LOWER-EMISSION SCHOOL BUS PROGRAM OUTLINE:

Part 1 -- Older Bus Replacement Program

Part 2 -- Particulate Matter Retrofits Program

OVERVIEW OF THE LOWER-EMISSION SCHOOL BUS PROGRAM GUIDELINES

What is the Lower-Emission School Bus Program?

The Air Resources Board's (ARB) budget for fiscal year 2000/2001 includes $50 million for replacement and retrofit of older diesel school buses. The primary goal of the program is to reduce the exposure of school children to both cancer-causing and smog-forming pollution. The focus is on reduction of particulate matter (PM) emissions through replacement and retrofit of high-polluting, older school buses.

How is this program structured?

The Program has two components -- school bus replacement, and school bus PM retrofits. Part 1 is the older school bus replacement and infrastructure program. Part 2 is the in-use school bus PM retrofit program. It is proposed that $30 million be spent on school bus replacement and infrastructure projects and $20 million on PM retrofit projects.

The California Energy Resources, Conservation and Development Commission (California Energy Commission or CEC) will be implementing the school bus replacement and infrastructure program, in consultation with the air districts. It is proposed that the air districts implement the school bus PM retrofit program.

Why is ARB holding workshops on the school bus program?

ARB staff is developing guidelines that will govern the implementation of both parts of the program. ARB staff will gather information at the workshops to use in developing the guidelines. Comments from all interested parties are solicited. ARB staff has prepared the attached outlines of the program to aid in the discussion at the workshops.

What other outreach is being undertaken?

The staffs of the ARB, the CEC, the California Highway Patrol, the State Department of Education, school districts and air districts are all participating in program development. The environmental organizations, engine and retrofit device manufacturers, school bus vendors, school transportation officials, and others are also providing valuable input.

Additional outreach will be necessary once the guidelines have been developed to ensure school districts understand the program and have the opportunity to participate.

PART 1 -- OLDER SCHOOL BUS REPLACEMENT PROGRAM

Background

Why this focus on replacing older school buses?

There are over 24,000 school buses operating in California. About 6550 larger pre-1987 school buses and over 2250 pre-1977 buses remain in service. Engines in these buses do not meet the current more stringent heavy-duty engine emission standards. Thus some older diesel school buses emit as much as ten times more particulate matter (PM) and three times more oxides of nitrogen (NOx) than current low-emission natural gas buses.

As well, federal school bus safety standards did not go into effect until May 1, 1977. New school buses must comply with stringent safety standards and be certified by the California Highway Patrol (CHP).

It is proposed that California public school districts would receive about $30 million for the purchase of new lower-emission school buses and alternative-fuel infrastructure.

What would be the results of this replacement bus program?

The overall goal is the replacement of nearly 300 older, high-polluting, diesel school buses with lower-emission buses, plus construction of alternative-fuel infrastructure. First, reduction of emissions of the criteria pollutants, NOx and PM, from operation of the new buses would result.

Second, replacement of older buses would result in the reduction of children's exposure to localized emissions of toxic diesel particulate matter. In 1998, the Air Resources Board (ARB or Board) identified PM emissions from diesel-fueled engines as a toxic air contaminant. At its September 2000 meeting, the Board will consider a proposed risk reduction plan that addresses future controls on diesel PM emissions that will reduce impacts on public health. One of the major components of the proposed plan is reduction of emissions from heavy-duty engines, such as those used in school buses. For information about the risk reduction plan, see the ARB web site, www.arb.ca.gov.

Third, improved safety would occur. Replacement of older school buses would mean more buses on the road that meet current safety standards, thus providing safer transportation for students.

What agencies are involved in the development and implementation of the program?

The ARB staff is developing the guidelines to be used in funding school bus purchases, fueling infrastructure and PM engine retrofits. The CEC will administer the funds in the school bus replacement program in cooperation with air districts. The CEC, the CHP, the State Department of Education, school districts and air districts are ARB's partners in program development.

Program Development

What about the ARB Guidelines?

It is planned that the final report on the proposed ARB Guidelines will be prepared after the September workshops, made available on the ARB Internet web page in November, and taken to the ARB Board for action in December 2000. Administration of the funds will comply with the adopted guidelines. In general, the guidelines will cover fund allocations, various eligibility requirements, emission reductions, cost-sharing, timing and reporting.

Who would be eligible recipients of new school buses and infrastructure?

This funding is limited. It is proposed that only California public school districts that own and operate school buses would be eligible recipients. There would be an allocation of funds per air district, county, or other designated areas, primarily based on population. Private school transportation providers, non-profit agencies, non-public schools and public transit agencies providing school bus services would not be eligible for these funds at this time.

What kind of buses and infrastructure would be eligible for funding?

It is important that that all size school districts have access to the funds. It is proposed that funding be available for the purchase of new lower-emission school buses of all sizes. This includes Type 1 and 2 buses -- conventional, medium/heavy-duty, special needs buses, cut-aways, etc. In order to assure that older diesel school buses are taken off the road, only replacement buses would be funded; buses needed to expand fleets would not be eligible for funding.

Bus engines would have to be certified to specified engine standards to assure the most emission benefits. It is proposed that only buses powered by electricity or with engines certified at lower PM emission levels (0.03 g/bhp-hr or lower), and to the applicable optional, reduced-emission NOx standard (currently 2.5 g/bhp-hr NOx and lower) would be eligible for funding. No prototype or experimental buses would be funded and all buses would have to meet applicable CHP safety requirements.

The oldest school buses on the road were not subject to any federal safety requirements, and their engines predate PM engine emission standards. Thus, under this proposal, replacement of school buses with model year 1976 and earlier engines would be given priority. In any given fleet, these buses would have to be replaced first and then scrapped. However, buses with model year 1986 and earlier engines could be replaced if there are not enough of the 1976 and older buses in the fleet. In this proposal, the model years 1977-1986 replaced buses would not have to be scrapped, but their CHP certification would be revoked. Resale to other school districts could be an option, on a case-by-case basis.

How much money is available?

Thirty million dollars in State funds is available. It is proposed that about $27 million dollars be directed for purchase of replacement buses. The level of demand for funds for alternative-fuel refueling infrastructure is unclear. However, capping infrastructure spending at about $3 million is being considered.

How would the costs be shared?

The State program would contribute the bulk of the bus purchase cost. It is proposed that the State program contributes approximately 75 percent of the cost. School districts would match that with a 25 percent contribution, with a cap of $25 thousand dollars per bus. Local and regional air quality grant funds, if available, could be used as match money. Under this proposal, no State funding would be available for bus maintenance or mechanics training.

It is proposed that a dollar limit be set on State contributions to the cost of new alternative-fuel infrastructure and recharging capability. This limit would be based on need and the number of buses to be serviced. Under the school bus replacement program, any increased fuel costs would not be eligible for funding.

What is the timing?

Timing is critical, as there is a very tight schedule for spending this money effectively. The ARB Board will act on the guidance documents in early December 2000. ARB would then distribute the State funds to the administering agency or agencies and applications for funding would be solicited. Applications would be reviewed, projects approved, and monies awarded on a first-come, first-served basis, within the population-based funding limits. The ARB is proposing that funds be awarded to school districts by July 2001 and all buses placed into service by July 2002.

ARB and CEC are working together with the California Department of Education to ensure that local school districts are aware of the opportunity to apply for funds to replace older school buses under this program. ARB notified the school

districts of the upcoming workshops to provide them an opportunity to participate in the development of the program.

What are some significant unresolved issues?

Population-Based Funding Allocations: Statewide allocations based on population are proposed. Some consideration is being given to including the current distribution of older buses throughout the state in the allocation formula. The most equitable way to allot the funding -- by county, aggregation of smaller counties, air districts, and/or aggregation of smaller air districts -- needs to be resolved. Comments from all interested parties are solicited.

Administration of Funds: State law requires the timely commitment and expenditure of State general funds. The CEC has primary responsibility for administering the funds, within ARB adopted guidelines. There are one or more air districts, however, that are well positioned to administer the school bus replacement funds in their districts. There are pros and cons to having multiple agencies distributing the funds. There is the potential to enhance the program. Which air districts may be eligible to administer their own programs, and under what conditions and time frame, needs to be resolved. In addition, which air districts are interested in administering the program needs to be determined. Comments from all interested parties are solicited.

Emission Reduction Requirements: To assure significant emission reductions, ARB staff is proposing that only buses with engines certified to the applicable ARB optional, reduced-emission NOx standard (currently 2.5 g/bhp-hr and lower) and at a 0.03 g/bhp-hr PM level are eligible for funding. Only natural gas engines are currently certified to the ARB optional NOx standard. ARB staff has been investigating the technical feasibility of low-NOx diesel engines. Discussions with engine and aftertreatment device manufacturers on the future availability of low-NOx diesel engines are ongoing. Comments from all interested parties are solicited.

PART 2 -- Particulate Matter Retrofits Program

Overview

This document outlines options being considered by the California Air Resources Board (ARB) staff in the development of the guidelines for the school bus particulate matter retrofit program. The document is intended to facilitate the discussion of the options and issues being discussed at the September 18, 2000 and September 21, 2000 public workshops. The goal of the program is to retrofit as many school buses as possible in an efficient manner to maximize the emission benefits of the program. Staff is seeking input on the proposals being considered.

The ARB identified particulate matter (PM) emissions from diesel engines as a toxic air contaminant in 1998. The Board will be considering a diesel control plan at its September 2000 meeting. Upon approval of the plan, ARB staff will begin the formal control measure development process. Among the measures identified in the diesel control plan is a measure to require the retrofit of heavy-duty diesel engines. ARB's goal is to retrofit all diesel engines with particulate filters by 2010, including diesel school buses.

Through the budget process, $50 million has been allocated for a Lower-emission School Bus Replacement Program. Staff proposes to use $20 million of these funds to implement a PM retrofit program. The program would fund the purchase and installation of retrofit devices. The goal of the program is to retrofit approximately 3000 older in-use diesel school buses. The ARB staff is proposing to have the air districts administer the program.

Because school buses are driven relatively low miles they remain in the fleet for extended periods of time. A typical school bus is driven about 15,000 miles per year. Thus, retrofitting of existing school buses will provide immediate, cost-effective emission benefits for several years.

Program Development

Why focus on retrofit of existing school buses?

The main goal of the program is to reduce exposure of school children to harmful PM emissions from diesel-fueled school buses. Children are exposed to PM emissions while waiting for, riding in, or playing near school buses. Diesel particulate filters (PM retrofits) will reduce children's exposure by at least 85%. The exposure of the general population to diesel PM emissions will also be reduced. Thus, a retrofit program will maximize the health benefits of the program by enabling the retrofit of more school buses than if the money were spent to purchase new buses.

The diesel particulate filters provide very large reductions in exposure. Because school buses operate for 15 to 20 years, retrofitting in-use diesel buses is essential in addressing the exposure of school children to toxic emissions. The PM retrofits will provide emission benefits for an extended period of time.

In February 2000, the ARB adopted a transit bus rule that requires the PM retrofit of diesel engines in urban buses. Transit agencies will only be able to operate buses in their active fleets that are in compliance with the PM retrofit requirements in the rule. The PM retrofits are phased in from January 2003 to January 2009. Diesel buses with the highest PM emissions will be the first buses retrofitted. A retrofit device that demonstrates 85 percent conversion efficiency will have to be installed. All low-sulfur fuel will have to be purchased beginning in July 2002 to assure the durability of the retrofit devices is maintained. The retrofit manufacturers and diesel fuel suppliers assured ARB staff that both the retrofits and low sulfur diesel would be available.

Some local air districts are interested in retrofitting diesel engines to reduce public exposure to harmful PM emissions. Currently, the South Coast AQMD and the ARB are conducting a demonstration program in which several school buses have been retrofitted with particulate filters (the ARB is providing testing support). Three school districts are participating in this demonstration program in which retrofit devices from several manufacturers are being evaluated for performance and durability. The South Coast AQMD has identified school buses as a category for potential regulation under their 1190 series of fleet rules. However, no rule has yet been proposed for school buses.

How much money will be available for the retrofit program?

Staff is proposing to use $20 million for the retrofit program. This should be able to retrofit about 3000 school buses with particulate filters to reduce emissions of particulate matter that has been identified as a toxic air contaminant.

Will the program pay for the full cost of the retrofit devices?

Yes, the program would pay for the full cost and installation of the retrofit device. We anticipate that the only cost the school district would incur is the incremental cost of low-sulfur diesel fuel. This is expected to be 3 to 5 cents per gallon. The school district would be responsible for obtaining low-sulfur diesel fuel to ensure proper operation of the retrofit device. Also, the school district would be responsible for minor routine maintenance of the retrofit devices.

Who will administer the school bus retrofit program?

ARB staff is proposing to provide grants to the local air districts to implement the school bus retrofit program. Those air districts that want to implement the program will apply to the ARB for funding.

How would the funds be allocated to the air districts?

Staff is proposing to allocate funds based on population by air district. The total funds available to any air district will depend on the number of districts applying for funds. The participating air districts will administer the retrofit program consistent with ARB guidelines. Air districts will not be required to provide match funding to implement the retrofit program. The table below shows the estimated allocations for the larger air districts and the available funds for smaller air districts to implement a retrofit program.

Estimated Allocations

District	Estimated Allocation (million $)
South Coast AQMD	8.5
Bay Area AQMD	3.9
San Joaquin Unified APCD	1.8
San Diego APCD	1.7
Sacramento Metro AQMD	.6
Ventura County APCD	.4
Monterey Bay Unified APCD	.4
Other Districts	2.1

Who qualifies to have their school bus retrofitted with a particulate filter?

California public school districts that directly provide transportation services and joint power authorities (JPA) would be eligible to apply for funds to retrofit their diesel-powered buses. Private transportation companies who provide transportation services, under contract, to public school districts may also apply for funding. In order to qualify, a school district would have to commit to using low-sulfur fuel in their entire fleet at a given site to avoid possible mis-fueling of the retrofitted buses. Also, staff is considering requiring a minimum number of retrofits per fleet participating in the program to ensure manufacturers support and adequate training.

How do I apply if I want to retrofit my school bus?

A school district interested in participating in the retrofit program would apply directly to their local air district for funding for the purchase and installation of particulate matter retrofit devices.

What if my local air district does not participate in the program?

If your local air district does not participate, you will not be able to apply for funding this year to have your buses retrofitted. You are encouraged to contact your local air district to express your interest in applying for funds to retrofit your buses.

What type of buses can qualify for retrofits?

Only in-use diesel-powered buses qualify for retrofit; both type I and type II buses will be eligible. The focus will be on retrofitting the highest polluting buses that can be reliably retrofitted with particulate filters. ARB, through its certification processes, will verify the emissions control efficiency, reliability and durability of the PM retrofit devices.

Beginning with the 1988 model year, the ARB set an emission standard of 0.6 g/bhp-hr for particulate matter emissions from heavy-duty diesel engines. The standard was lowered to 0.25 g/bhp-hr in 1991. In 1994, the standard was lowered to its current level of 0.1 0 g/bhp-hr. Pre 1987 model year buses are uncontrolled for PM and can have significantly higher PM emission levels.

What retrofit devices are available?

Diesel particulate filters have been used extensively both in the U.S and in Europe in various applications. The PM retrofits will be certified by ARB to reduce emissions by at least 85% in school bus applications. As part of the certification process, the PM retrofits will demonstrate reliability and durability requirements. ARB staff expects that manufacturers will certify PM retrofit devices by the time the program is implemented. While retrofit devices may not be available for all model years and engine types right away, we expect that enough retrofit devices will be available to make the program effective.

It is possible that some retrofit technologies will provide some NOx emission reduction in addition to the PM benefits. Such devices, however, may have an incremental cost relative to the diesel particulate filters. An air district can use their discretion in deciding whether to fund such devices, while weighing the additional benefits and any incremental costs.

While the diesel particulate filters provide a significant level of control they require properly maintained buses. Excessively smoking buses (e.g., those burning excess oil) or otherwise in need of repair could create damage to the filters and thus would not be good candidates for retrofit.

Why is low-sulfur diesel required?

Advanced catalyzed particulate filters require low-sulfur diesel fuel in order to achieve high (85% or greater) control efficiency. The use of low-sulfur fuel will also provide benefits in vehicles without particulate filters. Thus, a fleet using low-sulfur fuel would see emission reductions from all diesel vehicles in their fleet.

What is ARB doing to ensure that PM retrofits work in school bus applications?

Currently, the South Coast AQMD and the ARB are conducting a demonstration program involving 60 school buses from three participating school districts in the South Coast district. The program will evaluate retrofit devices from several manufacturers for emissions performance and durability. The ARB will be assisting in the emissions testing of several buses to verify the emission control efficiency of PM retrofits in a wide variety of school buses. The buses will operate on their normal routes and data on performance and durability will be collected. The program will be completed by early 2001.

The ARB has also established an In-Use Retrofit Team that can offer technical support to air districts and school districts participating in the school bus retrofit program.

What is the timing for the program?

ARB staff expects to present the guidelines to the Board for consideration in early December. ARB staff would then solicit air districts to apply for grants. We expect to award funds to the air districts by April 30, 2001. The air districts would have until June 30, 2002 to solicit projects from school districts.

What other criteria are being considered?

Staff is also seeking input on the following issues.

Should the retrofits program target larger fleets where significant number of buses can be retrofitted?

This would be the first large scale PM retrofit program in California that is aimed at reducing exposure of school children to diesel engine particulate matter emissions. It is important that this relatively new technology be effectively implemented. ARB is considering that retrofit programs be concentrated in large school bus fleets throughout the State. A significant percentage of the buses in a large fleet, or at a large bus yard, would be retrofitted. This would assure that school districts and school transportation contractors that choose to reduce PM emissions by installing retrofit devices would have adequate support from the

retrofit device manufacturers and other technical support. It would also facilitate adequate employee training and reduce opportunities for mis-fueling.

Is the increased cost of low-sulfur diesel fuel a significant barrier to school district participation in the retrofit program?

While the retrofit program, as proposed, would pay for the full cost and installation of the retrofit device, estimated to be $4000 to $6000. Low-sulfur fuel is necessary to ensure proper operation and durability of the retrofit device. Staff estimates the additional cost of low-sulfur diesel fuel to be 3 to 5 cents per gallon. Based on average school bus mileage, the total cost is estimated to be $100 per bus per year. Staff is soliciting input on whether this additional cost would discourage school districts from participating in the PM retrofit program. Providing additional funds for incremental cost of the low-sulfur fuel is a consideration.