



Motor Vehicles and the 1990 Clean Air Act

Background

The Clean Air Act of 1970 set a national goal of clean and healthy air for all. It established the first specific responsibilities for government and private industry to reduce emissions from vehicles, factories, and other pollution sources. In many ways, the far-reaching law has been a great success. Today's cars, for example, typically emit 70 to 90 percent less pollution over their lifetimes than their 1970 counterparts.

Despite considerable progress, the overall goal of clean and healthy air continues to elude much of the country. Unhealthy air pollution levels still plague virtually every major city in the United States. This is largely because development and urban sprawl have created new pollution sources and have contributed to a doubling of vehicle travel since 1970. Furthermore, scientists and now the public have become concerned about previously unrecognized environmental threats such as global warming, acid rain and air toxics.

With these issues in mind, Congress and the Administration in 1990 amended and updated the Clean Air Act for the first time since 1977. The 1990 Clean Air Act includes provisions to further control ground-level ozone (urban smog), carbon monoxide, and particulate emissions from diesel engines and to address air toxics and acid rain. Motor vehicles contribute to all these problems. This fact sheet focuses on the mobile source provisions of the 1990 law, which together will reduce most vehicle-related pollutants by more than 40 percent.

The 1990 Clean Air Act — What's New?

The new Clean Air Act strengthens components of the earlier law. The tailpipe standards for cars, buses, and trucks have been tightened, and Inspection and Maintenance (I/M) programs have been expanded to include more areas and allow for more stringent tests.

The 1990 law also introduces several entirely new concepts with regard to reducing motor vehicle-related air pollution. For the first time, fuel is considered along with vehicle technology as a potential source of emission reductions. And more attention is focused on reducing the growth in vehicle travel. The new provisions include:

- **Emphasis on Fuels**

The act mandates that improved gasoline formulations be sold in some polluted cities to reduce emissions of carbon monoxide or ozone-forming hydrocarbons. Other programs set low vehicle emission standards to stimulate the introduction of even cleaner cars and fuels.

- **Nonroad Engines**

The 1990 Clean Air Act requires the U.S. Environmental Protection Agency (EPA) to

consider emissions from off-highway vehicles as well as from highway vehicles such as cars and trucks. The so-called “nonroad” category includes boats, farm equipment, bulldozers, lawn and garden devices, and construction machinery. Because nonroad engines have not been previously regulated for pollution, they can be very dirty. EPA has determined that emissions from nonroad engines are a significant source of urban air pollution and is working with industry and the public to develop effective control strategies.

- **Clean Transportation Alternatives**

The law requires the smoggiest cities to limit growth in vehicle travel by encouraging alternatives to solo driving. In areas where ozone levels exceed certain criteria, employers of 100 or more will be asked to find ways to increase the average number of passengers in each vehicle for commutes to work and during work-related driving trips.

The 1990 Amendments: The View from the Driver’s Seat

Typical drivers will probably not be aware of many vehicle and fuel changes manufacturers are making in response to the 1990 Clean Air Act, although these changes could add \$200 to the cost of a car and a few cents per gallon to the cost of gasoline. But there are other programs that drivers will notice, especially in areas with air pollution problems.

New 1994 and later model cars must be equipped with “onboard diagnostic systems.” These systems feature dashboard warning lights that alert drivers to malfunctioning emission control equipment. Controlled by the vehicle’s computer, the onboard diagnostic system must also be capable of storing trouble codes that help mechanics pinpoint the malfunction.

Another change involves tampering and misfueling. Such activities have always been discouraged, but were previously illegal only for commercial operations. “Backyard mechanics” now are also subject to stiff penalties for deliberate tampering.

For drivers in polluted cities, more changes will be apparent. Some cities will have to start I/M programs to check vehicle emissions on a regular basis. Areas that already require I/M testing may have to institute more stringent programs.

A Summary of Some Specific Clean Air Act Programs

- **Tighter Tailpipe Standards**

Tailpipe (exhaust) standards for cars have been reduced under the 1990 law. The previous standards of 0.41 gram per mile (gpm) total hydrocarbons, 3.4 gpm carbon monoxide, and 1.0 gpm nitrogen oxides have been replaced with standards of 0.25 gpm nonmethane hydrocarbons and 0.4 gpm nitrogen oxides (the 3.4 gpm standard for carbon monoxide does not change). These standards will be fully phased in with 1996 models. EPA is required to study whether even tighter standards are needed, technologically feasible, and economical. If EPA determines by 1999 that lower standards are warranted, the standards will be cut in half beginning with 2004 model year vehicles.

- **Carbon Monoxide Control**

Mobile sources are the primary cause of carbon monoxide pollution in the United States. The 1990 Clean Air Act sets up two programs to address this problem. For the first time, carbon monoxide emissions will be regulated at cold temperatures. Carbon monoxide emissions can be very high in cold weather because both fuel combustion and pollution control equipment operate less efficiently in the cold. In the past, tailpipe standards applied only at 75 °F. so manufacturers optimized emission control equipment for that temperature. The 1990 Clean Air Act requires cars to meet a carbon monoxide standard at 20 °F. The phase-in of a 10 gpm standard began with 1994 models. If, by 1997, carbon monoxide levels are still too high in six or more cities, the cold temperature emission standard will drop to 3.4 gpm for 2002 models. The second new provision involves increasing the oxygen content of gasoline sold during the winter in cities that exceed national air quality standards for carbon monoxide pollution. The oxygen helps reduce carbon monoxide emissions by enhancing fuel combustion. The wintertime fuel requirements began in 1992.

- **Ozone Control**

Ground-level ozone, a primary component of smog, exceeds healthy levels in cities across the United States. It is our most serious and persistent air quality problem. A major thrust of the 1990 Clean Air Act involves reducing urban ozone levels. As a complement to stricter tailpipe standards, the new law introduces several programs to minimize pollution from evaporating gasoline. Evaporative emissions are a major source of the hydrocarbon compounds that form ground-level ozone. Devices that trap gasoline vapors from the engine and fuel system will be improved. In addition, gasoline volatility will be capped, reducing the propensity for gasoline to evaporate in the first place.

- **Air Toxics Control**

Most provisions requiring cleaner cars and fuels will dramatically lower vehicle toxic emissions. In addition, EPA has completed a study of air toxics emissions and may, if warranted, regulate emissions of benzene, formaldehyde, and other toxic air pollutants.

- **Reformulated Gasoline**

By 1995, all gasoline sold in the country's worst ozone areas must contain a minimum oxygen content and a maximum benzene content. Through refining changes that will not be apparent to motorists, reformulated gasoline will achieve a 15 to 17 percent reduction in both ozone forming hydrocarbons and toxic emissions from motor vehicles. By 2000, gasoline sold in these cities will achieve a 25 to 29 percent hydrocarbon reduction, a 20 to 22 percent toxics reduction, and a 9 to 10 percent reduction in nitrogen oxide emissions. Many cities have voluntarily chosen to use this cleaner gasoline.

- **Urban Buses**

Beginning in 1993, the diesel particulate standard for urban buses was reduced by 60 percent, from 0.25 to 0.1 gram per brake-horsepower per hour (g/bhp-hr).

The standard, which applies to urban transit buses, dropped to 0.07 g/bhp-hr in 1994 and to 0.05 g/bhp-hr in 1996. If monitoring data show that buses in actual use are not meeting the standard, EPA must implement a “low-polluting fuels” program for new buses in large cities. Possible fuels include methanol, ethanol and compressed natural gas.

- **Clean Fleets**

Beginning in 1998, 30 percent of new vehicles purchased by centrally-fueled fleets in certain cities will be required to use clean fuels and meet tailpipe standards that are lower than those in place for general passenger cars (0.075 gpm hydrocarbons, 3.4 gpm carbon monoxide, and 0.2 gram per mile nitrogen oxides). The purchase requirement will grow to 70 percent by the year 2000. The program, which is intended to stimulate development of new, low-polluting fuel/vehicle combinations, will affect 22 metropolitan areas in 19 states across the country where pollution levels are high.

- **California Pilot Program**

Like the fleets program, the California Pilot program is designed to encourage production of clean fuels and vehicles. Beginning in 1996, manufacturers must produce at least 150,000 “clean” cars (capable of meeting a 0.125 gpm hydrocarbon, 3.4 gpm carbon monoxide, and 0.4 gpm nitrogen oxide standard) for sale in California. The number increases to 300,000 by the year 1999. In 2001, the standards drop to the fleets program levels. Other states may petition EPA to adopt this program.

Timetable for Selected Mobile Source Provisions of the 1990 Clean Air Act

- 1992** Limits on maximum gasoline vapor pressure became law nationwide.
- Regulations setting minimum oxygen content for gasoline took effect in areas where carbon monoxide levels exceed national pollution standards.
- 1993** Production of vehicles requiring leaded gasoline became illegal.
- New standards for sulfur content of diesel fuel took effect, reducing the maximum sulfur level by 80 percent.
- 1994** Phase-in of tighter tailpipe standards for light-duty vehicles begins.
- Enhanced Inspection and Maintenance programs begin in some polluted cities.
- Phase-in of cold temperature carbon monoxide standards for light-duty vehicles begins.
- Trucks and buses must meet stringent diesel particulate emission standards.
- New cars must be equipped with on-board diagnostic systems.
- 1995** Reformulated gasoline provisions take effect in the nation's smoggiest cities and in other areas that voluntarily join the program.
- New warranty provisions on emission control systems take effect.
- 1996** Phase-in of California Clean Fuels pilot program begins.
- Lead banned from use in motor vehicle fuel.
- All new vehicles (1996 model year cars and light trucks) must meet new tailpipe and cold-temperature carbon monoxide standards.
- 1998** Clean-fuel fleet programs begin in ozone and carbon monoxide non-attainment areas in 19 states.
- 2001** Second phase of the Fleets and California Pilot clean fuels programs begin.

For More Information:

The Office of Mobile Sources is the national center for research and policy on air pollution from highway and off-highway motor vehicles and equipment. You can write to us at the EPA National Vehicle and Fuel Emissions Laboratory, 2565 Plymouth Road, Ann Arbor, MI 48105. Our phone number is (313) 668-4333.

Cities Affected by Key Mobile Source Provisions of the Clean Air Act

| METROPOLITAN AREA | POLLUTANT CATEGORY* | | | | | CONTROL PROGRAM | | | | |
|---|---------------------|----------|-------------------|------------------------|------------------|-----------------|--------------------|---------------------------|--|--|
| | Carbon Monoxide | Ozone | Commute Options** | Reformulated Gasoline† | Oxygenated Fuels | Clean Fleets | Refueling Controls | Inspection & Maintenance‡ | | |
| Albuquerque, NM | Moderate | | | | • | | | • | | |
| Anchorage, AK | Moderate | | | | • | | | • | | |
| Atlanta, GA | | Serious | | | | • | | • | | |
| Atlantic City, NJ | | Moderate | | | | | • | • | | |
| Bakersfield, CA (San Joaquin Valley) | | Serious | • | | • | • | • | • | | |
| Baltimore, MD | Moderate | Severe | | | | • | | • | | |
| Baton Rouge, LA | | Serious | | | | • | | • | | |
| Beaumont-Port Arthur, TX | | Serious | | | | • | | • | | |
| Boston-Lawrence-Worcester, MA-NH | Moderate | Serious | | | • | • | • | • | | |
| Charleston, WV | | Moderate | | | | | • | • | | |
| Charlotte-Gastonia, NC-SC | | Moderate | • | | | • | • | • | | |
| Chicago-Gary-Lake County, IL-IN-WI | | Severe | | • | • | • | • | • | | |
| Chico, CA | Moderate | | | | • | | | • | | |
| Cincinnati-Hamilton, OH-KY-IN | | Moderate | | | | • | | • | | |
| Cleveland-Akron-Lorain, OH | Moderate | Moderate | | | • | • | | • | | |
| Colorado Springs, CO | Moderate | | | | • | | | • | | |
| Dallas-Fort Worth, TX | | Moderate | | | | | • | • | | |
| Dayton-Springfield, OH | | Moderate | | | | | • | • | | |
| Denver-Boulder, CO | Moderate | | | | • | • | • | • | | |
| Detroit-Ann Arbor, MI | Moderate | Moderate | | | • | | • | • | | |
| Duluth, MN-WI | Moderate | Serious | | | • | • | | • | | |
| El Paso, TX | Moderate | | | | | | • | • | | |
| Fairbanks, AK | Moderate | | | | | | | | | |
| Fort Collins-Loveland, CO | Moderate | | | | | | • | • | | |
| Fresno, CA (San Joaquin Valley) | Moderate | Serious | | | • | • | • | • | | |
| Grand Rapids, MI | Moderate | Moderate | | | | | • | • | | |
| Greensboro-Winston Salem-High Point, NC | Moderate | Moderate | | | • | | • | • | | |
| Hartford, CT (Greater Connecticut) | Moderate | Serious | • | • | • | • | • | • | | |
| Houston-Galveston-Brazoria, TX | | Severe | • | • | | • | • | • | | |
| Huntington-Ashland, WV-KY-OH | | Serious | | | | | • | • | | |
| Josephine Co., OR (Grants Pass) | Moderate | | | | • | | • | • | | |
| Kewaunee Co., WI | | Moderate | | | | | | | | |
| Klamath Co., OR (Klamath Falls) | Moderate | | | | • | | • | • | | |
| Knox & Lincoln Co., ME | Moderate | Moderate | | | • | | • | • | | |
| Las Vegas, NV | Moderate | | | | | | | | | |
| Lewiston-Auburn, ME | Moderate | Moderate | | | • | | • | • | | |
| Los Angeles South Coast Air Basin, CA | Serious | Extreme | • | • | • | • | • | • | | |
| Louisville, KY-IN | | Moderate | | | | | | • | | |

* 1990 Clean Air Act classification. The metropolitan area generally includes suburbs and nearby towns.

** The Employee Commute Options (ECO) program is designed to discourage single-occupancy commuting to work.

† Other ozone nonattainment areas are expected to opt in to this program.

‡ This is a partial list of cities required to implement Inspection and Maintenance programs. "•" indicates an enhanced program will be required.

Cities Affected by Key Mobile Source Provisions of the Clean Air Act

| METROPOLITAN AREA | POLLUTANT CATEGORY* | | | | | | | | | | CONTROL PROGRAM | | | | |
|--|---------------------|----------|--------------------|------------------------|------------------|--------------|--------------------|----------------------------|---|--|-----------------|--|--|--|--|
| | Carbon Monoxide | Ozone | Commuter Options** | Reformulated Gasoline† | Oxygenated Fuels | Clean Fleets | Refueling Controls | Inspection & Maintenance†† | | | | | | | |
| Manitowoc Co., WI | Moderate | Moderate | | | • | | | | • | | • | | | | |
| Medford, OR | Moderate | Moderate | | | • | | | | • | | • | | | | |
| Memphis, TN-AR-MS | Moderate | Moderate | | | • | | | | • | | • | | | | |
| Miami-Fort Lauderdale, FL | Moderate | Moderate | | | • | | | | • | | • | | | | |
| Milwaukee, WI | Moderate | Severe | • | • | | | | | • | | • | | | | |
| Minneapolis-St. Paul, MN-WI | Moderate | Moderate | | | • | | | | • | | • | | | | |
| Missoula, MT | Moderate | Moderate | | | • | | | | • | | • | | | | |
| Modesto, CA | Moderate | Moderate | | | • | | | | • | | • | | | | |
| Muskegon, MI | | Severe | | | | | | | • | | • | | | | |
| Nashville, TN | | Moderate | | | | | | | • | | • | | | | |
| New York, N. NJ-Long Island, NY-NJ | Moderate | Severe | • | • | | | | | • | | • | | | | |
| Parkersburg-Marietta, WV-OH | Moderate | Serious | | | | | | | • | | • | | | | |
| Philadelphia, PA | Moderate | Severe | • | • | | | | | • | | • | | | | |
| Phoenix, AZ | Moderate | Severe | | | • | | | | • | | • | | | | |
| Pittsburgh-Beaver Valley, PA | | Moderate | | | | | | | • | | • | | | | |
| Portland, ME | | Moderate | | | | | | | • | | • | | | | |
| Portland-Vancouver, OR-WA | Moderate | Moderate | | | • | | | | • | | • | | | | |
| Portsmouth-Dover-Rochester, NH-ME | | Serious | | | | | | | • | | • | | | | |
| Providence-Pawtucket-Fall River, RI-MA | | Serious | | | | | | | • | | • | | | | |
| Provo-Orem, UT | Moderate | Serious | | | • | | | | • | | • | | | | |
| Raleigh-Durham, NC | Moderate | Moderate | | | • | | | | • | | • | | | | |
| Reading, PA | Moderate | Moderate | | | • | | | | • | | • | | | | |
| Reno, NV | Moderate | Moderate | | | • | | | | • | | • | | | | |
| Richmond-Petersburg, VA | | Moderate | | | | | | | • | | • | | | | |
| Sacramento, CA | Moderate | Serious | | | • | | | | • | | • | | | | |
| Salt Lake City-Ogden, UT | | Moderate | | | | | | | • | | • | | | | |
| San Diego, CA | Moderate | Severe | • | • | | | | | • | | • | | | | |
| San Francisco-Oakland-San Jose, CA | Moderate | Moderate | | | • | | | | • | | • | | | | |
| Santa Barbara-Santa Maria-Lompoc, CA | Moderate | Moderate | | | • | | | | • | | • | | | | |
| Seattle-Tacoma, WA | Moderate | Moderate | | | • | | | | • | | • | | | | |
| Sheboygan, WI | | Moderate | • | • | | | | | • | | • | | | | |
| Southeast Desert, CA | | Severe | | | | | | | • | | • | | | | |
| Spokane, WA | Moderate | Severe | | | • | | | | • | | • | | | | |
| Springfield, MA | | Serious | | | | | | | • | | • | | | | |
| St. Louis, MO-IL | | Moderate | | | | | | | • | | • | | | | |
| Stockton, CA | Moderate | Marginal | | | • | | | | • | | • | | | | |
| Syracuse, NY | Moderate | Moderate | | | • | | | | • | | • | | | | |
| Toledo, OH | | Moderate | | | | | | | • | | • | | | | |
| Ventura County, CA | Moderate | Severe | • | • | | | | | • | | • | | | | |
| Washington, DC-MD-VA | Moderate | Serious | | | • | | | | • | | • | | | | |