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**The Implementation of the New National Ambient Air Quality Standards (NAAQS)  
for Ozone and Fine Particles (Panel 2)**

Testimony Prepared for Presentation to  
Subcommittee on Clean Air, Wetlands, Private Property and Nuclear Safety  
Committee on Environment and Public Works  
U.S. Senate  
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Resources for the Future

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## **The Implementation of the New National Ambient Air Quality Standards (NAAQS) for Ozone and Fine Particles (Panel 2)**

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Mr. Chairman and distinguished committee members. Thank you for inviting me to testify on implementation issues associated with the EPA's proposed ozone and PM NAAQSs. I am pleased to provide you with my ideas and judgments on the issues, from my perspective as a professional environmental economist, based on sixteen years of experience at Resources for the Future (RFF), many of them spent on issues associated with the Clean Air Act and the design of environmental policies. RFF is an independent, nonpartisan research and educational organization concerning itself with environmental and natural resource issues. In addition, I currently cochair (with OAQPS Director John Seitz) the Clean Air Act Advisory Committee's Subcommittee on Ozone, Particulate Matter, and Regional Haze Implementation Programs. This is the body that Administrator Browner hopes will develop ideas for reducing costs of meeting whatever standards are promulgated. Also, I have recently served as a senior economist on the Council of Economic Advisors, with primary responsibility for the environmental and natural resource portfolio. While at CEA I worked on a number of Clean Air Act issues, including EPA's preliminary planning for analyses required to repromulgate the NAAQS for ozone. Also, I want to emphasize that the views I present today are entirely my own.

*The Main Message—*

*The proposed standards, if they become law, are likely to be incredibly expensive to implement. The Administrator has clearly endorsed cost-effectiveness as a major criterion for developing an implementation strategy. Your job is to help EPA live up to this goal and to remove any impediments posed by the CAA.*

Below, I assume that the proposed standards will go into effect and then discuss the consequences and the possibilities. First, the high costs of meeting the standards is discussed, followed by an examination of the activities of the Subcommittee on Ozone, Particulates and Regional Haze Implementation programs, my observations about the FACA and the issues it is taking up, followed by a discussion about actions that Congress should take.

### **COST OF MEETING THE OZONE AND PM STANDARDS**

(For details in this section, see Alan Krupnick's testimony in Panel 1: The Proposed NAAQSs for Ozone and PM, before this same subcommittee, April 24, 1997.)

By EPA's own analyses (in its November 1996 Regulatory Impact Analyses (RIAs) for Ozone and PM), the cost of going *partway* to meeting the ozone standard will be \$2.6 billion and the cost of going *partway* to meeting the fine particle standard will be \$6 billion, annually. These sums do not come close to bringing the country into attainment. For ozone, Chicago needs a 44% reduction in volatile organic compounds (VOCs) to go from the 2007 baseline ozone concentration to a 0.08 1AX standard (this means a standard of 0.08 ppm with the highest 8-hour reading in each of three years averaged; if this value is greater than 0.084 ppm, the area is in violation) but gets 14%; Baltimore-Washington needs 66% VOC reductions but gets 14%; New York needs 79% but gets 16%; Los Angeles needs 90% but gets 9%. For PM, the northeastern U.S. is estimated to need an 86% reduction in PM<sub>2.5</sub> concentrations from baseline, but EPA can only find and cost out technologies to deliver 16% of what the region needs. The same types of estimates apply to other regions.

The use of economic incentive approaches (which EPA did not include in its analyses) and innovations in pollution abatement and other technologies (which EPA did not analyze) may hold down cost increases. But, in truth, the analyses are so flawed that we have very little idea of what the costs will be—only that they will be very large relative to current costs unless major changes are made to the way in which the standards are implemented.

The distribution of the costs of the new standards may have some interesting aspects if long-range transport is significant (currently being debated by OTAG). If an area is newly classified as nonattainment (NA), the CAA planning apparatus and various mandates will come down on them (without the type of changes being discussed by our FACA (see below)). A current NA area may now have help in reaching attainment if it is downwind of previously less or un-regulated polluters. With more areas designated NA, more of these less regulated sources will come into the SIP program. States along the east coast may be helped. But these states will have to do much more on their own than they are doing now, because the standards are so much tighter. For the general public, there will be some shocks. In new NA areas, inspection and maintenance (IM) programs are very likely to be implemented (under the current system, at least).

### **THE FEDERAL ADVISORY SUBCOMMITTEE ON OZONE, PARTICULATES, AND REGIONAL HAZE IMPLEMENTATION PROGRAMS (FACA)**

As cochair of the Subcommittee (with OAQPS's Director John Seitz), I want to apprise the Senate of the work of our group.

The U.S. Environmental Protection Agency (EPA) established the Subcommittee for Ozone, Particulate Matter, and Regional Haze Implementation Programs (Subcommittee) in September 1995 as a part of the Clean Air Act Advisory Committee (CAAAC), under the authority of the Federal Advisory Committee Act (FACA). Given the potential for significant changes in national air quality standards and related

implementation programs in 1997, as well as the existing information about common sources and atmospheric processes leading to formation of ozone, particulate matter and regional haze, EPA believed it was important to initiate a process through which it could obtain advice and recommendations from a broad group of stakeholders on possible new integrated and cost-effective approaches to attaining the NAAQS and reducing regional haze. I was approached to bring an economic perspective to the subcommittee.

At the time of its April 1997 meeting, the Subcommittee was composed of 82 members representing a broad range of interests in air quality management, including state, local, and tribal governments, environmental and public interest organizations, industry, small business, members of federal agencies and academia. Five work groups were formed to assist the Subcommittee: the Base Programs Analyses and Policies Work Group (BPAPWG), the National and Regional Strategies Work Group (NRSWG), the Science and Technical Support Work Group (STSWG), the Communications and Outreach Work Group (COWG), and the Coordination Group. Together, the work groups involve more than 100 additional individuals and interested organizations contributing to the overall advisory committee process.

Upon their formation, the work groups identified priority issues to address and assigned lead authors for various "issue papers." An issue paper describes the background of the particular air quality management issue, options for addressing it, and pros and cons of each option. Where possible, the issue paper includes work group recommendations to the Subcommittee. Work group members were charged to develop innovative solutions to issues even if they were outside of the current regulatory framework set by the Clean Air Act. The determination of whether any proposed solutions fall outside of the authority of the CAA is an on-going process. During the first phase of its discussions, the Subcommittee considered 15 issue papers, drafted and presented principally by representatives from the BPAPWG and NRSWG. Representatives from the STSWG have played a significant role in the development of the issue papers as well, through joint authorship and responses to specific technical questions. Although few specific consensus recommendations have been made so far, the Subcommittee and associated work groups have made significant progress in identifying options, discussing pros and cons for many critical air quality management issues, and agreeing on principles by which options in particular areas should be evaluated.

The Subcommittee will continue throughout 1997 with the goal of providing EPA with input and, if possible, consensus recommendations on issues critical to the development of EPA's Phase II implementation strategy (scheduled for proposal in June 1998). This proposal is intended to address strategies for achieving cost-effective emissions reductions that allow attainment of the NAAQS and reductions in regional haze impairment (this is taken substantially from Federal Advisory Committee Act (FACA) Subcommittee for Ozone, Particulate Matter and Regional Haze Implementation Programs *Initial Report on Subcommittee Discussions Through November 1996*, Final Report, April 1997).

As cochair of the subcommittee, I have the following observations about our work.

*The FACA is a useful body for developing new ideas on implementation.* Such ideas are sorely needed to reduce the already enormous costs of meeting the NAAQS and to hold down costs of meeting the proposed NAAQS. The FACA's purview to examine the ozone and PM standards together places it in a particularly useful position to find benefits of integrating these programs. In this regard, and in many other ways, the FACA goes far beyond the charge and interests of the Ozone Transport Assessment Group.

*The members of the FACA want to try and reach consensus.* The value to all participants of presenting EPA with detailed ideas that have agreement from a diverse set of stakeholders is well understood.

The progress that has been made is due in no small part to EPA's strategy of studied neutrality (while emphasizing that it retains its responsibility to issue regulations that it views as appropriate) and willingness to lend its considerable expertise to the FACA's efforts. The FACA and work group members have been working extraordinarily hard to develop issue papers, present them, and develop consensus on their contents.

*The FACA cannot work miracles.* It is a large, diverse body of stakeholders operating in an advisory role. The key dynamic within the FACA is between industry and the environmental members: the former want cost reductions, the latter want greater certainty of attainment. The states want greater autonomy from EPA but generally are willing to participate in regional planning organizations. This mix of stakeholders has resulted in lively discussions and many new ideas. However, consensus is as yet lacking on most of these, primarily because the members are waiting to see and negotiate on the entire package.

Progress has also been limited because no decisions have been made on the ozone and PM standards. Once these are settled, the subcommittee's deliberations are likely to become more intense.

Even if consensus is reached, there is no guarantee that the consensus recommendations will be as cost-effective as they might be, simply because the negotiation process will demand some trading off of cost savings for certainty in attainment and other criteria.

Even if a consensus is reached, EPA may choose to ignore aspects of the agreements. The FACA is only an *advisory* body. EPA may come up with what it considers better ideas, or it may find that some suggestions run afoul of the Clean Air Act (see below).

EPA is severely limited by the Clean Air Act in its ability to implement new ideas (see below).

There are a number of measures that I believe have promise to reduce costs below what they otherwise would be. Some are presented below. Let me emphasize that this choice of measures is entirely my own, is only a partial list of measures discussed by the FACA, and is not meant to prejudge the outcome of the FACA, where many of these measures are only beginning to be discussed.

- Regional cap-and-trade program for NO<sub>x</sub>.
- Regional Air Management Partnerships (RAMPs) to perform a variety of duties related to regional transport and common precursors for ozone and PM.
- Reasonable Further Progress measurements better tied to concentration performance; credit now for future emissions reductions.
- New Source Review: lowering technology floor in a trading program.
- Cost per ton ceiling with Clean Air Fund.
- Economic incentives for mobile/area source reductions.
- Episodic controls for ozone.
- A NO<sub>x</sub> trading program.

A culture shift away from command-and-control to emissions trading programs has taken place at EPA, as evidenced by EPA's embrace of SO<sub>2</sub> allowance trading, the Agency's Open Market Trading Rule, and its support for NO<sub>x</sub> trading in the Northeast's Ozone Transport Commission and the eastern U.S.'s Ozone Transport Assessment Group (OTAG). Still, EPA lacks the authority to impose a trading program. To a large extent, the RAMP process (see below) is meant to address this vacuum. However, many observers question whether a voluntary trading program can work.

The FACA is closely examining how a regional NO<sub>x</sub> trading market can be designed. Consideration is being given to establishing trading ratios between regions at ratios other than one-to-one to reflect the effects of long-range transport. Consideration is also being given to including mobile sources in the trading program, insofar as including vehicle manufacturers and/or fleet owners.

- *The RAMP*

To address the long range transport of both ozone and PM-fine, Regional Air Management Partnerships would be formed to include states and tribes with common air quality problems, i.e., including areas of influence (AOIs), where source emissions contribute to areas violating the standards (AOVs) (like nonattainment areas under the current system). All states would be a member of at least one RAMP. RAMPs would identify AOIs and assist in development of Regional Integrated Plans (RIPs), which would be the place to consider region-wide market-based mechanisms. States and tribes or EPA would designate AOVs and EPA would approve the RAMP's AOIs. The states and tribes in an AOI would prepare RIPs, which would provide the basis for the State Implementation Plans.

- *Reasonable Further Progress reform.*

Serious consideration is being given to (i) basing measures of progress on "effective" emissions, which would account for the effect of location, "stack" height, HC species, and other factors on ozone and PM concentrations, rather than assuming that "all tons are equal," as in the current RFP system; (ii) giving states flexibility to define RFP that is appropriate for their particular conditions; (iii) permitting states to take credit in

the present for programs reducing emissions in the future (such as programs affecting land use).

- *New Source Review.*

New sources wishing to locate in nonattainment areas must install expensive abatement technologies to meet LAER requirements under the CAA. New sources outside such areas must install BACT. If such sources are part of a cap-and-trade system in the Area of Influence, they should be permitted to trade for meeting these technology requirements. The argument against this proposal—that hot spots may be created—could be addressed, in part, by requiring a technology floor, but one less stringent than LAER/BACT.

- *Cost per ton ceiling.*

Part of the controversy over attaining the new NAAQS is the fear that costs will be prohibitive. EPA, in its RIA, tries to calm such fears by noting that "extreme measures are not modeled because they would never be implemented." To give pollution sources greater certainty in this regard, consideration is being given to setting a cost/ton ceiling along with establishing a Clean Air Fund. Polluters would have the option of paying into this fund the ceiling price per ton of emissions in lieu of abatement. The resulting fund could be used to fund reductions in pollution that lie outside of the State Implementation Plan process.

- *Greater emphasis on economic incentives applied to mobile and area sources.*

The FACA is poised to address economic incentives as they apply to mobile and area sources. One intriguing possibility (being considered in detail by another subcommittee of the Clean Air Act Advisory Committee) is to shift emphasis away from inspection and maintenance (I&M) programs as we currently know them to on-board mobile source emissions monitoring technologies (OBDII). With 10 percent of the vehicles responsible for 50 percent of vehicle emissions, finding such vehicles and getting them fixed or scrapped should be a major priority. Enhanced I&M is a clumsy and expensive way to do this. New technologies for real-time monitoring of vehicle emissions, including remote and on-board sensing, hold significant promise for cheaply developing in-use emissions information to identify gross polluters for I&M programs and can serve as the foundation for other economic incentive programs, such as vehicle emissions fees (being considered in the South Coast), that target actual emissions.

Another possibility applied to mobile sources is to base vehicle registration fees on the vehicle's mileage, a strategy that can be revenue-neutral on average while increasing the marginal cost of driving.

Further reductions in the sulfur content of diesel fuel and in sulfur in gasoline may be cost-effective ways of reducing fine particle concentrations, if refineries can trade and bank emissions reductions, as they did during the period where lead was being phased out of gasoline.

Emissions from off-road diesel and gasoline use have been largely uncontrolled. Low-cost abatement approaches may exist in this category.

California's Area Source Alternative Compliance Program is an attempt to induce voluntary controls by area sources who would earn credits available for sale to point and mobile sources within the state's control programs.

- *Episodic control programs for ozone.*

With the possible exception of Los Angeles, areas classified as violating the ozone standard are actually in compliance the vast majority of the time. The average number of exceedance-days annually (excluding LA) is 5.2 and the median number is 2.3. Only 3 areas out of 43 are out of compliance more than 10 days. As most ozone violations are part of multiday episodes, this represents from 3 to 4 episodes a year, on average. (This is based on 1991–93 nonattainment areas. Areas which had experienced an average of 0 exceedances are omitted from the calculation, as is Los Angeles, leaving 43 out of 91 nonattainment areas in the tabulation. The mean, *including* areas which had experienced 0 exceedances, was 2.52 and the median was 0.) Put more dramatically, the standard was violated less than one-half of 1 percent of the monitor-hours in each city. Further, in the 1984–85 period, there were no cities showing more than 64 hours in violations at the worst monitor.

This skewed temporal distribution of violations presents obvious opportunities for episodic controls—strategies and measures to reduce ozone precursors on the few days where conditions warrant. Such controls would involve issuing a public warning in advance of meteorological conditions usually associated with high ozone, which would trigger a set of prearranged modifications to the behavior of ozone emitters. For instance, large stationary sources might cut back or shift output to different hours, produce products with lower emissions (VOCs from spray painting activities vary by the color of the paint), employers might shift to a flexible work schedule to reduce early morning traffic congestion, public transportation costs might be reduced, etc. Episodic controls could reduce the number of days requiring precursor emissions reductions substantially. With an ideal forecasting system, this number could be reduced from the entire three-month summer season, to about the number of days per year with weather conducive to ozone formation.

Efforts to develop voluntary episodic control programs are on-going in a number of localities. Some regions, such as Baltimore and Chicago, have worked to develop public-private partnerships to bring about episodic reductions in emissions of ozone precursors across a broad array of economic sectors. These programs also extend to government agencies and individuals, particularly with respect to transportation choices.

One obstacle to the acceptance of substituting episodic controls for continuous controls on air pollutants is the concern that the former would redistribute rather than reduce the production of the pollutant. However ozone's unique tendency to form in significant concentrations only on days with certain meteorological characteristics makes it the perfect candidate for episodic control. A mix of  $\text{NO}_x$  and VOCs on a warm, humid, sunny day will likely produce ozone, whereas on a cold, cloudy day it will not. Moving

the emission of large quantities of VOCs and NO<sub>x</sub> away from the few days per year likely to produce ozone will typically not defer the production of ozone to another time, but rather may prevent its formation altogether.

## **WHAT CAN CONGRESS DO?**

**I. Affirm EPA's Interpretation of Subpart 2, Title I of the Clean Air Act Amendments of 1990.** Congress should make it clear that it supports EPA's interpretation of this section of the CAA, which is that a change in the form and/or level of the ozone standard invalidates this section. This interpretation is based on the idea that the nonattainment area classification system developed in this section (moderate, severe, extreme, etc.) is tied to the current standard, becoming null if a new standard is set. Affirmation is essential if the highly prescriptive and expensive mandates contained in this section are to be re-examined.

**II. Open the Clean Air Act.** The Clean Air Act significantly restricts EPA's ability to implement a number of cost-effective ideas that have been raised by the various FACA members and work groups. Congress should re-open the Clean Air Act to:

- Facilitate the creation of regional trading institutions. The FACA membership generally agrees with the concept of forming regional planning institutions to account for regional transport. Upwind states are unlikely to make major reductions that benefit downwind states without being required to participate.
- Eliminate LAER/BACT requirements for New Source Review. A trading cap and minimum technology standards should help eliminate hot spots and fears that new plants will shop for pollution havens, while creating more emissions to trade, thereby enhancing the efficiency of the trading market.
- Make it clear that episodic use of controls to reduce ozone episodes are creditable towards Reasonable Further Progress and for use in attainment demonstrations. Effects of such a strategy on meeting other goals (e.g., reducing nitrates in the Chesapeake Bay) must be taken into account.
- Provide EPA with the authority to require that states adopt specific cost-effective policies and measures as part of their SIPs. EPA clearly lacks this authority now. In granting such authority, Congress should require EPA to demonstrate that its guidelines and/or requirements for implementing the standards, as well as the control strategies it implements directly, meet a cost-effectiveness test.
- Title II of the Clean Air Act may inhibit EPA's ability to reduce mobile source emissions in a timely and cost-effective fashion. Reopen this title to renewed scrutiny, in light of the new standards.
- Title IV's SO<sub>2</sub> allowance trading program has been very successful. However, a tighter cap and a program coordinated with Title I may be needed to help meet a fine particle standard and an ozone standard cost-effectively. Reopen this title in light of the new standards.

**III. Increase and target funding for monitoring.** Both the ozone and fine particle PM standards cannot be effectively implemented without better monitoring. Problems include:

- There are few fine particle monitors and fewer still with speciation capabilities.

- The PM reference method is inaccurate for California (readings are too low because volatilized nitrates are not being captured).
- There are few rural ozone monitors.

Congress needs to appropriate additional funds for a major augmented air quality monitoring program. Provide these funds as a line item in the EPA budget.

**IV. Increase Funding for Health and Economic Research.** Although EPA's Office of Research and Development has targeted health effects from PM and ozone for special attention, funding levels are too low. In addition, ORD does not have programs funding economic research (except for a small program in the Office of Exploratory Research and a special small program on valuation of environmental damage being run jointly by EPA and the National Science Foundation). Such research is needed for developing improved methods of cost estimation and methods to value health and environmental damages, as well as for the collection and analysis of data on human behavior to aid in the design of more effective and efficient economic incentive policies.