

State of California
Air Resources Board

BOARD ITEM SUMMARY

**ITEM # 07-5-1 Health Update: Long-Term Exposure to Air Pollution and
Incidence of Cardiovascular Events in Women**

STAFF RECOMMENDATION:

Informational Item.

DISCUSSION:

The ARB staff provides the Board with regular updates on recent research findings on the health effects of air pollution. This month, staff will present a study that examines the long-term exposure effects from fine particulate air pollution on the incidence of cardiovascular disease and death among postmenopausal women.

SUMMARY OF AGENDA ITEM:

Particles, as a component of polluted air, are clearly and consistently associated with adverse health impacts. Substantial epidemiologic and experimental evidence support the contribution of ambient particle pollution to cardiovascular disease. However, there is some evidence that the magnitude of the effects from fine particles may be gender specific with women being more susceptible. This study investigated 65,893 postmenopausal women without previous cardiovascular disease in 36 U.S. metropolitan areas from 1994 to 1998. Exposure to PM_{2.5} was determined by using the monitor located nearest to each woman's residence and then studying the effect between cities and within each city. This study found a 24% increase in the risk of a cardiovascular event and a 76% increase in the risk of death from cardiovascular disease per 10 $\mu\text{g}/\text{m}^3$ increase of PM_{2.5}. The investigators found that the between-city effect appeared to be smaller than the within-city effect for the cardiovascular events. The result from this study adds to other studies presented in a previous health update (see the following link for the December 2005 presentation <ftp://ftp.arb.ca.gov/carbis/research/health/healthup/dec05.pdf>) showing that fine particulate air pollution may be of particular concern among postmenopausal women. ARB is currently funding a study targeting California women, titled "Air Pollution and Cardiovascular Disease in the California Teachers Study Cohort." The study will help elucidate further the link between PM_{2.5} and premature mortality from cardiovascular disease in postmenopausal women in California.

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ITEM # 07-5-4: Planned Air Pollution Research, Fiscal Year 2006-2007

STAFF RECOMMENDATION:

Approve the proposed report.

DISCUSSION:

In establishing the State's approach to achieving clean air, the Legislature declared that an effective research program is an integral part of the broad-based statewide effort to combat air pollution in California and directed ARB to administer and coordinate all air pollution research funded, in whole or in part, with state funds. The ARB established objectives for air pollution research, and in accordance with Legislative direction, appointed a Research Screening Committee to give advice and recommendations with respect to air pollution research projects funded by the State. Each year, ARB staff solicits research ideas and develops a plan for supporting the Board's mission. The plan is reviewed and approved by the Research Screening Committee.

SUMMARY AND IMPACTS:

The report describes proposed new research projects in areas of health and welfare effects, exposure assessment, technology advancement and global climate change. Some projects are recommended for funding, while others are recommended if funding becomes available. A research budget of approximately \$5,000,000 is anticipated for fiscal year 2007-2008. Board approval of *Planned Air Pollution Research, Fiscal Year 2007-2008* will authorize ARB staff to proceed with developing the research projects outlined in the report.

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ITEM # 07-5-2: San Diego 2007 State Implementation Plan (SIP)

STAFF RECOMMENDATION:

Approve the plan and direct the Executive Officer to submit the plan to U.S. Environmental Protection Agency as a revision to the California SIP.

DISCUSSION:

The federal Clean Air Act requires areas exceeding National Ambient Air Quality Standards for ozone to submit plans to U.S. EPA demonstrating how they will reach attainment by specified deadlines. San Diego has already attained the federal one hour standard for ozone. However, U.S. EPA has since promulgated a new, more stringent 8-hour standard. Subsequently, U.S. EPA classified the San Diego Air Basin as a "basic" ozone nonattainment area with an attainment deadline of June 2009. Accordingly, the San Diego Air Pollution Control District developed an 8-hour ozone attainment plan with input from the public and will consider the plan for adoption at a duly noticed public hearing on May 23, 2007. ARB staff has analyzed San Diego's proposed 2007 plan, and concurs that the plan demonstrates attainment of the 8-hour ozone standard by June 2009.

SUMMARY AND IMPACTS:

The proposed plan demonstrates that existing local, State, and federal controls are sufficient to bring San Diego into attainment by June 2009. Approval of the plan will commit the District and ARB to continue implementing existing programs for reducing emissions in San Diego.

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ITEM #07-5-3: Proposed Allocation of \$25 Million for Alternative Fuel Incentives

STAFF RECOMMENDATION:

Approve the staff recommendations.

DISCUSSION:

Assembly Bill 1811 requires ARB to develop a joint plan with the California Energy Commission (CEC) to spend \$25 million to assist in the development of alternative fuel projects that reduce air pollution and greenhouse gas emissions. The funds must be encumbered by June 30, 2007, and fully expended by June 30, 2009. The \$25 million is to be used for:

- 1) Market-based incentives such as buy downs, rebates, credits, or other incentives for purchasers of high efficiency, high mileage, clean alternative fuel light, medium, and heavy duty vehicles, both individual and public fleet;
- 2) Production incentives such as loans, loan guarantees and credits for clean alternative fuel production in California;
- 3) Market-based incentives such as loans and loan guarantees for the construction of publicly accessible, clean alternative fuel refueling stations including refueling stations that sell ethanol blends consisting of at least 85 percent ethanol ("E-85");
- 4) Grants for research and development of clean and zero emission fuels and vehicle technology; and
- 5) Incentives to replace the current state vehicle fleet with clean, high mileage alternative fuel vehicles.

The ARB and CEC developed joint priorities, brought them to the ARB Governing Board for approval last year, then issued solicitations on February 9, 2007. More than 200 responses were received totaling more than \$150 million in requested funds. Each application was reviewed and ranked by a multi-state agency review team. ARB and CEC staff are recommending 38 projects be funded, at approximately \$25 million.

The staff is proposing that the Board approve about \$5.4 million to fund 10 projects that will support the use of E-85, biodiesel, electricity, and CNG, primarily through new fueling stations or station upgrades. The largest grant in this category is a proposed award to the Sacramento Metropolitan Air Quality Management District of \$3.5 million to establish a grant program that would ultimately establish 20 E-85 public stations and 10 E-85 fleet stations in the Sacramento metropolitan area.

The second major category of funding is for the start-up of small biofuel production facilities. There are 10 proposed grants representing \$6.0 million in this category, with six of the grants to develop biodiesel production facilities, two for converting landfill gas

to liquefied natural gas, one for converting cow manure waste to biofuel, and one for the production of methane from a dairy digester.

The third major category of funding is to encourage the use of plug-in hybrid and other alternative fuel vehicles. Seven projects are proposed for funding, accounting for a total of \$5.0 million. In general, most of the funding is used for demonstrating and supporting plug-in hybrid vehicles in both light-duty and medium-duty applications.

The remaining categories are designed to fund a number of projects to support transit bus projects (\$2.0 million); support an alternative fuel vehicle incentive program (\$1.5 million); enhance consumer education and outreach (\$1.6 million); and conduct various research and testing projects to facilitate the use of alternative fuels (\$3.2 million).

SUMMARY AND IMPACTS:

The \$25 million in alternative fuel incentive funds will kick start several projects needed to begin California's comprehensive development of policies and programs to reduce petroleum dependence, cut down emissions of criteria pollutants and toxic air contaminants, and advance the State's greenhouse gas efforts.

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ITEM # 07-5-5: Zero Emission Vehicle Program Review: Technology Status Report by the Independent Review Panel

STAFF RECOMMENDATION:

Staff is seeking Board direction on whether any adjustment to the California's existing ZEV regulations are warranted in light of the report from the Independent Review Panel on the status of various ZEV-related technologies.

DISCUSSION:

The ZEV program was initially adopted in 1990 as part of the Low-Emission Vehicle regulations. It is an integral part of ARB's strategy to drastically reduce pollution from passenger cars and light-duty trucks. The ZEV program required large automakers to commercialize vehicles with no direct emissions starting in 2000 and is intended to catalyze efforts to commercialize sustainable transportation. The program has had the added benefit of prompting automakers to develop extremely clean conventional, alternative fuel, and hybrid electric vehicles.

Due to the long-term, technology-forcing nature of the ZEV program, the Board has requested regular updates on the progress in meeting the requirements. The Board has also adjusted to the ZEV regulation several times to reflect the actual status of ZEV-related technologies. The last technological update and subsequent rule amendments were in April of 2003.

In April 2003, the Board directed that an independent panel of experts be appointed to report on the worldwide readiness of Zero Emission Vehicle (ZEV) technologies for commercialization. Staff contracted for that work in late 2005 with the major study period occurring in the summer of 2006. The Panel submitted its findings to ARB staff in February of this year. The Panel was not asked to comment on California's regulatory strategies, but to address only the commercial readiness of various technologies. Shortly after that submittal, the Panel's findings were posted on the web for all interested parties. Concurrently, ARB staff posted its own report on how those findings may affect the existing ZEV regulation, based on the Panel's findings, individual contacts with the automakers, and information gathered at an international symposium conducted by ARB staff on ZEVs and other advanced technologies.

Based on the Panel's findings and other information, staff believes the overall ZEV program is on track but that moderate adjustments to the regulation are warranted. If the Board agrees with that assessment, staff will develop, conduct workshops and prepare final regulatory changes for the Board's consideration at its October 2007 meeting.

SUMMARY AND IMPACTS:

The Panel's technological review was exceedingly thorough and has provided a variety of useful measuring sticks by which to determine if the ZEV regulation is on track. ARB staff has found that while some changes may be needed, overall, the program remains an effective and useful tool in reducing both near-term and long-term emissions from mobile sources. ARB staff will ask the Board for direction on how to address the key findings of the Panel and staff's conclusions regarding the state of technology.

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ITEM # 07-5-6: Proposed Regulation for In-Use Off-Road Diesel Vehicles

STAFF RECOMMENDATION:

Adopt the proposed regulation with modifications to be proposed by staff at the public hearing.

DISCUSSION:

Existing off-road diesel vehicles are responsible for nearly a quarter of the diesel particulate matter (PM) emissions and nearly a fifth of the oxides of nitrogen (NOx) emissions from mobile diesel sources statewide. These emissions have significant adverse health impacts, including causing an estimated 1,100 premature deaths per year in California. Diesel PM is a toxic air contaminant. It also contributes to ambient concentrations of fine particulate matter (PM2.5). Diesel related NOx emissions lead to the formation of ozone and PM2.5.

Controlling emissions from the existing diesel off-road fleet is necessary to meet the goals of ARB's October 2000 Diesel Risk Reduction Plan to reduce, by 2020, California's diesel PM and associated cancer risk 85 percent from 2000 baseline levels. Substantial reductions of PM and NOx emissions from existing off-road vehicles are also essential to achieve the State and national ambient air quality standards for PM2.5 and ozone in California nonattainment areas.

Manufacturers of new off-road vehicles will be required to meet strict aftertreatment-based emission standards for PM and NOx beginning in 2011. Unfortunately, many off-road vehicles in use today were manufactured before the mid-1990s when the first emission standards took effect. Since some off-road diesel vehicles have an actual life in excess of 30 years, controlling emissions from existing vehicles is essential.

The proposed regulation would provide significant PM and NOx emissions reductions from nearly 180,000 existing off-road diesel vehicles by requiring fleet owners to accelerate turnover to cleaner engines and install exhaust retrofits. The regulation would apply to any person, business or government agency that owns or operates diesel-powered off-road vehicles in California (except agriculture) whose engines have a maximum power of 25 horsepower (hp) or greater. Examples of vehicles subject to the regulation are crawler tractors, loaders, skid steers, backhoes, forklifts, cranes and airport ground support equipment. Vehicles used in industries such as construction, mining, landscaping, airlines, retail, wholesale, equipment rental, skiing, oil and gas drilling, recycling and utilities would be subject to the regulation.

The regulation would establish declining fleet average emission rate targets for PM and NOx for all off-road diesel vehicles with engines at or greater than 25 hp that operate in the state, regardless of whether or not they are California-based. The regulation would

require each fleet to meet the fleet average emission rate targets for PM each year or retrofit up to 20 percent of its total fleet horsepower with the highest level verified diesel emission control system (VDECS). The regulation would also require large and medium fleets to meet the fleet average emission rate targets for NOx each year or turn over up to a certain percent of their horsepower (8 percent in early years, and 10 percent in later years). The regulation's provisions would be more stringent for the largest fleets and less stringent for the smallest fleets owned by small businesses or municipalities.

Special provisions are proposed for specific circumstances. The regulation would exempt low-use vehicles, emergency equipment, and combat and tactical support equipment. Also, vehicles in small fleets, certain specialty vehicles, and vehicles less than 10 years old would be exempt from the mandatory turnover requirements. The regulation would not require exhaust retrofits for engines in vehicles less than 5 years old, nor require retrofits if they impair the safe operation of the vehicle. In addition, compliance extensions would be available for vehicle owners in the event of engine or VDEC manufacturer delays.

The regulation was developed through numerous public workshops, workgroup meetings, and other outreach activities. The ARB staff held 13 public workshops at various locations in the State between November 2004 and March 2007. Staff also conducted six informal public workgroup meetings from December 2004 to July 2006. In addition, as part of the regulatory development process, staff held numerous meetings with representatives from various companies, industry associations, environmental organizations, regional and local agencies, and other interested parties, and sent out over 376,000 mailings.

SUMMARY AND IMPACTS:

By 2020, the regulation is projected to reduce diesel PM emissions from existing off-road diesel vehicles by 92 percent from the 2000 baseline. Also, the regulation is expected to reduce diesel PM emissions by 5.2 tons per day (tpd) and NOx emissions by 48 tpd in 2020. The cumulative PM and NOx emissions reductions from 2010 to 2030 are expected to prevent approximately 4,000 premature deaths and tens of thousands of cases of asthma-related and other lower respiratory symptoms. Over this same time, there will also be significant health cost savings of \$18 to \$26 billion, primarily from avoided premature deaths.

The total cost of the regulation is expected to be between \$3.0 and \$3.4 billion, in 2006 dollars. The actual costs to individual fleets would vary depending on the size of each fleet, its initial vehicle composition and vehicle age, and its normal purchasing practices. Costs also would vary depending on the compliance strategy chosen by each fleet (whether to retrofit, repower, or replace the vehicle).