MAY 8, 2012 | N. FALMOUTH, MA

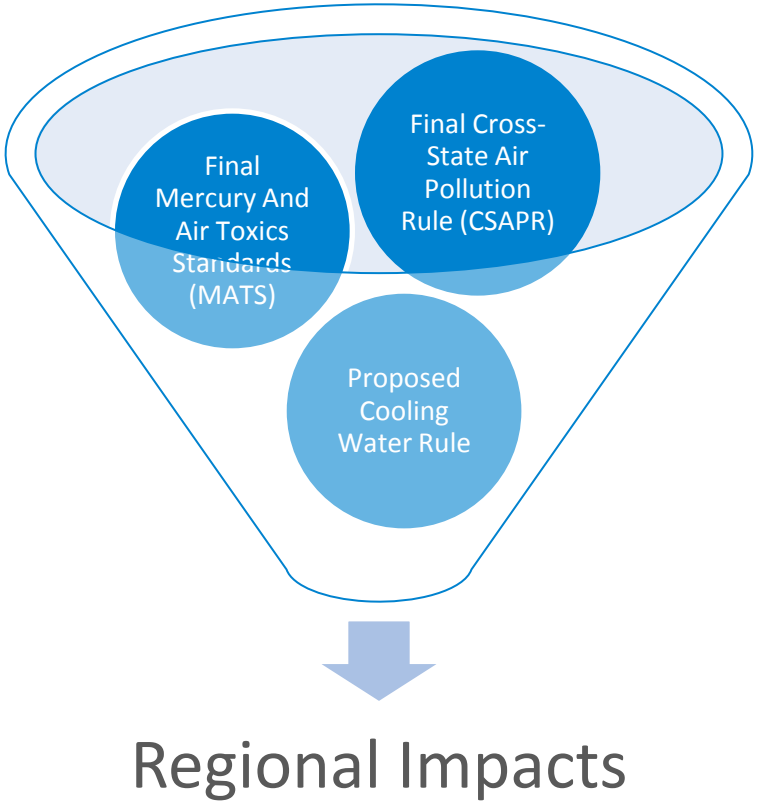
Northeast Energy and Commerce Association

19th Annual New England Energy Conference

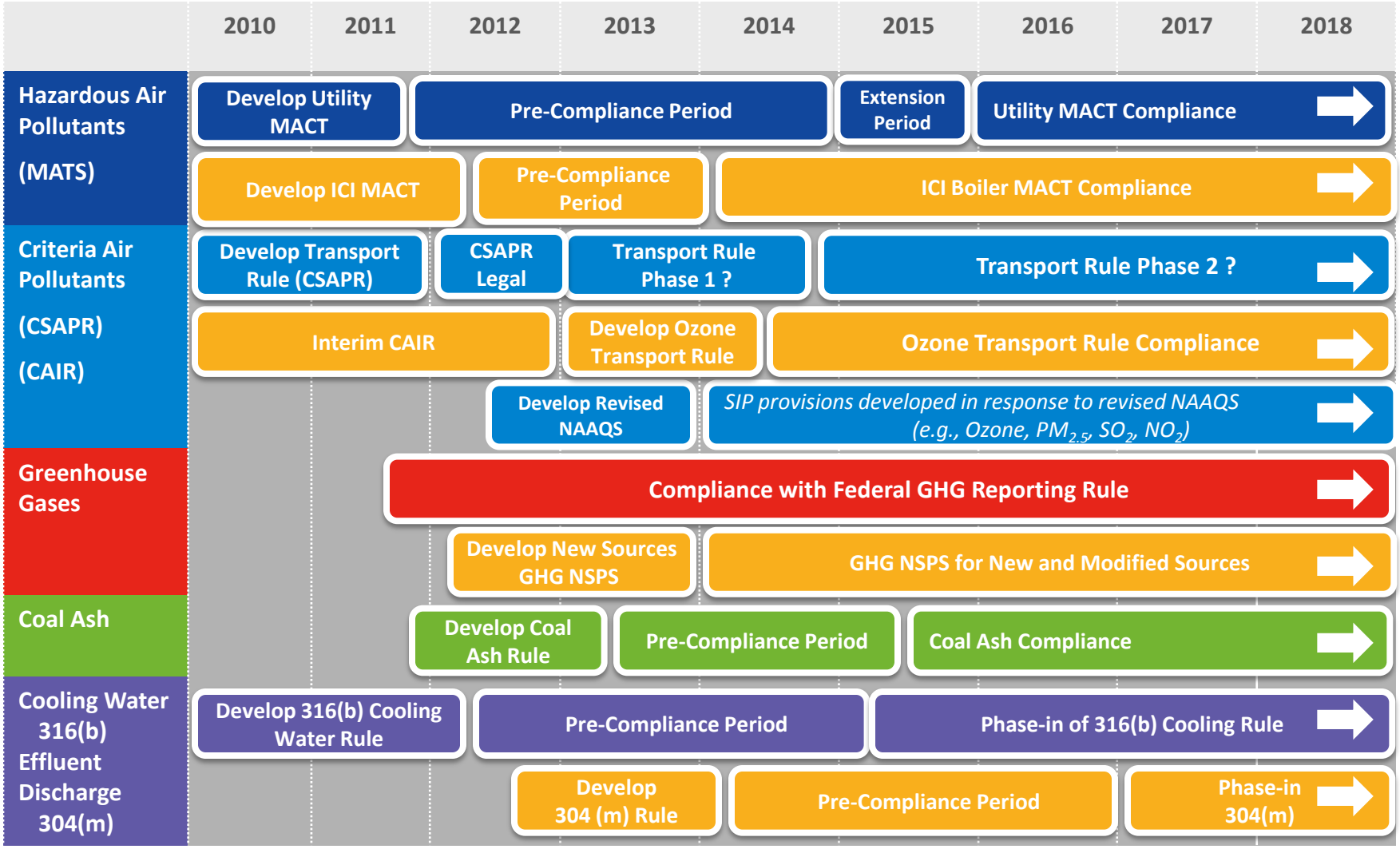
Patricio Silva

SENIOR ANALYST, SYSTEM PLANNING

MAJOR EPA RULEMAKINGS AFFECTING GENERATORS

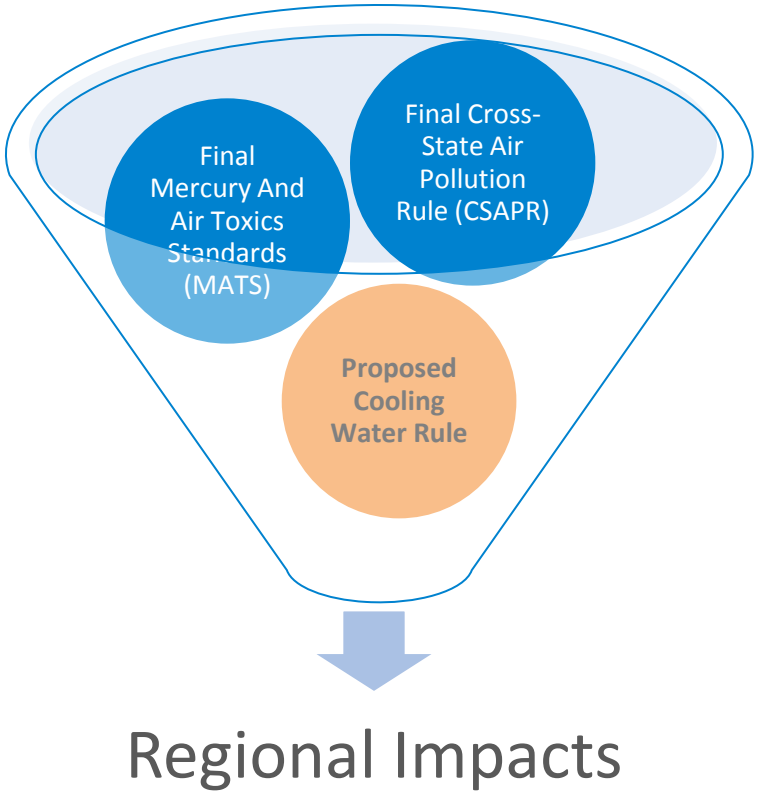


Major EPA Rulemakings Timeline



Sources: PJM; adapted from M. J. Bradley & Associates LLC

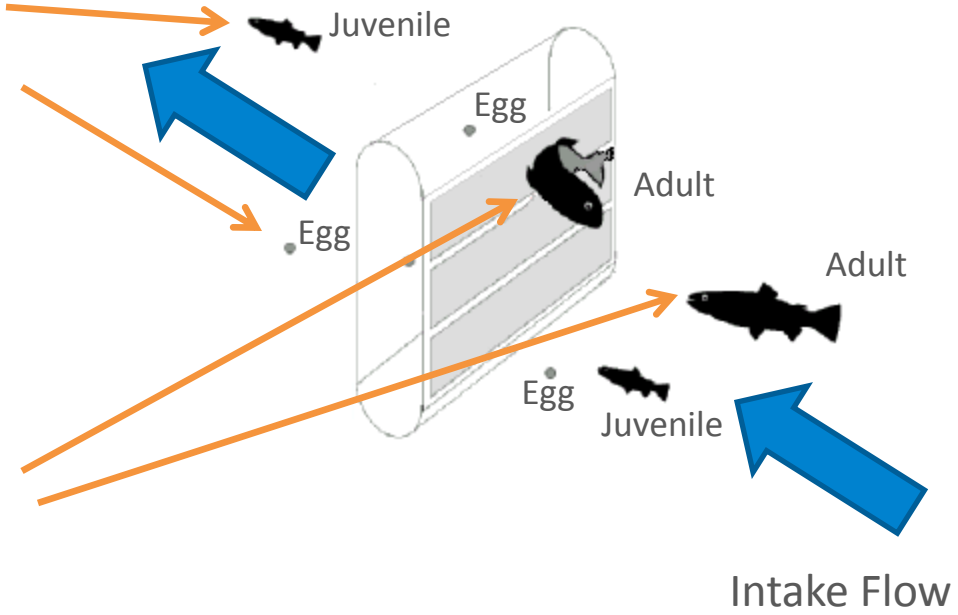
EPA PROPOSED COOLING WATER INTAKE STRUCTURE CWA § 316(B) RULE



Cooling Water Intake Structure (CWIS)

Impingement and entrainment impacts

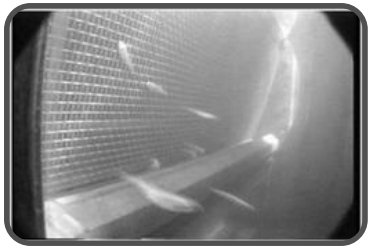
- Entrainment
  - Eggs, larvae, young juveniles, and smaller aquatic organisms are drawn into cooling systems and killed or injured by:
    - thermal
    - chemical, or
    - physical stresses
- Impingement
  - Larger aquatic organisms are pinned against screens or other structures and killed or injured



Source: EPA, 2011

Proposed Cooling Water § 316(b) Rule

Expected to be effective July 2012



Cooling water withdrawals remove billions of aquatic organisms from waters of the United States each year.

- Most impacts are to early life stages of fish and shellfish through impingement and entrainment

Existing electric generators and manufacturers with cooling water intake structures withdrawing at least 2 million gallons per day of cooling water subject to proposed § 316(b) rule.

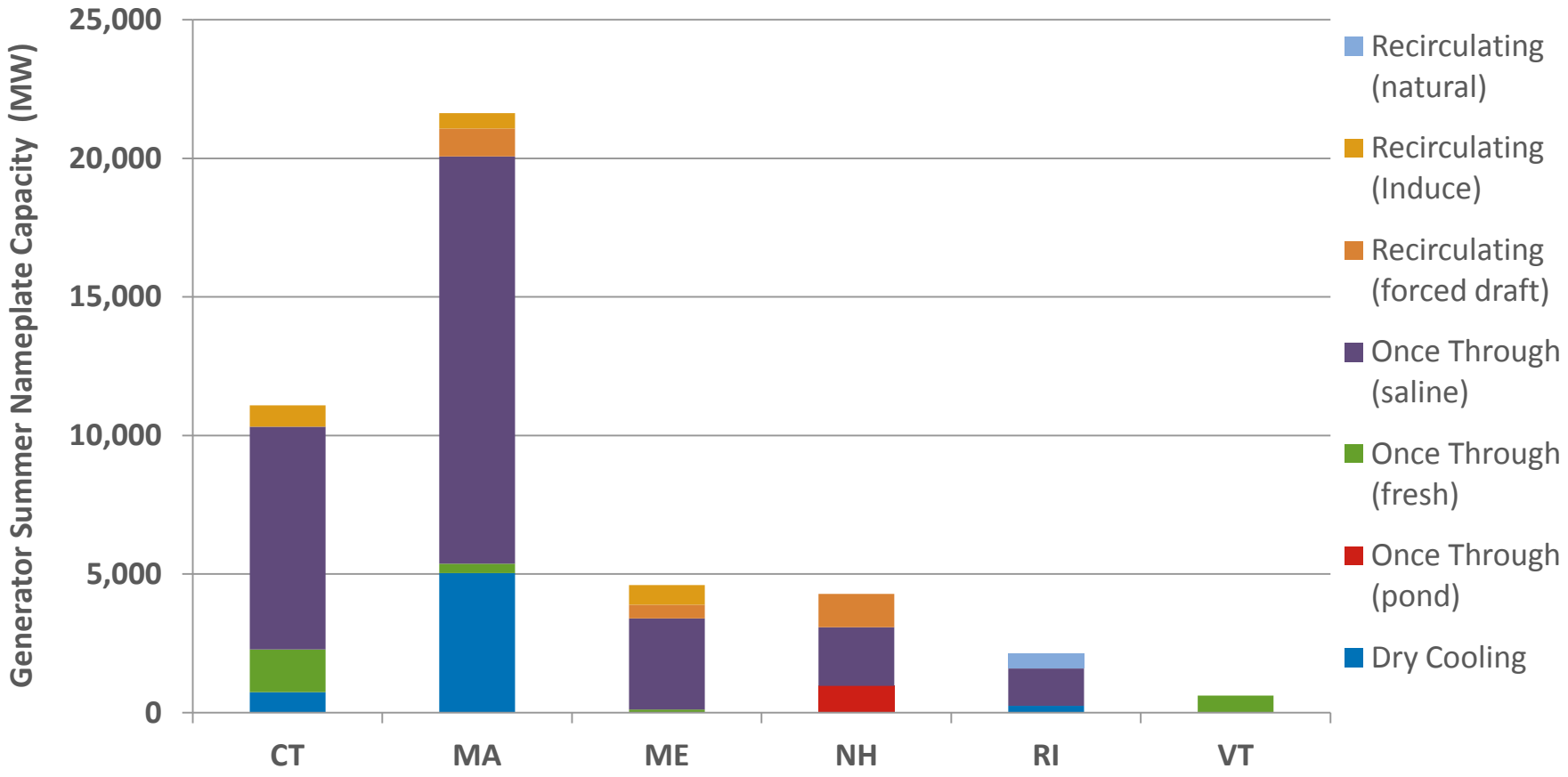
To minimize harmful impacts to the environment, CWIS location, design, construction and capacity must reflect best technology available (BTA) to minimize impingement and entrainment.

Expected Cooling Water § 316(b) Regional Impacts

- 12.1 GW expected to be subject to impingement mitigation requirements:
  - Either modifying CWIS or lowering intake velocity to 0.5 feet per second
  - Roughly 30 facilities in New England would be subject to this requirement
- 5.6 GW withdrawing > 125 million gallons per day likely subject to additional entrainment mitigation requirements:
  - Each facility will undergo a site specific assessment
  - Compliance requirements and costs may vary
- Closed-cycle cooling systems (natural draft and forced draft) are considered the most effective entrainment mitigation technologies available under proposed rule
  - Capital cost estimated to be $170 - $440 per gallon per minute (GPM)

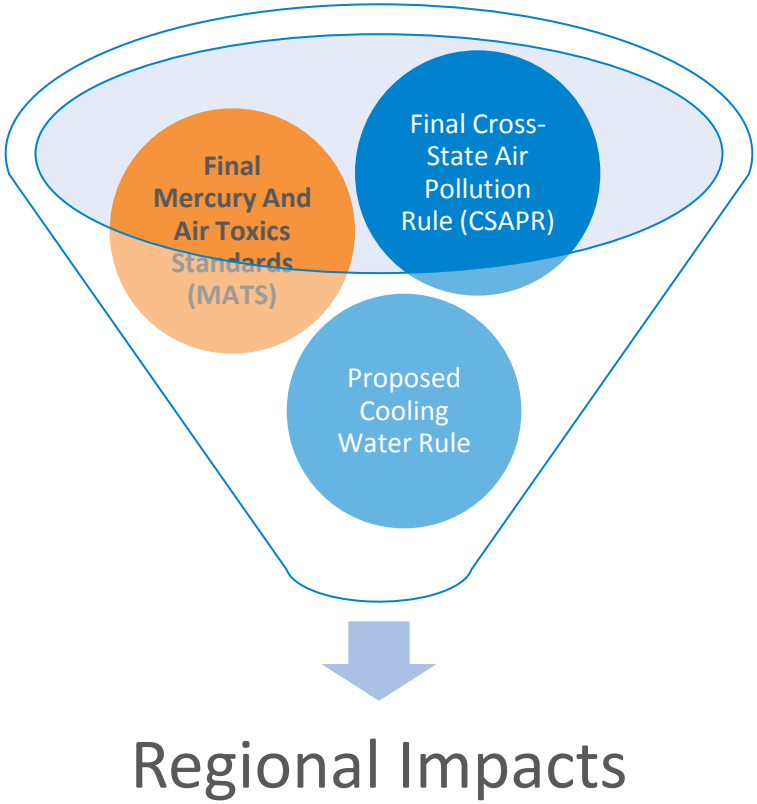
Installed Cooling Water Technology

At New England Power Plants (2010)



Sources: US Department of Energy; Energy Information Administration

EPA MERCURY AND AIR TOXICS STANDARDS (MATS)



MATS Impact in New England: < 1 GW Retirements

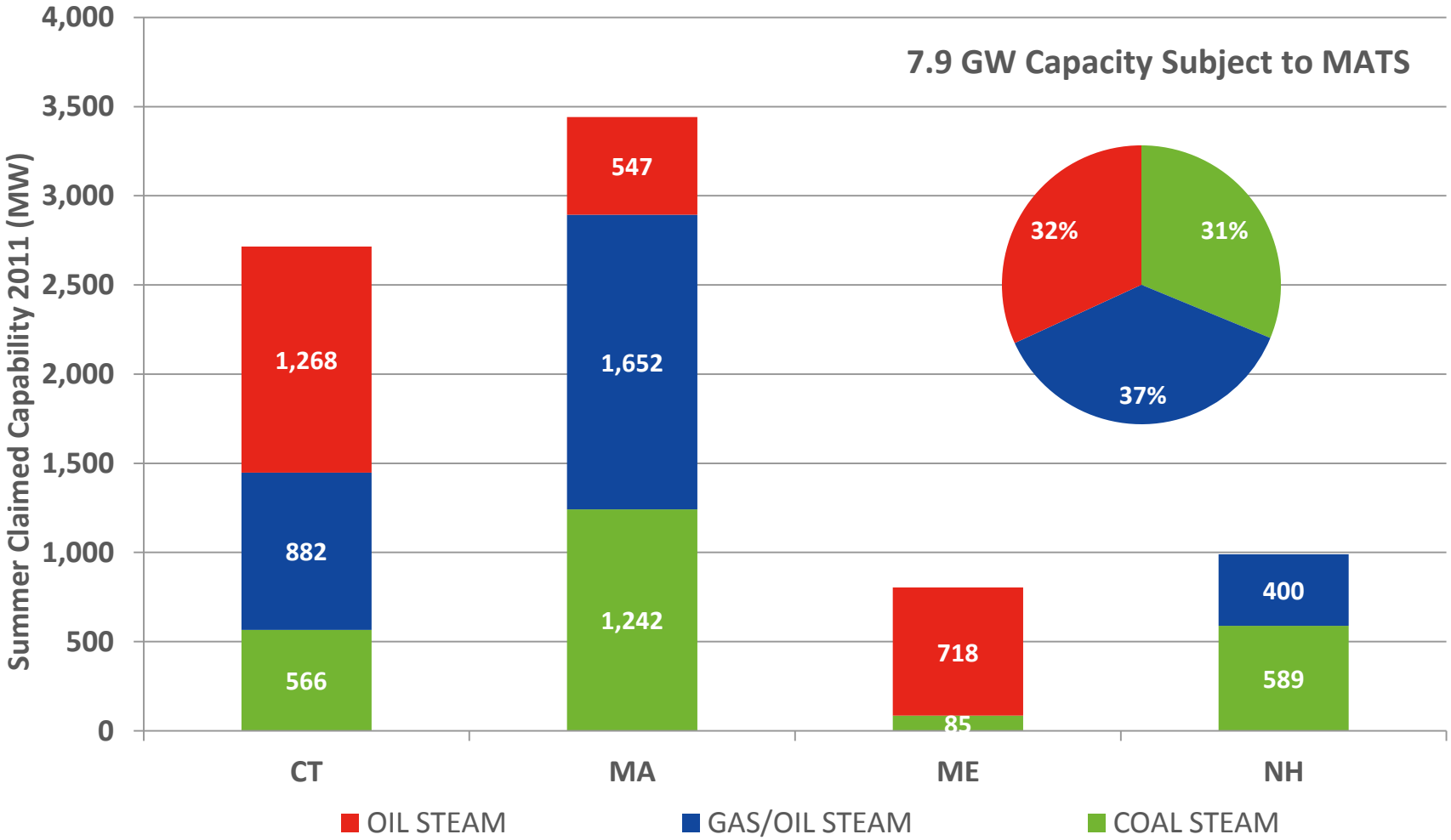
	Coal-Fired	Oil-Fired
Capacity	2,664 MW	5,920 MW
Average Age	47 years	47 years
Current Status	Majority of coal-fired capacity in region already achieving or near compliance with MATS (1,693 MW)	Existing oil-fired capacity lacks advanced pollution controls needed to meet applicable MATS limits
Technologies	Existing/planned air toxics controls include scrubbers and fabric filters	No existing/planned air toxics controls
Implications	•Smaller, partially controlled coal-fired generators (< 500 MW) considered at higher risk for environmental retirement •50 – 478 MW lack scrubbers, fabric filters •Excludes 490 MW in announced retirements	•Only compliance option for dual oil/gas generators (2,952 MW) appears to be fuel switching •MATS limited-use subcategory for oil- and oil/gas steam generators expected to not require retrofit of any controls

Final Mercury and Air Toxics Standards Overview

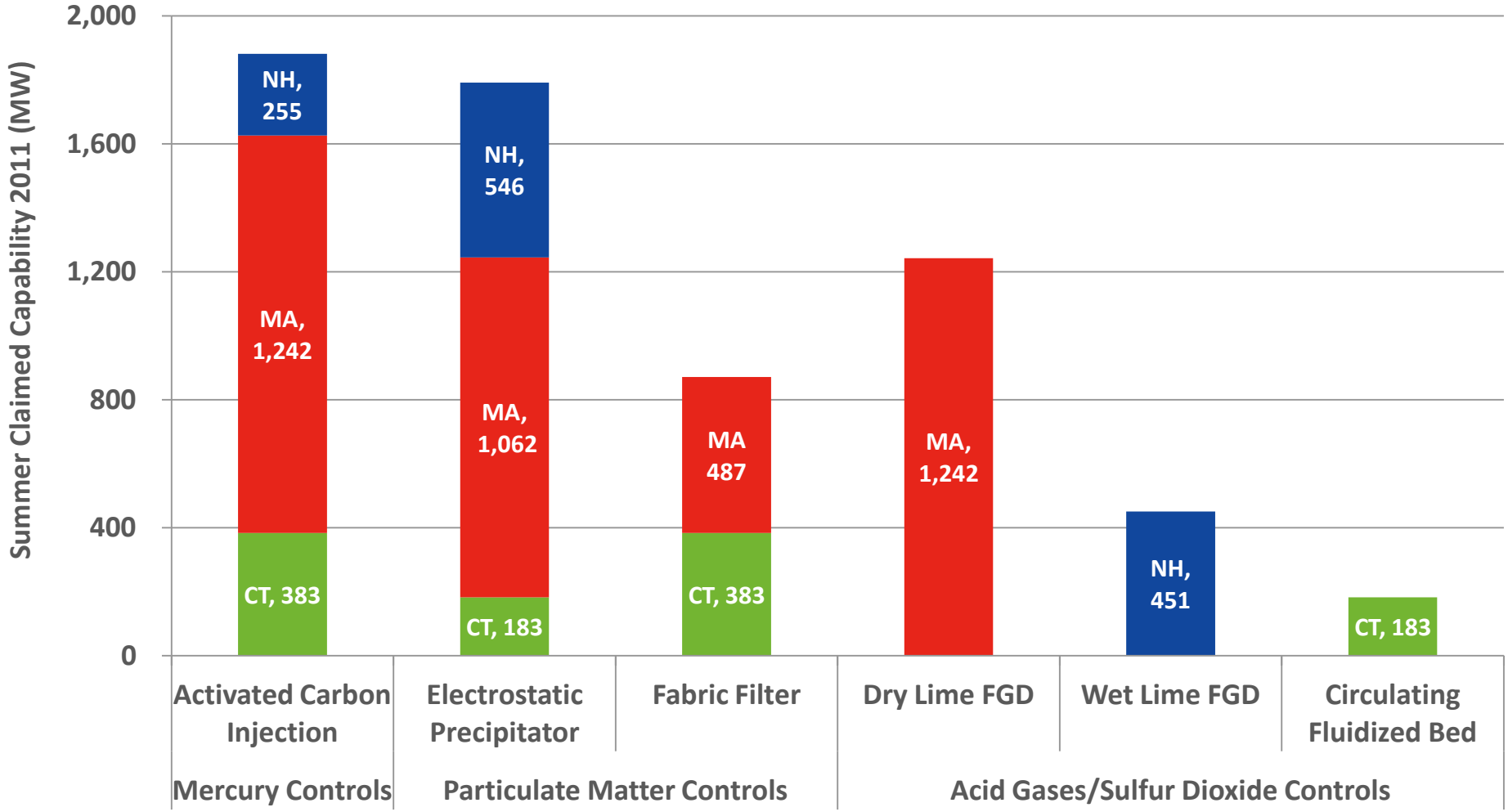
- Final MATS (December 16, 2011) requires new and existing coal- and oil-fired generators to reduce emissions.
  - Metals: mercury (Hg), arsenic, chromium, and nickel
  - Acid gases: hydrogen chloride and hydrogen fluoride
  - Particulate matter (filterable)
- Most standards require generators to meet specific emissions limits.
  - Averaging allowed between similar units at same facility for Hg limits
- MATS compliance schedule offers limited flexibility.
  - Majority of affected generators must be in compliance by April 2015
  - Additional time for retrofits or replacement available upon petition to permitting authority
  - Accompanying residential and EPA Enforcement Policy § 113 memoranda signal limited flexibility.

New England Generation Subject to MATS

Nearly 70% of affected capacity in region is residual oil-fired capacity with low annual capacity factors



Existing or Planned Control Technologies at MATS Affected Generators



MATS Compliance Timeline Pathways

Uncertain whether generators will seek additional time in the region

3+ Years

Existing sources generally have up to four years to comply by retrofitting or retiring units:

- All sources have at least three years to prepare (April 2015)
- Additional year for adding controls upon request and approval (April 2016)

4 Years

Fourth year available for operating a reliability critical unit until:

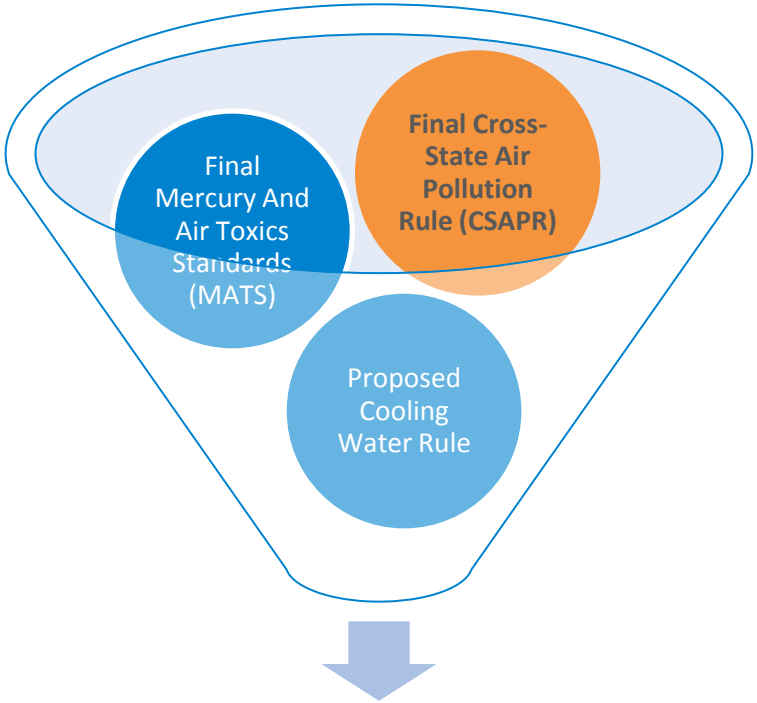
- Adding controls at another unit (April 2016)
- Construction of on-site or off-site replacement power (April 2016)
- Transmission upgrades can be completed (April 2016)

5+ Years (?)

A reliability critical unit can negotiate with EPA to obtain additional time to achieve compliance:

- Prolonged or extended outage coordination of multiple retrofits may require additional time
- EPA MATS enforcement policy offers uncertain flexibility to operators

CROSS-STATE AIR POLLUTION RULE

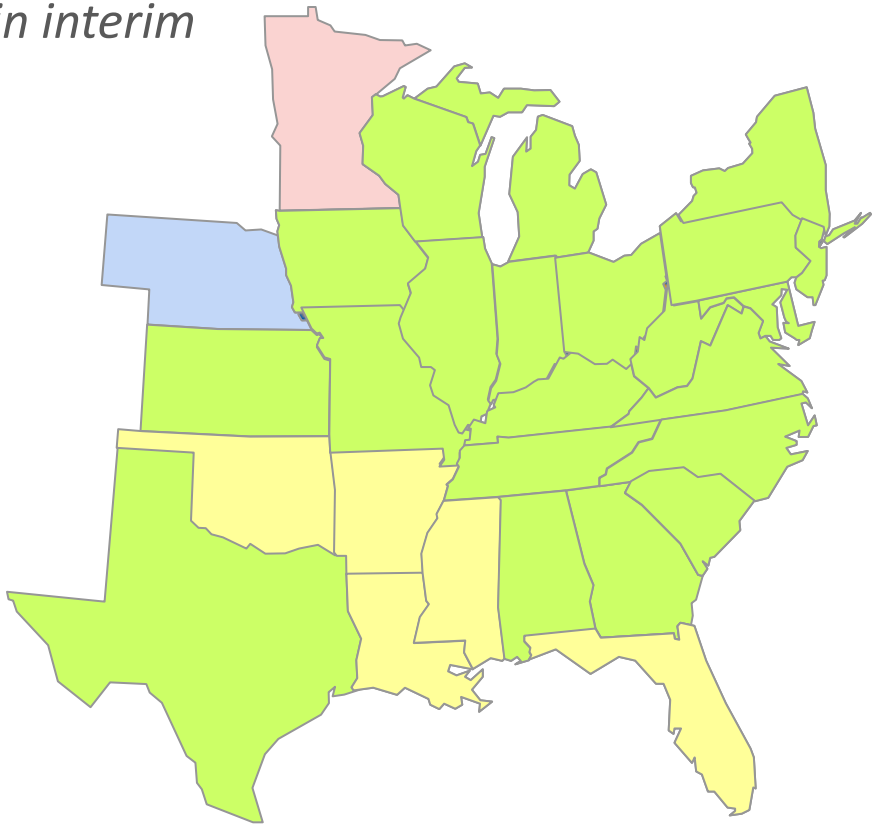


Regional Impacts ?

Cross-State Air Pollution Rule (CSAPR)

January 1, 2012, effective date stayed; EPA directed by court to continue implementing Clean Air Interstate Rule in interim

- CSAPR intended to limit upwind sulfur dioxide (SO_2) and nitrogen oxides (NO_X) from fossil fired generators impairing air quality
- Adopts cap-and-trade programs limiting SO_2 and NO_X emissions
- Affects generators in 28 states
- No affected generators within New England
- ISO evaluating impact on future interregional power-transfer trends



States controlled for ozone only (ozone season NO_x)

States controlled for fine particles only (annual SO_2 and NO_x)

States controlled for both fine particles (annual SO_2 and NO_x) and ozone (ozone season NO_x)

Questions