Clean Air Act Amendments and Highway Programs

Perspectives of State and Local Air Administrators

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The U.S. Congress is currently considering amendments to the Federal Clean Air Act that will have significant impacts on the transportation community. Much has changed since Congress last made major changes to this law. Will these latest changes help improve U.S. air quality?

It is clear that mobile source emissions make a significant contribution to the nation's air pollution problem. The projected increase in emissions from mobile sources (vehicles), caused by an increase in vehicle miles traveled (VMT) and the bottoming out of current emissions control technology, cannot go on unabated if air quality standards are to be attained and maintained.

Extent of the Problem

The health-based National Ambient Air Quality Standards (NAAQS) for ozone and carbon monoxide have not been attained in the United States. This failure is representative of a pervasive and nearly insurmountable problem. In much of the nation, for example, the summer of 1988 was the worst ozone season of that decade. Many areas, especially those east of the Mississippi River, experienced record-setting ozone levels. In 1988, 28 areas violated the national ozone standard for the first time. These violations increased the number of areas that did not meet the standard to nearly 100 and the number of citizens exposed to unhealthy air to more than 130 million.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Even the nation's beautiful and once-pristine national parks are no longer able to escape the adverse environmental effects of polluted air. During summer 1988, both Acadia National Park in Maine and Shenandoah National Park in Virginia experienced multiple violations of the national ozone standard.

Preliminary air quality data indicate that ozone levels in 1989 were not as high as those recorded in 1988. This reflects the milder weather conditions that prevailed in many parts of the country in 1989. Nonetheless, an extensive ozone problem remains. Exceedance of the national standard for carbon monoxide is an equally persistent problem in many parts of the United States. According to the Environmental Protection Agency, 59 areas violate the carbon monoxide standard, jeopardizing the health of millions.

Health Effects

The NAAQS were established to protect human health. The ever-increasing number of exceedances of these standards seriously threaten the health of U.S. citizens and residents. EPA has reported that even healthy people who exercise outdoors when ozone levels are at or slightly above the NAAQS can experience a variety of ailments, including chest pain, sore throat, decreased lung function, coughing, congestion, nausea, and increased respiratory rates. These symptoms do not always disappear when an ozone episode ends. Studies have demonstrated that permanent lung damage can result from repeated, prolonged exposure to ozone.

Exposure to the carbon monoxide levels that often occur in major U.S. cities prevents the delivery of oxygen to the tissues of the body, interfering with aerobic capacity, learning ability, vision, and manual dexterity. Although these effects are clearly of concern to anyone living or working within these areas, people with cardiovascular disease, children, and pregnant women and their unborn babies are especially endangered.

Stationary Sources

If the United States is to attain the air quality mandated by the health-based NAAQS, stationary sources must be regulated more stringently. Several steps can be taken to increase reductions in stationary source emissions. Controls could be imposed, for example, on a number of industrial sources that have escaped previous regulations, including smaller "area" sources of pollution such as dry cleaning operations. Federal standards could be promulgated for products that are manufactured and marketed on a regional or national basis, such as commercial and industrial solvents. Finally, the geographic coverage of designated "ozone nonattainment areas" could be expanded to include entire standard metropolitan statistical areas or consolidated metropolitan statistical areas to ensure that the more restrictive requirements apply to stationary sources located in these regions.

Mobile Sources

Mobile sources produce half of the ground-level ozone in the United States by emitting compounds that break down into ozone. These sources are also responsible for 70 to 90 percent of the U.S. carbon monoxide problem (*1*). (See Figure 1.) Most efforts to bring ozone and carbon monoxide down to NAAQS levels will prove ineffective without the backing of strong measures that address mobile sources.

In addition, vehicles and other mobile sources emit significant quantities of nitrogen oxides (which contribute to acid rain, impairment of visibility, and ozone production), fine particulate material, and toxic compounds. Increases in the number of motor vehicles, VMT, and congestion are expected to increase the quantities of vehicle emissions in the 1990s (M. Walsh. *Pollution on Wheels II: The Car of the Future,* January 1990, unpublished data). (See Figure 2.) More stringent mobile source controls are vital to counter this looming problem.

Tail Pipe Standards

The stringent, two-phase strategy for controlling tail pipe emissions included in the Clean Air Act Amendments is the critical foundation of an effective mobile source program. Technologically feasible and cost-effective standards, such as those already in place in California, are necessary if the first phase is to be completed in the short term. This first phase, to begin in 1993, would include a light-duty passenger car and truck emissions standard of 3.4 grams per mile for carbon monoxide, 0.25 gpm for hydrocarbons, and 0.4 gpm for nitrogen oxides.

A second phase of tighter standards, to take effect in the year 2000, will set standards of half the first phase standards. This strategy will ensure that emissions reductions continue into the next century.

Alternative Fuels

An aggressive alternative fuels program is the second fundamental component of a strong mobile source control strategy. The program recommended in the President's Clean Air proposal has the potential, in the long term, to improve air quality significantly. This program could be made even more effective if it were expanded and clarified in several respects.

First, the program should be "fuel neutral," meaning that it should allow any mixture of clean fuels (such as ethanol, methanol, compressed natural gas, or propane) or other vehicle propulsion systems (such as electricity). These new clean-fuel vehicles should be required to meet stricter performance standards than those for typical vehicles during the second phase.

Next, legislators should require the alternative fuels program in all of the severely polluted areas of the country. In 1998, the program could be expanded to require that 2 million improved vehicles be sold annually throughout the affected areas. Fleets of 15 or more centrally fueled vehicles should be required to use alternative fuels (or achieve equivalent reductions) by no later than 1996. Finally, clean fuels should be made avail-

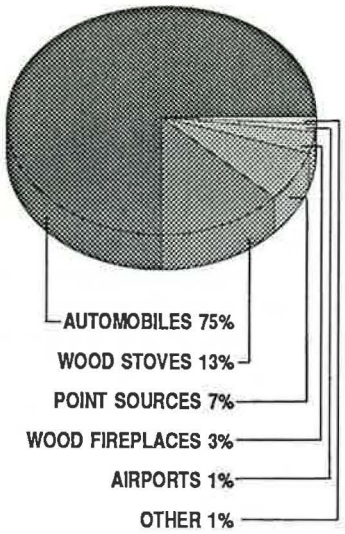

FIGURE 1 Carbon monoxide contribution in the metropolitan Denver area, by source, for an average December weekday, 1987 (1).

able for fleets in appropriate quantities, at appropriate locations, and at competitive prices.

Integration of Air Quality and Transportation Goals

Cleaner vehicles operating under tighter standards represent only one part of the comprehensive mobile source control strategy needed to achieve improved air quality. Other factors, such as altered driving habits and improved transportation systems, are also vital to such a strategy.

Conformance Procedures

It is important that transportation goals and programs conform to those for air quality. The basis for the integration of air quality and transportation planning is the June 12, 1980, agreement of the U.S. Department of Transportation and EPA on procedures for conformance of transportation plans, programs, and projects with Clean Air Act State Implementation Plans. In theory, this agreement should ensure consistency of efforts and improvements in air quality. Unfortunately, problems in the interpretation of "conformity" caused a breakdown in the system.

DOT officials interpret the 1980 agreement to mean that a transportation program or project conforms if it does not interfere with the timely implementation of transportation control measures included in a state implementation plan (SIP). EPA officials, however, maintain that a transportation program or project conforms only if its implementation will contribute to attainment and maintenance of the NAAQS and will not cause a new violation of those standards or worsen an existing violation. Because of this disagreement, transportation measures have been funded that EPA and state officials view as inconsistent with air quality goals. In other cases, transportation control measures that were included in SIPs and that could have improved air quality have suffered from funding delays. Some regional transportation plans have also been delayed.

For example, several years ago, in Denver, Colorado, the state highway department tried to divert funds to a non-SIP project from a high-occupancy vehicle (HOV) lane project that was included in the SIP. The State Air Quality Control Commission opposed the change because the highway department's alternative was not part of the SIP and did not contribute to air quality improvement. The highway department, however, did not believe that this conformity determination could prevent diversion of the funds. Several months of negotiations eventually produced a satisfactory agreement; but even then, the construction of the HOV lane encountered numerous delays, some of which were the result of differing opinions on the interpretation of conformity regulations.

The importance of SIPs to the consideration of air quality in transportation planning is illustrated by Section 110 of the Clean Air Act, which specifies that the purpose of SIPs is to establish a strategy that will result in attainment and maintenance of the NAAQS. In addition, Congress tried to facilitate implementation of SIP provisions by explicitly requiring, in Section 176, that all federal programs conform with SIPs.

Ensuring Conformity

Clearly, integration of air quality and transportation goals is complicated but essential. Control of VMT may be one of the few remaining solutions to the severe U.S. air pollution problem. Fortunately, it is a solution that is compatible with other transportation goals such as congestion relief and energy savings; and the expenditure of federal transportation funds for projects in nonattainment areas should encourage all reasonable techniques to reduce VMT. In addition, jurisdictions that use federal funds for transportation projects should give high priority to projects that best aid in the attainment and maintenance of air quality standards.

Unless transportation projects proposed for funding are evaluated on the basis of their ability to assist with air quality goals, adequate emissions reductions will be difficult, if not impossible, to achieve. The test of conformity should be the proposed project's consistency with the SIP. If the SIP is inadequate as a basis for this determination (either because it does not demonstrate attainment or because it does not extend far enough into the future), the test should be the degree to which the project will reduce emissions in both the short and the long term.

Changes to the Surface Transportation Act, which will be reauthorized in 1991, could help ensure that highway projects conform to air quality goals. Currently, air quality is just one of many criteria that a project must meet to be eligible for federal funding under this act. Instead, air quality should be identified as a separate goal and also be labeled a key criterion in the selection of alternatives for highway and transit funds. Transit assumptions should be revised to take into account factors likely to influence future behaviors, rather than relying on past behavior patterns. Finally, funding of transportation control measures (TCMs) in SIPs should be a priority.

Transportation Control Measures

Private Transportation

In an effort to reduce mobile source emissions, some state and local air pollution

control agencies have independently introduced TCMs that can influence the way U.S. motorists drive *(Costly Ozone/Carbon Monoxide Control Measures Implemented in States.* State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officials, Washington, D.C., January 1990, unpublished data). (See Table 1.)

The state of Arizona, for example, requires areas that are not attaining the NAAQS to have daily synchronization of traffic signals on streets with average daily traffic exceeding 15,000 vehicles. State regulations also require that 85 percent of the employees in political subdivisions of nonattainment areas be on alternative work schedules (a strategy that helps reduce peak hour congestion) and provide a corporate state income tax break for employer subsidies of trip-reduction measures (such as vanpools). In addition, Maricopa County (which includes Phoenix) and Pima County (Tucson) have mandatory state-funded, employer-based trip-reduction programs for businesses with 100 or more employees, and voluntary state-funded "no drive days" programs between October and March.

Because the timely implementation of TCMs could produce significant pollution reductions, these measures should be considered seriously and applied as expeditiously as possible in all areas having difficulty in attaining air quality standards by the federal deadlines. To encourage the use of TCMs, the Clean Air Act should prescribe a minimum set of specific measures, such as improved public transit, HOV lanes and roads, trip-reduction ordinances, and traffic flow improvements. Incentives to achieve VMT reductions should also be provided. VMT caps could be required in areas that face serious air pollution problems. Sanctions could be imposed in areas that do not comply with the requirements and then lifted when there is agreement on compliance.

A further transportation control consideration concerns employer transit subsidies. Those greater than $15 a month are subject to tax, whereas most parking subsidies are not. To promote high-occupancy transportation and ride-sharing, the tax incentive for private and shared transportation could be equalized by removing the $15 cap from subsidies for transit, vanpool, carpool, and other VMT-reduction measures.

TABLE 1 COSTLY OZONE/CARBON MONOXIDE CONTROL MEASURES IMPLEMENTED IN STATES

OPERATION OR CONTROL MEASURE	COST PER TON ESTIMATES ($)
California (Santa Barbara)	
Process heaters	1,200–5,200
Petroleum tank cleaning	3,400
Petroleum fixed roof tanks	5,000–24,000
Small industrial and commercial boilers	2,000–10,000
Large industrial and commercial boilers	4,500–8,000
Colorado	
Control of extended idling (elimination of drive-through facilities)	1,799
Expansion of peak period transit (purchase of 150 buses)	9,730
Use of school buses	8,011
High-occupancy vehicle (HOV) lanes	4,075
Reduction of transit fare on high pollution days	7,887
Increased gas tax (by $.10/gallon)	2,400
Connecticut	
Paint fountain (controlled by incinerator)	3,660
Dip coating operation (controlled by carbon absorber)	3,600
Spray paint and blade coating operation (controlled by catalytic incinerator)	4,800
Georgia	
Automobile inspection/maintenance	6,500–7,000
Maryland	
Metal coating operation (can company)	3,200
Metal coating (average for industry)	800
Printing companies	4,400
Light-truck manufacturing	3,200
Spiral tube manufacturing	2,800

Public Transit

Improvements and expansions in mass transit systems in the more seriously polluted areas of the United States could curb the projected increase in VMT and thereby improve air quality. Increased use of mass transit is expected to help reduce a wide range of problems, from urban traffic congestion and suburban sprawl to energy shortages and global warming. Given the importance of mass transit to air quality improvement strategies, funding should be increased. In particular, federal transportation funds for those areas that face serious problems in attaining federal air quality standards must be directed toward projects that provide alternatives to single-occupancy vehicles.

The city of Philadelphia and its environs provide an excellent example of how an enhanced mass transportation system can reduce VMT and air pollution. Currently, 70 percent of those employed in downtown Philadelphia use public transportation. If the Delaware Valley did not have such a well-developed public transit system, 250,000 additional vehicles would enter downtown Philadelphia every day. It is speculated that 45 new highway lanes would have to be built to accommodate that traffic and that adequate downtown parking would not be available. The resulting additional VMT and traffic congestion would lead to considerable additional air pollution. Federal, state, and local funds have been

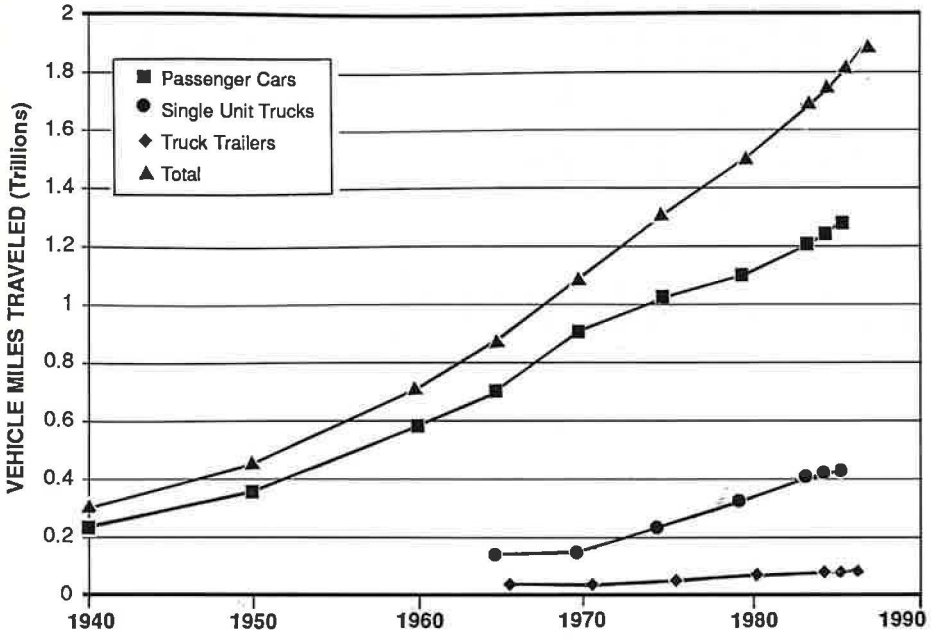

FIGURE 2 Vehicle miles traveled per year in the United States.

joined in this successful effort to support the public transit system and thereby decrease air pollution in the Philadelphia area.

Moving People, Not Automobiles

Mobile pollution sources, most of which are vehicles, make up a large portion of the projected increase in U.S. atmospheric emissions over the next 20 years. The increase in the number of vehicles on the roads and the eventual bottoming out of the effectiveness of technology in reducing mobile source emissions are the major factors in this undesirable contribution. Aggressive steps must be taken to reduce the number of vehicle miles traveled in this country so that health-based air quality standards can be attained and maintained. To provide U.S. citizens with clean air, as well as reducing congestion and reliance on imported fuels, the focus must be on moving people, not automobiles.

The cleanup of the nation's air will not be achieved by relying on only one or two measures. Control of tail pipe emissions is certainly a national priority that will require a comprehensive approach, but "clean" fuels, travel reduction, and transportation control measures must all play a vital part in the program to attain clean air.

Reference

1. *Airshed Modeling of Denver for Carbon Monoxide: A Comprehensive Overview.* Air Pollution Control Division, Colorado Department of Health, Denver, Feb. 1986.

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