show of Interest forms from new Generation and Demand Resources totaling over **12,400 MW**
 - Over **10,000 MW** from new Generation Resources.
 - Over **2,400 MW** from new Demand Resources including energy efficiency, load management, distributed generation and demand response.

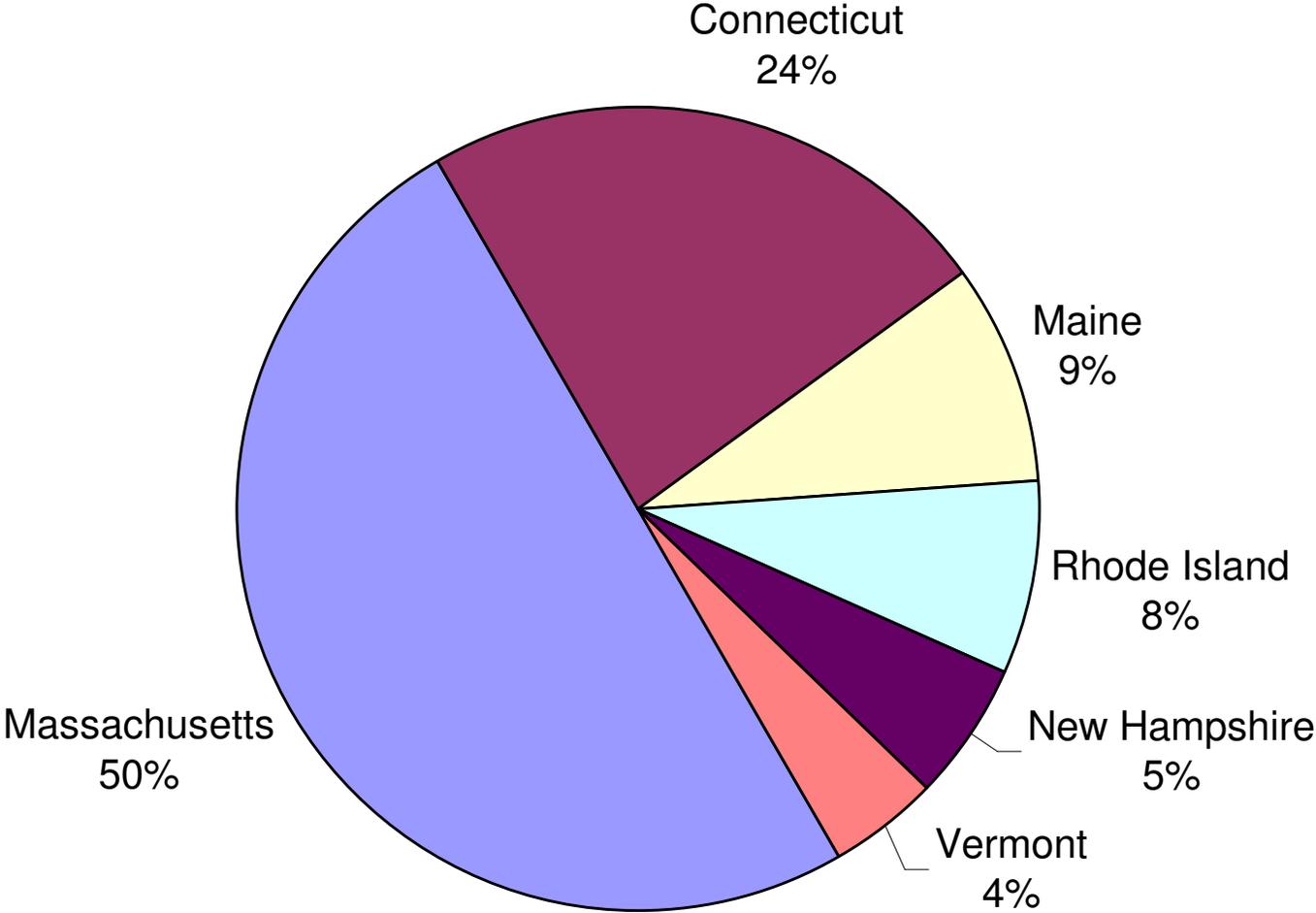
Demand Resources Show of Interest

MW by State and Resource Type

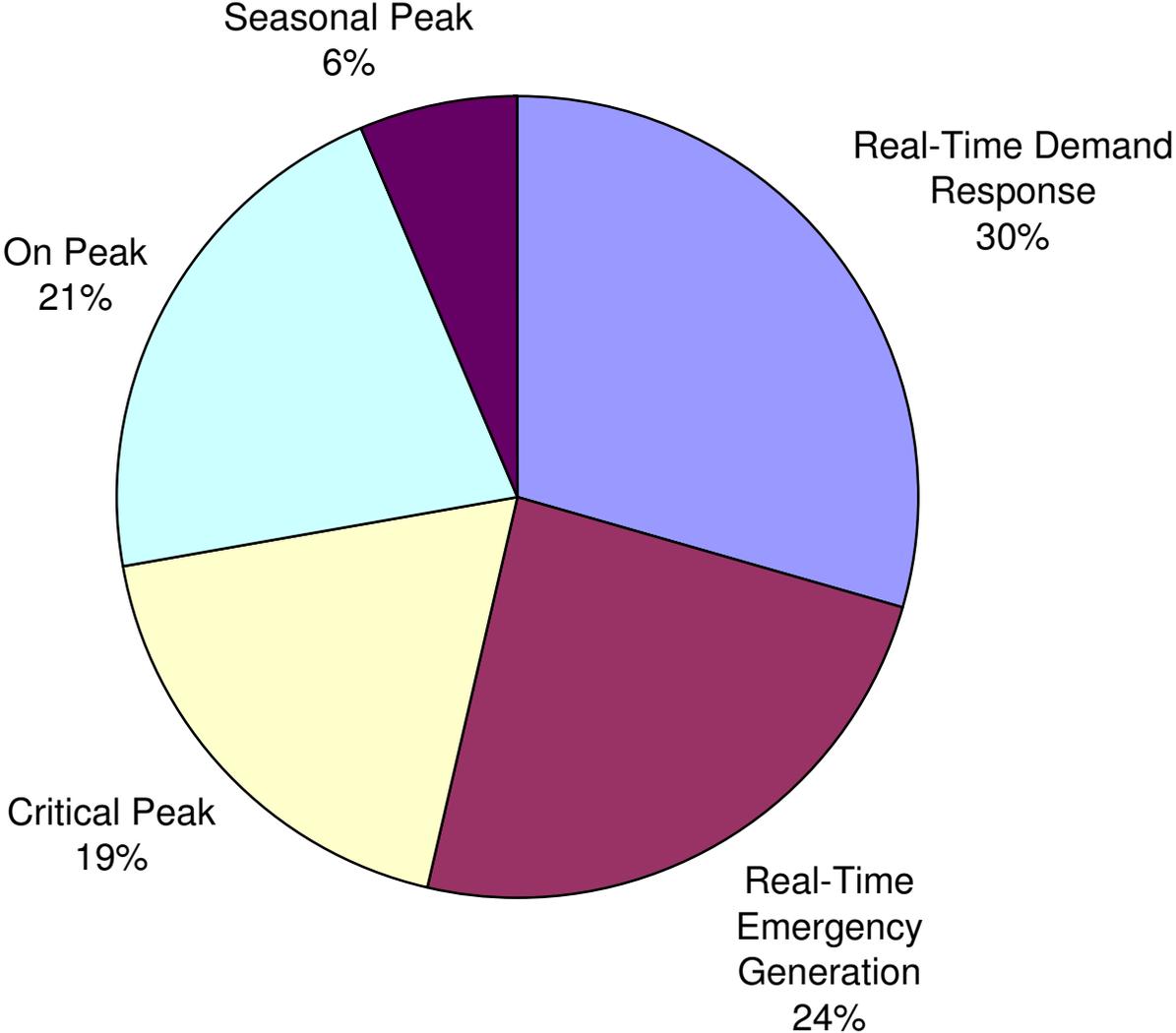
State	Resource Type					Grand Total
	Real-Time Demand Response	Real-Time Emergency Generation	Critical Peak	On Peak	Seasonal Peak	
Massachusetts	346	279	286	282	29	1,222
Connecticut	143	141	112	61	120	577
Maine	122	33	27	34	2	217
Rhode Island	68	74	9	36	4	192
New Hampshire	24	41	18	47	4	133
Vermont	17	22	8	61	1	109
Grand Total	720	590	460	521	159	2,449

80% of the proposed MWs are from non-utility suppliers such as energy services companies, third-party energy suppliers, equipment vendors and retail customers.

Demand Resources by State



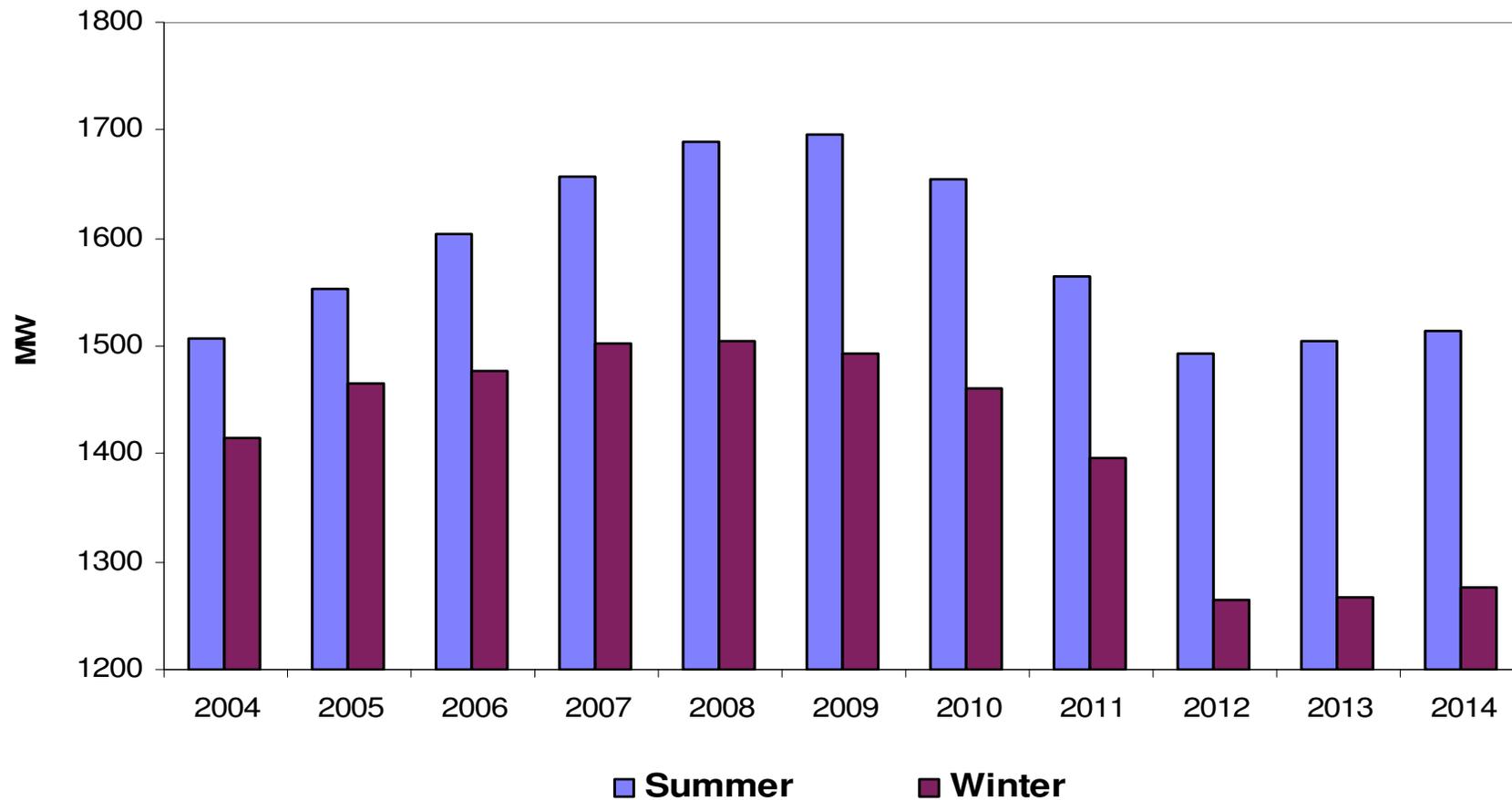
Demand Resources by Type



Early Observations:

- **Significant potential for demand resources to exceed what's available through current programs**
 - 20 years of Demand-Side Management Programs in New England funded through regulated rates have produced about 1,700 MW of peak load reductions.
 - Demand Resource Show of Interest for FCA #1 is well in excess of 1,700 MW.
 - Not all the projects that submitted Show of Interest forms will qualify, clear and perform – however, the level of interest demonstrates the effectiveness of the Forward Capacity Market design to attract investors and bring about the development of the most cost-effective capacity resources.

ISO Control Area DSM Impacts Reported by Region's Distribution Companies for the Regional System Plan (RSP) Summer and Winter Peak Load



Questions and Discussion



ISO New England Responses to Questions for Panelists
Technical Conference on Demand Response in Wholesale Markets (AD07-11)
April 23, 2007
Federal Energy Regulatory Commission
Washington, D.C.

Henry Yoshimura
Manager of Demand Response
ISO New England

Panel: Demand Response in Grid Operation and Markets – Part 1 (9:20 a.m.)

Panelists:

- Andrew Ott, PJM
- Henry Yoshimura, ISO New England
- Glen Perez, California Independent System Operator
- Mark Lynch, New York Independent System Operator
- Michael Robinson, Midwest Independent Transmission System Operator

Questions for panelists:

1. What was the experience with demand response during 2006, particularly during the summer heat events?

ISO New England response:

- ISO New England activated Demand Response Programs on August 2, 2006, in response to capacity deficiency and high price conditions.
 - A maximum load reduction of 625 MW was achieved.
- Reliability program activations started at 12:15 p.m. and ended at 6:00 p.m.
 - 513 MW of load reduction was achieved.
- Price program activations started at 12:00 and ended at 6:00 p.m.
 - 112 MW of additional load reduction was achieved.

2. Can demand response replace operating reserves, and, if not, what are the obstacles?

ISO New England response:

- ISO New England is presently implementing a Demand Response Reserves Pilot Program to determine if small generation and demand response resources < 5MW can provide a functionally equivalent reserves product.
 - The pilot is still ongoing and evaluation results will be forthcoming toward the end of this year.
- Current Supervisory Control And Data Acquisition (SCADA) and Electronic Dispatch Remote Intelligent Gateway (RIG) technology used by ISO New England for generation control and dispatch enhances system security.
 - However, such technology can be cost prohibitive to small, disbursed resources such as Demand Resources.
 - One of the goals of the Demand Response Reserves Pilot Program is to evaluate lower-cost, two-way communication alternatives to the current technologies presently required to connect dispatchable resources to the ISO.

3. What is the amount of potential demand response available during system emergencies in your regions? How do you know what is a potential demand response? How much of this capability was utilized in 2006?

ISO New England response:

- As of August 1, 2006, there was a total of 747.4 MW of ready-to-respond demand response resources enrolled in ISO New England programs. Of this amount:
 - 579.5 MW were enrolled in programs designed to protect system reliability;
 - The balance – 167.9 MW – was enrolled in price response programs.
- Reliability programs achieved a maximum of 513 MW of reduction on August 2, 2006 – a load reduction of 88.5% of the 579.5 MW enrolled in these programs.
- Price response programs achieved a maximum of 112 MW of reduction on August 2, 2006 – a load reduction of 66.7% of the 167.9 MW enrolled in the program. Considering that price response is voluntary, the response by price response program participants was quite high.
- The total potential for demand response (and Demand Resources in general) exceeds the amount of MW currently registered in the ISO New England Load Response Program, and exceeds the amount achieved by demand-side management programs implemented by the region's utilities financed through regulated rates.
 - At the beginning of April 2007, 907 MW of ready-to-respond demand response resources enrolled in ISO programs.
 - 810 MW were registered in reliability programs;
 - 97 MW were registered in price response programs.
 - After about 20 years of demand-side management program implementation in New England funded through regulated rates, about 1,700 MW of peak load reductions have been achieved.
 - To participate in the first Forward Capacity Auction (FCA), scheduled for February 2008, Project Sponsors must submit an application called a "Show of Interest" form.
 - Over 2,400 MW of applications were received from new Demand Resources including energy efficiency, load management, distributed generation and demand response.
 - 80% of the proposed MWs are from non-utility suppliers such as energy services companies, third-party energy suppliers, equipment vendors and retail customers.
 - Not all the projects that submitted Show of Interest forms will qualify, clear and perform – however, the level of interest demonstrates the effectiveness of the Forward Capacity Market design to attract investors and bring about the development of the most cost-effective capacity resources.

4. Several years of experience with ISO demand response programs are now available. Based on this experience, what is your evaluation of these programs?

ISO New England response:

- Efficient markets need active demand participation.
 - Competitive markets offer efficient prices if:
 - Supply is competitive; and
 - Demand is active.
- Active demand helps protect against exercise of market power.
- Demand participation expands the resources available to assure reliability.
- Given the right price signals, it has been ISO New England's experience that retail customers

- are more than willing to participate in wholesale markets in a predictable and reliable way.
- Demand response programs have proven useful jump-starting demand participation in wholesale markets, and in providing a learning platform for retail customers, third-party providers, technology providers, and RTOs.
- As wholesale markets mature, more emphasis should be placed on fully integrating demand into wholesale markets, which would reduce the need for out-of-market demand response programs.

5. What is the status of efforts to coordinate wholesale ISO demand response programs or market designs with retail demand response?

ISO New England response:

- Most customer rates in New England do not vary by hour and do not reflect cost of supply, particularly during high load hours.
- Flat prices send inaccurate price signals in high load hours encouraging electricity use when it is costly and when reliability is at greatest risk.
- Retail rates that reflect costs will encourage reductions in on-peak consumption resulting in lower costs and rates.
- In 2005 and 2006, ISO New England sponsored studies to determine if dynamic pricing for large C&I customers (demands \geq 500 kW) would provide benefits to the region.
 - Neenan Associates (UtiliPoint International) was retained by ISO New England to analyze the customer and market benefits of dynamic retail pricing in New England.
 - The study identified about \$265 million of benefits over a five-year period.
- In 2006, study results were shared and several meetings were held with the New England Conference of Public Utilities Commissioners.
- ISO New England has also intervened in state proceedings (in Connecticut and Massachusetts) addressing dynamic retail pricing – respectively, Docket No. 05-10-03 – Application of The Connecticut Light and Power Company to Implement Time-of-Use, Interruptible Load Response, and Seasonal Rates; and DTE 06-101, Petition of the Massachusetts Division of Energy Resources for an Investigation into Dynamic Pricing for Basic/Default Service.

6. What new efforts, market designs or programs are underway within your regions to further integrate demand response?

ISO New England response:

- *Forward Capacity Market – see ISO-NE PowerPoint presentation.*

7. What needs to be done in the future to fully integrate demand response?

ISO New England response:

- ISO New England's strategy to fully integrate demand response into the electricity market has the following elements:
 - Extend ISO Load Response Program in present form until 5/31/10, the end of the Forward Capacity Market Transition Period.
 - Capacity Market: Enable Demand Resources to compete in the Forward Capacity Market.
 - Operating Reserves Market:
 - Complete the Demand Response Reserves Pilot Program to determine the ability and willingness of small demand response resources to provide

- reserves.
- Determine more cost-effective telemetry and communication solutions more appropriate for small, geographically disbursed resources.
- Energy Market:
 - Encourage more price-responsive demand through dynamic retail pricing.
 - Work with states and others that are actively considering dynamic pricing.



Stephen Whitley
Senior Vice President and Chief Operating Officer
ISO New England Inc.

Remarks at the Federal Energy Regulatory Commission
Technical Conference on Demand Response in Wholesale Markets (AD07-11)
Demand Resources as an Alternative or Complement to Transmission Expansion Panel
April 23, 2007
Washington, D.C.

Thank you for the opportunity to appear before the Commission. Demand Response resources play a key role in meeting overall power system requirements on the New England Power System. Earlier today, you heard from Henry Yoshimura how demand response has played a significant role in shaving the system-wide peak during critical power supply periods, which enables system operators to maintain needed system operating reserves.

Today, I am going to offer a system planner and operator's perspective of how demand response can provide solutions to the future needs of the New England power system. I will point out how energy efficiency offers advantages for some conditions while demand response offers advantages for others. The key factor is what the operator can "count on."

Let's review the need to plan and operate the bulk transmission system in a reliable manner. We need to plan a combination of resources to meet future power system needs (generation, transmission, demand response, or energy efficiency) so that the system operator can "keep the lights on" during a variety of real-time system conditions. Planners must address a range of future demand conditions and generation dispatch scenarios.

We have to make sure the system is planned in accordance with NERC and NPCC standards, and the bar has been set higher in today's world of mandatory reliability standards. The system must be planned to withstand the sudden loss of any single power system element (line, transformer, substation bus, or generating unit) without causing voltage collapse, thermal overloads, or instability. We also have to plan the system to be able to withstand the loss of a second system element within 30 minutes after the loss of the first element.

We need to understand the electrical characteristics of the problem and the available solutions in order to understand which resource provides the best electrical solution. Let's look at two examples:

Resource Adequacy

The first example is a system-wide power supply shortfall that can be projected up to 30 minutes in advance. Typically, this is a condition where the forecast demand for the next few hours is expected to exceed the available supply even after the operator has called on all available generator

resources and emergency transactions from neighboring markets. This is a case where “operator controlled” demand response does an outstanding job. In other words the system operator can “count on” demand response to meet this need. In this case, there is time to notify demand response providers and reduce system-wide demand within 30 minutes. As mentioned earlier, this was clearly demonstrated on August 2, 2006 in New England.

Transmission Security

The second example is the sudden loss of a transmission element that causes an immediate voltage collapse, thermal overload, or instability on the power system. Voltage collapse can actually occur in a fraction of a second. In this case, demand response cannot be “counted on” to mitigate the need. On the other hand, this is an example of where energy efficiency, if deployed much earlier and in the right places, could have been a sound alternative to a potential transmission upgrade or may have deferred the need for the upgrade by essentially off-setting the demand growth in that area.

Through New England’s new capacity market, energy efficiency, demand response and other demand resources will have the opportunity to compete directly with supply-side resources. However, the opportunity for demand resources to be treated as capacity is new, and the challenges will be new as well. They will have to perform to get paid – just like supply-side resources.

In summary, ISO New England’s regional planning process identifies system needs and provides an opportunity for a variety of market-based solutions, including demand response and energy efficiency, to meet the needs. Our goal is to have the merchant marketplace provide solutions and we view the development of a regulated transmission plan as a backstop for reliability. ISO’s planning process and wholesale markets are designed to produce the appropriate mix of transmission, supply and demand resources needed to meet reliability standards in future years.

The amount of demand response in New England has grown substantially over the past seven years and I see demand resources playing an increasingly important role in the future of the region’s expansion plans.

Thank you.

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Technical Conference on Demand Response in Wholesale Markets (AD07-11)
April 23, 2007
Federal Energy Regulatory Commission
Washington, D.C.

Stephen Whitley
Senior Vice President and Chief Operating Officer
ISO New England

Panel: Demand Resources as an Alternative or Complement to Transmission Expansion (3:25 p.m.)

Panelists:

- The Honorable Dian M. Grueneich, Commissioner, California Public Utilities Commission
- Steven Whitley, ISO New England
- Bill Whitehead, PJM
- Sandra Levine, Conservation Law Foundation
- Eric Woychik, Strategy Integration L.L.C. on behalf of Comverge, Inc.

Questions for panelists:

1. Do current transmission planning processes integrate demand resources as an alternative or complement to transmission system upgrades?

ISO New England response:

- The transmission planning process recognizes demand response resources that are a part of the day-to-day energy market and can be used as resources in normal operation of the system. ISO New England does not develop transmission plans that would result in the routine need for demand response resources that are reserved for abnormal system conditions such as Operating Procedure No. 4 - Actions During a Capacity Deficiency. In the early stages of the planning process, the ISO defines a need for the region or for a critical sub-area of the region. At that time, non-transmission alternatives, such as demand response, can step forward to fully or partially meet that need. If the market response is sufficient, i.e., the need is met, the transmission upgrade may be cancelled or deferred.

If so, how and is this approach sufficient?

ISO New England response:

- ISO New England is responsible for planning a system that meets national and regional reliability criteria. If market solutions, such as demand response, are not sufficient to meet those needs, a regulated transmission solution must be developed to ensure that we can satisfy these criteria. By allowing market solutions to respond via the New England markets and through Market Participants, we are not prejudicing one market solution over another.

Are other forms of demand reduction, such as load shedding, incorporated into current transmission planning processes? If so, how?

ISO New England response:

- We generally do not plan the system to rely on load shedding. Special load shedding schemes are reserved for unique operating conditions and are employed rarely, if at all. Load shedding may be acceptable for situations where a facility is already out of service and a second contingency occurs.

2. What would be the key elements of a planning process that integrates demand resources as an alternative or complement to transmission facilities additions?

ISO New England response:

- The ISO planning process is designed to incorporate any market response, including demand response. This is accomplished by presenting a needs statement to all regional stakeholders through the New England Planning Advisory Committee (PAC) and allowing time for the market to respond. If market responses come forward, the need for new transmission is re-evaluated and can be cancelled or deferred. It is important to note that market solutions and transmission solutions are not equivalent in as much as a road and a vehicle are not equivalent. Market solutions may defer a need or only a part of a need. Therefore, system needs and the effectiveness of various options to mitigate the needs or remedy the problems must be thoroughly investigated.

What should be the means to determine the costs and benefits of a demand resource alternative or complement to transmission upgrades?

ISO New England response:

- ISO New England has created programs and markets that place a value on demand response resources that are part of the day-to-day electricity market. These resources can receive value by participating in one of the ISO's demand response programs, from the Energy Market through dynamic retail pricing, the locational Forward Reserve Market if qualified to participate in ISO's Ancillary Services Market, and the Forward Capacity Market. Load serving entities can evaluate the cost/benefit of adding demand response to their supply portfolio as an alternative to other means of supply or waiting for transmission reinforcements.

3. What are the current advantages, challenges and obstacles to implementation of demand resources as an alternative or complement to transmission facilities additions?

ISO New England response:

- With the new market mechanisms in place, implementation of demand response resources as part of the day-to-day market structure in New England is not difficult. Challenges continue to be the relative size and specific location of the demand response resources versus that of new generation or the magnitude of system benefit gained from major new transmission projects. When the system need is stated in the 100's or 1000's of MW's it is hard to put together enough demand response resources in the right places and at the right time to fully meet the need.

4. What market design or ratemaking initiatives can be taken to encourage the deployment of demand resources, and enabling technologies, in operating and planning the transmission system?

ISO New England response:

- As stated earlier, ISO New England has created market mechanisms that allow demand response resources to receive value from the Energy Market, the locational Forward Reserve Market, and the Forward Capacity Market. The ISO also plans to create further opportunities for demand response resources in wholesale markets and to encourage dynamic retail pricing as discussed by Mr. Yoshimura earlier today. These markets have already seen the creation of demand response "aggregators" who employ various forms of internet and other communication and monitoring technologies to ensure that the demand will be curtailed as required.

5. How should customers that provide a demand resource alternative/complement to transmission expansion be compensated?

ISO New England response:

- ISO New England markets compensate the demand response resources based on their operating characteristics and their relative value to system operations. In our market structure, a demand response resource can be compensated for energy, operating reserve and installed capacity based on the market prices in each respective market. Additionally, market participants and other parties can bilaterally contract with demand response resources or other entities if they have an inherent preference for these various types of resources.