

“The ARB considers the development of zero emission technology vital to meeting our mission of clean air, while maintaining economic growth. California’s unique geographic and economic features demand new technologies.”

—DR. ALAN LLOYD, CHAIR,
CALIFORNIA AIR RESOURCES BOARD

From its magnificent mountains to its sandy beaches there are many outstanding natural features that give California its identity. Unfortunately, having the most cars and correspondingly some of the nation’s worst air pollution is also one of these trademarks.

In 1967, California’s Legislature passed the Mulford-Carrell Act, which combined two Department of Health bureaus—the Bureau of Air Sanitation and the Motor Vehicle Pollution Control

Board—to establish the Air Resources Board (ARB). On February 8, 1968, the first meeting of the ARB was held in Sacramento. Since its formation, the ARB has worked with the public, the business sector and local governments to find solutions to California’s air pollution problem. The resulting state air quality

standards set by the ARB continue to outpace the rest of the nation and have prompted the development of new anti-smog technology for industrial facilities and motor vehicles.

ARB’s mission is to promote and protect public health, welfare and ecological resources through the effective and efficient reduction of air pollutants, while recognizing and considering the effects on the state’s economy.

An 11-member board appointed by the governor governs the ARB. Six of the members are experts in fields such as medicine, chemistry, physics, meteorology, engineering, business and law. Five others are elected officials who represent regional air pollution control agencies—one each from the Los Angeles region, the San Francisco Bay area, San Diego, the San Joaquin Valley and another to represent other, more rural areas of the state.

The ARB also oversees the activities of 35 local and regional air pollution control districts. These districts regulate industrial pollution sources. They also issue permits, develop local plans to attain healthy air quality and ensure that the industries in their area adhere to air quality mandates.

The “Father” of Air Pollution Control

Dr. Arie Haagen-Smit, known by many as the “father” of air pollution control, was a Dutch-born graduate of the University of Utrecht and a professor of biochemistry at the California Institute of Technology, Pasadena for 16 years before beginning his air pollution research in 1948.

An avid gardener in the Los Angeles region, Dr. Haagen-Smit first became concerned about damage

to his plants, such as discolored leaves and undersized flowers. His curiosity led to a series of experiments that uncovered the chemical interactions to form smog. He found that most of California’s smog is a result of photochemistry: when exhaust from motor vehicles and industrial facilities react with sunlight to create ozone. This breakthrough is the foundation upon which today’s nationwide air pollution standards are based.

After serving as an original board member of the Motor Vehicle Pollution Control Board, formed in 1960, Dr. Haagen-Smit became the ARB’s first chairman in 1968. Haagen-Smit died of lung cancer two months after the ARB laboratory in El Monte was dedicated in his name in March 1977.

Cutting Edge Research

The basis for all ARB programs is research into the causes of air pollution and their





Balloons are released to measure pollution in upper atmosphere.



Rooftop testing station measures emissions in the air.

effects on public health and the environment. From its first chairman, Dr. Haagen-Smit, to the present chair, Dr. Alan Lloyd, the ARB has led the country developing air quality standards based on its research efforts.

Some examples:

- The ongoing Children's Health Study, designed to assess the health effects of long-term air pollution exposure on Southern California children. The study includes over 3,000 children in 12 communities who undergo annual health examinations for up to 10 years. Although not yet complete, the study has already yielded important information, including a link between slow lung function growth and long-term exposure to outdoor air pollution
- A Fresno area study on the impact of air pollution on childhood asthma. The overall goal is to determine the effects of particulate matter, in combination with other pollutants, on asthmatic children. Still another ARB study is designed to determine how short and long term exposure to particulate matter affects the development and progression of cardiovascular disease in the elderly. The study group of 4,000 men and women has been followed since 1990.

Community Health Program

In 2000, the Air Resources Board announced the Community Health Program, which studies the influences of air toxics and other air pollutants within individual neighborhoods. For the first time, the ARB is addressing the cumulative effects of exposure from multiple air toxics along with strategies to reduce these health issues.

The ARB has begun to review ambient air quality standards to ensure that they adequately protect children. ARB is looking at six communities to examine the effects of air pollution on children's health. As part of this effort, the ARB has begun monitoring selected schools, daycare centers and playgrounds in order to determine air quality.

Indoor Air

Californians spend, on average, about 87 percent of their day indoors. During that time they are often exposed to air pollution levels higher than those outdoors. ARB's Indoor Air Quality and Personal Exposure Assessment Program includes sponsored research, exposure assessment, the develop-

ment of indoor air quality guidelines and public education and outreach to identify and reduce Californians' exposure to indoor air pollution.

Motor Vehicles

Californians set the pace nationwide in their love affairs with cars. The state's 34 million residents collectively own about 25 million cars, almost one for each man, woman and child, and drive more than most other Americans. Unfortunately, there is a consequence. Motor vehicles are California's number one cause of air pollution. Therefore, controlling pollution from cars and trucks is essential to reduce smog.

Through ARB regulations, today's new cars pollute 99 percent less than their predecessors did thirty years ago. Still, over half of the state's current smog-forming emissions come from gasoline and diesel-powered vehicles.

The ARB's efforts include:

- The nation's first motor vehicle emission standards in 1966. These standards produced bolt-on pollution controls, such



as air pumps that improve combustion efficiency. In 1970, the ARB required auto manufacturers to meet the first standards to control smog-forming hydrocarbon and nitrogen oxide emissions.

- The phase-out of lead because of concerns about its health impacts. Another benefit of this action was that manufacturers were then able to use catalytic converters to more effectively control tailpipe emissions.
- Efforts continue to reduce emissions of motor vehicles and fuels. Today's California gasoline contains less pollution-forming sulfur, benzene, aromatic hydrocarbons and olefins than most gasoline sold elsewhere in the nation. Use of cleaner-burning gasoline has removed the emissions equivalent of 3.5 million vehicles from California's roads. In 1999, the ARB also approved a rule that bans the additive MTBE in gasoline.
- California diesel fuel regulations require limits on sulfur and aromatic hydrocarbons lower emissions of particulate matter and nitrogen oxides. Diesel-powered vehicles account for about 30 percent of the nitrogen oxides and 60 percent of particulate matter (PM) emitted from California vehicles. In 1993, the first steps were taken to clean up diesel fuel.

In 1998 the ARB identified diesel particulate matter as a toxic air contaminant, which means the compound is a known human carcinogen. As part of that process, Cal/EPA's Office of Environmental Health Hazard Assessment completed a thorough health risk assessment. The findings revealed that diesel PM can cause life-shortening health problems ranging from respiratory illness to heart problems, asthma; and cancer.

Rules on diesel fuel and engine performance adopted between 1990 and 1998 have cut

diesel PM by 90 percent. Today, the ARB is striving to further reduce diesel emissions. New data show that diesel particulate is the most common airborne toxic that Californians breathe. As a result, the ARB has developed a 14-point program, the Diesel Risk Reduction Plan, to slash diesel emissions in the next decade.

This plan will retrofit new and existing engines with PM filters. This would reduce PM emissions by nearly 90 percent from today's levels. A major component of the plan calls for extensive use of low sulfur diesel fuel. Like removing lead from gasoline 20 years ago, this requirement is leading the way to new technological advances in automotive engineering.

To help cut emissions from the state's more than 1.25 million diesel engines, California has invested in a number of incentive programs to help the owners of diesel engines upgrade or replace them with cleaner-burning alternatives, such as compressed natural gas or electric-powered technology. Today, more than \$170 million annually is available to help make those conversions and protect California's public health from the threat of diesel exhaust.

To further control motor vehicle emissions and maintain pollution reductions to date, the ARB is making efforts to place more zero emission vehicles (ZEVs) on the road. In 1990 the ARB approved a rule to require that ten percent of all 2003 model year cars offered for sale in California be ZEVs. In February 2000, a similar ruling was adopted for transit buses, requiring transit agencies to demonstrate zero-emissions buses (ZEBs) in 2008 and to purchase 15 percent ZEBs for their fleets thereafter.

Stationary Sources

While it is important to reduce air pollution from vehicles, it is not enough. Large

industrial sources, such as refineries, factories and power plants must also meet state and federal air quality standards. These and other stationary sources, including gasoline service stations, dry cleaners; and bakeries, for example, are regulated by local air quality officials.

Industrial sources must use the best available control technology (BACT) to achieve the greatest feasible emission reductions. In addition to using advanced control technology in new factories, many older facilities have reduced their emissions by using retrofit equipment and switching to cleaner burning fuels.

Consumer Products

Smaller, more personal air pollution sources, known as consumer products, also affect our air quality. Products such as deodorants, hair spray and cleaning products contain ozone-forming chemicals known as volatile organic compounds (VOCs).

In 1990, consumer products emitted about 264 tons of smog-forming pollutants each day. This is more than all the refineries and gas stations in the state combined.

California's clean air plan commits to an 85 percent reduction in ozone-forming pollution from consumer products. To accomplish this,



the ARB works with industry to make sure the regulations are technologically and commercially viable.

Toxic Air Contaminants

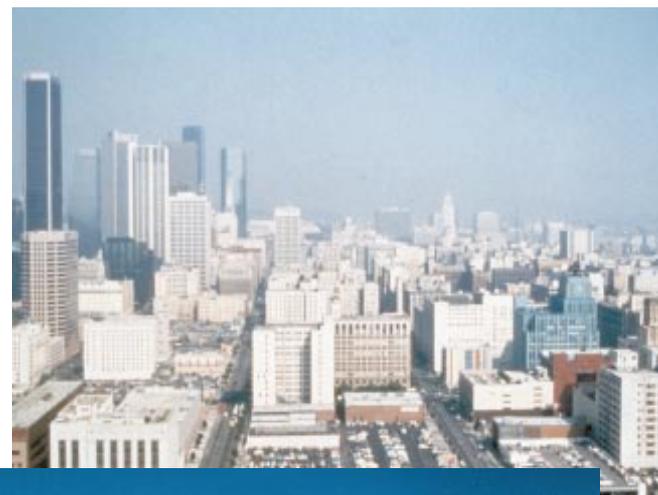
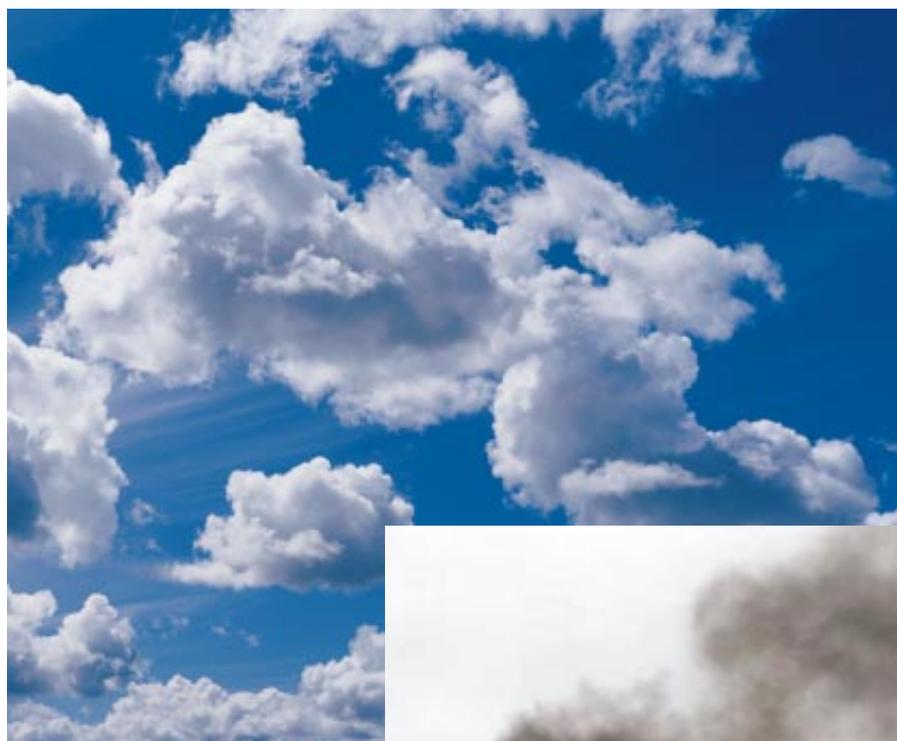
In 1977 the ARB appointed an independent panel of seven experts to review what was known about carcinogenic air pollutants in California. The panel recommended that follow-up research be done to explore further the relationship of cancer to air pollution and to determine the extent of the problem in California.

California's air toxics program began in 1983 with the adoption of the Toxic Air Contaminant Identification and Control Act (AB 1807, Tanner). The act set up a process to identify a

substance as a toxic air contaminant and, if necessary, develop one or more control measures to reduce emissions of that substance.

California's program was enhanced in 1987 through the adoption of the Air Toxics "Hot Spots" Information and Assessment Act. For the first time, stationary sources were required to report the type and quantity of toxic substances their facilities routinely released into the air and to notify neighbors if health risks were posed. This law prompted several industries to voluntarily reduce their emissions below harmful levels.

In 1992 the Toxic Air Contaminant Identification and Control Act was further amended to integrate rules from the federal Clean Air Act.



The difference between clean and dirty air is not always this obvious.



Conclusion

As a result of the ARB's and local air district's work to limit air pollution, Californians today breathe the cleanest air since measurements have been recorded. The number of first stage alerts in the Los Angeles area has been cut from over 200 per year in the 1970s to less than 10 per year today. Other regions of the state also have

improved air quality despite massive increases in population, the number of motor vehicles and the distances they are driven.

Cal/EPA's Air Resources Board continues to lead the world in the development of innovative air pollution control strategies to help protect California's public health from damage caused by air pollution.