

# **Volkswagen Environmental Mitigation Trust**

## ***Draft Beneficiary Mitigation Plan for Texas***

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Air Quality Division

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## Preamble

The Texas Commission on Environmental Quality (TCEQ) is pleased to present this draft *Beneficiary Mitigation Plan for Texas* for public review and comment, prior to the TCEQ issuing a final plan. This plan is proposed in accordance with the Environmental Mitigation Trust Agreement for State Beneficiaries (Trust Agreement) that resulted from litigation between Volkswagen (VW) and its related entities and the United States Environmental Protection Agency (EPA) and State of California. Background on the purpose of the agreement and the allocation of funds under the agreement are explained in the plan.

The TCEQ invited public comments and recommendations for development of this draft plan. Several of the major recommendations received are explained below, along with the TCEQ's proposed approach for dealing with the issue(s) discussed in those recommendations. The priorities, criteria, and processes outlined in this draft plan should be considered preliminary and subject to final decisions by the TCEQ. The TCEQ is interested in hearing from the public regarding this draft plan before making final decisions on implementation of the VW funding program.

The TCEQ received numerous comments from individuals and groups expressing their support for funds to be used to implement various technologies and different alternative fuels or electricity for vehicles and equipment. Those comments explained the benefits of specific technologies or fuels, compared to other technologies or fuel types. In addition, some entities and individuals interested in encouraging the use of natural gas and propane recommended that the percentage of cost limits for electric vehicles and engines be set at the same level as for natural gas and propane, to ensure a level playing field between electric and alternative fuel vehicles and equipment.

In implementing the state-funded Texas Emissions Reduction Plan (TERP) grant programs, the TCEQ has taken a fuel-neutral approach to the extent possible, except for those programs established by the legislature to specifically support use of one or more alternative fuels. The TCEQ has recommended that grant applicants research the available technologies and determine what types of vehicles, equipment, and fuels will work best to meet their needs, while achieving the desired reductions in nitrogen oxides (NO<sub>x</sub>).

The TCEQ also seeks to be fuel-neutral in implementing this plan, while expanding NO<sub>x</sub>-reduction opportunities by complimenting TERP. However, the Trust Agreement specifically promotes specific fuels. The draft plan includes the same cost percentages as set out in the Trust Agreement, with several exceptions. For projects to replace or repower government-owned vehicles or equipment and projects to replace or repower privately-owned vehicles or equipment with all-electric models, the plan sets a limit of

60% of costs to ensure that applicants have a financial stake in the project (for privately-owned vehicles or equipment replaced or repowered with diesel or alternative fuel models, the plan provides the maximum reimbursement allowed under the Trust Agreement; i.e., 25% for replacements or 40% for repowers). Similarly, a limit of 50% of eligible costs is set for light-duty zero emission vehicle (ZEV) electric charging equipment projects. Limits on hydrogen fueling stations for hydrogen fuel cell vehicles are set according to the Trust Agreement.

Certain stakeholders recommended that the TCEQ take a longer-term view in using the funds, including setting aside a percentage of the funding to provide an incentive for companies involved in developing new generations of electric vehicles and charging systems to locate in Texas. The incentive to these manufacturers would be the expectation that the funds would be available for grants for the purchase of the new vehicles and technologies, as those are developed.

Encouraging new technology manufacturers to locate in Texas and to spur faster development and implementation of new technologies is a valid goal for the state. However, the purpose of this program is to help mitigate the excess NO<sub>x</sub> emissions from the affected VW vehicles, particularly in areas impacted by ground-level ozone as a result of those emissions. Through this plan, the TCEQ intends to implement the grant projects quickly and efficiently to hasten the air quality benefits, as well as limit administrative costs. While it is possible that delaying project funding could provide manufacturers with additional incentives to bring new vehicle and equipment technologies to Texas, such an approach would delay the public health and economic benefits of reducing NO<sub>x</sub>. And as it relates to achieving the National Ambient Air Quality Standards (NAAQS), the economic consequences are significant.

Comments were received recommending that the funding be allocated to areas based on the number of affected VW vehicles that were registered in each county. The TCEQ determined that this approach would not best correspond to the need to address air quality issues in the state. In addition, past vehicle registration data does not necessarily reflect the current status and location of the vehicles or where the vehicles may operate, particularly when considering the buy-back program being implemented by VW.

A primary purpose of the Trust Agreement is to mitigate NO<sub>x</sub> emissions especially in regards to impacted communities. Those communities most impacted are those that likely had additional emissions from the vehicles under the consent decree that are measuring levels at or above the National Ambient Air Quality Standard for ozone. NO<sub>x</sub> is the limiting ozone precursor in the three areas in Texas that are designated nonattainment for the ozone NAAQS and thus very important in lowering or maintaining ground level ozone levels.

Specifically, the Dallas-Fort Worth (DFW), Houston-Galveston-Brazoria (HGB), and San Antonio (Bexar County) areas are currently designated nonattainment for the 2015 ozone NAAQS. Two other areas of primary interest from an ozone NAAQS perspective are El Paso and Beaumont-Port Arthur (BPA). Preliminary data for 2018 indicate that El Paso has some monitored values in excess of the 2015 NAAQS for ozone. The BPA area is considered a priority for mitigation for several reasons. First, the BPA area is under a federally enforceable ozone maintenance plan and was designated nonattainment for the revoked 1997 eight-hour ozone NAAQS. In addition, the BPA area has a history of higher ozone, including the period when the subject vehicles were being sold and driven. Specifically, the BPA area had ozone design values of 80 ppb as recently as 2012 and as high as 92 ppb in 2004. Given this information, coupled with a desire to focus resources in a limited number of geographic areas to maximize the impact of the mitigations actions, the following areas are proposed as Priority Areas under this plan: DFW, HGB, San Antonio, El Paso, and BPA. The draft plan allocates 81% of the funds for projects in these areas.

The plan also includes statewide allocation of up to 15% of the funds for light-duty zero emission vehicle (ZEV) supply equipment. A goal of the plan is to prepare for increased and sustained use of zero emission vehicles. It is appropriate that funds for these projects be made available not only in certain metropolitan areas, but also to provide for electric vehicle charging or hydrogen fuel cell vehicle fueling along major transportation routes and in areas around the state.

Other comments focused on the process of implementing the plan, including recommendations for administration of the funds by regional councils of governments (COGs). The TCEQ agrees that local input should be considered in determining priorities for funding. However, regional administration of the funds would create a complicated administrative process that would increase the administrative costs and implementation timeframes. That approach would also limit the ability of the TCEQ to quickly adjust program priorities and funding criteria to ensure quick and efficient distribution of the funds.

Under the plan, the TCEQ will be responsible for administering the funds. However, the TCEQ will give close consideration to comments and recommendations made by COGs and the Metropolitan Planning Organizations representing local governments in preparing the final plan.

The plan excludes funding for projects involving freight switchers and tugs and tow vessels, which are potentially eligible under the Trust Agreement. These projects are routinely funded under the TERP, and the TERP program provides funding for a greater percentage of the costs of these projects. Also, because of the limited areas where these locomotive and tugs and tow vessels operate, providing the funding under this

mitigation plan may have limited interest given the higher grant award funding available through the TERP program.

Some commenters recommended that the TCEQ apply for the Diesel Emissions Reduction Act (DERA) funds available from the EPA and then include the DERA option for use of the VW funds. Under that option, the VW funds could be used jointly with the DERA funds for other project categories not included in the main eligible VW funding categories, including a broader range of non-road equipment and funding for idle reduction projects. The TCEQ does not propose to apply for and use the DERA funds because DERA funds would result in only a small increase in funds to the TCEQ and would require a significant increase in resources and administrative costs. The TCEQ could apply for DERA funds in the future if it appears that the current eligible categories for the VW funds are not sufficient and the DERA program would offer additional project categories that would help meet the goals of the program.

Additional recommendations and comments not discussed here were also considered and, in some cases, were incorporated into the draft plan.

The TCEQ invites comments on this draft plan and will hold public meetings on the plan at selected locations. To submit comments and to obtain a schedule of the meetings, visit the TCEQ's VW website at [www.TexasVWFund.org](http://www.TexasVWFund.org).

## Background

Governor Greg Abbott selected the Texas Commission on Environmental Quality (TCEQ) as the Lead Agency responsible for the administration of funds received from the Volkswagen State Environmental Mitigation Trust (Trust). The Trust has allocated a minimum of \$209 million dollars to Texas for projects that reduce nitrogen oxides (NO<sub>x</sub>) in the environment.

The Trust is part of an Environmental Mitigation Trust Agreement for State Beneficiaries (Trust Agreement) resulting from litigation between the United States Environmental Protection Agency (EPA), the State of California, and Volkswagen (VW) and its related entities. The EPA and the State of California filed suit in the U.S. District Court for the Northern District of California against VW alleging that VW violated provisions of the Federal Clean Air Act. The suit alleged that approximately 590,000 light-duty 2.0-liter and 3.0-liter diesel vehicles manufactured by VW and its related entities contain emission defeat devices. These devices cause the emissions control system of those vehicles to perform differently during emissions testing compared to performance during normal vehicle operation and use. The subject vehicles emit NO<sub>x</sub> at a level above required standards during normal vehicle operation and use.

The EPA, California, and VW have resolved this case through three partial settlements (Amended 2.0 Liter Partial Consent Decree, 3.0 Liter Second Partial Consent Decree, and Third Partial Consent Decree). As part of the settlement agreements, VW must pay approximately \$2.9 billion into the Trust referenced above. The 50 states, the District of Columbia, and Puerto Rico had the option to elect to become a beneficiary to receive an allocation from the trust. A separate trust was established for allocation of funds to Indian Tribe beneficiaries.

Separately, VW was required to pay \$2 billion to fund a nationwide Zero Emission Vehicle (ZEV) Investment Plan. [Electrify America, LLC](#), was formed to develop and implement the ZEV Investment Plan. Over a 10-year period ending in 2027, Electrify America will invest in ZEV infrastructure and education programs in the United States. Of the \$2 billion available for this effort, \$1.2 billion will be invested nationwide (in states other than California), while \$800 million will be invested in California. As noted later in this document, the TCEQ will also have funds available under the Trust Agreement to fund ZEV infrastructure, and the TCEQ funding will be used to complement and not compete with the efforts of Electrify America.

The funds in the Trust are allocated based on the number of affected vehicles registered within the boundaries of each beneficiary state. Beneficiaries have between three and 10 years to spend their allocated funds on specific types of projects as outlined in the Trust documents. These projects are intended to mitigate the excess NO<sub>x</sub> emissions from the affected vehicles.

On June 29, 2017, the Court appointed Wilmington Trust, N.A. to serve as the trustee for the Trust. The final Trust Agreement was filed and became effective on October 2, 2017. Governor Abbott submitted the necessary certification documents for Texas to be designated a beneficiary state under the plan, and the trustee filed the beneficiary notifications with the Court on January 29, 2018. At that time, Texas became a designated beneficiary with TCEQ as the designated Lead Agency for administering the funds allocated to Texas.

As a next step, the TCEQ must develop a Beneficiary Mitigation Plan (plan) that summarizes how it will use the allocated funds and the plan must be submitted to the trustee at least 30 days prior to submission of the first funding request.

This draft plan has been prepared for discussion and consideration. The TCEQ has solicited input and recommendations from the public and stakeholders through notice on its Volkswagen Environmental Mitigation Trust website at [www.TexasVWFund.org](http://www.TexasVWFund.org). The comments are available online through this website.

This draft plan will be made available for public review and comment for up to a 60-day period. Public meetings will also be held in selected areas. A copy of the draft plan will be made available on the TCEQ's VW website along with a schedule of public meetings. Comments will be posted on the TCEQ's VW website. The final approved plan will be submitted to the trustee in fulfillment of the trust requirements and will be posted at the TCEQ's VW website.

## **Beneficiary Mitigation Plan Elements**

Pursuant to the Trust Agreement, the plan must summarize how the state proposes to use the mitigation funds allocated to it under the settlement agreement. According to the Trust Agreement, the plan must address the following four required elements:

- The state's overall goals for use of the funds.
- The categories of eligible mitigation actions the state anticipates will be appropriate to achieve the goals and a preliminary assessment of the percentages of funds anticipated to be used for each type of eligible mitigation action.
- A description of how the state will consider the potential beneficial impact of the selected eligible mitigation actions on air quality in areas that bear a disproportionate share of the air pollution burden within its jurisdiction.
- A general description of the expected ranges of emissions benefits the state anticipates will be realized by implementation of the eligible mitigation actions identified in the plan.

The plan must also explain the process by which the TCEQ has sought and considered public input on the plan. The TCEQ may adjust the goals and specific spending plans at its discretion.

## Goals

The TCEQ establishes the following goals for use of the mitigation funds to alleviate the air quality impacts from the affected vehicles.

### 1. Reduce NO<sub>x</sub> Emissions

The primary goal for use of the funds will be to reduce NO<sub>x</sub> emissions in those areas with the potential to be most impacted by NO<sub>x</sub> emissions and in particular areas of the state designated nonattainment for National Ambient Air Quality Standards (NAAQS) for ground level ozone and in other areas monitoring ground-level ozone levels near the NAAQS for ozone. These “Priority Areas” are impacted by a disproportionate share of the air pollution burden within the regional and local jurisdictions. The Priority Areas are listed in Table A.1 and shown on Figure A.1 in Appendix A.

Because the affected vehicles contain emissions defeat devices, those vehicles had NO<sub>x</sub> emissions in excess of the federal emission standards and the emissions VW represented to the government and consumers. In Texas, those excess NO<sub>x</sub> emissions would not have been accounted for in developing strategies for addressing NO<sub>x</sub> emissions.

In addressing this goal, the TCEQ will place a high priority on program administration efficiency to maximize the amount of funding used for NO<sub>x</sub> emissions reduction.

### 2. Reduce the Potential for Exposure of the Public to Pollutants

A second goal of the program will be to reduce the potential for exposure of the public to pollutants that are often emitted along with NO<sub>x</sub> from older vehicles and equipment.

The program will address this goal through funding to replace or repower vehicles and equipment that operate within communities and at facilities where emission sources may be concentrated, including refuse vehicles, school buses, and cargo handling equipment.

### 3. Prepare for Increased and Sustained Use of Zero Emission Vehicles (ZEV)

The Trust Agreement allows for allocation of up to 15% of the funds for equipment to supply light-duty ZEV with electricity or hydrogen for hydrogen fuel cells.

While the other mitigation actions will result in immediate reductions in NO<sub>x</sub> emissions and other pollutants, funding ZEV infrastructure will help prepare the state for the increased use of ZEV in Texas and will help sustain the use of those vehicles.

Helping to sustain the use of light-duty ZEV will contribute to achieving the plan's two primary goals of reducing NO<sub>x</sub> emissions and reducing the potential for exposure of the public to pollutants emitted from older gasoline and diesel vehicles.

This goal will include electric charging infrastructure in public areas, workplaces, and multi-unit residences, with consideration given to the availability of existing charging infrastructure at or near the project location. In addition, the TCEQ will consider funding for charging infrastructure along major transportation corridors of the state. Consideration will also be given to fueling infrastructure for hydrogen fuel cells, where there will be a sustainable market for use of the hydrogen fuel.

### 4. Complement Other Incentive Funding Programs

Texas has one of the most aggressive and extensive programs in the country providing voluntary incentives for replacement, repower, and upgrade of heavy-duty on-road vehicles and non-road equipment. From 2001 through 2017, the Texas Emissions Reduction Plan (TERP) program administered by the TCEQ has provided over \$1 billion in incentive funding for projects very similar to the eligible mitigation actions included under the Trust Agreement.

The TERP grants are also aimed at reducing NO<sub>x</sub> emissions in the areas of concern relative to the ozone NAAQS, as well as reducing the potential for exposure of the public to other pollutants emitted from mobile sources.

The TERP provides grants to reduce NO<sub>x</sub> emissions that would otherwise occur in the future if the grant-funded project were not implemented. Conversely, the VW funding is intended to help mitigate the impact of NO<sub>x</sub> emissions that should not have previously occurred and were not considered in air quality inventories and planning to ensure compliance with the NAAQS. To use the funds as efficiently as possible, it is important that the VW funding be used to complement the efforts of the TERP program.

Therefore, the TCEQ will focus on mitigation actions that are not well-suited for or are otherwise under-represented in the TERP program.

In making funding decisions, the TCEQ will also consider, to the extent possible, Electrify America's implementation of the National ZEV Investment Plan in Texas, to ensure that the two programs will be complementary.

## Eligible Mitigation Actions

The Trust Agreement Includes 10 categories of eligible mitigation actions, as outlined below. Not all of these actions are eligible under the proposed plan.

### **Categories of Eligible Mitigation Actions under the Trust Agreement**

1. *Class 8 Local Freight Trucks and Port Drayage Trucks* (repower or replacement)
2. *Class 4-8 School Bus, Shuttle Bus, or Transit Bus* (repower or replacement)
3. *Freight Switchers* (repower or replacement)
4. *Ferries/Tugs* (repower only)
5. *Ocean-Going Vessels Shore Power*
6. *Class 4-7 Local Freight Trucks* (repower or replacement)
7. *Airport Ground Support Equipment* (repower or replacement with all-electric)
8. *Forklifts and Port Cargo Handling Equipment* (repower or replacement with all-electric)
9. *Light-Duty Zero Emission Vehicle Supply Equipment* (electric charging for electric vehicles and hydrogen for hydrogen fuel cell vehicles)
10. *Diesel Emission Reduction Act (DERA) Option.* If a state receives DERA funds from the EPA, the VW funds may be used for the non-federal voluntary match. The combined funds may be used for eligible DERA projects, which include additional project categories and requirements.

## **Mitigation Actions Potentially Eligible Under the Plan**

Not all actions eligible for funding under the Trust Agreement are included in this plan. The categories and sub-categories of mitigation actions that may be considered eligible for funding are outlined below, not necessarily in priority order.

### **Statewide Light-Duty ZEV Supply Equipment Funding**

Mitigation actions to install light duty ZEV supply equipment will be eligible for funding statewide.

This category includes electric charging infrastructure for light-duty plug-in electric vehicles and hydrogen for fueling a vehicle powered by a hydrogen fuel cell. This funding category will help achieve the goal of preparing for increased and sustained use of ZEV.

As provided for in the Trust Agreement, the TCEQ will consider installation of electric charging infrastructure at public areas, workplaces, and multi-unit residences, as well as considering installation along key transportation corridors.

Consideration will also be given to funding for hydrogen fueling facilities for light-duty hydrogen fuel-cell vehicles, if and where the fueling infrastructure will have a sustained market for the fuel.

The TCEQ may prioritize funding for applicants that own the land and the facility at which the equipment will be installed and will have a vested interest in the use of the equipment, in order to maximize the long-term sustainability of the equipment. The TCEQ may also prioritize project selection based on the proposed location in relation to existing services, as well as other factors that may affect the potential for sustainable use of the infrastructure.

### **Priority Areas - Eligible Mitigation Actions**

The TCEQ proposes to open the following mitigation action categories for funding in the Priority Areas identified in Appendix A.

#### **1. Class 4 - 7 Local Freight Trucks**

This category includes replacement or repower of model year 1992 - 2009 Class 4-7 medium-duty local freight trucks.

These types of vehicles may operate locally or travel regionally between the Priority Areas. These actions would help reduce NO<sub>x</sub> emissions on a local and regional level and may also help to reduce the potential exposure of the public in the local communities to pollutants emitted by older engines.

## 2. Class 8 Local Freight Trucks and Port Drayage Trucks

This category includes replacement or repower of model year 1992 - 2009 Class 8 local freight trucks and port drayage trucks.

Many of these types of vehicles may travel regionally, but operations of these vehicles may also be concentrated at local facilities where cargo and freight are transferred and/or loaded onto the vehicles. These actions would help reduce NO<sub>x</sub> emissions on a local and regional level and may also help reduce the potential for exposure of the public in the local communities to pollutants emitted by older engines.

For some grant application periods, the TCEQ may prioritize Port Drayage Trucks separately and fund those types of trucks as its own subcategory. In those cases, the TCEQ may place restrictions on the location of use to include seaports, intermodal rail yards, and/or inland ports to focus on reducing emissions at those types of facilities.

## 3. Class 7 - 8 Refuse Vehicles

The TCEQ proposes to include refuse vehicles under a separate category from the local freight truck categories. This category includes replacement or repower of model year 1992 - 2009 refuse vehicles. The TCEQ will limit this category to Class 7 and 8 vehicles that are configured as a refuse vehicle.

The emissions from refuse vehicle fleets that operate on regular daily routes result in more concentrated NO<sub>x</sub> emissions that have the potential to add to the formation of ground-level ozone in the local and regional area. In addition, these vehicles operate on routes within the community, resulting in increased potential for exposure of the public to pollutants emitted by older engines.

## 4. School Buses

This category includes replacement or repower of model year 2009 and earlier Class 4 - 8 school buses.

These actions will reduce NO<sub>x</sub> emissions, while also reducing the potential for exposure of school children and the public in general to other pollutants from older diesel and gasoline engines. These vehicles operate on regular routes within the community, resulting in the potential for exposure of children riding on the school bus and the public in general along these routes to pollutants emitted by older engines.

## 5. Transit and Shuttle Buses

This category includes the replacement or repower of model year 2009 and earlier Class 4 - 8 transit and shuttle buses.

The operation of transit and shuttle bus fleets results in NO<sub>x</sub> emissions that can impact the formation of ground-level ozone in the local and regional area. In addition, these vehicles operate on regular daily routes within the community, resulting in increased potential for exposure of the public to pollutants emitted by older engines.

Replacing older diesel transit and shuttle fleets with newer, lower-emitting models, including those powered by alternative fuels, advanced diesel technologies, or electricity will directly address the program goals.

## 6. Electric Forklifts and Port Cargo Handling Equipment

This category includes replacement or repower of older model diesel or spark-ignition forklifts and cargo handling equipment with new electric models.

While this category refers to port equipment, these types of equipment are used at many types of facilities to move material, cargo, containers, and trailers around and near the facility. The Trust Agreement does not specify what constitutes a port or establish any sort of location restriction for use of this equipment. Therefore, the TCEQ will consider the eligibility criteria to refer to the type of equipment, rather than the location of use. The TCEQ generally intends to take a broad approach in determining where this equipment may operate. However, in some cases, priorities may be set for funding equipment used at a more limited number of facilities, such as seaports, intermodal rail yards, and/or inland ports.

Yard trucks are considered cargo handling equipment, and this category may include replacement of an older Class 8 on-road vehicle being used as a yard truck with a purpose-built electric on-road or non-road yard truck.

The costs for the electric charging infrastructure to support the equipment may be funded as part of the project, subject to cost-effectiveness and percentage of cost limits established by the TCEQ for each grant solicitation and application period.

Many of the facilities where this type of equipment is operated are in areas identified as Priority Areas. And many of these facilities are surrounded by communities where there is the potential for the public to be exposed to a higher concentration of pollutants emitted from older diesel engines operating at the facility. These actions will reduce pollutant emissions levels in these areas and will directly address the program goals.

These actions will also encourage further use of electric technology where the equipment and facility are well-suited to electrification.

#### 7. Electric Airport Ground Support Equipment

This category includes replacement or repower of older diesel or spark-ignition ground support equipment with new electric models.

The costs for the electric charging infrastructure to support the equipment may also be funded as part of the project, subject to cost-effectiveness and percentage of cost limits.

Several large airports are in designated nonattainment areas for ground-level ozone and areas where monitored ozone is close to the NAAQS levels. Also, in many cases, these facilities are surrounded by communities where there is the potential for the public to be exposed to a higher concentration of pollutants emitted from older engines operating at the facility. Funding for this category will reduce the emission of pollutants in these areas and will directly address the program goals.

These actions will also encourage further use of electric technology where the equipment and facility are well-suited to electrification.

#### 8. Ocean-Going Vessel Shore Power

Providing shore power to ocean-going vessels and encouraging its use can result in major reductions in NO<sub>x</sub> emissions and emissions of other pollutants.

Major seaports along the Texas Coast are in the Priority Areas identified in Appendix A. Reductions in NO<sub>x</sub> emissions from ocean-going vessels when docked at these seaports can assist in meeting air quality goals in those areas. Also, some of the seaports are surrounded by communities where there is the potential for the public to be exposed to a higher concentration of pollutants emitted from older diesel engines operated by oceangoing vessels. This initiative will reduce the emission of pollutants in these areas and will directly address the program goals.

#### **Criteria for Eligible Mitigation Actions**

Key criteria for the eligible mitigation actions are outlined in Appendix C, Eligible Mitigation Actions. Complete criteria and requirements will be included in the grant solicitation, contract, and application documents. As noted in Appendix C, the TCEQ proposes to fund replacements or repowers with all-electric models by governmental and non-governmental entities at up to 60% of eligible costs. Replacements and repowers with models using other fuels will also be funded at up to 60% of eligible costs for governmental applicants, and 25% for replacements and 40% for repowers by

non-governmental applicants. In addition, Light-Duty ZEV Equipment Supply activities will be funded at up to 50% of eligible costs for electric charging infrastructure and lower percentages (as specified in Appendix C) for hydrogen fueling infrastructure. The TCEQ may periodically adjust the eligible percentages within the cost limits established in the Trust Agreement.

This plan excludes funding for projects involving freight switchers and tugs and tow vessels, which are potentially eligible under the Trust Agreement and for which there is adequate funding under the TERP.

The TCEQ does not propose to apply for and use the DERA funds. Because the allocation of DERA funds available to the TCEQ is small, the funding would only result in a small increase in the amount of money available under the program. Use of the DERA funds would also require separate contract, tracking, payment, and reporting requirements, making program administration for both the grantee and the TCEQ more resource intensive. An advantage of using the DERA funds would be to open the funding to additional project categories authorized under the DERA program. However, the TERP program can fund many, if not all, of the categories available under the DERA program. Also, the TCEQ could apply for DERA funds in the future if it appears that the current eligible categories for the VW funds are not sufficient and the DERA program would offer additional project categories that would help meet the goals of the program.

## **Eligible Areas and Allocation of Funds**

The plan must provide a preliminary assessment of the percentages of funds anticipated to be used for each type of action. The plan must also describe how the state will consider the potential beneficial impact of the selected eligible mitigation actions on air quality in areas that bear a disproportionate share of the air pollution burden within its jurisdiction.

The Light-Duty ZEV Supply Equipment Supply categories are proposed for implementation statewide. Up to 15% of the available funds is proposed for allocation to these projects. This category of funding will help support the expected continued increase in use of ZEV and will include funding for electric charging stations along major transportation corridors in the state.

Appendix A includes a table (Table A.1, Priority Areas) and a map (Figure A.1, Priority Areas) of the areas of the state identified as nonattainment for the NAAQS for ground-level ozone and two other areas of the state that have monitored ground-level ozone levels close to the NAAQS limits. These Priority Areas contain many of the major metropolitan centers of the state as well as approximately 62.5% of the state population. Because of formation of ground-level ozone in these areas, the TCEQ has

determined that 81% of the funding will be allocated to these areas to provide beneficial impacts on air quality.

The mitigation actions will include replacement or repower of heavy-duty on-road vehicles that operate in and among these areas, equipment operating at airports, seaports, rail yards, and inland ports in these areas, as well as refuse vehicles, school buses, and shuttle and transit buses that operate within communities located in these areas. These initiatives will help address the goals of the program, including reduction in NO<sub>x</sub> emissions in the Priority Areas and reducing the potential exposure of workers at these local facilities and residents in surrounding communities to pollutants emitted from older vehicles and equipment.

The TCEQ may adjust the allocation percentages and amounts outlined in this plan, based on demand for the funds and evaluation how to best achieve the goals of the program.

#### **Estimated Administrative Funding (up to 4%)**

The TCEQ's initial estimates are that it will need less than 4% of the allocated funds (approximately \$8 million) to administer the program. These estimates are still preliminary, and the final administrative needs will depend on the number of years the program is implemented and the final resource needs of the TCEQ to administer the program. However, the TCEQ anticipates needing much less than the 15% of the funding authorized for administration.

#### **Statewide Funding for Light-Duty ZEV Supply Equipment (up to 15%)**

The TCEQ proposes to provide up to 15% of allocated funds (approximately \$31.4 million) statewide to increase available infrastructure for providing electricity to light-duty electric vehicles and, where warranted, hydrogen for hydrogen fuel cell vehicles. Providing statewide funding will help establish additional availability of charging or refueling infrastructure so that vehicles may travel longer distances and in a greater number of areas within the state.

The TCEQ will consider the efforts of Electrify America, LLC to implement the national ZEV Investment Plan when considering projects for funding under this category.

#### **Priority Areas Allocation (up to 81%)**

The TCEQ proposes to initially allocate the remaining 81% of the total funds (approximately \$170 million) among the five Priority Areas identified in Appendix A. Funding allocated to each of these areas is listed on Table 1, Funding Allocation by Area, below. The allocation is weighted toward three Priority Areas where air quality is closest to the 2015 ozone NAAQS, with two-thirds of the Priority Area funds allocated

by population among the San Antonio, El Paso, and Beaumont-Port Arthur Areas. The remaining third is divided, based on population, between Houston-Galveston-Brazoria and Dallas-Fort Worth Areas.

To be considered operating in an area, a majority (51% or more) of the annual mileage or hours of operation of the grant-funded vehicle or equipment must be expected to occur in the designated counties, based on historical usage.

In prioritizing the use of funds within each Priority Area, the TCEQ will give particular weight to comments of the relevant Councils of Governments and planning organizations, namely, Alamo Council of Governments, Houston-Galveston-Brazoria Area Council, North Central Texas Council of Governments, El Paso Metropolitan Planning Organization, and Southeast Texas Regional Planning Commission.

**Table 1. Funding Allocation by Area**

Area	Counties	Maximum Funding Amount	Percentage of Total Funds
San Antonio Area	Bexar, Comal, Guadalupe, Wilson	\$73,554,754	35.14%
Dallas-Fort Worth Area	Colin, Dallas, Denton, Ellis, Hood, Johnson, Kaufman, Parker, Rockwall, Tarrant, Wise	\$29,116,296	13.91%
Houston-Galveston-Brazoria Area	Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller	\$27,399,879	13.09%
El Paso County	El Paso	\$26,771,921	12.79%
Beaumont-Port Arthur Area	Hardin, Jefferson, Orange	\$12,705,673	6.07%
<b>Totals</b>		<b>\$169,548,523</b>	<b>81.0%</b>

## Grant Process

The grants under this program will be solicited through a Request for Grant Applications process. Grant applications and instructions will be provided on the TCEQ's VW website, [www.TexasVWFund.org](http://www.TexasVWFund.org). The TCEQ may also conduct workshops and webinars for potential applicants.

Applications will be considered under either a first-come, first-served process or a competitive-selection process. In most cases, an application may include multiple

eligible mitigation actions on one application form. Each action will be considered an individual activity as part of an overall project.

### **First-Come, First-Served**

Where appropriate, grants will be awarded first-come, first-served. The TCEQ may establish tables with pre-determined maximum funding amounts based on the maximum percentage of costs allowed and/or any caps that may be established on the maximum cost-effectiveness of the projects.

The review and approval of an application may take approximately one to two weeks, depending upon complexity of the project and the number of applications that must be reviewed. Development and issuance of a contract to the applicant will take another one to two weeks, with final execution of the contract dependent upon how long it takes for the applicant to sign and return the contract. These are estimated timeframes, and the process may take longer depending upon the size of the project and the number of grant applications being processed.

### **Competitive**

The TCEQ may also use a competitive process for certain categories. Under a competitive process, the TCEQ will review all applications submitted within a deadline established by the agency. Project selections will be made based on criteria established by the TCEQ. For vehicle and equipment projects, the selection criteria may include consideration of the cost-effectiveness of the project in reducing NO<sub>x</sub> emissions. Calculators will be available for use by applicants to calculate the NO<sub>x</sub> emissions reductions and cost-effectiveness of their project. However, the TCEQ will make the final calculations for purposes of evaluating the project for funding.

The review and approval of applications under a competitive grant round may take one to three months after the grant round is closed, depending upon the number of applications received. The contracting process will then be dependent upon how long it takes for the applicant to sign and return the contract.

Grants will be awarded through execution of a grant contract between the TCEQ and the grant recipient. However, the final obligation of the TCEQ to reimburse the grant expenses will depend upon the TCEQ issuing a Notice to Proceed (NTP) letter upon receipt of funds from the trustee. Any expenses incurred by the grantee before receipt of the NTP will be at the grantee's risk.

As the TCEQ awards the grants, the TCEQ will submit the project information to the trustee for approval and advance funding. For first-come, first-served grants, the TCEQ may submit the project information and funding requests monthly. For competitive grant rounds, the TCEQ may wait until all contracts under that grant application

period are executed before submitting a combined funding request or may submit funding requests on a monthly basis for the contracts executed the previous month.

The trustee will have 60 days after receipt of each funding request to approve, deny, or request modification to the request, or request additional information. The trustee will then have 15 days after approval of a request to disburse the requested funds.

Subject to acceptance of the approach by the trustee, the TCEQ will request funding for the approved projects and the administrative costs of the agency. The funds will be held in an agency account for use in reimbursing the grant expenses and the agency's administrative costs. As the TCEQ receives funds for a project, the TCEQ will issue the grant recipient an NTP, after which a grant recipient may be reimbursed for eligible expenses in accordance with the grant contract.

As grantees complete the purchases, the grantee will be required to request reimbursement from the TCEQ for eligible expenses. Upon approval, payment will be made from the agency's VW account.

For those projects requiring scrappage of the vehicle, equipment, and/or engine, the applicant will be required to complete the disposition process before requesting reimbursement from the TCEQ. If a grantee does not complete the scrappage and submit required documentation, the grant contract may be canceled.

As required under the Trust Agreement, the TCEQ will submit semi-annual reports to the trustee describing the process of implementing each eligible mitigation action included in the funding requests. These reports will include status of each project and updates on payments to grantees and agency administrative costs.

Summary information on grant applications, grant awards and contracts, grant reimbursements, and project reports will be made available on the TCEQ's VW website, [www.TexasVWFund.org](http://www.TexasVWFund.org). Copies of the complete applications, contracts, and reimbursement documents will be available through the TCEQ's [Open Records Request](#) system. Access to the system will also be explained on the website.

## **Emissions Benefits**

As required under the Trust Agreement, this plan is to include a general description of the expected ranges of emissions benefits the state anticipates will be realized by implementation of the eligible mitigation actions identified in the plan.

The primary focus of the plan is reducing NO<sub>x</sub> emissions from heavy-duty on-road vehicles and certain non-road equipment. Because of the substantial amount of funding allocated to Texas and the range of mitigation actions that will be considered,

a detailed determination of the NO<sub>x</sub> emissions reductions that will be achieved by each project in advance is not possible. The results will ultimately be determined by the type and number of projects funded.

The methodology that will be used by the TCEQ to determine NO<sub>x</sub> emissions reductions is explained in Appendix D, Emissions Calculations, including Table D.1, Calculating Reductions in NO<sub>x</sub> Emissions Based on Annual Mileage, to show calculations for on-road vehicles and Table D.2, Calculating Reductions in NO<sub>x</sub> Emissions Based on Annual Hours of Operation, to show the calculations for non-road equipment.

The TCEQ has also performed calculations for several examples of the types of vehicles and equipment that may be replaced under the eligible mitigation actions. Those results are provided in Appendix D, Table D.3, Example NO<sub>x</sub> Emissions Reduction and Cost Effectiveness. The cost-effectiveness examples consider the total annual NO<sub>x</sub> emissions reductions estimated for the project. For some types of projects, the TCEQ may use the NO<sub>x</sub> emissions reductions that occur only in the eligible areas.

The TCEQ did not attempt to estimate NO<sub>x</sub> emissions reductions for the ocean-going vessel shore power category. Calculation of emissions reductions for that type of project will depend upon the type of vessels and engines expected to operate at the seaport, the number of visits expected per year, and the number of hours each vessel will remain in port. If an application is submitted under this category, those factors will need to be assessed on a per-project basis.

The plan also does not include estimates of NO<sub>x</sub> emissions reductions from installation of electric charging or hydrogen fueling infrastructure. The goal of the Light-Duty ZEV Supply Equipment category is to prepare the state for increased and sustained use of ZEV, rather than direct reductions in NO<sub>x</sub> emissions. Any emissions reductions would occur as a result of decisions made by vehicle owners to purchase an electric or hydrogen fuel cell vehicle in lieu of a conventionally-fueled vehicle. Any attempt to predict those decisions based on the additional availability of charging or hydrogen fueling infrastructure would be speculative.

Estimates of the NO<sub>x</sub> emissions reductions from several example categories and cost-effectiveness of the plan in achieving those reductions are provided in Table 2 below.

**Table 2. Example Funding Allocation and NO<sub>x</sub> Emissions Reductions (based on a 5-year activity life)**

<b>Category (Replacement Only)</b>	<b>Example Funding Allocation</b>	<b>Tons of NO<sub>x</sub> Reduced</b>	<b>Cost Per Ton of NO<sub>x</sub> Reduced</b>	<b>Number of Vehicles &amp; Equipment</b>
Electric Forklifts and Port Cargo Handling Equipment and Airport Ground Support Equipment	\$28,258,088	1,189	\$23,776	418
Class 8a Refuse Vehicles	\$28,258,087	468	\$60,381	209
School Buses	\$28,258,087	286	\$98,805	473
Transit and Shuttle Buses	\$28,258,087	313	\$90,281	108
Class 6 Local Freight Truck	\$28,258,087	999	\$66,024	1,271
Class 8b Local Freight Trucks	\$28,258,087	2,699	\$10,470	733
<b>Totals</b>	<b>\$169,548,523</b>	<b>5,954</b>	<b>\$29,913</b>	<b>3,212</b>

The funding allocations among the categories in this table are based on the funding available to the Priority Areas. The equal funding amounts are examples only and do not represent the intended allocation of the funds. The TCEQ may consider specific allocations for the different categories or may open the funding to all eligible projects without setting limits on funding for each category. Also, this table does not include funding for shore power projects, which would result in different calculations.

These examples assume an activity life of five years, the period over which the TCEQ intends to assume that the grant-funded vehicles or equipment being replaced would have otherwise operated, absent the award of the grant. For projects involving electric equipment the maximum funding of up to 60% of the costs as established in this plan was used for the example calculations. Similarly, it was assumed that refuse vehicles, school buses, and transit and shuttle buses would be replaced by governmental entities at maximum funding of up to 60% of the costs. The examples for replacement of Class 8b Local Freight Trucks and Class 6 local freight trucks are based on applications by non-government applicants and funding up to 25% of the costs for diesel and alternative fuel vehicles.

These calculations are only examples and the actual funding amounts, NO<sub>x</sub> emissions reductions, and cost-effectiveness achieved by the program will depend on many factors, including whether the applicant is a governmental or non-governmental entity, the types and model year of vehicles and equipment replaced or repowered, and the vehicles, equipment, and engines purchased. Also, the TCEQ may establish maximum

cost-effectiveness limits for some of the categories, which would result in a greater number of tons of NO<sub>x</sub> reduced and more vehicles and equipment replaced.

## Consideration of Public Input

Upon being named the Lead Agency for Texas, TCEQ established a website to serve as the central information source for the Texas Program, [www.TexasVWFund.org](http://www.TexasVWFund.org). The agency invited the public to provide comments and recommendations regarding development of this mitigation plan, and the TCEQ provided an email address for ease of submitting comments, [vwsettle@tceq.texas.gov](mailto:vwsettle@tceq.texas.gov).

Copies of all comments received to date have been made available on the website. The agency also met with interested individuals and organizations, provided presentations, and listened to comments at various meetings.

Those comments have been considered in developing this draft plan. The *Draft Beneficiary Mitigation Plan for Texas* will be made available on the TCEQ website. Notice of a public comment period will also be posted on the website and in the *Texas Register*. The TCEQ intends to accept comment on the draft plan and will hold open meetings to accept comment in several Texas cities. Once the comment period closes, all comments received will be available for public review on the website.

The TCEQ will post the final plan on the website and make hard copies available upon request. The final plan will be submitted to the trustee.

Updates to the plan will be provided on the website. Plan updates will also be provided to the trustee. For any major changes to the plan, the TCEQ may provide a draft of the revised plan for public comment before preparing the final updates.



## Appendix A – Priority Areas

### Issues of Importance to Texas

The Texas Commission on Environmental Quality (TCEQ) monitors areas of the state for compliance with the National Ambient Air Quality Standards (NAAQS) established by the United States Environmental Protection Agency (EPA). For areas designated nonattainment with those standards, the TCEQ is responsible for developing a State Implementation Plan (SIP) to outline strategies that will be implemented to bring those areas into attainment of the NAAQS.

In terms of compliance with the NAAQS, the pollutant that has been most challenging to show attainment in Texas is ground-level ozone, considering the ozone NAAQS has become increasingly more stringent.

Ozone is a gas formed in the atmosphere when three atoms of oxygen combine. Stratospheric ozone is found naturally in the Earth's upper atmosphere and forms a protective layer that shields us from the sun's ultraviolet rays. However, ground-level ozone can cause acute respiratory health effects when people breathe high concentrations of it over several hours. These effects include decreased lung function and pain with deep breaths, and aggravated asthma symptoms.

Ozone is not emitted directly into the air but is created by chemical reactions between nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOC) in the presence of sunlight. Ozone forms in the highest concentrations on warm, sunny days with light wind speeds, which allows more of the pollutant to form and accumulate. Emissions from motor vehicle and off-road equipment exhaust, industrial facilities and electric utilities, gasoline vapors, and chemical solvents are some of the major sources of NO<sub>x</sub> and VOC. Over large areas of eastern Texas, the bulk of VOC is naturally emitted from vegetation such as trees and crops. Compared to these biogenic VOC emissions in rural areas, the anthropogenic VOC contribution is usually low, but generally increases in more urban and industrial environments.

In areas where VOC precursor emissions are greater the area is typically considered "NO<sub>x</sub> limited" where NO<sub>x</sub> reductions are more effective than VOC reductions for inhibiting ozone formation. Therefore, reductions in NO<sub>x</sub> are important in reducing or limiting ozone formation in the nonattainment areas and other urban areas.

The TCEQ has authority to limit through regulation emissions of NO<sub>x</sub> and VOC from industrial and utility sources, but emissions from mobile sources are regulated at the federal level by the EPA. In Texas nonattainment areas, NO<sub>x</sub> emissions are primarily emitted from mobile sources. Given the limited number of viable strategies available to states to limit mobile source emissions, Texas instituted and invested in a financial incentive program, the Texas Emissions Reduction Plan (TERP) program, to replace older heavy-duty engines in order to reduce future NO<sub>x</sub> emissions. The funds from the Trust Agreement will help mitigate the historical excess NO<sub>x</sub> emissions from the VW vehicles identified with defeat devices and to reduce NO<sub>x</sub> emissions in areas where formation of ground-level ozone is of greatest concern.

## Priority Areas

The Priority Areas are listed in Table A.1, Priority Areas, and illustrated in Figure A.1, Priority Areas, below. The counties in the Priority Areas represent approximately 62.5% of the Texas population.

In Texas, there are two nonattainment areas that do not meet the NAAQS for ground-level ozone based on the EPA's currently implemented 2008 eight-hour ground-level ozone standard of 0.075 parts per million (ppm), Dallas-Fort Worth (DFW) and Houston-Galveston-Brazoria (HGB). On October 1, 2015, the EPA revised the primary NAAQS for ozone from the eight-hour standard of 0.075 ppm to an eight-hour standard of 0.070 ppm. As a result, Bexar County was also designated nonattainment, in addition to the other two nonattainment areas.

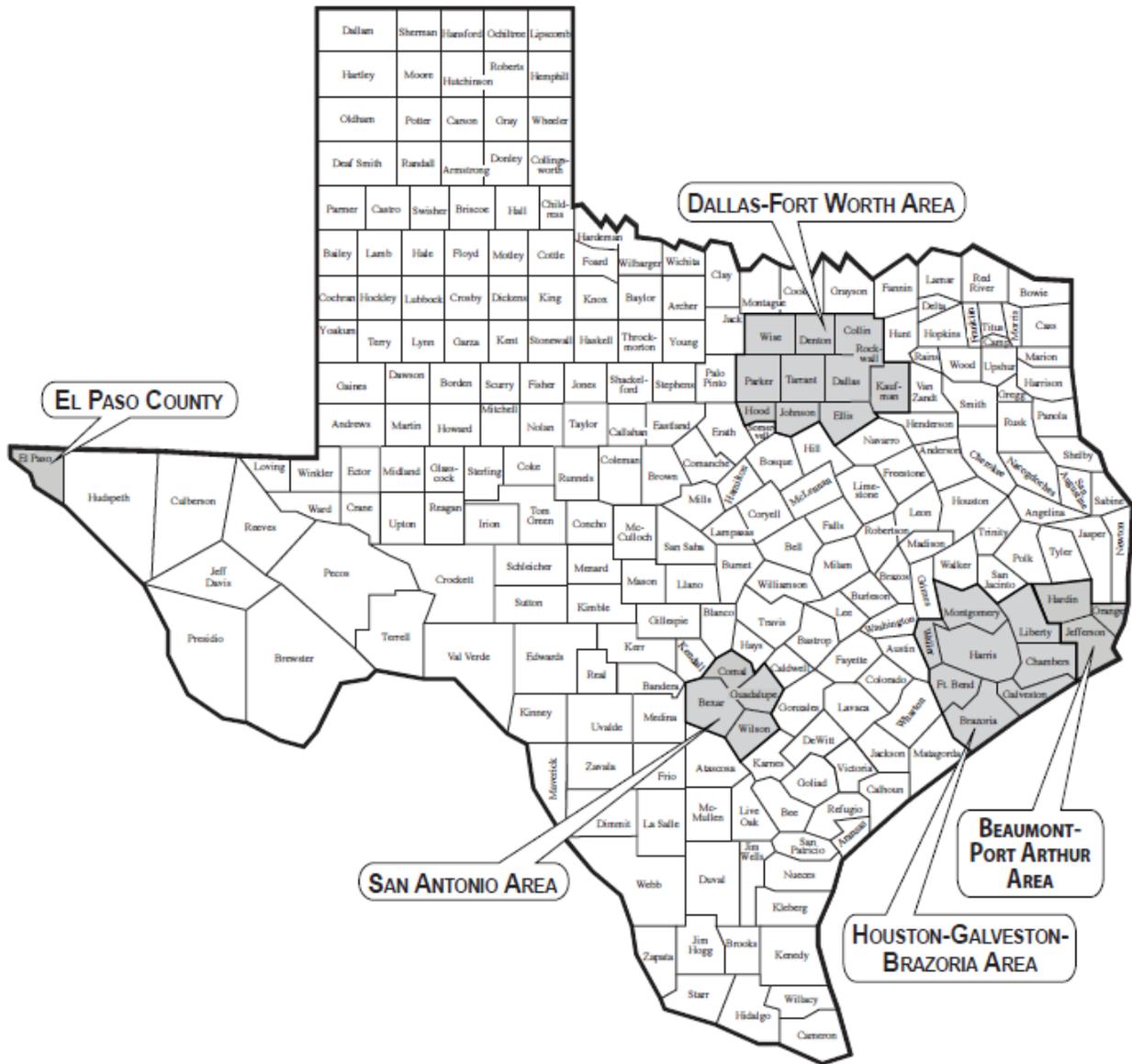
Additional counties are included in the San Antonio Area based on proximity to Bexar County. Hood County is included in the DFW Area for similar reasons.

The other areas of primary interest from an ozone NAAQS perspective are El Paso and Beaumont-Port Arthur (BPA). Preliminary data for 2018 indicate that El Paso has some monitored values in excess of the 2015 NAAQS for ozone. The BPA area is considered a priority for mitigation for several reasons. First, the BPA area is under a federally enforceable ozone maintenance plan and was designated nonattainment for the revoked 1997 eight-hour ozone NAAQS. In addition, the BPA area has a history of higher ozone, including the period when the subject vehicles were being sold and driven. Specifically, the BPA area had ozone design values of 80 ppb as recently as 2012 and as high as 92 ppb in 2004.

**Table A.1 Priority Areas**

<b>Area</b>	<b>Counties</b>
Dallas-Fort Worth Area	Colin, Dallas, Denton, Ellis, Hood, Johnson, Kaufman, Parker, Rockwall, Tarrant, Wise
Houston-Galveston-Brazoria Area	Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller
San Antonio Area	Bexar, Comal, Guadalupe, Wilson
El Paso County	El Paso
Beaumont-Port Arthur Area	Hardin, Jefferson, Orange

Figure A.1 Priority Areas



This map was generated for informational purposes by the Air Quality Division of the Texas Commission on Environmental Quality. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries. For more information concerning this map, contact the Air Quality Division at 512-239-4900.

## **Appendix B - Definitions/Glossary of Terms**

The following definitions shall apply to the eligible mitigation actions. Additional definitions and further explanation of these definitions may be included in grant solicitation, application, and contract documents.

“Airport Ground Support Equipment” shall mean vehicles and equipment used at an airport to service aircraft between flights.

“All-Electric” shall mean powered exclusively by electricity provided by a battery, fuel cell, or the grid.

“Alternative Fuel” shall mean a fuel different from or in addition to gasoline fuel or diesel fuel (e.g., CNG, propane, diesel-electric Hybrid).

“Certified Remanufacture System or Verified Engine Upgrade” shall mean engine upgrades certified or verified by the United States Environmental Protection Agency (EPA) or California Air Resources Board (CARB) to achieve a reduction in emissions.

“Class 4 - 7 Local Freight Trucks (Medium Trucks)” shall mean trucks, including commercial trucks, used to deliver cargo and freight (e.g., courier services, delivery trucks, box trucks moving freight, waste haulers, dump trucks, concrete mixers) with a Gross Vehicle Weight Rating (GVWR) between 14,001 and 33,000 lbs.

“Class 4 - 8 School Bus, Shuttle Bus, or Transit Bus (Buses)” shall mean vehicles with a Gross Vehicle Weight Rating (GVWR) greater than 14,001 lbs. used for transporting people. See definition for School Bus below.

“Class 8 Local Freight, and Port Drayage Trucks (Eligible Large Trucks)” shall mean trucks with a Gross Vehicle Weight Rating (GVWR) greater than 33,000 lbs. used for port drayage and/or freight/cargo delivery (including waste haulers, dump trucks, concrete mixers).

“CNG” shall mean Compressed Natural Gas.

“Drayage Trucks” shall mean trucks hauling cargo to and from seaports, inland ports, and intermodal rail yards.

“Forklift” shall mean non-road heavy-duty equipment used to lift and move materials short distances; generally includes tines to lift objects. Eligible types of forklifts also include reach stackers, side loaders, and top loaders.

“Freight Switcher” shall mean a locomotive that moves rail cars around a rail yard as compared to a line-haul engine that moves freight long distances.

"Inland Port" shall mean a site located away from traditional land and coastal borders containing a set of transportation multi-model assets and with the ability to allow international trade to be processed and altered by value-added services at the site as goods move through the supply chain.

"Generator Set" shall mean a switcher locomotive equipped with multiple engines that can turn off one or more engines to reduce emissions and save fuel depending on the load it is moving.

"Government" shall mean a state or local government agency (including a school district, municipality, city, county, special district, transit district, joint powers authority, or port authority owning fleets purchased with government funds), and a tribal government or native village.

"Gross Vehicle Weight Rating (GVWR)" shall mean the maximum weight of the vehicle, as specified by the manufacturer. GVWR includes total vehicle weight plus fluids, passengers, and cargo. Vehicle classes by GVWR are listed below.

Class 1:  $\leq 6000$  lb.

Class 2: 6001-10,000 lb.

Class 3: 10,001-14,000 lb.

Class 4: 14,001-16,000 lb.

Class 5: 16,001-19,500 lb.

Class 6: 19,501-26,000 lb.

Class 7: 26,001-33,000 lb.

Class 8:  $\geq 33,001$  lb.

"Hybrid" shall mean a vehicle that combines an internal combustion engine with a battery and electric motor.

"Infrastructure" shall mean the equipment used to enable the use of electric-powered vehicles (e.g., electric vehicle charging station).

"Intermodal Rail Yard" shall mean a rail facility in which cargo is transferred from drayage truck to train or vice-versa.

"Port Cargo Handling Equipment" shall mean rubber-tired gantry cranes, straddle carriers, shuttle carriers, and terminal tractors, including on-road and non-road yard hostlers and yard tractors (i.e., yard trucks) that generally operate within ports, but may also be used at cargo and materials distribution facilities and similar locations.

"Port" shall mean a seaport, multi-model rail yard, or inland port.

“Repower” shall mean the replacement of an existing engine with a newer, cleaner engine or power source that is certified by EPA and, if applicable, CARB, to meet a more stringent set of engine emission standards. Repower includes, but is not limited to, diesel engine replacement with an engine certified for use with diesel or a clean alternate fuel, diesel engine replacement with an electric power source (e.g., grid, battery), diesel engine replacement with a fuel cell, diesel engine replacement with an electric generator(s) (genset), diesel engine upgrades in Ferries/Tugs with an EPA Certified Remanufacture System, and/or diesel engine upgrades in Ferries/Tugs with an EPA Verified Engine Upgrade. All-Electric and fuel cell Repowers do not require EPA or California Air Resources Board certification.

“School Bus” shall mean a Class 4 - 8 bus sold or introduced into interstate commerce for purposes that include carrying students to and from school or related events. The bus may be Type A-D.

“Scrapped” shall mean to render inoperable and available for recycle, and, at a minimum, to specifically cut a 3-inch hole in the engine block for all engines. If any vehicle or equipment will be replaced as part of an eligible project, scrapped shall also include the disabling of the chassis by cutting the vehicle’s frame rails or equipment structural components completely in half.

“Tier 0, 1, 2, 3, 4” shall refer to corresponding EPA engine emission classifications for non-road engines.

“Zero Emission Vehicle (ZEV)” shall mean a vehicle that produces no emissions from the on-board source of power (e.g., All-Electric or hydrogen fuel cell vehicles).



## Appendix C – Eligible Mitigation Actions

The eligible mitigation actions and major eligibility criteria under this plan are outlined below. The criteria established for each action include criteria from the Trust Agreement, along with changes made by the Texas Commission on Environmental Quality (TCEQ) to further clarify the requirements and, in some cases, establish more restrictive requirements based on the priorities of the TCEQ.

Some of the eligible actions are listed differently from the Trust Agreement. School buses are listed separately from transit and shuttle buses, and refuse vehicles are listed separately from the other local freight truck categories. This approach will allow the TCEQ to potentially award grants to these categories under different solicitations, with different priorities.

Not all criteria and requirements are included below. The grant solicitation, application, and contract documents will contain the complete criteria and requirements for eligible mitigation action. Also, the TCEQ may amend or establish more limiting criteria than those listed below, subject to the requirements of the Trust Agreement.

### Eligible Actions

#### 1. Light-Duty Zero Emission Vehicle (ZEV) Supply Equipment

Funds may be used for the acquisition and installation of new light-duty ZEV supply equipment. Ongoing operation and maintenance costs will be the responsibility of the applicant.

- a. The equipment must be installed at a site without existing light-duty ZEV supply services, or to expand the number of vehicles that may be serviced at an existing site. Funding is not available to just replace existing equipment with newer equipment.
- b. The TCEQ may prioritize funding for applicants that own the land and the facility at which the equipment will be installed and will have a vested interest in the use of the equipment, in order to maximize the long-term sustainability of the equipment. The TCEQ may also prioritize project selection based on the proposed location in relation to existing services, as well as other factors that may affect the potential for sustainable use of the infrastructure.
- c. Light-duty electric vehicle supply equipment includes Level 1, Level 2, or fast-charging equipment (or analogous successor technologies) that is in a public place, workplace, or multi-unit dwelling and is not consumer light-duty electric vehicle supply equipment (i.e., not located at a private residential dwelling that

is not a multi-unit dwelling). Up to 50% of the eligible costs may be eligible for funding. The TCEQ may establish different funding percentages for certain grant application periods or for certain locations and use, up to the maximum allowed under the Trust Agreement.

- d. Light-duty hydrogen fuel cell vehicle supply equipment includes hydrogen dispensing equipment capable of dispensing hydrogen at a pressure of 70 megapascals (or analogous successor technologies) that is in a public place. Up to 33% of the eligible costs may be reimbursed for equipment capable of dispensing at least 250 kilograms (kg) per day. Up to 25% of the eligible costs may be reimbursed for equipment capable of dispensing at least 100 kg per day.
- e. In addition to the percentage of cost limits establish for electric vehicle supply and hydrogen supply equipment, the TCEQ may set maximum limits on the grant amount available for each charging or fueling facility or location.

## 2. Class 4 - 7 Local Freight Trucks

Subject to the priorities established by the commission, the commission may establish a different maximum percentage of costs or maximum funding amount for a grant application period.

- a. Eligible medium-duty trucks include 1992-2009 engine model year diesel powered class 4 - 7 local freight trucks.
- b. A privately-owned or government-owned truck may be replaced or repowered with a new all-electric, diesel, or alternative fuel (e.g., CNG, propane, hybrid) vehicle or engine, including charging infrastructure associated with a new all-electric engine.
- c. For a privately-owned truck, up to 25% of the cost of a replacement with a diesel or alternative fuel vehicle, up to 40% of the cost of a repower with a diesel or alternative fuel engine, or up to 60% of the cost of a replacement or repower with an electric vehicle or engine, including the cost of the charging infrastructure, may be reimbursed under a grant.
- d. For a government-owned truck, up to 60% of the cost of a replacement or repower, including the cost of charging infrastructure, may be reimbursed under a grant.
- e. For the repower or replacement of a truck, the engine model year of the replacement engine or engine on the replacement truck must be of an engine model year in which the mitigation action occurs or one engine model year prior.
- f. The applicant must own the vehicle at the time of application and must have continuously owned the vehicle and have been listed as the owner on the title

for the two years immediately preceding the application date. The TCEQ may waive the ownership requirements in certain cases that will be explained in the grant solicitation documents.

- g. Unless the vocational type of the vehicle is exempt from inspection and registration requirements, the vehicle must currently be registered for operation in Texas and must have been continuously inspected and registered in Texas for the two years immediately preceding the application date. The TCEQ may waive the registration and inspection requirements in certain cases that will be explained in the grant solicitation documents.
  - h. Vehicles with apportioned registration to allow for operation in multiple states must have been operated in Texas at least 75% of annual mileage for at least the two years preceding the application date.
  - i. The vehicle must have been used in its primary function in the routine operations of the applicant in Texas for the two years immediately preceding the application date.
  - j. The vehicle must currently be used in its primary function in the routine operations of the applicant and be considered capable of performing its primary function for the next five years.
  - k. For the repower of a truck, the engine being replaced must be scrapped prior to the grant recipient requesting reimbursement of costs.
  - l. For the replacement of a truck, the engine and truck being replaced must be scrapped prior to the grant recipient requesting reimbursement of costs.
  - m. For the replacement of a truck, the replacement vehicle must be of the same type, weight category, and body and axle configuration as the vehicle being replaced. The replacement vehicle must be configured and intended for use in the same application or vocation (for example, regional delivery), as the vehicle being replaced. The TCEQ may accept, in particular cases, a vehicle of a different type, weight category, or body and axle configuration to account for the latest technology or vehicle type used in a specific vocation.
  - n. Up to 60% of the costs for charging infrastructure associated with a project involving all-electric vehicles and equipment may also be included. Charging infrastructure will be considered as a separate activity under a project application.
3. Class 8 Local Freight Trucks and Port Drayage Trucks

Subject to the priorities established by the commission, the commission may establish a different maximum percentage of costs or maximum funding amount for a grant application period.

- a. Eligible large trucks include 1992 - 2009 engine model year diesel powered class 8 local freight or port drayage trucks.
- b. A privately-owned or government-owned truck may be replaced or repowered with a new all-electric, diesel, or alternative fuel (e.g., CNG, propane, hybrid) vehicle or engine, including charging infrastructure associated with a new all-electric engine.
- c. For a privately-owned truck, up to 25% (or 50% for a port drayage truck) of the cost of a replacement with a diesel or alternative fuel vehicle, up to 40% of the cost of a repower with a diesel or alternative fuel engine, or up to 60% of the cost of a replacement or repower with an electric vehicle or engine, including the cost of the charging infrastructure, may be reimbursed under a grant.
- d. For a government-owned truck, up to 60% of the cost of a replacement or repower, including the cost of charging infrastructure, may be reimbursed under a grant.
- e. For the repower or replacement of a truck, the engine model year of the replacement engine or engine on the replacement truck must be of an engine model year in which the mitigation action occurs or one engine model year prior.
- f. The applicant must own the vehicle at the time of application and must have continuously owned the vehicle and have been listed as the owner on the title for the two years immediately preceding the application date. The TCEQ may waive the ownership requirements in certain cases that will be explained in the grant solicitation documents.
- g. Unless the vocational type of the vehicle is exempt from inspection and registration requirements, the vehicle must currently be registered for operation in Texas and must have been continuously inspected the registered in Texas for the two years immediately preceding the application date. The TCEQ may waive the registration and inspection requirements in certain cases that will be explained in the grant solicitation documents.
- h. Vehicles with apportioned registration to allow for operation in multiple states must have been operated in Texas at least 75% of annual mileage for at least the two years preceding the application date.
- i. The vehicle must have been used in its primary function in the routine operations of the applicant in Texas for the two years immediately preceding the application date.
- j. The vehicle must currently be used in its primary function in the routine operations of the applicant and be considered capable of performing its primary function for the next five years.

- k. For the repower of a truck, the engine being replaced must be scrapped prior to the grant recipient requesting reimbursement of costs.
  - l. For the replacement of a truck, the engine and truck being replaced must be scrapped prior to the grant recipient requesting reimbursement of costs.
  - m. For the replacement of a truck, the replacement vehicle must be of the same type, weight category, and body and axle configuration as the vehicle being replaced. The replacement vehicle must be configured and intended for use in the same application or vocation (for example, regional delivery), as the vehicle being replaced. The TCEQ may accept, in particular cases, a vehicle of a different type, weight category, or body and axle configuration to account for the latest technology or vehicle type used in a specific vocation.
  - n. Up to 60% of the costs for charging infrastructure associated with a project involving all-electric vehicles and equipment may also be included. Charging infrastructure will be considered as a separate activity under a project application.
  - o. If Class 8 port drayage trucks are prioritized as an individual category for funding, location restrictions may be used, including a requirement that the drayage truck operate for much of the annual operation moving cargo to and from seaports, multi-model rail yards, and/or inland ports in the eligible areas.
4. Class 7 - 8 Refuse Vehicles

Subject to the priorities established by the commission, the commission may establish a different maximum percentage of costs or maximum funding amount for a particular grant application period.

- a. Eligible refuse vehicles include 1992 - 2009 engine model year class 7 - 8 refuse vehicles.
- b. A privately-owned or government-owned truck may be replaced or repowered with a new all-electric, diesel, or alternative fuel (e.g., CNG, propane, hybrid) vehicle or engine, including charging infrastructure associated with a new all-electric engine.
- c. For a privately-owned truck, up to 25% of the cost of a replacement with a diesel or alternative fuel vehicle, up to 40% of the cost of a repower with a diesel or alternative fuel engine, or up to 60% of the cost of a replacement or repower with an electric vehicle or engine, including the cost of the charging infrastructure, may be reimbursed under a grant.
- d. For a government-owned truck, up to 60% of the cost of a replacement or repower, including the cost of charging infrastructure, may be reimbursed under a grant.

- e. For the repower or replacement of a truck, the engine model year of the replacement engine or engine on the replacement truck must be of an engine model year in which the mitigation action occurs or one engine model year prior.
- f. The applicant must own the vehicle at the time of application and must have continuously owned the vehicle and have been listed as the owner on the title for the two years immediately preceding the application date. The TCEQ may waive the ownership requirements in certain cases that will be explained in the grant solicitation documents.
- g. Unless the vehicle is exempt from inspection and registration requirements, the vehicle must currently be registered for operation in Texas and must have been continuously inspected and registered in Texas for the two years immediately preceding the application date. The TCEQ may waive the registration and inspection requirements in certain cases that will be explained in the grant solicitation documents.
- h. The vehicle must have been used in its primary function as a refuse vehicle in the routine operations of the applicant in Texas for the two years immediately preceding the application date.
- i. The vehicle must currently be used in its primary function in the routine operations of the applicant and be considered capable of performing its primary function for the next five years.
- j. For the repower of a truck, the engine being replaced must be prior to the grant recipient requesting reimbursement of costs.
- k. For the replacement of a truck, the engine and truck being replaced must be scrapped prior to the grant recipient requesting reimbursement of costs.
- l. For the replacement of a truck, the replacement vehicle must be of the same type, weight category, and body and axle configuration as the vehicle being replaced. The replacement vehicle must be configured and intended for use in the same application, that is as compaction truck or a roll-off truck. The TCEQ may accept, in particular cases, a vehicle of a different type, weight category, or body and axle configuration to account for the latest technology or vehicle type.
- m. Up to 60% of the costs for charging infrastructure associated with a project involving all-electric vehicles and equipment may also be included. Charging infrastructure will be considered as a separate activity under a project application.

## 5. School Buses

Subject to the priorities established by the commission, the commission may establish a different maximum percentage of costs or maximum funding amount for a grant application period, such as \$500,000 per school district.

- a. Eligible buses include 2009 or earlier engine model year class 4 - 8 school buses.
- b. A privately-owned or government-owned school bus may be replaced or repowered with a new all-electric, diesel, or alternative fuel (e.g., CNG, propane, hybrid) school bus or engine, including charging infrastructure associated with a new all-electric engine.
- c. For a privately-owned school bus, up to 25% of the cost of a replacement with a diesel or alternative fuel vehicle, up to 40% of the cost of a repower with a diesel or alternative fuel engine, or up to 60% of the cost of a replacement or repower with an electric bus or engine, including the cost of the charging infrastructure, may be reimbursed under a grant.
- d. For a government-owned school bus or a privately-owned school bus operated under contract with a public school district, up to 60% of the cost of a replacement or repower, including the cost of charging infrastructure, may be reimbursed under a grant.
- e. For the repower or replacement of a school bus, the engine model year of the replacement engine or engine on the replacement school bus must be of an engine model year in which the mitigation action occurs or one engine model year prior.
- f. The applicant must own the school bus at the time of application and must have continuously owned the bus and have been listed as the owner on the title for the two years immediately preceding the application date. The TCEQ may waive the ownership requirements in certain cases that will be explained in the grant solicitation documents.
- g. The school bus being repowered or replaced must have been used to transport students on a regular daily route to and from the school for at least the two years preceding the submission of a grant application.
- h. The school bus being repowered or replaced must be in good operating condition and be considered capable of performing its regular function for the next five years.
- i. For the repower of a school bus, the engine being replaced must be scrapped before the grantee requests reimbursement of costs.
- j. For the replacement of a school bus, the engine and school bus being replaced must be scrapped before the grant recipient requests reimbursement of costs.

- k. Up to 60% of the costs for charging infrastructure associated with a project involving all-electric vehicles and equipment may also be included. Charging infrastructure will be considered as a separate activity under a project application.

## 6. Transit and Shuttle Buses

Subject to the priorities established by the commission, the commission may establish a different maximum percentage of costs or maximum funding amount for a grant application period.

- a. Eligible buses include 2009 or earlier engine model year class 4 - 8 buses.
- b. A privately-owned or government-owned bus may be replaced or repowered with a new all-electric, diesel, or alternative fuel (e.g., CNG, propane, hybrid) bus or engine, including charging infrastructure associated with a new all-electric engine.
- c. For a privately-owned bus, up to 25% of the cost of a replacement with a diesel or alternative fuel vehicle, up to 40% of the cost of a repower with a diesel or alternative fuel engine, or up to 60% of the cost of a replacement or repower with an electric bus or engine, including the cost of the charging infrastructure, may be reimbursed under a grant.
- d. For a government-owned truck, up to 60% of the cost of a replacement or repower, including the cost of charging infrastructure, may be reimbursed under a grant.
- e. For the repower or replacement of a bus, the engine model year of the replacement engine or engine on the bus must be of an engine model year in which the mitigation action occurs or one engine model year prior.
- f. The applicant must own the bus at the time of application and must have continuously owned the bus and have been listed as the owner on the title for the two years immediately preceding the application date. The TCEQ may waive the ownership requirements in certain cases that will be explained in the grant solicitation documents.
- g. The bus being repowered or replaced must be in good operating condition and be considered capable of performing its regular function for the next five years.
- h. For the repower of a bus, the engine being replaced must be scrapped before the grantee requests reimbursement of costs.
- i. For the replacement of a bus, the engine and bus being replaced must be scrapped before the grant recipient requests reimbursement of costs.

- j. Up to 60% of the costs for charging infrastructure associated with a project involving all-electric vehicles and equipment may also be included. Charging infrastructure will be considered as a separate activity under a project application.

## 7. Electric Forklifts and Port Cargo Handling Equipment

A maximum of 60% of the eligible costs for each eligible mitigation action may be funded under this initiative. Subject to the priorities established by the commission, the commission may establish a different maximum percentage of costs or maximum funding amount for a grant application period.

- a. Eligible forklifts include forklifts with greater than 8,000 pounds lift capacity.
- b. In addition to forklifts and other cargo handling equipment, this initiative may include replacement of an older Class 8 on-road vehicle being used as a yard truck with a purpose-built electric on-road or non-road yard truck.
- c. Eligible non-electric forklifts and port cargo handling equipment may be repowered with an all-electric electric engine, including the costs of installation of such engine, and charging infrastructure associated with such new all-electric engine
- d. Eligible non-electric forklifts and port cargo handling equipment may be replaced with the same equipment in all-electric form, including the of charging infrastructure associated with the new all-electric engine.
- e. The TCEQ may limit eligible forklifts and port cargo handling equipment to those with Tier 0, 1, or 2 diesel engines, or spark-ignition engines that are uncertified or certified to 3.0 g/bhp-hr of nitrogen oxides (NO<sub>x</sub>) or greater.
- f. A Class 8 on-road vehicle with a 1992 - 2009 engine being used as a port yard truck may also be replaced with a purpose-built all-electric on-road or non-road yard truck, including the charging infrastructure associated with the new all-electric engine.
- g. The applicant must own the equipment at the time of application and must have continuously owned the equipment for a minimum of two years immediately preceding the grant application date.
- h. The equipment must have been used in its primary function in the routine operations of the applicant in Texas for the two years immediately preceding the grant application date.
- i. The equipment must currently be used in its primary function in the routine operations of the applicant and be considered capable of performing its primary function for the next five years.

- j. For the repower of the equipment, the engine being replaced must be scrapped prior to the grant recipient requesting reimbursement of costs.
- k. For the replacement of the equipment, the engine and equipment being replaced must be scrapped prior to the grant recipient requesting reimbursement of costs.
- l. Up to 60% of the costs for charging infrastructure associated with a project involving all-electric vehicles and equipment may also be included. Charging infrastructure will be considered as a separate activity under a project application.

#### 8. Electric Airport Ground Support Equipment

A maximum of 60% of the eligible costs for each eligible mitigation action may be funded under this initiative. Subject to the priorities established by the commission, the commission may establish a different maximum percentage of costs or maximum funding amount for a grant application period.

- a. Eligible non-electric airport ground support equipment may be repowered with an all-electric electric engine, including the costs of installation of such engine, and charging infrastructure associated with such new all-electric engine
- b. Eligible non-electric airport ground support equipment may be replaced with the same equipment in all-electric form, including the charging infrastructure associated with the new all-electric engine.
- c. Eligible equipment is limited to those with Tier 0, 1, or 2 diesel engines, or spark-ignition engines that are uncertified or certified to 3.0 g/bhp-hr of NO<sub>x</sub> or greater.
- d. The applicant must own the equipment at the time of application and must have continuously owned the equipment for a minimum of two years immediately preceding the grant application date.
- e. The equipment must have been used in its primary function in the routine operations of the applicant in Texas for the two years immediately preceding the grant application date.
- f. The equipment must currently be used in its primary function in the routine operations of the applicant and be considered capable of performing its primary function for the next five years.
- g. For the repower of the equipment, the engine being replaced must be scrapped prior to the grant recipient receiving reimbursement of costs.
- h. For the replacement of the equipment, the engine and equipment being replaced must be scrapped prior to the grant recipient receiving reimbursement of costs.

- i. Up to 60% of the costs for charging infrastructure associated with a project involving all-electric vehicles and equipment may also be included. Charging infrastructure will be considered as a separate activity under a project application.

## 9. Ocean-Going Vessel Shore Power

Up to 25% of eligible costs for non-government owned shore power and up to 60% of the eligible costs for government owned shore power projects may be funded under this initiative. Subject to the priorities established by the commission, the commission may establish a different maximum percentage of costs or maximum funding amount for a grant application period.

- a. Applications are limited to providing shore power to ocean-going vessels.
- b. Eligible marine shore power includes systems that enable a compatible ocean-going vessel's main and auxiliary engines to remain off while the vessel is at berth.
- c. Components of such systems eligible for reimbursement are limited to cables, cable management systems, shore power coupler systems, distribution control systems, and power distribution.
- d. Marine shore power systems must comply with international shore power design standards (ISO/IEC/IEEE 80005-1-2012 High Voltage Shore Connection Systems or the IEC/PAS 80005-3:2014 Low Voltage Shore Connection Systems) and should be supplied with power sourced from the local utility grid.



## Appendix D – Emissions Calculations

### Calculating Reductions in NO<sub>x</sub> Emissions

The Texas Commission on Environmental Quality (TCEQ) proposes to use the same methodology for calculating nitrogen oxides (NO<sub>x</sub>) emissions reductions as used for the Texas Emissions Reduction Plan (TERP) grant programs.

The TCEQ intends for most, if not all, of the grants to be selected using a first-come, first-served process. The TCEQ may provide pre-determined maximum funding tables based on a maximum cost-effectiveness limit established for that grant application period. Alternatively, the TCEQ may establish pre-determined maximum funding tables based on other criteria, such as the estimated average costs and the maximum percentage of costs allowed. Under this approach, the NO<sub>x</sub> emissions reductions would be determined by the TCEQ and the applicant would not need to calculate the emissions reductions to apply for a grant.

If the TCEQ solicits some project categories on a competitive basis, the TCEQ may provide pre-determined (default) annual usage amounts and an example calculator for use by potential applicants to estimate the NO<sub>x</sub> emissions reductions and cost-effectiveness for their proposed project. The TCEQ will then also calculate the NO<sub>x</sub> emissions reductions and will make the final determination of the reductions and cost-effectiveness of the projects.

The general methodology that the TCEQ will use in calculating emissions reductions is outlined in this section.

In general, the emissions-reduction benefit represents the difference in the emissions of a baseline engine and a reduced-emissions engine. In situations where the model year of the equipment and the model year of the current engine are different, the model year of the engine must be used to determine the baseline emissions for benefit calculations.

The emissions level is calculated by multiplying an emissions factor, an activity level, and a conversion factor, if necessary. Emissions factors are generally expressed in terms of grams per brake horsepower-hour (g/bhp-hr), grams per mile (g/mi), or grams per gallon (g/gal). Conversion factors are generally expressed in units of brake horsepower-hour per mile (bhp-hr/mi) or horsepower-hour per gallon (hp-hr/gal). For most applications, the activity level will be established by the annual mileage or hours of operation.

## Calculation of NO<sub>x</sub> Emissions Reductions Based on Annual Mileage

The calculation of emissions and emissions reductions using annual mileage as the usage factor is determined by the steps in Table D.1. For activities where the emissions of the new or replacement engine are certified at a specific emissions level (g/bhp-hr), a conversion factor is needed to determine an appropriate emissions factor in grams per mile. Appropriate conversion factors to convert g/bhp-hr to g/mi will be included in the grant solicitation materials.

**Table D.1**  
**Calculating Reductions in NO<sub>x</sub> Emissions Based on Annual Mileage**

### *Applying the TxLED Correction Factor*

The counties affected by the TxLED requirements currently include all the eligible counties, except for El Paso County. For actions eligible statewide, the TCEQ will determine if a TxLED correction factor is needed.	
<b>TxLED correction factor for on-road:</b> <i>1 - 0.057</i>	<b>0.943</b>

### *Step 1. Determine the NO<sub>x</sub> Emissions Factor*

<b>Determine baseline NO<sub>x</sub> emissions factor</b>	
Baseline NO <sub>x</sub> emissions standard (g/bhp-hr)	
× TxLED correction factor <i>(diesel engines only)</i>	
= correction g/bhp-hr	
× conversion factor (bhp-hr/mi)	
= baseline NO <sub>x</sub> emissions factor (g/mi)	
<b>Determine reduced NO<sub>x</sub> emissions factor (g/mi)</b>	
<b>Option A. Reduced-emissions technology verified to achieve a percentage reduction from the baseline</b>	
Baseline NO <sub>x</sub> emissions factor (g/mi)	
× verified percentage reduction from baseline	
= reduced NO <sub>x</sub> emissions factor (g/mi)	

<b>Option B. Reduced-emissions engine certified to a specific emissions standard (g/bhp-hr)</b>	
Certified NO <sub>x</sub> emissions (g/bhp-hr)	
× TxLED correction factor ( <i>diesel engines only</i> )	
= corrected g/bhp-hr	
× conversion factor (bhp-hr/mi)	
= reduced NO <sub>x</sub> emissions factor (g/mi)	

**Step 2. Calculate the NO<sub>x</sub>-Emissions Reduction**

Baseline g/mi - reduced emissions g/mi	
× annual miles of operation	
× percent within eligible counties (%)	
= g/yr	
	÷ 907,200 grams per ton
= estimated annual NO <sub>x</sub> -emissions reduction (tons/yr)	
× activity life (years)	
= estimated activity-life NO <sub>x</sub> -emissions reduction (tons)	

## Calculation of NO<sub>x</sub> Emissions Reductions Based on Annual Hours of Operation

The calculation of emissions and emissions reductions using annual hours of operation as the usage factor is determined by the steps in Table D.2.

Appropriate baseline NO<sub>x</sub> emissions factors and default load factors will be included in the grant solicitation materials. Potential grant applicants should consult with the TCEQ to ensure they use the appropriate factors.

Unless otherwise specified by the TCEQ, the TCEQ will use a horsepower for the replacement equipment/engine that is 110% of the baseline equipment/engine horsepower, regardless of the actual rated horsepower of replacement equipment/engine. Applicants should still list the actual maximum-rated brake horsepower for both the old and the new engines in the application, but the TCEQ will calculate the emissions reductions under this approach.

For activities where the emissions of the new or replacement engine are certified at a specific emissions level (g/bhp-hr), use that emissions level as the emissions factor. For this program, non-road equipment eligible under the program must be powered by an all-electric engine, and the emissions factor for the new engines will be considered 0 g/bhp-hr.

**Table D.2**  
**Calculating Reductions in NO<sub>x</sub> Emissions Based on Annual Hours of Operation**

***Applying the TxLED Correction Factor***

The counties affected by the TxLED requirements currently include all the eligible counties, except for El Paso County. For actions eligible statewide, the TCEQ will determine if a TxLED correction factor is needed.	
TxLED correction factor for non-road: <i>1 - 0.07</i>	0.93

***Step 1. Determine the Reduced NO<sub>x</sub> Emissions Factor***

<b>Option A. Reduced-emissions technology verified to achieve a percentage reduction from the baseline</b>	
Baseline NO <sub>x</sub> emissions factor (g/bhp-hr)	
× verified percentage reduction from baseline	
= reduced NO <sub>x</sub> emissions factor (g/bhp-hr)	
<b>Option B. Reduced-emissions engine certified to a specific emissions standard (g/bhp-hr)</b>	
Certified NO <sub>x</sub> emissions (g/bhp-hr)	0

**Step 2. Calculate the NO<sub>x</sub>-Emissions Reduction**

Baseline		Reduced Emissions	
NO <sub>x</sub> emissions factor (g/bhp-hr)		NO <sub>x</sub> emissions factor (g/bhp-hr)	0
× TxLED correction factor ( <i>diesel engines only</i> )		× TxLED correction factor ( <i>diesel engines only</i> )	N/A
= corrected NO <sub>x</sub> emissions factor (g/bhp-hr)		= corrected NO <sub>x</sub> emission factor (g/bhp-hr)	N/A
× load factor		× load factor	N/A
× horsepower		× horsepower	
= g/hr		= g/hr	0
Baseline g/hr - reduced emissions g/hr =			
× annual hours of operation			
× percent within eligible counties (%)			
= g/year			
		÷ 907,200 grams per ton	
= estimated annual NO <sub>x</sub> emissions reduction (tons/yr)			
× activity life (years)			
= estimated activity-life NO <sub>x</sub> emissions reduction (tons)			

## Example NO<sub>x</sub> Emissions Reductions

Examples of the potential NO<sub>x</sub> emissions reductions for several of the eligible mitigation actions are show in Table D.3 below. For these examples, electric and government-only projects grant amounts are set at 60% of costs. Non-government diesel and alternative fuel projects are set at 25% of costs. These are examples only, and all project categories may include both government and non-government applicants.

**Table D.3 Example NO<sub>x</sub> Emissions Reduction and Cost Effectiveness (replacement of 2000 model year)**

Vehicle/Equipment	New Fuel <sup>1</sup>	Total 5-yr NO <sub>x</sub> Reduction (tons)	Estimated Cost	Example Grant Amount	Cost Per Ton of NO <sub>x</sub> Reduced
School Bus (assumes govt. only)	Diesel	0.5905	\$90,000	\$54,000	\$91,448
	Alt. Fuel	0.6183	\$109,333	\$65,600	\$106,097
	Electric	0.6216	\$290,000	\$174,000	\$279,923
Class 8a Refuse Truck (assumes govt. only)	Diesel	2.1804	\$210,000	\$126,000	\$57,692
	Alt. Fuel	2.2830	\$240,000	\$144,000	\$63,075
	Electric	2.2951	\$560,000	\$336,000	\$146,399
Transit Bus (assumes govt. only)	Diesel	2.7857	\$300,000	\$180,000	\$64,616
	Alt. Fuel	2.9168	\$355,000	\$213,000	\$73,025
	Electric	2.9323	\$650,000	\$390,000	\$133,001
Class 8b Local Freight Truck (assumes non-govt. only)	Diesel	3.5905	\$140,000	\$35,000	\$9,748
	Alt. Fuel	3.7594	\$168,333	\$42,083	\$11,194
Class 6 Local Freight Truck (assumes non-govt. only)	Diesel	0.7663	\$75,000	\$18,750	\$24,468
	Alt. Fuel	0.8023	\$103,000	\$25,750	\$32,095
	Electric	0.8066	\$190,000	\$114,000	\$141,334
Cargo Handling Equipment	Electric	3.7560	\$150,000	\$90,000	\$23,962
Airport Ground Support Equipment (aircraft tug)	Electric	2.2910	\$90,000	\$54,000	\$23,570

<sup>1</sup>Alt. Fuel means Alternative Fuel, which may include natural gas or propane.

