

The North Carolina Clean Smokestacks Act

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The story of North Carolina's Clean Smokestacks Act is a story about the link between the environment and health. It is a story about the good things that can happen when a state looks at health care policy through the lens of environmental health. For North Carolina, those good things are cleaner air and better health, for people and the environment, from Clingman's Dome to Jockey's Ridge.

Environmental Health: The Link That Changed the Game

In the 1990s, many citizens and organizations, in North Carolina and elsewhere, had growing concerns about the harmful effects of air pollution on people and the environment. Although the country had made much progress in air pollution control through decades of regulatory actions and technological advances, there was a growing body of disturbing evidence about deteriorating air quality and previously unknown effects of air pollution on health and welfare [1]. Many people were worried about what ozone, haze, smog, tiny particles, acid rain, and nitrogen deposition were doing to mountain ridges and valleys, to piedmont cities and towns, to coastal communities and waters, to forests and streams, to scenic vistas and wildlife, and to people, whether young or old, healthy or vulnerable, or advantaged or disadvantaged. They knew that a leading source of these different pollutants or their precursors was the coal-fired power plants of their state, the region, and areas upwind.

In 1992, in response to specific concerns that declining air quality in the southern Appalachian Mountains was adversely affecting the natural resources of the mountains, particularly the national parks and wilderness areas, 8 southern states, including North Carolina, and various partners began a pivotal, decade-long modeling study of air pollution in the region. Called the Southern Appalachian Mountains Initiative (SAMI), the study was voluntary, collaborative, and innovative [2].

As the SAMI investigators looked at the effects of ozone and fine particle pollution on the natural resources of the region, public health investigators were looking at the impact of the same pollution on the human resources of the region. Scientific evidence was mounting that declining air quality in the region was adversely affecting not only the health of the natural resources, but also the health of the people. Numerous studies linked ground-level ozone, tiny particle

pollution, or both to a long list of human health effects, including premature mortality, hospital admissions for respiratory and cardiovascular problems, emergency department visits for asthma, nonfatal heart attacks, lower- and upper-respiratory tract illness, lost work days, lost school days, minor restricted-activity days, asthma exacerbation among asthmatic populations, and respiratory exacerbation among asthmatic populations.

As the new century began, concerns about the effects of pollutants on the health of people and the environment grew stronger, as did awareness that environmental changes were necessary to improve population health. Numerous individuals and organizations across the state urged the legislature to act. The concerns were especially strong in western North Carolina, and they helped convince then-State Representative Martin Nesbitt and then-State Senator Stephen Metcalf that action was needed. The 2 prepared a bill that would significantly reduce emissions of nitrogen oxide (NO_x) and sulfur dioxide (SO₂) from North Carolina's 14 coal-fired power plants. The bill went beyond the requirements of the federal Clean Air Act and came to be known as the North Carolina Clean Smokestacks Act [3]. The state Senate passed an initial version of the bill in 2001, but it stalled in the state House of Representatives because of questions about its effects on utility rates.

Although the bill stalled, concerns about health and the environment did not. When Mike Easley, governor of North Carolina at the time, hosted the regional 2002 Governors' Air Summit, on May 10, 2002, in Charlotte, North Carolina, a large crowd turned out to express their concerns and urge action [4]. At the summit, people's concerns and the scientific evidence about the human health and welfare effects of the region's decreasing air quality converged in a game-changing way.

Harold Reheis, director of the Georgia Environmental Protection Division, presented the findings of the 10-year SAMI study. SAMI modeling provided clear and compelling evidence that North Carolina would gain substantial ben-

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efits from the Clean Smokestacks Act, regardless of what happened in other states. Previously, one of the arguments against the bill was that it would not do much good because the primary problem was pollution from other states. SAMI showed that each state would benefit most from reducing emissions within its own boundaries. It also showed that the cuts would yield benefits across the state, not just in the mountains.

Clay Ballentine, a physician from Asheville, North Carolina, and Leah Devlin, who was then the North Carolina state health director, presented evidence that the health benefits of the Clean Smokestacks Act would be significant. Ballentine reported on a unanimous 2001 resolution from the North Carolina Medical Society that urged all branches of state government to work toward cleaner air because of the large public health impact of exposure to air pollution. Devlin spoke about the public health imperative of reduced emissions and cleaner air.

The combination of SAMI findings and evidence of adverse effects on human health and welfare made a compelling case that each state should control its own coal-fired power plant emissions. People felt that something had to be done. The governors urged action across the region.

After the summit, the debate about the Clean Smokestacks Act in North Carolina was no longer focused on need, but squarely on costs. Governor Easley and legislators met with utility companies and other stakeholders, in an effort to develop a compromise that could win support in the House. Out of the negotiations came a revised bill that would freeze electric rates for 5 years, while allowing utility companies to accelerate the write-off of their costs for installing new pollution controls, which they estimated to be \$2.3 billion.

The compromise broke the stalemate, and the bill moved forward. The North Carolina General Assembly passed it by overwhelming margins, and Governor Easley signed the North Carolina Clean Smokestacks Act into law on June 20, 2002. North Carolina had looked at the strong link between environment and population health and had enacted a precedent-setting law that promised cleaner air and better health by controlling multiple pollutants.

The Requirements of the Clean Smokestacks Act

The act required the 14 coal-fired power plants of Duke Energy and Progress Energy to achieve a 77% cut in NO_x emissions by 2009 and a 73% cut in SO₂ emissions by 2013. NO_x is a main ingredient in ozone, one of North Carolina's biggest air quality problems, and it contributes to particle pollution, haze, and acid rain. SO₂ is a main ingredient of tiny particle pollution, haze, and acid rain. These same cuts were expected to reduce mercury emissions significantly, as a co-benefit.

An important feature of the Clean Smokestacks Act was that Duke Energy and Progress Energy were required to achieve the emissions cuts through actual reductions at their 14 North Carolina power plants—not by buying or trad-

ing emissions credits from utility companies in other states, as is allowed under federal regulations. Also, the companies were required to reduce their NO_x emissions year-round, not just during the summer ozone season, as under federal requirements.

Successful Implementation of the North Carolina Clean Smokestacks Act

On June 1, 2010, Dee A. Freeman, secretary of the North Carolina Department of Environment and Natural Resources (DENR), and Edward S. Finley Jr., chairman of the North Carolina Utilities Commission, reported to the North Carolina General Assembly on the implementation of the Clean Smokestacks Act. The news was good. The DENR and the commission concluded that the actions taken through June 1, 2010, by Duke Energy and Progress Energy were in accordance with the provisions and requirements of the act. The report detailed the successful implementation of the law:

2007 marked the first step in meeting the emission reductions required by the Clean Smokestacks Act. Specifically, Duke Energy is limited to 35,000 tons of oxides of nitrogen (NO_x) in any calendar year beginning 1 January 2007, and Progress Energy is limited to 25,000 tons of NO_x. Both utilities reported to have met their respective limits as recorded through continuous emission monitoring (CEM) data. ... The end of 2009 marked the second milestone in emission reductions, when Duke Energy had to further reduce its calendar year NO_x emissions to 31,000 tons, and both utilities were required to reduce their calendar year sulfur dioxide (SO₂) emissions, Duke Energy to 150,000 tons and Progress Energy to 100,000 tons. Both utilities reported that they have met their respective limits for 2009, which has been confirmed by DENR staff. The next milestone in emission reductions occurs in 2013, when Duke Energy and Progress Energy must reduce their annual SO₂ emissions to 80,000 tons and 50,000 tons, respectively. Duke Energy's SO₂ emissions were below the 2013 cap in 2009. Progress Energy is expected to meet this target with the recently planned retirement of the Lee coal-fired power plant and its replacement with a combined-cycle natural gas fired plant [5p2].

Two graphs from the North Carolina Division of Air Quality (DAQ) illustrate the dramatic reductions in SO₂ emissions (available at: <http://daq.state.nc.us/news/leg/so2.jpg>) and NO_x emissions (available at: <http://daq.state.nc.us/news/leg/nox.jpg>) [6]. For mercury, the commission

FIGURE 1.
Levels of Ozone in North Carolina, 1990-2009

This figure is available in its entirety in the online edition of the NCMJ.

Note. National Ambient Air Quality Standards (NAAQS) are established by the Environmental Protection Agency under the authority of the Clean Air Act and apply to outdoor air throughout the country. Levels are based on the annual fourth highest 8-hour maximum value recorded. 2009 data are preliminary.

stated that “[t]he controls needed to comply with the North Carolina Clean Smokestacks Act provide significant co-benefits in the form of mercury emissions reductions” [5]. In fact, DAQ Director Sheila Holman indicated that mercury emissions from the coal-fired power plants of Duke Energy and Progress Energy decreased from 3,581 pounds in 1999 to 1,987 pounds in 2008 (S. Holman, e-mail communication, March 4, 2011).

Breathing Better, Dying Later

Now, almost a decade after the enactment of the Clean Smokestacks Act, the citizens of North Carolina are receiving the benefits of cleaner air and better health. Reduced emissions brought about by the Clean Smokestacks Act, in concert with several other state and federal programs to control air pollution, have resulted in significant reductions in levels of important air pollutants in North Carolina. By use of its network of air quality monitors, the DAQ has measured the decrease in the ozone level (Figure 1, available only in the online edition of the NCMJ) and the fine particle level (Figure 2, available only in the online edition of the NCMJ) [6]. “North Carolinians are breathing cleaner air and seeing bluer skies because of the Clean Smokestacks Act,” said Holman. “The act has led to substantial reductions in emissions that cause ozone, haze, particle pollution and other air quality problems.”

As North Carolina has done the hard work of cleaning up its air at home, the scientific evidence supporting the health and welfare benefits of the cleanup have grown stronger and clearer. Here are 2 brief examples.

As noted above, the SAMI found that emissions reductions applied in a particular state would generate the most benefits in that state. That finding had an important role in convincing legislators who were considering the Clean Smokestacks Act to move ahead. The same finding, with respect to the benefits of controlling fine particle and ozone pollution, is now broadly recognized, as demonstrated in an article recently published in *The Economist*, which remarked that “[t]he benefits in terms of breathing better and dying later accrue mostly to the country that is doing the cutting” [7].

Finally, the Clean Smokestacks Act recently contributed to another victory for cleaner air and better health, not just in North Carolina but across the southeastern United States. The act directed the state to use “all available resources” to effect similar reductions from sources in other states, “including the Tennessee Valley Authority” (TVA) [3]. Consequently, the North Carolina Attorney General sued the TVA in 2006, alleging that emissions of SO₂ and NO_x from the TVA’s coal-fired power plants were a public nuisance.

On April 14, 2011, the EPA, the TVA, North Carolina, Alabama, Tennessee, Kentucky, the National Parks Conservation Association, the Sierra Club, and Our Children’s Earth Foundation announced a far-reaching air quality settlement that will result in emissions reductions

FIGURE 2.
Levels of Fine Particles in North Carolina, 2000-2009

This figure is available in its entirety in the
online edition of the NCMJ.

Note. National Ambient Air Quality Standards (NAAQS) are established by the Environmental Protection Agency under the authority of the Clean Air Act and apply to outdoor air throughout the country. Levels are annual averages. 2009 data are preliminary.

across the TVA system that are substantially equivalent to those required by the Clean Smokestacks Act. As James C. Gulick, senior deputy attorney general, reported to the North Carolina Environmental Management Commission on May 12, 2011, the air quality benefits of the agreement to North Carolina will be great. They include substantial health benefits, environmental benefits associated with reduced acid deposition and improved visibility, and economic benefits [8].

Although North Carolina has not estimated the health benefits of the emissions reductions under the settlement agreement, the reductions will exceed those sought by North Carolina in the nuisance case. In that case, the state’s experts meticulously estimated the annual health benefits in North Carolina associated with the emissions reductions the state sought. According to these estimates, the reduced emissions would result in 99 fewer premature deaths; 20 and 40 fewer hospital admissions for treatment of cardiovascular disease and respiratory disease, respectively; 57 fewer visits to the emergency department; 43 fewer cases of chronic bronchitis; 19,000 fewer cases of asthma exacerbation; 47,000 fewer minor-restricted-activity days; and 2,300 fewer lost school days [8].

H. Kim Lyerly, a physician at Duke University Medical Center, sees the Clean Smokestacks Act story as a sign of things to come. “There is an increasing appreciation of the impact of the environment on the behavior of cells. The potential health impact of these behavioral changes may range from preventing the normal development of critical tissues, to the promotion of cancer. A methodical and systematic look at the biologic effects of these environmental changes is critical.” *NCMJ*

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