

EPA's Clean Air Rules: *An Update*

Presentation for
DOE/NETL's 2007 Mercury Control Technology Conference
Pittsburgh, Pennsylvania

U.S. Environmental Protection Agency
Office of Air and Radiation

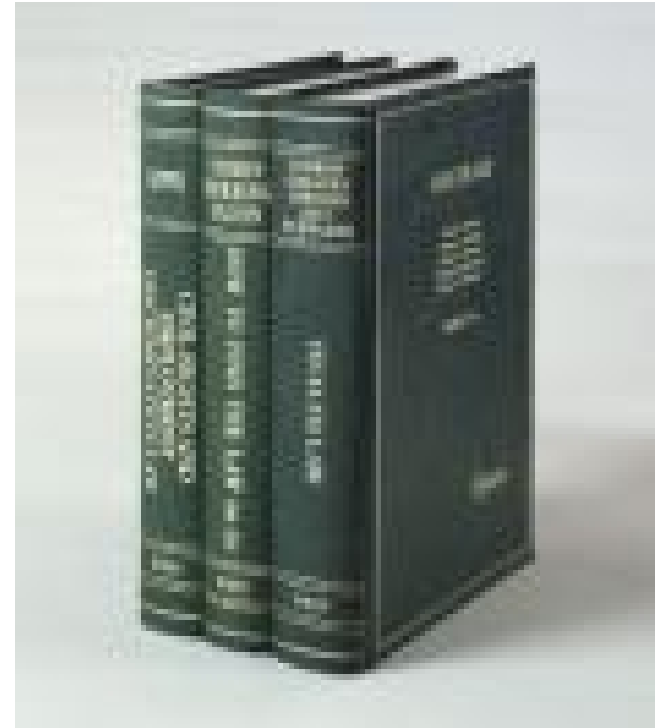
December 11, 2007



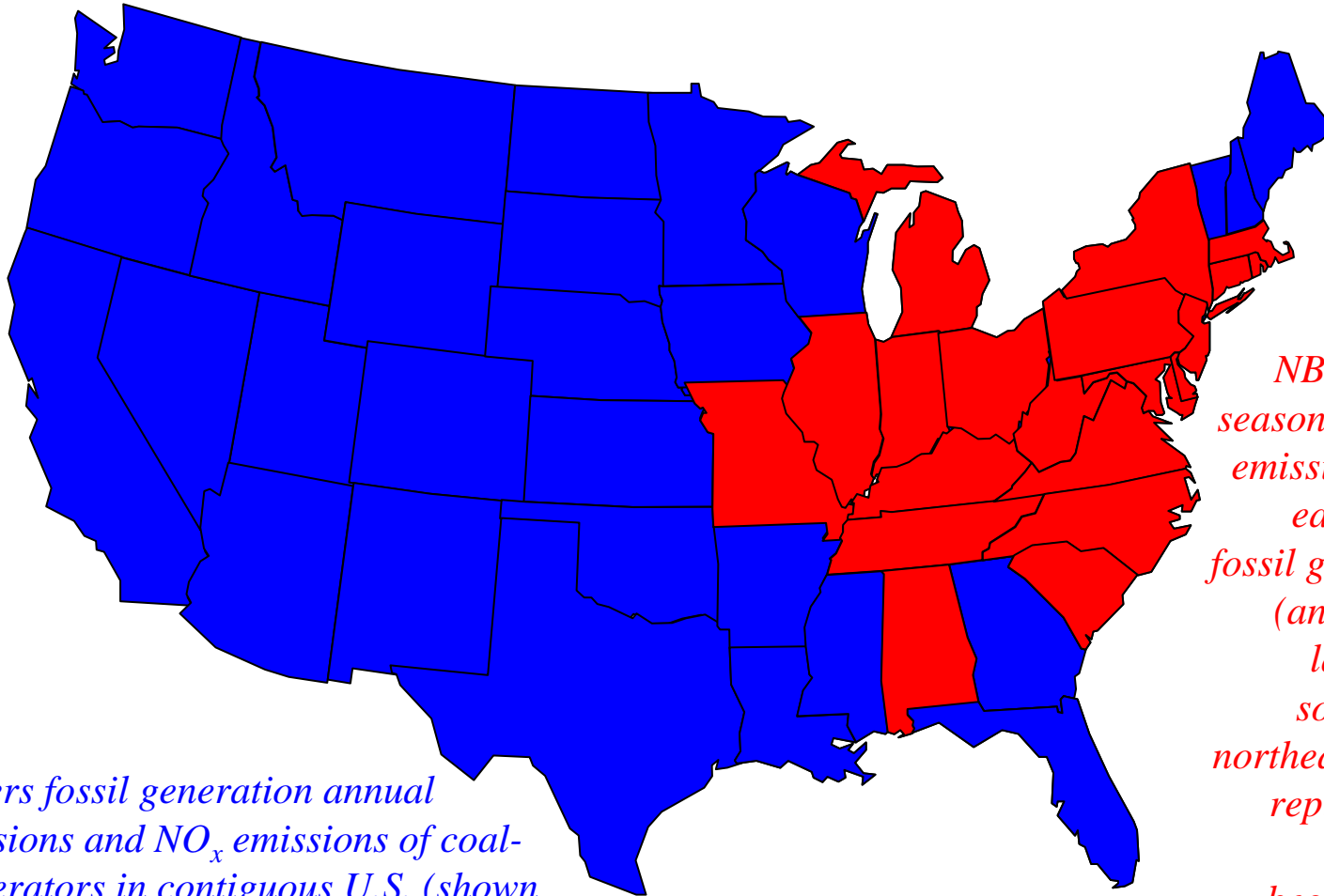
Overview

Already on-the-books:

- **Acid Rain Program (ARP)**
- **NO_x Budget Trading Program (NBP)**
- **Clean Air Rules:**
 - **Interstate Rule (CAIR)**
 - **Mercury Rule (CAMR)**
 - **Visibility Rule (CAVR)**
- **New Source Review (NSR)**
- **Potentially on-the-way:**
 - **Carbon Management Strategies**
 - **Injection Controls for Carbon Sequestration**
 - **Additional NSPS work**



Coverage of ARP and NBP



NBP covers ozone season (summer) NO_x emissions in selected eastern states for fossil generation units (and several other large stationary sources). Earlier northeastern program replaced by larger eastern region beginning in 2004.

ARP covers fossil generation annual SO_2 emissions and NO_x emissions of coal-fired generators in contiguous U.S. (shown in blue and red). Largest SO_2 and NO_x emitters faced control in 1995 and 1996, respectively, all others joined the program in 2000.

EPA's Clean Air Rules

- **Clean Air Interstate Rule (CAIR)**

- Finalized March 10, 2005
- Designed to dramatically reduce regional air pollution; specifically, NO_x (60%) and SO₂ (70%) emissions

- **Clean Air Mercury Rule (CAMR)**

- Finalized March 15, 2005
 - Permanently caps and reduces mercury emissions from coal-fired power plants
 - Phase 1 – 38 tons; Phase 2 – 15 tons; overall 70% reduction in Hg emissions

- **Clean Air Visibility Rule (CAVR)**

- Finalized June 15, 2005
 - Finalized amendments to the 1999 Regional Haze Rule, which apply to the provisions requiring best available retrofit technology (BART) for 26 industrial categories

EPA's Clean Air Rules - Timeline

CAIR

Phase I: CAIR NO_x Programs
(ozone-season and annual)

Early Reductions for CAIR NO_x ozone-season program and CAIR SO₂ program begin immediately because NO_x SIP Call and title IV allowances can be banked into CAIR

CSP Early Emission Reduction Period
(annual CAIR NO_x program)
('07 and '08)

States develop SIPs
(18 months)

SIPs Due
(Sep '06)

NO_x Monitoring and Reporting Required ('08)

SO₂ Monitoring and Reporting Required ('09)

Phase I: CAIR SO₂ Program
('10)

Phase II: CAIR NO_x and SO₂ Programs Begin
('15)

Hg Monitoring and Reporting Required
('09)

Phase I: Hg Program
('10)

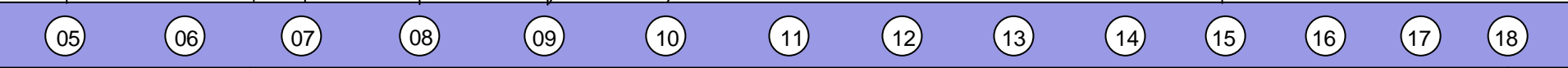
Phase II: Hg Program
('18)

CAMR Rule signed

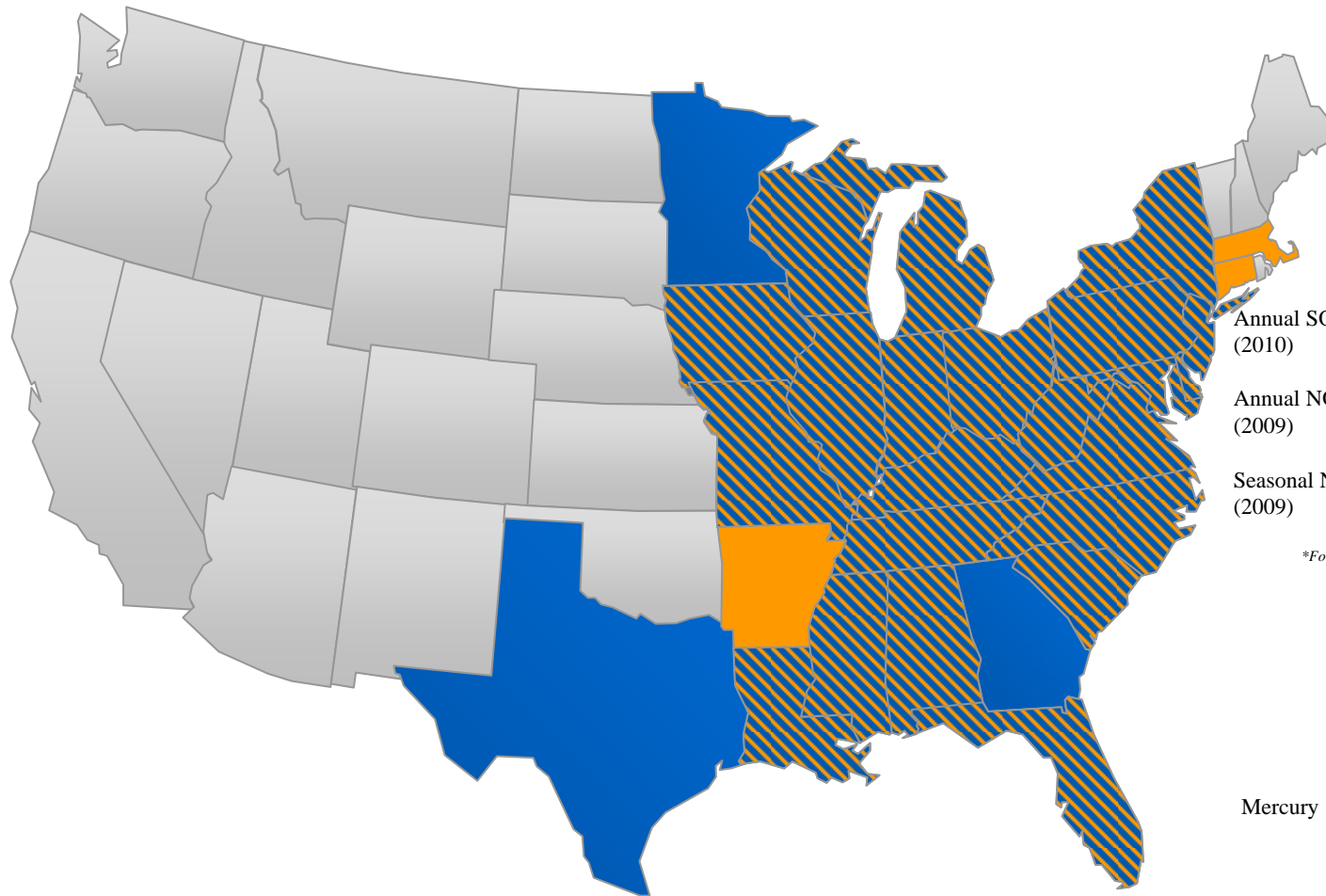
SPs Due
(Nov '06)

States develop SPs
(18 months)

CAMR



CAIR, CAMR and CAVR – Overall Picture



- States not covered by CAIR
- States controlled for fine particles (annual SO₂ and NO_x)
- States controlled for both fine particles (annual SO₂ and NO_x) and ozone (ozone season NO_x)
- States controlled for ozone (ozone season NO_x)

CAIR Emission Caps* (million tons)

	<u>2009/2010</u>	<u>2015</u>
Annual SO ₂ (2010)	3.7	2.6
Annual NO _x (2009)	1.5	1.3
Seasonal NO _x (2009)	.58	.48

*For the affected region.

CAMR Emissions Caps (tons)

	<u>2010</u>	<u>2018</u>
Mercury	38	15

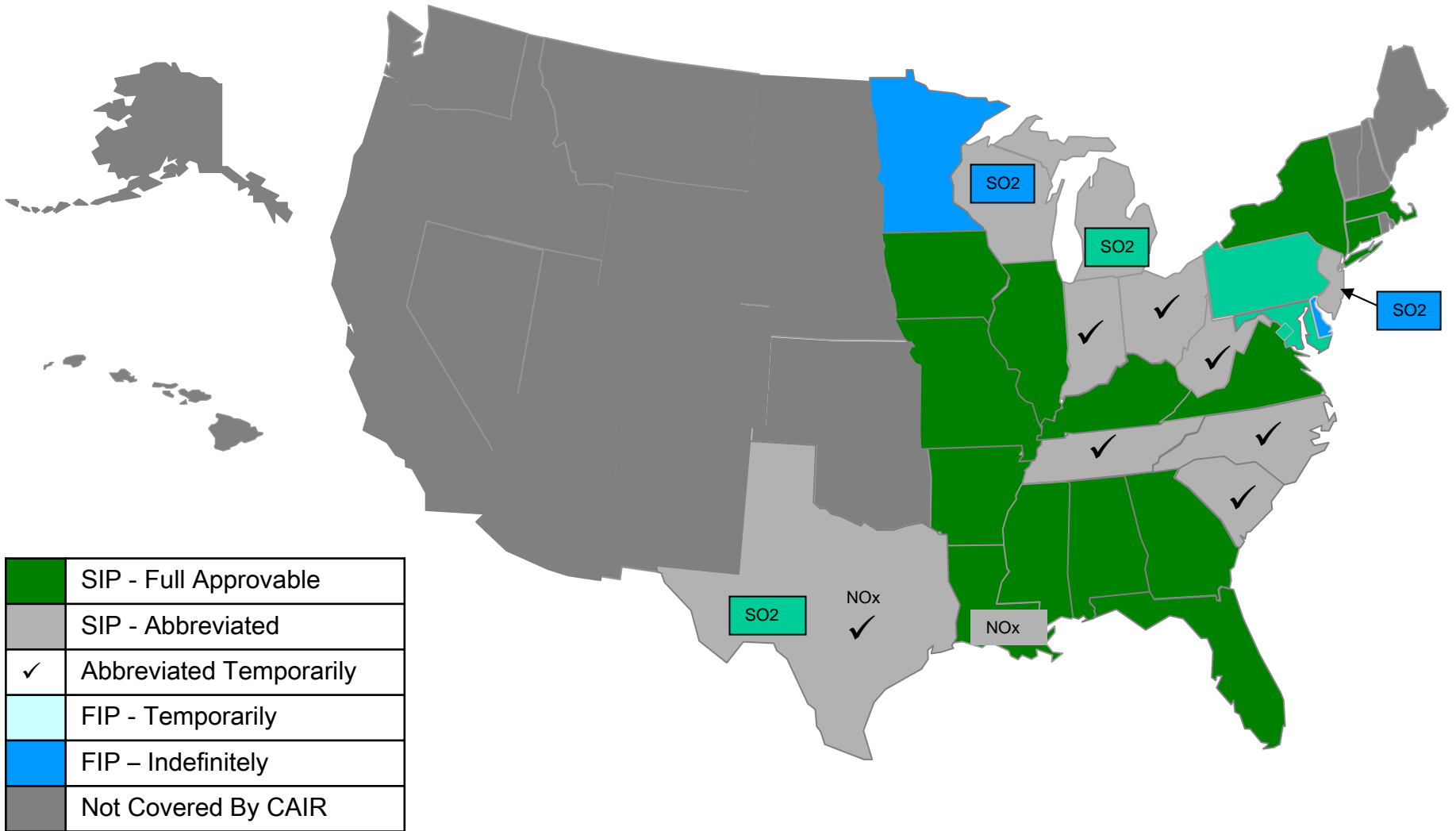
CAVR

Outside of CAIR Region – BART

Status of State Submissions

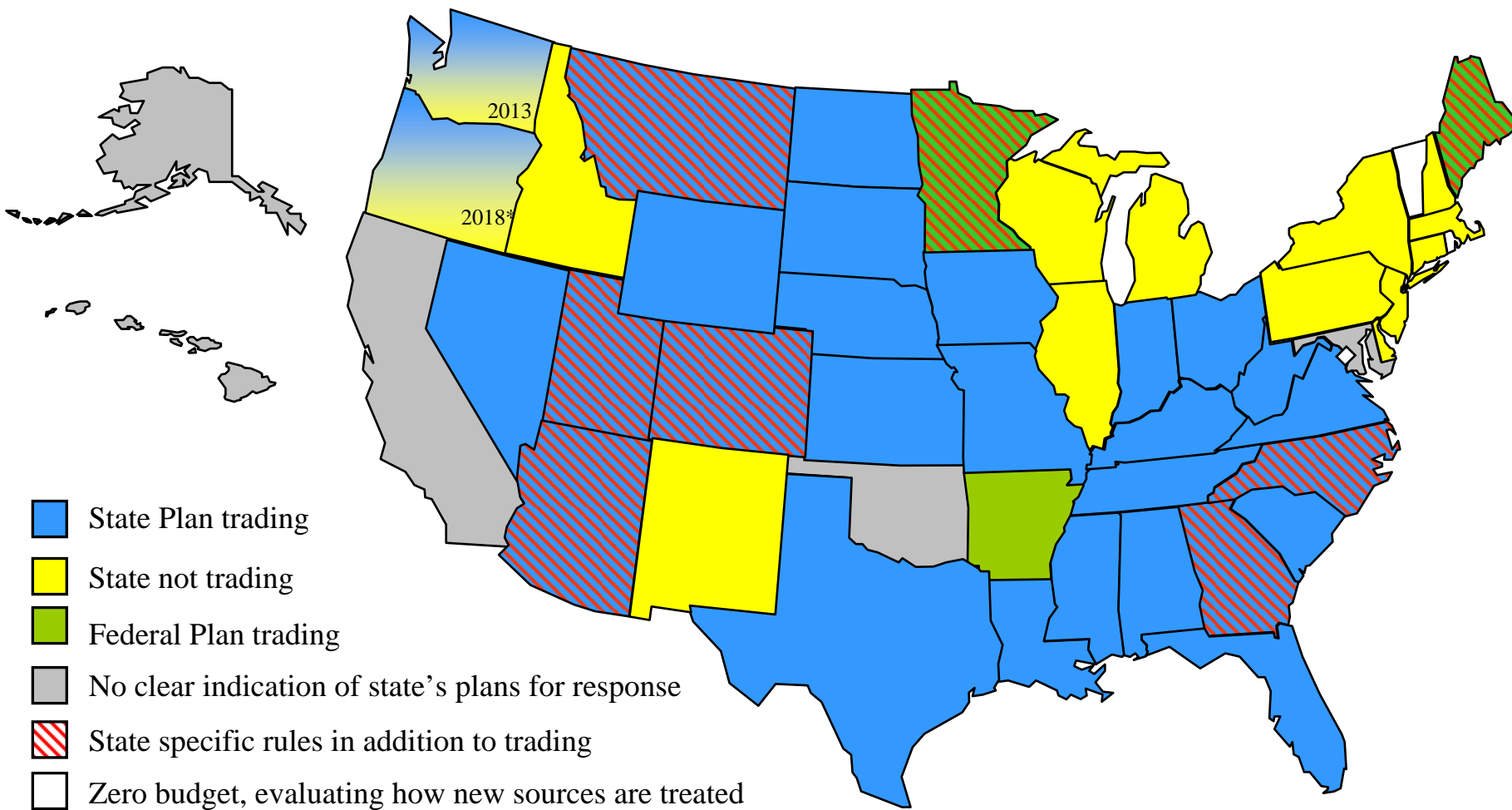
- State Plans submitted by deadline*
 - **CAIR (Sept 2006):** AL, IA, LA(SO₂), NC, TN, TX, WV
 - **CAMR (Nov 2006):** AL, AZ, CT, DE, IA, ID, IL, LA, MA, MT, ND, NH, NJ, NV, NY, PA, RI, SD, TX, VT, WV
- * Plans vary in readiness for approval
- Proposed approval of AL, FL, GA, IA, LA, MA, MS, & NJ, TX (NO_x) CAIR
- Published final notice for IA CAIR
- Proposed approval of LA CAMR

CAIR SIP Submissions



Map represents best available information as of November 2007.

CAMR: State Plan Submittal Status



Map represents best available information as of October 2007.

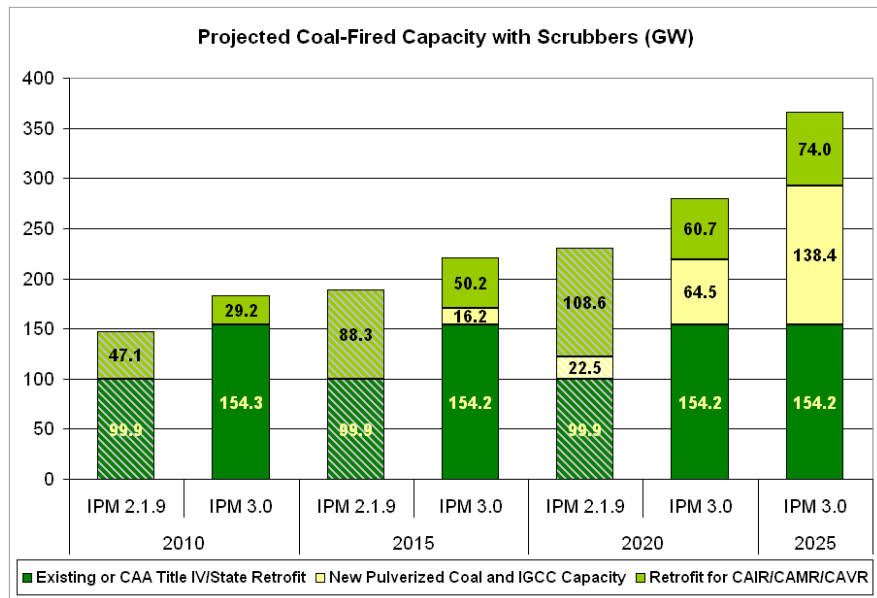
Major Accomplishments

- Implementation Outreach
 - Training for States
 - Training for sources
 - Coordination with all 10 EPA Regions
- Major effort to review all State rules in draft and proposal
 - 131 State rules to shepherd (plus drafts and proposals)
- CAIR FIP in effect June 2006
- All States want NO_x and SO₂ trading under CAIR
- States are proceeding along three paths for CAMR
 - Trading programs
 - Expect enough CAMR trading States for viable market
 - Direct controls
 - Hybrid approaches
- Controls and monitoring installations are in progress and nearing completion at facilities

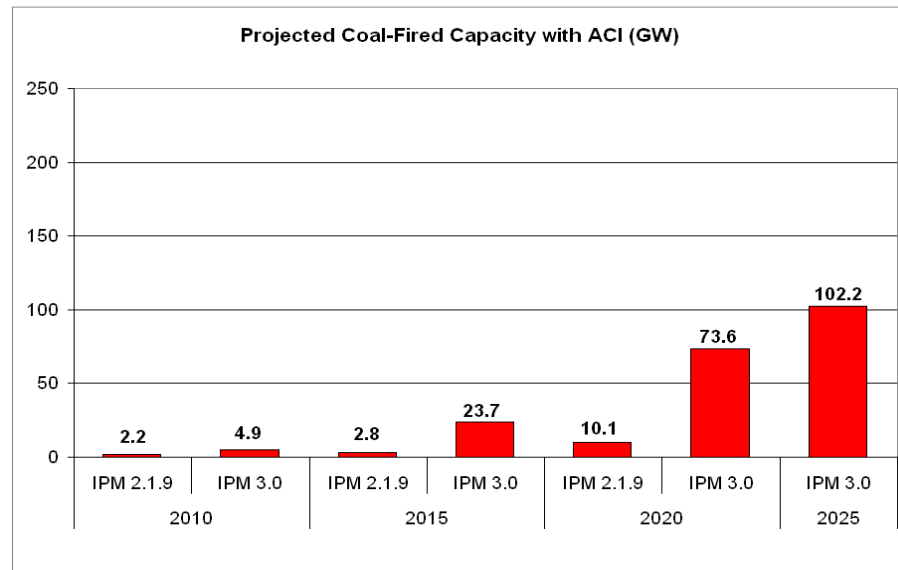
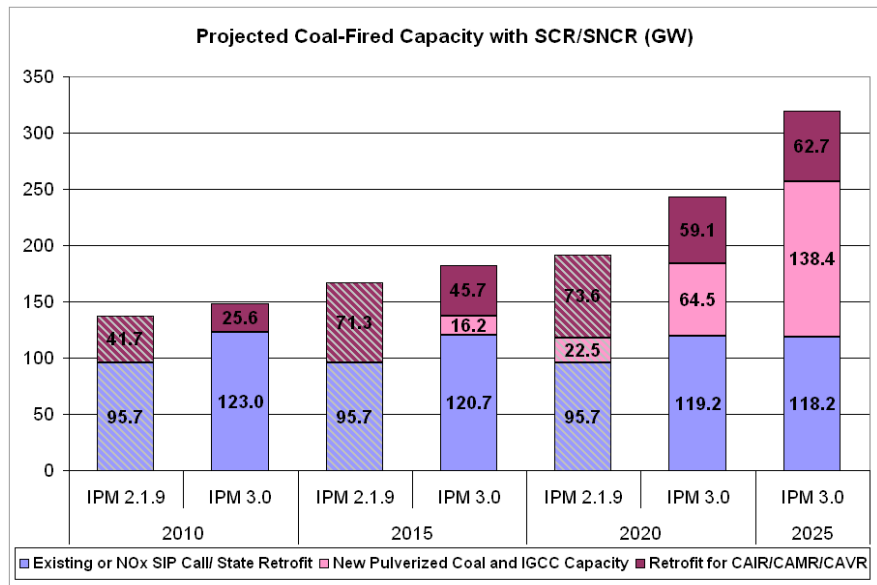
IPM Improvements

- During Fall 2006, EPA completed an update to the Integrated Planning Model (IPM)
- Key changes included:
 - Fuel supply curves
 - Stakeholder comments on unit data
 - Regulatory update
 - General modeling update
- Update results in some differences in emission projections from the past

Advanced Pollution Controls

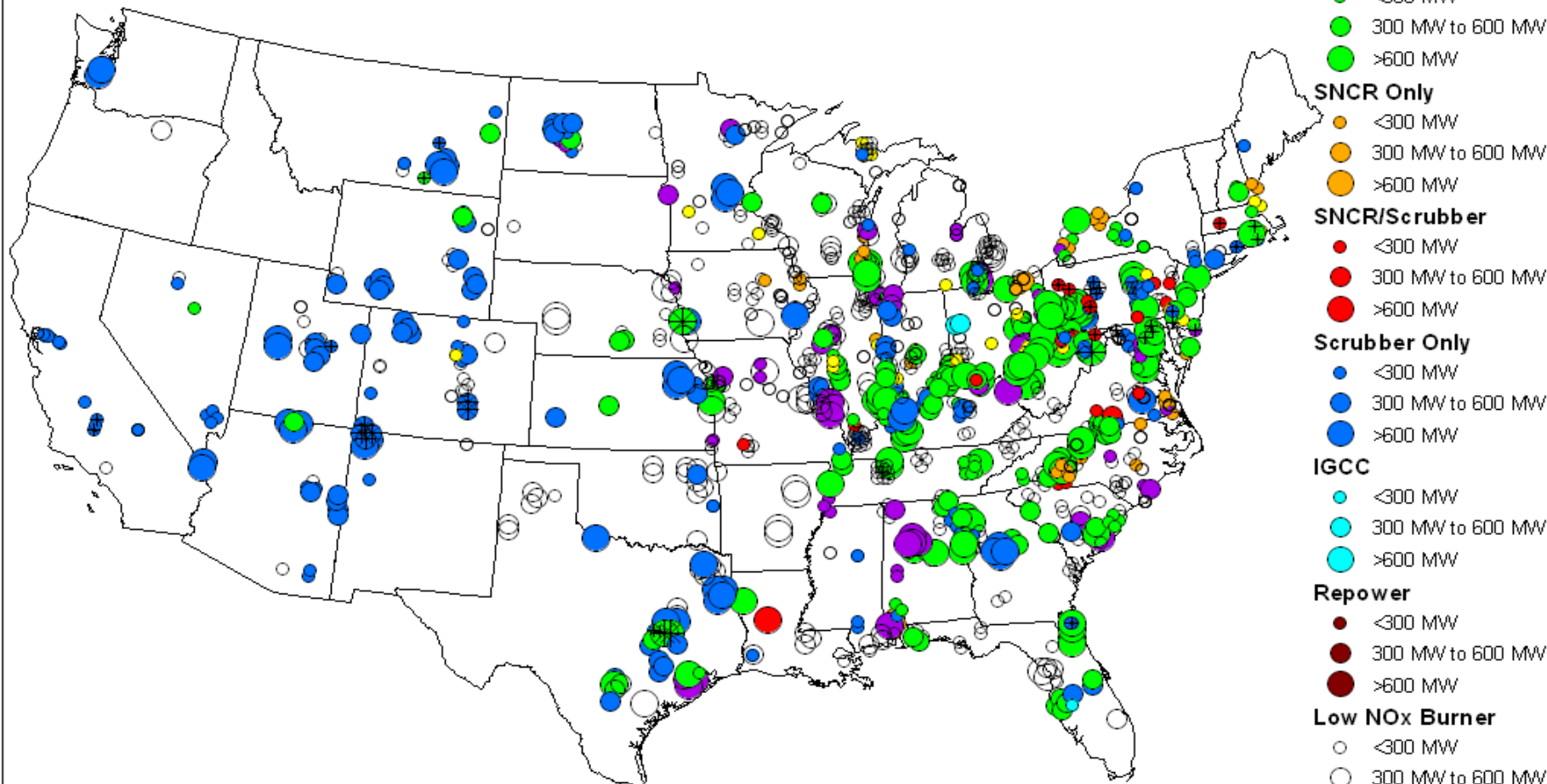


- Increased coal generation under environmental constraints, including new State regulations and NSR settlements, leads to more advanced SO₂, NO_x, and mercury controls in IPM 3.0 installed earlier.
- Rise in subbituminous coal consumption leads to more ACI retrofits (and an increase in mercury allowance prices).



*2025 numbers are highly tentative due to more uncertainty in future years.

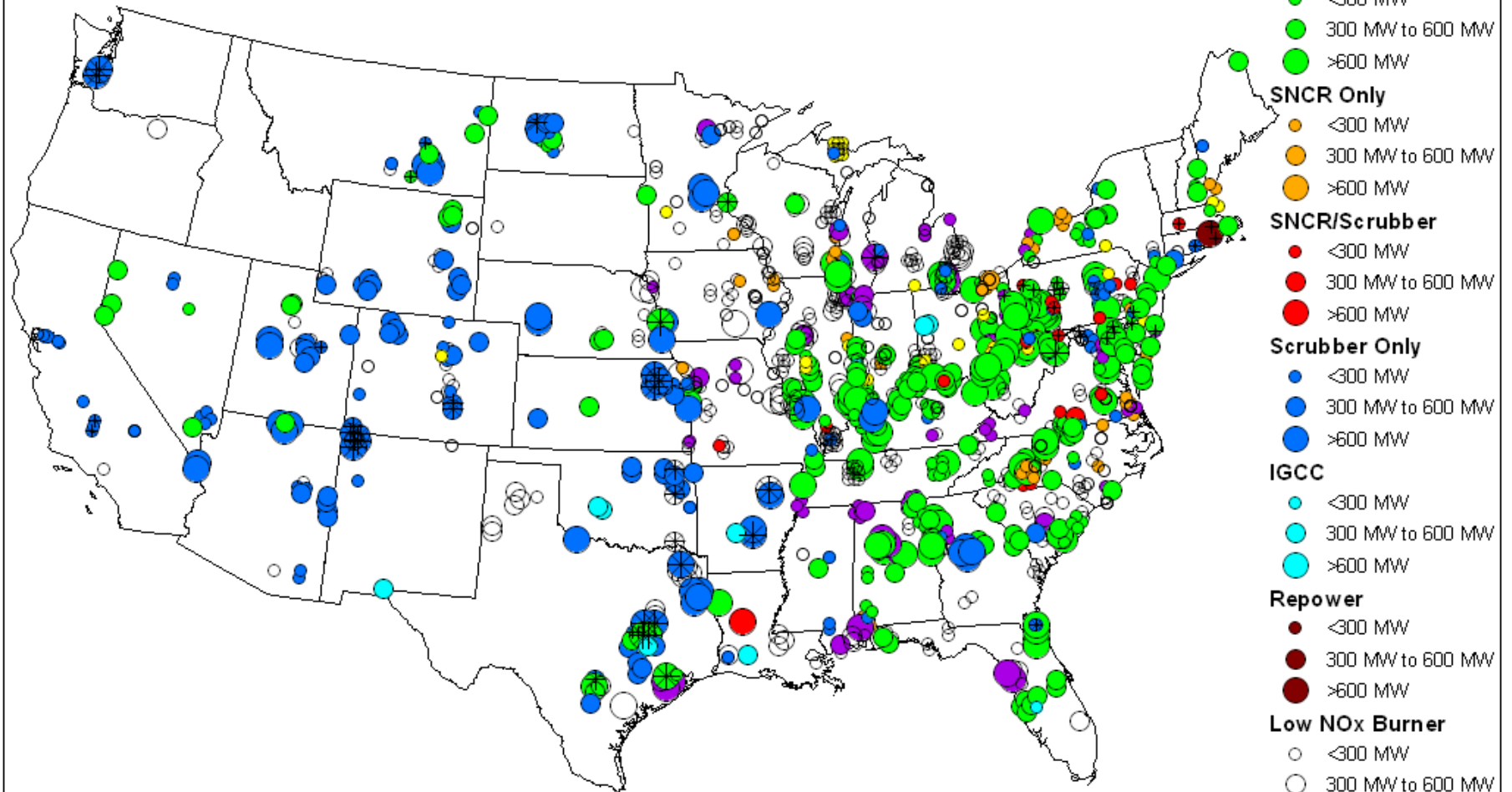
Projected Retrofits at Coal-Fired Units in 2010 after CAIR/CAMR/CAVR*



- SCR Only**
 - <300 MW
 - 300 MW to 600 MW
 - >600 MW
- SCR/Scrubber**
 - <300 MW
 - 300 MW to 600 MW
 - >600 MW
- SNCR Only**
 - <300 MW
 - 300 MW to 600 MW
 - >600 MW
- SNCR/Scrubber**
 - <300 MW
 - 300 MW to 600 MW
 - >600 MW
- Scrubber Only**
 - <300 MW
 - 300 MW to 600 MW
 - >600 MW
- IGCC**
 - <300 MW
 - 300 MW to 600 MW
 - >600 MW
- Repower**
 - <300 MW
 - 300 MW to 600 MW
 - >600 MW
- Low NO_x Burner**
 - <300 MW
 - 300 MW to 600 MW
 - >600 MW
- Non-Economic**
 - <300 MW
 - 300 MW to 600 MW
 - >600 MW

* Retrofits also include Title IV, NO_x SIP Call and other State programs.
 Starbursts within circles represent Activated Carbon Injection retrofits.
 "Scrubber" also includes Reagent Injection for Fluidized Bed Combustion units. These units achieve an SO₂ removal efficiency similar to scrubbers.
 "Non-Economic" indicates that a unit that is not projected to operate.
 Coal-fired units also have additional particulate controls not shown.

Projected Retrofits at Coal-Fired Units in 2015 after CAIR/CAMR/CAVR*



* Retrofits also include Title IV, NO_x SIP Call and other State programs.

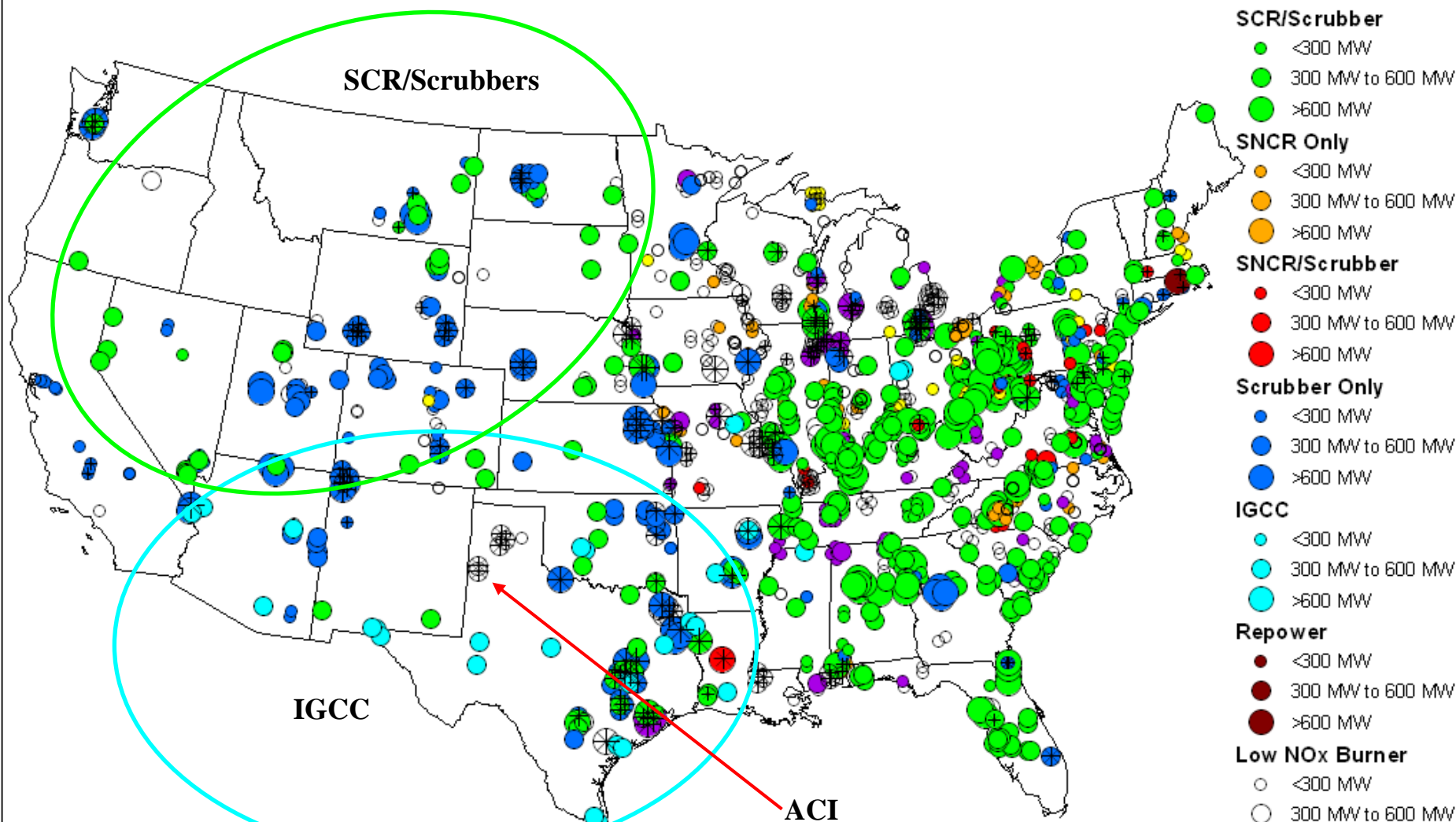
Starbursts within circles represent Activated Carbon Injection retrofits.

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Coal-fired units also have additional particulate controls not shown.

Projected Retrofits at Coal-Fired Units in 2020 after CAIR/CAMR/CAVR*



*Retrofits also include Title IV, NO_x SIP Call and other State programs.
Starbursts within circles represent Activated Carbon Injection retrofits.

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Challenges Remain

- Implementing §110 and §111—there are differences
 - Integrating new sources into §111(d) is new ground
 - CAIR FIP in place/ SIPs replace upon approval
- Post-Promulgation Rule Changes
 - CAIR and CAMR modified since original adoption and have rulemakings pending
 - Biomass cogen proposal
 - CAMR model rule changes
 - CAMR Federal Plan finalization
 - Pending D.C. Circuit litigation



Litigation Status (2007 unless otherwise indicated)

	Petitioners' Brief	EPA Brief	Petitioners' Reply Brief	Final Brief	Projected Decision Date
CAMR	January 12	May 4	June 15	July 13	Oral Argument: December 6, 2007
CAIR	March 5	June 13	July 25	September 5	Spring, 2008
Section 126	June 4	September 10	October 31	November 28	Fall, 2008

Planning for the Future - Strike a Balance

- Reliable, affordable electricity is key
 - **National Security**
 - **Reduced dependence on foreign oil imports**
 - **Stable grid structure**
 - **Continued domestic economic growth and prosperity**
- Producing electricity has environmental consequences
 - **Criteria pollutants, air toxics and greenhouse gases**
- Challenge is to achieve a delicate balance
 - **Reducing our overall environmental footprint and,**
 - **Maintaining affordable energy prices**

Summary – Closing Thoughts

- In a carbon-constrained world, **ALL** generation options will need to be evaluated in order to meet rising energy demand
 - Coal, natural gas, nuclear & renewables
- Construction costs for new coal plants are increasing – especially for advanced coal technologies
 - Copper, steel, concrete, labor
 - Advanced Coal Technology Work Group Web Site Link:
<http://www.epa.gov/air/caaac/coaltech>
- Emissions are approaching “near zero” for new coal plants without CO₂ capture
 - IGCC, USCPC
- CO₂ capture is costly for both IGCC and PC plants
 - Carbon capture is demonstrated and likely feasible
 - Integration costs are still very uncertain
- Large-scale carbon capture and sequestration projects needed soon
 - Demonstrate commercial deployment of the technology

To Learn More....

Clean Air Interstate Rule

www.epa.gov/cleanairinterstaterule

Clean Air Mercury Rule

www.epa.gov/mercury

Clean Air Rules Combined Analysis for IPM 3.0

<http://www.epa.gov/airmarkets/progsregs/epa-ipm/index.html>

Multi-Pollutant Legislative Analysis

<http://www.epa.gov/airmarkets/mp>