

March 12, 2018

Lisa Williams
Staff Lead
California Air Resources Board
Email: lisa.williams@arb.ca.gov

ATTN: VW Settlement

Dear Ms. Williams:

On behalf of the Diesel Technology Forum, I submit these comments regarding the draft Beneficiary Mitigation Plan (“Plan”) published by the Air Resources Board concerning the use of \$423 million in Environmental Mitigation Trust revenue. By way of background, the Diesel Technology Forum represents manufacturers and suppliers of diesel engines, vehicles and equipment. The Forum is a not-for-profit educational organization dedicated to raising awareness of the clean air and economic benefits of clean diesel technology. More information on the Forum is at www.dieselforum.org.

Summary

In its present form, The Plan ...

- Fails to live up to the sole purpose of the Trust to reduce emissions of oxides of nitrogen (“NOx”) particularly for sensitive communities. Instead of maximizing emission reductions in the shortest time achievable, the Plan seeks to achieve transportation technology transformation, favoring zero emission technologies including those sectors where a zero emission option is not currently available.
- Fails to align funding priorities with achievable emission reduction thereby diluting the total potential benefits provided by Trust revenue. By failing to take advantage of the Diesel Emission Reduction Act (“DERA”) option, the Plan ignores substantial emission reductions that could benefit agricultural communities and those near goods movement facilities that are home to a large variety of off-road equipment types. The Plan chooses to set aside more funds as non-committal than it proposes to actively invest in substantial NOx mitigation projects in off road engines and equipment.
- Sacrifices immediate term, low cost emissions reductions that could be achieved under a technology neutral approach. While the draft Plan seeks to mitigate 10,000 tons of NOx emissions, many more emissions could be eliminated if the Plan incorporates a technology neutral approach that awarded funding towards those projects that reduce the most emissions per dollar invested while also leveraging additional significant resources provided through the DERA option.

I. The Draft Plan Does Not Meet the Spirit of the Environmental Mitigation Trust

The sole purpose of the Environmental Mitigation Trust for state beneficiaries is to reduce NOx emissions and to do so quickly. The draft Plan published by the Air Resources Board fails to meet this important criteria by sacrificing many tons of easily remediable NOx emissions in favor of pursuing technology transformation in the

heavy-duty transportation sector often with little or no immediate emission reduction. For example, the Plan would seek to spend \$90 million to incentivize the purchase of zero emission Class 8 freight trucks. Yet the Plan notes that a zero emission Class 8 freight truck is not currently available and this technology is not expected to be available in the near term. The projected benefit of this program – anticipated 100 to 150 tons of NO_x emission reduced per year – will not be realized for years in the future.

The Plan fails to identify how and when disadvantaged communities will benefit from the proposed measures for NO_x mitigation that are not presently available in the marketplace. While some zero-emission technologies are available today in certain applications, others are not, particularly zero-emission Class 8 dray trucks that can meet the demanding duty cycle of this segment. \$90 million will be appropriated towards these technologies that, according to the Plan, are not available today and may be available in the next three to five years. Waiting for the availability of emerging technology may result in delayed air quality improvements and negative health consequences for sensitive communities. Meanwhile, already proven and available technologies, including clean diesel, are ready today to replace older trucks and generate significant emission reductions for these sensitive communities. These proven and available technologies come with a much lower price tag allowing many more older and higher emitting trucks to be taken out of service and reduce many more tons of NO_x emissions than waiting for the availability of a zero emissions truck when available.

California's experience with alternative fuels in the Class 8 truck segment demonstrates the potential shortcomings of the anticipating benefits of promoting zero-emission Class 8 freight trucks. After more than a decade of promoting alternative fuels in this segment of the truck market, currently only 3 percent of Class 8 trucks in operation in California are powered by natural gas with the remainder powered by diesel.¹ Of the diesel Class 8 fleet, three-in-four do not come with the latest generation technology to meet the model year 2010 emissions standard. Efforts to rejuvenate the Class 8 truck fleet through alternative fuel incentives has not generated significant benefits. The success with alternative fuel incentives and promotions in the Class 8 truck segment may prove an early warning over similar success rates with efforts to incentivize zero emission technology. Meanwhile, available clean diesel technology can reduce emissions cost effectively and immediately.

Many more NO_x emissions could be eliminated immediately and generate immediate term benefits for disadvantaged communities across California by replacing older and higher emitting Class 8 trucks with new clean diesel models. According to an analysis commissioned by the Diesel Technology Forum and conducted by IHS Markit, significant NO_x reduction are achievable if more commercial vehicles in operation in California were turned over to new clean diesel technology:

- What if California achieved the national average for the penetration of the latest clean diesel technology at 30 percent?: **53,000 tons of NO_x reduced** or five times the benefits of the anticipated emissions reduced in the Plan.
- What if one-half of California's commercial vehicles came with the latest clean diesel technology? **200,000 tons of NO_x reduced per year**, or twenty times the anticipated benefits of the emission reductions outlined in the Plan. By way of background, Indiana is the leading state for the penetration rate of the latest clean diesel technology with 50 percent of the trucks on the road of the latest generation technology.
- What if every commercial vehicle on the road in California came with the latest generation clean diesel technology? **550,000 tons of NO_x reduced per year**.

¹ According to analysis performed by the Diesel Technology Forum using 2016 commercial vehicle in operation data compiled by IHS Insight.

II. The Draft Plan Funding Priorities Do Not Align with Achievable Results

The most cost effective projects that will deliver the most emission reductions, including those for disadvantaged communities, will receive the least funding: **71 percent of total emission reduction benefits will be derived from a single category (Internal Combustion Engine – Freight & Marine) that will receive only 14 percent of funds.** The most cost effective technologies are not zero emissions technologies but advanced internal combustion engine technologies. **In fact, more Trust revenue is scheduled to meet administrative expenses than devoted to the most cost effective projects that will yield to the greatest emission reductions.**

Proposed Environmental Mitigation Funding Allocations			
Category	Cost Effectiveness (\$ per ton NOx reduced)	Anticipated Total Benefit (tons of NOx reduced per year)	Funding
#1 Internal Combustion Engine – Freight & Marine	\$5,000 - \$30,000 per ton	650 – 750 tons per year	\$60 million
#2 ZEV – Class 8 Trucks	\$80,000 - \$90,000 per ton	100-150 tons per year	\$90 million
#3 ZEV Bus	\$30,000 - \$180,000 per ton	50 – 100 tons per year	\$130 million
#4 ZEV Freight Equipment	\$130- \$350,000 per ton	30 – 50 tons per year	\$70 million

Recent research commissioned jointly by the Diesel Technology Forum and the Environmental Defense Fund confirms that replacing older engines in the fleet of switch locomotives and marine workboats are one of the most cost effective projects to reduce NOx emissions. For example, replacing older engines with new clean diesel engines that power a tug boat can reduce one tons of NOx for an investment of \$4,380 while a similar engine replacement project for a switch locomotive may reduce one ton of NOx emissions for a \$15,201 investment. A summary of these research finding is included at the end of these comments. These are the most cost effective projects based on the anticipated range of cost effective investments outlined in the Plan.

III. The Draft Plan Excludes Off-Road Equipment by Failing to Take Advantage of the DERA Option

The draft plan fails to take advantage of the Diesel Emission Reduction Act (DERA) matching fund opportunity and denies California with additional revenue for emission reduction projects. This option would allow the Air Resources Board to leverage additional resources to repower or replace a wide variety of off-road equipment types found in-use in agricultural communities that are located in non-attainment areas along with construction equipment used across the state.

The latest Tier 4 clean diesel technologies are now available in the most utilized pieces of agricultural and construction machines helping to reduce emissions for the communities in which they are located. The use of the DERA option would allow the Air Resources Board to leverage additional revenue provided through the DERA program to replace more and older off-road equipment and generate greater emission reductions.

California has been the single largest recipient state of DERA funds since funding was appropriated to the program beginning in 2008. While appropriations for the program has fluctuated, Congress has consistently funded the program with a significant increase in funding over the last two cycles. Failing to take advantage of the expanded funding for the DERA program would exclude many communities from realizing the emission reduction benefits of the latest clean technologies used in those communities by the wide variety of off-road equipment types including the most used agricultural and constructions machines.

IV. Proposed Changes to the Draft Plan

In order to maximize the total emission reductions and deliver the most benefits to communities across the state, including disadvantaged communities, a more prudent strategy would take a technology neutral approach. Three out of four of the eligible categories for funding explicitly restrict technology to only zero-emission technology. In doing so, these categories demonstrate the least cost effectiveness and deliver the least benefits. Collectively, all zero emission technology categories are expected to deliver about 30 percent of benefits as measured by tons of NOx reduced per year. A technology neutral approach would allocate funding towards eligible projects that achieve the greatest cost effectiveness and deliver the most emission reductions for communities across the state. The draft Plan seeks to eliminate 10,000 tons of NOx emissions. How many more tons of emissions could be reduced if the draft Plan incorporated a technology neutral approach that prioritized projects based on demonstration of the most cost effective investments to deliver the most emission reductions?

Failing to take advantage of the DERA option greatly limits funds and reduces the total amount of revenue achievable for opportunities provided by the Trust. As mentioned earlier, California is the single largest recipient of DERA funds. Over one in ten DERA investments have been granted to recipients in California. The DERA option would allow the Air Resources Board to gain access to even greater DERA funds when leveraged against a one-to-one match with Environmental Mitigation Trust revenue. The use of the DERA option could significantly boost funds to upgrade the wide variety of the most used off-road equipment types to generate emission reductions for the communities in which they serve.

V. Conclusions


The draft Plan does not meet the spirit of the Environmental Mitigation Trust – to reduce NOx emissions and do so quickly. Instead, the Plan sacrifices investments in many proven and available clean technologies across many funding categories in favor of prospective future technology transformation. In doing so, the Plan minimizes the total emission reduction benefits that would accrue to communities across the state. This strategy not only fails to meet the spirit of the Trust but provides communities, including many disadvantaged communities that have been promised emission reductions, with the least emission reductions possible.

A more prudent strategy would invest in technologies that demonstrate the greatest cost effectiveness thereby taking many more older and higher emitting trucks, buses and other equipment out of service to generate even greater emission reductions. In certain instances, a zero emission option may be the most compelling while others, a clean diesel, hybrid or other technology or fuel type may be the most cost effective choice.

By failing to take advantage of the DERA option, the Air Resources Board is failing to leverage additional resources that could be used to replace or repower a wide variety of older off-road equipment types, including many of the most used agricultural and construction machines, to generated even greater emission reduction benefits for more communities across California.

Thank you for the opportunity to provide insights concerning the draft beneficiary mitigation plan published by the Air Resources Board. Going forward, the Diesel Technology Forum looks forward to providing any additional analysis or insight to ARB as the state considers efforts to implement strategies to make the most of the Trust. Please contact us at (301) 668-7230 with any questions or concerns.

Very truly yours,



Allen R. Schaeffer
Executive Director

CC: Mary Nichols, Chair, California Air Resources Board
Richard Corey, Executive Officer, California Air Resources Board
Jack Kitwoski, Chief, Mobile Source Control Division, California Air Resources Board

ENCL



Tug and Switcher Engine Upgrades Offer Most Cost-Effective Option for VW Funds, Research Shows

New Research Demonstrates the Significant Emission Reduction and Cost-Saving Benefits of Clean Diesel Large Engine Upgrades

March 8, 2018 (WASHINGTON) – Clean diesel technology upgrades for large tug and switcher locomotive engines cost only \$4,379 to \$15,201 per ton of nitrogen oxides (NOx), compared to more than [\\$30,000](#) per ton of NOx for many other diesel emission reduction projects.

The [Diesel Technology Forum](#) (DTF) and the [Environmental Defense Fund](#) (EDF) today [released a report](#) documenting the significant emission reduction benefits that can be gained by replacing older engines in tug boats and switcher locomotives with the latest clean diesel models. Funds from Volkswagen’s (VW) \$2.9 billion environmental trust, established to mitigate for the excess emissions resulting from defeat devices on 590,000 diesel vehicles, can be used to help pay the cost of repowering these and other old diesel engines.

The [joint research](#) estimates that replacing older engines in a typical tug boat with the latest clean diesel model that meets the latest emissions milestones can eliminate on average 14.9 tons of NOx emissions per year. A similar activity for switchers can reduce NOx emissions by 9.0 tons per year.

DTF and EDF’s research confirms that upgrading tug and switcher engines to the latest clean diesel technology offers the most cost-effective option for reducing diesel emissions. Replacing tugboat engines with clean diesel technology costs on average \$4,379 per ton of NOx eliminated, while upgrading a switcher engine costs \$15,201 per ton.

“The substantial reductions possible with clean diesel replacements offer great news for communities near ports and rail yards. These areas are often among those most vulnerable to smog-forming compounds like NOx, so residents there stand to reap the greatest benefits,” said Allen Schaeffer, DTF Executive Director. “While engine replacement projects are costly, the return on the investment on a dollar-per-ton of emissions reduced makes these projects a compelling choice. States looking to maximize cost-effective investments to reduce NOx emissions should prioritize clean diesel upgrades for tug and switcher engines.”

“Many tugs and switchers operate in ports that fail to meet federal health-based air quality standards,” said Dr. Elena Craft, EDF Senior Health Scientist. “Repowering older tug and switcher engines can deliver cleaner, healthier air faster to at-risk communities near ports. These new engines also help reduce carbon dioxide emissions and black carbon, two important climate pollutants.”

Starting in 2015, new clean diesel engines used in marine applications and switcher locomotives in the United States were required to meet Tier 4 emissions standards. Relative to previous generations of technology, the latest clean diesel technologies can reduce emissions, including NOx and fine particle emissions (PM2.5), by 88 percent to 95 percent. While the latest clean diesel technologies are ready and available to reduce emissions, the U.S. Environmental Protection Agency estimates that by 2020, unless action is taken, only 5 percent of the switch locomotive and 3 percent of the marine workboat fleets will be powered by these clean technologies.

“Right now, state governments have an opportunity to get more of these clean technologies out in the field to deliver immediate emission reductions for communities near port operations,” said Schaeffer. “The recent settlement with VW established an environmental remediation program that will soon provide \$2.9 billion to states for the sole purpose of reducing NOx emissions. Policymakers looking to reduce emissions quickly for communities near ports and rail lines should consider these highly cost-effective clean diesel solutions.”

Learn more at <https://www.dieselforum.org/largeengineupgrades> and <https://www.dieselforum.org/vwfund>.

Benefit Analysis, NOx Reductions for Large Engines				
	Parts & Labor Cost (total)	NOx Reduction (tons/year)	Cost Effectiveness	
			Full Cost (\$/ton)	40% Cost (\$/ton)
Tug	\$1,400,000	14.9	\$4,379	\$1,752
Switcher	\$2,600,000	9.0	\$15,201	\$6,080

Source data [available here](#).

The most cost-effective upgrades make the biggest health impact

New Tier 4 engines for tug boats reduce NOx emissions by 91%

The \$2.9 billion VW Environmental Mitigation Trust provides funding to upgrade older vehicles and equipment to rapidly reduce nitrogen oxide (NOx) emissions, which contribute to hazardous smog pollution. Upgrading just one of the oldest, dirtiest tug boats is like taking tens of thousands of passenger vehicles off the road per year, bringing substantial health benefits to at-risk communities. With states now deciding how to invest those funds, repowering these older vessels with cleaner Tier 4 engines is a game-changer for delivering immediate and cost-effective air quality benefits.



Upgrading an old tug boat with new Tier 4 engines removes **30 tons of NOx/year¹**

This is equivalent to



Replacing **96** drayage trucks²

OR



Removing **26,667** cars for 1 year³

Upgrading old engines means cleaner air for all

EPA estimates that by 2020, only 3% of tug boats will be replaced with cleaner Tier 4 engines. The VW Environmental Mitigation Trust provides a rare opportunity to retire the oldest diesel engines still in operation, which can last 50 years or longer. Tier 4 or Tier 3 engines will deliver cleaner, healthier air faster to at-risk communities. These new engines also improve fuel efficiency, which reduces CO₂ and black carbon emissions, two important greenhouse gas pollutants.

Tug projects are a better value

1 ton of NOx reduction costs



Other projects \$36,000⁴



Tier 4 tug engines \$5,000⁴

1. EPA, 2018, "Reducing and eliminating emissions from marine diesel engines" (https://www.epa.gov/marine-diesel-engines/reducing-and-eliminating-emissions-marine-diesel-engines)

2. EPA, 2018, "Roadway Pollution Research Report" (https://www.epa.gov/roadway-pollution-research-report)

3. EPA, 2018, "Roadway Pollution Research Report" (https://www.epa.gov/roadway-pollution-research-report)

4. EPA, 2018, "Roadway Pollution Research Report" (https://www.epa.gov/roadway-pollution-research-report)



The most cost-effective upgrades make the biggest health impact

New Tier 4 engines for switchers reduce NOx emissions by 95%

The \$2.9 billion VW Environmental Mitigation Trust provides funding to upgrade older vehicles and equipment to rapidly reduce nitrogen oxide (NOx) emissions, which contribute to hazardous smog pollution. Upgrading just one of the oldest, dirtiest switchers is like taking tens of thousands of passenger vehicles off the road per year, bringing substantial health benefits to at-risk communities. With states now deciding how to invest those funds, repowering these older switchers with cleaner Tier 4 engines is a game-changer for delivering immediate and cost-effective air quality benefits.



Upgrading an old switcher with new Tier 4 engines removes **9 tons of NOx/year¹**

This is equivalent to



Replacing **29¹** older trucks

OR



Removing **8,000** cars for 1 year³

Upgrading old engines means cleaner air for all

EPA estimates that by 2020, only 5% of switcher engines will be replaced with cleaner Tier 4 engines. The VW Environmental Mitigation Trust provides a rare opportunity to retire the oldest diesel engines still in operation, which can last 70 years or longer. Tier 4 engines will deliver cleaner, healthier air faster to at-risk communities. These new engines also improve fuel efficiency, which reduces CO₂ and black carbon emissions, two important greenhouse gas pollutants.

Switcher projects are a better value

1 ton of NOx reduction costs



Other projects \$36,000⁴



Tier 4 switcher engines \$15,000⁴

1. EPA, 2018, "Reducing and eliminating emissions from marine diesel engines" (https://www.epa.gov/marine-diesel-engines/reducing-and-eliminating-emissions-marine-diesel-engines)

2. EPA, 2018, "Roadway Pollution Research Report" (https://www.epa.gov/roadway-pollution-research-report)

3. EPA, 2018, "Roadway Pollution Research Report" (https://www.epa.gov/roadway-pollution-research-report)

4. EPA, 2018, "Roadway Pollution Research Report" (https://www.epa.gov/roadway-pollution-research-report)



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***The Diesel Technology Forum** is a non-profit organization dedicated to raising awareness about the importance of diesel engines, fuel and technology. Forum members are leaders in clean diesel technology and represent the three key elements of the modern clean-diesel system: advanced engines, vehicles and equipment, cleaner diesel fuel and emissions-control systems. For more information, visit www.dieselforum.org. For the latest insights and information from the leaders in clean diesel technology, join us on [Facebook](#), follow us on [Twitter](#) @DieselTechForum, or [YouTube](#) @DieselTechForum and connect with us on [LinkedIn](#). Get it all by subscribing to our newsletter [Diesel Direct](#) for a weekly wrap-up of clean diesel news, policy analysis and more direct to your inbox.*

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