

Upcoming Clean Air Act Changes As They Relate to Transportation

The original Clean Air Act was passed 1970. In it the U.S. Environmental Protection Agency (EPA) establish standards for several pollutants. It also created two categories of standards, the primary standards designed to protect the most sensitive individual in society, and the secondary standards designed to protect human welfare - such as the pollutant's impact to plants, animals, and visibility.

The most recent amendment to the Clean Air Act (CAA) was in 1990. Like previous amendments, this amendment relied on locally developed and federally mandated controls. Deadline dates were established for the attainment of National Ambient Air Quality Standards (NAAQS) for the six criteria pollutants – ground level ozone, carbon monoxide, nitrogen dioxide, lead, sulfur dioxide, and particulate matter. For the first time deadlines were established that varied with the pollutant and its severity. The more severe the pollution problem, the more extensive the requirements. And these measures have been fairly successful. Since 1970 air quality has improved for the criteria pollutants except for the oxides of nitrogen.

There are three sources for air pollutants - mobile, stationary, and area. Stationary sources are relatively large, fixed sources of emissions such as power plants. Sources that are too small or numerous to be considered stationary sources are called area sources. Collectively they contribute significantly to air pollution, for example, dry cleaners, and bakeries. Mobile sources include both on and off road pollutant sources such as cars, trucks, buses, trains, ships, airplanes, lawnmowers and construction equipment. A mix of tradeoffs between controls on these sources is required to meet the NAAQS.

The mobile source pollutants of greatest concern are carbon monoxide (CO), hydrocarbons, nitrogen oxides, and small particulate matter. According to EPA, transportation accounts for as much as 1/3 of the United State's emissions of greenhouse gases. Interestingly enough, in the last 10 years mobile source emissions have reduced dramatically due to improved technology even though vehicle miles traveled has increased (28%). Total emissions of CO are down 18%, with CO emissions from highway vehicles decreasing 26%. One of the biggest success stories has been lead. In the last decade, total emissions of lead are down 50%, with lead emissions from highway vehicles decreasing 99%. This is a result of the increased use of unleaded gasoline. In order to address ozone pollution, EPA has focuses its control strategies on reducing emissions of volatile organic compounds. Ozone is not emitted directly into the air; rather it is formed when volatile organic compounds react in the presence of sunlight. Volatile organic compound emissions from highway vehicles have declined 35% in the last 10 years. Even emissions nitrogen oxides from highway vehicles have reduced by 6% though total emissions have increased by 3%. Nitrogen oxides (NO_x) are precursors to both ozone and acid rain. In October 1997, the EPA proposed a rule that will significantly reduce trends in emissions of NO_x in 22 eastern states, including Indiana. It is hoped that this emission reduction will reduce the regional transport of ozone.

When areas do not meet the National Ambient Air Quality Standards for any of the criteria pollutants, they are designated non-attainment by the EPA. CAA requires specific transportation related measures for non-attainment areas. The measures increase in number and severity as the areas' non-attainment classification increases. Depending upon the area, these include such programs as the following:

- inspection and maintenance programs
- vapor recovery systems
- clean fuel fleet programs

reformulated gas or oxygenated fuels

Transportation conformity to the Clean Air Act is nothing new. The concept was first introduced in 1977. Conformity was then a responsibility of each federal agency. Transportation activities not conforming to the Clean Air Act could not be approved. The U.S. Department of Transportation (DOT) and EPA developed conformity procedures for transportation programs. Activities were considered to conform if they did not adversely affect transportation control measures, and contributed to reasonable progress.

The 1990 amendment to the CAA has had a major impact on transportation. Nonattainment areas now have to periodically assess vehicle miles traveled, congestion, emissions, and meet emission budgets. Transportation activities cannot:

- create new NAAQS violations
- increase the frequency or severity of air quality violation
- delay attainment of the National Ambient Air Quality Standards

The 1990 Amendment emphasized reconciling the estimates of emissions rather than simply providing for the implementation of the transportation control measures. This forced an integration of transportation and air quality planning. The planning had to ensure that growth projections are not exceeded without measures to counterbalance the excess growth, that targets are achieved, and that air quality maintenance efforts are not undermined.

All areas are required to have an emissions inventory. This inventory is an incorporation of criteria pollutant sources. From this inventory an emissions budget is created which is designed to bring an area into conformity by the required deadline year, and then they keep it in conformity. In 1993 the U.S. EPA, the U.S. DOT and the Federal Transit Administration issued transportation conformity regulations. These were followed in February and August of 1995 and again in 1997 with amendments to these rules. These regulations encompass hundreds of pages of the federal register in three columns of small print explaining, in the simplest possible terms, how all transportation plans and programs can demonstrate conformity... and if you believe this...

These regulations outlined how to document emissions reduction. Transportation conformity is a very complex analytical process required of the Metropolitan Planning Organizations (MPO). Metropolitan Planning Organizations are regional associations of governments that plan and coordinate programs for a metropolitan area. Under the Intermodal Surface Transportation Efficiency Act (ISTEA) and the Clean Air Act as Amended (CAAA), the Metropolitan Planning Organizations have broad responsibilities in the formulation of an area's transportation program, including federally funded highway and transit projects, transportation control measures and state air quality implementation plans. Once the Metropolitan Planning Organization undertakes the conformity determination, they submit the determinations to the U.S. Dept. of Transportation for approval.

Conformity determinations are made no less than every three years or as changes are made to the transportation plans, programs, or projects. Certain events such as a revised emissions budget, or changing transportation control measures will trigger new conformity determinations. What happens if these transportation activities do not meet the conformity requirements? The following options are available:

- they can be modified to offset the emissions
- or the State Improvement Plan can be modified to offset emissions

If this is not accomplished, neither transportation nor transit activities can advance.

What about sanctions? Sanctions are EPA's big stick and they are mandatory. The EPA can sanction non-attainment areas or the entire state, depending on the circumstances. The purpose of the sanctions is to ensure that the Clean Air Act is adhered to. Sanctions are vitally important to the transportation community because there does not have to be a direct causal relationship between the pollutant source and the sanction that is to be applied. For example, highway sanctions can be applied for deficiencies caused by stationary sources.

There are two kinds of sanctions. One affects stationary sources, the other mobile sources. The first requires a 2:1 emissions offset for major stationary sources, in other words, for the area under sanction, each new stationary source must be offset by a 2:1 ton reduction of existing stationary sources through control measures. Needless to say this can put a real damper on the industrial development of an area. Normally this is the first sanction applied to an area. The second sanction follows six months later if the action that caused the sanction in the first place had still not been remedied. This sanction consists of withholding Federal highway funding except for certain exempt projects.

Normally, EPA gives the state 18 months to correct any deficiencies. If, after 18 months, they have not been corrected, then one of the two sanctions must be applied. If the EPA determines that the state is not trying to correct the problem, then both sanctions may be applied.

In 1991 Intermodal Surface Transportation Efficiency Act was signed. This act revamped the nation's transportation program in many ways. For one thing, note that the act is titled "Intermodal Surface Transportation". ISTEA places a high priority on considering transportation needs from an intermodal perspective. It also provided additional tools to improve air quality. These tools included increased funding, enhanced planning requirements and an unprecedented flexibility to select the best mix of projects to meet local needs, whether highway, transit, or other. The Indiana Department of Transportation's (INDOT) multimodal planning process focuses on adhering to ISTEA and providing for the State's transportation infrastructure. The CAAA has resulted in a substantial revision of the federal highway program in non-attainment areas, due to its provisions for sanctions, conformity, vehicle miles traveled, and transportation/air quality planning. The conformity provisions significantly increased the contributions that transportation must make towards air quality improvement.

Congestion is one factor in emission rates. The greater the vehicle miles traveled, and the smaller the increases in system capacity, the greater the congestion and emission rates. Traffic congestion on urban Interstate highways has been steadily increasing. In 1990, 69% of peak-hour traffic occurred under congested conditions. Managing traffic congestion is a planning activity required by ISTEA.

INDOT encourages all of the Metropolitan Planning Organization's to take the lead in the development of congestion management systems for their areas, as well as the public transportation and intermodal management systems. In non-attainment Transportation Management Areas (urbanized area with population over 200,000), highway projects which significantly increase capacity for single-occupant vehicles must be part of an approved congestion management system. The congestion management system provides an analysis of all reasonable strategies. These include traffic operations, ridesharing, pedestrian and bicycle facilities, alternate work schedules, freight movement options, high occupancy vehicle treatments, telecommuting, and public transportation improvements. If the analysis demonstrates

that additional capacity is warranted, then all reasonable strategies to manage the facility efficiently must be included.

The congestion management system is an analysis of regional needs. Metropolitan areas need more focused analyses. This is the Major Investment Study. It is used for an in depth analyses of options. Major Investment Study's are required for transportation projects with substantial cost, and significant effect on capacity, traffic flow, level of service, or mode share. For example construction of a new partially controlled access principal arterial would require a Major Investment Study. These studies evaluate the effectiveness of various alternatives in attaining transportation goals.

IDEM, EPA and the MPO representative can speak as to the various controls that the Clean Air Act requires for reducing emissions from mobile sources. Many of these controls are the responsibility of automobile and gasoline manufacturers rather than state or local officials. These include stricter tailpipe emission standards, reformulated and oxygenated gasoline.

Federal mandates are extremely effective in reducing motor vehicle emissions. Since 1970, car emissions decreased by 80 to 95%, while emissions from diesel trucks by 10 to 60%, even though vehicle miles traveled increased 102%. The decline in emissions is probably attributable in large part to the reduction in gasoline volatility and the retirement of older vehicles from the fleet.

Vehicle miles traveled increased 41% between 1980 and 1990 on a national basis. This growth is attributable to a number of trends, including growth in the population, the number of households, and a declining average automobile occupancy. Since the late 1960's, there has been an increase in the number of workers, particularly women; an increase in the number of suburban jobs; and an increase in vehicle ownership. In addition, low fuel costs and higher fuel efficiencies mean low per mile driving costs.

The number of household vehicle trips has also increased substantially over time. Between 1977 and 1990, the number of trips has increased from 35% to 46%. Work related trips have declined from 35% in 1977 to 28% in 1990. Because work related trips make up only one quarter of the current vehicle trips, transportation control measures aimed only at work trips seriously limit the effectiveness of limiting emissions.

Areas with the worst air quality problems are provided the most time to conform to the national ambient air quality standards. The requirements for reducing emissions increase with each worsening classification. These requirements must be included in the State Implementation Plan. The plans must contain procedures to monitor, control, maintain and enforce compliance with the Standards...

Each classification must handle emissions with emissions inventory and budgets. An emissions inventory is a complete list of mobile, stationary, and area sources and their emissions within a specific area and time interval. An emissions budget identifies the allowable emission levels needed to achieve the National Ambient Air Quality Standards. The emission levels are used for meeting emission reduction milestones, attainment or maintenance demonstrations.

If a non-attainment area experiences more than three exceedences of a criteria pollutant standard, EPA would "bump up" the area to the next higher category. Hot summers tend to increase the chances of exceedences for ozone.

If an area is "bumped up" to a higher classification, then that area has to meet all of the requirements for the higher classification, which is very difficult, especially since the area obviously could not meet the requirements for the lower standard. Just making the submittals for these requirements is difficult, but worse, it is extremely hard to implement the measures early enough to reduce emissions and have a significant impact on pollutant levels by the deadline date

for attainment. As a result of this, areas face the possibility of missing the attainment dates and being bumped up again, requiring a whole new set of requirements

The maintenance period begins when the EPA approves a request for redesignation. A maintenance area must still show conformity to the CAAA, but the requirements are the least stringent of all of the possible designations. Should an area experience violations of the standards (> 3 in 3 year average) after being redesignated as a maintenance area, it would remain a maintenance area. The area would have to implement one or more of its contingency measures to ensure no further violations.

Despite the strong language of the CAAA and ISTEA, they do not guarantee attainment. Many deadlines of the 1990 CAAA have already slipped. The EPA has projected that full implementation of the act's requirements will not be enough to bring about attainment in many of the worst areas. Technological advances required by the Clean Air Act have the potential to produce impressive reductions in emissions. These include controls on gasoline volatility, evaporative losses, tailpipe standards, alternative fuel programs, clean fuel fleets, reformulated and oxygenated fuels, and inspection and maintenance programs. By 2010 these programs could produce almost half of the required emissions reductions nationwide. But vehicle miles traveled growth will more than offset the benefits of a cleaner fleet. Forecasters expect steady growth of vehicle miles traveled around 2% annually between 1990 and 2010. The EPA projects that by 2005, continued vehicle miles traveled growth may outweigh the benefits of cleaner vehicles and fuels presently mandated in the Clean Air Act, and at that time, the annual total highway volatile organic compound emissions may start to rise.

Alternatives to single occupant vehicle travel have long been held out as the way to have both mobility and air quality. Alternatives of some kind are essential, but increasing the availability of conventional options such as rail, bus, and carpooling will not free urban America from its mobility and air quality dilemma. These options are far from perfect substitutes for private automobiles, and cannot in the public's mind, match the variety and level of service of automobile. Projects designed to reduce traffic congestion and improve air quality are becoming more common across the United States. Some federal initiatives include the Department of Energy's Clean Cities Program, the Partnership for a New Generation of Vehicles (a program involving several federal agencies, 20 federal laboratories, and Chrysler, Ford and General Motors), and programs to promote telecommuting, discourage subsidized parking, and encourage the purchase of tires that reduce fuel consumption.

High occupancy vehicle lanes and parking spaces are another commonly postulated alternative to single occupant vehicles. Compared with transit, carpooling offers many consumers a higher level of service and greater flexibility at a lower cost. However the emissions benefits of expanded high occupancy vehicle lanes is usually very small. Strictly speaking, high occupancy vehicle lanes do not provide an alternative to the automobile, but rather an incentive to better utilize its capacity. One analysis comparing 75 miles of high occupancy vehicle lanes around Washington D.C. to a hypothetically expanded 334 mile network, showed a reduction in weekday trips of only 0.5%. Home to work trips were reduced by only 2.3%. Even these results exaggerate emissions impacts, considering the extra trips or miles traveled at slower speed required to assemble carpools.

Conventional travel alternatives present only a limited potential to reduce emissions. Continued declines in urban density and the movement of jobs to the suburbs place commuters in situations usually poorly served by non-automotive travel alternatives. Conventional travel alternatives aim at the workday commuters. The past decade has seen little growth in home to

work trips. Non-work trips have become the dominant and fastest growing source of travel demand. Travel alternatives may attract car-pool riders, but fail to attract the driver or eliminate his car's emissions. Furthermore, non-drivers are an endangered species. Between 1969 and 1990 the percentage of households without a vehicle dropped from 21% to 9%. Although today's households are smaller than in previous decades, more than one-fifth of them has three or more vehicles. The dominance of the automobile, and of single occupancy vehicular travel in particular, continues to grow.

How will large and growing urban areas meet the emission standards? EPA's Office of Policy Analysis has postulated several possible solutions. One approach relies on mandatory trip reduction ordinances. Another approach would begin to appropriately price road use, allowing individuals to decide for themselves how best to provide the amount, timing, pattern and mode of their mobility. Strengthening tailpipe and fuel standards with market incentives for a cleaner fleet, improving efficiency by leaving the costs of roads to drivers, congestion pricing, reshaping parking subsidies into more valuable employee benefits, and unlocking the potential of innovative travel alternatives by eliminating barriers to private transit and telecommuting all are ideas worth considering.

Cities must adopt appropriate strategies. Demand for automobile travel is so strong that simply providing travel alternatives will not lessen the growth in automobile travel. On the other hand, road pricing will have little success managing demand for automobile travel if drivers have no new alternatives. These alternatives must be planned and provided for in such a manner as to lead to an integrated transportation strategy, which can lead to decreasing emissions.