



Agency of Natural Resources

Beneficiary Mitigation Plan  
for the  
Volkswagen Environmental  
Mitigation Trust

May 29, 2018

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## INTRODUCTION

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On June 28, 2016, the U.S. Department of Justice filed with the U.S. District Court, Northern District of California, a Partial Consent Decree that resolves claims against Volkswagen (VW) for violating the Clean Air Act by selling approximately 500,000 vehicles containing 2.0-liter diesel engines equipped with devices designed to defeat emission controls. These defeat devices caused increased emissions of nitrogen oxides (NOx), resulting in adverse impacts to air quality and increased risk of associated harmful health and environmental impacts. On October 25, 2016, the Court approved the Partial Consent Decree that requires VW to:

1. buy back or modify emission controls on at least 85 percent of the subject vehicles,
2. invest \$2 billion to promote the use of zero emission vehicles and infrastructure, and
3. establish and fund a \$2.7 billion Environmental Mitigation Trust.

In late December of 2016, a settlement involving similar claims for 83,000 Volkswagen vehicles containing 3.0-liter diesel engines equipped with defeat devices was reached, which includes an additional \$225 million towards the Environmental Mitigation Trust (EMT).

According to the court-approved partial settlement, the purpose of the EMT is to fund eligible projects to mitigate the harm caused by the excess NOx emitted by the affected VW vehicles. Specifically, Appendix D-2 of the Partial Consent Decree states:

*“Trust Purpose. It shall be the purpose of the Mitigation Trust to fund Eligible Mitigation Actions to be proposed and administered by the Beneficiaries subject to the requirements of the Consent Decree and this Trust Agreement. **The goal of each Eligible Mitigation Action shall be to achieve reductions of NOx emissions in the United States.**”*

The partial settlement is structured to provide jurisdictions with the ability to select and implement mitigation actions eligible for funding by the EMT. The EMT will be administered by Wilmington Trust, an independent trustee that has been appointed by the court. The final mitigation trust agreement was filed with the court in September of 2017, and the Trust Effective Date occurred on October 2, 2017. Vermont filed its Beneficiary Certification Form on November 1, 2017, and was certified as a Beneficiary on January 29, 2018.

Vermont’s allocation of the EMT is \$18.7 million. Funds will be available for Eligible Mitigation Actions (“eligible projects”) starting 30 days from the date that the BMP is submitted to the VW Trustee (See Figure 1). Vermont may request one-third of its total allocation during the first year, or two-thirds of its allocation during the first two years after the Trust Effective Date. Vermont will have access to the full allocation of funds three years after the Trust Effective Date. Non-government and government entities will be eligible to apply for the beneficiary funding to implement eligible projects. Vermont will have until October 2, 2027 to request its allocation of the EMT and implement mitigation actions.

Figure 1 - Timeline for Implementation of the Environmental Mitigation Trust



Vermont must file a Beneficiary Mitigation Plan (BMP) with the Trustee to receive funds from the Trust. Prior to submittal to the Trustee, the BMP must be made available for public review and comment, and must specifically describe:

- ✓ Section I: Vermont’s overall goal for the use of its allocation under the EMT;
- ✓ Section II: The categories of eligible projects that Vermont anticipates will be appropriate to achieve the stated overall goal, and the preliminary assessment of the percentages of funds anticipated to be used for each type of eligible project;
- ✓ Section III: How Vermont will consider the potential beneficial impact of the selected eligible projects on air quality in areas that bear a disproportionate share of the air pollution burden within Vermont; and
- ✓ Section IV: The expected ranges of emission benefits Vermont estimates will be realized by implementation of the eligible projects to be prioritized.

Vermont’s Proposed BMP was released for public review and comment on November 29, 2017. A public meeting was held on December 13, 2017, and the public comment period for the proposed BMP ended on January 13, 2018. The BMP includes all the required elements listed above and provides the Trustee and the public with an understanding of Vermont’s current challenges in addressing NOx emissions. The BMP is not a request for proposals (RFP), as such it does not include details regarding applications for funding or the project selection process. Information about the funding process for eligible projects will be made available to the public when it is finalized. While not a required element of the BMP, Vermont’s BMP does include, in Section I, project priorities that will be used to inform the development of project selection criteria and prioritization for eligible projects.

# PUBLIC HEALTH & ENVIRONMENTAL BENEFITS OF REDUCING EMISSIONS IN VERMONT

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The primary objective of the EMT is to reduce emissions of NO<sub>x</sub> from mobile sources, and to mitigate the excess NO<sub>x</sub> emissions that were released to the atmosphere through the operation of diesel vehicles equipped with illegal emissions controls/defeat device software. The unlawful actions by Volkswagen (VW) resulted in drastic increases in NO<sub>x</sub> emissions from their light duty diesel engines, of up to 40 times the EPA standard.<sup>1</sup> Even without deliberate attempts to circumvent emissions controls, emissions from diesel engines adversely impact public and environmental health across the U.S. each year.

Reducing public exposure to emissions from diesel-powered engines is an ongoing challenge and priority. Despite the adoption of more stringent emissions standards for new heavy-duty on-road and nonroad vehicles and equipment, millions of existing diesel engines continue to emit substantial quantities of air pollutants such as NO<sub>x</sub>, fine particulate matter (PM<sub>2.5</sub>), air toxics, volatile organic compounds (VOCs), greenhouse gases and short-term climate forcing pollutants. Each of these pollutants presents a distinct set of challenges and risks to public health and the environment.

## Nitrogen Oxides and Related Pollutants Associated with Diesel Engine Exhaust

- NO<sub>x</sub> are a group of highly-reactive compounds that pose direct human health impacts, such as irritation of the respiratory tract, and the worsening or triggering of asthma.<sup>2</sup> These gases are also important precursor pollutants that undergo complex chemical reactions in the atmosphere to form other air pollutants of concern, such as fine particulate matter (PM<sub>2.5</sub>), ground-level ozone (also known as smog), and nitric acid (HNO<sub>3</sub>). NO<sub>x</sub> also contributes to the formation of acid rain<sup>3</sup> and visibility impairment (haze)<sup>4</sup> in Vermont. Each year, diesel engines emit more than half of the mobile source-related NO<sub>x</sub> emissions in Vermont (Figure 2).<sup>5</sup>
- Fine particulate matter (PM<sub>2.5</sub>) is emitted both directly from the exhaust of diesel engines, and formed through secondary reactions involving NO<sub>x</sub> and other atmospheric pollutants. The PM<sub>2.5</sub> emitted directly in diesel exhaust is largely comprised of many different chemicals adsorbed to tiny particles of elemental (black) carbon. These microscopic particles can be inhaled deeply into the lungs, and / or transferred into the bloodstream, resulting in significant health problems.<sup>6</sup> Specifically, diesel exhaust particles affect lungs by directly stimulating the nerves, causing a reflex response in the airways and consequent reduction in lung function.<sup>7</sup> Negative health impacts

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<sup>1</sup> EPA – News release: <https://www.epa.gov/newsreleases/volkswagen-spend-147-billion-settle-allegations-cheating-emissions-tests-and-deceiving>

<sup>2</sup> EPA – Basic Information about NO<sub>2</sub> webpage: <https://www.epa.gov/no2-pollution/basic-information-about-no2#Effects>

<sup>3</sup> EPA – Acid Rain webpage: <https://www.epa.gov/acidrain/what-acid-rain>

<sup>4</sup> EPA – Fact Sheet: [https://www.epa.gov/sites/production/files/2016-02/documents/fs\\_2005\\_6\\_15.pdf](https://www.epa.gov/sites/production/files/2016-02/documents/fs_2005_6_15.pdf)

<sup>5</sup> EPA – NEI 2014: <https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data>

<sup>6</sup> EPA - Health and Environmental Effects of Particulate Matter (PM) website: <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm>

<sup>7</sup> Ryan K. Robinson, Mark A. Birrell, John J. Adcock, Michael A. Wortley, Eric D. Dubuis, Shu Chen, Catriona M. McGilvery, Sheng Hu, Milo SP. Shaffer, Sara J. Bonvini, Sarah A. Maher, Ian S. Mudway, Alexandra E. Porter, Chris Carlsten, Teresa D. Tetley, Maria

range from premature death in individuals with heart or lung disease, to worsened asthma, to increased incidence of non-fatal heart attacks.<sup>8</sup> There is also considerable evidence that diesel exhaust is likely a carcinogen.<sup>9</sup> Elevated concentrations of PM<sub>2.5</sub> in the atmosphere also contribute to increased scattering and absorption of light, which can result in regional haze that noticeably reduces the visibility and clarity of distant objects. In addition, the black carbon which largely makes up diesel exhaust has also been identified as a powerful short-lived climate forcer that contributes to accelerated global warming by facilitating greater absorption of solar energy near the Earth's surface.

- Ground-level ozone (also known as smog) is created through complex chemical reactions between NO<sub>x</sub> and VOCs in the presence of sunlight. Diesel (and other) engines emit large quantities of both NO<sub>x</sub> and VOCs during their operation that can result in enhanced ozone formation. Breathing air with elevated concentrations of ozone is especially harmful to children, the elderly, and people of all ages who have asthma and other respiratory impairments. Breathing ozone can trigger a variety of health issues ranging from coughing, to chest pain, to reduced lung function or damage.<sup>10</sup> Elevated ground-level ozone concentrations also can result in damage to sensitive vegetation, crops, and ecosystems.
- Nitric acid (HNO<sub>3</sub>) is formed when NO<sub>x</sub> emissions react with water, oxygen, and other chemicals in the atmosphere. Nitric acid, as well as sulfuric acid (H<sub>2</sub>SO<sub>4</sub>) formed from another pollutant associated with diesel exhaust, sulfur dioxide (SO<sub>2</sub>), result in acid precipitation, better known as acid rain. Acid precipitation has negatively impacted many of Vermont's aquatic and terrestrial ecosystems.<sup>11</sup> The majority of NO<sub>x</sub> and SO<sub>2</sub> that cause acid rain originates from burning fossil fuels, including the diesel fuel burned in on-road and non-road vehicles.

### Other Key Pollutants Emitted from Diesel Vehicles

- Carbon monoxide (CO) is created through incomplete combustion of materials, including diesel fuel. At high enough concentrations indoors, this colorless, odorless gas can lead to dizziness, confusion, unconsciousness, and death. Although levels of this magnitude are not likely in the outdoor air, CO can still negatively impact the health of those with some types of cardiovascular diseases.
- SO<sub>2</sub> emitted from diesel fuel combustion can result in the formation of sulfuric acid that causes acid precipitation. SO<sub>2</sub> can harm the respiratory tract, impair breathing, and can react with other compounds in the atmosphere, resulting in reduced visibility (haze). Regulatory fuel standards aimed at reducing sulfur levels in diesel fuel have made a marked reduction in emissions of this pollutant in recent years.

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G. Belvisi. Mechanistic Link between Diesel Exhaust Particles and Respiratory Reflexes. *Journal of Allergy and Clinical Immunology*, 2017; DOI: 10.1016/j.jaci.2017.04.038

<sup>8</sup> EPA website - Health and Environmental Effects of Particulate Matter (PM): <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm>

<sup>9</sup> Region 1: EPA New England – Diesel Particulate Matter” <https://www3.epa.gov/region1/eco/airtox/diesel.html>

<sup>10</sup> EPA Ozone Basics: <https://www.epa.gov/ozone-pollution/ozone-basics#effects>

<sup>11</sup> Acid Rain in the 21<sup>st</sup> Century: <http://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/AcidRainFactSheetTemplateC.pdf>

- Air toxics are pollutants known or suspected to cause cancer, or result in other serious health impacts, and environmental degradation. Diesel engines emit significant quantities of many air toxics, including known or suspected carcinogens like benzene, formaldehyde, and diesel particulates. Programs and initiatives effective at reducing emissions of air toxics, include projects to replace older diesel engines, or deploy pollution control technology in diesel fleets.
- Carbon dioxide (CO<sub>2</sub>) is a long-lived greenhouse gas responsible for the greatest amount of anthropogenic climate change since the industrial revolution. It is emitted from burning diesel and other fuels, and the amount of CO<sub>2</sub> depends on the amount of carbon present in the fuel. Even though diesel vehicles frequently consume less fuel per mile driven than their gasoline counterparts, diesel fuel combustion emits about 15% more CO<sub>2</sub> per gallon than gasoline.

As required by the Consent Decree, the EMT focuses on eligible projects that result in NOx emissions reductions; however, it provides an excellent opportunity to achieve other air quality co-benefits that are associated with NOx reductions, such as corresponding decreases in concentrations of ozone, PM<sub>2.5</sub>, SO<sub>2</sub>, CO, and CO<sub>2</sub>, through simultaneous multi-pollutant emissions reductions. Diesel engines tend to have relatively long service lives, with ever-increasing emissions as the engines deteriorate over time. Eligible projects that result in replacement or repowering of the older, more polluting vehicles with newer, more advanced combustion and electric technologies will result not only in reduced NOx emissions, but also reductions in a suite of other harmful air pollutants (described above) that are associated with older diesel engines. Eligible projects also will further Vermont's efforts to mitigate the emissions that contribute to anthropogenic climate change. Repowering and replacement projects will result in reduced emissions of black carbon, a potent climate forcer and likely carcinogen, from diesel exhaust. In addition, a portion of the mitigation fund can be used for electric vehicle supply equipment (EVSE), which will help reduce greenhouse gas and other air pollutant emissions by providing additional infrastructure to facilitate the expanded use of electric vehicles. The electricity provided by the EVSE projects will reflect a generation mix having a comparatively low emissions rate, and an increasing supply of clean renewable energy in Vermont and the region.

## VERMONT'S NOX EMISSIONS SOURCES

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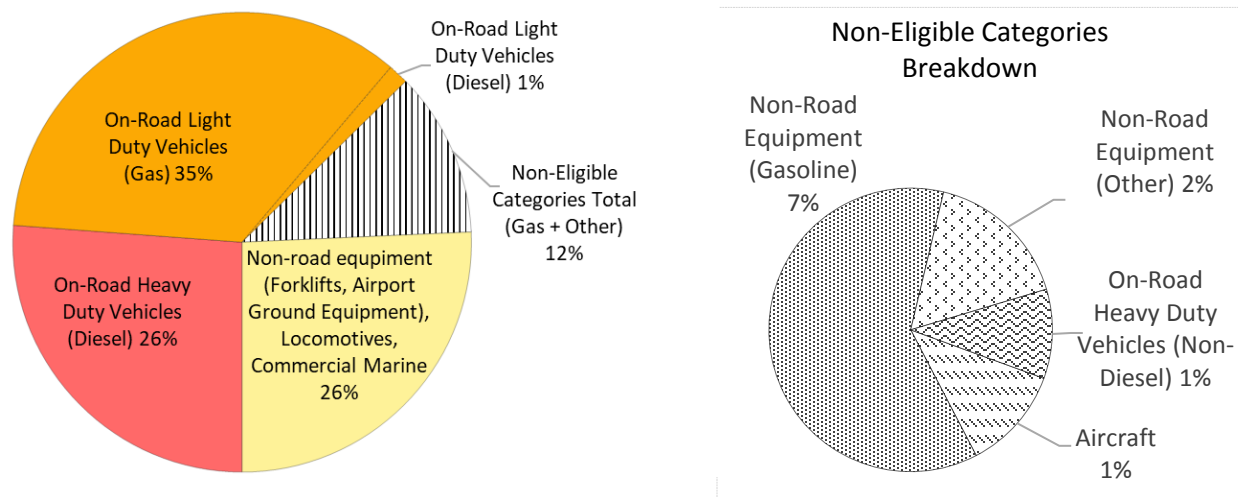
Vermont mobile sources, covered within the categories of eligible projects, have annual NOx emissions of approximately 8,700 tons.<sup>12</sup> This total includes emissions from on-road heavy duty diesel vehicles, non-road equipment, locomotives, and commercial marine vessels, and on-road light duty gasoline and diesel vehicles. NOx emissions from light duty gasoline vehicles have been included in the eligible mobile sources total since a portion of the mitigation fund can be used for EVSE, which will help to mitigate emissions from this source category (although light duty vehicles themselves are not eligible for replacement/repower). Of the eligible categories (see Section II), on-road light duty gasoline and diesel vehicles accounted for the highest percentage of emissions at 36%, with on-road heavy duty diesel vehicles as the second highest source category at 26% of the total. Mobile non-road equipment, locomotives, and commercial marine vessels were the next largest contributors at 26% (Figure 2). The on-road heavy duty diesel vehicles category is mostly comprised of large freight trucks, transit buses, shuttle buses, and school buses, the non-road diesel category is made up of vehicles such as construction

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<sup>12</sup> EPA – NEI 2014v1: <https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data>

equipment, logging equipment, and farming equipment, and the on-road light duty fleet consists of gasoline and diesel-powered passenger cars and light trucks.

Figure 2 - Vermont NOx Emissions from Mobile Sources (NEI 2014 v1 - EPA)



Note: Totals may not sum exactly due to independent rounding

A substantial fraction of the diesel NOx emissions (Figure 2) are attributable to the operation of older engines and technologies. By replacing these older vehicles with newer models, equipped with more advanced emission control technologies, and certified to much stricter emissions standards, or producing no tailpipe emissions, significant progress can be made in reducing NOx emissions in Vermont. Engine upgrades decrease emissions and provide potential fuel efficiency improvements.

Currently, there are three main initiatives in Vermont focusing on the reduction of emissions from diesel engines:

- The Diesel Emissions Reduction Program (DERA)<sup>13</sup> is the primary initiative. This program is administered by the Vermont Department of Environmental Conservation, Air Quality and Climate Division, Mobile Sources Section, and provides funding and technical assistance for vehicle and equipment replacements, as well as idle reduction and exhaust control retrofit technologies.
- The Vehicle Inspection and Maintenance program mandates an annual inspection to ensure that vehicles in Vermont meet safety standards, and that light duty car and truck components that reduce emissions are functioning properly. Although the Inspection and Maintenance program does not focus exclusively on diesel vehicles, it does reduce diesel emissions by ensuring the emissions reduction equipment is operational in applicable vehicles registered in the state. The recent introduction of an electronic data collection and management system (known as the Automated Vehicle Inspection Program or AVIP) is providing significant benefits including improved accuracy, reduced fraud, more efficient and effective enforcement, elimination of

<sup>13</sup> VT DEC – Mobile Sources: <http://dec.vermont.gov/air-quality/mobile-sources>



existing paperwork, enabling effective communication with inspection stations, and reduced costs to the state.

Using VW EMT funding for eligible projects provides a valuable opportunity to significantly augment existing activities to reduce diesel emissions of NO<sub>x</sub>, as well as other pollutants such as air toxics and greenhouse gas emissions from the transportation sector in Vermont. Mobile sources are the largest contributor to emissions of these pollutants in the state, and accordingly are a fundamental area of focus for the mitigation of air pollution to protect human health and the environment.

## SECTION I: VERMONT'S OVERALL GOAL FOR USE OF THE ENVIRONMENTAL MITIGATION TRUST ALLOCATION

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Overall Goal: Vermont will work to implement its Trust allocation under the EMT to:

- **REDUCE** NO<sub>x</sub> emissions from mobile sources, eligible for replacement or repower, in the most cost-effective way possible;
- **DEMONSTRATE** the feasibility of all-electric or other NO<sub>x</sub> mitigating alternatively fueled heavy-duty and transit vehicles and begin to catalyze market transformation; and
- **MAXIMIZE** public and private investment in electric vehicle charging infrastructure.

Cost effective NO<sub>x</sub> reductions can be achieved by prioritizing eligible projects that provide the lowest cost per pound of NO<sub>x</sub> reduction achieved within each eligible project category described in Section II of this document. Vermont will balance implementation of eligible projects that will improve air quality and maximize cost-effective NO<sub>x</sub> reductions in Vermont with the second prong of the goal: incentivizing and demonstrating feasibility of replacement with all-electric or other NO<sub>x</sub> mitigating alternative fuels to achieve co-benefits of NO<sub>x</sub> reduction. The third prong of the goal focuses on light-duty vehicle charging, which is a reflection of Vermont's commitment to use 15% of its trust allocation (the maximum allowed under the Trust Agreement) to fund electric vehicle charging stations in strategic locations across Vermont. Project funding priorities are listed below and will be used to inform ultimate selection of eligible projects to be funded.

Vermont's overall goal is grounded in the assessment of:

- Current NO<sub>x</sub> emissions from mobile sources;
- Existing air quality and regulatory programs in Vermont geared towards emission reductions from mobile sources;
- Equity considerations for distribution of funds throughout the entire state;
- Locations where populations are most vulnerable to the health impacts of air pollution due to background air quality, exposure to diesel emissions, and individual risk factors; and
- The air quality issues unique to Vermont given its largely rural landscape.

While the EMT encourages beneficiaries to achieve the greatest air quality benefit in terms of NO<sub>x</sub> emission reductions, public and environmental exposure to various air pollutants, including PM<sub>2.5</sub>, black carbon, and ground level ozone, or smog will also be reduced.

## FUNDING PRIORITIES FOR ELIGIBLE PROJECTS

Funding priorities inform Vermont's project qualification and selection criteria. The funding priorities, while not required to be articulated in the BMP, are vital in shaping the project selection criteria and will ensure that projects funded support Vermont's overall goal outlined in this Section.

- Project qualification will be based on a proposed project's compliance with the eligible projects (see Section II) described in Appendix D of the partial settlement and other qualification criteria set by the State.
- Project selection criteria will be based primarily on Vermont's overall goal for use of its allocation of the EMT, as described above, and project funding priorities such as time critical applicability factors, like eligible model years.

Actual expenditures from Vermont's allocation of the EMT will also be dependent upon interest levels and the number of applications received.

Funding priorities include:

- Projects that achieve the greatest NOx emission reduction or offset per amount funded through the EMT (i.e., capital cost effectiveness in VW Trust fund dollars/pound of NOx reduced<sup>14</sup>);
- Projects demonstrating that the replacement/repower if funded would occur earlier than it normally would have;
- Projects that include a cost share above and beyond the minimum required or leverage other third-party funding, especially in the case of heavy-duty electrification projects where the cost of the technology is expected to become lower as the technology advances;
- Projects that affect public transportation and result in increased ridership and/or expanded routes and schedule;
- Projects in areas that receive a disproportionate quantity of air pollution from diesel fleets such as but not limited to schools, rail yards, truck stops, airports, terminals, and bus depots;
- Projects that can be implemented efficiently and within 18 months of approval;
- Projects that ensure feasibility of deployment and technology that can be supported in continued operation for the life of the equipment/vehicle;
- Projects that promote other statewide energy, environmental, health, and economic development goals, such as the Comprehensive Energy Plan and the Zero Emissions Vehicle MOU and Multi-State Action Plan;
- Projects that result in emissions and air quality co-benefits, such as a reduction in greenhouse gases, particulate matter, and other emissions;
- Project proposals from government and non-government entities with demonstrated experience and existing administrative and programmatic structure in place for implementing diesel emission reduction projects;

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<sup>14</sup> Project cost effectiveness will be determined as EMT funded project cost divided by the total emissions reductions associated with the project, as estimated using the EPA Diesel Emissions Quantifier (DEQ) tool, or the Argonne National Laboratory AFLEET tool, and the necessary applicant supplied information. Emissions reductions estimates may incorporate lifecycle emissions and cost calculations where appropriate, and when the necessary upstream information is available to inform these calculations.

- Projects demonstrating feasible and supported all-electric powered alternatives in each mobile source sector;
- Project proposals for electric replacement or repower that demonstrate coordination with the local utilities, and charging of these electric replacements or repowers is managed to promote affordability of the electric system by ensuring projects are not adding to peak demand;
- Project proposals that target investments in locations that maximize health benefits, especially to those populations most vulnerable to the health impacts of air pollution – youngest, oldest, compromised respiratory and cardiovascular systems – and over-burdened and under-resourced communities;
- Project proposals that commit to implementation of project sustainability measures above and beyond what is required in the EMT and other emission control measures, such as fleet idle reduction; and
- Project proposals for electric vehicle replacement/repower or electric vehicles supply equipment where charging stations or infrastructure are powered by the cleanest available energy sources.

It is important to note that this BMP is a living document and will continue to be updated over the life of the EMT. Funding priorities are subject to change based on air quality or other relevant data, the level of interest in various sectors, and other applicable factors. The Agency will provide any updates of the BMP to the Trustee and post the updated versions online. Funding priorities are not necessarily project selection criteria but will be used to shape the project selection criteria that will be used to decide which eligible projects to fund from Vermont’s allocation of the EMT.

## SECTION II: ELIGIBLE PROJECT CATEGORIES AND PROPOSED FUNDING ALLOCATIONS

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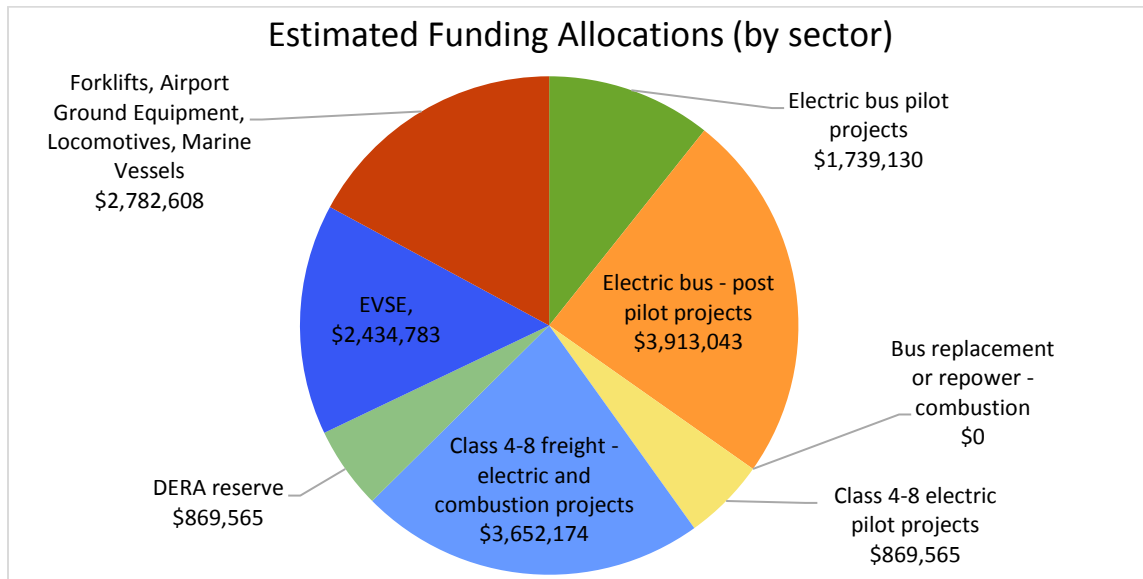
The categories of eligible projects deemed appropriate to achieve the stated goals in this plan take into consideration mobile source NOx emission sources for Vermont (Figure 2) as well as public comments received. Actual expenditures from the EMT will also take into account the overall goal and funding priorities stated in Section 1, the level of interest in a particular eligible project category, the type and number of applications received, and other factors discussed in this document.

Expenditures from the EMT can only be used for eligible non-government and government projects that are specified in Appendix D-2 of the Partial Consent Decree. During fiscal year 2019 project funding will focus solely on electric replacement or repower projects and EVSE deployment. Cost sharing percentages for expenditures on vehicles and equipment are specified in Appendix D-2 of the Partial Consent Decree and cannot be exceeded. The following categories of eligible projects, including anticipated benefits, are expected to be appropriate to achieve the overall goal of Vermont’s BMP.

Table 1 - Funding Allocation for Eligible Project Categories

Eligible Project Category	Funding Allocation Percentage	
<b>Light Duty Electric Vehicle Supply Equipment (EVSE)</b>	<b>15%</b>	
<b>On-Road Heavy Duty Vehicles</b>		
➤ School, Transit, Shuttle Buses – Electric Pilot Program	11%	<b>63%</b>
➤ School, Transit, Shuttle Buses – Electric (Post-Pilot)	24%	
➤ School, Transit, Shuttle Buses – Combustion	0%	
➤ Class 4-8 Local Freight Trucks – Electric Pilot Program	5%	
➤ Class 4-8 Local Freight Trucks – Electric (Post-Pilot) and/or combustion	23%	
<b>Non-Road Equipment (Forklifts and Airport Ground Support Equipment), Locomotives and Marine Vessels</b>	<b>17%</b>	
<b>DERA Reserve (includes other emission reduction technologies for on-road and non-road projects)</b>	<b>5%</b>	
<b>Total (includes a 15% administrative reserve)</b>	<b>100%</b>	

Figure 3 - Estimated Funding Allocations



Note: Estimated Funding Allocations represent project costs only, not including the administrative reserve

### LIGHT DUTY ELECTRIC VEHICLE SUPPLY EQUIPMENT (ELECTRIC AND HYDROGEN FUEL CELL SUPPLY)

The light duty vehicle fleet generates the largest percentage of NOx emissions from mobile sources in the state, approximately 3,500 tons, or 37% of the total in 2014. Light duty vehicle replacement/repower in this sector are not eligible under Appendix D-2. VW has committed to directly address the affected 2.0 and 3.0-liter diesel vehicles as outlined in Appendices A and B of the partial consent order through a buy-back and recall program which is currently underway. However, NOx mitigation efforts in the light duty vehicle fleet can be advanced through the installation of EVSE.

Up to 15% of the available funding may be used to install EVSE. This will help to increase the rate of adoption of electric vehicles and advance the electric vehicle market throughout the state. This plan will utilize the total allowable funds (15% of Vermont's Trust allocation – or approximately 2.8 million dollars including potential administrative costs) for the deployment of EV charging infrastructure to help offset emissions from the light-duty vehicle sector (both diesel and non-diesel). This funding allocation is dependent on the number of eligible applications received and may be adjusted based on level of interest.

**Eligible project Types:** The acquisition, installation, operation and maintenance of new EVSE for light duty vehicles.

- Level 1, Level 2 or fast charging equipment - DCFC (or analogous successor technologies) that is in a public place, workplace, or multi-unit dwelling and is not consumer light duty EVSE (i.e., not located at a private residential dwelling that is not a multi-unit dwelling), and
- Hydrogen fuel cell vehicle supply equipment includes hydrogen dispensing equipment capable of dispensing hydrogen at a pressure of 70 megapascals (MPa) (or analogous successor technologies) that is located in a public place.

**Expenditures for EVSE:**

- Up to 100% of the cost to purchase, install and maintain eligible light duty electric vehicle supply equipment that will be available to the public at a Government owned property.
- Up to 80% of the cost to purchase, install and maintain eligible light duty electric vehicle supply equipment that will be available to the public at a Non-Government owned property.
- Up to 60% of the cost to purchase, install and maintain eligible light duty electric vehicle supply equipment that is available at a workplace but not to the general public.
- Up to 60% of the cost to purchase, install and maintain eligible light duty electric vehicle supply equipment that is available at a multi-unit dwelling but not to the general public.
- Up to 33% of the cost to purchase, install and maintain eligible light duty hydrogen fuel cell vehicle supply equipment capable of dispensing at least 250 kg/day that will be available to the public.
- Up to 25% of the cost to purchase, install and maintain eligible light duty hydrogen fuel cell vehicle supply equipment capable of dispensing at least 100 kg/day that will be available to the public.

*\*Note: Expenditure percentages are specified in Appendix D-2 of the Partial Consent Decree and cannot be exceeded.*

The EVSE program, along with the minimum and priority criteria, are being established by an interagency working group which includes; the Department of Environmental Conservation, Agency of Commerce and Community Development, Department of Public Service, Agency of Transportation, and the Department of Health. The EVSE program will be administered by the Agency of Commerce and Community Development, with support from the Department of Environmental Conservation. The focus of the group is to establish a robust network of appropriately sited charging stations throughout the state which will help promote EV adoption and alleviate range anxiety and other charging concerns. Locations of particular interest include major travel corridors, workplaces, state designated centers, tourist destinations, and multi-unit dwellings (MUDs). Additional information and criteria for the EVSE program will be released prior to the program start date, which is anticipated to begin in June of 2018.

## ON-ROAD HEAVY DUTY DIESEL VEHICLES

On-Road Heavy Duty Diesel Vehicles emitted over 2,500 tons of NO<sub>x</sub> in Vermont in 2014. This makes them the second largest contributor of NO<sub>x</sub> from the mobile sources sector, behind on-road light duty gas-powered vehicles and the largest source of diesel emissions in the state, at just over 26% of the total NO<sub>x</sub> emissions. Taking into account the goals and priorities listed in Section I of this document, Vermont is allocating 63% of Vermont's Trust allocation to On-Road Heavy Duty Diesel Vehicles. This funding allocation is dependent on the number of eligible applications received and may be adjusted based on level of interest.

### **Eligible project Types:**

- Class 8 Local Freight Trucks (Eligible Large Trucks);
- Class 4-8 School Bus, Shuttle Bus or Transit Bus (Eligible Buses); and
- Class 4-7 Local Freight Trucks (Eligible Medium Trucks).

Eligible trucks (engine model years 1992-2009) and eligible buses (engine model year 2009 and older) may be repowered with any new diesel or alternative fueled engine or all-electric engine or may be replaced with any new diesel or alternative fueled or all-electric vehicle, with the model year in which the eligible project occurs or one engine model year prior.

At this time, Vermont does not plan to allocate any funds towards the replacement of older diesel buses with buses using newer combustion technologies. This will focus bus replacement funds solely on all-electric technologies. While electric buses are currently being deployed in various settings across the United States, demonstration and pilot projects are still needed to help Vermonters understand the feasibility and applicability of this type of technology in Vermont. Therefore, Vermont is allocating approximately 11% of the Trust allocation to an electric bus pilot program to be implemented in fiscal year 2019. Approximately 24% of the Trust allocation will be reserved for use at the successful conclusion of the pilot program to further the adoption of electric buses in Vermont. The amount set aside in this reserve will be revisited at the end of the pilot program to determine if other types of technologies, including combustion, should be considered given the results of the pilot projects, and other considerations such as model year restrictions.

Vermont is allocating approximately 5% of funds to a pilot program aimed at studying the feasibility of Class 4-8 heavy-duty vehicle electrification. Implementation of this pilot program will depend on interest and availability of applicable technology, which is not expected until after 2020. Given that Class 4-8 heavy duty all-electric truck technology is not widely deployed in the United States at this time, approximately 23% of the Trust allocation are being reserved for additional replacement/repower of Vermont's Class 4-8, heavy-duty diesel fleet with new diesel or alternative fueled or all-electric engines and vehicles. Continued use of this reserve will be revisited after the pilot program and each year as all-electric technology advances in this sector and as model year availability of eligible projects exists.

### **Expenditures for Non-Government Owned Eligible Large and Medium Trucks, and Eligible Buses:**

- Up to 40% of the cost of a repower with a new diesel or alternative fueled engine, including the costs of installation of such engine.
- Up to 25% of the cost of a new diesel or alternative fueled vehicle.
- Up to 75% of the cost of a repower with a new all-electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new all-electric engine.
- Up to 75% of the cost of a new all-electric vehicle, including charging infrastructure associated with the new all-electric vehicle.

### **Expenditures for Government Owned Eligible Large and Medium Trucks, and Eligible Buses:**

- Up to 100% of the cost of a repower with a new diesel or alternative fueled engine, including the costs of installation of such engine.
- Up to 100% of the cost of a new diesel or alternative fueled vehicle.
- Up to 100% of the cost of a repower with a new all-electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new all-electric engine.
- Up to 100% of the cost of a new all-electric vehicle, including charging infrastructure associated with the new all-electric vehicle.

*\*Note: Expenditure percentages are specified in Appendix D-2 of the Partial Consent Decree and cannot be exceeded.*

## **LOCOMOTIVES, MARINE VESSELS, AND NON-ROAD DIESEL EQUIPMENT (FORKLIFTS AND AIRPORT GROUND SUPPORT EQUIPMENT)**

Emissions from non-road diesel equipment, locomotives, and marine vessels accounted for approximately 26% of NOx emissions from mobile sources in Vermont in 2014. Although not all categories which comprise this percentage are eligible under Appendix D-2, additional project categories which contribute to this sector are potentially eligible through the Diesel Emissions Reduction Act (DERA) option listed below. Vermont proposes to allocate approximately 17% of the Trust allocation towards repowering or replacing a combination of eligible Locomotives, Marine Vessels, Airport Ground Support Equipment, and Forklifts. This funding allocation is based on the large NOx contribution from these sectors, as well as the long lifetimes of the equipment. At this time Vermont is not determining specific funding allocations for categories within this sector given that there is insufficient data to inform the number of eligible projects within each category. The funding allocation also depends on the amount of eligible applications received.

### **Eligible project Types:**

Non-Road Diesel Equipment: Airport Ground Support Equipment and Forklifts

- Airport ground support equipment eligible for replacement includes Tier 0, Tier 1, or Tier 2 diesel powered equipment; and uncertified, or certified to 3 grams per brake horsepower-hour (g/bhp-hr) or higher emissions, spark ignition engine powered equipment. Eligible forklifts include reach stackers, side loaders, and top loaders with greater than 8,000 pounds lift capacity.

#### Locomotives: Freight Switchers

- Freight switchers eligible for replacement include pre-Tier 4 switcher locomotives that operate 1,000 or more hours annually. Eligible freight switchers may be repowered with any new diesel or alternative fueled or all-electric engine(s) (including generator sets), or may be replaced with any new diesel or alternative fueled or all-electric (including generator sets) freight switcher, that is certified to meet the applicable EPA emissions standards (or other more stringent equivalent State standard) as published in the CFR for the engine model year in which the mitigation action occurs.

#### Marine Vessels: Ferries

- Ferries eligible for replacement include those powered with unregulated, Tier 1, or Tier 2 marine engines. Eligible ferries may be repowered with any new Tier 3 or Tier 4 diesel or alternative fueled engines, or with all-electric engines, or may be upgraded with an EPA Certified Remanufacture System or an EPA Verified Engine Upgrade.

### **Allowable Funding Percentages and Expenditures**

#### **Non-road Diesel: Forklifts and Airport Ground Support Equipment**

##### **Expenditures for Non-Government Owned Eligible Forklifts and Airport Ground Support Equipment:**

- Up to 75% of the cost of a repower with a new all-electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new all-electric engine.
- Up to 75% of the cost of a new all-electric piece of equipment, including charging infrastructure associated with the new all-electric equipment.

##### **Expenditures for Government Owned Eligible Forklifts and Airport Ground Support Equipment:**

- Up to 100% of the cost of a repower with a new all-electric engine, including the costs of installation of such engine and charging infrastructure associated with the new all-electric engine.
- Up to 100% of the cost of a new all-electric piece of equipment, including charging infrastructure associated with the new piece of equipment.

#### **Locomotives: Freight Switchers**

##### **Expenditures for Non-Government Owned Freight Switchers:**

- Up to 40% of the cost of a repower with a new diesel, alternative fuel engine(s) or generator sets, including the costs of installation of such engine(s).
- Up to 25% of the cost of a new diesel or alternative fuel freight switcher.
- Up to 75% of the cost of a repower with a new all-electric engine(s), including the costs of installation of such engine(s), and charging infrastructure associated with the new all-electric engine(s).
- Up to 75% of the cost of a new all-electric freight switcher, including charging infrastructure associated with the new all-electric freight switcher.



### **Expenditures for Government Owned Freight Switchers:**

- Up to 100% of the cost of a repower with a new diesel or alternative fueled engine, including the costs of installation of such engine for freight switchers.
- Up to 100% of the cost of a new diesel or alternative fueled freight switcher.
- Up to 100% of the cost of a repower with a new all-electric engine(s), including the costs of installation of such engine(s), and charging infrastructure associated with the new all-electric engine(s).
- Up to 100% of the cost of a new all-electric freight switcher, including charging infrastructure associated with the new all-electric freight switcher.

### **Marine Vessels: Ferries**

#### **Expenditures for Non-Government Owned Eligible Ferries:**

- Up to 40% of the cost of a repower with any new Tier 3 or Tier 4 diesel or alternative fuel engine(s), including the cost of installation of such engine(s).
- Up to 75% of the cost of a repower with any new all-electric engine(s), including the cost of installation of such engine(s).

#### **Expenditures for Government Owned Eligible Ferries:**

- Up to 100% of the cost of a repower with any new Tier 3 or Tier 4 diesel, alternative fuel, or all-electric engine(s), including the cost of the installation of such engine(s) and the charging infrastructure associated with the all-electric engine(s).

*\*Note: Expenditure percentages are specified in Appendix D-2 of the Partial Consent Decree and cannot be exceeded.*

## **DIESEL EMISSION REDUCTION ACT (DERA) OPTION**

Emissions related to the DERA option sectors are difficult to quantify, as they are dependent upon the particular sources and sectors that are selected. Estimated emission reductions will be calculated based on specific sources and projects funded through the DERA program option. Vermont is reserving 5% of its Trust allocation for DERA eligible projects. Continued use of this reserve will be reevaluated each year as technologies advance and interest levels change.

**Eligible project Types:** Under the State DERA Program, a larger variety of diesel emission sources and projects become eligible for funding. Actions not specifically enumerated as an eligible project in Appendix D-2, but otherwise eligible under DERA pursuant to all DERA guidance documents available through the EPA include, but not limited to, the following emission sources and project types:

#### *Additional Emission Sources*

- Any On-Road Class 5-8 not eligible under Appendix D-2
- Line-Haul Locomotives
- All Commercial Marine Vessels
- Non-Road Engine, Equipment & Vehicles used in agriculture, construction, cargo handling, mining, or energy production (including stationary generators)

### Additional Project Types

- Exhaust Controls
- Engine Upgrades
- Cleaner Fuel Use
- Idle Reduction Technologies
- Aerodynamic Technologies and Low Rolling Resistance Tires

Any source type applying for grant funding will be subject to the requirements of the State DERA Program, including but not limited to general eligibility, project evaluation criteria, eligible project and administrative expenditures, cost-share, and funding restrictions. Although the DERA option may be used to fund projects that are ineligible under Appendix D-2, DERA requirements are generally more stringent and limiting than the eligibility criteria under Appendix D-2.

### ADMINISTRATIVE RESERVE

The EMT Agreement allows beneficiaries to spend up to 15% of project costs associated with eligible projects on administrative activities, including personnel costs, travel, supplies, contracted services, and other professional and accounting related expenses. Vermont will balance the need to be flexible in administering the EMT, given the varying degrees of complexity associated with each eligible project, with the goal of being as cost effective as possible. Vermont will therefore reserve 15% of eligible project costs for administrative expenses. Actual administrative expenses associated with each project will vary, and any unused funds in this reserve will be reallocated to fund additional eligible projects over the life of the EMT.

An administrative reserve amount of 15% is built into each of the funding allocations for eligible projects listed in Figure 3, above.

## SECTION III: CONSIDERATION OF IMPACT OF FUNDING PRIORITIES ON AIR QUALITY IN AREAS THAT BEAR A DISPROPORTIONATE SHARE OF THE AIR POLLUTION BURDEN IN VERMONT

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In addition to consideration of the eligible project category priorities, Vermont will give priority to eligible projects located in areas that receive a disproportionate quantity of air pollution from diesel fleets, and that are most vulnerable to negative health impacts due to air quality, exposure to diesel emissions, and individual risk factors. Locations with concentrated diesel emissions may include:

- Truck stops (e.g. places especially for truckers that are usually by a highway or interstate and that include a parking area, fueling services, and other facilities),
- Rail yards (e.g. places at which trains originate or terminate, or at which they are distributed or combined),
- Terminals (e.g. freight or passenger stations at the end of carrier lines, or that serve as junctions at any point with other lines, that have facilities for the handling of freight and passengers),

- Construction sites (e.g. sites of ongoing large-scale commercial, industrial, or heavy civil construction),
- School bus depots/yards (e.g. parking areas and/or garages where school buses are stored and maintained, or where school buses queue),
- Airports,
- Areas near high diesel-powered vehicle traffic roadways (truck routes),
- Distribution centers (e.g. facilities that perform consolidation, warehousing, packaging, decomposition and other functions linked with handling freight, often in proximity to major transport routes or terminals, and which generate large amounts of truck traffic), and
- Truck and Bus maintenance facilities.

Locations where individuals may be more affected by diesel emissions include:

- Areas with poor air quality;
- Areas with high concentrations of human activity in close proximity to diesel emission sources;
- Areas with high numbers of children or older adults, including schools, childcare facilities, senior housing communities, and medical or assisted living facilities;
- Areas where the population experiences high prevalence of respiratory or cardiovascular disease; and
- Over-burdened and under-resourced communities.

## SECTION IV: EXPECTED EMISSIONS BENEFITS IN VERMONT

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The replacement, repower, or retrofit (under the DERA option) of eligible vehicles and equipment may provide a wide range of emission benefits based on many variables, including the type of vehicle or engine replaced, the initial age of the engine, and the engine power rating.

Expected general benefits include, but are not limited to:

- Reduced public exposure to diesel engine exhaust, which the EPA classifies as *likely to be carcinogenic* to humans, by inhalation from environmental exposures,
- Improved ambient air quality and human health in communities located in areas that bear a disproportionate share of the air pollution burden, as well as benefits to the local economy, and the welfare of residents in such communities,
- Tons of air pollution reduced over the lifetime of the engines/vehicles, specifically, NO<sub>x</sub>, PM<sub>2.5</sub>, air toxics, and greenhouse gases, and
- Net reduction in gallons of diesel fuel and/or other fossil fuels used.

Specific emissions reduction benefits will vary depending on selected technology and fuel type and usage. Based on the US EPA's Diesel Emissions Quantifier (DEQ)<sup>15</sup>, emissions benefits from a variety of example projects of each eligible category include (based on current EPA exhaust emission standards for NOx):

- Heavy duty highway trucks (examples include eligible large and medium trucks) may provide up to a 96% reduction in NOx emissions per vehicle, depending on the model year of the vehicle being replaced with a new diesel vehicle,
- Heavy duty highway buses (examples include school and transit buses) may provide up to a range of 79% - 96% reduction in NOx emissions per vehicle, depending on the model year of the vehicle being replaced and whether the replacement vehicle is diesel or electric,
- Locomotives, replacing the oldest (Tier 0) engine with the newest (Tier 4) diesel engine may provide up to an 89% NOx reduction per engine,
- Commercial marine vessels, an upgrade or repower of a ferry engine may provide up to an 80% NOx reduction for each vessel,
- Non-road equipment (forklifts and airport ground support equipment) replacements may provide up to a 100% reduction in NOx tailpipe emissions per piece of equipment, based on replacing a diesel engine or piece of equipment with an all-electric model,
- Non-road equipment (under the DERA option) replacements, depending on the type of equipment and engine power rating, may provide between a 20% and 95% reduction in NOx emissions for each engine.
- EVSE installations will promote the expansion of the electric vehicle market in Vermont by providing the infrastructure critical to the more widespread adoption of these vehicles. This expansion will help to mitigate NOx emitted by the light duty vehicle fleet, which is the largest contributing sector in the state. Exact NOx emissions benefits from each installation will vary, depending on utilization of the installation, the type of vehicles charged, and the source of the electricity used to charge the vehicles. Replacing a light-duty passenger vehicle with a Plug-in Hybrid Electric Vehicle (PHEV) or a Battery Electric Vehicle (BEV) may provide a 40 – 76% reduction in NOx emissions<sup>16</sup>.

It is important to note that the range of emission benefits mentioned above are for individual engines and actual NOx emissions reductions will vary based on the type of eligible projects received for funding consideration and the eligible projects ultimately funded. However, to achieve the goals of the BMP, it is a priority to fund sizeable projects designed to achieve the greatest emission reduction for the dollar (i.e., capital cost effectiveness in VW Trust fund dollars/pound of NOx reduced), and to act as a catalyst for public and private investments into vehicular retrofit, repower and replacement to further mitigate NOx and other air pollutant emissions.

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<sup>15</sup> Emissions reductions estimates from replacing a diesel vehicle with an electric vehicle include the emissions associated with the electricity generated to power that vehicle. The emissions from electricity generation are not accounted for in the DEQ, so the calculations are based on the annual kWh usage by the vehicle and an ISO New England average NOx emission rate.

<sup>16</sup> This emissions benefit calculation assumes 0.32 kWh/mi for the BEV and 0.367 kWh/mi for the PHEV, 55% miles on electricity for the PHEV, an annual VMT of 12,000 miles, an electricity generation NOx rate of 0.00035 lbs/kWh, and an average auto emission factor for NOx of 0.00047 lbs/mi (2013 model year). Source: US DOE Alternative Fuels Data Center, 2015 ISO-NE Average Annual NOx Emissions Rate, and ARB – Emission factor Table 3A – Methods to Find the Cost Effectiveness of Funding Air Quality Projects.

## NEXT STEPS

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The Partial Consent Decree requires that Vermont involve the public in its development of the BMP. As stated above, Vermont sought comment on the Draft BMP and has published a Responsiveness Summary that includes a summary of public comments received, responses to those comments and how comments are addressed in the final BMP.

### FINALIZATION OF MITIGATION PLAN

The BMP will be published online and submitted to the EMT Trustee in accordance with the requirements of the Partial Content Decree. Note that the BMP is subject to change, as described above, in the event that Vermont's goals or priorities need to change to adapt to eligible project interest, funding and feasibility. In the event that any major components of the finalized BMP are amended, those amendments will be submitted to the VW Trustee and will be made available to the public online.

### NEXT STEPS

Funding from the Trust will be made available to Vermont 30 days after the BMP is accepted by the VW Trustee. Project funding priorities will be used to finalize project selection criteria for eligible project categories and requests for proposals and/or information will be made available to the public to give notice of funding opportunities. ANR will maintain and periodically update the Vermont VW Environmental Mitigation Trust website (<http://dec.vermont.gov/air-quality/vw>) with new information and funding opportunities.

### FOR MORE INFORMATION

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