

Why is diesel exhaust a problem?

Diesel exhaust contains tiny, very toxic particles. It comes from diesel engines such as cars, small and large trucks, buses, trains, ships, and farm and construction equipment. Diesel exhaust also contains:

- carbon dioxide, an important greenhouse gas;
- carbon monoxide;
- sulfur oxides;
- nitrogen oxides; and
- 18,000 identified hydrocarbon compounds, including more than 40 cancer-causing chemicals.

The tiny particles in diesel exhaust are too small for our noses and upper respiratory systems to filter. We can't avoid breathing them deep into our lungs, where they can cause damage and chemical changes.

Ecology concludes that diesel exhaust has the potential to cause cancer, premature death, and other health problems. Several well-known organizations identify diesel particles as a probable or possible human carcinogen. These include The World Health Organization, the National Institute of Occupational Health and Safety, the International Agency for Research on Cancer, the National Toxicology Program, the federal Environmental Protection Agency (EPA), and the California Air Resources Board.

Health effects of diesel exhaust

Breathing diesel exhaust causes both immediate and long term health effects. Known and probable effects include:

- heart attack and stroke in people with existing heart disease;
- lung cancer and other forms of cancer;
- asthma attacks and worsening of asthma symptoms;
- increased likelihood of respiratory infections;
- male infertility;
- birth defects;
- impaired lung growth in children;
- worsening allergic reactions; and
- eye, nose, and throat irritation along with coughing, labored breathing, chest tightness, and wheezing.

WHY IT MATTERS

More than four million people in Washington live and work near busy roads where they breathe harmful levels of diesel exhaust every day. Diesel exhaust affects us all, but causes the most health problems for the elderly, children, and people with heart and lung disease.

Recent research shows that small particles have very serious health effects even at levels much lower than what the air quality standard allows. Small particles can come from sources other than diesel exhaust, such as wood smoke, but they are not as toxic as the particles in diesel exhaust.

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How Ecology and others are reducing diesel exhaust

Retrofits and cleaner buses

Ecology's strategy for reducing diesel exhaust focuses on older existing diesel engines (generally pre-2007 model year engines). Although new diesel engines burn much cleaner, older existing engines have a long life span and can continue to harm public health for many years unless we clean them up, too.

Ecology and the state's seven local clean air agencies have provided funding to retrofit over 6,000 school buses with cleaner technology. Ecology has also provided funding to retrofit over 1,000 public fleet vehicles owned by cities, counties, ports, and transit authorities. The retrofits, combined with ultra-low sulfur diesel fuel, reduce emissions on individual vehicles by 40 to 90 percent. Ecology is also helping some school districts replace their aging school buses with new, very clean running buses.

Ecology has begun to focus on privately owned vehicles and equipment in densely populated areas, such as near urban seaports and in urban neighborhoods. This involves providing funding to retrofit cargo handling equipment, locomotives and garbage trucks. The private sector makes up 90 percent of the diesel vehicles and equipment in Washington. Reducing the harm from these vehicles will require much more work.

Stricter emission standards

In addition to efforts by your state and local governments, EPA is requiring much stricter diesel exhaust emission standards for new on-road trucks, off-road equipment, locomotives, and some marine vessels. Trucks must meet these standards starting with 2007 models. EPA will phase in these requirements over the next several years for the other categories.

Cleaner fuels

EPA has required the use of Ultra-Low Sulfur Diesel fuel (ULSD) since 2006 for on-road trucks. EPA will begin phasing in this requirement later for other types of diesel equipment. Lowering the sulfur content in the fuel reduces fine particles and other toxic emissions even without any additional pollution controls. Using ULSD also makes emission reducing retrofit technologies work better.

For a more complete list of projects that reduce diesel exhaust, please see the table of major projects at: http://www.ecy.wa.gov/programs/air/pdfs/diesel_majorprojects_2008.pdf.

MORE INFORMATION

Ecology's diesel web page:
http://www.ecy.wa.gov/programs/air/cars/diesel_exhaust_information.htm

Concerns about Adverse Health Effects of Diesel Engine Emissions:
<http://www.ecy.wa.gov/biblio/0802032.html>

Ecology's Strategy for Reducing Diesel Emissions in Washington State:
<http://www.ecy.wa.gov/biblio/0602022.html>

Evaluating the Effects of Ambient Air Pollution on Life Expectancy, *New England Journal of Medicine*:
<http://content.nejm.org/cgi/content/full/360/4/413>

How you can reduce diesel exhaust

- Avoid unnecessary idling. This is true for drivers of both diesel and gasoline vehicles because gasoline engines also emit harmful air pollutants.
- Owner/operators and fleet managers can purchase idle reduction equipment. This equipment enables drivers to use heaters, appliances, and other equipment without idling the main engine. This saves fuel, which eventually pays for the cost of the idle reduction equipment. For more information on idle reduction equipment, visit the EPA website at: <http://www.epa.gov/smartway>
- Owners of diesel vehicles and equipment can retrofit exhaust mufflers with emission reducing technologies that they purchase themselves; use cleaner fuels; and encourage operating practices that reduce emissions. Examples of these operating practices are requiring engines to be shut down when they are not needed, and increasing engine maintenance to keep the engine in top operating condition. For a more detailed discussion of the technologies, fuels and operating practices that reduce diesel emissions, see Ecology's Diesel Strategy: <http://www.ecy.wa.gov/pubs/0602022.pdf>

Is reducing diesel exhaust worth the cost?

Yes. Although the cost of reducing diesel emissions from the existing fleet is high, it represents a small fraction (as little as five percent) of the total cost of operating and maintaining the existing fleet over a 10-year period.¹ The benefits to human health and the environment outweigh the costs in the following ways:

- A recent study showed that every decrease of 10 micrograms per cubic meter of particulate matter increases the average life span by about five months.²
- According to the California Air Resources Board, every dollar spent cleaning up diesel emissions (through exhaust retrofits, vehicle replacements, clean fuels, idle reduction, etc.) saves three to eight dollars in improved health and lower operating and maintenance costs for diesel fleets.³
- The Union of Concerned Scientists estimates that society gains nine to 16 dollars for every dollar paid for diesel exhaust retrofits.⁴

¹ "Recommendations for Reducing Emissions from the Legacy Diesel Fleet – Report from the Clean Air Act Advisory Committee", April 10, 2006.

² "Fine-Particulate Air Pollution and Life Expectancy in the United States"—New England Journal of Medicine, Volume 360:376-386, Number 4, January 22, 2009 4.

³ "Emission Reduction Plan for Ports and Goods Movement in California – Proposed", California Environmental Protection Agency, Air Resources Board, March 21, 2006.

⁴ "Sick of Soot: Reducing the Health Impacts of Diesel Pollution in California", Union of Concerned Scientists, Cambridge, MA, 2004.