

Upcoming Power Sector Environmental Regulations:

Framing the issues about potential reliability/cost impacts

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Raab Roundtable
Boston, MA

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Overview

- Potential power sector issues related to EPA rules
- Review of industry “tools” to address concerns
- Assessment from an interconnect-wide perspective
- Review of potential circumstances in New England
- *Starting Point:* two “givens:”
 - The national and regional health benefits of implementing updated clean air and water rules warrant action – and the geographic distribution of benefits resembles that of the costs
 - EPA estimates annual benefits (mostly public health) of CATR alone of \$120 – 290 billion in 2014, vs. roughly \$3 billion in costs
 - Power system reliability can not be compromised

Point of view

Basis of remarks: recent report co-authored for Clean Energy Group: *Ensuring a Clean, Modern Electric Generating Fleet while Maintaining Electric System Reliability*

- Co-authors: with Sue Tierney of Analysis Group; and Michael J Bradley, Chris Van Atten, Amlan Saha, and Carrie Jenks MJB Associates;
- CEG participating companies are some of the nation's largest generators of electricity, with over 170,000 MW of electric generating capacity (including 110,000 MW of fossil generating capacity) in the U.S., and serve nearly a fifth of all U.S. electric customers.

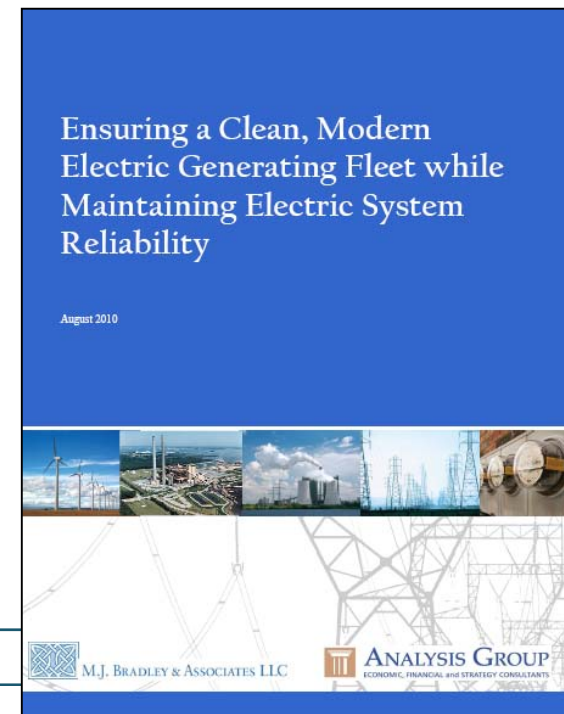
Calpine Corporation
Energy Corporation
NextEra Energy
PG&E Corporation

Constellation Energy
Exelon Corporation
National Grid
Public Service Enterprise Group

Our report focused on air rules (CATR, MACT rules).

<http://www.mjbradley.com/documents/MJBAandAnalysisGroupReliabilityReportAugust2010.pdf>;
<http://www.analysisgroup.com/article.aspx?id=10786>

October 29, 2010



Some key questions:

What can we tell now about the impact on electric industry reliability of EPA's rules, with respect to plant retirements, retrofits?

What tools are available to manage through the transition in a reliable way?

What does this mean for New England?

What can we tell about the impacts on reliability? (1)

The overall amount of affected capacity is smaller than it might first appear.

Of the 310 GW of coal capacity in the U.S.:

- Many plants are likely to retire due to market economics .
 - This is particularly true since many of the least-economically viable units are small, uncontrolled, old, relatively inefficient – and will face economic closure decisions from the air (and water) rules.
- Many plants are already controlled or have proposed retrofits.
 - 65% (over 200 GW) has already installed or planned scrubbers.
 - ~50% is already or soon to be retrofitted with advanced NOx controls.
- Roughly 25-75 GW of coal is in a genuinely uncertain state

What can we tell about the impacts on reliability? (2)

EPA projects that the new CATR regulations would require:

- 14 GW of additional capacity (beyond previously announced units) would need to be retrofitted with scrubbers
- Less than 1 GW retrofitted with advanced NOx controls by 2014
- *(NERC Report: 25 – 75 GW of retirement/derating due to all rules)*
- **This amount is small in comparison to current circumstances, industry response to capacity needs:**
 - There is currently over 100 GW of excess capacity
 - Industry added over 160 GW *in just 3 years* between 2001/2003
 - Between 2008-2010, approximately 60 GW of coal capacity was installed with scrubbers, with the industry completing 50+ scrubber retrofits each year.

All NERC reliability regions have excess capacity, totaling over 100 GW of excess capacity nationwide

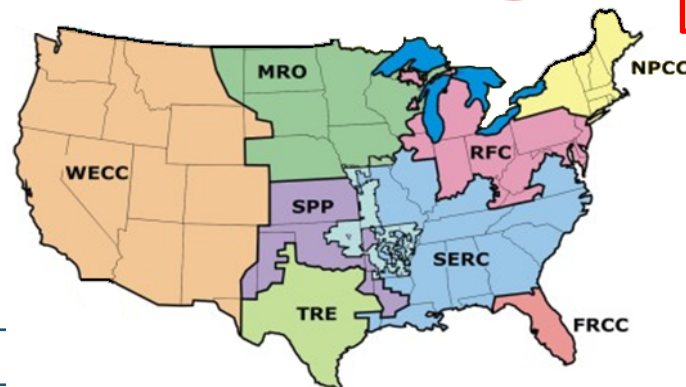
Estimated Reserve Margins in NERC Regions

NERC Electric Reliability Region	Projected Reserve Margin ⁽¹⁾ in 2013	Cushion Above NERC Target Reserve Margin ⁽²⁾ In 2013
TRE	23.9%	7.8 GW
FRCC	28.6%	6.1 GW
MRO	22.1%	3.2 GW
NPCC	24.4%	5.9 GW
RFC	24.3%	17.1 GW
SERC	26.3%	23.9 GW
SPP	30.3%	7.7 GW
WECC	42.6%	35.6 GW
Total		107.3 GW

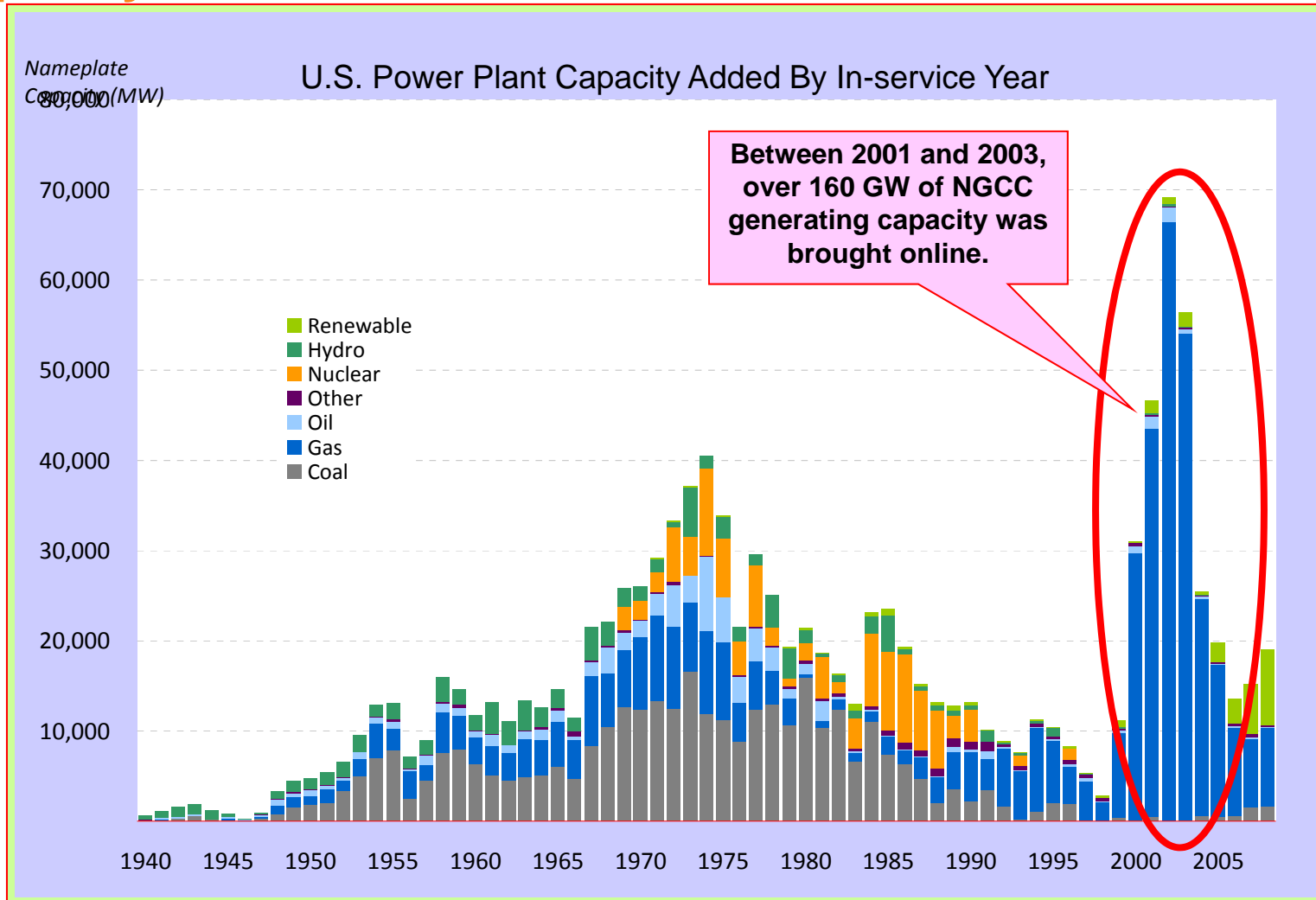
Compare to estimated 25-75 GW of retirement/derate capacity projected by analysts

1. Includes capacity defined by NERC as Adjusted Potential Reserve Margin, which is the sum of deliverable capacity resources, existing resources, confidence factor adjusted future resources and conceptual resources, and net provisional transactions minus all derates and net internal demand expressed as a percent of net internal demand.
 2. Capacity in excess of what is required to maintain NERC Reference Margin or the regional target reserve levels.

Source: NERC, 2009 Long-Term Reliability Assessment: 2009-2018, October 2009.



Industry track record of adding new generating capacity when and where needed



The electric industry is well-positioned to respond:

Many tools available to:

Manage
Retirements

Schedule
Outages

The electric industry is well-positioned to respond

Managing Retirements:

- Adequate capacity and under-utilized existing capacity
- Introduction of more aggressive energy efficiency, demand response, load-management tools. Considerable demand-side opportunities exist in all affected regions
- RTO markets: forward capacity markets, demand-response markets, planning functions, load-flow studies/“what if” analyses will all be key
- Planning responses: in non-market states, new capacity will be added as a result of planning efforts, proceedings
- All regions: ability to plan ahead, and to address any apparent reliability issues in short term if necessary

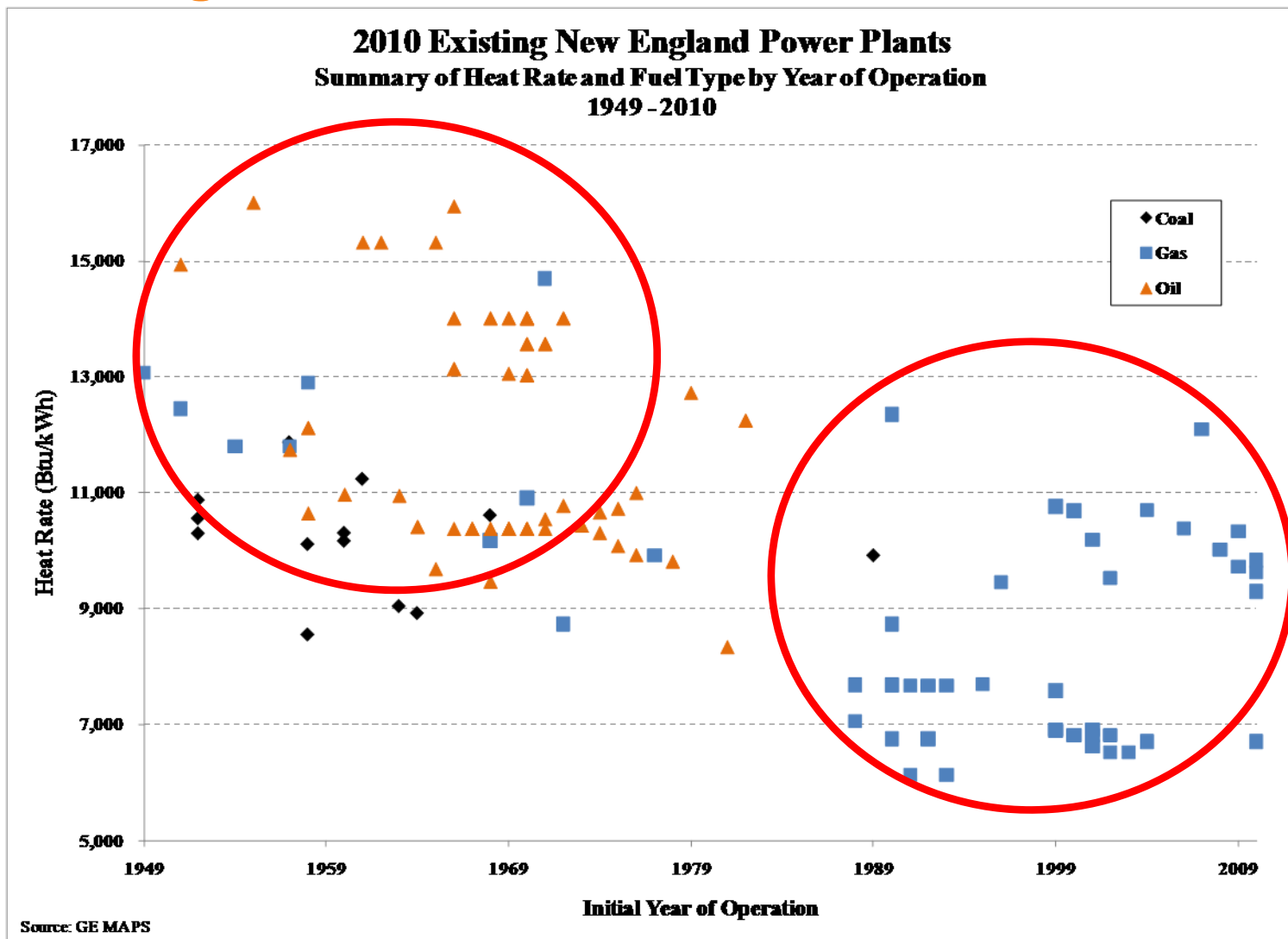
The electric industry is well-positioned to respond

Scheduling Outages:

- **NO_x, SO₂, mercury, acid gas control technologies are commercially available, have been widely deployed in past**
- **Existing under-utilized capacity at gas-fired combined cycle plants can facilitate the scheduling of outages**
- **RTOs can help coordinate outages and provide for sharing reserves**
- **In a worst-case scenario, if all else failed or unexpected circumstances arose:**
 - **EPA can grant time extensions to complete pollution control installations on a case-by-case basis**
 - **DOE can override compliance requirements in limited emergency circumstances**
 - **EPA and the President can extend deadlines for utility MACT rules where necessary for electric system reliability**
 - **RTOs and other system operators can implement emergency measures**

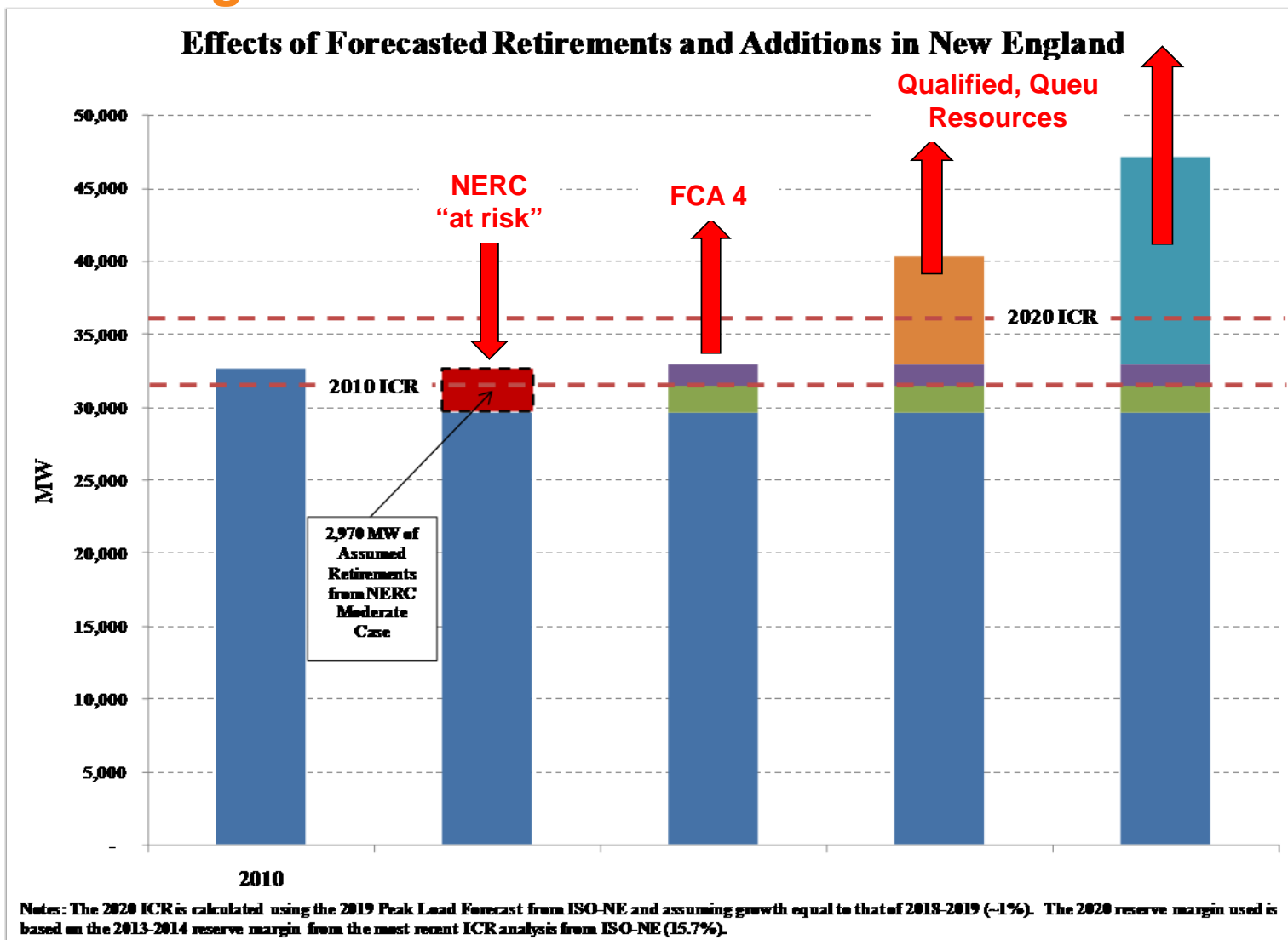
What about New England?

- A mix of lots of new gas-fired CC (good)
- ...and older oil, gas, and coal generation (not good)
- lots of MW above 11,000 heat rate, older than 40 years
- Lots of once-through cooling
- Challenging market conditions



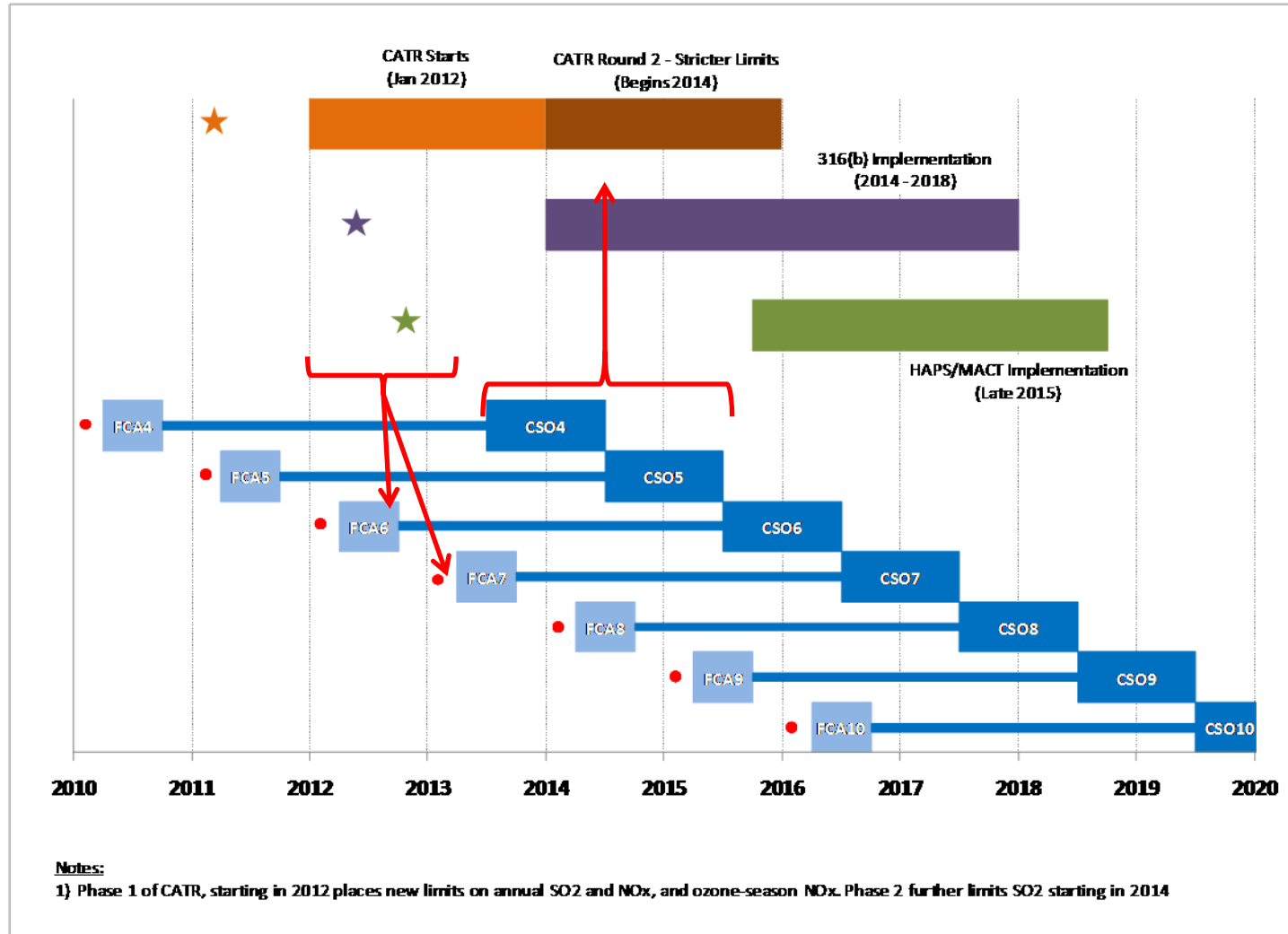
What about New England?

- Capacity in the Northeast could be affected
- We already have a CSO cushion
- Substantial additional market resources poised to respond
- Planning, market signals will be key



New England

- CSOs are already within compliance timeframes
- All final rules will be known by around the time of FCA 6, and...
- In time for delist proposals-FCA 7.
- The market will respond, but...
- ...local impacts will matter
- Now is the time to ensure proper planning review, market calibration



→ Review RSP, FCM, and Interconnection Queue analyses and structures with this in mind...

Wrap up

- **Timely action by EPA is justified by quantifiable public health and environmental benefits**
- **Reliability must not be compromised**
- **Significant fleet turnover across the Eastern Interconnect, over the next 7 years, is plausible**
 - **Oldest, least efficient generation at risk**
 - **New investment opportunities could be significant**
- **Industry is well poised to respond, and to manage the transition, with many market, planning, and operational tools**
- **New England is also well situated, but will be affected by air and water rules**
- ***Local impacts will matter*, and warrant up-front (i.e., now!) review of system impacts, management tools, planning assumptions, and market rules**
- **Challenging the rules will be neither necessary nor productive**
 - **Certainty is needed**
 - **Focus should be on managing the transition to achieve competitive and economically efficient result**

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