

# Up In Smoke

Congress'  
failure to  
control  
emissions  
from coal  
power plants



**U.S. PIRG Education Fund**



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## Executive Summary

Electricity generation from old, heavily-polluting coal-fired power plants rose 15.8 percent nationwide between 1992 and 1998, an increase big enough to power all the industries, businesses and homes in the state of California for a year. This jump, which was spurred in large part by loopholes in the Clean Air Act and the deregulation of the wholesale electric power market, threatens to erode completely the steps that have been taken to reduce pollution from coal-fired power plants. If not for this huge increase in generation from coal-fired power plants the air would be much cleaner today.

The environmental consequences of our continued reliance on coal-fired power plants are alarming. Compared to 1992, increased electricity generation at coal-burning power plants produced 755,000 tons of nitrogen oxide pollution in 1998, that would otherwise not have been emitted. This is the same amount of smog-forming pollution emitted each year by nearly 37 million cars. In addition, the increase in power generation from these plants is responsible for 298 million tons of carbon

dioxide in 1998, the principal cause of global warming. This is an amount equal to the carbon dioxide emitted per year by nearly 44 million cars.

Several factors are encouraging the trend toward increased use of old, polluting coal plants. The Clean Air Act grandfathers pollution from power plants planned or constructed before 1977, allowing them to pollute up to ten times more than new facilities. The Clean Air Act also allows all power plants, regardless of age, to emit unlimited amounts of carbon dioxide and the toxic metal mercury. As a result, power plants are the largest industrial emitters of these pollutants.

These clean air loopholes give older, heavily-polluting plants a competitive edge over cleaner, modern power sources. Congress fueled this advantage in 1992 by deregulating the wholesale power market without equalizing environmental standards for all power plants. Wholesale power is the electricity that utilities sell to each other. Deregulation of the wholesale power market helped increase the demand for power from

**Compared to 1992, increased electricity generation at coal-burning power plants caused 755,000 tons of nitrogen oxide pollution in 1998, that would otherwise not have been emitted.**

**This is the same amount of smog-forming pollution emitted each year by nearly 37 million cars.**

Twenty-eight (28) percent of the increase in coal-fired electricity since 1992 was generated at 188 coal-burning power plants that did not have *any* pollution controls for smog-forming nitrogen oxides at all as of 1997.

existing coal-fired facilities, while simultaneously discouraging the construction of new, cleaner power plants. Retail deregulation is likely to compound this effect unless accompanied by strong environmental standards.

This license to pollute, combined with competition brought on by deregulation, is producing a windfall for the power industry, and a pollution crisis for the public at large. Twenty-eight (28) percent of the increase in coal-fired electricity since 1992 was generated at 188 coal-burning power plants that did not have *any* pollution controls at all for smog-forming nitrogen oxides as of 1997. In 1998, these heavily-polluting facilities accounted for nearly 40 percent (297,000 tons) of the smog and toxic particle forming nitrogen oxides associated with increased power generation at coal-fired facilities since 1992.

Pollution from these power plants sends tens of thousands of Americans, primarily children, to emergency rooms each summer, and contributes to thousands of premature deaths each year. Toxic mercury has contaminated over 50,000 lakes and streams, threatening brain and nervous system damage to unborn babies and young children who are exposed to the mercury through the food chain. Global warming from carbon dioxide emissions is linked to a wide range of health and ecological threats, including increasingly frequent and severe natural disasters, which caused

50,000 deaths worldwide in 1998. According to a recent Red Cross report, in 1998 natural disasters created more 'refugees' than wars for the first time in history (Red Cross 1999).

Efforts to control power plant pollution have met with fierce resistance from the electric utilities. Last summer the U.S. Environmental Protection Agency (EPA) adopted a rule requiring smog-forming emission reductions from power plants in 22 eastern states. Rather than cooperate, a coalition of power companies and states have tied up this regulation in court, delaying its implementation indefinitely.

## Findings

This report measures the nitrogen oxides and carbon dioxide pollution resulting from increased generation of electricity from the nation's old, heavily polluting power plants since 1992. We analyzed generation and emission records at every coal-burning power plant for which pollution data is publicly available—446 plants representing 99 percent of coal-fired electricity generation in the United States—and found that:

- Compared to 1992, increased electricity generation at coal-burning power plants caused 755,000 tons of nitrogen oxide pollution in 1998, that would otherwise not have been emitted. This is the same

**Table 1. Eight of the fifteen states responsible for the most pollution from increased coal-fired power generation supported legal action to overturn EPA's smog reduction plan.**

State	Generation at Coal-Fired Plants 1992 (Mwh)	Generation at Coal-Fired Plants 1998 (Mwh)	Generation Percent Increase (1992 - 1998)	Resulting Nitrogen Oxide Emissions (tons in 1998)	Emissions Equivalent in Automobiles (1998)
Illinois	50,785,947	74,370,042	46%	79,715	3,888,537
West Virginia*	71,911,304	89,244,116	24%	69,982	3,413,756
North Carolina*	54,166,695	69,261,656	28%	56,570	2,759,512
Missouri	47,073,500	63,192,237	34%	52,205	2,546,585
Georgia	58,405,055	71,384,022	22%	43,134	2,104,098
Indiana*	96,723,157	112,828,238	17%	42,860	2,090,732
Kentucky	73,582,567	87,672,553	19%	36,861	1,798,098
Ohio*	119,984,819	129,096,139	8%	35,108	1,712,585
Alabama*	61,082,911	73,421,957	20%	32,106	1,566,146
Texas	122,420,993	135,551,865	11%	26,189	1,277,512
South Carolina*	27,450,087	38,304,352	40%	26,108	1,273,561
Virginia*	25,198,799	35,701,589	42%	24,867	1,213,024
Michigan*	61,687,528	70,489,207	14%	24,305	1,185,610
Maryland	26,333,524	32,720,561	24%	24,018	1,171,610
Wisconsin	33,048,994	40,686,480	23%	21,234	1,035,805

Source: Environmental Working Group. Compiled from DOE and EPA data.

\* States that are opposing EPA's smog reduction plan.

amount of smog-forming pollution emitted each year by nearly 37 million cars.

- The nitrogen oxide pollution caused by increased generation in Illinois, West Virginia, North Carolina, Missouri, Georgia and Indiana *each* has the smog effect of pollution emitted each year by 2 million cars (Table 1).
- The annual carbon dioxide pollution caused by increased generation in Illinois, Missouri, Indiana, Georgia, West Virginia and Kentucky *each* exceeded the annual carbon dioxide emissions from 2.5 million cars (Table 2).
- Eight of the fifteen states responsible for the most nitrogen oxide pollution from increased coal power generation supported legal action to overturn EPA health safeguards that would have reduced NOx pollution from coal-fired power plants by 1 million tons per year (see asterisks in Table 1).
- By increasing electricity generation from coal power plants, eight large electric utility companies, American Electric Power Company, The Southern Company, Edison International, Duke Power Company, Cinergy Corp, Dominion Resources, Tennessee Valley Authority

**Table 2. Power plants in just fifteen states accounted for 75 percent of the global warming emissions from increased electricity generation at coal-fired facilities.**

State	Generation at Coal-Fired Plants 1992 (Mwh)	Generation at Coal-Fired Plants 1998 (Mwh)	Generation Percent Increase (1992-1998)	Increase in Carbon Dioxide Emissions (tons in 1998)	Emissions Increase Equivalent in Automobiles (1998)
Illinois	50,785,947	74,370,042	46%	27,469,516	4,100,778
Indiana*	96,723,157	112,828,238	17%	19,955,858	2,979,104
Missouri	47,073,500	63,192,237	34%	18,539,907	2,767,724
Georgia	58,405,055	71,384,022	22%	18,148,459	2,709,287
West Virginia*	71,911,304	89,244,116	24%	17,631,394	2,632,097
Kentucky	73,582,567	87,672,553	19%	16,952,563	2,530,758
North Carolina*	54,166,695	69,261,656	28%	16,105,922	2,404,367
Texas	122,420,993	135,551,865	11%	15,581,306	2,326,050
Alabama*	61,082,911	73,421,957	20%	13,215,844	1,972,923
Virginia*	25,198,799	35,701,589	42%	12,260,738	1,830,340
South Carolina*	27,450,087	38,304,352	40%	11,286,406	1,684,887
Michigan*	61,687,528	70,489,207	14%	10,271,792	1,533,421
Ohio*	119,984,819	129,096,139	8%	9,958,070	1,486,587
Wisconsin	33,048,994	40,686,480	23%	9,707,354	1,449,159
Iowa	25,008,316	32,129,427	28%	9,197,158	1,372,995

Source: Environmental Working Group. Compiled from DOE and EPA data.  
 \* States that are opposing EPA's smog reduction plan.

**None of the 446 coal power plants analyzed in this report meet the standard for nitrogen oxide emissions applied to new power plants.**

and Associated Electric Coop Inc., each caused the emission of as much smog-forming pollution as would be emitted in a year by one million cars (Table 3).

- Not surprisingly, the individual plants with the largest increases in coal-fired electricity generation and pollution are concentrated in the states and owned by the utilities that have the largest increase in electricity generation from coal-fired power plants (Table 5).

Many utilities with the largest *increases* in pollution from coal-fired facilities are also those spewing the most pollution overall (Tables 3 and 4).

## Recommendations

Coal-fired power plants are the largest industrial source of air pollution in the country. They are major contributors to deadly fine particle air pollution (soot), asthma inducing smog, toxic emissions of mercury, acid rain forming oxides, and carbon dioxide emissions which cause global warming. In spite of the nation's commitment to clean air, much of the pollution from these power plants remains uncontrolled. None of the 446 power plants analyzed in this report meet the requirement for nitrogen oxide emissions applied to new power plants, even though the technology exists to radically reduce pollution from outdated coal-fired power

**Table 3. Because of increased electricity generation from coal, many utility companies emitted thousands of tons of smog-forming nitrogen oxides in 1998 that would otherwise have been avoided.**

Rank	Utility/Holding Company	Percent Increase Electricity Generation from Coal (1992-1998)	NOx Emissions from Increased Generation from Coal Tons (1998)	Number of Cars that Emitted an Equivalent Amount of Pollution in 1998	Total NOx Emissions* from Utility Tons (1997)
1	American Electric Power Company, Inc.	20%	89,252	4,353,756	2
2	Southern Company, The	24%	80,701	3,936,634	3
3	Edison International	73%	48,745	2,377,805	8
4	Duke Power Company	46%	47,973	2,340,146	4
5	Cinergy Corporation	21%	35,388	1,726,244	5
6	Dominion Resources, Inc.	33%	27,186	1,326,146	7
7	Tennessee Valley Authority	10%	23,747	1,158,390	1
8	Associated Electric Coop Inc	47%	22,281	1,086,878	15
9	DTE Energy Company	17%	17,030	830,732	11
10	Union Electric Co	36%	16,754	817,268	27
11	Illinova Corporation	29%	15,291	745,902	16
12	Carolina Power & Light Co	13%	14,895	726,585	10
13	Baltimore Gas & Electric Co	32%	14,521	708,341	25
14	Kansas City Power & Light Co	25%	12,970	632,683	35
15	Northern States Power Company	19%	11,801	575,659	18
16	South Carolina Pub Serv Authority	46%	11,718	571,610	40
17	KU Energy Corporation	30%	11,441	558,098	45
18	LG&E Energy Corporation	18%	10,990	536,098	23
19	Central and South West Corporation	19%	10,924	532,878	20
20	DPL Inc.	20%	10,830	528,293	14
21	Potomac Electric Power Co	19%	10,460	510,244	29
22	Wisconsin Energy Corporation	24%	9,665	471,463	30
23	Public Service Co of NM	43%	9,425	459,756	51
24	Nebraska Public Power District	55%	9,405	458,780	54
25	IES Industries Inc.	62%	8,776	428,098	75

Source: Environmental Working Group. Compiled from DOE and EPA data. \*1997 is the most recent year for which emissions data are available.

6 Table 4. Because of increased electricity generation from coal, many utility companies emitted millions of tons of global warming gases in 1998 that would otherwise have been avoided.

Rank	Utility/Holding Company	Percent Increase Electricity Generation from Coal (1992-1998)	CO2 Emissions from Increased Generation from Coal Tons (1998)	Number of Cars that Emitted an Equivalent Amount of Pollution in 1998	Total CO2 Emissions* from Utility Tons (1997)
1	Southern Company, The	24%	34,224,213	5,109,151	156,530,080
2	American Electric Power Company, Inc.	20%	20,393,148	3,044,385	124,761,892
3	Edison International	73%	16,880,938	2,520,065	43,281,518
4	Cinergy Corporation	21%	14,525,757	2,168,473	68,701,370
5	Duke Power Company	46%	14,104,241	2,105,547	47,125,343
6	Dominion Resources, Inc.	33%	12,449,164	1,858,469	41,374,415
7	Tennessee Valley Authority	10%	9,366,495	1,398,274	109,273,902
8	Union Electric Co	36%	8,768,181	1,308,955	29,795,433
9	DTE Energy Company	17%	7,596,984	1,134,113	47,357,187
10	Central and South West Corporation	19%	6,597,544	984,912	41,208,157
11	Associated Electric Coop Inc	47%	5,745,340	857,691	17,623,146
12	Northern States Power Company	19%	5,208,734	777,584	27,117,071
13	South Carolina Pub Serv Authority	46%	5,069,825	756,847	16,110,617
14	San Antonio City of	87%	5,046,416	753,353	11,274,650
15	KU Energy Corporation	30%	4,876,780	728,028	18,171,797
16	Wisconsin Energy Corporation	24%	4,784,706	714,283	24,901,556
17	LG&E Energy Corporation	18%	4,749,272	708,994	29,415,632
18	GPU, Inc.	10%	4,547,975	678,943	49,669,038
19	Public Service Co of NM	43%	4,423,264	660,326	14,509,543
20	Illinova Corporation	29%	4,366,853	651,904	16,966,683
21	IPALCO Enterprises, Inc.	30%	4,352,252	649,724	17,173,177
22	Houston Industries Incorporated	13%	4,230,588	631,562	35,829,608
23	Carolina Power & Light Co	13%	4,211,327	628,687	30,299,426
24	IES Industries Inc.	62%	4,158,113	620,743	8,790,258
25	Nebraska Public Power District	55%	4,056,016	605,501	11,758,311

Source: Environmental Working Group. Compiled from DOE, ACEEE, and EPA data. \*1997 is the most recent year for which emissions data are available.

plants, and to switch from coal to clean and affordable sources of power.

The United States is never going to achieve its clean air goals or substantially reduce global warming pollution without significant reductions in emissions from coal-fired power plants. To clean up coal power and get the nation on the road toward clean energy:

- The Congress must end the pollution exemption for old, dirty power plants. All power plants, regardless of age or fuel type, must meet new source standards for nitrogen oxides and sulfur dioxide, of 0.15 and 0.3 pounds per million Btu respectively. In addition, caps on power plant emissions of carbon dioxide and mercury must be set at levels that will meet or exceed all international obligations and protect public health.

- Congress should require increased investment in renewable energy and energy efficiency programs. The deregulation of the electric industry should be used as an opportunity to increase our commitment to clean and efficient electricity.
- The Environmental Protection Agency's nitrogen oxide reduction plan is a great first step toward a clean and reliable national energy supply. The states that are suing EPA in an attempt to weaken its plan should abandon their challenges to these rules and begin immediately to develop state plans that meet the health based targets of the EPA rules.
- States must ensure that consumers have the information and ability to choose clean sources of power.

**The United States is never going to achieve its clean air goals or substantially reduce global warming pollution without significant reductions in emissions from coal-fired power plants.**

∞ Table 5. Electric power deregulation and Clean Air Act loopholes have combined to produce substantial increases in electricity generation at heavily polluting coal-fired power plants.

Utility/Holding Company	Plant Name	State	Increased Generation from Coal (1992 - 1998)	Carbon Dioxide Emissions Resulting from Increased Generation Rank	Nitrogen Oxide Emissions Resulting from Increased Generation Rank
Southern Company, The	Scherer	Georgia	113%	1	1
Southern Company, The	James H Miller Jr	Alabama	61%	2	6
Dominion Resources, Inc.	Clover	Virginia	N/A	3	12
American Electric Power Company, Inc.	John E Amos	West Virginia	47%	4	3
American Electric Power Company, Inc.	Phil Sporn**	West Virginia	157%	5	4
Cinergy Corporation	Walter C Beckjord	Ohio	117%	6	7
Duke Power Company	Belews Creek**	North Carolina	33%	7	2
South Carolina Pub Serv Authority	Cross	South Carolina	116%	8	31
San Antonio City of	J K Spruce	Texas	1031%	9	24
Public Service Co of NM	San Juan	New Mexico	43%	10	16
Associated Electric Coop Inc	Thomas Hill**	Missouri	86%	11	9
Orlando Utilities Comm	Stanton Energy	Florida	120%	12	49
Duke Power Company	Marshall	North Carolina	32%	13	28
American Electric Power Company, Inc.	Mitchell	West Virginia	51%	14	20
Western Resources, Inc.	Jeffrey Energy Center	Kansas	34%	15	32
Edison International	Powerton**	Illinois	195%	16	5
Nebraska Public Power District	Gerald Gentleman Station	Nebraska	57%	17	25
DPL Inc.	Killen Station	Ohio	170%	18	15
Edison International	Waukegan**	Illinois	200%	19	26
Edison International	Joliet 29**	Illinois	126%	20	33

Source: Environmental Working Group. Compiled from DOE, ACEEE, and EPA data.

\*1997 is the most recent year for which emissions data is available.

\*\*Facility is not listed by the EPA as having any pollution control equipment for nitrogen oxide emissions.

# Electricity Generation from Coal Power Plants is Increasing

## Weak Air Pollution Standards Promote Dirty Power Generation

*Grandfathering of Older Power Plants.* When it passed the Clean Air Act in 1970, Congress exempted older power plants from the emissions controls required for new sources of pollution. A chief reason for this loophole was the power industry's assertion that older plants would be retired and replaced by new, clean facilities. Therefore, they argued, it would be a waste to require retrofits to these plants. Congress renewed this "grandfather clause" when it amended the Clean Air Act in 1977 and 1990.

Now, nearly thirty years after the original exemption, these plants are still in operation and, as this report documents, they are producing more and more of the nation's electricity. Of the 446 plants analyzed for this report, 309 had at least one unit begin operation by 1970 and 363 had one unit running by 1977 (U.S. DOE 1997). Today, these old plants can emit as much as ten times more pollution than new power generation facilities.

Currently, before a new facility can begin operations, it must install pollution control technology that produces either the "lowest achievable emission rate" — in an area where the air quality does not meet federal health-based standards, (42 U.S.C. 7503(a)(2)) or the "best available control technology," — in areas where the air quality is meeting federal health-based standards, (42 U.S.C. 7503(a)(4)). Although these terms are interpreted slightly differently by each state regulatory agency, it is generally accepted that the "best available control technology" today for new coal plants is selective catalytic reduction which will achieve emission rates of 0.15 pounds of nitrogen oxides per million Btu, and scrubbers for sulfur dioxide, which can achieve emission rates of less than 0.3 pounds of sulfur dioxide per million Btu. By contrast, older, coal-burning power plants routinely emit well over 0.5 pounds of nitrogen oxides per million Btu, and some emit as much as 6.0 pounds of sulfur dioxide per million Btu. Natural gas burning power plants can achieve pollution rates well below the new source standards.

When it passed the Clean Air Act in 1970, Congress exempted older power plants from the emissions controls required for new sources of pollution.

Now, nearly thirty years after the original exemption, these plants are still in operation and they are producing more and more of the nation's electricity.

**As long as they retain their license to pollute, there is a strong incentive to lengthen the lives of old facilities, rather than replacing them with modern, clean generation sources.**

According to the most recent (1997) DOE data, only *seven* of the power plants for which we have pollution control information (of the 446 plants analyzed the EPA collected information on pollution control equipment at 412 facilities) have the newest nitrogen oxide pollution control equipment (selective catalytic and non-catalytic reduction). And 188 of the 412 power plants did not have any pollution control equipment for nitrogen oxides (EPA 1997a).

Not a single power plant analyzed in this report meets the new source performance standard of 0.15 pounds of nitrogen oxide per million Btu, including those seven plants that installed the newest nitrogen oxide pollution control equipment (most likely because they did not use the equipment at all boilers, or year-around). More than 100 plants produced emissions in excess of five times the 0.15 standard (EPA 1997a).

The lack of pollution control on grandfathered plants results in an economic advantage over new plants. Recent quantification suggests that this “pollution subsidy” for nitrogen oxides and sulfur dioxide can confer as much as a 2-cent per kilowatt-hour advantage to an older coal plant compared to a new combined cycle gas power plant (Clean Air Task Force 1999). As long as they retain their license to pollute, there is a strong incentive to lengthen the lives of old facilities, rather than

replacing them with modern, clean generation sources.

*No Standards for Carbon Dioxide and Mercury Pollution.* Current regulations under the Clean Air Act do not limit power plant emissions of carbon dioxide or mercury. This creates one more incentive to generate electricity with coal, which is a big producer of both of these pollutants.

Older, coal-burning plants emit more carbon dioxide than any other source of power, both because they are inefficient, and because the carbon content of coal is higher than other fuels. Pollution control equipment will not reduce carbon dioxide emissions. Instead, reduction in carbon dioxide emissions from the electric power sector can only be achieved through increased efficiency or by switching to cleaner fuels. Renewable energy sources like solar or wind power do not result in carbon dioxide emissions. An analysis by the Alliance to Save Energy found that a modern (combined cycle) natural gas plant, which is nearly twice as efficient and uses fuel with only half the carbon content of coal, could produce power with only one-quarter the carbon dioxide emissions compared to an average coal plant (Alliance to Save Energy 1997).

Mercury emissions from coal-burning power plants, the largest source of mercury pollution, are not regulated at all. The power

industry has successfully blocked any discussion of potential mercury emissions controls, and the EPA has no plans to implement such standards. In contrast, all other major sources of mercury are regulated. Municipal and hospital waste incinerators are currently being regulated for mercury emissions and the health care industry is voluntarily reducing the use of mercury-containing instruments.

There are several ways of reducing mercury emissions from power plants. The most effective way is to switch to fuels that contain little or no mercury, such as natural gas or renewable energy (EPA 1999b). There is also growing evidence that activated carbon injection technology can reduce mercury emissions at coal-burning power plants by 90 percent or more, (EPA 1999b) however the solid waste that would result from this process would contain mercury and would pose disposal problems.

### **Deregulation of the Electric Industry**

The deregulation of the wholesale electric market fundamentally changed the way utilities make decisions about which plants generate how much power. Instead of assuming they need their own power plants to meet the needs of their customers, utilities now look to the wholesale marketplace to meet the demand for power. Moreover, deregulation has

eliminated the traditional revenue incentive for utilities to build new power plants. This has led to an increased reliance on heavily-polluting older power plants and the reopening of some mothballed facilities (see Sidebar). From 1988 to 1992, coal power generation increased only two percent. Since 1992, when the federal Energy Policy Act was passed coal power generation has increased by nearly 16 percent.

Before deregulation, utilities built more power plants than were necessary to meet the local demand for power. Regulators typically required investments in power plants to meet often inflated predictions of future power needs and to avoid any potential for blackouts. Utilities were happy to build more plants because they made regulated profits from investments in power plants and not on the amount of electricity they sold.

This all changed in 1992, when the Congress passed the Federal Energy Policy Act allowing competition in wholesale electric marketplace. Several states have gone further, passing laws allowing competition among utilities for retail electric customers. With very few exceptions, however, efforts to restructure the electric industry ignored or inadequately addressed the effects of the policy changes on the environment or public health.

Deregulation breathed new life into old creaky power plants. As

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**DEREGULATION MAY ENCOURAGE UTILITIES TO REOPEN OLD POWER PLANTS THAT ARE NOT EQUIPPED WITH MODERN POLLUTION CONTROL EQUIPMENT**

Some utilities appear to be attempting to meet a growing market for cheap power by reopening mothballed, dirty power plants that do not meet modern pollution control standards. In the past, when utilities received a guaranteed rate of return on all investments in used and useful power plants, utility companies built new power plants to meet the growing demand for power. Now, in a deregulated generation market, utilities are searching for cheap sources of power. Mothballed power plants often meet that criteria, in large part because Clean Air Act loopholes have allowed them to avoid investments in pollution controls.

Several utility companies have announced plans to open plants that have been shut down for years. Recently, Detroit Edison attempted to open the Conners Creek power plant in Detroit without installing new pollution control devices on the plant. However, Detroit Edison lost its legal fight with local citizens and now plans to switch the plant to natural gas and install modern pollution control equipment. Similarly, Illinois Power recently announced plans to open five oil-burning units at its Havana plant, which have been closed since 1996.

a result, today's coal power generation increases in the United States are not being driven by new power plants. Instead, the increased demand for power is being met by old power plants that run significantly less than their full capacity. In 1992 plants that generate power predominately from coal were using 60 percent of their capability. By 1997 the utilization had jumped to 67 percent (DOE 1994/1999). Utility power plant capacity increased only 2.4 percent from 1992 to 1997, compared to 11.6 percent total increase in electricity demand during these same years (DOE 1994/1997). Generation from coal power plants could potentially increase another 20 percent (theoretically plants can run at 85

percent of their maximum capacity).

At the same time utility companies have slashed their spending on energy efficiency programs. Between 1992 and 1997, U.S. utilities cut their combined investment in energy savings programs by 45 percent, or \$736 million, largely in response to industry deregulation (EWG 1998).

Another big change in the utility industry is the purchase of power plants by non-utility companies. Once purchased by a non-utility company, power plants are not affiliated with any local retail market or service area. Instead, they generate as much power as possible for as

many customers as possible. This causes obvious harmful consequences if the plant has significant unused generation potential and is operating with substandard or nonexistent pollution controls. Additional generation at unregulated old

power plants now owned by non-utility corporations is the clear direction of the deregulated wholesale energy market. Deregulation of the retail market will only increase this trend, unless strong environmental safeguards accompany it.

## Up in Smoke

**Most of the power plants reviewed in the report are still operating well below their maximum capacity. If nothing is done to reduce their emissions, increasing power generation and massive amounts of air pollution from old coal-fired plants will almost certainly continue as long as there is a growing demand for electricity.**

The combination of weak or nonexistent air pollution standards and electricity deregulation has created incentives for increased use of older, coal-burning power plants. Over the six years between 1992 and 1998, power generation at the 446 coal power plants in this analysis increased by 15.8 percent. Our analysis indicates that increased generation from these power plants since 1992 has resulted in 755,000 tons of nitrogen oxide pollution (Table 6) and 298 million tons of global warming pollution in 1998 (Table 7), which otherwise would have been avoided. This is the same amount of smog-forming pollution emitted each year by nearly 37 million cars.

Although the increase in generation from coal power plants is a fairly uniform national phenomenon, several states have seen remarkable increases. Twenty-four (24) states have experienced ten percent or greater increases in coal power generation since 1992. Five states, Illinois, Mississippi, Nebraska, South Carolina and Virginia experienced growth in electricity generation from coal-

fired power plants of greater than 40 percent. These huge increases in power generation result in pollution that would otherwise not be emitted. In each of sixteen states, the nitrogen oxide emissions in 1998 associated with this increase in generation have had the same smog effect as the annual pollution from at least 1 million cars. In each of twenty states, the carbon dioxide emissions associated with the increase in coal-fired power generation equals the global warming pollution emitted annually by one million cars.

By increasing electricity generation from coal power plants, eight large utility companies—American Electric Power Company, The Southern Company, Edison International, Duke Power Company, Cinergy Corp, Dominion Resources, Tennessee Valley Authority and Associated Electric Coop Inc.—each caused the emission of as much smog-forming pollution in 1998 as would be emitted annually by one million cars (Table 3).

The vast majority of coal power plants nationally have

**Table 6. The increased generation from coal power plants since 1992 had the same smog effect in 1998 as the annual pollution from 37 million cars.**

State	Generation at Coal-Fired Plants 1992 (Mwh)	Generation at Coal-Fired Plants 1998 (Mwh)	Generation Percent Increase (1992 - 1998)	Resulting Nitrogen Oxide Emissions (tons in 1998)	Emissions Equivalent in Automobiles (1998)
Illinois	50,785,947	74,370,042	46%	79,715	3,888,537
West Virginia*	71,911,304	89,244,116	24%	69,982	3,413,756
North Carolina*	54,166,695	69,261,656	28%	56,570	2,759,512
Missouri	47,073,500	63,192,237	34%	52,205	2,546,585
Georgia	58,405,055	71,384,022	22%	43,134	2,104,098
Indiana*	96,723,157	112,828,238	17%	42,860	2,090,732
Kentucky	73,582,567	87,672,553	19%	36,861	1,798,098
Ohio*	119,984,819	129,096,139	8%	35,108	1,712,585
Alabama*	61,082,911	73,421,957	20%	32,106	1,566,146
Texas	122,420,993	135,551,865	11%	26,189	1,277,512
South Carolina*	27,450,087	38,304,352	40%	26,108	1,273,561
Virginia*	25,198,799	35,701,589	42%	24,867	1,213,024
Michigan*	61,687,528	70,489,207	14%	24,305	1,185,610
Maryland	26,333,524	32,720,561	24%	24,018	1,171,610
Wisconsin	33,048,994	40,686,480	23%	21,234	1,035,805
Tennessee	50,155,187	56,371,562	12%	20,722	1,010,829
Iowa	25,008,316	32,129,427	28%	18,818	917,951
Kansas	22,294,246	28,208,206	27%	17,067	832,537
Nebraska	12,492,598	18,444,954	48%	16,351	797,610
Minnesota	25,444,283	30,771,358	21%	16,136	787,122
Florida	68,046,593	74,026,935	9%	12,765	622,683
Pennsylvania	105,200,026	111,212,569	6%	11,695	570,488
Mississippi	7,867,619	12,434,290	58%	10,321	503,463
Colorado	30,161,834	33,303,342	10%	7,855	383,171
Arkansas	20,079,663	23,189,194	15%	5,939	289,707
Oklahoma	30,298,706	33,051,856	9%	5,645	275,366
New Mexico	25,434,789	27,678,830	9%	5,330	260,000
South Dakota	2,508,016	3,133,728	25%	4,557	222,293
Nevada	16,678,218	17,224,933	3%	4,509	219,951
Wyoming	41,216,717	43,356,749	5%	4,355	212,439
Utah	31,573,050	33,234,668	5%	3,609	176,049
North Dakota	26,893,384	28,219,639	5%	3,022	147,415
Arizona	36,275,967	36,813,902	1%	1,186	57,854
New Hampshire	3,220,476	3,533,747	10%	1,160	56,585
Louisiana	23,906,980	24,161,978	1%	1,061	51,756
Massachusetts	13,942,856	14,447,772	4%	860	41,951
Delaware	5,263,408	5,107,687	-3%	(191)	(9,317)
Oregon	3,688,338	3,357,104	-9%	(721)	(35,171)
Washington	9,704,462	9,310,093	-4%	(979)	(47,756)
Connecticut	2,787,936	2,162,790	-22%	(981)	(47,854)
Montana	17,157,002	16,537,821	-4%	(1,341)	(65,415)
Alaska	290,834	158,238	-46%	(1,434)	(69,951)
New York	25,457,907	24,206,609	-5%	(3,072)	(149,854)
New Jersey	7,256,269	6,157,070	-15%	(4,565)	(222,683)
Total	1,620,161,560	1,875,872,065	16%	754,941	36,826,390

Source: Environmental Working Group. Compiled from DOE and EPA data.

\* States that are opposing EPA's smog reduction plan.

**Table 7. The increased generation from coal power plants since 1992 had the same global warming effect in 1998 as the annual pollution from 44 million cars.**

State	Generation at Coal-Fired Plants 1992 (Mwh)	Generation at Coal-Fired Plants 1998 (Mwh)	Generation Percent Increase (1992-1998)	Increase in Carbon Dioxide Emissions (tons in 1998)	Emissions Increase Equivalent in Automobiles (1998)
Illinois	50,785,947	74,370,042	46%	27,469,516	4,100,778
Indiana*	96,723,157	112,828,238	17%	19,955,858	2,979,104
Missouri	47,073,500	63,192,237	34%	18,539,907	2,767,724
Georgia	58,405,055	71,384,022	22%	18,148,459	2,709,287
West Virginia*	71,911,304	89,244,116	24%	17,631,394	2,632,097
Kentucky	73,582,567	87,672,553	19%	16,952,563	2,530,758
North Carolina*	54,166,695	69,261,656	28%	16,105,922	2,404,367
Texas	122,420,993	135,551,865	11%	15,581,306	2,326,050
Alabama*	61,082,911	73,421,957	20%	13,215,844	1,972,923
Virginia*	25,198,799	35,701,589	42%	12,260,738	1,830,340
South Carolina*	27,450,087	38,304,352	40%	11,286,406	1,684,887
Michigan*	61,687,528	70,489,207	14%	10,271,792	1,533,421
Ohio*	119,984,819	129,096,139	8%	9,958,070	1,486,587
Wisconsin	33,048,994	40,686,480	23%	9,707,354	1,449,159
Iowa	25,008,316	32,129,427	28%	9,197,158	1,372,995
Minnesota	25,444,283	30,771,358	21%	7,256,671	1,083,310
Nebraska	12,492,598	18,444,954	48%	7,129,959	1,064,394
Maryland	26,333,524	32,720,561	24%	6,942,103	1,036,350
Kansas	22,294,246	28,208,206	27%	6,939,590	1,035,975
Tennessee	50,155,187	56,371,562	12%	6,822,805	1,018,540
Pennsylvania	105,200,026	111,212,569	6%	6,582,811	982,713
Florida	68,046,593	74,026,935	9%	6,509,997	971,843
Mississippi	7,867,619	12,434,290	58%	5,346,459	798,144
Colorado	30,161,834	33,303,342	10%	3,813,892	569,356
Arkansas	20,079,663	23,189,194	15%	3,665,234	547,163
Oklahoma	30,298,706	33,051,856	9%	3,086,469	460,763
New Mexico	25,434,789	27,678,830	9%	2,913,418	434,929
Wyoming	41,216,717	43,356,749	5%	2,766,405	412,982
Utah	31,573,050	33,234,668	5%	1,909,981	285,131
North Dakota	26,893,384	28,219,639	5%	1,672,424	249,667
Nevada	16,678,218	17,224,933	3%	1,031,491	153,986
South Dakota	2,508,016	3,133,728	25%	817,888	122,098
Louisiana	23,906,980	24,161,978	1%	767,872	114,632
Massachusetts	13,942,856	14,447,772	4%	593,939	88,666
Arizona	36,275,967	36,813,902	1%	439,226	65,570
New Hampshire	3,220,476	3,533,747	10%	390,807	58,341
Delaware	5,263,408	5,107,687	-3%	(150,937)	(22,533)
Alaska	290,834	158,238	-46%	(328,977)	(49,111)
Oregon	3,688,338	3,357,104	-9%	(402,763)	(60,126)
Washington	9,704,462	9,310,093	-4%	(446,313)	(66,628)
Montana	17,157,002	16,537,821	-4%	(722,672)	(107,884)
Connecticut	2,787,936	2,162,790	-22%	(723,566)	(108,017)
New Jersey	7,256,269	6,157,070	-15%	(1,332,659)	(198,946)
New York	25,457,907	24,206,609	-5%	(1,595,739)	(238,219)
Total	1,620,161,560	1,875,872,065	16%	297,978,103	44,483,565

Source: Environmental Working Group. Compiled from DOE and EPA data.  
 \* States that are opposing EPA's smog reduction plan.

increased their generation of power since 1992. Over three-quarters of the 446 coal-fired power plants analyzed in this report increased their generation from between 1992 and 1998. Over one-third (163) of the plants increased their generation by more than 25 percent, and 48 plants more than doubled their generation over this period.

Most of the power plants reviewed in the report are still operating well below their maximum capacity. If nothing is done to reduce their emissions, increasing power generation and massive amounts of air pollution from old coal-fired plants will almost certainly continue as long as there is a growing demand for electricity.

# Air Pollution from Power Plants Threatens Public Health and the Environment

In the same way that smog attacks or “oxidizes” human lung tissue, it also oxidizes plant tissues, damaging forests and crops.

## Ozone or “Smog”

Ground-level ozone, also known as “smog,” is our nation’s most prevalent form of air pollution. Despite reductions in smog levels since the passage of the Clean Air Act in 1970 (EPA 1998b), today an estimated 117 million people live in areas of the United States where the air can be unsafe to breathe due to smog (ALA 1997).

Ozone is an invisible, odorless gas which is formed when nitrogen oxides (NO<sub>x</sub>) mix with volatile organic compounds (VOCs) in the presence of sunlight. Thus, the risk to public health is the highest during “ozone season” from mid-May to mid-September in most places, when there is plenty of sunlight.

When inhaled, ozone oxidizes and “burns through” lung tissue. Breathing ozone causes airways in the lungs to become swollen and inflamed. Eventually, this causes scarring, and decreases the amount of oxygen that is delivered to the body through each breath. Outdoor exercise on days when ozone concentrations are high increases the impact on the respiratory system.

In addition, the corrosive effect of exposure to ozone in the respiratory system increases susceptibility to bacterial infections (ALA 1996b).

For vulnerable populations, including children, people with asthma or respiratory disease, and the elderly, smog poses a more serious health threat, sending those with asthma and cardiopulmonary disease to emergency rooms. A number of studies have linked ozone pollution with emergency room visits, including one study showing a 26 percent increase in the number of asthma patients admitted to emergency rooms in New Jersey on summer days when ozone concentrations were high (Weisel et al. 1995). A 1996 American Lung Association study of 13 cities found that between 30,000 and 50,000 emergency room visits were caused by ozone pollution (ALA 1996a).

In the same way that smog attacks or “oxidizes” human lung tissue, it also oxidizes plant tissues, damaging forests and crops. By eroding plants’ stores of carbon, it leaves trees and crops unable to respond to normal demands of growth and

## EIGHT STATES ARE REFUSING TO CUT SMOG CAUSING POLLUTION

During the summer of 1998, EPA issued a plan, known as the NOx SIP Call, for reducing smog-forming nitrogen oxide emissions from coal power plants in the Eastern United States. The purpose of the plan was to address the transport of smog across state boundaries. The plan would have reduced summertime NOx by more than one million tons per year.

Several Southern and Midwestern states have refused to comply with the EPA SIP Call, and have instead waged a courtroom battle in an effort to invalidate the plan. The states who are suing EPA are: Alabama, Indiana, Michigan, North Carolina, Ohio, South Carolina, Virginia, and West Virginia. These states recently won a victory when a three-judge panel of the DC Circuit Court of Appeals voted to delay implementation of

the EPA plan until the case is adjudicated. This will delay the NOx SIP Call for at least one year. EPA, however, is moving forward with other plans to reduce nitrogen oxide emissions from power plants.

Meanwhile, eleven of the twelve states in the Ozone Transport Region have adopted a resolution pledging to meet the goals of the smog reduction plan and to work with other states to see the plan fully implemented. These states include: Maine, Vermont, New Hampshire, Massachusetts, Connecticut, New York, New Jersey, Maryland, Delaware, Pennsylvania, and Rhode Island. The District of Columbia also intends to comply with the SIP Call. Virginia was the only state in the Ozone Transport Region to vote against the resolution.

development and abnormal demands caused by bad weather, pests, or nutrient deficiencies. Among the findings regarding ozone's impact on vegetation are that at least ninety plant species in the Great Smoky Mountain National Park exhibit ozone injury (Renfro 1994), twenty-three plant, wildflower and tree species in Virginia are sensitive to smog (Federal Register 1990), and in the Shenandoah National Park 97 percent of milkweed plants and 85 percent of white pine trees exhibit evidence of ozone damage (Thompson 1992).

Smog also leads to over a billion dollars of crop loss each

year (EPA 1997b). One analysis of crop damage caused by ozone in eight southern states found that losses of seven major commodity crops in these states cost between \$194 million and \$313 million each year (DOA 1996).

### Carbon Dioxide

The earth's average temperature appears to be on the rise, threatening wide-ranging catastrophic climate changes, and the probable cause is the emission of gases from man-made sources. Such was the conclusion of 2,500 of the world's leading climate scientists, economists and other experts of the United Nations' Intergovernmental Panel on

**The primary gas associated with global warming is carbon dioxide.**

Climate Change in its fall 1995 report (IPCC 1996). The evidence is convincing. The hottest 10 years on record have all occurred since 1980, culminating in 1998 – the hottest year ever recorded (NASA 1998).

The primary gas associated with global warming is carbon dioxide. During the past 100 years, human beings have increased the atmosphere's concentration of carbon dioxide by 25 to 30 percent (NRDC 1999). The largest sources of global warming pollution is the burning of fossil fuels to produce electricity and to power automobiles. Electric power plants emit one-third of all carbon dioxide in the U.S (EPA 1994).

**Electric power plants emit one-third of all carbon dioxide in the U.S (EPA 1994).**

Climate scientists' predictions about the consequences of global warming are dire. The Intergovernmental Panel on Climate Change warns that if carbon dioxide concentrations double, which could happen in the next 50 years, the resulting temperature rise could produce severe environmental effects. These might include longer droughts, expansion of deserts, loss of coastal regions due to rising seas, species extinction, spread of malaria and other insect-borne disease, and more frequent and extreme weather events including floods and tornadoes (Epstein 1998). A 1998 U.S. PIRG report documented that in 1998 the worldwide economic losses from natural disasters totaled a record \$90 billion (U.S. PIRG 1998).

On December 11, 1997 in Kyoto, Japan a historic agreement was reached between 150 nations to limit greenhouse gases, binding the U.S. to reducing its emission of greenhouse gases to seven percent below 1990 levels. The global warming agreement has received a cold reception in Congress, fueled in part by the protests of the coal, auto, electricity and oil industries that are responsible for most of our global warming pollution. These industries have been waging a multi-million dollar campaign to defeat efforts to curb pollution from their facilities. Meanwhile, the large increase in global warming pollution that has resulted from increased coal power generation has made the global warming targets much harder to achieve. A continuation of this trend for the next few years will make attainment virtually impossible.

### **Fine Particulate Matter, or "Soot"**

The American Lung Association estimates that 70 million people live in areas where the air is unsafe to breathe due to fine particulate pollution (ALA 1997). Particulate matter or "soot" consists of tiny solids or acid aerosols, some of which are large enough to see, and some of which are so tiny that they are invisible, and potentially lethal.

Combustion of fossil fuels including gas, oil, coal, and

diesel fuel, by sources such as electric power plants, industry, cars and trucks, is the primary cause of fine particulate air pollution. In some cases burning fossil fuel releases fine particles directly into the air, but more often nitrogen oxides or sulfur dioxide released through combustion are transformed into acid aerosols in the air. These acid aerosols act as tiny particles when inhaled, but due to their acidic nature, are more irritating to the human lungs.

Coal-burning is far and away the largest source of fine particles and their precursors, emitting 22 million tons per year (NRDC 1996). Other sources include gasoline and diesel exhaust from cars and trucks, dust from agriculture and unpaved roads, chemical manufacturing, solvent use, forest fires, wood burning and other industrial processes.

Based on decades of research, scientists have discovered that the most dangerous particles are the ones that are least visible, the tiny ones that become deeply imbedded in the lungs when inhaled. Therefore, EPA has created two particulate air pollution standards, one for coarser particles with diameter of up to 10 microns, and one for fine particles with a diameter of less than 2.5 microns (see Sidebar).

As is the case with ozone, fine particulate matter is of

most concern to certain vulnerable populations including young children, the elderly and those with respiratory disease such as asthma. Coughing, swallowing or sneezing cannot expel these "fine" particles, and as they sit in the lungs, they cause varying degrees of irritation and loss of heart and lung function depending upon their chemical composition. Particulate-related illnesses include bronchitis, chronic cough, increased emergency room visits and hospital admissions and, in the worst cases, premature death. The U.S. EPA estimates that tens of thousands of lives are cut short each year in the U.S. due to fine particulate pollution (EPA 1999a).

In addition to threatening respiratory health, soot also causes "haze," making it difficult to see in some of the most beautiful vistas in America. According to the National Park Service, forty years ago one could see for over 90 miles from the peaks of the Southern Appalachians, whereas today visibility is under 35 miles on an average summer day, and under 12 miles on a smoggy day. Studies conducted by the National Park Service and the U.S. Forest Service show that visibility in the Southern Appalachians declined by 60 percent on average since 1948, with an 80 percent decline in summertime visibility (DOI 1992).

### **Acid Rain**

Sulfur and nitrogen oxides from power plants do their

**Coal-burning is far and away the largest source of fine particles and their precursors, emitting 22 million tons per year.**

## NEW CLEAN AIR STANDARDS FOR SMOG AND SOOT ARE CHALLENGED

In July 1997, the U.S. Environmental Protection Agency adopted new, tighter ozone and particulate health standards, acting upon ample medical evidence showing that under the existing standards, legally acceptable levels of ozone and particulate matter were causing severe respiratory problems including premature death for tens of thousands of Americans.

EPA's move to adopt tougher air standards was vehemently opposed by a very powerful coalition of industries including the auto, electric, and oil industries. These special interests spent over \$30 million on advertising and lobbying in a public campaign to subvert the Clean Air Act's

mandate to ensure clean air. In one of the decade's most hard-fought environmental battles, the united efforts of grassroots and national environmental organizations supporting EPA's proposed tougher standards were victorious.

This spring a three-judge panel, deciding a suit filed by the American Trucking Association, overturned the new standards in a 2-to-1 decision. The ruling has been appealed to the full District of Columbia U.S. Court of Appeals. In the meantime, polluters are using this pending case to argue for delays in smog-cutting measures that could significantly improve air quality.

damage not only in the form of airborne ozone and particulates, but in the form of acid rain, which threatens entire forest and aquatic ecosystems throughout the eastern U.S. and in some parts of the upper Midwest. Once emitted into the air, sulfur and nitrogen oxides form sulfates and nitrates, respectively, which are the principal components of acid rain. National treasures, such as the forests of the Shenandoah and Great Smoky Mountains National Parks, New Jersey's Pine Barrens, Pennsylvania's Allegheny National Forest and the lakes of the Adirondacks and Southeastern Canada, all remain in decline due to acid rain.

Acid in rain, clouds, and fog damage trees in two primary

ways: (1) they directly damage the needles and foliage, making them more vulnerable to adverse conditions including cold temperatures, and (2) they deplete nutrients from the soils in which the trees grow. Acid clouds and fog generally have even higher concentrations of damaging sulfates and nitrates than does acid rain. Thus, acid deposition is linked to the decline of red spruce growing at high elevations or in coastal areas which are immersed in acid clouds and fogs for long time periods (Johnson et al. 1992).

Lake and stream ecosystems are also vulnerable to the effects of acid rain. As the acidity of the lakes and streams increases, the number of species that can

live therein declines (U.S. National Acid Precipitation Assessment Program 1991). It is not unusual to see episodic acidification of lakes and streams in the Great Lakes and in the Northeastern U.S. with pH levels below 5.0, in which very few species can survive and nearly none can reproduce. Moreover, acid rain in water causes an increase in aluminum concentrations, which is toxic to many fish species.

In 1990 Congress amended the Clean Air Act, calling for dramatic reductions in sulfur dioxide pollution to address the acid rain problem. Despite the success of the acid rain program in reducing emissions of sulfur dioxide by about 25 percent, eastern lakes have shown little or no improvement. Of 202 monitored lakes in Southeastern Canada, 67 percent have shown no appreciable reduction in acidity (Driscoll 1993). Forests at high elevations, such as New Hampshire's Mt. Washington, continue to be shrouded in acid clouds, while stream-water "can still pickle the leaves that fall from the trees" in Hanover, New Hampshire (Marks 1997). The reason for the failure of current regulations to bring about the recovery of these ecosystems is simple: the program did not require deep enough cuts in sulfur dioxide and nitrogen oxide emissions.

## Mercury

Fish in over 50,000 bodies of water in 40 states contain such high levels of toxic mercury that

health agencies have warned that eating these fish poses serious health risks (EPA 1998a).

Coal and oil power plants are the largest sources of mercury emissions nationally. According to current estimates they represent 33 percent of mercury emissions, followed by municipal waste incinerators, commercial and industrial boilers powered by coal or oil, medical waste incinerators, manufacturing plants, and hazardous waste incinerators (EPA 1997c).

Mercury is a toxic heavy metal, which, when ingested, can cause serious neurological damage, particularly to developing fetuses, infants and children. Consequences of exposure to mercury can include permanent and irreversible developmental delays in learning to walk and talk, incoordination, cerebral palsy, mental retardation, visual loss, abnormal heart rhythms, abnormal reflexes, liver degeneration and gastrointestinal disturbances (Massachusetts PIRG 1996). In recent years scientists have discovered that mercury damages the developing brain and nervous system in more subtle ways at doses that were previously thought to be safe. People most at risk include women of child-bearing age, pregnant women and their fetuses, nursing mothers and their children, and subsistence fishers.

Mercury makes its way into our diets primarily by first being emitted into the air, where it

**Despite the success of the acid rain program in reducing emissions of sulfur dioxide by about 25 percent, eastern lakes have shown little or no improvement.**

undergoes photochemical oxidation, creating inorganic mercury, which is washed into lakes and streams by rain and snow, where it reacts with bacteria to form organic mercury, the form most toxic to humans (CAN 1998). According to a recent study by the Environmental Working Group and Health Care Without Harm, the most commonly eaten fish products, including canned tuna, can present serious health threats to unborn babies and young children because of mercury contamination (EWG/HCWH 1999). Reductions of mercury in the food chain will occur only if we dramatically reduce emissions from industry.

Although power plants are the largest industrial source of mercury, they are not required to

limit their emissions of mercury, nor are most plant owners required to disclose mercury emissions (EPA 1997c). Since 1995, EPA has issued mercury limits for municipal and medical waste incinerators, proposed limits for hazardous waste incinerators, and begun to develop regulations to control mercury from small solid waste incinerators. EPA recently began a one-year collection of data on mercury emissions from coal-fired power plants. However, it remains to be seen whether EPA will take the next step and limit mercury pollution from power plants. Likewise, Congress refused to require mercury reductions from power plants as part of the Clean Air Act Amendments of 1990.

## Policy Recommendations

The United States is never going to achieve its clean air goals or substantially reduce global warming pollution without significant reductions in emissions from coal-fired power plants. The technology exists to power our homes, offices and industries with clean and affordable power. Protection of public health demands that we end our reliance on old, coal-burning power plants.

To clean up coal power and get the nation on the road to clean energy:

- The Congress must end the pollution exemption for old, dirty power plants. All power plants, regardless of age or fuel type, must meet new source standards for nitrogen oxides and sulfur dioxide, of 0.15 and 0.3 pounds per million Btu respectively. In addition, caps on power plant emissions of carbon dioxide and mercury must be set at levels which will meet or exceed all international obligations and protect public health.
- Congress should require increased investment in renewable energy and energy efficiency programs. The deregulation of the electric industry should be used as an opportunity to increase our commitment to clean and efficient electricity.
- The Environmental Protection Agency's nitrogen oxide reduction plan is a great first step toward a clean and reliable national energy supply. The states that are suing EPA in an attempt to weaken its plan should abandon their unfounded legal challenges to these rules and begin immediately to develop state plans that meet the health based targets of the EPA rules.
- States must ensure that consumers have the information and ability to choose clean sources of power.

**The United States is never going to achieve its clean air goals or substantially reduce global warming pollution without significant reductions in emissions from coal-fired power plants.**

## Methodology

This report is based upon data from the Department of Energy (DOE) Energy Information Administration (EIA) and the Environmental Protection Agency (EPA). We first identified the 454 plants that burned coal using EPA's E-GRID database (<http://www.epa.gov/acidrain/egrid/egrid.htm>). After identifying the coal plants we eliminated the few (8) plants for which neither emissions nor generation data was available. The remaining 446 plants represented over 99 percent of all generation from coal-fired power plants in 1996 (the most recent year for which E-GRID data exists).

Many power plants in this report burn both coal and oil or natural gas. On average, however, 98 percent of the generation at these plants is from coal. Because of this, the generation at the plants in our analysis is slightly higher than utility generation from coal fuels only. Other fuels were included in the report because the emission rates of coal-fired power plants are not separated by fuel type.

We used DOE Form 759 (<http://www.eia.doe.gov/cneaf/>

[electricity/page/eia759.html](http://www.eia.doe.gov/cneaf/electricity/page/eia759.html)) data to calculate the increased generation at coal-fired power plants from 1992 to 1998. After calculating the increase in generation from 1992 to 1998 we multiply the increased generation by the most recent emissions rate for the facility to calculate the pollution that has resulted from the increase in electricity generation. In most cases the recent emissions rate is from the 1997 EPA Emissions Tracking System (ETS) database (<http://www.epa.gov/acidrain/so2emis.html#ets>). In a few cases we use the 1996 E-GRID database. We did not use the 1998 EPA ETS database because EPA has not quality-checked the industry submissions yet and recommends that it not be used at this time.

We believe the estimates of 1998 emission rates from 1997 or 1996 rates accurately represent the emission rates for nitrogen oxides and carbon dioxide. There have been no federal programs to reduce pollution from these facilities since 1996 when the NO<sub>x</sub> reductions from the 1990 amendments for the CAA were completed. Further, a

quality control analysis using preliminary 1998 emissions rates from the ETS database indicate that using the 1998 emissions rates would not have significantly changed the results.

In ten cases we used the heat input at the plant to calculate the 1998 power generation. This was required for those plants that have been sold to non-utility companies. The generation data from non-utility companies will be available in October, 1999.

To calculate the automobile equivalent we used two sources. For the nitrogen oxide equivalencies we used the U.S. EPA

Office of Mobile Sources Assessment and Modeling Division estimate of 41 pounds of nitrogen oxides per year for the "average" passenger car (EPA 1997d). To calculate the carbon dioxide "average" car emissions rates we used three sources which resulted in an emissions rate of 6.7 tons per year. We used the National Highway Traffic Safety Administration average fuel efficiency of 23.4 miles per gallon. We used the DOE estimate of 11,800 miles per year for the average vehicle. We used American Council for an Energy Efficient Economy's estimate of 26.5 pounds of carbon dioxide per gallon of gasoline (ACEEE 1999).

## Appendix 2

### Utilities Identified by Holding Company\*

Holding Company	Utility/Non-Utility Name	State
Allegheny Power System, Inc.	Monongahela Power Co Potomac Edison Co West Penn Power Co	West Virginia Maryland Pennsylvania
American Electric Power Company, Inc.	Appalachian Power Co Central Operating Co Columbus Southern Power Co Indiana Michigan Power Co Kentucky Power Co Ohio Power Co	West Virginia West Virginia Ohio Indiana Kentucky Ohio
Atlantic Energy, Inc.	Atlantic City Electric Co	New Jersey
Centerior Energy Corporation	Cleveland Electric Illum Co Toledo Edison Co	Ohio Ohio
Central and South West Corporation	Central Power & Light Co Public Service Co of Oklahoma Southwestern Electric Power Co West Texas Utilities Co	Texas Oklahoma Texas Texas
CILCORP Inc.	Central Illinois Light Co	Illinois
Cinergy Corporation	Cincinnati Gas & Electric Co PSI Energy Inc	Ohio Indiana
CIPSCO Inc.	Central Illinois Pub Serv Co	Illinois
CMS Energy Corporation	Consumers Power Co	Michigan
Dominion Resources, Inc.	Dominion Energy Virginia Electric & Power Co	Illinois Virginia
DPL Inc.	Dayton Power & Light Co	Ohio
DOE	Duquesne Light Co	Pennsylvania
DTE Energy Company	Detroit Edison Co	Michigan
Eastern Utilities Associates	Montaup Electric Co	Massachusetts
Edison International	Edison Mission Energy Southern California Edison Co	Illinois Nevada
Entergy Corporation	Arkansas Power & Light Co Gulf States Utilities Co	Arkansas Louisiana
Florida Progress Corporation	Florida Power Corp	Florida
GPU, Inc.	Metropolitan Edison Co Pennsylvania Electric Co	Pennsylvania Pennsylvania
Houston Industries Incorporated	Houston Lighting & Power Co	Texas
IES Industries Inc.	IES Utilities Inc	Iowa
Illinova Corporation	Illinois Power Co	Illinois

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IPALCO Enterprises, Inc.	Indianapolis Power & Light Co	Indiana
KU Energy Corporation	Kentucky Utilities Co	Kentucky
LG&E Energy Corporation	LG&E Energy Corp Louisville Gas & Electric Co	Kentucky Kentucky
MDU Resources Group, Inc	Montana-Dakota Utilities Co	North Dakota
Minnesota Power	Minnesota Power & Light Co	Minnesota
NIPSCO Industries, Inc.	Northern Indiana Pub Serv Co	Indiana
Northeast Utilities	Holyoke Water Power Co Public Service Co of NH	Massachusetts New Hampshire
Ohio Edison Company	Ohio Edison Co Pennsylvania Power Co	Ohio Pennsylvania
Pacific Gas and Electric	U.S. Generating Company	Massachusetts
PECO Energy Company	Philadelphia Electric Co	Pennsylvania
Pinnacle West Capital Corporation	Arizona Public Service Co	New Mexico
Portland General Corporation	Portland General Electric Co	Oregon
PP&L Resources, Inc.	Pennsylvania Power & Light Co	Pennsylvania
Public Service Company Of Colorado	Public Service Co of Colorado	Colorado
Public Service Enterprise Group, Inc.	Public Service Electric & Gas Co	New Jersey
SCANA Corporation	South Carolina Electric & Gas Co South Carolina Generating Co Inc	South Carolina South Carolina
Sierra Pacific Resources	Sierra Pacific Power Co	Nevada
SIGCORP, Inc.	Southern Indiana Gas & Elec Co	Indiana
Southern Company, The	Alabama Power Co Georgia Power Co Gulf Power Co Mississippi Power Co Savannah Electric & Power Co State Line Energy, LLC	Alabama Georgia Florida Mississippi Georgia Indiana
TECO Energy, Inc.	Tampa Electric Co	Florida
Texas Utilities Company	Texas Utilities Electric Co	Texas
TNP Enterprises, Inc.	Texas-New Mexico Power Co	Texas
Western Resources, Inc.	Kansas Power & Light Co	Kansas
Wisconsin Energy Corporation	Wisconsin Electric Power Co	Wisconsin
WPL Holdings Inc.	Wisconsin Power & Light Co	Wisconsin
WPS Resources Corporation	Wisconsin Public Service Corp	Wisconsin

Source: Environmental Working Group, compiled from DOE/EIA form 759 and 860 and Company Annual Reports.  
\*List includes only companies that own coal-fired power plants.

## Appendix 3

### Holding Company Indexed by State\*

State	Utility/Non-Utility Name	Holding Company
Alabama	Alabama Power Co Arkansas Power & Light Co	Southern Company, The Entergy Corporation
Colorado	Public Service Co of Colorado	Public Service Company Of Colorado
Florida	Florida Power Corp Gulf Power Co Tampa Electric Co	Florida Progress Corporation Southern Company, The TECO Energy, Inc.
Georgia	Georgia Power Co Savannah Electric & Power Co	Southern Company, The Southern Company, The
Illinois	Central Illinois Light Co Central Illinois Public Service Co Dominion Energy Edison Mission Energy Illinois Power Co	CILCORP Inc. CIPSCO Inc. Dominion Resources, Inc. Edison International Illinova Corporation
Indiana	Indiana Michigan Power Co Indianapolis Power & Light Co Northern Indiana Public Service Co PSI Energy Inc Southern Indiana Gas & Elec Co State Line Energy, LLC	American Electric Power Company, Inc. IPALCO Enterprises, Inc. NIPSCO Industries, Inc. Cinergy Corporation SIGCORP, Inc. Southern Company, The
Iowa	IES Utilities Inc	IES Industries Inc.
Kansas	Kansas Power & Light Co	Western Resources, Inc.
Kentucky	Kentucky Power Co Kentucky Utilities Co Louisville Gas & Electric Co	American Electric Power Company, Inc. KU Energy Corporation LG&E Energy Corporation
Louisiana	Gulf States Utilities Co	Entergy Corporation
Maryland	Potomac Edison Co	Allegheny Power System, Inc.
Massachusetts	Holyoke Water Power Co Montaup Electric Co U.S. Generating Company	Northeast Utilities Eastern Utilities Associates Pacific Gas and Electric
Michigan	Consumers Power Co Detroit Edison Co	CMS Energy Corporation DTE Energy Company
Minnesota	Minnesota Power & Light Co Northern States Power Co	Minnesota Power Northern States Power Company
Mississippi	Mississippi Power Co	Southern Company, The
Nevada	Sierra Pacific Power Co Southern California Edison Co	Sierra Pacific Resources Edison International
New Hampshire	Public Service Co of NH	Northeast Utilities
New Jersey	Atlantic City Electric Co Public Service Electric & Gas Co	Atlantic Energy, Inc. Public Service Enterprise Group, Inc.
New Mexico	Arizona Public Service Co	Pinnacle West Capital Corporation

(Continued)

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North Carolina	Duke Power Co	Duke Power Company
North Dakota	Montana-Dakota Utilities Co	MDU Resources Group, Inc
Ohio	Cincinnati Gas & Electric Co Cleveland Electric Illum Co Columbus Southern Power Co Dayton Power & Light Co Ohio Edison Co Ohio Power Co Toledo Edison Co	Cinergy Corporation Centerior Energy Corporation American Electric Power Company, Inc. DPL Inc. Ohio Edison Company American Electric Power Company, Inc. Centerior Energy Corporation
Oklahoma	Public Service Co of Oklahoma	Central and South West Corporation
Oregon	Portland General Electric Co	Portland General Corporation
Pennsylvania	Duquesne Light Co Metropolitan Edison Co Pennsylvania Electric Co Pennsylvania Power & Light Co Pennsylvania Power Co Philadelphia Electric Co West Penn Power Co	DOE GPU, Inc. GPU, Inc. PP&L Resources, Inc. Ohio Edison Company PECO Energy Company Allegheny Power System, Inc.
South Carolina	South Carolina Electric & Gas Co South Carolina Generating Co Inc	SCANA Corporation SCANA Corporation
Texas	Central Power & Light Co Houston Lighting & Power Co Southwestern Electric Power Co Texas Utilities Electric Co Texas-New Mexico Power Co West Texas Utilities Co	Central and South West Corporation Houston Industries Incorporated Central and South West Corporation Texas Utilities Company TNP Enterprises, Inc. Central and South West Corporation
Virginia	Virginia Electric & Power Co	Dominion Resources, Inc.
West Virginia	Appalachian Power Co Central Operating Co Monongahela Power Co	American Electric Power Company, Inc. American Electric Power Company, Inc. Allegheny Power System, Inc.
Wisconsin	Wisconsin Electric Power Co Wisconsin Power & Light Co Wisconsin Public Service Corp	Wisconsin Energy Corporation WPL Holdings Inc. WPS Resources Corporation

Source: Environmental Working Group, compiled from DOE/EIA form 759 and 860 and Company Annual Reports.  
\*List includes only companies that own coal-fired power plants.

## Appendix 4

### Appendix 4. The top fifty utilities producing the most nitrogen oxide pollution from increased electricity generation at coal-fired power plants.

Rank	Utility/Holding Company	Plant Name	State	Increased Generation from Coal-Fired Power Plants (1992 - 1998)	Nitrogen Oxide Emissions Resulting from Increased Generation Tons (1997)*
1	Southern Company, The	Scherer	Georgia	113%	28,788
2	Duke Power Company	Belews Creek**	North Carolina	33%	26,076
3	American Electric Power Company, Inc.	John E Amos	West Virginia	47%	21,536
4	American Electric Power Company, Inc.	Phil Sporn**	West Virginia	157%	20,701
5	Edison International	Powerton**	Illinois	195%	18,365
6	Southern Company, The	James H Miller Jr	Alabama	61%	16,968
7	Cinergy Corporation	Walter C Beckjord	Ohio	117%	13,622
8	American Electric Power Company, Inc.	Gen J M Gavin**	Ohio	13%	12,715
9	Associated Electric Coop Inc	Thomas Hill**	Missouri	86%	12,122
10	American Electric Power Company, Inc.	Tanners Creek	Indiana	54%	11,684
11	Kansas City Power & Light Co	La Cygne	Kansas	46%	11,182
12	Dominion Resources, Inc.	Clover	Virginia	N/A	10,175
13	Associated Electric Coop Inc	New Madrid**	Missouri	23%	10,159
14	American Electric Power Company, Inc.	Kanawha River**	West Virginia	133%	9,814
15	DPL Inc.	Killen Station	Ohio	170%	9,790
16	Public Service Co of NM	San Juan	New Mexico	43%	9,425
17	Tennessee Valley Authority	Allen**	Tennessee	41%	8,953
18	Baltimore Gas & Electric Co	Herbert A Wagner**	Maryland	77%	8,702
19	Edison International	Will County**	Illinois	124%	8,627
20	American Electric Power Company, Inc.	Mitchell	West Virginia	51%	8,603
21	Illinova Corporation	Baldwin	Illinois	15%	8,258
22	Union Electric Co	Sioux**	Missouri	37%	8,092
23	Tennessee Valley Authority	Shawnee	Kentucky	28%	7,677
24	San Antonio City of	J K Spruce	Texas	1031%	7,607
25	Nebraska Public Power District	Gerald Gentleman Station	Nebraska	57%	7,242
26	Edison International	Waukegan**	Illinois	200%	7,125
27	Potomac Electric Power Co	Morgantown	Maryland	38%	7,043
28	Duke Power Company	Marshall	North Carolina	32%	6,916
29	Northern States Power Company	Riverside**	Minnesota	75%	6,831
30	NIPSCO Industries, Inc.	R M Schahfer	Indiana	31%	6,795
31	South Carolina Pub Serv Authority	Cross	South Carolina	116%	6,540
32	Western Resources, Inc.	Jeffrey Energy Center	Kansas	34%	6,530
33	Edison International	Joliet 29**	Illinois	126%	6,338
34	Cinergy Corporation	Wabash River	Indiana	68%	6,286
35	Nevada Power Co	Reid Gardner	Nevada	45%	6,144
36	Southern Company, The	Greene County	Alabama	43%	5,909
37	Cinergy Corporation	Miami Fort	Ohio	24%	5,798
38	Hoosier Energy R E C Inc	Merom	Indiana	54%	5,725
39	East Kentucky Power Coop Inc	H L Spurlock	Kentucky	55%	5,630
40	Florida Progress Corporation	Crystal River	Florida	10%	5,467
41	Carolina Power & Light Co	H B Robinson**	South Carolina	38%	5,379
42	KU Energy Corporation	Ghent	Kentucky	19%	5,280
43	Tennessee Valley Authority	Johnsonville	Tennessee	33%	5,190
44	Houston Industries Incorporated	Limestone	Texas	25%	5,180
45	Southern Illinois Power Coop	Marion**	Illinois	80%	5,078
46	UtiliCorp United Inc	Sibley**	Missouri	32%	5,052
47	Edison International	Joliet 9**	Illinois	252%	4,976
48	Duke Power Company	Cliffside**	North Carolina	103%	4,973
49	Orlando Utilities Comm	Stanton Energy	Florida	120%	4,869
50	Southern Company, The	McIntosh	Georgia	543%	4,654

Source: Environmental Working Group. Compiled from DOE and EPA data.

\* 1997 is the most recent year for which emissions data are available.

\*\* Facility is not listed by the EPA as having any pollution control equipment for nitrogen oxide emissions.

Appendix 5. The top fifty utilities producing the most carbon dioxide pollution from increased electricity generation at coal-fired power plants.

Rank	Utility/Holding Company	Plant Name	State	Increased Generation from Coal-Fired Power Plants (1992 - 1998)	Carbon Dioxide Emissions Resulting from Increased Generation Tons (1997)*	Nitrogen Oxide Emissions Resulting From Increased Generation Tons (1997)*
1	Southern Company, The	Scherer	Georgia	113%	14,171,804	28,788
2	Southern Company, The	James H Miller Jr	Alabama	61%	7,735,723	16,968
3	Dominion Resources, Inc.	Clover	Virginia	N/A	7,245,811	10,175
4	American Electric Power Company, Inc.	John E Amos	West Virginia	47%	4,934,151	21,536
5	Cinergy Corporation	Waller C Beckjord	Ohio	117%	4,715,656	13,622
6	Cinergy Corporation	Wabash River	Indiana	68%	4,575,372	6,286
7	Public Service Co of NM	San Juan	New Mexico	43%	4,423,264	9,425
8	San Antonio City of	J K Spruce	Texas	1031%	4,398,978	7,607
9	Edison International	Powerion**	Illinois	195%	4,102,331	18,365
10	Associated Electric Coop Inc	Thomas Hill**	Missouri	86%	4,095,471	12,122
11	Duke Power Company	Belews Creek**	North Carolina	33%	4,066,576	26,076
12	American Electric Power Company, Inc.	Phil Sporn**	West Virginia	157%	3,998,507	20,701
13	Western Resources, Inc.	Jeffrey Energy Center	Kansas	34%	3,880,324	6,530
14	South Carolina Pub Serv Authority	Cross	South Carolina	116%	3,846,772	6,540
15	DPL Inc.	Killen Station	Ohio	170%	3,549,921	9,790
16	Nebraska Public Power District	Gerald Gentleman Station	Nebraska	57%	3,520,977	7,242
17	Orlando Utilities Comm	Stanton Energy	Florida	120%	3,389,873	4,869
18	American Electric Power Company, Inc.	Mitchell	West Virginia	51%	3,379,901	8,603
19	Edison International	Waukegan**	Illinois	200%	3,229,516	7,125
20	Edison International	Joliet 29**	Illinois	126%	3,228,907	6,338
21	SCANA Corporation	Cope	South Carolina	N/A	3,206,064	4,481
22	Duke Power Company	Marshall	North Carolina	32%	3,199,617	6,916
23	Union Electric Co	Labadie	Missouri	26%	3,194,770	3,484
24	Edison International	Will County**	Illinois	124%	3,150,501	8,627
25	Union Electric Co	Rush Island	Missouri	52%	3,049,704	2,786
26	Northern States Power Company	Sherburne County	Minnesota	17%	3,031,425	4,520
27	Southern Company, The	Victor J Daniel Jr**	Mississippi	109%	2,984,529	3,860
28	Hoosier Energy R E C Inc	Merom	Indiana	54%	2,824,851	5,725
29	Kansas City Power & Light Co	La Cygne	Kansas	46%	2,807,361	11,182
30	East Kentucky Power Coop Inc	H L Spurlock	Kentucky	55%	2,756,851	5,630
31	Houston Industries Incorporated	Limestone	Texas	25%	2,735,287	5,180
32	NIPSCO Industries, Inc.	R M Schaefer	Indiana	31%	2,705,549	6,795
33	Central and South West Corporation	Welsh	Texas	27%	2,673,746	3,622
34	IES Industries Inc.	Ottumwa	Iowa	60%	2,340,242	4,209
35	Tennessee Valley Authority	Johnsonville	Tennessee	33%	2,257,506	5,190
36	KU Energy Corporation	Ghent	Kentucky	19%	2,256,377	5,280
37	Polomac Electric Power Co	Morgantown	Maryland	38%	2,252,025	7,043
38	Florida Progress Corporation	Crystal River	Florida	10%	2,247,172	5,467
39	Tennessee Valley Authority	Shawnee	Kentucky	28%	2,225,131	7,677
40	Duke Power Company	Cliffside**	North Carolina	103%	2,176,261	4,973
41	IPALCO Enterprises, Inc.	Petersburg	Indiana	19%	2,115,241	3,416
42	American Electric Power Company, Inc.	Gen J M Gavin**	Ohio	13%	2,099,459	12,715
43	CIPSCO Inc.	Newton	Illinois	48%	2,074,536	3,340
44	Edison International	Crawford**	Illinois	348%	2,030,827	3,629
45	Energy Corporation	White Bluff	Arkansas	21%	2,028,365	3,576
46	Duke Power Company	G G Allen	North Carolina	87%	1,988,936	4,227
47	Baltimore Gas & Electric Co	Herbert A Wagner**	Maryland	77%	1,974,695	8,702
48	DTE Energy Company	Belle River	Michigan	23%	1,967,307	2,805
49	Cinergy Corporation	Gibson	Indiana	10%	1,885,798	4,560
50	Allegheny Power System, Inc.	Harrison	West Virginia	14%	1,884,013	4,346

Source: Environmental Working Group. Compiled from DOE, ACEEE, and EPA data.

\* 1997 is the most recent year for which emissions data are available.

\*\* Facility is not listed by the EPA as having any pollution control equipment for nitrogen oxide emissions.

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