

# Upcoming Power Sector Environmental Regulations:

Framing the issues about potential reliability impacts

NPCC  
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## Overview

- **Potential power sector issues related to EPA rules**
- **Review of industry “tools” to address concerns**
- **Zeroing in: New England physical/market context as example**
- ***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
    - Air quality to improve across the Eastern US
  - **Power system reliability can not be compromised**
- **How should industry respond?**

## 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*

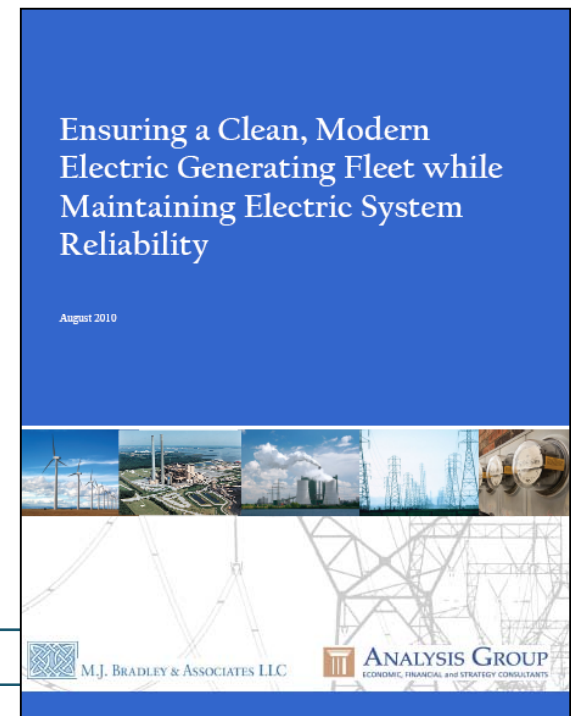
- Co-authors: with Sue Tierney of Analysis Group; and Michael J Bradley, Chris Van Atten, Amlan Saha, and Carrie Jenks MJB Associates;
- CEG participating companies are some of the nation's largest generators of electricity, with over 170,000 MW of electric generating capacity (including 110,000 MW of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

Calpine Corporation  
Entergy 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>



## Some key questions:

**What can we tell now – at a high level – 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 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 with respect to air rules

## 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
- **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 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.
  - *These are large amounts, even relative to NERC analysis including 316(b) water rule impacts (up to 78 GW)*

# All NERC reliability regions have excess capacity, totaling over 140 GW of excess capacity nationwide

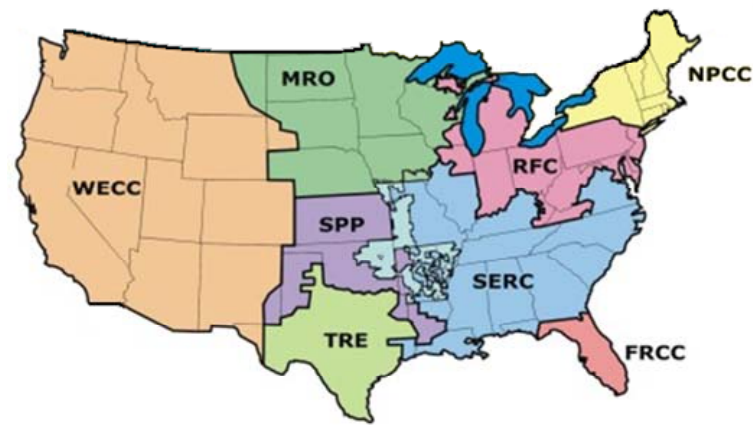
Estimated Reserve Margins in NERC Regions

NERC Electric Reliability Region	Projected Reserve Margin <sup>(1)</sup> in 2014	Cushion Above NERC Target Reserve Margin <sup>(2)</sup> In 2014
TRE	23.9%	12.5 GW
FRCC	28.6%	7.4 GW
MRO	22.1%	5.5 GW
NPCC	24.4%	9.5 GW
RFC	24.3%	34.7 GW
SERC	26.3%	30.5 GW
SPP	30.3%	12.3 GW
WECC	42.6%	33.2 GW
<b>Total</b>		<b>145.7 GW</b>

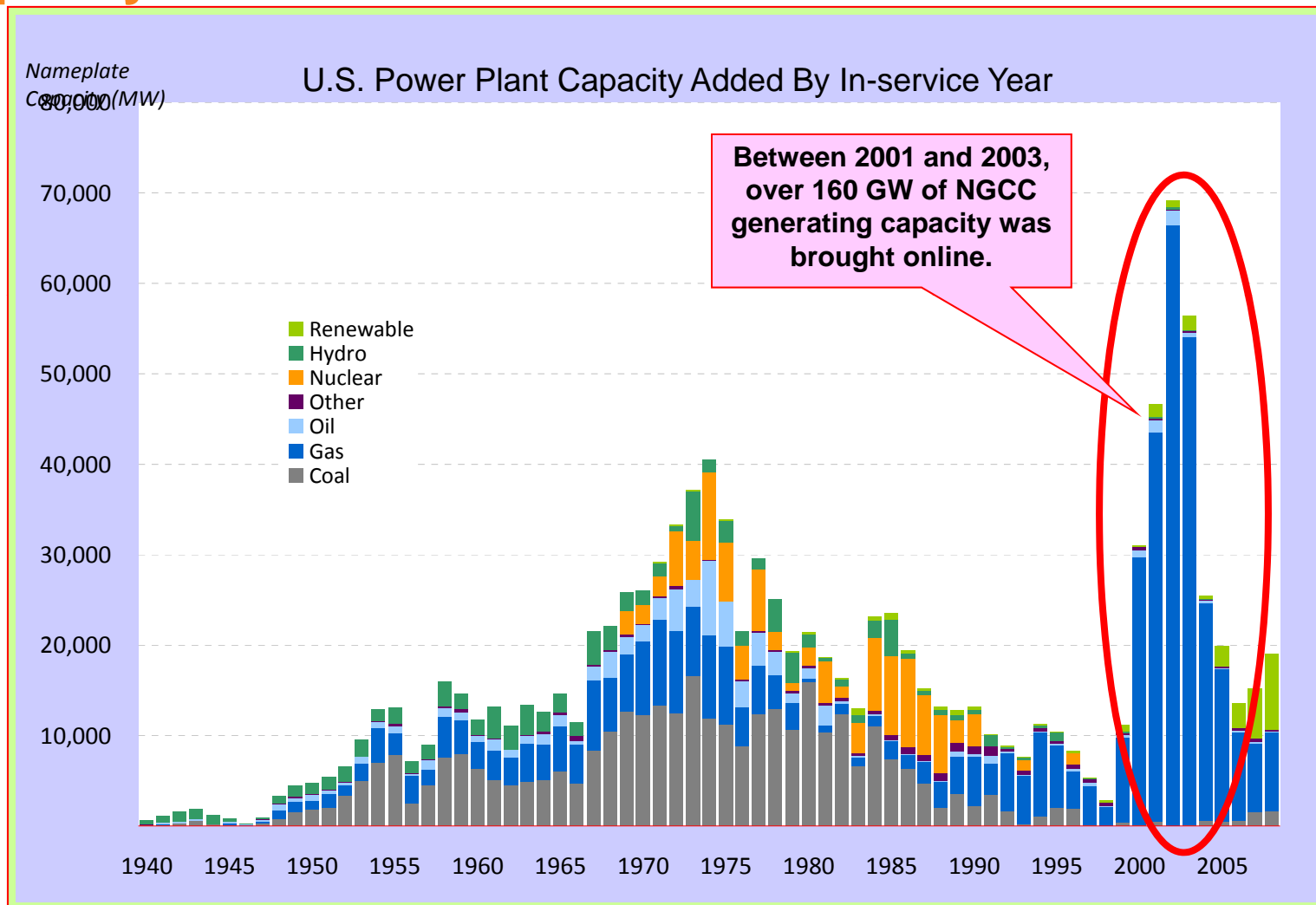
Compare to estimated 25-75 GW of retirement/derate capacity projected by analysts

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, 2010 Long-Term Reliability Assessment, October 2010.



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





## The electric industry is well-positioned to respond:

- At a high level, existing capacity and industry build history are strong
  - ...But diligent local review is warranted
- Many tools available to manage the two challenges:

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, appropriate ratemaking treatment
- All regions: ability to plan ahead and to manage transition; also, ability to address any apparent reliability issues in short term if necessary

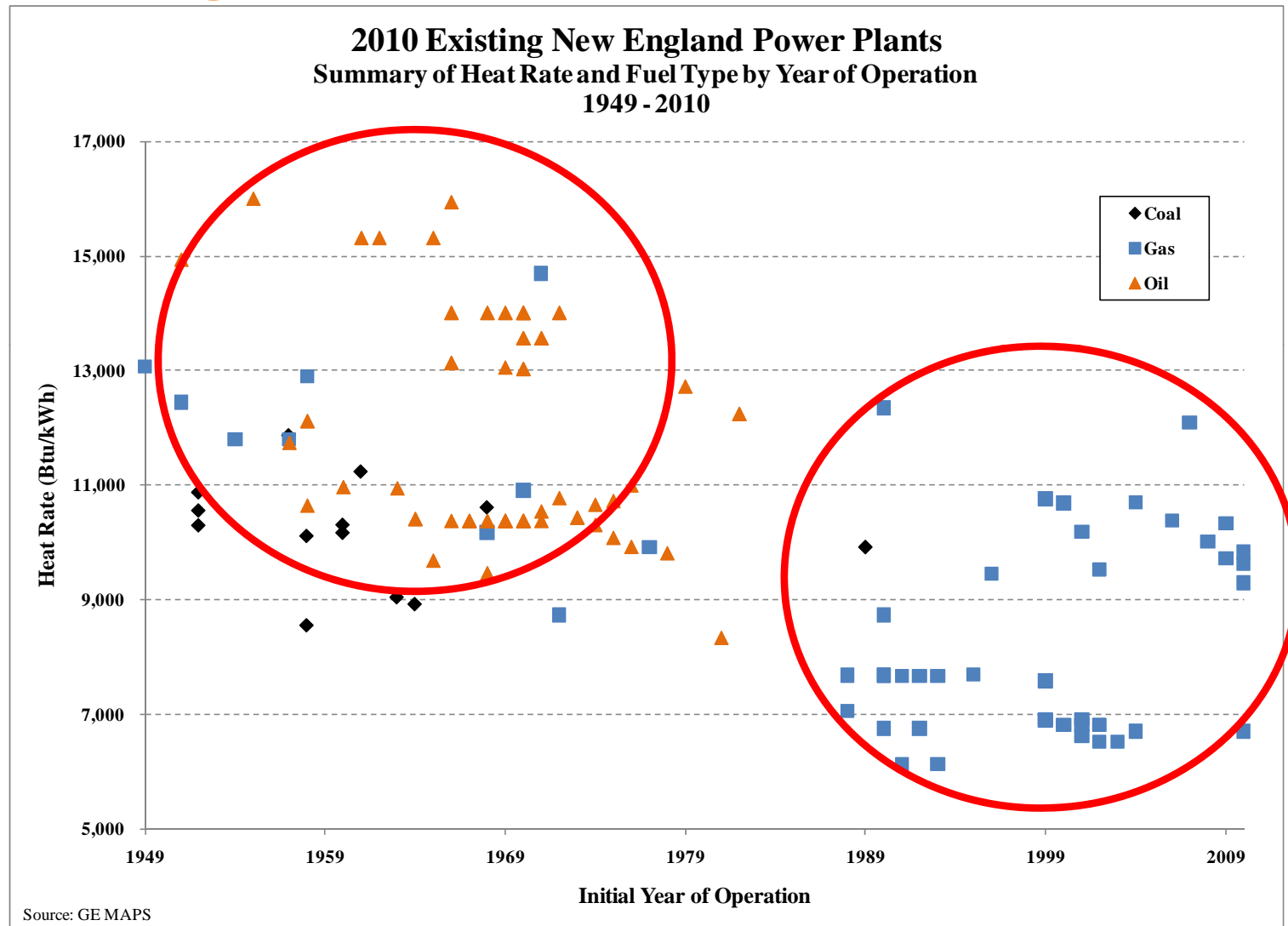
## The electric industry is well-positioned to respond

### Scheduling Outages:

- NO<sub>x</sub>, SO<sub>2</sub>, 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 – flexibility with respect to 316(b) implementation, and 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

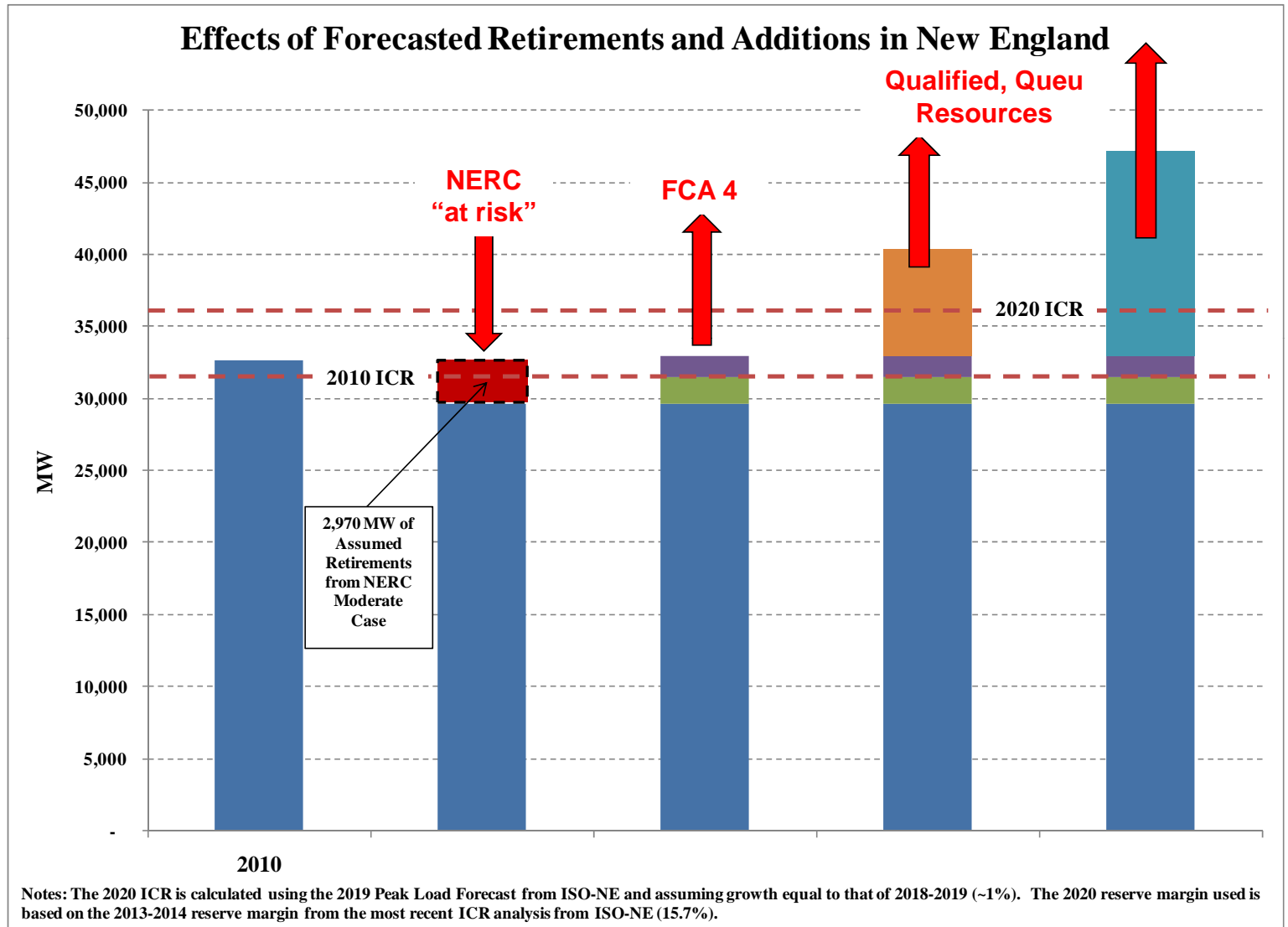
## Example: New England

- 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*



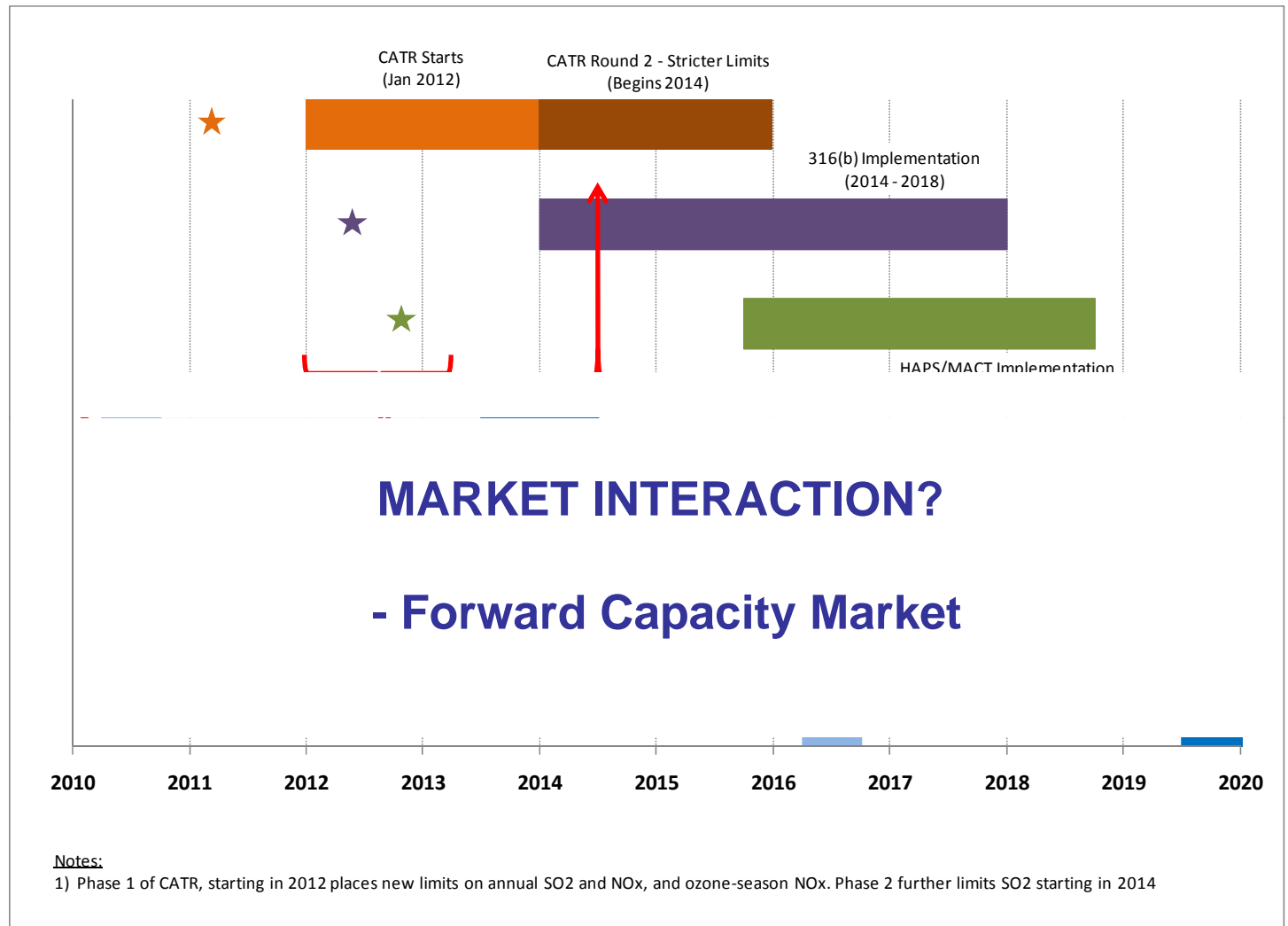
## Example: New England

- 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*



## Market Interface

- 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



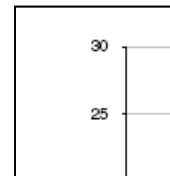
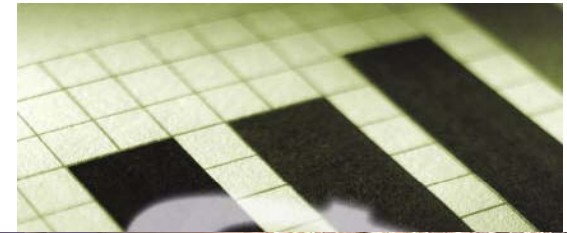
**→ Review RSP, FCM, and Interconnection Queue analyses and structures with this in mind...**

## 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 nation, NPCC 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 EPA rules will be neither necessary nor productive**
  - **Certainty is needed**
  - **Focus should be on managing the transition to achieve competitive and economically efficient result**

# Final Word: Don't Lose Sight of Benefits

- Health benefits – plus
- Modernizing the electric system
- Power Plant Efficiencies
- Transmission utilization
- Economic activity, jobs
- GHG emissions reductions
- Reliability





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