Energy Reliability, Costs, and the Regional Market

Energy Policy Commission

April 17, 2013

David Cash, Commissioner
Department of Public Utilities

Agenda

- Structure of the regional wholesale electricity market and lowering costs for ratepayers
- Reliability issues
  - Fuel diversity
  - The Gas/Electric problem
  - The problem of peak demand
- Energy Cost Savings

Why create a regional wholesale market?

- **Protect "captive" ratepayers from risk (recall stranded costs). By deregulating, merchant generators bear risk, not captive ratepayers.**

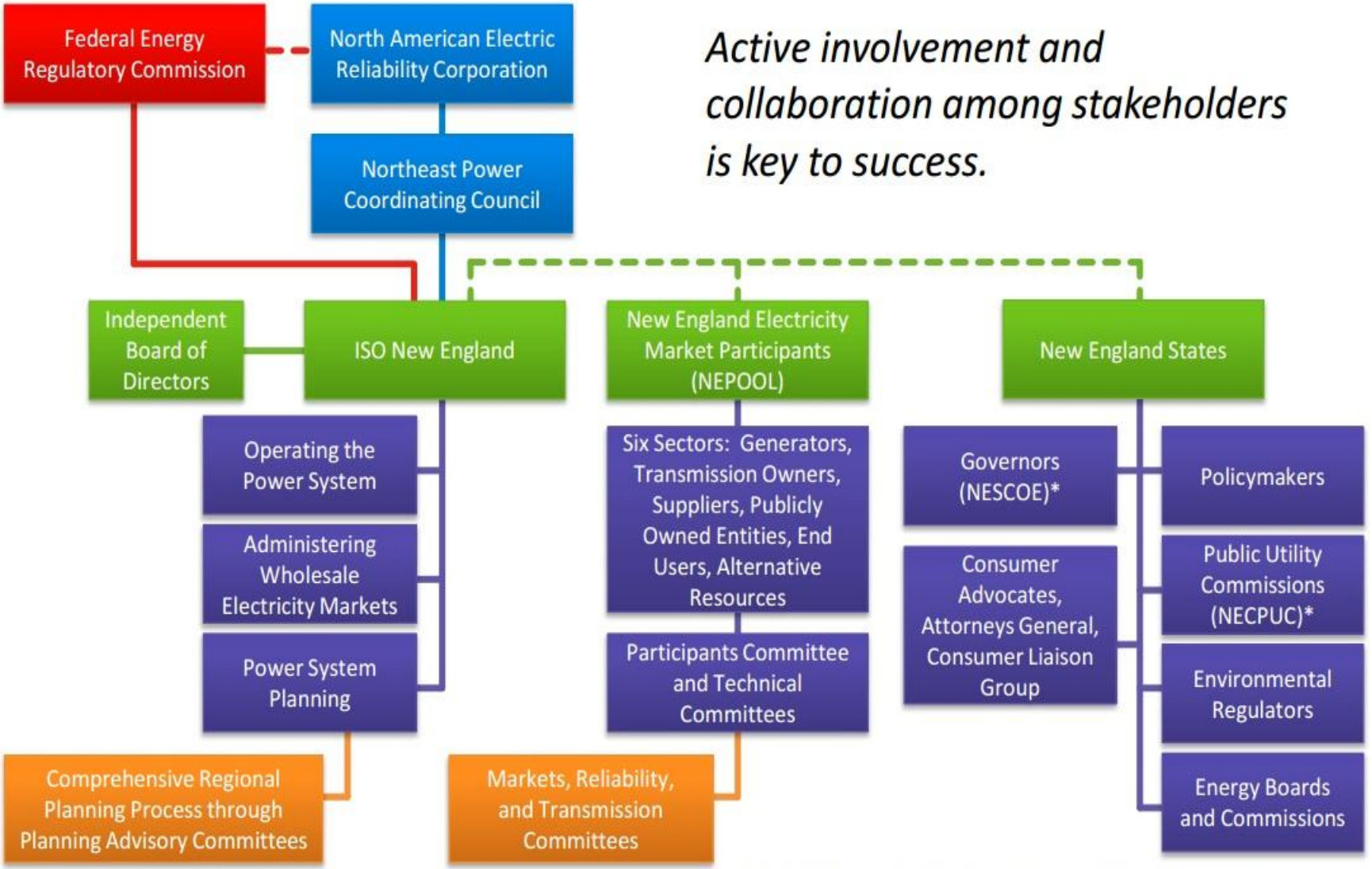
- **Use the market to minimize cost of producing electricity – wholesale electricity market**

- **Use the market to assure capacity – Forward Capacity Market (FCM)**

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
- 32,000 megawatts of total supply and 2,000+ megawatts of demand resources
- 28,130 megawatts all-time peak demand, set on August 2, 2006
- 500 participants in the marketplace
- $5-11 billion annual energy market value

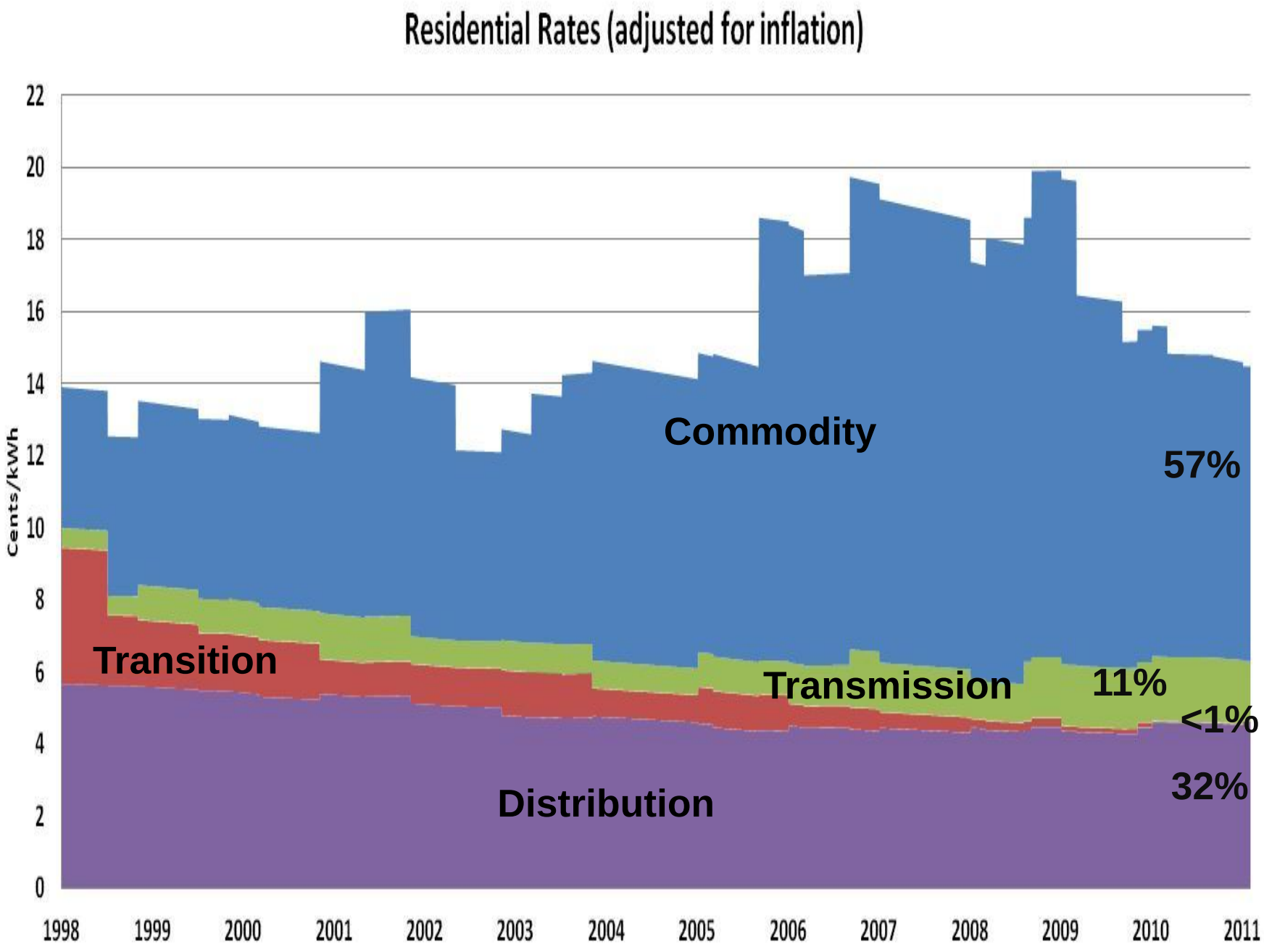
Industry Structure in New England



Active involvement and collaboration among stakeholders is key to success.

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

Source: ISO-NE


Residential Rates (adjusted for inflation)
Cents/kWh
22
20
18
16
14
12
10
8
6
4
2
0
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Commodity
57%
Transition
Transmission
11%
<1%
Distribution
32%

Administering Wholesale Electricity Markets

New England's Wholesale Electricity Markets

Quantity buying, selling, and reselling of the electric energy generated by a bulk power system to meet the system's demand for electric energy

Energy Market

System for purchasing and selling electricity using supply and demand to set the price

Forward Capacity Market **(FCM)**

Market where resources receive compensation for having invested in capacity and delivering it in the capacity commitment period

Ancillary Services

Services that ensure the reliability of production and transmission of electricity: e.g., reserves, regulation,

Source: ISO-NE

Electricity Market

Electricity Auctions

- Daily auctions for electric power
  - Determine electricity prices at wholesale level
  - Regionally-based markets
  - Buyers and sellers are:
    - Large energy users (buyers)
    - Distribution utilities/retailers (buyers, serving homes/businesses)
    - Power plant owners (sellers)
    - Financial traders (buy and sell)
- Timing
  - Every hour has different price and quantity

Source: ISO-NE

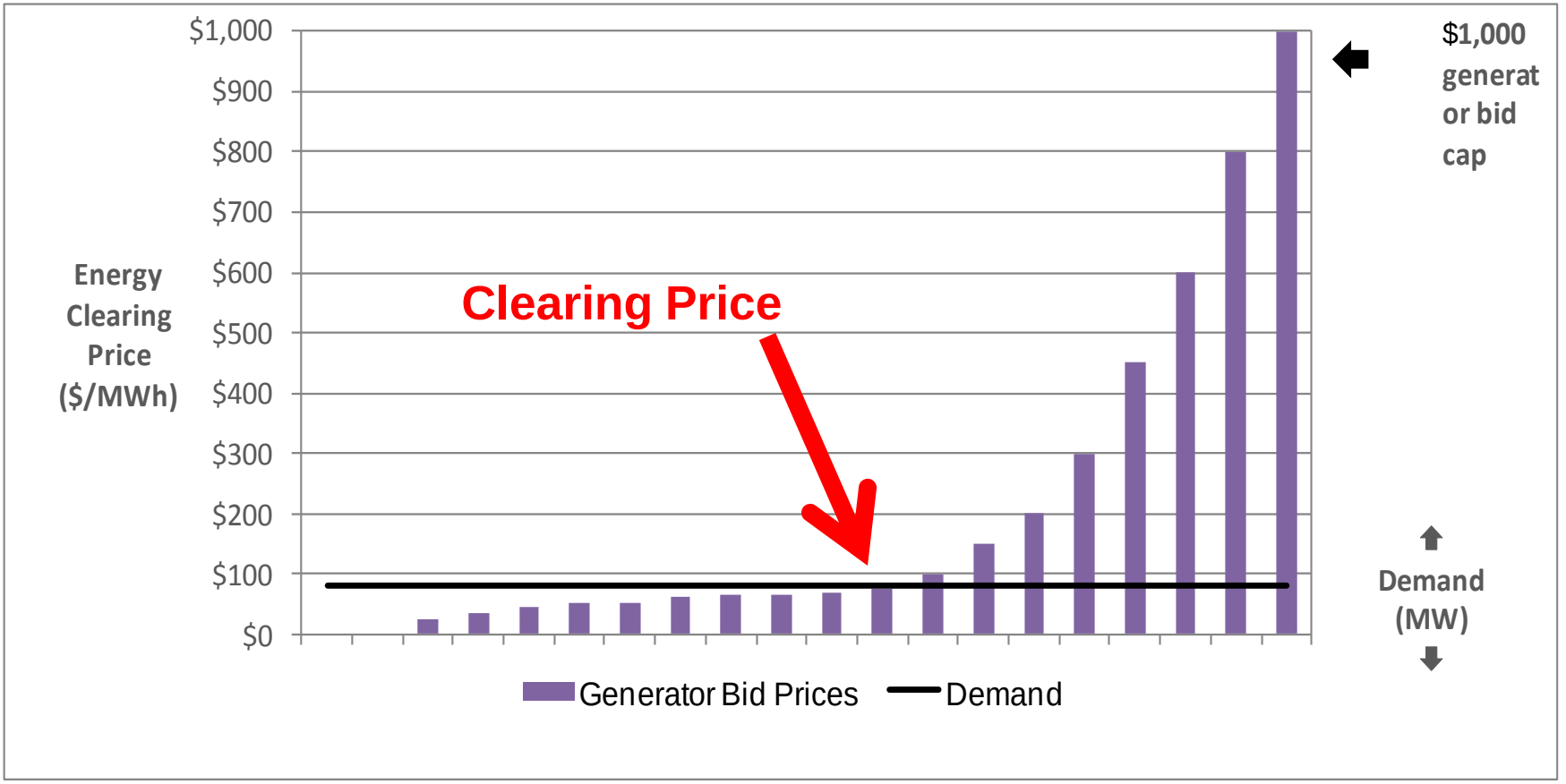
Real-time Energy Operations: Lowest-Cost Resources Dispatched

- Economic dispatch – resources are dispatched from lowest to highest offer
  - Generators with the lowest-price offers are committed and dispatched first, higher-priced generators are brought online as demand increases
  - Market clearing price is based on the last generating unit needed to meet demand
- Objective is to minimize the total cost of producing electricity while keeping the system in balance
- Thus, in general, when demand is high, wholesale prices will be higher, and vice versa, but real time prices are capped in situations of scarcity.
- Transmission constraints limit the transfer of energy and result in higher prices

Source: ISO-NE

ISO Commits Lowest-Priced Supply to Meet Demand

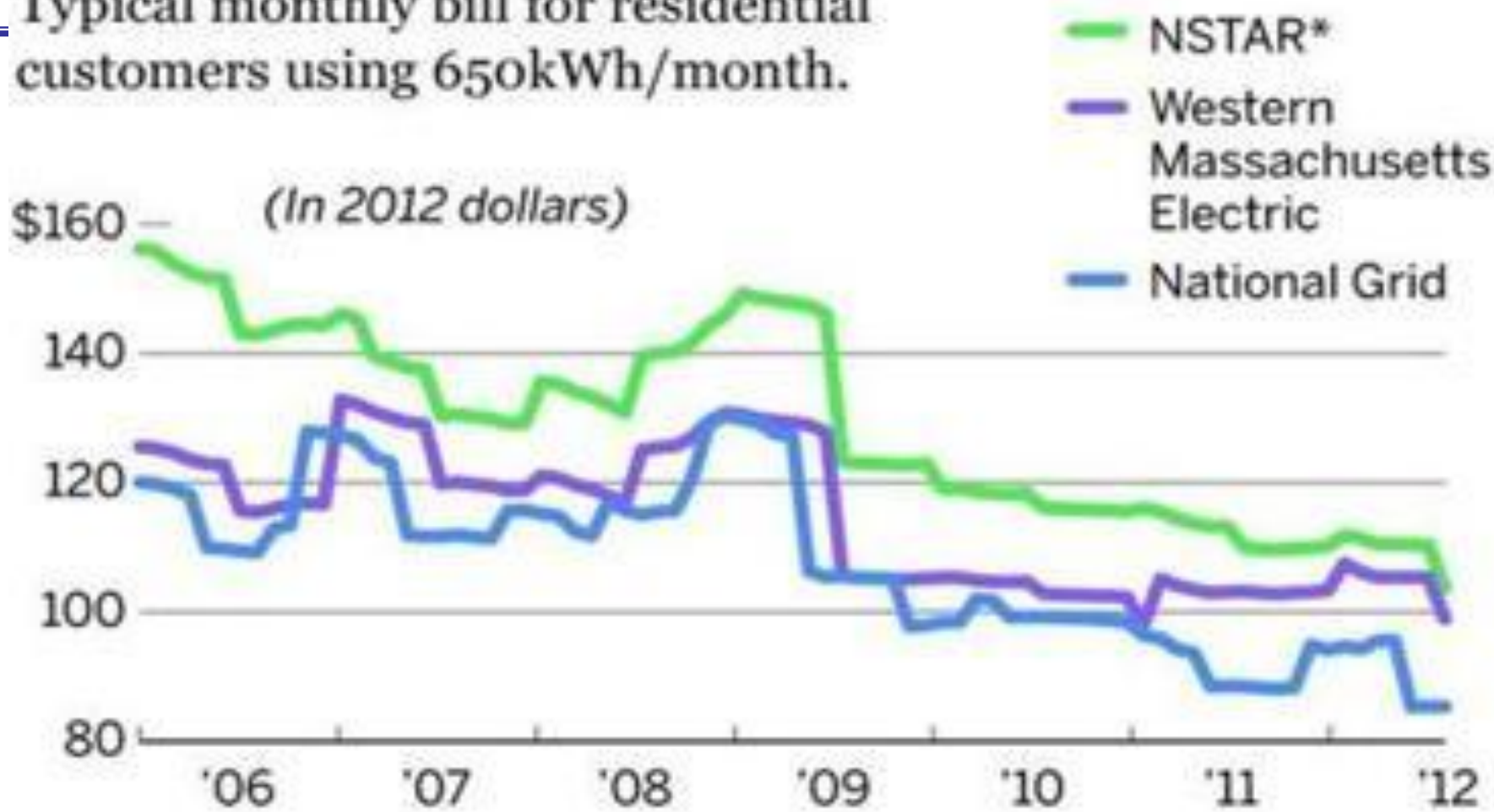
As demand rises, ISO commits resources higher up in the bid stack



Source: ISO-NE

Dropping electrical bills

Typical monthly bill for residential customers using 650kWh/month.



*Weighted average of NSTAR companies (Boston Edison, Commonwealth Electric and Cambridge Electric and Light Company)

SOURCE: Massachusetts Department of Public Utilities

Boston Globe, May 18, 2012

James Abundis GLOBE STAFF

Forward Capacity Market (FCM)

Why is a FCM needed?

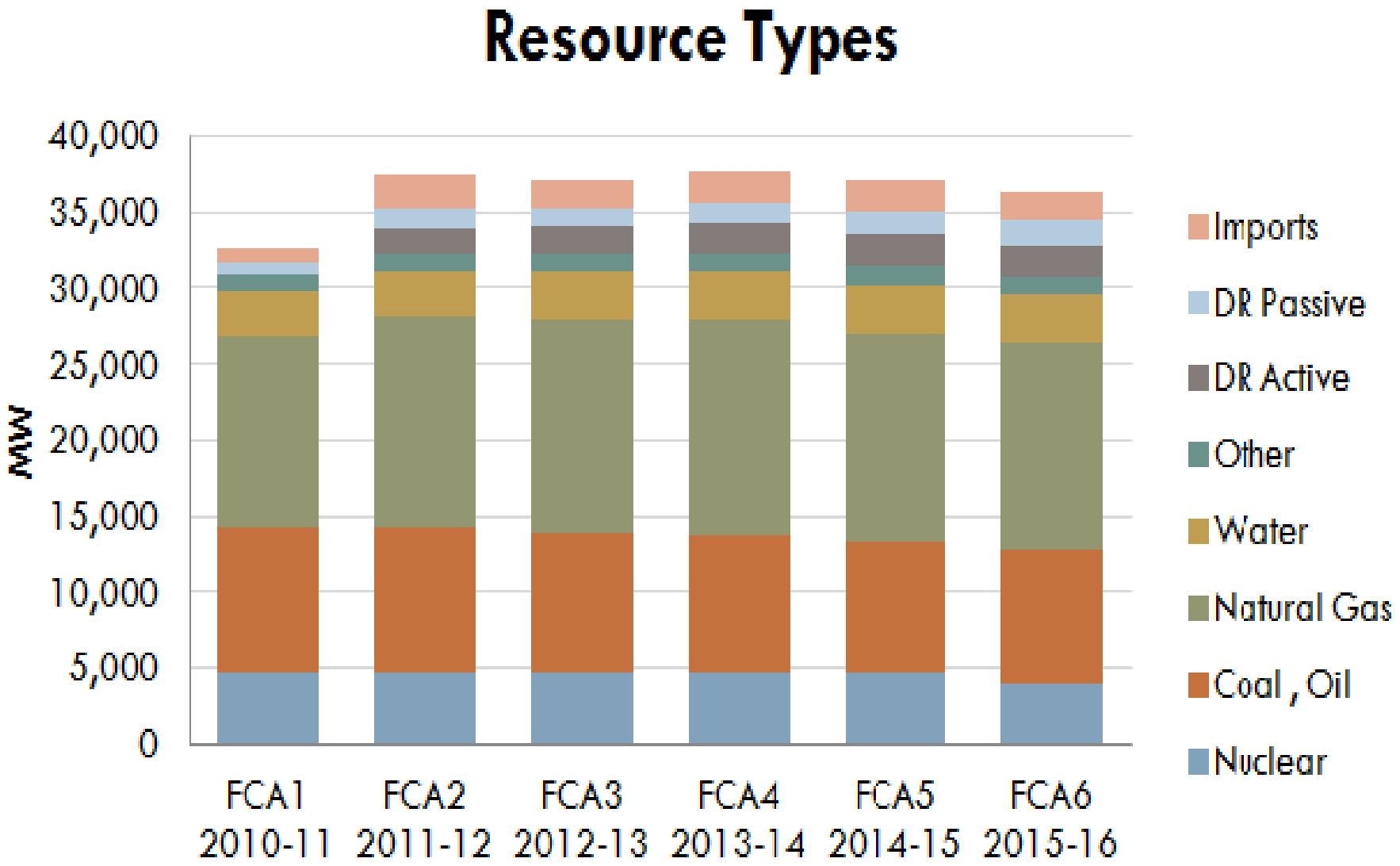
- Real-time energy market is not allowed to reflect true scarcity price.
- Even if true scarcity pricing is allowed, the long term price signal too uncertain to make long term investments.

Source: ISO-NE

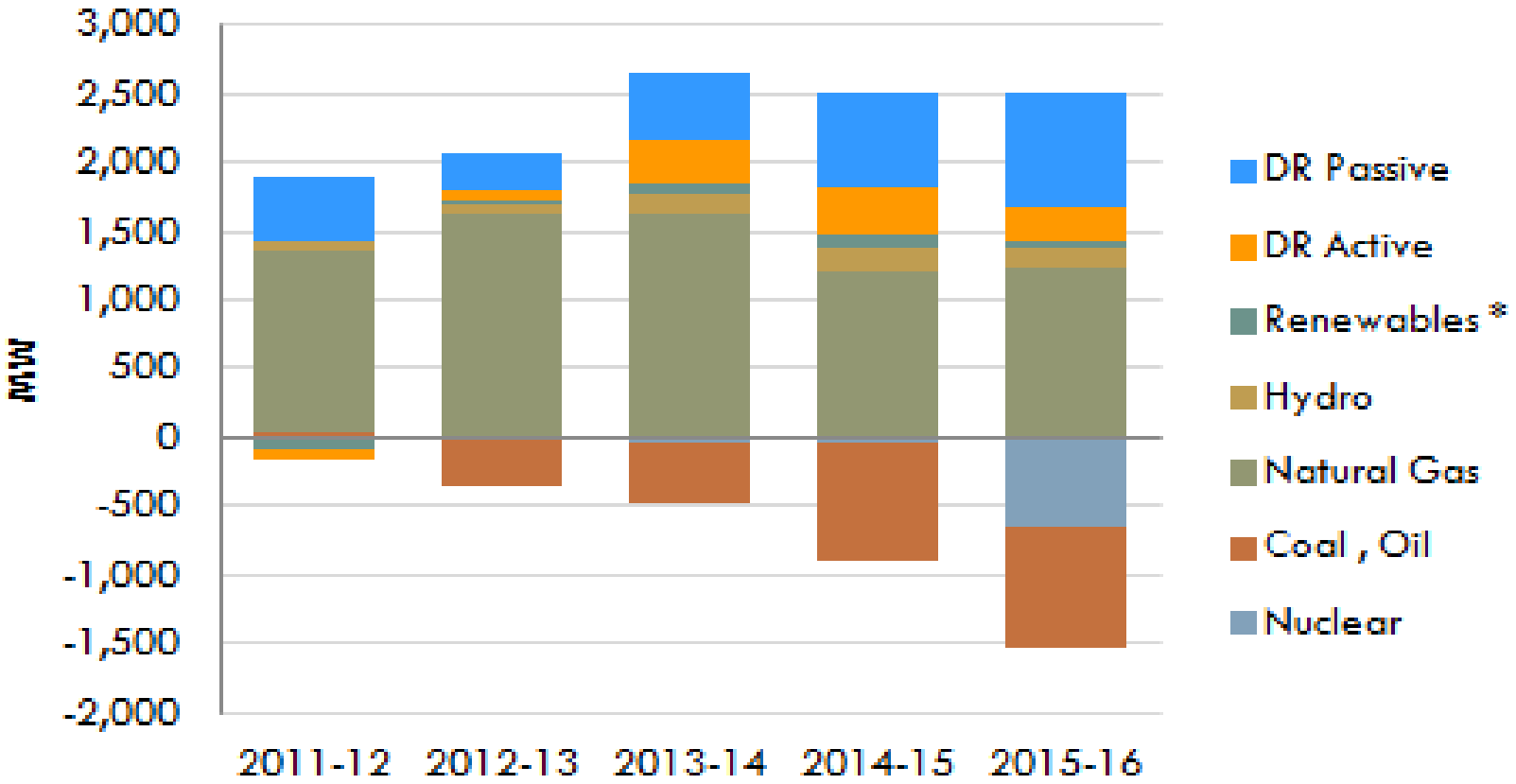
Basic Auction Design

- The ISO determines locational resources needed to meet peak load (plus reserves) = Installed Capacity Requirement (ICR).
- Administers a Forward Capacity Auction (FCA) three years in advance of delivery.
- All projects that clear in the auction receive payments in the delivery year based upon a single clearing price set in the auction.
- Mechanisms to avoid market power mitigation.
- Includes both price floor and cap

Forward Capacity Results



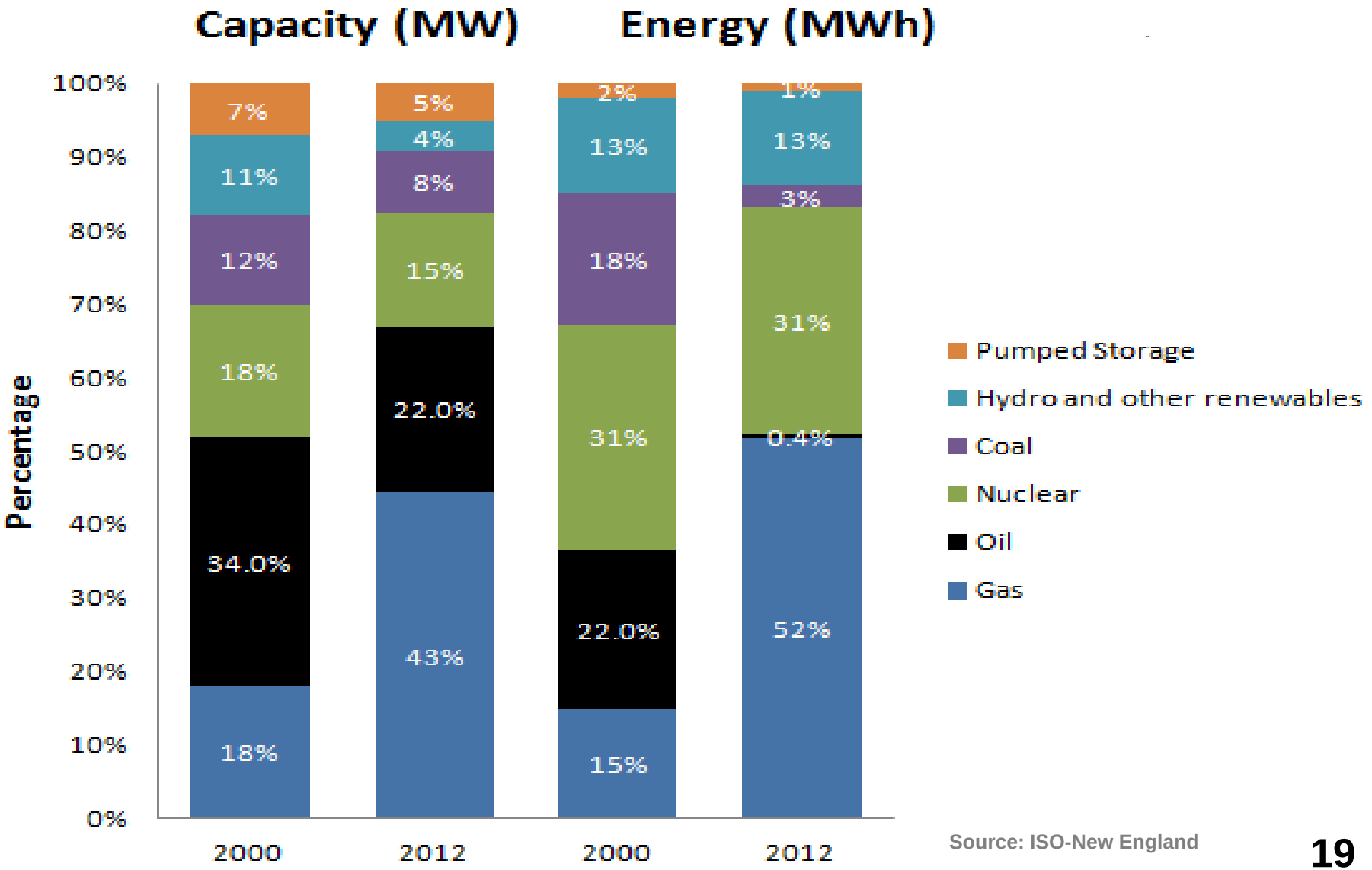
New Resources in the Capacity Market Since 2010



Source: ISO-New England

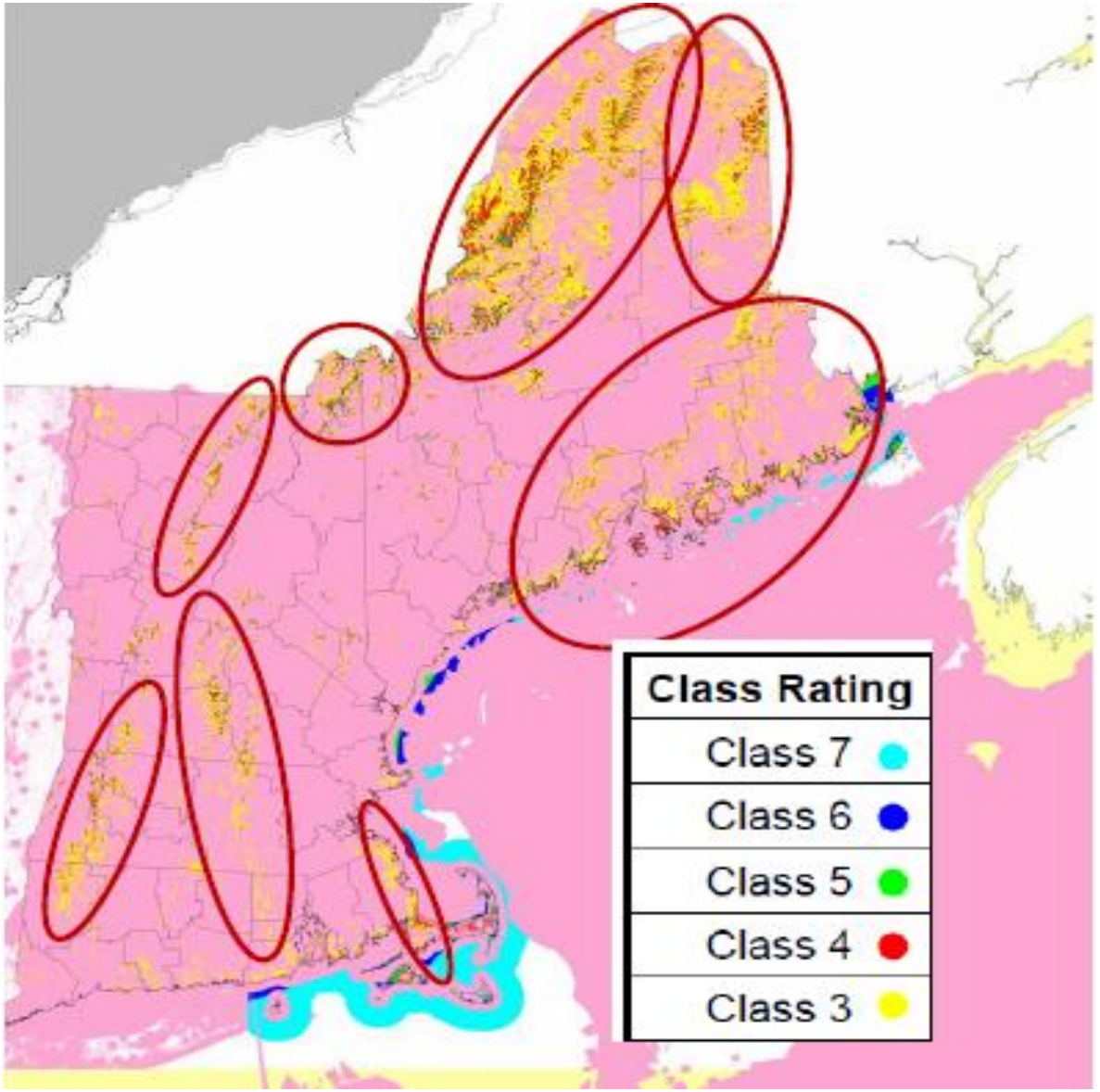
Issues Related to Reliability, Markets and Costs

Need to Diversify Fuel Mix

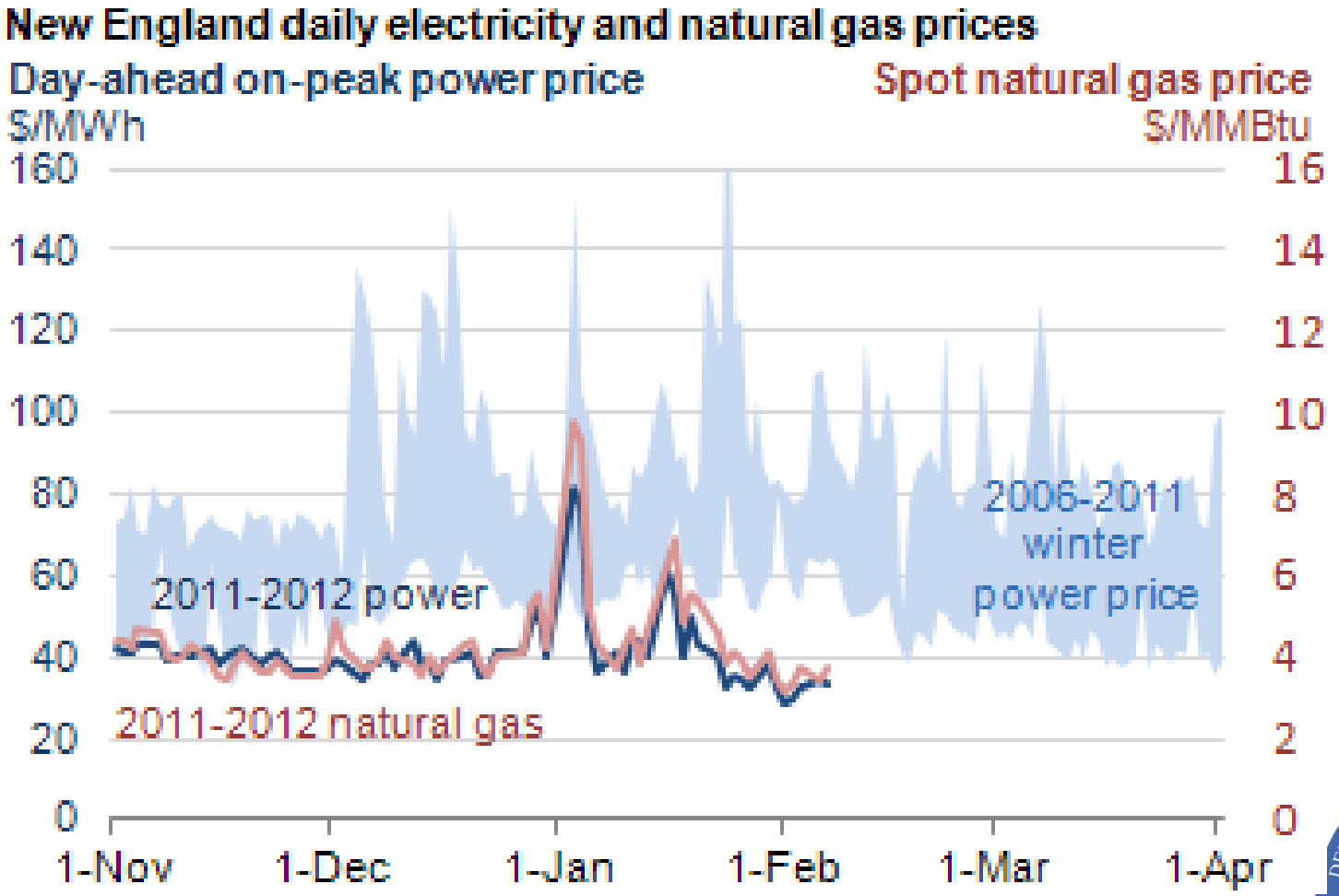


Source: ISO-New England

Wind Resources in N.E.



The “Gas-Electric Problem”

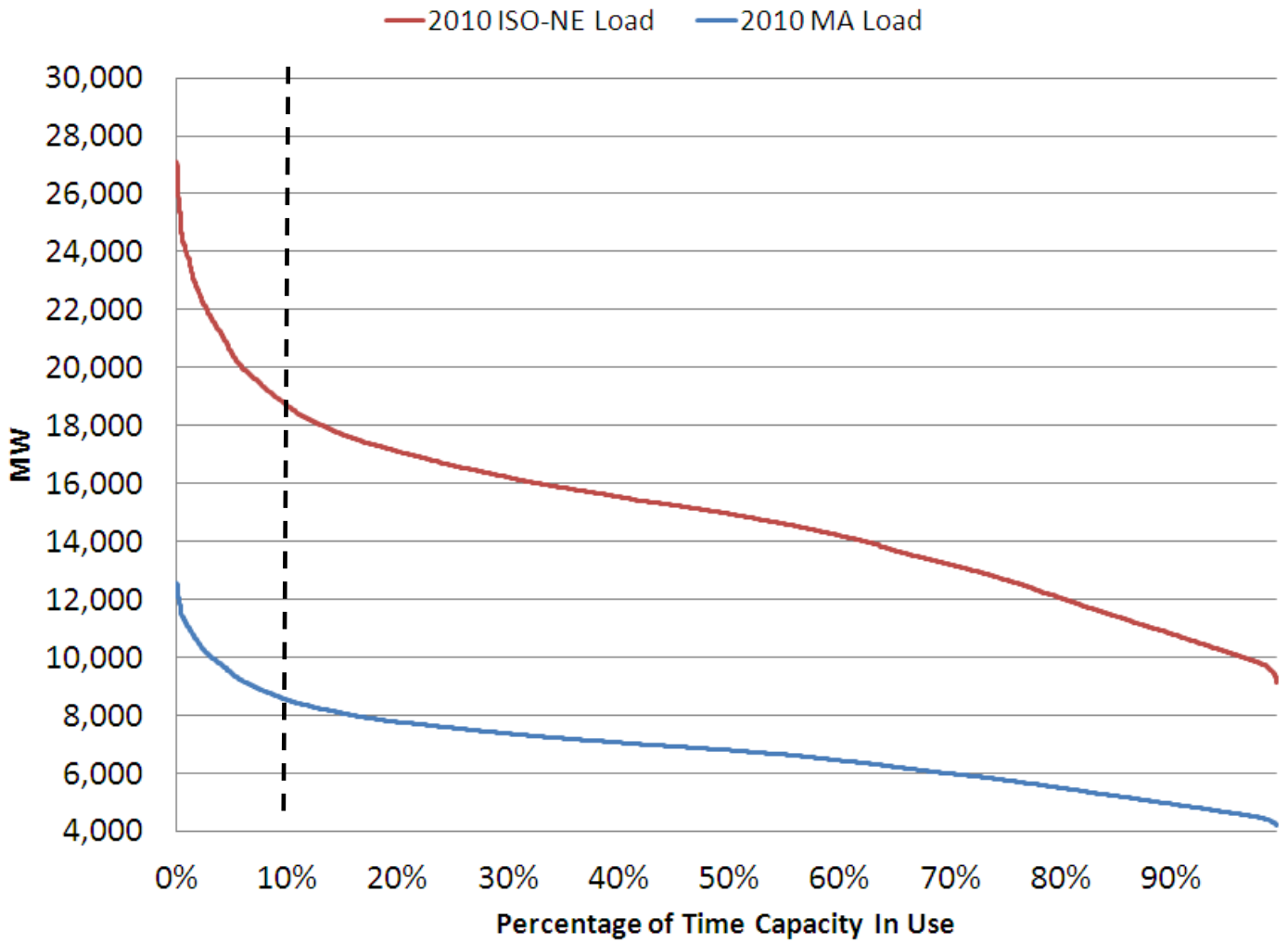


Source: EIA

The “Gas-Electric Problem”

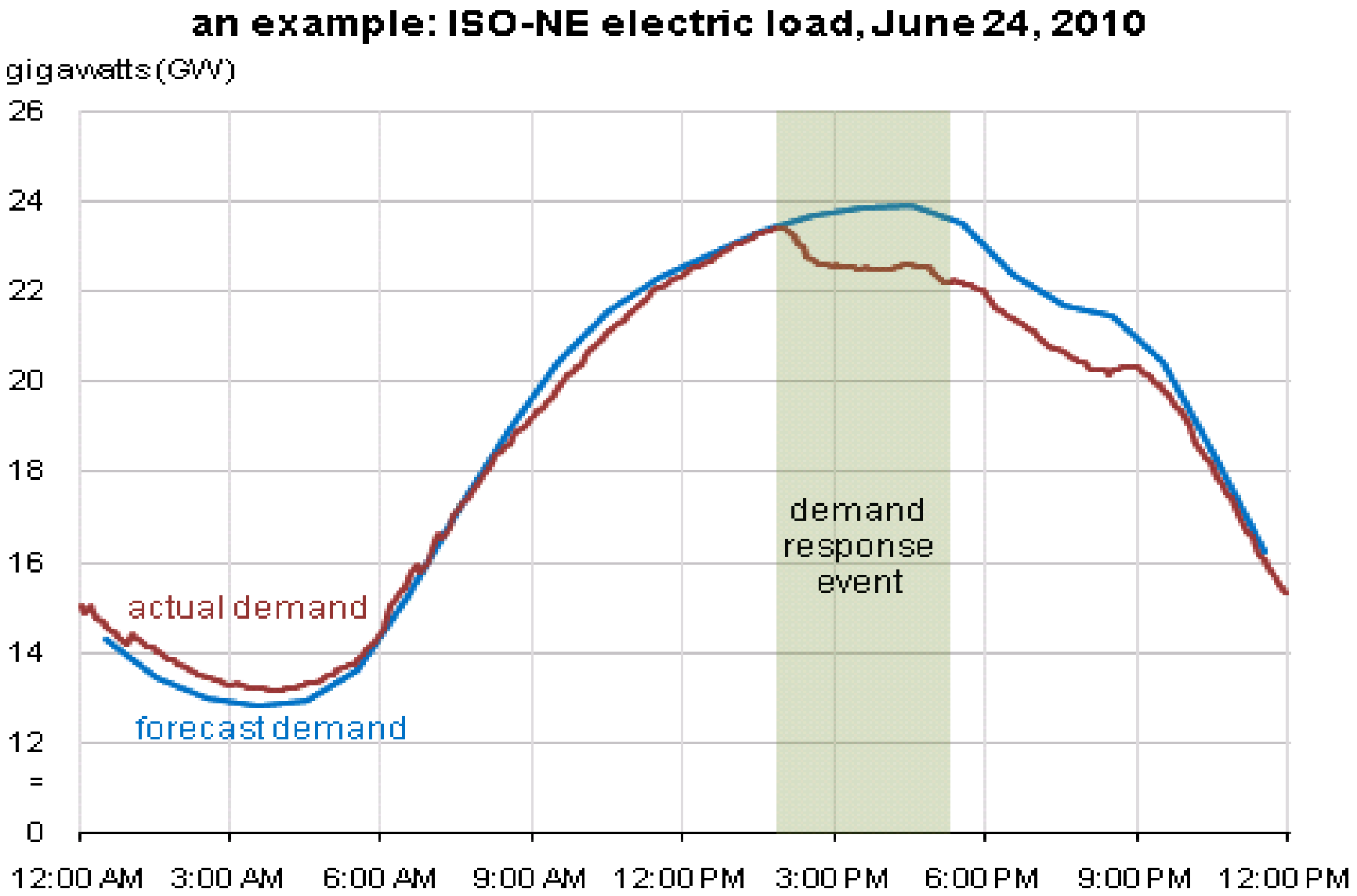
- Possible Solutions
  - Pay for Performance
    - Better aligning incentives/disincentives for performance during peak times
  - More Dual Fuel
  - More Fuel Diversity

New Generation is Driven by Peak Demand



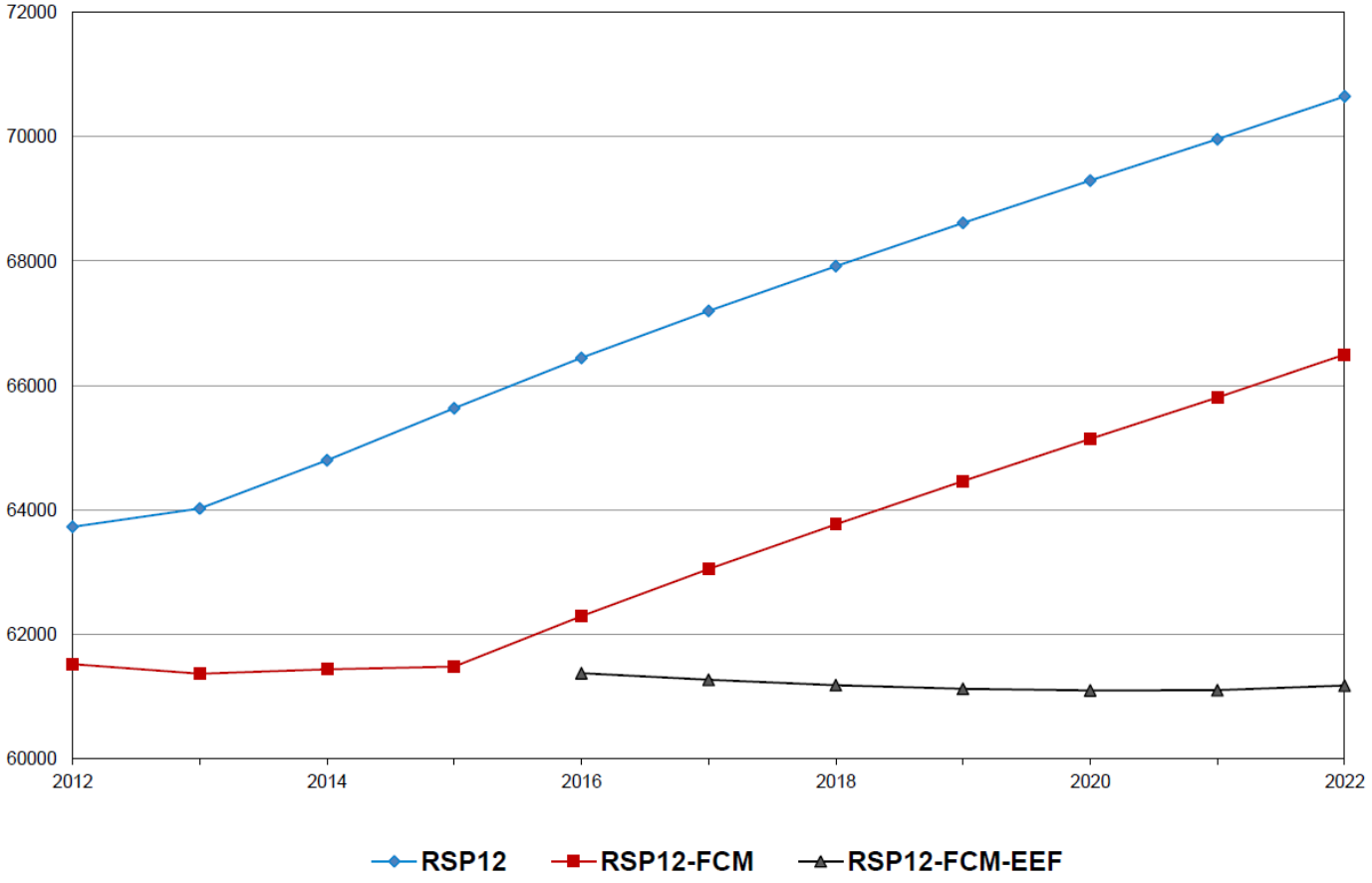
Source: ISO-New England

Allowing Demand Response to Play in the Market Results in Peak Shaving – And Cost Savings



Allowing Demand Response and EE to Play in the Market Results in Lower Energy and Transmission Costs

EE "Eliminates" Energy Load Growth……



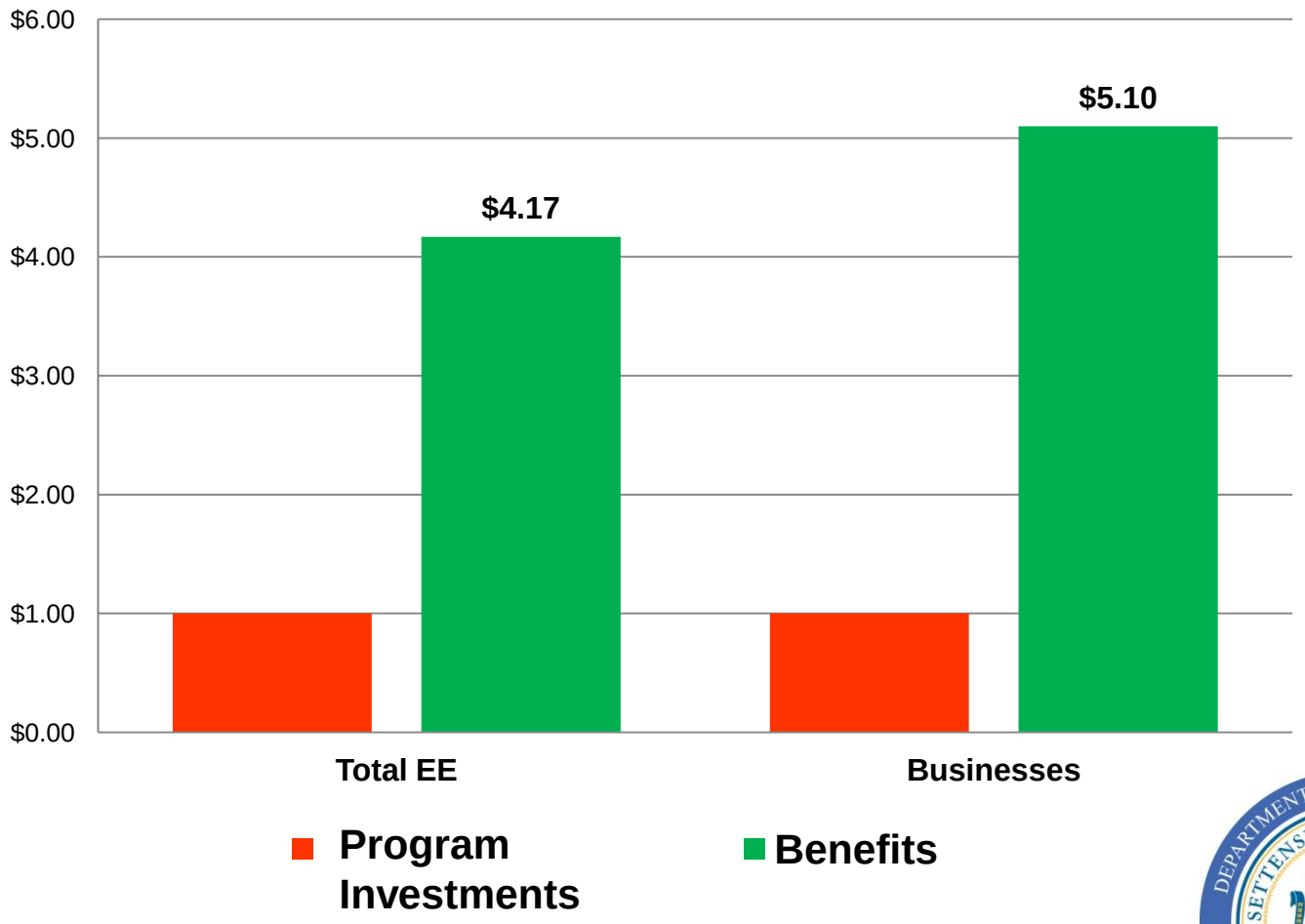
Baseline demand

w/ FCM including EE

w/ FCM including EE plus additional projected EE

Source: ISO-New England

Allowing Demand Response and EE to Play in the Market Results in Lower Energy and Transmission Costs



Allowing Demand Response and EE to Play in the Market Results in Lower Energy and Transmission Costs

Revised analysis shows that the region can actually defer 10 transmission upgrades that earlier studies showed were needed to ensure system reliability. By deferring these upgrades, the region will save an estimated $260 million.

- Stephen Rourke, VP for system planning, ISO-NE

Grid Modernization

DPU Proceeding, with stakeholder report complete by June 2013

Opportunities and Challenges

- Old infrastructure
- Demand for better reliability
- Fundamental inefficiencies in the system
  - Generation and cost driven by peak load
  - Possible dynamic pricing
- Begin to create the utilities of the future today
  - Electric vehicles
  - Renewables integrated into grid