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Air Quality: Multi-Pollutant Legislation in the 109th Congress

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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 (SO₂), nitrogen oxides (NO_x), and mercury (Hg), as well as suspected greenhouse gases, particularly carbon dioxide (CO₂). 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.

In February 2002, the Bush Administration announced two air quality initiatives. The first, “Clear Skies,” would amend the Clean Air Act to place emission caps on electric utility emissions of SO₂, NO_x, and Hg. Implemented through a tradeable allowance program, the emissions caps would generally be imposed in two phases: 2008 and 2018. The second initiative begins a voluntary greenhouse gas reduction program. This plan, rather than capping CO₂ 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.

In the 109th Congress, four bills have been introduced that would impose multi-pollutant controls on utilities. Two of the bills, H.R. 227 and S. 131, are modified versions of the Administration's three-pollutant proposal. The other two bills, S. 150 and H.R. 1451, are four-pollutant proposals that include carbon dioxide. S. 150 is similar to a bill reported by the Senate Environment and Public Works Committee in the 107th Congress. Likewise, H.R. 1451 is similar to H.R. 1256 introduced in the 107th Congress. All of these bills involve some form of emission caps, typically beginning in 2010; and most include a tradeable credit program to implement that cap. The provisions concerning SO₂, NO_x, and Hg in S. 150 and H.R. 1451 are generally more stringent and take full effect earlier than the comparable provisions of S. 131. S. 150 and H.R. 1451 would cap utility emissions of CO₂. It is difficult to compare those CO₂ caps to the Administration's proposal concerning CO₂ — both because the Administration's proposal is voluntary rather than mandatory and because it is broader (covering all greenhouse gas emissions rather than just utility CO₂ emissions). However, it appears that actual U.S. greenhouse gas emissions would be higher under the Administration's proposal than those allowed by S. 150 and H.R. 1451.

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 accounts for about two-thirds 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 dioxide (SO₂), nitrogen oxides (NOx), and mercury (Hg). Particulate matter, SO₂, and NOx are currently regulated under the Clean Air Act (CAA), and the Environmental Protection Agency (EPA) has proposed rules to regulate mercury. Other gases may pose indirect risks, notably carbon dioxide (CO₂), which may contribute to global warming.² **Table 1** provides estimates of SO₂, NOx, and CO₂ 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 the cost of constructing new ones.

Table 1. Emissions from U.S. Fossil-Fuel Electric Generating Plants
(thousands of metric tons)

Emissions	1998	1999	2000	2001	2002	2003
SO ₂	12,509	12,445	11,297	10,966	10,515	10,594
NOx	6,235	5,732	5,380	5,045	4,802	4,396
CO ₂	2,313,013	2,326,558	2,429,394	2,379,603	2,397,937	2,408,961

Source: Energy Information Administration. Includes emissions from combined-heat-and-power plants.

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 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 SO₂ as contributors to PM_{2.5}, and to Hg as a toxic air

¹ Particulate matter is regulated depending on the particle size; current regulations address particles less than 10 microns in diameter (PM₁₀); EPA has promulgated regulations for particles less than 2.5 microns in diameter (PM_{2.5}) that are in the process of being implemented. SO₂ 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 SO₂ 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.

pollutant. Also, under the United Nations Framework Convention on Climate Change (UNFCCC), the United States agreed to voluntary limits on CO₂ 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 CO₂ 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 SO₂ and NO_x and for new controls directed at Hg and CO₂ 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 — SO₂, NO_x, Hg, and CO₂. 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

The Bush Administration’s Proposals

In February 2002, the Bush Administration announced two air quality proposals to address the control of emissions of SO₂, NO_x, Hg, and CO₂.⁴ The first proposal, called “Clear Skies,” would amend the Clean Air Act to place emission caps on electric utility emissions of SO₂, NO_x, and Hg. Implemented through a tradeable allowance program, the emissions caps would be imposed in two phases: 2010 (2008 in the case of NO_x) and 2018. As part of a complete rewrite of Title IV of the Clean Air Act, the Administration’s proposal was introduced in the 108th Congress as H.R. 999 and S. 485. Revised versions of Clear Skies legislation have been introduced in the 109th Congress as H.R. 227 and S. 131.

The second proposal (for which no legislation has been introduced) initiates a new voluntary greenhouse gas reduction program, similar to ones introduced by the earlier George H. W. Bush and Clinton Administrations.⁵ 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 Bush Administration proposal 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

³ CRS Report RL30878, *Electricity Generation and Air Quality: Multi-Pollutant Strategies*, by Larry Parker and John Blodgett.

⁴ Papers outlining the Administration’s proposals are available from the White House website: [<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.

⁵ For a discussion of those previous plans, see CRS Report 94-404 ENR, *Climate Change Action Plans*, by Larry Parker and John Blodgett, May 9, 1994 (archived, available from the authors).

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. The Administration notes that the new initiatives would achieve about one-quarter of the objective, while three-quarters of the projected reduction would occur through already existing efforts.

Proposed Legislation and Legislative Action in the 109th Congress

In the 109th Congress, four bills have been introduced that would impose multi-pollutant controls on utilities. Two of the bills, H.R. 227, introduced by Representative Sweeney, and S. 131, introduced by Senator Inhofe, are modified versions of the Administration's three-pollutant proposal. The other two bills are four-pollutant proposals that include carbon dioxide. S. 150, introduced by Senator Jeffords, is similar to a bill reported by the Senate Environment and Public Works Committee in the 107th Congress. Likewise, H.R. 1451, introduced by Representative Waxman, is similar to H.R. 1256 introduced in the 107th Congress. All of these bills involve some form of emission caps, typically being in 2010; and most include a tradeable credit program to implement that cap. The provisions concerning SO₂, NO_x, and Hg in S. 150, H.R. 227, and H.R. 1451, are generally more stringent and take full effect earlier than the comparable provisions of S. 131. S. 150, and H.R. 1451 would cap emissions of CO₂.

The four bills are summarized in the Appendix. Each of these bills builds on the SO₂ allowance trading scheme contained in Title IV of the 1990 Clean Air Act Amendments (CAAA).⁶ 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.

SO₂, NO_x, and Hg Controls. As indicated in the Appendix, the caps for SO₂ and NO_x in S. 131 are less stringent for 2010 than in S. 150 and H.R. 1451, and remain less stringent than S. 150 even through the second phase beginning in 2018. H.R. 227 would require full compliance with its SO₂ and NO_x provisions by 2014, in effect accelerating S. 131's proposed phase 2 emission caps by four years. However, S. 131 phase 1 NO_x reduction would begin two years earlier (2008) than S. 150, H.R. 227, or H.R. 1451.

Allowance allocation schemes for the bills also differ, with S. 150 containing detailed provisions for allocating SO₂, NO_x, and CO₂ 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 own purposes. In contrast, S. 131 would base its allowance formulas on fuel usage adjusted by factors specified in the bill, while H.R. 227 and H.R. 1451 would leave the allocation issue to EPA.

⁶ P.L. 101-549.

On mercury, S. 131's emissions goal would allow about three times more emissions and eight additional years for compliance than allowed by S. 150 and H.R. 1451, which also would mandate plant-by-plant controls; H.R. 227 would require EPA to promulgate Hg regulations by March 15, 2005. (It is difficult to compare the Hg controls of S. 131, S. 150, or H.R. 1451 to H.R. 227, which does not specify an Hg emissions goal, leaving regulation up to EPA.)

Related Regulatory Provisions. In addition to the emissions caps, S. 131 would substantially modify or eliminate several provisions in the Clean Air Act with respect to electric generating facilities. The bill would eliminate New Source Performance Standards (NSPS) (Section 111) and replace them with statutory standards for SO₂, NO_x, particulate matter, and Hg for new sources. Modified sources could also opt to comply with these new statutory standards and be exempted from the applicable Best Available Control Technology (BACT) determinations under Prevention of Significant Deterioration (PSD) provisions (CAA, Part C) or Lowest Achievable Emissions Rate (LAER) determinations 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, Maximum Achievable Control Technology (MACT) requirements for Hg, and non-attainment LAER and offset 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 three years of enactment. In addition, S. 131 would provide these exemptions for industrial sources that choose to opt into the Clear Skies program.

S. 150 would require all powerplants 40 years or older to meet emission limitations based on current best available control technology for a new source. In a similar vein, H.R. 1451 would require all powerplants 30 years or older to meet current New Source Performance Standards (NSPS) requirements.

S. 131 also would include an exemption for steam electric generating facilities from Hg regulation under Section 112 of the CAA (including the residual risk provisions), and relief from enforcement of any Section 126 petition (with respect to reducing interstate transportation of pollution) before December 31, 2014.

Neither H.R. 227, S. 150, nor H.R. 1451 would provide such regulatory relief provisions.

CO₂. Of the four bills, S. 150 and H.R. 1451 would specify CO₂ reductions. In contrast, the Administration's CO₂ proposal relies on various voluntary programs and incentives to encourage reductions in greenhouse gases from diverse sources, including CO₂ emissions from electric generation.

Based on the estimate provided by the Administration's climate change proposal, and using the 2002 *Climate Action Report*⁷ (CAR) for projections to 2010,

⁷ *Climate Action Report* — 2002, at [<http://www.epa.gov/globalwarming/publications/car/index.html>]. This is the U.S. report to the UNFCCC Secretariat on U.S. emissions and (continued...)

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 George H. W. 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 that proposed by S. 150 or H.R. 1451 with the Administration's voluntary program is comparing apples to oranges. The first is legally binding, the second is an exhortation.

While S. 150 and H.R. 1451 focus on electric utility emissions, the mandated reductions would result in lower total 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 S. 150, H.R. 1451, nor the Administration's initiative would be sufficient to bring U.S. emissions near the level committed to in the 1992 UNFCCC.

Discussion in the CAR observes that the pace of economic growth would affect emissions. A high economic growth scenario would increase energy use and related carbon emissions, compared to the reference case of "business as usual"; likewise, lower economic growth would decrease 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, S. 150 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 addresses carbon intensity, not absolute emission levels; it does not cap emissions growth.

Table 2. Comparison of Administration's Voluntary Program with Proposed Legislation

	Percentage Change v. Business as Usual (2010)	Percentage Change v. 1990 levels per UNFCCC
S. 150	-7.5%	+24.2%
H.R. 1451	-9.5%	+21.7%
Administration's Voluntary Program*	-4.4 to -4.5%	+28.3%
Business as Usual	0	+34.4%

Source: CRS calculations based on projections contained in 2002 CAR.

*Assumes goal of the Administration's voluntary program is achieved in 2010, rather than 2012.

⁷ (...continued)
measures taken to reduce them.

⁸ For a discussion of emission projections and trends, see CRS Report 98-235 ENR, *Global Climate Change: U.S. Greenhouse Gas Emissions — Status, Trends, and Projections*, by John Blodgett and Larry Parker.

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*, DOE/EIA-0383 (Washington, DC, 2002), December 2001, p. 177.

Appendix. Comparison of Multi-Pollutant Control Proposals

Provisions	H.R. 227 (Sweeney)	S. 150 (Jeffords)	S. 131 (Inhofe)	H.R. 1451 (Waxman)
Emissions Cap on NO_x	2.1 million tons in 2010, declining to 1.7 million tons in 2014.	1.51 million tons in 2010.	2.19 million tons in 2008, declining to 1.79 million tons in 2018.	Estimated at 1.5 million tons in 2010.
Emissions Cap on SO₂	4.45 million tons in 2010, declining to 3.0 million tons in 2014.	2.25 million tons in 2010.	4.5 million tons in 2010, declining to 3.0 million tons in 2018.	2.23 million tons in 2010.
Emission Cap on CO₂	Not covered.	2.05 billion tons from utilities in 2010.	Not covered.	Estimated at 1.937 billion tons in 2010.
Emissions Cap on Mercury	EPA to promulgate regulations by March 15, 2005.	5 tons in 2009.	34 tons in 2010, declining to 15 tons in 2018.	Estimated at 4-5 tons in 2010.
Scope	50 states and DC.	50 states and DC.	50 states, DC, and territories.	50 states and DC.
Affected Units	Electric generating facilities 25 Mw or greater; Hg regulations to include industrial sources.	Electric generating facilities 15 Mw or greater (coal-fired only for Hg).	Existing electric generating facilities 25 Mw or greater (coal-fired only for Hg); co-generation sources exempted.	Electric generating facilities 15 Mw or greater.
Penalties for non-compliance	NO _x : \$6,000 per excess ton plus one-for-one offset from future emission allocations. SO ₂ : same as CAA, title IV. Hg: not specified, CAA enforcement provisions would apply.	NO _x , SO ₂ and CO ₂ same as CAA, title IV, except excess emission penalty is three times the average market price for allowances. Hg: three times the average Hg control costs per gram of excess emission.	NO _x , SO ₂ , Hg: reduces the excess emissions penalties under CAA, title IV to the EPA auction clearing price for allowances plus one-for-one offset from future emission allocations, if paid within 30 days. Otherwise, the number of excess emissions is multiplied by 1.5 for penalty purposes.	Determined by EPA.

Provisions	H.R. 227 (Sweeney)	S. 150 (Jeffords)	S. 131 (Inhofe)	H.R. 1451 (Waxman)
Special Provisions	EPA to determine by 2014 whether emission reductions sufficient to protect sensitive regional ecosystems; if not, EPA must promulgate rules requiring additional NO _x and SO ₂ reductions within two years of such determination.	<p>Beginning in 2014, all powerplants 40 years or older must meet emission limitations based on current best available control technology for a new major source.</p> <p>SO₂ cap divided by region (West and East) with no trading permitted between regions.</p> <p>EPA to determine by 2013 whether emission reductions sufficient to protect sensitive regional ecosystems; if not, EPA must promulgate rules requiring additional NO_x and SO₂ reductions within two years of such determination.</p> <p>Other provisions to protect local air quality.</p>	<p>New performance standards for new sources replace current NSPS for new sources. Compliance with bill's provisions exempts facilities from New Source Review (NSR), PSD-BACT requirements, visibility BART requirements, and non-attainment LAER and offset requirements. The exemption does not apply to PSD-BACT requirements if facility is within 50 Km of Class 1 area. Existing sources can opt in by meeting a particulate standard.</p> <p>Exempts utility units from Hg regulation under CAA, Section 112, including residual risk provisions.</p> <p>Prevents EPA from enforcing any Section 126 petition before December 31, 2014.</p> <p>NO_x cap divided by region (West and East).</p>	All powerplants 30 years or older must meet current New Source Performance Standard (NSPS) requirements.
Implementation Strategy	<p>Tradeable allowance system for SO₂ and NO_x.</p> <p>Hg compliance on a source-by- source basis.</p>	Tradeable allowance system for SO ₂ (restricted between East and West regions), NO _x and CO ₂ . Allowances allocated to various sectors and interests, including households, dislocated workers and communities, electricity intensive	<p>Tradeable allowance system for SO₂, NO_x, and Hg. Allocation formulas based on historic fuel usage adjusted by factors specified in the bill.</p> <p>7% of SO₂ and 5% of NO_x and Hg allowances are set</p>	To be determined by EPA — market mechanisms permitted (except for Hg).

Provisions	H.R. 227 (Sweeney)	S. 150 (Jeffords)	S. 131 (Inhofe)	H.R. 1451 (Waxman)
		<p>industries, affected utilities, energy efficiency and renewable energy activities, and sequestration activities.</p> <p>Hg compliance on a source-by-source basis (plantwide averaging explicitly allowed).</p>	<p>aside for new units.</p>	

Source: Congressional Research Service.