

The Clean Air Act in a Nutshell: How It Works

Congress designed the Clean Air Act to protect public health and welfare from different types of air pollution caused by a diverse array of pollution sources. Congress established the law's basic structure in the Clean Air Act Amendments of 1970, and made major revisions in 1977 and 1990.

The Act contains key provisions to control common pollutants which, at the time of the 1970 amendments, formed dense, visible smog in many of the nation's cities and industrial centers. To protect public health and welfare nationwide, the law requires EPA to establish national ambient air quality standards based on the latest science, and requires states to adopt enforceable plans to achieve the standards. State plans also must control emissions that drift across state lines and harm air quality in downwind states. Congress designed the law to minimize pollution increases from growing numbers of motor vehicles, and from new or expanded stationary sources (i.e., power plants, industrial plants, and other facilities that are not mobile). The law calls for new stationary sources to be built with best technology, and allows less stringent standards for existing stationary sources.

The Act also contains specific provisions to address:

- "Hazardous" or "toxic" air pollutants that pose health risks such as cancer or environmental threats such as bioaccumulation of heavy metals,
- Acid rain that damages aquatic life and ecosystems, acidifies forest soils, damages property, and forms from pollution that degrades visibility and harms public health.
- Chemical emissions that deplete the stratospheric ozone layer which protects us from skin cancer and eye damage, and
- Regional haze that impairs visibility in national parks and other recreational areas.

In addition, Congress drafted the Act with general authorities that can be used to address pollution problems that emerge over time, such as greenhouse gases that cause climate change.

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Table of Contents

This overview explains how the Clean Air Act addresses each type of pollution problem, and summarizes key cross-cutting provisions.

Note: If viewing via computer, clicking on the links below takes you to the start of each section.

TOPIC	PAGE
<u>How the Act controls certain common, widespread pollutants using national air quality standards</u>	<u>3</u>
<u>How the Act controls “hazardous air pollutants”</u> (also called “toxic air pollutants” or “air toxics”)	<u>12</u>
<u>How the Act protects visibility in national parks</u>	<u>13</u>
<u>How the Act controls acid rain</u>	<u>14</u>
<u>How the Act protects the stratospheric ozone layer</u>	<u>16</u>
<u>How the Act reduces pollution that causes climate change</u>	<u>17</u>
<u>How the Act provides for operating permits</u>	<u>18</u>
<u>How the Act provides for enforcement</u>	<u>19</u>
<u>How the Act relates to state clean air laws</u>	<u>20</u>
<u>Miscellaneous provisions</u>	<u>21</u>

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How the Clean Air Act controls common, widespread pollutants

Air quality standards and their implementation -- Overview

The Act requires EPA to set and revise national ambient air quality standards (NAAQS) for certain common and widespread pollutants, known as criteria pollutants, and provides authority for EPA to add additional pollutants.¹ Standards are in effect today for six pollutants: sulfur dioxide, carbon monoxide, particles, nitrogen dioxide, ozone and lead.

EPA is directed to set primary standards that are requisite to protect public health, including the health of sensitive subpopulations, with an adequate margin of safety. Secondary standards are to be set at levels requisite to protect the public from adverse effects on soil, water, crops, buildings, and other matters separate from public health. Every five years, the Act requires EPA to review scientific data, and determine whether to revise the standards for a pollutant. An independent scientific advisory committee provides advice and recommendations to EPA for this review.

The air quality standards must be set based on science without regard to costs of implementing pollution controls to achieve the standards. Costs are considered during implementation of the standards.

Implementing the air quality standards is a joint responsibility of states and EPA. In this partnership, states are responsible for developing enforceable state implementation plans to meet and maintain air quality that meets national standards.² Each state plan also must prohibit emissions that significantly contribute to air quality problems in a downwind state.³

EPA assists state efforts by providing technical and policy guidance, and by issuing national emissions standards for new sources as described below. EPA reviews state plans to ensure that they comply with the Act.⁴ If a state fails to adopt and implement an adequate plan, EPA is required to issue a federal implementation plan.⁵

¹ Sections 108 and 109. They are called criteria pollutants because the NAAQS are based on EPA's scientific assessment of the health and welfare effects of the air pollution, which is referred to as the "air quality criteria" in section 108.

² Section 110, Part C, and Part D

³ Section 110(a)(2)(D)

⁴ Section 110(k)

⁵ Section 110(c)

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Interstate pollution transport controls, state implementation plans for nonattainment areas, and EPA's national emission standards for new sources work together to help the nation achieve the national ambient air quality standards.

Designation of clean and dirty air areas⁶

After EPA sets a new NAAQS or revises an existing NAAQS, EPA, considering state recommendations, determines whether areas do or do not meet the air quality standards. These determinations generally are based on data collected from air quality monitors located around the country.

Areas where the air quality falls short of national standards are designated as "non-attainment areas." Areas where air quality meets the standards are called "attainment areas." Areas for which data is lacking are designated "unclassifiable" and generally have the same obligations as attainment areas (unless they are later redesignated "nonattainment"). An area can be in attainment for one pollutant and out of attainment for another. Air quality planning and control requirements differ for nonattainment and attainment areas.

State implementation plans

States are required to devise and carry out state implementation plans (SIPs) to clean up dirty air and protect clean air from degradation. The Act sets minimum requirements for measures that must be included in these plans. Plans must be submitted to EPA for review to ensure that they meet the Act's requirements.

In the air quality planning process, states use emissions inventories, emissions projections, and computerized air quality models to estimate future air quality and improvements due to potential control measures. State implementation plans contain emission limits and compliance schedules for stationary pollution sources, such as power plants and factories. Depending on the pollutant, plans may also include state measures to reduce emissions from existing vehicles, such as state emissions inspection and maintenance programs that require cars with excessive emissions to be tuned-up or repaired.

⁶ Section 107

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Requirements for cleaning the air in nonattainment areas⁷

The Act contains generic requirements for the state planning process for nonattainment areas. These requirements are to some degree supplanted by more specific requirements in subparts that apply to specific pollutants.

Under the generic provisions, state plans for nonattainment areas generally are due within 3 years after designations for a new or revised air quality standard. These plans must provide for attainment of the standard as expeditiously as practicable and within 5 years of designation— or up to 10 years if EPA determines additional time is warranted considering the severity of pollution and availability of controls.⁸

Under the pollutant-specific subparts, different schedules apply. For ozone, the 1990 Amendments provide up to 3, 6, 9, 15, 17 or 20 years to attain the standard, depending on the severity of the pollution.⁹ For sulfur dioxide, nitrogen oxides and lead, state plans are due in only 18 months, and there is no potential extension of the 5-year attainment deadline.¹⁰

In addition to demonstrating that its air quality will meet the standards by the attainment date, a state plan must also contain some specific measures set forth in the CAA.

Nonattainment area plans must include reasonably available control measures (RACM), including reasonably available control technology (RACT) for existing stationary sources. During the period before attainment, state plans must achieve annual incremental emissions reductions that represent “reasonable further progress” (RFP) toward meeting the standard on time.¹¹

Through a preconstruction permit process known as “nonattainment new source review,” states are required to ensure that new major stationary sources do not further degrade air quality. This includes a requirement that new sources install controls at least as effective as the best used by an existing pollution source of the same kind. The level is established in each individual permit and is called the “lowest achievable emission rate” (LAER).¹²

⁷ Part D

⁸ Subpart 1, section 172

⁹ Subpart 2, section 181

¹⁰ Subpart 5

¹¹ Section 172(c)

¹² Section 172(c)(5), Section 173

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Under this permit program, new plants cannot be built in nonattainment areas unless the added emissions are offset by reductions in pollution from existing facilities in the area. A company can obtain offsets by reducing emissions from other facilities it owns, buying emissions credits from another company that reduces emissions, or closing down an old plant.

A “general conformity” requirement¹³ requires that any activity funded by or approved by federal agencies must conform to a state’s Clean Air Act implementation plan for a nonattainment area (or for a “maintenance area,” a former nonattainment area redesignated to attainment). “Conform” means that the activities will not cause or contribute to new air quality violations, worsen existing violations, or delay attainment of air quality standards. “Transportation conformity” provisions¹⁴ require that any transportation, plan, program or project approved by a federal agency or metropolitan planning organization conform to the approved state implementation plan for the nonattainment or maintenance area.

As revised in 1990, the Act contains additional requirements for nonattainment areas with excessive levels of ozone¹⁵, coarse particles (PM-10)¹⁶ and carbon monoxide.¹⁷ In general, areas with higher pollution levels are granted more time to meet the standards, but also are required to include more congressionally specified control measures in their plans.

For ozone, examples of the specified controls include percentage milestones for emissions reductions, extension of controls to smaller new and existing emitters, more stringent emissions offset requirements for new sources, improved auto emissions inspection and maintenance programs, and “stage II” evaporative emissions controls on gasoline pumps. The list of required measures is progressively longer, and more stringent, for areas with more severe pollution problems.

Control techniques guidance

EPA is authorized to issue control technique guidelines (CTGs) and alternative control techniques guidance (ACTs) to help states reduce emissions from existing stationary sources, and Congress mandated that EPA issue guidelines for numerous industry

¹³ Section 176

¹⁴ Section 176

¹⁵ Subpart 2

¹⁶ Subpart 4

¹⁷ Subpart 3

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categories.¹⁸ This guidance assists states in determining the levels of control that represent “reasonably available control technology” for existing sources in nonattainment areas.

More generally, to assist state air quality planning, EPA is authorized to issue information on control techniques.¹⁹ EPA also is required to make available to states information on measures to reduce emissions from transportation, and on emission control technology through a central database that includes information from state permit programs.²⁰

Ensuring Development of Implementation Plans

The Act includes provisions to ensure that states and localities submit and implement adequate state implementation plans. Sanctions come into play if the agency finds that a state has failed to submit or carry out an adequate state implementation plan, or if EPA disapproves a submitted plan.²¹ If the state has not cured the deficiency within 18 months of EPA’s finding or disapproval, new major stationary sources in the nonattainment area must obtain offsetting emissions reductions from the same source or other sources at a 2-to-1 ratio. If the deficiency is not remedied within 2 years of EPA’s finding or disapproval, restrictions apply to the state’s use of federal highway funds for projects in the nonattainment area. Also within 2 years, if EPA finds that a state has failed to submit an approvable state plan to demonstrate attainment or disapproves a submitted plan, EPA is required to develop a federal implementation plan to ensure improvement of air quality for citizens living in that area.²²

Interstate air pollution

A “good neighbor” provision requires states to limit interstate air pollution. The law requires state implementation plans to prohibit emissions that significantly contribute to nonattainment, or interfere with maintenance, of an air quality standard in another state.²³ EPA is required to issue a federal plan if a state does not meet this requirement.²⁴ A related

¹⁸ Sections 108, 183, 190

¹⁹ Section 108

²⁰ Section 108(f), transportation measures; section 108(h), “RACT/BACT/LAER clearinghouse”

²¹ Section 179, section 110(m)

²² Section 110(c)

²³ Section 110(a)(2)(D)

²⁴ Interpretation of the timing of the state obligation to submit plans to address interstate transport is the subject of litigation. EPA has historically interpreted section 110(a)(1) of the Clean Air Act as requiring states to submit 110(a)(2)(D) interstate transport revisions to its state implementation plan (SIP) three years after a NAAQS is issued or revised. However, the D.C. Circuit’s recent opinion in EME Homer City Generation v. EPA, 696 F.3d 7

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provision (section 126) gives states the right to petition EPA for control of pollution sources in an upwind state. If the petition demonstrates that the sources significantly contribute to nonattainment or interfere with maintenance of the standards in the downwind state, then EPA must impose federal control requirements, and sources must comply within three years.

For ozone, the Act establishes a Northeast ozone transport region including 12 states and the District of Columbia, and authorizes EPA to create other ozone transport regions. Specified controls (e.g., RACT for existing sources, and LAER and offsets for new sources) are required in these regions.²⁵

Maintaining clean air after a nonattainment area meets the standard

Once a nonattainment area has air quality meeting the national air quality standard, the state can request that the area be redesignated to attainment. Several conditions must be met. For example, EPA must determine that the improvement in air quality is due to permanent and enforceable emissions reductions. EPA must have approved the state's "maintenance plan," which must provide for maintaining clean air in the area for at least 10 years after the redesignation. Also, the state must have met all applicable implementation plan requirements for the area.²⁶

Preserving clean air in attainment areas

To preserve clean air in attainment areas, the 1977 Act added the Prevention of Significant Deterioration (PSD) program.²⁷ The program requires state plans to include measures to prevent existing air quality from increasing above a maximum allowable concentration (or increment) that represents "significant" deterioration in each area. The principal measure required by the Act to achieve this goal is a preconstruction permit program for stationary sources located in attainment areas that emit regulated pollutants above specified levels ("major sources") and attainment. (This program is similar, but not identical, to the

(D.C. Cir. 2012) concluded that EPA cannot find that a state failed to submit its transport SIP revision, or to implement its "good neighbor" obligation, until after EPA has defined the State's good neighbor obligation. EME Homer City Generation v. EPA, 696 F.3d 7, PIN CITE (D.C. Cir 2012). In January 2013 the court denied EPA's petition for rehearing en banc, and as of early March EPA was weighing its options with respect to seeking review by the Supreme Court. In the meantime, EPA intends to act in accordance with the holdings in the EME Homer opinion. EME Homer City, 696 F.3d at 13.

²⁵ Section 184

²⁶ Section 175A

²⁷ Part C

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nonattainment new source review program described above.) Collectively, the PSD permitting program and nonattainment area permitting program for major sources are known as “New Source Review.”) Before starting the construction of a new major source located in an attainment, or unclassifiable area, or the modification of an existing major source that results in a significant emissions increase in such areas, the source must obtain a PSD permit under the Act.²⁸ State or local agencies are usually the permitting authority, and the majority of these agencies run the program under a state law that has been approved by EPA as part of the SIP. A smaller number of states implement the program under federal law with delegated authority from EPA. To obtain a permit, these sources must:

- Be designed with “best available control technology” (BACT) considering cost and other factors.
- Show that the added emissions will not cause or contribute to an air pollution increase in excess of the allowable increment, any national ambient air quality standard, or any other applicable Clean Air Act emissions standard.
- Show that the added emissions will not have an adverse impact on air-quality-related values in a “Class I” area such as a national park or wilderness area.

National standards for new stationary sources (e.g., power plants and factories)²⁹

EPA must set emissions standards for new and modified stationary pollution sources in source categories that significantly endanger public health or welfare. These “new source performance standards” (NSPS) typically apply to industrial facilities such as power plants and manufacturing facilities, but also have been issued for smaller equipment such as wood stoves. Standards are set for new facilities and for modifications that increase the emission rate of existing facilities. NSPS often limit criteria pollutants or precursors, but also can apply to other pollutants, including greenhouse gases.

Rather than specify a technology, these performance standards generally establish a numerical emission limitation, allowing industry to comply using any method that achieves the required performance level. EPA is required to set standards that reflect the level of emissions performance achievable through the best system of emission reduction, considering cost and other factors, that has been adequately demonstrated. Updating of standards is required at least every eight years.

²⁸ Section 165

²⁹ Section 111

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National standards or guidelines for consumer and commercial products³⁰

EPA also was required to list categories of consumer and commercial products (e.g., solvents, paints and coatings) accounting for at least 80 percent of ozone-forming VOC emissions from those products in ozone nonattainment areas. For the listed product categories, EPA is required either to issue national rules or to issue CTGs to assist states in limiting those emissions.

National standards for new vehicles and engines, and fuels³¹

The Act gives EPA authority to set and revise standards for all types of new vehicles and their engines, commonly called “mobile sources.” These include on-road vehicles such as cars, trucks, and buses; non-road engines and equipment such as farm and construction equipment, off-road motorcycles, recreational equipment, lawn and garden equipment, locomotives, and marine vessels; and aircraft. EPA rules under these provisions often help states attain and maintain air quality standards for common pollutants, as well as reduce toxic emissions. Recently, EPA has also used this authority to limit greenhouse gas pollution from motor vehicles.

The Act has specific provisions specifying how EPA sets emissions standards for light-duty motor vehicles (such as passenger cars and light-trucks);³² heavy-duty motor vehicles (such as larger trucks, tractor trailers, buses),³³ non-road engines and equipment,³⁴ including locomotives, and aircraft.³⁵ In all cases, cost is among the factors required to be considered in setting these standards. Some of the provisions vary by the air pollutant. Congress specified minimum emissions limits for a number of these categories in the law, but also gave EPA authority to update them.

EPA has issued emissions standards for all of these source categories, and has updated them in light of technological improvements, achieving deep reductions in emissions from on-highway vehicles, off-highway vehicles and equipment, locomotives, and ships.

Standards for new motor vehicles apply for a specified time-period during their use, which is defined for passenger cars as 10 years or 100,000 miles, whichever comes first.³⁶ Light-

³⁰ Section 183(e)

³¹ Title II of the Act

³² Section 202

³³ Section 202

³⁴ Section 213

³⁵ Section 231

³⁶ Section 207

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duty vehicles must have onboard vapor recovery systems to cut evaporative emissions from gasoline, and onboard diagnostic devices to identify emissions malfunctions.³⁷

Compliance with motor vehicle standards is monitored through testing and certification of new vehicles prior to sale by the manufacturer; authority for production line testing;³⁸ and authority for in-use testing and recalls.³⁹ In addition, the Act requires that manufacturers provide emissions-related warranties for design, defects and emissions performance. If the owner properly maintains and uses the vehicle and it fails a state inspection and maintenance test, the manufacturer is liable for repairs during the life of the warranty.⁴⁰ For heavy-duty vehicles, EPA can allow sale of new vehicles that do not meet the standards if the manufacturer pays a non-compliance penalty.⁴¹

Separate provisions govern regulation of fuels for these mobile sources.⁴² EPA can issue regulations to control or prohibit a fuel or fuel additive if the agency determines that it causes or contributes to air or water pollution that may endanger public health or welfare, or that it will impair performance of emission controls. For fuels designated by EPA (motor vehicle gasoline and motor vehicle diesel fuel), manufacturers must register their fuel or additive with EPA and provide certain information on content and health effects.

Prior to 1990, EPA used this authority to require reductions in the lead content of leaded gasoline and the sale of unleaded gasoline, reductions in the sulfur content of on-highway diesel fuel, and required the sale of lower volatility gasoline in the summer (to reduce emissions contributing to smog). Congress mandated a number of specific fuel controls in 1990 that built on these programs. For example, the Act bans leaded gasoline for highway use, bars misuse of leaded fuel and high-sulfur diesel, limits gasoline volatility which contributes to evaporative emissions, requires detergent additives, and limits sulfur content of motor vehicle diesel fuel. The Act mandates reformulated gasoline in at least the nine metro areas that had the highest levels of ozone pollution at the time of the 1990 Amendments; that measure has since been adopted more broadly. Oxygenated gasoline (typically containing ethanol) is required in more than 40 areas where carbon monoxide exceeded the health standard. Since the 1990 amendments, EPA has adopted additional controls requiring reductions in the sulfur content of gasoline, further reductions in the

³⁷ Section 202(m)

³⁸ Section 206

³⁹ Section 207

⁴⁰ Section 207

⁴¹ Section 206(g)

⁴² Section 211

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sulfur content of on-highway diesel and expanded this to include diesel fuel or nonroad, locomotive and marine engines, and reductions in the benzene content of gasoline.

(For more on fuels, see [“How the Clean Air Act Relates to State Clean Air Laws”](#) on p. 20.)

Outer Continental Shelf emissions

The 1990 Amendments granted EPA authority to regulate emissions from outer continental shelf oil drilling and production platforms, and associated vessels, off most of the United States.⁴³ EPA was required to issue regulations requiring new and existing sources within 25 miles of the state boundary to meet the same requirements as would apply if the source were located onshore – including state and local requirements for emissions controls, offsets, permitting, monitoring, testing and reporting. The 1990 amendments preserved the pre-existing authority of the Department of Interior to regulate air emissions from sources in the Western Gulf of Mexico. In 2011, Congress passed legislation that extended this carve-out for the Western Gulf of Mexico to include areas offshore of the North Slope of Alaska.

How the Clean Air Act regulates hazardous air pollutants⁴⁴

The 1970 Act had required EPA to regulate hazardous air pollutants (also known as “toxic” air pollutants, or “air toxics”) on a pollutant-by-pollutant basis, based on risk. In 1990, Congress rewrote those provisions after EPA in 20 years had managed to regulate only some sources of seven pollutants.

Rather than having EPA list the substances to be regulated, Congress listed nearly 190 hazardous air pollutants but gave EPA authority to modify the list if warranted. Congress required EPA to issue “maximum achievable control technology” (MACT) emissions standards for all new and existing major industrial sources of these pollutants, category by category, within 10 years after enactment of the 1990 amendments. These standards require higher-emitting sources to reduce their emissions to the levels already being achieved by other similar sources.

New source standards are based on the emissions levels achieved by the top-performing similar source. For existing sources, EPA must set standards that require at least the level of performance already achieved by the average of the top-performing 12 percent of

⁴³ Section 328

⁴⁴ Section 112

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similar sources. These provisions are known as the “MACT floor.” The resulting performance standards give all sources the flexibility to decide the most cost-effective way to comply.

Every eight years, EPA must review and, if warranted, update these performance standards, as well as consider whether more stringent, risk-based standards are required to protect public health with an ample margin of safety. [<learn more about setting performance-based and risk-based air toxics standards>](#)

EPA was required to regulate hazardous air pollutant emissions from electric utilities if, based on a study of those emissions, the agency found it “appropriate and necessary.” (Final standards were issued in 2012.)

Other provisions required a national urban air toxics strategy including regulation of small “area sources” of hazardous air pollutants. EPA was required to list and regulate enough categories of area sources to ensure that 90 percent of the area source emissions of the 30 pollutants posing the greatest threat to public health in the largest number of urban areas are subject to regulation. This provision was designed to reduce elevated health risks from multiple hazardous pollutants in urban areas. For area sources, EPA can set MACT standards or standards which provide for the use of generally available control technologies or management practices (GACT) standards. GACT differs from MACT in that there is no statutory floor requirement that provides a minimum level of stringency and limits consideration of cost.

Separate provisions required EPA to issue new source performance standards to control hazardous air pollutant emissions from solid waste incinerators burning municipal, hospital, medical, and other commercial and industrial waste.⁴⁵ Standards similar to MACT were required for multiple categories of incinerators for specified criteria and hazardous air pollutants. EPA also was required to issue guidelines for states to control emissions from existing units.

Toxic emissions from motor vehicles are reduced by a variety of motor vehicle and fuels standards. For example, the reformulated gasoline requirements reduce toxic emissions. EPA also was required to issue standards for motor vehicles and fuels to limit toxic emissions, including formaldehyde and benzene. EPA also has adopted additional controls on the amount of benzene in gasoline.

⁴⁵ Section 129

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Separate provisions were designed to prevent accidental release of extremely hazardous air pollutants. EPA was required to issue regulations for prevention and detection of accidental releases from stationary sources. Risk management plans were required for facilities that handle more than threshold amounts of a list of extremely hazardous substances. An independent Chemical Safety and Hazardous Investigation Board was created.

How the Clean Air Act protects visibility in national parks

The Prevention of Significant Deterioration preconstruction permit program (described above) includes requirements to protect park air quality from individual new and modified sources. In addition, the Act establishes a regional haze program to protect park visibility.

Regional Haze

The Act sets a national goal of preventing any future, and remedying any existing, impairment of visibility caused by human-caused air pollution in congressionally designated areas where visibility is an important value.⁴⁶ These areas include national parks over 6,000 acres, wilderness areas and national monuments over 5,000 acres, and international parks, that existed in August 1977..⁴⁷ Examples include the Grand Canyon, Great Smokies, Shenandoah and Yosemite national parks.

States must include regional haze provisions in their state implementation plans. Each regional haze plan must require best available retrofit technology (BART) for certain facilities built between 1962 and 1977 that have the potential to emit more than 250 tons a year of an air pollutant and are reasonably anticipated to cause or contribute to visibility impairment in one or more Class I areas. These facilities fall into 26 categories, including utility and industrial boilers, and large industrial plants such as pulp mills, refineries and smelters. In the case of fossil-fuel-fired power plants with generating capacity exceeding 750 megawatts, the BART emissions limits must be determined pursuant to EPA's [guidelines](#), published in 2005.

State haze plans also must include a long-term strategy for making reasonable progress toward meeting the national goal. Under EPA's implementing regulations, the plans must show progress over the next 10 years; states are required to revise their haze plans every ten years and submit the revised plans to EPA for approval.

⁴⁶ Section 169A

⁴⁷ Section 162

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If EPA makes a determination that a state failed to submit a complete plan, or disapproves the state submission in whole or in part, EPA is required to issue a federal implementation plan.⁴⁸

How the Clean Air Act controls acid rain⁴⁹

The 1990 Amendments called for reducing acid rain -- which damages aquatic life, acidifies forest soils, and damages property -- by controlling utility emissions of sulfur dioxide and nitrogen oxides, which react to form sulfuric acid and nitric acid.

Cap and Trade for Sulfur Dioxide from Power Plants

Congress set a goal of reducing annual SO₂ emissions by 10 million tons below the 1980 level, mostly from power plants. The law called for a market-based emissions trading approach to limit the amount of SO₂ emitted by U.S. power plants. The initial phase, starting in 1995, applied to 111 large, high-emitting coal-fired power plants. The second phase, starting in 2000, brought smaller plants and cleaner plants (coal-, gas-, and oil-fired) into the program.

The trading system provides companies with flexibility on both the means and timing of reducing their emissions, which enables them to minimize their compliance costs. Under the trading system, EPA issues emissions allowances to regulated electric generating units. Each emissions allowance is for one ton of SO₂. A company after the end of each year must hold enough allowances to cover its annual emissions; this requirement is an enforceable Title V permit term. For each generating unit, an electric power company can comply by reducing emissions to match its amount of allocated allowances, by purchasing allowances made available through extra pollution reductions achieved at other units, by using "banked" (saved) allowances from previous years, or by a combination of these methods.

For example, a company could choose to reduce SO₂ emissions by installing controls, switching to cleaner burning fuel, or switching some electricity production from dirtier units to cleaner ones. Because a company can sell unused allowances for profit, the trading system encourages companies to reduce emissions beyond required levels.

The SO₂ trading program has strong provisions to ensure accountability. These include continuous emissions monitoring, an allowance tracking system operated by EPA,

⁴⁸ Section 110(c)

⁴⁹ Acid rain provisions are often referred to as "Title IV" of the 1990 amendments.

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expensive penalties for noncompliance, and a requirement that excess emissions be offset by extra reductions the following year.

Allowance incentives were provided to encourage use of flue-gas scrubbers, and to promote energy conservation and renewable energy. Detailed allowance allocation provisions were included to address regional interests, new units, independent power producers, and special cases, and auction provisions were included to ensure market liquidity.

Emission Rate Standards for Nitrogen Oxides from Power Plants

To cut power plant emissions of nitrogen oxides, the law called for EPA to set more traditional emission rate standards designed to result in installation of low-NO_x burners. Companies were allowed to comply based on the average emissions rate of all their covered units.

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How the Clean Air Act protects the stratospheric ozone layer⁵⁰

The ozone layer in the stratosphere protects life on earth by filtering out harmful ultraviolet radiation from the sun. The Act contains a range of provisions to phase out production of chemicals that harm the ozone layer, and prevent the release of such chemicals already in use. These provisions implement the Montreal Protocol, the international agreement on ozone layer protection, and in some respects go beyond it. The Act requires EPA to phase out production and import of listed ozone-depleting substances.⁵¹ The best-known ozone-depleting substances, chlorofluorocarbons (CFCs), have already been phased out. EPA is currently phasing out hydrochlorofluorocarbons (HCFCs), which are regarded as transitional substitutes for CFCs. Certain exceptions to the phase-outs are allowed. For example, EPA is authorized to allow limited production of ozone-depleting substances for export to developing countries.

The Act provides for implementing the phase-outs through the issuance of allowances that can be traded among companies.⁵² International trading is also allowed, subject to certain constraints.

EPA is required to issue regulations that reduce use and emissions of ozone-depleting substances to the lowest achievable level, and that set requirements for recycling and disposal. The Act prohibits intentional release of ozone-depleting substances used as refrigerants in equipment including appliances, industrial process refrigeration, and motor vehicle air conditioners.⁵³ Mechanics servicing auto air conditioners must be trained and use certified recycling equipment.⁵⁴ Non-essential uses of ozone-depleting substances, such as in noise horns and party streamers, are banned.⁵⁵ Beginning in 2015, products containing or made with HCFCs must be labeled; a labeling requirement is already in effect for products containing or made with other ozone-depleting substances.⁵⁶

EPA is required to issue regulations prohibiting replacement of any ozone-depleting substance with a substitute substance which EPA determines may present adverse effects to human

⁵⁰ These provisions often are referred to as “Title VI” of the 1990 amendments.

⁵¹ Sections 604-606

⁵² Section 607

⁵³ Section 608

⁵⁴ Section 609

⁵⁵ Section 610

⁵⁶ Section 611

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health or the environment, where EPA has identified an alternative that is available and poses less risk.⁵⁷

EPA is given general authority to issue regulations if a substance or activity may reasonably be anticipated to affect the stratosphere and to endanger public health or welfare.⁵⁸

How the Clean Air Act reduces pollution that contributes to climate change

The Clean Air Act's authority to regulate emissions that cause or contribute to air pollution that may endanger public health or welfare extends to air pollution from greenhouse gases. In 2007 the Supreme Court decided that the Act's definition of air pollutant includes greenhouse gases. Since then, EPA has determined that certain provisions of the Act should be used to control large sources of emissions that contribute to climate change.

EPA has issued greenhouse gas regulations for motor vehicles, including cars, trucks and buses.⁵⁹ Because greenhouse gases are now regulated pollutants, large new and modified stationary sources of greenhouse gases must comply with the preconstruction permitting provisions of the Act under the PSD program, including the requirement to apply the best available control technology (BACT) considering cost and other factors.⁶⁰ EPA has issued rules to limit this statutory requirement to large emitters (e.g., power plants, cement manufacturers, refineries, etc.).

EPA also has proposed carbon pollution standards for new power plants under provisions that provide authority for EPA to issue national "new source performance standards" (NSPS) for categories of stationary sources.⁶¹

A related provision provides for regulation of existing sources, in specific circumstances, for pollutants such as GHGs that are not regulated through requirements for national air quality standards or hazardous air pollutant provisions. EPA is responsible for regulations that establish a procedure for each state, in those circumstances, to submit a plan containing emissions performance standards for existing sources of such emissions. EPA is authorized to prescribe a plan for a state if the state fails to submit or enforce a satisfactory plan.⁶²

⁵⁷ Section 612

⁵⁸ Section 615

⁵⁹ Under Section 202

⁶⁰ Part C; see especially section 165

⁶¹ Section 111(b)

⁶² Section 111(d)

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March 22, 2013

The Energy Policy Act of 2005 [PL 109-58] established a Renewable Fuels Standard program for gasoline and diesel under the Clean Air Act.⁶³ This provision was extended and the required volume of renewable fuel increased by the Energy Independence and Security Act of 2007 [PL 110-140]. The program is designed to reduce oil imports and reduce greenhouse gas emissions from the transportation sector through expanded use of renewable fuels.

The renewable fuels standard requires that U.S. transportation fuel contain at least 4 billion gallons of renewable fuel in 2006, rising annually to 9 billion gallons in 2008, 15.2 billion gallons in 2012, and 36 billion gallons in 2022. Advanced biofuels include cellulosic ethanol and a range of biofuels other than conventional ethanol derived from corn starch. Specific volumes are required for advanced biofuels generally, as well as two types of advanced biofuels: cellulosic biofuel and biomass-based diesel. Advanced biofuels are required to achieve either a 50% or 60% reduction in lifecycle greenhouse gas emissions compared to the life-cycle emissions of a baseline gasoline or diesel. A person that refines, imports or blends gasoline containing more renewable fuel than required generates credits that can be used for compliance or sold to another person for purposes of complying with the volume mandates.

EPA is authorized to temporarily waive the volume mandates in whole or in part if EPA determines that implementation would severely harm the economy or environment, or that there is an inadequate domestic supply. Renewable fuels produced from new biorefineries commencing construction after the law's enactment are required to reduce by at least 20 percent the life cycle greenhouse gas emissions relative to the baseline gasoline and diesel.

Congress directed EPA to establish a mandatory reporting system for greenhouse gas emissions in the fiscal year 2008 [Consolidated Appropriations Act \(PDF\)](#) (613 pp, 1.5M) (H.R. 2764; Public Law 110-161). EPA's [Greenhouse Gas Reporting Rule](#) requires reporting for direct greenhouse gas emitters, fossil fuel suppliers, industrial gas suppliers, and facilities that inject CO₂ underground for sequestration.

How the Act provides for operating permits⁶⁴

The 1990 Amendments required all major pollution sources and certain others to apply for and operate pursuant to operating permits that assure compliance with all of their Clean Air Act requirements.⁶⁵ Operating permits generally are issued by state and local permitting agencies

⁶³ Section 211

⁶⁴ These provisions often are referred to as "Title V" of the 1990 amendments.

⁶⁵ Title V of the CAA, Sections 501 and following.

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March 22, 2013

under EPA approved programs. These programs are required to charge permit fees sufficient to cover the costs of the permit program.

Operating permits are required for major sources and other sources subject to acid rain control requirements, new source performance standards, hazardous air pollutant standards, and permitting requirements under Title I of the Act.

Permits are to be issued for a fixed term of up to five years. Each permit must contain enforceable emissions standards and limitations, a schedule of compliance, and a requirement that the source submit any required monitoring results every six months or more often. Permitting authorities may issue general permits covering numerous similar sources.

States must submit permit applications, proposed permits and final permits to EPA for review. Each permitting authority must give notice of each permit application or proposed permit to nearby states. EPA has an opportunity to object to the issuance of a state proposed permit that is not consistent with the Act; if EPA does not object, any person may petition the EPA Administrator to make such an objection.

States must create programs providing technical assistance and other information to small businesses to help them comply with the Act. An EPA program is to assist the states.

How the Act provides for enforcement

The Act's enforcement provisions include administrative and judicial enforcement provisions that enable EPA, states and others to seek enforcement against those who violate the Clean Air Act.

Congress gave EPA the authority for ensuring compliance with the Clean Air Act and for pursuing enforcement actions against those who are in violation of the Act. States that have Clean Air Act programs approved or delegated by EPA under various provisions also have the authority to implement and enforce those programs. When a state finds a violation of the Act, the state has authority to enforce against the violator. If EPA decides to take enforcement action for certain violations, EPA must notify both the facility and the state in advance. EPA and states often confer to avoid duplication of effort.

EPA finds violations using information-gathering authorities⁶⁶ that allow EPA to inspect facilities, to require monitoring or testing of emissions or to demand the production of documents. In general, when EPA finds that a violation has occurred, the agency can issue an

⁶⁶ Section 114

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administrative compliance order, issue an administrative penalty order, or bring a civil or criminal enforcement action⁶⁷. EPA is authorized to assess administrative penalties of up to \$37,500 per day of violation, up to a maximum amount of \$290,000, unless the Administrator and the Attorney General jointly agree to a larger amount.⁶⁸ The Act provides up to \$37,500 per day of violation for civil judicial violations, and higher penalties and imprisonment for criminal violations.⁶⁹ The penalty numbers are increased periodically for inflation.

The Act provides separate enforcement provisions for motor vehicles and other mobile sources that are generally similar in nature to those for stationary sources.⁷⁰

Any person⁷¹ can sue EPA to compel the agency to perform mandatory duties under the Act⁷² or to seek judicial review of final agency actions⁷³, and also can file lawsuits to compel compliance by facilities that may be violating CAA requirements⁷⁴. Courts are authorized to impose civil penalties in lawsuits brought under the citizen suit provisions, and can direct up to \$100,000 to be used for mitigation projects that enhance public health and the environment.⁷⁵

How the Clean Air Act relates to state clean air laws

The Clean Air Act contemplates that states will implement many of its requirements under state laws and that EPA will review such laws to ensure they are sufficient to satisfy the requirements of the Act and EPA's implementing regulations. The Act does not restrict states' ability to adopt standards or requirements that are more stringent than federal requirements, except in the mobile source arena.

The Clean Air Act generally preempts state authority to adopt or enforce emissions standards for new motor vehicles. Because California was already setting new motor vehicle standards before the federal government began, the Act requires EPA to waive preemption of California standards if those standards are in the aggregate at least as protective of public health and

⁶⁷ Section 113(a)-(d)

⁶⁸ Section 113(d)

⁶⁹ Section 113(b), (c), (e)

⁷⁰ See, for example, sections 203-208, 211(d), 213(d) and 232.

⁷¹ "Person" is defined in Section 301(e) to include a wide variety of individuals and entities.

⁷² Section 304

⁷³ Section 307

⁷⁴ Section 304

⁷⁵ Section 304(g)

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March 22, 2013

welfare as federal standards, and certain other criteria are met. The Act allows other states to adopt California's standards for new vehicles.⁷⁶

The Act does not preclude state and local governments from regulating the use, operation or movement of registered motor vehicles.

States are generally preempted from adopting or enforcing emissions standards for nonroad vehicles and engines. As with on-road vehicles and engines, the law provides for a California waiver for most nonroad vehicles and engines, but the waiver is not available for certain new nonroad engines.⁷⁷

For fuels and fuel additives, state and local governments except the state of California generally are prohibited from prescribing or enforcing requirements for fuels or fuel additive for emission control purposes if EPA has regulated the fuel or fuel additive, or if EPA has published a decision not to regulate it. However, they can adopt requirements identical to EPA's if EPA has issued requirements for the fuel or fuel additive. Also, the state can regulate a fuel or fuel additive in its state implementation plan if EPA finds that the state requirement is necessary to achieve the relevant national ambient air quality standard and other requirements are met that limit the number of different state fuel requirements.

Miscellaneous

Tribes: Tribal governments can play important roles implementing the Clean Air Act in their areas. If a tribe has the desire and capability to administer one or more Clean Air Act programs and meets certain criteria, the law authorizes EPA to approve the tribe as eligible to be treated in the same manner as a state.⁷⁸ The tribe can then develop and obtain approval of one or more Clean Air Act programs from EPA. Otherwise, EPA generally implements the law in Indian country. EPA's Office of Air and Radiation (OAR) works closely with tribal governments and tribal environmental professionals to increase their capacity to develop and manage their air quality programs by providing training, grants, and technical support.

State air grants: EPA is authorized to make grants to air pollution control agencies in amounts up to three-fifths of the cost of planning, developing and carrying out air pollution control programs.⁷⁹

⁷⁶ Section 209

⁷⁷ Section 209

⁷⁸ Section 301(d)

⁷⁹ Section 105

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“812 Study:” EPA is required to make a comprehensive report on the impact of the clean air law on the public health, economy and environment, considering costs, benefits and other effects.⁸⁰

Research: EPA is given broad research authorities.⁸¹ EPA is directed to establish a national research and development program for prevention and control of air pollution, including:

- conducting and promoting research on causes, effects, extent, prevention and control of air pollution,
- providing technical services and financial assistance to air pollution control agencies and other appropriate public or private organizations and individuals,
- establishing technical advisory committees composed of recognized experts to assist in examination and evaluation of research progress and proposals
- Conduct and promote training related to air pollution.

Radon/Indoor air: EPA is given authority to conduct a radon gas and indoor air quality research program. The programs’ specified elements include dissemination of information to assure the public availability of the findings of the research and demonstration activities under the program.⁸²

⁸⁰ Section 312 of CAA. (This section is widely known as “section 812” from its section number in the 1990 Amendments.

⁸¹ Section 103

⁸² Section 101 of the CAA, enacted in the “Radon Gas and Indoor Air Quality Research Act of 1986,” Pub.L. 99-499, Title IV, sections 401 to 405, Oct. 17, 1986.

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