DECEMBER 19, 2013 I BOSTON, MA

ISO New England Update

Massachusetts Plant Revitalization Task Force

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VICE PRESIDENT, SYSTEM PLANNING

About ISO New England

- **Not-for-profit corporation created in 1997 to oversee New England's restructured electric power system**
  - Regulated by the Federal Energy Regulatory Commission (FERC)
- **Regional Transmission Organization**
  - Independent of companies doing business in the market
  - No financial interest in companies participating in the market
  - Neutral as to resource fuel type

ISO New England's Core Responsibilities

Operating the Regional Power System

- Balance electricity supply and demand every minute of the day by centrally dispatching the generation and flow of electricity across the region's transmission lines.

Administering Wholesale Electricity Markets

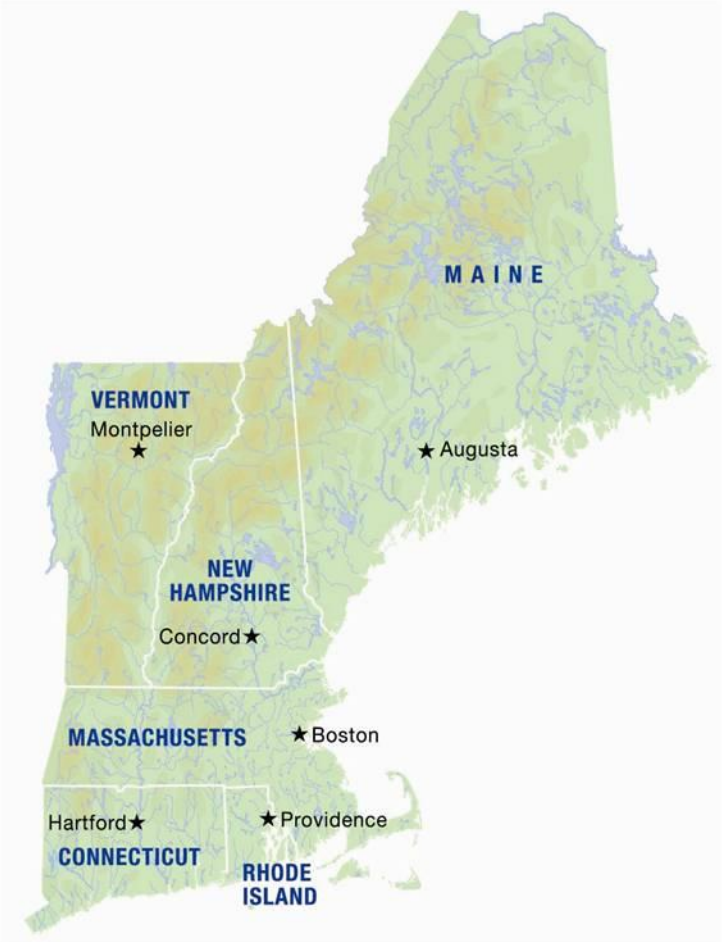
- Develop and administer the region's marketplace through which wholesale electricity is bought and sold.

Regional Power System Planning

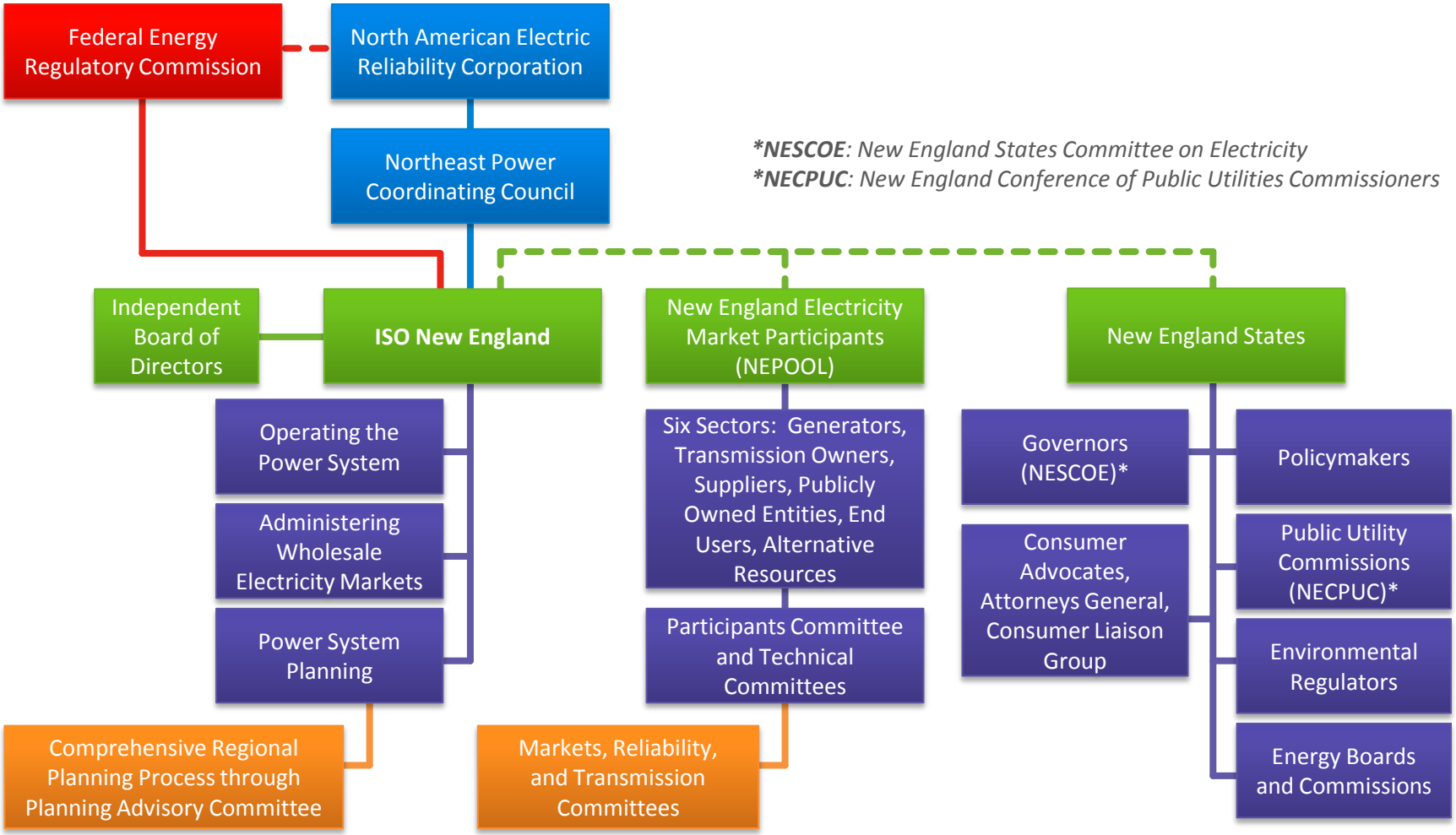
- Ensure the development of a reliable and efficient power system to meet current and future electricity needs.

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
- 31,750+ megawatts (MW) of generating capacity and approximately 1,850 MW of demand resources
- 28,130 MW all-time peak demand, set on August 2, 2006
- 500+ buyers and sellers in the region's wholesale electricity markets
- $5 billion in transmission investment since 2002; approximately $6 billion planned over next 5 years
- $5 billion total energy market value in 2012



Industry Structure in New England



**NESCOE*: *New England States Committee on Electricity*
**NECPUC*: *New England Conference of Public Utilities Commissioners*

ISO New England's Strategic Planning Initiative

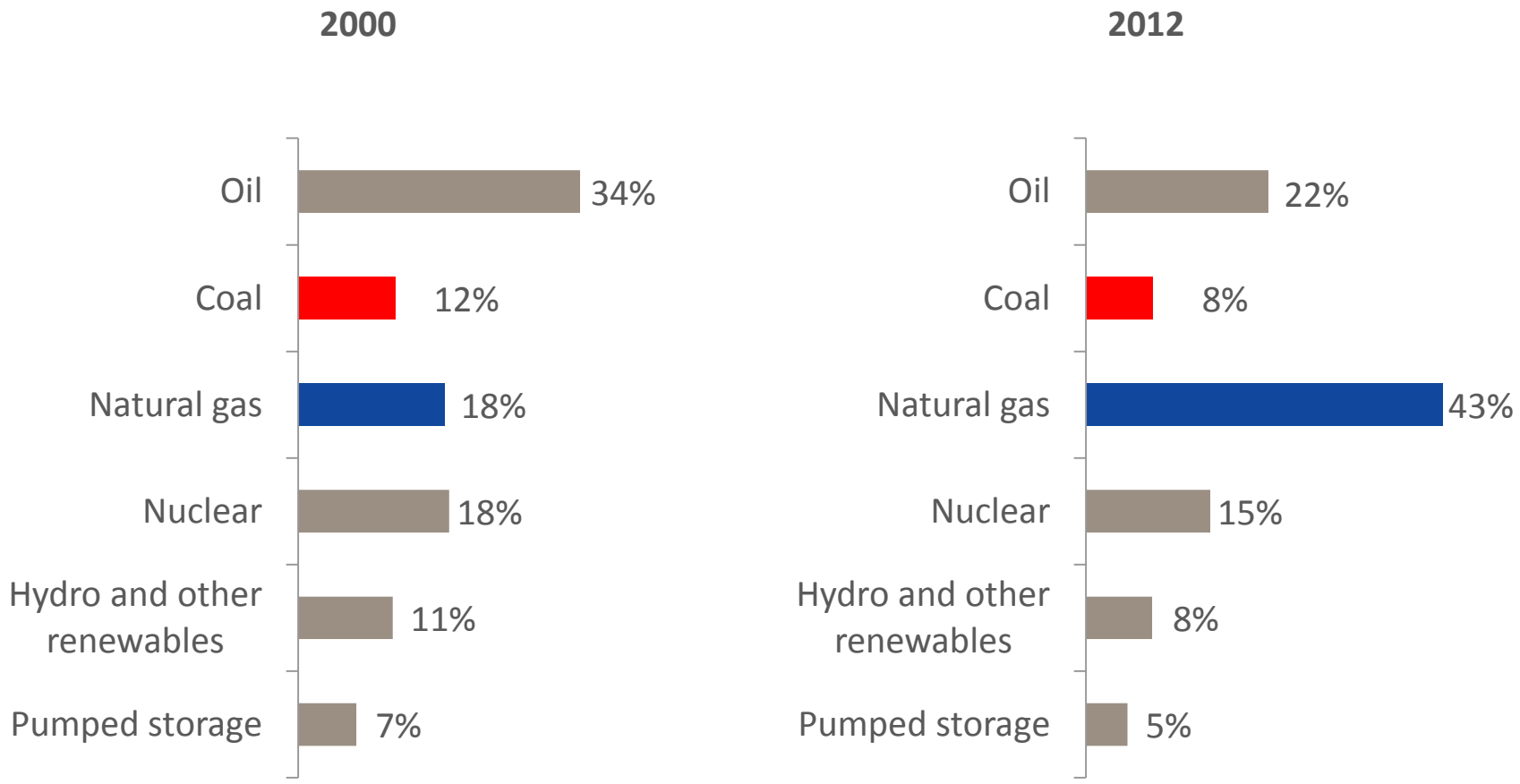
Focused on developing solutions to the top five challenges facing the region

SPI
STRATEGIC PLANNING INITIATIVE

1. Resource Performance and Flexibility
2. Increased Reliance on Natural Gas-Fired Capacity
3. **Retirement of Generators**
4. Integration of a Greater Level of Variable Resources
5. Alignment of Markets with Planning

Regional *Capacity* Shifts Toward Natural Gas

Percent of Total System Capacity

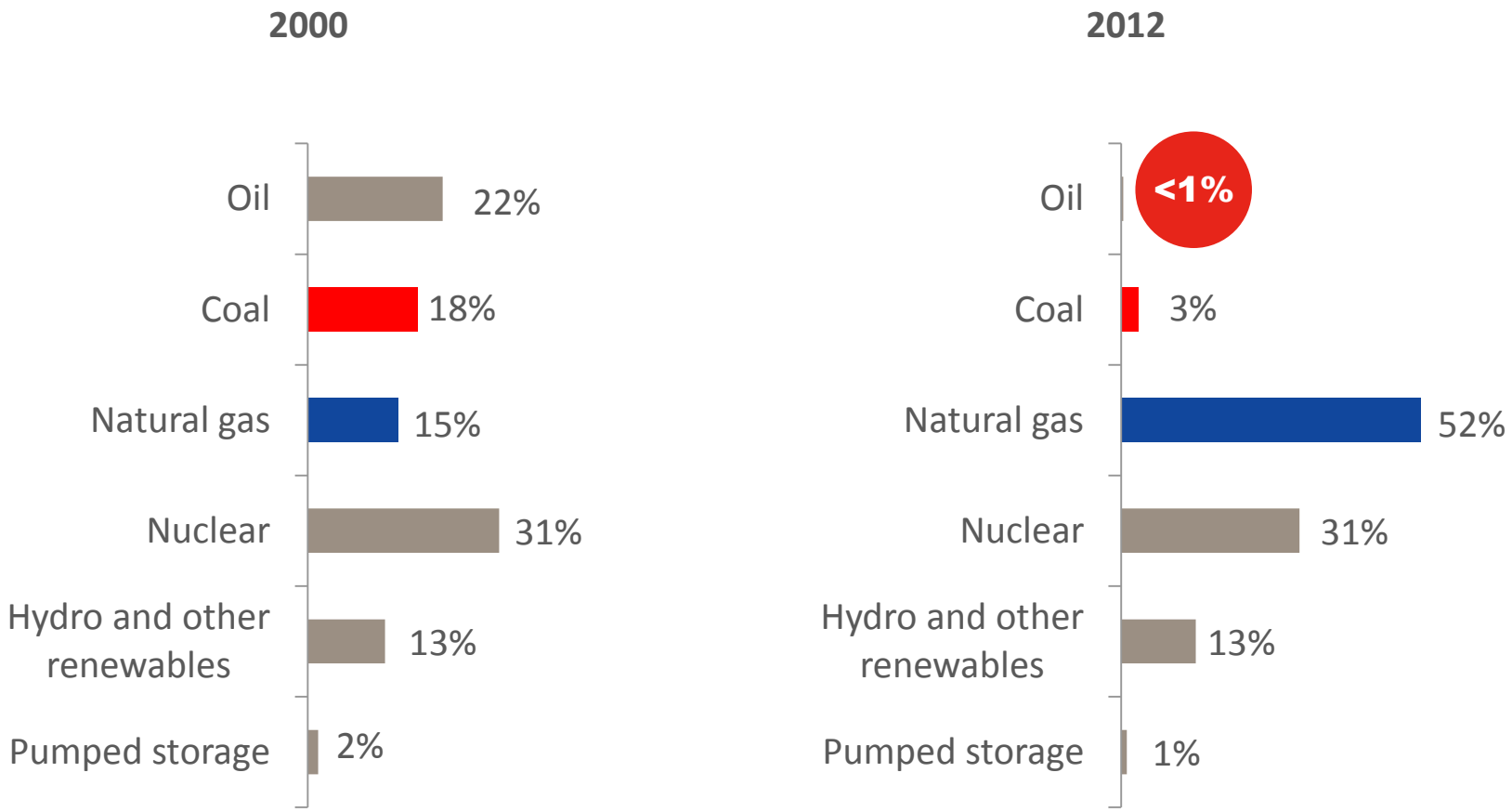


Other renewables include landfill gas, biomass, other biomass gas, wind, solar, municipal solid waste, and misc. fuels.

Source: Regional Profile (2012/13)

Regional *Energy* Shifts Toward Natural Gas

Percent of Total Electric Energy Production



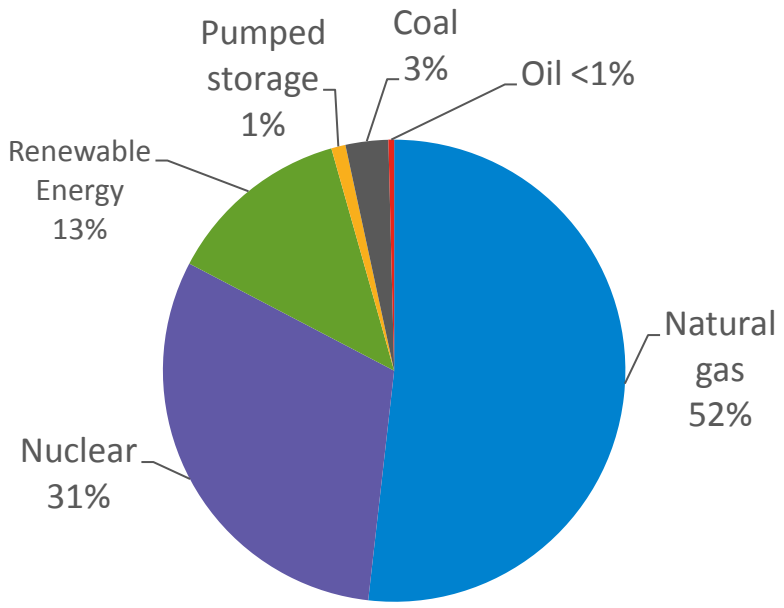
Other renewables include landfill gas, biomass, other biomass gas, wind, solar, municipal solid waste, and misc. fuels.

Source: Regional Profile (2012/13)

Natural Gas has Become the Dominant Fuel for Power Generation in New England

Existing Generation

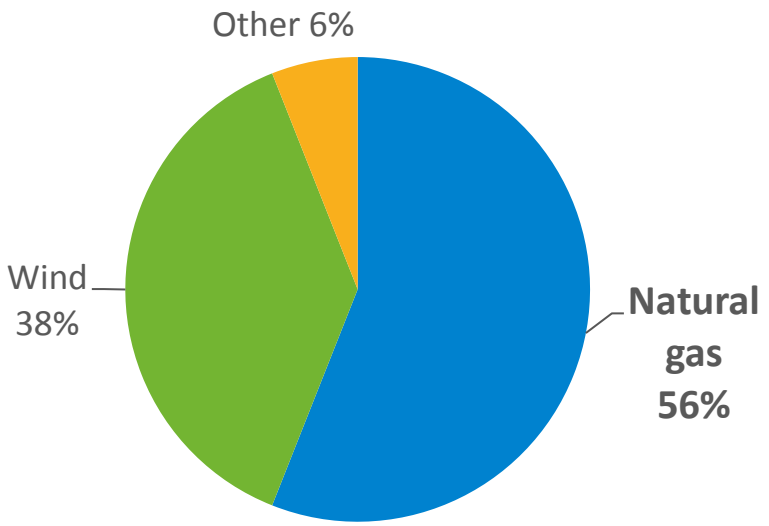
Natural gas has largely displaced oil- and coal-fired generation



Energy Production by Fuel Type, 2012

Proposed Capacity

Natural gas is the fuel of choice for new capacity and gas-fired generators will be needed to balance variable energy resources



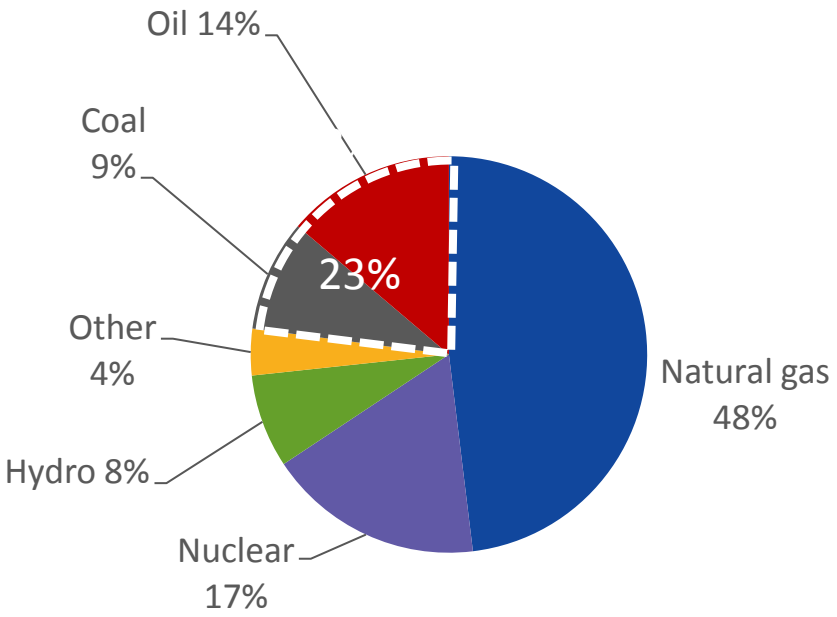
ISO Generator Interconnection Queue (April 2013)

But Oil and Coal Resources Still Needed

Aging, infrequently dispatched coal- and oil-fired resources provide the region with diversity during times of peak demand

2011 Peak Day
July 22

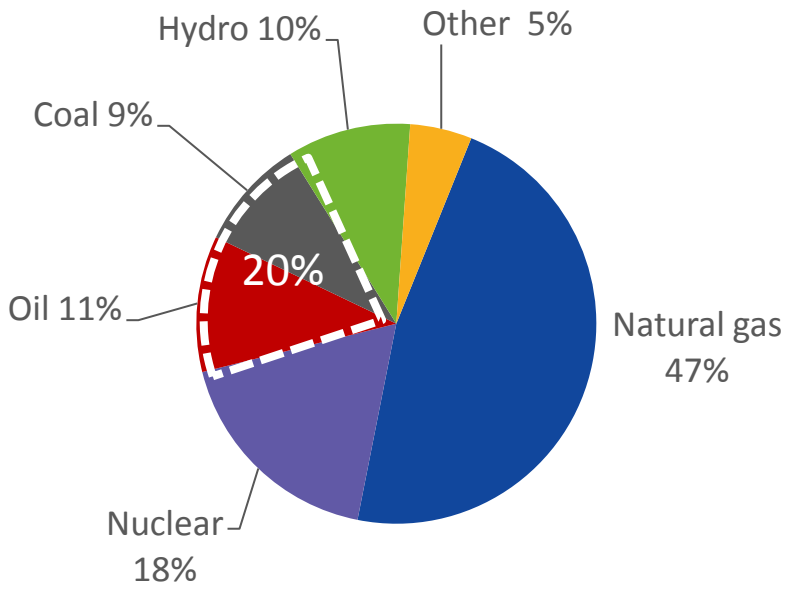
+26,000 MW demand



Source: August 2011 COO Report

2013 Peak Day
July 19

+27,000 MW demand

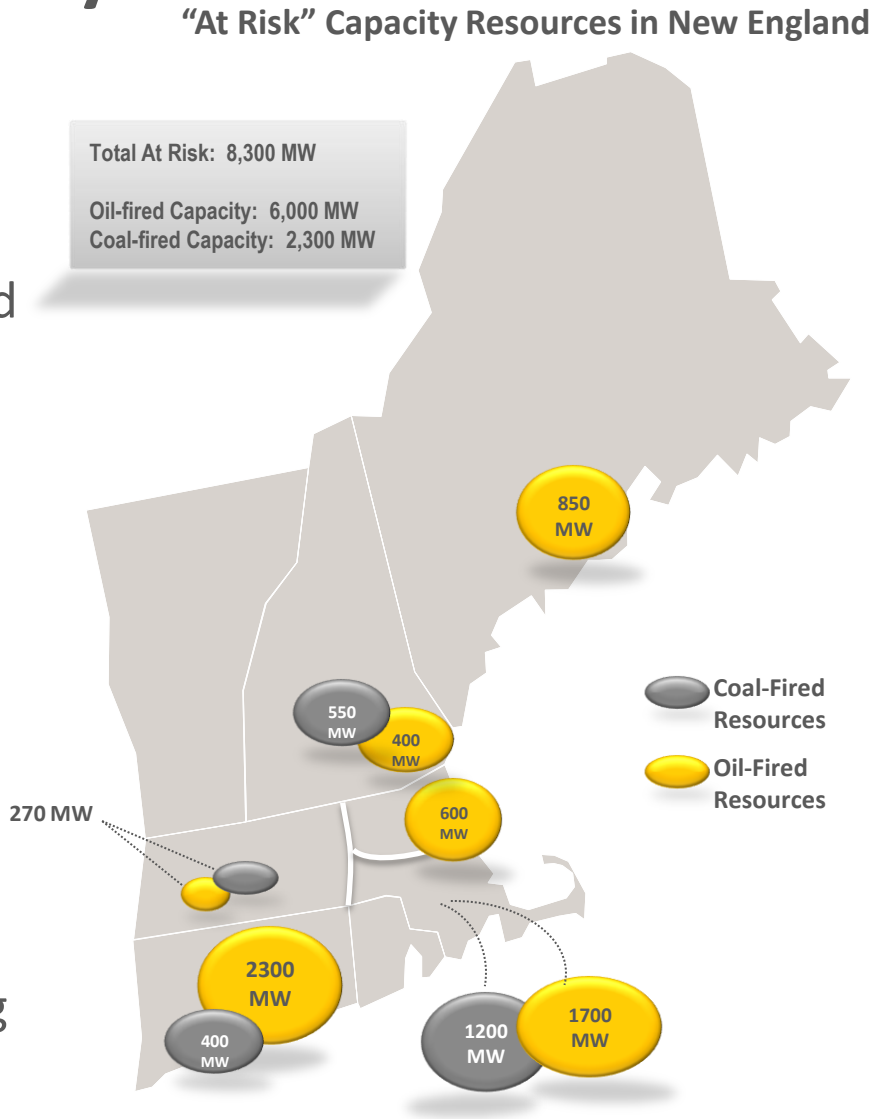


Source: August 2013 COO Report

GENERATOR RETIREMENTS

Generator Retirement Study

- Objective
  - Evaluate reliability impact associated with the assumed retirement of 28 coal- and oil-fired resources with 8,300 MW of capacity by 2020
- Primary Concerns
  - Resource Adequacy
  - Load-Resource Energy Balance
  - Area Transmission Security
- Another Issue
  - Consequence of constraints impacting deliverability of existing capacity resources to load



Capacity Resources Assumed to be "At Risk" of Retirement in Generator Retirement Study

Unit	Unit Type	MW Maximum Assumed	In-service Date	Age in 2020
BRAYTON POINT	**Coal**	**261**	**01-Aug-63**	**57**
BRAYTON POINT	**Coal**	**258**	**01-Jul-64**	**56**
BRAYTON POINT	**Coal**	**643**	**01-Jul-69**	**51**
BRAYTON POINT	Oil	458	01-Dec-74	46
BRIDGEPORT HBR	Oil	190	01-Aug-61	59
BRIDGEPORT HBR	Coal	401	01-Aug-68	52
CANAL	Oil	597	01-Jul-68	52
CANAL	Oil	599	01-Feb-76	44
MERRIMACK	Coal	121	01-Dec-60	60
MERRIMACK	Coal	343	30-Apr-68	52
MIDDLETOWN	Oil	123	01-Jan-58	62
MIDDLETOWN	Oil	248	01-Jan-64	56
MIDDLETOWN	Oil	415	01-Jun-73	47
MONTVILLE	Oil	85	01-Jan-54	66
MONTVILLE	Oil	418	01-Jul-71	49
MOUNT TOM	**Coal**	**159**	**01-Jun-60**	**60**
MYSTIC	Oil	615	01-Jun-75	45
NEW HAVEN HBR	Oil	483	01-Aug-75	45
NEWINGTON	Oil	424	01-Jun-74	46
NORWALK HBR	Oil	173	01-Jan-60	60
NORWALK HBR	Oil	179	01-Jan-63	57
SCHILLER	Coal	51	01-Apr-52	68
SCHILLER	Coal	51	01-Jul-57	63
W. SPRINGFIELD	Oil	111	01-Jan-57	63
YARMOUTH	Oil	56	01-Jan-57	63
YARMOUTH	Oil	56	01-Jan-58	62
YARMOUTH	Oil	122	01-Jul-65	55
YARMOUTH	Oil	632	01-Dec-78	42

TOTAL 8,281 MW

Note: AES Thames, Somerset, & Salem Harbor plants were also assumed retired

Observations: Generator Retirement Study

- If 8,300 MW retire by 2020, resource adequacy needs dictate replacement capacity of more than 6,000 MW to satisfy the region's Installed Capacity Requirement
- At least 900 MW of the 6,000+ MW replacement capacity must be in specific locations due to transmission constraints
  - 500 MW must be in Southeast Massachusetts
  - 400 MW must be in Connecticut
- Approximately 5,100 MW, may need to be integrated into the Hub (all 5,100 MW can be delivered ***to load from the hub***)
- Note that more transmission may be needed to make resources deliverable ***to the hub***

Generator Non-Price Retirement Requests

Almost 3,400 MW of generation plan to retire within the next five years

Major Retirement Requests:

- **Salem Harbor Station (749 MW)**
  - 4 units (coal & oil)
- **Vermont Yankee Station (604 MW)**
  - 1 unit (nuclear)
- **Norwalk Harbor Station (342 MW)**
  - 3 units (oil)
- **Brayton Point Station (1,535 MW)**
  - 4 units (coal & oil)

Total MW Retiring in New England*	
Connecticut	348 MW
Maine	37 MW
Massachusetts	2,360 MW
New Hampshire	1 MW
Rhode Island	13 MW
Vermont	634 MW
Total	**3,393 MW**

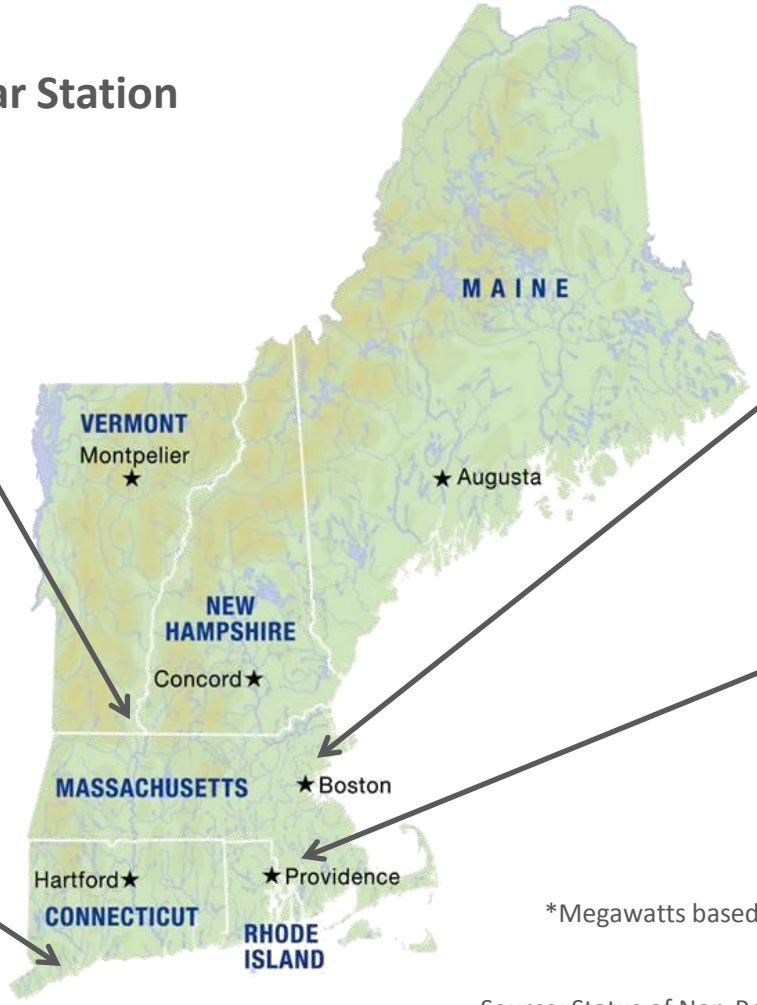
*Megawatts based on relevant Forward Capacity Auction (FCA) summer qualified capacity (NOTE: total includes full and partial generator Non-Price Retirement (NPR) requests for Capacity Commitment Period (CCP) 2013-2014 through CCP 2017-2018; does not include NPRs for demand response (DR) resources)

Source: Status of Non-Price Retirement Requests; October 23, 2013

Major Non-Gas-Fired Generators Retiring

Vermont Yankee Nuclear Station
Unit 1: 604 MW
Total: 604 MW

Norwalk Harbor Station
Unit 1: 162 MW (oil)
Unit 2: 168 MW (oil)
Unit 10: 12 MW (oil)
Total: 342 MW



Salem Harbor Station
Unit 1: 82 MW (coal)
Unit 2: 80 MW (coal)
Unit 3: 150 MW (coal)
Unit 4: 437 MW (oil)
Total: 749 MW

Brayton Point Station
Unit 1: 239 MW (coal)
Unit 2: 239 MW (coal)
Unit 3: 612 MW (coal)
Unit 4: 435 MW (oil)
Brayton Diesels 1-4: 10 MW
Total: 1535 MW

*Megawatts based on relevant FCA summer qualified capacity

Source: Status of Non-Price Retirement Requests; October 23, 2013

Resources Can Withdraw (De-list) Temporarily from the Capacity Market or Retire

- If Existing Capacity Resource does not submit a De-List Bid then resource is entered into the Forward Capacity Auction
- A De-Listed Capacity Resource opts out of the FCM

Permanent	Prior to the auction, resource seeks to permanently exit FCM, but can participate in other markets
Static	Prior to the auction, resource seeks to exit FCM for a single year
Dynamic	During the auction, resource seeks to exit the FCM for a single year
Non-Price Retirement	Resource seeks to permanently retire

Brayton Point Non-Price Retirement Requests

- On October 6, 2013, EquiPower Resources Corp. submitted Non-Price Retirement (NPR) requests for Brayton Point Power Station (Units 1 – 4) and its four diesel generators to retire the plant as of June 1, 2017
- An NPR request is a binding request to retire all or part of a generating capacity resource; once submitted, it cannot be withdrawn and supersedes any prior de-list bid for the Capacity Commitment Period
- Submittal of an NPR request triggers a reliability review by the ISO to determine whether the resource is needed for reliability
- The ISO's reliability review determination for Brayton Point was presented to the NEPOOL Reliability Committee on December 19, 2013
- Regardless of the outcome of the review, the ISO does not have the authority to prevent a resource from retiring

Brayton Point Reliability Review Determination

- ISO New England has reviewed EquiPower's NPR requests for Brayton Point Power Station Units 1 – 4 and the station's four diesel generators
- The ISO has determined that there is a reliability need for Units 1 – 4 and, accordingly, has rejected the NPR requests for these resources
- The ISO has accepted the NPR requests for the station's four diesel generators
- EquiPower must notify the ISO within six months of its decision to retire, despite the reliability need, or to continue to operate until a transmission upgrade is in place
- Once the reliability need is addressed, the NPR request will be approved and the resource must retire

Questions