DIRT ON DIESEL 2016

THE TRUE COST TO OREGON OF DELAYING ACTION

Oregon Environmental Council
It's Your Oregon

HEALTHY AIR FOR OREGON

Every Oregonian has the right to breathe clean and healthy air in our homes and neighborhoods.

Oregon's air has less soot and smog today than a generation ago, but we have more work to do to ensure air is healthy and safe. It's time to get serious to address today's air problems and prevent health crises in the future.

A decade ago, Oregon Environmental Council called for swift action to address one of our state's most deadly sources of toxic air pollution: diesel exhaust.

Since that time, both federal and state initiatives have made only incremental steps towards cleaning up diesel in Oregon.

Federal laws are now delivering cleaner diesel fuel and are requiring that new engines be built to produce less pollution. Together, these engines and fuels are capable of running with 95% less pollution, virtually eliminating cancer risk.[1]

However, because diesel engines last a very long time, the U.S. Environmental Protection Agency (EPA) estimates that approximately one million old polluting engines will still remain in use in the year 2030,[2] leaving us with unsafe air for another generation.

Many community organizations in Oregon have made advancing clean air solutions a top priority and are doing critical work. A number of groups have worked tirelessly to ensure that Oregon decision-makers understand the effects of diesel on our health, hear from marginalized communities where diesel exposure is highest, and explore solutions that will protect health. Diesel fleet upgrade projects have counted on community partners to shepherd the process. Today, these groups are joined by emerging neighborhood-based advocates. OEC applauds the efforts of these groups and individuals who are tackling air pollution to improve public health. Learn more at oeconline.org/cleanairchampions

Oregon Environmental Council advances innovative, collaborative and equitable solutions to Oregon's environmental challenges for today and future generations.

DIRT ON DIESEL: THE TRUE COST TO OREGON
SUMMARY

OREGON FACES A TURNING POINT

Oregon's neighboring states are making significant progress to upgrade diesel engines, test emissions, and set stronger standards in order to protect public health from deadly exposures. Meanwhile, Oregon has cut funding to diesel cleanup programs and failed to meet goals set by legislature. It's time for a commitment to protect every Oregonian from deadly diesel pollution.

If we do nothing, Oregonians will die from diesel pollution for decades. By 2023, all of California's trucks and buses will run 95% cleaner. Old construction vehicles are also on a timeline for upgrades. Unless we take action, old engines that don't meet California's standards will be sold for many more years of use in Oregon.

STATE INVESTMENTS 2002-2015

WASHINGTON: $58M INVESTED IN 14,000 ENGINE UPGRADES

OREGON: $4.3M INVESTED IN 369 ENGINE UPGRADES

OREGON IS FALLING BEHIND

Oregon has...

...not funded diesel engine upgrades since 2009

...eliminated a tax credit program in 2012

...missed the state goal to upgrade all diesel school buses by 2017

...allowed 23 of 36 counties to exceed the state health benchmark for diesel pollution

Deadly diesel pollution...

...causes more fatalities than traffic crashes

...puts 90% of Oregonians at risk for cancer

...damages the heart, lungs and brain

...causes up to 460 premature deaths in Oregon each years

...burdens Oregon with up to $3.5 billion a year in health costs and lost productivity

...is at highest concentrations in neighborhoods with more low-income and people-of-color residents

...is 100X more toxic than gasoline exhaust

...is the sole source of one of Oregon's worst toxic air pollutants (diesel particulates)

...can contain many of Oregon's other toxic air pollutants: cadmium, arsenic, benzene, formaldehyde and chromium compounds

PROVEN SOLUTIONS

Upgraded diesel engines...

...run with 95% less pollution

...deliver $17 in health benefits for every dollar invested

...can benefit Oregon's climate directly by reducing black carbon

DIESEL IN THE 21ST CENTURY

For 125 years, diesel engines have been used in trucks, buses, ships, trains, and in farming and construction equipment.

Their use in heavy-duty trucks increased steadily from about 1950 through the year 2000.[3]

They are durable, powerful and efficient—but we pay a high price for the potent pollutants from diesel. By some estimates, diesel exhaust is 100 times more toxic than gasoline exhaust.[4]

Cleaner diesel offers a huge return on investment for human health.

GOOD NEWS: FEDERAL STANDARDS

New diesel engines in trucks, construction equipment, and others that cause the most pollution are now required to be far cleaner.[5]

GOOD NEWS: EMISSIONS CONTROL

Emissions control technology on new engines, as well as upgrades to old engines, can cut emissions by as much as 95%.[6]

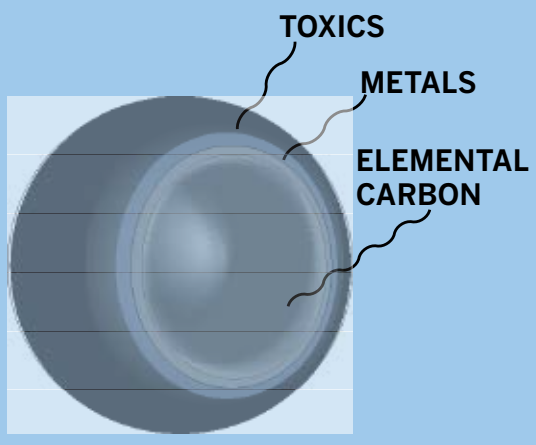
BAD NEWS: LONG-LASTING DIRTY DIESEL

Diesel engines last for so long that they may be in use for decades. The full benefit of the federal standards for new engines will not take full effect until old engines are retired, sometime after 2030.

BAD NEWS: DIESEL IS HARMING HEALTH

About 90% of Oregonians today live where diesel exhaust exceeds health benchmarks.[7]

What is diesel exhaust?



A DIESEL PARTICLE

- Diesel exhaust includes fine sooty particles layered in heavy metals and toxic gases including formaldehyde and benzene.
- Diesel exhaust can contain up to 40 hazardous substances including many of Oregon's worst toxic air pollutants.
- Diesel's fine sooty particles (PM 2.5) are more toxic than particles from wood smoke or car exhaust.
- Soot ranges in size from a sand grain to "nano-particles" so small they can move from lungs to the bloodstream.[8]

"Diesels always have had a reputation for being smoky and smelly. But now, what we're discovering through advances in medical research is that particulates are more than a nuisance; they are a health concern." —Kevin Downing, Oregon Department of Environmental Quality

DIESEL AND OUR HEALTH

Diesel exhaust causes more fatalities than do traffic crashes in Oregon each year.[9]

BREATHING

By the time you smell diesel, it is already causing harm. Diesel exhaust triggers coughing, wheezing, asthma attacks and bronchitis. Up to 10,000 cases of respiratory symptoms, bronchitis and asthma can be attributed to diesel exhaust in Oregon.[11]

HEART DISEASE

Diesel soot may be more dangerous to the heart than the lungs. The fine particles are responsible for more deaths from cardiovascular disease than from respiratory problems.[12]

The American Heart Association found in 2010 that exposure to fine diesel particles for just a few hours can trigger heart attack, stroke, arrhythmia, cardiac arrest or heart failure.

Exposure over years increases the risk of dying from heart trouble. Diesel pollution in Oregon causes 145 heart attacks each year, adding up to $5.6 million in hospitalization costs.[13]

CANCER

Fifteen substances in diesel exhaust are listed by the International Agency for Research on Cancer as possibly or probably carcinogenic to humans.[14]

In 2012, the agency classified diesel exhaust as a whole to be "carcinogenic to humans."

The U.S. EPA knows that cancer risk from diesel is "likely to be substantial." EPA is exploring the possibility that diesel poses the greatest cancer risk, more than all other air toxics.[15]

CHILDREN AT RISK

The time between conception and birth is one of the most vulnerable life stages. The environment can have both immediate and life-long effects on health, including:[17]

- premature birth
- low birth weight
- greater infant mortality
- immunologic effects
- infertility
- diabetes
- cognitive disorders
- behavioral disorders

Early-life exposure to diesel exhaust can also create changes in the brain[18] that raise the risk of neurological disease later in life.[19]

THE HEALTH COST OF DOING NOTHING

Lowering diesel particulate pollution yields about $17 in human health benefits per dollar invested in cleaner on-road diesel engines and up to $40 per dollar invested in off-road engines such as construction vehicles.[20]

That's comparable in effectiveness to home-based asthma interventions and a far better return on investment than smoking cessation programs ($3 for every dollar spent).[21]

Oregon could avoid up to 119 asthma emergency room visits for children each year by reducing harmful diesel exhaust.

With asthma hospitalizations averaging $14,000 each, that's a significant savings for our health and economy.[22]

HOW MUCH IS TOO MUCH?

Instead of setting limits for the total amount of toxics in the air we breathe, federal authorities rely on states to set those limits.

Nationally, there are 187 toxic substances likely to occur in air pollution.[23] Oregon's Department of Environmental Quality focuses on 52 pollutants that are most likely to appear in our air. [24] They set a benchmark for each pollutant: the level that would be low enough to maintain less than one in a million cancer risk.

Oregon's "Air Toxics Science Advisory Council" helps determine what that benchmark should be. California, Washington and New Jersey set the benchmark level for diesel particulate matter at 0.0033 µg/m3. Oregon, however, set the benchmark at 0.1 µg/m3 — thirty times less protective. Even under the less stringent benchmark, diesel particulate matter in 23 of Oregon's 36 counties—where 90% of the state's population lives—exceeds this benchmark. More than 50% of the state population lives in Multnomah, Washington, Clackamas and Marion counties, where levels are ten times the benchmark.[25]

According to the U.S. EPA's 2013 report America's Children and the Environment, 7% of children in the U.S. live in areas where toxic air pollutants create a 1-in-10,000 risk of cancer. The report does not include diesel risk, but notes that if it did, 73% of children would live in areas where air quality gives them a 1-in-10,000 risk of cancer.[26]

How do we know what's in the air?

Every five years, the U.S. EPA releases a National Air Toxics Assessment: a computer model that combines air monitoring data with business, geographic and other data to create a map of toxic air pollution. The EPA warns that the model should be used with caution: it is not a picture of what people actually experience. But it is designed to raise a red flag where there are problems. Those red flags often appear in low-income and people-of-color neighborhoods.

Oregon's Department of Environmental Quality has about a dozen stations in the state that regularly measure the microscopic fine sooty particles called PM 2.5. However, only four monitors measure black carbon, the component that separates diesel and wood smoke from other kinds of particles. An investment in more monitoring would give us a clearer picture of diesel risk.[27]

DIESEL AND SOCIAL JUSTICE

A 2011 study of Portland air toxics, using models and data from five air monitors placed in 2005, found that the entire Portland metro area experiences diesel pollution above the state's health benchmark.[28]

But the study also found that ***the ten lowest income and ten highest minority census block groups experience more exposure to all sources of air toxics*** than the average block group.[29]

In Multnomah County, census tracts with higher than average Black/African American, Asian/Pacific Islander and/or Latino residents have ***two to three times more exposure to diesel particulate matter*** than census tracts with 90% or more non-Latino white populations.[30]

In communities everywhere, people of color and low-income communities are often located at the margins of urban areas: near busy roads and highways, rail lines and ports, business and industrial facilities.

HOT SPOTS AT HOME

High social stress, inadequate housing and less access to fresh food and health care makes people more vulnerable to harm from pollutants like diesel. Some research suggests that simply living in a low-income community is enough to raise risk of health harm.

Studies in Sweden[31] and the U.S. found higher incidence of heart disease among people in low-income neighborhoods, regardless of the education, occupation or personal income of those individuals.[32]

Communities of color experience unique health disparities. African Americans have the highest prevalence of asthma, heart disease and lung cancer. American Indians/Alaskan Natives have a higher prevalence of asthma than do non-Latino whites. Incidence of asthma and heart disease are high among Pacific Islanders.[33]

Greater vulnerability—with greater exposure to pollutants—may lead to higher rates of disease in low-income populations that is associated with diesel pollution. In Oregon, both asthma and heart disease are more prevalent in low-income households.[34] Nationwide, cancer rates and cancer deaths are higher among low-income individuals.[35]

HOT SPOTS ON THE JOB

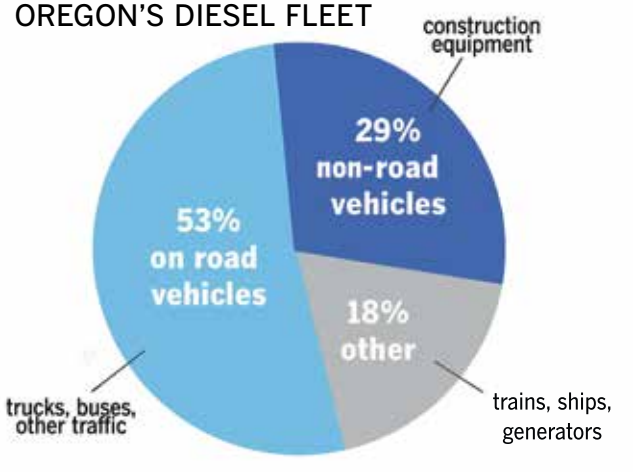
Workers are particularly at risk for health impacts from diesel engine exhaust. For example, ***a study of truckers with 35 years on the job found that they were 89% more likely than the general public to contract lung cancer.***[36] More than 30 epidemiological studies of those who work on railroads, docks, and construction sites, in trucks or buses, or as diesel mechanics found that ***people who are routinely exposed to diesel exhaust have a greater risk of lung cancer.*** [37] In Oregon, that accounts for 29,000 people in the work force.[38]

HOT SPOTS ON THE ROAD

The highway network is also a moving "hot spot" for those who spend significant time commuting or traveling on busy roadways. A 2007 study by the Clean Air Task Force found ***diesel particle levels four to eight times higher inside cars, buses and trains*** than in the ambient outdoor air.[39]

OREGON IS FALLING BEHIND

OREGON'S DIESEL FLEET



OREGON HAS...

...not funded diesel engine upgrades since 2007-09.

...eliminated a tax credit program in 2012.

...cut funding for upgrading school buses, leaving thousands of dirty buses on the road and missing a goal to upgrade the entire fleet by 2017.

...under-invested state funds to cleanup, totaling a mere 1-5% of California and Washington state funds dedicated since 2002.[40]

STATE INVESTMENTS 2002-2015

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THE COST OF DOING NOTHING

Because diesel engines are so long-lived, EPA estimates that more than a million of the older, dirtier vehicles will continue to operate nationwide in 2030. This estimate assumes that about 10% of old vehicles will be replaced each year. In Oregon, the rate of turnover is closer to 4% a year.

The older the vehicle, the more likely it is to be operating locally in neighborhoods rather than doing long hauls on the highway.[41]

California is phasing in regulations that will replace all dirty diesel engines in trucks and buses by 2023. Construction equipment and other heavy-duty engines are also on a timeline for upgrades. If Oregon's diesel standards remain weaker than California's, it is likely that old California vehicles will be sold into Oregon for many more years on the road.

73% OF OREGON'S TRUCKS ARE DIRTY

Federal standards requiring vastly cleaner engines for heavy-duty vehicles started in 2007 and were fully in place by 2010.

By one estimate, 73% of Oregon's heavy duty on-road diesel fleet, which makes up the largest portion of diesel engines, is older than 2010.[42] There is no current inventory of non-road diesel to estimate the age of that fleet. However, we know that Oregon's older engines include:

- 110,00 interstate trucks operating in Oregon
- 36,500 Oregon trucks
- 2,700 school buses
- 573 Oregon Department of Transportation engines

DIESEL AND OUR ECONOMY

"The costs of emission reductions are significant, but the societal benefits are much larger. Few public investments show as much promise in providing these returns." —U.S. EPA Clean Air Act Advisory Committee[45]

The cost of emissions controls that deliver 90% less pollution for old engines average $16,000. Technology to reduce pollution on old engines by 40% costs between $600 and $2,000.[43] New truck and bus engines can cost between $150,000 and $250,000.

State and federal authorities agree that upgrading the diesel fleet is a wise financial investment.

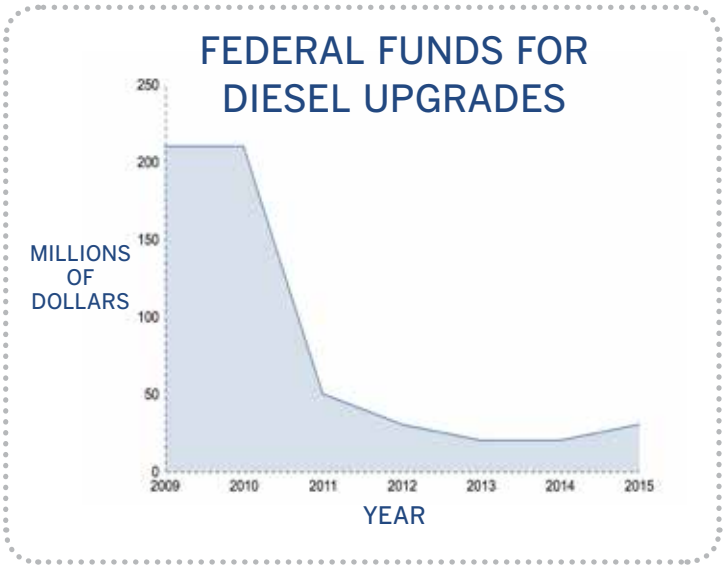
RETURN ON INVESTMENT

The single biggest return on investment for diesel upgrades is saved lives and avoided health costs. But according to the national report to Congress on clean diesel projects, there are also economic returns in support for clean diesel technologies, environmental jobs and innovation in the marketplace.

FEDERAL FUNDING HAS DECLINED

Under the 2005 Diesel Emissions Reduction Act, the EPA distributes money for diesel engine upgrades, including funds for states to create grant and low-interest loan programs.[44] The federal program distributed $420 million at its peak in 2009-2010, supplemented by Recovery Act funding.

Funding has since dropped significantly, even though federal funding requests greatly exceed availability. In 2016, Congress will decide whether to reauthorize the Act through 2021.



FEDERAL FUNDS DON'T STAND ALONE

EPA divides federal funds evenly between states. If a state dedicates its own funds, it can increase EPA's contribution. EPA is authorized to match state funds up to 50% above and beyond the state's allocation. If Oregon were to invest more, there is an opportunity to make the most of federal funds.

WHAT WE MUST DO

ASSESS

Set stronger health benchmarks

Washington and California set a health benchmark level at 0.0033 µg/m3 (micrograms per cubic meter of air) in order to measure when cancer risk from diesel fine particles reaches one in a million.[46] Oregon, however, set the benchmark at 0.1 µg/m3—thirty times higher. Oregon should revise its health benchmark to align with the latest science on cancer risk.

Accurately assess diesel pollution concentrations

The state relies on federal estimates in order to create models which may be very different from the real experience of kids in a school yard near a highway, or neighbors down the road from a major wholesale distribution center. Oregon can develop state-specific estimates of diesel exposure instead of relying solely on federal estimates. The Motor Vehicle Emissions Simulator (MOVES) would more accurately assess concentrations of pollution.

Improve data and citizen involvement

Oregon has limited capacity to measure and monitor diesel fine particulate matter, with only a dozen air quality monitors in the entire state. Oregon should make use of strong citizen science programs at universities, supporting community efforts to monitor health, traffic and air quality in ways that can inform state agencies.

Register non-road diesel engines

Because Oregon may become the retirement home for old dirty engines from neighboring states, it is urgent to determine just how many and what kind of diesel engines are in operation in Oregon and ensure that they are cleaned up over time.

PROTECT

Reduce engine idling

Oregon law limits unnecessary idling to five minutes. Unfortunately, the law is filled with exceptions, is not enforced, and prohibits local anti-idling ordinances. Oregon should adopt legislation to fix flaws, broaden the types of vehicles subject to the law, and limit idling to three minutes.

Prioritize our most vulnerable

Some communities have three strikes against health: higher rates of disease, greater vulnerability in their demographics, and higher levels of diesel emissions in their neighborhood. If Oregon can focus solutions on these neighborhoods, it will have greater impact on public health.

Resources for diesel clean-up should give priority to solutions in neighborhoods with higher than average numbers of low-income families and people of color. Sources located in close proximity to schools, hospitals, and medical clinics should be high priority.

ACCELERATE CLEAN-UP

Set stronger emissions standards

In Oregon, we've adopted California's strong emissions standards for some vehicles[43], but not for heavy-duty vehicles and equipment. The Oregon Legislature should require the Environmental Quality Commission to adopt protective diesel emission standards for heavy-duty trucks and non-road diesel engines, giving businesses adequate time to retrofit, rebuild or replace polluting engines.

Restore state incentives

In the past, Oregon's Department of Environmental Quality has supported fleets in repowering, retrofitting, replacing old equipment, and rebuilding engines. Oregon will benefit from restoring incentive dollars and programs to help fleet owners.

Oregon should create a fund to assist businesses and public agencies with diesel clean-up. It should focus on assistance for schools, small and disadvantaged businesses, and trucks and equipment operating in high impact areas.

Clean up construction

The models we use to understand diesel pollution fail to account for construction projects—some lasting for months or years—that may create pollution hot spots. The traffic back-ups resulting from the project add to pollution from construction equipment. Incorporating clean diesel into publicly funded construction projects would begin to address these hot spots.

In public contracts, Oregon's state, regional and local jurisdictions should include "clean diesel" provisions that require newer engines or engines retrofit with the best technology. Special considerations for disadvantaged business enterprises should be included in contracting requirements. Oregon Department of Administrative Services should develop model language for clean diesel contracting and provide training to state agencies and local jurisdictions on implementation.

Photo courtesy MN Pollution Control

PROGRESS SINCE 2003:

OEC's 2003 Dirt on Diesel report made six recommendations for change. Here's how Oregon has made progress since then.

Require Ultra-Low-Sulfur Diesel (ULSD): Success!

Since 2010, highway engines have used ULSD; since 2014, nonroad, locomotive and marine engines have as well. This fuel enables the "advanced technology" of newer engines to achieve upwards of 95% emissions reductions.

Economic incentive to move to cleaner alternative fuels: Success!

Oregon's Clean Fuels Standard is bringing a range of cleaner fuel alternatives to Oregon.

Federal regulation of non-road diesel: Success!

Federal regulations now require cleaner engines for small non-road engines as of 2008 and larger non-road engines as of 2014, with exceptions for some of the largest.

Retrofits: Limited progress.

Oregon has retrofit or replaced 600 of its oldest diesel school buses. Another 2,700 are due to be retrofit or replaced. The Oregon Legislature originally set a goal of finishing the job by 2017, but funding is inadequate to meet that goal.

Anti-idling: Limited progress.

Oregon passed a state law setting limits on engine idling. Unfortunately, the limits are not well enforced, loopholes exist, and the program preempts local ordinances to limit idling.

Diesel emissions testing program: Stalled.

California and Washington both test heavy duty vehicles for emissions; Oregon does not.

Contract preference for clean fleets: Stalled.

Oregon has a voluntary clean diesel program and Fleet Forward recognition program to encourage fleets clean-up. Little funding or other incentives are available for either program.

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