

Roadmap to Demand Resource Integration in New England

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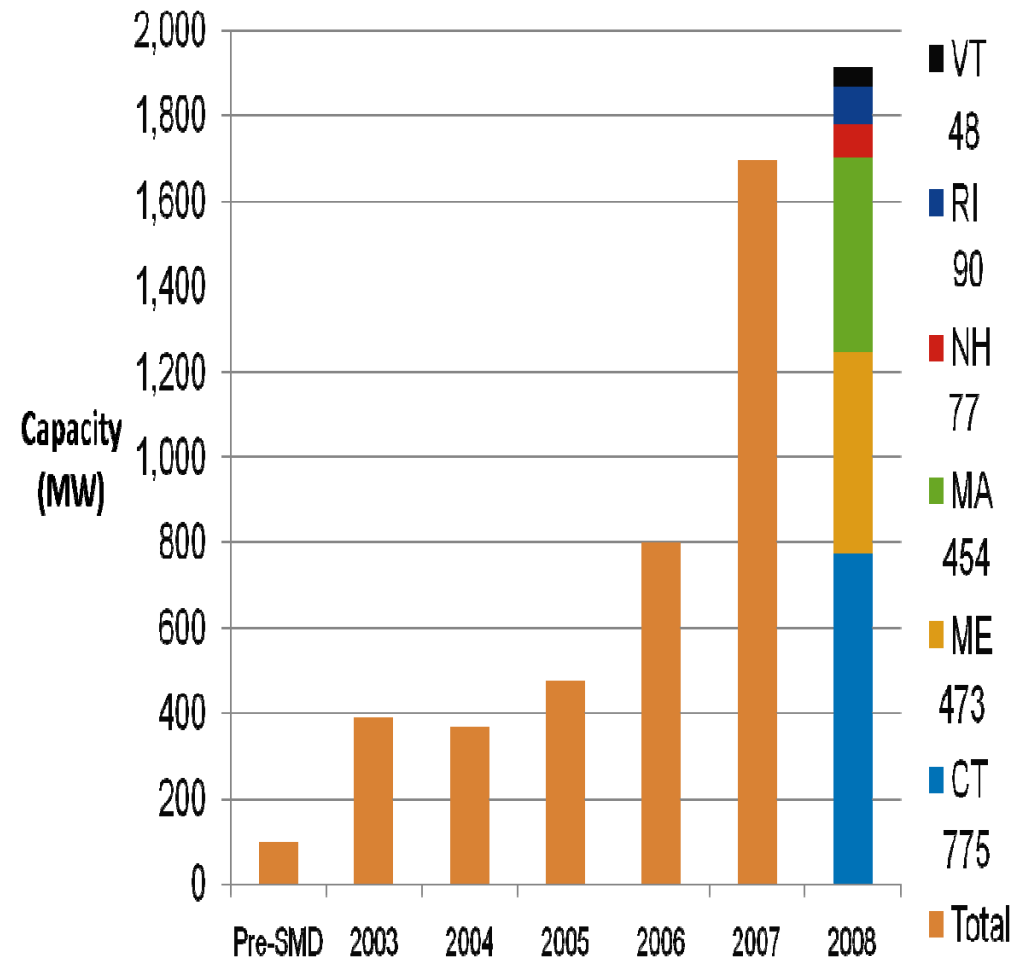
New England's Future Grid

- Distributed and renewable resources are starting to become main-stream
- The power system is evolving from a traditional generation base to various different kinds of resources:
 - Demand Resources
 - Wind and other variable renewable resources
 - Storage devices such as flywheels, batteries and plug-in hybrids

Operational Challenge

- Integration of demand and renewable resources effectively into real-time operations is critical to maintain reliability
 - Today, the ISO is focused on the integration of Demand Resources (June of 2010 for FCM products)
 - Next, the ISO will be focused on the integration of wind and “smart grid” resources (Wind Integration Study Summer 2010)
 - Demand Resources are playing a major role in the resource mix to meet the needs of New England under the Forward Capacity Market

Demand Resources Integration



- Growth of Demand Resources (DR) continues under FCM
- DR Clearing in Forward Capacity Auctions:
 - FCA #1: over 2500 MW
 - FCA #2: over 2900 MW

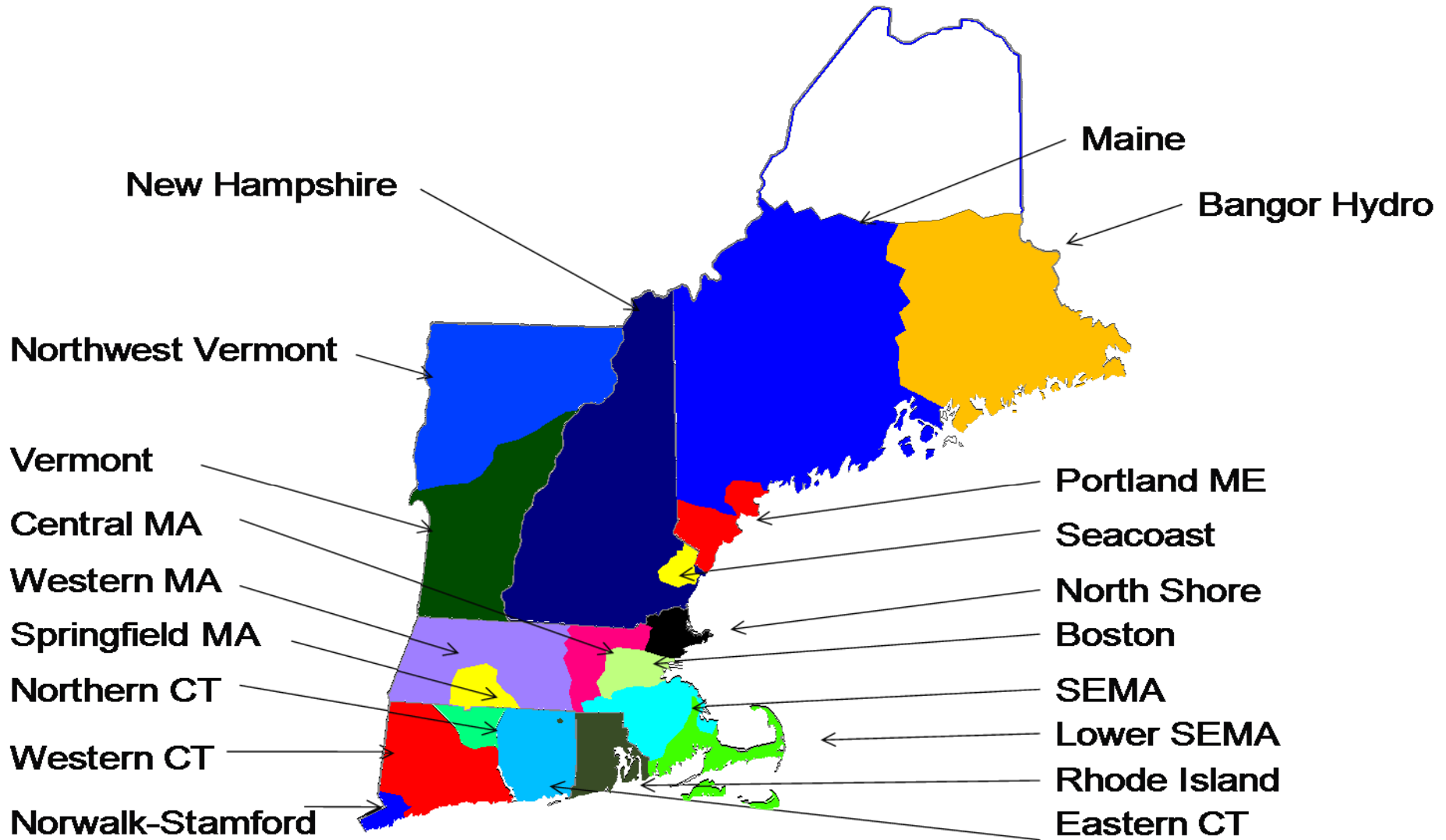
Integration Challenges and Opportunities

- Initial version of Demand Resource Market Rules did not allow the flexibility to dispatch resources where you needed them, when you needed them, and in just the right quantities to solve constraints
- One class of Demand Response Resources were not visible to the system operator (Critical Peak)
- The Annual Forward Auction Processes did not allow Demand Resources to make educated assessments of how they might be expected to operate in a delivery year
- Demand Resource Providers were not able to take a portfolio approach to meeting their Capacity Obligations
- Current Infrastructure is internet based and subject to provider denials of service and potential cyber attacks at the time when the Demand Resources are needed most

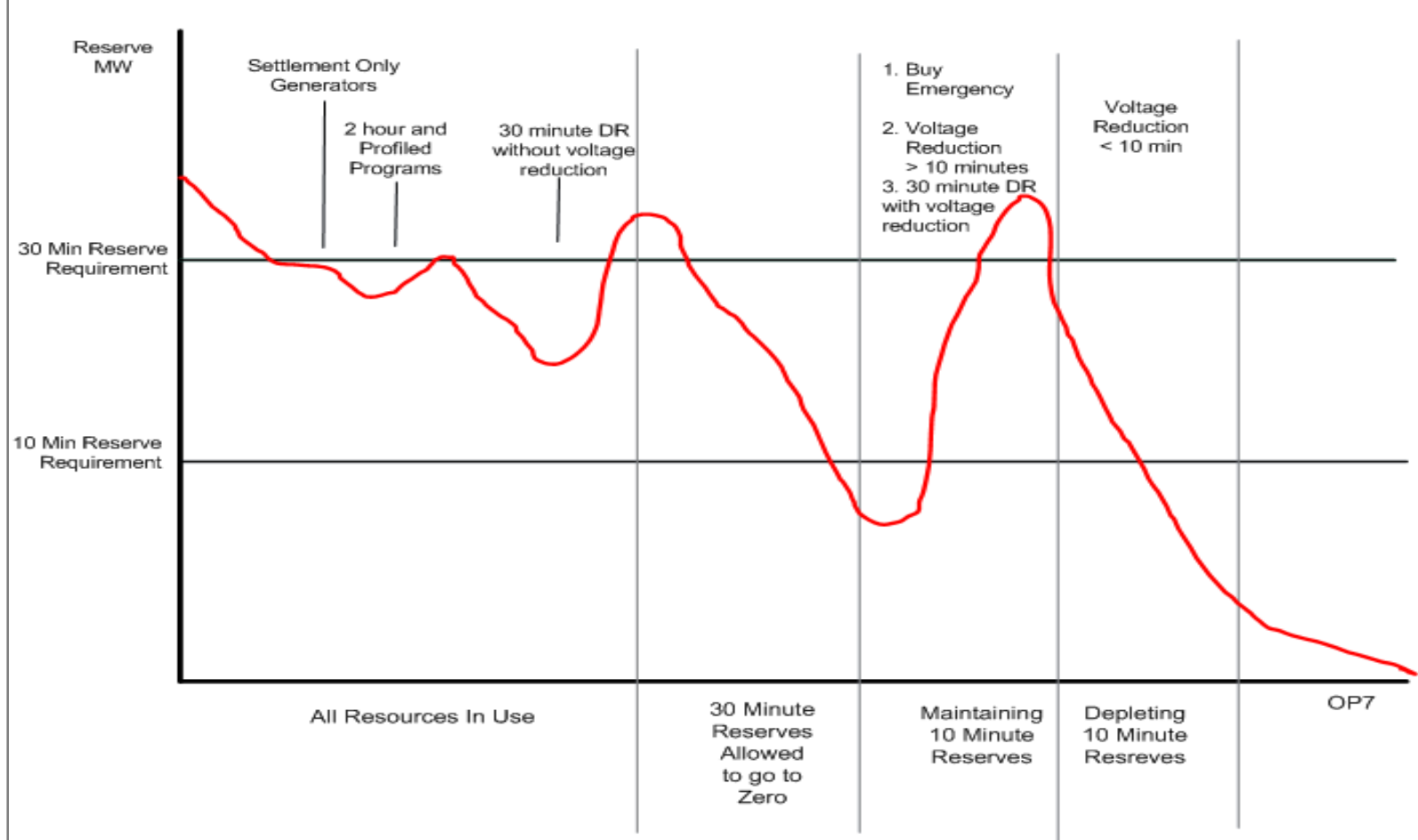
Improvements to be ready for June 2010

- Working with all stakeholders solutions were developed to solve these integration challenges during 2008 and culminated in an uncontested filing and approval by the Commission in October 2008.
 - Introduced a Demand Resource Operable Capacity Analysis to inform the market about potential hours of operation for the future delivery year for the primary auction
 - Flexibility allowed for Market Participants to use a portfolio of assets to respond within a zone to meet a demand resource obligation
 - Eliminates the class of demand with no visibility to the system operator (Critical Peak)
 - Allows dispatch of resources only when, where and in amounts needed (System Wide, Load Zone and or Dispatch Zone)
 - Dispatch in 19 targeted areas (Dispatch Zones):
 - Prevents unnecessary activation of DR
 - Limits customer fatigue

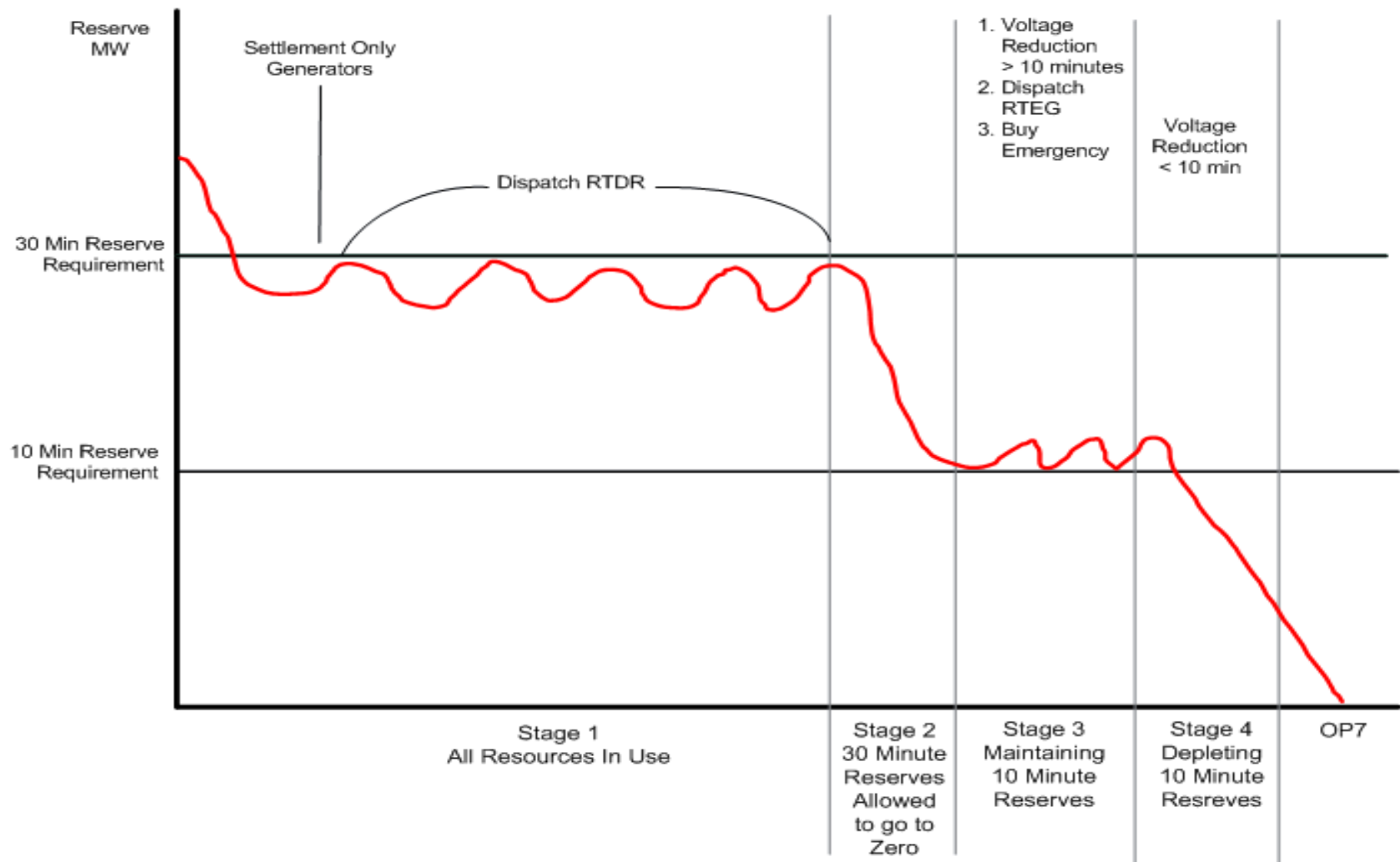
Dispatch Zones Under FCM



Hypothetical Reserve Plot During a System Wide Reserve Deficiency



Reserve During System Wide Event & Proposed DR Dispatch



Improved DR Software & Communications Infrastructure

- Developing enhanced and secure communication with DR very similar to generators
- Improving forecasting of DR availability and projected use
- Implementing new software that will fully integrate the DR solution into the Energy Management System
- Establishes coordination with Demand Designated Entities

Communication Overview under FCM

