

Report: 50 Dirtiest Power Plants

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Despite slow progress, U.S. air pollution picture remains dominated by old and inefficient electricity-generating facilities

Mixed Picture: CO2 Pollution Up, Sulfur Dioxide and Nitrogen Oxide Easing, Mercury Holding Steady; States With Most Problem Facilities Are AL, IA, IL, IN, KY, ND, NE, NJ, OH, PA, TX, and WY.

Washington, D.C. — Even as some of America's dirtiest power plants start to clean up their act, scores of large, old, and inefficient electricity-generating facilities that fail to use available technology continue to pollute the nation's air, according to a report from the nonprofit Environmental Integrity Project (EIP.) For example, just 4 percent of the nation's nearly 1,200 fossil-fuel-burning power plants account for 45 percent of their sulfur dioxide emissions. A fully searchable database of the EIP report is available online at <http://www.dirtykilowatts.org>.

The EIP report notes: "Power plants provide electricity for our homes, businesses, and factories. But they also foul America's air with dangerous pollution. Each year, power plants emit millions of tons of sulfur dioxide (SO₂) and nitrogen oxides (NO_x), pollutants that trigger asthma attacks and contribute to lung and heart disease. Power plants are major contributors to global warming, emitting billions of tons of carbon dioxide (CO₂) each year. And, power plants emit dangerous toxics like mercury, a neurotoxin especially harmful to children and developing fetuses. Nationwide, power plants account for two thirds of all SO₂, 22 percent of NO_x, 40 percent of CO₂, and a third of all mercury emissions."

A bright spot in the EIP report: After years of delay, sulfur dioxide emissions should start to decline over the next several years, as a significant number of coal-fired power plants install scrubbers to meet deadlines imposed under federal and state clean air rules, or to resolve enforcement actions brought by EPA and states. Almost half (46) of the 100 largest SO₂ emitters have either begun construction of a scrubber, or have committed to install one by 2010. Large coal-fired power plants equipped with scrubbers have shown that cleaner power is achievable. For example, Allegheny Energy's Conemaugh plant in Pennsylvania and Harrison plant in West Virginia, and Dominion's Mount Storm plant in West Virginia, all have units equipped with wet limestone scrubbers, and these plants are achieving SO₂ emission rates of approximately one pound per megawatt hour (MWh), well below the dirtiest 50 plants- average of 22 pounds per MWh.

EIP ranked each of the just under 400 power plants for which the most recent emissions and electrical generation data are publicly available, based on emission rates, or pounds of pollutant for each megawatt-hour (or million megawatt-hours, in the case of mercury) that the plant produced. Based on a combined ranking across all four pollutant categories (SO₂, NO_x, CO₂ and mercury), the three worst-scoring plants in the U.S. were in North Dakota, with the very worst - Basin Electric's Leland Olds plant - coming in first based on a ranking of 35th for sulfur dioxide, 19th for carbon dioxide, 24th for nitrogen oxides, and 37th for mercury emission rates.

The balance of the top 10 dirtiest power plants based on the combined score consisted of: #2 Minnkota's Milton Young in North Dakota; #3 Otter Tail's Coyote in North Dakota; #4 South Mississippi Electric Power Association's R. D. Morrow plant; #5 Reliant's Shawville in Pennsylvania; #6 Southern Company's E. C. Gaston in Alabama; #7 Northern States Power's Riverside plant in Minnesota; #8 Southern Company's Greene County plant in Alabama; #9 Central Louisiana Electric's Dolet Hills plant; and #10 Progress Energy's L.V. Sutton plant in North Carolina. The 12 states that are home to at least two of the 50 dirtiest power plants were: Indiana (5); Alabama (4); Kentucky (4); North Dakota (4); Ohio (3); Pennsylvania (3); Texas (3); Iowa (3); Illinois (2); Nebraska (2); New Jersey (2); and Wyoming (2).

The report also ranks the dirtiest power plants on each of the four pollutants - SO₂, CO₂, NO_x, and mercury - for both total tons and by emission rate. For the complete database of the detailed findings go to <http://www.dirtykilowatts.org> on the Web.

Key EIP Findings

Sulfur Dioxide. Emissions of sulfur dioxide from power plants have remained steady over the past three years. The 50 dirtiest power plants based on emission rate are responsible for nearly 38 percent of sulfur dioxide emissions, but generate just over 13 percent of electricity. The 50 dirtiest plants in terms of total tons emitted are responsible for nearly half of all SO₂

The 50 dirtiest plants in terms of total tons emitted are responsible for nearly half of all SO₂ emissions, but generate only 26 percent of electricity. The report notes that power plant companies are finally starting to reduce their sulfur dioxide pollution, thanks to a combination of factors including enforcement actions and new federal rules. Half of the top fifty highest SO₂ emitters in terms of total tons are expected to have scrubbers in operation by 2010.

The top 50 plants averaged 22.44 pounds of sulfur dioxide per megawatt-hour, compared to only one pound per hour for plants equipped with state of the art scrubbers. For the second year in a row, Louisville Gas and Electric's Coleman plant in Kentucky claimed the top spot as the nation's dirtiest power plant in terms of SO₂, generating just over 40 pounds of sulfur dioxide per megawatt-hour of electricity. Southern Company's Bowen plant in Georgia led the nation, with just over 186,000 tons - 20,000 tons more than it emitted in 2004. Reliant's Keystone plant in Pennsylvania followed in close second, with over 178,000 tons - 7,000 more tons than it emitted in 2004. Pennsylvania, Ohio, Indiana, and Georgia have the heaviest concentrations of the dirtiest plants in the nation for SO₂.

Carbon Dioxide: Emissions are creeping upward in the absence of any federal standards. About two-thirds of the heat energy that is consumed at a typical coal-fired power plant is wasted, and that inefficiency contributes directly to high CO₂ emissions from these facilities. This problem is expected to grow worse under a wave of new coal-fired plants being permitted and built across the country. The Department of Energy predicts that CO₂ emissions from electric generating plants will increase nearly 40 percent by 2025, driven in part by the addition of these new coal-fired plants.

Texas has more plants (6) represented in the top 50 than any other state for CO₂ emission rates. Large coal-fired power plants in Georgia, Alabama, and Indiana are among the biggest CO₂ polluters in terms of total tons. Large lignite-burning power plants in North Dakota and Texas rank among the worst CO₂ polluters based on emission rate. Lignite is low grade fuel, abundant in places like Texas and North Dakota, and its comparatively low BTU (heat) value means more CO₂ for the electricity it generates.

Nitrogen Oxide: Slow but steady progress is seen in eastern states. Nitrogen oxides emissions declined slightly nationwide in 2005, but are expected to decline even further in eastern states over the next five years. Rules to limit the interstate transport of NO_x during the summer ozone season were adopted in the late nineties, and emission ceilings have been ratcheted steadily downward. In some states, tough new state standards like the Maryland Healthy Air Act should lead to additional reductions in year-round NO_x emissions. Unfortunately, this trend is not apparent everywhere. NO_x levels remain high in western states, and even in some eastern states like Florida, where stricter federal rules don't apply.

The top 50 plants had an average emission rate of 5.8 pounds of NO_x per megawatt-hour, more than double the 2.8 lbs/MWh average for all 376 of the nation's largest power plants. Of the 376 plants, the top 50 accounted for 22 percent of all NO_x emissions but only 11 percent of net electric generation. For the second year running, Northern State's Riverside plant in Minnesota claimed the top spot, with 11 pounds of NO_x for every megawatt-hour. Otter Tail Power's Big Stone (South Dakota) and Minnkota's Milton Young (North Dakota) power plants have the second and third highest emission rates, with 9.7 and 9.3 pounds of NO_x per megawatt-hour, respectively. Many plants in the top 50, including seven out of the top 10, are in states with less stringent.

NO_x emission limits because they do not fall under the "NO_x SIP call," a federal rule designed to reduce summertime ozone in many eastern U.S. states. Arizona Public Service Company's Four Corners (New Mexico), Florida Power and Light's Crystal River, and American Electric Power's Gavin (Ohio) plants topped the list, emitting more than 41,743, 38,754, and 38,704 tons of NO_x, respectively.

Mercury: Emissions levels remain steady. Power plant mercury emissions remain steady as compared to previous years. EIP's report ranks plants based on 2004 data, which is the most recent publicly available information from EPA's Toxics Release Inventory. Roughly 400 plants emitted just over 47 tons of mercury. Many plants are installing scrubbers to control sulfur dioxide, and mercury emissions will decline with SO₂ controls at these plants. But, EPA's new power plant mercury rule is unlikely to have any effect in the short-term. Power plant mercury emissions are expected to decline to roughly 24 tons in 2020 - significantly higher than EPA's so-called cap of 15 tons by 2018, as power plants "bank" pollution allowances in the early years of the rule's implementation. Widespread use of banked allowances means that EPA's cap of 15 tons will likely not be met until 2026 or beyond.

For all plants ranked for mercury, the top 50 plants with the highest emission rates together emitted 15 tons of mercury, just over 30 percent of all power plant mercury pollution, but generated only about 17 percent of the electricity. Plants in Texas and Pennsylvania topped the list for the nation's highest power plant mercury emission rates. AEP's Pirkey plant (Texas) and Reliant's Shawville plant (Pennsylvania) are the top two dirtiest plants based on mercury emission rates. The top 50 power plant mercury polluters accounted for more than 20 tons, or 43 percent of the industry's mercury emissions, and generated 33 percent of the electricity. TXU's Martin Lake (Texas) plant ranked number one, with more than 1,700 pounds of mercury emissions. Southern Company's Miller plant (Alabama) and Scherer plant (Georgia) came in second and third, emitting 1,544 and 1,465 pounds, respectively. Twenty-three plants in 13 states ranked in the top 50 for both emission rate and total pounds emitted. Two Texas power plants, TXU's Big Brown and American Electric Power's Pirkey, rank in the top 10 for both emission rate and total pounds.

Health/Environmental Impacts Of Power Plant Pollution

Sulfates (from SO₂) are major components of the fine particle pollution that plagues many parts of the country, especially communities nearby or directly downwind of coal-fired power plants. Sulfur dioxide also interacts with NO_x to form nitric and sulfuric acids, commonly known as acid rain, which damages forests and acidifies soil and waterways. Harvard School of Public Health studies have shown that SO₂ emissions from power plants significantly harm the cardiovascular and respiratory health of people who live near the plants. According to EPA studies, fine particle pollution from power plants causes more than 20,000 premature deaths a year. In April 2005, EPA took final action to designate 177 counties and 31 partial counties - home to more than 100 million Americans - as "nonattainment" for health-based fine particle pollution standards.

Nitrogen oxide is tied to ground-level ozone, which is especially harmful to children and people with respiratory problems such as asthma, is formed when NO_x and volatile organic compounds (VOCs) react in sunlight. NO_x also reacts with ammonia, moisture, and other compounds to form fine particle pollution, which damages lung tissue and is linked to premature death. Small particles penetrate deeply into sensitive parts of the lungs and can cause or worsen respiratory disease such as emphysema and bronchitis, and aggravate heart disease. According to the White House Office of Management and Budget, the public health benefit of reducing power plant NO_x emissions amounts to \$1,300 per ton, considering only the benefits of reduced mortality from fine particle pollution linked to heart and lung disease. NO_x also increases nitrogen loading in water bodies, especially in sensitive coastal estuaries. Too much nitrogen accelerates eutrophication, which leads to oxygen depletion and kills fish. According to EPA, NO_x emissions are one of the largest sources of nitrogen pollution in the Chesapeake Bay.

Coal-fired power plants are the single largest source of mercury air pollution, accounting for roughly 40 percent of all mercury emissions nationwide. Mercury is a highly toxic metal that, once released into the atmosphere, settles in lakes and rivers, where it moves up the food chain to humans. The Centers for Disease Control has found that roughly 10 percent of American women carry mercury concentrations at levels considered to put a fetus at risk to neurological damage.¹⁸

Power plants are responsible for about 40 percent of all man-made CO₂ emissions in the nation, and unlike emissions of SO₂ and NO_x, the electric power industry's CO₂ emissions are steadily rising. Carbon dioxide emissions contribute to global warming.

Methodology

The rankings in the EIP report are based on the most current publicly available data (2005 for SO₂, CO₂, and NO_x, and 2004 for mercury) from two federal agencies. The report ranks all large power plants generating at least 2 million megawatt-hours that reported emissions to EPA's Emission Tracking System. For SO₂, CO₂, and NO_x, EIP ranked 376 plants, and for mercury it ranked roughly 400 plants. These plants account for most of the electric generation from the 1,000-plus power plants tracked by EPA. The vast majority of these large power plants are coal-fired.

Net electric generation data was obtained from the Department of Energy's Energy Information Administration (EIA) "Power Plant Reports". These databases collect the fuel consumption, electric generation, and fuel stocks of all power plants in the United States with a generating capacity of one megawatt and greater. Sulfur dioxide, carbon dioxide, and nitrogen oxides emissions data are from EPA's Acid Rain Program Emissions Tracking System (ETS). Mercury data is derived from EPA's Toxics Release Inventory (TRI). Net

electric generation and plant ownership data is drawn from the Energy Information Administration (EIA) within the Department of Energy.

All data is self-reported to these agencies by the utility industry.