

# Blowing in the Wind

*North Carolina acts to cut  
upwind pollution*

BY BETTY JOYCE NASH

Everybody lives downwind from someone. Just as wind picks up leaves from a neighbor's yard and scatters them onto your raked lawn, so, too, dirty air drifts from state to state, miles from original sources.

Pollution transport has grown into a touchy regional issue as pressure mounts to clean the air in the wake of recent reports that more than half the people in the nation breathe air that doesn't meet federal standards.

In Fifth District states, most metropolitan areas don't measure up. The United States Environmental Protection Agency (EPA) in April reported that about 159 million people live where ozone pollution exceeds standards. Ozone is a gas that damages lungs and aggravates breathing problems. It forms from a brew of chemical emissions, gasoline vapors, and solvents, and worsens in summertime.

Theories of pollution control have changed as scientists gain more information. For example, tall smokestacks, built in response to existing clean air rules, thrust dirty air high into the atmosphere to dilute it. While that helps clean local air, experts now know that the tall stacks send pollutants far and wide, borne by wind and weather patterns.

Epidemiological science has spoken loudly about health effects of tiny particles of pollution called particulate matter. The smaller the particles, the more damage they do. The EPA has set and courts have upheld a standard of 2.5 microns or smaller, with 2.5 being

about one-tenth of the diameter of a human hair. Because they are minuscule, the particles can lodge in people's lungs too deeply to be expelled naturally. Those particles, produced by combustion, can cause a wide range of problems, from respiratory and pulmonary distress, among others, to premature death.

Dirty air looms large over both coasts and it won't dissipate without substantial costs to power producers and, by extension, people who use electricity. Sulfates, formed from sulfur dioxide, are responsible for particle pollution and are emitted primarily from coal-fired power plants.

Market approaches that set caps and allocate allowances have helped cut sulfur dioxide (SO<sub>2</sub>) pollution efficiently in the EPA's acid rain program. Deeper cuts of SO<sub>2</sub> and other pollutants are in store and the EPA is suggesting market caps as a way for states to reach goals.

In the Fifth District, North Carolina has pushed regional air-quality issues to the forefront by filing a petition with the EPA that would force its upwind neighbors to reduce pollution.

## **North Carolina's Clean Smokestacks**

North Carolina in 2002 passed a law mandating air pollution standards stricter than those set by the federal government. The law will cut nitrogen oxide (NO<sub>x</sub>) by 77 percent by 2009 and sulfur dioxide (SO<sub>2</sub>) by 73 percent by

2013. Those two chemicals figure prominently in formation of particulates. The standard is more strict than the Clean Air Interstate Rule proposed by the EPA late last year for 29 Eastern states and Washington, D.C.

North Carolina's legislators bought into the strict controls for a variety of reasons, says Michael Shore, Southeast air quality manager for Environmental Defense. For example, there is continuing public outcry over pollution that obscures visibility in the Tarheel State's prized Southern Appalachian region, degrading the view and the tourist economy. Since 1948, annual average visibility in the Southern Appalachians has decreased 60 percent, 80 percent in summer and 40 percent in winter. Visibility should be 113 miles, but averages 25 instead.

The state also knew from its own data that some areas would not meet the EPA's latest particulate matter standards, says Tom Mather, spokesman for the North Carolina Division of Air Quality.

North Carolina's Attorney General last spring asked the EPA to instruct upwind states to cut power plant emissions to help clean its air.

Recognizing that certain pollutants, such as NO<sub>x</sub>, travel widely, EPA has targeted NO<sub>x</sub> reduction to clean up downwind states, says Rona Birnbaum, chief of assessments and communications for EPA's Clean Air Markets Division. "It's not just a phenomenon that can be addressed adequately by local controls," she says. The Clean Air

Interstate Rule would require states to cut SO<sub>2</sub> and NO<sub>x</sub> emissions. States would have flexibility to choose what sources to control and how to achieve the caps on pollution.

North Carolina submitted its petition after the EPA proposed this rule, notes Carla Oldham, an environmental scientist with the EPA's Air Division.

"Some states showed interest in developing regulations somewhat similar to North Carolina's but they hadn't really made any progress," Oldham says.

Petition 126, which refers to the clause allowing the appeal, has been used before. In the late 1990s, Northeastern states could not meet federal standards for ozone levels. They blamed interstate transport of NO<sub>x</sub> and the states resorted to the 126 petition.

The states weren't sure the EPA would finalize the rule or that the states in question would follow the rule. The EPA and the states agreed that if the agency stayed on track with its requirement that states submit plans to reduce NO<sub>x</sub>, the states would defer action under the petition.

"That worked out nicely for us because with states knowing 126 was out there, if they didn't respond to [the call for plans to reduce NO<sub>x</sub>], then the EPA would regulate their sources. [It was] a strong incentive for states to regulate," Oldham says.

Discussions are under way between the EPA and North Carolina to resolve the issue, given the proposed rule, which may be final this fall and affect the petition's outcome. The rule would require states to submit plans to achieve pollution cuts.

### The Price of Air

Further cuts in emissions will cost big money because even the savviest of power plant operations will need scrubbing systems that remove SO<sub>2</sub> and NO<sub>x</sub>. Power plants emit 63 percent of the nation's SO<sub>2</sub> and about 22 percent of NO<sub>x</sub>.

Duke Power last winter began a \$400 million project at the Marshall Steam Station located near Charlotte, according to spokesman Thomas Williams. The effort will cut the plant's sulfur dioxide emissions by 90 percent. Duke Energy will spend \$1.5 billion

within seven years to comply with Clean Smokestacks. (That legislation allowed North Carolina's biggest power producers, Progress Energy and Duke, to recover costs by freezing rates through 2007. Rates had been scheduled to decline, as projects were amortized and paid off, but will stay the same for now.)

Dan Genest, a spokesman for Dominion Resources, based in Richmond, Va., said the company does not know how much it will cost to comply with the EPA's proposed air pollution rules. But he says the firm's 10 coal-fired plants in Virginia and West Virginia will likely require scrubbers to remove pollutants. Currently, Dominion Virginia Power has scrubbers on all three units at Mt. Storm in northeastern West Virginia, on both units at Clover in Halifax County, Va., and plans for scrubbers on the two biggest units at Chesterfield Power Station in 2010 and 2011.

Continuing to breathe the unavoidable, minuscule particles of soot and ozone will be expensive, too, though. Estimates of the annual costs of implementing the rule are \$3 billion and \$4 billion in 2010 and 2015 respectively. The EPA's benefit-cost estimates put the annual benefits at \$58 billion in 2010 and \$84 billion in 2015 [both estimates in 1999 dollars].

The analysis did not place dollar values on impacts such as the effect on recreational demand from damaged forests, damage to ecosystems, effects of acid deposits to commercial and recreational fishing, among others. But benefits include 1 million fewer days annually lost to workplace absences by 2010 as well as 22,500 fewer hospital admissions and emergency room visits by 2015. And the rules are expected to prevent nearly 10,000 premature deaths annually by 2010. On linking particulate matter with premature death, the EPA's cost-benefit analysis notes: "Inhalation of fine particles is causally associated with premature death at concentrations near those experienced by most Americans on a daily basis. Although biological mechanisms for this effect have not yet been definitively established, the weight of the available epidemiological evidence

supports an assumption of causality."

Cost-benefit analyses are always controversial, especially when the calculation involves placing value on human life. The practice raises a host of ethical issues — as well as tricky technical questions for those charged with determining dollar figures. The EPA's estimates of a statistical life have been criticized by some as too low and by others as too high. "I know that many economists intimately familiar with the statistical life estimate the EPA uses in its analyses feel it is too high," says David Evans of Resources for the Future. The numbers of lives saved or asthma attacks reduced, for example, are not disputed but the value is. "This is particularly true for the benefits of reduced mortality, which constitutes the bulk of the benefits of reduced SO<sub>2</sub> and NO<sub>x</sub> emissions."

Power plants will pass on costs to ratepayers, as any business would, increasing the cost of doing business for industrial and business users and monthly bills for people. Economic theory would suggest that if electricity is associated with pollution, then users should bear as much of the full cost as feasible.

Clean air, economists have urged, can be achieved more efficiently through market-based approaches, which often can out-perform traditional command and control regulation. Evidence from the cap-and-trade program to control SO<sub>2</sub> bears out this notion.

In 1990, the Clean Air Act Amendments capped power plant emissions at half the 1980 levels. The industry was allocated a fixed number of allowances and firms gave up one allowance for every ton of sulfur dioxide emitted. Firms may trade allowances among facilities or bank them for future years.

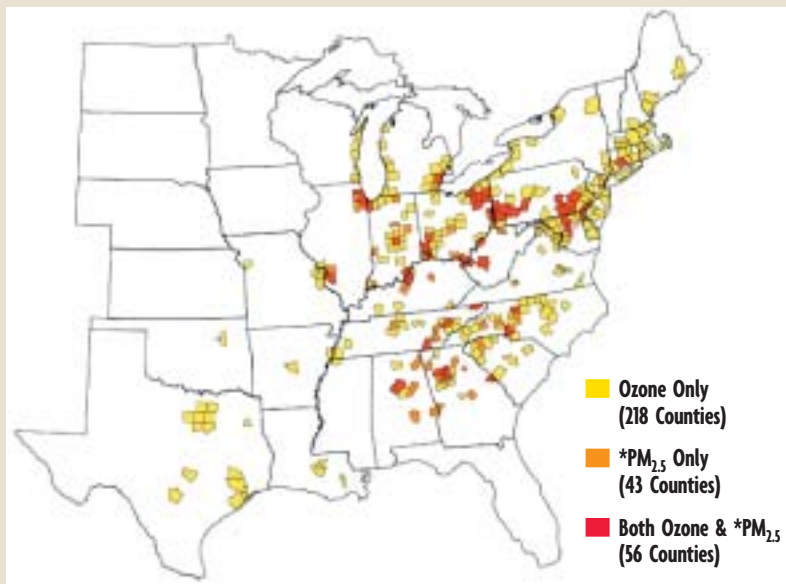
Birnbaum of the EPA says the cap-and-trade programs, including a trading plan among Northeastern states to reduce NO<sub>x</sub> emissions, have been an efficient model for cutting pollution transport.

The operative word when describing a trading program is "cap," notes Birnbaum. For example, the EPA's new Clean Air Interstate Rule, if adopted, will cap NO<sub>x</sub> and SO<sub>2</sub> emissions at 65 percent and 70 percent of current levels respectively by 2015.



## Ozone and Fine Particle Pollution

Eastern counties that exceed standards for ozone and fine particle pollution



NOTE: Based on 2000-2002 data of counties with monitors that have three years of complete data

\*Fine particle matter that can lodge deeply into the lungs

SOURCE: Environmental Protection Agency Office of Air and Radiation

Trading plans are often misunderstood, with people sometimes confusing credits as rights to pollute.

"One thing you have to realize is that you can't just buy a credit," Birnbaum explains. "There has to be an emission reduction someplace above and beyond where they're allowed to be." In the SO<sub>2</sub> trading plan, most of the reductions occurred in higher-emitting states in the Ohio River Valley, where many older power plants operate.

"And typically those are the plants that contribute to a broader scale of problems in multiple states," Birnbaum says.

Another distinguishing feature of a trading plan is that a ton of a pollutant becomes a commodity. That puts the focus on monitoring and assessment rather than prescriptive regulation. "Stringent, accurate, continuous emissions monitoring is a critical component of that program," Birnbaum says. "If they're [emissions] being sold, banked, or traded, you need to track every emission and every allowance that's traded."

Emissions caps, as currently designed, are not adjusted for the size of the economy. As the economy grows and electricity demand heats up, sources

must meet demand within the cap. Flexibility allows power producers to figure out how to meet the cap in the most efficient manner.

The SO<sub>2</sub> cap-and-trade plan cut pollution by half at about half the expected cost, according to Denny Ellerman, executive director of the MIT Center for Energy and Environmental Policy Research.

Cap-and-trade plans allow flexibility, and that sparks innovation. The SO<sub>2</sub> program "also has resulted in innovation through changes in organization and technology, in the organization of markets, and through experimentation at individual boilers, much of which arguably would not have occurred under a more prescriptive approach to regulation," write Dallas Burtraw and Karen Palmer. The discussion paper was written for the Washington, D.C.-based think tank, Resources for the Future.

### Local Gain, Regional Pain

While local cuts in SO<sub>2</sub> emissions cleaned local air, experts realized that power plants' tall stacks added to pollution transport, write Burtraw and Palmer:

"Emitted high in the atmosphere, SO<sub>2</sub> emissions from coal plants travel

hundreds of miles and convert to sulfates that, as particulates, play an important role in air quality affecting human health and visibility."

Contributing to the problem of acid rain and particulates in the Eastern United States is the continued burning of high-sulfur coal found in the Appalachians and the Midwest. That's encouraged by the high cost of transporting low-sulfur Western coal and by coal industry politics that encourage using the high-sulfur local coal.

To tackle regional air pollution, the EPA has expanded the number of states involved in its original nine-state NO<sub>x</sub> cap-and-trade plan to solve summertime smog problems in the Northeast. That plan has been blended into another plan covering more Eastern seaboard states. Virginia is among the states covered by the plan this year, and the state auctioned 5 percent of its NO<sub>x</sub> allowances, raising \$10.5 million. (Virginia and Kentucky are the only states to sell allowances rather than give them to electric utilities.)

Ultimately these programs will fall under the proposed Clean Air Interstate Rule. The rule will cover NO<sub>x</sub> and SO<sub>2</sub> emissions in 29 Eastern states and Washington, D.C.

And the market innovations used to control pollution will make it cheaper to buy more clean air. **RF**

### READINGS

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