



Natural Gas Vehicles for America

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December 16, 2016

Commonwealth of Virginia
Department of Environmental Quality, Air Division
P.O. Box 1105
Richmond, VA 23218

RE: The Commonwealth of Virginia (Virginia) Department of Environmental Quality Request for Comment on the Volkswagen Diesel Emissions Settlement and the Environmental Mitigation Trust Implementation for Virginia

Dear Virginia Volkswagen Mitigation Plan Director:

Introduction

Natural Gas Vehicles for America (NGVAmerica) respectfully submits the following comments on how the Virginia Department of Environmental Quality (VA DEQ) can best use the Environmental Mitigation Trust (EMT or Trust) funds that the state will receive as part of the Volkswagen (VW) diesel emission settlement. We thank the Commonwealth of Virginia for the opportunity to comment on the future investment of Trust funds, and we strongly encourage the state to recognize the superior and unmatched role that natural gas vehicles can play in delivering nitrogen oxide (NOx) emissions reductions required by the settlement and Trust.

The Trust was set up to fund projects that reduce NOx emissions to mitigate the excess pollution contributed by the non-compliant light-duty diesel vehicles. The Trust focuses on the environmental opportunity presented by addressing the emissions associated with the medium- and heavy-duty vehicles and non-road vehicles that contribute a disproportionate share of the NOx emissions in urban areas. By focusing on the retirement of older, high-mileage, higher emission medium- and heavy-duty vehicles and replacing them with new, cleaner vehicles, the settlement looks to generate larger emissions reductions than could be achieved through similar light duty focused programs. It also presents a significant opportunity to accelerate the use of cleaner, alternative transportation fuels, and thereby truly transform the transportation sector.

The VA DEQ understands the focus for the Trust and has set priorities in its VA VW Mitigation Plan that call for “sizeable projects designed to achieve the greatest NOx emission reduction or offset for the dollar (i.e., capital cost effectiveness in dollars/ton).” NGVAmerica concurs with this focus and believes that natural gas vehicles offer the best solutions for these projects.

Medium- and heavy-duty natural gas vehicles are the only alternative fueled vehicles widely available from manufacturers today. These new natural gas vehicles have an exceedingly cleaner emissions profile than the vehicles targeted for replacement. Moreover, new natural gas vehicles that are certified to California’s Optional Low NOx Standard surpass EPA’s most stringent emissions standards by as much as 90 percent. Vehicles

that operate on clean-burning, domestically produced natural gas offer the most cost-effective solution in designing transportation projects that reduce harmful emissions caused by non-compliant diesel vehicles. NGVs employ the latest clean fuel technologies and are commercially available in all applications of on-road vehicles permissible for funding.

NGVAmerica and its members stand ready to assist the VA DEQ with its development of the Beneficiary Mitigation Plan including potential natural gas vehicle projects in the state and we welcome the opportunity for further discussion.

Comments

Our comments clearly demonstrate that:

- The funds available from the Trust provide an extraordinary opportunity to incentivize alternative fuel vehicles and transform Virginia’s transportation sector;
- Natural gas vehicles are much cleaner than comparable diesel vehicles as evidenced by recent in-use testing studies;
- The latest technology “Near-Zero” low-NOx natural gas engines deliver NOx and greenhouse gas emission benefits that are equal to or greater than electric vehicles when accounting for emissions from the electrical grid;
- Natural gas vehicles are the most cost-effective alternative fuel vehicle option that significantly reduces NOx emissions;
- Natural gas vehicles are the only alternative fuel vehicle option that offers commercially available vehicles for all the categories that qualify for funding under the Trust; and
- Natural gas vehicles deliver other important benefits including: lower greenhouse gas emissions; fuel diversity and energy security; and increased jobs and economic investment.

Transforming the Transportation Sector to Alternative Fuel Use

The Trust fund provides an extraordinary opportunity to transform the medium- and heavy-duty transportation sector by promoting alternative fuel projects that reduce NOx emissions and decrease ground-level ozone pollution in areas with the greatest need. It also represents an unprecedented opportunity to incentivize public and private fleets to accelerate their move to greater use of alternative transportation fuels and away from being nearly totally reliant on petroleum fuels. The timing of this funding could not be better as new, low-NOx and Near-Zero natural gas engines are coming into the market-place. We strongly encourage Virginia to fast-track its transition to new and cleaner natural gas vehicles, truly transforming and immediately improving the environmental footprint of its medium- and heavy-duty transportation sector.

Natural Gas Vehicles – the Cleanest and Most Cost-Effective Solution

Today’s medium- and heavy-duty natural gas vehicles meet or exceed the most demanding emission requirements and provide substantial NOx reductions compared to even the cleanest diesel fueled vehicles. In-use testing data presented in a paper published in *Environmental Science and Technology*¹ indicates “that three-way catalyst (TWC) equipped stoichiometric natural gas vehicles emit 96 percent fewer NOx emissions compared to selective catalytic reduction (SCR) equipped diesel vehicles.” The report evaluated in-use emissions from drayage trucks utilizing natural gas and diesel engines. The diesel vehicles evaluated for the report in some cases had emissions that were 5 -7 times higher than in-use certification limits.

¹ *Environ. Sci. Technol.*, **2015**, 49 (8), pp 5236–5244 (Emission Rates of Regulated Pollutants from Current Technology Heavy-Duty Diesel and Natural Gas Goods Movement Vehicles).

New “Near-Zero” natural gas engine technology has been certified by the EPA and the California Air Resources Board to NO_x levels that are 90 percent lower than current federal standards for such engines.² A recently released report from the California Energy Commission indicates that the Near-Zero natural gas engine **“can reduce the lifecycle emissions of medium- and heavy-duty vehicles to levels near or equal to those of zero emission electric vehicles.”**

The emission benefits of the new “Near-Zero” engine are well documented in the 2016 *Game Changer* report issued by Gladstein, Neandross and Associates (GNA).³ The GNA report indicates that a truck equipped with a natural gas engine that has been certified to the 0.02 g/bhp-hr Optional Low NO_x Standard has lower life-cycle NO_x emissions than an All-Electric truck being charged on any electrical grid in the United States. The report also concludes that the low-NO_x natural gas truck can provide these low NO_x emissions at a cost that is considerably lower than a comparable All-Electric truck. While actual cost depends on the application, an All-Electric medium- or heavy-duty vehicle costs three to four times the amount of a comparable vehicle powered by a 0.02 g/bhp-hr natural gas engine.

The *Game Changer* report documents that natural gas vehicles are the only viable near-term option for reducing NO_x emission and greenhouse gas emissions from heavy-duty vehicles. While the Trust does not require greenhouse gas reductions, many states are likely to be interested in understanding the greenhouse gas benefits of projects. The GNA report finds that both conventional and renewable natural gas produce less greenhouse gas emissions than comparable electric vehicle projects because the lower cost of natural gas vehicles means that significantly more low-greenhouse gas vehicles can be deployed for a given amount of funding. This report also documents that today an increasingly larger amount of renewable natural gas is being used to fuel natural gas vehicles. Compared to diesel fuel, renewable natural gas reduces greenhouse gases by as much as 80 percent or greater. Conventional natural gas provides about a 13–17 percent reduction in greenhouse gases compared to diesel fuel.

The Volkswagen settlement provides an unprecedented opportunity to accelerate the deployment of cleaner natural gas engines including low-NO_x natural gas engines. Natural gas vehicles are currently available in **all**⁴ of the on-road applications identified in the list of Eligible Mitigation Actions. This means that Virginia can act quickly to deploy new, cleaner natural gas trucks and buses.

Natural gas vehicles are far more cost-effective in delivering emission reductions than other alternative fuel options, such as hybrid and electric vehicles. In addition, using EMT funds for NGV related projects will result in the deployment of far greater numbers of vehicles. Dollar-for-dollar natural gas delivers greater numbers of total vehicles and greater total tons of NO_x emission reductions. This is illustrated by the figure below which looks at several different funding options for natural gas and electric vehicles including providing 100% of the cost of new, replacement vehicles for public fleets, using the maximum funding levels specified in the settlement for natural gas and electric vehicles purchased by private fleets, or funding only the incremental cost of new, replacement vehicles.

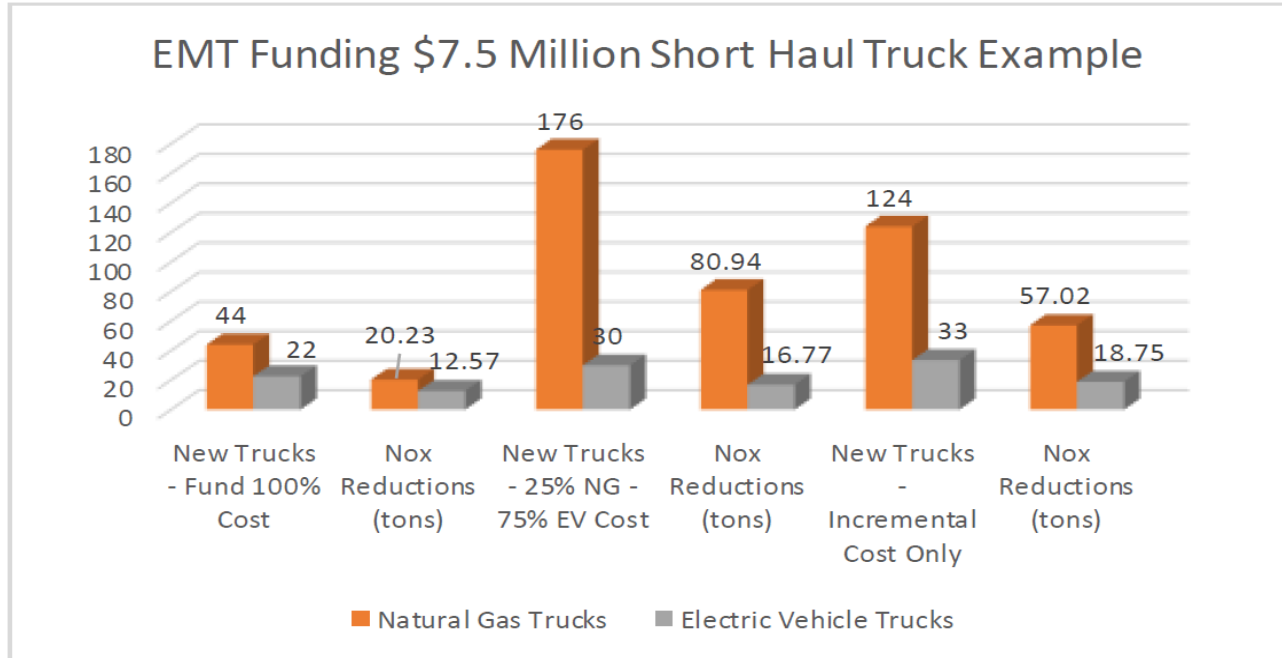
² Since 2010, EPA has required heavy-duty diesel engines to be certified at the 0.2 grams-per-brake-horsepower- hour (“g/bhp-hr”) level. The California Optional Low NO_x Standard is set at 0.02 g/bhp-hr, 90 percent lower than the EPA standard. “Final Regulation Order for Phase 1 Greenhouse Gas Regulations.” California Air Resources Board, December 5, 2014.

<http://www.arb.ca.gov/regact/2013/hdghg2013/hdghgfrot13.pdf>, pages 3 and 6.

³ Gladstein, Neandross & Associates, *Game Changer Technical White Paper* (2016) <http://ngvgamechanger.com/>, Section 6.4 and Appendix 1. Emissions of low-NO_x natural gas engines produce NO_x emissions that are comparable to or lower than similar electric drive vehicles in all 50 U.S. states when considering upstream NO_x.

⁴ The same cannot be said of battery electric or fuel cell vehicles.

Figure 1. Truck Deployment and NOx Reduction Comparisons Under Different Funding Scenarios



Clearly, the deployment of new, cleaner natural gas vehicles and “Near-Zero” natural gas trucks (such as in regional haul trucking, refuse trucks, and transit buses) will help Virginia provide the most NOx emissions reduction to comply with the EPA’s latest national ozone standards.

NGVAmerica Recommendations for EMT Funding

Setting Aside Funding for Cleaner Technologies

NGVAmerica recommends that the VA DEQ consider prioritizing its incentives by providing all or a large share of the available funding for medium- and heavy-duty engines that deliver NOx reductions that exceed today’s federal emission requirement for new diesel vehicles. This will provide greater incentives for fleets to acquire even cleaner vehicles.

Given that the EMT has been created because of the NOx pollution associated with non-compliant diesel vehicles, we believe that the funding should be set aside exclusively for clean, alternative fuel vehicle projects.

By prioritizing funding for clean, alternative fuel technologies, Virginia can kick-start the commercialization and deployment of medium-duty and heavy-duty engines that are much cleaner than the cleanest diesel fueled vehicles and can encourage investments in technologies that will continue to deliver emissions benefits for many years as these projects encourage others in the state to make similar investments in cleaner transportation technologies.

Providing Increased Funding Percentages for Cleaner Technologies

If funding is provided for diesel vehicles that meet the current, minimum federal standards, then the percentage offered for such vehicles should be less than that offered for cleaner vehicles.

There also should be a higher level of funding for technologies that historically have demonstrated lower in-use emissions even if they are certified to the same baseline standard as new diesel vehicles. Vehicles with engines certified to California's Optional Low-NOx Standard should receive the highest level of funding (i.e., 25 percent in the case of private sector vehicle replacements or 50 percent in the case of drayage trucks). If the state has an approved DERA plan, it should consider funding low-NOx natural gas trucks that are not drayage trucks under the DERA Option because the DERA program provides 35% of the replacement cost for vehicles equipped with low-NOx engines.⁵

Maximizing the Benefit of Funds for Public Fleets

In the case of publicly funded vehicles, we recommend adjusting the funding levels to maximize the benefit of the program and accelerate the deployment of additional alternative fueled vehicles. While it might be tempting to fund public vehicles at the 100% level, this will obviously lessen the overall effectiveness of the projects by limiting the total number of deployed vehicles. Funding levels should be large enough to offset the incremental cost of new, cleaner vehicles and sufficient to address fact that replaced vehicles must be scrapped. Funding levels for different alternative fuel technologies should be commensurate with the level of NOx emissions provided by the fuel technology.

Targeting Vehicle Applications that Deliver the Largest NOx Reductions

Priority should be given for those applications that produce the largest share of NOx emissions occurring in urban and non-attainment areas. In most cases, this means prioritizing funding for short- and long-haul trucks, or at least ensuring that some funding goes to incentivize the purchase of new, cleaner trucks in these applications. For many areas of the country, short-haul and regional-haul trucks produce a disproportionate amount of the NOx emissions. These trucks also consume a lot of fuel and drive a lot of miles which makes them excellent candidates for using natural gas. We therefore strongly recommend setting aside some funding for private fleets that operate short-haul and regional haul trucks. These types of projects will compliment other projects involving school buses, transit buses, shuttle buses and refuse trucks that can have a positive impact on the air quality in urban areas.

Prioritizing Funding for Vehicles over Other Uses

In developing its Mitigation Plan, **we urge the VA DEQ to use its Trust funds for vehicle deployment projects and not for other purposes.** Using funding only for vehicle deployment will maximize the NOx emission reductions and environmental benefit. Every dollar spent on infrastructure and for other purposes takes away from critical funding that could be better used to deploy more vehicles. Funding should be used to incentivize fleets and vehicle acquisitions where existing fueling infrastructure exists. If fueling infrastructure needs to be developed, other available funds or private funding should be secured as part of private-public partnerships to ensure that the maximum amount of funding goes toward deploying cleaner vehicles that reduce NOx emissions. Using the funding in this way and encouraging private-public partnerships for infrastructure will encourage additional economic development in the state and increase the availability of stations for all users.

Conclusion

The VW settlement money should be spent on transformational, alternative fuel projects that deliver the most NOx emissions for every dollar spent, with a focus on areas with current high NOx emissions, but not excluding areas that have lesser emissions but have good reasons to be included (connecting gaps in

⁵ Under DERA and the settlement the maximum funding for replacement vehicles fueled by natural gas is 25 percent, or 35 percent if the truck is a low-NOx engine. However, both DERA and the VW settlement provide 50 percent in the case of new natural gas drayage trucks.

corridors, rapidly growing areas, etc.). Spending should be accelerated in the early years to maximize emission reductions, with appropriate accounting for actual vehicles deployed and emissions reduced.

The Volkswagen settlement presents an unprecedented opportunity to advance the pace of clean vehicle deployment and reduce NOx emissions. The opportunity is unprecedented because of the scale of the funding that is being made available and because new, extremely lower emitting natural gas engines are just now becoming available for a variety of on-road, medium and heavy-duty applications that emit a significant amount of urban pollution. NGVAmerica and its members believe that natural gas vehicles offer the best solution for achieving the objectives of the Trust. We are eager to serve as a resource to assist the VA DEQ in its evaluation and development of the state's Beneficiary Mitigation Plan.

We welcome the opportunity to provide further information and analysis on the economic and environmental benefits of natural gas vehicles in Virginia. Please contact Jeff Clarke, NGVAmerica General Counsel & Director Regulatory Affairs at 202.824.7364 or jclarke@NGVAmerica.org, or Sherrie Merrow, NGVAmerica State Government Advocacy Committee Chair at 303.883.5121 or smerrow@NGVAmerica.org.

Sincerely,

A handwritten signature in black ink that reads "Matthew Godlewski". The signature is written in a cursive, slightly slanted style.

Matthew Godlewski
President