ENVIRONMENTAL Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

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Heavy-Duty Diesel Engines: Trucks and Buses
Air Quality Impacts

Diesel trucks and buses have served transportation and freight needs well for over 50 years because of their durability, reliability and relative efficiency. Since 1970, with the focus on air pollution and the setting of national ambient air quality standards, heavy-duty diesel engines have become less harmful to the environment. Despite progress in cleaner fuels and emission standards and technology, diesel engines remain one of the largest sources of fine particulate matter, considered to be a significant threat to public health. Diesel exhaust also contributes to ozone formation, acid rain and global climate change. For more information about the environmental and health effects, see ARD-44 Diesel Vehicles and Equipment: Environmental and Public Health Impacts.

Air Emissions from Diesel Vehicles and Equipment

Like their gasoline-powered counterparts, heavy-duty diesel vehicle exhaust contains unburned hydrocarbons, carbon monoxide (CO), nitrogen oxides (NOx), sulfur oxides (SOx) particulate matter (PM), and other toxic compounds, but at much higher concentrations. Emission standards for diesels have lagged behind those of gasoline vehicles and were not a practicable option until the widespread availability of ultra-low sulfur diesel in 2006. Beginning in model year 2007, diesel vehicle emissions are 90 percent cleaner. However, many diesel engines are expected to last up to one million miles with proper maintenance and engine rebuilding. This means that older, dirtier engines may be in operation for 15 to 30 more years. According to the EPA's National Emissions Inventory for 2008, heavy-duty diesel vehicles contributed 36 percent of the particulate matter, 30 percent of the NOx and 26 percent of the SOx from the transportation sector, yet comprise only 2 percent of the total number of vehicles on the roadways. Diesel emissions also contain black carbon, particles of soot composed of carbon that are a major contributor to climate change.[1]

Emissions from heavy duty diesel engines are a significant factor in efforts to meet healthy air quality standards. Policies and practices exist to insure that diesel engines currently in use are maintained at the lowest emission levels possible and do not emit excessive smoke. These include, but are not limited to, reducing idling time, retrofitting diesel engines with emission control equipment and ensuring that diesel engines do not exceed opacity standards.

[1] Target 'black carbon' to tackle climate change, recommends UN | Environment | guardian.co.uk

- Reduce idle time. New Hampshire rules limit idling to 5 minutes when ambient temperatures are above 32°F (0°C) and 15 minutes when ambient temperatures are below that and above -10°F (-23°C). Idling time is not limited when it is below -10°F.[2] Another means of reducing idling time is with the installation of an engine block heater. These preheat the engine prior to operation, significantly reducing warm up idling time. They can also supply cabin heat, depending on the type of heater that is installed.
- Retrofit vehicles with emission control devices. After-market retrofits can be installed on diesel equipment to reduce harmful emissions. More information about these devices can be found below.
- Diesel vehicle maintenance. Heavy smoke from diesel engines indicates poor repair and excessive emissions. Exhaust smoke can be measure in terms of its *opacity*, the degree through which light will pass. Diesel vehicles over 10,000 pounds must be in compliance with New Hampshire opacity standards[2]. They are enforced by the Department of Safety[3] during weigh station inspections or safety stops. In addition, New Hampshire has prohibitions on tampering with emission control devices.[2]

Diesel Emission Control Retrofit Devices

Installing after-market retrofit devices can significantly reduce harmful diesel emissions. Some of these technologies are employed in new vehicles by manufacturers to meet EPA emission standards. The most common include:

- Diesel oxidation catalysts (DOCs) consists of a metal clad honeycomb substrate through which exhaust gases flow. The precious metal coating of the substrate reacts causes a catalytic reaction that reduces PM, hydrocarbons and carbon dioxide.
- Diesel particulate filters (DPFs) reduce PM by trapping it with filters, and require that either a) exhaust gases are hot enough to periodically combust accumulated PM or b) periodic filter changes.
- Selective catalytic reduction (SCR) systems inject urea into the exhaust stream where it reacts with a catalyst to convert NOx emissions to N2 (nitrogen gas) and oxygen.

What's Being Done in New Hampshire

In addition to implementing idling restrictions and smoke opacity standards, New Hampshire has received financial support from the federal government for addressing diesel emission pollution. Through the Diesel Emission Reduction Act (DERA) and other programs, DES has provided assistance to New Hampshire municipalities and private enterprises that have helped to reduce diesel emissions. Examples include the installation of engine block heaters on 72 school buses, the replacement of nine diesel refuse trucks with compressed natural gas trucks, and the replacement of four diesel vehicles with newer trucks.

For more information about diesel vehicles and equipment, please see the DES website at: http://des.nh.gov/organization/divisions/air/tsb/tps/msp/diesel-vehicles/index.htm.

[2] New Hampshire Env-A 1100
[3] New Hampshire Chapter Saf-C 5800