POLLUTION REPORT CARD

Grading America's School Bus Fleets

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February 2002

Executive Summary

Every day, parents watch the trusted yellow bus pull away, taking their children to school. There's no sign on the rear of these buses warning that the exhaust from the tailpipe may be harmful to children's health. But there should be. The exhaust from diesel fuel—which powers nearly 90 percent of the 454,000 school buses on the road today—has been shown to cause or exacerbate a host of health problems, including asthma and other respiratory ailments, and has been linked to cancer and premature death. Children may be particularly vulnerable to the harmful impacts of air pollution because they are outdoors for longer periods and breathe at higher rates than adults (Wiley, 1993). As they wait on the curb, play near idling buses, or even ride safely inside the bus, children may be exposed to this noxious substance every school day.

Health Risks

All of today's school buses, whether powered by diesel, gasoline, natural gas, or other alternative fuels, release pollution from the tailpipe. But conventional diesel school buses, particularly older models, release more smog-forming pollutants and toxic soot than cleaner alternative technologies, and may pose greater risks to children's health.

School buses routinely expose children to soot and smog-forming pollution.

Numerous scientific studies have linked exposure to diesel exhaust with cancer. A study by air pollution control officials and administrators estimates that diesel may be responsible for over 125,000 additional cancers in the United States over a lifetime of exposure (STAPPA/ALAPCO, 2000). In California, the Air Resources Board estimates that diesel pollution is responsible for 70 percent of the state's cancer risk due to airborne pollution (CARB, 2000a).

Air pollution can cause or exacerbate a variety of respiratory ailments, including asthma. The most common chronic disease of childhood, asthma is also a leading cause of disability among children. In 1998, over 3.7 million children—about one in 20—had asthma (Federal Interagency Forum on Child and Family Statistics, 2001). A study of the economic costs of asthma estimated that children with this disease incurred nearly three times more health care expenses per year than did children without asthma (Lozano et al., 1999). This translates to $2.4 billion in additional health costs in the United States for children with asthma.

School Bus Pollution

School buses routinely expose children and communities to soot (particulate matter) and smog-forming pollution (nitrogen oxides and nonmethane hydrocarbons), and also add to the global burden of greenhouse gas emissions. Every year, the nation's

fleet of school buses releases 3 thousand tons of soot, 95 thousand tons of smog-forming pollutants, and 11 million tons of greenhouse gas emissions.

Over the last three decades, school bus engine manufacturers have had to meet progressively stronger pollution standards for buses, providing better protection for children's maturing lungs. But older school buses are exempt from today's stronger standards and expose children to greater levels of air pollution. Buses built before 1990 and 1991, which constitute around a third of buses currently in operation, are allowed to release at least six times more toxic soot and nearly three times more smog-forming nitrogen oxides than today's models.

Cleaner Alternatives

There are cleaner alternatives to standard diesel buses. School buses powered by natural gas and other alternative fuels offer the cleanest option commercially available across the country. Natural gas school buses emit 90 percent less toxic soot than conventional new diesel-powered buses, and are over 98 percent cleaner than older diesel buses. Natural gas school buses also reduce smog-forming pollution by more than 30 percent relative to today's diesel, and by over 45 percent relative to diesel buses built in 1990.

Over the last decade, natural gas buses and trucks have moved into the mainstream, with one in five new transit buses on order powered by natural gas (DOE, 2000). These buses have a proven track record of success. School districts in at least 19 states including Indiana (Evansville-Vanderburgh School Corporation), Oklahoma (Tulsa Public Schools), and Texas (Northside Independent School District) currently use natural gas buses. School districts and transit bus operators have turned to alternative fuel buses because of their clean air benefits and lower operating costs. Though the capital cost of a natural gas school bus is about $35,000 greater than that of a diesel school bus, some school districts and transit agencies report that lower operating costs enabled them to quickly recoup the initial investment (SRTD and STA, 1999).

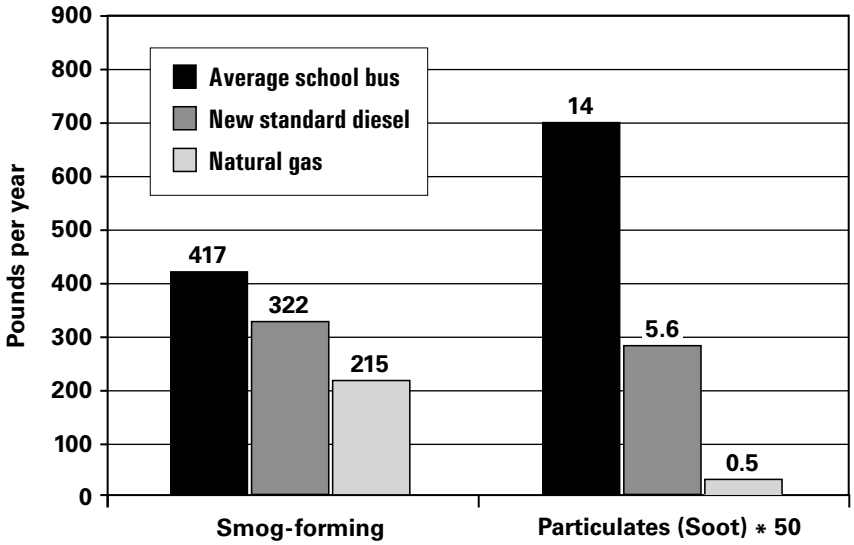
Natural gas school buses emit 90 percent less toxic soot than conventional new diesel-powered buses.

Diesel emission control technologies are evolving and improving, and new low-emission diesel buses are starting to enter the market. Emissions from diesel buses can be reduced through a combination of engine improvements, changes to fuel and oil formulation, and exhaust control equipment. If these clean-up technologies live up to their theoretical potential, they can reduce smog-forming pollutants and toxic soot by 90 percent or more. While clean-up technologies offer hope for a cleaner future for diesel, they have yet to prove effective under a range of real-world conditions. Without government oversight and stricter regulations, diesel clean-up technologies may not be adequate to keep school buses clean over the 20, 30, and even 40 years that they remain on the road.

Grading State Fleets

While school bus fleets across the country differ significantly in terms of age, fuel type, and pollution performance, all states rely to some extent upon high-polluting school buses, primarily those powered by diesel, to transport children. Every year, the average school bus releases twice the amount of smog-forming pollution, 27 times as much soot, and 6,000 pounds more global-warming pollution than a natural gas school bus.

Figure ES-1. School Bus Annual Emissions: National Average Versus Natural Gas



We gave each state fleet grades based on the emissions of particulates, smog-forming pollution, and greenhouse gases from the average state school bus. The level of emissions from a natural gas school bus set the bar for the highest grade, an "A." No state even came close to receiving this highest grade for superior pollution performance. The large gap in environmental performance between today's fleet of school buses and the standard set by natural gas buses shows that even the "cleanest" state fleet has room for improvement.

We allotted grades "B" through "D" based upon relative performance in each pollution category and gave each state an overall grade average. Only six states and the District of Columbia were ranked "ahead of the curve." Twenty-three states received a "middle of the road" ranking, while the remaining 21 states did poorly or flunked out.

Table ES-1 shows the grade each state received for each pollutant category. Figure ES-2 maps the state grade averages.

Policy Recommendations

School districts need help—technical, regulatory, and financial—to fund cleaner school buses and to ensure that the buses remain clean over their lifetime on the road. Many school districts do not have the resources to replace older school buses with newer, cleaner models. Some states make school districts choose between new buses and other educational expenses. As long as there remains a trade-off between books and buses, children's health may be compromised. Government action is needed to sponsor and conduct research, set standards and policies to ensure real world emissions reductions, and provide funding to replace and clean up older diesel school buses.

Table ES-1. School Bus Report Card

State	Smog-Forming	Soot	Global Warming	Overall Grade Average
Alabama	B	B	B	B
Alaska	D	C	D	D+
Arizona	D	D	C	D+
Arkansas	D	B	D	C-
California	D	D	D	D
Colorado	D	C	D	D+
Connecticut	B	C	C	C+
Delaware*	B	B	B	B
District of Columbia*	B	B	B	B
Florida	B	C	B	B-
Georgia	C	D	C	C-
Hawaii	B	D	B	C+
Idaho	C	C	C	C
Illinois	B	B	C	B-
Indiana	B	C	B	B-
Iowa	C	C	D	C-
Kansas	B	B	C	B-
Kentucky	C	B	D	C
Louisiana	D	C	D	D+
Maine	C	C	C	C
Maryland*	B	B	B	B
Massachusetts	B	B	B	B
Michigan	C	C	B	C+
Minnesota	C	D	C	C-
Mississippi	B	B	C	B-
Missouri	B	B	B	B
Montana	D	C	D	D+
Nebraska	D	B	D	C-
Nevada	D	D	C	D+
New Hampshire	C	C	B	C+
New Jersey	C	C	C	C
New Mexico	C	C	C	C

* States with strong and effective bus replacement policies

Table ES-1 School Bus Report Card (continued)

State	Smog-Forming	Soot	Global Warming	Overall Grade Average
New York	C	D	B	C
North Carolina	C	D	B	C
North Dakota	B	B	D	C+
Ohio	D	D	C	D+
Oklahoma	D	B	D	C-
Oregon	C	B	C	C+
Pennsylvania	B	B	B	B
Rhode Island	C	D	B	C
South Carolina	D	D	C	D+
South Dakota	D	C	D	D+
Tennessee	B	C	C	C+
Texas	C	C	C	C
Utah	C	D	C	C-
Vermont	C	D	C	C-
Virginia	C	D	C	C-
Washington	D	D	D	D
West Virginia	C	C	C	C
Wisconson	C	C	C	C
Wyoming	D	C	D	D+
National Average	**C**	**C**	**C**	**C**

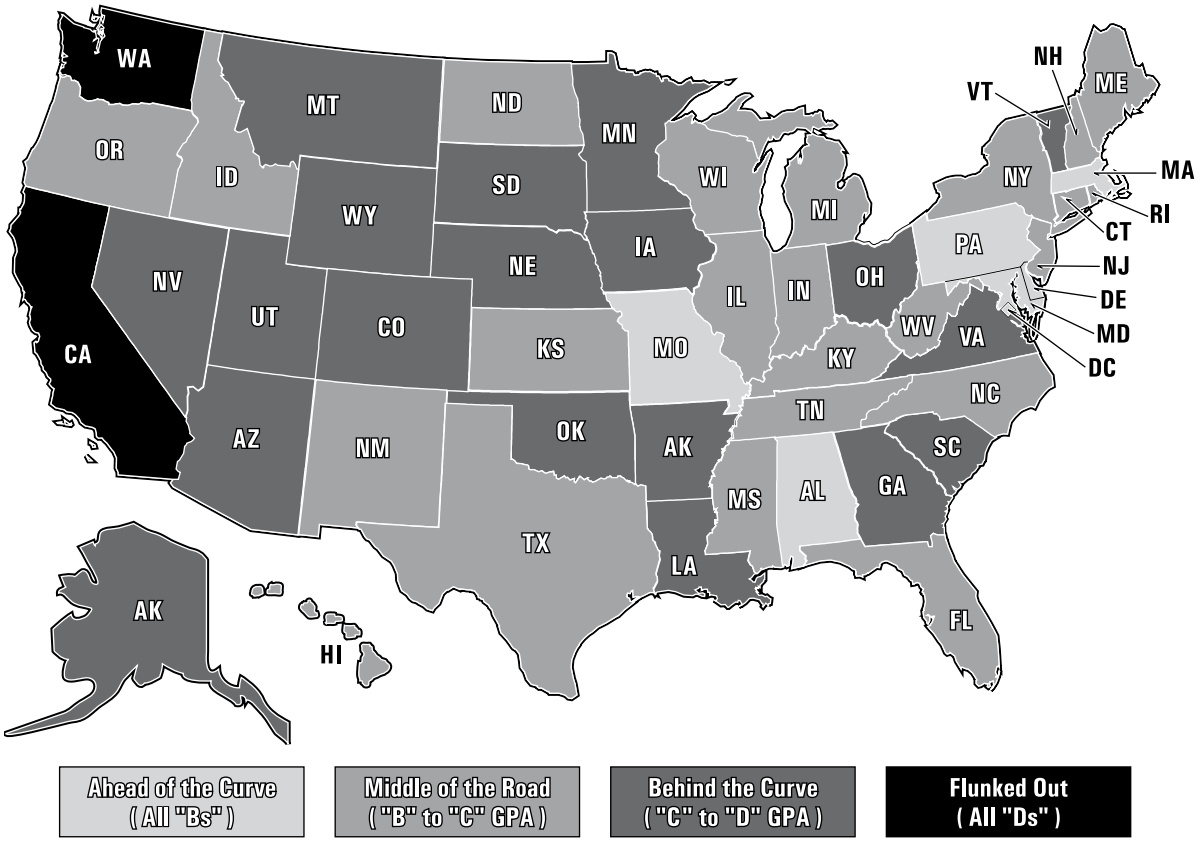
Research and Development

Critical gaps remain in our understanding of school bus clean-up technologies and in the health impacts of air pollution, particularly the role of very small particles. As school buses become cleaner, the average particle size from exhaust may become smaller. Research and development can play a critical role in improving our understanding of the health impacts of pollution from low-emission diesel and alternative fuel school buses, getting cleaner buses on the road today, and putting even cleaner technologies—like fuel cells—on the road in the future.

Standards and Policies

Government policies can help narrow the gap between emissions measured in a laboratory setting and real-world emissions. To help keep diesel clean-up equipment effective over the life of the vehicle, the US government needs to develop an inspection and maintenance program. Ultimately, new standards for engines based on in-use performance should replace today's inadequate certification process.

Figure ES-2. State Grade Averages



Funding for Cleaner Buses

Children's vulnerability to the harmful impacts of pollution underscores the need for a national school bus replacement program with strict pollution limits. Federal and state funding for cleaner school buses can help meet the dual needs of promoting energy security and protecting children's health and is key to ensuring that children across the country are able to ride in clean and safe school buses.