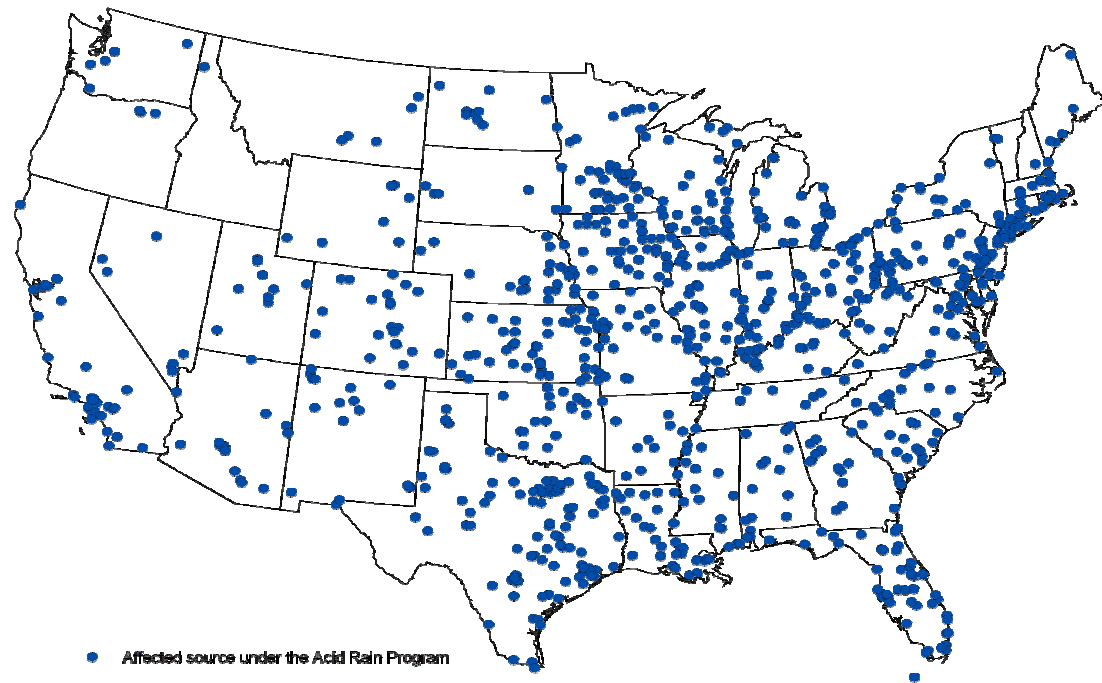


# Electric Power and Clean Air: Going Forward from Our Past



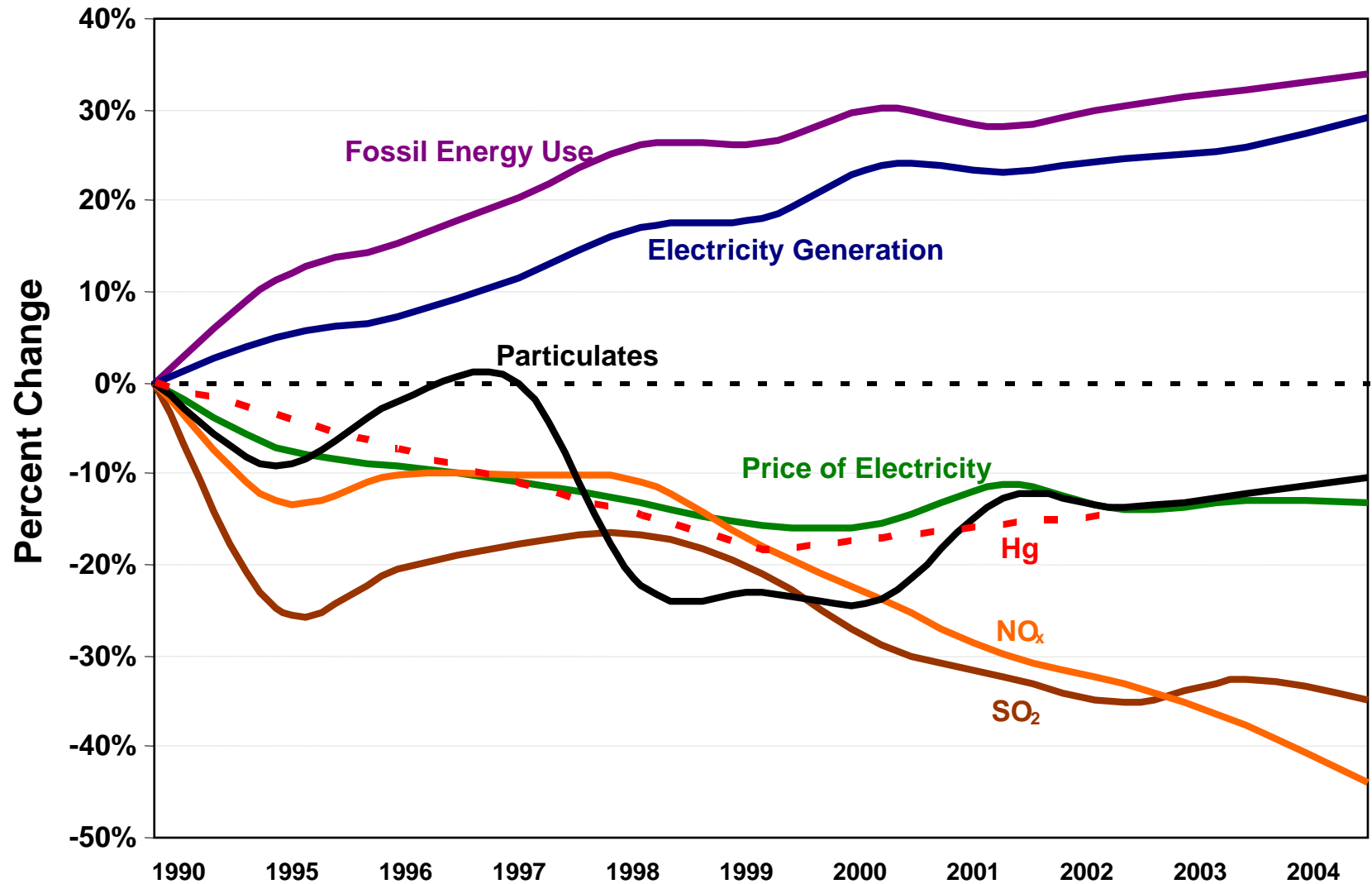
Committee for Energy Resources and the Environment  
NARUC Winter Committee Meetings  
February 14, 2006

Washington, DC

Presentation of the Office of Air and Radiation, U.S. EPA

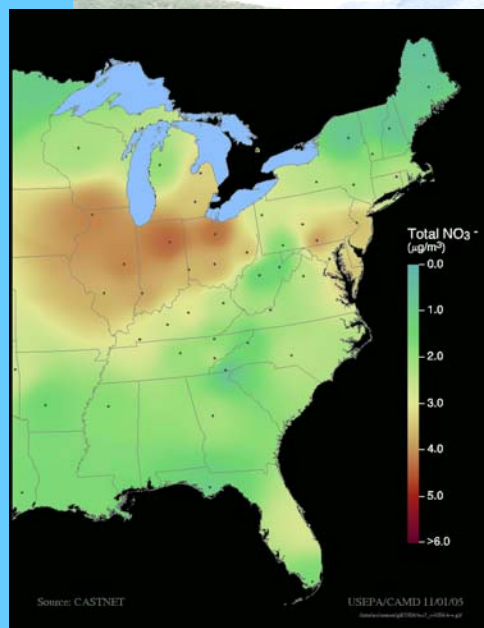
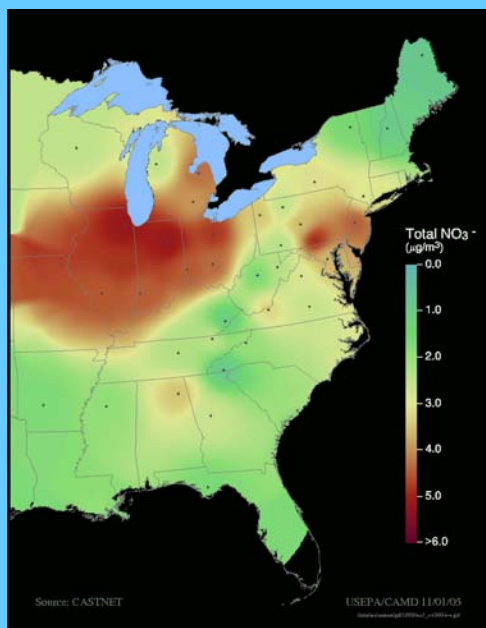
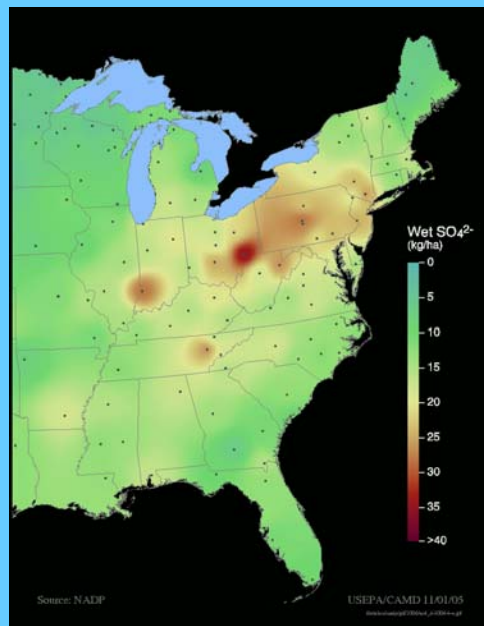
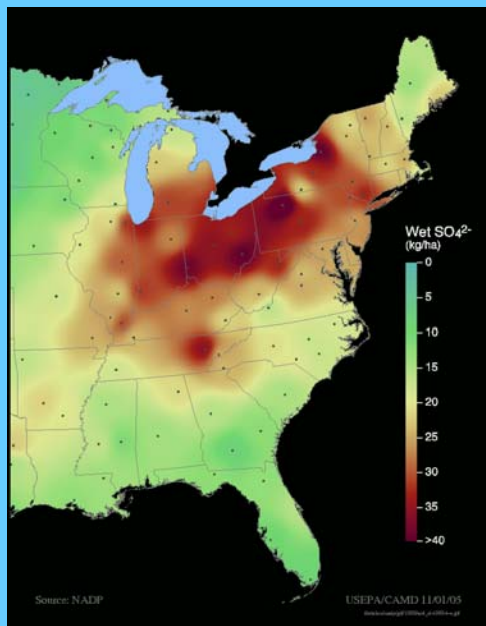


# Trends in Electric Generation and Air Emissions from 1990 to 2004

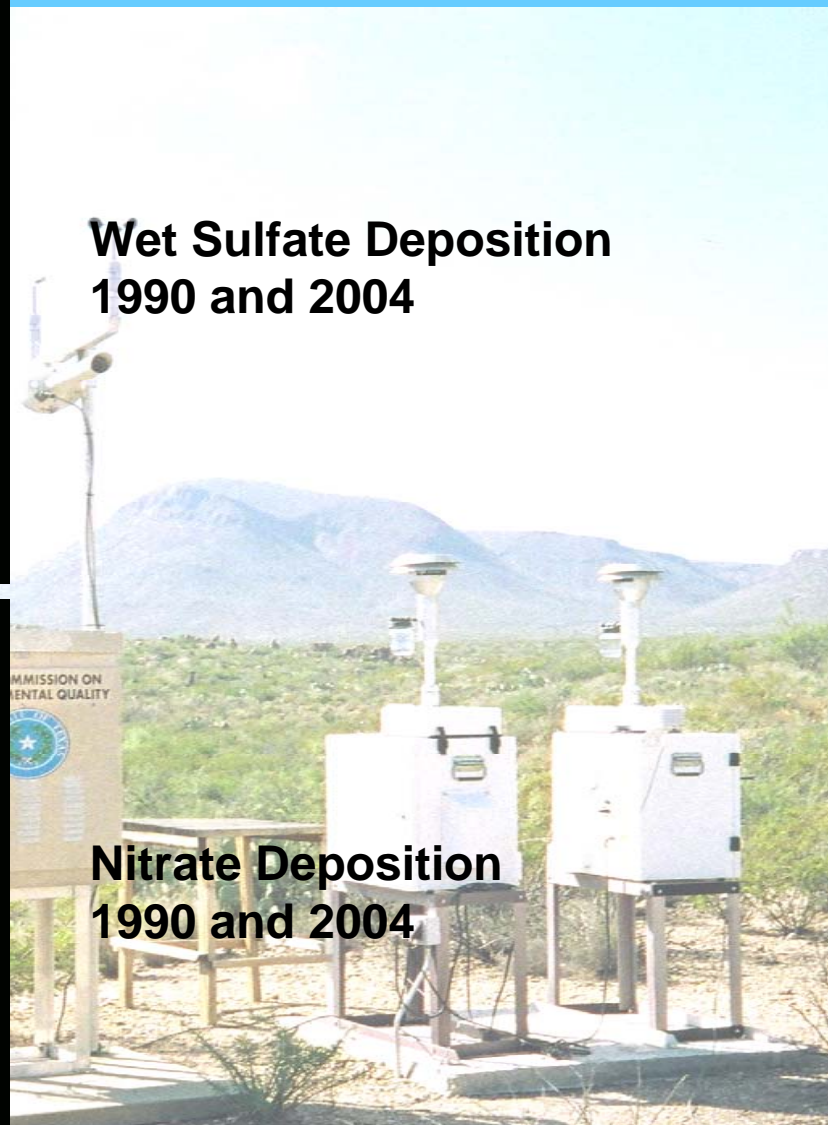


Sources: EPA (fossil energy use and emissions) and EIA (electricity generation and price values).

# Changes in Sulfate and Nitrate Concentrations



**Wet Sulfate Deposition  
1990 and 2004**



**Source: National Atmospheric Deposition Program (NADP)  
and Clean Air Status and Trends Network (CASTNET)**



## Environmental Benefits

The Acid Rain Program, created by Title IV of the 1990 Clean Air Act Amendments, was a regional response to an environmental problem — acidification of lakes and streams.

We have monitored significant emission reductions of SO<sub>2</sub> and NO<sub>x</sub>, resulting in important environmental benefits, at a significantly lower-than-expected cost:

- Improvements in acid deposition, over 30 percent reduction in sulfur deposition in the eastern U.S.
- Improved visibility in national parks and wilderness areas
- Signs of recovery in acidic lakes and streams

## Human Health Benefits

In the course of implementing, monitoring and assessing the Acid Rain Program, we've learned that in addition to the environmental benefits there are considerable benefits to human health.

Counties have been brought into attainment with the NAAQS.

A recent study puts annual health benefits in 2010 at:

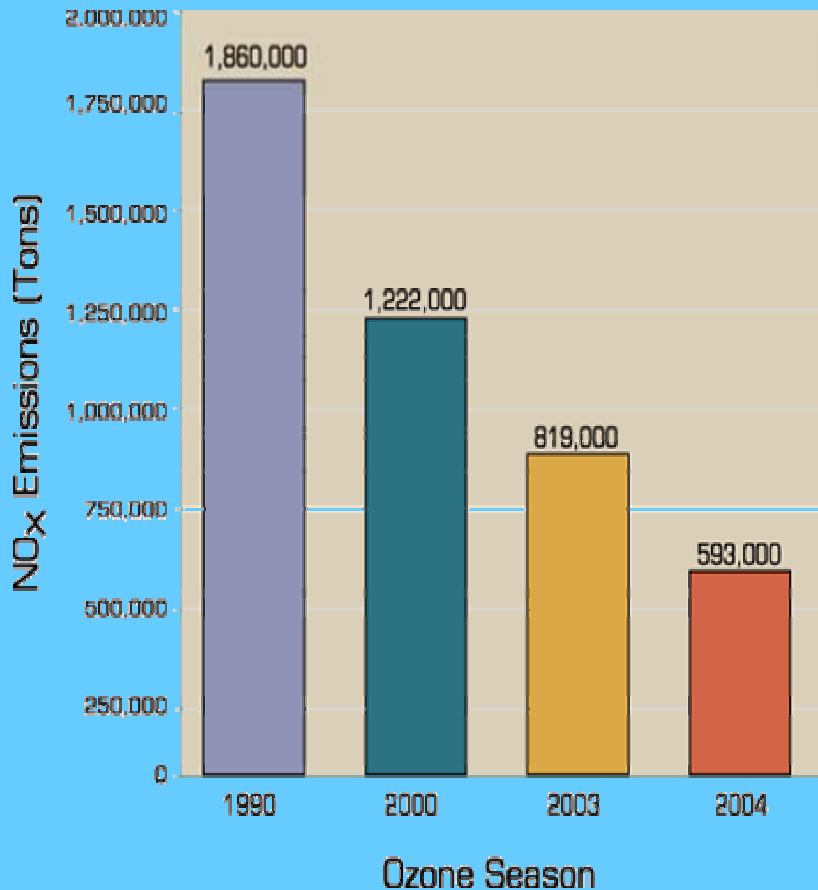
- Over 18,000 cases of avoided premature mortality
- Over 15,000 fewer emergency room visits for children with asthma, and over 26,000 fewer cases of acute bronchitis in children and 23,000 fewer nonfatal heart attacks
- Over 2 million fewer “work loss” days

Overall the quantified annual benefits in 2010 of the Acid Rain Program are projected to be \$122 billion.

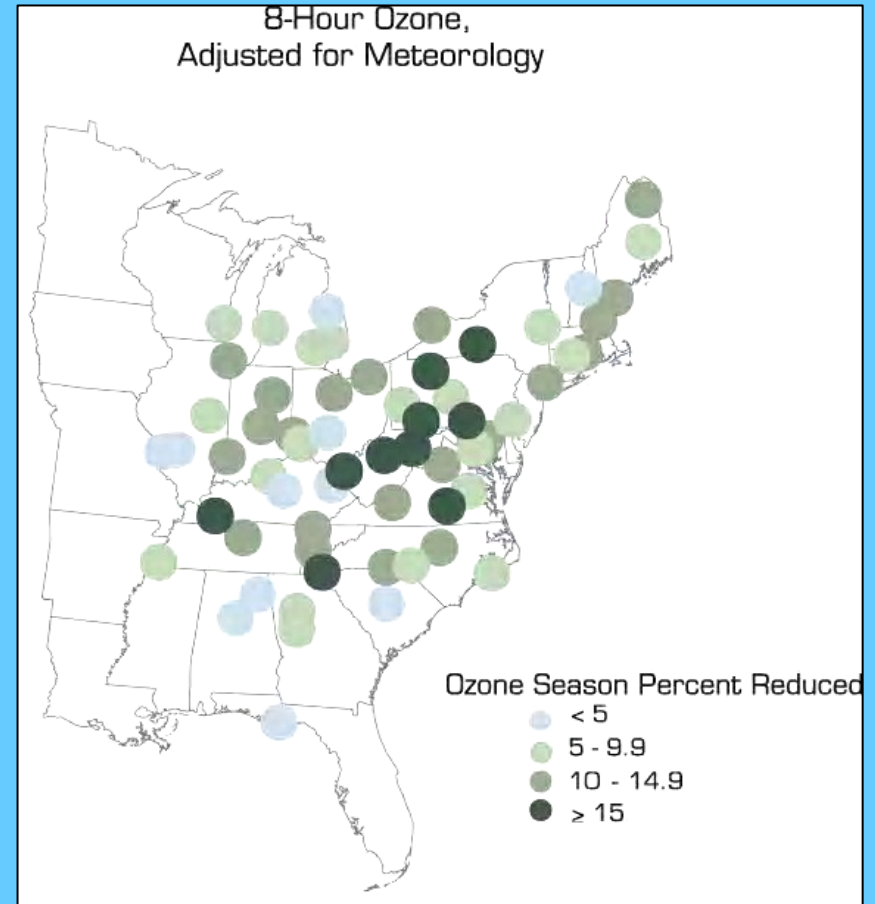
*The Acid Rain Program accounts for the largest quantified human health benefits of any federal regulatory program of the last 10 years, with benefits exceeding costs by more than 40:1.*

# NO<sub>x</sub> Emissions and Ozone Levels Have Declined across the NO<sub>x</sub> SIP Call Region

## Total NO<sub>x</sub> Budget Trading Program Ozone Season NO<sub>x</sub> Emissions



## Reductions in 8-Hour Ozone 2002 vs. 2004







Source: *Evaluating Ozone Control Programs in the Eastern United States: Focus on the NO<sub>x</sub> Budget Trading Program, 2004*

# CAIR, CAMR, CAVR, and Other Actions

## CAIR Region



-  CAIR States controlled for fine particles (annual SO<sub>2</sub> and NO<sub>x</sub>)
-  CAIR States controlled for ozone (ozone season NO<sub>x</sub>)
-  CAIR States controlled for both fine particles (annual SO<sub>2</sub> and NO<sub>x</sub>) and ozone (ozone season NO<sub>x</sub>)
-  States not in CAIR face CAVR





# CAIR, CAMR, CAVR Implementation Timeline

**CAIR**

**Phase I: CAIR NOx Programs  
(ozone-season and annual)  
(09)**

**CSP Early Emission Reduction Period  
(annual CAIR NOx program)  
(07 and 08)**

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

**SIPs Due  
(Sep 06)**

**Phase I: CAIR SO2 Program  
(10)**

**Phase II: CAIR NOx and  
SO2 Programs Begin  
(15)**

**CAIR Rule signed**

05

06

07

08

09

10

11

12

13

14

15

16

17

18

**CAMR Rule signed**

**SPs Due  
(Nov 06)**

**Regional Haze  
SIPs Due (Dec 07)**

**Phase I: Hg Program  
(10)**

**Phase II: Hg Program  
(18)**

**CAVR**  
**States develop SPs  
(18 months)**

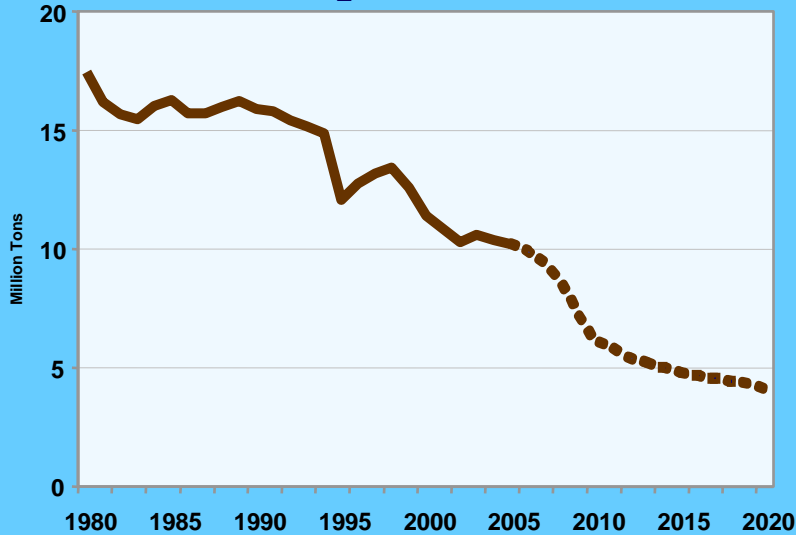
**BART Controls Required  
(5 years after RH SIPs approved)**

**CAMR and CAVR**

**Note:** Dotted lines indicate a range of time.

# CAIR, CAMR, and CAVR Lower Power Industry Emissions

## SO<sub>2</sub> Emissions



- Projected annual costs nationwide:

- \$ 2.7 billion in 2010

- \$ 6.1 billion in 2020

- Reasonable changes in:

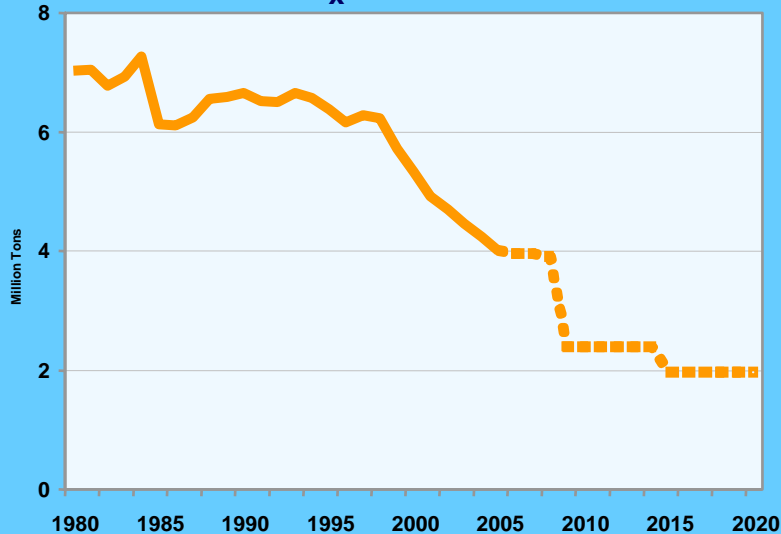
- electricity and natural gas prices

- coal production

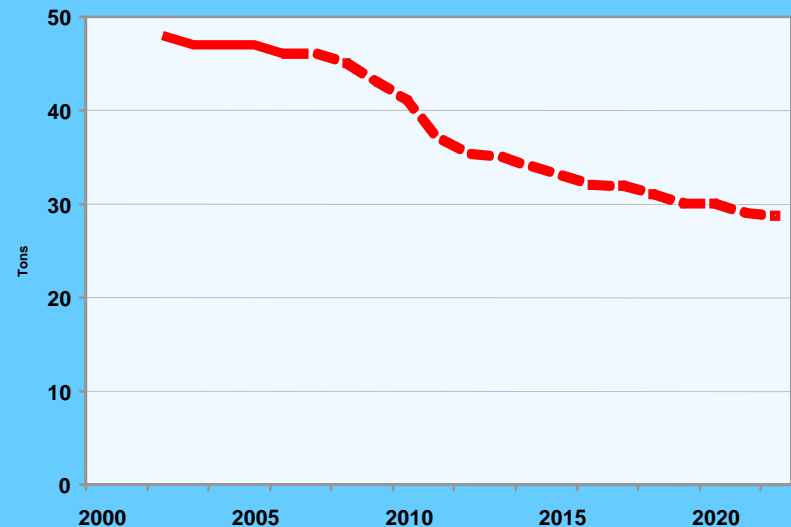
- electric generation mix

- allowance prices

## NO<sub>x</sub> Emissions



## Hg Emissions





# Benefits Are Substantial

- By 2020, CAIR, CAMR, and CAVR will result in \$120-140 billion in health benefits each year, preventing:
  - 22,000 premature deaths
  - 29,000 non-fatal heart attacks
  - 32,000 hospital admissions
  - 2 million work loss days
  - 430,000 school absence days
- Almost \$2 billion in improved visibility benefits each year

- Other non-monetizable benefits:
  - Improved visibility
  - Reduced mercury deposition
  - Decreases in ozone-related damage to agriculture
  - Decreases in sulfur and nitrogen deposition
  - Reduced acidification of surface waters, damage to forest ecosystems and soils, and coastal eutrophication
  - Reduction in acid rain

*Collectively, Title IV and these programs are providing a very large set of benefits to the public.*

# Implementation of New Programs Is Proceeding

- **There is “fast track” reconsideration of parts of rules**
- **States are defining programs for EPA approval**
- **EPA is devising federal plans for CAIR and CAMR as a backstop**
- **Litigation is developing, while passage of Clear Skies remains a high priority**



# For More Information on Power Sector Air Programs:

**Acid Rain Program:**

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

**NOx SIP call:**

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

**Clean Air Interstate Rule:**

<http://www.epa.gov/cair/>

**Clean Air Mercury Rule:**

<http://www.epa.gov/camr/>

**Clean Air Visibility Rule:**

<http://www.epa.gov/visibility/>

**Multi-Pollutant Analyses:**

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

