Clean Air Interstate Rule (CAIR)




Putting the Multi-Pollutant Control Concept to Work

Presentation to the

Annual Energy Outlook 2005 Conference

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Office of Air and Radiation

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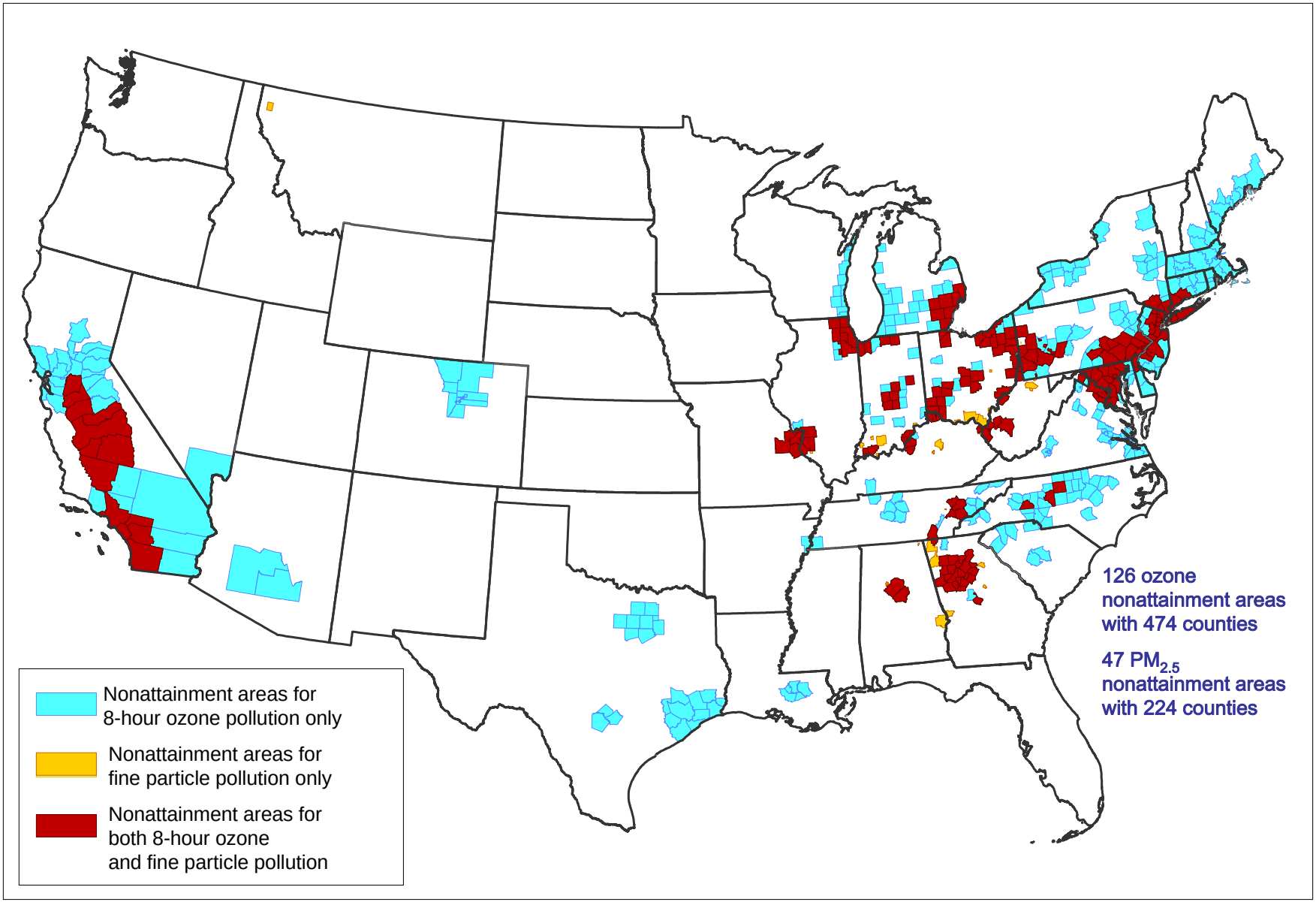
Benefits of the Clean Air Interstate Rule (CAIR)

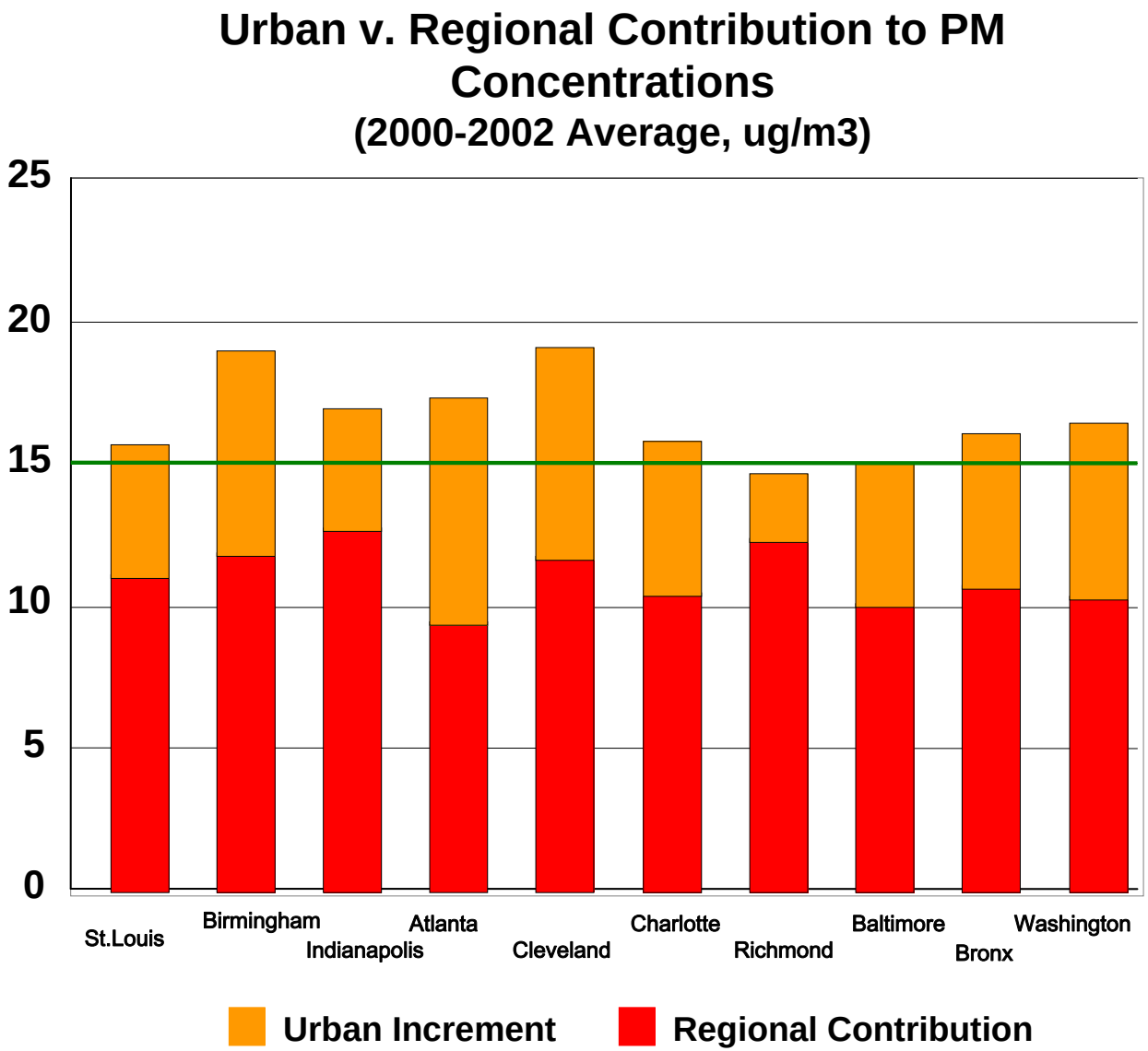
- Reduces sulfur dioxide (SO_2) and nitrogen oxide (NOx) emissions which contribute to fine particle pollution ($PM_{2.5}$) and ground level ozone.
- Provides substantial human health and environmental benefits – the largest benefits for any Clean Air Act rule in the last 12 years.
- Helps cities and states in the East meet new, more stringent national ambient air quality standards for ozone and fine particles.
- Emission reductions occur while economic strength is preserved. U.S. maintains both low electricity prices and fuel diversity.

The most important step EPA can take now to improve air quality.

Areas Designated Nonattainment for Ozone and $PM_{2.5}$ NAAQS in 2004



In the East, Regional Emissions Contribute Significantly to Local Nonattainment Problems

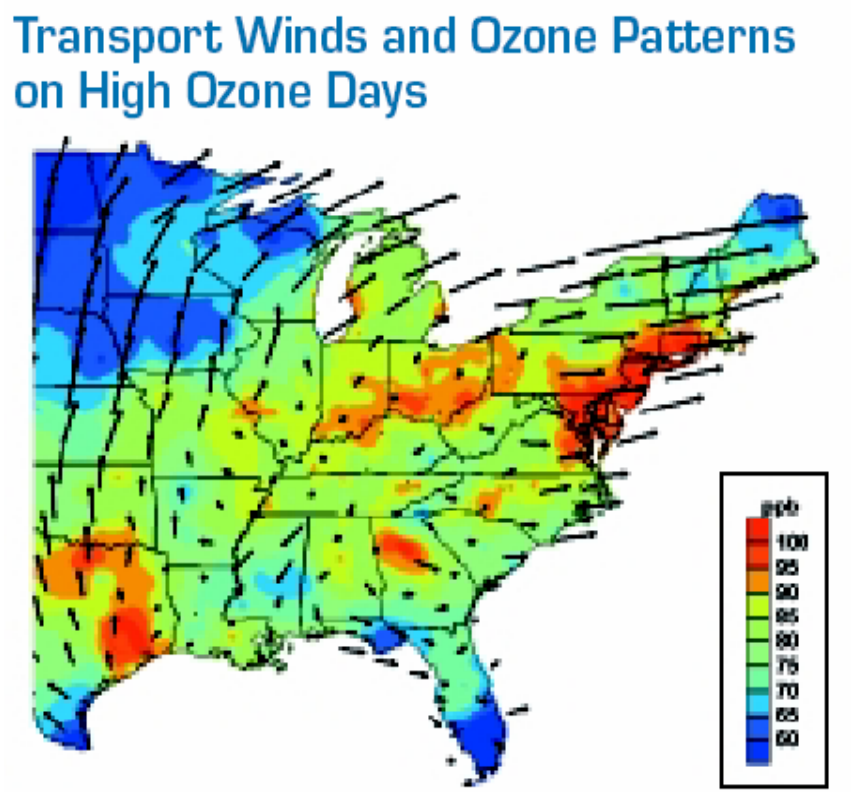


- Because emissions are often transported across state boundaries, both regional and local action is needed to address air quality issues.
- Federal action would significantly reduce the burden on state and local governments by addressing transport.

Pollutants and Concerns

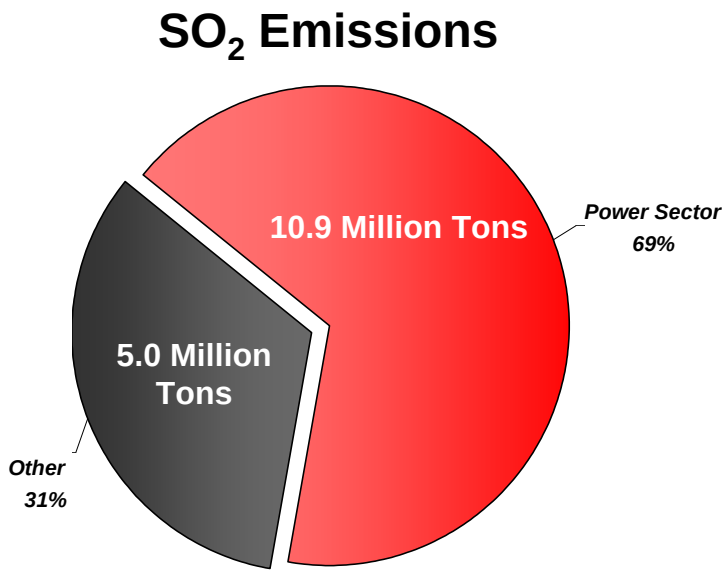
- NO_x contributes to the formation of $PM_{2.5}$ and ground-level ozone.
- SO_2 contributes to the formation of $PM_{2.5}$.
- $PM_{2.5}$ has been linked to premature death, serious illnesses such as chronic bronchitis and heart attacks, and respiratory problems.
- Ozone causes changes in lung function and respiratory symptoms, aggravation of asthma and other respiratory conditions, and may contribute to premature mortality.
- Sulfur deposition acidifies surface waters, damages forest ecosystems and soils, and contributes to decreased visibility.
- Nitrogen deposition acidifies surface waters, damages forest ecosystems and soils, contributes to coastal eutrophication, and impairs visibility.

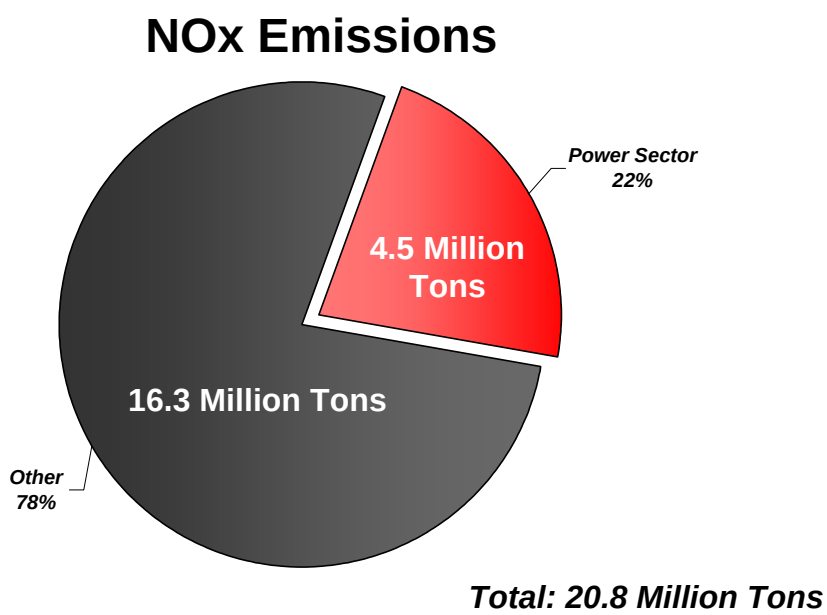
Long-Range Transport of Air Pollution



- Air pollution can travel hundreds of miles and cause multiple health and environmental problems on regional or national scales.
- Emissions contributing to $PM_{2.5}$ and ozone nonattainment often travel across state lines, especially in the eastern U.S.
  - SO_2 and NOx, and other pollutants, contribute to $PM_{2.5}$ transport
  - NOx and other pollutants contribute to ozone transport.
- Attaining national ambient air quality standards will require some combination of emission reductions from:
  - Sources located in or near nonattainment areas (such as mobile sources) and
  - Sources, such as power plants, located further from the nonattainment area.
- Clean Air Act contains provisions for States and EPA to address interstate pollution transport.
- EPA is also addressing ozone and particle pollution from mobile sources by implementing national fuel and engine standards.

Electric Power Generation: A Major Source of Air Emissions





Source: SO_2 and NOx data is from EPA's 2003 National Emissions Inventory. "Other" sources of pollutants include transportation and other mobile sources and industrial sources.

Two Ways to Address Transported Emissions from Power Plants

- **The President's Clear Skies legislation is the preferred approach to achieving multi-pollutant emission reductions:**
  - **Multipollution caps apply to entire country.**
  - **Legislation can provide more certainty and less complexity.**
- **Use of existing Clean Air Act authority to address interstate transport of pollution:**
  - **Until legislation passes, our attainment deadlines and other problems related to power plant emissions demand we act now.**
  - **CAIR will provide very significant air quality attainment, health, and environmental improvements across the eastern U.S. in a highly cost-effective manner.**

CAIR Approach

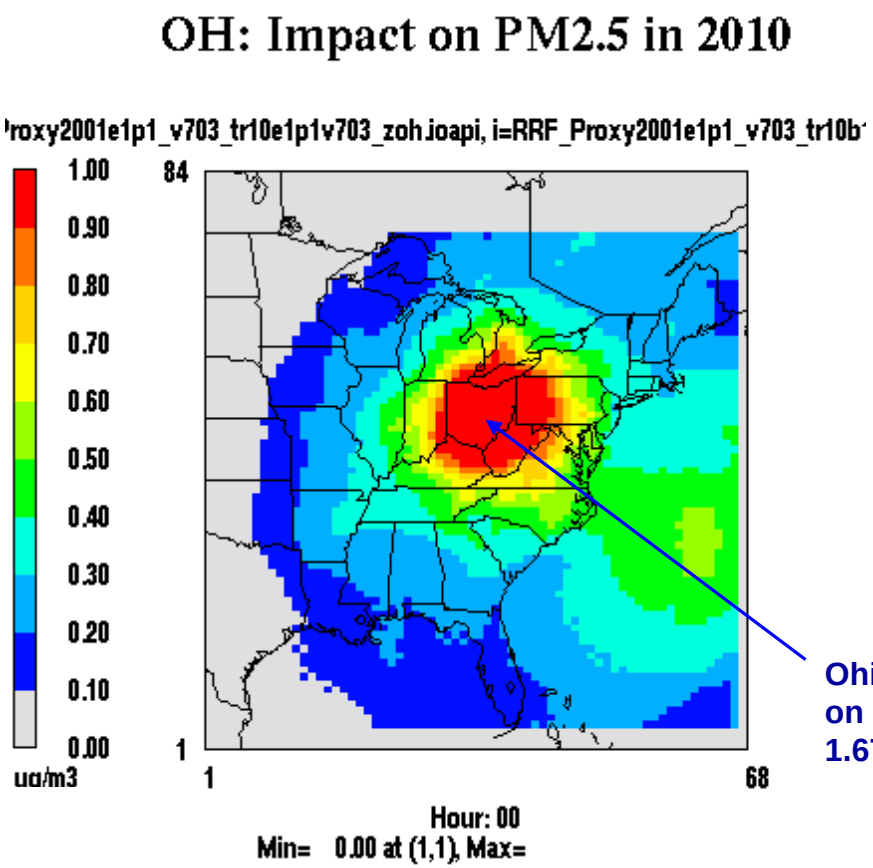
- Analyze sources of SO_2 (for $PM_{2.5}$) and NOx (for $PM_{2.5}$ and ozone).
- Determine if a **significant contribution** is projected from individual states on ozone and PM nonattainment in 2010, to define **geographic boundaries** covered by the rule.
- Allow cost-effective approach for regional reductions, propose an **optional cap-and-trade program** similar to current Acid Rain Program for SO_2 (Title IV) and the NO_x SIP call.
- EPA develops an **emissions budget for each state** based on application of highly effective controls on electric generating units (EGU) in a cap and trade program, that includes all affected states. States have discretion in deciding which sources to control to meet the budget.
- Provide the most timely reductions; propose a **two-phase program** with declining compliance caps for NOx in 2009 and 2015, and for SO_2 in 2010 and 2015.

How EPA Evaluated Significant Air Quality Contributions

Simulated elimination of all anthropogenic SO_2 and NO_x emissions from Ohio illustrates influence of interstate transport (proposal model example)

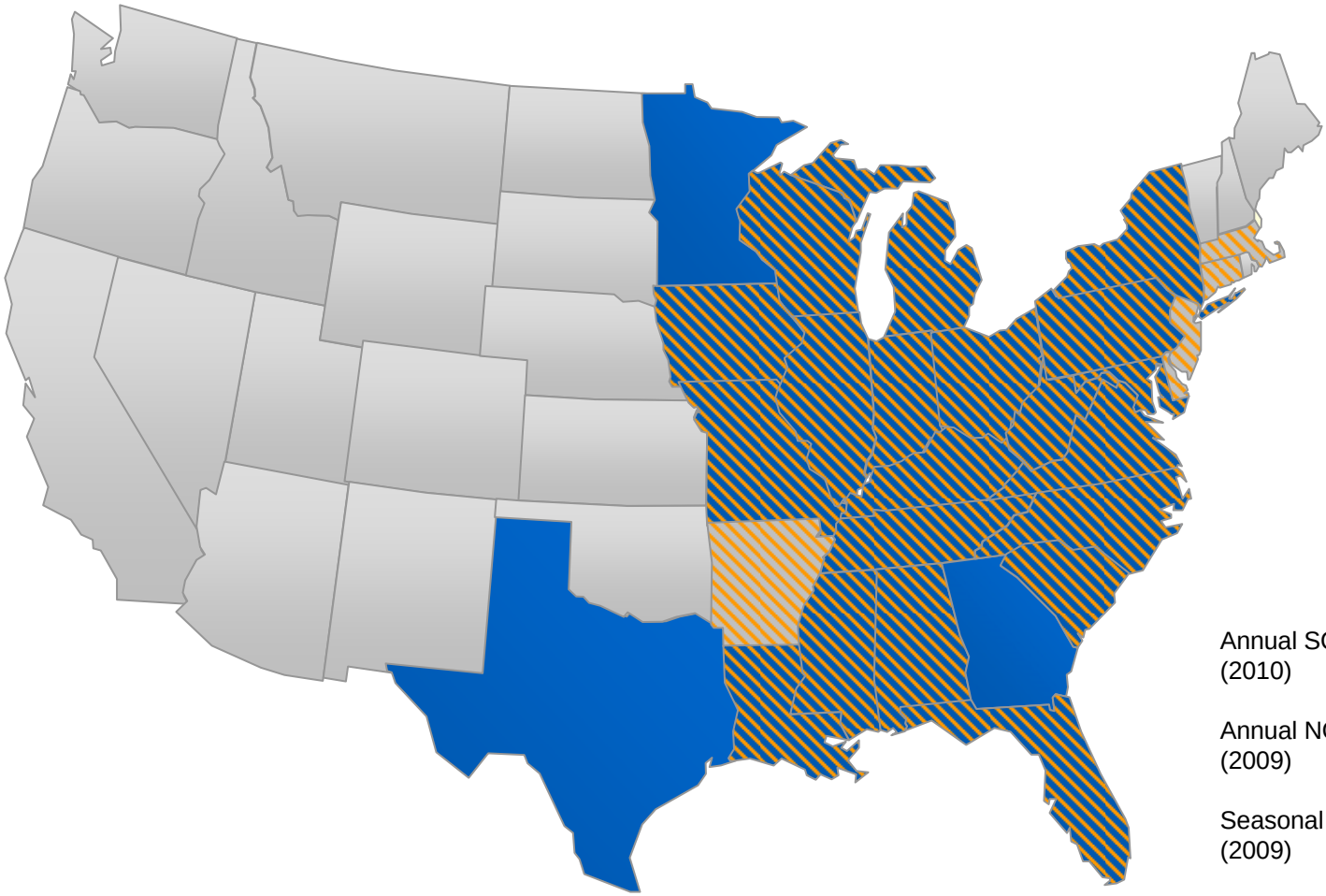
Steps in determining significant transport

- Forecast areas that would remain nonattainment in 2010 without additional controls
- Zero out upwind states emissions
- Determine contribution to downwind non-attainment
- If >0.2 ug/m3, significant



Ohio's maximum impact on 2010 non-attainment is 1.67 ug/m3 in Pittsburgh

CAIR: Affected Region and Emission Caps



Emission Caps*
(million tons)

	2009/2010	2015
Annual SO_2 (2010)	3.6	2.5
Annual NOx (2009)	1.5	1.3
Seasonal NOx (2009)	.58	.48

**For the affected region.*

- States controlled for fine particles (annual SO_2 and NOx)
- States controlled for ozone (ozone season NOx)
- States controlled for both fine particles (annual SO_2 and NOx) and ozone (ozone season NOx)
- States not covered by CAIR

Key Elements of CAIR

- **CAIR sets an emission reduction requirement for each State, based on capping power plant emissions collectively at levels that EPA believes are highly cost-effective to achieve.**

- **Provides an optional cap and trade program based on successful Acid Rain and NOx Budget Trading programs as a method to implement the necessary reductions.**

- **Includes a two-phase program with declining power plant emission caps:**

  - **SO_2 annual caps: 3.6 million tons in 2010 and 2.5 million in 2015**
  - **NOx annual caps: 1.5 million tons in 2009 and 1.3 million in 2015**
  - **NOx ozone season caps: 580,000 tons in 2009 and 480,000 tons in 2015**
  - **Emission caps are divided into State SO_2 and NOx budgets.**

- **Allows States flexibility on how to achieve the required reductions, including which sources to control and whether to join the trading program.**

Cap and Trade Mechanism: Allowance Allocation and Markets

EPA ROLE

- Set state budgets
- Establish trading program and market procedures
- Administer tracking systems
- Define allowance allocation parameters

STATE ROLE

- Identify sources for reduction
- Voluntary trading program
  - Adopt rules/program in 18 months
  - Determine trading program budget
  - Allocate NOx allowances (SO_2 already allocated)

- **EPA expects a smooth transition to new trading program**
  - **Designed with existing cap and trade programs in mind**
  - **Reasonable control costs available**
  - **High number of sources facing different control costs**

CAIR Health and Environmental Benefits: Benefits over 25 Times Greater than Costs

By 2015, CAIR will result in:

$85-100 billion in health benefits each year, preventing:

- 17,000 premature deaths
- 22,000 non-fatal heart attacks
- 12,300 hospital admissions
- 1.7 million lost work days
- 500,000 lost school days.

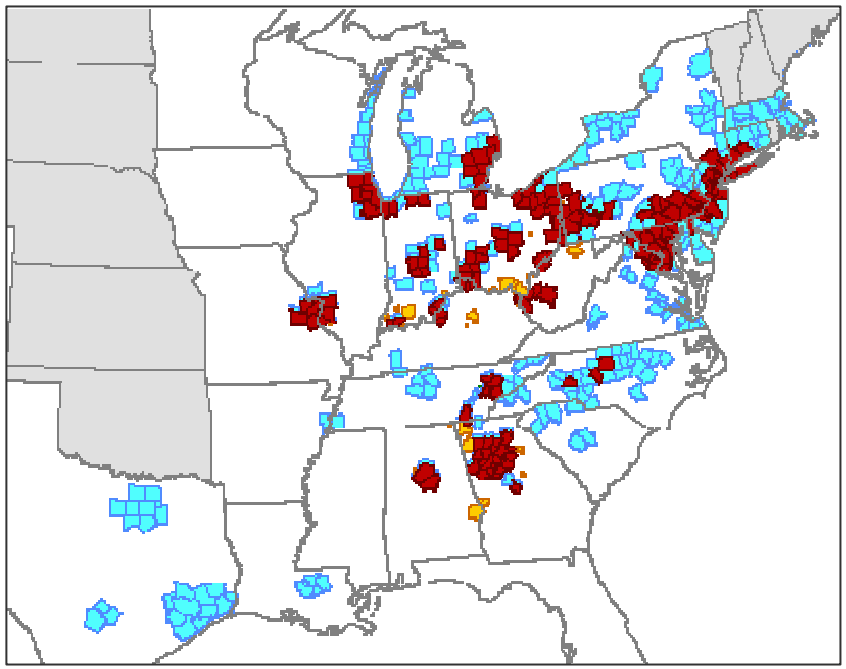
Almost $2 billion in improved visibility benefits each year.

Other non-monetizable benefits – reductions of mercury emissions, acid rain, nitrification, eutrophication, and more.

In 2015, CAIR will cost about $3.6 billion a year. Implementation beyond 2015 leads to higher annual benefits and costs.

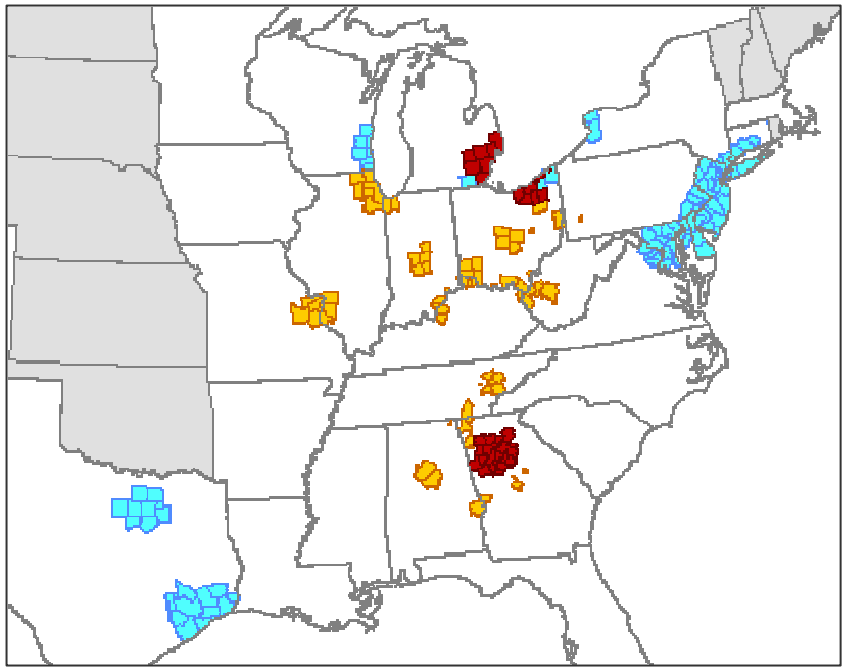
Ozone and Particle Pollution: CAIR, together with other Clean Air Programs, Will Bring Cleaner Air to Areas in the East - 2010

Ozone and Fine Particle Nonattainment Areas (March 2005)



- 104 ozone nonattainment areas with 408 counties
- 43 $PM_{2.5}$ nonattainment areas with 211 counties

Projected Nonattainment Areas in 2010 after Reductions from CAIR and Existing Clean Air Act Programs



- 14 ozone nonattainment areas
- 20 $PM_{2.5}$ nonattainment areas

Nonattainment areas for 8-hour ozone pollution only

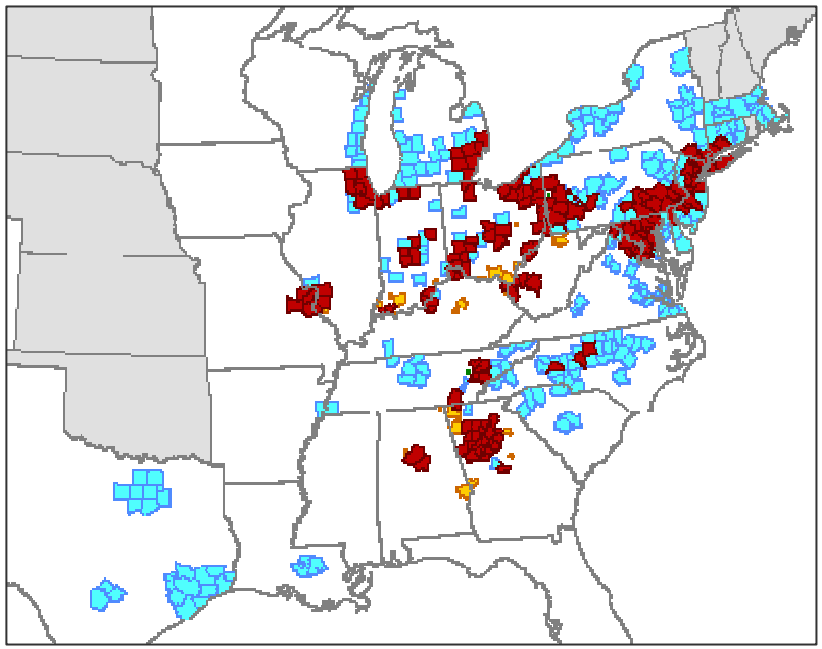
Nonattainment areas for fine particle pollution only

Nonattainment areas for both 8-hour ozone and fine particle pollution

Projections concerning future levels of air pollution in specific geographic locations were estimated using the best scientific models available. They are estimations, however, and should be characterized as such in any description. Actual results may vary significantly if any of the factors that influence air quality differ from the assumed values used in the projections shown here.

Ozone and Particle Pollution: CAIR, together with other Clean Air Programs, Will Bring Cleaner Air to Areas in the East - 2015

Ozone and Fine Particle Nonattainment Areas (March 2005)



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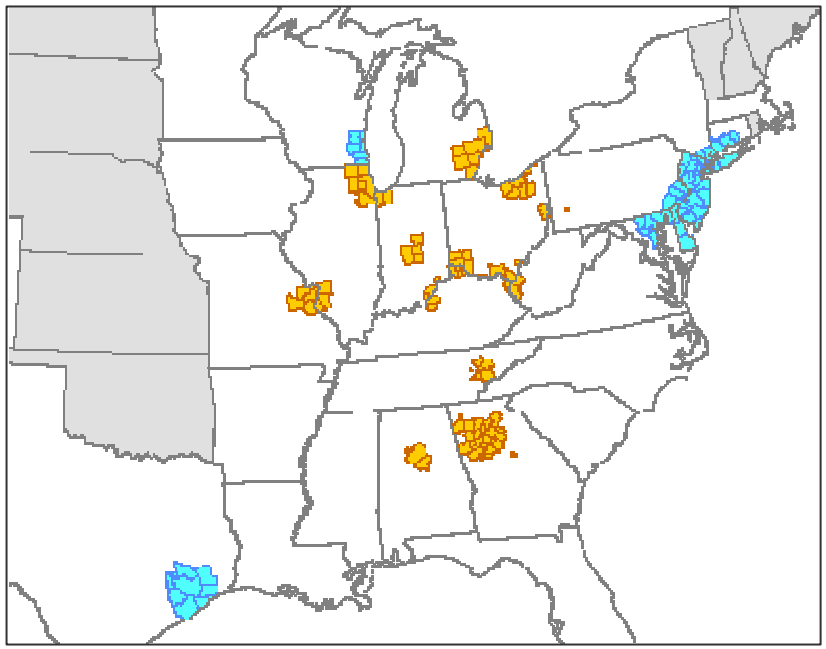
Projected Nonattainment Areas in 2015 after Reductions from CAIR and Existing Clean Air Act Programs



- 5 ozone nonattainment areas
- 14 $PM_{2.5}$ nonattainment areas

Nonattainment areas for 8-hour ozone pollution only

Nonattainment areas for fine particle pollution only

Nonattainment areas for both 8-hour ozone and fine particle pollution

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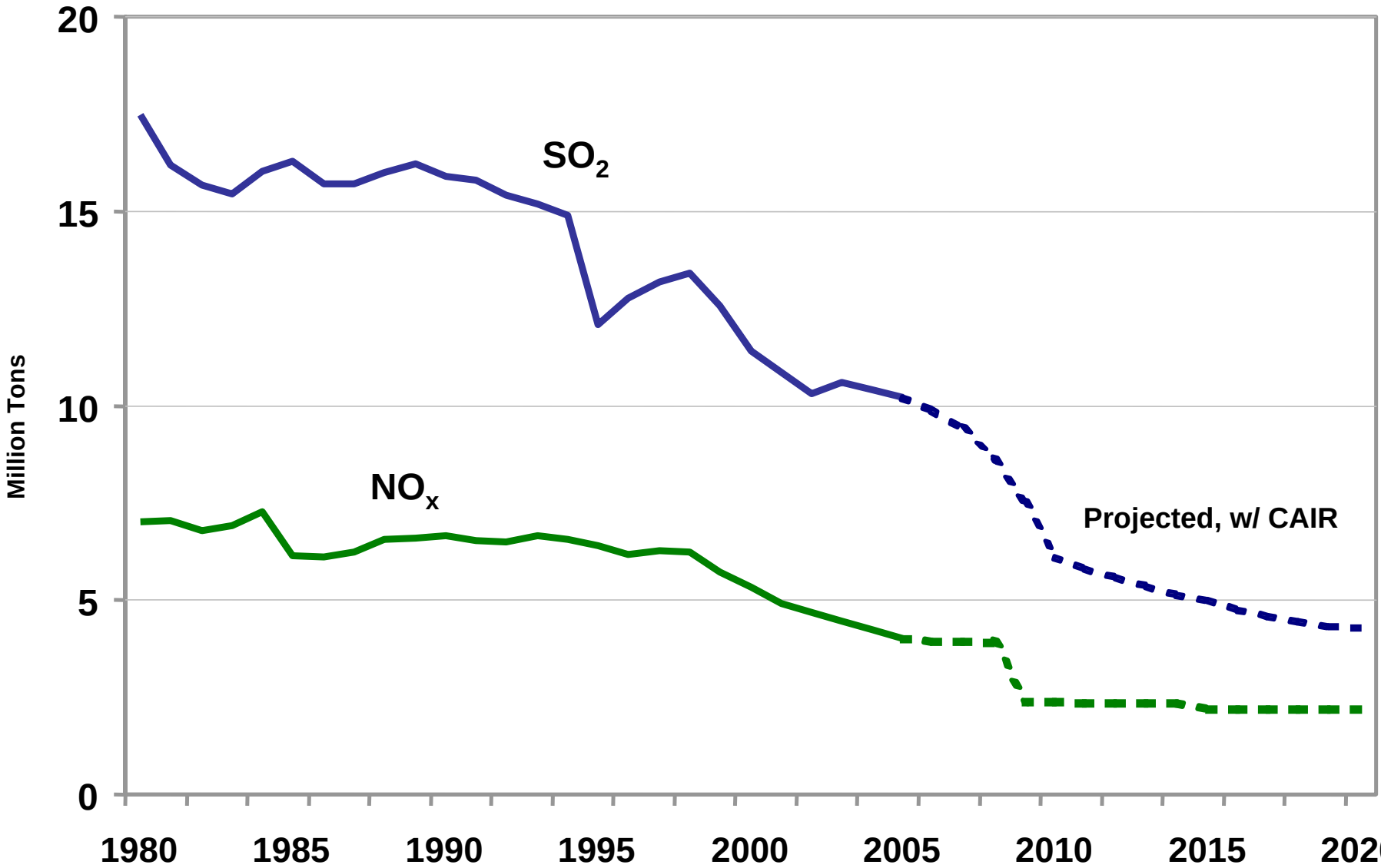
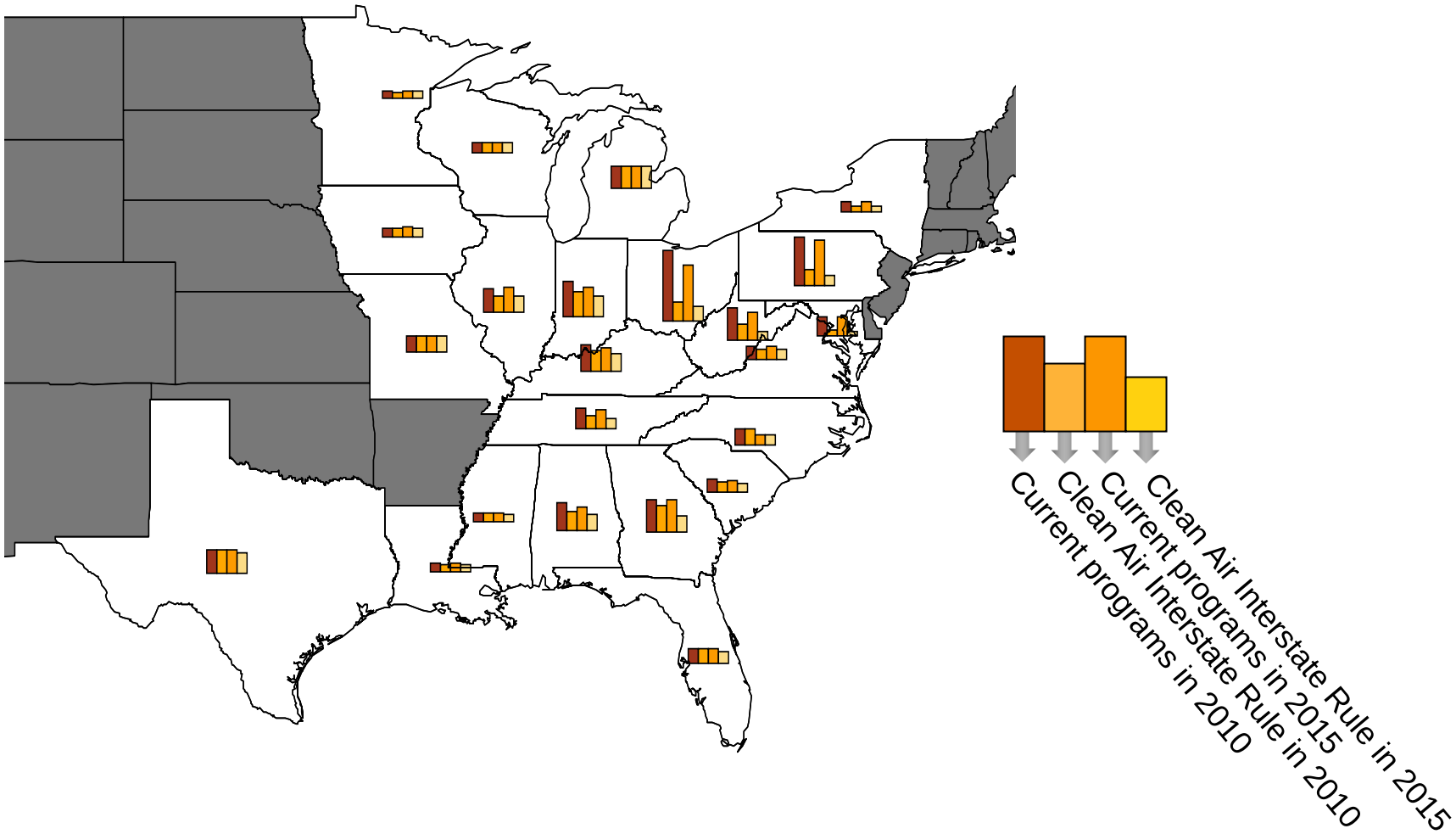
National NO_x and SO_2 Power Plant Emissions: Historic and Projected with CAIR

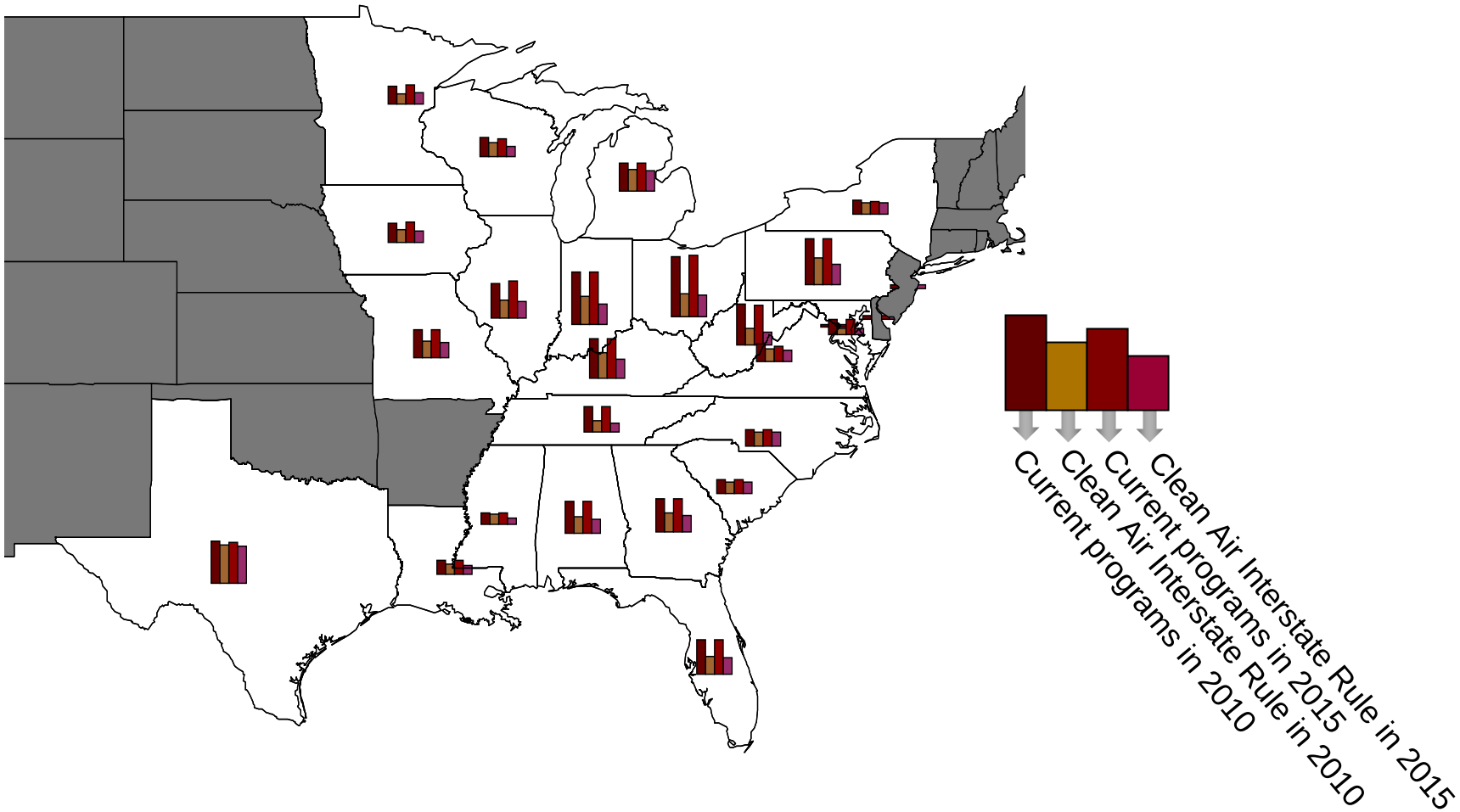


Source: EPA

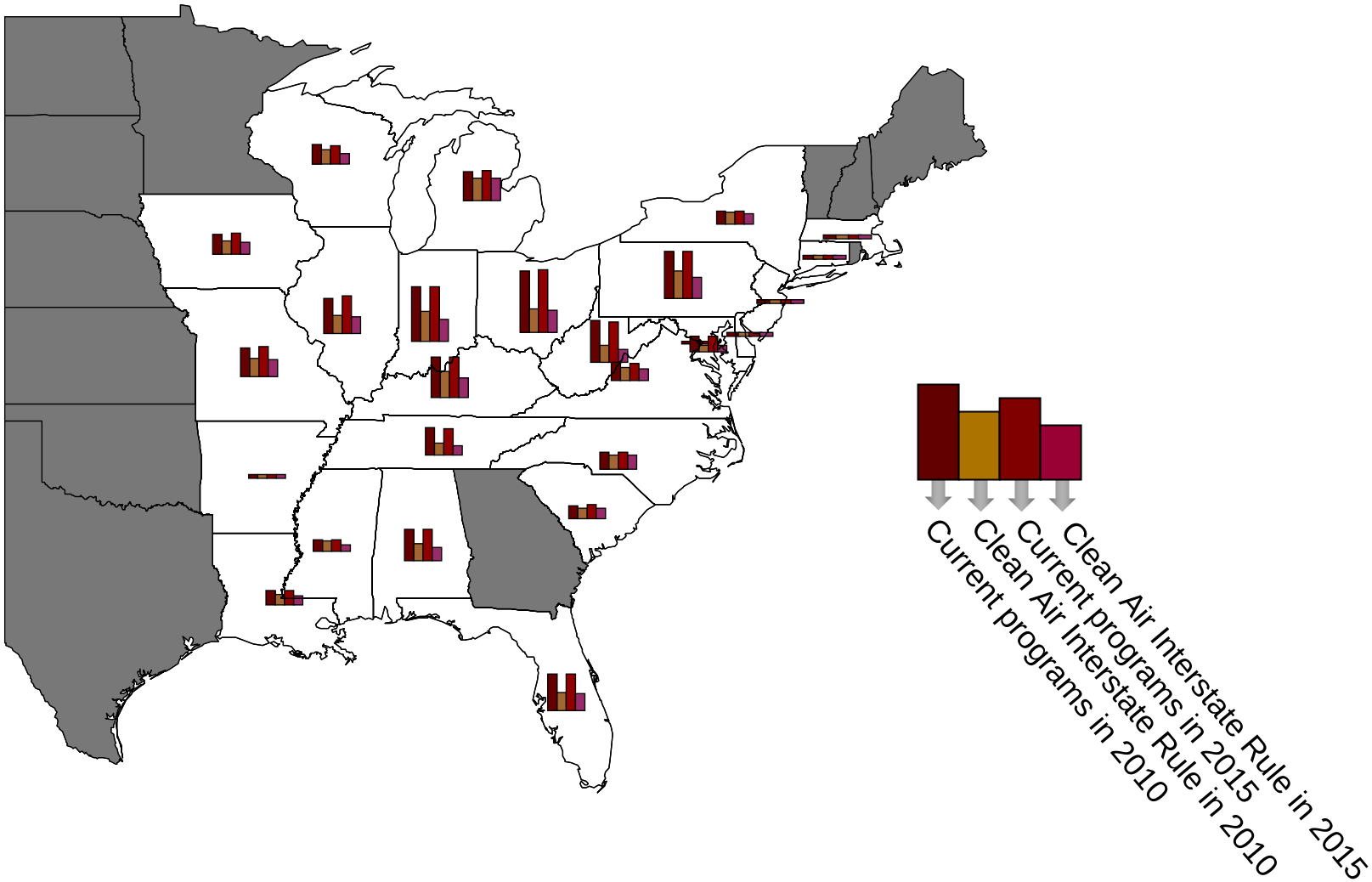
Projected Annual SO_2 Emissions for Power Plants Under CAIR



Projected Annual NOx Emissions for Power Plants Under CAIR

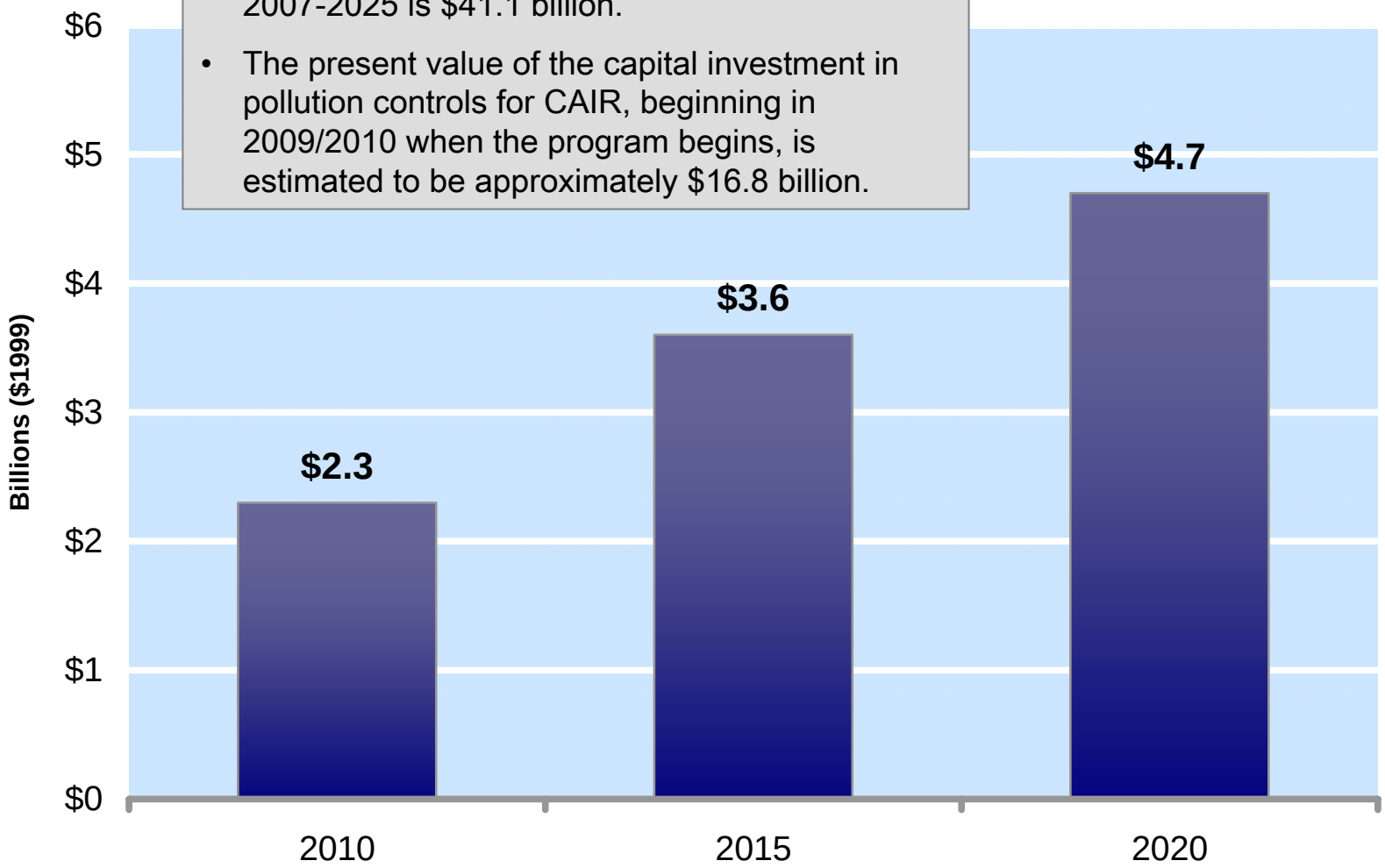


Projected Ozone Season NOx Emissions for Power Plants under CAIR



Annualized Private Cost of CAIR

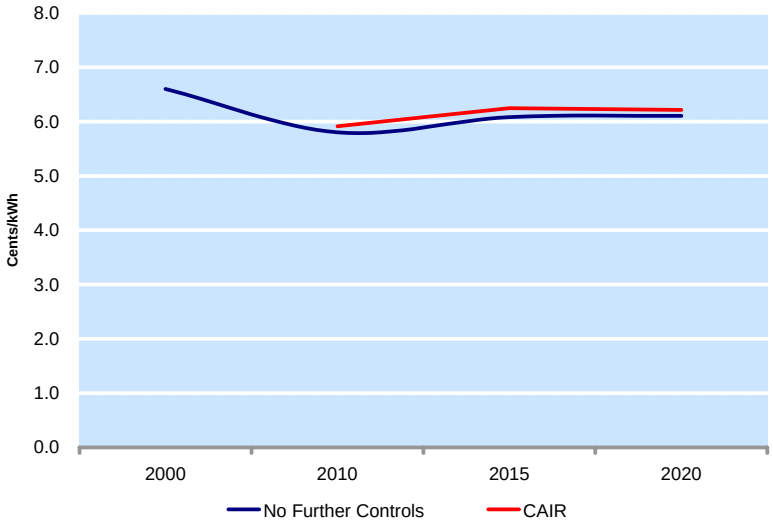
- The net present value of CAIR for the years 2007-2025 is $41.1 billion.
- The present value of the capital investment in pollution controls for CAIR, beginning in 2009/2010 when the program begins, is estimated to be approximately $16.8 billion.



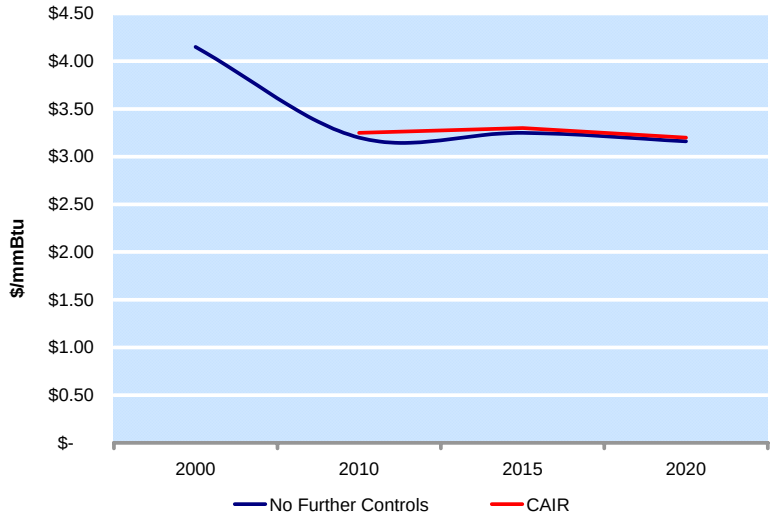
Note: From IPM, for the affected region.

Other Projected Impacts

Regional Retail Electricity Prices

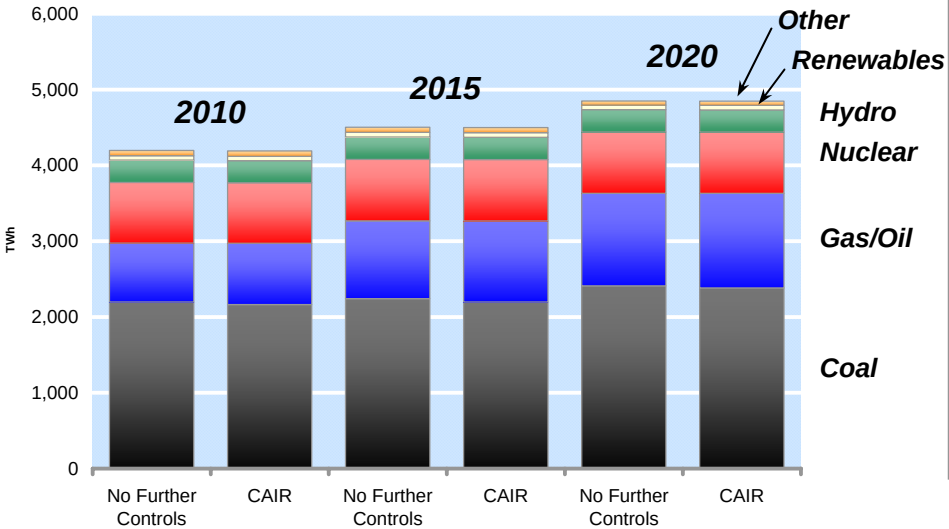


Natural Gas Prices



Note: Henry Hub prices

Generation Mix



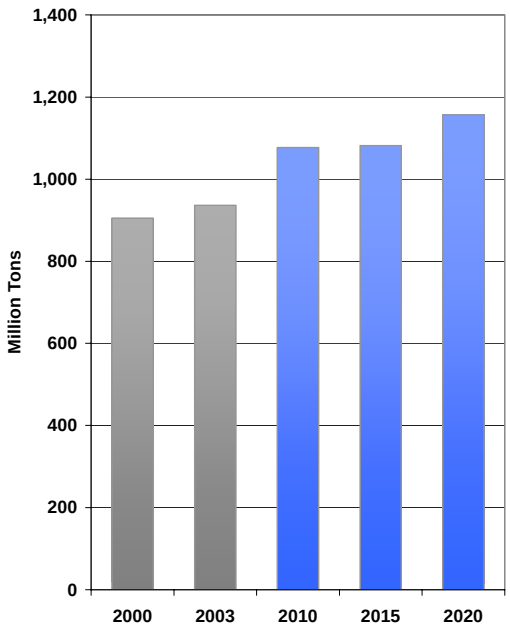
Coal Production for Electricity Generation (million tons)

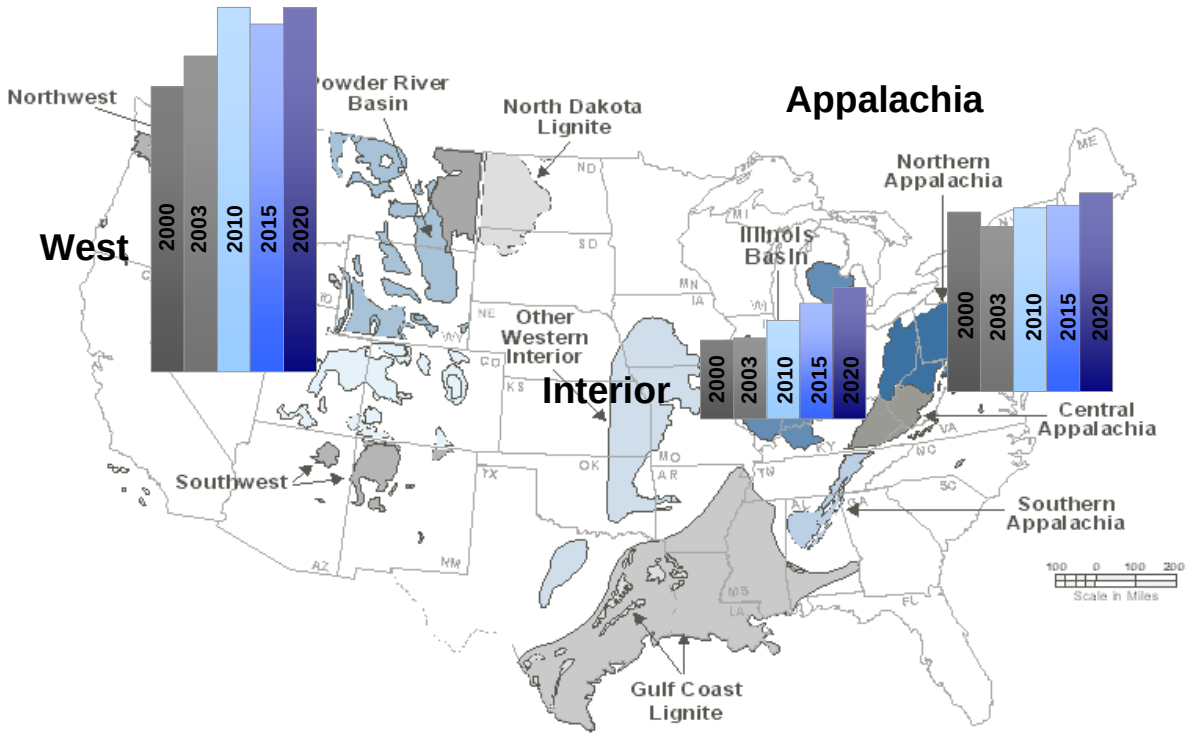
	2000	2003	CAIR 2010	CAIR 2015
Appalachia	299	275	306	306
Interior	131	135	165	191
West	475	526	607	586
National	905	936	1,078	1,083

Note: Retail prices for 2000 are from AEO2003. Natural Gas prices for 2000 are from Platts GASdat. All other data is from EPA's Integrated Planning Model.

Current and Projected Coal Production for the Power Sector with CAIR

National Coal Production for the Power Sector: Continued Growth with CAIR





By 2020, nationwide coal production is projected to increase by 23%, with growth occurring in all major supply regions.

Scale: Appalachia 2000 = 299 million tons

Notes: Coal production for the power sector. This data is from the Final CAIR Regulatory Impact Analysis.

Summary

CAIR significantly cuts emissions of SO_2 and NOx from power plants and:

- Helps cities and States in the East meet new, more stringent national ambient air quality standards (NAAQS) for ozone and fine particles.
- Guarantees substantial benefits for public health and the environment.
- Achieves the largest reduction in air pollution in more than a decade (since the highly successful Acid Rain Program).
- Provides one of the largest investments in pollution control technology in history.
- Serves as the single most important step to take now to improve air quality in the U.S.

To Learn More…

Clean Air Interstate Rule

www.epa.gov/cleanairinterstaterule