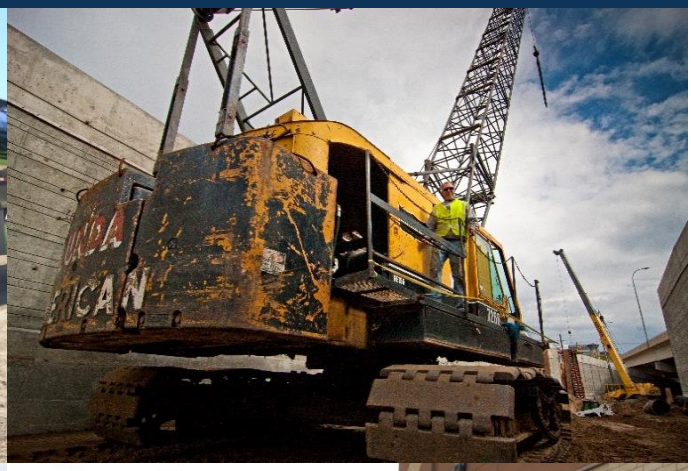
Volkswagen settlement

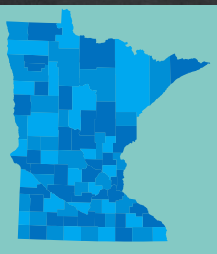
April 2018

Minnesota's Volkswagen Settlement Beneficiary Mitigation Plan

Minnesota's plan for using funds from the national Volkswagen settlement



MINNESOTA POLLUTION CONTROL AGENCY



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This report is available in alternative formats upon request, and online at www.pca.state.mn.us/vw.

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Executive summary

The settlement

In 2016 Volkswagen Corporation was caught violating air pollution standards for nitrogen oxides (NO_X) in its diesel cars and SUVs. Their vehicles were producing 30-40 times more pollution than allowed by law. The federal government took VW to court and on October 2, 2017, the Department of Justice and VW signed a $15 billion settlement. A portion of the settlement – $2.9 billion – will be shared among the U.S. states and tribes, based on the number of violating vehicles registered in each jurisdiction. Minnesota's share is $47 million. Governor Dayton designated the Minnesota Pollution Control Agency (MPCA) to manage the settlement funds, which will be spent over 10 years on projects to offset the excess pollution from the violating vehicles.

States can develop programs and fund projects that make the most sense for them, within the boundaries set by the settlement. Because VW's violations involved diesel models, the settlement will fund pollution reductions from diesel vehicles. States and tribes can only use the funds on activities outlined in the settlement, most of which involve replacing older diesel vehicles or equipment with new ones that produce far less pollution. The replacements can use any fuel, including diesel, propane, natural gas, and electricity. Replacements allowed under the settlement are:

- Heavy-duty and medium-duty trucks
- School, transit, and shuttle buses
- Switcher locomotives
- Ferry, tug, and tow boats
- Shore power for ocean-going vessels
- Airport ground support equipment
- Forklifts and port cargo-handling equipment
- Construction equipment (by supplementing the existing Diesel Emission Reduction Act)

Additionally, up to 15% of each state's funds may be used for electric vehicle charging infrastructure. All funds must be spent or committed to approved projects by October 2, 2027.

Minnesota's plan

States must develop plans for using their settlement funds and submit them for approval to the Trustee managing the funds nationally. Minnesota's plan involves three phases of funding for five grant programs, over 10 years. Once it's approved, the MPCA can begin requesting proposals for projects and issuing grants.

Goals

The MPCA will use the state's settlement funds to support a healthy environment for all Minnesotans and achieve significant emissions reductions across the state, especially in those communities most impacted by vehicle pollution. Because 60% of the violating vehicles were registered in the Twin Cities metropolitan area and 40% were registered in Greater Minnesota, the funds will be targeted using the same 60%-40% ratio. We will invest in communities disproportionately impacted by air pollution, both in the Twin Cities area and in Greater Minnesota. In developing the grant programs and selecting projects for funding, we will balance project costs with emissions reductions and other benefits.

Three phases

Minnesota's plan is structured in three phases, so the MPCA can seek additional input and make changes as needed along the way. This plan addresses Phase 1 (2018-2019) only.

The three phases are:

- Phase 1: $11.75 million (25% of overall funds) – 2018-2019
- Phase 2: $23.5 million (50%) – 2020-2023
- Phase 3: $11.75 million (25%) – 2024-2027

Five grant programs in Phase 1 (2018-2019)

Minnesota will manage the VW settlement funds through five grant programs that will allow different vehicle and equipment types to be compared with each other through the grant process. With these investments in 2018 and 2019, the MPCA expects to reduce approximately 1,152-1,228 tons of nitrogen oxides, 41-60 tons of fine particles, and 21,188-34,751 tons of greenhouse gases.

Table: Summary of grant programs, 2018-2019 (phase 1)

MN grant categories (2018-2019)	Settlement category	Eligible fuels	2018-2019 grants (Phase 1)	
			Targeted percent*	Targeted dollar amount
School bus replacement program	School buses	All (diesel, propane, natural gas, electric)	20%	$2,350,000
Clean heavy-duty on-road vehicles program	Transit buses, class 4-8 trucks	All (diesel, propane, natural gas, electric)	35%	$4,112,500
Clean heavy-duty off-road equipment program	Switcher locomotives, ferries, tugs, port cargo handling equipment, ocean-going vessel shore power, Diesel Emission Reduction Act (DERA)	All (diesel, propane, natural gas, electric)	15%	$1,762,500
Heavy-duty electric vehicle program	School buses, transit buses, trucks, airport ground support equipment, forklifts	Electric	15%	$1,762,500
Electric vehicle charging stations	Zero-emission vehicle infrastructure	Not applicable	15%	$1,762,500
	Total:			**$11,750,000**

*Percentage of available settlement funds targeted at these activities for 2018-2019

Outreach and input

The MPCA is committed to developing a program that benefits all Minnesotans and reflects the needs and desires of people across the state. The agency sought input statewide for more than a year. Before drafting the state plan, we held nine public meetings and four stakeholder meetings, kept interested people up to date with informational email bulletins, received nearly 300 written comments and over 800 responses to online surveys, sought input from the MPCA's Environmental Justice Advisory Group, and posted information and data on a website. We released a draft of the state plan and gave Minnesotans the opportunity to tell us if we did a good job reflecting their input. We held seven public meetings, one webinar meeting, and one stakeholder meeting, and received over 580 written comments. All the information gathered during this process is available at www.pca.state.mn.us/vw. We also encourage anyone interested in applying for funds in the future, to go to our website and sign up to receive our emails.

Minnesota's Plan

Minnesota's Beneficiary Mitigation Plan for submission to the Wilmington Trust of Wilmington, Delaware as required by the Environmental Mitigation Trust Agreement for State Beneficiaries as part of the Volkswagen Environmental Settlement.

Introduction

Volkswagen's tampered diesel vehicles have emitted an estimated 600 tons of excess air pollution in Minnesota. The Minnesota Pollution Control Agency (MPCA) is committed to ensuring that Minnesota's funding from the Volkswagen settlement – $47 million over 10 years – is used to improve air quality in our state, especially for those most vulnerable to its effects. Our goals are to mitigate the pollution from VW vehicles and reduce air pollution emissions, while moving Minnesota towards a cleaner transportation future.

Purpose

This document is Minnesota's Beneficiary Mitigation Plan, a required step in the federal court settlement. To use settlement funds, states must specify how they plan to spend them in a plan submitted to the Trustee managing the funds for states. The federal settlement specifies the project types on which states can spend funds. However, within that structure, we can prioritize projects and initiatives that make the most sense for Minnesotans and reflect our state's priorities and goals. The plan must include:

- Minnesota's goals for the funds
- The types of vehicles and equipment Minnesota plans to replace with the funds
- How Minnesota will use the funds to benefit communities disproportionately impacted by air pollution
- Estimates of the emissions reductions that Minnesota expects to achieve with these funds

This document our plan for these funds, focusing on overall goals for the 10 years of the program and projected investments for the first two years (2018-2019). The MPCA intends to seek further input and revise the plan after the first two years of the program.

Goals and targets

The MPCA solicited input from Minnesotans across the state on how the VW settlement funds should be spent, and used the feedback to set goals for the funds to guide us over the 10 years of the program. The MPCA will use the funds to achieve significant emissions reductions across the state, especially in areas that have been most impacted by vehicle pollution. Based on the number of violating VW vehicles registered in different parts of the state, we plan to target investing 60% of the settlement funds in the Twin Cities metropolitan area and 40% in Greater Minnesota. We will also maximize emissions reductions in areas disproportionately impacted by air pollution, both in the Twin Cities and across the state. We will prioritize bringing health benefits to Minnesotans by reducing their exposures to vehicle-related air pollution. We will balance these priorities with cost-effective management of the funds. (To learn more about Minnesota's goals and targets for its settlement funds, see page 13.)

Grant program plan

The federal Volkswagen settlement outlines 10 specific activities on which states can use settlement funds. Most of these allowable projects involve replacing old heavy-duty diesel vehicles or equipment with new, cleaner vehicles or equipment. The new vehicles can use diesel or alternative fuels such as propane, compressed natural gas, or electricity. The old vehicles must be destroyed. States can also spend up to 15% of their settlement funds on electric vehicle charging stations. (See Appendix 1 for a summary of the settlement and Appendix 9 for the settlement language describing the types of vehicles and equipment replacements that can be funded.)

Using the input of Minnesotans, the analysis of project benefits, and MPCA staff expertise, the agency has developed this plan for the first phase of funding (2018-2019) from Minnesota's $47 million allocation from the VW settlement. (See Appendix 4 for details of the input we have received through our engagement process and Appendix 5 for a summary of input we received on our draft plan.) All funds must be spent or committed to projects by October 2, 2027.

Phased funding

Minnesota's $47 million allocation will be invested over three phases. The phased plan will allow the agency to:

- Build in transparency and involve the public in reviewing and revising the plan between phases
- Learn which projects work best in Minnesota, and modify our requests for proposals in subsequent phases to focus the most effective projects
- Identify areas in need of additional assistance as we seek out proposals
- Track constantly changing vehicle technology and invest in the most effective at the time

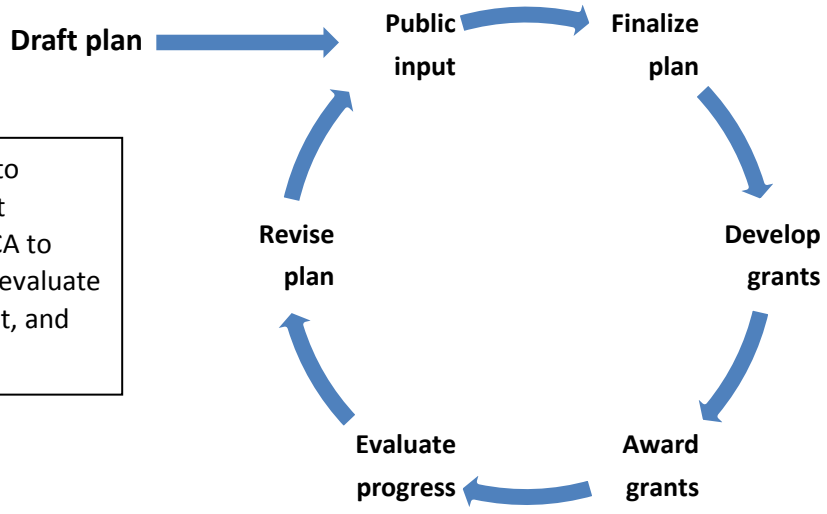
The first phase of funding will be a first step in achieving our 10-year goals for the program. The three phases of funding are:

Phase 1: $11.75 million (25% of overall funds) – 2018-2019 – Smaller amount of money to learn and ramp up. Phase 1 is the period addressed in this plan. We will solicit input and review and revise the plan after Phase 1.

Phase 2: $23.5 million (50% of overall funds) – 2020-2023 – Most of the funds will be spent during this period. We will develop the spending plan for Phase 2 after further public input. We will solicit input on spending priorities for Phase 3 and review and revise the plan after Phase 2.

Phase 3: $11.75 million (25% of overall funds) – 2024-2027 – Remaining funds allocated.

Figure 1: Plan revision process



The three-phase approach to Minnesota's VW settlement program will allow the MPCA to write a plan, award grants, evaluate the process, get public input, and revise the plan.

Phase 1 of grants (2018-2019)

During the initial 2018-2019 period, the MPCA will allocate 25% of Minnesota's overall funding, or $11.75 million. The state's ability to fund projects in each category at the target levels will depend on the applications received and interest by vehicle and equipment owners. The exact percentages may shift with demand. Table 1 reflects our preferred investment scenario, but if we do not receive sufficient applications in a category, the MPCA would shift funds between programs in Phase 1 or move funds into the next funding phase (2020-2023).

Figure 2: Grant program funding allocations (2018-2019, Phase 1)

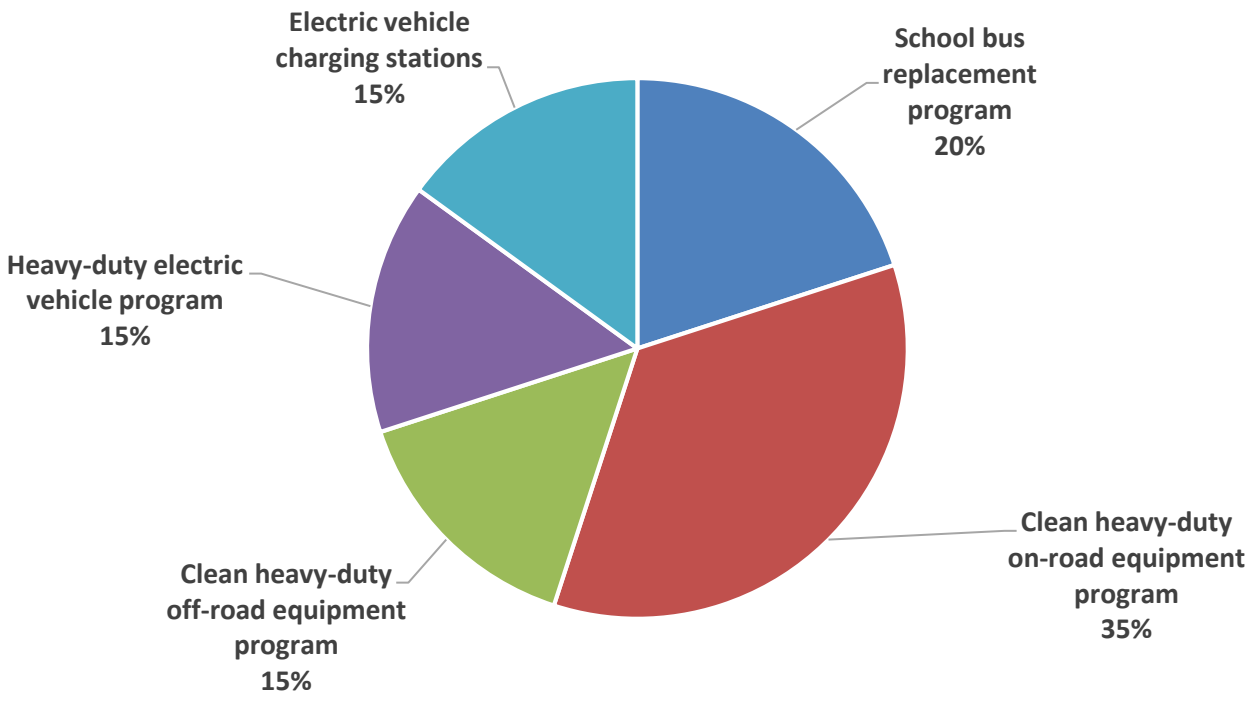


Table 1: Summary of grant programs for 2018-2019 (Phase 1)

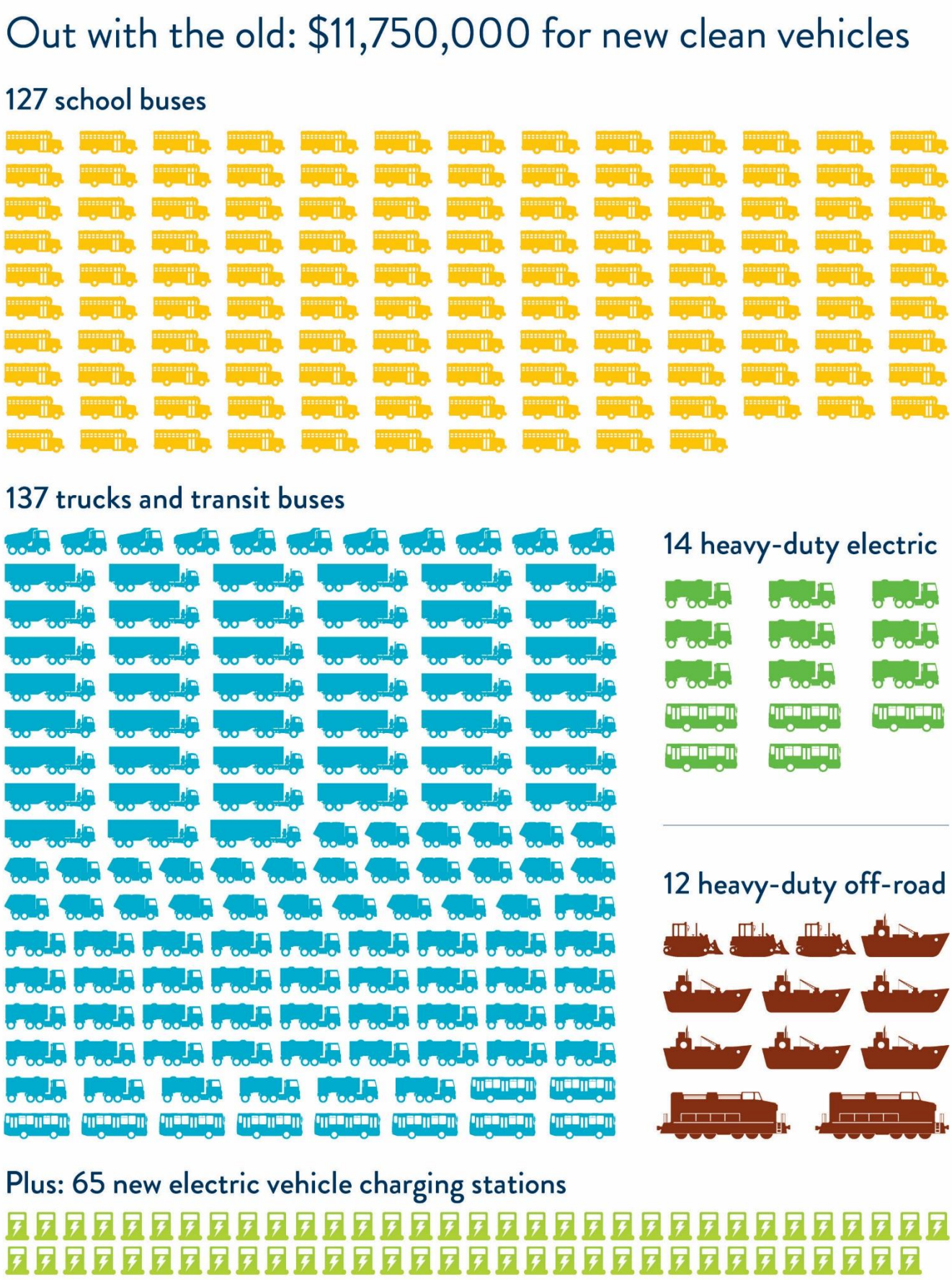
Grant program (2018-2019)	Settlement category	Eligible fuels	2018-2019 grants (Phase 1)			
			Targeted percent*	Targeted dollar amount	Approx. number purchased**	Estimated emissions reductions (tons)***
School bus replacement program	School buses	All (diesel, propane, natural gas, electric)	20%	$2,350,000	127	NO_X: 23-28 $PM_{2.5}$: 1.0-1.7 GHGs: 292-585
Clean heavy-duty on-road vehicles program	Transit buses, class 4-8 trucks	All (diesel, propane, natural gas, electric)	35%	$4,112,500	137	NO_X: 494-564 $PM_{2.5}$: 17-34 GHGs: 12,543-23,160
Clean heavy-duty off-road equipment program	Switcher locomotives, ferries, tugs, port cargo handling equipment, ocean-going vessel shore power, Diesel Emission Reduction Act (DERA)	All (diesel, propane, natural gas, electric)	15%	$1,762,500	12	NO_X: 619 $PM_{2.5}$: 23 GHGs: 1,866
Heavy-duty electric vehicle program	School buses, transit buses, trucks, airport ground support equipment, forklifts	Electric	15%	$1,762,500	14	NO_X: 15-16 $PM_{2.5}$: 0.5-1.0 GHGs: 1,855-4,508
Electric vehicle charging station program	Zero-emission vehicle infrastructure	Not applicable	15%	$1,762,500	Fast chargers: 20 Level-2 chargers: 45	NO_X: 1.1 $PM_{2.5}$: 0.05 GHGs: 4,632
	Total:			**$11,750,000**		**NO_X: 1,152-1,228** **$PM_{2.5}$: 41-60** **GHGs: 21,188-34,751**

*Percentage of available settlement funds targeted at these activities for 2018-2019.

**Each category includes an estimated mix of eligible vehicles and equipment types. These estimates provide an idea of how many vehicles of each type could be funded in Phase 1 in order to make emissions calculations, but do not reflect a preference for any vehicle or fuel type or funding targets or allocations within each grant program. (See Appendix 7 for methods.)

***Emission benefits for projects funded in Phase 1 compared to emissions expected if the old vehicles were to continue to operate for their remaining useful life. Calculated for nitrogen oxides (NO_X), fine particles ($PM_{2.5}$), and greenhouse gases (GHGs). NO_X and $PM_{2.5}$ emissions are calculated for tailpipe emissions only. GHG emissions benefits are calculated from well to wheel. (See Appendix 7 for calculation methods.)

Figure 3: Grants from Phase 1 will replace hundreds of vehicles across the state.



Funding process

Projects will be funded through a competitive grant application process. The MPCA will develop a set of criteria for scoring projects and selecting those that best align with the plan goals.

In most cases, the settlement requires that most of the funds for vehicle and equipment replacement be provided by equipment owners; the smaller portion of the total cost of the new vehicle will be covered by VW settlement funds (see next section for allowable matches). Eligible applicants are people and organizations who either own heavy-duty diesel vehicles and equipment or install electric vehicle charging infrastructure. Applicants may include, but are not limited to, local governments, school districts, state government agencies, metropolitan planning organizations, transit authorities, tribes, private businesses, and non-profit organizations. Vehicle owners can also work with third parties to submit aggregated applications for multiple vehicles owned by different organizations.

Selected applicants will receive their funding as a reimbursement after their new equipment has been delivered and the MPCA has received confirmation that their old equipment has been destroyed. VW funds cannot be used for vehicles, engines, or electric vehicle charging stations that are purchased before a grant agreement is signed between the owner and the MPCA.

Phase 1 Grant programs

Below are descriptions of the five grant programs the MPCA will administer during Phase 1.

School bus grant program – 20% ($2,350,000)

Estimated emissions reductions: nitrogen oxides (NO_X): 23-28 tons; fine particles ($PM_{2.5}$): 1.0-1.7 tons; greenhouse gases (GHGs): 292-585 tons

This program will provide grants for the replacement of school buses up to $15,000 each, or $20,000 each for operators serving school districts where 40% of students are eligible for free or reduced-cost lunch. The MPCA will provide a list of districts eligible for additional funding.

Eligibility: All Minnesota school bus operators, both public and private. Groups of vehicle owners may work with third parties to submit aggregated applications. All fuel types, including diesel, propane, natural gas, and electric. Gasoline vehicles are not eligible for funding under the terms of the national settlement.

Why school buses? During the MPCA public engagement effort, a main theme was prioritizing projects that reduce pollution exposures for children and replacing aging school buses. Minnesota previously invested more than $3 million in Project Green Fleet, retrofitting 3,500 diesel school buses with diesel oxidation catalysts, which reduced fine particle emissions by 20% on buses model years 2006 and older. But replacing even those buses with new ones now would provide a 95% reduction in emissions.

After receiving feedback from fleet owners, school districts, and school bus vendors on Minnesota's draft plan, we believe a $15,000 grant would be enough incentive to replace outdated school buses. A $15,000 grant level will allow Minnesota to replace a large number of buses and bring benefits to many school districts and children across the state. The $15,000/$20,000 grant amounts also improve the cost-effectiveness of these replacements (see Appendix 6 for more data on cost effectiveness).

Clean heavy-duty on-road vehicles grant program – 35% ($4,112,500)

Estimated emissions reductions: NO_X: 494-564 tons; $PM_{2.5}$: 17-34 tons; GHGs 12,543-23,160 tons

This program will fund the replacement of transit buses and large and medium-sized (class 4-8) trucks up to $40,000, or 25% of the overall cost of the vehicle, whichever is less. The funding cap reflects that vehicles in this category vary greatly in size and cost, from step vans to garbage trucks, and aligns with caps the MPCA has used for Minnesota's Diesel Emission Reduction Act program for many years.

Eligibility: Public and private organizations around the state. Groups of fleet owners may work with third parties to submit aggregated applications. All fuel types, including diesel, propane, natural gas, and electric. Gasoline vehicles are not eligible for funding under the terms of the national settlement.

Why heavy-duty on-road vehicles? This category represents the largest opportunity for emissions reductions. The heavy-duty on-road category contains diesel equipment that emits the most nitrogen oxides in Minnesota, including the approximately 46,000 on-road diesel trucks in the state eligible for funding (see Appendix 6 for data). These are also some of the most cost-effective vehicle replacements (see Appendix 6). Additionally, the majority of survey respondents cited trucks and buses as some of the vehicles they are most concerned about emitting diesel pollution in their neighborhoods (see Appendix 4).

Clean heavy-duty off-road equipment grant program – 15% ($1,762,500)

Estimated emissions reductions: NO_X: 619 tons; $PM_{2.5}$: 23 tons; GHGs: 1,866 tons

This program will fund the replacement of heavy-duty off-road equipment, including switcher locomotives, ferries, tug boats, and construction equipment eligible under the Diesel Emission Reduction Act (DERA). Based on the matching levels allowed by the settlement (see Appendix 9 for details), this program will fund projects up to the following levels:

- Ferries/tug boats/towboats: up to 40% to repower (replace the engine only)
- Switcher locomotives: up to 40% to repower and up to 25% for a new vehicle
- Ocean-going vessel shorepower: up to 25%
- Construction equipment through the DERA: up to 25% for replacement or up to 40% to repower to Tier 4.

Eligibility: Public and private organizations across the state. Groups of equipment owners may work with third parties to submit aggregated applications. All fuel types, including diesel, propane, natural gas, and electric. Gasoline equipment is not eligible for funding under the terms of the national settlement.

Why heavy-duty off-road equipment? Among the equipment types eligible for VW settlement funding, heavy-duty off-road equipment can be some of the largest emitters of air pollution (see Appendix 6 for data). Through MPCA's experience with DERA and conversations with equipment owners, we know that many of these engines are rarely upgraded without financial incentive. There are many old diesels in this category in Minnesota that have no pollution controls at all.

Heavy-duty electric vehicle grant program – 15% ($1,762,500)

Estimated emissions reductions: NO_X: 15-16 tons; $PM_{2.5}$: 0.5-1.0 tons; GHGs: 1,855-4,508 tons

This program provides funds for electric alternatives to heavy-duty vehicles and equipment. We anticipate particular interest in replacing transit buses, school buses, and airport ground support equipment. Heavy-duty electric vehicles are newer technology and significantly more expensive than other alternatives; organizations may therefore need more financial assistance to begin to adopt it. This grant program will provide an opportunity for our state to begin to adopt and learn about this technology.

Eligibility: Public and private organizations across the state. Groups of fleet owners may work with third parties to submit aggregated applications. All heavy-duty vehicles and equipment eligible for replacement by electric alternatives are eligible to apply for funding in this category. Airport ground support equipment and forklifts, which are only eligible for electric replacements under the terms of the national settlement will be considered in this category. Must replace diesel vehicle with all-electric vehicle.

Why heavy-duty electric vehicles? Support for more electric vehicles was the most common comment the MPCA received during its public engagement efforts. Public transit providers, school bus operators, airports, and utilities across the state all said the state should invest in this technology. Electric vehicles have no tailpipe emissions, and putting more of them on the road supports Minnesota's Next Generation Energy Act goals for reducing greenhouse gas emissions.

Electric vehicle charging station grant program – 15% ($1,762,500)

Estimated emissions reductions: NO_X: 1.1 tons; $PM_{2.5}$: 0.05 tons; GHGs: 4,632 tons

Minnesota will spend the bulk of the funds in this grant program on fast electric vehicle charging stations along highway corridors in Greater Minnesota. Ten percent ($176,250) will fund level 2 (slower-charging) stations at public locations, workplaces, and multi-unit dwellings. As allowed by the settlement, the program will fund up to 80% of the cost of charging stations in public locations and up to 60% of the cost of charging stations in workplaces and multi-unit dwellings.

Eligibility: The MPCA will identify target highway corridors for funding. Applicants building fast charging stations must install them at 30- to 70-mile increments along identified highways approximately two miles or less from the exit. Fast charging stations must be a minimum of 50 kilowatts and include adequate conduit size at each station for future upgrades as well as space for extending the parking pad. To maximize emission reductions, we will encourage charging stations be powered by electricity generated from renewable sources (wind and solar) through either a utility renewable energy program or by purchasing renewable energy credits. Groups of applicants can come together to submit proposals for multiple station locations.

Why electric vehicle charging stations? Support for more electric vehicles was by far the most common comment the MPCA received during its public engagement efforts. Minnesotans made a strong call to use as much of the VW settlement funds as possible for electric vehicle charging stations. Survey and comment data indicate support for a fast charging network around the state to make it possible for all Minnesotans to travel by electric vehicle. In Greater Minnesota, participants asked for electric vehicle charging corridors so owners could travel beyond their immediate communities. Based on public comments on Minnesota's draft state plan, the MPCA plans to focus on installing 50kW chargers with necessary conduits for future upgrades along highway corridors in Phase 1. Funding 50kW chargers will allow Minnesota to extend our fast charging network more rapidly than if we were to require higher-cost 150kW chargers. 50kW charging also aligns with current vehicle technology.

Stakeholders also stated that fast charging currently is hard to finance without subsidy; slower level-2 chargers are lower cost and easier to fund. Many municipalities, counties, universities, and others have expressed interest in installing this lower-cost option. Level-2 chargers in multiunit housing are especially important for supporting access to electric vehicles for lower-income Minnesotans as the cost of purchasing the vehicles continues to decrease. Electric vehicles have no tailpipe emissions, and putting more of them on the road supports Minnesota's Next Generation Energy Act goals for reducing greenhouse gas emissions.

Core application criteria

The MPCA's goals (see page 13) will guide the application and project selection process. The process will consider the location of each replacement to meet our 60% Twin Cities metropolitan area and 40% Greater Minnesota investment goals, as well as our goals to invest in vulnerable communities. Each program's application process may have specific criteria based on the purpose of the program, but the MPCA plans to include core criteria in all applications. The core criteria for diesel replacement projects are:

- Emissions reduction – Reducing nitrogen oxides, fine particles, and greenhouse gases.
- Cost-per-ton – Cost effectiveness based on cost paid with VW funds (not total project cost).
- Vulnerable populations – Vehicles and equipment operating in areas of concern for vulnerable populations based on the MPCA's mapping tool.
- Exposure – Reducing emissions in areas of high diesel exposure as identified using MPCA's risk modeling tool or other tool as developed in conjunction with the Minnesota Department of Health.

Most of the electric vehicle charging stations will be installed along highway corridors throughout Greater Minnesota. For electric vehicle charging infrastructure, other core criteria are:

- Cost effectiveness

- Renewable energy – Powering charging stations with electricity generated from renewable sources (wind and solar) through either a utility renewable energy program, by purchasing renewable energy credits, or on-site generation.
- Vulnerable populations – Level 2 (240 volt) charging stations operating in areas of concern for vulnerable populations based on the MPCA's mapping tool.

Additional criteria will be included in each application. The MPCA may tweak the mechanisms for ranking these criteria based on future experience in project selection and application review.

Making funding accessible

The MPCA will promote opportunities to apply for funds broadly, especially in rural communities and communities disproportionately impacted by air pollution. We will develop a user-friendly application so that vehicle and equipment owners are able to fill out the forms themselves without help from professional grant writers. The MPCA is committed to working within the state's grant processes to create application processes that balance our need for information with the needs of applicants. The MPCA will provide opportunities to ask questions about the funding applications, publicly share answers to those questions, and host meetings and webinars on the funding opportunities. The purpose of these efforts is to lower the barriers to access to these funds and help all organizations with eligible projects understand the process, but especially to help those organizations without experience in applying for funds from the state to do so now.

Program goals

The MPCA solicited input from Minnesotans on how the VW settlement funds should be spent, and used that feedback to set goals for the 10 years of this program. The aim is to use the funds in a way that both brings the most benefits to the state and most effectively manages the settlement funds. The MPCA's goals for these funds over the 10 years of the program are:

Achieve significant emissions reductions

Projects funded will target specific reductions in three categories:

- Nitrogen oxides (NO_X): 4,000 tons
- Fine particles ($PM_{2.5}$): 150 tons
- Greenhouse gases (GHGs): 100,000 tons

What Minnesotans told us: During our public meetings, the MPCA heard about the need to change out our aging vehicles for modern, cleaner versions. Attendees urged us to consider not only nitrogen oxides, but fine particles and greenhouse gases. Fine particles from diesel pollution are the main driver of health risks from breathing outdoor air in Minnesota. State residents also called on us to use the settlement fund to reduce the state's contribution to climate change.

Benefit all parts of the state

- 60% of the funds will be invested in the Twin Cities metropolitan area
- 40% of the funds will be invested in Greater Minnesota

Because 60% of the violating vehicles were registered in the Twin Cities metropolitan area and 40% were registered in Greater Minnesota, the funds will be targeted using the same 60%-40% ratio.

What Minnesotans told us: Community members in Greater Minnesota expressed concerns about long bus rides for school children and busy roads that, though not interstate highways, support significant truck traffic, particularly for timber and agricultural industries. Attendees were interested in using electric vehicles, but limited by the lack of charging stations in some areas.

In the Twin Cities, participants shared concerns about busy highways, large industrial facilities with heavy truck traffic, train yards, transit buses, and waste haulers. Attendees discussed wanting to use electric vehicles, but felt concerned that without charging opportunities across the state, they would not be able to travel outside of the metropolitan area.

Help people and places disproportionately affected by air pollution

At least 20% of the funds will be invested in areas disproportionately affected by air pollution in the Twin Cities area, and another 20% in such areas in Greater Minnesota.

The VW settlement directs states to consider the potential impact of the projects they fund on areas that "bear a disproportionate share of the air pollution burden within its jurisdiction." The MPCA considers an area of potential concern for disproportionate impacts if it has:

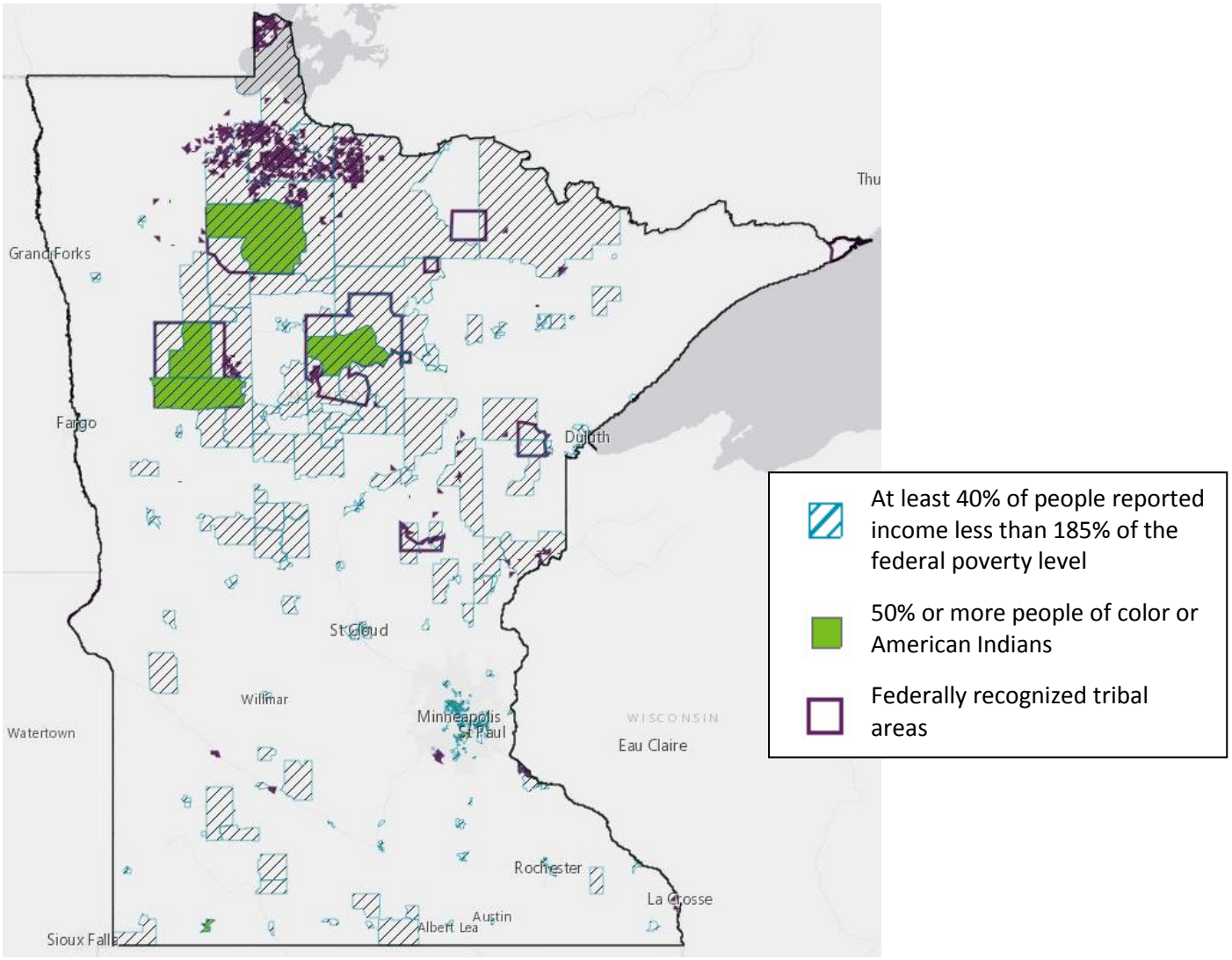
- Census tracts where more than 50% of residents are people of color or American Indians
- Census tracts where more than 40% of the households have an income of less than 185% of the federal poverty level
- Tribal lands

See page 15 for a map of vulnerable populations in Minnesota. The MPCA will include vulnerable populations in the scoring criteria for selecting projects for funding. Combining this demographic information with diesel exhaust exposure and risk data can help identify overburdened communities.

What Minnesotans told us: We were asked to emphasize projects benefiting air quality in areas with greater health effects from air pollution. Some communities not only experience higher levels of pollution, but also may not have the amenities, resources, and conditions to support healthy living. The MPCA is working with a variety of stakeholders and state, local, and national government partners to address disparities in air pollution exposure and related health effects with the VW settlement funds. The MPCA is working to meaningfully involve vulnerable communities during the development of this plan. The agency's Environmental Justice Advisory Group participated in stakeholder meetings, provided advice on engagement, and recommended ways to incorporate these concerns into our plan. Many of the Tribes in Minnesota have shared how diesel pollution impacts their communities and where our governments may be able to collaborate.

Figure 4: Minnesota areas vulnerable populations

Find an interactive version of this map on the MPCA's VW website.



Reduce exposures to harmful air pollutants and maximize health benefits

The MPCA will use air quality modeling and health data to consider public health in choosing projects to fund. Agency modeling indicates that diesel exhaust is a primary driver of health risks from outdoor air pollution in the state. MPCA mapping tools can help identify areas of high diesel-exhaust exposure, and Minnesota Department of Health data on health outcomes, such as asthma-related hospitalizations, can pinpoint areas with air pollution-related health challenges. The MPCA plans to work with the Minnesota Department of Health to develop a method for considering public health in choosing projects to fund.

What Minnesotans told us: Many in our public meetings said we should focus on reducing people's exposures to diesel pollution and target funding in areas where people experience disproportionate levels of health outcomes related to air pollution.

Balance cost effectiveness with other goals

The MPCA will require applicants, including governments, to match settlement funds towards the cost of new vehicles. Cost-effectiveness will also be considered in project selection. We will strive to leverage other funding opportunities when possible.

What Minnesotans told us: The MPCA has heard consistently that we should strive to operate a cost-effective program that focuses on achieving real emissions reductions as intended by the settlement. Minnesotans also told us that we should achieve other important benefits with these funds. For instance, Minnesotans want funds to be used to replace school buses, which are important for reducing children's exposures to air pollution; however, school buses do not emit as much overall pollution as other vehicles, such as trucks (see Appendix 6 for data on cost effectiveness). While school bus replacements might not be the most cost effective funding option, the opportunity to reduce exposures to children – a population particularly vulnerable to the effects of air pollution – makes them an important investment option. Therefore, cost effectiveness will be balanced with our other important goals.

Economic benefits

The VW settlement will not only benefit our air quality, but also our economy. Phase 1 will invest $4.7 million in Greater Minnesota and $7.05 million in the Twin Cities metropolitan area, and have benefits beyond how the settlement funds are spent.

The reduction of vehicle emissions resulting from Phase 1 spending should contribute to improved air quality and related health outcomes, including fewer:

- Asthma attacks
- Respiratory symptoms
- Work-loss days
- Hospital admissions for respiratory and cardiovascular issues
- Non-fatal heart attacks
- Premature deaths

Using the U.S. Environmental Protection Agency's (EPA) co-benefits risk assessment screening model (see Appendix 7 for methods and assumptions), the MPCA estimates that these health gains represent $25 million to $57 million in economic benefits for Minnesota.

These investments also mean jobs for Minnesotans. New Flyer manufactures transit buses at their facility in St. Cloud, producing clean electric, hybrid, diesel, and CNG buses used around the region. Replacing engines in large equipment such as boats, locomotives, and construction equipment can take weeks or months of labor; a project may require between $60,000 and $200,000 to employ mechanics with the appropriate skills. And companies in Minnesota, such as ZEF Energy, ChargePoint, Werner Electric, and Hunt Electric, install, operate, and maintain electric vehicle charging stations.

MPCA's previous experience with the Diesel Emission Reduction Act (DERA) demonstrated that heavy-duty vehicle replacements both reduce communities' exposures to harmful diesel pollution and benefit industries that rely on heavy equipment. Vehicle efficiency improvements reduce maintenance and operation costs for grant recipients, who can then invest the savings elsewhere. For instance, a 2016 DERA grant replaced two school buses in St. Louis County, which reduced emissions from those buses by 95% and saved the school district more than $21,000 a year in maintenance and fuel costs.

Electric vehicles have lower fuel and maintenance costs than traditional models, over the life of the vehicles. In addition, electric vehicle prices are decreasing and the used market is expanding, making them an affordable choice for more people. Installing more charging stations around the state will make electric vehicles even more

accessible to all Minnesotans. Restaurants, shops, and tourist destinations will benefit from hosting charging stations when electric vehicle owners eat, shop, or explore while they wait for their cars to charge up.

Public input

The MPCA has sought to develop a state plan for the VW settlement funds that reflects the input and needs of Minnesotans. We sought early input to help develop a draft plan, then shared our draft with Minnesotans to give them the opportunity to tell us whether they thought we appropriately incorporated their input (see Appendix 5). This plan reflects all of that input. We have also built in opportunities for future public engagement and input.

The MPCA's VW settlement website (www.pca.state.mn.us/vw) offers details of the settlement, information on public meetings and other opportunities to provide input, summaries of the input we have received, and data on heavy-duty vehicles and equipment in our state.

For details of our public engagement process and what we heard, see Appendices 3 and 4. For details on what we heard through this process, see Appendices 4 and 5.

Early input

The MPCA sought early input from community members and stakeholders to help shape the development of this plan. We received 274 comment letters and over 800 responses from two web surveys. In 2017, the MPCA held eight community meetings in St. Paul, Minneapolis, Brainerd, Cloquet, Bemidji, Marshall, Rochester, and West St. Paul. The MPCA's Environmental Justice Advisory Group hosted a listening session in North Minneapolis. The meetings in Cloquet and Bemidji were co-hosted with the Fond du Lac Band of Lake Superior Chippewa and the Leech Lake Band of Ojibwe, respectively.

The MPCA also held four stakeholder meetings for businesses and organizations with expertise in heavy-duty vehicles and equipment, electric vehicle charging stations, and health impacts of air pollution. We have also presented to and sought input from our Environmental Justice Advisory Group, the MPCA Advisory Committee, the Minnesota Department of Health, the Metropolitan Planning Organization Directors, the School Bus Safety Expo, the Association of Minnesota Counties, and the Metropolitan Council's Transportation Advisory Board.

The agency has done outreach to legislators, including personal meetings with the authors of related 2017 legislation, committee chairs, committee ranking minority members, and legislative committee staff.

Input on the draft state plan

The MPCA released Minnesota's draft plan for public input in February 2018. The plan was open for public comment for 30 days. During that time, we received over 580 written comments. We also held public meetings in Brainerd, Detroit Lakes, Duluth, Mankato, Marshall, Minneapolis, and Rochester. One public meeting was offered as a webinar. We held a stakeholder meeting in St. Paul, which was also available as a webinar. We also offered to present the draft plan to interested organizations. (See Appendix 5 for a summary of the input we received on the draft plan and how that input is reflected in this final plan.)

Ongoing input

The MPCA will continue to engage with the public during the 10 years of this program. While this plan reflects the input we received during our planning process, we intend to solicit ideas and improve the program as we learn more about what is working in Minnesota. The agency will use our public website, email lists, and social media to keep the public informed of any projects and processes that may be of interest to them, as well as to receive ideas

and suggestions to help improve the program. We specifically plan to seek input between each funding phase to inform updates to our plan.

Appendices

Appendix 1: Background on the Volkswagen settlement

Appendix 2: Air quality in Minnesota

Appendix 3: Public and stakeholder engagement

Appendix 4: What matters to Minnesotans

Appendix 5: Input on Minnesota's draft plan

Appendix 6: Data on heavy-duty diesel vehicles and equipment in Minnesota

Appendix 7: Emission reduction calculation methods

Appendix 8: Glossary of terms

Appendix 9: Volkswagen settlement appendix D-2 – Eligible mitigation actions and mitigation action expenditures

Appendix 1: Background on the Volkswagen Settlement

The violation

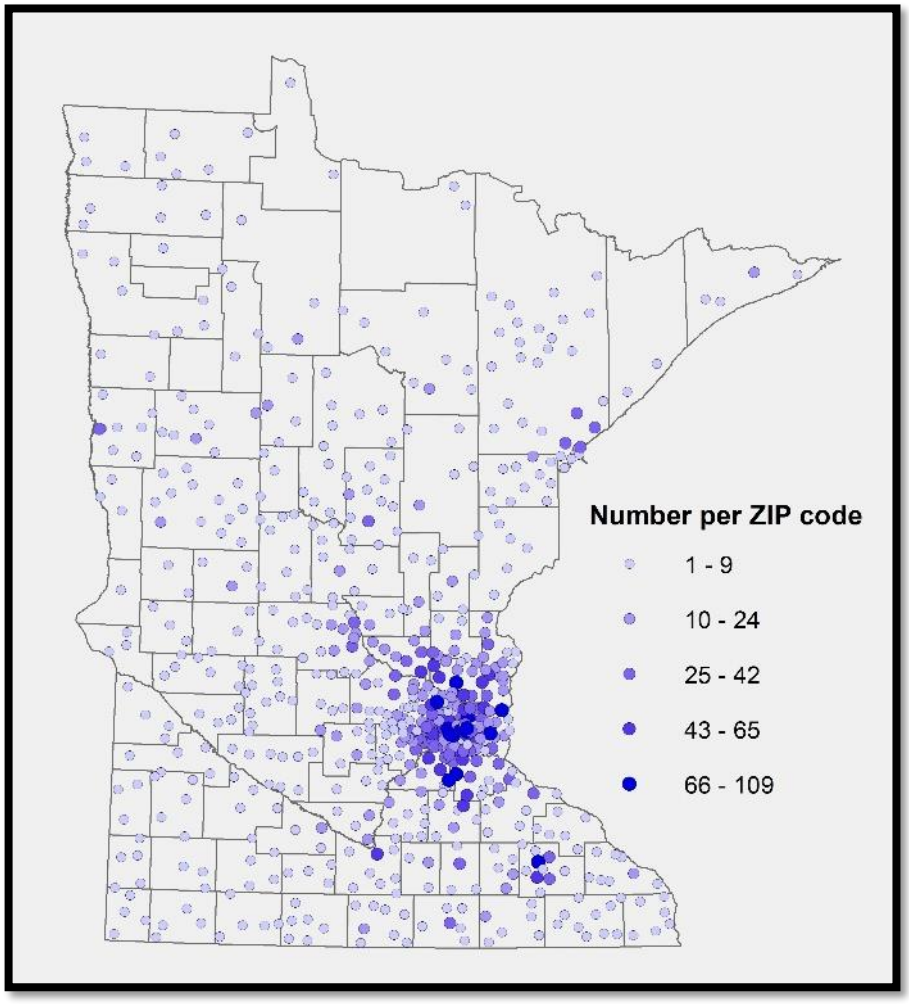
In 2015, the federal government announced it had discovered that Volkswagen (VW) was violating Clean Air Act emission standards for nitrogen oxides (NO_X) in its model year 2009-2016 diesel cars and sports utility vehicles (SUVs) and cheating on emissions tests to hide the violations. The violating vehicles contained software that would turn on the NO_X emissions controls under standard testing conditions, but would then switch them off during normal driving. This software made it look like the VW vehicles were complying with the emissions standards, when they were not. VW chose to cheat because they had not developed the necessary technology to achieve both the fuel efficiency they desired and the emission control levels they were legally obligated to achieve. The VW diesel engines were found to be emitting more than 30 times the allowable quantity of NO_X under the tailpipe NO_X emissions standards over a seven-year period.

Impacts of the violation

Nationwide, VW sold approximately 580,000 violating vehicles and about 9,300 of those were sold in Minnesota. Approximately 60% of these vehicles were registered in the Minneapolis-St. Paul metropolitan area and 40% were registered in Greater Minnesota. The MPCA estimates that the violating vehicles in Minnesota have already emitted and will continue to emit approximately 600 tons of excess NO_X pollution over their lifetime.

NO_X can cause lung irritation and reduce the ability to fight off respiratory infections. Beyond its direct health effects, NO_X is a major component of ground-level ozone (also known as smog), which can trigger respiratory and lung problems such as asthma and bronchitis. Ozone is a pollutant of concern for Minnesota because of its health impacts and also because monitored concentrations of ozone in the state are close to, while not currently exceeding, federal air quality standards. NO_X also reacts with other chemicals to contribute to acid rain, reduced visibility, and nutrient pollution in water.

Figure 5: Violating VW diesel vehicles registered in Minnesota by ZIP



Source: MN Department of Public Safety vehicle registration data

The settlement

The federal government took VW to court and they reached a settlement, finalized and signed by all parties on October 2, 2017. The settlement requires VW to pay $2.9 billion over 10 years into an environmental mitigation trust for states, Tribes, and Puerto Rico. These funds are to be used to mitigate the excess emissions caused by these violating vehicles. States will receive funds based on the number of violating vehicles they have registered in their borders. The money for states will be placed into a trust fund and managed by Wilmington Trust, of Wilmington Delaware. Minnesota is receiving $47 million of these funds.

The settlement also allocates $55 million for federally recognized Tribes. The 11 federally recognized Tribes within Minnesota's borders are eligible to apply for a portion of this funding. The MPCA is working to support the local Tribes in their application process and will collaborate as possible to bring air quality benefits to all Minnesotans. Local Tribes are also eligible to apply for funding from the state.

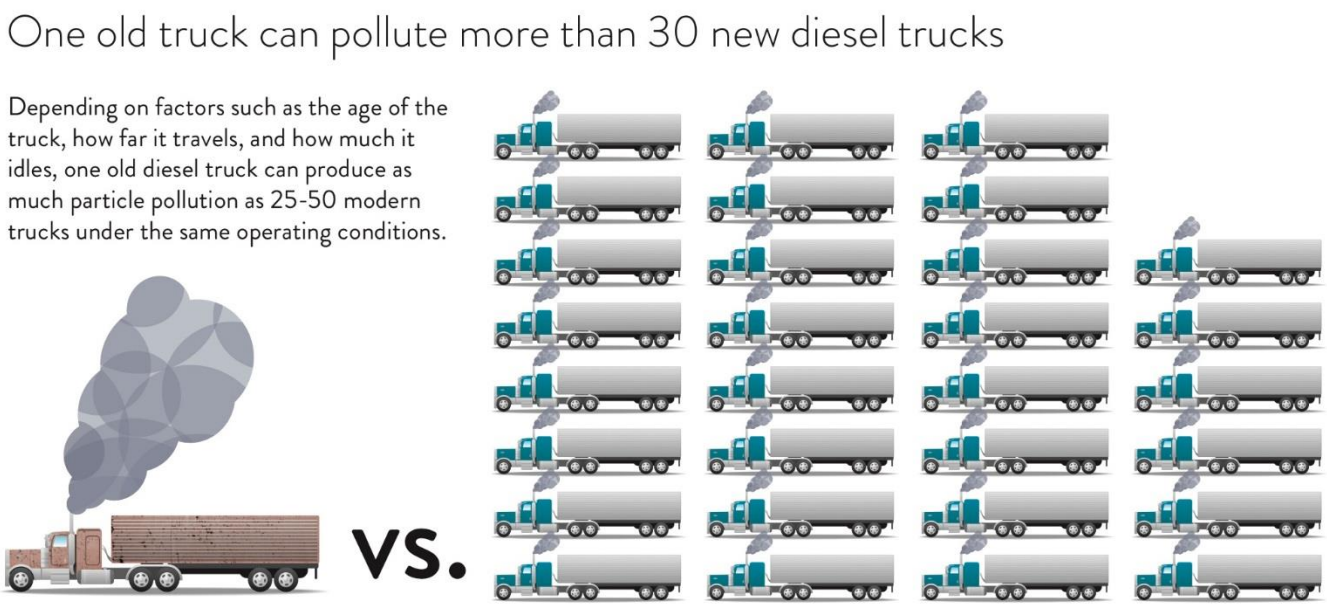
The settlement also requires VW to set aside $10 billion to repurchase and/or repair the violating cars and SUVs. VW must also spend $2 billion nationwide on developing electric vehicle charging stations. Both of these programs are managed by VW and are not addressed in Minnesota's state plan.

Eligible vehicle and equipment types

Settlement funds are designated for mitigation efforts to reduce NO_X. The settlement outlines a very specific list of vehicle and equipment types that are potentially eligible for replacement funding through this program. Most eligible project types would replace or retrofit an old, heavy-duty diesel vehicle or piece of equipment, or replace an old engine with a new engine in the original equipment body. An old diesel vehicle can be replaced with new diesel technology or other fuel technologies, such as electricity, propane, or natural gas. The old equipment must be scrapped. The funds would pay for part of the overall cost of these projects and the project proposer would need to fund a portion of the project as well.

The settlement focuses on replacing old diesel equipment with new equipment because heavy-duty technology has seen a revolution in recent years. Old diesel trucks and other heavy-duty equipment emit significantly larger amounts of NO_X and other pollutants compared with modern technology. Therefore, replacing old diesel equipment with modern equipment can significantly reduce emissions of harmful pollutants into our air.

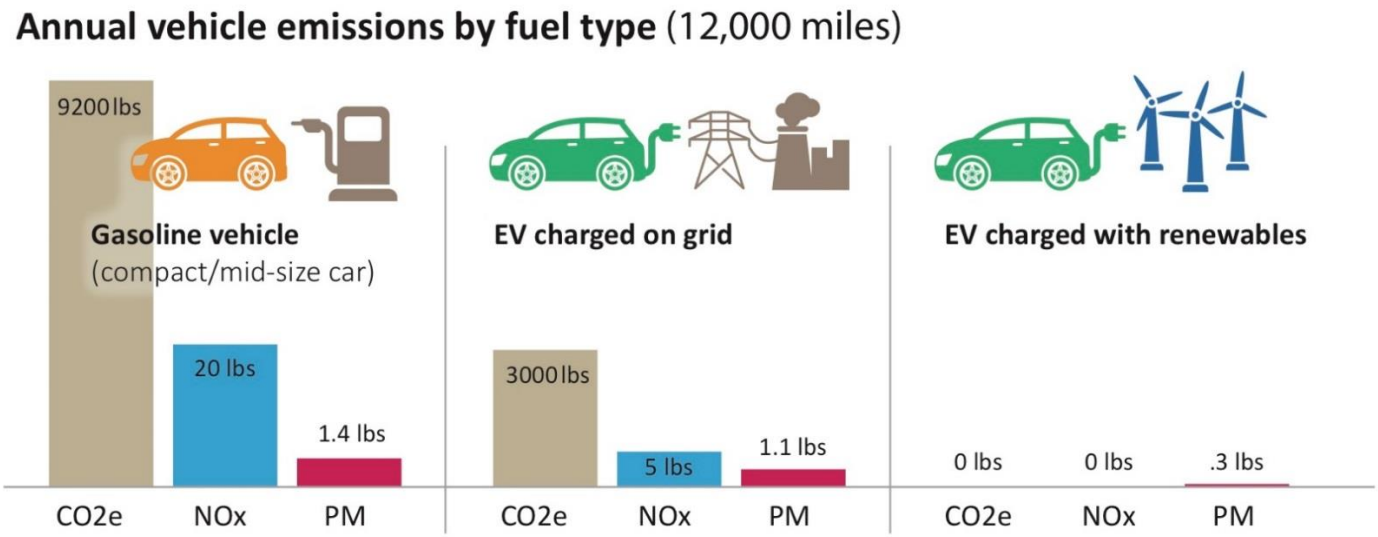
Figure 6: Improvements in heavy-duty vehicle technology



Source: EPA's Diesel Emissions Quantifier

The settlement also allows for up to 15% of the funds to be spent on electric vehicle (EV) charging stations. The settlement allows this because electric cars have fewer overall emissions compared with gasoline-powered cars. This is especially true if EVs are charged with renewable energy, such as wind or solar.

Figure 7: Emissions from electric vehicles and gasoline vehicles in Minnesota

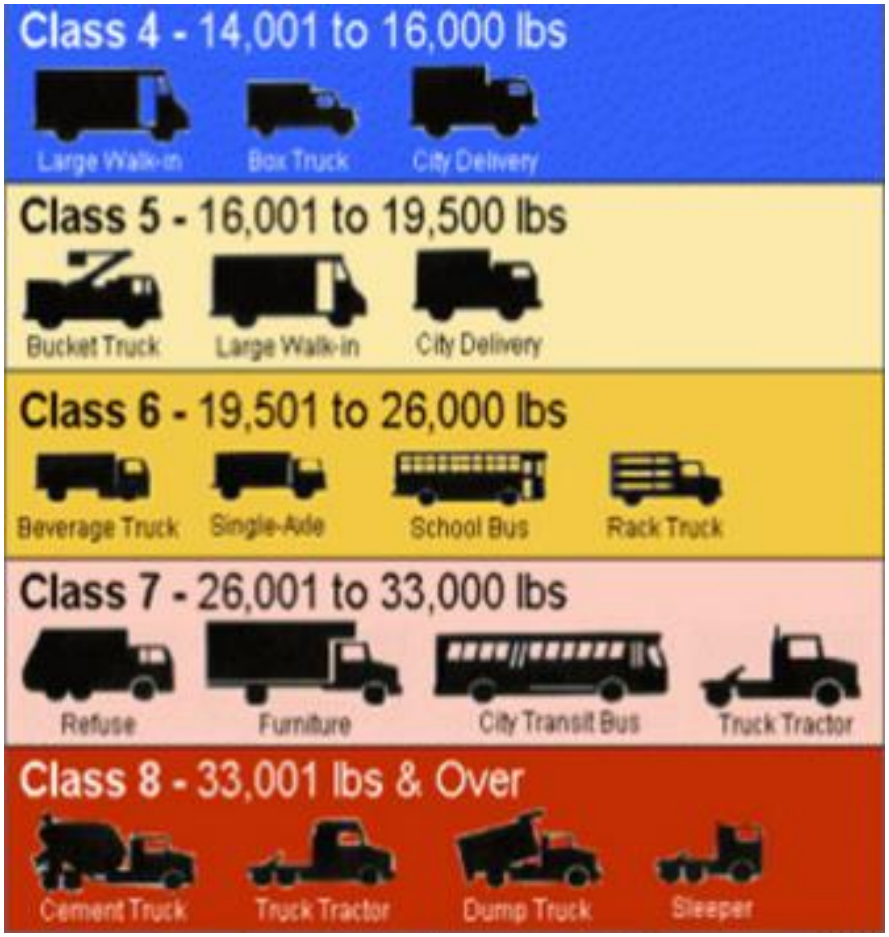


Source: MOVES2014a and 2014 EPA National Emissions Inventory Database

The vehicle and equipment types eligible for replacement are (see Appendix 9 for descriptions as provided in the VW settlement):

- Class 8 local freight trucks and port drayage trucks (large trucks) – This includes large trucks weighing more than 33,000 lbs., including but not limited to waste hauling trucks, dump trucks, and concrete mixers.
- Class 4-7 local freight trucks (medium trucks) – These are medium-sized trucks weighing between 14,001 and 33,000 lbs. and include, but are not limited to delivery trucks and box trucks.
- Class 4-8 school buses, shuttle buses, or transit buses – These are buses weighing more than 14,001 lbs. used for transporting people, including school children.

Figure 8: Heavy-duty vehicle classes



- Pre-Tier 4 diesel switcher locomotives – These are locomotives that move rail cars around rail yards, not engines that transport freight over long distances.

- Ferries and tugs – Tugs are boats that pull or push larger boats around ports, harbors, and inland waterways.

- Ocean-going vessel shore power – Shore power supplies electricity to large boats while at port, allowing the boats to turn off their engines.

- Airport ground support equipment – These are vehicles used at airports to service planes between flights.

- Forklifts and port cargo handling equipment – Forklifts are equipment that lift and move materials short distances not on roads. Port cargo handling equipment moves freight within ports.

- Light-duty zero emission vehicle supply equipment – These are charging stations for electric vehicles.

- Matching funds for projects eligible under the Diesel Emission Reduction Act (DERA) – DERA is a successful long-standing federal program that helps states fund projects that replace diesel equipment and engines with new, cleaner equipment and engines. This category of funds would allow states to fund change-outs of construction equipment.

The settlement does not allow states to spend funds on anything beyond this list of approved vehicle and equipment types. Therefore, no funds can be spent on projects such as replacing light-duty cars or trucks. No funds can be spent on infrastructure for alternative fuels except electric vehicle charging.

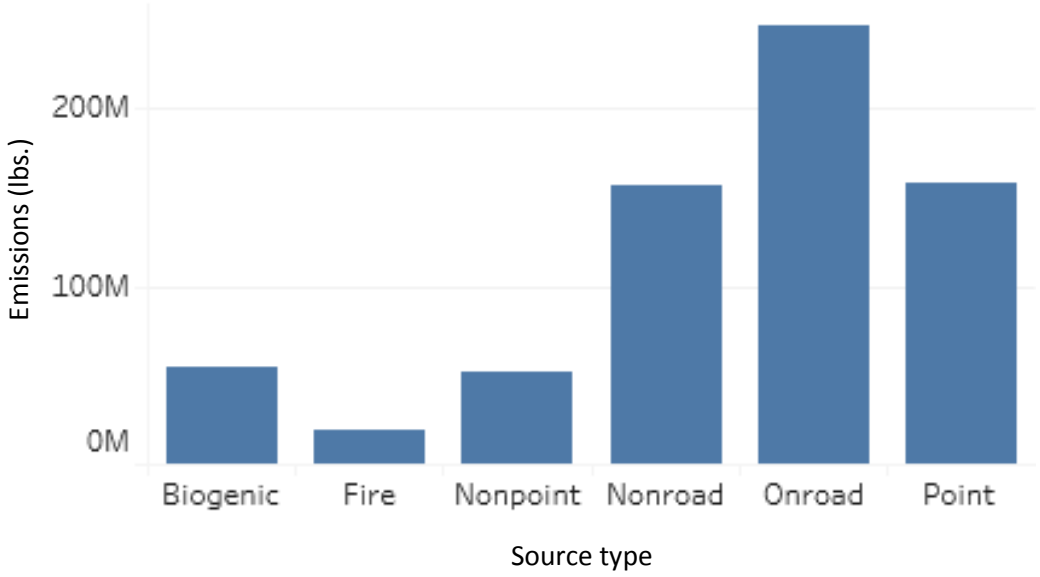
Appendix 2: Air quality in Minnesota

Overall, air quality in Minnesota has been improving over the past 20 years and Minnesotans expect the air to be clean, clear, and healthy for all to breathe. The Clean Air Act requires the EPA to set National Ambient Air Quality Standards (NAAQS) for common pollutants that are considered harmful to public health and the environment. Minnesota is complying with all the NAAQS. However, even though Minnesota is meeting all the NAAQS, MPCA and Minnesota Department of Health research, published in the Life and Breath Report (https://www.pca.state.mn.us/featured/life-and-breath), indicates that in the Minneapolis-St. Paul metropolitan area, ground-level ozone and fine particles air pollution contributed to about 2,000 deaths, 400 hospitalizations, and 600 emergency-room visits in both 2008 and 2012 (study years). Diesel pollution contributes to both ground-level ozone and fine particles concentrations in our air. The study also indicates that the groups most affected by air pollution are people of color, elderly residents, children with asthma, and lower-income Minnesotans.

Vehicles and air pollution

In Minnesota, on-road vehicles are the largest source of NO_X.

Figure 9: Annual NOx emissions by source type in pounds (lbs.) in Minnesota, 2011



Source: Minnesota 2011 emissions inventory (www.pca.state.mn.us/air/statewide-and-county-air-emissions).

Diesel vehicles emit a variety of pollutants. Three of the pollutants of primary concern from diesel vehicles are:

- Nitrogen oxides (NO_X): Violating VWs emitted excess quantities of NO_X into the air. This pollutant contributes to the formation of ground-level ozone. It causes lung irritation and can diminish the body's ability to fight respiratory infections.

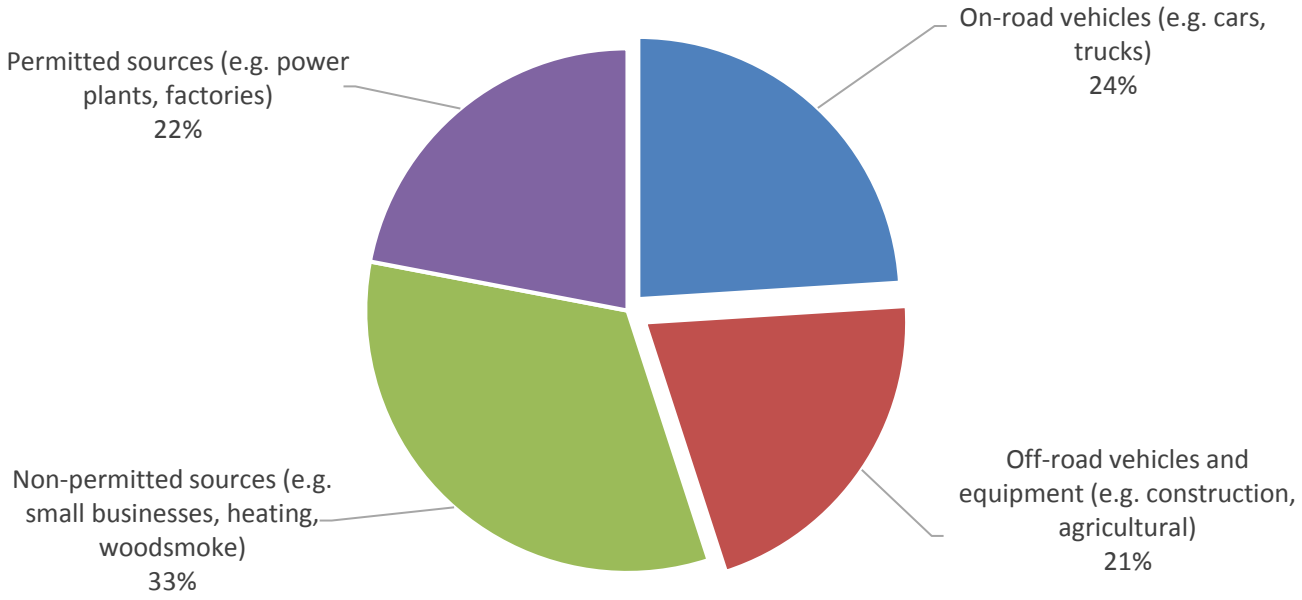
- Fine particles ($PM_{2.5}$): This pollutant is associated with the most health risks from diesel exhaust, including increased risk of heart attacks, asthma attacks, and other respiratory issues. Diesel fine particles are also likely carcinogens, or cancer-causing substances.

- Greenhouse gases (GHGs): These pollutants warm our planet and cause climate change.

On-road vehicles make up approximately a quarter of all air pollution emissions in Minnesota. Off-road vehicles and equipment, which include, among other things, construction and other heavy-duty equipment, account for 21% of overall emissions in the state.

Figure 10: Air pollution by source type in Minnesota, 2011

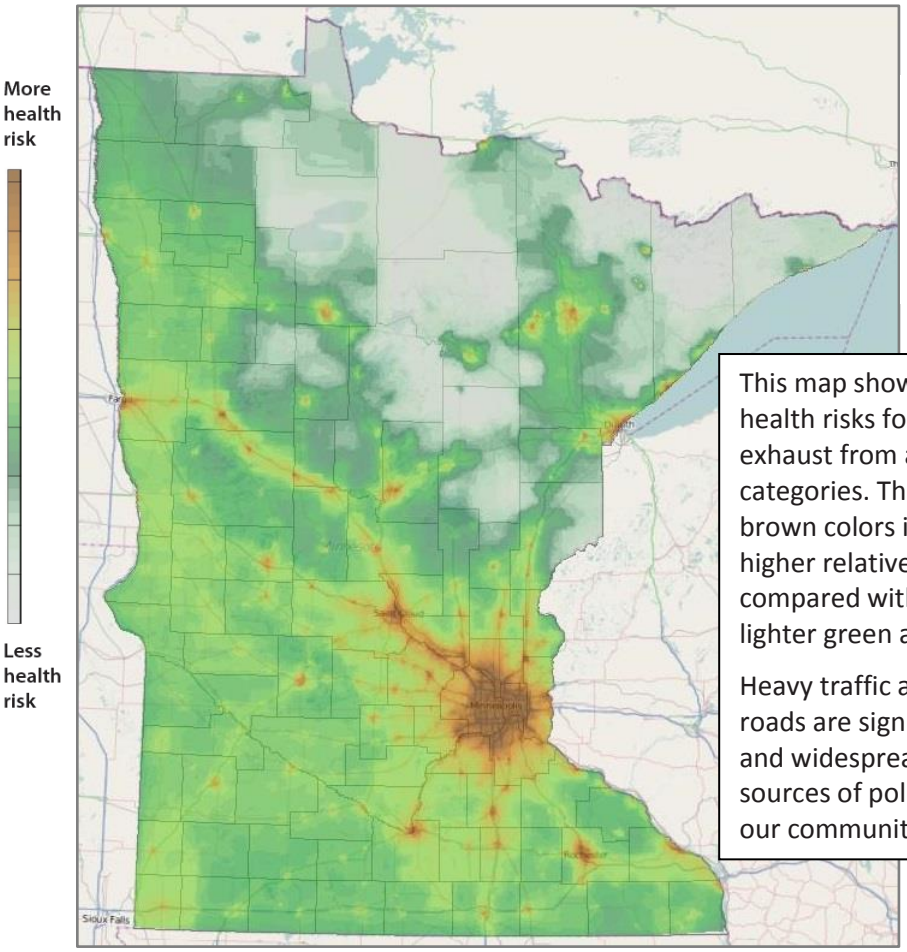
Includes emissions of NOX, PM2.5, sulfur dioxide, and volatile organic compounds.



Source: Minnesota 2011 emissions inventory.

Figure 11: Health risks from diesel exhaust (all source categories)

The MPCA models health risks associated with air pollution to better understand the sources of exposure and to prioritize our work. MPCA modeling indicates that diesel exhaust is a primary driver of risk from outdoor air pollution in our state. Figure 11 shows the health risks associated with diesel exhaust in Minnesota. The map shows that health risks from diesel exhaust are higher close to roadways.



This map shows relative health risks for diesel exhaust from all vehicle categories. The darker brown colors indicate higher relative risk compared with the lighter green areas.

Heavy traffic and busy roads are significant and widespread sources of pollution in our communities.

Source: MPCA's MNrisks statewide air pollution risk model. Explore interactive maps on our website (https://www.pca.state.mn.us/air/mnrisks-pollutant-priorities).

Disproportionate burdens of air pollution

Our most vulnerable populations often suffer a disproportionate burden of health impacts from vehicle emissions. MPCA research shows that higher concentrations of harmful air pollutants occur within 300 meters of busy roadways. A 2015 study by MPCA researchers found that while communities of color and lower socio-economic status tend to own fewer vehicles, do less driving, and use public transit more often than other groups, they are also exposed to higher levels of traffic-related pollution. This is because busy roadways, and their associated air pollution, often run through communities of color and lower socio-economic status. Many of these communities therefore bear a disproportionate burden of traffic-related health impacts while contributing less to vehicle pollution.

The MPCA partners with the Minnesota Department of Health to better understand the health effects of air pollution on Minnesotans. Our research, published in the Life and Breath Report found that air pollution doesn't affect everyone in the same way. The groups most affected by air pollution are people of color, elderly residents, children with uncontrolled asthma, and people living in poverty. These vulnerable populations may experience more health effects because these groups already have higher rates of heart and lung conditions. They experience more hospitalizations, emergency-room visits for asthma, and death related to air pollution.

Appendix 3: Public and stakeholder engagement

The MPCA is committed to using the VW settlement funds in ways that reflect the input and interests of Minnesotans. We are striving to have an open and transparent process that includes the input of a wide range of Minnesotans. We have been soliciting and listening to public and stakeholder input to help inform the development of this plan. We will also have opportunities to receive input throughout the 10-year period of the settlement program.

The agency also sought input from the Legislature. We have had personal meetings with the authors of related 2017 legislation, committee chairs, committee ranking minority members, and legislative committee staff.

Information on how to provide input, content from all public and stakeholder meetings, and summaries of input the MPCA has received so far, is located on our VW settlement website: www.pca.state.mn.us/vw.

The MPCA sought early input on the development of our Plan so that it would reflect the ideas and input of Minnesotans. (For information on what we heard, see Appendix 4.) Some of the ways we sought input included:

Public meetings

The MPCA began our engagement by holding three public meetings in February and March of 2017, in Minneapolis, St. Paul, and Brainerd. MPCA staff provided background on the settlement, answered questions, and encouraged participants to provide input on what matters most to them. MPCA staff took notes at those meetings for consideration with the written comments we have received. Participants were also encouraged to submit written comments and were provided information on how to do so.

In September 2017, the MPCA's Environmental Justice Advisory Group hosted a community listening session in conjunction with our VW settlement team. The listening session was held in North Minneapolis. At that event, the MPCA provided information on the settlement and then spent most of the time answering questions and listening to community members' input on the settlement and priorities for their communities. Written materials were provided in English, Spanish, and Somali.

After receiving and reviewing significant input in person, through web surveys, and in written comments, we took the key issues we heard were important to people and went back out to hold additional public meetings around the state. We held meetings in Cloquet, Bemidji, Marshall, Rochester, and West St. Paul. We co-hosted the meetings in Cloquet and Bemidji with local Tribes – Fond du Lac Band of Lake Superior Chippewa and Leech Lake Band of Ojibwe, respectively – to hear Tribal perspectives and so that the local Tribes could also share information on the Tribal Settlement. In these meetings we discussed some of the tensions and tradeoffs we must wrestle with in developing Minnesota's program for using these funds. We provided discussion questions and worksheets for people to fill out along with opportunities for discussion.

Written comments

The MPCA received written public comments throughout 2017. We shared information about the settlement and the opportunity to comment on the MPCA's VW webpage (www.pca.state.mn.us/vw); by emailing the MPCA's Clean Diesel email list (870 members), environmental justice email list (2,700 members), and Air Mail Newsletter (1,900 members); and by sharing on social media, among other means. We have also established a VW settlement informational email list for people who wish to follow our activities more closely.

We received 274 comment letters from the general public as well as from stakeholders. Staff has reviewed and categorized these comments. A summary of this input can be found on our website. Key themes include supporting electrification and electric vehicles; considering alternative fuels, including propane and natural gas; and promoting environmental justice and health benefits (see Appendix 4 for details).

Stakeholder meetings

The MPCA held a series of four stakeholder meetings with interested groups over the summer of 2017. These meetings were open to any person or organization wanting to participate and dive into details on the settlement. Information on participating in the group was posted on the MPCA's website and shared with the VW settlement email list. The participants represented a variety of interests, including:

- Utility companies
- Bus manufacturing companies
- School bus operators
- Local governments
- Tribes
- Propane and natural gas industry
- Electric vehicle advocates
- Politicians (state elected senators and representatives)
- Environmental non-profit groups
- Environmental Justice Advisory Group representatives
- Minnesota Department of Health
- Transit operators

The purpose of these stakeholder meetings was for the MPCA learn from these representatives about their industries and areas of expertise and to understand what is important to them, and for the stakeholders to learn from each other and the MPCA. Topics discussed at these meetings included:

- Summary of the settlement and eligible project types
- Data on diesel pollution in Minnesota
- Data on the current diesel fleet in Minnesota and new, cleaner vehicles
- Background on the Diesel Emission Reduction Act and how Minnesota has implemented that program
- Background on electric vehicles and charging infrastructure
- Discussion of health impacts and exposure
- Discussion of environmental justice
- Discussion of vehicles and climate change

The fourth stakeholder meeting was a listening session where all interested participants could present on their area of expertise and share how they felt their issue fits in with Minnesota's key priorities.

At all meetings, participants were encouraged to discuss key issues and provide input on what mattered to them and what should be considered in Minnesota's Plan. All meetings included call-in and webinar options for remote participation. All agendas, meeting notes, and presentations are included on the MPCA's VW settlement website.

Tribal engagement

Tribes in Minnesota have access to National Tribal VW Settlement Funds. The MPCA has been working with local Tribes to support them in their applications and will continue to support their work as they desire. We co-hosted two listening sessions with local Tribes to both hear their input and have an opportunity for both governments to hear input from our communities. The MPCA will continue to look for opportunities for collaboration where our interests in reducing diesel pollution align during the implementation of this program.

Presentations and open door policy

The MPCA has had an open offer to come to any group's meeting or event to talk about the VW settlement and take input. We have also had an open door policy where any person or group could request a meeting to discuss the settlement and provide input.

MPCA staff have presented to:

- MPCA's Advisory Committee
- MPCA's Environmental Justice Advisory Group
- Public Utilities Commission
- Metropolitan Council's Transportation Advisory Board
- Metropolitan Planning Organizations Directors meeting
- Association of Minnesota Counties
- School Bus Safety Expo
- Clean Air Minnesota
- MN350

Organizations that have met with MPCA staff have included:

- Metro Transit
- Metropolitan Airports Commission
- Caterpillar
- Knoxville Locomotive Corporation
- Minnesota Propane Association
- CenterPoint Energy
- National Waste and Recycling Association, Minnesota Chapter
- HourCar
- ZEF Energy

Data request

To better understand Minnesota's current diesel fleet and opportunities for improvements, the MPCA put out an informal request for information to people and organizations that are involved with heavy duty equipment and vehicles. We received 11 responses with information including ages of diesel equipment, typical retirement timeframes, and operation parameters. This information highlighted opportunities for maximizing emissions reductions and cost-effectiveness in the state plan.

Online opportunities

The MPCA developed a user-friendly website to share information on the settlement and gather input. The website is meant to serve as an "online public meeting" where members of the public and the stakeholder group can go to get information and share input even if they are unable to participate in the in-person meetings. The website also serves as a tool for transparency where we can share with the broader public what is discussed at meetings.

The website includes all the data shared at our stakeholder meetings in interactive data tools. It also provides agendas, notes, and presentation materials from all stakeholder meetings. In an effort to help communicate with the public about what we are hearing as we hear it, we also include summaries of comments received and results of our "dotmocracy" engagement tool.

We developed two surveys to provide additional opportunities for the public to provide input in convenient ways. The first survey was a high-level look at potential priorities, while the second dove into details of implementation.

We used social media, especially Twitter and Facebook, to get the word out on meetings, surveys, comment periods, and the settlement in general.

Figure 12: Map of participation in VW meetings

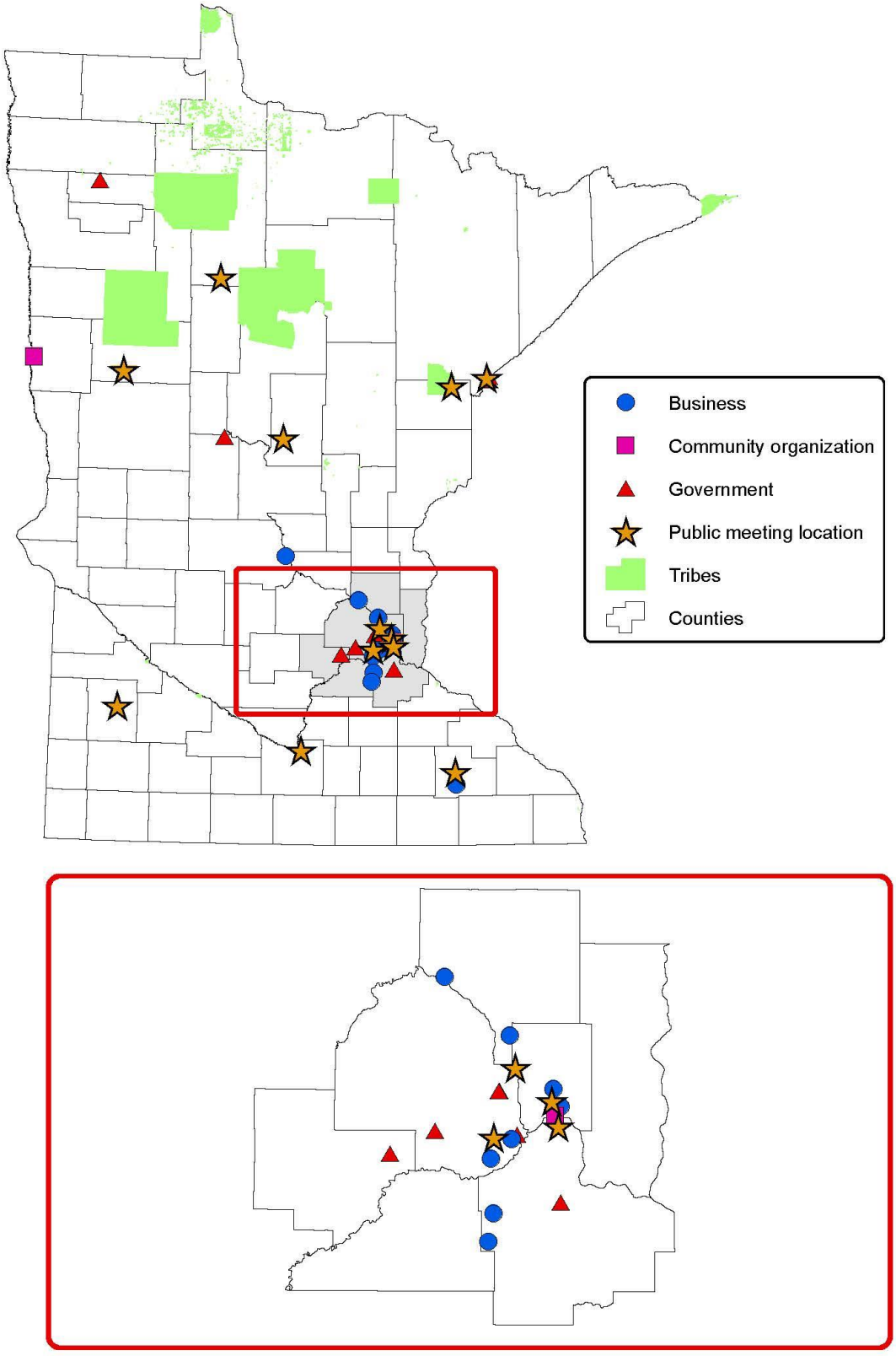


Table 2: Stakeholder group participants

Statewide associations
Aggregate and Ready Mix Association of MN
Association of General Contractors of MN
MN Auto Dealers Association
MN Propane Association
MN Trucking Association
NGV America (Natural gas association)

Community organizations and advocates	
Citizens Local Energy Action Network	Fargo-Moorhead community group for clean energy
Clean Energy Resource Teams	Statewide organization supporting community clean energy projects
Environmental Justice Advisory Group	MPCA EJ advisory group
West Side Community Organization	Supports West St. Paul community

Utilities and other energy and fuel providers	
CenterPoint Energy	Natural gas utility
Clean Energy Fuels	Transportation natural gas provider
Connexus Energy	Electric utility cooperative
Dakota Electric Association	Electric utility cooperative
Great River Energy	Electric utility
MN Power	Electric utility
Quality Propane	Propane sales
Southern MN Municipal Power Agency	Municipal utility
Stearns Electric Assoc.	Electric utility cooperative
TruStar Energy	Natural gas sales and distribution
Xcel Energy	Electric utility

Electric vehicle advocates and related businesses	
ChargePoint	EV charging operator
HourCar	Car sharing non-profit
Kandiyo Consulting	EV consultant
MN Plug-In EV Owners Circle	EV advocacy group
Plug-In Connect	EV consulting
ZEF Energy	EV charging operator

Non-profits
American Lung Association in MN
Environmental Initiative
Fresh Energy
Great Plains Institute
MN Center for Energy & the Environment
MN Renewable Energy Society

Local governments and transportation providers
City of Duluth
City of Minneapolis
City of Saint Paul
Duluth Transit Authority
East Carver City School District
Metro Transit
Metropolitan Airport Commission
Metropolitan Council
MN Department of Commerce
MN Department of Health
MN Department of Natural Resources
MN Department of Transportation
MN Transportation Center - Dakota Co. Technical College
Northland Community College
Region Five Development Commission
Southwest Transit
St. Paul Port Authority

Manufacturing and other related businesses		
Ace Solid Waste	North metro (Ramsey headquarters)	Trash hauler
Blue Bird	National	Bus manufacturer
Caterpillar	Bloomington and statewide	Replaces and retrofits heavy-duty equipment
Clean Fleets	National	Consultant for diesel fleets
CleanFuture, Inc.	National	Consultant for fleet energy efficiency
CNG Cylinders International	National	Natural gas tank manufacturer
Cummins	Fridley	Manufacturer of heavy-duty engines
General Motors	National	Automobile company
Kew Consultants	Statewide	Grant management consultant
Koenig & Sons Truck Sales	St. Paul	Truck repair and servicing company
Nordco	National	Rail and other heavy equipment manufacturing
North Central Bus and Equipment	St. Cloud and Minneapolis	Bus sales and service
Nuss, Truck & Equipment	Statewide facilities, Rochester based	Truck and trailer sales
Proterra	National	Heavy-duty electric vehicle manufacturer

Manufacturing and other related businesses		
Sun Country	Twin Cities metropolitan area	MN-based international airline
Telin Transportation Group	Statewide	Bus sales and service
United Parcel Service	National	Parcel delivery
Upper River Services	St. Paul	Marine services
Waste Management	Twin Cities metropolitan area	Solid waste haulers

Appendix 4: What matters to Minnesotans

As described in the previous section, the MPCA has worked to understand the priorities of Minnesotans and incorporate those priorities into this plan. This section summarizes key ideas and recommendations we heard through this engagement process.

General themes

Through public and stakeholder meetings, a public comment period, and online engagement tools, the MPCA heard a wide range of ideas for how the VW settlement funds should be spent in Minnesota. Some of the principal priorities Minnesotans expressed were:

- Achieve significant emissions reductions
- Do so cost effectively
- Include both Greater Minnesota and the Twin Cities metropolitan area
- Look to the long-term future of Minnesota's transportation sector
- Consider many vehicle and equipment types
- Consider many fuel types
- Advance environmental justice
- Reduce exposures and support public health
- Protect vulnerable populations, such as children and the elderly
- Reduce emissions of greenhouse gases
- Support the growth of electric vehicles
- Achieve and report measureable results

Community meetings

The MPCA held nine community meetings around the state in 2017. Key themes from those meetings included:

Including all parts of the state

Many meeting participants told us to ensure that funding reaches across the state and benefits many communities in ways that make sense for those areas. In Greater Minnesota, community members expressed concerns about the exposure of children to emissions during long bus rides to school, as well as concerns about traffic along busy roadways. Participants told the MPCA that funding should be invested in rural areas and smaller metropolitan areas, as well as the Twin Cities metropolitan area.

In the Twin Cities, community members expressed concerns about the many pollution sources that people are exposed to in urban areas, and specifically concerns about environmental justice. Many community members told us to focus efforts in areas where there are intersections of pollution sources, poverty, and communities of color. Participants raised the importance of reducing emissions from transit buses, especially since they are a critical mode of transportation for many lower-income people. Many community members also wanted reduced emissions from garbage and recycling trucks.

Making it easy to apply

Vehicle owners have told the MPCA that we should develop a simple, user-friendly application. We should provide information and answer questions to help applicants fill out any necessary forms. Many community members also expressed that the MPCA should work on ways to get the word out, especially in communities that have historically struggled to access state grant funding.

Advantages of alternative fuels

At many meetings participants expressed an interest in advancing Minnesota's transportation sector towards alternative fuels. They shared information on the advantages of fuels such as propane, natural gas, and electric in terms of lower emissions and reduced maintenance and operating costs. Participants included people who have first-hand experience with different fuel types being used in different types of equipment and different operating conditions.

Fast electric vehicle (EV) charging across the state

Many Minnesotans said they would like to see funds invested in electric vehicle charging stations across the state. Participants expressed particular interest in fast-charging corridors that would allow all Minnesotans to travel around the state by electric vehicle. Both EV users and people who would like to use an EV all over the state encouraged us to provide the infrastructure that they need to use their EV more broadly to travel outside their immediate communities, especially in Greater Minnesota.

Written comments

One of the primary ways we received input was through written comments. The MPCA received 311 total comments, submitted by 274 unique commenters. A summary of these comments can also be found on our website. Key themes from these comments include:

Electrification and electric vehicles

Electricity can power light-duty cars as well as some heavy-duty vehicles and equipment. Funds from the VW settlement could be used for electric charging stations for light-duty vehicles or to replace heavy-duty vehicles and equipment with electric versions. Of the 274 unique comments, 126 of them (46%) support the addition of EV infrastructure, including charging stations. This is the highest proportion of comments received on any single topic. Commenters made suggestions for the locations of the charging stations, including major roadways and travel corridors, especially at small, locally owned gas stations and convenience stores, and multi-family dwellings. Many commenters support the use of renewable energy, especially solar, to power these stations.

We received 54 comments in support of the use of electric buses, predominantly for public transit, but also school buses. There are a total of 77 comments that recommend replacing fleet vehicles; of those, 41 (53%) specify that the funds should be spent to electrify fleet vehicles.

Propane and natural gas

Fuels such as propane or natural gas can power many heavy-duty vehicles and equipment instead of using diesel. Funds from the VW settlement could be used to replace old diesel equipment with equipment powered by other fuels. Of the 274 comments, 36 of them (13%) were in support of propane school buses, particularly in Greater Minnesota. Many of these same commenters (19) supported propane-run fleet and freight vehicles, in addition to school buses. Many commenters also supported opportunities for using compressed and liquid natural gases. These fuels were especially supported by commenters whose businesses rely on the use of medium- and heavy-duty vehicles, such as waste haulers.

Environmental justice and health impacts

Diesel emissions are harmful to human health, and in Minnesota people of lower income and communities of color are disproportionately exposed to diesel pollution. Funds from the VW settlement could be focused on projects that would provide most health benefits, especially to vulnerable communities. Of all the comments received, 47 (17%) supported environmental justice-related uses of the VW funds. The majority of these comments focused on concerns about helping low-income communities. There are 45 comments relating to health and exposure concerns (16%), most of which focus on children.

Eligible project types

The settlement outlines a very specific list of project types that are eligible for funding through this program. Within that list, Minnesota has the flexibility to select or emphasize project types that reflect the state's priorities. Some commenters stated preferences for project types that they felt would bring the most benefits to Minnesota. We received 76 comments (28%) supporting replacing school buses with cleaner equipment, nearly all of whom specified preferences for either propane or electric options. Forty-nine commenters (18%) supported funding upgrades to transit buses, half of whom recommended adopting electric technology. Many commenters also supported using funds to replace diesel trucking fleets (46 comments, or 17%) and grow Minnesota's Diesel Emission Reduction Act program, which upgrades a wide variety of heavy-duty equipment, including construction equipment.

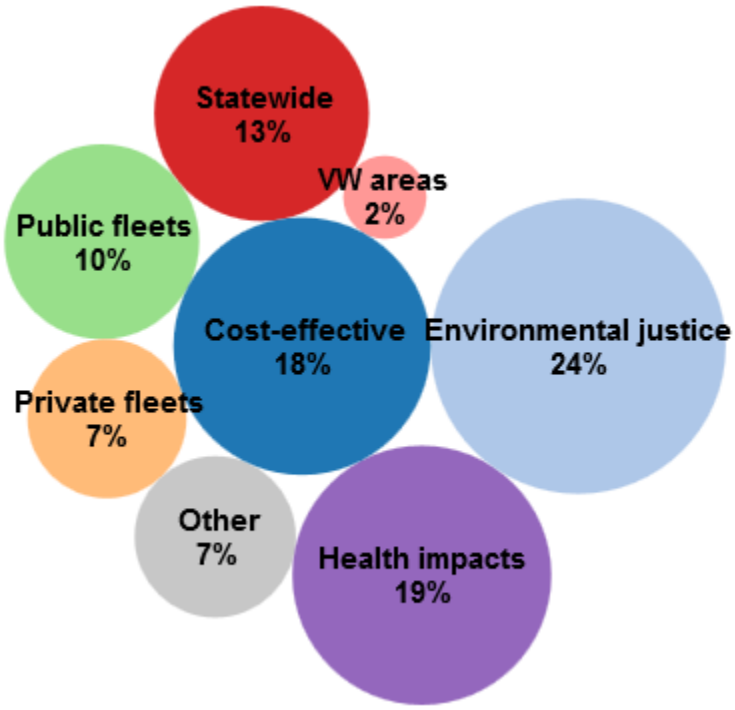
Other ideas

The comments offer a wide range of other suggestions, some of which are not eligible for funding based on the requirements of the settlement. Ideas included using funds for rail and light rail-related projects, supporting clean energy and infrastructure development, offering rebates for the purchase and ownership of EVs, supporting biofuel research, helping to improve indoor air quality issues, and grant matching for EV purchases for fleets.

"Dotmocracy"

At all of our meetings, we included an interactive engagement tool that we call "dotmocracy" to get a sense of what people in the room cared about related to the VW settlement. To reach more Minnesotans, we also launched a web survey with the same questions. We received a total of 488 responses to this outreach tool. The following graphic shows the results of that engagement. This information also is available as an interactive data tool on our website.

Figure 33: Themes from "dotmocracy" engagement tool



Total Votes	Estimated participants
1,463	488

Each participant was given three dots to "vote" for their priorities.

Category descriptions:

- Health impacts: Focus on achieving health benefits by also reducing related pollutants
- Cost-effective: Achieve greatest NOx emissions reductions for lowest cost per ton
- Statewide: Spread funding across Minnesota
- Public fleets: Focus on publicly-owned vehicles
- Environmental justice: Prioritize vulnerable communities
- Private fleets: Equal eligibility for privately-owned vehicles
- Volkswagen areas: Fund projects where most diesel VWs were located
- Other: Fill in your other ideas

During our second series of public meetings (Cloquet, Bemidji, Marshall, Rochester, and West St. Paul), we had additional dotmocracy posters to help participants to dive a bit deeper on topics that seemed to be of particular interest on our original tool. Results from those engagement tools include:

Pollutants of concern

Participants were asked to express which pollutants they are most concerned about and would like the MPCA to focus on as part of allocating settlement funds. 51% of participants selected greenhouse gases, 30% selected nitrogen oxides, and 19% selected fine particles.

Total pollution and exposure

Participants were asked to share how they thought we should balance total pollution reduction and reducing exposures to people. At times reducing total pollution will also reduce exposure the most, but this is not always the case depending on the type of equipment replaced and its location. Participants put dots along a spectrum and the majority indicated the MPCA should emphasize total emission reductions over exposure.

Vehicles of concern

Participants were given three dots to indicate the types of vehicles and equipment they would like settlement funds to replace. The options included all possible vehicles and equipment eligible for funding under the settlement. The most dots (35%) were placed in the school bus category and the second most (25%) were placed in the electric vehicle charging station category. The next most common selections were transit buses (17%) and trucks (13%), with the other categories coming in at under 5%.

Survey results

The MPCA used a second survey to allow participants to express more detailed interests on key topics from the first survey and dotmocracy tool (above). We received 507 responses to this survey. Below are summaries of the responses we received. We also received hundreds of written responses to open-ended questions, which have been reviewed, but not quantified.

Reducing pollution

Survey respondents indicated that we should consider not just NO_X in selecting projects to fund, but should also consider other pollutants related to diesel vehicles. 15% of respondents said they are most concerned about reducing NO_X with settlement funds, 46% said we should focus on reducing fine particles, and 39% said we should focus on greenhouse gases.

The survey also asked participants if they thought the MPCA should focus on achieving the largest emissions reductions or weigh exposures to pollution more. Respondents were split on this issue, but slightly favored focusing on reducing total emissions (53.5%) over focusing on exposure (46.5%)

Environmental justice

Environmental justice was the biggest priority expressed in our initial dotmocracy tool and it is a requirement of the settlement. Respondents in the second survey indicated that to address environmental injustices, the MPCA should focus on emissions reductions that benefit people of color and/or lower income (42%), people experiencing negative health effects related to air pollution (32%), and people exposed to higher levels of diesel exhaust (24%).

We also asked how we could integrate environmental justice into project selection (participants could select up to two options). 30% of respondents suggested (as one of their two preferred selections) we set aside a percentage of the funds for projects relating to vulnerable communities. The other options related to what sorts of projects should be considered as benefiting these communities. Respondents suggested prioritizing vehicles that operate in areas of concern for environmental justice (27%), projects with demonstrated community support (21%), projects submitted by organizations owned by people from targeted groups (persons of color, women, veterans, persons with disabilities, or other targeted groups) (14%), and vehicles owned by organizations based in areas of concern for environmental justice (8%)

Locations

We asked participants if we should prioritize projects in any particular parts of the state (respondents could select up to two options). Participants were split on the issue and prioritized areas in this order (choosing as one of their two selections): areas of concern for environmental justice (26%), the Twin Cities metropolitan area including surrounding suburbs (23%), Minneapolis and St. Paul (14%), rural parts of the state (13%), smaller cities (13%), and that no area of the state should receive prioritization (11%).

Eligible project types

The survey asked participants to indicate what types of vehicles they were most concerned about operating in their neighborhoods (the could select up to three options). Participants prioritized eligible vehicles in this order: school buses (28% choosing as one of their two selections), heavy-duty and medium-duty trucks (23%), garbage trucks (19%), transit buses (17%), construction equipment (6%), trains in rail yards (2%), boats in ports or along rivers (2%), and airport vehicles (2%).

Survey respondents favored partly funding a greater number of projects (62.8%) over fully funding a smaller number of projects (37.2%).

The survey asked participants if Minnesota should prioritize vehicles owned by certain types of organizations (participants could select up to two options). Participants slightly preferred (as one of their two selections) prioritizing local governments (22%). The next most common selection was to not prioritize any particular group (19%). The remaining options were: non-profits (14%); businesses in areas of concern for environmental justice (13%); small businesses (9%); businesses owned by targeted groups, such as people of color, women, veterans, and people with disabilities (9%); state governments (8%); and any private business (5%).

Electric vehicles

The survey asked participants what types of charging stations would be most useful to them and would be most important for getting them to use an electric vehicle. Respondents expressed a strong preference for charging along highway corridors to allow long-range travel between cities (38%). Other options were: more Twin Cities metro area charging (15%); charging at businesses people frequent (13%); charging in rural areas (12%); charging in smaller metropolitan areas (11%); and charging at multiunit housing, such as apartments and townhomes (10%).

Appendix 5: Input on Minnesota's draft plan

The MPCA took the large amount of input we received during 2017 (see Appendices 3 and 4) and used it to draft a proposed state plan. The plan sought to balance and reflect the large amount of wide-ranging input we heard during our first year of engagement. We released the draft plan for public input on February 15, 2018 and took comment through March 19, 2018. During that time, we solicited written comments, held public meetings, and spread the word on our website and over social media.

We received 581 written comments. Of these, 96 were individual comments and 485 were form comments. We also held public meetings in Brainerd, Detroit Lakes, Duluth, Mankato, Marshall, Minneapolis, and Rochester. One public meeting was offered as a webinar. We held a stakeholder meeting in St. Paul, which was also available as a webinar. At our public and stakeholder meetings, we presented information on the draft plan, answered questions, and sought verbal comment. We took notes and also encouraged commenters to provide us with more detailed comments in writing.

We offered to attend other groups' meetings to share the draft plan with them and receive their input. A few groups took us up on the offer and we presented and heard feedback from the Metropolitan Council's Transportation Advisory Board and Technical Advisory Committee and the Minnesota Valley Transit Authority.

Key themes

Comments on Minnesota's draft plan were overall positive. We heard from Minnesotans on a wide variety of issues, including many comments on both sides certain topics. Not all of the ideas we have heard could be captured here. The following, therefore, are some of the major themes and issues that commenters indicated are most important to them.

School buses

We have heard from many Minnesotans that the VW funds should reduce emissions from school buses to protect the health of children. 24% of all comments and 14% of individual commenters specifically wrote to support the proposed school bus grant program. Some commenters recommended the MPCA require applicants to use certain fuel types in their new buses.

Electric vehicles

During the MPCA's early engagement, support for electric vehicles was the most common comment we received. Electric vehicles continued to be a main focus of comments on our draft plan. 90% of all commenters and 36% of individual commenters specifically supported the proposed heavy-duty electric vehicle grant program, many saying we should dedicate even more funds to this category of vehicle. 65% of all commenters and 21% of the individual comments recommended replacing diesel school buses and transit buses with electric versions. 91% of all commenters and 45% of individual commenters wrote in support of the proposed electric vehicle charging station program. They offered many suggestions about type of charging stations that should receive funding. Many commenters recommended that the plan in some way support the use of renewable energy for charging vehicles.

Health and environmental justice

Throughout our engagement efforts we have heard that Minnesotans want the MPCA to focus on reducing harmful exposures to diesel pollution, especially in lower-income communities and communities of color that are often disproportionately impacted by air pollution. 87% of all commenters and 24% of individual commenters wrote in support of including these issues Minnesota's plan for the VW funds.

Summary of plan changes

Some commenters provided recommendations for changes to the draft plan. In deciding which updates to make to the plan, we considered any new information that commenters provided that we did not have before writing the draft. We also considered how possible changes might impact the overall balance of the plan. Since the input we received on the draft plan was generally positive, the MPCA decided not to make changes that would change the overall direction or balance of the plan. The three-phase structure of Minnesota's program will allow us to consider any larger changes to the program for Phase 2 based on our experience with Phase 1 and additional input from Minnesotans between the phases.

School bus grant amounts

The MPCA received new information from school districts, school bus fleet owners, and school bus vendors indicating that $10,000 grants would not be sufficient to incentivize fleet owners to retire working diesel buses early. We received a range of recommendations on appropriate grant amounts. Since school bus emissions expose children to diesel pollution and were a main focus of public comment, we want to make sure that the school bus grant program will encourage bus owners to retire their old, dirty vehicles. Therefore, in the final plan the MPCA has increased the grant amounts for school buses to $15,000 and $20,000 for low-income school districts.

Electric vehicle charging stations

We received many comments on our plans for electric vehicle charging stations. Many of the comments focused on factors that they believe are most likely to encourage people to use an electric vehicle. We heard a strong call for us to allow 50 kilowatt (kW) stations along highway corridors rather than requiring 150 kW stations. 50 kW stations do not charge cars as fast as 150 kW stations, but they are much less expensive. Commenters said that it was most important to install a large number of stations across the state so that people all over the state can travel by electric vehicle. Commenters recommended installing 50 kW stations during Phase 1, then considering upgrades to faster stations in later phases. The MPCA recognizes the benefits of installing more stations and therefore changed the final plan to allow 50 kW stations along highway corridors.

The MPCA received some comments recommending that we increase the amount of funding allocated to Level 2 charging stations. We decided not to change this allocation amount because during our outreach and engagement efforts in 2017, we heard that Minnesotans are most interested in using electric vehicle charging station funding to increase fast charging along corridors.

Aggregation of applications

At many of our public meetings, we were asked if we would allow aggregation of applications. In the final plan, the MPCA clarified that groups of vehicle owners can come together and apply for funding as a group, including using a third party to submit a joint application. We not only will allow aggregation of applications, but expect and encourage it.

Heavy-duty electric vehicles

Many commenters wrote in support of the heavy-duty electric vehicle grant program. Many recommended that the MPCA allocate additional funds for heavy-duty electric vehicles. For Phase 1 of this program we have decided not to increase the funding for this grant program. The program will allow an initial investment in heavy-duty electric equipment in Minnesota and allow us to begin to try this technology here. However, this equipment is still significantly more expensive than other fuels, so we will be able to achieve greater emissions reductions through the balanced approach outlined in this plan. We plan to reconsider the level of funding for this category for Phase 2 when we hope and expect the cost effectiveness of heavy-duty electric vehicles will improve and that there may be more opportunities to invest in this technology at that time.

We also received several comments stating that heavy-duty electric vehicles would require a larger grant in order to encourage people to try the new technology. We decided to eliminate the 25% funding cap for this category in order to provide a greater incentive. We may set a new, higher funding cap through the request for proposal process.

Clarifying eligibility and program structure

Commenters highlighted a variety of areas in our draft plan that required clarification or changes for consistency. We clarified that gasoline vehicles are not eligible for funding under the terms of the national settlement and that airport ground support equipment and forklifts are eligible for funding under the heavy-duty electric vehicle grant category.

Glossary of terms

The MPCA's Environmental Justice Advisory Group recommended adding a glossary of terms to help readers understand some of the more technical terms in the state's plan. A glossary (Appendix 8) was added upon their recommendation.

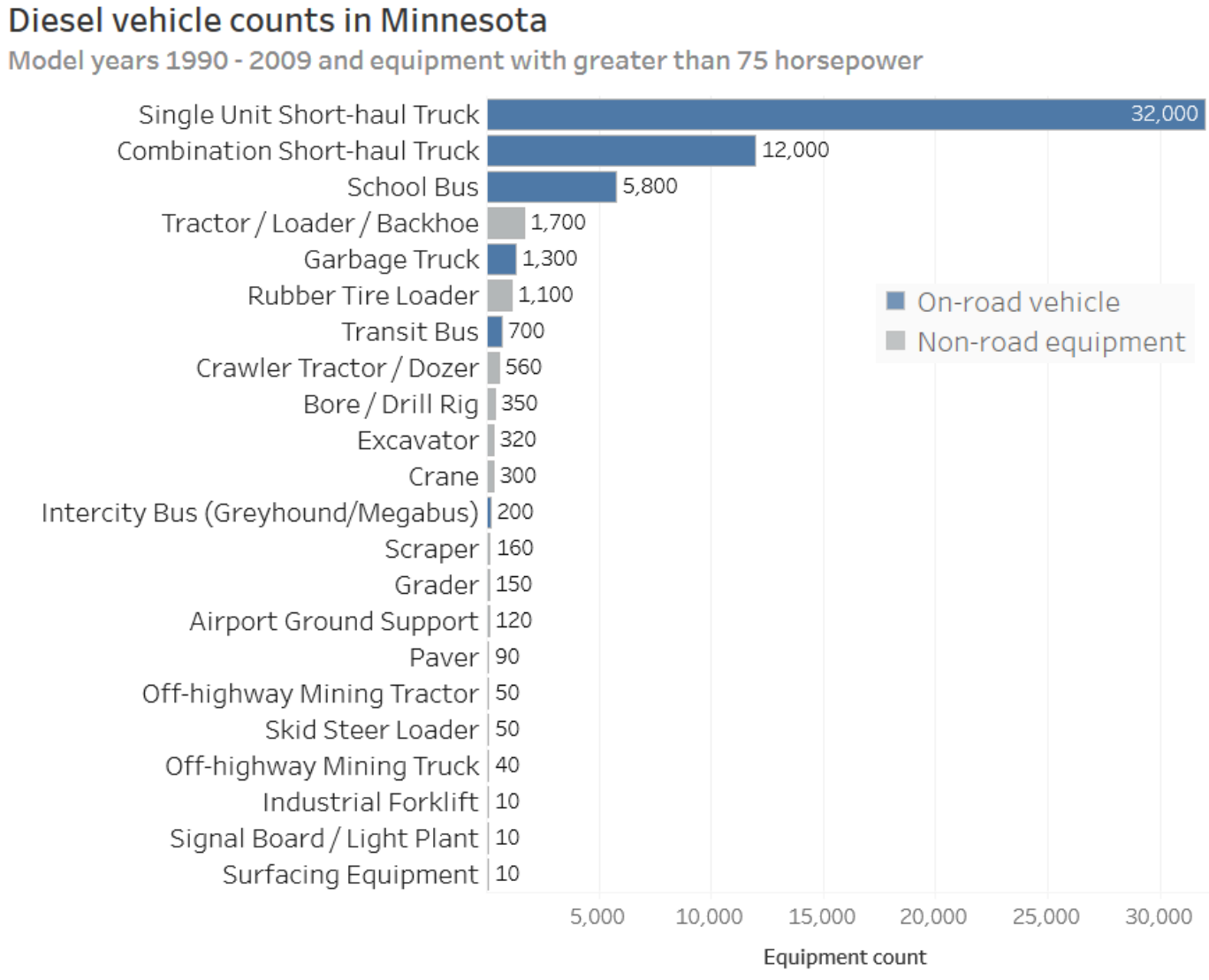
Appendix 6: Data on heavy-duty diesel vehicles and equipment in Minnesota

The following graphs include data on eligible vehicle population, emissions, and cost effectiveness that was used to help develop Minnesota's plan for the VW settlement funds. The graphs display data for NO_X; to see emissions estimates for $PM_{2.5}$ and GHGs, visit our website (www.pca.state.mn.us/vw).

Vehicle inventory

Figure 14 shows the number of vehicles and equipment in Minnesota that are eligible for VW settlement replacement funding. The graph includes modeling data for 2017 based on the Environmental Protection Agency's vehicle emissions model, MOVES2014a; EPA's 2014 National Emissions Inventory version 1 (rail yards and ports); and the National Association of State Energy Official's Volkswagen Settlement Beneficiary Mitigation Plan Toolkit. (See our website for full reference materials.)

Figure 14:



Emissions inventory

Figures 15 and 16 show emissions from vehicles eligible for VW settlement replacement funding. These graphs include modeling data for 2017 based on the Environmental Protection Agency's vehicle emissions model, MOVES2014a; EPA's 2014 National Emissions Inventory version 1 (rail yards and ports); and the National Association of State Energy Official's Volkswagen Settlement Beneficiary Mitigation Plan Toolkit. (See our website for full reference materials.)

Figure 15:

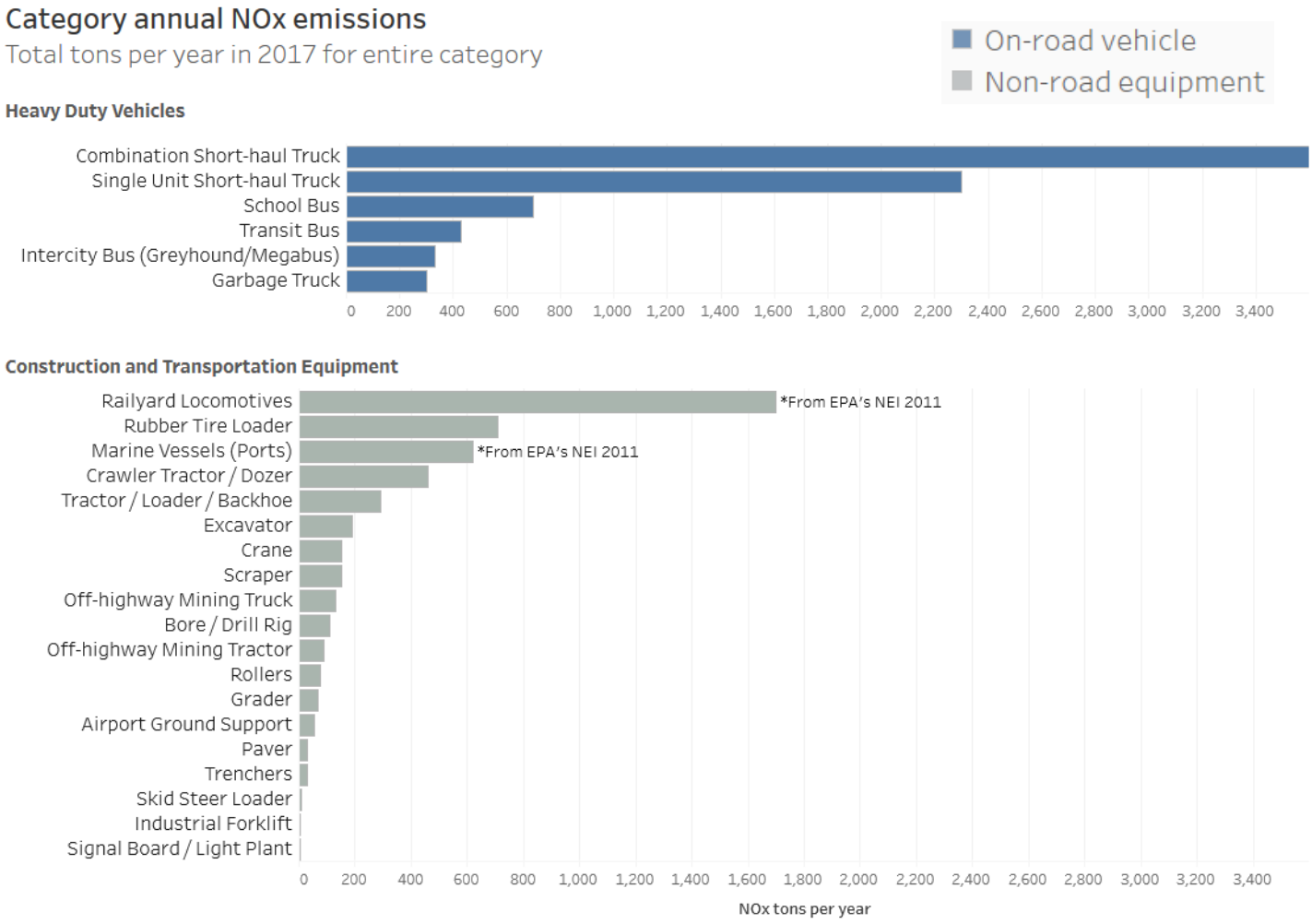
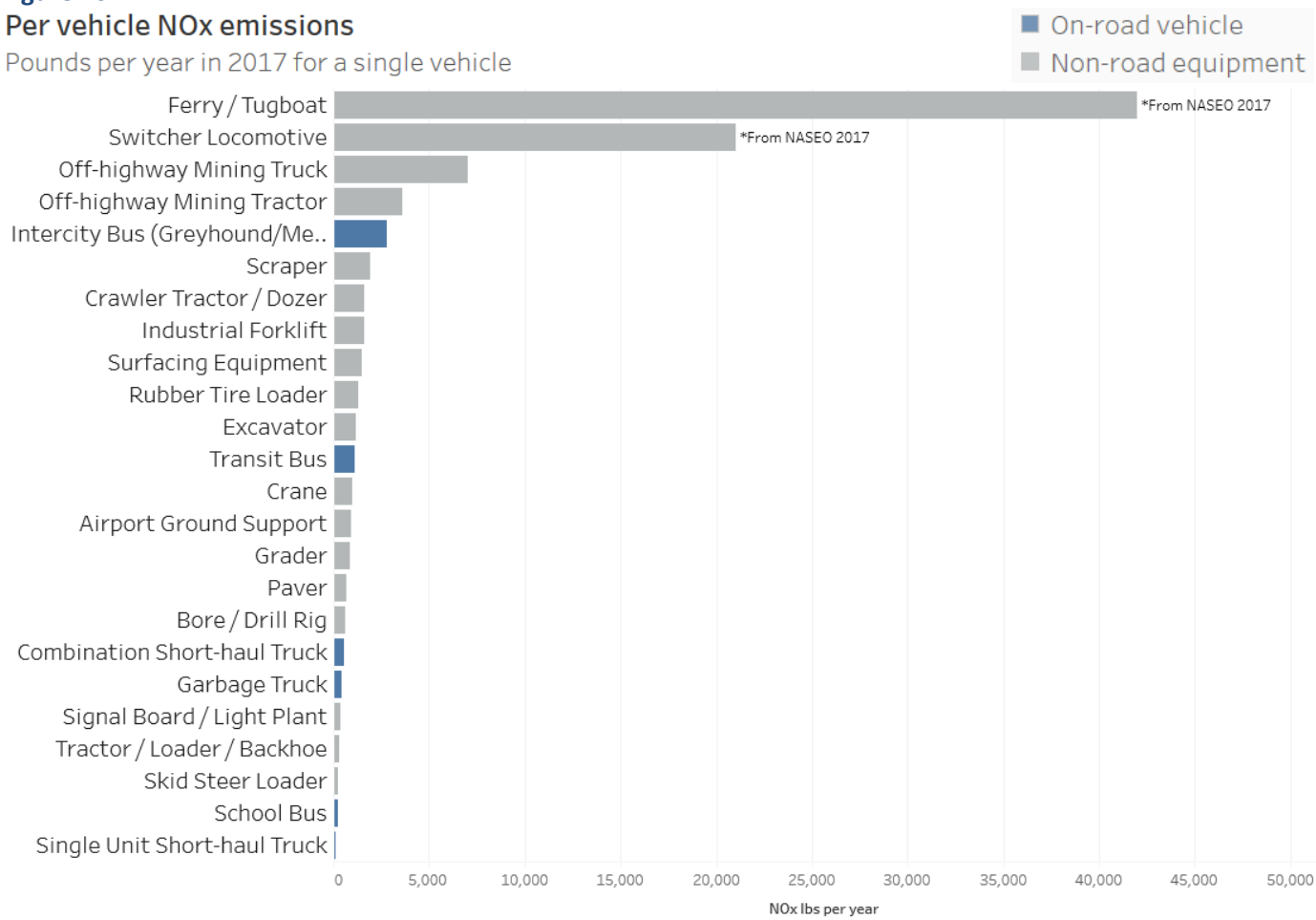


Figure 16:


Per vehicle NOx emissions
Pounds per year in 2017 for a single vehicle
On-road vehicle
Non-road equipment
Ferry / Tugboat
Switcher Locomotive
Off-highway Mining Truck
Off-highway Mining Tractor
Intercity Bus (Greyhound/Me..
Scraper
Crawler Tractor / Dozer
Industrial Forklift
Surfacing Equipment
Rubber Tire Loader
Excavator
Transit Bus
Crane
Airport Ground Support
Grader
Paver
Bore / Drill Rig
Combination Short-haul Truck
Garbage Truck
Signal Board / Light Plant
Tractor / Loader / Backhoe
Skid Steer Loader
School Bus
Single Unit Short-haul Truck
*From NASEO 2017
*From NASEO 2017
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
50,000
NOx lbs per year

Cost effectiveness

The following graphs show the comparative cost-effectiveness of vehicle and equipment replacements. The emissions avoided are estimated over the remaining useful lifetime of a MY1998 retired vehicle (see Appendix 7 for methods and assumptions).

Figure 17 shows cost effectiveness by comparing the NO_x reductions to the entire cost of purchasing a new vehicle or piece of equipment.

Figure 18 shows cost effectiveness by comparing the NO_x reductions to the grants made from the VW settlement funds. This shows that the grants are structured to improve the cost effectiveness of investments made in response to citizen comments.

Figure 17:

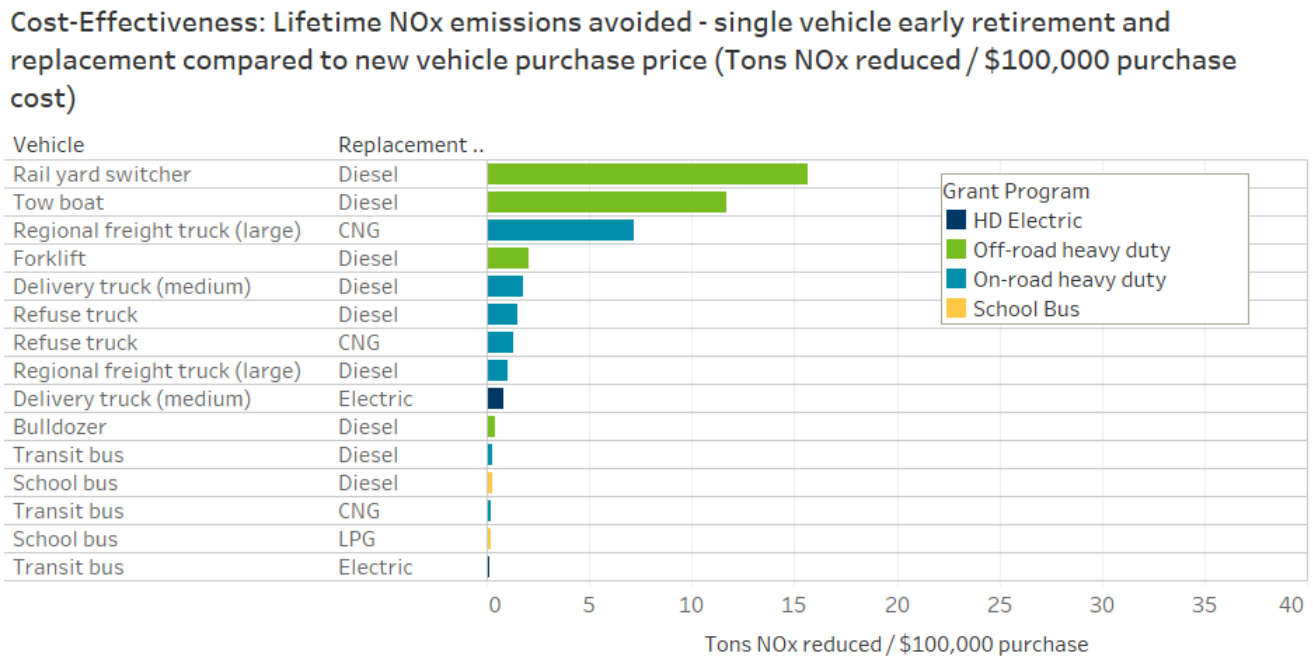
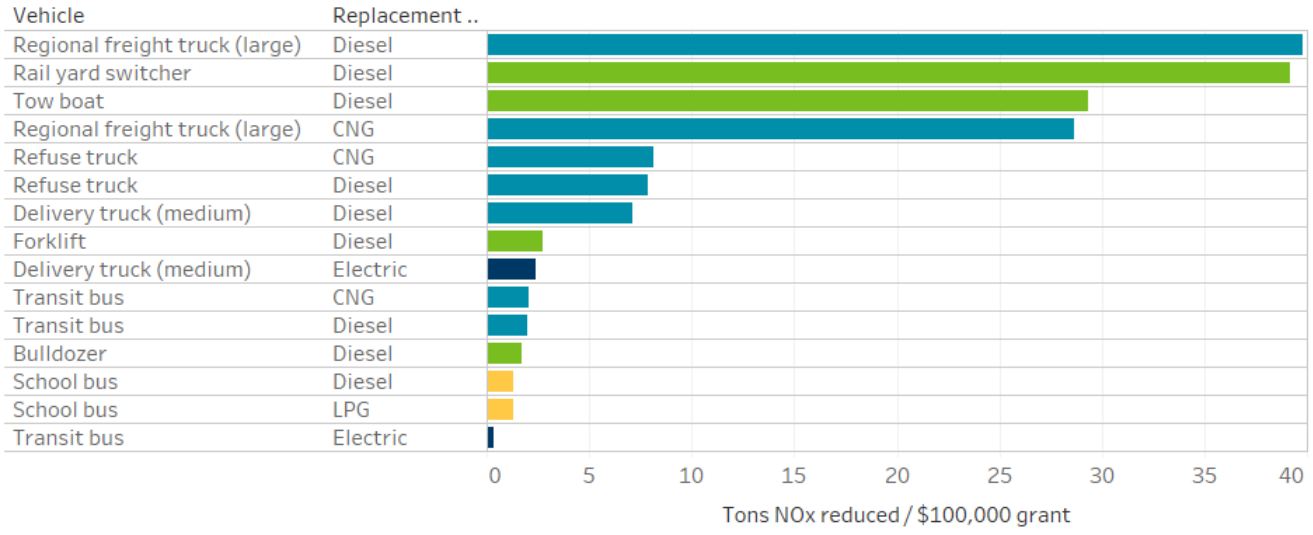


Figure 18:



Appendix 7: Emission reduction calculation methods

The MPCA used the following methods and assumptions to calculate estimated emissions benefits of Phase 1 of VW settlement funding.

Heavy-duty on-road vehicles

The MPCA used Argonne National Labs' Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool (2017) to estimate emissions from heavy-duty on-road vehicles. The general approach estimated the annual emissions from the vehicles to be retired and the new replacement vehicles, and calculated the difference.

AFLEET assumptions and methods

MPCA adapted AFLEET to reflect conditions in Minnesota as noted in Table 3. We used default values for other terms.

We held annual vehicle miles traveled (VMT) constant for all model years (see Table 4). This allowed comparisons between vehicles of the same type where the only difference was the vehicle age and fuel type and allowed comparisons between vehicle types that are reasonably representative of actual operation.

Table 3: AFLEET parameters

Primary vehicle location	• Minnesota
Predicted lifetime	• 25 years (regional freight, delivery, and refuse trucks) • 15 years (school and transit buses)
Electricity: MN in-state generation (U.S. Energy Information Administration, 2016)	• 39% Coal • 24% Nuclear • 20% Other renewables • 15% Natural gas • 2% Biomass
Model years	• 1998 and 2005 (vehicles to be retired) • 2018 (new replacement vehicles)
Outputs used: Annual emissions	• Well-to-wheels: GHGs • Vehicle operation: NO_x, $PM_{2.5}$, $PM_{2.5}$ (TBW)

Table 5 shows the combinations of vehicles and fuel types we modeled. Model year 1998 and 2005 diesel vehicles provide a range of vehicle ages that could be retired and therefore a range of emissions reduction benefits. We used model year 2018 vehicles as the baseline replacement vehicles and modeled them with many fuel and engine configurations. We relied on default fuel efficiencies in the AFLEET background data to calculate fuel use.

Table 4: Annual vehicle miles traveled

Vehicle type	Annual VMT
Delivery truck	16,500
Regional freight truck	65,000
Refuse truck	23,400
Transit bus	35,000
School bus	15,000

In the plan, we report estimated vehicle operation emissions of NO_X and $PM_{2.5}$ and well-to-wheel emissions of GHGs. Vehicle operation emissions of $PM_{2.5}$ come from fuel combustion and tire and brake wear (TBW). Well-to-wheels emissions are useful for comparing the full lifecycle GHG emissions from different fuels and vehicle operation emissions are useful for comparing local effects of NO_X and $PM_{2.5}$.

Table 5: Vehicle and fuel type combinations modeled

Model Year	Fuel	Delivery Truck	Dump Truck	Refuse Truck	Regional freight truck	School Bus	Transit Bus
1998	Diesel (B10/B5)	X	X	X	X	X	X
2005	Diesel (B10/B5)	X	X	X	X	X	X
2018	Diesel (B10/B5)	X	X	X	X	X	X
	Electricity	X					X
	LPG	X				X	
	CNG	X	X	X	X		X
	LNG	X					
	BD20	X	X	X	X	X	X
	BD100	X	X	X	X	X	
	Diesel HEV	X		X		X	X
	BD 20 HEV					X	X

Table 6: Selected model results – annual emissions from delivery trucks

Replacement vehicle fuel	Model Year	Well-to-wheels (short tons)	Vehicle Operation Air Pollutants (lb)		
		GHGs	NO_x	$PM_{2.5}$	$PM_{2.5}$ (TBW)
Diesel (B10/B5)	1998	40.5	481.2	19.1	0.6
Diesel (B10/B5)	2005	35.2	229.9	16.7	0.5
Diesel (B10/B5)	2018	29.5	24.1	0.4	0.5

Grant program modeling

The MPCA extracted the resulting annual emissions for each vehicle into a data table to create a new module to work with the AFLEET results and accommodate modeling the targeted grant programs.

We calculated an estimated remaining useful lifetime for the 1998 and 2005 example vehicles, based on model year, AFLEET defaults, and Minnesota-specific experience, assuming that the vehicle would have remained in use for at least one year. We used the remaining useful lifetime to determine the lifetime emissions reduction achieved by retiring the vehicle early through the grant project.

Eq. 1: $$Fuel\ consumption_{annual} = VMT_{annual} * Fuel\ efficiency$$

Eq. 2: $$Emissions_{annual} = Fuel\ consumption_{annual} * Emission\ factor$$

Eq. 3: $$Emissions\ avoided_{annual} = Retired\ vehicle_{annual\ emissions} - Replacement\ vehicle_{annual\ emissions}$$

Eq 4: $$Remaining\ useful\ lifetime = Predicted\ vehicle\ life - Vehicle\ age$$

Eq. 5: $$Lifetime\ emissions\ avoided = Emissions\ avoided_{annual} * Remaining\ useful\ lifetime$$

We extracted the default purchase cost of new vehicles from AFLEET background data. We capped the grants as identified in the main text: for most vehicles, the lower amount of either 25% of the purchase price or $40,000, and either $15,000 or $20,000 for school buses. For school bus projects, we estimated one-third of the projects might qualify for the higher $20,000 grant based on the number of school districts in the state that would qualify under the criteria outlined on page 10. For heavy-duty electric vehicles we estimated that applicants might on average request a 35% grant. Based on input at our public meetings and agency experience, we estimated a variety of vehicle types that might receive funding through each grant program in Phase 1. These estimates provide an idea of how many vehicles of each type could be funded in Phase 1 in order to make emissions calculations, but do not reflect a preference for any vehicle or fuel type or funding targets or allocations. This assortment of vehicles creates an example showing the potential emission reductions for Phase 1.

Table 7: Number of vehicle replacement projects funded in Phase 1 model

	Diesel (BD10/BD5)	BD100	All-Electric	Diesel Hybrid Electric	Propane (LPG)	Compressed Natural Gas (CNG)	Total
Regional Freight	40	-	-	-	-	5	45
Delivery Truck	15	2	21	10	10	6	64
Dump Truck	6	-	-	-	-	5	11
Refuse Truck	10	3	-	-	-	15	28
Transit Bus	-	-	5	10	-	-	15
School Bus	91	-	-	-	91	-	182
Total	162	5	26	20	101	31	345

Finally, we used the lifetime emissions avoided from each vehicle project and number of projects funded to estimate the total emission reduction from the full grant program. We also used the total cost of purchasing new vehicles in the cost effectiveness analysis.

$$Program\ lifetime\ emissions\ avoided = Projects\ funded * Project\ lifetime\ emissions\ avoided$$

Example: Program funds 10 projects replacing a MY1998 diesel delivery truck with a MY2018 diesel delivery truck

Well-to-wheels greenhouse gas emissions avoided

$$11.0\ tons_{\ ann.\ WTW\ GHGs\ avoided} = 40.5\ tons_{\ MY1998\ ann.\ WTW\ GHG\ emissions} - 29.5\ tons_{\ MY2018\ ann.\ WTW\ GHG\ emissions}$$

$$5\ years_{\ Remaining\ useful\ lifetime} = 25\ years_{\ Predicted\ vehicle\ life} - 20\ years_{\ Vehicle\ age}$$

$$55\ tons_{\ Lifetime\ WTW\ GHG\ emissions\ avoided} = 11.0\ tons_{\ ann.\ WTW\ GHGs\ avoided} * 5\ years_{\ Remaining\ useful\ lifetime}$$

$$550\ tons_{\ Program\ lifetime\ WTW\ GHG\ emissions\ avoided} = 10_{\ Projects\ funded} * 55\ tons_{\ Lifetime\ WTW\ GHG\ emissions\ avoided}$$

Vehicle operations NO_x emissions avoided

$$457.2\ lb_{\ ann.\ V.Op.\ NOx\ emissions\ avoided} = 481.2\ lb_{\ MY1998\ ann.\ V.Op.\ NOx\ emissions} - 24.1\ lb_{\ MY2018\ ann.\ V.Op.\ NOx\ emissions}$$

$$5\ years_{\ Remaining\ useful\ lifetime} = 25\ years_{\ Predicted\ vehicle\ life} - 20\ years_{\ Vehicle\ age}$$

$$2{,}286\ lb_{\ Lifetime\ V.Op.\ NOx\ emissions\ avoided} = 457.2\ lb_{\ ann.\ V.Op.\ NOx\ emissions\ avoided} * 5\ years_{\ Remaining\ useful\ lifetime}$$

$$22{,}860\ lb_{\ Program\ lifetime\ V.Op.\ NOx\ emissions\ avoided} = 10_{\ Projects\ funded} * 2{,}286\ lb_{\ Lifetime\ V.Op.\ NOx\ emissions\ avoided}$$

Heafvy-duty non-road vehicles and equipment

The MPCA used the U.S. Environmental Protection Agency's Diesel Emission Quantifier (DEQ) to estimate NO_X and $PM_{2.5}$ emissions reductions from heavy-duty non-road vehicles. We used a conservative estimate of a 5% greenhouse gas emission reduction because the DEQ does not provide GHG emission reduction estimates. We chose 5% based on conversations with equipment vendors and their estimates of fuel savings by upgrading old equipment to new. We relied on the DEQ for non-road equipment because AFLEET only contains data for on-road vehicles. We modeled a mix of equipment to represent grants that might be funded through Phase 1. These estimates provide an idea of how many pieces of equipment of each type could be funded in Phase 1 in order to make emissions calculations, but do not reflect a preference for any equipment or fuel type or funding targets or allocations. This assortment of equipment creates an example showing the potential emission reductions for Phase 1. The mix of equipment and associated assumptions are:

- Switcher locomotives
    - Action: Replace uncontrolled engine with tier 4 engine
    - Estimated total cost: $980,000 per engine
    - Estimated grant: 40% of overall cost or $392,000 per engine
    - Estimated number of grants in this category: 2
    - Estimated remaining useful life of old engines without replacement: 21 years

- Towboats
    - Action: Replace tier 0 engine with tier 3 engine
    - Estimated total cost: $145,000 per engine
    - Estimated grant: 40% of overall cost or $58,000 per engine
    - Estimated number of grants in this category: 7
    - Estimated remaining useful life of old engines without replacement: 4 years

- Bulldozer (Diesel Emissions Reduction Act example)
    - Action: Replace tier 1 diesel equipment with tier 4 diesel equipment
    - Estimated total cost: $517,000 per bulldozer
    - Estimated grant: 25% of overall cost or $129,000 per bulldozer
    - Estimated number of grants in this category: 3
    - Estimated remaining useful life of old engines without replacement: 4 years

Electric vehicle charging stations

We estimated the cost of single connection charging ports based on Department of Energy data[1] for non-residential level 2 and direct current (DC) fast chargers (Table 8).

Ninety percent of the electric vehicle charging station funds are directed towards DC fast charging stations. Ten percent of the electric vehicle charging station program funds are targeted toward level 2 charging stations at public places, multi-unit housing, or work sites. Level 2 charging stations may also be

Table 8: Cost estimates for installing charging stations

Station type	Cost for single connection port
Level 2	$5,000
50 kW DC Fast Charger	$70,000

[1] DOE (2015) Costs associated with non-residential electric vehicle supply equipment. https://www.afdc.energy.gov/uploads/publication/evse_cost_report_2015.pdf

funded with money remaining after funding DC fast chargers. The difference in cost between level 2 stations represents different features and durability available. A multi-unit housing installation may use less expensive wall mounted stations in contrast to more robust models used in general access locations. Installation costs are also very dependent on the particular project.

Grants were estimated to cost $5,000 for level 2 chargers and $70,000 for DC fast chargers.

Table 9: Example projects funded

Type	# single connections
Level 2	**45**
50 kW Direct Current Fast Chargers	**20**
Total	**65**

These estimates provide an idea of how many charging station projects of each type could be funded in Phase 1 in order to make emissions calculations, but do not reflect a preference for any location type or funding targets or allocations.

We assumed that, on average, one vehicle per day will charge at the stations funded. This estimate is based on current fast charging usage as reported by ZEF Energy, which operates fast chargers in Minnesota. We expect usage to increase over the coming years as electric vehicles become more common, but feel this is a reasonable, conservative estimate based on current use levels. We did not attempt to make estimates of usage growth. We estimated that vehicles can travel 3.4 miles from each kWh of charge. We estimated the amount of charge per vehicle based on data from the U.S. Department of Energy Alternative Fuels Data Center.

We are unable to estimate the impact these investments may have on increasing use of electric vehicles, but we are able to estimate the amount of conventional gasoline vehicle miles displaced by drivers using charging stations funded by this project. We assume that the miles driven by electric vehicles are equally displacing conventional vehicle miles.

Table 10: Estimate of vehicle miles displaced by electric vehicles charging at program stations

	Vehicles per day	kWh charge per vehicle	VMT/kWh	VMT from charge	units funded	Annual VMT displaced
Level 2 - public	1	22	3.4	74.8	45	1,228,590
50 kW DC Fast Chargers	1	13	3.4	44.2	20	322,660
Total						**1,551,250**

We used the AFLEET model to estimate fuel use and emissions from a MY2015 electric vehicle and MY2015 conventional passenger vehicle. To travel 10,000 miles, the conventional passenger car uses 382 gallons of gasoline (E10) and the electric vehicle uses 2,940 kWh of electricity.

We modeled the sources of electricity generation using the 2016 Minnesota in-state generation mix reported by the U.S. Energy Information Administration. We plan to encourage use of renewable energy to supply charging stations, so this provides a conservative estimate of emissions benefits.

Table 11: Minnesota in-state electricity generation

Coal	39%
Nuclear	24%
Other renewable (solar, wind, hydro)	20%
Natural gas	15%
Biomass	2%

Using the annual miles driven after charging at funded stations, we calculated the emissions avoided as the difference between emissions from the conventional gasoline vehicle and the electric vehicle. The electric vehicle has no tailpipe NO_X or $PM_{2.5}$ emissions; those emissions occur upstream. The model calculates GHGs only on a well-to-wheels basis and therefore does include GHGs from electricity generation and fuel production. Solar or wind energy sources used for vehicle charging would create no GHG emissions.

To estimate lifetime emissions reductions of these investments, we multiplied the annual emissions benefits by a conservatively estimated 10-year life of the charging stations.

Health and economic benefits

The MPCA used EPA's Co-Benefits Risk Assessment (COBRA) screening model[2] to estimate the resulting change in annual health impacts as well as the economic value of those impacts from the vehicle emissions reductions expected from Phase 1 of Minnesota's plan. (See Table 2 for these projected emissions reductions.) COBRA is a reduced-form screening model designed to help state and local governments explore how changes in air pollution from clean energy and clean transportation policies and programs can affect human health and estimate the economic value of the health benefits. COBRA is not intended to give precise estimates of health and economic impacts; rather, it is a preliminary screening tool to identify those scenarios that might benefit from further evaluation with more sophisticated air-quality modeling approaches. COBRA only estimates the health impacts from $PM_{2.5}$ exposure, which is formed by direct emissions of $PM_{2.5}$ as well as from the formation of secondary $PM_{2.5}$ from NO_x emissions (and other air pollutants) in the atmosphere. No ozone impacts, nor direct impacts of NO_x, are considered.

The MPCA provided the model with the expected emissions reductions of NO_x and $PM_{2.5}$ (see Table 2), and assigned those reductions to a geographic area and to source categories. The geographic area for this exercise was the entire state of Minnesota, which essentially means that the emissions reductions are assumed to be evenly distributed throughout the state. Table 12 shows the COBRA source categories where the expected emissions reductions would occur for each of the Phase 1 grant programs.

Table 12: COBRA source categories

Grant Program	Source Category
School bus replacement program	Highway vehicles: heavy-duty diesel vehicles
Clean heavy-duty on-road vehicles program	Highway vehicles: heavy-duty diesel vehicles
Clean heavy-duty off-road equipment program	Off highway (Railroads, Marine vessels, and Non-road diesel)
Heavy-duty electric vehicle program	Highway vehicles: heavy-duty diesel vehicles
Electric vehicle charging station program	Highway vehicles: light-duty gas vehicles

We estimated emissions reductions for each year of each project's lifetime (listed above on pages 45, 47, and 48) and assumed total emissions reductions would be spread out evenly over the project lifetimes. The health benefits in future years of emissions reductions were estimated assuming year 2017 baseline emissions levels. We used a three-percent discount rate to convert future benefits into present value terms.

Once we entered emissions reductions into COBRA by geographic area and source category, COBRA estimated the resulting change in ambient $PM_{2.5}$ concentration in every county in Minnesota. The model used the estimated changes in ambient $PM_{2.5}$ concentrations and EPA's standard concentration-response relationships to estimate changes in health impacts, including adult mortality, non-fatal heart attacks, respiratory hospital admissions, cardiovascular hospital admissions, acute bronchitis, respiratory symptoms, asthma emergency room visits, asthma exacerbations, and work loss days for each county. For some health outcomes, including premature mortality, EPA uses concentration-response parameters from two different widely-accepted epidemiological cases. Thus, for some health outcomes, the model generates both a low and high health effects value.

Finally, COBRA converted expected changes in health impacts to monetary values using EPA's standard economic valuation functions. These include EPA's value of a statistical life for premature mortality impacts and various

[2] https://www.epa.gov/statelocalenergy/co-benefits-risk-assessment-cobra-health-impacts-screening-and-mapping-tool

other willingness-to-pay and cost-of-illness functions for non-fatal health impacts. For health outcomes that use both “low” and “high” concentration-response parameters, the model produces a range of economic values.

The MPCA summed the estimated values of all health impacts for each year and then discounted all future year values into present value terms using a 3% discount rate to obtain the total estimated economic benefits of health improvements presented in the “Economic benefits” section of this plan.

Appendix 8: Glossary of terms

The following are definitions of some of the terms and phrases as they are used in Minnesota's state plan.

- **Disproportionately impacted:** Communities that are exposed to higher levels of pollution than the rest of the population and/or are more vulnerable to the health impacts of this pollution. The MPCA uses population statistics to look at communities that have higher proportions of lower-income households or people of color. These populations have been shown to be more burdened by air pollution than other communities.

- **Electric vehicle infrastructure:** Stations used for charging electric cars and other vehicles. These stations are like gas stations for electric vehicles. They supply electricity and people can plug their cars in to the equipment to charge their batteries.

- **Issuing grants:** The MPCA will select projects for funding based on a competitive process. The selected projects will receive funding in the form of a grant. Unlike loans, grants do not require payback of funds.

- **Mitigation:** Reduce or clean up.

- **Soliciting proposals:** The MPCA will share information about how to apply for funding through the settlement.

- **Stakeholder:** People and organizations particularly interested in the VW settlement. Especially people and groups that have experience with various aspects of the settlement, such as heavy-duty vehicles and equipment, alternative fuels, electric vehicles, and health impacts of vehicle pollution.

- **Trustee:** The organization that manages the funds for all the states and tribes. The Department of Justice selected Wilmington Trust of Wilmington, Deleware to manage the funds for the VW settlement. VW puts money into accounts managed by Wilmington Trust who then makes sure the funds are used for their intended purpose. States and tribes will select projects and request the funds from Wilmington Trust to pay for those projects.

Appendix 9: Volkswagen settlement appendix D-2 – Eligible mitigation actions and mitigation action expenditures

APPENDIX D-2

ELIGIBLE MITIGATION ACTIONS AND MITIGATION ACTION EXPENDITURES

1. Class 8 Local Freight Trucks and Port Drayage Trucks (Eligible Large Trucks)

    a. Eligible Large Trucks include 1992-2009 engine model year Class 8 Local Freight or Drayage. For Beneficiaries that have State regulations that already require upgrades to 1992-2009 engine model year trucks at the time of the proposed Eligible Mitigation Action, Eligible Large Trucks shall also include 2010-2012 engine model year Class 8 Local Freight or Drayage.

    b. Eligible Large Trucks must be Scrapped.

    c. Eligible Large Trucks may be Repowered with any new diesel or Alternate Fueled engine or All-Electric engine, or may be replaced with any new diesel or Alternate Fueled or All-Electric vehicle, with the engine model year in which the Eligible Large Trucks Mitigation Action occurs or one engine model year prior.

    d. For Non-Government Owned Eligible Class 8 Local Freight Trucks, Beneficiaries may only draw funds from the Trust in the amount of:

        1. Up to 40% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine, including the costs of installation of such engine.

        2. Up to 25% of the cost of a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) vehicle.

        3. Up to 75% of the cost of a Repower with a new All-Electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new All-Electric engine.

        4. Up to 75% of the cost of a new All-Electric vehicle, including charging infrastructure associated with the new All-Electric vehicle.

    e. For Non-Government Owned Eligible Drayage Trucks, Beneficiaries may only draw funds from the Trust in the amount of:

        1. Up to 40% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine, including the costs of installation of such engine.

        2. Up to 50% of the cost of a new diesel or Alternate Fueled (e.g. CNG,

propane, Hybrid) vehicle.

3. Up to 75% of the cost of a Repower with a new All-Electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new All-Electric engine.

4. Up to 75% of the cost of a new all-electric vehicle, including charging infrastructure associated with the new All-Electric vehicle.

f. For Government Owned Eligible Class 8 Large Trucks, Beneficiaries may draw funds from the Trust in the amount of:

1. Up to 100% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine, including the costs of installation of such engine.

2. Up to 100% of the cost of a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) vehicle.

3. Up to 100% of the cost of a Repower with a new All-Electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new All-Electric engine.

4. Up to 100% of the cost of a new All-Electric vehicle, including charging infrastructure associated with the new All-Electric vehicle.

2. Class 4-8 School Bus, Shuttle Bus, or Transit Bus (Eligible Buses)

a. Eligible Buses include 2009 engine model year or older class 4-8 school buses, shuttle buses, or transit buses. For Beneficiaries that have State regulations that already require upgrades to 1992-2009 engine model year buses at the time of the proposed Eligible Mitigation Action, Eligible Buses shall also include 2010- 2012 engine model year class 4-8 school buses, shuttle buses, or transit buses.

b. Eligible Buses must be Scrapped.

c. Eligible Buses may be Repowered with any new diesel or Alternate Fueled or All-Electric engine, or may be replaced with any new diesel or Alternate Fueled or All-Electric vehicle, with the engine model year in which the Eligible Bus Mitigation Action occurs or one engine model year prior.

d. For Non-Government Owned Buses, Beneficiaries may draw funds from the Trust in the amount of:

1. Up to 40% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine, including the costs of installation of such engine.

2. Up to 25% of the cost of a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) vehicle.

3. Up to 75% of the cost of a Repower with a new All-Electric engine,

including the costs of installation of such engine, and charging infrastructure associated with the new All-Electric engine.

4. Up to 75% of the cost of a new All-Electric vehicle, including charging infrastructure associated with the new All-Electric vehicle.

e. For Government Owned Eligible Buses, and Privately Owned School Buses Under Contract with a Public School District, Beneficiaries may draw funds from the Trust in the amount of:

1. Up to 100% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine, including the costs of installation of such engine.

2. Up to 100% of the cost of a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) vehicle.

3. Up to 100% of the cost of a Repower with a new All-Electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new All-Electric engine.

4. Up to 100% of the cost of a new All-Electric vehicle, including charging infrastructure associated with the new All-Electric vehicle.

3. Freight Switchers

a. Eligible Freight Switchers include pre-Tier 4 switcher locomotives that operate 1000 or more hours per year.

b. Eligible Freight Switchers must be Scrapped.

c. Eligible Freight Switchers may be Repowered with any new diesel or Alternate Fueled or All-Electric engine(s) (including Generator Sets), or may be replaced with any new diesel or Alternate Fueled or All-Electric (including Generator Sets) Freight Switcher, that is certified to meet the applicable EPA emissions standards (or other more stringent equivalent State standard) as published in the CFR for the engine model year in which the Eligible Freight Switcher Mitigation Action occurs.

d. For Non-Government Owned Freight Switchers, Beneficiaries may draw funds from the Trust in the amount of :

1. Up to 40% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine(s) or Generator Sets, including the costs of installation of such engine(s)

2. Up to 25% of the cost of a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) Freight Switcher.

3. Up to 75% of the cost of a Repower with a new All-Electric engine(s), including the costs of installation of such engine(s), and charging infrastructure associated with the new All-Electric engine(s).

4. Up to 75% of the cost of a new All-Electric Freight Switcher, including charging infrastructure associated with the new All-Electric Freight Switcher.

e. For Government Owned Eligible Freight Switchers, Beneficiaries may draw funds from the Trust in the amount of:

1. Up to 100% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine(s) or Generator Sets, including the costs of installation of such engine(s).

2. Up to 100% of the cost of a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) Freight Switcher.

3. Up to 100% of the cost of a Repower with a new All-Electric engine(s), including the costs of installation of such engine(s), and charging infrastructure associated with the new All-Electric engine(s).

4. Up to 100% of the cost of a new All-Electric Freight Switcher, including charging infrastructure associated with the new All-Electric Freight Switcher.

4. Ferries/Tugs

a. Eligible Ferries and/or Tugs include unregulated, Tier 1, or Tier 2 marine engines.

b. Eligible Ferry and/or Tug engines that are replaced must be Scrapped.

c. Eligible Ferries and/or Tugs may be Repowered with any new Tier 3 or Tier 4 diesel or Alternate Fueled engines, or with All-Electric engines, or may be upgraded with an EPA Certified Remanufacture System or an EPA Verified Engine Upgrade.

d. For Non-Government Owned Eligible Ferries and/or Tugs, Beneficiaries may only draw funds from the Trust in the amount of:

1. Up to 40% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine(s), including the costs of installation of such engine(s).

2. Up to 75% of the cost of a Repower with a new All-Electric engine(s), including the costs of installation of such engine(s), and charging infrastructure associated with the new All-Electric engine(s).

e. For Government Owned Eligible Ferries and/or Tugs, Beneficiaries may draw funds from the Trust in the amount of:

1. Up to 100% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine(s), including the costs of installation of such engine(s).

2. Up to 100% of the cost of a Repower with a new All-Electric engine(s), including the costs of installation of such engine(s), and charging infrastructure associated with the new All-Electric engine(s).

5. Ocean Going Vessels (OGV) Shorepower

a. Eligible Marine Shorepower includes systems that enable a compatible vessel's main

and auxiliary engines to remain off while the vessel is at berth. Components of such systems eligible for reimbursement are limited to cables, cable management systems, shore power coupler systems, distribution control systems, and power distribution. 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. Eligible Marine Shorepower includes equipment for vessels that operate within the Great Lakes.

b. For Non-Government Owned Marine Shorepower, Beneficiaries may only draw funds from the Trust in the amount of up to 25% for the costs associated with the shore-side system, including cables, cable management systems, shore power coupler systems, distribution control systems, installation, and power distribution components.

c. For Government Owned Marine Shorepower, Beneficiaries may draw funds from the Trust in the amount of up to 100% for the costs associated with the shore-side system, including cables, cable management systems, shore power coupler systems, distribution control systems, installation, and power distribution components.

6. Class 4-7 Local Freight Trucks (Medium Trucks)

a. Eligible Medium Trucks include 1992-2009 engine model year class 4-7 Local Freight trucks, and for Beneficiaries that have State regulations that already require upgrades to 1992-2009 engine model year trucks at the time of the proposed Eligible Mitigation Action, Eligible Trucks shall also include 2010- 2012 engine model year class 4-7 Local Freight trucks.

b. Eligible Medium Trucks must be Scrapped.

c. Eligible Medium Trucks may be Repowered with any new diesel or Alternate Fueled or All-Electric engine, or may be replaced with any new diesel or Alternate Fueled or All-Electric vehicle, with the engine model year in which the Eligible Medium Trucks Mitigation Action occurs or one engine model year prior.

d. For Non-Government Owned Eligible Medium Trucks, Beneficiaries may draw funds from the Trust in the amount of:

    1. Up to 40% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine, including the costs of installation of such engine.

    2. Up to 25% of the cost of a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) vehicle.

    3. Up to 75% of the cost of a Repower with a new All-Electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new All-Electric engine.

    4. Up to 75% of the cost of a new All-Electric vehicle, including charging infrastructure associated with the new All-Electric vehicle.

e. For Government Owned Eligible Medium Trucks, Beneficiaries may draw funds from the Trust in the amount of:

1. Up to 100% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine, including the costs of installation of such engine.

2. Up to 100% of the cost of a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) vehicle.

3. Up to 100% of the cost of a Repower with a new All-Electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new All-Electric engine.

4. Up to 100% of the cost of a new All-Electric vehicle, including charging infrastructure associated with the new All-Electric vehicle.

7. Airport Ground Support Equipment

    a. Eligible Airport Ground Support Equipment includes:

        1. Tier 0, Tier 1, or Tier 2 diesel powered airport ground support equipment; and

        2. Uncertified, or certified to 3 g/bhp-hr or higher emissions, spark ignition engine powered airport ground support equipment.

    b. Eligible Airport Ground Support Equipment must be Scrapped.

    c. Eligible Airport Ground Support Equipment may be Repowered with an All- Electric engine, or may be replaced with the same Airport Ground Support Equipment in an All-Electric form.

    d. For Non-Government Owned Eligible Airport Ground Support Equipment, Beneficiaries may only draw funds from the Trust in the amount of:

        1. Up to 75% of the cost of a Repower with a new All-Electric engine, including costs of installation of such engine, and charging infrastructure associated with such new All-Electric engine.

        2. Up to 75% of the cost of a new All-Electric Airport Ground Support Equipment, including charging infrastructure associated with such new All-Electric Airport Ground Support Equipment.

    e. For Government Owned Eligible Airport Ground Support Equipment, Beneficiaries may draw funds from the Trust in the amount of:

        1. Up to 100% of the cost of a Repower with a new All-Electric engine, including costs of installation of such engine, and charging infrastructure associated with such new All-Electric engine.

        2. Up to 100% of the cost of a new All-Electric Airport Ground Support Equipment, including charging infrastructure associated with such new All-Electric Airport Ground Support Equipment.

8. Forklifts and Port Cargo Handling Equipment

    a. Eligible Forklifts includes forklifts with greater than 8000 pounds lift

capacity.

b. Eligible Forklifts and Port Cargo Handling Equipment must be Scrapped.

c. Eligible Forklifts and Port Cargo Handling Equipment may be Repowered with an All-Electric engine, or may be replaced with the same equipment in an All-Electric form.

d. For Non-Government Owned Eligible Forklifts and Port Cargo Handling Equipment, Beneficiaries may draw funds from the Trust in the amount of:

1. Up to 75% of the cost of a Repower with a new All-Electric engine, including costs of installation of such engine, and charging infrastructure associated with such new All-Electric engine.

2. Up to 75% of the cost of a new All-Electric Forklift or Port Cargo Handling Equipment, including charging infrastructure associated with such new All-Electric Forklift or Port Cargo Handling Equipment.

e. For Government Owned Eligible Forklifts and Port Cargo Handling Equipment, Beneficiaries may draw funds from the Trust in the amount of:

1. Up to 100% of the cost of a Repower with a new All-Electric engine, including costs of installation of such engine, and charging infrastructure associated with such new All-Electric engine.

2. Up to 100% of the cost of a new All-Electric Forklift or Port Cargo Handling Equipment, including charging infrastructure associated with such new All-Electric Forklift or Port Cargo Handling Equipment.

9. Light Duty Zero Emission Vehicle Supply Equipment. Each Beneficiary may use up to fifteen percent (15%) of its allocation of Trust Funds on the costs necessary for, and directly connected to, the acquisition, installation, operation and maintenance of new light duty zero emission vehicle supply equipment for projects as specified below. Provided, however, that Trust Funds shall not be made available or used to purchase or rent real- estate, other capital costs (e.g., construction of buildings, parking facilities, etc.) or general maintenance (i.e., maintenance other than of the Supply Equipment).

a. Light duty electric vehicle supply equipment includes Level 1, Level 2 or fast charging equipment (or analogous successor technologies) that is located 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).

b. Light duty hydrogen fuel cell vehicle supply equipment includes hydrogen dispensing equipment capable of dispensing hydrogen at a pressure of 70 megapascals (MPa) (or analogous successor technologies) that is located in a public place.

c. Subject to the 15% limitation above, each Beneficiary may draw funds from the Trust in the amount of:

1. Up to 100% of the cost to purchase, install and maintain eligible light duty electric vehicle supply equipment that will be available to the public at a Government Owned Property.

2. Up to 80% of the cost to purchase, install and maintain eligible light duty electric vehicle supply equipment that will be available to the public at a Non-Government Owned Property.

3. Up to 60% of the cost to purchase, install and maintain eligible light duty electric vehicle supply equipment that is available at a workplace but not to the general public.

4. Up to 60% of the cost to purchase, install and maintain eligible light duty electric vehicle supply equipment that is available at a multi-unit dwelling but not to the general public.

5. Up to 33% of the cost to purchase, install and maintain eligible light duty hydrogen fuel cell vehicle supply equipment capable of dispensing at least 250 kg/day that will be available to the public.

6. Up to 25% of the cost to purchase, install and maintain eligible light duty hydrogen fuel cell vehicle supply equipment capable of dispensing at least 100 kg/day that will be available to the public.

10. Diesel Emission Reduction Act (DERA) Option. Beneficiaries may use Trust Funds for their non-federal voluntary match, pursuant to Title VII, Subtitle G, Section 793 of the DERA Program in the Energy Policy Act of 2005 (codified at 42 U.S.C. § 16133), or Section 792 (codified at 42 U.S.C. § 16132) in the case of Tribes, thereby allowing Beneficiaries to use such Trust Funds for actions not specifically enumerated in this Appendix D-2, but otherwise eligible under DERA pursuant to all DERA guidance documents available through the EPA. Trust Funds shall not be used to meet the non- federal mandatory cost share requirements, as defined in applicable DERA program guidance, of any DERA grant.

Eligible Mitigation Action Administrative Expenditures

For any Eligible Mitigation Action, Beneficiaries may use Trust Funds for actual administrative expenditures (described below) associated with implementing such Eligible Mitigation Action, but not to exceed 15% of the total cost of such Eligible Mitigation Action. The 15% cap includes the aggregated amount of eligible administrative expenditures incurred by the Beneficiary and any third-party contractor(s).

1. Personnel including costs of employee salaries and wages, but not consultants.
2. Fringe Benefits including costs of employee fringe benefits such as health insurance, FICA, retirement, life insurance, and payroll taxes.
3. Travel including costs of Mitigation Action-related travel by program staff, but does not include consultant travel.
4. Supplies including tangible property purchased in support of the Mitigation Action that will be expensed on the Statement of Activities, such as educational publications, office supplies, etc. Identify general categories of supplies and their Mitigation Action costs.

5. Contractual including all contracted services and goods except for those charged under other categories such as supplies, construction, etc. Contracts for evaluation and consulting services and contracts with sub-recipient organizations are included.
6. Construction including costs associated with ordinary or normal rearrangement and alteration of facilities.
7. Other costs including insurance, professional services, occupancy and equipment leases, printing and publication, training, indirect costs, and accounting.

Definitions/Glossary of Terms

"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.

"Alternate Fueled" shall mean an engine, or a vehicle or piece of equipment which is powered by an engine, which uses 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 EPA or 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 ports and intermodal rail yards.

"Forklift" shall mean nonroad equipment used to lift and move materials short distances; generally includes tines to lift objects. Eligible types of forklifts 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 move freight long distances.

"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. The term 'State' means the several States, the District of Columbia, and the Commonwealth of Puerto Rico.

"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.

Class 1: < 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: > 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 yard hostlers and yard tractors that operate within ports.

"Plug-in Hybrid Electric Vehicle (PHEV)" shall mean a vehicle that is similar to a Hybrid but is equipped with a larger, more advanced battery that allows the vehicle to be plugged in and recharged in addition to refueling with gasoline. This larger battery allows the car to be driven on a combination of electric and gasoline fuels.

"Repower" shall mean to replace 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 (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 CARB 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. 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 Eligible Vehicle 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 completely in half.

"Tier 0, 1, 2, 3, 4" shall refer to corresponding EPA engine emission classifications for nonroad, locomotive and marine engines.

"Tugs" shall mean dedicated vessels that push or pull other vessels in ports, harbors, and inland waterways (e.g., tugboats and towboats).

"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).