

Improving Reliability and Integrating New Resources with Smart Grid Technology in New England

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What is “Smart Grid”?

“A modernization of the nation’s electricity transmission and distribution system to maintain a reliable and secure electricity infrastructure that can meet future demand growth”

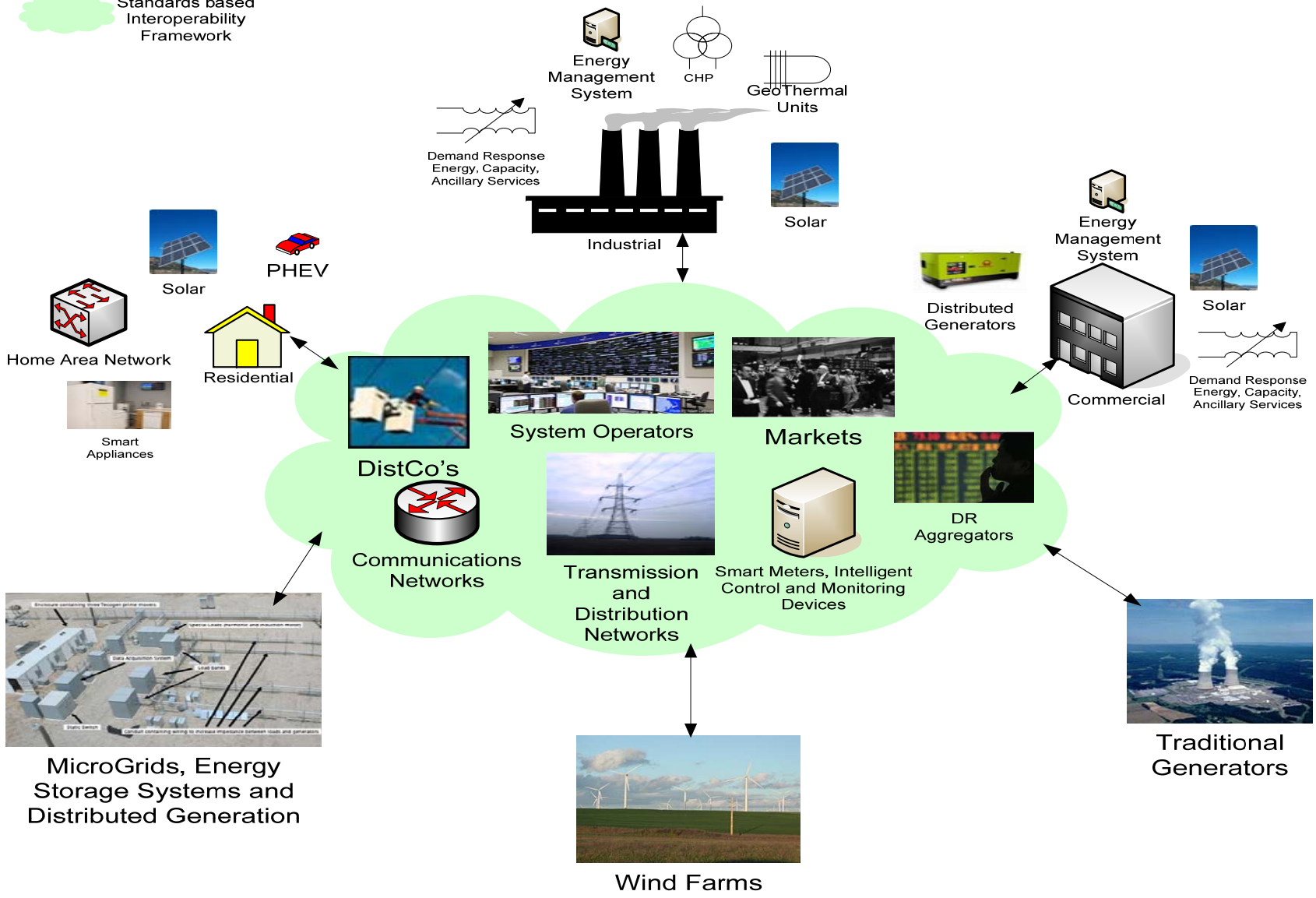
Energy Independence and Security Act of 2007

The Smart Grid

More intelligence = more complexity

Legend:

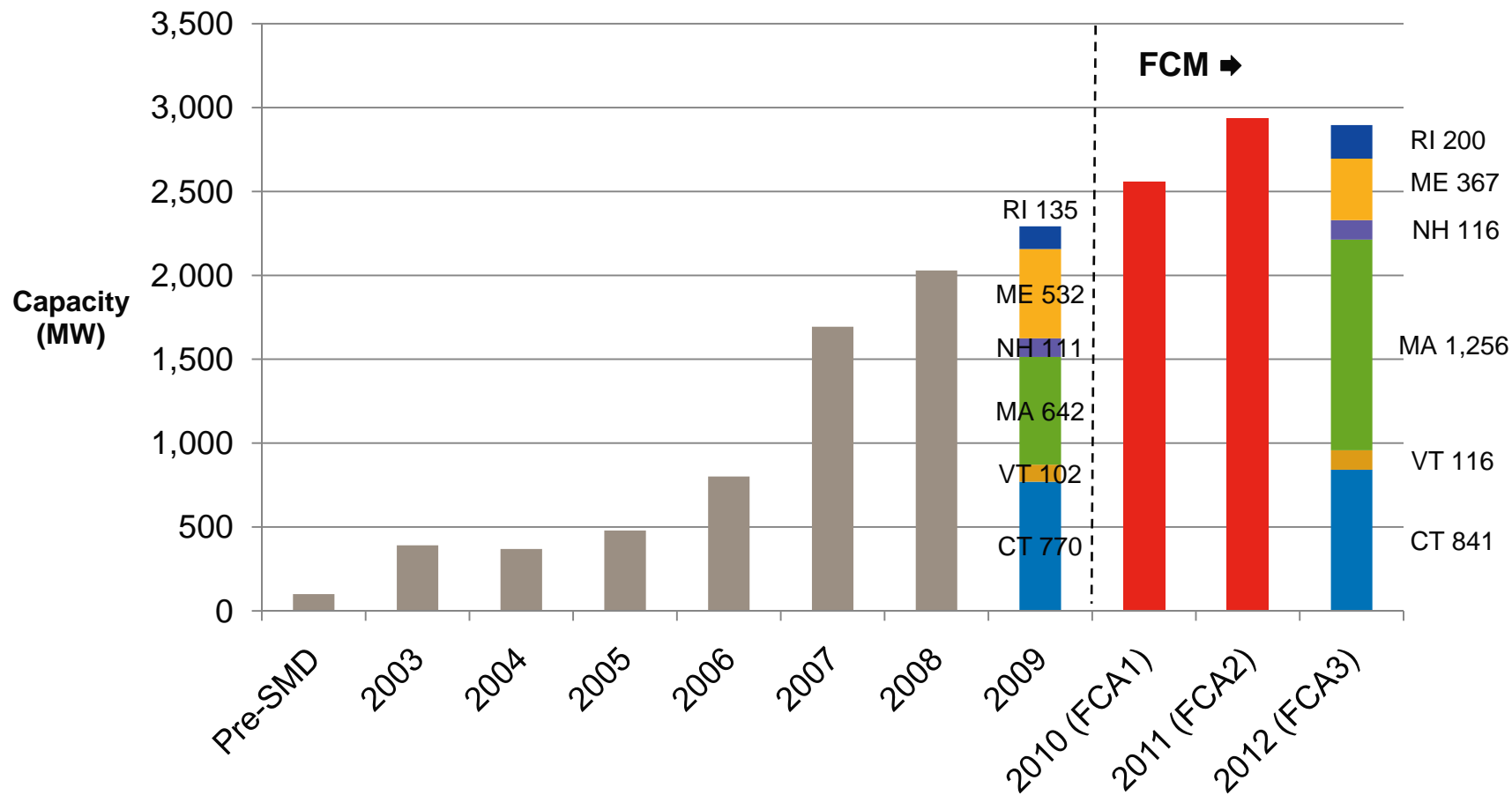
 Standards based Interoperability Framework



Smart Grid Objectives

- For Reliability
 - More capacity from transmission and distribution resources
 - Intelligent devices that automate monitoring and respond to emergency situations
 - Efficient production, movement and consumption of electricity
 - Tools and training to support control room
- For the Environment
 - Greater penetration of demand resources, energy storage, and renewable resources
 - Reduction in greenhouse gases
- For Consumer Control
 - Transparency into electricity usage and prices
 - Opportunities for consumers to supply energy, capacity and ancillary services

Demand Resources Growing in New England



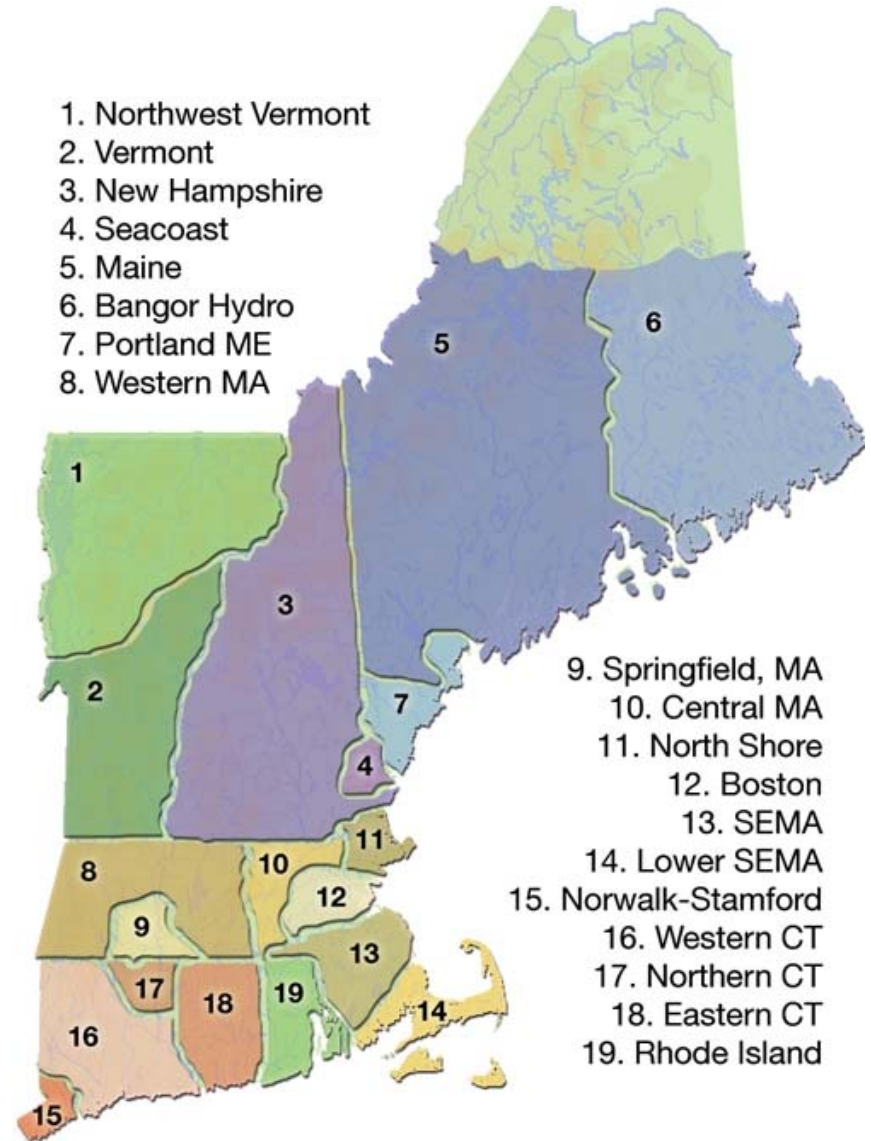
Through 2009: Total DR Enrollment in ISO Programs

2010-2012: Total DR Cleared in FCM (New and Existing)

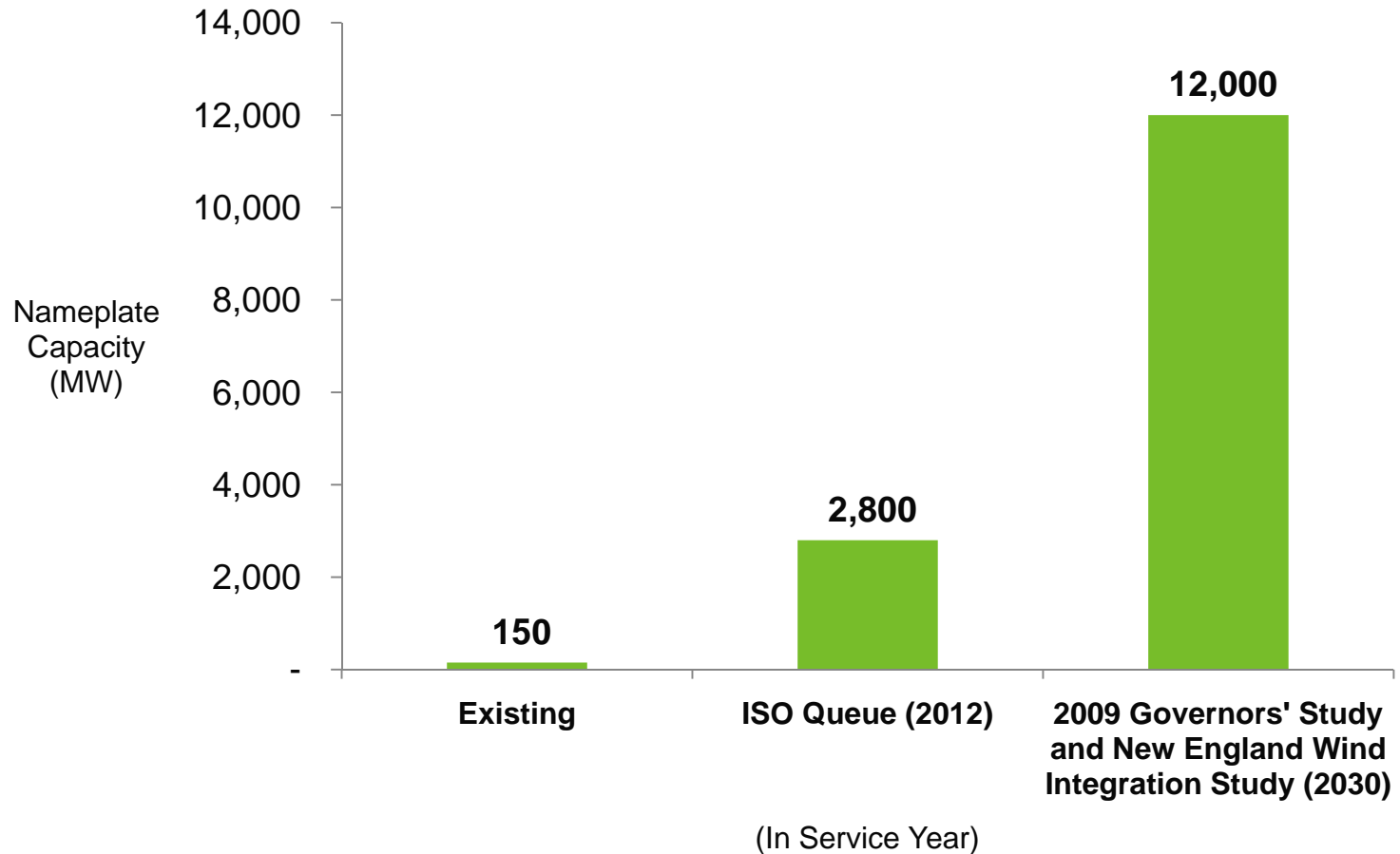
ISO to Dispatch Demand Resources in Targeted Areas

19 dispatch zones:

- Allows dispatch of resources only when, where and in amounts needed



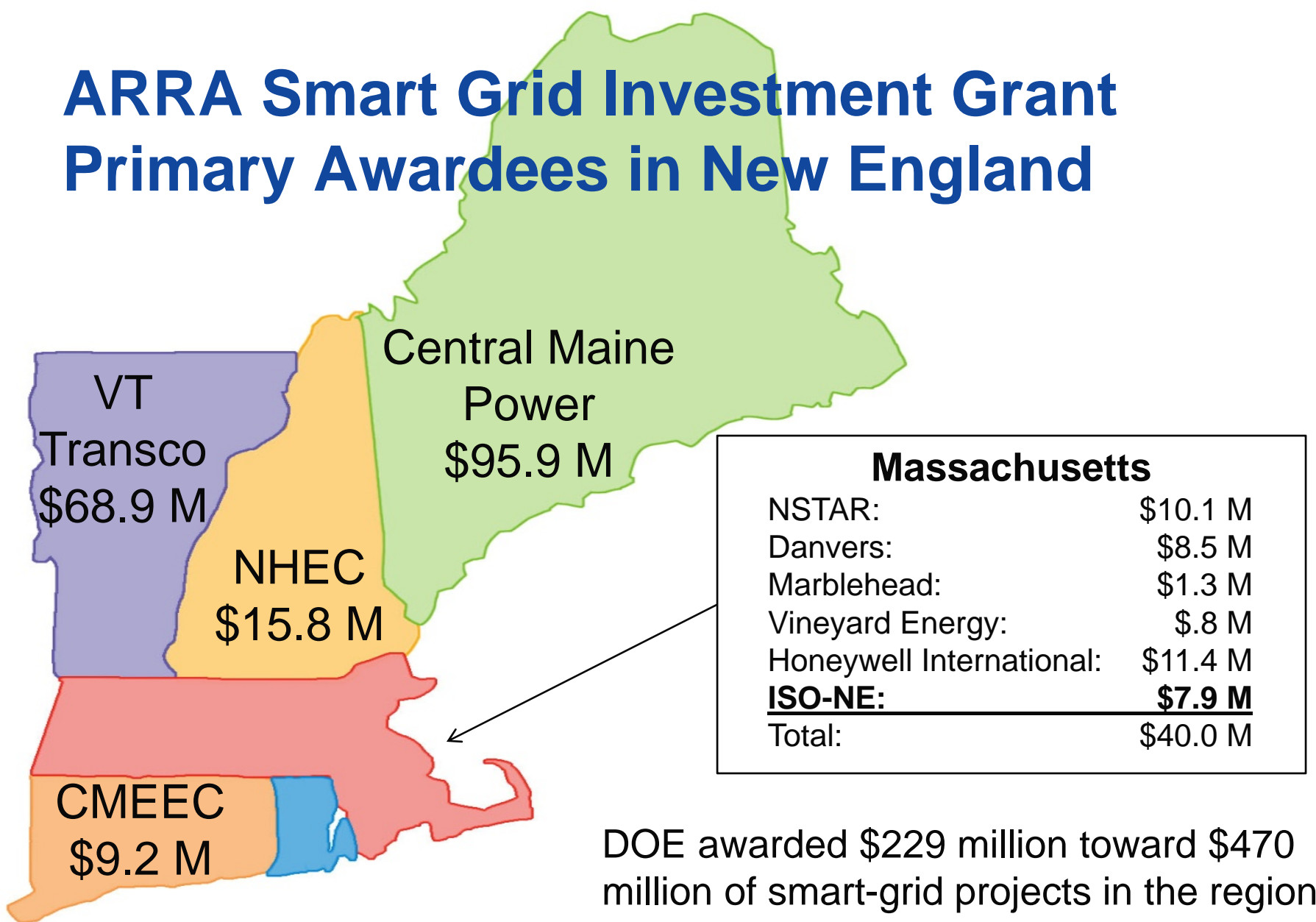
Potential Wind Resources in New England



Federal Policy Drivers Behind Smart Grid

- ***Energy Independence and Security Act of 2007 (EISA), Sec. XIII***
 - Founding document for smart grid implementation
- ***American Recovery and Reinvestment Act of 2009 (ARRA)***
 - Economic stimulus bill that provides funding for smart grid
- **FERC/NARUC Smart Grid Collaborative**
 - Forum for regulators to discuss issues and make recommendations for state and federal policies to support smart grid
- ***American Clean Energy and Security Act of 2009 (H.R. 2454)***
(Pending)
 - Includes provisions to reduce utility peak loads through smart grid and demand response applications

ARRA Smart Grid Investment Grant Primary Awardees in New England



ISO's Smart Grid Project

- Provide enhanced real-time visibility of the electric grid
 - All transmission Owners in New England install smart-grid devices at 30 locations across the region to enable enhanced monitoring and control by ISO system operators
 - “Synchrophasor” technology used as a foundation for the next generation of power-grid situational awareness
 - Phasor measurement units (PMUs) observe system conditions 30 times per second—much faster than conventional technology
- Deployment of this technology was one of the DOE's key recommendations following the 2003 blackout

ISO's Smart Grid Project (cont.)

- DOE funding accelerates deployment of the ISO's smart-grid efforts at a lower cost to New England
- Benefits for the region:
 - Faster response to real-time system events
 - Increased capability of monitoring system stability and more accurate system models
 - New capabilities in system restoration
 - Increased ability to reduce congestion

IRC Smart Grid Initiatives

- ISO-NE is sponsoring two smart-grid initiatives with the ISO/RTO Council (IRC):
 1. **Plug-In Electric Vehicles (PEV) Integration Project** will:
 - Identify products and services that PEVs could provide under existing market and reliability structures within ISO/RTO markets
 2. **Smart Grid Standards Development Project** will develop a straw standard:
 - Describing smart grid end-to-end process flows, from all service providers between customers and the ISO/RTO
 - Defining and prioritizing the applications and functions that have most urgent need for standards
 - Developing draft architecture and standards to support information between ISO/RTOs and smart grid aggregators

Conclusions

- Federal policy is driving the move toward smart grid
- Smart-grid technologies will enhance system reliability
- Investments in smart-grid technologies will also enable integration of demand resources, energy storage, and renewable resources
- ISO New England is actively involved in developing standards to make the smart-grid concept a reality