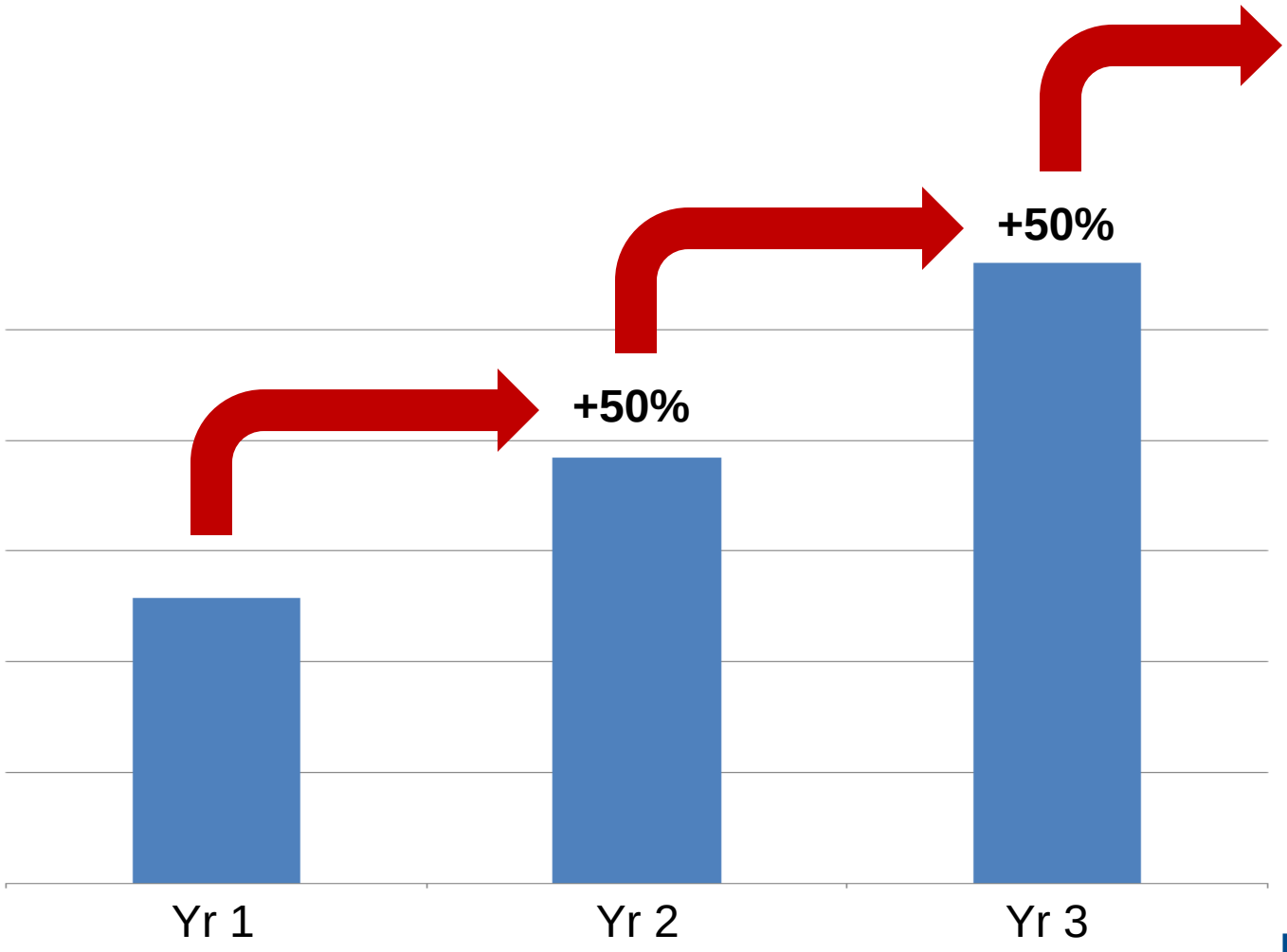
Creating A Cleaner Energy Future For the Commonwealth

Massachusetts Department of Energy Resources

Energy Markets Overview
Energy Efficiency Advisory Council
April 8, 2014

Birud Jhaveri
Deputy Commissioner

What if Wholesale Electricity costs…



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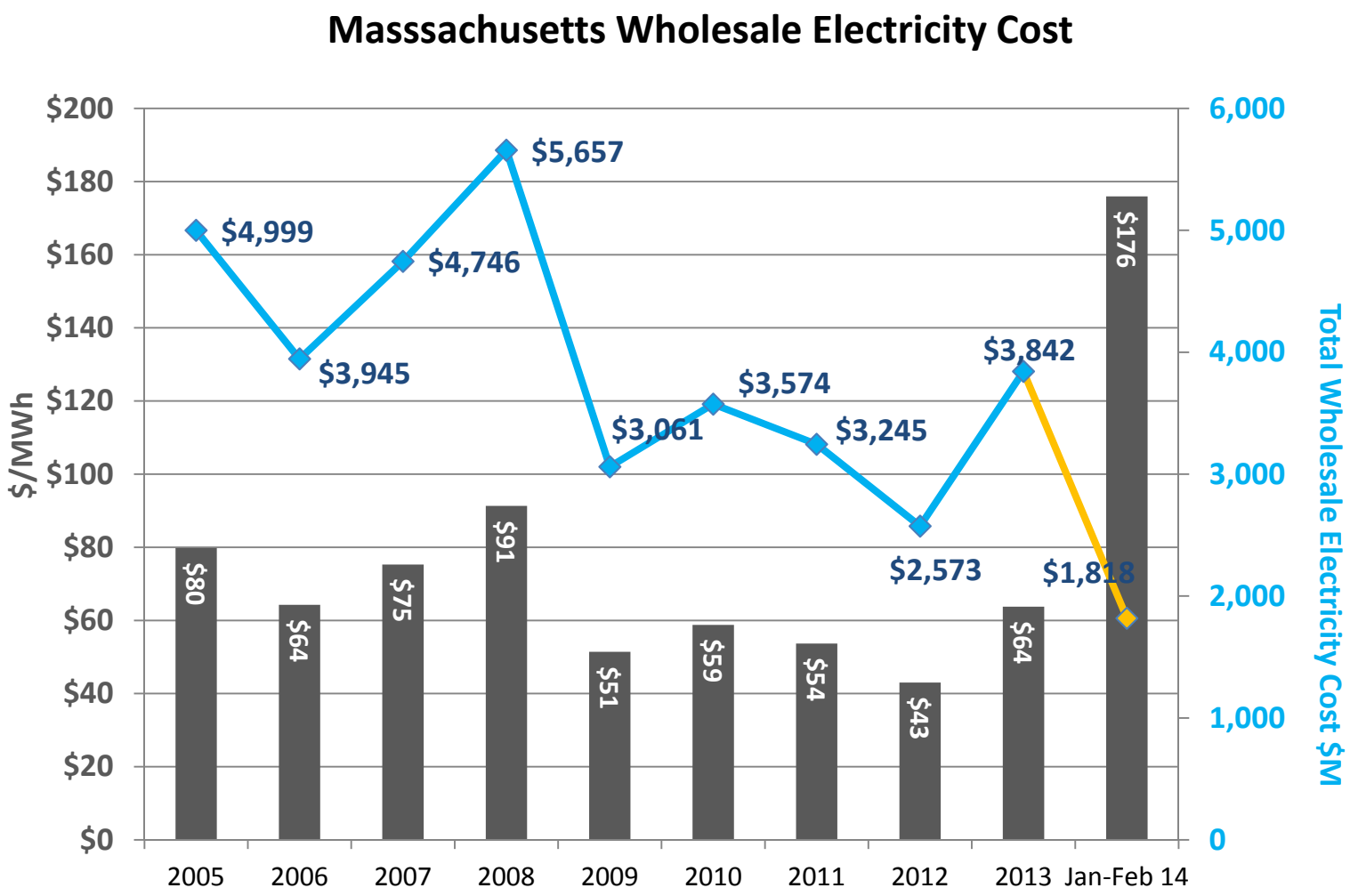
Today's presentation will cover…

- Current Energy Market Overview
- Why we are in the Current State of Affairs
- What to expect in next Short/Medium term
- What role Energy Efficiency plays

Jan-Feb 2014 nearly 50% of 2013 costs



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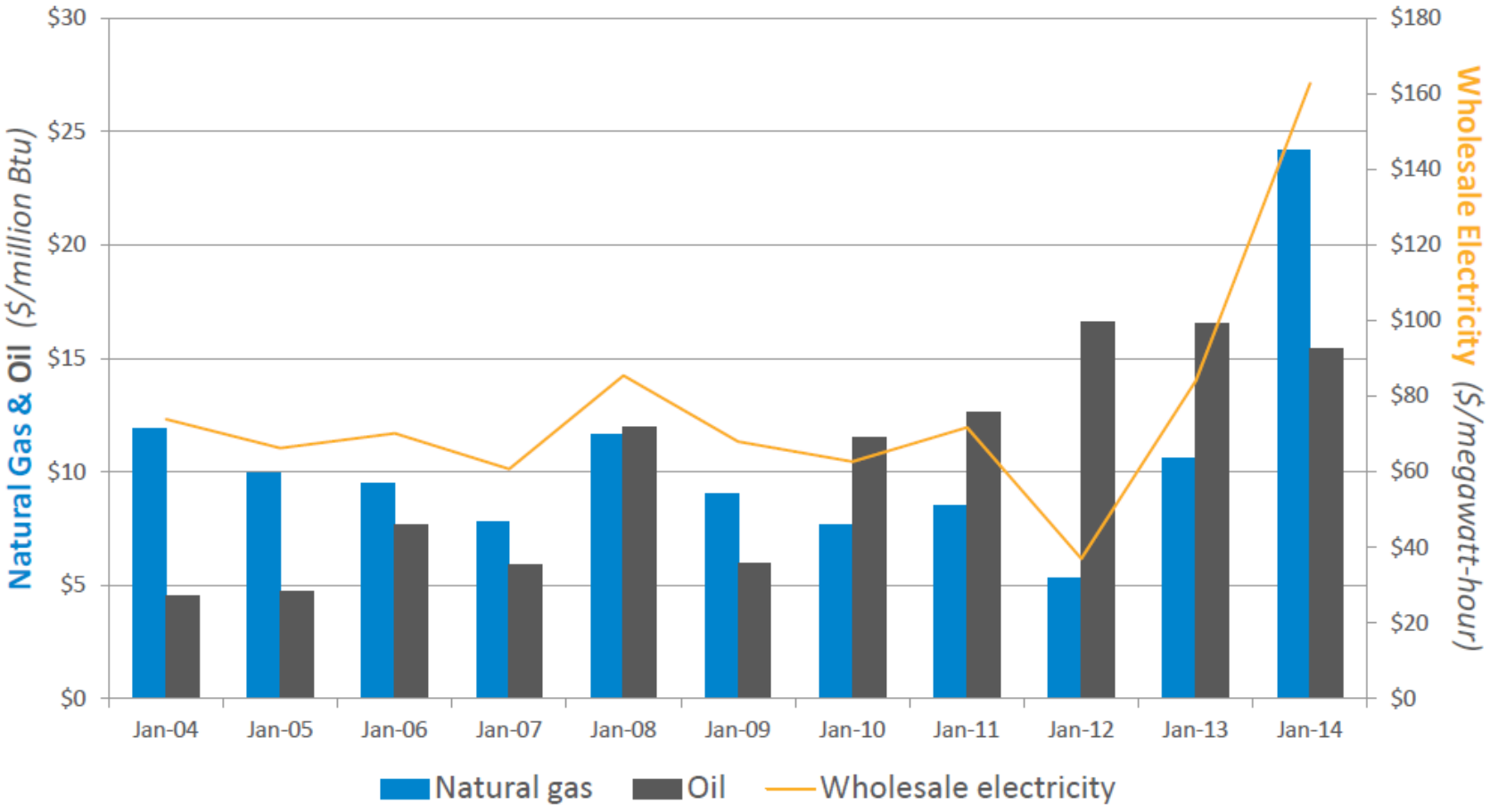
Winter Gas and Electricity prices surge



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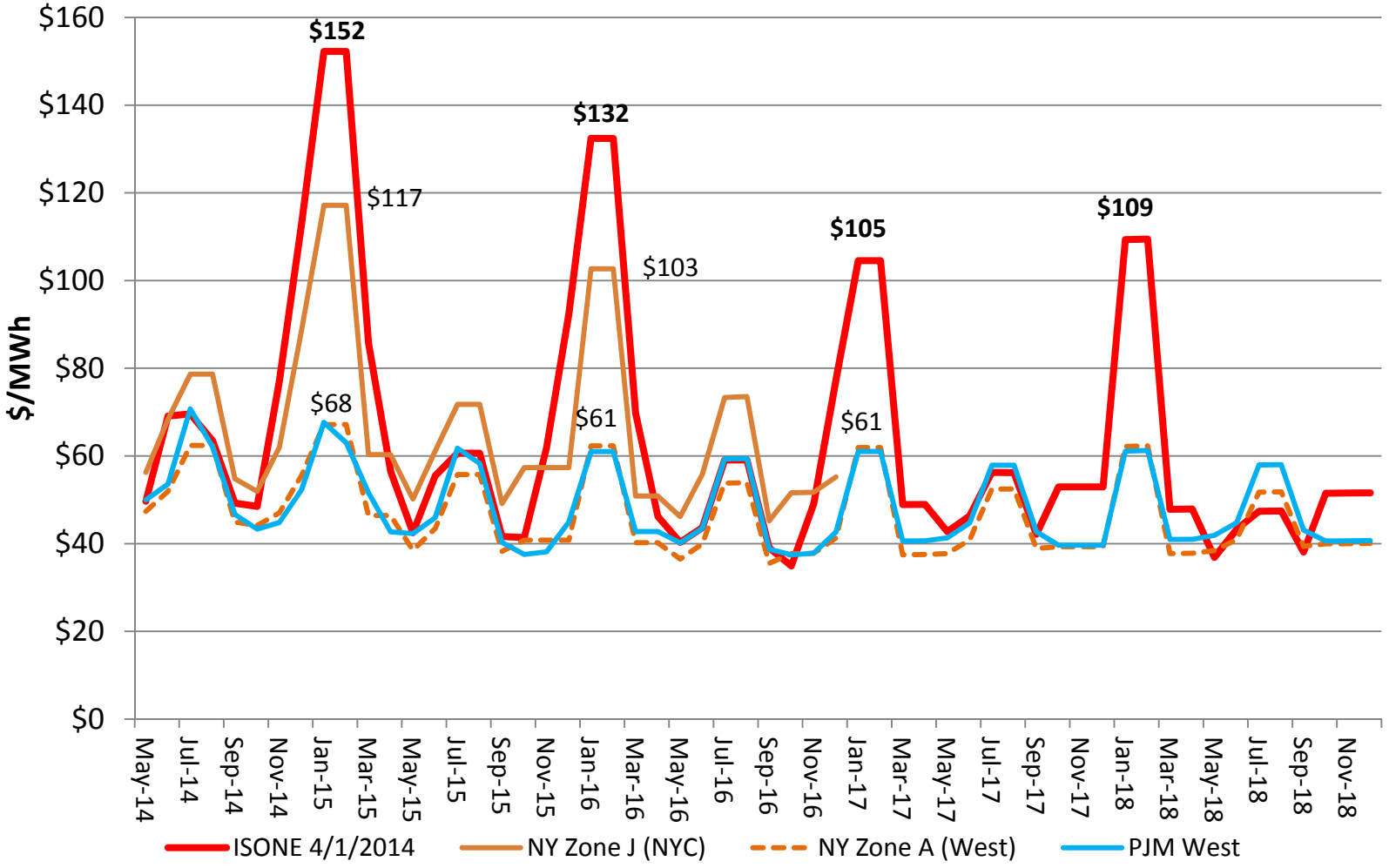
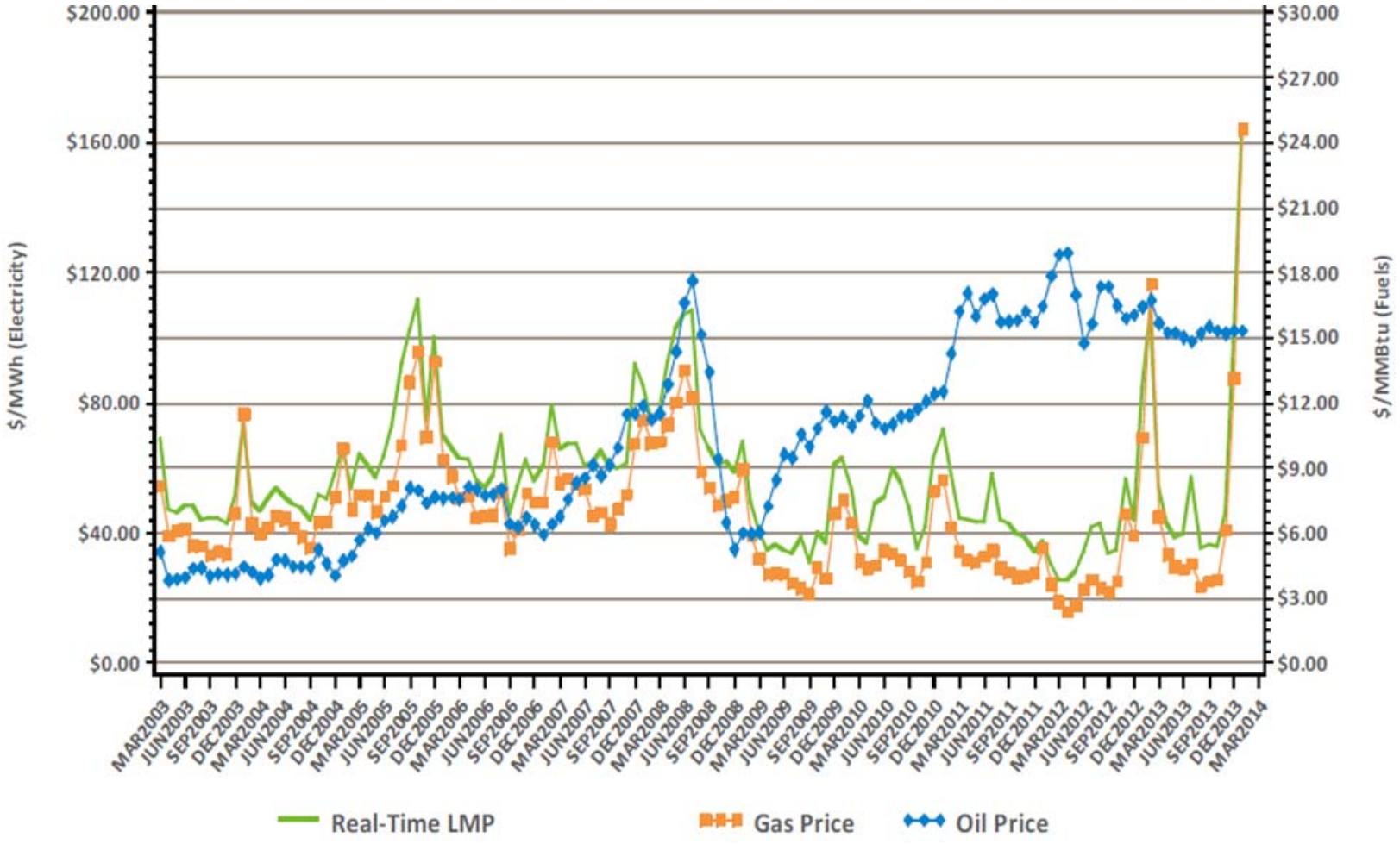
Mass Hub Forward On-Peak Prices remain high; temporary dip after AIM pipeline



Why are we in the Current State of Affairs?

Oil and Gas prices decoupled in 2008



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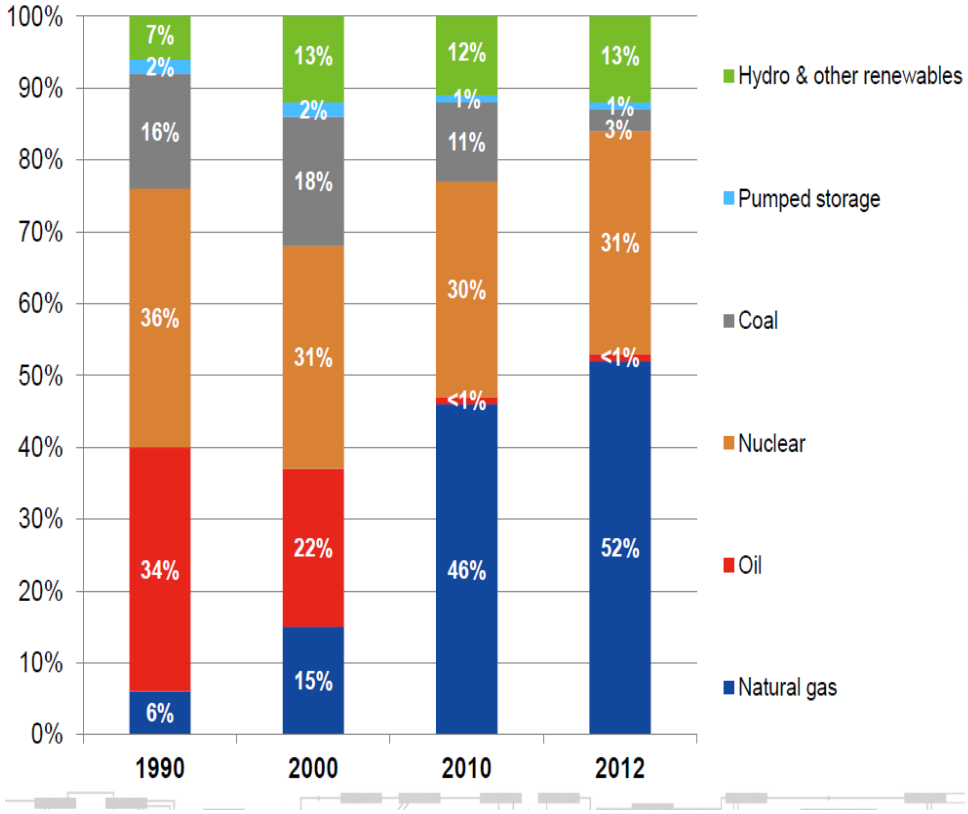
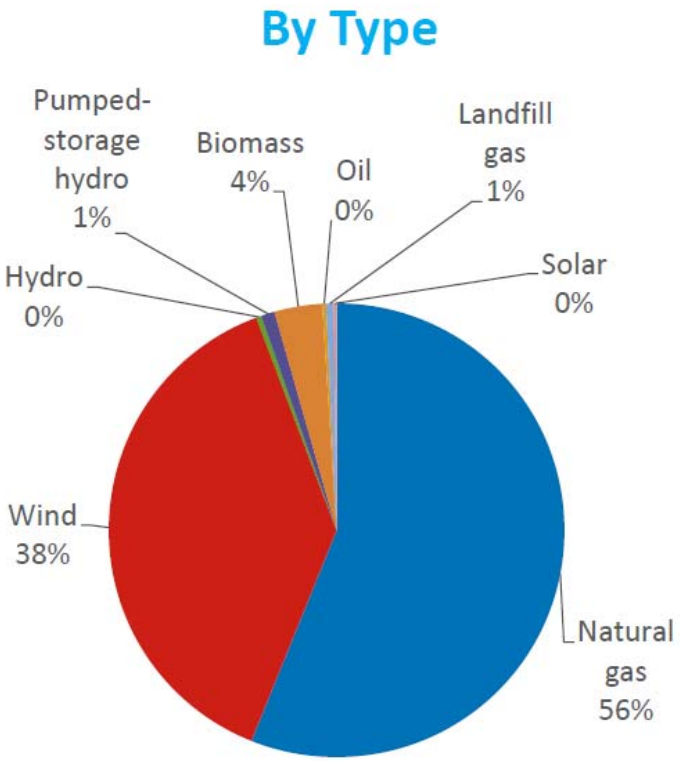
Region is highly dependant on gas generation

Generation By Type



Interconnection Queue



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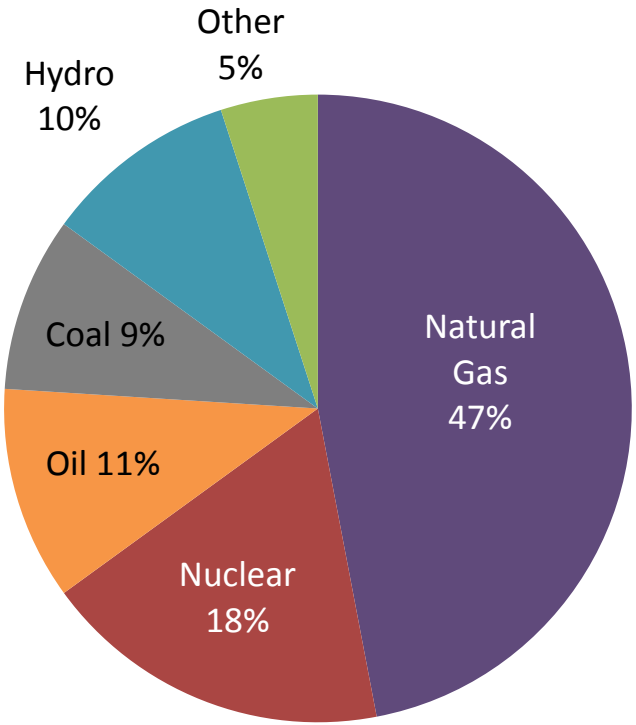
Thermal and Electric Demand Compete for Gas Supplies in Winter

Summer Peak

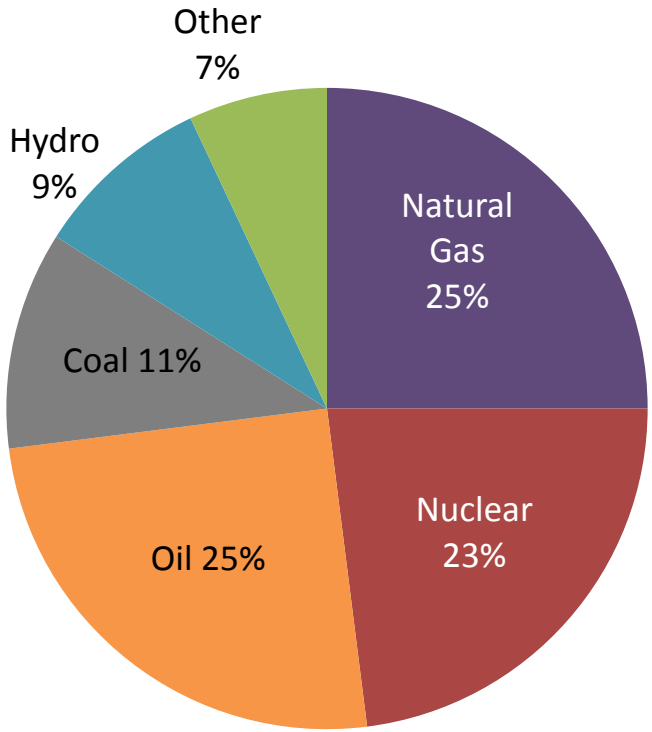
July 19, 2013



+27,000 MW Demand

Winter Peak

January 7, 2014



+20,500 MW Demand

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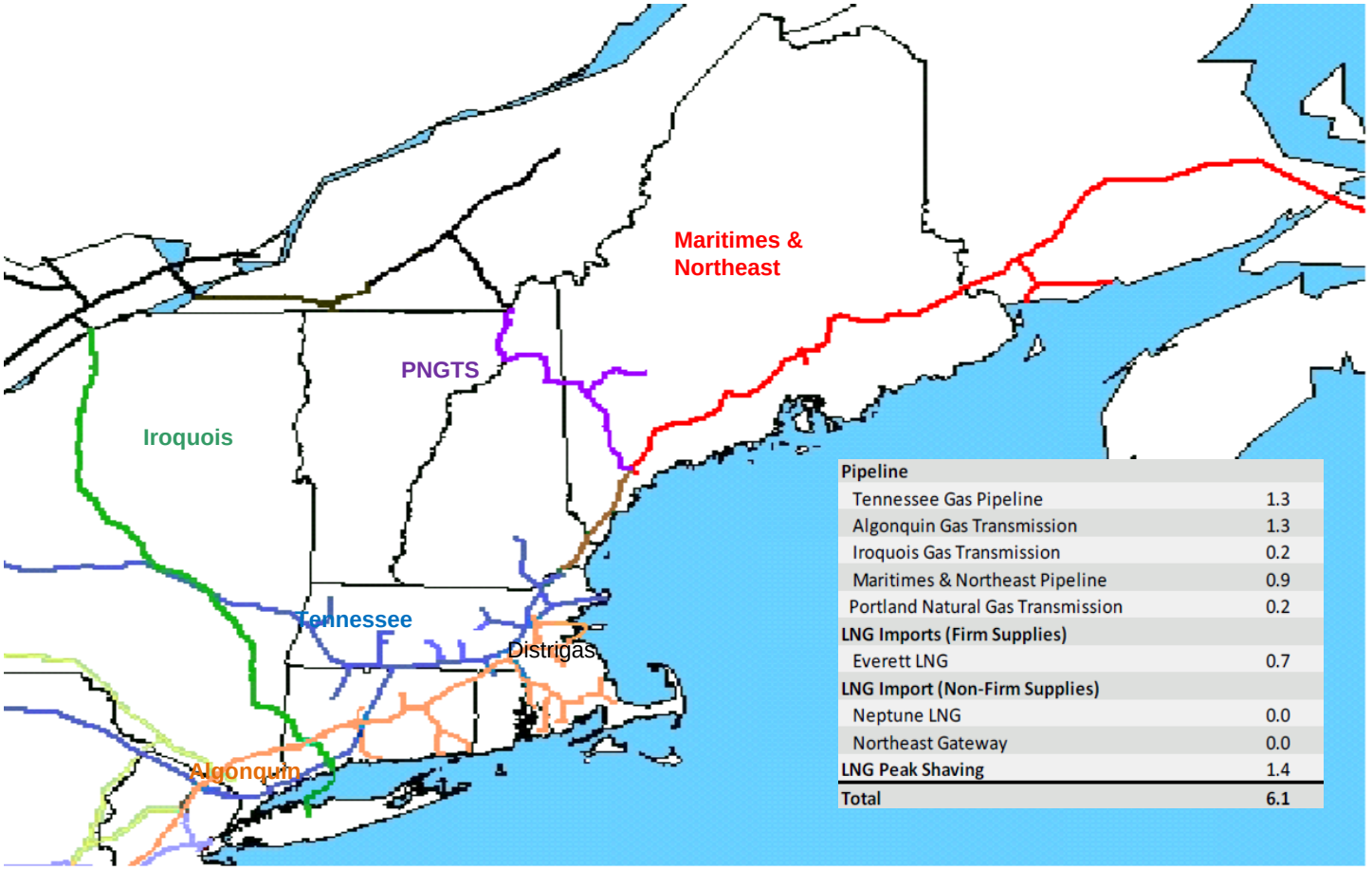
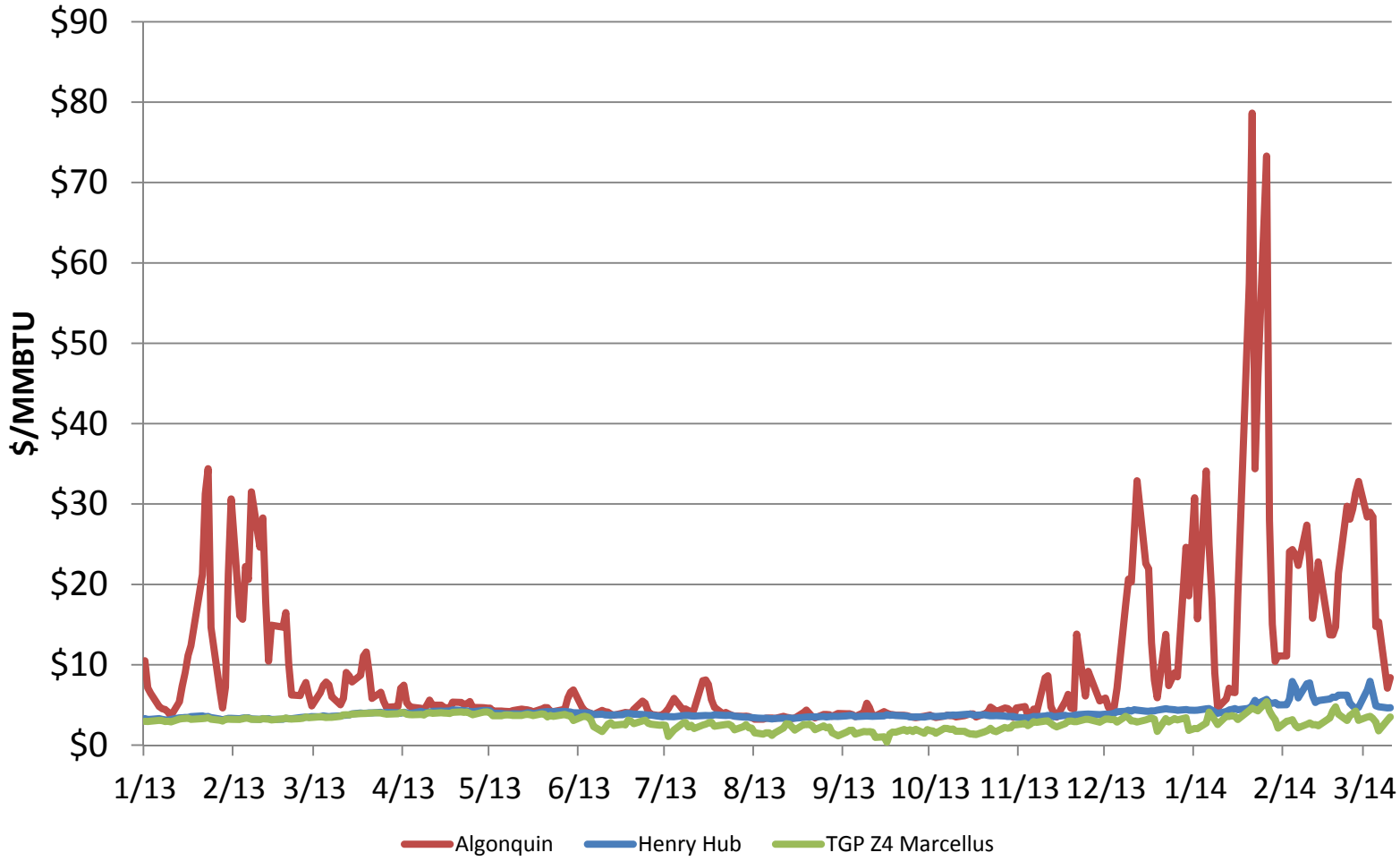
Algonquin and Tennessee Supply Majority of Capacity into the Region



Pipeline	
Tennessee Gas Pipeline	1.3
Algonquin Gas Transmission	1.3
Iroquois Gas Transmission	0.2
Maritimes & Northeast Pipeline	0.9
Portland Natural Gas Transmission	0.2
LNG Imports (Firm Supplies)	
Everett LNG	0.7
LNG Import (Non-Firm Supplies)	
Neptune LNG	0.0
Northeast Gateway	0.0
LNG Peak Shaving	1.4
Total	6.1

Record Breaking Prices in New England driven by Pipeline Constraints



Winter Reliability Program

- Due to natural gas unavailability on peak days in Winter 2013, ISO-NE implemented a Winter Reliability program for winter 2013/2014 that paid for demand resources and generators to have backup fuel onsite.
- ISO sought 2.4 million MWh, but accepted bids for oil inventory and demand resources equivalent to 1.95 million MWh
- ISO-NE would have been challenged to keep lights on without the program this past winter

What should be expected in the short/medium term?

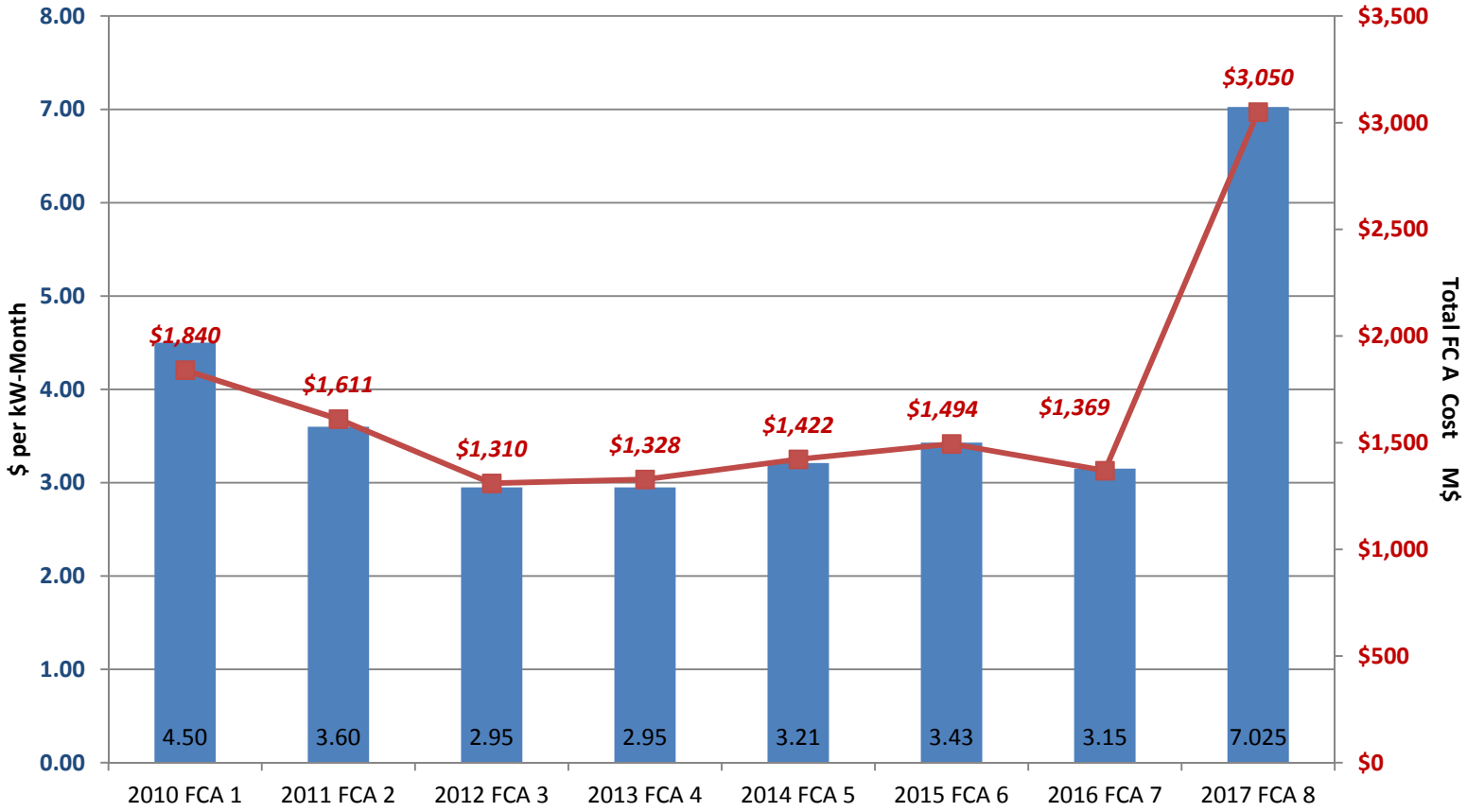
Region challenged to meet 2020 ICR absent replacements, repowering or new resources

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*

* Figure does not include recent retirement of Vermont Yankee (604 MW)

Capacity Costs double to $3B driven by resource withdrawal



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Challenging market conditions will continue

- Non-gas generators capable of producing up to 2.6 million MWh are scheduled to retire by next winter
  - the winter reliability program procured 1.95 million MWh
- New England likely to experience sustained high natural gas prices during peak periods:
  - Demand for Marcellus shale gas via Algonquin and Tennessee Pipelines will continue to increase constraints into New England
  - Gas supplies from the east – Sable Island and LNG from Canaport and Distrigas likely to remain in decline due to higher prices in Europe and Asia
  - Deep Panuke should offer limited additional capacity for short term
- Transmission constraints curtailing wind generation in the north
  - Physical limitations on amount of power that can flow
  - Interconnection in weaker parts of system (rural areas not designed to integrate large amounts of additional power)
  - Older wind technology has system voltage and stability support issues
- Oil shipment is just in time; supply chain is increasingly constrained

Upcoming infrastructure expansions will not be available immediately

In Process

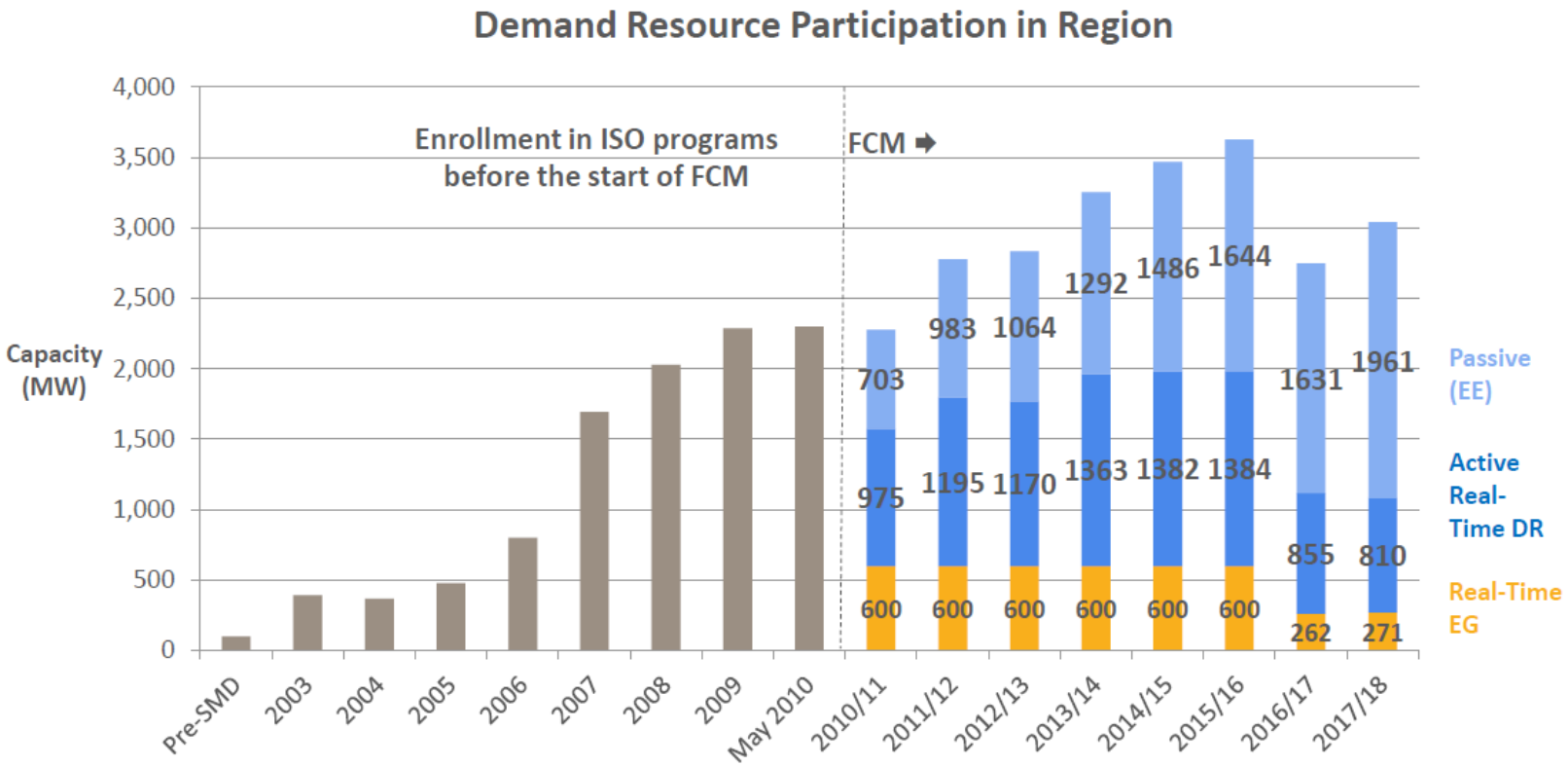
- Massachusetts Solar Program target, 1,600 MW
- Algonquin AIM Project, 342 MMCF/d from New York into New England (target in-service date 11/2016)
- Tennessee CT Expansion, 72 MMCF/d from New York into New England (target in-service date 11/2016)
- Other reliability related transmission projects

Proposed

- Northern Pass line (NU), 1,200 MW from Quebec to New England
- New England Energy Express (TDI), 1,000 MW from Quebec to New England
- Atlantic Bridge (Algonquin and M&N), 100-600 MMCF/d from New York into New England
- Tennessee Northeast Expansion, 0.6-2.2 BCF/d from New York into New England
- Other transmission lines for renewables/hydro and pipelines

What role can Efficiency play?

Energy Efficiency is a growing resource



Note: : Total real-time emergency generation (EG) capped at 600 MW:
Cap reached for FCAs #1 – #6 (2010/11–2014/16); RTEG cleared below cap over last two auctions

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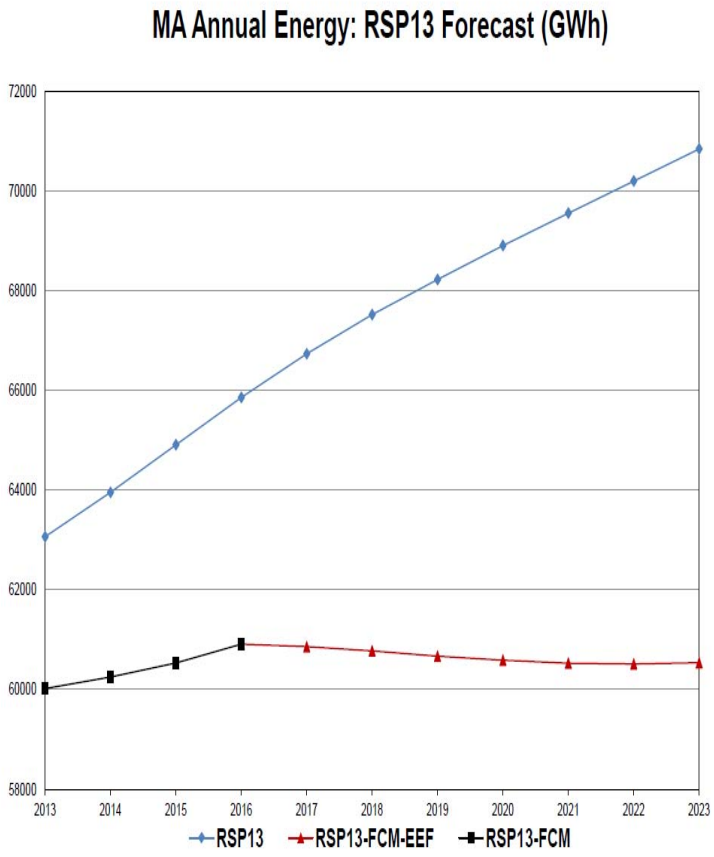
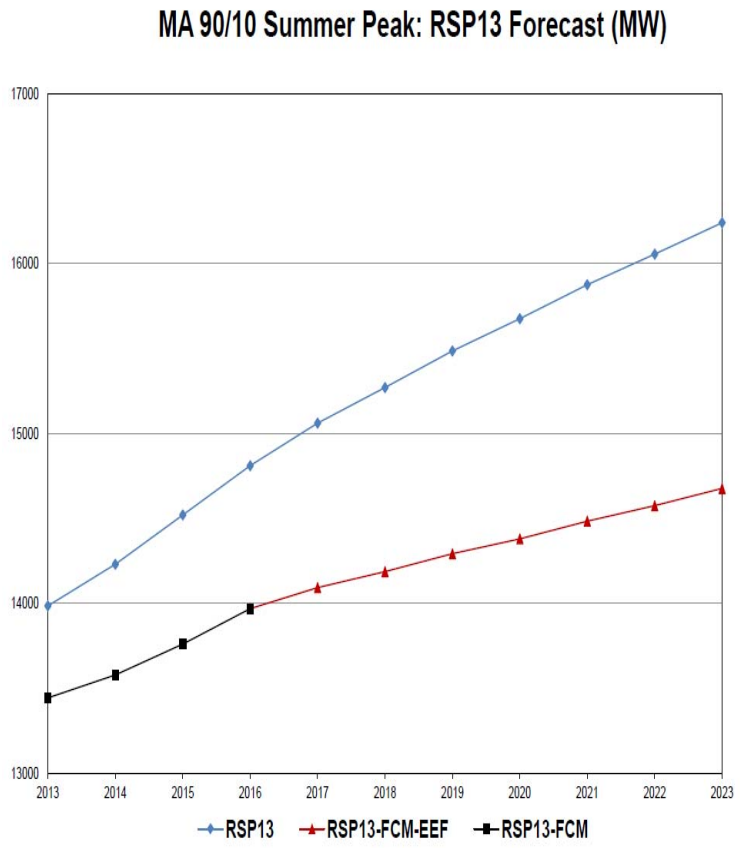
Growth in Peak Demand remains a concern; need to reduce peak usage to reduce costs





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Conclusions

- New England has significant economic and mounting reliability problems due to:
  - Gas pipeline constraints
  - LNG availability
  - Insufficient transmission infrastructure for Renewables, Hydro
  - Poor performance by some system resources
  - Retirements of non-gas generation
  - Constrained oil supply chain (just in time inventory)
  - Need to balance an increasing amount of intermittent renewable energy

- New England to face high prices and reliability challenges over the next several years until market enhancements are implemented and additional infrastructure is built in the region

Conclusions (cont)

- Conservation, demand response and self-supply play a critical role in reducing financial impact and reliability challenges.
  - Energy efficiency has immediate beneficial impact on cost and reliability challenges
  - Serious consideration must be made for targeting energy efficiency investments to reduce system-wide price and reliability impacts
  - Continued growth in peak demand remains a concern
  - Additional efficiency from both electric and gas sectors will be a key resource to meet demand
  - Efficiency is the lowest cost option to help meet MA energy needs