



Diesel Engine and Emissions Overview in Oregon

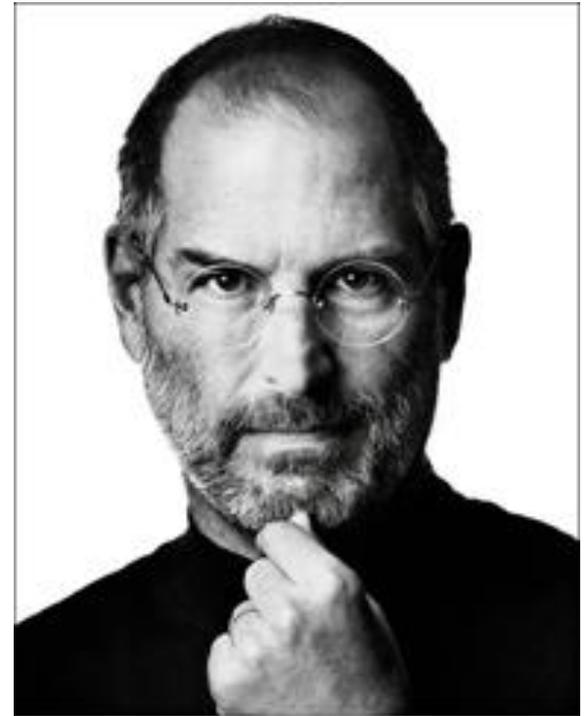
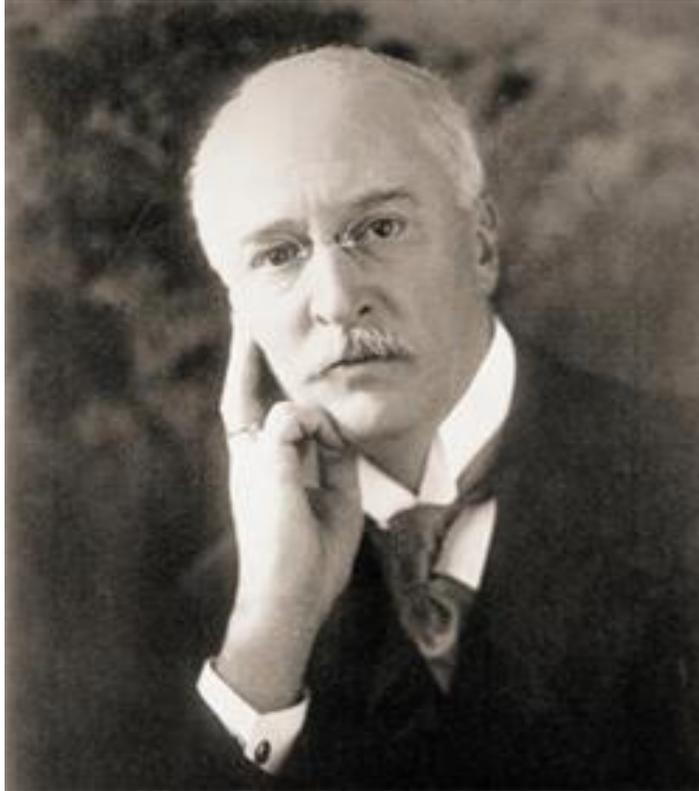
Diesel Work Group

Kevin Downing
Oregon DEQ

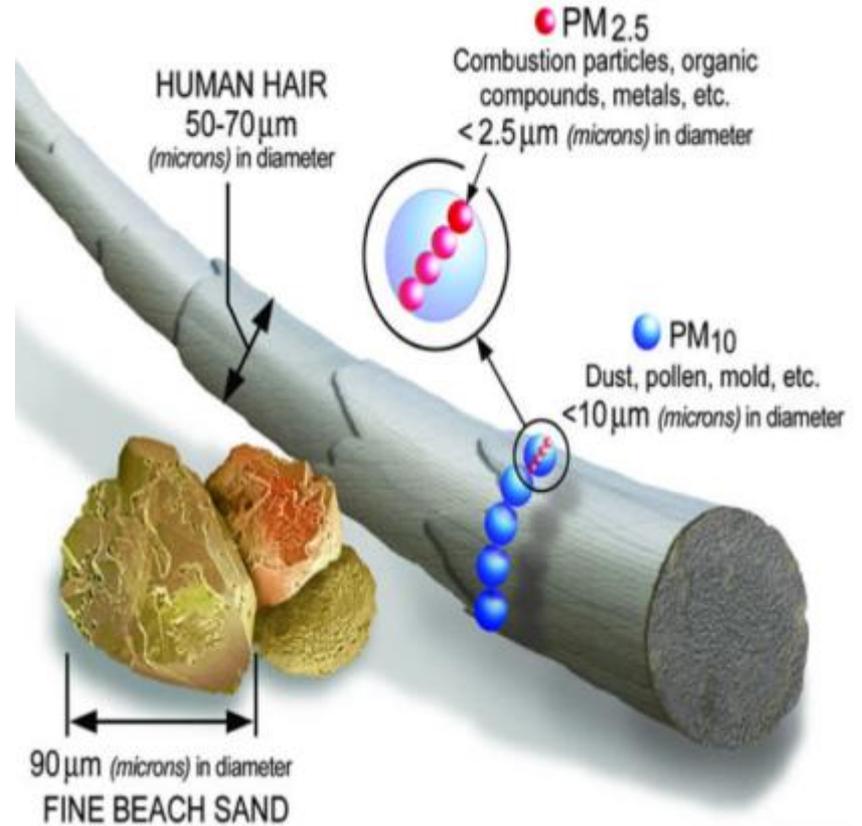
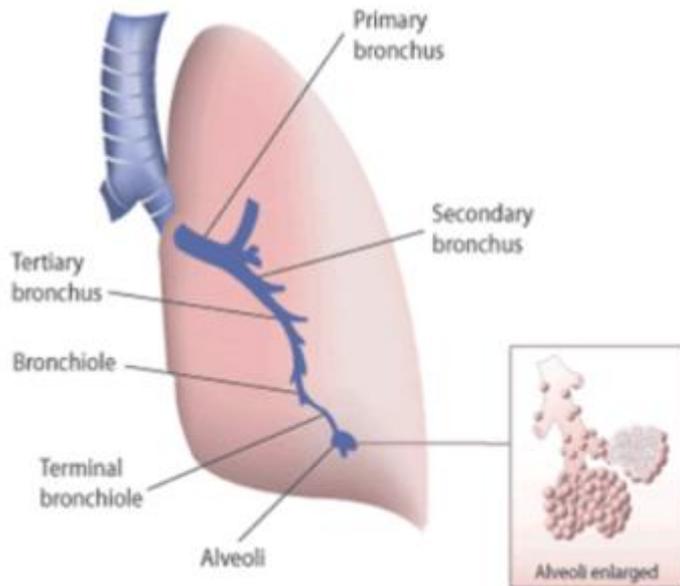
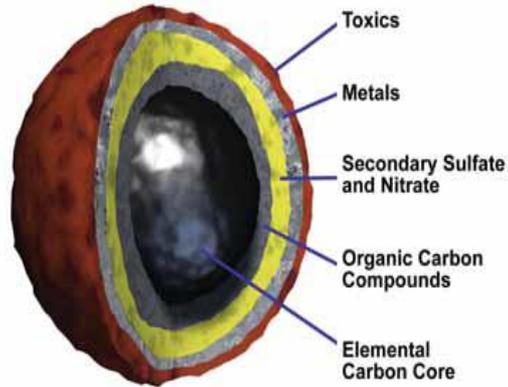
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Diesel and Air Quality



Particle Size Matters



Diesel Engines and Air Quality

PATS 2017 MODELING RESULTS DIESEL PARTICULATE MATTER ALL SOURCES

-  PATS Study Area boundary
-  Benchmark contour (0.1 µg/m³)

Annual average concentration

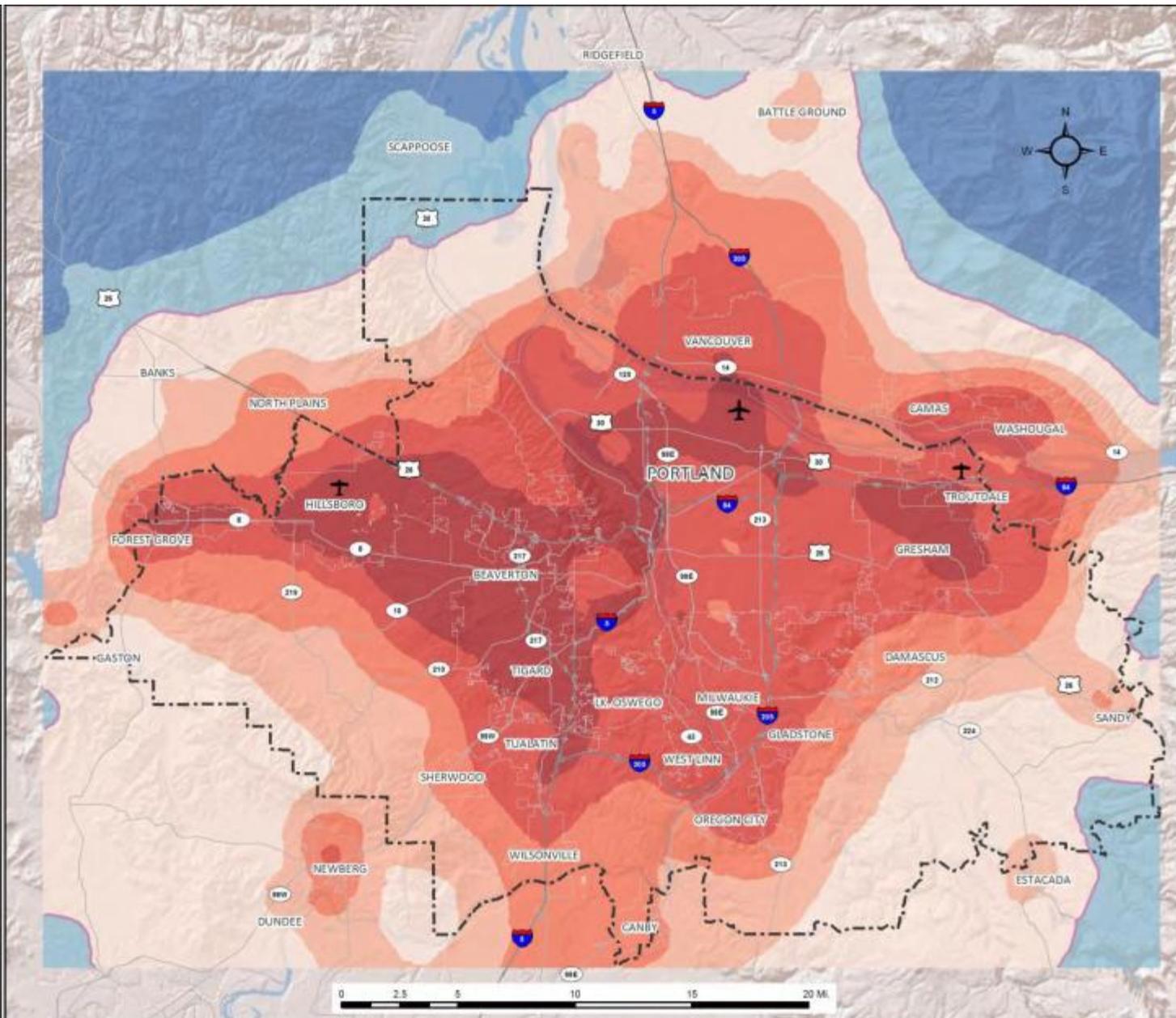
-  < ½X benchmark
-  ½X - 1X benchmark
-  1X - 2X benchmark
-  2X - 3X benchmark
-  3X - 5X benchmark
-  5X - 10X benchmark
-  > 10X benchmark



NOTE: Areas beyond the modeling domain (color-shaded region) are beyond the scope of this project.

REFERENCES:

Concentration data from DEQ Portland Air Toxics Study (PATS)
Basemap from Metro and ESRI data.



Diesel Engines and Air Quality

PATS 2017
MODELING RESULTS
DIESEL

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Environmental
Quality

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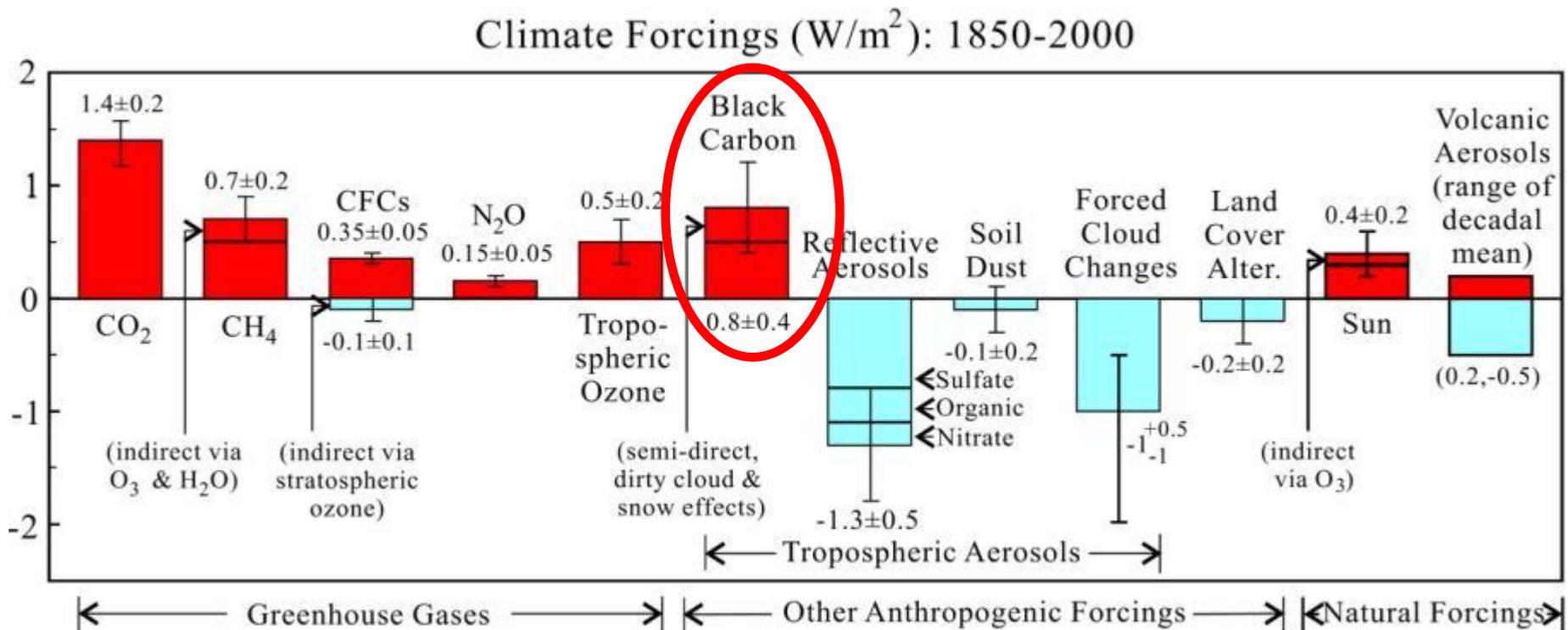
Reduction Targets To Meet Diesel PM Benchmark

89-92 %

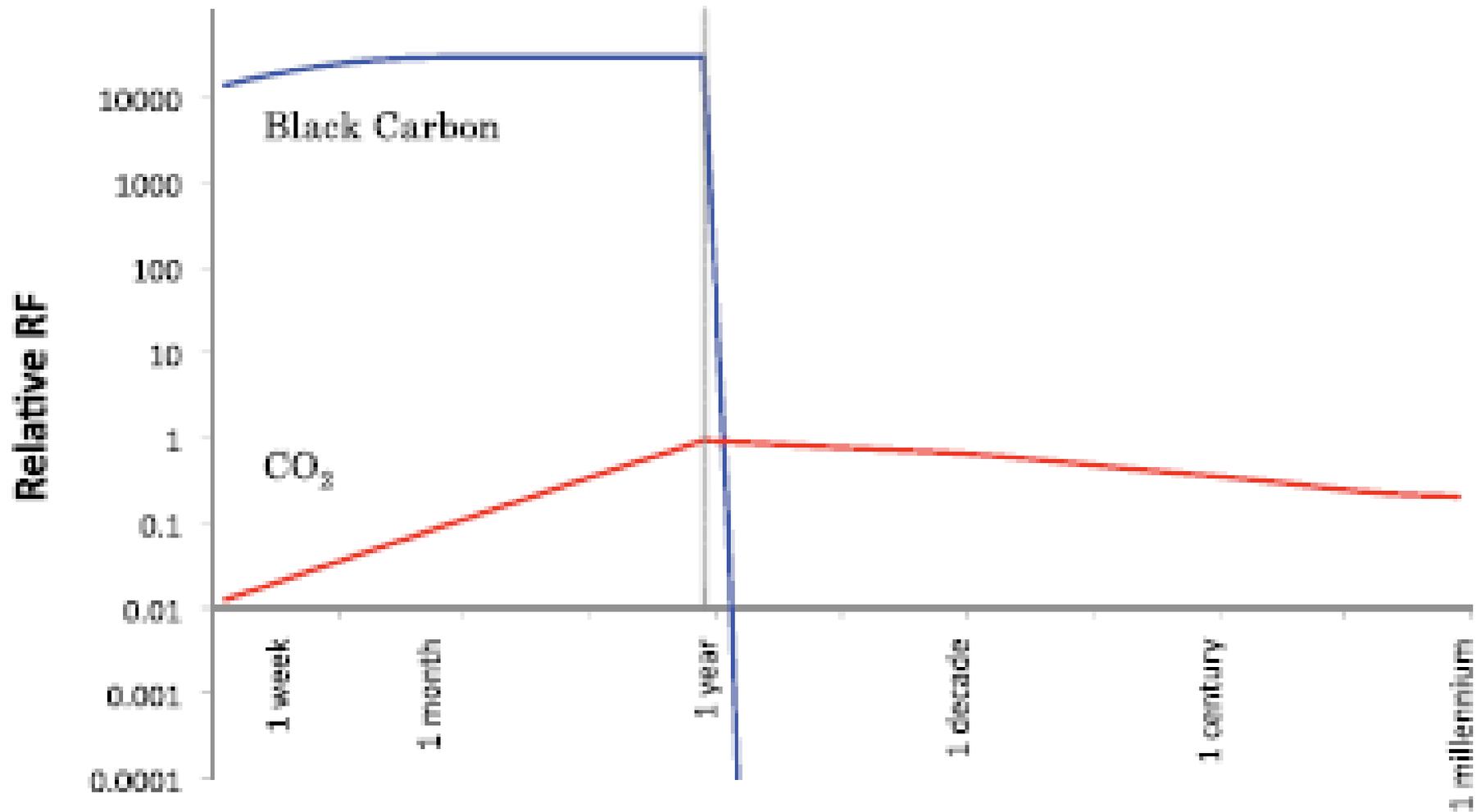
Depending upon the source category



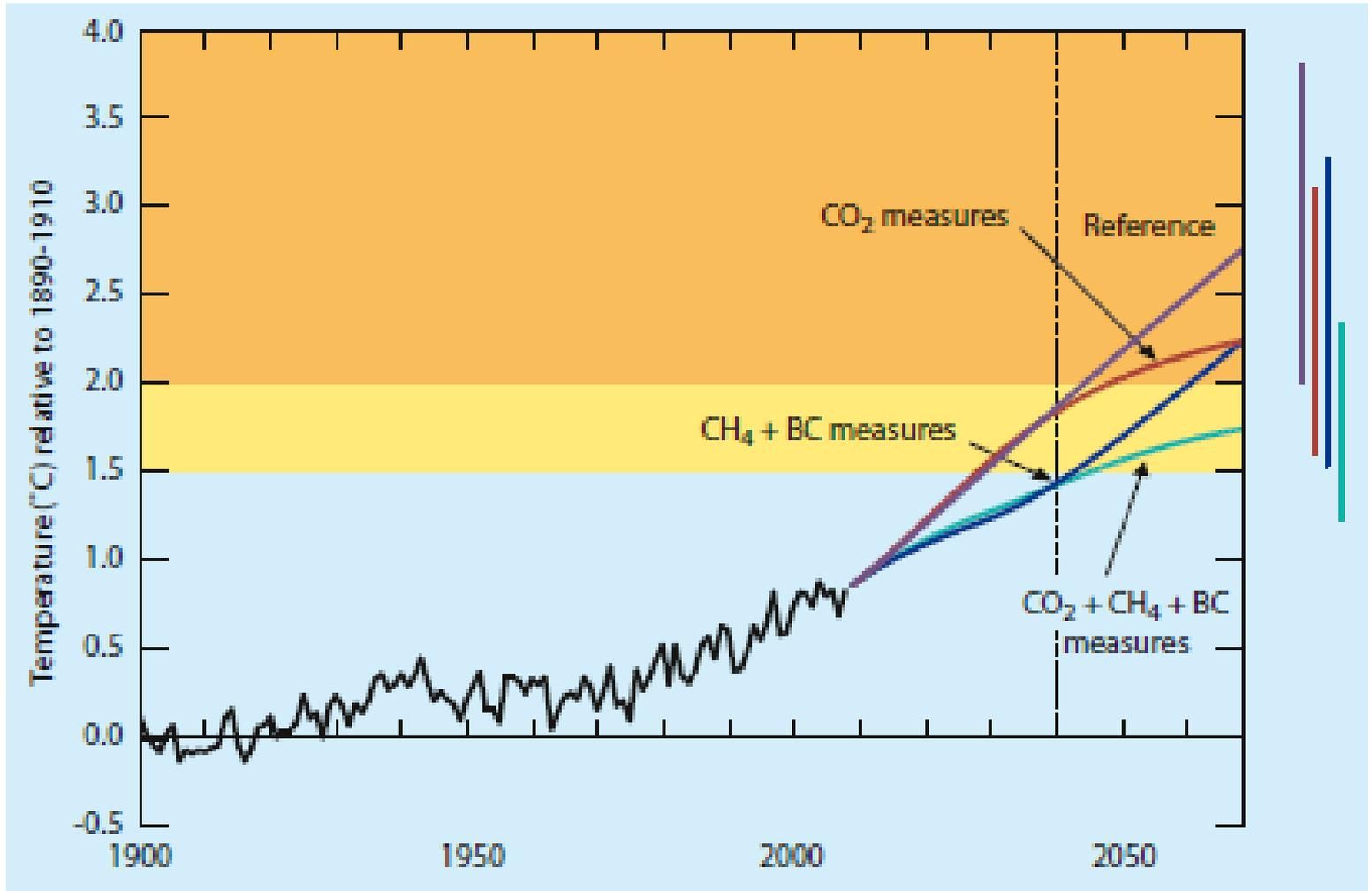
Climate Change Agents



Relative Radiative Forcing BC v. CO₂

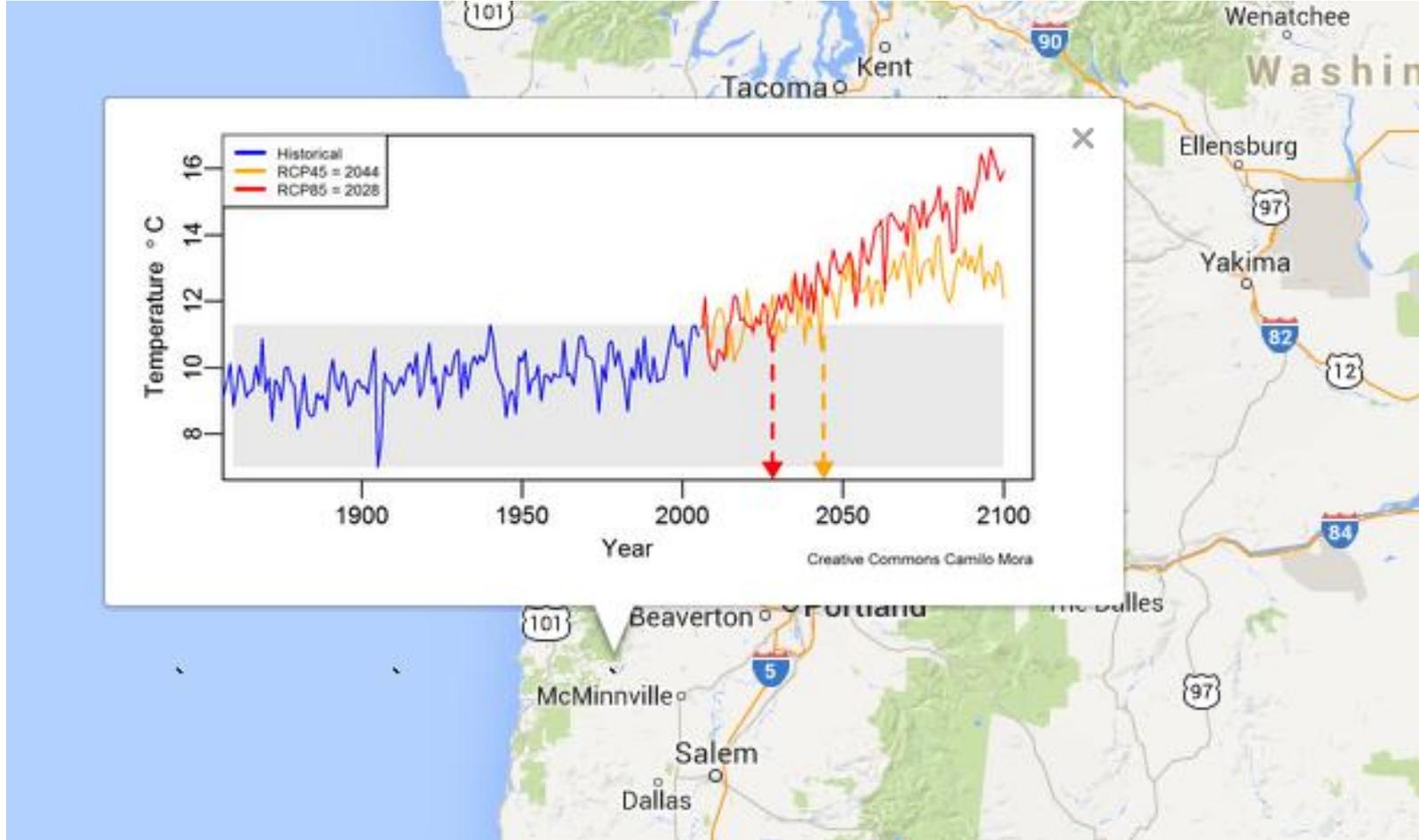


Short Lived Climate Forcings



Source: UNEP/WMO, 2011

Climate Change



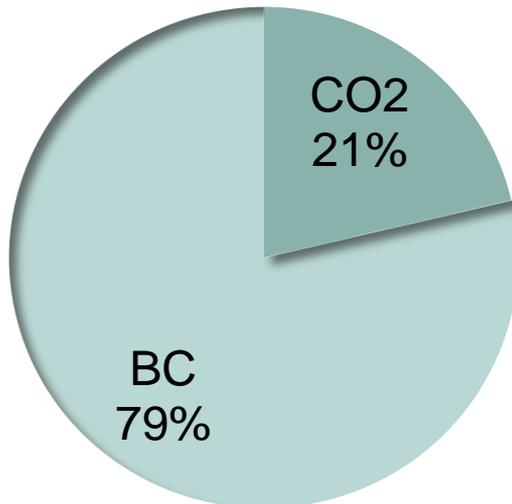
Black Carbon Project Benefits



Repowering engines saves fuel, reduces emissions

- 2.4 T PM
- 32,000 gallons fuel

Climate Change Benefit



Oregon Clean Diesel Initiative



- Burn Cleaner Fuel
- Burn Fuel Cleaner
- Burn Less Fuel

Clean Diesel Initiative

Clean Diesel for Oregon Bridges

Final Report

EPA National Clean Diesel Campaign Demonstration Assistance Project

Submitted by: Associated General Contractors Oregon-Columbia Chapter Foundation
9450 SW Commerce Circle, #200
Wilsonville, Oregon 97070
John Rakowitz
503.682.3363
johnr@agc-oregon.org



U.S. 97 over California Avenue

Summary: The project funded an engine upgrade and diesel exhaust controls equipment used in highway bridge replacement projects as part of a program to promote adoption of clean diesel technology. The state of Oregon is currently building and repairing over 300 aging highway bridges. Four contractors involved in bridge reconstruction and highway reconstruction projects participated. Twenty three pieces of equipment were identified for retrofit. All of the devices were verified for emission reduction. The project included installing diesel particulate filters, partial flow filters and regenerating diesel particulate filters, partial flow filters and diesel particulate filters. This began as the first effort in the Pacific Northwest to retrofitting exhaust controls on nonhighway equipment and will be followed by a widespread fleet operator acceptance elsewhere in the region.

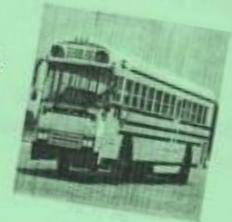
Oregon Clean Diesel Conference



Diesel engines are the most efficient mover of freight and people commonly available today. Whether by truck, locomotive or ship, over 90 percent of the freight in America is carried by a diesel engine. Well regarded by users, these engines are known for their fuel efficiency, power, reliability and durability. But they are also one of the largest contributors to environmental pollution problems. Concern is growing over how much diesel pollution affects human health and well-being. Technological advances in engine design and emission controls are making it possible, however, for these engines to develop a new reputation as a clean diesel.

What Can I Do?

Trucks and buses currently in service can take advantage of the technological advances in catalytic systems, filters and cleaner diesel fuel. You don't have to wait until 2007 when the new generation of diesel engines arrives in dealer showrooms to improve the public image of your fleet and its environmental performance. Proven emission controls available can be retrofitted to today's engines to make them run as cleanly as those powered by compressed natural gas, at a much lower cost.



How Do I Find Out More About This?

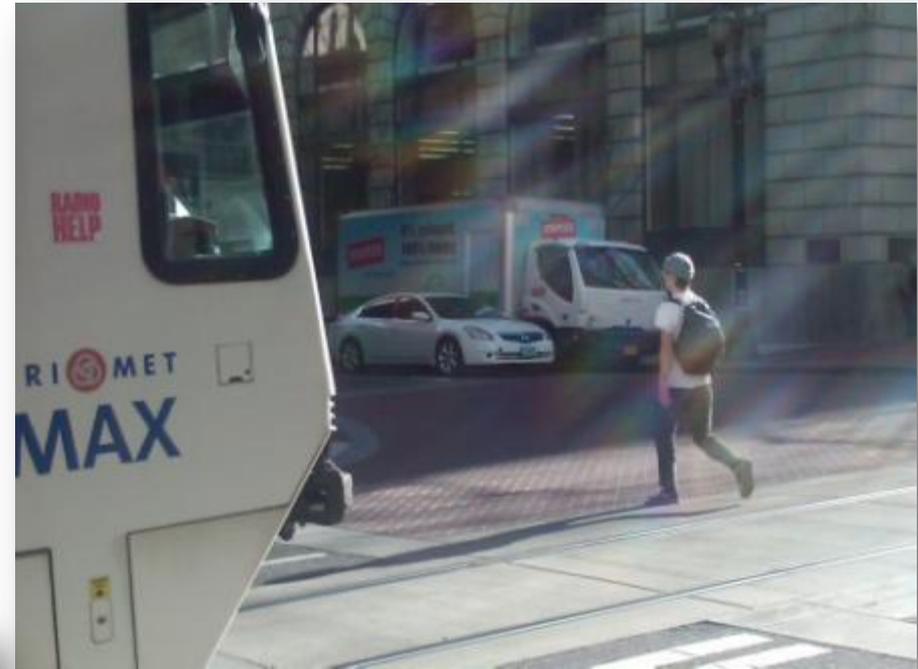
Come to the Oregon Clean Diesel Conference, July 24, 2001, cosponsored by the Oregon Department of Environmental Quality, the Oregon Trucking Associations and the U.S. Environmental Protection Agency. The conference will bring together fuel suppliers, engine manufacturers and retrofit providers so that you can get the answers you need to evaluate the benefits of updating your fleet. You will also find out about technical and financial resources available to support your efforts to improve your vehicles, including Oregon tax incentives. Fill out the enclosed registration form to reserve your spot at this important event. For more information, call Kevin Downing at DEQ at 503 229-6549.



Burn Cleaner Fuel



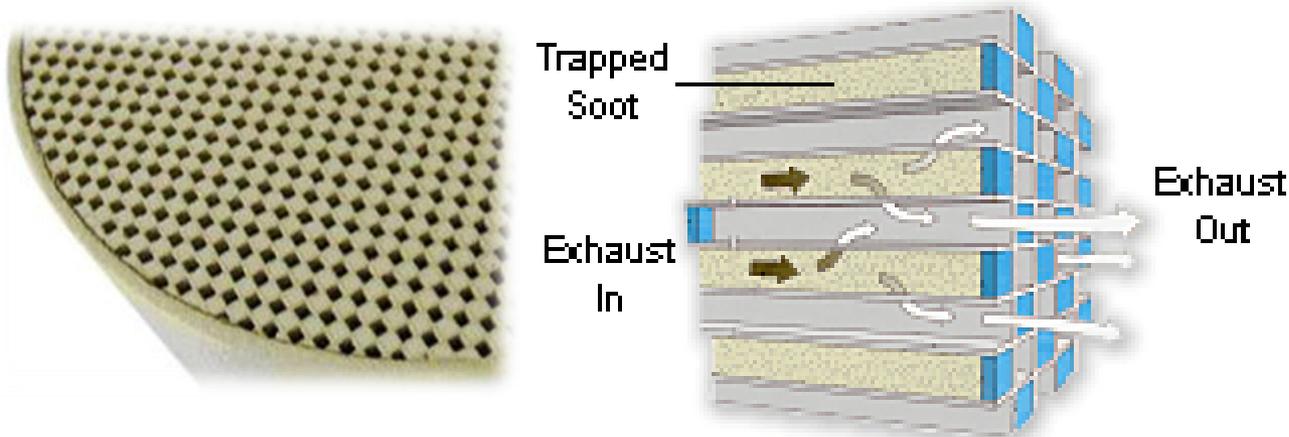
- ULSD
- Biodiesel
- Renewable Diesel
- Natural Gas
- Propane
- Electric



Burn Fuel Cleaner



- Catalyst oxidizes CO, HC to harmless gases
- Trap prevents particulate emissions to open air; catalyst oxidizes the particulate, regenerating the trap
- Can reduce total particulate emissions by up to 95 %
- Better toxic reduction (carbonyl & PAHs) than CNG



Burn Less Fuel



Improving fuel economy



Reducing Idling



Upgrading engines to reduce fuel consumption

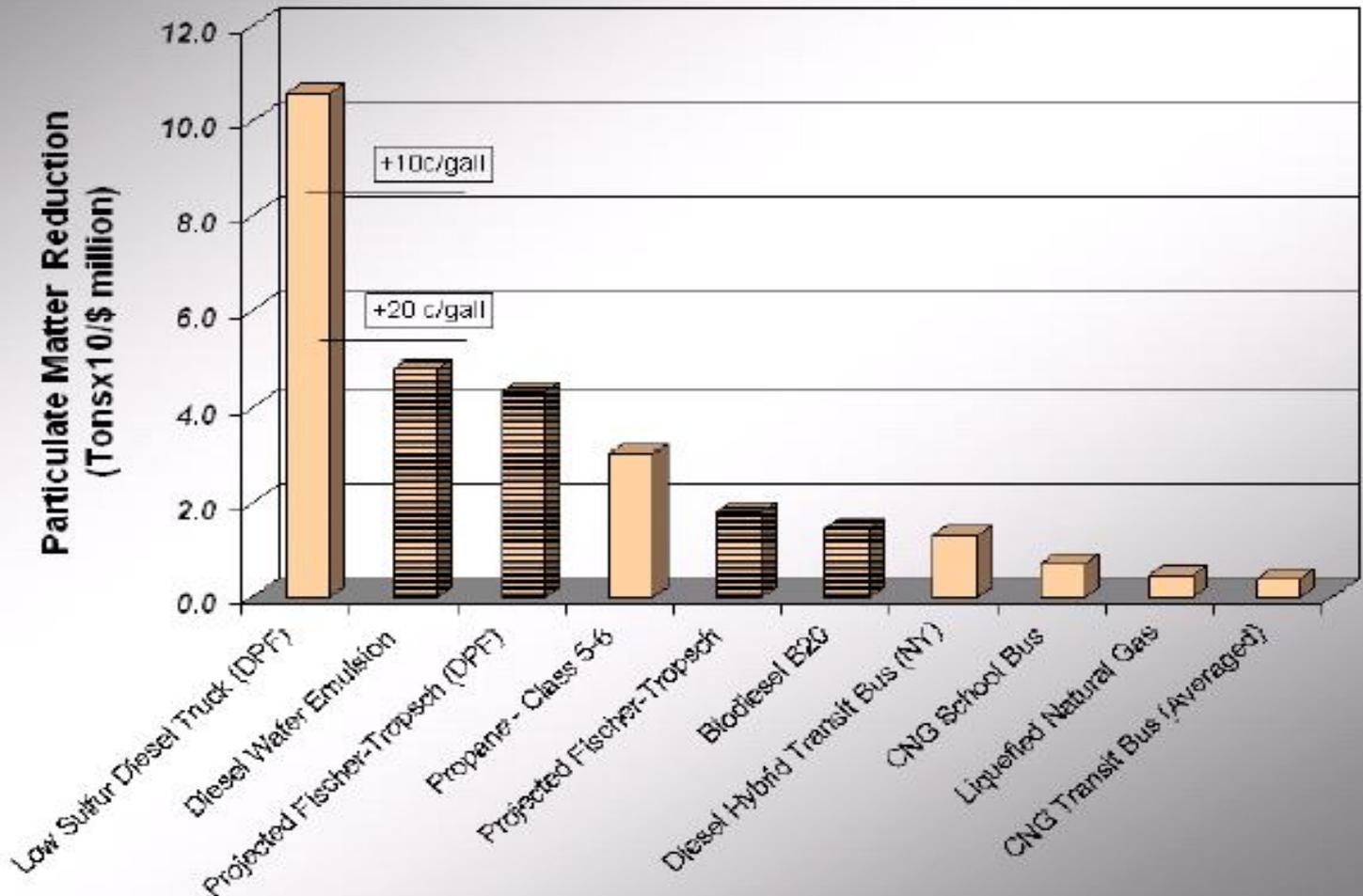
Clean Diesel Projects



Cost Effectiveness of Alternative Controls



Particulate Matter and Toxics Reduction per Million Dollars Expended



From:

Alternative Diesel
Fuel Symposium,
August 2003,
California Energy
Commission

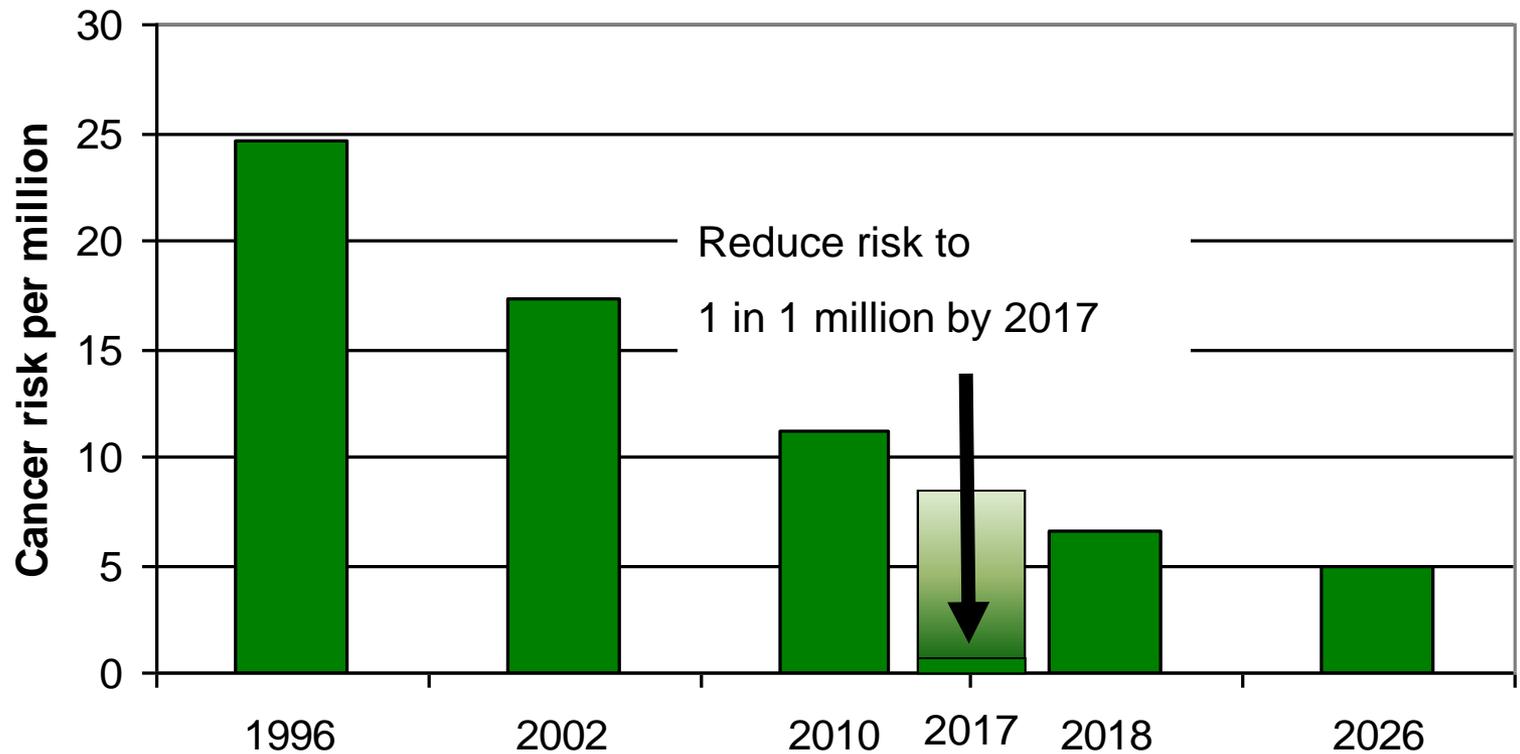
Port Emission Reduction Grant



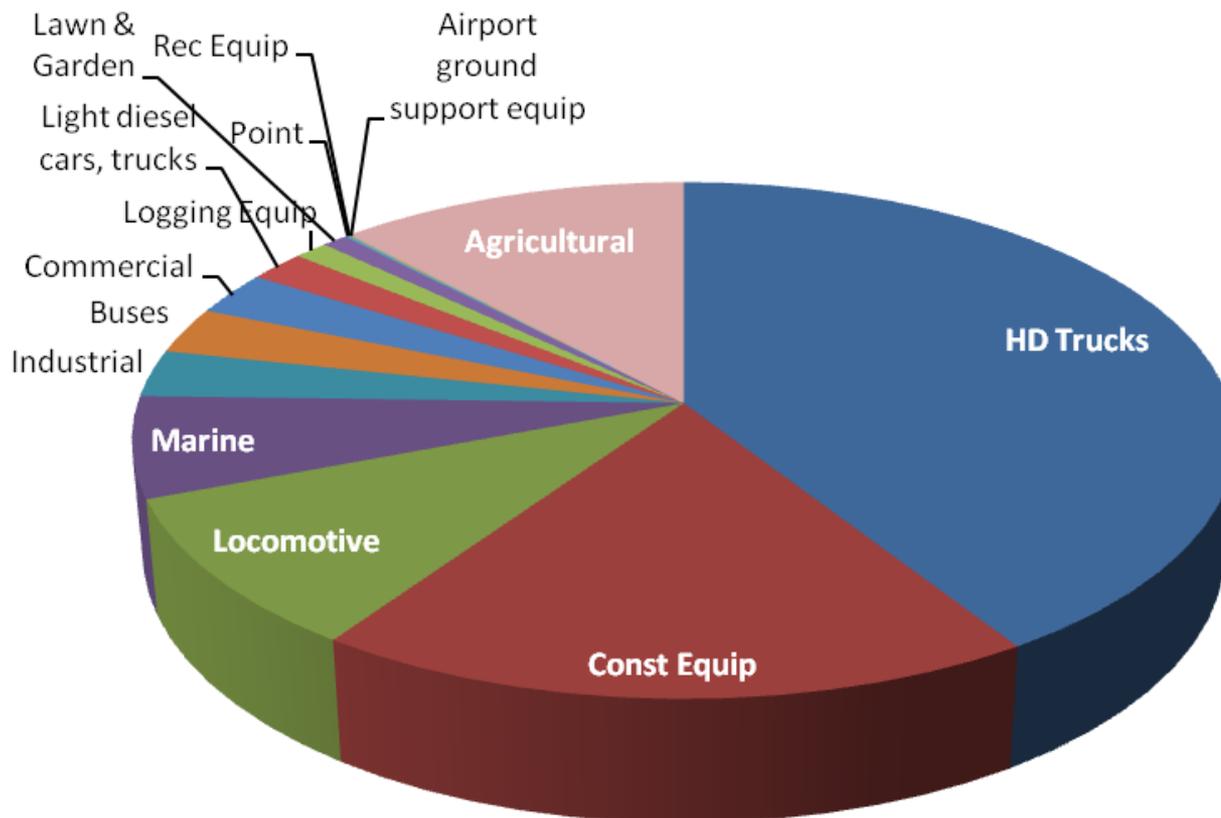
Replace 23 trucks
Retrofit 3 cargo handlers
Cost \$ 296,000
Benefit \$1.2 million



Projected Diesel PM Risk in Oregon



Oregon Sources of Diesel PM - 2011



DEQ 2011 Emission Inventory

Oregon Heavy Duty Truck Fleet



Oregon based
54,952



Multi state
320,090

2008 and newer

209,607

110,483

2007 and older

Oregon Heavy Duty Truck Fleet



Multi-
state
320,090



Oregon
based
54,952

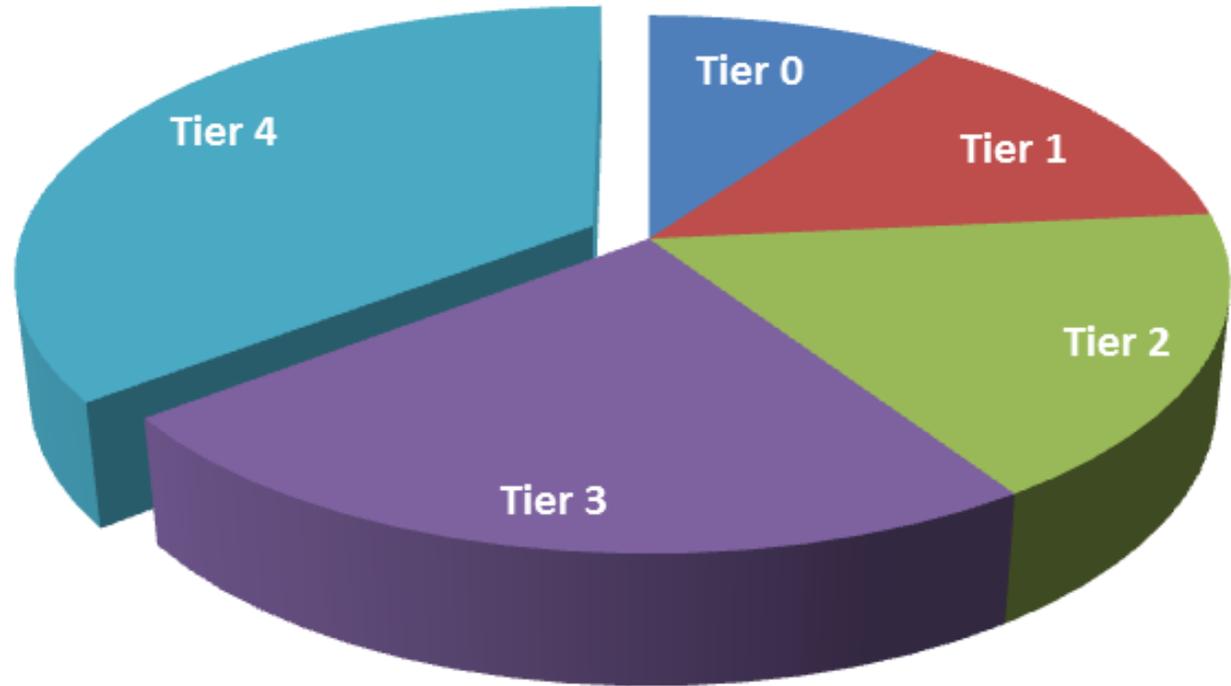
2008 and newer

18,415

36,537

2007 and older

Oregon Non-road Diesel \geq 25 HP



By Emission Tier

EPA NONROAD Model

Clean Diesel Challenges



- Benefits are disbursed and in the future
- Solutions come at a cost
- Can require substantial effort
- Legacy problem
- Voluntary vs. regulatory



Clean Diesel Opportunities



- Addresses a serious need
- Solution readily available
- Cost effective
- Substantial gains in protecting public health and the environment

