

Nuclear Energy's Importance In Reaching Clean Air Act Goals

January 2007

Key Points

■ Nuclear power plants generate electricity for 20 percent of U.S. homes and businesses. Because they do not burn anything, they produce no greenhouse gases or emissions associated with acid rain or urban smog. As a result, nuclear power plants make a significant contribution to clean-air compliance.

■ The Clean Air Act of 1970 set standards to improve the nation's air quality. The legislation established limits on the emission of certain pollutants for states and regions of the country. These pollutants include nitrogen oxides and sulfur dioxide.

■ States that fail to meet federal clean-air standards face economic consequences that can affect the economic growth and jobs. Increased use of clean-air nuclear energy will give states additional flexibility for economic expansion and reduce the overall cost of clean-air compliance.

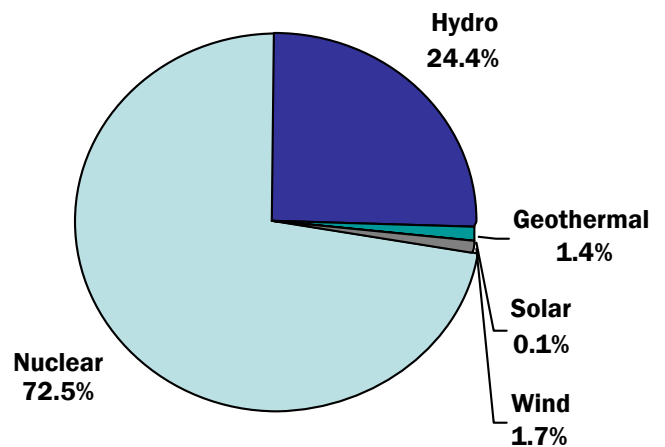
■ Nuclear power has played an important role in reducing air pollution while meeting increased demand for electricity. With nuclear power plant relicensing and construction of new reactors, these clean-air benefits will continue in the future.

Clean Air Act Goals: Improved Air Quality and Healthier Environment

The Clean Air Act of 1970 and federal regulations set standards to improve the nation's air quality. Clean air helps people breathe more easily and curbs air-related health impacts.

The Clean Air Act and regulations established by the U.S. Environmental Protection Agency set limits on the emission of certain pollutants for states and regions of the country. These pol-

**U.S. Sources of Clean-Air
Electricity Generation (2005)**



Sources: Global Energy Decisions/Energy Information Administration

lutants include nitrogen oxides, a precursor of ground-level ozone and smog; sulfur dioxide, which produces acid rain; particulate matter, such as smoke and dust; and mercury. The emissions come from several sources, such as industry, fossil fuel power plants and automobiles. They are not produced by nuclear power plants.

Besides the health impacts of elevated emissions, states that do not meet federal clean air standards face economic consequences. The federal government can penalize states that do not meet federal emissions standards in ways that could affect the economy and jobs. For instance, the EPA could restrict environmental permits for new industrial activities, which could cause businesses to locate elsewhere.



SUITE 400
1776 I STREET, NW
WASHINGTON, DC
20006-3708
202.739.8000
www.nei.org

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Alternatively, the EPA could withhold environmental permits for new coal- or gas-fired power plants to meet growing electricity demand, which could result in less reliable electricity supply and higher electricity rates. That, in turn, could cause businesses to locate elsewhere. Further, the federal government could limit funds for highways and other important services, which could result in the need to increase state and local taxes.

Nuclear Energy Will Meet Electricity Demand While Keeping the Air Clean

Nuclear energy has played an important role by reducing air pollution while meeting increased demand for electricity. Since 1990, nuclear power generation has increased by more than 35 percent and has helped meet demand for more electricity by consumers in dozens of states.

The nuclear energy industry achieved this rise in electrical output mostly by increasing the efficiency of existing plants. The additional electricity generated is the equivalent of adding 26 new nuclear power plants to our nation's grid. However, these plants are operating at record efficiency levels and additional increases would be difficult. To achieve further significant reductions in air pollutants, the operating licenses for these plants must be renewed and new nuclear power plants must be built.

Since 2000, the U.S. Nuclear Regulatory Commission has renewed the operating licenses for nearly half of the nation's reactors. In addition, more than a dozen consortia and companies have announced plans to seek licenses for more than 30 new reactors.

The Nuclear Energy Institute estimates that because of increased demand for electricity, it would take 50,000 megawatts of new nuclear power by 2030 to maintain nuclear's current 20 percent share of total generation. The United States may need even more to meet increasingly stringent clean-air requirements. Congress and other policymakers should consider the environmental benefits of nuclear energy in

future clean-air legislation in view of its critical role in keeping emissions low today and in meeting new requirements. This is essential to the health of the nation's cities and citizens.

Nuclear Energy Helps Cut Emission Of Nitrogen Oxides, Sulfur Dioxide

Nuclear energy has played a key role in America's clean-air program for decades. Like hydroelectric, solar and wind power, nuclear power plants are considered a clean-air energy source because they do not burn anything or emit criteria pollutants regulated by the Clean Air Act. In fact, nuclear power plants generate 73 percent of clean-air electricity. As a result, nuclear plants make a significant contribution to improve our air quality and our health.

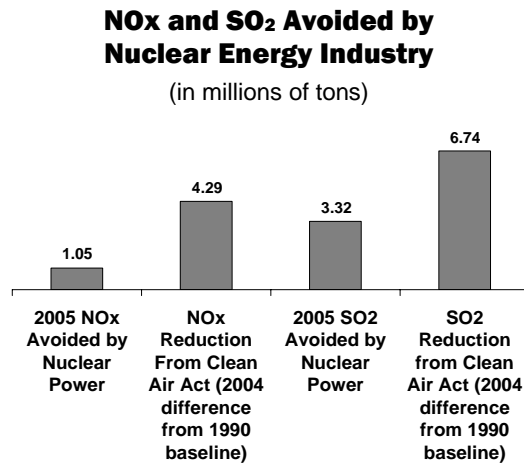
Nuclear power plants have helped states meet air-quality standards. Federal air-quality regulations limit pollution through emission "caps" and "permits," which set a fixed amount of emissions allowed for a range of activities, including electricity production.

As the economy and population grow, electricity demand increases as well. Emissions, however, are not allowed to increase. In fact, the long-term goal is to decrease the emission of criteria pollutants, not just prevent them from increasing. A state or region can more easily remain within its emission caps and still meet its electricity needs when clean-air energy sources are used as much as possible. Improved nuclear plant performance through increased efficiency has helped states reduce air pollution to a greater degree and at a lower cost than expected.

The government has developed extensive regulations to reduce various emissions, including nitrogen oxides (NO_x), associated with ground-level ozone. The EPA created the Ozone Transport Commission and the NO_x Budget Program under the Clean Air Act amendments of 1990 to help reduce ground-level ozone in the northeast and mid-Atlantic states.

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Source: Emissions avoided by nuclear power are calculated using regional fossil-fuel emissions rates from the Environmental Protection Agency and plant generation data from the Energy Information Administration. Contribution of 1990 Clean Air Act measured as changes from 1990 baseline emissions. Data provided by Energy Information Administration.

This program requires a phased, state-based approach to reduce emissions significantly. Its market-based cap-and-trade program has been effective.

Under this program, NO_x emissions were 4.29 million tons lower in 2004 than the base year of 1990. For perspective, nuclear energy prevented the emission of more than 1 million tons of NO_x in the year 2005. In addition, NO_x emissions prevented by nuclear energy were two times greater than those prevented by all other renewable energy sources in 2005.

The federal government also created regulations to reduce sulfur dioxide (SO₂), associated with acid rain. Nuclear power plants help to meet the SO₂ restrictions imposed by Title IV of the Clean Air Act amendments of 1990.

Under this program, SO₂ emissions were 6.74 million tons lower than the base year of 1990. Nuclear energy avoided the emission of 3.32 million tons in 2005. In addition, the SO₂ emissions prevented by nuclear energy in 2005 were more than two times greater than those prevented by all other renewables.

New Clean Air Standards Will Increase Competitiveness of New Reactors

EPA established the Clean Air Interstate Rule and the Clean Air Mercury Rule in 2005 to dramatically reduce nitrogen oxides, sulfur dioxide, ozone, particulates and mercury. These regulations will require coal plants, which meet about half of U.S. electricity demand, to invest as much as \$50 billion in pollution-control equipment, but it may not be cost-effective to retrofit these controls on older fossil plants.

Regional electric system operators, public utility commissions and electric company executives are jointly responsible for meeting electric demands that are projected to increase by 45 percent by 2030. To do so, new baseload generation, both coal and nuclear, is in the planning stage.

Faced with increased coal-plant compliance costs to meet EPA's tough new clean-air rules and future costs to meet likely carbon constraints, policymakers and electric companies may look increasingly to nuclear energy to meet a larger percentage of expected baseload demand growth.

This policy brief also is available at www.nei.org, where it is updated periodically.