

The ISO New England Forward Capacity Market (FCM)

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Disclaimer

This Forward Capacity Market (FCM) presentation was made possible by copying presentation slides from various presentations made by other members of the ISO staff. This presentation covers the highlights of the FCM. The details of the FCM are being developed into market rules as we speak.

Any opinion expressed during the presentation is 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 Forward Capacity Market
 - Overview
 - Components

New England Power System

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

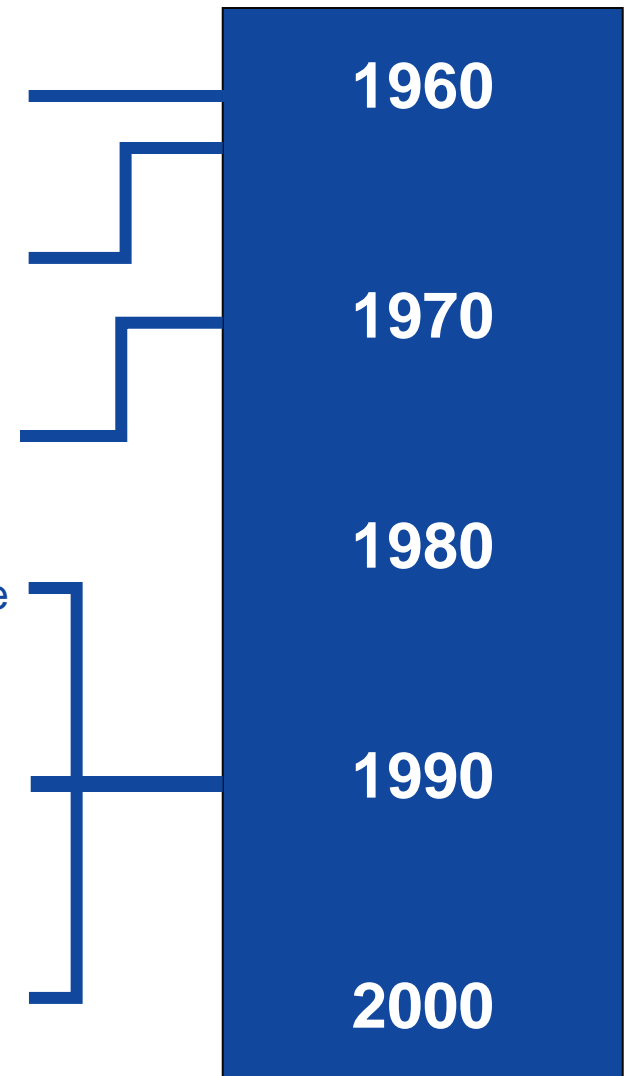
November 9, 1965: Northeast Blackout shuts down power for 30 million customers

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

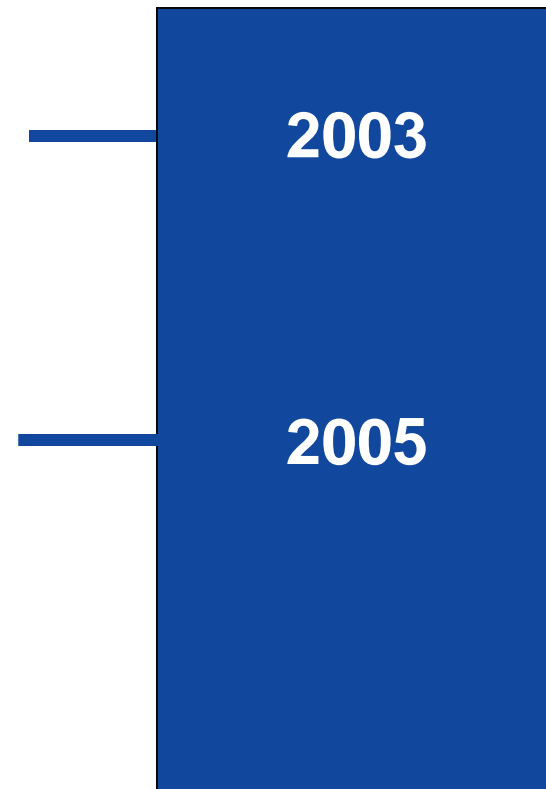
May 1, 1999: ISO New England begins managing restructured regional wholesale power markets



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)



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

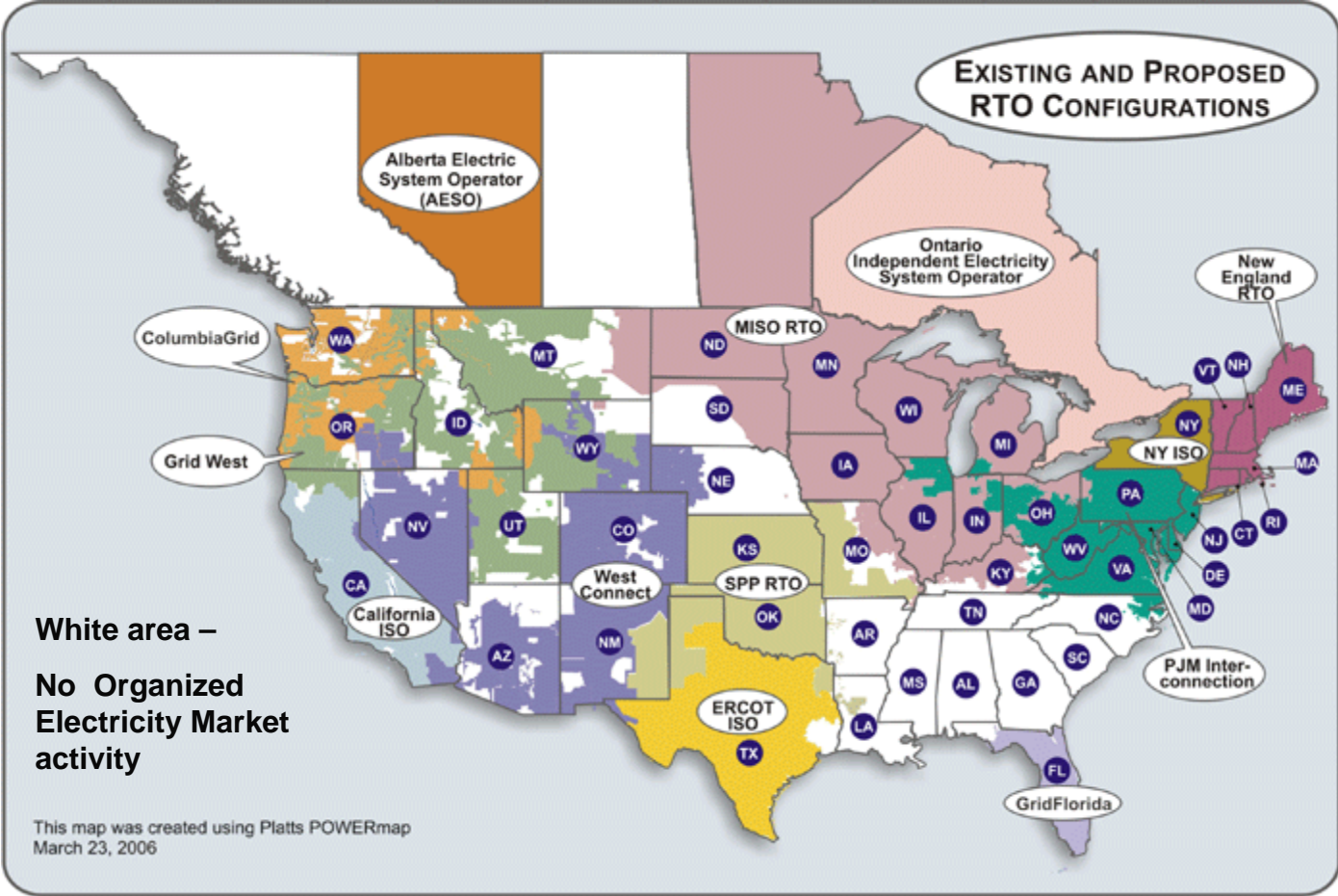
ISO New England Profile (cont.)

- 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 in the future
 - Timely information to promote efficient market responses
 - Transmission plan to preserve reliability – approximately 250 projects, with a current cost estimate of between \$2 billion and \$4 billion

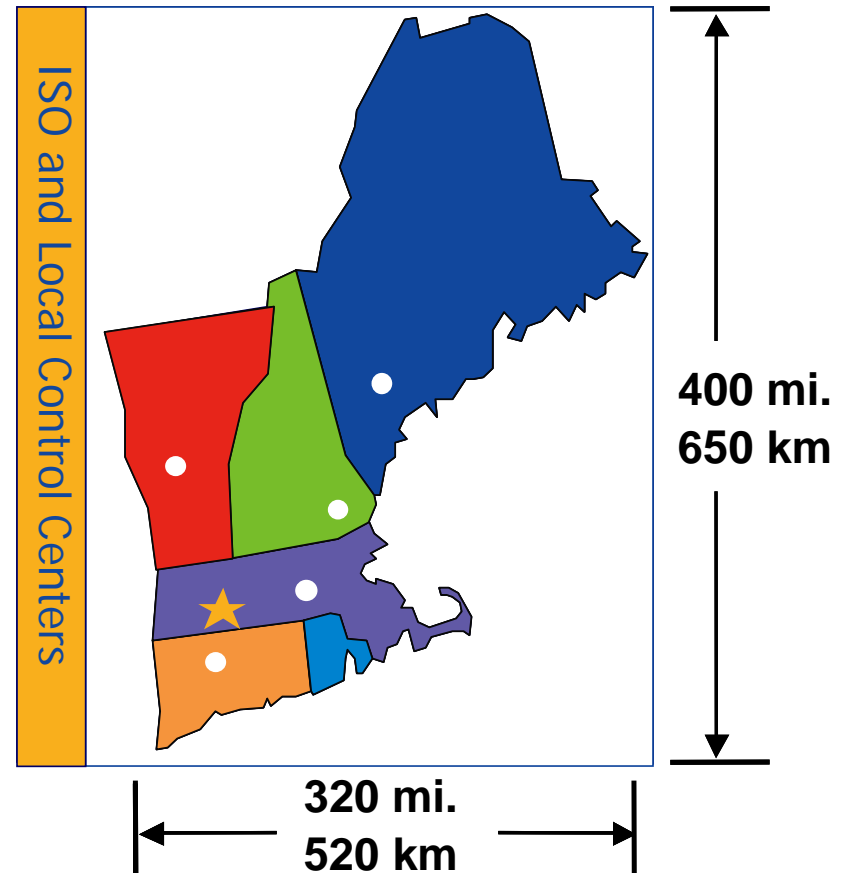
Existing and Proposed RTO Configurations



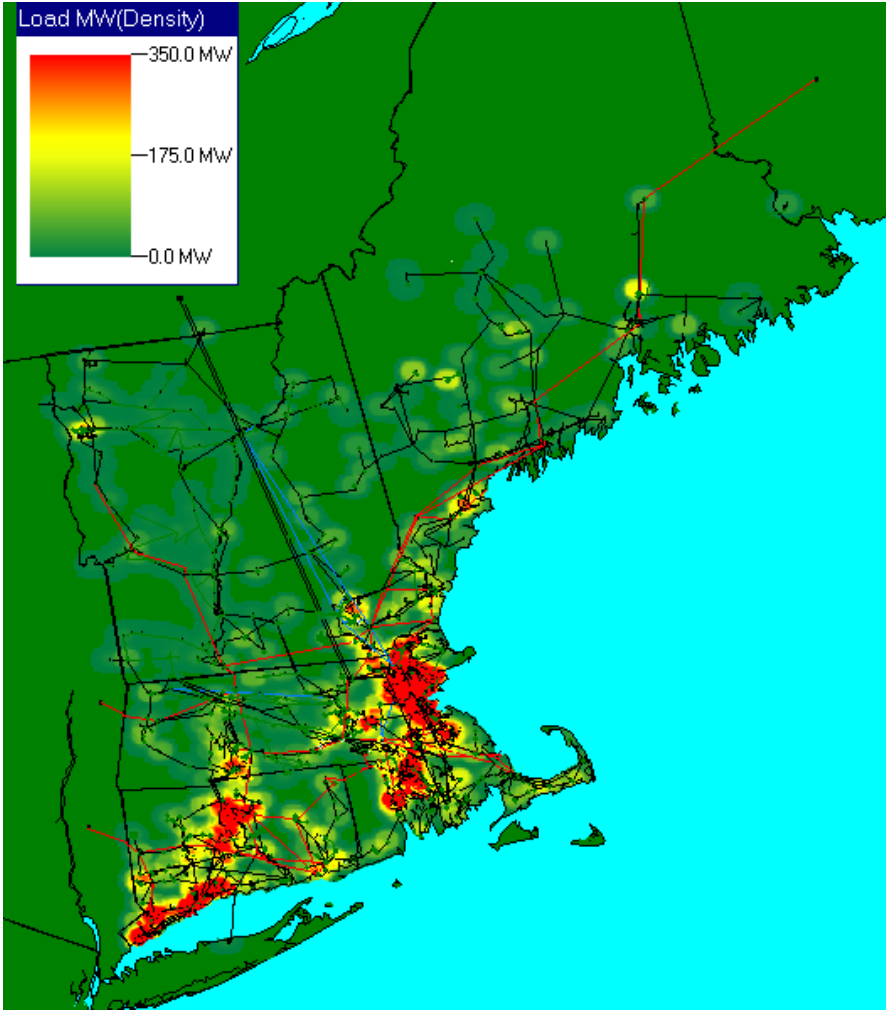
Resource: FERC Maps

New England's Electric Power Grid

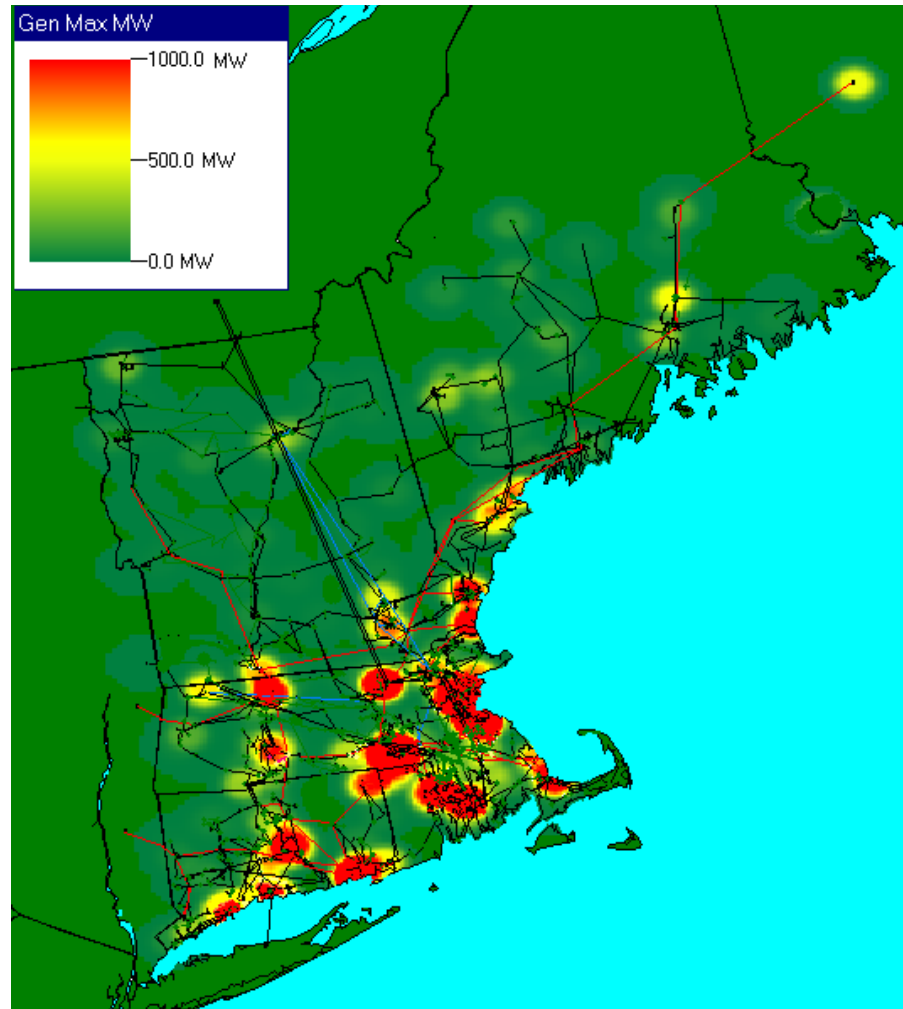
- 6.5 million customer meters
- 350+ generators
- 8,000+ miles of high voltage transmission lines
- 5 local control centers
- 12 interconnections to neighboring systems
- 31,000 MW of installed generating capacity
- Peak load:
 - Summer: 28,127 MW (8/06)
 - Winter: 22,818 MW (1/04)



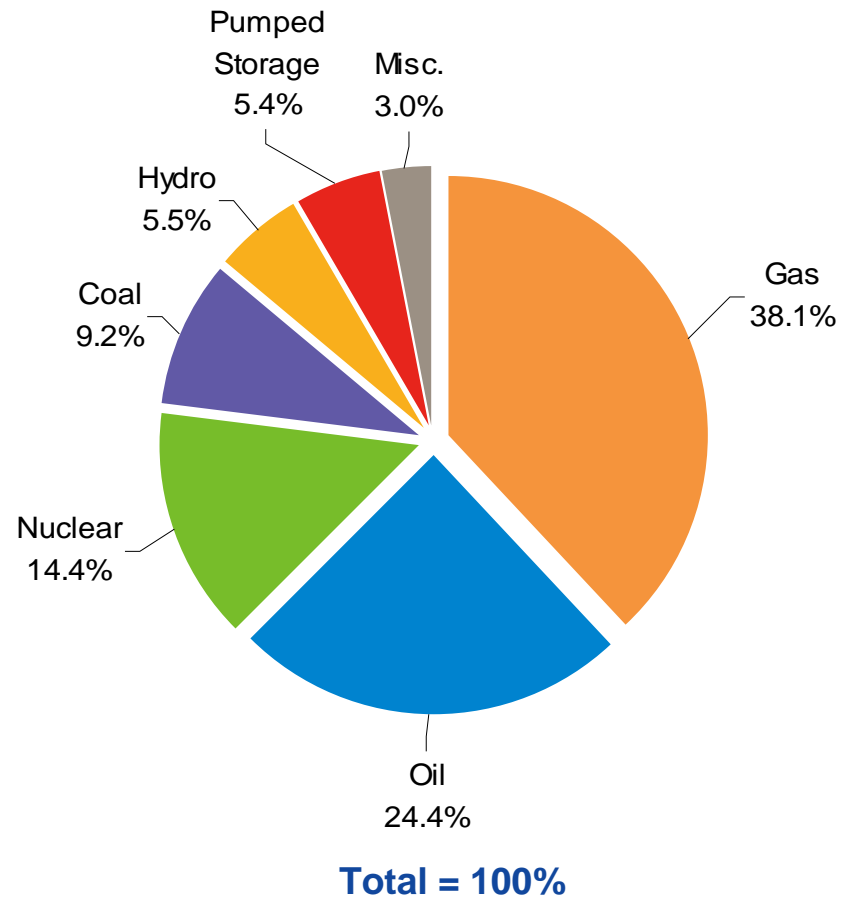
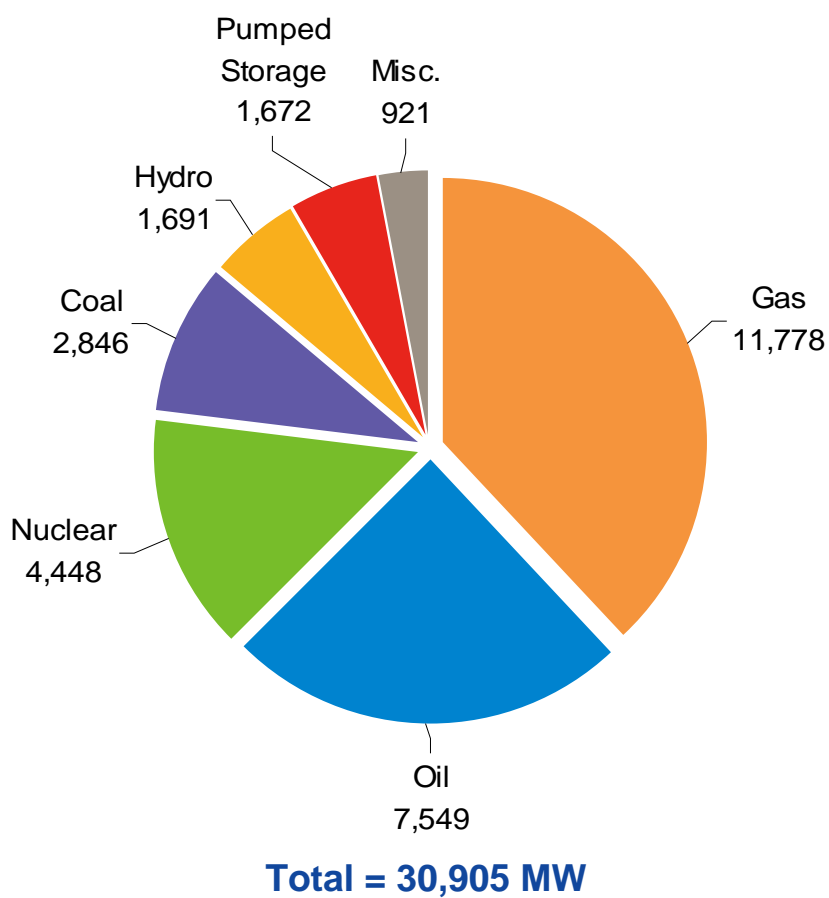
Load concentrations in New England



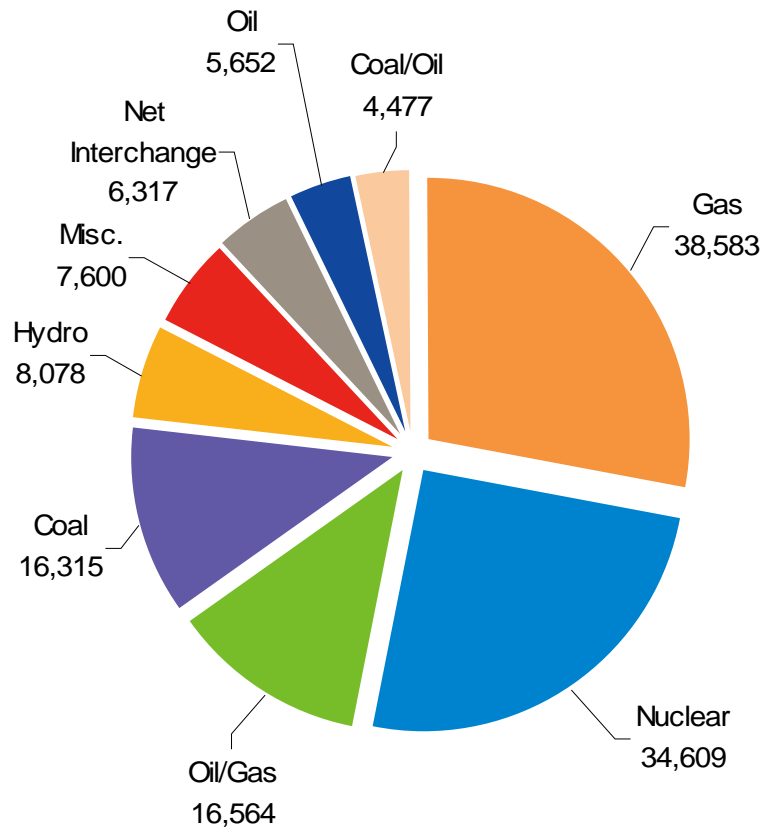
Distribution of generation resources throughout New England



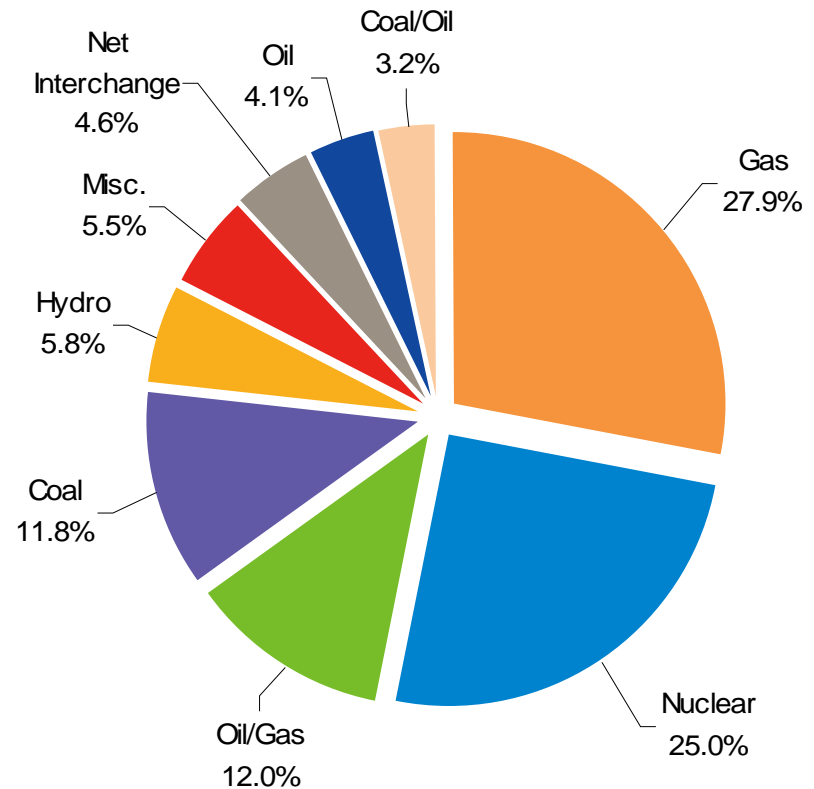
New England Installed Generation by Primary Fuel Type for Summer 2006 (MW and percent)



New England Annual Source of Energy for 2005 (1,000 MWh and percent)



Total = 138,195 (1,000 MWh)



Total = 99.9% (due to rounding)

Note 1: Load = Generation + Net Interchange - Pumping Load

Note 2: Data is not available for the amount of generation by individual fuels in dual fuel units such as oil/gas.

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)

The Forward Capacity Market (FCM)

New England Capacity Market History

- Dec., 2002 FERC orders Locational Capacity Market as part of SMD
- Apr., 2003 FERC issues Devon Order ordering ISO-NE to file a Locational Capacity Market proposal
- Mar., 2004 ISO-NE files LICAP Proposal with FERC
- June, 2004 FERC issues order accepting LICAP principles, setting parameters for hearing
- June, 2005 ALJ accepts most of ISO-NE filing
- Sept. 20, 2005 FERC holds oral argument on LICAP
States propose an FCM
- Dec.'05 - Mar., 2006 Settlement talks on LICAP
- March 6, 2006 Settlement filed with FERC
- June 15, 2006 FERC unconditionally accepts settlement

FCM Objective

- Purchase sufficient capacity for reliable system operation for a future year at competitive prices
- All Resources can participate, both new and existing:
 - Generation
 - Demand Resources
 - Imports/Exports

FCM Overview

- Primary auction (Forward Capacity Auction or FCA) for Capacity Resources three years in advance
 - Descending clock auction
 - Resources are qualified to participate
- Commitment Period is one year for existing Resources, one to five years for new Resources
- ISO-NE 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

FCM Overview (cont.)

- Reconfiguration auctions after primary auction enable trading of obligations and adjustments to capacity purchases
- Resources provide capacity and receive payment during Commitment Period three years after primary auction
- Payments reduced by the following:
 - Lack of Real-Time availability
 - Peak Energy Rents (PER) (revenues above a strike price)
- Market Monitoring review of certain offers into the auction (existing and new)

Forward Capacity Market Components

- Transition payments to existing and new supply
- Forward Capacity Market
 - Qualification and Interconnection
 - Competitive auction process
 - “Reconfiguration” auctions
 - Annual, Seasonal, Monthly
- Payment during delivery year
 - Existing resources: 1 year
 - New resources: 5 year Price Certainty

FCM Components

- Qualification
 - For both Existing and New Capacity Resource offers
- Forward Capacity Auction
 - To purchase the Capacity Resources
- Reconfiguration Auctions
 - To buy and sell (exchange) capacity obligations; adjust purchases to revised needs
- Commitment Period
 - Fulfillment of capacity obligation
- Performance Incentives
 - Pay-for-performance during shortage events
 - Forego energy market revenues during high-priced periods (PER)

FCM Components – Qualification

- Qualification of all Resources is required
 - Existing Capacity that does not want to participate in the FCM (De-list bids: Permanent, partial, etc.)
 - Existing Capacity Resources
 - Self-Supplied Resources
 - Exports of Capacity
 - Imports of Capacity
 - New Resources (Including Intermittent and Demand Resources)
- Qualification Criteria are different for each Resource Type
 - **New Capacity Resource:** By the qualification deadline, assure that it will be able to produce a specific MW value for the Commitment Period
- Existing Capacity Resources will be assigned (based on demonstrated output) a specific MW value for a future Commitment Period

FCM Components – Auctions

- Primary Auction (FCA) uses a descending clock auction
- Clearing prices by Capacity Zone
- Offers are Resource specific (physical rather than financial)
- *New Resources* submit offers subject to the outcome of qualification procedures
- *Existing Resources* can opt out (de-list) by submitting a price, otherwise existing Resources clear in the auction
 - De-list requests may be subject to pre-auction review
- Reconfiguration auctions to true-up amounts and to allow Resources to acquire or release obligations
 - Annual, Seasonal, Monthly
 - Not a descending clock auction

FCM Components – Primary Auction Descending Clock Mechanics

- Auction begins at a price well above the expected clearing price
 - All Resources that elect to participate are initially in the auction
 - Price descends during auction
 - Resources withdraw from auction as price falls until remaining Resources just equal need
 - Price effective for each month of Commitment Period
 - New Resources can elect to lock in monthly price for up to five years

FCM Components – Primary Auction Descending Clock Mechanics (cont.)

- Clock auction is done in discrete rounds rather than with a continuously falling price
- Pauses between rounds to allow participants to review auction status and their auction strategy
- In each round
 - Auctioneer announces
 - Excess supply quantity at the end of prior round
 - Start of round price (higher price)
 - End of round price (lower price)
 - Each bidder submits a set of price-quantity pairs at prices between start-of-round price and end-of-round price
 - Auctioneer determines excess supply at end of round price
 - If no excess supply, clearing price is determined

FCM Components – Primary Auction Locational Components

- Sub-areas of New England that have specific capacity needs/surplus can become Capacity Zones
 - Capacity zones included in the FCA
 - Can be export or import constrained
 - May have different clearing prices than the rest of New England

FCM Components – Primary Auction

ICR and LSR: How Much Is Bought and Where

- Installed Capacity Requirement (ICR): The amount of MW purchased in the FCA
 - ICR is the expected amount of capacity required to meet reliability needs during Commitment Period
 - Determined in advance of FCA each year; reviewed with Stakeholders and filed at FERC
 - See forthcoming Regional System Plan for current estimates
- Local Sourcing Requirement (LSR): The minimum amount of capacity required in an import-constrained Capacity Zone
 - Determined in conjunction with ICR; reviewed with Stakeholders and filed at FERC
 - LSR modeled in FCA only if new capacity is needed

Auction Pricing Rules

- First 3 successful auctions
 - Collar of \$4.50/kw-mo – \$10.50/kw-mo
- Insufficient Supply: Offered Capacity < ICR
Insufficient Competition
 - New capacity receives its offer price
 - Existing capacity is paid $1.1 * CONE$

Existing Capacity

- Assumed to be in the market unless it takes action to leave (De-list)
 - Addresses seller's Market Power
- De-list bids
 - Permanent
 - Opt out of market for entire Commitment Period
 - Market monitor approval for bids above 1.25 CONE
 - Dynamic
 - Opt out of market for one auction cycle
 - Market monitor approval for bids above .8 CONE
 - Export bids treated the same as de-list bids

Alternative Price Rule: New Capacity

- Applies system wide or by zone
- Addresses Buyer's Market Power
 - New Capacity that offers in below 0.75 Cone is reviewed by the market monitor
 - If offer is too low, then capacity is considered Out of Market
- If Out of Market capacity exceeds the amount of new capacity needed, price set at the lower of CONE or the price at which the last new capacity left the auction

FCM Components – Reconfiguration Auctions

- Reconfiguration auctions are not descending clock auctions
 - Static double auction – supply offers and demand bids submitted in advance
 - Price determined by intersection of supply and demand
- Purpose of reconfiguration auction
 - Facilitate obligation trading among physical resources
 - Additional capacity to cover increased ICR
 - Released capacity to match decreased ICR
 - Procure capacity to replace de-listed resources, if needed/applicable
- Distinct product for each Capacity Zone

FCA Components – Reconfiguration Auctions (cont.)

- Annual Reconfiguration Auctions
 - Full-year obligations accepted/released
 - Held each year between the FCA and the Commitment Period
- Monthly and Seasonal Reconfiguration Auctions
 - Partial-year obligations accepted/released
 - Held beginning prior to the first month of the Commitment Period
 - Permits participants to adjust (buy/sell) obligations in either monthly or seasonal increments

FCM Components – Commitment Period

- Resources with capacity obligations from the FCA or Annual Reconfiguration Auctions must provide capacity for entire power year, e.g., June 2010 – May 2011
 - Different Resources can be combined to meet the capacity obligation for entire year through composite offers
 - Monthly and Seasonal Auctions allow shorter obligations
- Resources paid monthly
- Payments contingent on providing service as required; adjusted by Availability during Shortage Hours and reduced by PER

FCM Components – Commitment Period Resource Obligations

- Capacity Resources are required to participate in the Day-Ahead and Real-Time Energy Markets
- Capacity Resources must adhere to ISO New England Operating Procedures, Planning Procedures, Market Rules, etc.
 - E.g. scheduling of maintenance with the ISO

FCM Components – Performance Incentives Availability Metric

- Real-time availability performance measure
 - Resources must be available when operating reserves are short (Shortage Events)
- Resources unavailable in Shortage Events get reduced capacity payments
 - Penalty = 5% of annual FCA payment per event
 - Capped at 10% per day
 - Monthly penalty cannot exceed 2.5 times FCA payment in Month
 - Annual penalties cannot exceed total FCA payment less PER
- Availability penalty revenues are credited to Resources that were available during Shortage Events

FCM Components – Performance Incentives

Peak Energy Rent (PER) Adjustment

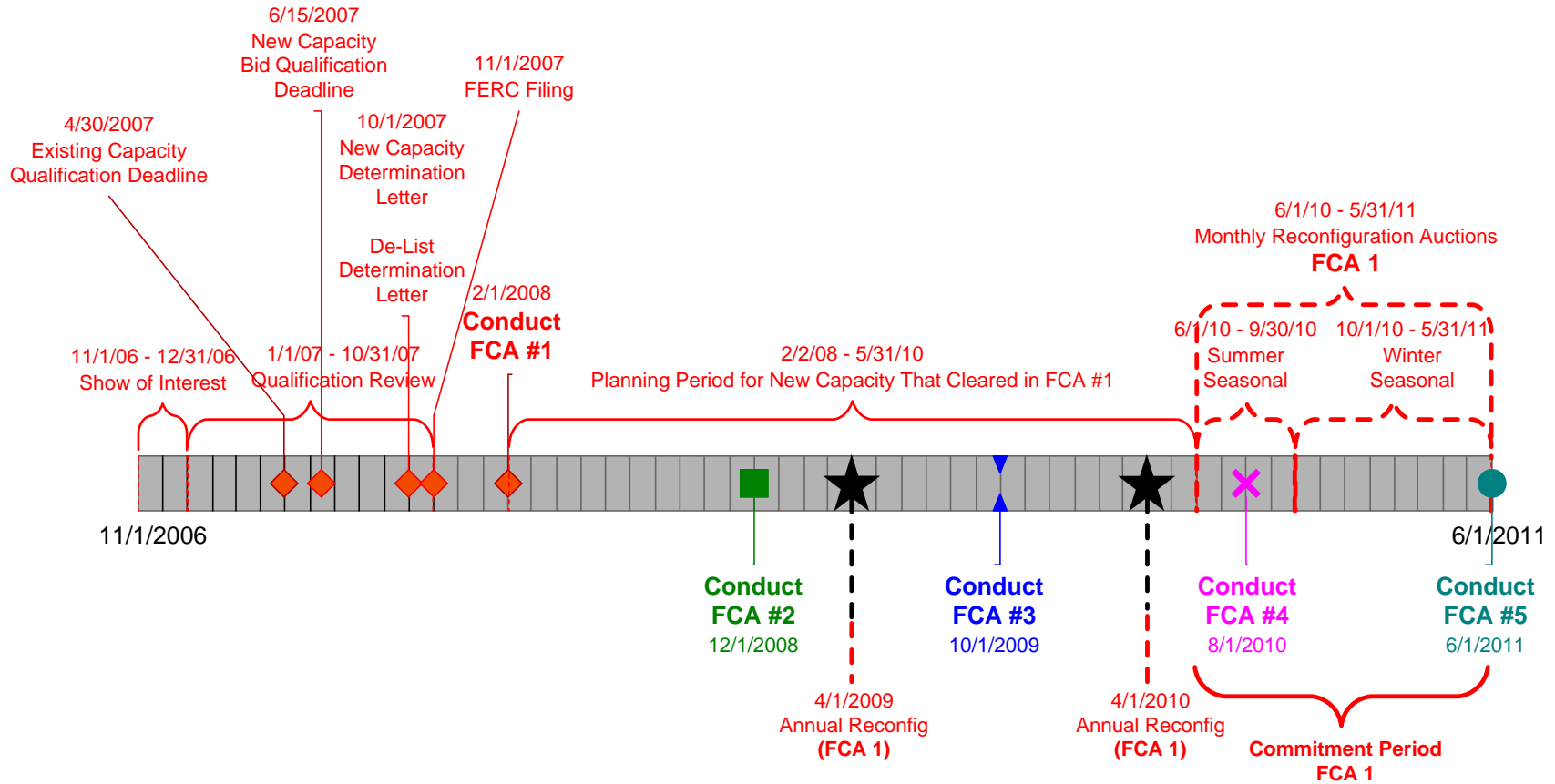
- Capacity resources, in addition to providing capacity, also commit to foregoing energy market revenues above a formulaic strike price
 - Locational Marginal Energy Price > strike price → PER deduction
- Capacity payments in that month are reduced by PER
 - Example: forego energy revenues above 22,000 BTU/kWh heat rate x gas index (At current gas prices, this is approximately \$155/MWH)

FCM Timeline for 1st FCA

Horizon	Action
11/01/2006-12/31/2006	Show of Interest Application
02/15/2007	FCM rules filed with Federal Energy Regulatory Commission
01/01/2007 – 10/31/2007	Qualification Review
04/30/2007	Deadline: Existing Capacity Qualification Packages and De-list requests
05/01/2007	ISO Posts Export and De-List Bid Information
06/15/2007	Deadline: Qualification for New Capacity and Imports
10/01/2007	Notify New Resources of Qualification and Financial Assurance Requirements as well as disposition of de-list requests
10/12/2007	Deadline: Post Financial Assurance for New Resources
11/01/2007	De-List Bids, Capacity Zones, LSRs & ICR filed with FERC
02/01/2008	FCA #1 – Delivery for June 2010 through May 2011

Forward Capacity Auction Timeline

1st FCA for Commitment Period Beginning June 1, 2010



Transition Costs Bridge To FCM

- **Fixed capacity payments to all resources including Imports**
 - Ensures reliability
 - According to historical availability
 - **Payment Schedule:**

Date	kw-Month	Est. Capacity Payment in Billions
12/01/2006 – 05/31/2007	\$3.05	0.6
06/01/2007 – 05/31/2008	\$3.05	1.2
06/01/2008 – 05/31/2009	\$3.75	1.4
06/01/2009 – 5/31/2010	\$4.10	1.6

How to Participate in the FCA

- First Step: Submit Show of Interest (Nov-Dec 2006)
 - Required for new capacity
- Next Step: Submit additional materials required for Qualification (June 15, 2007)
- Auction to be held February 2008 (expected)

How to Get More Information

Forward Capacity Auction

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

Qualification of Resources

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

Qualification Timeline

Reconfiguration Auctions

Market Bilateral Transactions

Financial Assurance

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

More/updated information

- ISO website http://www.iso-ne.com/markets/othrmrks_data/fcm/index.html
- More details on specific sources in binder

Market Support / Customer Service

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