New England's Forward Capacity Market and Regional Resource Adequacy

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ISO new england

Disclaimer

Opinions expressed during this presentation are solely of my own and are not those of the ISO New England.

Agenda

- History of the New England Bulk Power System
  - New England Power Pool
  - ISO New England
- ISO New England Electricity Markets
- The New England Resource Situation
- The Forward Capacity Market
  - Overview
  - Components
- How the FCM is expected to impact regional resource adequacy

New England Power System

November 9, 1965: Northeast Blackout shuts down power for 30 million customers

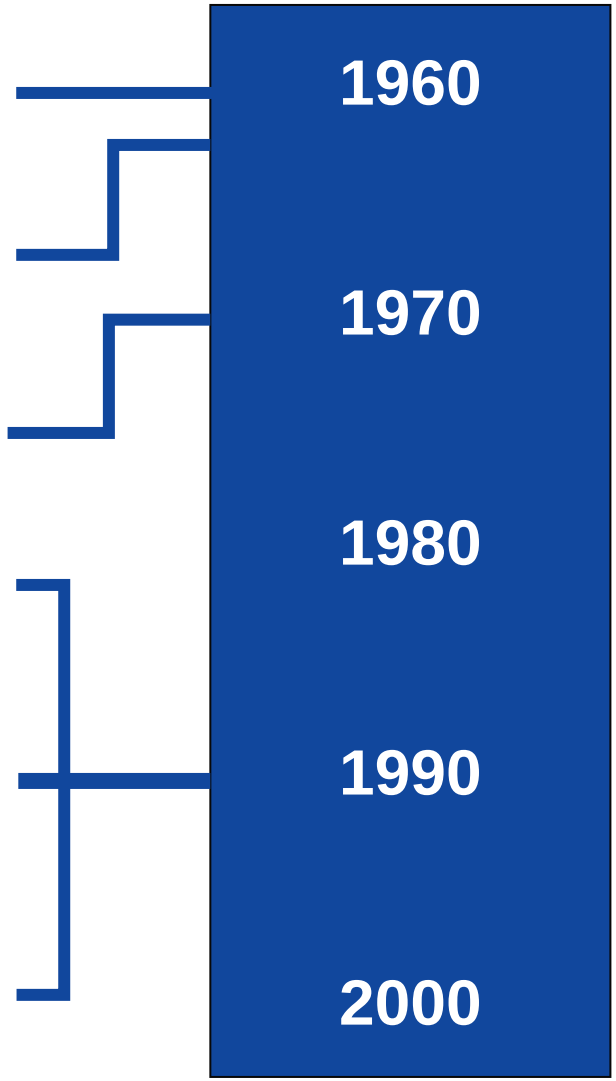
January 1966: Northeast Power Coordinating Council (NPCC) formed to improve system reliability

1971: New England Power Pool (NEPOOL) created to establish a central dispatch system and enhance system reliability

1996: FERC Order 888 deregulates generation portion of the electric power market and implements open access for transmission lines

July 1, 1997: ISO New England created to manage the regional bulk power system and new wholesale markets and ensure access to transmission systems

May 1, 1999: ISO New England begins managing restructured regional wholesale power markets

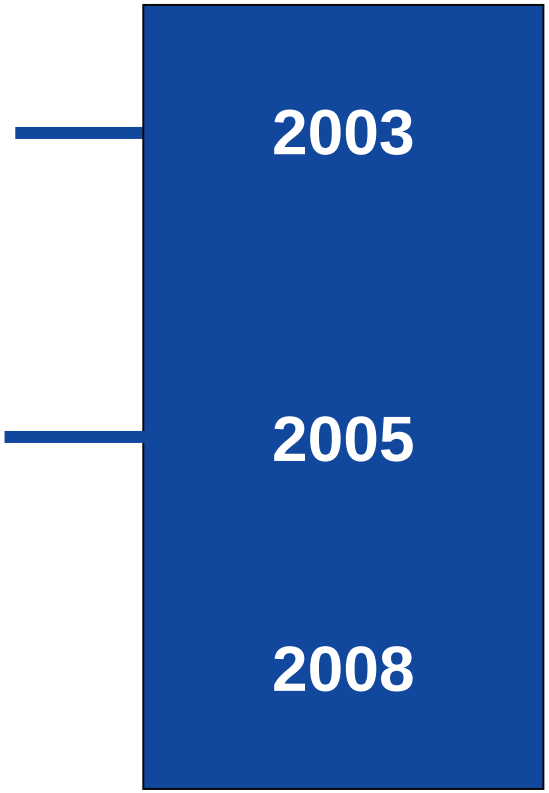


New England Power System (cont.)

March 1, 2003: ISO implements Standard Market Design with locational pricing and Day-Ahead Market

February 1, 2005: ISO begins operation as Regional Transmission Organization (RTO)

February 1, 2008: ISO expects to conduct its first Forward Capacity Market Auction



New England Power Pool (NEPOOL)

- NEPOOL established in November 1971, in response to the Great Northeast Blackout of 1965
- Originally is a voluntary association of vertically integrated utilities.
  - Now membership is open to any party interested in the New England electricity markets
- Objectives: reliability, economic efficiency, and “tight” power pool with regional central dispatch
- NEPOOL members own the physical power system in New England.

ISO New England Overview

- Private, not-for-profit corporation created in 1997 to oversee New England's deregulated electric power system
  - Regulated by the Federal Energy Regulatory Commission (FERC)
  - Independent of companies doing business in the market
  - Independent board of directors, with no financial stake in regional energy firms
  - The ISO operates in accordance with an RTO Tariff, a Participants Agreement with NEPOOL and a Transmission Operating Agreement with the Transmission Owners
  - Over 400 employees headquartered in Holyoke, Massachusetts

ISO New England's Mission

- Maintain day-to-day bulk power generation and transmission system reliability
- Ensure oversight and fair administration of the wholesale electricity markets
- Conduct annual independent power system needs assessment

ISO New England Profile

Power System Operations 24/7/365

- Dispatch of bulk power system to continuously balance supply and demand every 5 seconds
- Continuously analyze power system to be able to react to power system events (every 3 to 9 minutes)
- Forecast Office provides hourly updated load forecast and available generation
- Maintain direct contact with four Satellite Control Centers
- ‘Dual-redundant’ and ‘hot-standby’ computer systems with additional ‘hot-standby’ back-up control center
- Operating procedures in place to manage shortages in supply, load shedding and system restoration

ISO New England Profile (cont.)

- Market Operations 24/7/365
  - Dispatch of the most economic mix of resources every 5 minutes
  - Administration of ‘Day-Ahead (DA)’ and ‘Real-Time (RT)’ spot markets through real-time Web interfaces
  - Continuous market monitoring and mitigation
- Market Administration
  - Weekly financial settlement of a wholesale Market valued at over $7 billion annually
- Market Development
  - Successfully implemented second-generation ‘Standard Market Design (SMD)’ ahead of the federal initiative for standardized Markets
  - ‘Wholesale Market Plan’ lays out the roadmap for the future evolution of the wholesale Electricity Markets

ISO New England Profile (cont.)

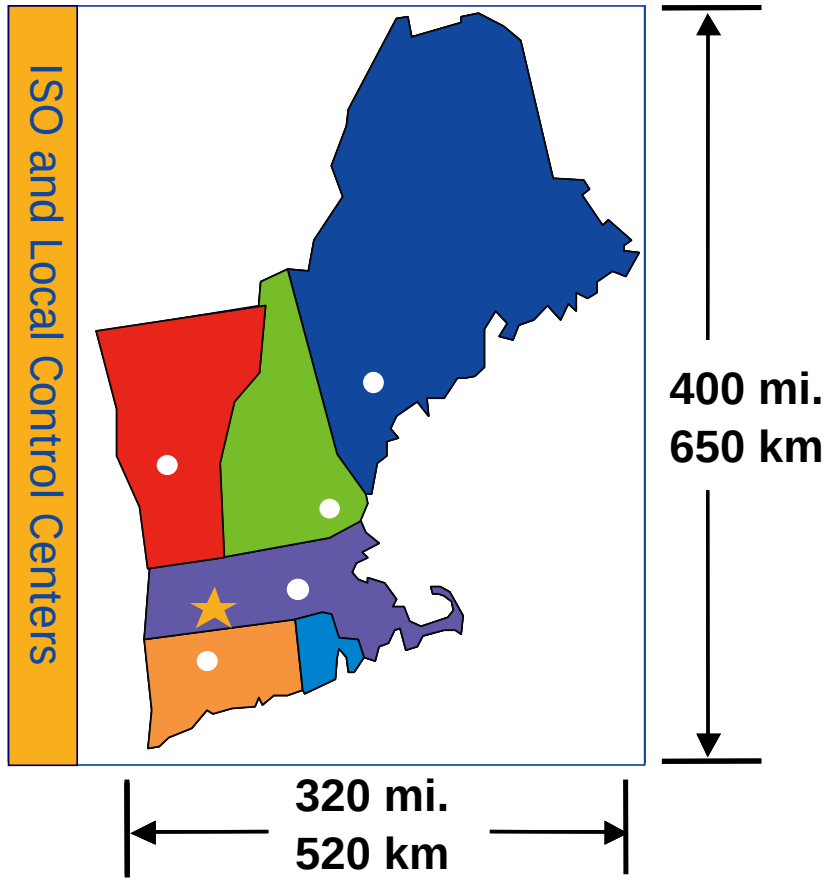
- Power System Planning
  - Annual and on-going assessment detailing the needs of the power system today and 10 years into the future
  - Timely information to promote efficient market responses
  - Transmission plan to preserve reliability – approximately 260 projects, with a current cost estimate of between $2 billion and $4 billion
  - Forward Capacity Market Annual and Reconfiguration Auctions including the development of Installed Capacity Requirements

Existing and Proposed RTO Configurations

Resource: FERC Maps

New England's Electric Power Grid

- 6.5 million customer meters
- 350+ generators
- 8,000+ miles of high voltage transmission lines
- 5 local control centers
- 12 interconnections to neighboring systems
- 31,000 MW of installed generating capacity
- Peak load:
  - Summer: 28,127 MW (8/06)
  - Winter: 22,818 MW (1/04)



ISO New England Wholesale Electricity Markets

- Electricity Energy Market
  - DAM and RTM
- Ancillary Services
  - Locational Forward Reserve Market (LFRM)
  - Regulation Market
- Capacity Market
  - Installed Capacity Market (ICAP Market)
  - To become Forward Capacity Market
- Financial Transmission Rights (FTR)

Resource Adequacy Issues in a Market Environment

- The single biggest resource adequacy issue under a market environment is that no entity is responsible for long-term system resource adequacy.
  - The Market will provide (will it? Or will it not?)
- ISO New England has authority to ensure operational reliability.
  - ISO New England has authority to build transmission facilities
  - Market participants build supply resources as they determine profitable.

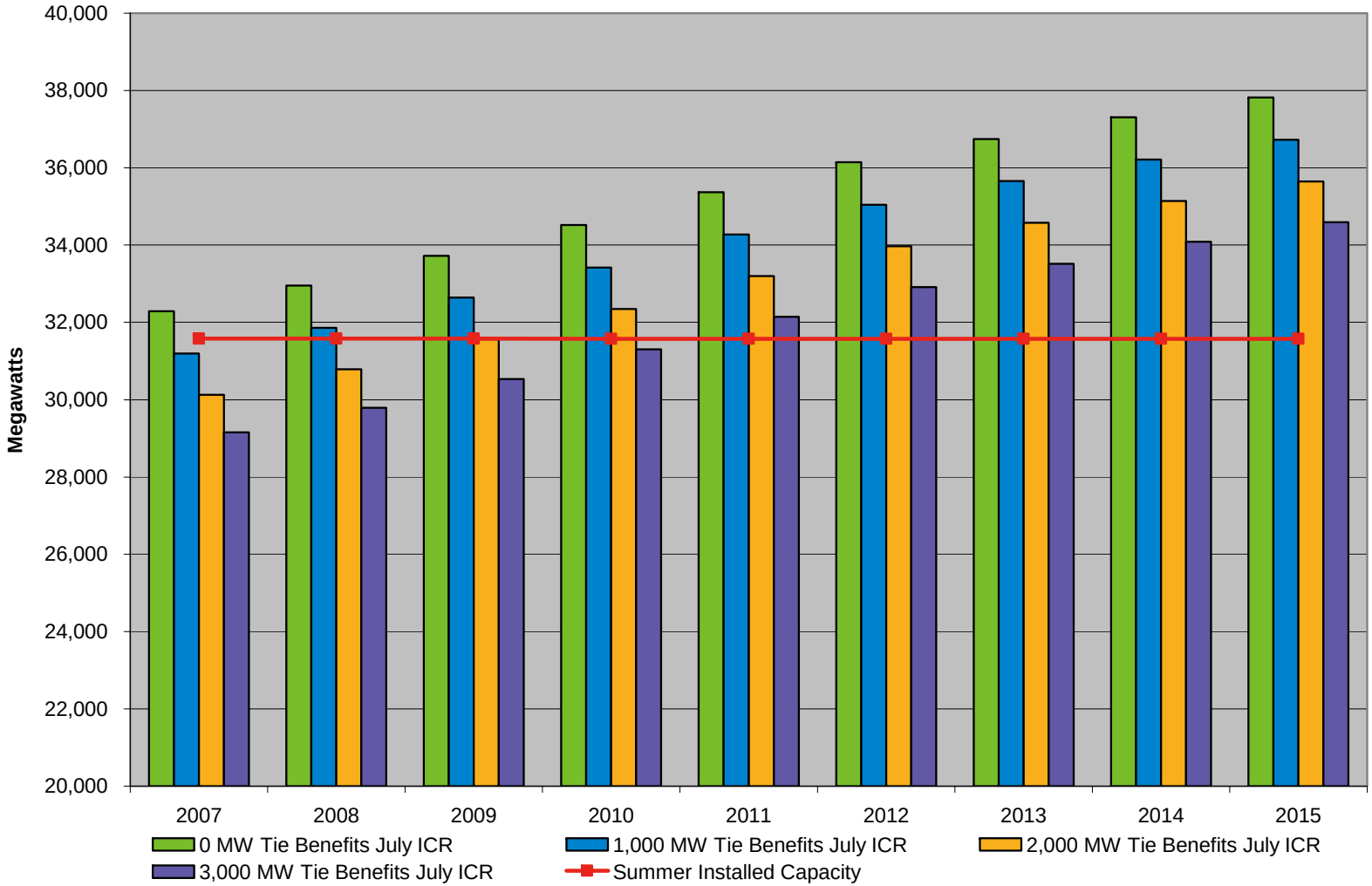
ISO New England has Limited Resource Adequacy Responsibility

- Current Installed Capacity (ICAP) Market is an annual "requirements" market
  - capacity requirements determined just for one future year and auction takes place just prior to the start of the capability year.
  - if the market does not react, insufficient time to install resources.
- If capacity shortage is expected
  - ISO New England has the authority to exercise non-market option to meet the need (issues Request for Proposal to buy resources).

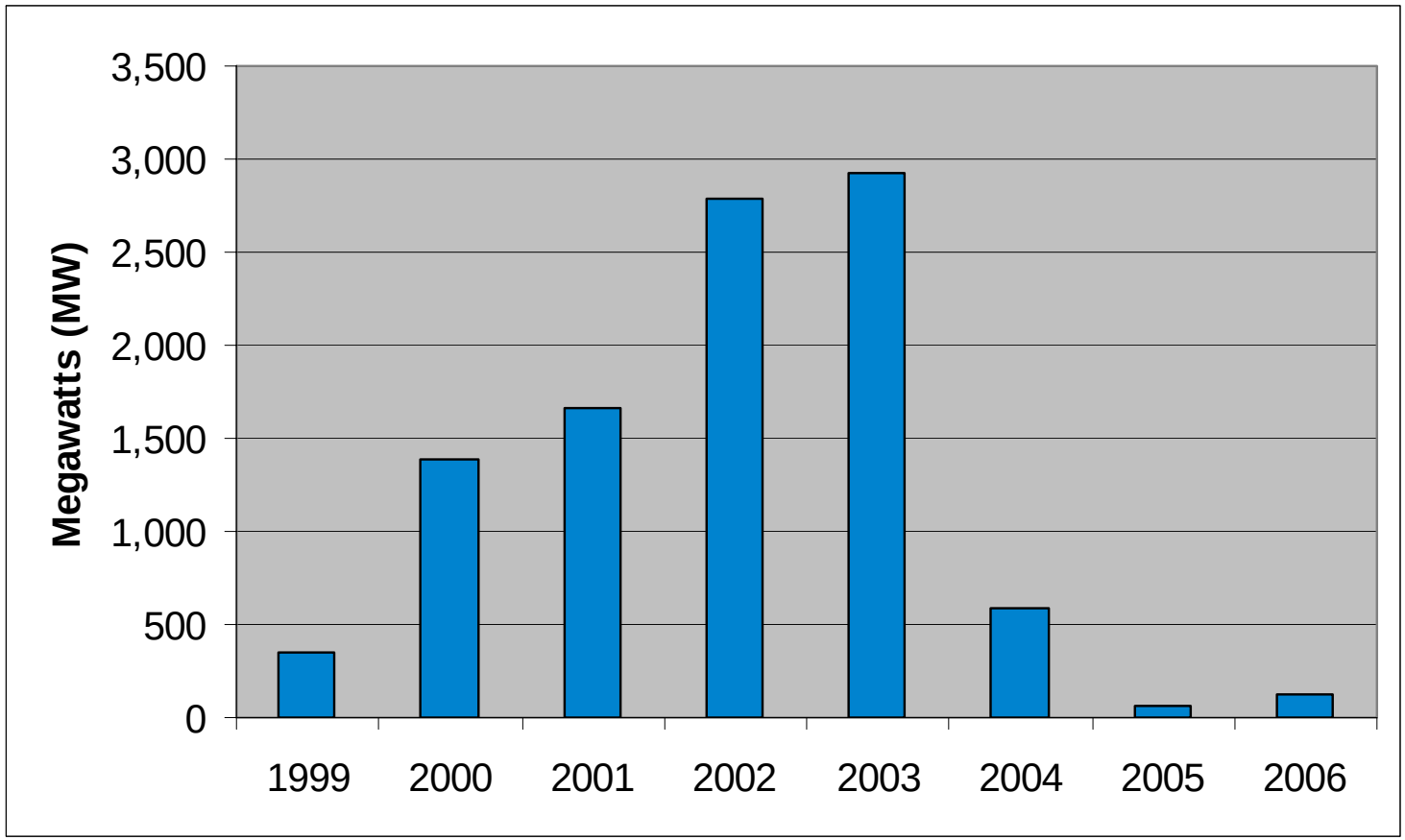
Demand growth is Expected to Out Pace Supply

- Electricity use continues to grow, investment to new supply has slowed down.
- Average annual electricity growth projection (2007 -2016):
  - Peak load – 1.7%
  - Energy – 1.2%
- Since 1999, over 10,000 MW of generating resources have been installed in New England
- Most installed between years 2000 and 2003
  - reaction to New England being one of the first markets in the US
- Almost nothing has been installed after 2004
  - Markets too competitive
  - High cost resources unable to financially survive
  - New generators unwilling to take risk
- 200 to 300 MW additions are expected in 2007

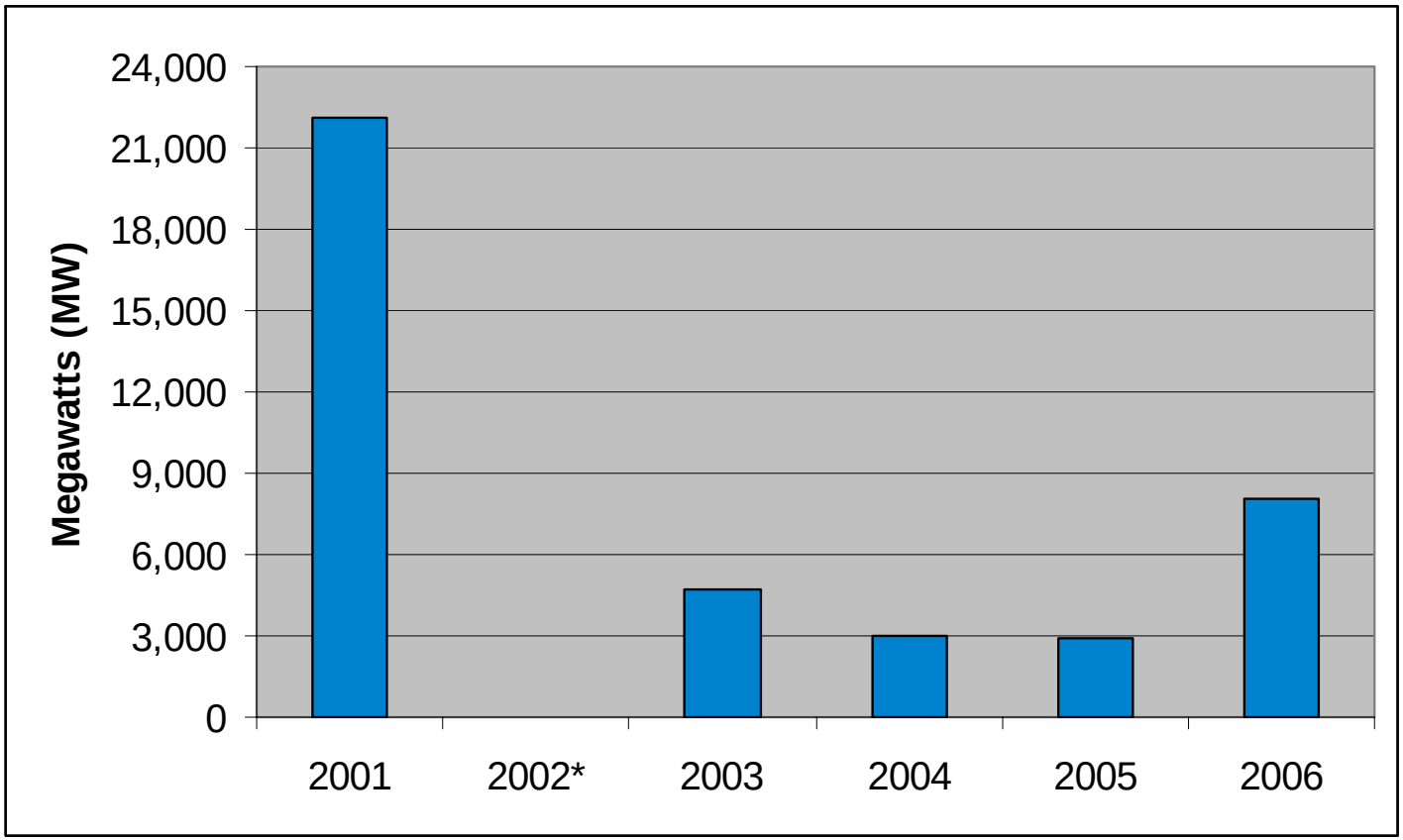
Projection of Installed Capacity Requirements (2006 Regional System Plan)



Generator Additions 1999 - 2006

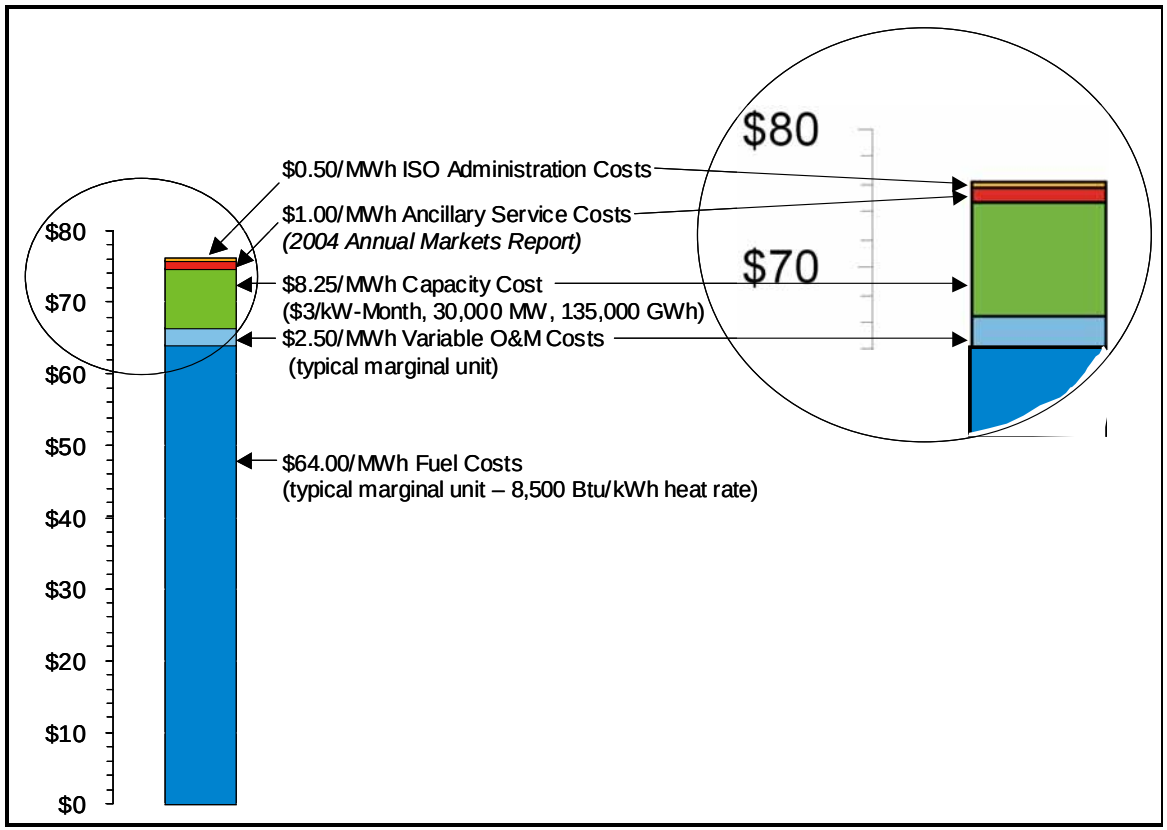


Generator Interconnection Queue Totals 2001 - 2006



* Data not available for 2002

New England Wholesale Electricity Cost For a Typical Hour

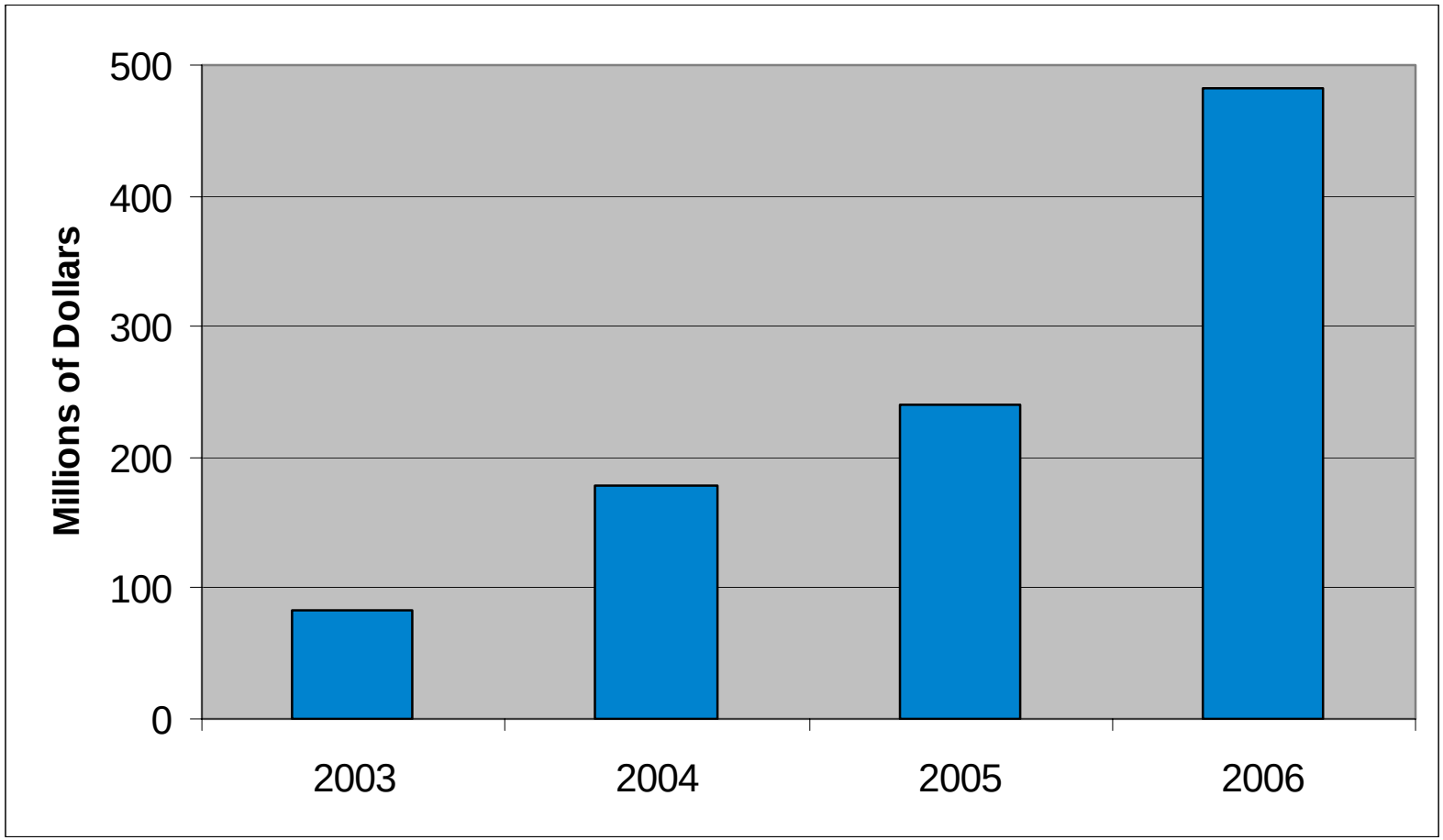


New England wholesale electricity cost for a typical hour with a gas unit on the margin, total $76.25/MWh (2005).

Reliability Agreements to keep Resources

- As a member of NEPOOL, resources can only deactivate or retire from the Markets with approval from ISO New England.
  - Approval is granted if no reliability consequences
  - Otherwise, procedure is in place to compensate for the resource to stay in the Markets
  - Compensation rates have to be filed and approved by the Federal Energy Regulatory Commission
- Approximately 21 power plants have entered into Reliability Agreements with ISO New England
  - They are not competitive in markets
  - Have requested deactivation or retirement
  - But are needed by the region for reliability
- Reliability payments to these plants totaled over $ 480 million in 2006.

ISO-NE Reliability Agreement Costs 2003 - 2006



ISO New England Charged to develop a Market to Address the Reliability Issue

- In 2003, the Federal Energy Regulatory Commission charged ISO New England with developing a market to address the reliability issue threatening New England.
- After working with New England stakeholders, a competitive market structure to sustain a reliable electricity system was developed in 2006 through a Settlement Agreement.
  - Create an auction-based Forward Capacity Market
    - Power resources commit to be available to provide power roughly three years in advance of when power is needed.
    - Allows time for new resources to be developed and built.
    - Market price will be set by the lowest priced new capacity.
- The first FCM Auction is targeted for February 2008 for Commitment Period June 1, 2010 through May 31, 2011.

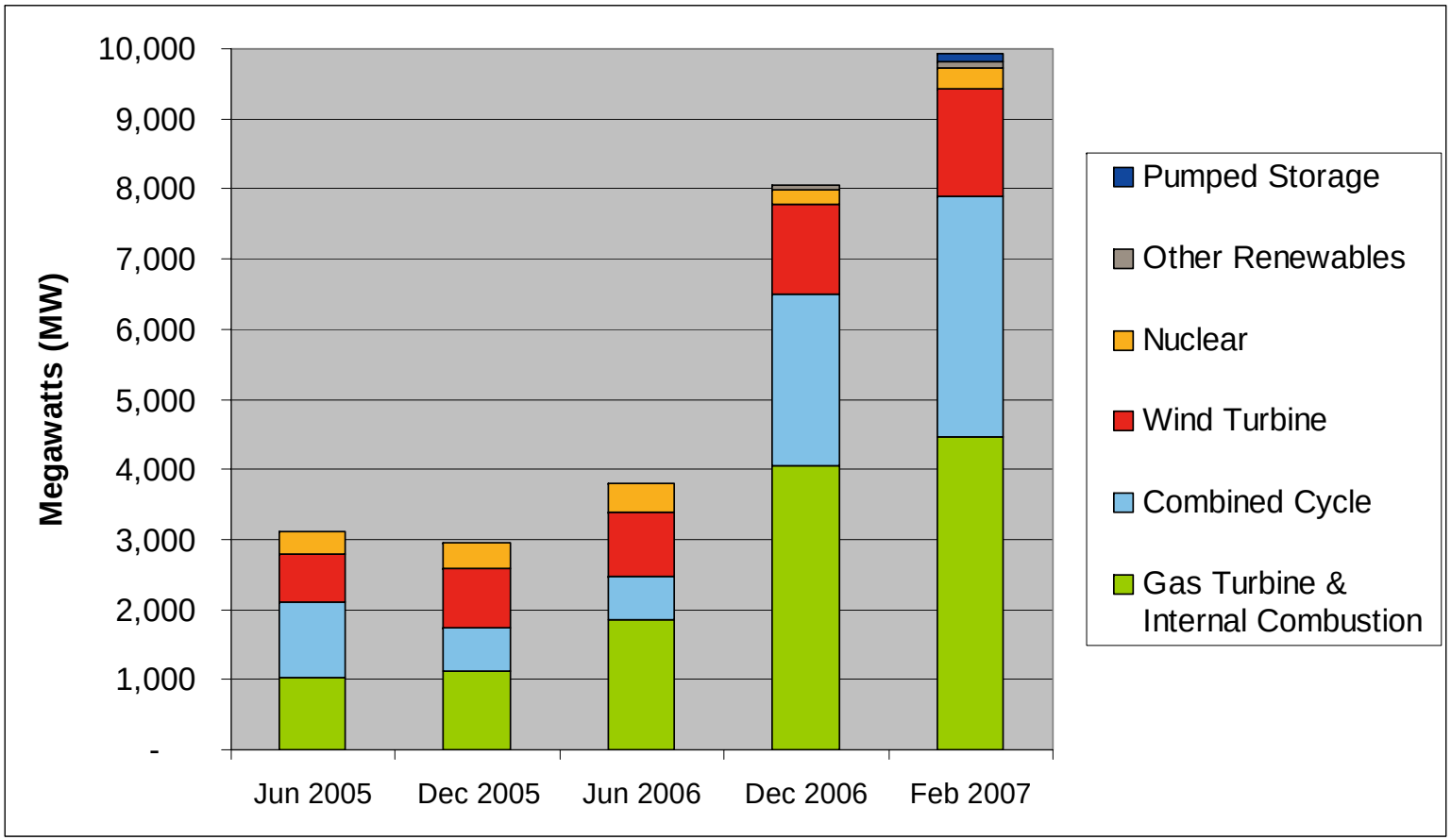
Forward Capacity Market (FCM)

- The FCM is intended to provide economic incentives to attract investments in existing and new capacity resources
  - Supply from power plants or decreased electricity use through Demand Resources
- The FCM provides an auction structure through which capacity resources compete to obtain a market-priced capacity payment, in exchange for a commitment to be available in the years ahead to meet region's electricity needs.
- Resources must qualify to participate
  - Show support that they can meet their commitment to provide capacity
  - Existing resources are automatically entered into the auction unless they opt out under certain condition
  - New resources must submit a Show of Interest Application
- For new resources, ISO New England to review:
  - Transmission upgrade requirements and completion date for power plants
  - Meet ISO quality standards

New Resource Development Interest

- As of mid March 2007, ISO New England has received Show of Interest Applications for approximately 17,600 MW of power resources.
  - 2,300 MW of Demand Resources (such as energy efficiency, load management, distributed generation)
  - 10,000 MW of Supply Resources (mostly combustion turbines and combined cycles)
  - 5,300 MW of Imports (resources located in other Control Areas and imported into New England through its interconnections with Quebec, New York and New Brunswick)
- The amount of resources requesting interconnection studies has increased from approximately 3,000 MW in December 2005 to approximately 10,000 MW as of February 2007.

Generation Interconnection Queue Resources by Generator Type



What Does the FCM Mean So Far?

- Show of Interest responses indicate that the proposed market is sending appropriate market signal and that it is designed properly
  - Well over half of the projects proposed in the Show of Interest applications are for resources in Connecticut and Massachusetts
    - In response to studies that indicated resources are needed in these pockets of high demand that their energy needs cannot be solely met by local power resources
- If Demand Resources are selected in the auction
  - Their contribution to meeting New England's capacity needs will signal an important milestone for the wholesale markets in New England and may serve as a model for the rest of the United States.
- The FCM should provide adequate incentive to maintain existing and attract new resources and has mechanism to purchase new resources up to 8 years into the future.

The Forward Capacity Market (FCM)

Forward Capacity Market is…

- A Forward procurement, auction-based locational capacity market
  - Intended to send appropriate price signals to attract new investment and maintain existing resources where and when they are needed, thus ensuring the reliability of the New England electricity grid.
  - The FCM auction allows new capacity (capacity planned to build but not commercial) to set the market clearing price, while accounting for locational capacity requirements, thereby providing a market-based measure of the cost of new entry.

Forward Capacity Market Purpose

- Capacity market whereby the ISO will project the needs of the power system three years in advance and then hold an annual auction to purchase power resources to satisfy those projected needs.

Forward Capacity Market Components

- Transition Period (until the FCM market is in place)
  - Fixed negotiate prices for all UCAP
- Forward Capacity Market
  - Forward Capacity Auctions
  - Reconfigure auctions

Forward Capacity Market Basics

- Transition Period
  - Starts on December 1, 2006
  - Ends in 2010
  - Purpose
    - Interim compensation arrangements to ensure sufficient capacity to meet demand
  - Because of the forward nature of the Forward Capacity Market, the 2010-2011 Power Year is the first year for which capacity will be compensated under the Forward Capacity mechanism.
  - As detailed in the Settlement Agreement, a Transition Period will bridge the gap between December 2006 and the 2010-2011 Power Year.
  - Payment
    - First year $3.05/kilowatt month

Forward Capacity Market Basics

- Forward Capacity Market
  - Start
    - First Forward Capacity Auction
      - First quarter 2008 for the commitment year beginning June 1, 2010
  - Payment
    - Determined in auction

Forward Capacity Auctions

- Primary FCA: Three years ahead of delivery
  - e.g., Auction held in early 2008 for delivery in mid-2010
- Total Installed Capability Requirements (ICR) purchased through primary FCA
  - ICR from System Planning Analysis
  - Local Sourcing Requirements (LSR) for each Capacity Zone
    - Based on constraints that may bind in the Auction
- Forward Capacity Market Settlement Agreement established that New and Existing Resources would be "Qualified" for participation in the FCA
- Qualified means that the Resource meets the criteria contained in the Qualification Section of the FCM Market Rule

FCM Additional Information

- All resources can participate, both new and existing, but must be qualified:
  - Generation
  - Demand Resources
  - Imports
- Primary auction (Forward Capacity Auction or FCA) for capacity resources three years in advance
  - Descending clock auction
  - Resources are qualified to participate

FCM Overview (cont.)

- Commitment Period is one year for existing resources and one to five years for new capacity resources
- Market monitoring review
- ISO New England seeks to purchase entire expected resource need in FCA
- Capacity is bought in locations where needed
  - Capacity zones can have specific MW requirements and prices

Forward Capacity Reconfigure Auctions

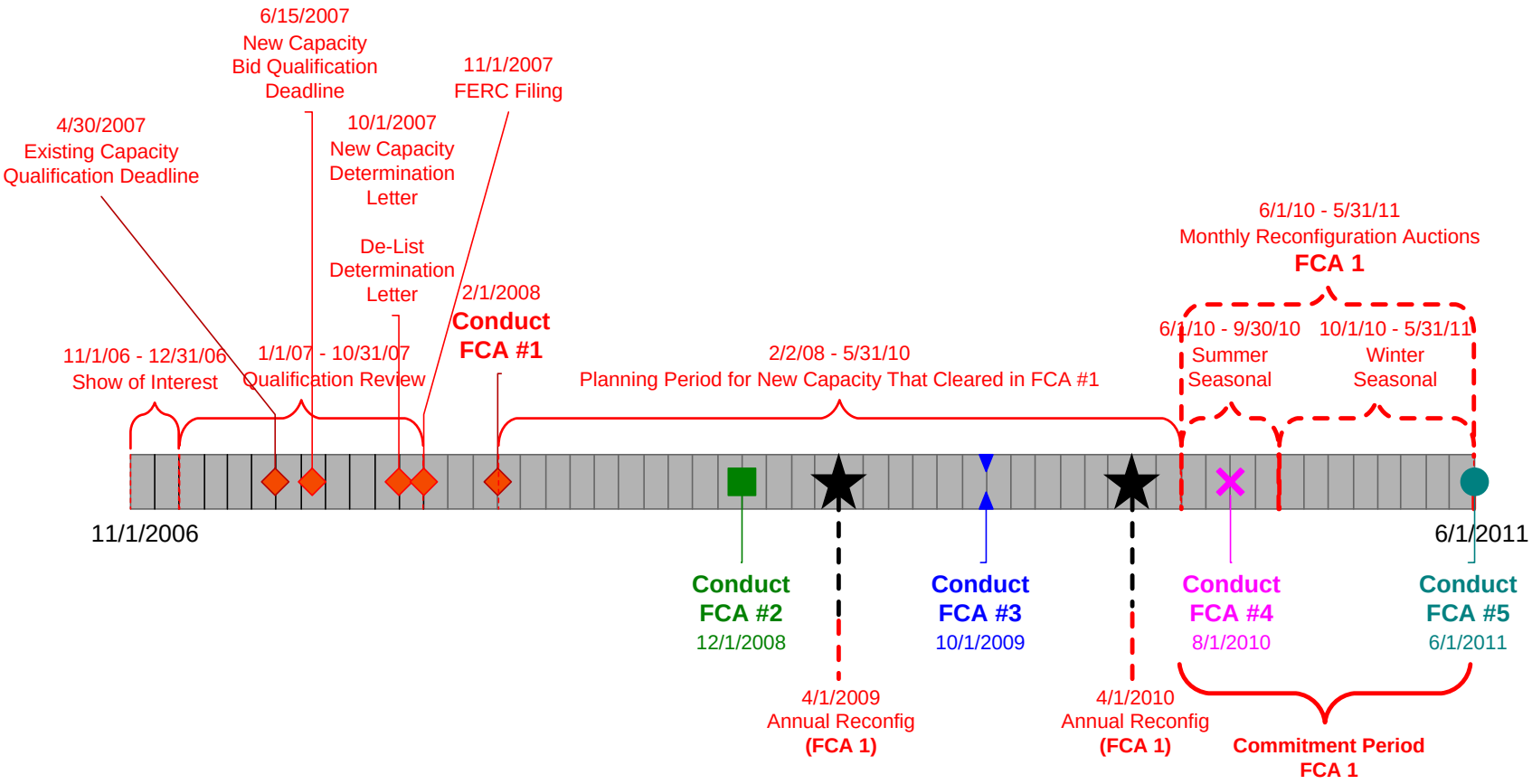
- Uniform-price auction in which sellers submit offers and buyers submit bids simultaneously, the clearing price is determined by the balance of supply and demand, and all sell offers and buy bids that clear are paid or pay the clearing price.
- Reconfiguration auctions are to be held on an annual, seasonal and monthly basis for each Capacity Commitment Period.

FCM Overview (cont.)

- Reconfiguration auctions, after primary auction, enable trading of obligations and adjustments to capacity purchases
- Resources provide capacity and receive payment during Capacity Commitment Period, three years after primary auction
- Payments reduced by the following:
  - Penalties for reduced real-time availability during most needed hours (“Shortage Hours”)
  - Peak Energy Rents (PER) (revenues above a strike price)

Forward Capacity Auction Timeline

1st FCA for Commitment Period Beginning June 1, 2010



How to Get More Information

Forward Capacity Auction

- http://www.iso-ne.com/committees/comm_wkgrps/mrkts_comm/mrkts/mtrls/2006/sep222006/a4_fcm_fca.ppt#370,1,Forward Capacity Auction (“FCA”)

Qualification of Resources

- http://www.iso-ne.com/committees/comm_wkgrps/mrkts_comm/mrkts/mtrls/2006/sep222006/a3_fcm_qualification.ppt

Qualification Timeline
Reconfiguration Auctions
Market Bilateral Transactions
Financial Assurance

- http://www.iso-ne.com/committees/comm_wkgrps/mrkts_comm/mrkts/mtrls/2006/oct62006/index.html

Treatment of Generator in Case of Transmission Line Delay
Payments, Performance and Charges
Qualification Process Details

- http://www.iso-ne.com/committees/comm_wkgrps/mrkts_comm/mrkts/mtrls/2006/oct112006/index.html

More/updated information

- ISO website http://www.iso-ne.com/markets/othrmkts_data/fcm/index.html

Market Support / Customer Service

Email: custserv@iso-ne.com