MEMORANDUM

Prepared for: JTFRDE
Date: March 19, 2020
By: Tyler Larson, Analyst
Re: Estimated costs of retrofit, refuel, and replacement of diesel engines

LPRO: LEGISLATIVE POLICY AND RESEARCH OFFICE

The Joint Task Force on Supporting Businesses in Reducing Diesel Emissions (JTFRDE or Task Force) is required to report to the Legislative Assembly with recommendations for:[1]

- statewide funding and incentives to encourage the replacement, repower, or retrofitting of medium- and heavy-duty diesel trucks; and,
- barriers to small contractor participation in public contracting under clean diesel requirements.

At its November and December meetings, the JTFRDE learned more about current and developing technology to reduce diesel emissions and the potential costs associated with implementation.

SUMMARY

There are approximately 124,000 medium- and heavy-duty diesel trucks in Oregon, roughly 13,600 of which are subject to the tri-county phase out enacted in House Bill 2007 (2019).[2] Over half of Oregon's diesel commercial fleet is model year (MY) 2007 and newer and produces significantly fewer pollutants than older diesel engines.[3, 4] House Bill 2007 (2019) requires the Task Force to develop recommendations for incentives to reduce emissions from approximately 50,000 diesel trucks built prior to MY 2007 that are not subject to the tri-county phase out.

Pollutants

Diesel engines are durable and efficient. They also create a number of pollutants which can be harmful to humans and the global climate:

- Carbon monoxide (CO):[5] a colorless, odorless, and tasteless flammable gas which can cause sudden illness and death when absorbed into the bloodstream. CO does not directly impact climate change, but its presence affects the abundance of greenhouse gases like methane and carbon dioxide.

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[1] House Bill 2007 (2019).
[2] Oregon Department of Transportation, *House Bill 2007: Titling and Registration Requirements* (October 31, 2019), *available at* https://olis.oregonlegislature.gov/liz/2019I1/Downloads/CommitteeMeetingDocument/207401 (last visited March 11, 2020).
[3] *Id*.
[4] Diesel Technology Forum, *Presentation for the Oregon JTF on Supporting Businesses in Reducing Diesel Emissions* November 21, 2019, *available at* https://olis.oregonlegislature.gov/liz/2019I1/Downloads/CommitteeMeetingDocument/207981 (last visited March 11, 2020).
[5] National Aeronautics and Space Administration, *Fourteen years of carbon monoxide from MOPITT*, https://climate.nasa.gov/news/2291/fourteen-years-of-carbon-monoxide-from-mopitt/ (last visited March 3, 2020).

- Nitrogen oxides (NO_x):[6] a group of highly reactive gases and compounds that cause respiratory harm, hazy air pollution, acid rain, and nutrient pollution in coastal waters.
- Particulate matter (PM):[7, 8] carbonaceous fine matter that causes headaches, dizziness, and irritation of the eyes, nose, and throat, and an increased risk of cardiovascular, cardiopulmonary, and respiratory disease. A significant portion of PM is "black carbon" which impacts rain patterns and decreases the reflectivity of snow and ice, hastening melt.
- Volatile organic compounds (VOCs):[9] organic chemicals with high vapor pressure at ordinary room temperature. Diesel exhaust contains VOCs including benzene, and formaldehyde, both of which are known carcinogens that cause respiratory harm.

RETROFIT

Retrofits are mechanical solutions designed to reduce emissions and increase efficiency in existing diesel engines. Retrofit programs are an important tool for reducing emissions and improving air quality.

Retrofit Options

The availability, effectiveness, and cost of retrofit technologies varies by application (Table 1).

Table 1: Diesel Retrofit Options, Reductions, and Costs

Option	Pollutant Reductions	Typical Cost
Diesel Oxidation Catalyst (DOC)	• CO: 10-60% • NO_x: none • PM: 20-40% • VOCs: 40-75%	\$500-\$2000
Diesel Particulate Filter (DPF)	• CO: 70-90% • NO_x: none • PM: 85-90% • VOCs: 70-90%	Passive: \$8,000-\$20,000 Active: \$12,000-\$30,000
Selective Catalytic Reduction (SCR)	• CO: none • NO_x: 70-95% • PM: 20-30% • VOCs: 80%	\$20,000-\$30,000, includes DOC or DPF
Lean NOx Catalyst (HC-SCR)	• CO: none • NO_x: 25-40% • PM: 85% • VOCs: none	\$15,000-\$20,000
NOx Adsorber/Lean NOx Traps (LNT)	• CO: none • NO_x: 80-90% • PM: 85%	No data

[6] U.S. EPA, *Nitrogen Dioxide (NO_2) Pollution*, https://www.epa.gov/no2-pollution (last visited March 3, 2020).
[7] U.S. Dept. of Labor, *Diesel Exhaust/Diesel Particulate Matter*, https://www.osha.gov/dts/hazardalerts/diesel_exhaust_hazard_alert.html (last visited March 5, 2020).
[8] U.S. EPA, *Black Carbon Research*, https://www.epa.gov/air-research/black-carbon-research (last visited March 5, 2020).
[9] Jo-Yu Chin *et al*, *Gaseous and Particulate Emissions from Diesel Engines at Idle and Under Load: Comparison of Biodiesel Blend and Ultralow Sulfur Diesel Fuels* (2012), *available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4339034/pdf/nihms-656986.pdf (last visited March 3, 2020).

	• VOCs: none	
Closed Crankcase Ventilation (CCV)	• CO: none • NO_x: none • PM: 100% (crankcase only) • VOCs: none	$450-$700

Source: Legislative Policy and Research Office
Data: U.S. EPA, MECA

Diesel Oxidation Catalyst (DOC)[10, 11] DOCs are catalytic converters designed specifically for use with diesel engines. DOCs use chemical reactions to oxidize CO, PM, and VOCs, converting the soluble organic fraction of PM into carbon dioxide and water. DOCs are suitable and available for most types of engines. They do require a minimum exhaust temperature for optimum function, which is not achieved in all duty cycles.

- *Pollutant reductions*: DOCs can reduce PM by 40 percent, VOCs by 75 percent, and CO by 60 percent. DOCs do not impact NO_x emission. While DOCs themselves require little or no maintenance, problems with fuel control or oil consumption impact performance.
- *Typical cost*: DOCs generally cost between $500 and $2,000 and should remain effective for 10,000 or more hours of operation.

Diesel Particulate Filter (DPF)[12, 13] DPFs use a porous filter to capture PMs from diesel exhaust. DPFs must be regenerated by achieving a temperature around 1,100 degrees Fahrenheit which reduces the captured PM to ash. Regeneration can happen passively in some duty cycles or is actively induced through other sources of fuel or heat in low-temperature applications.

- *Pollutant reductions*: DPFs can reduce CO, PM, and VOCs by up to 90 percent. The do not impact NO_x emissions. Cleaning is required every 6 to 12 months to remove noncombustible materials and ash. DPF maintenance schedules are influenced largely by engine maintenance and performance. Backpressure monitoring systems and routine inspections are required to ensure the filter is performing correctly.
- *Typical cost*: DPFs typically cost between $8,000 and $30,000, with active systems generally costing more. The installation includes vehicle inspection, data logging, and backpressure monitoring systems, and cleaning stations or services will need to be obtained. Properly installed and maintained DPFs should remain effective for 10,000 or more hours.

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[10] U.S. Environmental Protection Agency (EPA), *Technical Bulletin: Diesel Oxidation Catalyst Installation, Operation, and Maintenance* (May 2010), *available at* https://www.epa.gov/sites/production/files/2016-03/documents/420f10030.pdf (last visited March 5, 2020).
[11] Manufacturers of Emission Controls Association (MECA), *Retrofitting Emission Controls for Diesel-Powered Vehicles* 14-17 (November 2014), *available at* http://www.meca.org/resources/MECA_diesel_retrofit_white_paper_1114_FINAL.pdf (last visited March 9, 2020).
[12] U.S. EPA, *Technical Bulletin: Diesel Particulate Filter, General Information* (May 2010), *available at* https://www.epa.gov/sites/production/files/2016-03/documents/420f10029.pdf (last visited March 9, 2020).
[13] MECA, *supra* note 7, at 17-22.

Selective Catalytic Reduction (SCR)[14, 15] SCRs chemically reduce NO_x molecules into molecular nitrogen and water vapor using a nitrogen-based reagent like ammonia or urea. Diesel exhaust is routed through injection ductwork where the reagent reacts with the NO_x at a specified temperature range. Reagent injection is controlled by an algorithm that estimates the amount of NO_x in the exhaust system. SCRs are typically combined with DPFs to achieve broad PM and NO_x reductions.

- *Pollutant reductions*: SCRs can reduce NO_x emissions over 90 percent, VOC emissions by 80 percent, and PM emissions by 30 percent. SCRs must be designed for the specific vehicle and are the preferred strategy for on-road heavy-duty engine manufacturers to comply with current diesel emission standards. In original equipment manufacturer (OEM) applications, SCRs also reduce fuel consumption five to seven percent.
- *Typical cost*: SCRs cost roughly $20,000 to $30,000 when installed with a DOC or DPF.

Lean NO_x Catalyst (HC-SCR)[16] HC-SCRs use micro-porous materials to trap NO_x in microscopic sites that are fuel or hydrocarbon rich, chemically reducing NO_x molecules into nitrogen. Similar to standard SCRs, some HC-SCRs inject diesel fuel or another reductant into the exhaust upstream from the catalyst to serve as a reagent.

- *Pollutant reductions*: HC-SCRs can reduce NO_x emissions by 40 percent and PM by 85 percent.
- *Typical cost*: HC-SCRs cost $15,000 to $20,000 when installed with a DPF.

NO_x Adsorber/Lean NO_x Traps (LNT)[17, 18] LNTs oxidize NO to NO_2 using a precious metal catalyst, then store the NO_2 in an adjacent site as a nitrate which is periodically removed in a regeneration process that reduces the NO_x to nitrogen. The regeneration process requires the engine to run rich periodically, creating a fuel penalty and increase in CO_2 emissions.

- *Pollutant reductions*: LNTs reduce NO_x 80 to 90 percent in OEM applications and have demonstrated regeneration at temperatures as low as 392 degrees Fahrenheit.
- *Typical cost*: LNTs are typically limited to smaller engines and light-duty applications.

Closed Crankcase Ventilation (CCV)[19] The combination of rapidly moving engine parts in the crankcase, exhaust bypass, and lubricating oil leads to atomized engine oil combined with exhaust particles and is a major source of PM in diesel engines. CCVs are filter devices fitted to the crankcase filter vent.

- *Pollutant reductions*: CCVs can capture up to 100 percent of PMs emitted from the crankcase and can be combined with DOCs or DPFs to reduce PM emissions from both the crankcase and tailpipe. Filter elements must be replaced at normal oil change intervals.

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[14] U.S. EPA, *Selective Catalytic Reduction* (June 2019), *available at* https://www.epa.gov/sites/production/files/2017-12/documents/scrcostmanualchapter7thedition_2016revisions2017.pdf (last visited March 9, 2020).
[15] MECA, *supra* note 7, at 25-28.
[16] MECA, *supra* note 7, at 28-29.
[17] MECA, *supra* note 7, at 29-31.
[18] W. Addy Majewski, *NOx Adsorbers* (February 2020), *available at* https://dieselnet.com/tech/cat_nox-trap.php (last visited March 9, 2020).
[19] MECA, *supra* note 7, at 31-32.

- *Typical cost*: CCVs cost between $450 and $700.

Retrofit Programs are a Partnership[20]

According to the Manufacturers of Emission Controls Association (MECA), successful retrofit programs are a partnership between the manufacturer, the installer, and the owner. Each party has a responsibility to ensure the effective design, installation, and maintenance of any diesel retrofit option.

Manufacturer's Responsibility: Manufacturers must develop solutions which are appropriately tailored to the technical needs of the vehicle. They should use only verified technologies with proven performance and durability.

Installer's Responsibility: Vehicles must be inspected to ensure they are appropriate for retrofit. Vehicles in poor condition or which have not been well maintained are poor candidates for retrofit installation. Installation should be done professionally and according to manufacturer's specifications.

Owner's Responsibility: Vehicles and retrofit equipment must be regularly inspected and maintained to ensure proper performance. Operators must note and respond to any feedback from monitoring systems.

REFUEL

Modern diesel engines have significantly reduced emissions using the technologies described above. Another way to reduce emissions from diesel engines is to use cleaner alternative fuels that produce fewer tailpipe emissions.

Cleaner Diesel[21]

Diesel fuel contains as much as 5,000 parts per million (ppm) sulfur, a natural lubricant that also results in high NO_x and PM emissions. The U.S. Environmental Protection Agency (EPA) has regulated the sulfur content in diesel fuel since 1993.

From 2006 to 2010, the EPA phased in Ultra-Low Sulfur Diesel (ULSD) standards which require all highway fuel sold in the U.S. to contain no more than 15 ppm sulfur. ULSD is required for use in all MY 2007 and later highway vehicles, and higher sulfur content may harm those engines. ULSD was phased in for nonroad, locomotive, and marine diesel engines from 2007 to 2014.

Alternative Fuels

Alternative fuels vary widely in their potential outcomes, appropriate applications, and required investment. Some can be used in existing diesel engines, while others require significant

[20] MECA, *Diesel Retrofit Experience for Heavy Duty Vehicles: Presentation to the Joint Task Force on Supporting Businesses in Reducing Diesel Emissions* (November 21, 2019), *available at* https://olis.oregonlegislature.gov/liz/2019I1/Downloads/CommitteeMeetingDocument/207997 (last visited March 9, 2020).
[21] U.S. DOE, *Diesel Fuel Standards and Rulemakings*, https://www.epa.gov/diesel-fuel-standards/diesel-fuel-standards-and-rulemakings (last visited March 10, 2020).

retrofits or new vehicles. The U.S. Department of Energy (DOE) tracks nationwide retail prices of alternative fuels (Figure 1).[22]

Figure 1: National Average Retail Fuel Prices July 2019 to October 2019

Fuel Type	July 2019	October 2019	Change in Price July-October	Units of Measurement
Gasoline	$2.76	$2.68	-$0.08	per gallon
Diesel	$3.04	$3.08	$0.04	per gallon
CNG	$2.21	$2.20	-$0.01	per GGE
LNG	$2.76	$2.69	-$0.07	per DGE
Ethanol (E85)	$2.36	$2.28	-$0.08	per gallon
Propane**	$2.83	$2.76	-$0.07	per gallon
Biodiesel (B20)	$2.86	$2.87	$0.01	per gallon
Biodiesel (B99/ B100)	$3.62	$3.73	$0.11	per gallon

Source: U.S. DOE

Biodiesel and Renewable Diesel[23, 24] Biodiesel is a renewable, biodegradable fuel manufactured from vegetable oils, animal fats, or recycled restaurant grease for use in diesel engines. Renewable diesel is biomass-derived fuel suitable for use in diesel engines. It is chemically similar to petroleum diesel.

Biodiesel and renewable diesel are typically blended with diesel as B5 (up to five percent biodiesel) and B20 (up to 20 percent biodiesel). Blends can be used in most engines manufactured after 1994 without modification with similar fuel consumption, horsepower, and torque. Biodiesel also increases the lubricity of fuel, helping to offset the loss of sulfur in ULSD.

Biodiesel appears to reduce PM, CO, and VOCs in engines produced before model year 2010, but the primary benefit of biodiesel and renewable diesel is reduced greenhouse gas emissions over the lifecycle of the fuel because CO_2 released during combustion is offset by the CO_2 sequestered while growing the feedstocks used to produce the fuel.

All diesel fuel sold in the state must be at least B5; fuel sold for use by locomotive and marine diesel engines and home heating is exempt.[25] Higher blends are available from retailers throughout the state.[26]

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[22] U.S. DOE, *Clean Cities Alternative Fuel Price Report* (October 2019), *available at* https://afdc.energy.gov/files/u/publication/alternative_fuel_price_report_oct_2019.pdf (last visited March 10, 2020).
[23] U.S. DOE, *Alternative Fuels Data Center: Biodiesel*, https://afdc.energy.gov/fuels/biodiesel.html (last visited March 10, 2020).
[24] U.S. DOE, *Alternative Fuels Data Center: Renewable Hydrocarbon Biofuels*, https://afdc.energy.gov/fuels/emerging_hydrocarbon.html (last visited March 10, 2020).
[25] ORS 646.922.
[26] U.S. DOE, *Alternative Fueling Station Locator*, https://afdc.energy.gov/stations/#/find/nearest?location=Oregon&fuel=BD (last visited March 10, 2020).

Electric[27, 28] Electric vehicles (EVs) use onboard rechargeable batteries to store energy to power electric motors. EVs have no tailpipe emissions but may have upstream emissions from the production of electricity.

Because of their limited range and need to charge, EVs are best suited to dedicated routes that allow trucks to return to established charging locations. EV infrastructure improvements will be required for other use cases. Medium- and heavy-duty EVs are available, but options are limited and are not yet cost effective for most business models.

Hydrogen[29, 30] Hydrogen vehicles use H_2 to power fuel cells that drive electric motors. Hydrogen gas is an abundant resource and contains more than triple the energy per pound of diesel. Hydrogen fuel cells are lighter than electric batteries and allow for a range that is more competitive with existing diesel trucks.

Medium- and heavy-duty hydrogen vehicles are not yet available for purchase. Hydrogen is still expensive to manufacture and transport, and infrastructure investment will be required to make hydrogen a viable alternative to diesel.

Hydrogen vehicles produce no emissions, though there are emissions associated with the production of H_2 gas.

Natural Gas[31, 32] Natural gas is a mix of hydrocarbons, primarily methane, that can be sourced as a fossil fuel or a renewable when sourced from organic materials like landfills through anaerobic digestion. Natural gas currently accounts for about 30 percent of energy use in the country, but only about two-tenths of a percent of natural gas is used for transportation fuel. Natural gas is sold in two forms: compressed (CNG) in a gaseous state at a pressure up to 3,600 pounds per square inch, or liquified (LNG) by supercooling the gas below its boiling point.

Medium- and heavy-duty natural gas vehicles (NGVs) are available OEM and through qualified retrofitters. NGVs have an increased incremental cost of $35,000 to $100,000 over medium- and heavy-duty diesel vehicles and require dedicated fuel stations. NGVs are best suited to high-mileage, centrally fueled fleets that allow NGVs to refuel over an extended time.

Natural gas produces 90 percent less NO_x than diesel, and renewable sources produce 500 percent less greenhouse gases over their lifecycle than diesel.

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[27] U.S. DOE, *Alternative Fuels Data Center: Electricity*, https://afdc.energy.gov/fuels/electricity.html (last visited March 10, 2020).

[28] Oregon Legislature Joint Committee on Transportation, *Electrification of Medium and Heavy Duty Truck Fleets*, November 19, 2019, *available at* https://olis.oregonlegislature.gov/liz/2019I1/Committees/JCT/2019-11-19-14-00/Agenda (last visited March 10, 2020).

[29] U.S. DOE, *Alternative Fuels Data Center: Hydrogen*, https://afdc.energy.gov/fuels/hydrogen.html (last visited March 10, 2020).

[30] Oregon Legislature Joint Task Force on Supporting Businesses in Reducing Diesel Emissions, *Technology Questions and Answers: Hydrogen* December 19, 2019, *available at* https://olis.oregonlegislature.gov/liz/2019I1/Committees/JTFRDE/2019-12-19-13-30/Agenda (last visited March 10, 2020).

[31] U.S. DOE, *Alternative Fuels Data Center: Natural Gas*, https://afdc.energy.gov/fuels/natural_gas.html (last visited March 10, 2020).

[32] NW Natural presentation to the Joint Task Force on Supporting Businesses in Reducing Diesel Emissions, *Natural Gas as an Alternative to Diesel* November 21, 2019, *available at* https://olis.oregonlegislature.gov/liz/2019I1/Downloads/CommitteeMeetingDocument/207982 (last visited March 10, 2020).

REPLACE

Diesel engine regulations enacted in the last 20 years have significantly reduced PM and NO_x emissions in diesel vehicles and equipment. Replacing older diesel vehicles and equipment with newer engines built after current regulations went into effect can be an effective way to reduce emissions.

Diesel Trucks[33]

Diesel truck engines manufactured in MY 2010 utilize current technology like SCRs and DPFs to produce 98 percent less PM and NO_x than engines produced in model year 1988. A wide range of factors influence the decision to invest in newer trucks, including public and private incentives, regulations, warranty, maintenance, business needs, and economic conditions.

The price of diesel trucks varies widely depending on use and features. For the purposes of rulemaking, the California Air Resources Board assumed the composite price of a new Class 8 diesel truck is $110,000 and the cost depreciates by 50 percent after four years. Data presented to the Task Force suggests current prices for a Class 8 diesel truck are $113,000 to $125,000, with a depreciation of 50 percent after four years.

Nonroad Diesel in Public Contracts[34]

Manufacturing regulations for nonroad diesel equipment for MY 2014 and newer reduced PM 96 percent and NO_x 93 to 96 percent, with similar reductions for MY 2011 and newer bulldozers and mining equipment. Nonroad diesel equipment varies widely by project, with smaller equipment replaced more readily than medium or large equipment. There are generally fewer retrofit options for nonroad diesel equipment, and replacement costs vary widely.

The Oregon Department of Environmental Quality will provide results on its survey of the state's nonroad diesel inventory to the Task Force at a future meeting.

COST EFFECTIVENESS

The Congestion Mitigation and Air Quality (CMAQ) Improvement Program, administered by the U.S. Department of Transportation, produced cost-effectiveness information to help state and local planning organizations prioritize cost-effective transportation projects, including diesel retrofits and congestion mitigation efforts, that also produce an air quality benefit (Figure 2).[35] According to this information, diesel retrofits and heavy diesel vehicle replacements are among the most cost effective strategies for reducing all types of emissions.

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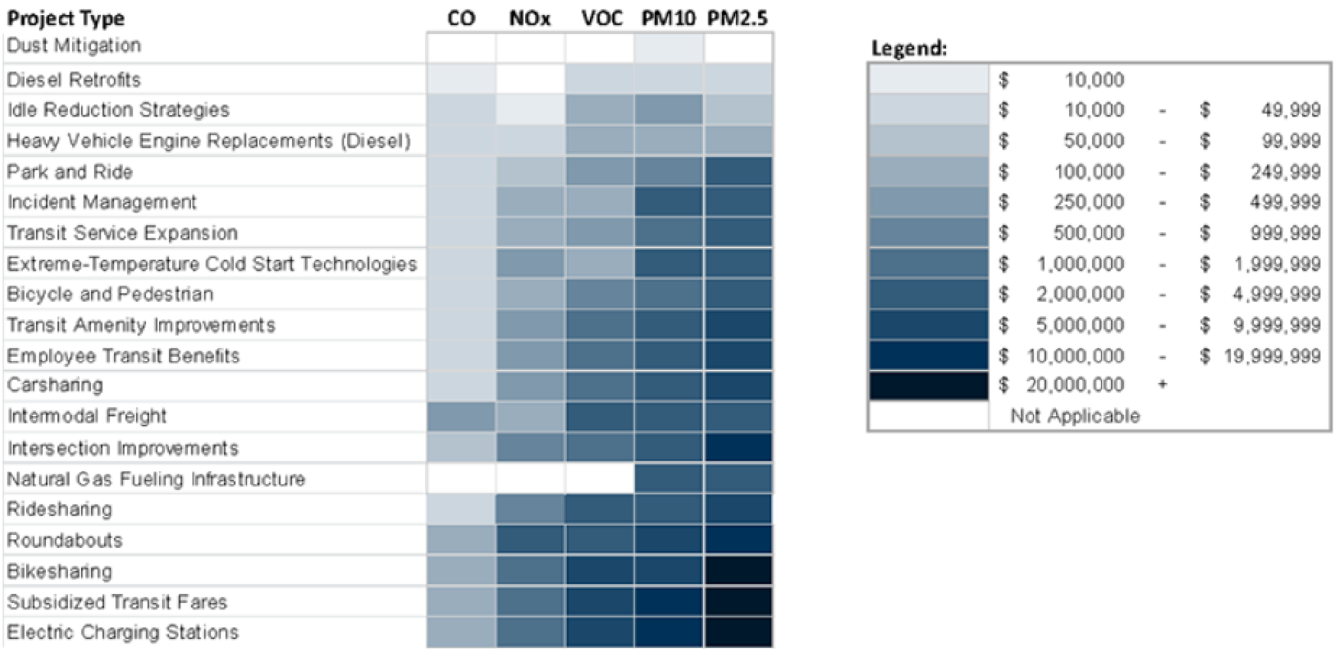
[33] Diesel Technology Forum, *Presentation for the Oregon JTF on Supporting Businesses in Reducing Diesel Emissions* November 21, 2019, *available at* https://olis.oregonlegislature.gov/liz/2019I1/Downloads/CommitteeMeetingDocument/207981 (last visited March 11, 2020).

[34] *Id*.

[35] U.S. DOT Federal Highway Administration, *Cost Effectiveness Tables Summary*, https://www.fhwa.dot.gov/environment/air_quality/cmaq/reference/cost_effectiveness_tables/#Toc445205106 (last visited March 3, 2020).

Figure 2: Median Cost-Effectiveness Estimates (Dollars per Ton of Pollutant Reduced)



Source: U.S. DOT

DERA RETURN ON INVESTMENT (ROI)

The Diesel Emissions Reduction Act (DERA) provides grants to retrofit or replace legacy diesel engines. From 2008 to 2016, the U.S. Environmental Protection Agency (EPA) awarded $629 million in DERA grants to retrofit or replace 67,300 diesel engines in vehicles, vessels, locomotives, and other pieces of equipment (Figure 3).[36]

Figure 3: DERA Program Outcomes (2008-2016)

Investment of DERA Program	Emission and Fuel Reductions
$629 million funds awarded	472,700 tons of NO_x
67,300 engines retrofitted or replaced	15,490 tons of PM
Up to $19 billion in monetized health benefits	17,700 tons of hydrocarbon
Up to 2,300 fewer premature deaths	61,550 tons of carbon monoxide
64% of projects targeted to areas with air quality challenges	5,089,170 tons of carbon dioxide
3:1 leveraging of funds from non-federal sources	454 million gallons of fuel saved

Source: U.S. EPA

[36] U.S. EPA, *DERA Fourth Report to Congress: Highlights of the Diesel Emissions Reduction Program* (2019), *available at* https://www.epa.gov/sites/production/files/2019-07/documents/420r19005.pdf (last visited March 2, 2020).

If Oregon were to implement an incentive program with the same ROI as the DERA program from 2008 to 2016, it could expect to spend:[37]

- $9,350 per engine retrofitted or replaced;
- $1,330 per ton of NO_x reduced;
- $40,600 per ton of PM reduced;
- $0.33 per dollar saved in health benefits; and,
- $273,480 per premature death avoided.

DERA ROI Varies by Program[38]

Data from the various DERA grant programs reflects a wide range of potential costs (Table 2). From 2014 to 2016, the DERA National Competitive Grant Program issued $58.9 million to retrofit or replace 1,845 diesel engines, which is nearly $32,000 per engine.

DERA State Grants over the same time period provided $23.2 million to retrofit or replace 1,520 engines, which is just over $15,000 per engine.

DERA Tribal Grants for 2014 to 2016 provided $3.7 million to retrofit or replace 50 engines at a cost of $74,000 per engine.

Table 2: 2014-2016 DERA ROI by Program

Grant Program	Total Funds Granted	Engines Retrofitted or Replaced	Cost per Engine
National Competitive Grants	$58.9 million	1,845	$31,924.12
State Grants	$23.2 million	1,520	$15,263.16
Tribal Grants	$3.7 million	50	$74,000.00
School Bus Rebate	$17 million	858	$19,813.52

Source: Legislative Policy and Research Office
Data: U.S. EPA

[37] *Id.*
[38] *Id.*