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Report for Congress

Air Quality: Multi-Pollutant Legislation

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Summary

With the prospect of new layers of complexity being added to air pollution controls and with electricity restructuring putting a premium on economic efficiency, interest is being expressed in finding mechanisms to achieve health and environmental goals in simpler, more cost-effective ways. The electric utility industry is a major source of air pollution, particularly sulfur dioxide (SO_2), nitrogen oxides (NOx), and Mercury (Hg), as well as suspected greenhouse gases, particularly carbon dioxide (CO_2). At issue is whether a new approach to environmental protection could achieve the Nation's air quality goals more cost-effectively than the current system.

One approach being proposed is a "multi-pollutant" strategy – a framework based on a consistent set of emissions caps, implemented through emissions trading. Just how the proposed approach would fit with the current (and proposed) diverse regulatory regimes remains to be worked out; they might be replaced to the greatest extent feasible, or they might be overlaid by the framework of emissions caps.

Currently, six bills have been introduced that would impose multi-pollutant controls on utilities. All of the bills control at least NOx and SO_2; others include CO_2 and Hg. All of these bills involve some form of emission caps, typically taking effect in 2007; and most include a tradeable credit program to implement that cap. On June 27, 2002, the Senate Environment and Public Works Committee reported out an amended version of S. 566. Introduced by Senator Jeffords, the bill would place emission caps on NOx, SO_2, and CO_2, and emission limitations on Hg.

In February, 2002, the Bush Administration announced two air quality proposals. The first would amend the Clean Air Act to place emission caps on electric utility emissions of SO_2, NOx, and Hg. Implemented through a tradeable allowance program, the emissions caps would be imposed in two phases: 2008 and 2018. The second Bush proposal initiates a new voluntary greenhouse gas reduction program. This plan, rather than capping CO_2 emissions, focuses on improving the carbon efficiency of the economy, reducing current emissions of 183 metric tons per million dollars of GDP to 151 metric tons per million dollars of GDP in 2012.

The Administration's three-pollutant proposal was introduced July 26, 2002, as H.R. 5266 (introduced in the Senate as S. 2815). Its provisions concerning SO_2, NOx, and Hg are less stringent than the other bills introduced and take effect later. The Administration's proposal concerning CO_2 is difficult to compare with the pending bills because it is voluntary rather than mandatory: Although the Administration's proposal is broader (covering all greenhouse gas emissions rather than just utility CO_2), it appears that actual U.S. greenhouse emissions would be higher than allowed by the other bills.

This report will be updated as warranted.

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Introduction

Electric utility generating facilities are a major source of air pollution. The combustion of fossil fuels (petroleum, natural gas, and coal), which account for 67% of U.S. electricity generation, results in the emission of a stream of gases. These gases include several pollutants that directly pose risks to human health and welfare, including particulate matter (PM),[1] sulfur dioxides (SO_2), nitrogen oxides (NOx), and mercury (Hg). Particulate matter, sulfur dioxide and NOx are currently regulated under the Clean Air Act (CAA), and the Environmental Protection Agency (EPA) has announced its intention to regulate mercury. Other gases may pose indirect risks, notably carbon dioxide (CO_2), which may contribute to global warming.[2] Table 1 provides estimates of SO_2, NOx, and CO_2 emissions from electric generating facilities. Annual emissions of Hg from utility facilities are more uncertain; current estimates indicate about 48 tons. Utilities are subject to an array of environmental regulations, which affect in different ways both the cost of operating existing generating facilities and of constructing new ones.

Table 1: Emissions From U.S. Fossil-fuel Electric Generating Plants
(thousands of short tons)

Emissions	1994	1995	1996	1997	1998	1999
SO_2	14,211	11,437	12,053	12,317	12,432	11,968
NOx	6,790	6,737	6,996	7,227	7,221	7,051
CO_2	1,986,079	1,995,471	2,065,339	2,142,118	2,209,286	2,191,576

Source: Energy Information Administration, *Electric Power Annual 1999*, vol. II, p. 40

The evolution of air pollution controls over time and as a result of growing scientific understanding of health and environmental impacts has led to a

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[1]Particulate matter is regulated depending on the particle size; current regulations address particles less than 10 microns in diameter (PM_{10}); EPA has promulgated regulations for particles less than 2.5 microns in diameter ($PM_{2.5}$) which have not been implemented. SO_2 and NOx emissions could be affected by regulations of $PM_{2.5}$. Current concerns about emissions from fossil-fuel electric generating plants do not explicitly address PM, but could indirectly do so through attention to SO_2 and NOx.

[2]Steam-electric utilities produce minor amounts of volatile organic compounds (VOCs), carbon monoxide (CO), and lead — on the order of 2% or less of all sources.

multilayered and interlocking patchwork of controls. Moreover, additional controls are in the process of development, particularly with respect to NOx as a precursor to ozone, to both NOx and SO_2 as contributors to $PM_{2.5}$, and to Hg as a toxic air pollutant. Also, under the United Nation's Framework Convention on Climate Change (UNFCCC), the United States agreed to voluntary limits on CO_2 emissions. The current Bush Administration has rejected the Kyoto Protocol, which would impose mandatory limits, in favor of a voluntary reduction program. Thus, mandatory federal CO_2 controls in the United States appear unlikely in the near term.

For many years the complexity of the air quality control regime has caused some observers to call for a simplified approach. Now, with the potential both for additional control programs on SO_2 and NOx and for new controls directed at Hg and CO_2 intersecting with the technological and policy changes affecting the electric utility industry, such calls for simplification have become more numerous and insistent. One focus of this effort is the "multi-pollutant" or "four pollutant" approach. This approach involves a mix of regulatory and economic mechanisms that would apply to utility emissions of up to four pollutants in various proposals – SO_2, NOx, Hg, and CO_2. The objective would be to balance the environmental goal of effective controls across the pollutants covered with the industry goal of a stable regulatory regime for a period of years.[3]

Proposed Legislation and Legislative Action in the 107th Congress

Currently, seven bills have been introduced in the 107th Congress to reduce emissions by increasing pollution controls on electric generating facilities. They are summarized in Appendix 1. All of the bills control at least NOx and SO_2; others include CO_2 and Hg. All of these bills involve some form of emission caps, and most include a tradeable credit program to implement that cap.

Two bills, H.R. 25 and S. 588, are companion legislation focused on SO_2 and NOx, with a mandate to EPA to regulate Hg by 2005. The bills build on the SO_2 allowance trading scheme contained in title IV of the 1990 Clean Air Act Amendments (CAAA); under this program utilities are given a specific allocation of permitted emissions (called allowances) and may choose to use those allowances at their own facilities, or, if they do not use their full quota, to bank them for future use or to sell them to other utilities needing additional allowances.

Two other bills, H.R. 1256 and S. 556 as originally introduced, are the same except for minor wording differences. The bills would control SO_2, NOx, Hg, and CO_2, but provide considerable flexibility to EPA in developing implementation strategies. Specifically, EPA implementing regulations are required to allocate reductions equitably and may consider market-oriented mechanisms, except for Hg.

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[3]Larry Parker and John Blodgett, *Electricity Generation and Air Quality: Multi-pollutant Strategies*, CRS Report RL30878, March 13, 2001.

The fifth bill introduced, H.R. 1335, controls SO_2, NOx, Hg, and CO_2, but with individual unit-by-unit requirements for SO_2 and NOx based on output-based emission rates and average 1998-2000 fuel consumption[4]; a percentage reduction requirement for Hg; and an allowance-based system for CO_2.

The last two bills introduced, H.R. 5266 and S. 2815, are the Administration's proposal to control SO_2, NOx, and Hg. It is discussed in the next section along with the Administration's voluntary CO_2 initiative.

On June 27, 2002, the Senate Environment and Public Works Committee reported out an amended version of S. 556. As indicated in Appendix 1, in comparison with the bill as introduced, the amended S. 566's compliance deadlines for its reduction requirements have been extended one year to 2008. In addition, the reported bill elaborates on provisions with respect to excess emissions penalties and protections for possible local ambient air impacts. In particular, the reported bill has detailed provisions for allocating SO_2, NOx and CO_2 allowances to various economic sectors and interests. In most cases, these interests (or their trustees in the case of households and dislocated workers and communities) would auction off (or otherwise sell) their allowances to the affected utilities, and use the collected funds for their designated purposes.

The Bush Administration's Proposals

In February, 2002, the Bush Administration announced two air quality proposals.[5] The first would amend the Clean Air Act to place emission caps on electric utility emissions of SO_2, NOx, and Hg. Implemented through a tradeable allowance program, the emissions caps would be imposed in two phases: 2010 (2008 in the case of NOx) and 2018. It was introduced as part of a complete rewrite of Title IV of the Clean Air Act on July 26th as H.R. 5266. It was introduced in the Senate on July 29th as S. 2815.

As indicated in Appendix 1, H.R. 5266/S. 2815's NOx cap is significantly less stringent for 2008 than the requirements for 2005 or 2007 in the bills discussed above, and remains less stringent even through the second phase beginning in 2018. The situation is similar for SO_2, except that its 2010 cap is similar to the H.R. 25/S. 588 cap for 2007, and its 2018 cap is similar to the H.R. 1335 cap for 2005. On mercury, H.R. 5266/S. 2815's provisions are less stringent and come into effect later than the caps imposed by S. 556, H.R. 1256, or H.R. 1335; in fact, H.R. 5266/S. 2815's 2018 Hg emissions goal allows about 3 times more emissions than these bills' goals for 2005, 2007, or 2008. (It is not really possible to compare H.R. 25/S. 588, which do not specify an Hg emissions goal, leaving regulation up to EPA, except that

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[4] Plants built after 2000 appear to be in an anomalous position; as their historical fuel consumption would be zero, the bill would seem to imply they can emit no SO_2 or NOx.

[5]Papers outlining the Administration's proposals are available from the White House web site: [http://www.whitehouse.gov/news/releases/2002/02/clearskies.html] for the three pollutant proposal and, [http://www.whitehouse.gov/news/releases/2002/02/climatechange.html]for the climate change initiative.

the bills set a regulatory deadline of 2005 while the Administration proposal would begin regulating Hg in 2010.)

In addition to the emissions caps, H.R. 5266/S.2815 would substantially modify or eliminate several provisions in the Clean Air Act with respect to electric generating facilities. The New Source Performance Standards (Section 111) would be eliminated and replaced with standards for SO2, NOx, particulate matter, and Hg for new sources, and modified sources that opt to comply with them in lieu of Best Available Control Technology (BACT) determinations under Prevention of Significant Deterioration (PSD) provisions (CAA, Part C) or Lowest Achievable Emissions Rate (LAER) determination under non-attainment provisions (CAA, Part D). Compliance with these provisions exempts such facilities from New Source Review (NSR), PSD-BACT requirements, visibility (Best Available Retrofit Technology) BART requirements, and non-attainment LAER requirements. The exemption does not apply to PSD-BACT requirements if facilities are within 50 km of a PSD Class 1 area.

Existing sources can also receive these exemptions if they agree to meet a particulate matter standard specified in the bill along with good combustion practices to minimize carbon monoxide emissions within 3 years of enactment.

Other exemptions provided by H.R. 5266/S. 2815 include an exemption for steam electric generating facilities from regulation under Section 112 of the CAA, and relief from enforcement of any Section 126 petition before 2012.

The second Bush administration proposal (for which no legislation has been introduced) initiates a new voluntary greenhouse gas reduction program, similar to ones introduced by the earlier Bush and Clinton Administrations.[6] Developed in response to the U.S. ratification of the 1992 UNFCCC, these previous plans projected U.S. compliance, or near compliance, with the UNFCCC goal of stabilizing greenhouse gas emissions at their 1990 levels by the year 2000 through voluntary measures. The new proposal introduced by the Bush Administration does not make that claim, only projecting a 100 million metric ton reduction in emissions from what would occur otherwise in the year 2012. Instead, the plan focuses on improving the carbon efficiency of the economy, reducing current emissions of 183 metric tons per million dollars of GDP to 151 metric tons per million dollars of GDP in 2012. It proposes several voluntary initiatives, along with increased spending and tax incentives, to achieve this goal. However, the Administration states that three-quarters of the projected reduction would be achieved through current efforts underway, not by the new initiatives.

It is difficult to compare the Administration's proposal to the bills that have been introduced, as it is a voluntary, not mandatory program. The three bills that contain CO_2 provisions set their caps at 1990 levels. In contrast, the Administration contains no cap or other limits on emissions. Rather, following general climate change approaches of the earlier Bush Administration and the Clinton

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[6]For a discussion of those previous plans, see Larry Parker and John Blodgett, *Climate Change Action Plans*, CRS Report 94-404 ENR, May 9, 1994.

Administration, the Administration's proposal relies on various voluntary programs and incentives to encourage reductions in greenhouse gases from diverse sources, including CO_2 from electric generation.

Based on the estimate provided by the Administration's climate change proposal, and using the draft 2001 *Climate Action Report*[7] (CAR) for projections to 2010, table 2 presents estimates of U.S. greenhouse gas emissions in 2010, assuming the Administration's voluntary program reaches its goals.[8] This should not be taken as a given, as neither the former Bush Administration's program, nor the Clinton Administration's program achieved their stated goals. Thus, in one sense, comparing a mandatory reduction program, such as those proposed in legislation, with the Administration's voluntary program, is comparing apples to oranges. The first is legally binding, the second is an exhortation.

While the bills that would cap CO_2 emissions address only electric utility emissions, their mandated reductions would result in lower greenhouse gas emissions in 2010 than those projected to occur under the Administration's initiative that includes all sources of all greenhouse gases.[9] However, neither the proposed legislation nor the Administration's initiative would be sufficient to bring U.S. emissions anywhere near the level committed to at Rio with the UNFCCC.

Indeed, discussion in the CAR suggests that a high economic growth scenario would significantly increase energy use and related carbon emissions. For example, under a high economic growth scenario, greenhouse emissions in 2010 would increase 37.7% above those in 1990, based on energy growth alone. This increase would represent an additional 53 million metric tons of emissions.[10] However, the proposed legislation would cap emissions from increased electricity generation at 1990 levels, which would reduce the 53 million metric tons by 16 million metric tons, or 30% of the high growth increase. The Administration's initiative is voluntary, and contains no such mandatory caps on emissions growth.

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[7]This is the U.S. report to the UNFCCC Secretariat on U.S. emissions and measures taken to reduce them. The *Climate Action Report 2001*, Draft for Public Comment, [http://www.epa.gov/globalwarming/publications/natcomm.html]

[8]For a discussion of emission projections and trends, see John Blodgett and Larry Parker, *Global Climate Change: U.S. Greenhouse Gas Emissions – Status, Trends, and Projections*, CRS Report 9-235 ENR (February 28, 2002).

[9] The assessment assumes that the Administration's proposal actually achieves its goal in 2010, rather than 2012.

[10]Energy Information Administration, *Annual Energy Outlook 2000*, Washington D.C., DOE/EIA-0383 (2002), December 2001. p. 177.

Table 2: Comparison of Administration Voluntary Program with Proposed Legislation

	Percentage Change v. Business as Usual (2010)	Percentage Change v. 1990 levels per UNFCCC
S. 566, H.R. 1256, H.R. 1335	-7.5%	+24.2%
Administration Voluntary Program*	-4.4 to -4.5%	+28.3%
Business as Usual	0	+34.4%

*Assumes goal is achieved in 2010, rather than 2012.

Source: CRS calculations based on projections contained in draft 2001 CAR.

Appendix 1: Comparison of Multi-Pollutant Control Proposals

Bills / Provisions	H.R. 25 (Sweeney)/ S. 588 (Schumer)	S. 556 (as reported) (Jeffords)	H.R. 1256 (Waxman)/ S. 556 (as introduced) (Jeffords)	H.R. 1335 (Allen)	H.R. 5266/S. 2815 (Administration's Proposals)
Emissions Cap on NOx	estimated at 1.5 million tons in 2007 with interim reductions	estimated at 1.5 million tons in 2008	estimated at 1.5 million tons in 2007	estimated at 1.6 million tons in 2005, declining with plant retirements	2.1 million tons in 2008, declining to 1.7 million tons in 2018
Emissions Cap on SO_2	4.45 million tons in 2007	2.25 million tons in 2008	2.23 million tons in 2007	estimated at 3.2 million tons in 2005, declining with plant retirements	4.5 million tons in 2010, declining to 3.0 million tons in 2018
Emission Cap on CO_2	not covered	estimated at 2.05 billion tons in 2008	estimated at 1.914 billion tons in 2007	1.914 billion tons in 2005	none, program is voluntary
Emissions Cap on Mercury	EPA to regulate by 2005	estimated at 5 tons in 2008	estimated at about 4-5 tons in 2007	estimated at about 4-5 tons in 2005	26 tons in 2010, declining to 15 tons in 2018
Scope	48 contiguous states and DC	50 states and DC	50 states and DC	50 states and DC	50 states, DC, and territories
Affected Units	electric generating facilities 25 Mw or greater	electric generating facilities 15 Mw or greater	electric generating facilities 15 Mw or greater	electric generating facilities 15 Mw or greater (50 Mw for CO_2)	for existing SO_2, NOx, and Hg, electric generating facilities 25 Mw or greater; no size minimum on new facilities; voluntary CO_2 program is economy-wide

Bills / Provisions	H.R. 25 (Sweeney)/ S. 588 (Schumer)	S. 556 (as reported) (Jeffords)	H.R. 1256 (Waxman)/ S. 556 (as introduced) (Jeffords)	H.R. 1335 (Allen)	H.R. 5266/S. 2815 (Administration's Proposals)
Penalties for non-compliance	NOx: $6,000 per excess ton plus one-for-one offset from future emission allocations. SO_2: same as CAA, title IV	NOx and SO_2: same as CAA, title IV except excess emission penalty is three times the average market price for allowances. CO_2: three times the average market price per excess metric ton of CO_2 emissions Hg: three times the average Hg control costs per gram of excess emission	determined by EPA	NOx, SO_2, Hg: no special penalties specified – CAA penalties would apply CO_2: $100 per ton plus one-for-one offset from future emission allocations	NOx, SO_2, Hg: reduces the excess emissions penalties under CAA, title IV to the lowest EPA auction price for allowances plus one-for-one offset from future emission allocations CO_2: none – voluntary program

Bills / Provisions	H.R. 25 (Sweeney)/ S. 588 (Schumer)	S. 556 (as reported) (Jeffords)	H.R. 1256 (Waxman)/ S. 556 (as introduced) (Jeffords)	H.R. 1335 (Allen)	H.R. 5266/S. 2815 (Administration's Proposals)
Special Provisions	NOx allowance value halved during ozone season; reserve of allowances for new sources	all powerplants 30-years or older must meet current New Source Performance Standard (NSPS) requirements SO_2 cap divided by region (West and East) other provisions to protect local air quality	all powerplants 30-years or older must meet current New Source Performance Standard (NSPS) requirements	permanent CO_2 and NOx reductions through plant retirements should be credited in any future climate change implementation program enacted by Congress	New performance standards for new sources replace current NSPS for new sources. Compliance exempts such facilities from New Source Review (NSR), PSD-BACT requirements, visibility BART requirements, and non-attainment LAER requirements. The exemption does not apply to PSD-BACT requirements if facilities is within 50 Km of Class 1 area. Existing sources can opt in by meeting a particulate standard. Exempts utility units from regulation under CAA, Section 112. Prevents EPA from enforcing any Section 126 petition before 2012 NOx cap divided by region (West and East)

Bills / Provisions	H.R. 25 (Sweeney)/ S. 588 (Schumer)	S. 556 (as reported) (Jeffords)	H.R. 1256 (Waxman)/ S. 556 (as introduced) (Jeffords)	H.R. 1335 (Allen)	H.R. 5266/S. 2815 (Administration's Proposals)
Implementation Strategy	tradeable allowance system	tradeable allowance system for SO_2 (restricted between East and West regions), NOx and CO_2. Allowances allocated to various sectors and interests, including households, dislocated workers and communities, electricity intensive industries, affected utilities, energy efficiency and renewable energy activities, and sequestration activities. Hg compliance on a unit-by-unit basis.	to be determined by EPA — market mechanisms permitted (except for Hg)	unit-by-unit compliance with SO_2, NOx, Hg provisions; tradeable allowance system for CO_2	tradeable allowance system for SO_2, NOx, and Hg. Allocation formulas in the bill initially provide most allowances to affected sources free, with a small percentage sold at auction. Over time, an increasing percentage of the allocation is sold at auction with affected sources receiving fewer allowances free

Unless otherwise noted, estimates by CRS using Department of Energy and Environmental Protection Agency data