# PROJECT UPDATE

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New York State Energy Research and Development Authority

Environmental Monitoring, Evaluation, and Protection Program

# Reducing Emissions from the Electricity Sector: The Costs and Benefits Nationwide and in the Empire State


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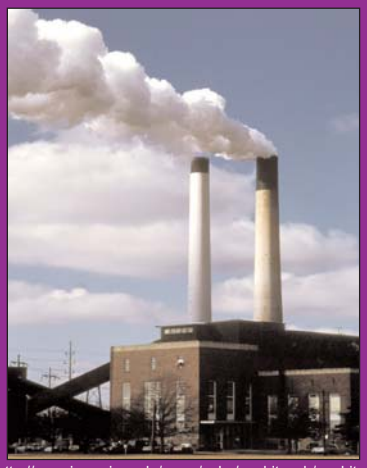
***Project Location***

Statewide



http://www.isgs.uiuc.edu/servs/pubs/geobitspub/geobit12/gb12a.htm
Fine particulate matter (PM) emissions from a power plant.

***Contact Information***

For more information on this project see:

http://www.nyserda.org/programs/environment/emep.asp

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***Keywords***

- Cap and trade
- Emissions caps
- Clean Air Interstate Rule (CAIR)
- Multi-pollutant policy
- Regional strategy


## PROJECT FOCUS

This research project analyzed how new federal rules to reduce emissions of $SO_2$, $NO_X$, and mercury from the electricity sector will likely affect air quality, acid deposition and the cost of supplying electricity to New York residents and to electricity consumers across the nation. The research analyzed the Clean Air Interstate Rule (CAIR) coupled with a number of different proposed approaches to reduce mercury emissions from the electricity sector.

## CONTEXT

The generation of electricity through the combustion of fossil fuels, in particular coal, is a major contributor to air pollution, emitting more $SO_2$ than any other source (68% of U.S. total), as well as $NO_X$ (22% of U.S. total), $CO_2$ (40% of U.S. total), and mercury (40% of U.S. total). Coal-burning power plants are the largest unregulated source of mercury emissions in the country. These pollutants have a range of negative consequences for the environment and human health, including particulate matter, ozone, and mercury pollution; global warming ($CO_2$); and acidic deposition.

A number of multipollutant policies have recently been considered at the national and regional levels for mitigating the effects of air pollution related to electricity generation. These include CAIR and a companion mercury rule. Together these rules address three pollutants ($NO_X$, $SO_2$, and Hg) with a regional cap on $NO_X$ in the eastern United States, a tighter regional cap on $SO_2$ layered on top of a preexisting national cap and national restrictions on mercury emissions.

Alternative proposals for reducing mercury emissions have also been suggested by the states and there is much disagreement about the wisdom of using a cap and trade approach to reduce mercury emissions. The emission reduction targets and approach to reducing Hg emissions have important implications for the cost and for the location of emissions of $NO_X$, $SO_2$, and Hg, as reductions in Hg are often achieved jointly with reductions in other pollutants.

## METHODOLOGY

The project used a suite of models, including a model of capacity planning and operation for the U.S. electricity sector, an integrated assessment model of air transport and environmental effects, and a state-of-the-art air chemistry model for the eastern United States. The combined use of these tools, modified for the purposes of this project, allowed for a broad assessment of the costs and benefits

**EPA Proposed $SO_2$ $NO_x$ Rule, including June 10, 2004 Supplement**

**Summary**

EPA proposes implementing a cap and trade program for 28 eastern States[1] and the District of Columbia to reduce emissions of $SO_2$ and $NO_x$ from electricity generating units. Participation in the regional trading program is optional for the 28 States and the District of Columbia. States that opt-out of the trading program must meet State-level emission caps.

**Affected Facilities (both proposals)**

- Fossil fuel-fired[2] electricity generating units with a capacity greater than 25 MW, **AND**
- Fossil fuel-fired steam co-generation units with a capacity greater than 25 MW that sell more than 1/3 of their potential electric output.

**Regional Annual Allowance Allocation Caps**

**$SO_2$:** 3.86 million tons by 2010 and 2.70 million tons by 2015.
**$NO_x$:** 1.60 million tons by 2010 and 1.33 million tons by 2015.

[1] The 28 States are: Alabama, Arkansas, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, West Virginia, and Wisconsin.

[2] Fossil-fuel fired units are those that fire: natural gas, petroleum, coal, or any fuel derived from such materials, alone or in combination with any other fuel.

Prepared by David Lankton. More information may be found at www.rff.org/multipollutant/.

Credit: Karen Palmer, RFF

### Project Status

- Initiated 2004
- Project complete

New York Energy Smart℠
Public Service Commission — NYSERDA

Since 1975, the New York State Energy Research and Development Authority (NYSERDA) has developed and implemented innovative products and processes to enhance the State's energy efficiency, economic growth, and environmental protection. One of NYSERDA's key efforts, the Environmental Monitoring, Evaluation Protection (EMEP) Program, supports energy-related environmental research. The EMEP Program is funded by a System Benefits Charge (SBC) collected by the State's investor-owned utilities. NYSERDA administers the SBC program under an agreement with the Public Service Commission.

of potential national and regional policies. In evaluating the potential environmental benefits of these proposals, researchers specifically analyzed how they would influence emissions from power plants that affect air quality in New York and the nation. The analysis of environmental effects includes air quality parameters, such as concentrations of fine particulate matter (including nitrates and sulfates) and ozone, and acidic deposition. Potential improvements in air quality are translated into economic benefits, in dollars, associated with health improvements among residents. Additional economic studies focus on the costs, for the electricity sector and consumers, of pollution controls that would have to be installed and on the extent to which residents and businesses would pay for them.

**EPA Proposed Mercury[2] (Hg) Rule**

**Summary**

The EPA proposes two options for reducing national Hg emissions from coal-fired utility units:

1. Maximum Available Control Technology (MACT), OR
2. National Mercury Cap and Trade Program.

Choice of program will depend on legal interpretation of the Clean Air Act (CAA) and its amendments:

- EPA believes it has the authority, under section 111 of the CAA, to implement a national cap and trade program for mercury.
- However, some interpretations of sections 111 and 112 of the CAA and two (apparently contradictory) amendments passed in Congress may restrict EPA's authority. If this is the case, EPA suggests MACT.

**Affected Facilities (both proposals)**

- Coal-fired electricity generating units with a capacity greater than 25 MW, **AND**
- Coal-fired steam co-generation units with a capacity greater than 25 MW that supply more than 1/3 of their potential electric output to an electricity generator.

[1] Prepared by David Lankton. This document can be found at www.rff.org/multipollutant/.
[2] The rule also proposes Nickel emission limitations on oil-fired generators, which are not discussed in this summary.

## FINDINGS

- Benefits to the nation and to New York State significantly outweigh the costs associated with reductions in $SO_2$, $NO_X$ and mercury, and all policies show dramatic net benefits.
- The manner in which mercury emissions are regulated will have important implications not only for the cost of the regulation, but also for emission levels for $SO_2$ and $NO_X$ and where those emissions are located.
- Contrary to EPA's findings, CAIR as originally proposed by itself would not keep summer emissions of $NO_X$ from electricity generators in the SIP region below the current SIP seasonal $NO_X$ cap. In the final CAIR, EPA added a seasonal $NO_X$ cap to address seasonal ozone problems. The CAIR with the seasonal $NO_X$ cap produces higher net benefits.
- The effect of the different policies on the mix of fuels used to supply electricity is fairly modest under scenarios similar to the EPA's final rules.
- A maximum achievable control technology (MACT) approach, compared to a trading approach as the way to achieve tighter mercury targets (beyond EPA's proposal), would preserve the role of coal in electricity generation.
- The evaluation of scenarios with tighter mercury emission controls shows that the net benefits of a maximum achievable control technology (MACT) approach exceed the net benefits of a cap and trade approach.

## PROJECT IMPLICATIONS

Through the integrated use of a set of modeling tools, this project combined scientific, economic, and public policy approaches to addressing pollution from the electricity sector. The project's findings are intended to provide New York with information necessary not only for the state's effective participation in the ongoing debate on multipollutant policy options, but also for the development of successful regional and state policies benefiting the environment and human health.

http://djfink.com/grafix/personal/RI-May2003.html
Power Plant in Queens, New York.