

# Utah Beneficiary Mitigation Plan for the Volkswagen Environmental Mitigation Trust



UTAH DEPARTMENT *of*  
**ENVIRONMENTAL**  
**QUALITY**

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## Background

In 2015, the United States (U.S.) Environmental Protection Agency (EPA) issued two notices of violation of the Clean Air Act (CAA) to Volkswagen Group<sup>1</sup> (Volkswagen or VW), the German automotive manufacturer. The EPA asserted that VW installed software that activated emissions controls only while undergoing emissions testing, but rendered certain emissions controls inoperative during normal driving conditions. Consequently, approximately 500,000 2.0-liter diesel vehicles (models 2009 to 2015) and 90,000 3.0-liter diesel vehicles (models 2009-2016) sold across the U.S. emitted between 9 and 40 times the nitrogen oxides (NO<sub>x</sub>) emissions allowed by federal law<sup>2</sup>.

On January 4, 2016, the United States Department of Justice filed a civil suit against VW for CAA violations seeking to permanently prevent VW from selling non-compliant vehicles, to permanently prevent VW from installing the offending software in vehicles, to mitigate the excess NO<sub>x</sub> emissions, and to impose monetary penalties for the CAA violations<sup>3</sup>. Through two partial settlements<sup>4</sup>, VW is required to pay \$15.7 billion, divided into three components:

- \$10.8 billion for the buyback and emission control modifications on a minimum of 85% of the non-compliant vehicles
- \$2 billion to support the increased use of zero-emissions vehicle (ZEV) technology
- \$2.9 billion for an Environmental Mitigation Trust (the Trust)

The State of Utah (State), a beneficiary of the Trust<sup>5</sup>, has been allocated \$35,177,506, which is based on approximately 7,000 non-compliant VW vehicles registered throughout the state<sup>6</sup>:

- 2.0-liter diesel VW vehicles (engine-model years 2009-2015): 5,983 statewide
- 3.0-liter diesel VW, Audi, and Porsche vehicles (engine-model years 2009-2016): 1,030 statewide

As a beneficiary, the State is required to develop this Environmental Mitigation Plan (EMP) to provide the public with a high-level overview of how the State intends to use the Trust funds to mitigate the excess NO<sub>x</sub> emissions from the non-compliant vehicles. The settlement specifies eligible mitigation action (EMA) categories the State may select to achieve its NO<sub>x</sub>-reduction goals. The categories include

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<sup>1</sup> The Volkswagen Group collectively includes Volkswagen AG, Audi AG, Volkswagen Group of America, Inc., Porsche AG, and Porsche Cars North America, Inc. Notice of Violation from Phillip A. Brooks, EPA Air Enforcement Division to David Geanakopulos and Stuart Johnson, Volkswagen Group of America, Inc. (September 18, 2015); Notice of Violation from Susan Shinkman, EPA Office of Civil Enforcement to David Geanakopulos and Stuart Johnson, Volkswagen Group of America, Inc. and Joseph Folz and Walter J. Lewis, Porsche Cars North America, Inc. (November 2, 2015).

<sup>2</sup> EPA - Frequent Questions about Volkswagen Violations: <https://www.epa.gov/vw/frequent-questions-about-volkswagen-violations>.

<sup>3</sup> *Complaint* at 26-28, U.S.A. v. Volkswagen AG et al, (E.D. Mich. 2016).

<sup>4</sup> The third partial settlement addressed \$1.45 billion in penalties to settle the civil claims of EPA and the U.S. Customs and Border Protection and injunctive relief for VW. *Third Partial Consent Decree*, Case No. MDL 2672 CRB (JSC) (April 13, 2017). VW also entered a plea agreement to pay a criminal fine of \$2.8 billion related to installing the emission software. *Plea Agreement*, U.S.A. v. Volkswagen AG, (E.D. Michigan 2017).

<sup>5</sup> See *Notice of Beneficiary Designation Under the Volkswagen Diesel Emissions Environmental Mitigation Trust for State Beneficiaries, Puerto Rico, and the District of Columbia*, Case No. MDL 2672 CRB (JSC) (January 29, 2018).

<sup>6</sup> *Partial Consent Decree*: <https://www.epa.gov/sites/production/files/2016-10/documents/amended20partial-cd.pdf>.

vehicle and engine replacement or repower projects from certain on-road vehicles and non-road equipment, as well as projects that expand light-duty, electric-vehicle infrastructure.

Gary R. Herbert, Governor of the State of Utah, has designated the Utah Department of Environmental Quality (UDEQ) as the lead agency to administer Utah's portion of the Trust funds. UDEQ is the agency with jurisdiction over regulation of air quality for the state and is responsible for monitoring and enforcing regulations pertaining to the CAA. UDEQ views the availability of Trust funds as a unique opportunity to reduce NO<sub>x</sub> and other pollutants through a means other than existing regulatory parameters. As such, UDEQ has completed a careful assessment of the EMA categories to determine which ones will provide the greatest benefit to the state<sup>7</sup>.

## NO<sub>x</sub> Emissions and Utah's Air Quality

NO<sub>x</sub> emissions have a significant impact on Utah's air quality. Nitrogen oxides are highly reactive gases that are toxic on their own and also react with other pollutants to form ozone and particulate matter (PM). Ozone and fine PM (PM<sub>2.5</sub>) are the primary air quality concerns in the state. NO<sub>x</sub> emissions result from fuel combustion at high temperatures, making on-road vehicles and non-road equipment the largest NO<sub>x</sub> contributors in the most populous areas of the state<sup>8</sup>. Combined with unique topography, geography, and meteorology, NO<sub>x</sub> emissions are conducive to areas of the state exceeding the National Ambient Air Quality Standards (NAAQS) set by EPA for 24-hour PM<sub>2.5</sub> and ozone. During the winter months, Utah experiences about five to six multi-day inversion episodes during which air quality monitors report exceedances of the 24-hour PM<sub>2.5</sub> NAAQS. Similarly, in the summer months, these areas of the state experience high levels of ozone that exceed the NAAQS. In fact, during the summer of 2017, the State experienced more exceedances of the federal ozone standard than in any of the last ten years.

PM<sub>2.5</sub> can lodge deep in the lungs and infiltrate the bloodstream and negatively affect both the heart and lungs. Complications from exposure to PM<sub>2.5</sub> include irritated airways, coughing, difficulty breathing, aggravated asthma, decreased lung function, irregular heartbeat, nonfatal heart attacks, and even premature death in people with heart or lung disease<sup>9</sup>.

Exceedances of the 24-hour PM<sub>2.5</sub> standard occur in the winter months when temperature inversions occur. The Wasatch Mountains, Oquirrh Mountains, and Traverse Mountains create a bowl that surrounds lowland valleys where Utah's population is concentrated. This unique topography blocks horizontal air movement, causing air masses to stagnate in those population centers where vehicles are abundant. During the cold winter months, temperature inversions develop where a warmer air mass sits on top of a colder air mass. Very little vertical air exchange happens during an inversion and the warm air acts as a lid on top of a bowl, trapping air and pollution. Primary and secondary PM<sub>2.5</sub> build and cannot dissipate until a strong weather system moves through the lowland valleys. The air stagnation and pollution

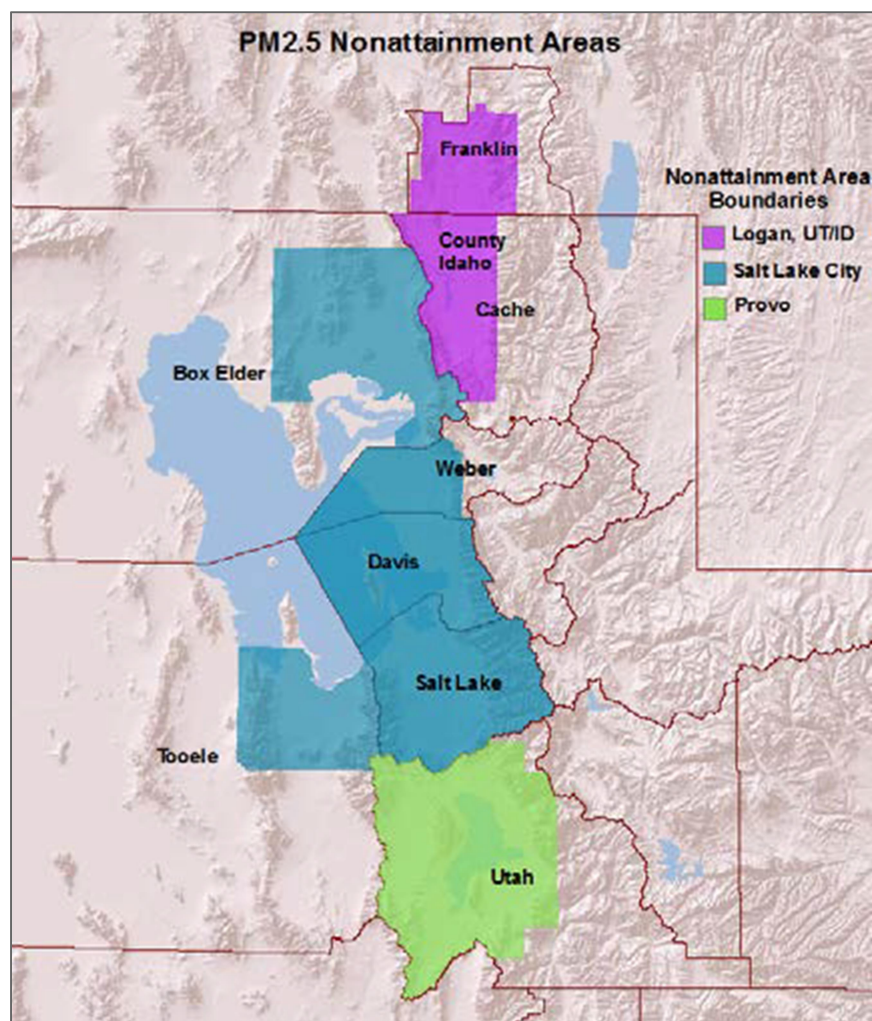
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<sup>7</sup> Note the terms of the Trust require UDEQ to only provide the level of detail reasonably ascertainable at the time of submission of this plan. Nothing in this provision is intended to make this Beneficiary Mitigation Plan binding on the State, nor does it create any rights in any person to claim an entitlement of any kind. The State may adjust goals and specific spending plans at its discretion and, it will provide the Trustee and the public with any updates to the Beneficiary Mitigation Plan.

<sup>8</sup> 2014 Utah Division of Air Quality Emissions Inventory

<sup>9</sup> EPA – Health and Environmental Effects of Particulate Matter (PM): <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm>.

buildup results in exceedances of the 24-hour PM<sub>2.5</sub> NAAQS. Consequently, the EPA has classified the Provo and Salt Lake areas as serious nonattainment areas for 24-hour PM<sub>2.5</sub> and the Logan area as a moderate nonattainment area for PM<sub>2.5</sub> (see Figure 1).



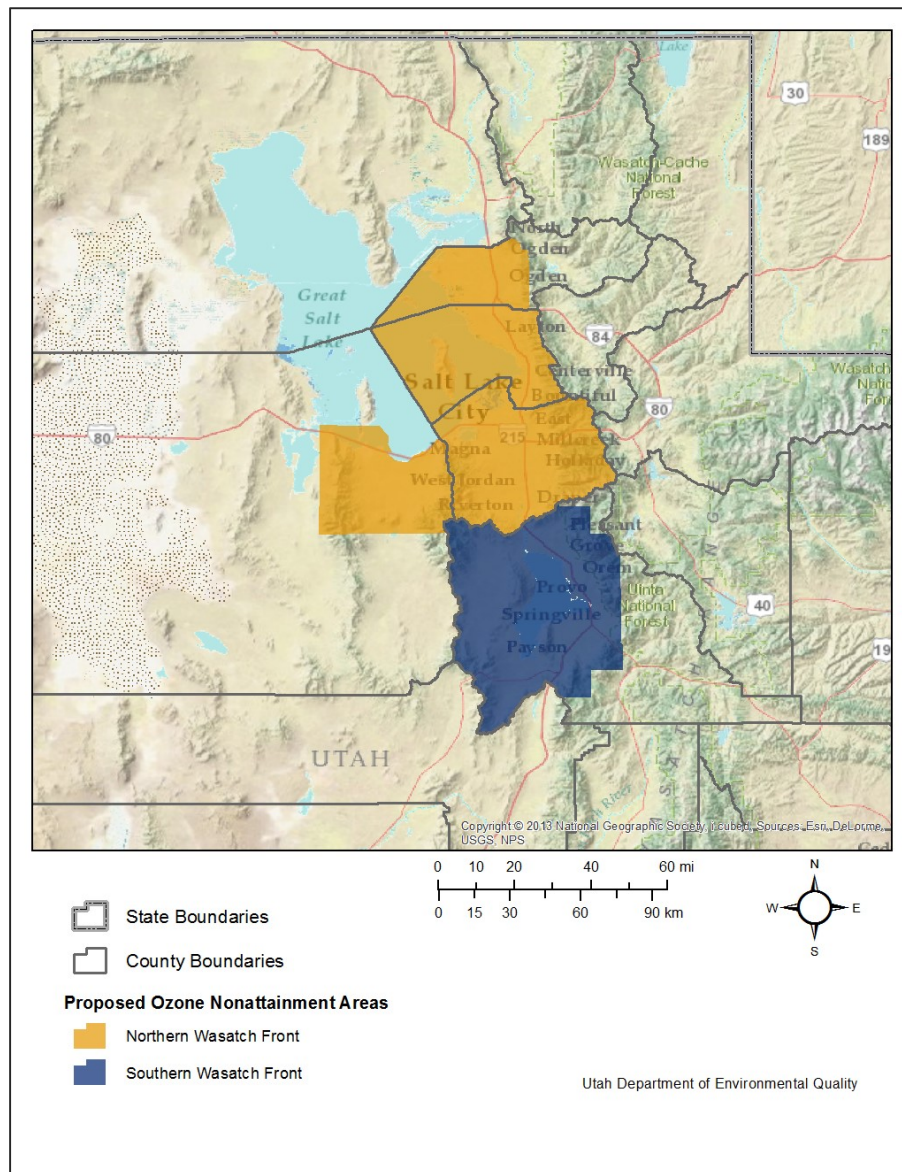
**Figure 1: Utah 24-hour PM<sub>2.5</sub> Nonattainment Areas**

While Utah's meteorology and unique natural characteristics are important factors in the buildup of fine particulate in Utah's nonattainment areas, the majority of the PM<sub>2.5</sub> that builds up during these pollution episodes is formed through complex chemical reactions involving volatile organic compounds (VOCs) and NO<sub>x</sub>. Those same VOCs and NO<sub>x</sub> also contribute to the formation of ozone, which is a summertime issue along the Wasatch Front when sunlight causes chemical reactions to occur between VOCs and NO<sub>x</sub> to produce ozone. Ozone can cause chest pains, breathing difficulties, coughing, aggravated asthma symptoms, and stinging in the eyes or throat. The elderly, young children and those with asthma or other respiratory problems are particularly impacted by ozone<sup>10</sup>.

<sup>10</sup> EPA - Basic Information about Ozone: <https://www.epa.gov/ozone-pollution/basic-information-about-ozone#effects>.



On April 30, 2018, EPA Administrator Scott Pruitt signed a final notice designating the Northern and Southern Wasatch Front and the Uinta Basin (Duchesne and Uinta counties) as marginal nonattainment areas for the 2015 8-hour ozone standard.

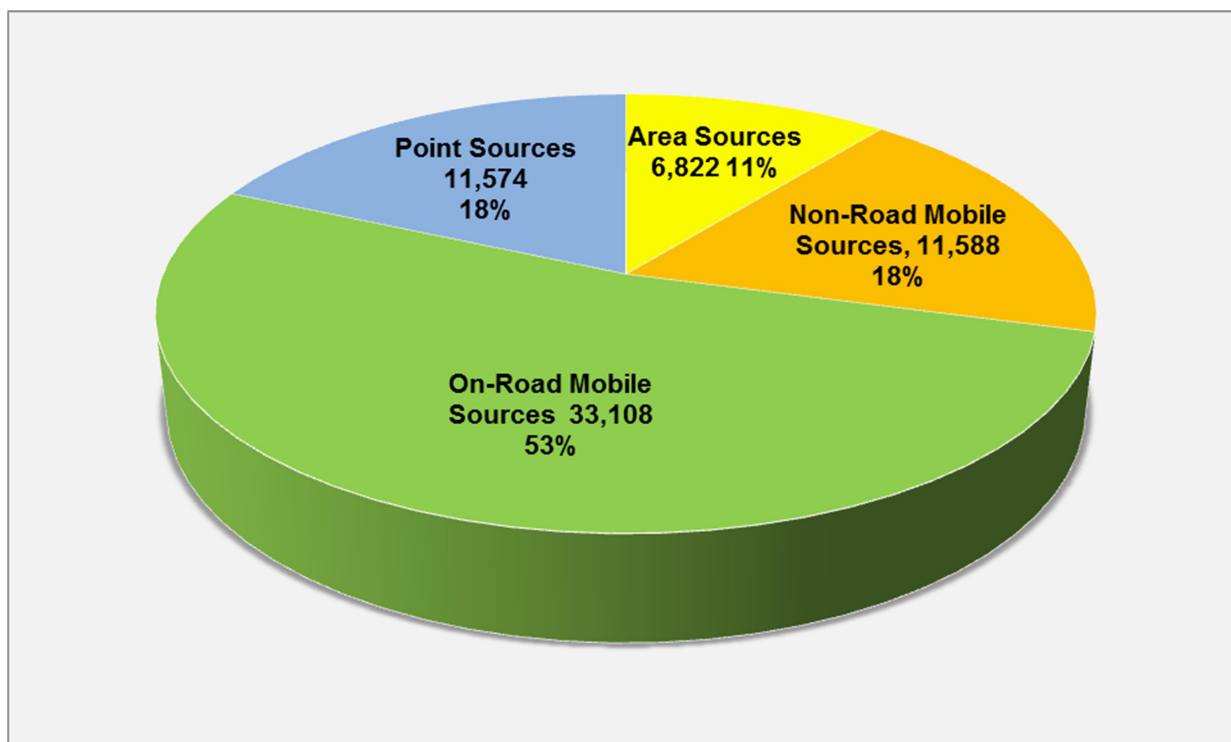


**Figure 2: Utah 8-hour Ozone Wasatch Front Nonattainment Areas**

The majority of the non-compliant VW vehicles registered in Utah operated in the state's nonattainment areas. Although the EMAs specified in the Trust are intended to mitigate the excess  $\text{NO}_x$  emissions from these vehicles, some of these projects will result in reductions of other pollutants such as primary PM (tailpipe) and VOCs in the state's nonattainment areas. However, success of the Trust-funded projects in Utah will only be measured in terms of  $\text{NO}_x$  reductions.

## Impact in Areas That Bear a Disproportionate Share of the Air Pollution Burden

The 2014 emissions inventory for Utah shows that 53 percent of the NO<sub>x</sub> emissions in the 24-hour PM<sub>2.5</sub> nonattainment areas are from on-road mobile sources (see Figure 3), which include light- and heavy-duty gasoline vehicles and light-, medium-, and heavy-duty diesel vehicles.

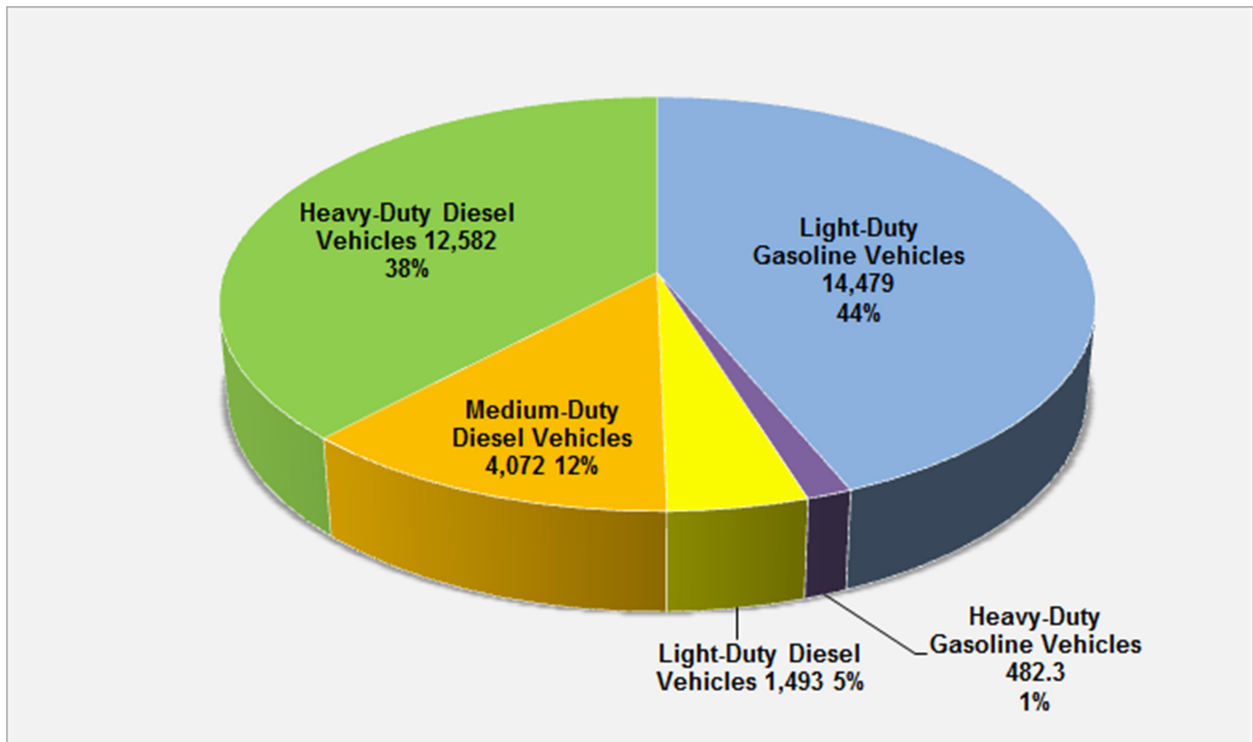


**Figure 3: 2014 Emissions Inventory NO<sub>x</sub> Sources (TPY) in PM<sub>2.5</sub> Nonattainment Counties**

Medium- and heavy-duty diesel vehicles are the largest mobile source contributors of NO<sub>x</sub> emissions in the nonattainment areas, representing half of the on-road mobile sources category (see Figure 4). The Trust identifies the replacement or repower of these vehicles as an EMA, which presents an opportunity for implementing voluntary emissions reductions from a source that is not regulated at the state level.

Medium- and heavy-duty diesel vehicles are the primary mode of freight movement in Utah. In fact, considering the state's relatively modest population of just over three million, Utah handles a disproportionate amount of freight traffic when compared to total traffic of all 50 states, having the highest percentage of freight trucks nationwide<sup>11</sup>.

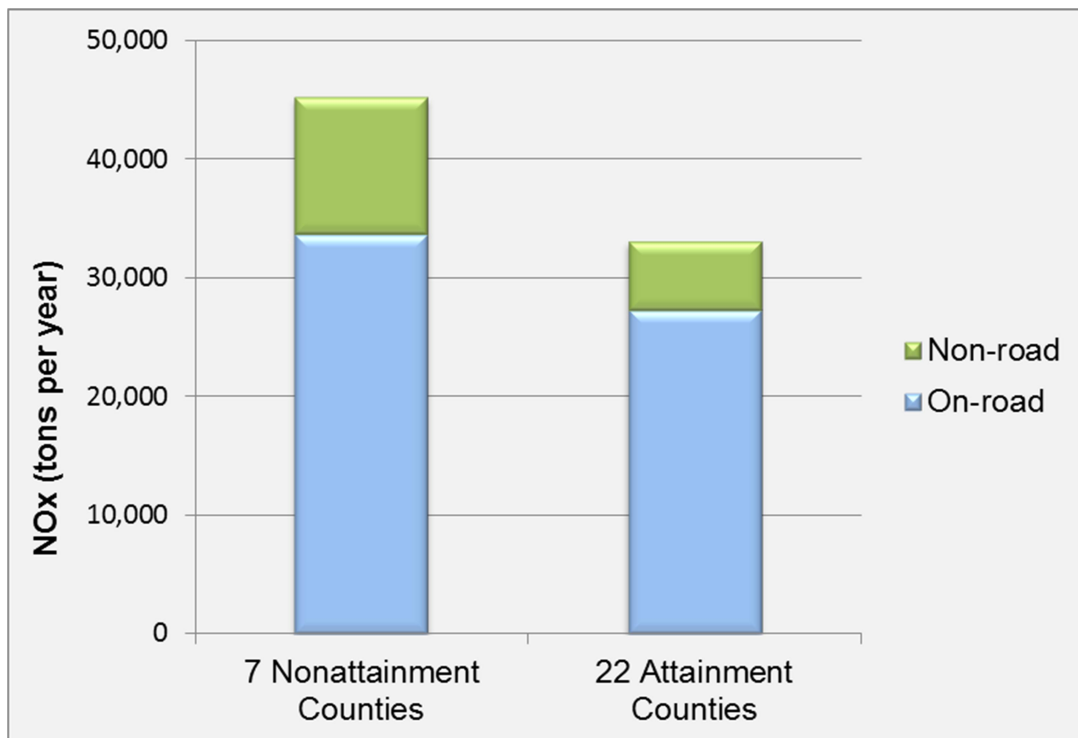
<sup>11</sup> Utah Department of Transportation, Utah Freight Plan 2017:  
<http://www.udot.utah.gov/main/uconowner.gf?n=23980801691013244>



**Figure 4: 2014 Emissions Inventory Mobile NO<sub>x</sub> Sources (TPY) in PM<sub>2.5</sub> Nonattainment Counties**

As the “Crossroads of the West” for freight traffic, Utah provides a life-line to critical transportation arteries for freight distribution coast to coast and between Canada and Mexico. Interstates 15, 80, 84, and 70 and other freight routes provide connections to Utah’s central transportation network, which serves as a strategic hub for highway, rail, inter-modal, pipeline and air freight in the Western United States.





**Figure 5: Mobile NO<sub>x</sub> Sources in PM<sub>2.5</sub> Nonattainment vs. Attainment Counties**

More than 80% of the state's population live and work in the Salt Lake and Provo PM<sub>2.5</sub> nonattainment portions of the Wasatch Front where construction projects and major transportation systems are most prevalent. Because the Wasatch Front is only approximately 18 miles wide, most of the land within this area has been developed and has experienced rapid growth from Utah's aggressive economic development trends. The Wasatch Front is a central point for national freight distribution and is home to thousands of warehouses, distribution centers, and terminals for the country's largest trucking companies, carriers, and suppliers, creating a high presence of freight traffic.

North of the Wasatch Front, the Logan PM<sub>2.5</sub> nonattainment area located in Cache County, has similar topography as the Wasatch Front. The Cache Valley is approximately 4,500 feet above sea level and is almost entirely surrounded with steep mountains reaching over 9,000 feet above sea level, forming a bowl around the valley. During the winter, sub-freezing temperatures, snow-covered ground, and stagnant high-pressure systems result in dense fog formation and temperature inversions over the valley, trapping pollution near the valley floor. The Logan nonattainment area has received national attention for having some of the worst air quality in the country during the inversion season and sees 65,564,200 vehicle miles traveled annually by heavy-duty diesel vehicles<sup>12</sup>.

UDEQ will focus efforts in all three nonattainment areas to reduce diesel emissions. As shown in Figure 5, the 24-hour PM<sub>2.5</sub> nonattainment areas bear a disproportionate share of the air pollution burden when

<sup>12</sup> UDEQ 7-County Heavy-Duty Vehicle Inventory (2016 Annual)

compared to the rest of the state. As such, priority will be given to vehicle/equipment projects that operate in the seven PM<sub>2.5</sub> nonattainment counties.

## Stakeholder and Public Input Process

### Advisory Committee

An advisory committee was established to serve in a consultative role to the UDEQ for developing recommendations regarding which EMAs to include in the State's EMP and determine overall goals and criteria for selecting projects. The committee represented key stakeholders, including the Utah Legislature, air quality advocacy groups, local governments, metropolitan planning organizations, the Utah Office of Energy Development, the Utah Department of Health, and the Utah Department of Transportation. After several workshops, the advisory committee reached full consensus on the following recommendation to UDEQ:

Eligible Mitigation Actions	Advisory Committee Recommendations
Class 8 Local Freight Trucks	52%
Class 4-7 Local Freight Trucks	25%
Class 4-8 School, Shuttle, or Transit Bus	7%
Freight Switchers	0%
Airport Ground Support	0%
Forklifts	0%
Light-Duty Zero Emission Vehicle Supply Equipment	11%
Diesel Emission Reduction Act (DERA) Option	0%
Administrative Costs	5%

**Table 1: Advisory Committee Funding Recommendations**

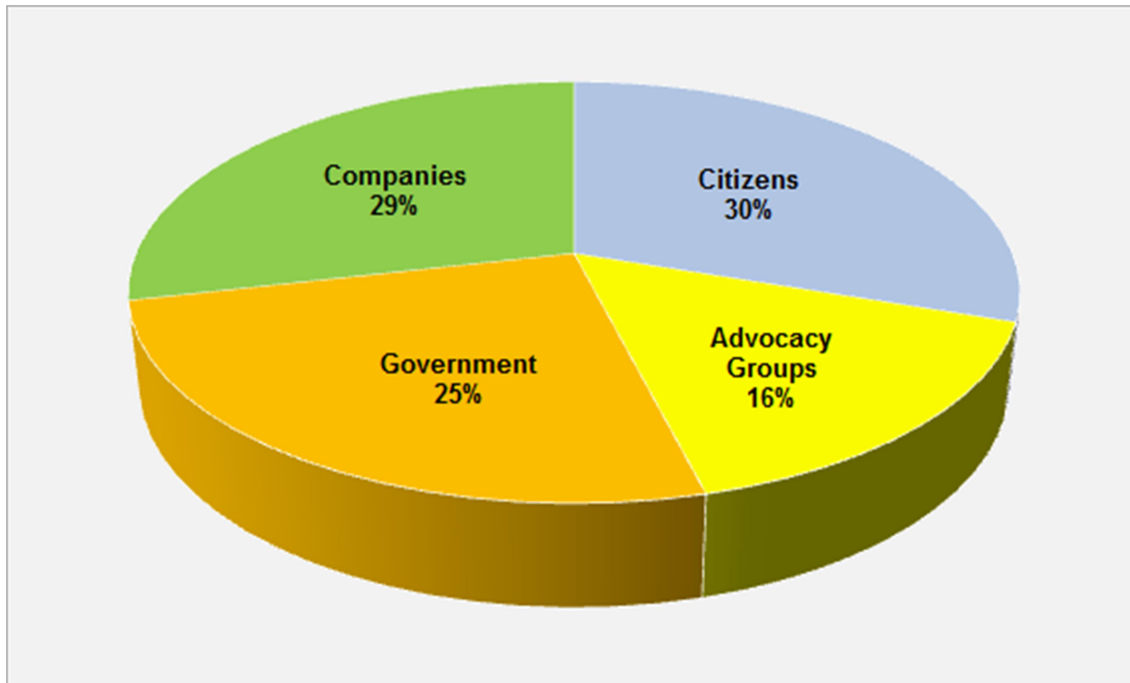
### Public Input Process

Once the advisory committee made their final recommendations, UDEQ opened a 30-day public comment period to allow the public an opportunity to provide input on which EMA categories should be included in the State's plan.

The public input process was offered online at [vw.utah.gov](http://vw.utah.gov), and the website included access to information about the different EMA categories, the impact of NO<sub>x</sub> emissions in the state, and the parameters of the VW Settlement. The site also included an interactive calculator providing a general comparison of the estimated NO<sub>x</sub> reductions that might result from the eligible projects and how their costs per ton of NO<sub>x</sub> emissions reductions might fit into the overall plan. Participants were encouraged to review the advisory committee's recommendations and use the interactive calculator prior to submitting their recommendations and comments.

## Results

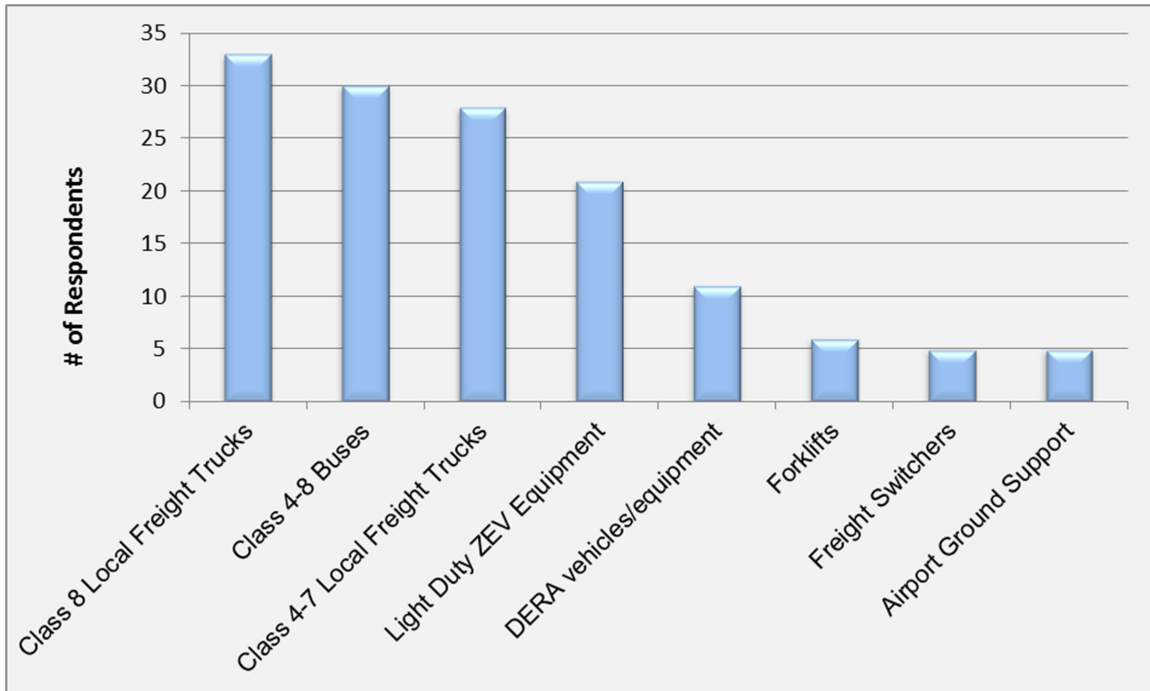
There were 43 online respondents and 20 comments received by email. Figure 6 shows the percentages of responses by affiliation category.



**Figure 6: Public Survey Respondents Affiliation Category**

Citizen responses varied both geographically and by the nature of the comments. Twenty-nine percent of the responses were from businesses promoting their technologies. Environmental advocacy groups generally commented that the Trust funds should be used to promote electric vehicle (EV) technologies. All government responses were from Cache County and were in favor of public fleet replacements. Approximately 15 responses were in favor of using the full 15% allowed for light-duty, zero-emissions equipment. Eighty-two respondents submitted a form through an advocacy group submitting identical comments. These identical responses were counted as one group response.

Figure 7 shows the results of the public's selection of EMA categories. The top five selected categories were: Class 8 Local Freight Trucks, Class 4-8 Buses, Class 4-7 Local Freight Trucks, Light-Duty, Zero-Emissions-Vehicle Equipment, and projects eligible through the Diesel Emissions Reduction Act (DERA).



**Figure 7: Eligible Mitigation Action Categories Selected by Public Survey Respondents**

UDEQ is using the [vw.utah.gov](http://vw.utah.gov) website to continue keeping the public informed. Updates on the VW EMP, the process for which to submit potential projects, selection criteria, and general information regarding the VW Settlement will be posted at [vw.utah.gov](http://vw.utah.gov).

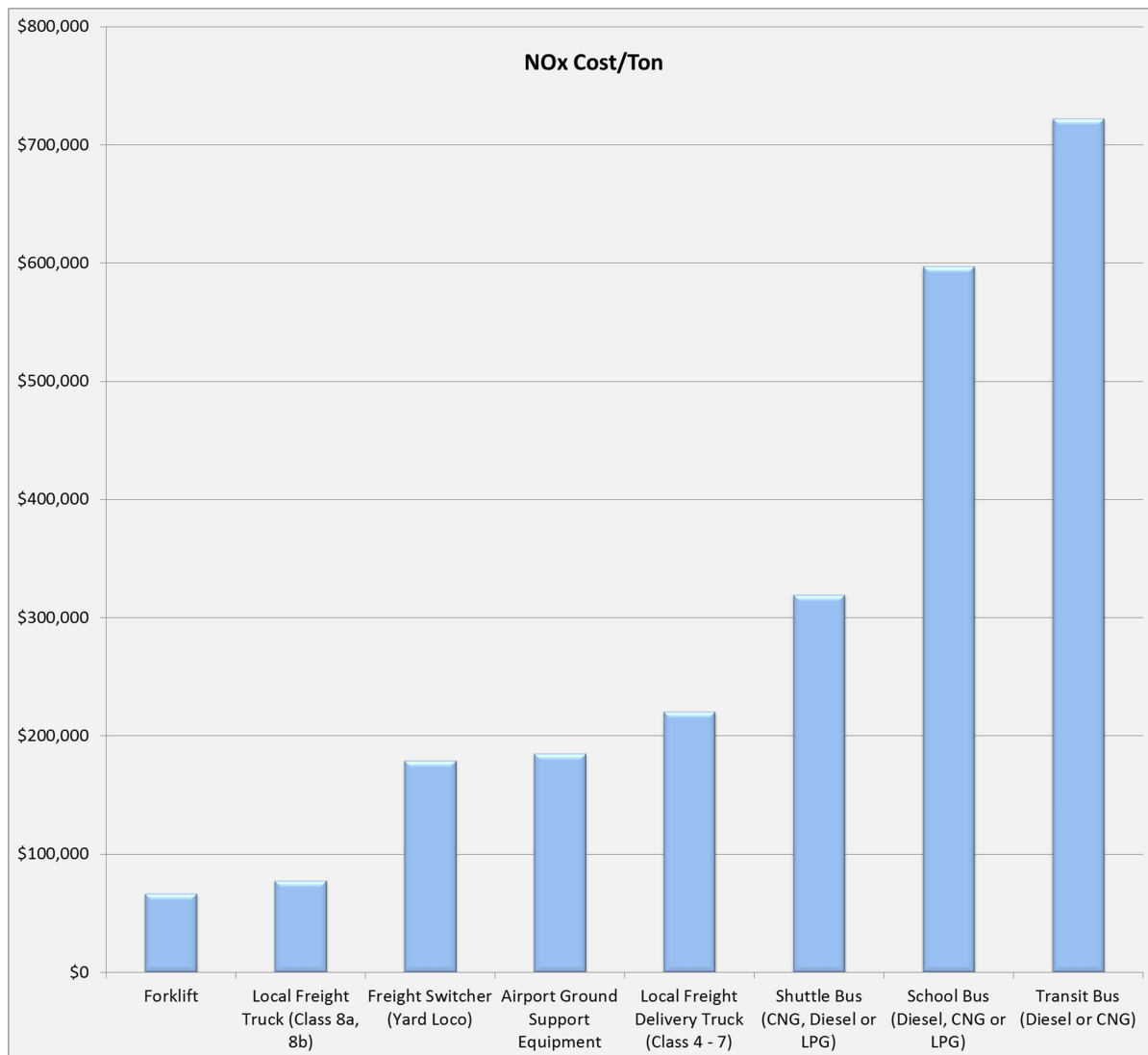
## Utah's Overall Goals and Priorities

Utah's goals for the Environmental Mitigation Trust are to:

- achieve significant NO<sub>x</sub> reductions that work toward fully mitigating the excess lifetime NO<sub>x</sub> emissions from the non-compliant VW vehicles and contribute to the State's ongoing goal of reaching attainment of the NAAQS,
- maximize the amount of emissions reductions for each dollar spent (see Figure 8),
- benefit areas in Utah that bear a disproportionate amount of the air pollution burden,
- stimulate emerging vehicle technologies that result in long-term emissions benefits, and
- provide economic and health benefits to the citizens of Utah.

UDEQ will give priority to vehicle/equipment projects that:

- operate a significant amount of time in nonattainment areas,
- have a reasonable number of years remaining in useful life, and
- are well-leveraged.



**Figure 8: Vehicle/Equipment Replacement Annual Cost/NO<sub>x</sub> TPY**

To achieve these goals, UDEQ will dedicate the majority of Trust funds for government-owned fleet projects. Government fleet turnover is typically hindered as a result of limited budgets, resulting in older, dirtier vehicles/equipment remaining in operation for extended periods of time. Retiring government-owned vehicles/equipment that are intended to remain in operation for several more years and providing financial incentives to permanently remove them from service sooner will provide air quality benefits, while also profiting tax payers. Further, public fleets operate full-time in their local airsheds, ensuring NO<sub>x</sub> reductions will occur in the nonattainment areas where vehicles/equipment are replaced. Although 100 percent funding is eligible for government-owned vehicles, UDEQ will offer up to 50 percent funding for vehicle/equipment replacements and an increased amount for repowers in order to fund additional emissions reductions. An added incentive will be provided for all-electric projects. Private fleet owners will have an opportunity to participate through the DERA category.

The State recognizes the worldwide trends for electric vehicle technologies. Automotive manufacturers, consumer demand, and international market forces are creating a transformative revolution in

transportation. UDEQ received favorable support from the public to direct funding toward electric vehicles. As such, the State will incent the implementation of electric vehicle technology for government-owned fleets and facilities.

Utah's goals for its EMP align with UDEQ's mission to safeguard Utah's air, land, and water through balanced regulation. Aside from the goal of reducing NO<sub>x</sub> emissions, there are other economic, health, and technological reasons to consider when determining the best use of this unique funding opportunity. UDEQ will evaluate specific projects weighing these factors in final decisions.

## Eligible Mitigation Action Categories Selected for Funding

UDEQ plans to allocate the Trust funds to the EMA categories, with focus on government-owned vehicles and equipment, as outlined in Table 2. UDEQ's selection of funded EMA categories is based on the advisory committee's recommendations, public input, and UDEQ's goals and priorities.

Utah's Selected EMA Categories	
EMA	Funding Percentages
Class 8 Local Freight Trucks	73.5%
Class 4-7 Local Freight Trucks	
Class 4-8 School, Shuttle, or Transit Buses	
Freight Switchers	0%
Airport Ground Support	0%
Forklifts > 8,000 lb. lift capacity (port handling equipment)	0%
Light-Duty Zero Emission Vehicle Supply Equipment	11%
Diesel Emission Reduction Act (DERA) Option	7%
Administrative Costs	8.5%
<b>Total</b>	<b>100%</b>

**Table 2: EMA Funding Percentages**



## **Class 4-8 Local Freight Trucks, School Buses, Shuttle Buses, and Transit Buses**

As previously demonstrated, medium- (Class 4-6) and heavy-duty (Class 7-8) on-road diesel vehicles combined represent half of the NO<sub>x</sub> emissions from on-road mobile sources in Utah's PM<sub>2.5</sub> nonattainment areas and are in the top five eligible categories for being the most cost-effective for achieving NO<sub>x</sub> reductions. As such, Utah will allocate 73.5 percent of the Trust funds towards Class 4-8 local freight trucks and school, shuttle, or transit buses. Combining these categories allows UDEQ to make final funding determinations based on specific vehicle/equipment projects and their ability to achieve the State's goals.

Government-owned diesel vehicles will be replaced or repowered with vehicles or engines that meet the most stringent emissions standards. Replacement vehicle fuel types will be left to the fleet owners; however, added incentives will be given to electric-vehicle technologies. Private fleets will have funding opportunities through the Diesel Emissions Reduction Act (DERA).

### **DERA Funding**

Utah will allocate seven percent of the Trust funds to the Diesel Emissions Reduction Act (DERA) category. Nearly \$18 million in DERA awards from EPA to UDEQ have resulted in the reduction of approximately 8,000 lifetime tons of emissions from medium- and heavy-duty diesel vehicles<sup>13</sup> since 2008. Projects have included exhaust-control and idle-reduction technologies, on-road and non-road vehicle/equipment replacements, and repowers. Apportioning trust funds to this category allows UDEQ to continue its investment to this program by matching EPA's annual base amounts for years to come in order to receive additional funding incentives of 50% of the base amount.

The DERA category allows the State to use Trust funds for other projects not limited to the EMAs detailed in the Trust. For example, the State can use the DERA option to fund non-road equipment such as construction, agriculture, locomotives, etc., or exhaust controls or EPA-verified idle-reduction technologies. Investing in this category allows the State more flexibility for funding NO<sub>x</sub> reduction projects that are relevant to fleet owners in Utah. UDEQ will focus on funding private fleets through this category.

### **Light-Duty, Zero-Emission Vehicle Supply Equipment**

As recommended by the advisory committee and based on support received from the public, the State will allocate 11 percent of the Trust to the Light-Duty, Zero-Emission Vehicle Supply Equipment category. The State plans to install EV charging stations at government-owned facilities within Utah's nonattainment areas to expand the use of EVs in the state and local government fleets. Project prioritization will be based on location related to the nonattainment areas, major transportation corridors, and availability to the public.

According to the State's 2014 On-Road Mobile Sources NO<sub>x</sub> Emissions Inventory, light-duty vehicles account for 44 percent of the state's NO<sub>x</sub> emissions in the nonattainment areas. Allocating funding to this category allows an opportunity to address NO<sub>x</sub> emissions from a category not otherwise eligible through the Trust.

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<sup>13</sup> Calculations derived from EPA's Diesel Emissions Quantifier.

In addition to allocating 11 percent of the Trust funds to EV equipment, significant investments are being made in Utah toward the implementation of EVs. A five-year pilot program to provide \$2 million a year over five years for EV infrastructure expansion throughout the state was approved by the State Legislature to begin in 2017. The State Legislature also passed legislation to expend up to \$200,000 from the Transportation Fund to partner with other entities to expand the availability of infrastructure for emerging vehicle technology. The local utility, PacifiCorp, received a \$4 million grant from the U.S. Department of Energy for EV charging infrastructure and fleet deployment. The goal for the grant is to electrify over 1,500 miles of interstate highways in three states with EV chargers every 50-100 miles along the corridors. Expanding workplace EV charging is another segment of this program. For many years, the State has offered millions of dollars in grants and tax credits to incent the purchase of EVs.

Additionally, through the \$2 billion ZEV Investment included in the VW Settlement, other opportunities exist for funding EV expansion. The governors of Utah, Colorado, and Nevada have collaborated to create an EV charging network across the Western United States that aligns with the Federal Highway Administration's Electric Vehicle Corridor, setting the stage for further funding opportunities.

### **Administrative Costs**

The Trust allows up to 15% of the State's allocation to be used for administrative costs. The UDEQ plans on using 8.5% of the Trust funds for administrative costs to implement the funded EMA projects. UDEQ recognizes that administrative costs must be tied to specific EMAs. UDEQ anticipates the administrative costs associated with the EMAs to include tasks such as establishing a process to solicit, select and submit funding requests for eligible mitigation projects and implementing and providing oversight of authorized projects. Considering the level of oversight required to administer the program effectively, and to ensure the timely availability of information to the public, a significant amount of staff resources will be applied to this long-term project.

## **Expected Ranges of Emissions Benefits**

### **Total Excess NO<sub>x</sub> Emissions in Utah**

The objective for the Trust is to fund vehicle/equipment projects that fully mitigate the excess lifetime NO<sub>x</sub> emissions from the non-compliant VW vehicles that were registered in the state. This section will describe the excess NO<sub>x</sub> emissions from the non-compliant vehicles and the estimated ranges of NO<sub>x</sub> emissions benefits the State anticipates from the EMA category selections.

The 5,983 2.0-liter and 1,030 3.0-liter non-compliant vehicles that were registered in the state phased into use between 2009 and 2016. The 2.0-liter partial settlement requires Volkswagen to recall or repair 85% of the 2.0-liter vehicles by June 30, 2019. According to the Claims Supervisor Report published on February 19, 2018, 82% of the 2.0-liter vehicles have been recalled or repaired by that date<sup>14</sup>. The 3.0-liter partial settlement had two different 85% recall/repair dates, November 30, 2019, and May 31, 2020<sup>15</sup>.

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<sup>14</sup> Report of Independent Claims Supervisor on Volkswagen's Progress and Compliance Related to Resolution Agreements Entered October 25, 2016, (April 26, 2018).

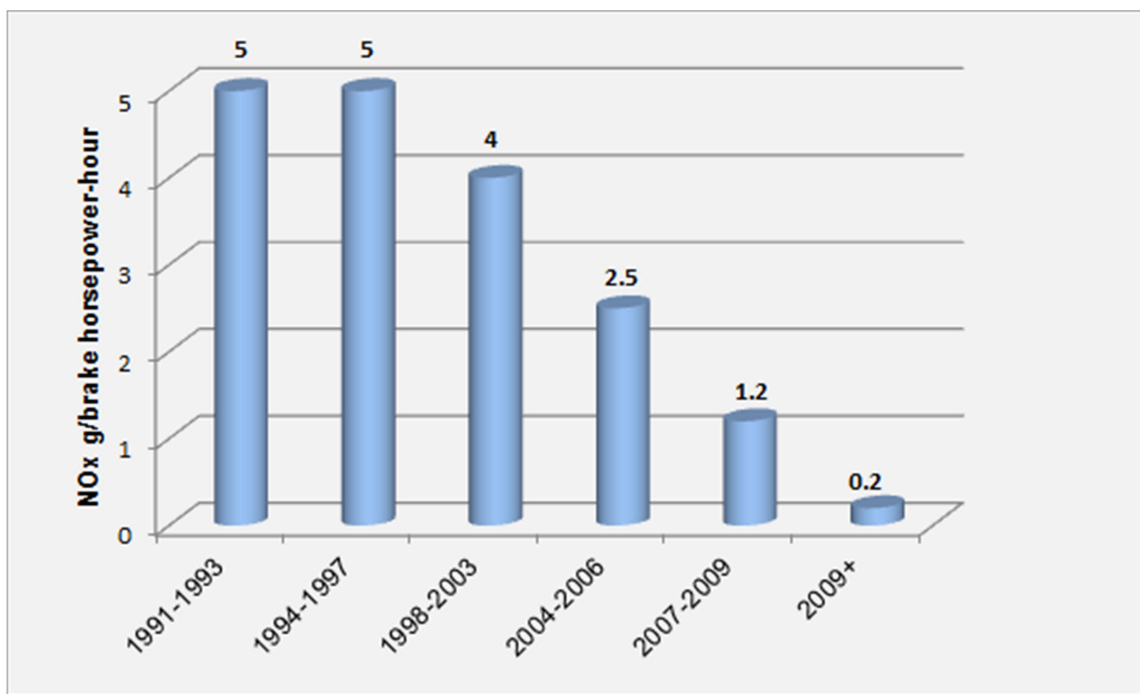
<sup>15</sup> *Second Partial Consent Decree*, MDL No. 2672 CRB (JSC) (approved May 17, 2017): <https://www.epa.gov/sites/production/files/2016-12/documents/30literpartialconsentdecree.pdf>.

UDEQ estimates the lifetime NO<sub>x</sub> emitted by the non-compliant vehicles to be between 351-1,556 tons of NO<sub>x</sub> over the span of time they were operating in Utah. This calculation is based on the phased vehicle deployment, partial settlement recall parameters, the actual rates of recall to date, estimated vehicle miles traveled per year<sup>16</sup>, and information from the 2.0-liter partial settlement that states the non-compliant vehicles emitted between 9 and 40 times the EPA standard set for light-duty tier II bin 5 vehicles<sup>17</sup>.

### Estimated Emissions Benefits

The amount of emissions reductions, including NO<sub>x</sub>, PM<sub>2.5</sub>, VOCs, carbon monoxide, and carbon dioxide from projects selected within the EMA categories are dependent on multiple variables, such as the original vehicle type/usage, engine model year and associated emissions standards, the remaining useful life for the vehicle/equipment being replaced or repowered, and the new engine fuel-type.

When evaluating emissions reductions from a broader perspective than what would be calculated for specific projects, UDEQ estimated the range of emissions reduction using the standards set by EPA. The EPA sets exhaust emissions standards for on-road and non-road vehicles and engines. The latest heavy-duty highway engine standards were revised in 2007<sup>18</sup> and the NO<sub>x</sub> standards were phased in between 2007 and 2009. The Trust allows the replacement of vehicles/equipment or repower of engines with engine model years between 1992-2009 with vehicles/equipment or engines that meet the most stringent emissions standards. The allowable NO<sub>x</sub> emissions from heavy-duty engines has decreased significantly since 1991 (See Figure 9).



**Figure 9: EPA NO<sub>x</sub> Emissions Standards**

<sup>16</sup> Federal Highway Administration: <https://www.fhwa.dot.gov/policyinformation/statistics/2015/vm1.cfm>.

<sup>17</sup> Light-Duty Vehicles, Light-Duty Trucks, and Medium-Duty Passenger Vehicles: Tier 2 Exhaust Emission Standards and Implementation Schedule: <https://nepis.epa.gov/Exec/ZipPDF.cgi/P100SMQA.PDF?Dockey=P100SMQA.PDF>.

<sup>18</sup> EPA – Heavy-Duty Highway Compression-Ignition Engines and Urban Buses: Exhaust Emission Standards: <https://nepis.epa.gov/Exec/ZipPDF.cgi?Dockey=P100O9ZZ.pdf>.

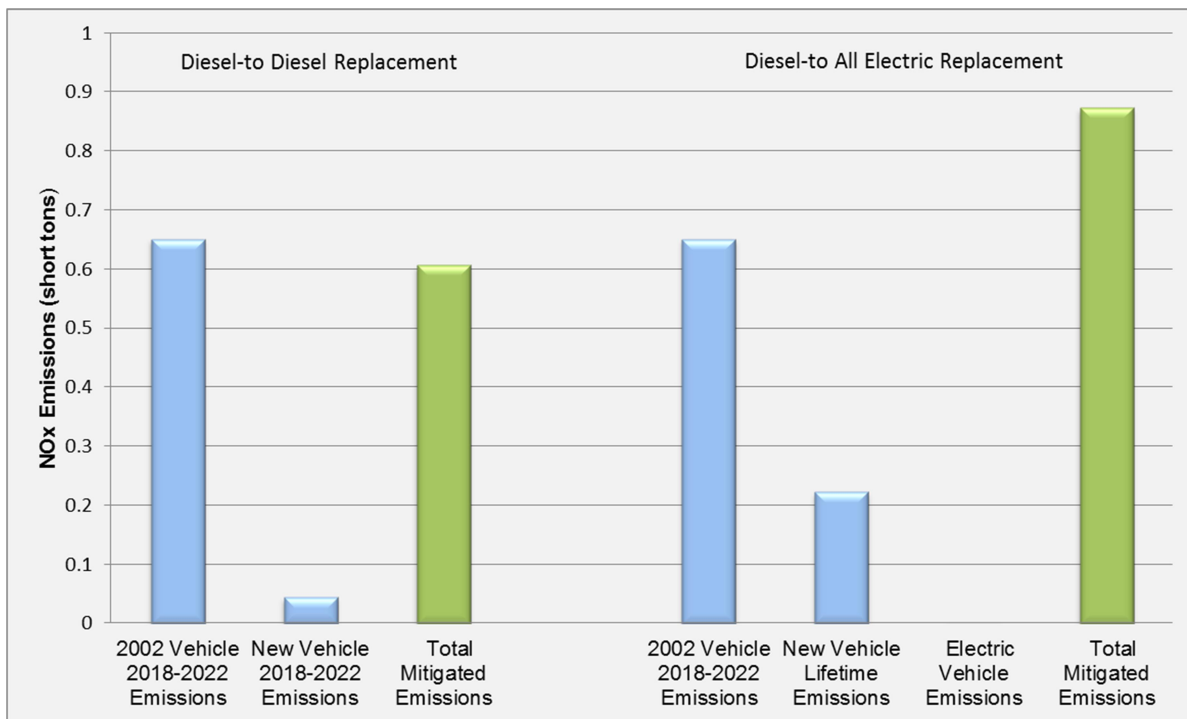
Table 3 is an example of diesel-to-diesel annual NO<sub>x</sub> reductions in tons per year depending on vehicle type and engine model year emissions standards for the on-road EMA categories selected by the State.

<b>Engine Model Years of Emissions Standard</b>	<b>Class 4-5</b>	<b>Class 6-7</b>	<b>Class 8</b>	<b>Transit Bus</b>	<b>School Bus</b>
1991-1993	.223	.223	.677	1.286	.231
1994-1997	.223	.223	.677	1.286	.231
1998-2003	.11	.11	.466	.829	.116
2004-2006	.093	.093	.214	.437	.087

**Table 3: Diesel-to-Diesel Replacement NO<sub>x</sub> Reductions (TPY) Per Vehicle Type and Engine Model Year Emissions Standards**

When selecting vehicle projects, UDEQ will consider the useful life of the vehicle being replaced. This is an important factor in calculating lifetime emissions reductions since it determines the amount of time the selected vehicles would have remained in operation. Useful life is typically based on vehicle usage, mileage, and fleet retirement schedules. UDEQ will fund vehicles with a minimum of three to four years remaining in useful life in order to ensure emissions reductions are being achieved, rather than supplementing emissions reductions that would have occurred otherwise.

The fuel type of the new vehicle or engine also influences the emissions reduction outcome. UDEQ will consider emissions reductions based on specific projects submitted by fleet owners that will indicate their fuel of choice. UDEQ will use the EPA's Diesel Emission Quantifier tool for calculating emissions reduction for diesel-to-diesel replacement and repowers. The Argonne National Laboratory Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) tool may be used for calculating emissions reductions for diesel to alternative fuel replacements or repowers. Figure 10 represents how total emissions reductions can be compared and quantified with different fuel types.



**Figure 10: Example of NO<sub>x</sub> reductions with different fuel-types from a baseline model year 2002 diesel vehicle with a 20-year retirement schedule, retiring four years early in 2018**

Emissions reductions from installing light-duty ZEV supply equipment is based on various factors and hypothetical scenarios, making it challenging to quantify. The immediate NO<sub>x</sub> reductions will likely be small. However, as electric vehicles become more common, and the sources for powering EVs relies less on fuel combustion, the long-term overall emissions reductions from installing light-duty ZEV supply equipment are promising.

## Statement from Governor Gary Herbert

*“Utah’s world-class landscape brings unique air quality challenges that require strategic, evidence-based solutions. The VW Settlement provides an opportunity to put that call into action by removing vehicles that are proven to be significant sources of pollution in our airshed. A well-functioning transportation system is critical to our strong economy, and the emissions reductions that will result from the VW Settlement allow our economy to continue growing while improving our air quality.”*

## Acronyms and Abbreviations

CAA	Clean Air Act
EMA	Eligible Mitigation Action
EMP	Environmental Mitigation Plan
EPA	Environmental Protection Agency
DERA	Diesel Emission Reduction Act
NAAQS	National Ambient Air Quality Standards
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>2.5</sub>	Fine Particulate Matter (diameter of 2.5 micrometers and smaller)
TPY	Tons Per Year
Trust	Environmental Mitigation Trust Agreement for State Beneficiaries
UDEQ	Utah Department of Environmental Quality
Volkswagen or VW	Volkswagen Corporation and Subsidiaries
VOC	Volatile Organic Compound
ZEV	Zero Emissions Vehicle