SCHOOL BUS EMISSIONS & RETROFITS

LOWER EMISSIONS. CLEAN AIR. Factsheet April 2016

School buses are safe transportation, but they emit pollution that is dangerous to breathe. Studies have found that diesel pollution can concentrate inside school buses, leading to even higher exposures for children who ride buses. It is well-documented that children are more vulnerable than healthy adults to the effects of diesel emissions, which can exacerbate long-term conditions such as asthma and cause respiratory disease. The US EPA has worked aggressively at the national level to reduce pollution from new diesel-powered school buses by requiring them to meet more stringent emissions standards. As a result, new buses are up to 95 percent cleaner than yesterday's models. However, because of the high level of durability and relatively long life of heavy-duty diesel engines, it will take years for new cleaner buses to replace those in the existing fleet. This means that without additional effort, today's kindergartners will be in college before the benefits of today's standards are fully realized.

Depending on the age of the school bus, pollution, in the form of gases and fine particulates, is emitted from the engine crankcase and tailpipe. Although children spend only a short time on the school bus, they are repeatedly exposed to higher levels of contaminants every school day. A study in Connecticut found contaminants inside the cabins of buses 5-15 times higher than levels outside.

> *Levels of fine particles were often higher under certain circumstances: when buses were idling with windows opened, when buses ran through their routes with windows closed, when buses moved through intense traffic, and especially when buses were queued to load or unload students while idling.*[1]

What is in Diesel Exhaust from School Buses?

Each year, diesel emissions are linked to thousands of premature deaths, hundreds of thousands of asthma attacks, millions of lost work/school days, and numerous other health and environmental impacts. Contaminants include:

- **Fine Particulate Matter** (PM), or $PM_{2.5}$ can travel deep into lungs and may even reach the bloodstream causing damage to the lungs and heart.
- **Nitrogen Oxides** (NOx) react with volatile organic compounds to form ground-level ozone ("smog"). Smog damages lung tissue and aggravates respiratory disease.
- **Toxic Air Pollutants** – diesel exhaust contains at least 40 toxic air pollutants that are known or suspected of causing cancer or other serious health effects if inhaled. Diesel exhaust includes benzene and 1,3-butadiene, both classified as known human carcinogens. In fact, the World Health Organization has classified diesel exhaust as a **known human carcinogen**.

[1] *Wargo, John, Ph.D., Children's Exposure to Diesel Exhaust on School Buses. 2002. Environment and Human Health, Inc., p. 10.*

For More Info:

Contact the Vermont Air Quality & Climate Division at (802) 828-1288 or visit our website:

http://dec.vermont.gov/air-quality/mobile-sources/diesel-emissions/vt-diesel-grant

Asthma Prevalence in Vermont School Children

Children are more susceptible to air pollution than healthy adults because their respiratory systems are still developing and they have faster breathing rates.

Asthma is now the most prevalent chronic disease among U.S. children.[2] In 2014, the Vermont Department of Health indicated 8% of children in Vermont have asthma. This equates to approximately 9,100 children or one in twelve children having asthma.[3]

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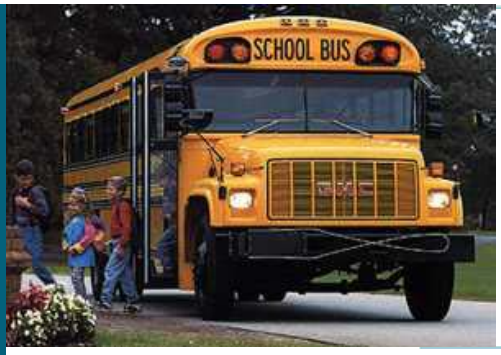


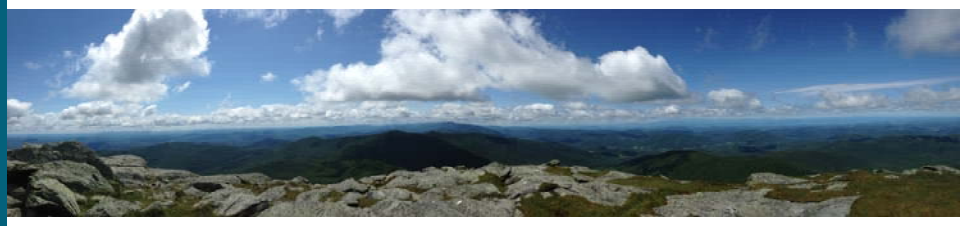
Older, more polluting school buses can lead to increased health risks for students who typically ride these buses for one-half to two hours a day.

Reduce Exposure to Diesel Exhaust—Solutions Provided at No Cost to Schools

The **Vermont Diesel Emissions Reduction Grants** provide funding for 100% the cost to retrofit school buses with emission-reduction technologies. These verified technologies reduce emissions and engine idling. The primary goal of school bus retrofit efforts in Vermont is to help reduce diesel emissions and children's exposure to diesel exhaust from school buses. With funding from the Environmental Protection Agency's (EPA's) Diesel Emission Reduction Act (DERA) grant, Vermont Department of Environmental Conservation (DEC) provides technical and financial assistance to Vermont school districts and supervisory unions statewide to retrofit school buses with a combination of diesel oxidation catalysts (DOCs), closed-crankcase ventilation (CCV) systems, and auxiliary fuel operated heaters (FOHs). The program is successful in reducing diesel school bus emissions and improving fleet fuel efficiency, and has successfully retrofit over 50 school buses in Vermont so far.

"A teacher and a group of middle school students became very interested in the amount of time that the buses were idling in front of the school. They brought this to our attention and kept after us until we responded [by adopting a policy to limit idling]. It was a great lesson in advocacy and involvement and change. It was great to have a teacher and students take the lead!"

"[In addition to adopting policy,] it is a source of pride that CESU has researched the technology and taken advantage of options to improve our fleet of buses." - Patricia Connelly, Grants Coordinator, Chittenden East Supervisory Union Participant, Vermont Breathe Better Campaign Grantee, Clean Bus USA and Diesel Emission Reduction Act grant program.



[2] *Centers for Disease Control and Prevention. Asthma Prevention Program. http://www.cdc.gov/asthma/nacp.htm*

[3] *Vermont Department of Health, Asthma Among Vermont's Children. December 2015. http://healthvermont.gov/research/asthma/documents/data_brief_asthma _schools.pdf*