MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Volkswagen Trust

Be Part of the Solution

Missouri Volkswagen Trust

Compilation of Comments Received Prior to Proposed Beneficiary Mitigation Plan

Missouri Department of Natural Resources

Jan. 24, 2018

MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Volkswagen Trust

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Comments received during public meetings

From October 2017 through January 2018, the department hosted six public meetings to discuss the VW Trust and to gather public input guiding the development of Missouri's 10-year VW Trust Beneficiary Mitigation Plan.
Attendance records and presentations -- as well as videos containing verbal comments received during the public meetings -- appear on webpage dnr.mo.gov/env/apcp/vw/vw-meetings.htm.

The department held the six public meetings on the following dates:

Oct. 30, 2017 – Jefferson City

Nov. 14, 2017 – Kansas City

Nov. 21, 2017 – St. Louis

Nov. 30, 2017 – Springfield
Dec. 7, 2017 – Jefferson City

Jan. 22, 2018 – Jefferson City

Comments Received via Department's Online Comment Form

dnr.mo.gov/env/apcp/vw/vwcommentform.htm

(Individual comments begin on page 6)

You can use the Adobe bookmark tool to navigate comments.

Name of Person Commenting Online	Affiliation or Type of Organization
Alex Devlin	Small business/ interest group/ EV charging advocate
Amanda Graor	Mid-America Regional Council
Bill Cowling	Blue Springs School District
Brenda Enos	Kansas City International Airport
Brent Buerck	City of Perryville
Brent Davis	Individual/advocate for alternative fuels
Britta Gross	GM Corporation
Bryan Breyfogle	Missouri State University
Bryan Inmon	City of Rogersville
Casey Wasser	Missouri Soybean Association
Catherine Werner	City of St. Louis
Charles Shell	Shell Engineering
Chip Casteel	Individual
Chris Bartlow	Individual
Christine Hall	Individual
Colin Priest	Individual
Dan Bryan	City of Desloge
David Riddle	Individual
David Schatz	Chargepoint (Campbell, California)
Dean Stapleton	Interest group/operator of private fleet
Drew Brooks	City of Columbia
Eric Holder	City of Independence
Glenda Stegner	City of Rogersville
Guy Kuhn	Southern FS
Hollie Elliott	Dallas County Public Works
Isabel Villa-Garcia	Global Automakers
Jane Hinds	City of Columbia
Jared Richmond	Carl Junction School District
Jim Struckel	Individual/interest group/EV charging advocate/ alternative fuel advocate
John Harrington	Individual
John Hunter	Small business
John View	Individual
Joseph Pemberton	Lebanon School District
Josh Boehm	Individual
Katherine Wurtz	KEW Grant Services

Name of Person Commenting Online	Affiliation or Type of Organization
Ken Scott	Willard Fire Department
Kenneth Cook	Malden School District
Kevin Herdler	St. Louis Clean Cities
Kevin Pearson	Ferrell Gas
Kim Cella	Missouri Public Transit Association/ St. Louis Citizens for Modern Transit
Lisa Disbrow	Waste Management
Liza Farr	Government
Mark Brown	City of Perryville
Mary Vandiver	Trade association
Melody Vieth	Individual
Michael Jamison	St. Louis County Courthouse
Mike Highfill	City of Rogersville
Mike Saxton	Orange EV
Mona Menezes	City of Branson
Nancy Edson	City of Rogersville
Norm Lucas	City of Park Hills
Pat Barr	Individual
Patrick Justis	Missouri EV collaborative
Paul Brugmann	Cummins
Randy Warner	Individual/small business/ alternative fuel advocate
Ranjith Udawatta	Government
Rick Higgins	Government
Ryan Rowden	American Petroleum Institute
Sara Fields	Ozark Transportation
Scott Kersey	City of Rogersville
Sheila Kimlinger	Small business
Stan Perkins	Missouri Office of Administration
Steve Ahrens	Missouri Propane Education and Research Council
Ted Hillmer, Jr.	Government
Terry O'Day	EVgo
Zach Baugher	Grow Mark
Zachary Kahn	BYD America

Written Comments Received through U.S. Mail or Email

(They begin on page 176)

You may use the Adobe bookmark tool to navigate the comments.

People emailing or mailing comments	Affiliation or Type of Organization
Andy Knott	Sierra Club and eight other organizations
Anne Arquit Niederberger	Enervee
Ashok Gupta	NRDC
Brett Barry Clean Energy Fuels	VW Coalition
Empire District Electric	Empire District Electric - EV Initiative
Dick Wiles	Waste Management
Eric Holder City of Independence	Missouri EV Collaborative
Jeannie Kozk	Shell Engineering
Kelly Gilbert	Clean Cities - KC
Kim Cella	Missouri Public Transit Association
Kim Cella	Citizens for Modern Transit
Kim Johnson	UPS
Leighton Yates	Alliance of Auto Manufacturers
Mark Brown	Perryville Public Works Director
Paul Brugmann	Cummins - Start Stop Technology
Robbie Makinen	KC Area Transportation Authority (KCATA)
Ron Leone	MO Petroleum Marketers and Convenience Store Association (MPCA)
Ryan Rowden	Missouri Petroleum Council
Sherrie Merrow	NGV America
Stan Perkins	Missouri Office of Administration
Steve Ahrens	Missouri Propane Education and Research Council
Theresa Wilke	Flourish

Written Comments Received
through Department's Online Comment Portal

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#15]
Date: Wednesday, October 25, 2017 9:34:18 AM

Name	Alex Devlin
Email Address	
Address	
City	St. Louis
State	Missouri
Zip Code	63110
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Small Business • Interest Group • Advocate for Electric Vehicle Charging Stations
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses

Comments on Missouri's Environmental Mitigation Trust

Replacing transit buses state wide will benefit the environment, economy, and public health of Missouri.

- New electric transit buses will more efficiently consume energy.
- New electric transit buses will assist cash strapped transit agencies.
- Transit agencies will be financially able to expand service to the public.
- New electric transit buses will include new onboard technology that will encourage new riders.
- New riders will leave their cars at home, further benefiting the environment.
- Studies show that transit riders walk more on a daily basis. Therefore, new rider health will improve. Lowering the cost of health care.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#64]
Date: Tuesday, January 02, 2018 12:30:57 PM

Name	Amanda Graor
Email Address	
Address	
City	Kansas City
State	Missouri
Zip Code	64105
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 8: Local Freight Trucks and Port Drayage Trucks • Class 4-8: School Buses, Shuttle Buses or Transit Buses • Freight Switchers • Class 4-7: Local Freight Trucks • Airport Ground Support • Forklifts and Other Equipment for Handling Port Cargo • Charging Equipment for Light-duty Zero-emission vehicles • Option Involving the Diesel Emission Reduction Act
Comments on Missouri's Environmental Mitigation Trust	Please see attached letter.
Document Upload Option	Attachment Below

600 Broadway, Suite 200
Kansas City, Missouri 64105-1659

816-474-4240
816-421-7758 FAX
www.marc.org

MARC
MID-AMERICA REGIONAL COUNCIL

December 30, 2017

RE: Volkswagen Environmental Mitigation Trust Implementation Plan

To Whom It May Concern:

The Mid-America Regional Council (MARC) Air Quality Forum, created in accordance with Section 174 of the Clean Air Act to coordinate the development and implementation of air quality policy in the bi-state Kansas City region, offers the following comments on the development of statewide implementation plans for the Volkswagen Environmental Mitigation Trust funds.

Focus program spending on areas with the greatest public health impact.

The Air Quality Forum (AQF) suggests that the funds would be best spent in areas with the greatest impact on public health. Urbanized areas generally have more air quality concerns, and are also likely where the highest number of qualifying vehicles were registered and have been operating. The Mid-America Regional Council has partnered with public and private entities in Kansas and Missouri on diesel emission reduction projects since before inception of the DERA program through Congestion Mitigation Air Quality funds, and encourages building on existing relationships in addition to forming new ones for implementation of this plan.

The Kansas City region has worked for many years to reduce diesel emissions from the transportation sector and has adopted plans, goals and strategies to achieve these targeted reductions. Investments made through the Volkswagen settlement funds should reinforce this work to enable efficient and effective deployment of the funds.

Preserve funds for technological advancements.

Preserving funds for expenditure in future years allows for potential increases in cost effectiveness through innovation and technology advancements. Additionally, there may be some level of stress placed on the scrap metal industry and other supply chain issues that occur with massive projects nationwide during the first few years of project eligibility.

Make alternative fuels a priority in areas where capacity is already available.

Missouri and Kansas have made great strides in increasing their capacity for alternative fuel vehicles. In areas where excess fueling capacity exists, alternative fuels should be made a priority over replacement with new diesel vehicles. Alternative fuel vehicles include electric vehicles, compressed natural gas (CNG), propane, biodiesel and other diesel alternatives.

Chair
Carol Suter
Councilmember
Gladstone, Missouri

1st Vice Chair
Rob Roberts
Commissioner
Miami County, Kansas

2nd Vice Chair
Jimmy Odom
Commissioner
Cass County, Missouri

Treasurer
Harold Johnson Jr.
Commissioner
Unified Government
of Wyandotte County/
Kansas City, Kansas

Secretary
Randy Rhoads
Mayor
Lee's Summit, Missouri

Executive Director
David A. Warm

Place a priority on older equipment, smaller operators and medium and heavy duty vehicles.

In considering applications for funding, the largest air quality improvements would be expected from replacement of older diesel vehicles that are far more polluting than newer diesel engines. Additionally, medium and heavy duty applications should be a priority for funding based on higher potential cost effectiveness of emissions reductions from these sources.

Ensure that the investments made through Electrify America complement the state investment.

Due to the multi-pronged nature of the settlement and the expectation that a significant amount of funding will be invested specifically in electrification, the AQF suggests that the state agencies work with Electrify America and other parties to ensure that investments in electrification with state funds complements other planned investments as much as possible.

Thank you for this opportunity to comment. Please contact Amanda Graor, MARC Air Quality Program Manager at 816-701-8333 or agraor@marc.org if you have any questions.

Sincerely,

Scott Burnett
Missouri Co-Chair, Air Quality Forum

Richard Boeshaar
Kansas Co-Chair, Air Quality Forum

Cc: Kansas Department of Health and Environment, Bureau of Air
Missouri Department of Natural Resources, Air Pollution Control Program

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#35]
Date: Tuesday, November 14, 2017 1:45:05 PM

Name	Bill Cowling
Email Address	
Address	
City	BLUE SPRINGS
State	MISSOURI
Zip Code	64014
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• School District
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses
Comments on Missouri's Environmental Mitigation Trust	School districts are constantly facing financial constraints. We have found it increasingly difficult to advance alternative fueled vehicles. We look forward to seeking this assistance in oder to advance our long range fleet renewal plan. Thank you.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#38]
Date: Monday, November 20, 2017 11:19:13 AM

Name	Brenda Enos
Email Address	
Address	
City	Kansas City
State	MO
Zip Code	64114
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Advocate for Alternative Fuels • Advocate for Electric Vehicle Charging Stations
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Airport Ground Support
Comments on Missouri's Environmental Mitigation Trust	Kansas City International Airport is interested in replacing 5 existing CNG shuttle buses with 5 new electric shuttle buses. Emission calculations have already been calculated and understand the scrappage requirements for the program. NOx reductions will benefit the city.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#22]
Date: Tuesday, October 31, 2017 1:43:11 PM

Name	Brent Buerck
Email Address	
Address	
City	Perryville
State	MO
Zip Code	63775
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 8: Local Freight Trucks and Port Drayage Trucks • Class 4-8: School Buses, Shuttle Buses or Transit Buses • Class 4-7: Local Freight Trucks • Option Involving the Diesel Emission Reduction Act
Comments on Missouri's Environmental Mitigation Trust	I think money should go to also support Natural Gas vehicles and infrastructure. Electric cars will never be used to ship freight across the county but NGV trailer trucks can. Why not build out that infrastructure to allow more people to use NGV vehicles for freight and otherwise.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#52]
Date: Thursday, December 07, 2017 4:53:39 PM

Name	Brent Davis
Email Address	
Address	
City	Kansas City
State	MO
Zip Code	64157
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Individual • Advocate for Alternative Fuels
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses • Option Involving the Diesel Emission Reduction Act
Comments on Missouri's Environmental Mitigation Trust	The use of the funds to reduce emissions that are closest to our school children (old diesel buses) will have the biggest health effect on our youngest citizens and have long term benefits for our society plus reduce operating costs for our school systems state wide.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#40]
Date: Wednesday, November 29, 2017 12:22:16 PM

Name	Britta Gross
Email Address	
Address	
City	Detroit
State	Michigan
Zip Code	48265
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Engine/Vehicle Manufacturer or Vendor
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Charging Equipment for Light-duty Zero-emission vehicles

Comments on Missouri's Environmental Mitigation Trust

29 November, 2017

Missouri Department of Natural Resources

Subject: GM Comments relative to Missouri's VW Environmental Mitigation Trust (EMT) Fund

General Motors LLC (GM) appreciates the opportunity to provide input on the use of funding in the state's Environmental/Beneficiary Mitigation Plan and would like to encourage Missouri to use the maximum allowed 15% of the fund (equating to about $6mil) to increase the availability of critically-needed electric vehicle (EV) charging stations. There are currently about 4,000 EVs registered in Missouri, and in order to grow the EV market and attract even more advanced transportation technologies to the state, such as self-driving EVs, Missouri needs to invest in a charging infrastructure network that addresses consumer and industry concerns.

Automakers have made enormous investments in the electrification of transportation - GM alone has invested billions of dollars to develop electrification technologies, including the state-of-the-art Chevrolet Volt and Chevrolet Bolt EV, which has swept the industry's most prestigious car awards, including North America Car of the Year, Motor Trend's® 2017 Car of the Year, MotorWeek's 2017 Drivers' Choice "Best of the Year" Award, and Green Car Journal's Green Car of the Year. The Bolt EV is the industry's first affordable, long-range EV with an EPA estimated range of 238 miles-per-charge. Last month, after 8 months of continual sales growth, the Bolt EV was the top-selling EV in the United States. This advanced technology will require more widespread charging infrastructure to convince consumers that EVs can be driven anywhere they need to go. Thus, the urgency to rapidly expand EV charging infrastructure in Missouri.

While the majority of all EV charging today is done at the home, there are still critical infrastructure needs not met by single-family home charging. And to maximize the impact of limited state funds, it is important to invest strategically. GM would prioritize today's key infrastructure needs as follows:

1. Highway corridor DC fast-charging most visibly inspires consumer confidence in the driving range, and practicality, of EVs. A 2016 survey of 2,500 consumers by Altman Vilandrie & Company found the top reason customers gave for not wanting to purchase a plug-in electric vehicle was a perceived lack of charging stations (85%). Highly visible corridor EV charging (SAE industry standard) can help address this consumer perception issue.

2. Workplace EV charging creates an EV "showroom" that very effectively grows EV awareness among corporations, and employees of these corporations. According to US DOE data, workplace charging results in employees 6X more likely to purchase an EV than employees at companies not offering workplace charging.

3. Multi-unit dwelling EV charging provides an important opportunity to expand EV adoption to consumers residing in townhomes, condominiums, and apartments, who may not have access to a "home" charger every evening. This is currently an untapped segment of potential EV buyers. This need can be met by Level 1 or Level 2 charging directly at the multi-unit dwellings, or by neighborhood DC fast-charge hubs that can serve these residents.

4. Public EV charging at key destinations is also important to increase the practicality of EVs and the number of places an EV can go, with a special focus on destinations typically outside a consumer's normal daily driving patterns (e.g. airports, beaches, hotels, resorts, etc.).

EV charging infrastructure is vital to the growth of the EV market and will lead to long-lasting emissions reductions that increase over time as the market expands. And Missouri's low electricity prices mean that electric vehicles are an important economic driver for Missouri. Finally, we encourage the state to directly engage all electric utilities in the strategic planning of EV infrastructure to ensure the most cost-effective and grid-responsible EV charging solutions.

The VW Environmental Mitigation Trust is an opportunity to invest in forward-looking infrastructure that lays a much-needed foundation for EV market growth and will help attract even more advanced transportation technologies to Missouri. GM greatly appreciates Missouri's commitment to support the strategic transition to transportation electrification and all efforts to help drive this emerging market.

Sincerely,

Britta K. Gross, Director
Advanced Vehicle Commercialization Policy
britta.gross@gm.com
(586) 596-0382

Document Upload Option	Attachment Below

GENERAL MOTORS

Britta K. Gross Director
Advanced Vehicle Commercialization Policy
Environment, Energy & Safety Policy

General Motors Global Headquarters
MC: 482-C30-C76
300 Renaissance Center
Detroit, MI 48265-3000

29 November, 2017

Missouri Department of Natural Resources

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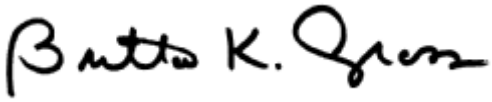
Sincerely,



Britta K. Gross, Director
Advanced Vehicle Commercialization Policy
britta.gross@gm.com
(586) 596-0382

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#39]
Date: Tuesday, November 28, 2017 6:36:14 PM

Name	Bryan Breyfogle
Email Address	
Address	
City	Springfield
State	MO
Zip Code	65897
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• School District
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-7: Local Freight Trucks

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#57]
Date: Monday, December 11, 2017 9:31:11 AM

Name	Bryan Inmon
Email Address	
Address	
City	Rogersville
State	MO
Zip Code	65742
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-7: Local Freight Trucks

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#26]
Date: Thursday, November 02, 2017 9:55:04 AM

Name	Casey Wasser
Email Address	
Address	
City	Jefferson City
State	MO
Zip Code	65018
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Trade Association
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Forklifts and Other Equipment for Handling Port Cargo • Option Involving the Diesel Emission Reduction Act

Comments on Missouri's Environmental Mitigation Trust

The biodiesel industry has created a renewable, clean burning fuel source that reduces emissions. Life cycle analysis completed by Argonne National Laboratory found that greenhouse gas emissions for 100% biodiesel (B100) are 74% lower than those from petroleum diesel. Blending biodiesel with petroleum diesel is a proven and effective way to reduce emissions.

Using the settlement funds to increase biodiesel use and awareness is exactly what the Department of Natural Resources (Department) should be considering. The Missouri Qualified Biodiesel Producer Incentive Fund (Biodiesel Fund) is a great example of government programs that worked as intended. Unfortunately the state has not upheld their end of the deal which wrongfully has taken the main focus away from increasing biodiesel use/emission reduction and instead thousands of hour and dollars trying to get the money producers and investors are owed by the state of Missouri.

I strongly encourage the Department to use a small portion of the settlement funds to pay the remaining balance due under the Biodiesel Fund thus carrying out the mission of the Air Pollution Control Program and the settlement agreement.

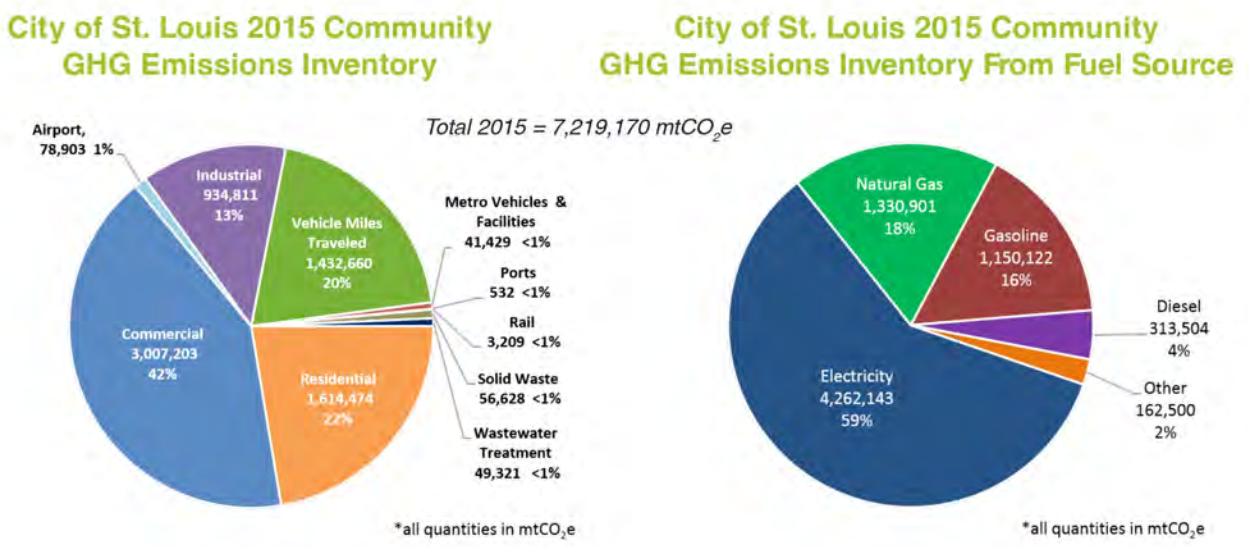
From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#46]
Date: Friday, December 01, 2017 7:50:44 PM

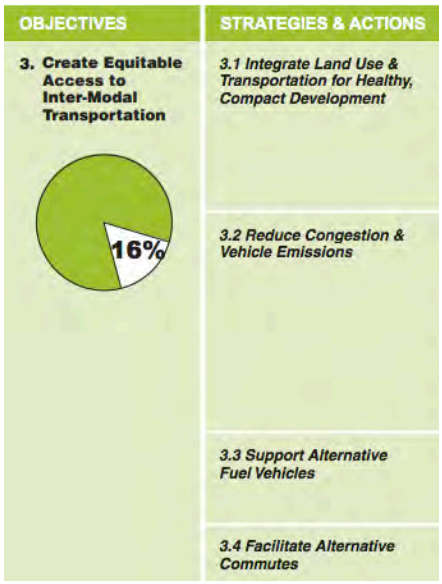
Name	Catherine Werner
Email Address	
Address	
City	St. Louis
State	MO
Zip Code	63103
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 8: Local Freight Trucks and Port Drayage Trucks • Class 4-8: School Buses, Shuttle Buses or Transit Buses • Freight Switchers • Ferries/Tugs • Shore Power for Ocean-Going Vessels • Class 4-7: Local Freight Trucks • Airport Ground Support • Forklifts and Other Equipment for Handling Port Cargo • Charging Equipment for Light-duty Zero-emission vehicles • Option Involving the Diesel Emission Reduction Act
Document Upload Option	Attachment Below

Volkswagen Settlement Beneficiary Mitigation Plan Fund Request:
The City of St. Louis, Including St. Louis Lambert International Airport
December 1, 2017

Climate Projection Initiative and VW Settlement Funds

The City of St. Louis prioritizes efforts to improve environmental conditions, produce better air quality and achieve climate protection objectives. To position the City to make well-informed decisions regarding climate actions, the City has conducted Greenhouse Gas (GHG) Emission Inventories for the years 2005, 2010, 2013 and 2015. The most recent GHG Inventory indicates that 20% of the GHG emissions from the St. Louis Community are from Vehicle Miles Traveled (VMT). The chart, below, reflects the GHG emissions by sector, and also fuel source.

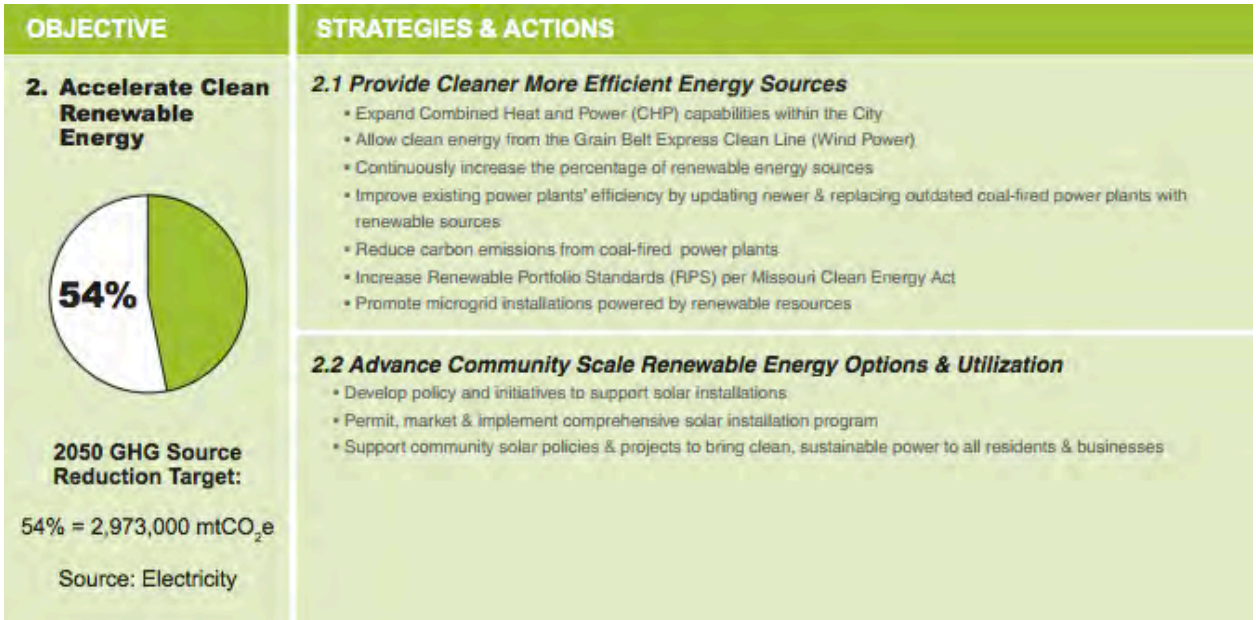




The City of St. Louis has been working to achieve an 80% reduction of GHGs by the year 2050, and has pledged to meet the expectations associated with the Compact of Mayors/Global Covenant of Mayors for Climate & Energy. In 2017, the Mayor's Office of Sustainability finalized a Climate Action & Adaptation Plan for the City of St. Louis Sustainability Plan. There are multiple objectives and specific strategies in the Climate Action & Adaptation Plan that could be advanced by VW Settlement Funds. The chart to the left shows how the Settlement funds present a critically important opportunity to implement the City's Climate Protection Initiative through improvements to the transportation sector.

In addition to the climate action emission strategies specific to the transportation sector, a major emphasis of the City's

climate initiative is to shift from reliance on fossil fuel sources to use of renewable energy sources. As such, incorporating solar-powered infrastructure is an important aspect of adding electric vehicle charging stations.



Since the Missouri Department of Natural Resources (MDNR) has indicated that approximately 45% of the affected Volkswagen vehicles were sold to the St. Louis Region, it would be consistent and appropriate for 45% of the Missouri VW Settlement funds also be distributed to the St. Louis Region. The City of St. Louis respectfully requests consideration of the following specific items, as the Missouri Department of Natural Resources determines how the mitigation funds are allocated.

Summary Of VW Settlement Request By The City Of St. Louis:

- Two 32-passenger electric buses at Airport
- Two electric forklifts at Airport
- One solar EV Carport over existing 5 EV charging stations at Airport and
- Zero-Emission Vehicle Charging Station at Airport public space
- Fifteen Portable CNG/NG Generators for Municipal Buildings
- Three Zero-Emission Vehicle Government-owned public charging stations in City
- One electric class 3 box truck, five electric class 2 cargo vans and a charging station
- School Bus Idling Enforcement Program and Outreach Campaign
- Telematics idling tracking devices for Government-owned large and medium trucks

Two 32-passenger electric buses at Airport
Estimated Cost: $1 million dollars for two buses (2 x $500,000 = $1,000,000)

St. Louis Lambert International Airport is actively engaging in reducing fossil fuel emissions in the St. Louis metropolitan area. The Airport is a leader in sustainable practices and is committed to continually increasing alternative fuel use to power its fleet vehicles. The Mayor's Sustainability Action Agenda set a goal to expand use of alternative fuels to 85% of the Airport's fleet. The Airport currently powers 79% of its fleet with alternative fuels including biodiesel, bi-Fuel, compressed natural gas (CNG), electric, propane, and diesel electric. Biodiesel fuel use is the most prominent, powering 41% of airport fleet vehicles. The Airport is electrifying gates in the A Concourse to replace jet fueled auxiliary units and diesel ground power units with electric pre-conditioned air units and electric ground power units. With EPA's Diesel Emission Reduction Act (DERA) funds, the Airport is replacing a 32-passenger bus with a new CNG bus. Alternative fuel vehicles run on non-petroleum based fuels, which produce substantially less greenhouse gas emissions. Electric vehicles are no emission vehicles. The Airport has also installed electric charging stations for both Airport and public use.

The Airport has three 32-passenger buses. With funding from the VW Settlement, the Airport can purchase two 32-passenger electric buses to replace two 20-year old diesel buses. The third bus is being replaced with DERA funds. The current buses require much maintenance and are past their useful life. The buses are used to transport passengers from aircraft during disasters and emergencies as well as providing transportation for officials on the airfield. Replacing fossil fuel equipment with cleaner forms of alternative fuels will reduce emissions, improve air quality, and reduce health risks to employees and the public. Emission reductions are estimated to be 9.50 tons/year for the 10-year useful life of the vehicles.

Two electric forklifts at Airport
Estimated Cost: $200,000 for two forklifts (2 x $100,000 = $200,000)

With funding from the VW Settlement, the Airport can purchase two electric forklifts to replace two gasoline forklifts. The forklifts will be used in storage areas to move materials, and in the Airport warehouse.

Replacing fossil fuel equipment with cleaner forms of alternative fuels will reduce emissions, improve air quality, and reduce health risks to employees and the public. The estimated emission benefit would be an ozone reduction of 0.01 tons/year with a lifetime savings of 0.09 tons/year for the 13-year useful life of the vehicles.

One solar EV Carport over existing 5 EV charging stations at Airport
Estimated Cost: $100,000 for 1 solar carport

As shown in the image to the right, the Airport currently has five electric vehicle charging stations for the public to use in a government-owned location, an Airport parking lot. With funding from the VW Settlement, the Airport can install a solar-powered carport over the existing EV charging stations, replacing the use of fossil fuel energy with renewable energy sources for the electric vehicles.

One duel Zero-Emission Vehicle solar charging station at Airport public space
Estimated Cost: $60,000

In addition, with funding from the VW Settlement, the Airport can install Zero-Emission Vehicle (ZEV) Equipment in a government-owned public location for highway light-duty vehicles, which emit a large amount of exhaust. Ideally, this ZEV equipment would have a renewable energy source, such as the municipal solar-powered carport depicted in the image on the left.

Fifteen Portable CNG/Natural Gas Generators for Municipal Buildings
Estimated Cost: $375,000 for 15 Generators (15 x $25,000 = $375,000)

With funding from the VW Settlement, the City can purchase fifteen EverGreen Mobile Compressed Natural Gas/Natural Gas Generators. These portable generators are locally manufactured, and are sustainable because they operate on CNG/NG in place of traditional diesel generators. The generators would be utilized for back up/emergency power at City-owned buildings, including City Hall, Fire Houses, Police Stations, the Parks, Recreation & Forestry Department, and the Public Utility/Water Department. They could also be utilized for cleaner special event power in parks or other areas where power is not readily available. The MSRP on these units is approximately $25,000 each. Since they are an alternative to diesel, we believe they would fall within the DERA option. Additionally, the use is consistent with the medium duty truck category, since these are engines, and it is similar to the Marine Shorepower systems which enable vessels' main engines to remain off.

One electric class 3 box truck, five electric class 2 cargo vans and a charging station
Estimated Cost: $540,000
$120,000 (1 box truck) and $400,000 (5 cargo vans) and $20,000 (1 charging station)

With funds from the VW Settlement, the City can replace (by junking) one old diesel box truck and five old full-sized diesel vans. Although too small to meet the class 4 criteria, these are vehicles that emit a large amount of diesel exhaust and that the City's Facilities Management division would use daily as a cleaner replacement to the ones currently in use.

Three duel Zero-Emission Vehicle Government-owned public charging stations in City
Estimated Cost: $180,000 ($20,000-$60,000 x 3 stations; range for the solar carport option)

There are several Government-owned public areas in the City of St. Louis that would benefit by having Zero-Emission Vehicle infrastructure for light-duty vehicles. City Hall and the Case Forestry/Facilities Management facilities are possible locations. With funds from the VW Settlement, the City can install three duel ZEV infrastructure areas that will support vehicles with substantially reduced exhaust emissions. Moreover, if the ZEV infrastructure includes a solar canopy, fossil fuel source energy would be replaced with renewable source energy, and contribute to overall air quality in the City of St. Louis.

School Bus Idling Enforcement Program and Outreach Campaign
(Cost TBD)

The City of St. Louis has taken full advantage of DERA funds, such that it no longer has large and medium trucks, shuttle or transit buses in the eligible mitigation action categories for repowers of new engines or replacement. However, diesel emissions associated with trucks and buses still present a serious health threat to the people in St. Louis. To address health concerns associated with vehicle exhaust, the City passed St. Louis City Ordinance 68137, a No Idling ordinance that regulates and controls motor vehicle idling. The ordinance does include penalties, but enforcement resides with the police department. While not squarely within one of the current Eligible Mitigation Actions, there are two

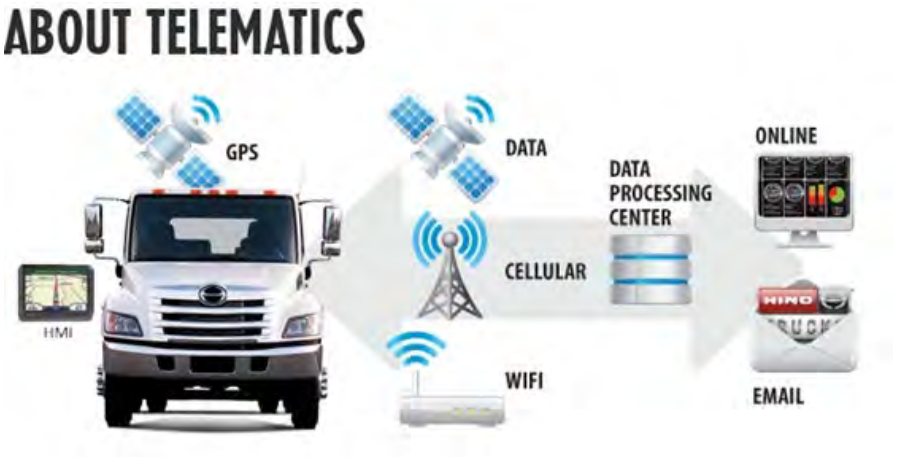
important uses for VW Settlement funds that could have a very positive impact on exhaust reduction and health: (1) enforcement of the existing No Idling Ordinance and (2) conducting an outreach and education campaign about idling, particularly in conjunction with schools, where diesel school buses are prevalent and pose a risk to health of school children. The Saint Louis Clean Air Partnership includes the following reasons why it is important to address idling:

- *Every gallon of gas wasted produces over 20 pounds of air pollution.*
- *Two minutes of idling uses the same amount of fuel as driving one mile.*
- *Idling vehicles emit 20 times more pollution than a car traveling 30 miles per hour.*
- *Much of the pollution emitted includes air toxics, which are known to cause cancer, birth defects, respiratory and reproductive effects and other serious health concerns.*
- *Exposure to car exhaust can increase asthma symptoms, and also cause nasal, throat, respirator, eye and other health problems.*

Telematics idling tracking devices for Government-owned large and medium trucks
Estimated Cost: $560,000 (850 x $560 = $476,000 and 7 x $12,000 = $84,000)

Since 2007 the City of St. Louis has piloted the use of an innovative technology: telematics fleet tracking. By installing telematics software in municipal fleet, the City is able to track usage and take corrective action when idling or inefficiencies are identified. The City has installed 526 telematics devices in municipal vehicles, and estimates 5.6% savings in those fleet segments in fuel consumption and reductions in associated vehicle exhaust. Despite initial success, lack of local funds has slowed implementation of the City's telematics program. To optimize the effort, funds from the VW Settlement can be used to purchase an additional 850 units at $560 each ($476,000) and 7 data download stations at $12,000 each ($84,000) for an approximate total cost of $560,000.

Although not specifically identified in the current list of eligible uses for the VW Settlement, using these funds to purchase telematics devices for government-owned vehicles would be a cost-effective way to promote less exhaust by municipal trucks and vehicles. The VW Settlement funds could jumpstart completion of this effort and help the City achieve diesel reductions 3-5 years sooner than they are likely to occur otherwise. Consequently, we strongly encourage MDNR to consider telematics devices as an eligible use of VW Settlement funds.



From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#62]
Date: Monday, December 18, 2017 4:26:43 PM

Name	Charles Shell
Email Address	
Address	
City	columbia
State	missouri
Zip Code	65203
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Small Business
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Option Involving the Diesel Emission Reduction Act

Comments on Missouri's Environmental Mitigation Trust

We are a small business in Columbia, MO, specializing in air monitors and dispersion modelling. After reviewing all of the APCP VW settlement meetings, Appendix D-2 of the Consent Decree, and the public comments of states further ahead in this settlement process (Colorado), we fully agree with the DNR APCP that there is a great need to be able to measure the actual impacts of the diesel emission reduction project implementations. This is why we propose to provide monitoring and modelling services to DNR, small businesses, and not-for-profit groups to measure the actual air quality improvements after implementing some projects, and to develop models to predict impacts of future technology funding.

One of the most beneficial locations to install monitors is near heavily-impacted schools. As we have long understood, the areas with the greatest need for air quality improvements are elementary schools near highways, in industrial/warehouse areas, and in low-income areas. We are open to suggestion on other partners.

Another high-impact use of air monitors would be to compare types of diesel emission projects to determine best use of future funding. As the representative of the Missouri Petroleum Marketers and Convenience Store Association pointed out, the duty to use public money to benefit the citizens of Missouri requires a sound metric system based on actual emissions reductions.

The project benefits could be extended further by training the students in the community to use these new air monitors, providing benefits to our local economies and health to last throughout perpetuity.

This project would require relatively little funding compared to the far-reaching benefits. While the EPA's Diesel Emissions Quantifiers provide some level of comparison, these tools have substantial limitations and are antiquated (Diesel Emissions Quantifier Methodology). These simple equations need to be improved with validated modelling that considers newer technology and current input conditions. Missouri has the potential to become a leader in developing such cradle-to-grave footprint predictions, and the Volkswagen settlement is a perfect opportunity for the investment required to develop these long-needed, total lifecycle effects models.

These and similar tools could be funded under the DERA option, so we propose a minimal cap on this option.

Document Upload Option	Attachment Below

Diesel Emissions Quantifier Health Benefits Methodology

United States Environmental Protection Agency

Diesel Emissions Quantifier Health Benefits Methodology

Transportation and Regional Programs Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

NOTICE

This technical report does not necessarily represent final EPA decisions or positions. It is intended to present technical analysis of issues using data that are currently available. The purpose in the release of such reports is to facilitate the exchange of technical information and to inform the public of technical developments.

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United States Environmental Protection Agency

EPA-420-B-10-034
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I. BACKGROUND

The Diesel Emissions Quantifier Benefits Module is a tool for estimating the health and monetary benefits that could result from a decrease in diesel exhaust emissions. The Benefits Module is a new component of EPA's existing web-based Diesel Emissions Quantifier (the Quantifier). The Benefits Module uses the 2002 National Emissions Inventory (NEI) data and the 2002 National Air Toxics Assessment (NATA) model results to estimate the relationship of changes in diesel emissions to changes in primary particulate matter air concentrations for each county in the U.S. The Benefits Module then uses previously-generated outputs from the Environmental Benefits Mapping and Analysis Program (BenMAP) model to estimate the value of changes in the incidence of avoided premature mortality and several excess morbidity endpoints.

The Quantifier, which was released on EPA's website in 2007, allows users to estimate the diesel emission reductions that result from implementing a variety of control strategies for mobile or stationary diesel engines that the user selects. It is designed for users who do not have technical expertise in emissions modeling or air pollution in general, but it does include a substantial amount of technical information for users who do have that expertise. The Quantifier's output includes tabular estimates of particulate matter emission reductions as well as estimates of emission reductions for NO_x, CO, CO_2, and hydrocarbons on both an annual and engine lifetime basis. These tables can be exported in spreadsheet format. It also includes a User's Guide that explains the data and calculations used to estimate the emission reductions. A more detailed description of the Quantifier, and access to the tool itself, can be found at www.epa.gov/cleandiesel/quantifier/.

The Benefits Module runs off of a county-scale "look-up table" within the larger Quantifier tool. The look-up table includes estimates of the monetary benefits per unit of reduction in emissions (tons/year) for each county in the United States. A user does not see this table directly but instead answers a set of questions about the type of engine being controlled, the emission control(s) used, and the location of the emission reductions. Once the Quantifier estimates the emission changes, users can choose to have the Benefits Module estimate the health and monetary impacts of reductions in fine particulate ($PM_{2.5}$) emissions. Those results are calculated from the lookup table and the combined monetary value of avoided mortality and morbidity is presented in tabular format for the counties the user identified. Monetary values are based on avoided incidences of the following health effects:

Premature mortality
Chronic bronchitis
Acute bronchitis
Upper and lower respiratory symptoms
Asthma exacerbation
Nonfatal heart attacks
Hospital admissions
Emergency room visits
Work loss days
Minor restricted-activity days

EPA has developed look-up tables for total diesel PM sources, as well as for on-road diesel sources and non-road diesel sources (diesel pleasure craft, diesel locomotives, diesel commercial marine vessels, and all other non-road diesel sources). The look-up table for total diesel PM sources was developed as part of the Quality Assurance for this tool; the tool uses the on-road and non-road look-up tables and sums the results for the total benefits for projects that include both types of engines. Due to the limitations of BenMAP (the benefits modeling component), the Benefits Module results are only available for the contiguous 48 states. Therefore, it cannot be used to provide benefits for diesel emission reductions strategies in Alaska, Hawaii or the U.S territories.

The purpose of the Quantifier and the Benefits Module is to provide a screening-level estimate of the emissions and health effects, respectively, of specific diesel engine emission reduction options. These options include adding post-combustion control technologies (also known as aftertreatment) to remove or reduce pollutants from the exhaust, replacing older engines with newer, cleaner engines, and/or switching to lower-emitting fuels. Emission reductions for any single project can be distributed in up to five counties. The Quantifier is not considered adequate or appropriate for SIP planning or credit calculation purposes. Users wanting to estimate the air quality or health benefits of a large number of diesel emission reduction programs spread out over many counties should use more complex air quality modeling tools that account for longer range transport of pollution and secondary pollutant formation.

The Quantifier allows the user to enter the size of the fleet affected by the strategy and the year in which the changes will take effect, as well as the location (county) of the engines. For engines used in multiple counties, such as long-haul trucks, the user should specify the county where the majority of the emissions are located. (While the Benefits Module allows the user to allocate emission reductions among multiple counties for the purpose of estimating monetary benefits, currently the Quantifier requires users to pick a single county for the purposes of calculating the effectiveness of each emission reduction strategy.) The Quantifier includes assumptions about the effectiveness at reducing emissions of various emission control technologies; the Benefits Module does not make any changes to those data. The Quantifier also includes scrappage estimates to inform lifetime engine emission reduction estimates. In contrast, the Benefits Module does not include estimates of the health impacts over the lifetime of an engine. Results are instead presented for the single year in which the emission reduction strategy was implemented. More information on the Quantifier can be found in the Users Guide at www.epa.gov/cleandiesel/documents/420b10033.pdf

II. ESTIMATING CHANGES IN $PM_{2.5}$ AIR QUALITY CONCENTRATIONS RESULTING FROM DIESEL EMISSIONS

A. Data Inputs

i. National Emissions Inventory

The NEI is a comprehensive inventory covering criteria pollutants and hazardous air pollutants (HAPs) for the 50 states, Washington DC, Puerto Rico, and the U.S. Virgin Islands. The NEI is assembled and reported every three years by EPA's Emission Inventory and Analysis Group.

Sources in the NEI are described as either stationary or mobile sources. Mobile sources are categorized as either on-road or non-road sources. On-road sources include motorized vehicles that are normally operated on public roadways. This includes passenger cars, motorcycles, minivans, sport-utility vehicles, light-duty trucks, heavy-duty trucks, and buses. Non-road sources include recreational marine and land-based vehicles, farm and construction machinery, industrial, commercial, logging, and lawn and garden equipment, aircraft, airport ground support equipment (GSE), locomotives, and rail maintenance equipment. These sources are powered by diesel, gasoline, compressed natural gas (CNG), and liquefied petroleum gas (LPG) -fueled engines, among others.

In developing the 2002 draft mobile source NEI, EPA provided state, local, and tribal agencies the opportunity to review and provide comment on the preliminary NEI. EPA's National Mobile Inventory Model (NMIM, www.epa.gov/oms/nmim.htm) was used to generate the preliminary non-road estimates for the 2002 NEI. The preliminary on-road estimates were developed by E.H. Pechan & Associates, Inc. using many of the same data and methods being used in NMIM (U.S. EPA, 2004). The on-road emission estimates in the NEI are based on running EPA's MOBILE6 model (http://www.epa.gov/oms/m6.htm) to generate emission factors in grams per mile and then determining total annual tons using annual vehicle miles traveled (VMT). The Highway Performance Monitoring System (HPMS), on which VMT estimates are based, uses sampling frames based on states, metropolitan areas, and non-metropolitan areas within states. EPA then allocates VMT to the county level. The annual VMT used in the preliminary version of the NEI was based on preliminary national 2002 VMT estimates made by the Federal Highway Administration (FHWA). Thirteen states submitted revised VMT data to EPA for incorporation in the final 2002 NEI. Once state, local, and tribal agencies submitted their review of preliminary NEI information to EPA, these data were logged, reviewed, and quality-assured by EPA.

Documentation for the 2002 NEI is provided at www.epa.gov/ttn/chief/net/2002inventory.html

Documentation for the 2002 Mobile NEI is located at ftp://ftp.epa.gov/EmisInventory/2002finalnei/documentation/mobile/2002_mobile_nei_version_3_report_092807.pdf

ii. National-Scale Air Toxics Assessment

The degree to which a reduction in diesel PM emissions results in a change in ambient diesel PM concentrations has been determined based on the results of EPA's 2002 National-Scale Air Toxics Assessment (NATA) (www.epa.gov/ttn/atw/natamain/). NATA, which is often referred to as a "screening model" due to limitations in the underlying data and methodology, predicts

ambient concentrations of diesel PM at the census tract level. NATA does this by performing dispersion modeling of diesel PM emissions taken from the 2002 National Emissions Inventory (NEI). The 2002 NATA includes 292 air pollutants, including all 187 hazardous air pollutants and diesel PM. The assessment includes four steps:

1. Compiling a national emissions inventory of air toxics emissions from outdoor sources.
2. Estimating ambient concentrations of air toxics across the United States.
3. Estimating outdoor population exposures across the United States.
4. Characterizing potential public health risk due to inhalation of air toxics including both cancer and non-cancer effects.

The first step, developing emissions inventories for the NEI, is described above. Since the NEI only provides county-scale emissions for mobile sources and area-wide stationary sources, the emissions must be apportioned to the census tract level for NATA modeling purposes. For diesel emission sources, the emissions are apportioned based on source category, for example:

On-road diesel emissions use roadway miles (urban primary roads, rural primary roads, urban secondary roads, rural secondary roads) for all roads except local roadways. This is because information on local roadway miles is not generally available so population was instead used as a surrogate for roadway miles

Locomotive diesel emissions use railroad miles

Commercial marine diesel emissions use port locations and underway miles, i.e. miles traveled under engine power

Construction diesel emissions use population change (according to the census, i.e. 1990 - 2000)

Diesel pleasure craft emissions use miles of water coastline

Types of Particulate Matter

The Quantifier estimates changes in diesel particulate matter, or diesel PM. This is all diesel particles, regardless of size. Likewise, NATA models diesel PM.

Health effects and monetary benefits, however, are related to exposures to fine particulate matter, or $PM_{2.5}$. $PM_{2.5}$ includes diesel particles as well as other types of small particles (the "2.5" means the particles are smaller than 2.5 microns).

Most diesel particulate matter is $PM_{2.5}$; some, however, is larger than 2.5 microns.

The Benefits Module uses the same estimate as EPA's MOBILE 6.2 model (the latest mobile source inventory development tool) and assumes that 96% of diesel particulate matter is $PM_{2.5}$. Therefore, the Benefits Module benefits are calculated on 96% of the total diesel PM emission reductions estimated by the Quantifier.

A complete list of surrogates is available on Tables C-7 and C-8 of "User's Guide for the Emissions Modeling System for Hazardous Air Pollutants (EMS-HAP) Version 3.0" (www.epa.gov/scram001/userg/other/emshapv3ug.pdf).

For step 2, a computer simulation model called the Assessment System for Population Exposure Nationwide (ASPEN; www.epa.gov/ttn/atw/nata1999/aspen99.html) is used to estimate toxic air pollutant concentrations. This model is based on EPA's Industrial Source Complex Long Term model (ISCLT) which simulates the behavior of the pollutants after they are emitted into the atmosphere. ASPEN uses estimates of toxic air pollutant emissions and meteorological data from National Weather Service Stations to estimate air toxics concentrations nationwide by census

tract. The ASPEN model takes into account important determinants of pollutant concentrations, such as:

Rate of release
Location of release
The height at which the pollutants are released
Wind speeds and directions at the meteorological stations closest to the release
Breakdown of the pollutants in the atmosphere after release (i.e., reactive decay)
Settling of pollutants out of the atmosphere (i.e., deposition)
Transformation of one pollutant into another (i.e., secondary formation)

ASPEN estimates toxic air pollutant concentrations for every census tract in the continental United States, Puerto Rico and the Virgin Islands. Census tracts are land areas defined by the U.S. Bureau of the Census and typically contain about 4,000 residents each. Census tracts in cities are usually smaller than 2 square miles in size but are much larger in rural areas (U.S. Bureau of Census, 2000) The ASPEN user's guide is available at www.epa.gov/scram001/userg/other/aspenug.pdf.

For emissions apportioned from the county-level to the census tract, such as on-road and non-road diesel sources, the emission locations within each census tract are treated as pseudo-point sources at locations in a radial grid around the census tract centroid. Pseudo-point sources are assumed to be vented point sources with an effective stack height of 5 meters and for which no plume rise calculations are made. ASPEN modeling was carried out to 40 km. Annual average emissions rates were used – no diurnal patterns were assumed. Because of this approximation in emissions source location, ASPEN was deemed sufficiently accurate for purposes of modeling on-road and non-road diesel sources. The 2002 NATA uses a more sophisticated dispersion model, AERMOD (see www.epa.gov/scram001/dispersion_prefrec.htm#aermod), to model large stationary sources where more detailed emissions information is available, but the AERMOD analysis does not apply to the module described here.

For some pollutants, the concentration estimates include a "background" concentration which is based on monitored values. Background concentrations are the contributions to outdoor air toxics concentrations resulting from natural sources, persistence in the environment of past years' emissions, and long-range transport from sources that are more than 50 kilometers away. In other words, background concentrations are levels of pollutants in the atmosphere that would be present if there had been no anthropogenic emissions in the area being modeled. (www.epa.gov/ttn/atw/nata1999/background.html). For diesel PM, NATA does not use monitored air quality concentrations to estimate background concentrations. Instead, it uses a modeling-based approach that provides a rough approximation of air concentrations resulting from transport from sources located between 50 km and 300 km from the receptors. These estimates are included in the source category concentration estimates instead of being treated as a separate source category in the 2002 NATA.

The results of NATA step 2, predicted ambient concentration for diesel PM at the census tract level, are used in the Benefits Module. The results from steps 3 and 4 of the NATA analysis (estimating population exposures and characterizing public health risk) have not been used to support the Benefits Module and thus are not further described here. Instead, the Quantifier uses the Environmental Benefits Mapping and Analysis Program (BenMAP) to estimate the health

impacts. Further information on NATA's use of the Hazardous Air Pollutant Exposure Model 5 (HAPEM5) can be found at www.epa.gov/ttn/atw/nata1999/ted/teddraft.html. For further information summarizing the 2002 NATA and past results, see www.epa.gov/ttn/atw/nata1999/natafinalfact.html.

NATA results are publicly available on EPA's website at www.epa.gov/ttn/atw/natamain/. Results can be found for the entire United States, at the county or census tract level, and by source type or pollutant. These results are best used for comparing counties or census tracts to one another, and do not define "hotspots" or areas of significantly higher concentrations within a single census tract, or answer epidemiological questions such as whether proximity to sources causes increased adverse health effects or higher risks.

The NATA methodology has undergone Science Advisory Board (SAB) peer review. Details of the review, including slide presentations and user documentation for each step of the NATA approach, are available at www.epa.gov/ttn/atw/sab/sabrev.html.

B. Analysis and Calculations

The census tract level NATA-predicted ambient concentrations of diesel PM were used to create the lookup tables that are the basis for the Benefits Module. These predicted ambient concentrations of diesel PM are used in conjunction with standard $PM_{2.5}$ concentration-response functions used in the BenMAP benefits modeling tool.

In order to create county-level ambient concentrations, the census tract level ambient concentration NATA results (c) have been population-weighted to county values:

For a county *i* and tract *a*:

$$c_i = \frac{\sum (c_{i,a} * Population_{i,a})}{Population_i}$$

This analysis was performed for total ambient diesel PM, as well as for on-road diesel PM and non-road diesel PM. County-level, versus census-tract level, concentrations have been used for the Benefits Module because (a) county-level results are a better match for the standard $PM_{2.5}$ concentration-response functions used in the health benefits analysis and (b) mobile source emissions, taken from NEI, are estimated at the county-level and the use of census tract level results would introduce additional uncertainty.

As an additional note, long range dispersion of diesel PM may contribute to an increase in diesel PM concentrations in one county due to emissions from a neighboring county. In general, this effect is likely to be insignificant because the large majority of diesel impacts occur in close proximity to the source, but it is a potential concern for low-emitting counties in close proximity to or downwind of one or more high-emitting counties. In areas where long-range transport is more important, the uncertainty resulting from the approach used here may be more significant and remains inadequately accounted for in this methodology. An inspection of the resulting

county ratios, described in the Quality Assurance section below, reveals that there were only a few counties that had very low emissions and large ambient PM diesel concentrations, none of which were clearly an inaccurate result. Nonetheless, given the uncertainty in the results for these counties, benefits have been calculated, but a flag has been added in the Benefits Module to indicate where benefit per ton estimates for low-emitting counties may be underestimates, and also where benefit per ton estimates for high-emitting counties may be overestimates (due to transport of emissions into surrounding counties). The method used to identify and flag counties, based on a ratio of predicted ambient concentration to emissions density in each county, is described further in Section IV.C below.

III. ESTIMATING THE HUMAN HEALTH BENEFITS OF CHANGES IN $PM_{2.5}$ AIR QUALITY

A. Overview

Having first estimated change in $PM_{2.5}$ ambient concentrations resulting from a change in diesel $PM_{2.5}$ emissions, the Benefits Module then estimates the per-ton benefit of reducing ambient diesel $PM_{2.5}$. To perform this benefits analysis, the Benefits Module uses the "damage function" approach, which is a peer-reviewed technique for estimating the human health impacts associated with exposure to ambient pollutants (Levy et al., 1999). As a result, the Benefits Module calculates the benefit-per-ton of $PM_{2.5}$ emission reduction in a manner generally consistent with the methods found in the recently published Regulatory Impact Analysis (RIA) for the Ozone NAAQS (U.S. EPA, 2008a).

Estimating $PM_{2.5}$ benefit-per-ton entails three basic steps:

1. Estimating the change in $PM_{2.5}$ air quality for the geographic area of interest
2. Loading the estimated air quality changes into the Environmental Benefits Mapping and Analysis Program (BenMAP) and estimating the resulting change in the incidence of health outcomes and monetizing the benefits of those outcomes (Abt Associates Inc., 2005a)
3. Dividing the total monetized benefit by the total estimated emission reduction

The discussion in the preceding section described how the estimates of change in ambient diesel PM air quality concentrations were derived for each county, which constitutes the first step above. The following sections detail how we estimated health benefits of $PM_{2.5}$ exposure and performed the final benefit-per-ton calculations.

B. Data Inputs and Health Endpoints

The Benefits Module uses the BenMAP model to estimate the health endpoints (the health effects that are caused, exacerbated, or otherwise affected by exposure to $PM_{2.5}$ such as premature mortality or asthma attacks) resulting from a unit change in diesel emissions in each county. Table 1 below summarizes the health endpoints quantified and the health impact functions applied for this analysis.

Modeling was done for each of three air quality modeling scenarios—on-road, non-road and total diesel PM. The model compared baseline air quality for each scenario (reflecting total county level ambient $PM_{2.5}$ from that particular source type alone) and a control air quality scenario (reflecting a zero-out of ambient $PM_{2.5}$) The modeling predicted relatively small incremental changes in $PM_{2.5}$ in each county. Because most of the health impact functions (equations that explain the relationship between exposure and changes in health endpoints) used for our analysis are log-linear (and thus produce different estimates of health impacts depending on the baseline level of air quality change), the benefits are somewhat sensitive to the baseline levels of air quality. For this reason, we modified the air quality inputs slightly by adding 10 $\mu g/m^3$ to the baseline and control air quality files—ensuring that the benefits were calculated higher on the curve. Because it is not possible to know ex-ante what the baseline air quality levels will be in the counties in which users apply the benefit-per-ton estimates, this seemed like a reasonable adjustment.

In general, the benefits assessment used techniques, health impact functions and valuation functions that are consistent with the $PM_{2.5}$ health impacts assessments supporting the $PM_{2.5}$ and the Ozone National Ambient Air Quality Standards (U.S. EPA, 2006; U.S. EPA 2008a), with two major exceptions. First, in contrast to those analyses, this assessment applies non-threshold adjusted $PM_{2.5}$ health impact functions. Some researchers have hypothesized the presence of a threshold relationship between $PM_{2.5}$ exposure and the risk of adverse health effects, including premature mortality. For this reason, EPA has traditionally applied an assumed 10 $\mu g/m^3$ cutpoint to the long-term mortality and short-term morbidity concentration-response functions. We determined that such a threshold would be inappropriate for this analysis because we do not know, ex ante, which areas would receive air quality improvements above or below this hypothesized threshold. Further, we did not believe it appropriate to assign zero benefits to counties where ambient PM levels were below a threshold level of 10 $\mu g/m^3$.

The second major divergence from the two RIAs noted above is that we estimated current year population exposure (2008), rather than a projected exposure. We anticipated that most users would wish to estimate the near-term benefits of diesel control strategies, which called for using current year population to generate exposure estimates in BenMAP. Users interested in additional details regarding the health impact assessment may refer to the most recent $PM_{2.5}$ and ozone RIAs (U.S. EPA 2006; U.S. EPA 2008a).

Table 1: Summary of health endpoints and health impact functions

Endpoint	Pollutant	Study and Functional Form	Study Population
Premature Mortality			
Premature mortality — cohort study, all-cause	$PM_{2.5}$ (annual)	Laden et al. (2006), log-linear	>25 years
Premature mortality — all-cause	$PM_{2.5}$ (annual)	Woodruff et al. (1997), logistic	Infant (<1 year)
Chronic Illness			
Chronic bronchitis	$PM_{2.5}$ (annual)	Abbey et al. (1995), logistic	>26 years
Nonfatal heart attacks	$PM_{2.5}$ (daily)	Peters et al. (2001), logistic	Adults
Hospital Admissions			
Respiratory	$PM_{2.5}$ (daily)	Pooled estimate: Moolgavkar (2003)—ICD 490-496 (COPD), log-linear Ito (2003)—ICD 490-496 (COPD), log-linear	>64 years
	$PM_{2.5}$ (daily)	Moolgavkar (2000)—ICD 490-496 (COPD), log-linear	20–64 years
	$PM_{2.5}$ (daily)	Ito (2003)—ICD 480-486 (pneumonia), log-linear	>64 years
	$PM_{2.5}$ (daily)	Sheppard (2003)—ICD 493 (asthma), log-linear	<65 years
Cardiovascular	$PM_{2.5}$ (daily)	Pooled estimate: Moolgavkar (2003)—ICD 390-429 (all cardiovascular), log-linear Ito (2003)—ICD 410-414, 427-428 (ischemic heart disease, dysrhythmia, heart failure), log-linear	>64 years
	$PM_{2.5}$ (daily)	Moolgavkar (2000)—ICD 390-429 (all cardiovascular), log-linear	20–64 years
Asthma-related ER visits	$PM_{2.5}$	Norris et al. (1999), log-linear	0–18 years
Other Health Endpoints			
Acute bronchitis	$PM_{2.5}$	Dockery et al. (1996), logistic	8–12 years
Upper respiratory symptoms	PM_{10}	Pope et al. (1991),	Asthmatics, 9–11 years
Lower respiratory symptoms	$PM_{2.5}$	Schwartz and Neas (2000)	7–14 years
Asthma exacerbations	$PM_{2.5}$	Pooled estimate: Ostro et al. (2001) (cough, wheeze and shortness of breath) Vedal et al. (1998) (cough)	6–18 years[a]
Work loss days	$PM_{2.5}$	Ostro (1987), log-linear	18–65 years
Minor restricted activity days (MRADs)	$PM_{2.5}$	Ostro and Rothschild (1989), log-linear	18–65 years

[a] The original study populations were 8 to 13 for the Ostro et al. (2001) study and 6 to 13 for the Vedal et al. (1998) study. Based on advice from the SAB-HES, we extended the applied population to 6 to 18, reflecting the common biological basis for the effect in children in the broader age group.

The final stage of the benefits analysis is to estimate the monetary value of the health impacts for each county and each of the three scenarios. As in the health incidence stage of the benefits analysis, here we follow techniques that are generally consistent with previous EPA RIA benefits analyses. As in those analyses, mortality benefits are estimated using the EPA standard Value of Statistical Life of $5.5 million (1990 dollars income levels, 1999$). We also apply an EPA Science Advisory Board-recommended 20-year distributed lag between exposure and premature mortality.[1] When calculating monetized benefits, it is necessary to discount over this time period. Hence, we discount the mortality benefits at 3% and then sum the monetary value of each independent endpoint. We estimated valuation for a cost year of 2006 and adjusted the Willingness to Pay (WTP) valuation functions to reflect 2008 projected income levels. Users interested in the complete technical details of the valuation stage may refer to the most recent $PM_{2.5}$ and ozone RIAs (U.S. EPA 2006; U.S. EPA 2008a).

i. Annual versus Annualized Monetized Benefits

The steps above produce an annual estimate of the benefits of reducing an incremental ton of $PM_{2.5}$ from various emission sources for the year 2008. However, we expect that diesel retrofits will provide a stream of benefits over a number of years. Moreover, the costs of these controls are frequently expressed in annualized terms that take into account the expected "lifetime" of the investment. Annualizing costs is the process of combining capital and operating-and-maintenance costs and then distributing these costs on an annual basis over the life of the equipment.

Thus, the benefits and costs are expressed in somewhat different temporal scales. Ideally, the benefits should also be annualized as well. However, this process would require a year-to-year estimate of the change in emissions and air quality over the life of each piece of equipment. For this same time period we would calculate year-to-year benefits, and this stream of future benefits would then be discounted back to the original year in which the emission control was installed. Moreover, we would account for year-to-year changes in population growth and distribution. We would also project changes in income growth to account for the increasing willingness to pay to reduce mortality risk. These were not practical analyses for this project.

Instead, we have made the assumption that the annual benefits are a fair surrogate for the annualized benefits. On one hand, we have neither modeled future population growth and distribution, nor accounted for future income growth; these are factors that should increase benefits over time. On the other hand, this stream of benefits would be discounted, which would reduce the annualized benefits. In our judgment, these countervailing factors more or less balance out such that the annual benefits are comparable to the annualized benefits. Each of the tables and maps in this document treat annual benefits as annualized benefits.

ii. Calculating the $PM_{2.5}$- Benefit per-ton Estimate

The final step is to simply divide the county level benefit estimate by the total change in emissions—resulting in a benefit-per-ton estimate. The benefit-per-ton estimate can also be represented as follows:

[1] This lag reflects the hypothesis that some reductions in premature mortality from exposure to ambient $PM_{2.5}$ will occur over short periods of time in individuals with compromised health status, but other effects are likely to occur among individuals who, at baseline, have reasonably good health that will deteriorate because of continued exposure.

$$BPT_{ii} = \left(\frac{\Delta w_i}{\Delta e_i} \right)$$

where

BPT_{ii} = average health benefits (in 2002 dollars) in county i per ton of reduced diesel PM emissions in county i,

Δe_i = total reduction in diesel PM emissions (in tons) in county i,

Δw_i = health benefits (in 2006 dollars) in county i as a result of Δc_i.

For this Benefits Module, no factor was used to convert the ambient diesel PM concentrations (Δc_i) in each county to ambient $PM_{2.5}$ concentration, prior to calculating health benefits (Δw_i). Similarly, BPT_{ii} were calculated by dividing by county diesel PM emissions (Δe_i), and not just the $PM_{2.5}$ component. Diesel PM consists primarily of $PM_{2.5}$, generally 96% by mass (U.S. EPA MOBILE 6.2). Without additional information about how the percentage of $PM_{2.5}$ to total diesel PM may vary between sources and locations within a county, and because Δw_i generally scales linearly with Δc_i, any factor that describes the proportion of diesel PM that is $PM_{2.5}$ would be multiplied in both the numerator (Δw_i*factor*) and denominator (Δe_i*factor*) of the BPT_{ii} calculation, and would cancel out. Thus, for purposes of deriving BPT_{ii}, the relative proportion of diesel PM that is $PM_{2.5}$ is unimportant.

When applying the BPT_{ii} to determine the health benefits for specific diesel exhaust reductions, it is important to remember that the health functions to derive Δw_i are specific to $PM_{2.5}$. Thus, the derived BPT_{ii} most accurately describes health benefits per ton of $PM_{2.5}$ reduced, and not total diesel PM. The emissions changes predicted by the Quantifier are presented in the Quantifier as changes in particulate matter (PM). The Benefits Module converts the Quantifier diesel PM into changes in $PM_{2.5}$ using the 96% conversion factor identified above before the health benefits can be calculated.

IV. ESTIMATING ANNUALIZED COSTS

The Quantifier estimates the cost-effectiveness of each project over the average remaining lifetime of the engine. These values are not easily comparable to the annual benefits presented in the Benefits Module. Therefore, the Benefits Module also estimates the annualized cost of each project.

The annualized cost is based on project cost data the user inputs into the Quantifier. Users can enter two different costs into the Quantifier: the total project cost and the capital costs. The total project costs refer to the entire cost of a retrofit project (for example, the amount of grant funding received to do the project) whereas the capital costs refer to the portion of the total costs that go towards purchasing and installing the retrofit equipment. Capital costs do not include any on-going maintenance costs. To calculate the annualized cost, the Benefits Module uses the value the user enters for the capital cost of the project.

The formula for calculating annualized costs in essence "spreads out" the initial investment costs of the project over the remaining lifetime of the engine being retrofitted. The remaining lifetime is calculated from the existing scrappage tables in the Quantifier. These are the same data used to calculate the cost-effectiveness estimates in the existing version of the Quantifier. This process is used because although the costs are usually paid upfront, the benefits are spread out each year over the remaining lifetime of the engine. By annualizing costs and benefits, the values can be more easily compared.

The formula used for annualizing costs is:

$$AC = (P * r)/(1-(1+r)^{-n})$$

Where:

AC = Annualized Cost
P = Principal (or upfront capital cost)
r = Discount rate
n = Years (remaining life of the engine)

In this case we use a discount rate of 3%. This rate is recommended by EPA draft guidance ftp://ftp.epa.gov/EmisInventory/2002finalnei/documentation/mobile/2002_mobile_nei_version_3_report_092807.pdf regarding discounting of future costs and benefits in situations where all costs and benefits occur as changes in consumption flows rather than changes in capital stocks, i.e., capital displacement effects are negligible. As of the date of publication, current estimates of the consumption rate of interest, based on recent returns to Government-backed securities, are close to 3%.

Since the remaining lifetime of engines in a given retrofit project may vary, the annualized costs must be calculated separately for each type and model year of engine in any given project. These values are then summed to calculate the total annualized cost for each project.

V. UNCERTAINTIES, LIMITATIONS, AND QUALITY ASSURANCE

The Benefits Module represents a new way to bring together existing tools and databases to provide information to state and local agencies, the public and other parties as they seek to implement diesel reduction strategies. These existing data and tools have at various times been subjected to comment and peer review and reflect the recommendations of many experts in multiple disciplines. Nonetheless, the approach and data used by the Benefits Module contain multiple uncertainties and limitations that can limit the application of this tool. These uncertainties and limitations are discussed in more detail below.

A. Input Data

The emissions inventory for diesel PM from the 2002 NEI includes uncertainties associated with the emissions factors, particularly those built into NMIM and the activity information either included by default by EPA or provided by state and local agencies. It also includes the

methodology used to apportion diesel PM emissions to the census tract level using surrogates in NATA

The NATA modeling approach has a series of limitations as well. First, the results are considered most reliable at comparing geographic areas, not analyzing specific locations. The assessment focused on variation between geographic areas such as census tracts, counties and states. It cannot be used to identify "hot spots" where the air concentration, exposure and/or risk might be significantly higher within a census tract or county. In addition, this kind of modeling assessment cannot address the kinds of questions an epidemiology study might, such as the relationship between asthma and proximity of residences to point sources, roadways and other sources of air toxics emissions.

Second, the results do not include impacts from sources in neighboring countries (i.e., Canada or Mexico). Since the assessment did not include the emissions of sources in Canada and Mexico, the results for states that border either of these countries would not reflect these potentially significant sources of transported emissions.

Third, the assessment does not fully reflect variations in background ambient air concentrations. This includes both emissions from natural sources unrelated to anthropogenic emissions as well as transport of emissions from other counties. The assessment uses background ambient air concentrations that are average values over broad geographic regions. Much more research is needed before an accurate estimate of background concentrations at the level of census tracts, or even at the higher geographic scales (i.e. counties or states), can be made. Since background levels are significant contributors to the overall exposure in this assessment, the lack of detailed information on variations in background exposures probably causes the amount of variation in total exposure and risk between census tracts to be smaller than would otherwise be the case.

It is also important to keep in mind that NATA might systematically underestimate ambient air concentration for some compounds. A comparison of the 1996 and 1999 NATA results with ambient monitoring found good agreement for benzene (which primarily comes from gasoline engines), but underestimates for several other species, especially metals. Diesel PM monitoring is not generally available, so no comparison between NATA-predicted diesel PM concentrations and ambient monitoring has been made. There are several possible reasons for the underestimation of pollutant concentrations by NATA:

> *The National Emissions Inventory (NEI) may be missing specific emissions sources* (for many of the sources in the NEI some of the emissions parameters are defaulted or missing). Where data were missing or of poor quality, NATA uses default, or simplified assumptions.
>
> *If the emission rates are underestimated in many locations*. EPA believes the ASPEN model itself is contributing in only a minor way to the underestimation. This is mainly due to output from the predecessor of the ASPEN model comparing favorably to monitoring data in cases where the emissions and meteorology were accurately characterized and the monitors took more frequent readings.

If there are problems in monitor siting. Sites are normally situated to find peak pollutant concentrations, which imply that errors in the characterization of sources would tend to make the model underestimate the monitor values.

Uncertainty in the accuracy of the monitor averages, which, in turn, have their own sources of uncertainty. The results suggest that the model estimates are uncertain on a local scale (i.e., at the census tract level). EPA believes that the model estimates are more reliably interpreted as being a value likely to be found within 30 km of the census tract location.

With respect to diesel PM specifically, the ASPEN modeling used in NATA does not take into account secondary formation of $PM_{2.5}$ (i.e. atmospheric transformation into $PM_{2.5}$ of other pollutants present in diesel exhaust such as oxides of sulfur and nitrogen along with volatile organic carbons). Many of the emission controls included in the Quantifier will reduce mobile source NOx, which is an important precursor to the formation of ambient $PM_{2.5}$. By not modeling the influence of NOx reductions on $PM_{2.5}$ formation, our benefit-per-ton estimates may be biased downward. While we are aware of no published estimates quantifying this bias, it is possible to generate a bounding estimate by using previously published $PM_{2.5}$ benefit-per-ton estimates.

EPA published a series of $PM_{2.5}$ benefit-per-ton estimates in 2008 that relate changes in PM precursors to monetary benefits (U.S. EPA 2008b). These estimates vary by precursor reduced and source type affected. These estimates indicate that the value in 2015 of reducing one ton of directly emitted carbonaceous particles from a mobile source is about $380,000 (Laden et al. mortality estimate, 3% discount rate). Conversely, the value of reducing one ton of NOx emissions from mobile sources is about $10,000 (Laden et al. mortality estimate, 3% discount rate). The significant difference in valuation estimates reflects the differing potential for these precursors to form $PM_{2.5}$ in the atmosphere. This difference suggests, in turn, that not modeling NOx emissions may bias our estimates of $PM_{2.5}$ formation by only a small degree.[2]

In summary, the uncertainties and limitations associated with several key components of the analysis propagate through the analysis. The estimated health effects are calculated based on an array of "upstream" data and assumptions, the most significant of which relate to the change in ambient PM concentrations resulting from changes in emissions. We note that diesel PM is predominately but not exclusively $PM_{2.5}$, and $PM_{2.5}$ includes but is not limited to diesel particles. Based on these predicted air quality changes, we draw upon the vast body of $PM_{2.5}$ health effects literature to apply well-established benefit estimation techniques.

There are several key limitations and uncertainties associated with the benefit-per-ton estimates as well:

Estimating benefits at the local scale carries special uncertainties. This benefits analysis combines county-level air quality data with a substantial amount of national- and regional-level baseline incidence data to estimate the change in $PM_{2.5}$-related health outcomes. With the exception of baseline incidence rates for mortality, the health inputs

[2] In addition, as noted further in the document, we do not estimate ozone-related benefits or other benefits categories such as visibility. As such, the benefit-per-ton estimates likely understate total benefits.

to the analysis are defined at a much broader geographic scale than the air quality data. Moreover, the study we use to estimate $PM_{2.5}$ mortality benefits (Laden et al., 2006) is based upon population exposure data in six cities across the U.S. To the extent that populations in that study and the populations exposed to diesel PM are different, we may under- or over-state total benefits. For these reasons, this analysis is unlikely to have completely characterized the spatial variability in benefits.

The benefit-per-ton metrics contain each of the uncertainties inherent in a $PM_{2.5}$ benefits analysis. As discussed in the $PM_{2.5}$ NAAQS RIA (Table 5.5; U.S. EPA 2006), there are a variety of uncertainties associated with calculating PM benefits; these uncertainties are passed through to the benefit-per-ton estimates included in the Benefits Module. To some extent these uncertainties are exacerbated when applied at smaller scales.

These estimates omit certain benefits categories. Reductions in $PM_{2.5}$ precursors may provide visibility benefits, which are not expressed in the benefit-per-ton metrics. Certain unquantified benefit categories, described fully in the $PM_{2.5}$ NAAQS RIA (U.S. EPA 2006), are also omitted. These categories include ecological benefits, changes in pulmonary function, low birth weight, and non-asthma respiratory ER visits.

The full description of the limitations and uncertainties of the BenMAP modeling tool are available in the BenMAP User's Guide Technical Appendices, Appendix I: Uncertainty and Pooling (pg 254-263) (Abt, 2005a) and online at www.epa.gov/air/benmap/models/BenMAPappendicesSept08.pdf

B. Appropriate Use of This Application

For all of these factors, the uncertainty may lead to either a positive or negative bias in the results. The potential magnitude of the uncertainty in results is difficult to quantify. Past experience with emissions inventories would suggest that the magnitude of emissions, a product of emissions factors and activity, would be one of the largest uncertainties associated with the use of these data. However, basing our estimate on the ratio of the ambient concentration to total emissions, as is done for the Benefits Module, tends to minimize the importance of uncertainties in the emissions. For example, doubling emissions in a specific area would tend to double ambient concentrations, but keep the ratio relatively static, and thus the absolute uncertainty in emissions is not as significant a concern as other uncertainties in this analysis. Conversely, to the extent that these emissions transport to other areas, the uncertainty may be larger.

One of the main factors determining magnitude of health benefits associated with a given emissions reduction is the proximity of the emissions to people. Thus, uncertainty in the apportionment of emissions could be an important factor in this analysis. There are two things to consider for this uncertainty. First, if emissions are assigned to a larger census tract, then the same level of emissions will result in a lower ambient concentration, on average (the pollution, in effect, being spread out over a larger area means that there is less of it at any given point in that area). The opposite is true as well (i.e., assigning emissions to a smaller census tract will result in higher average concentrations). Second, if emissions are assigned to a less populated census tract, fewer people will be exposed to the resulting concentration of air pollution and the population-weighting at the county scale will predict a lower concentration and thus a lower

ratio. Again, the opposite is true (i.e., emissions assigned to higher-populated tracts leads to an overestimate of concentration and ratio).

We do not anticipate a high degree of uncertainty associated with treating mobile sources as a series of radial points within census tracts, although this may be more of a concern for counties and census tracts that cover a large geographic area. The Benefits Module uses average concentrations at a much larger geographic scale (i.e., county-level), which would tend to underestimate the importance of local hotspot impacts that are not detected by the NATA approach. Some bias may result, however, if the population within a census tract is located closer to and therefore more exposed to pollution from major roads or other low-level releases than our analysis assumes.

The health benefits in the Benefits Module are for $PM_{2.5}$ generically and are not dependent on the precise chemical composition of the $PM_{2.5}$ emissions in a particular area. Therefore the only likely significance associated with not considering atmospheric chemistry is if chemical reactions could lead to either loss or formation of $PM_{2.5}$. The loss of directly-emitted diesel PM through chemical reactions is unlikely, since the impacts from diesel PM tend to be highly local for these source types (e.g., no high stacks, minimal exit velocity) and there is insufficient time for reactions to occur before concentrations have been diluted by dispersion alone. Dilution of diesel PM occurs in less than 1 mile, or less than 20 minutes at even slow wind speeds, which is much faster than the typical atmospheric half-life of $PM_{2.5}$, which is considered to be on the order of days to weeks (e.g. Wilson and Suh, 1997).

In addition, the exposure and benefit-per-ton values to not include highly localized exposures, such as those that occur when diesel exhaust "self-pollutes" the cabin on the vehicle from which it has been emitted. This phenomenon has been studied extensively in diesel school buses, and the data indicate it can be a significant source of exposure from older diesel engines (e.g. Marshall and Behrentz, 2005). This Benefits Module does not capture this type of micro-scale exposure and thus the benefits estimate does not include the benefits of reducing these types of exposures.

Uncertainties in the use of NEI emissions and NATA-predicted ambient concentration may be reduced by considering the following when calculating health benefits using the Benefits Module:

> The highest uncertainties in the Benefits Module's emissions, dispersion, health, and monetary benefits calculations are likely all associated with considering only a single location or project. Uncertainties that may have either a positive or negative bias when considered together are more likely to be substantially smaller when considering multiple emissions reductions over larger geographic areas, to the extent that such bias is not highly correlated with population.
> The results of the Benefits Module may be used to characterize the relative benefits of diesel emission reduction projects between areas, but comparisons are likely to be more uncertain when comparing areas in different states, where differences in underlying methodology (e.g., local submission of emissions information to NEI) are likely to be more significant.
> The benefits module is most appropriate when used to estimate scale and relative distribution of results (as opposed to precise predictions) and thus should be used for

purposes where this type of estimate is appropriate only. These results are not an adequate substitute for a more refined emissions, dispersion, and health impacts analysis in support of broader decision-making.

Both the calculation of air concentrations from emissions estimates and the subsequent estimation of the health benefits of those improvements in air quality are subject to significant uncertainty. As stated earlier, these estimates should be considered just that: estimates, and not precise calculations or predictions.

C. Quality Assurance

Figure 1 and Tables 2 through 4 are designed to examine whether the highest predicted benefit-per-ton results are reasonable. One of the primary concerns with our methodology is with counties that may experience substantial diesel impacts due to atmospheric transport from surrounding counties, but may not themselves have substantial emissions. This would likely skew the results towards unusually high benefit-per-ton numbers in those counties (i.e., skewed higher ratios of NATA-predicted diesel PM concentrations versus county emissions would be used as inputs for benefits calculations in BenMAP).

Figure 1 is a plot of monetary benefit-per-ton of diesel emissions reduced (expressed in $/ton) for each county in the United States versus total emissions (tons/year), by source, in that county. This figure illustrates two main points. First, there are few, if any, outliers with high benefit-per-ton but low local emissions. Although this figure cannot illustrate sufficiently whether the low-emitting counties are nonetheless skewed higher by atmospheric transport than would otherwise be expected, no low-emitting counties have benefit-per-ton results beyond what is observed for higher emitting, and thus more certain, counties. Second, the distributions show a relative positive trend; that is, benefit-per-ton estimates increase with county emissions. This result is reasonable because higher emitting counties also tend to be more populated counties and the combination of a higher density of sources and population in proximity to each other would lead to higher anticipated health benefits for diesel exhaust reductions.

Another way to consider the impacts of atmospheric transport either into or out of a county is to estimate the import/export factor. This factor describes the relationship between the change in NATA-predicted ambient concentration to the change in emissions density for that county. Figure 2 shows a plot of monetary benefit-per-ton of diesel emissions reduced (expressed in $/ton) for each county in the United States versus the ratio of change in concentration versus change in emissions density. This can be indicated by. $c_i/(e_i/a_i)$, where c_i, e_i, and a_i are the concentration, emissions, and area of county *i*. Counties that are highest in $c_i/(e_i/a_i)$ would be indicative of those that are most likely to import a relatively large portion of diesel PM, while counties that are lowest in $c_i/(e_i/a_i)$ would be indicative of those that are most likely to export a relatively large portion of diesel PM. A high import/export value indicates the air concentrations in the county are likely affected by imports of diesel PM from other counties. A low value indicates the county is likely to export a large portion of the diesel PM emitted there to other counties.

Figure 1: Monetary benefit-per-ton of diesel emissions reduced ($/ton) for all counties in the United States plotted versus source-specific diesel emissions (tons/year) in that county. Results are presented for (a) total diesel sources, (b) on-road diesel sources, and (c) non-road diesel sources.

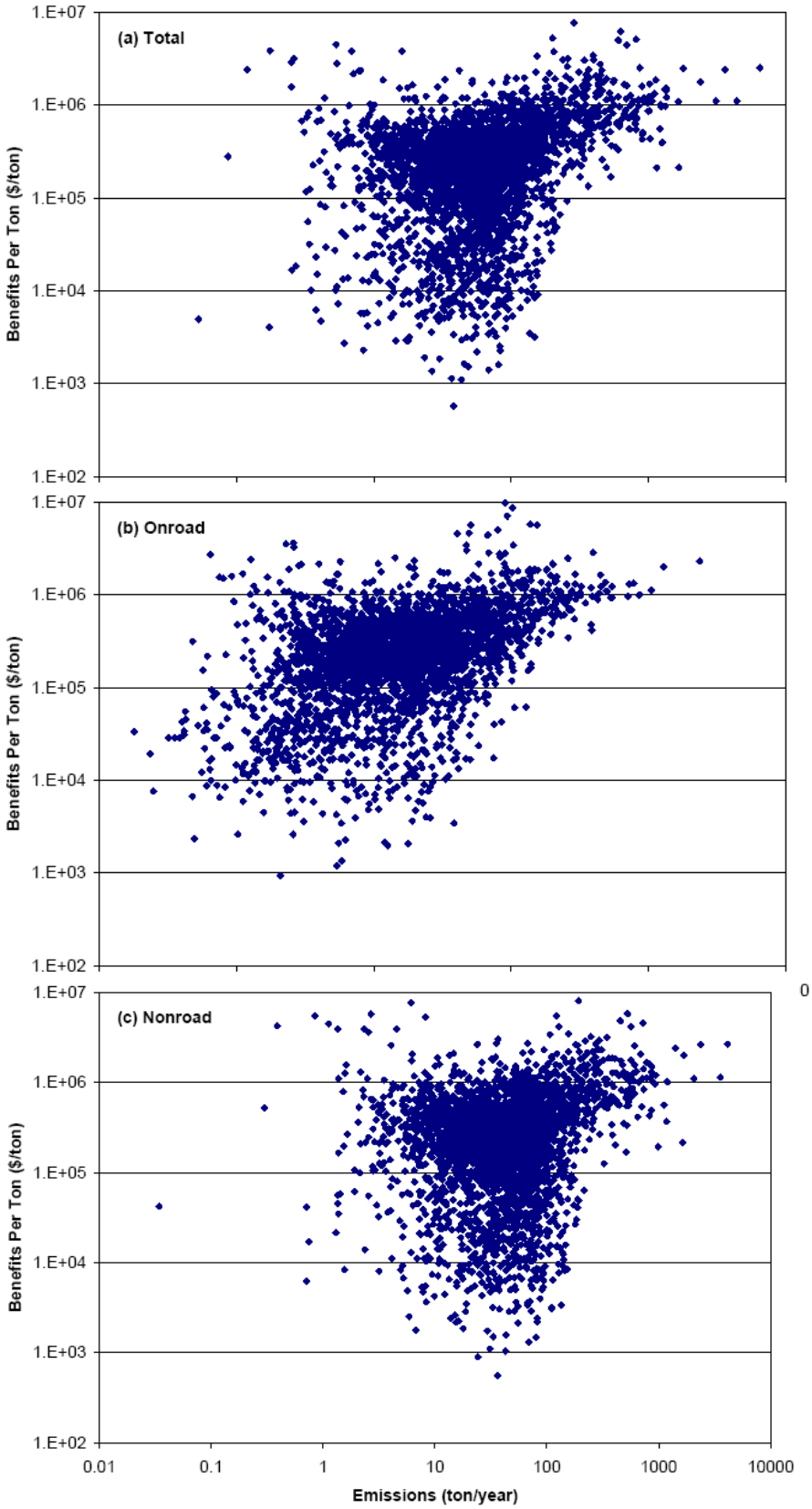
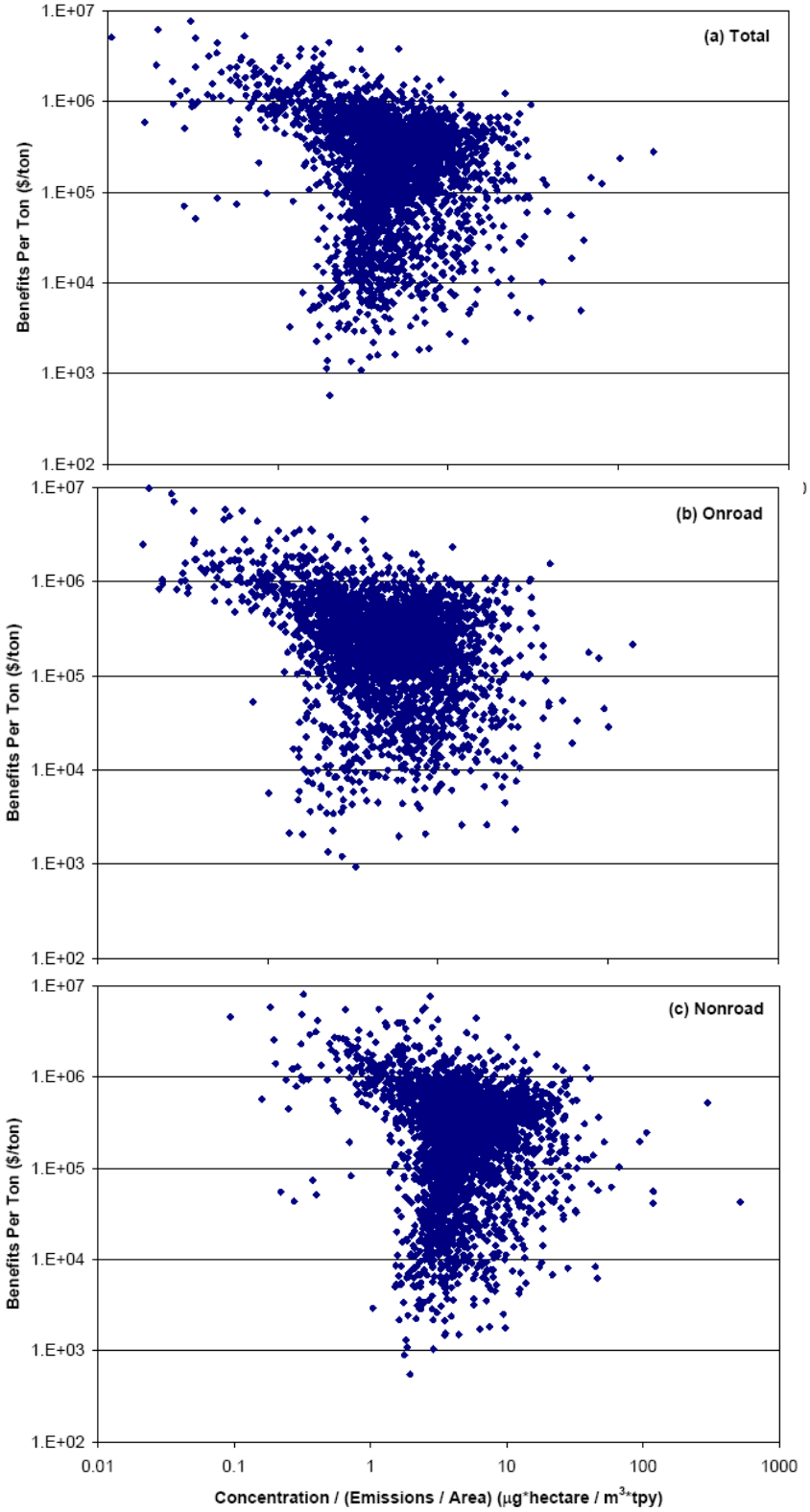


Figure 2: Monetary benefit-per-ton of diesel emissions reduced ($/ton) for all counties in the United State versus the import/export factor. This factor is a ratio of change in concentration versus change in emissions density for each county, i.e. $c_i/(e_i/a_i)$, where c_i, e_i, and a_i are the concentration, emissions, and area of county *i*. Results are presented for (a) total diesel sources, (b) on-road diesel sources, and (c) non-road diesel sources.



Tables 2 through 4 show the counties with highest predicted benefit-per-ton due to reductions from total diesel sources, on-road diesel sources, and non-road diesel sources, respectively. Tables 5 through 7 show the benefit-per-ton for counties with the lowest emissions for total diesel sources, on-road diesel sources, and non-road diesel sources, respectively. Tables 8 through 10 show the counties with the highest import/export factor (i.e. counties likely to import) and Tables 11 through 13 show the counties with the lowest import/export factor (i.e. counties likely to export) nationally.

A closer examination of the counties with the highest-predicted benefit-per-ton estimates (Tables 2 through 4) shows that counties with a high density of sources and/or high population density (such as Bronx, Kings, New York, Manhattan, and Queens Counties, which are part of the City of New York) have some of the highest benefit-per-ton estimates, which is expected. The independent cities of Virginia, i.e. Fairfax, Poquoson, Portsmouth, Winchester, Franklin, Lexington, and Falls Church, also show very high benefit-per-ton results, especially relative to their local emissions. These results do not appear unreasonable since these cities tend to be fairly dense with both sources and receptors. Many of these same counties have the lowest import/export factors in Tables 11 through 13, supporting the assertion that, if anything, the counties are mostly exporters of diesel emissions and the benefit-per-ton estimates may be underestimates.

Most of the instances of unusually high or low benefit-per-ton results are for non-road emissions. For example, the Loving County, TX, benefits of $42,000 per ton (Table 7), while small, is most likely due entirely to transport of outside pollutants, because there are essentially no local sources. Similarly, the $520,000 per ton for Alpine County is quite large, given the minimal local sources (0.3 tons/year) and sparsely populated, low density county. The import/export factor analysis supports both of these assertions, since both counties have a very high ratio (Table 13), and could thus be interpreted as diesel importers. Two other counties with low emissions (<2 tons/year) but high predicted benefit-per-ton (> $500,000 per ton) are Owsley County, KY, and Clay County, WV.

In order to acknowledge this uncertainty, the diesel benefits calculator takes the following approach. First, in addition to reporting results for the county selected, the results are also calculated and reported using statewide benefit-per-ton values in order to provide context. Second, for all counties with import/export factors in the lowest 5th percentile – for either on-road or non-road sources, depending on the query – the results are flagged with the following message:

> Benefits estimates are "flagged" for this county, indicating that we have less confidence in these results due to a large amount of inter-county transport of emissions. The impacts estimation tool may be <u>underestimating</u> benefits for emissions reduction projects in this county because it has a relatively high density of emissions compared to surrounding areas. As a result, this county is likely to be a net <u>exporter</u> of diesel emissions, and many of the benefits of reducing these emissions are likely to take place in downwind counties. Please take this increased uncertainty into account when interpreting your results.

Also, for all counties with import/export factors in the highest 5th percentile – for either on-road or non-road sources, depending on the query – the results are flagged with the following message:

> Benefits estimates are "flagged" for this county, indicating that we have less confidence in these results due to a large amount of inter-county transport of emissions. The impacts estimation tool may be overestimating the benefits for emissions reduction projects in this county because it has relatively few emissions compared to surrounding areas. As a result, this county is likely to be a net importer of diesel emissions, and air quality is significantly affected by emissions in upwind counties. Please take this increased uncertainty into account when interpreting your results.

EPA also calculated a population-weighted average of the county benefit-per-ton values within each state and within the entire United States. The procedure was identical to the population-weighting performed for averaging census tract ambient concentrations to the county level.

For total diesel sources, we calculated a range from $3.2 million per ton for New York State to $68,000 per ton for Wyoming. The national population-weighted average was $1.2 million per ton. The national benefit-per-ton value is somewhat higher than the national mobile source benefit-per-ton from carbonaceous particles from all mobile sources of $730,000 that was calculated as part of the ozone NAAQS RIA (U. S. EPA, 2008a). For on-road diesel sources we calculated a range from $3.8 million per ton for New York State to $63,000 per ton for Wyoming. For non-road diesel sources we calculated a range from $3.2 million per ton for New York State to $73,000 per ton for Wyoming. The national population-weighted average for on-road sources and non-road sources are $1.2 million per ton of diesel reduced. This is also somewhat higher than the on-road and non-road estimates calculated as part of the ozone NAAQS RIA, which are $740,000 per ton and $720,000, respectively.

The benefit-per-ton estimates from this project are clearly very different from those in the most recent ozone RIA. However, the divergence may be due to the fact that the diesel PM benefit-per-ton estimates reflect air quality changes from diesel sources alone. Conversely, the benefit-per-ton estimates developed for the ozone RIA reflect air quality changes from reductions in carbonaceous particles across all on-road and non-road mobile sources. Finally, these two benefit-per-ton estimates may diverge due to inherent differences in the model used to estimate air quality impacts. As described above, EPA used a dispersion model to estimate diesel PM air quality changes; conversely, EPA used a photochemical grid model to generate air quality estimates for the benefit-per-ton estimates that supported the ozone RIA.

Table 2: Counties with Highest Predicted Benefit-per-ton Estimates ($/ton) for Total Diesel Sources.

County	State	2000 Population	Emissions input (tons/year)	County area (hectares)	Import/ export factor	Benefits output ($/ton)
Bronx County	NEW YORK	1,332,650	290	40	0.31	7,800,000
Kings County	NEW YORK	2,465,326	630	60	0.20	6,200,000
Baltimore city	MARYLAND	651,154	200	85	0.64	5,300,000
New York County	NEW YORK	1,537,195	820	23	0.11	5,100,000
Queens County	NEW YORK	2,229,379	610	110	0.33	5,000,000
Fairfax city	VIRGINIA	21,498	5.3	10	0.99	4,500,000
Philadelphia County	PENNSYLVANIA	1,517,550	700	150	0.44	4,500,000
Poquoson city	VIRGINIA	11,566	1.8	20	5.1	3,900,000
Portsmouth city	VIRGINIA	100,565	16	35	1.4	3,800,000
Winchester city	VIRGINIA	23,585	6.9	11	1.7	3,800,000
Ocean County	NEW JERSEY	510,916	210	620	3.1	3,800,000
Hudson County	NEW JERSEY	608,975	400	57	0.44	3,500,000
Passaic County	NEW JERSEY	489,049	150	200	1.8	3,400,000
Falls Church city	VIRGINIA	10,377	2.6	3.5	1.3	3,200,000
Richmond County	NEW YORK	443,728	260	48	0.39	3,200,000
Bergen County	NEW JERSEY	884,118	400	250	1.0	3,100,000
Camden County	NEW JERSEY	508,932	240	230	1.6	3,100,000
Essex County	NEW JERSEY	793,633	340	130	0.61	3,100,000
Franklin city	VIRGINIA	8346	2.5	3.2	0.60	2,900,000
Hopewell city	VIRGINIA	22,354	5.4	8.8	1.0	2,800,000

Table 3: Counties with Highest Predicted Benefit-per-ton Estimates ($/ton) for On-road Diesel Sources.

County	State	2000 Population	Emissions input (tons/year)	County area (hectares)	Import/ export factor	Benefits output ($/ton)
New York County	NEW YORK	1,537,195	91	23	0.20	9,900,000
Kings County	NEW YORK	2,465,326	100	60	0.27	8,700,000
Bronx County	NEW YORK	1,332,650	94	40	0.28	7,000,000
Philadelphia County	PENNSYLVANIA	1,517,550	140	150	0.56	5,800,000
Queens County	NEW YORK	2,229,379	150	110	0.37	5,700,000
Hudson County	NEW JERSEY	608,975	50	57	0.71	5,700,000
Baltimore city	MARYLAND	651,154	79	85	0.60	5,000,000
Ocean County	NEW JERSEY	510,916	49	620	3.7	4,600,000
Richmond County	NEW YORK	443,728	41	48	0.55	4,500,000
Essex County	NEW JERSEY	793,633	68	130	0.87	4,400,000
Bristol County	RHODE ISLAND	50,648	2.6	23	1.8	3,600,000
Winchester city	VIRGINIA	23,585	2.3	11	1.5	3,500,000
Bergen County	NEW JERSEY	884,118	100	250	1.2	3,500,000
Passaic County	NEW JERSEY	489,049	47	200	1.8	3,400,000
Fairfax city	VIRGINIA	21,498	2.6	10	1.4	3,300,000
Providence County	RHODE ISLAND	621,602	48	430	2.3	3,000,000
Orange County	CALIFORNIA	2,846,289	400	800	1.3	2,900,000
Union County	NEW JERSEY	522,541	69	110	0.73	2,800,000
District of Columbia	DISTRICT OF COLUMBIA	572,059	90	66	0.37	2,800,000
Delaware County	PENNSYLVANIA	550,864	83	190	1.0	2,800,000

Table 4: Counties with Highest Predicted Benefit-per-ton Estimates ($/ton) for Non-road Diesel Sources.

County	State	2000 Population	Emissions input (tons/year)	County area (hectares)	Import/ export factor	Benefits output ($/ton)
Bronx County	NEW YORK	1,332,650	190	40	0.32	8,100,000
Portsmouth city	VIRGINIA	100,565	6.2	35	2.7	7,800,000
Kings County	NEW YORK	2,465,326	530	60	0.18	5,800,000
Fairfax city	VIRGINIA	21,498	2.7	10	2.5	5,800,000
Baltimore city	MARYLAND	651,154	121	85	0.66	5,500,000
Franklin city	VIRGINIA	8346	0.84	3.2	1.2	5,500,000
Hampton city	VIRGINIA	146,437	8.2	51	2.4	5,400,000
Queens County	NEW YORK	2,229,379	460	105	0.31	4,800,000
New York County	NEW YORK	1,537,195	730	23	0.093	4,600,000
Poquoson city	VIRGINIA	11,566	1.1	20	6.0	4,500,000
Lexington city	VIRGINIA	6867	0.39	5.1	3.1	4,300,000
Camden County	NEW JERSEY	508,932	130	230	2.2	4,200,000
Philadelphia County	PENNSYLVANIA	1,517,550	560	150	0.41	4,200,000
Winchester city	VIRGINIA	23,585	4.6	11	1.7	4,000,000
Falls Church city	VIRGINIA	10,377	1.4	3.5	1.6	3,900,000
Staunton city	VIRGINIA	23,853	2.3	13	1.6	3,900,000
Colonial Heights city	VIRGINIA	16,897	2.4	7.0	1.3	3,900,000
Hopewell city	VIRGINIA	22,354	2.6	8.8	1.3	3,600,000
Ocean County	NEW JERSEY	510,916	160	620	2.8	3,500,000
Passaic County	NEW JERSEY	489,049	110	200	1.8	3,400,000

Table 5: Benefit-per-ton of Diesel Emissions Reduced ($/ton) for Counties with the Lowest Emissions of Total Diesel Sources.

County	State	2000 Population	Emissions input (tons/year)	County area (hectares)	Import/ export factor	Benefits output ($/ton)
Loving County	TEXAS	67	0.53	660	60	4900
Alpine County	CALIFORNIA	1208	0.87	730	160	280,000
Lexington city	VIRGINIA	6867	1.2	5.1	1.8	2,400,000
Hinsdale County	COLORADO	790	1.7	1100	30	4100
Poquoson city	VIRGINIA	11,566	1.8	20	5.1	3,900,000
Franklin city	VIRGINIA	8346	2.5	3.2	0.60	2,800,000
Buena Vista city	VIRGINIA	6349	2.5	4.9	0.87	1,600,000
Daggett County	UTAH	921	2.5	710	14	17,000
Falls Church city	VIRGINIA	10,377	2.6	3.5	1.3	3,200,000
Edwards County	TEXAS	2162	2.7	2100	53	19,000
Owsley County	KENTUCKY	4858	3.0	200	23	670,000
Robertson County	KENTUCKY	2266	3.1	110	21	510,000
Real County	TEXAS	3047	3.2	690	19	120,000
Wirt County	WEST VIRGINIA	5873	3.3	230	26	740,000
McMullen County	TEXAS	851	3.3	1100	53	56,000
Norton city	VIRGINIA	3904	3.3	5.0	0.79	820,000
Irion County	TEXAS	1771	3.4	1100	20	32,000
Mineral County	NEVADA	5071	3.4	3800	80	120,000
Esmeralda County	NEVADA	971	3.5	3600	36	10,000
Glascock County	GEORGIA	2556	3.6	150	14	230,000

Table 6: Benefit-per-ton of Diesel Emissions Reduced ($/ton) Results for Counties with the Lowest Emissions of On-road Diesel Sources.

County	State	2000 Population	Emissions Input (tons/year)	County Area (hectares)	Import/ export factor	Benefits Output ($/ton)
Arthur County	NEBRASKA	444	0.18	720	66	34,000
McPherson County	NEBRASKA	533	0.24	870	62	19,000
Petroleum County	MONTANA	493	0.25	1700	29	7600
Loup County	NEBRASKA	712	0.32	570	29	28,000
Esmeralda County	NEVADA	971	0.36	3600	100	29,000
Thomas County	NEBRASKA	729	0.39	700	22	28,000
Hooker County	NEBRASKA	783	0.40	720	21	43,000
Keya Paha County	NEBRASKA	983	0.41	780	21	34,000
Blaine County	NEBRASKA	583	0.41	710	23	31,000
Banner County	NEBRASKA	819	0.42	750	54	55,000
Harding County	NEW MEXICO	810	0.42	2100	95	45,000
Slope County	NORTH DAKOTA	767	0.47	1200	19	6700
Storey County	NEVADA	3399	0.48	260	24	320,000
Loving County	TEXAS	67	0.49	660	29	2300
Greeley County	KANSAS	1534	0.53	790	19	39,000
Grant County	NEBRASKA	747	0.55	770	17	12,000
Alpine County	CALIFORNIA	1208	0.57	730	88	150,000
Buffalo County	SOUTH DAKOTA	2032	0.58	500	12	61,000
Stanley County	SOUTH DAKOTA	2772	0.58	1500	24	34,000
Logan County	NEBRASKA	774	0.58	560	16	22,000

Table 7: Benefit-per-ton of Diesel Emissions Reduced ($/ton) Results for Counties with the Lowest Emissions of Non-road Diesel Sources.

County	State	2000 Population	Emissions Input (tons/year)	County area (hectares)	Import/ export factor	Benefits Output ($/ton)
Loving County	TEXAS	67	0.034	660	520	42,000
Alpine County	CALIFORNIA	1208	0.30	730	300	520,000
Lexington city	VIRGINIA	6867	0.39	5.1	3.1	4,300,000
Edwards County	TEXAS	2162	0.70	2100	120	41,000
Hinsdale County	COLORADO	790	0.71	1100	46	6200
San Juan County	COLORADO	558	0.75	400	13	17,000
Franklin city	VIRGINIA	8346	0.84	3.2	1.2	5,500,000
Poquoson city	VIRGINIA	11,566	1.1	20	6.0	4,500,000
Daggett County	UTAH	921	1.3	710	19	22,000
Irion County	TEXAS	1771	1.4	1100	28	45,000
Falls Church city	VIRGINIA	10,377	1.4	3.5	1.6	3,900,000
Catron County	NEW MEXICO	3543	1.4	7000	120	56,000
Norton city	VIRGINIA	3904	1.4	5.0	1.1	1,100,000
Sterling County	TEXAS	1393	1.4	920	32	35,000
Real County	TEXAS	3047	1.4	690	27	170,000
Crockett County	TEXAS	4099	1.4	2800	47	57,000
Owsley County	KENTUCKY	4858	1.5	196	27	790,000
Kimble County	TEXAS	4468	1.5	1300	52	200,000
King County	TEXAS	356	1.6	940	45	8300
Clay County	WEST VIRGINIA	10,330	1.6	350	38	1,300,000

Table 8: Counties with Highest Import/Export Factors for Total Diesel Sources

County	State	2000 Population	Emissions Input (tons/year)	County Area (hectares)	Import/ export factor	Benefits Output ($/ton)
Alpine County	CALIFORNIA	1208	0.87	730	160	280,000
Nye County	NEVADA	32485	24	18,000	100	240,000
Mineral County	NEVADA	5071	3.4	3800	80	120,000
Inyo County	CALIFORNIA	17945	20	10,000	69	140,000
Catron County	NEW MEXICO	3543	4.5	7000	63	29,000
Loving County	TEXAS	67	0.53	660	60	4900
Edwards County	TEXAS	2162	2.7	2000	53	19,000
McMullen County	TEXAS	851	3.3	1100	53	56,000
Moffat County	COLORADO	13184	27	4800	38	62,000
Hamilton County	NEW YORK	5379	7.8	1800	38	120,000
Sierra County	CALIFORNIA	3555	4.9	960	36	140,000
Esmeralda County	NEVADA	971	3.5	3600	36	10,000
Graham County	NORTH CAROLINA	7993	4.0	300	31	930,000
Hinsdale County	COLORADO	790	1.7	1100	30	4100
Malheur County	OREGON	31615	75	9900	30	85,000
Highland County	VIRGINIA	2536	4.1	420	29	250,000
Coconino County	ARIZONA	116320	260	19,000	29	93,000
Mono County	CALIFORNIA	12853	15	3100	29	59,000
Pendleton County	WEST VIRGINIA	8196	7.8	690	29	380,000
Greenlee County	ARIZONA	8547	4.1	1800	28	86,000

Table 9: Counties with Highest Import/Export Factors for On-road Diesel Sources

County	State	2000 Population	Emissions Input (tons/year)	County Area (hectares)	Import/ export factor	Benefits Output ($/ton)
Mineral County	NEVADA	5071	0.61	3800	140	220,000
Esmeralda County	NEVADA	971	0.36	3600	100	29,000
Harding County	NEW MEXICO	810	0.42	2100	95	45,000
Alpine County	CALIFORNIA	1208	0.57	730	88	153,000
Nye County	NEVADA	32485	3.9	18,000	77	180,000
Arthur County	NEBRASKA	444	0.18	720	66	34,000
McPherson County	NEBRASKA	533	0.24	870	62	19,000
Banner County	NEBRASKA	819	0.42	750	54	55,000
Hancock County	TENNESSEE	6786	0.75	220	46	1,600,000
Brewster County	TEXAS	8866	2.3	6100	45	52,000
McMullen County	TEXAS	851	1.4	1100	45	48,000
Inyo County	CALIFORNIA	17945	10	10,000	43	89,000
Skamania County	WASHINGTON	9872	4.2	1700	42	210,000
Sierra County	CALIFORNIA	3555	1.3	960	42	160,000
Meagher County	MONTANA	1932	0.60	2400	42	36,000
Catron County	NEW MEXICO	3543	3.1	7000	39	18,000
Lincoln County	NEVADA	4165	1.3	11,000	38	14,000
Highland County	VIRGINIA	2536	1.2	420	38	320,000
Mariposa County	CALIFORNIA	17130	4.3	1500	36	460,000
Webster County	WEST VIRGINIA	9719	1.5	560	36	680,000

Table 10: Counties with Highest Import/Export Factors for Non-road Diesel Sources

County	State	2000 Population	Emissions Input (tons/year)	County Area (hectares)	Import/ export factor	Benefits Output ($/ton)
Loving County	TEXAS	67	0.034	660	520	42,000
Alpine County	CALIFORNIA	1208	0.30	730	300	520,000
Catron County	NEW MEXICO	3543	1.4	7000	120	56,000
Edwards County	TEXAS	2162	0.70	2100	120	41,000
Nye County	NEVADA	32485	20	18,000	110	250,000
Inyo County	CALIFORNIA	17945	10	10,000	96	200,000
Mineral County	NEVADA	5071	2.8	3800	67	100,000
McMullen County	TEXAS	851	1.9	1100	59	62,000
Kimble County	TEXAS	4468	1.5	1300	52	195,000
Brooks County	TEXAS	7976	2.1	970	47	360,000
Crockett County	TEXAS	4099	1.4	2800	47	57,000
Hinsdale County	COLORADO	790	0.71	1100	46	6200
King County	TEXAS	356	1.6	940	45	8300
Hamilton County	NEW YORK	5379	4.0	1800	43	140,000
Moffat County	COLORADO	13184	18	4800	42	67,000
St. Helena Parish	LOUISIANA	10525	4.2	410	41	960,000
Coconino County	ARIZONA	116320	130	19,000	39	120,000
Clay County	WEST VIRGINIA	10330	1.6	350	38	1,300,000
Blanco County	TEXAS	8418	3.6	720	37	310,000
Park County	COLORADO	14523	8.2	2200	37	130,000

Table 11: Counties with Lowest Import/Export Factors for Total Diesel Sources

County	State	2000 Population	Emissions Input (tons/year)	County Area (hectares)	Import/ export factor	Benefits Output ($/ton)
New York County	NEW YORK	1537195	820	23	0.11	5,200,000
Norfolk city	VIRGINIA	234403	460	48	0.16	590,000
San Francisco County	CALIFORNIA	776733	870	47	0.19	2,500,000
Kings County	NEW YORK	2465326	630	60	0.20	6,200,000
Suffolk County	MASSACHUSETTS	689807	370	69	0.24	1,700,000
Denver County	COLORADO	554636	400	100	0.24	940,000
Bristol city	VIRGINIA	17367	17	5.1	0.27	1,200,000
San Juan County	WASHINGTON	14077	52	56	0.28	70,000
Newport News city	VIRGINIA	180150	180	75	0.28	510,000
Arlington County	VIRGINIA	189453	180	26	0.29	1,300,000
Bronx County	NEW YORK	1332650	290	40	0.31	7,700,000
Emporia city	VIRGINIA	5665	10	3.5	0.31	1,000,000
Fredericks-burg city	VIRGINIA	19279	26	7.3	0.31	880,000
Williamsburg city	VIRGINIA	11998	9.7	4.8	0.32	890,000
District of Columbia	DISTRICT OF COLUMBIA	572059	370	6	0.32	2,400,000
Dukes County	MASSACHUSETTS	14987	180	95	0.33	51,000
Queens County	NEW YORK	2229379	610	110	0.33	5,000,000
Manassas Park city	VIRGINIA	10290	6.6	1.7	0.34	990,000
Lynchburg city	VIRGINIA	65269	48	23	0.38	1,200,000
Richmond County	NEW YORK	443728	260	48	0.39	3,200,000

Table 12: Counties with Lowest Import/Export Factors for On-road Diesel Sources

County	State	2000 Population	Emissions Input (tons/year)	County area (hectares)	Import/ export factor	Benefits Output ($/ton)
San Francisco County	CALIFORNIA	776733	260	47	0.19	2,500,000
New York County	NEW YORK	1537195	91	23	0.20	9,900,000
Norfolk city	VIRGINIA	234403	33	48	0.23	840,000
Bristol city	VIRGINIA	17367	8.5	5.1	0.24	1,100,000
Denver County	COLORADO	554636	140	100	0.24	940,000
Kings County	NEW YORK	2465326	100	60	0.27	8,600,000
Bronx County	NEW YORK	1332650	94	40	0.28	7,100,000
Fredericks-burg city	VIRGINIA	19279	9.7	7.3	0.29	830,000
Emporia city	VIRGINIA	5665	2.9	3.5	0.31	1,000,000
Danville city	VIRGINIA	48411	16	17	0.32	1,200,000
Lynchburg city	VIRGINIA	65269	22	23	0.33	1,000,000
Franklin city	VIRGINIA	8346	1.7	3.2	0.33	1,600,000
Hampton city	VIRGINIA	146437	25	51	0.34	750,000
Harrisonburg city	VIRGINIA	40468	12	11	0.34	870,000
Queens County	NEW YORK	2229379	150	110	0.37	5,700,000
Suffolk County	MASSACHUSETTS	689807	84	69	0.37	2,600,000
District of Columbia	DISTRICT OF COLUMBIA	572059	90	66	0.37	2,800,000
St. Louis city	MISSOURI	348189	140	72	0.37	1,700,000
Arlington County	VIRGINIA	189453	35	26	0.38	1,700,000
Pinellas County	FLORIDA	921482	210	310	0.41	1,400,000

Table 13: Counties With Lowest Import/Export Factors for Non-road Diesel Sources

County	State	2000 Population	Emissions Input (tons/year)	County area (hectares)	Import/ export factor	Benefits Output ($/ton)
New York County	NEW YORK	1537195	730	23	0.094	4,600,000
Norfolk city	VIRGINIA	234403	430	48	0.16	580,000
Kings County	NEW YORK	2465326	530	60	0.18	5,800,000
San Francisco County	CALIFORNIA	776733	610	47	0.20	2,500,000
Suffolk County	MASSACHUSETTS	689807	280	69	0.20	1,400,000
San Juan County	WASHINGTON	14077	51	56	0.22	55,000
Denver County	COLORADO	554636	260	100	0.24	940,000
Newport News city	VIRGINIA	180150	150	75	0.25	450,000
Arlington County	VIRGINIA	189453	140	26	0.27	1,200,000
Dukes County	MASSACHUSETTS	14987	170	95	0.28	43,000
Williamsburg city	VIRGINIA	11998	8.6	4.8	0.29	800,000
Bristol city	VIRGINIA	17367	8.1	5.1	0.29	1,300,000
District of Columbia	DISTRICT OF COLUMBIA	572059	280	66	0.31	2,300,000
Emporia city	VIRGINIA	5665	7.2	3.5	0.31	1,000,000
Queens County	NEW YORK	2229379	460	110	0.31	4,800,000
Manassas Park city	VIRGINIA	10290	5.3	1.7	0.32	920,000
Bronx County	NEW YORK	1332650	190	40	0.32	8,100,000
Fredericks-burg city	VIRGINIA	19279	17	7.3	0.33	920,000
Salem city	VIRGINIA	24747	17	10	0.35	940,000
Richmond County	NEW YORK	443728	220	48	0.36	2,900,000

Figures 3 and 4 below illustrate the geographic distribution of county-level $PM_{2.5}$ benefit-per-ton estimates by source type. Two key summary conclusions may be drawn:

> *There is a high degree of spatial heterogeneity.* For example, the states of California, New Jersey and Florida contain among the highest benefit-per-ton estimates, while interior states such as North and South Dakota contain very low estimates. Human health benefit estimates are strongly influenced by population exposure. Other things being equal, counties with higher population density will exhibit larger benefit-per-ton estimates.
>
> *Estimates are not equally accurate for all counties.* The Benefits Module "flags" results for counties where the non-road and on-road benefit-per-ton values are likely to be more uncertain due to transport of fine particle concentrations into or out of a county. These counties, identified by the import/export factors, are hashed on these maps. They are often but not always counties with very high and very low emissions.

Figure 3: Distribution of County-Level Benefit-per-Ton of Diesel PM Emission Reductions: <u>On-road</u> Sources (Laden et al. mortality estimate, 2006$)

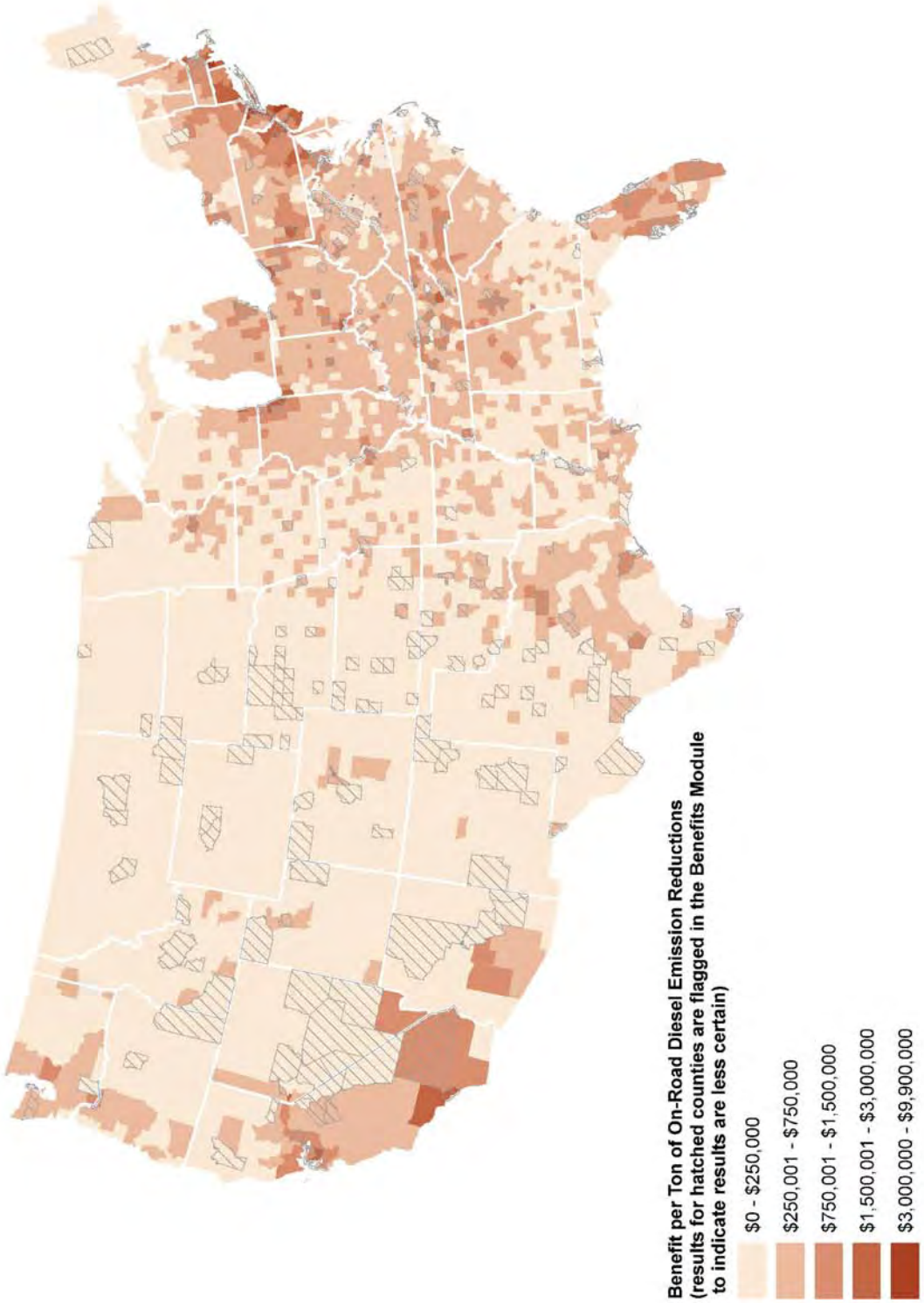
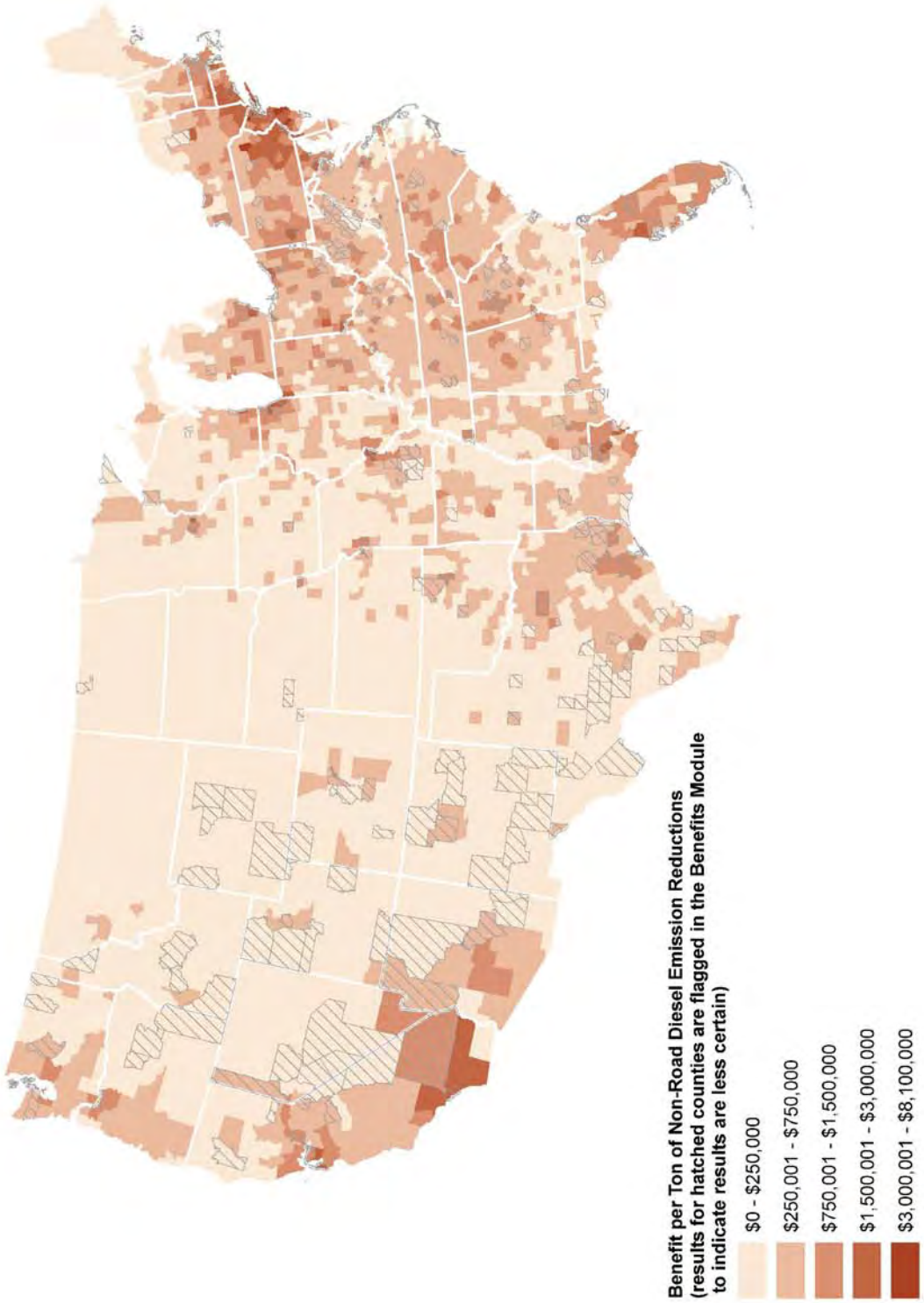


Figure 4: Distribution of County-Level Benefit-per-Ton of Diesel PM Emission Reductions: <u>Non-road</u> sources (Laden et al. mortality estimate, 2006$)



VI. EXAMPLE RESULTS

An example set of results for the Benefits Module are presented to assist users in understanding how the tools works. To provide example results, the Quantifier was run twice with two different scenarios. Results are presented for the "current" year – the year the emission reductions take place -- and dollar values are presented in 2006 dollars. These benefits would be expected to be similar in subsequent years, assuming that the performance of the emission reduction technology stays constant (for example, installed diesel catalysts continue to perform at the same efficiency). This is based on existing assumptions inherent in the Quantifier and some field research (Chandler et al., 2003). Given the scales and uncertainty in this analysis, we assume that population growth would slightly increase the benefits at roughly the same rate that discounting future benefits would reduce them. Therefore, this annual benefits number can be used as a rough estimate of annual benefits for each year of the lifetime of the engine retrofit.

To calculate these example results, the Quantifier was run for two counties: Cook County, IL and Anderson County, Texas. Cook County is a highly urban county, including the city of Chicago (land area 1,635 square miles and population in 2000 of 5.3 million), while Anderson County is a highly rural county southeast of Dallas (land area 1,078 square miles and population in 2000 of 55,109).

In the example scenario, 100 school buses were retrofitted in 2008 with diesel particulate filters and began using ultra low-sulfur diesel fuel (15 ppm sulfur). The buses were model year 2002 and traveled 13,000 miles per year. Before the retrofit, these 100 buses emitted a total of 0.32 tons/year of diesel PM. The retrofit reduced emissions 85%, or 0.27 tons per year.

In addition, 10 pieces of construction equipment (e.g. tractors, loaders, backhoes) were retrofitted in 2008 with diesel particulate filters and began using low-sulfur diesel fuel (500 ppm sulfur). The equipment was all model year 2000. Before the retrofit, the construction equipment emitted 0.20 tons/year. The retrofit reduced emissions 85%, or 0.17 tons per year.

Table 14 presents the estimates of the economic value of the emission reductions from both scenarios.

Table 14. Example Quantifier and Benefits Module results for Cook County, IL and Anderson County, TX

Benefits Module Results			
county	annual tons diesel PM reduction	annualized costs	annual benefits
Cook County, IL	0.44	$15,203	$1,000,000
Anderson County, TX	0.45	$15,203	$224,000

When reporting benefits estimates, we believe that there are two key uncertainties:

The assumptions used by EPA to derive the benefits-per-ton may differ significantly from the policy scenario in which users apply the benefit-per-ton. Specifically, the types of emission sources controlled, the temporal distribution of emission controls, the types of emissions, the source locations and background $PM_{2.5}$ levels may differ between the modeling scenario used to generate the benefit-per-ton estimates and the user-defined scenario.

The benefits-per-ton do not reflect certain non-linear relationships. Because the benefit-per-ton estimates are averages, they may not reflect non-linear relationships between air quality changes and background $PM_{2.5}$ levels. For example, because the concentration-response functions are non-linear, the estimated change in health impacts is sensitive to the background levels of $PM_{2.5}$ in the atmosphere. Overall we expect this to contribute a small amount to total uncertainty because the functional form of the mortality estimate (which represents the great majority of total benefits) is a nearly flat log-linear form.

VII. LITERATURE CITED

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VIII. WEBSITE INDEX/INTERNET RESOURCES

AERMOD model: www.epa.gov/scram001/dispersion_prefrec.htm#aermod

Assessment System for Population Exposure Nationwide (ASPEN) user's guide is available at www.epa.gov/scram001/userg/other/aspenug.pdf

BenMAP User's Guide Technical Appendices, Appendix I: Uncertainty and Pooling: www.epa.gov/air/benmap/models/BenMAPappendicesSept08.pdf

Diesel Emissions Quantifier

A more detailed description of the Quantifier, and access to the tool itself, can be found at www.epa.gov/cleandiesel/quantifier/

More information on the Quantifier can be found in the Users Guide, which is available on the website at www.epa.gov/cleandiesel/documents/420b10033.pdf

Documentation for the 2002 NEI is provided at www.epa.gov/ttn/chief/net/2002inventory.html

Documentation for the 2002 Mobile NEI is located at ftp://ftp.epa.gov/EmisInventory/2002finalnei/documentation/mobile/2002_mobile_nei_version_3_report_092807.pdf

EPA's MOBILE6 model is used to generate emission factors in grams per mile and then determining total annual tons using annual vehicle miles traveled (VMT): www.epa.gov/oms/m6.htm

EPA's National Mobile Inventory Model: NMIM, www.epa.gov/oms/nmim.htm

EPA's 2002 National-Scale Air Toxics Assessment (NATA): www.epa.gov/ttn/atw/natamain/

EPA's Draft Guidance for Discounting Future Costs and Benefits http://yosemite.epa.gov/ee/epa/eerm.nsf/vwAN/EE-0516-06.pdf/$File/EE-0516-06.pdf?OpenElement

NATA's use of the Hazardous Air Pollutant Exposure Model 5 (HAPEM5) can be found at www.epa.gov/ttn/atw/nata1999/ted/teddraft.html

2002 NATA and past results summarized: www.epa.gov/ttn/atw/nata1999/natafinalfact.html

NATA results: www.epa.gov/ttn/atw/natamain/

Science Advisory Board (SAB) peer review of the NATA approach: www.epa.gov/ttn/atw/sab/sabrev.html

Technology Transfer Network 1999 National-Scale Air Toxic Assessment: www.epa.gov/ttn/atw/nata1999/background.html

User's Guide for the Emissions Modeling System for Hazardous Air Pollutants (EMS-HAP) Version 3.0: www.epa.gov/scram001/userg/other/emshapv3ug.pdf

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#29]
Date: Tuesday, November 07, 2017 2:46:49 PM

Name	Chip Casteel
Email Address	
Address	
City	Clayton
State	MO
Zip Code	63105
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Individual
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses

Comments on Missouri's Environmental Mitigation Trust

The VW settlement presents a unique opportunity for Missouri to increase its investment in public transit, which can be an integral part of the overall $41 million plan for mitigation of mobile source emissions. Experts have shown that public transportation produces dramatically less emissions than private vehicles. Yet, Missouri invests only $.17M per year for all transit providers across the state -- this is a significantly lower commitment than many other states and is simply not satisfactory going forward. Please do your part to ensure that transit is part of the solution for Missouri's future, both in the context of this newfound VW settlement opportunity and beyond. Thank you for your consideration.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#25]
Date: Thursday, November 02, 2017 6:01:45 AM

Name	Chris Bartlow
Email Address	
Address	
City	Chesterfield
State	MO
Zip Code	63005
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Individual
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Charging Equipment for Light-duty Zero-emission vehicles

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#73]
Date: Thursday, January 18, 2018 3:53:53 PM

Name	Christine Hall
Email Address	
Address	
City	Saint Peters
State	MO
Zip Code	63376
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Individual
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Charging Equipment for Light-duty Zero-emission vehicles
Comments on Missouri's Environmental Mitigation Trust	I love my 100% electric vehicle, but we definitely need more quick charge stations. We will be purchasing another electric vehicle for our next car.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#61]
Date: Wednesday, December 13, 2017 11:19:49 AM

Name	Colin Priest
Address	
City	Jefferson City
State	MO
Zip Code	65101
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Individual
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 8: Local Freight Trucks and Port Drayage Trucks • Class 4-8: School Buses, Shuttle Buses or Transit Buses • Class 4-7: Local Freight Trucks • Option Involving the Diesel Emission Reduction Act
Comments on Missouri's Environmental Mitigation Trust	Could a program be instituted similar to cash for clunkers, where people with older trucks which don't meet current emissions standards can trade those vehicles in and the settlement money is used to help them purchase a newer truck which would meet the standards. This could apply to either large freight vehicles, or personal trucks.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#42]
Date: Thursday, November 30, 2017 11:21:39 AM

Name	Dan Bryan
Email Address	
Address	
City	Desloge
State	Mo
Zip Code	63601
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 8: Local Freight Trucks and Port Drayage Trucks • Class 4-7: Local Freight Trucks

Comments on Missouri's Environmental Mitigation Trust

New emissions standards have increased prices for diesel trucks used by local governments. Often, cities have difficulties dealing with the expense of replacing diesel trucks and equipment. The higher priced replacement diesels present a disincentive for local governments, in that maintaining older and higher emission vehicles often proves cheaper than purchasing replacements with lower emissions. Replacement assistance will overcome the tendency to operate existing high emission vehicles through their lengthy design life to defer higher replacement costs. Residents will more readily accept early replacement of functioning government equipment with subsidies rather than local tax revenue. Often times, the rural areas of Missouri and the cities and counties outside the more metropolitan or higher populated cities are the areas that unfortunately are forced to utilize these older diesel vehicles with higher emissions output.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#47]
Date: Sunday, December 03, 2017 8:52:33 PM

Name	David Riddle
Email Address	
Address	
City	Springfield
State	Missouri
Zip Code	65807
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Individual
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses
Comments on Missouri's Environmental Mitigation Trust	Use all of the money to fund grants to Missouri's transit systems.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#17]
Date: Thursday, October 26, 2017 9:41:04 PM

Name	David Schatz
Email Address	
Address	
City	Campbell
State	CA
Zip Code	94402
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Small Business • Advocate for Electric Vehicle Charging Stations
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Charging Equipment for Light-duty Zero-emission vehicles
Comments on Missouri's Environmental Mitigation Trust	Please see attached comments file. Thank you for your consideration of ChargePoint's comments.
Document Upload Option	Attachment Below

ChargePoint, Inc.
254 East Hacienda Avenue | Campbell, CA 95008 USA
+1.408.841.4500 or US toll-free +1.877.370.3802

October 26, 2017

Kyra Moore, Director
Air Pollution Control Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

RE: Comments on Proposed Mitigation Plan for the Volkswagen Environmental Mitigation Trust

Dear Ms. Moore,

Thank you for the opportunity to provide comments on the Environmental Mitigation Trust funding allocated to the State of Alabama under Appendix D of the VW Settlement. ChargePoint is the largest electric vehicle (EV) charging network in the world, with charging solutions for every charging need and all the places EV drivers go: at home, work, around town and on the road. With more than 41,000 independently-owned charging spots and more than 7,000 customers nationwide, ChargePoint drivers have completed more than 29 million charging sessions, saving upwards of 28 million gallons of gasoline and driving more than 687 million gas-free miles. In addition, there are currently more than 1,300 ChargePoint charging spots in the State of Alabama.

Background on VW Settlement

In 2016, Volkswagen entered into a consent decree with the federal government and the State of California to resolve damages, penalties, and mitigation actions associated with 2.0- and 3.0-liter vehicles involved in “Dieselgate”. Appendix D establishes a $2.9 billion trust for environmental mitigation, the funds of which will be allocated to all 50 states in amounts proportionate to each state’s number of VW diesel vehicles involved in the case. On October 2, 2017, parties to the Settlement filed trust agreements with the Court, establishing Environmental Mitigation Trust effective date. In Missouri’s case the State will receive nearly $41.2 million.

Within 60 days of the trust effective date (by December 1, 2017), each state may designate and certify a beneficiary agency, an entity charged to oversee program implementation and funds. The State of Missouri has indicated that the Department of Natural Resources (MoDNR) will be the lead agency and act on behalf of the trust for the State.

Recommended Eligible Mitigation Projects in Missouri

Appendix D-2 of the VW Settlement Consent Decree details how each beneficiary agency must invest trust allocations in eligible mitigation projects designed to reduce NOx emissions. Importantly, up to fifteen percent (15%) of a state’s trust allocation may be put towards deploying new, light-duty electric vehicle supply equipment (EVSE).

ChargePoint recommends that Missouri allocate the maximum 15% of its allocation towards electric vehicle charging infrastructure. We believe that this investment in EVSE will significantly

support increased electric vehicle adoption throughout the State. Additionally, we recommend that the following features be included in a light-duty EVSE program, which we suggest be dispersed through a simple rebate and/or grant program:

1. Incentives should be structured simply through rebates, vouchers, or a straightforward grant program;
2. Supports competition and allow multiple vendors and business models to participate in any program;
3. When possible, requires site hosts of charging stations to have “skin in the game” and provide private match, which will stretch the value of the investment and lead to more efficient siting of infrastructure;
4. Encourage data collection that could be shared with state agencies for planning purposes, enabled through the use of networked smart charging stations;
5. Coordinates with other state and utility programs;
6. Seeks to coordinate with neighboring states to establish EV fast charging corridors, including those identified by the FAST Act, as well as prepare for future federal corridor designations; and,
7. Focuses funding on areas of greatest need include workplaces, multifamily housing, and disadvantaged communities.

Additional Appendix D Funding

Beyond the 15% allocation to EV charging infrastructure, ChargePoint encourages the State to allot a significant portion of the remaining 85% to electrification categories over other fuel types, which will lead to long-term transportation emissions reductions and increased efficiency. For example, Electric buses get the equivalent of 21 miles per gallon (MPG), compared to 4 MPG in conventionally-fueled buses. Every mile driven in an electric bus will save taxpayers about 60-70% of what they would have paid with a diesel engine, per mile. Given currently available technology, ChargePoint suggests Missouri prioritize electric buses and medium-duty transit vehicles.

Under the terms of the Environmental Mitigation Trust, funds used for electric buses and medium-duty transit vehicles may cover the cost of the vehicle and associated charging infrastructure. ChargePoint notes that some electric buses and trucks have the ability to charge on standard DC fast charging stations, which may also be used for light-duty vehicles. Investing in those models and associated infrastructure will allow public light-duty fast charging stations to be leveraged for bus charging and other fleet needs. Possible bus electrification programs could support regional, municipal, and school bus fleets.

Thank you for your consideration. If you have any questions, please contact me at david.schatz@chargepoint.com or (215) 858-4748.

Sincerely,

David Schatz
Director, Public Policy
ChargePoint

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#34]
Date: Friday, November 10, 2017 6:18:38 PM

Name	Dean Stapleton
Email Address	
Address	
City	Reading
State	PA
Zip Code	19607
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Interest Group • Operator of Private Fleet
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 8: Local Freight Trucks and Port Drayage Trucks • Class 4-8: School Buses, Shuttle Buses or Transit Buses • Class 4-7: Local Freight Trucks • Forklifts and Other Equipment for Handling Port Cargo
Document Upload Option	Attachment Below

November 10, 2017

Kyra Moore
Missouri Department of Natural Resources
1101 Riverside Dr.
Jefferson City, MO 65102

Re: Penske Comments on VW Funding Planning

Dear Ms. Moore:

Penske would like to thank the Missouri Department of Natural Resources (DNR) for the opportunity to provide comments on the Volkswagen settlement funding plan for the state. The Missouri DNR has consistently provided an opportunity for stakeholder engagement and feedback to shape and refine programs to ensure they are meeting their intended purposes—a process we strongly respect and admire.

Penske remains committed to reducing vehicular emissions and accelerating deployment of cleaner vehicle technology and can be a natural partner with the state in achieving some of its goals to reduce emissions from transportation. Penske's average customer size is between 8 and 12 trucks and is able to provide comprehensive vehicle services to companies that do not have the financial capital and necessary experience to purchase and maintain alternative fueled vehicles. Leasing with Penske provides the following benefits to fleets:

- No upfront purchase costs and concerns about vehicle residual/resale
- No costs to modify maintenance facilities
- No maintenance training costs and investment in special tools
- No fueling anxiety as Penske will help with vehicle routing and fueling contracts
- 24/7 Roadside assistance & nationwide service network
- Cost savings from Penske's purchasing power for fuels and vehicles that can be passed onto customers

In order to provide alternative fuel vehicles at competitive rates with their diesel and gasoline counterparts, Penske leverages incentives, such as grant programs and tax credits. Since Penske accesses these programs throughout the U.S., we have come to understand the programs that work best to incentivize clean vehicle deployment for small, mid-sized and large fleets alike. We are providing this insight to you so that you may consider it as you work to create funding programs from the VW settlement but also in your efforts to create future incentive programs to deploy cleaner and more advanced vehicle technology within the state. Specifically, we would recommend the following:

1. **Treat vehicle leasing like any other financing mechanism and allow fleets the opportunity to have equal access to program funding regardless of the financing mechanism**. Programs can be created in ways that allow you to achieve your objectives in terms of the certain number of years in operation; requirements to hold onto the vehicle for a certain length of time; and targets on mileage/area operation. This can all be done with leasing—just like it can be done with vehicle loans directly by the fleet. We would encourage that you develop programs that do

not differentiate between the financing mechanisms used and instead focus on the specific objectives you are trying to achieve, regardless of the financing mechanism utilized to get there.

2. **Create a priority list** versus a wait list that will allow for you to rank projects that achieve better emissions reductions through replacement of vehicle miles travelled of traditional diesel or gasoline.
3. If you do create a waiting list mechanism for an ongoing program, **provide waiting list and application funding transparency.** Funds for clean vehicle programs frequently become oversubscribed almost immediately upon program opening for popular funding programs. A simple email list that lets people know weeks before the date it will open will allow for transparency in the program.
4. **Ability to move between weight classes and increase number of vehicles** once awarded. From the period of application to award, things change. Maintaining programmatic flexibility while ensuring that projects are still held to their allocated dollar amount and program effectiveness (e.g., meeting emissions requirements) is key.
5. **Simple contracting mechanisms** are key to ensure faster deployment. We have seen that purchase order formats with terms and conditions in a 1-2 page format on the back of a purchase order, such as that in Colorado, work really well and are easy to understand and follow.
6. **Simple reporting templates** are key to encourage and receive timely reporting. We recommend 2-4 times a year and have it specific to fuel use, mileage and listing of any project challenges encountered.
7. **Quick payment periods** are essential, especially for smaller fleets, so they do not have to carry expenses for too long without reimbursement.
8. **Scrappage alternatives** are very helpful as frequently companies will see this as a barrier to entry. Many fleets know that their 10 year old truck, for example, carries more value than what can be achieved when just sending it to a dismantler and collecting scrap value. Yet we recognize the state might not want these vehicles to reenter the state. Allow for flexibility here to dispose of the vehicles in ways other than outright scrappage—perhaps an export option like that allowed in Texas or even the opportunity to sell the vehicle to a fleet who has much older units in operation as a 10 year diesel vehicle would be cleaner than a 20 or 30 year old unit that is in operation. Another key opportunity area is to provide a way for an entity like Penske to apply for the funding but for the end user (the actual fleet) to turn in one of their vehicles.

We are eager to work with you and your team to advance cleaner vehicle technology and to reduce emissions in the state. When fleets choose Penske for their clean vehicle needs, it is analogous to hiring an experienced in-house alternative fuel team, and the fleets we work with in your state are eager to replace some of their older vehicles with cleaner and more fuel efficient, less polluting options.

Sincerely,

Dean Stapleton, Senior Manager of Alternative Fuels
Penske Truck Leasing

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#9]
Date: Tuesday, October 10, 2017 12:55:35 PM

Name	Drew Brooks
Email Address	
Address	
City	Columbia
State	MO
Zip Code	65203
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government • Operator of Public Fleet • Advocate for Alternative Fuels
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses
Comments on Missouri's Environmental Mitigation Trust	It is my recommendation, as the current Vice President of the Missouri Public Transit Association and a transit manager in Columbia, MO, that these funds be spent on low emission or no emission public transit vehicles. Transit vehicle have the best ROI when it comes to lowering emissions and creating positive economic impacts.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#21]
Date: Tuesday, October 31, 2017 8:04:38 AM

Name	Eric Holder
Email Address	
Address	
City	INdependence
State	MO
Zip Code	64051
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 8: Local Freight Trucks and Port Drayage Trucks • Class 4-7: Local Freight Trucks • Charging Equipment for Light-duty Zero-emission vehicles

Comments on Missouri's Environmental Mitigation Trust

The City of Independence would like to express its interest in grant funding. We feel we represent a great value proposition for the state as it considers how best spend grant money and lower NOx emissions. We are located in Jackson County, one of the highest density counties in the state for offending VW vehicles sold. Our City owns and operates the only publically owned, non-profit electric utility in Jackson County. This makes us uniquely qualified to locate and provide free to low cost electricity for EV Charging Stations in the City. The location of the I-70 and I-470 corridors running through our city offer prime support locations for EV Charging infrastructure encouraging the use of electric vehicles commuting in and out of the Kansas City Metropolitan area.

Reimer, Shelly

From: Wufoo <no-reply@wufoo.com>
Sent: Thursday, October 05, 2017 7:41 AM
To: Reimer, Shelly
Subject: DNR - VW Settlement [#4]

Name	Eric Holder
Email Address	
Address	
City	Independence
State	MO
Zip Code	64057
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	Class 4-7: Local Freight Trucks Charging Equipment for Light-duty Zero-emission vehicles

Comments on Missouri's Environmental Mitigation Trust

The City of Independence is a progressive city and our newly adopted strategic plan "Independence for All" calls for the transformation of our City through engagement, innovation, and sustainable services. This commitment to a green, sustainable future is evidenced by the recent completion of the Independence Community Solar Farm and the Independence Utilities Center, a Leadership in Environmental and Energy Design (LEED) Platinum building. With firm 2018 commitments to expand our Community Solar Farm in 2018, It will soon be one of the largest solar farms in the State. The City of Independence would like to expand its green energy offerings to our citizens and the metro by locating numerous electric vehicle charging stations throughout our city. We believe that the I-70 and I-470 corridors which traverse our city make ideal locations for this green energy offering that will encourage the expansion of electric vehicles and the reduction

of NOx and other mobile source pollution in Missouri.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#58]
Date: Monday, December 11, 2017 9:31:16 AM

Name	Glenda Stegner
Email Address	
Address	
City	Rogersville
State	MO
Zip Code	65742
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-7: Local Freight Trucks

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#72]
Date: Monday, January 15, 2018 3:24:18 PM

Name	Guy Kuhn
Email Address	
Address	
City	marion
State	Illinois
Zip Code	62959
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Small Business
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses

Reimer, Shelly

From: Wufoo <no-reply@wufoo.com>
Sent: Monday, October 09, 2017 1:15 PM
To: Reimer, Shelly
Subject: DNR - VW Settlement [#7]

Name	Hollie Elliott
Email Address	
Address	
City	Buffalo
State	MO
Zip Code	65622
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	Interest Group
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	Class 8: Local Freight Trucks and Port Drayage Trucks Class 4-8: School Buses, Shuttle Buses or Transit Buses Freight Switchers Class 4-7: Local Freight Trucks

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#69]
Date: Friday, January 12, 2018 3:08:36 PM

Name	Isabel Villa-Garcia
Email Address	
Address	
City	Washington
State	District of Colombia
Zip Code	20001
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Trade Association
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Charging Equipment for Light-duty Zero-emission vehicles

Document Upload Option	Attachment Below

January 12, 2018

Ms. Kyra Moore
Director
Air Pollution Control Program
Missouri Department of Natural Resources
P.O Box 176
Jefferson City, MO 65102

RE: Maximizing Settlement Fund Allocation for Charging and Hydrogen Refueling Infrastructure

Dear Director Moore:

The Association of Global Automakers (Global Automakers) represents the U.S. operations of international motor vehicle manufacturers, original equipment suppliers, and other automotive-related trade associations. In 2016, Global Automakers members manufactured 36% of all new motor vehicles and 71% of green technology vehicles sold in Missouri.

Global Automakers and our members have a longstanding commitment to improving air quality, reducing greenhouse gas emissions, and increasing fuel efficiency. Our members are investing heavily in alternative fuel and green technologies, including being the first to successfully launch hybrid electric vehicles 20 years ago and since then plug-in and fuel cell electric vehicles. We are proud that the number of electric-drive vehicles, in a variety of options and price points, are increasing every year.

Under Appendix D of the Volkswagen settlement, Missouri is due to receive $41 million, which can be used for a variety of environmental-based projects. A maximum of 15% of this money, or $6.2 million, can be used for the acquisition, installation, operation, and maintenance of electric vehicle infrastructure.

Global Automakers urges the State of Missouri to allocate the full 15% towards this effort and to support all electric vehicle infrastructure – charging stations *and* hydrogen refueling stations. The state needs to establish a strong foundation for electric vehicles by expanding its network of charging and building out a network of hydrogen refueling stations to support sales of electric vehicles. Increasing available infrastructure is critical to the state's ability to advance electrification. Range anxiety is a significant impediment to sale of electric vehicles.

In 2017, Missouri's electric-drive vehicle sales made up 0.4% of new vehicles sold. With more electric-drive vehicle options expected in the coming years, in a variety of prices and segment, sales of these vehicles are expected to increase. Investment in electric vehicle infrastructure will prepare the market for these new offerings while furthering air quality and supporting customers today in your state that choose to buy electric vehicles.

GlobalAutomakers

Should you have any questions, please do not hesitate to contact us. Thank you for your consideration of our request, and your continued support of electrification.

Sincerely,

Damon Shelby Porter
Director
State Government Affairs

Julia M. Rege
Director
Environment and Energy

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#16]
Date: Thursday, October 26, 2017 11:05:02 AM

Name	Jane Hinds
Email Address	
Address	
City	Columbia
State	MO
Zip Code	65201
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Charging Equipment for Light-duty Zero-emission vehicles

Reimer, Shelly

From: Wufoo <no-reply@wufoo.com>
Sent: Friday, October 13, 2017 12:23 PM
To: Reimer, Shelly
Subject: DNR - VW Settlement [#12]

Name	Jared Richmond
Email Address	
Address	
City	Carl Junction
State	MO
Zip Code	64834
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	School District
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	Class 4-8: School Buses, Shuttle Buses or Transit Buses
Comments on Missouri's Environmental Mitigation Trust	I think school buses would be a great choice. I would also like to see buses with alterative fuels or electric.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#70]
Date: Friday, January 12, 2018 9:01:02 PM

Name	Jim Struckel
Email Address	
Address	
City	Webster Groves
State	Missouri
Zip Code	63119
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Individual • Advocate for Electric Vehicle Charging Stations
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Charging Equipment for Light-duty Zero-emission vehicles
Comments on Missouri's Environmental Mitigation Trust	Install some level 1 and/or level 2 charging stations at Missouri VA hospital parking lots/garages, and also at the new (to be built) National Geospatial-Intelligence Agency in St Louis.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#28]
Date: Thursday, November 02, 2017 11:12:32 PM

Name	Jim Struckel
Email Address	
Address	
City	Webster Groves
State	Missouri
Zip Code	63119
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Individual • Interest Group • Advocate for Electric Vehicle Charging Stations
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses • Class 4-7: Local Freight Trucks • Charging Equipment for Light-duty Zero-emission vehicles
Comments on Missouri's Environmental Mitigation Trust	I would like to see more level 2 and level 3 electric vehicle charging stations along interstate highways in Missouri. Specific areas in St Louis that I would like to see level 2 and level 3 charging stations: I-44 and Lindbergh Blvd; I-64 and Lindbergh Blvd; I-64 and Brentwood Blvd; I-70 and Lindbergh Blvd. Thank you.

Reimer, Shelly

From: Wufoo <no-reply@wufoo.com>
Sent: Thursday, October 05, 2017 12:40 PM
To: Reimer, Shelly
Subject: DNR - VW Settlement [#5]

Name	John Harrington
Email Address	
Address	
City	Granby
State	Mo
Zip Code	64844
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	Individual
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	Class 4-8: School Buses, Shuttle Buses or Transit Buses
Comments on Missouri's Environmental Mitigation Trust	Use the money to replace old diesel school buses with new propane powered ones. Offer the opportunity to smaller more rural school districts first! they are likely to have the older buses and need the most help.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#27]
Date: Thursday, November 02, 2017 3:39:07 PM

Name	John Hunter
Email Address	
Address	
City	Dexter
State	MO
Zip Code	63841
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Small Business

Comments on Missouri's Environmental Mitigation Trust

The biodiesel industry has created a renewable, clean burning fuel source that reduces emissions. Life cycle analysis completed by Argonne National Laboratory found that greenhouse gas emissions for 100% biodiesel (B100) are 74% lower than those from petroleum diesel. Blending biodiesel with petroleum diesel is a proven and effective way to reduce emissions.

Using the settlement funds to increase biodiesel use and awareness is exactly what the Department of Natural Resources (Department) should be considering. The Missouri Qualified Biodiesel Producer Incentive Fund (Biodiesel Fund) is a great example of government programs that worked as intended. Unfortunately the state has not upheld their end of the deal which wrongfully has taken the main focus away from increasing biodiesel use/emission reduction and instead the industry is spending thousands of hours and dollars trying to get the money producers and investors are owed by the state of Missouri.

Other states have already detailed their plans to use the settlement money to increase use of clean-burning diesel and we should do the same. I strongly encourage the Department to use a small portion of the settlement funds to pay the remaining balance due under the Biodiesel Fund thus carrying out the mission of the Air Pollution Control Program and the settlement agreement.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#32]
Date: Friday, November 10, 2017 8:07:08 AM

Name	John View
Email Address	
Address	
City	NIXA
State	MO
Zip Code	65714
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Individual
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#19]
Date: Monday, October 30, 2017 7:30:07 AM

Name	Joseph Pemberton
Email Address	
Address	
City	Lebanon
State	MO
Zip Code	65536
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Small Business • School District • Trade Association
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses

Comments on Missouri's Environmental Mitigation Trust

District owned school bus fleets across Missouri in 2017 average 7.89 years old. This doesn't appear all that bad at first until you consider the districts that are pulling that average down. Lebanon MO. school district is one of those districts with an average age bus of 17 years old, the oldest one in the fleet is 26 years old. School districts have suffered from funds being consistently being cut for several years and continue to struggle with more cut in the future. Districts such as Lebanon R-3 need new buses as the upgrades to emissions would in reality spending more on upgrades than what the value of the buses are actually worth. Today's meeting in Jefferson City will be the first that I have attended so I apologize if this information is not what you are requesting I will be better informed after today. Thank You

Reimer, Shelly

From: Wufoo <no-reply@wufoo.com>
Sent: Wednesday, October 11, 2017 5:25 PM
To: Reimer, Shelly
Subject: DNR - VW Settlement [#10]

Name	Josh Boehm
Email Address	
Address	
City	Kansas City
State	MO
Zip Code	64111
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	Individual
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	Class 4-8: School Buses, Shuttle Buses or Transit Buses

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#74]
Date: Monday, January 22, 2018 4:27:54 PM

Name	Katherine Wurtz
Email Address	
Address	
City	Knoxville
State	Tennessee
Zip Code	37902
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Small Business
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Freight Switchers

Comments on Missouri's Environmental Mitigation Trust

KEW Grant Services LLC is submitting comment for railcar movers to be reviewed as an eligible project under the freight switcher category for VW funding. Currently, an all-electric railcar mover is the only electric freight switcher option currently available. (Please reference the attached NASEO document pg. 26).

KEW Grant Services LLC reached out to the EPA to clarify the eligibility of an all-electric railcar mover and the EPA provided the response below on October 20, 2017:
"The EPA is not offering technical guidance to beneficiaries or private entities, and has no role in determining the eligibility of funding requests. Questions regarding Eligible Mitigation Actions 1-9 for states should be directed to your designated lead state agency."

Electric railcar movers perform the same function as a freight switcher and cost between $840,000 and $1,260,000 including charging infrastructure.

Document Upload Option	Respondent included a digital copy of the National Association of State energy Offices' VW Trust Beneficiary Mitigation Plan Toolkit. The document is available online. Click here to access the document.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#43]
Date: Thursday, November 30, 2017 11:57:22 AM

Name	Ken Scott
Email Address	
Address	
City	Willard
State	Missouri
Zip Code	65781
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Comments on Missouri's Environmental Mitigation Trust	I'm not seeing a classification for Fire Apparatus or Public Safety type vehicles

Reimer, Shelly

From: Wufoo <no-reply@wufoo.com>
Sent: Friday, October 13, 2017 8:53 AM
To: Reimer, Shelly
Subject: DNR - VW Settlement [#11]

Name	Kenneth Cook
Email Address	
Address	
City	Malden
State	MO
Zip Code	63863
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	School District
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	Class 4-8: School Buses, Shuttle Buses or Transit Buses

Comments on Missouri's Environmental Mitigation Trust

It seems to me the best solution is to replace aging school buses throughout Missouri with clean idle and clean emission vehicles. Even though there is a program to replace aging school buses, funding is limited and the requirements are sometimes difficult to meet for smaller rural school districts. For instance, the bus replacement program requires that the new bus be similar in horsepower to the new bus. In my district our older buses were purchased with a very small engine which does not adequately pull the buses over the railroad tracks. We have to be extra careful when crossing the tracks with these buses due to the extra time it takes to get the bus to move and clear the tracks. It doesn't make sense to replace these buses with a bus that is no better than the one we have even though the newer bus would have less emissions.

Furthermore, if there is a decision to use the money to replace aging school buses, the formula for distributing the funds should take into account that our smallest districts still must transport students and sometimes has the most difficult time purchasing buses. For instance, districts in the 0-500 range would be able to purchase one bus, 501 to 1000 range purchase two buses, etc. I also think there should be a cap on the funds per district of say $80,000 and if the district wanted more options then the district would pay the difference. Finally I think that bus contractors should not be able to participate in this program as they build in to their expenses periodic replacement of buses.

Therefore I respectfully submit that these funds be used to replace aging school buses in public schools and help supplement the loss of money from the legislature through the transportation formula.

Reimer, Shelly

From: Wufoo <no-reply@wufoo.com>
Sent: Wednesday, October 04, 2017 4:07 PM
To: Reimer, Shelly
Subject: DNR - VW Settlement [#2]

Name	Kevin Herdler
Email Address	
Address	
City	St. Louis
State	MO
Zip Code	63126
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	Advocate for Alternative Fuels
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	Class 8: Local Freight Trucks and Port Drayage Trucks Class 4-8: School Buses, Shuttle Buses or Transit Buses Ferries/Tugs Class 4-7: Local Freight Trucks Option Involving the Diesel Emission Reduction Act
Comments on Missouri's Environmental Mitigation Trust	As you know, we support your program fully and will be here to help as needed. Asking that you highlight American Fuels and vehicles including biodiesel.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#67]
Date: Thursday, January 11, 2018 10:20:04 AM

Name	Kevin Pearson
Email Address	
Address	
City	Nixa
State	MO
Zip Code	65714
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Advocate for Alternative Fuels
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses
Comments on Missouri's Environmental Mitigation Trust	I believe we should use 100% of the money for school bus replacement. It should be up to the individual school systems as to what fuel they would like to use in the new buses.

Reimer, Shelly

From: Wufoo <no-reply@wufoo.com>
Sent: Tuesday, October 10, 2017 12:30 PM
To: Reimer, Shelly
Subject: DNR - VW Settlement [#8]

Name	Kim Cella
Email Address	
Address	
City	St. Lois
State	MO
Zip Code	63101
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	Interest Group
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	Class 4-8: School Buses, Shuttle Buses or Transit Buses

Comments on Missouri's Environmental Mitigation Trust

Public Transit can be an integral part of the mitigation solution. The Missouri Public Transit Association provider members provide more than 62 million rides almost everywhere for everybody every day in Missouri and they employ thousands in our communities. In addition, transit service in this state has a direct impact on our environment. According to national transit experts, public transportation produces 95% less carbon monoxide, 90% less volatile organic compounds (vocs) and about half as much carbon dioxide and nitrogen oxide per mile compared to private vehicles. With more people using public transit, we decrease our reliance on fossil fuels. If one in 10 Americans used transit regularly, U.S. reliance on foreign oil could decline by more than 40%, or nearly the amount of oil imported from Saudi Arabia each year. In addition, according to the American Public Transit Association the state receives a $4 return for every one dollar invested in transit.

Missouri currently provides little assistance for transit providers even though transit provides significant benefits for this state. Last year, the Missouri Legislature allocated only $1.7 million for transit providers across the state. The Volkswagen Environmental Mitigation Trust is an opportunity for Missouri to make a significant difference in our environment and the state's economy by investing in transit. Please consider transit as a part of your solution when developing the plan for investment. Thank you for your consideration and please feel free to reach out with any questions.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#44]
Date: Thursday, November 30, 2017 1:28:18 PM

Name	Lisa Disbrow
Email Address	
Address	
City	St. Louis
State	MO
Zip Code	62147
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Operator of Private Fleet
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 8: Local Freight Trucks and Port Drayage Trucks

Comments on Missouri's Environmental Mitigation Trust

Thank you for the opportunity to provide comments on Missouri's VW Settlement Trust and mitigation plan.

Waste Management has been a pioneer in natural gas since the early 1990s and invested more than $1 billion in transportation innovation. In fact, Waste Management has the largest industrial fleet of natural gas trucks with over 6,000 in operation. We support this fleet with fueling capabilities at 100 of our sites, including 25 public fueling stations. In Missouri, Waste Management has over 100 diesel trucks to be replaced by natural gas trucks. Much of our St. Louis fleet consists of diesel trucks (and thus have higher emissions) because we have been investing in natural gas trucks in those states offering incentive programs for such investments.

We would recommend the Air Pollution Control Program give preference to compressed natural gas vehicles and funding for private industry. According to the Natural Gas Vehicle Association of America (NGVA), natural gas vehicles deliver the most cost effective nitrogen oxides (NOx) emissions reductions, dollar for dollar, of all vehicles eligible for VW Settlement Funds. Natural gas engines are the cleanest heavy-duty truck engines in the world. In September 2015, the U.S. EPA and the California Air Resources Board (CARB) certified the world's first heavy-duty engine that emit NOx at levels so low they are considered "near-zero" (0.02g NOx/bhp-hr). This is the cleanest commercially available heavy-duty engine available in the market today, offering the ability to reduce emissions 90% below even the most stringent U.S. EPA standards. Compared to new diesel trucks, natural gas engines today meet an optional Low NOx Standard that is ten times cleaner than the standard required for new diesel engines. In addition, the new "Near-Zero" engine has tailpipe emissions comparable to or lower than the NOx emitted to produce electricity used to charge a comparable

heavy-duty All-Electric Truck.

As the fund must be used to address excess NOx emissions through vehicle purchases or repowers, the State of Missouri has a significant opportunity to make a real impact in reducing NOx as well as the associated “free” greenhouse gas (GHG) emission reductions, in the state. We would ask the Air Pollution Control Program to earmark funds in the mitigation plan for private industry vehicles from the VW Settlement Fund to achieve the biggest environmental bang and allow the funding to go three times as far by taking advantage of private investment with additional economic activity. Those trucks are proven at scale and offer immediate air quality improvements in Missouri.

The refuse industry is a perfect industry for natural gas trucks as they run similar routes each day and always return to the same spot. Transitioning to a natural gas fleet requires significant capital investment – over $300,000 per truck. This investment results in significant reduction in NOx – which is what the VW Settlement is intended to specifically remedy as well as GHG emissions. CNG vehicles are 26% more cost effective on a dollar/ton of NOx reduced basis than a new diesel trucks. A new, near-zero NOx CNG truck will emit about 0.04 tons of NOx over its lifetime versus an existing diesel, which emits 1.11 tons of NOx. Funding natural gas vehicles will lead to the largest dollar-for-dollar total reduction in NOx emissions associated with this funding.

Attached is supporting documentation.

Lisa Disbrow
Director – Government & Public Affairs
Waste Management of Missouri, Inc.

Document Upload Option	Attachment Below

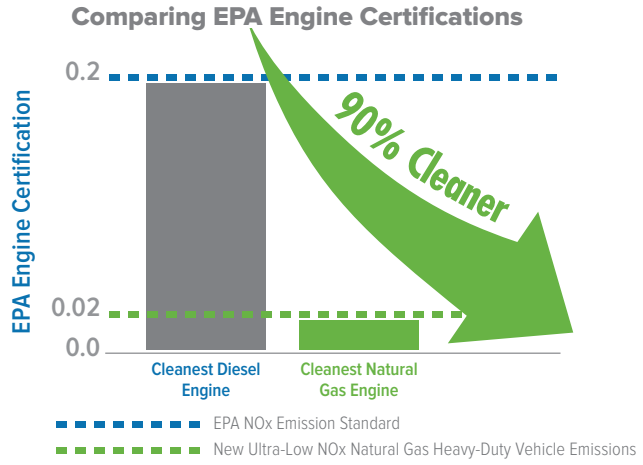
Make a Bold Impact on Air Quality Today

More than 50% of Americans are exposed to unhealthful levels of ozone and particulate pollution, putting them at greater risk for asthma, lung cancer, cardiovascular disease, and premature death. Volkswagen's $2.9 billion Environmental Mitigation Trust fund provides each state an incredible opportunity to make an immediate and tangible impact on air quality by targeting medium- and heavy-duty vehicles—the leading source of these toxic air contaminants in almost every metropolitan area.

Natural gas vehicles (NGVs) can transform the medium- and heavy-duty transportation sector.

Sustainable:

NGVs Offer the Cleanest Heavy-Duty Truck Engines in the World



Natural gas medium- and heavy-duty engines provide unmatched reductions of smog-forming emissions of nitrogen oxides (NOx). In 2015, a revolutionary natural gas engine was certified by the U.S. Environmental Protection Agency and California Air Resources Board to a level 90% below the EPA's current exhaust standard and 90% below the cleanest diesel engine. A truck with this engine has an emission profile equivalent to that of a heavy-duty battery electric truck.

Available:

NGVs are Commercially Available Today Across All Applications Qualified for Funding

NGVs are commercially available from traditional truck OEMs with established sales and service networks. Retrofit and repower options are also available from a variety of manufacturers.

Applications Include:

- Cement Mixer
- City Delivery Truck
- Conventional Van
- Dump Truck
- Fuel Truck
- Heavy Semi Tractor
- Large Walk In Van
- Motor Coach
- Rack Truck
- Refrigerated Van
- Refuse Truck
- Single Axle Van
- School Bus
- Shuttle Bus
- Transit Bus
- Tow Truck
- Utility Truck

Responsible:

Dollar-for-Dollar, NGVs Deliver the Most Cost-Effective NOx Emissions Reductions

The calculations shown below assume the deployment of the cleanest commercially available model for each application. Funding natural gas vehicles will lead to the largest total reduction in NOx emissions.

Short/Regional Haul Trucks

	Natural Gas	Diesel	Electric
$ per lb of NOx	$39	$54	$85
Technology Cost	$150,000	$100,000	$324,000
NOx Reduced	3,810 lbs	1,858 lbs	3,810 lbs

Refuse Trucks

	Natural Gas	Diesel	Electric
$ per lb of NOx	$140	$190	$313
Technology Cost	$300,000	$270,000	$670,000
NOx Reduced	2,141 lbs	1,417 lbs	2,141 lbs

School Buses

	Natural Gas	Diesel	Electric
$ per lb of NOx	$220	$291	Not Commercially Available
Technology Cost	$148,000	$115,000	
NOx Reduced	671 lbs	396 lbs	

Transit Buses

	Natural Gas	Diesel	Electric
$ per lb of NOx	$273	$540	$569
Technology Cost	$360,000	$300,000	$750,000
NOx Reduced	1,318 lbs	555 lbs	1,318 lbs

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Natural Gas Vehicles for America

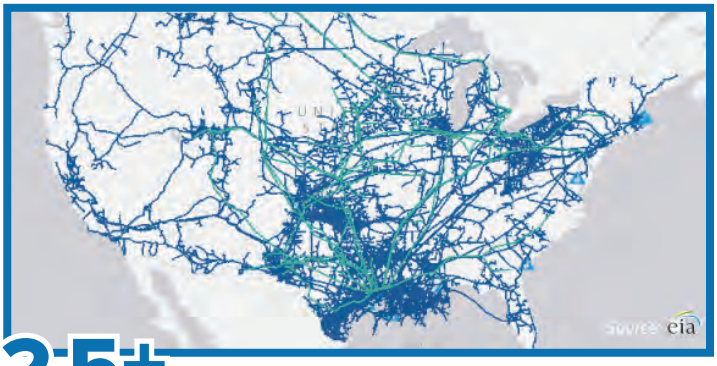
For more information visit: **www.ngvamerica.org/vwsettlement**

#1 Natural Gas Producer in the World

90+ years supply of recoverable natural gas

Continual supply by harnessing **renewable sources**

Source: U.S. Energy Information Administration



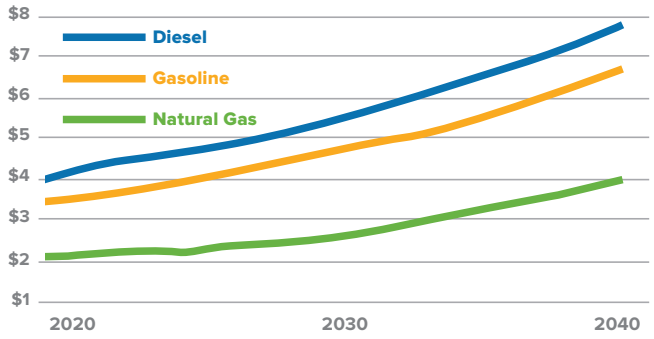
2.5+ million miles of U.S. pipeline infrastructure

The U.S.' expansive natural gas pipeline system is well poised to support a national network of natural gas fueling stations. Nearly 2,000 CNG and LNG fueling stations are operating today, with continual expansion underway.

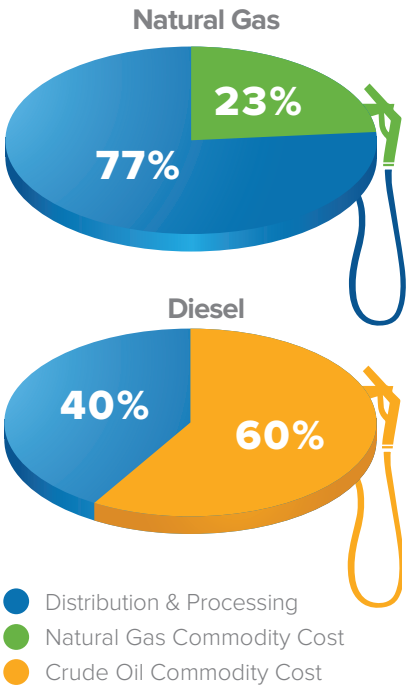
Natural gas is a clean, low-cost, and domestically abundant transportation fuel.

Natural Gas Provides Long-Term Fuel Price Stability and Cost Savings

Projected Fuel-Price Differentials (prices per $DGE)



Source: U.S. Energy Information Administration



Currently, natural gas prices are $0.75 to $1 or more lower than diesel at the pump, with a firm price advantage expected to remain for decades as shown in the chart above.

Beyond the fuel-price differential, the pump price of natural gas remains relatively stable for two reasons. First, it is domestically sourced. Second, the commodity cost of natural gas only makes up 23% of the pump price so price fluctuations have minimal impact.

In contrast, approximately 60% of the price of diesel fuel is impacted by the market cost of crude oil, which is largely sourced from politically unstable, high-conflict regions. When crude oil prices increase, diesel prices follow suit which can lead to significant swings in a fleet's fuel costs.

Natural Gas Reduces WTW Greenhouse Gas Emissions

Compared to Diesel:

GHG

- LNG **11% reduction**
- CNG **17% reduction**
- RNG **115% reduction**

Source: NGVAmerica Fleets Run Cleaner on Natural Gas White Paper 2016

Volkswagen EMT Funding Recommendations

- Fund alternative fuel vehicle projects that cost effectively maximize NOx reductions for both public and private fleets
- Provide higher funding levels for medium- and heavy-duty engines that deliver NOx reductions greater than current EPA standards
- Target funding for technologies that have demonstrated lower in-use emissions
- Prioritize funding for commercially available products and projects that are ready to begin

Natural gas vehicles can fulfill all of these recommendations today!

NGVAMERICA
Natural Gas Vehicles for America

For more information visit: **www.ngvamerica.org/vwsettlement**

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#23]
Date: Wednesday, November 01, 2017 9:01:54 AM

Name	Liza Farr
Email Address	
Address	
City	St. Louis
State	MO
Zip Code	63108
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses
Comments on Missouri's Environmental Mitigation Trust	I think its really important we dedicate a good portion of this money to transit buses or smaller transit vehicles. They are truly the greenest transportation option considering how many cars they remove from the road, and the money could be put toward electric transit vehicles, making them even lower in emission.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#24]
Date: Wednesday, November 01, 2017 2:58:50 PM

Name	Mark Brown
Email Address	
Address	
City	Perryville
State	Missouri
Zip Code	63775
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 8: Local Freight Trucks and Port Drayage Trucks • Class 4-8: School Buses, Shuttle Buses or Transit Buses • Class 4-7: Local Freight Trucks • Option Involving the Diesel Emission Reduction Act

Comments on Missouri's Environmental Mitigation Trust

Recently, the funds from the VW mitigation settlement were distributed to the states. In Missouri, the Department of Natural Resources was deemed the department to distribute the funds. Somehow, the natural gas industry was omitted from the projects allowed to be funded with this money. From all appearances, the electric industry will receive virtually all of this money. Why?

If the goal of this funding was to make our state and country greener, certainly, the electric industry should not be the primary beneficiary. Why? Well, for starters, electric is not a power source but rather a transmission method. The power source is mostly coal in our state, with less than one third of that power being from natural gas. So the funding for a greener Missouri goes to an industry that has far more emissions than natural gas. Remember, natural gas is 95% cleaner than coal and the cleanest of all fossil fuels. Natural gas is 100% domestic, supporting literally millions of American jobs. 92% of all metropolitan areas in the United States have a Natural Gas vehicle infrastructure, including St. Louis and Kansas City. Many schools have entire bus fleets running on natural gas. Funding for the continued growth of the natural gas fueling infrastructure is critical for growth of this CLEAN power source. Why would we want to devote an entire funding program to a fuel that is dirtier and already has a strong infrastructure, rather than promoting a potentially better and cleaner fuel? Natural gas vehicles are only limited to the lack of fueling stations across the country and the biggest barrier to those stations is the initial cost. VW settlement funding would help to spur the growth of this needed and necessary infrastructure development.

Why is this not happening in Missouri?

Someone should be asking questions. And someone should be demanding answers. We hope that someone is you.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#31]
Date: Wednesday, November 08, 2017 8:52:40 AM

Name	Mary Vandiver
Email Address	
Address	
City	Bloomfield
State	MO
Zip Code	63825
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Trade Association
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses
Comments on Missouri's Environmental Mitigation Trust	Missouri is the only State in America to provide Public transit in all counties. We make an actual difference in the area of rural transportation. The targeted population of school buses and public transit will linchpin almost all areas of individuals using transportion. It would be an extremely prudent expenditure of funding.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#20]
Date: Monday, October 30, 2017 6:08:23 PM

Name	Melody Vieth
Email Address	
Address	
City	Boonville
State	MO
Zip Code	65233
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Individual
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses • Option Involving the Diesel Emission Reduction Act
Comments on Missouri's Environmental Mitigation Trust	I don't know if this falls into any of the eligible categories, but I think it should go toward the new monorail between Kansas City and St. Louis. It can help reduce emissions by reducing the number of individual vehicles on the roads as people shift to using this new form of transportation.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#63]
Date: Wednesday, December 27, 2017 2:35:15 PM

Name	Michael Jamison
Email Address	
Address	
City	Clayton
State	Missouri
Zip Code	63105
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Charging Equipment for Light-duty Zero-emission vehicles

Comments on Missouri's Environmental Mitigation Trust

I am a Circuit Judge in St. Louis County, Missouri and our court the Twenty-First Judicial Circuit is very interested in the installation of electric charging stations in St. Louis County. I happen to personally own a plug in electric vehicle, a 2017 Chevrolet Volt and would be interested in such a station but besides myself other members of the judiciary have expressed an interest in the purchase of PIEV (Plug-In Electric Vehicles) and corresponding recharging stations. Our court house was just recently renovated and I believe it would make an ideal location for such a station but there are of course many other locations in St. Louis County that would benefit from the availability of these stations. I can be reached at (314)615-3267 and would very much like to receive feed back on the status of and the installations of these stations. Thank You.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#60]
Date: Monday, December 11, 2017 9:31:19 AM

Name	Mike Highfill
Email Address	
Address	
City	Rogersville
State	MO
Zip Code	65742
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-7: Local Freight Trucks

Reimer, Shelly

From: Wufoo <no-reply@wufoo.com>
Sent: Thursday, October 05, 2017 9:10 PM
To: Reimer, Shelly
Subject: DNR - VW Settlement [#6]

Name	Mike Saxton
Email Address	
Address	
City	Riverside
State	MO
Zip Code	64150
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	Engine/Vehicle Manufacturer or Vendor
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	Class 8: Local Freight Trucks and Port Drayage Trucks Forklifts and Other Equipment for Handling Port Cargo
Comments on Missouri's Environmental Mitigation Trust	Please see the attached document for Orange EV's comments regarding the Missouri VW Beneficiary Mitigation Plan. Thank you for your consideration.
Document Upload Option	Attachment Below

October 5, 2017

Subject: Developing Missouri's Volkswagen Beneficiary Mitigation Plan

Thank you for requesting and considering these comments regarding the development of Missouri's Volkswagen Beneficiary Mitigation Plan (VW BMP).

The detailed comments in this document are grouped into four main sections: Guiding Principles, Process for Administering Projects, Benefits to Low-Income and Disadvantaged Communities, and Eligible Mitigation Action Categories to Consider.

In this letter we provide broadly applicable recommendations and emissions information, along with data and requests that are specific to yard trucks. When developing Missouri's VW BMP, please ensure that:

1) All components of yard truck projects (trucks, charging, and infrastructure) are individually eligible for funding under one project umbrella,
2) Electric yard truck projects are funded at the maximum allowable, and
3) Yard trucks in all operating environments are eligible for funding.

Thank you for your consideration and partnership in the mission to deploy emission-free technologies.

Respectfully,

Mike Saxton
Orange EV, Chief Commercial Officer

Background

Orange EV manufactures heavy-duty (Class 8) pure-electric terminal trucks also know as yard trucks, drayage trucks, hostlers, spotters, and more - they can all refer to the same vehicle. Yard truck replacements/repowers are ideal VW mitigation projects given that retiring just one diesel engine typically results in calculated NOx emissions reductions of 1-2 tons per year depending on usage, and real-world reductions may be far greater. New studies have shown that diesel emissions control devices do not operate as designed at lower speeds; since yard trucks operate under 25 mph and often 10-15 mph, they lie squarely in the worst-case scenario for diesel emissions control systems.

Orange EV provides the first - and still only - commercially deployed Class 8, 100%-electric vehicles. The trucks have been commercially deployed since 2015, and most fleet customers have required incentive funding to offset higher up-front capital costs and to overcome the perceived "risk premium" associated with newer technology and the cost of change that comes with testing and deploying new equipment. Orange EV trucks meet the demands of even the harshest environments (e.g. Chicago rail intermodal) and 75% of fleet customers have re-ordered within 6 months of receiving their first truck. The hurdles remain, however, and to accelerate deployment of heavy duty electrics, significant incentives are required.

Guiding Principles

The following list is not exhaustive but provides a framework for the decision and planning processes. We respectfully request that the Missouri VW BMP:

1) Supports projects to accelerate and/or enhance commercial adoption of zero-emission vehicles.
2) Augments existing private and public incentives and grants at a project level.
3) Focuses investment in locations to benefit disadvantaged communities.
4) Demonstrates sustainability of zero emission fleets and projects.
5) Avoids interfering with or undermining emerging and existing businesses.
6) Encourages innovation and speed-to-market for additional zero emission vehicles.
7) Incents users to transition fleets more quickly.

Process for Administering Projects

The VW BMP provides a rare opportunity to fund projects in a way that is complementary and additional to current state and federal incentive programs. Currently even the most successful programs for heavy duty yard trucks (such as California's Carl Moyer program which funds up to 85% of truck cost) have limitations in that they cannot address the complex tapestry of ownership and operations associated with third party logistics and yard management companies.

Fund multiple projects under one umbrella

Due to the typical business models utilized in freight handling, there are frequently several parties paying for different aspects of one project. Quite often, yard trucks are owned by a yard management company who has a contract to move freight at a customer site. When moving to all-electric, the yard management company purchases the vehicles, while the facility

or site owner is responsible for utility costs as well as the cost of installing infrastructure and charging equipment. For a project to move forward, all parties must work together and agree to individual costs. For the business case to make sense for all parties, all components of the project - vehicle acquisition, charging, and infrastructure - must be eligible for incentive funding.

To address this all-too-common scenario, please develop a funding structure that allows for multiple contracts (with multiple entities) under one project umbrella. This unique approach will remove roadblocks, incent all parties who shoulder project costs, and speed adoption of zero emission vehicles.

Fund electric projects at the maximum allowable

For Class 8 all-electric solutions, the Volkswagen trust agreement allows up to 75% of the project to be funded for private fleets and 100% for public; this funding applies to repower or replacement projects and includes charging and infrastructure. To accelerate deployments of heavy duty electrics and to achieve cost parity, incentive amounts should be set at this maximum allowable. These benefits should also allow for augmentation by other private or public funding programs.

Cost parity vs. emissions parity

The following table provides a comparison of Orange EV yard truck acquisition costs vs. the cost of a Tier 4 diesel refurbishment, and also highlights the incentive level required to achieve cost parity. What the data doesn't quantify is the "emissions parity" or perhaps better the "emissions advantage" delivered with zero-emission projects. When a pure electric vehicle replaces a diesel, emissions are completely eliminated (i.e. there are no Tier 4 emissions) and the emissions advantage is permanently captured.

When analyzing the table, it's important to note that in most cases fleets are not looking to buy a new Tier 4 diesel, but rather extend the life of a current truck or buy a refurbished vehicle that meets emission standards. The purchase decision boils down to three alternatives: 1) use incentives to move quickly and purchase a pure-electric vehicle; 2) purchase an acceptable refurbished diesel; or 3) wait until the normal replacement cycle to purchase a new Tier 4 diesel.

Basic Cost Comparison: Orange EV Pure-Electric Terminal Truck Solution vs. Diesel

	REPLACEMENT		REPOWER	
Costs	**NEW Extended Duty (160kWh) w/Fast Charge Cabinet**	**NEW Extended Duty (160kWh) w/Standard Onboard Charging**	**REMAN Extended Duty (160kWh) w/Fast Charge Cabinet**	**REMAN Standard Duty (80kWh) w/Standard Onboard Charging**
Orange EV truck, base price[1]	$284,950	$284,950	$239,950	$199,950
Orange EV charging	$49,950	$0	$49,950	$0
Electrical infrastructure[2]	$20,000	$6,000	$20,000	$6,000
Taxes (estimated 8%)	$28,392	$23,276	$24,792	$16,476
Total electric vehicle solution:	**$383,292**	**$314,226**	**$334,692**	**$222,426**
Comparable diesel truck w/8% tax (refurb)[3]:	**$54,000**	**$54,000**	**$54,000**	**$54,000**
Cost difference:	**$329,292**	**$260,226**	**$280,692**	**$168,426**
Percent incentive required to achieve cost parity:	**86%**	**83%**	**84%**	**76%**

Note 1: The costs shown are for the base price of an Orange EV yard truck. Most fleets pay additional cost to install air conditioning, trailer stops, galvanizing, etc. These are optional costs, but in many places are necessary given the operating environment and/or stipulations in union contracts. For a remanufacture, the fleet must also supply an acceptable donor vehicle.

Note 2: Infrastructure is built out and paid for by the fleet (or site owner if the fleet is contracting services to the site); costs can vary dramatically by site. Costs are typically less for "standard onboard" charging due to lower voltage and amperage, and more readily available capacity. Factors that increase the cost of infrastructure include running cabling over long distances, installing a transformer, and hiring outside contractors (not as necessary for the standard onboard charging solution).

Note 3: Cost for diesel trucks can range from $25,000 to $120,000 based on refurbished vs. new, and the fleet's buying power. In most cases, fleets are not looking to buy a new Tier 4 diesel, but rather extend the life of a current truck or buy a refurbished vehicle that meets emission standards.

In Orange EV's experience, fleets are making capital last as long as they can and the alternative to a pure-electric solution is usually as stated in the table above. But for the scenario where fleets must purchase a new vehicle (i.e. life extension or purchasing refurbished aren't viable options), and assuming $100,000 per diesel with 8% taxes, fleets would still require 72%, 66%, 68%, or 51% incentive funding (respectively, left to right on the table above) to achieve cost parity.

Offering maximum incentive levels increases the likelihood of replacing diesels with zero emission vehicles, accelerating widespread adoption, and achieving statewide emission reductions targets.

Utilize max percentages, OEM product approval, and a first-come first-approved model

We request that maximum funding levels are set utilizing percentages rather than fixed dollar amounts. Infrastructure costs are site dependent and highly variable and new technology is more expensive by nature. If assigning a fixed maximum dollar amount, Missouri risks discouraging innovation for the larger and more expensive zero emission vehicles and stifling projects that have increased infrastructure costs. Maximum percentages create a more robust environment for developing and implementing new technologies.

In our experience, the most effective incentive programs (such as California's HVIP, Chicago's Drive Clean Chicago, and New York's NYSEV-VIF) utilize OEM product approvals and a first-come, first-approved basis. This model simplifies the application, streamlines the process, and provides greater certainty for fleet managers, site managers, and manufacturers regarding the order/manufacture/delivery timeline.

While projects will be funded across categories, allocations should be technologically neutral and support viable technologies that meet the intended NOx reduction standards.

Benefits to Low-Income and Disadvantaged Communities

Focus and priority should be given for projects at freight facilities located in non-attainment or disproportionately impacted communities. Funding projects in these locations (at least 25% across each category, as appropriate) will result in dramatically reduced emissions in disadvantaged communities, potentially much larger than current calculations estimate.

Studies show high diesel emissions at idle, low speed, and low load

Yard trucks typically operate in highly impacted areas in goods movement operations such as waste transfer stations, warehouses, distribution centers, manufacturing plants, rail intermodal yards, seaports, and more. Replacing diesel with 100% electric eliminates a calculated estimate of 1-2 tons of NOx per truck annually. Real world emissions may be significantly higher, though, according to a 2017 Wells to Wheels analysis ("Environmental implications of natural gas as a transportation fuel", Hao Cai et al).

In this analysis, multiple studies found that performance of a diesel's selective catalytic reduction (SCR) system is highly dependent on the duty cycle. In high-speed duty cycles, the SCR system performs well and diesel trucks have relatively low NOx emissions. In duty cycles with significant idling, low speeds, or low loads, however, diesel engine temperatures do not reach levels that support sustained SCR performance. This results in very high NOx emissions, up to 10x higher than the 2010 EPA NOx emission standard.

Given that yard trucks typically operate 10-15 mph, diesels may emit far more NOx than currently estimated, along with other criteria pollutants. Replacing diesels with 100% electric will eliminate yard truck emissions and improve air quality.

Eligible Mitigation Action Categories to Consider

The VW Mitigation Trust Consent Decree outlines ten eligible categories for funding. The focus of our comments will relate to Category 1 (Class 8 Local Freight Trucks and Port Drayage Trucks) and Category 8 (Forklifts and Port Cargo Handling Equipment).

Allow functionally "similar-for-similar" replacement

Allowing "similar-for-similar" replacement in Categories 1 and 8 (and perhaps others) has the potential to be transformative, focusing on the operational needs of a facility rather than strictly requiring "like-for-like" replacement. As an example, the role of a yard truck is often performed less efficiently by an over-the-road drayage truck. If the functionality of a diesel on-road drayage truck can be replaced with an all-electric yard truck, program goals are met, and the community and environment benefit.

Define "port" in broad terms

Yard trucks are specifically identified both Categories 1 and 8. Note, however, that in each Category, the word "port" is attached. In Category 1, drayage trucks are defined as "trucks hauling cargo to and from ports and intermodal rail yards" while Category 8 applies to port cargo handling equipment. Using the word "port" is potentially limiting since it evokes the image of a traditional seaport. In the broadest sense, ports are terminals which move cargo, and more and more, these terminals are clustered at inland transportation hubs in disadvantaged communities.

If mitigation fund projects under Categories 1 and 8 are limited to those located in traditional seaports, approximately 80% of yard truck operations will be eliminated; just 20% work in seaport operations. The Consent Decree does not define the word port, however, which gives states the flexibility to consider all yard truck projects that meet the overarching goal to reduce NOx emissions in impacted areas.

In discussions with other states, regulators have agreed that the Consent Decree provides leeway to define port to include all freight facilities. If a broad "port" definition is not adopted, then allocations of funds between categories should address the more restrictive number of opportunities in Categories 1 and 8, and prioritize funds to projects like these that result in greater environmental benefit.

Summary

To realize cost effective emissions reductions in Missouri's Volkswagen Beneficiary Mitigation Plan, please ensure that all aspect of yard truck projects (vehicle, charging and infrastructure) are eligible for funding in all operating environments and at the maximum level allowed.

In today's market, pure-electric yard trucks can be "gateway" vehicles to heavy-duty electrics. Although yard trucks generally operate out of the public eye, word spreads quickly between yard operators and fleet companies. Successful deployments generate interest in a way that overcomes pre-conceived notions and speeds adoption of green technologies.

Orange EV has 100% electric Class 8 terminal trucks deployed and operating in fleets from California to New York. From these deployments, we have gathered a wealth of experience and data. Please consider us a resource and contact us if we can be of assistance.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#36]
Date: Thursday, November 16, 2017 4:47:09 PM

Name	Mona Menezes
Email Address	
Address	
City	Branson
State	MO
Zip Code	65616
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-7: Local Freight Trucks • Forklifts and Other Equipment for Handling Port Cargo • Charging Equipment for Light-duty Zero-emission vehicles

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#55]
Date: Monday, December 11, 2017 9:31:08 AM

Name	Nancy Edson
Email Address	
Address	
City	Rogersville
State	MO
Zip Code	65742
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-7: Local Freight Trucks
Comments on Missouri's Environmental Mitigation Trust	Please consider funding replacement of Class 4-7 freight trucks. These are medium sized daily-use vehicles that operate 12 months of the year. Rather than spend the funds on vehicles that are in actual operation only periodically (i.e. fire trucks), the greater impact should be focused on those vehicles that are in use daily. To get the biggest return on investment and most effective assistance to our environment, please consider funding replacement of Class 4-7 daily-use freight vehicles. Thank you!

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#37]
Date: Friday, November 17, 2017 10:55:32 AM

Name	Norm Lucas
Email Address	
Address	
City	Park Hills
State	MO
Zip Code	63601
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-7: Local Freight Trucks

Comments on Missouri's Environmental Mitigation Trust

New emissions standards have increased prices for diesel trucks used by local governments. Cities and counties must plan carefully for the expense of replacing diesel trucks and equipment. The higher priced replacement diesels present a disincentive for local governments, in that maintaining older and higher emission vehicles often proves cheaper than purchasing replacements with lower emissions. Replacement subsidies will overcome the tendency to operate existing high emission vehicles through their lengthy design life to defer higher replacement costs. Residents will more readily accept early replacement of functioning government equipment with subsidies rather than local tax revenue.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#54]
Date: Friday, December 08, 2017 2:11:46 PM

Name	Pat Barr
Email Address	
Address	
City	Lamar
State	MO
Zip Code	64759
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Individual
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#49]
Date: Wednesday, December 06, 2017 11:41:25 AM

Name	Patrick Justis
Email Address	
Address	
City	St. Louis
State	MO
Zip Code	63103
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Interest Group • Operator of Private Fleet • Advocate for Electric Vehicle Charging Stations
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 8: Local Freight Trucks and Port Drayage Trucks • Class 4-8: School Buses, Shuttle Buses or Transit Buses • Freight Switchers • Class 4-7: Local Freight Trucks • Airport Ground Support • Forklifts and Other Equipment for Handling Port Cargo • Charging Equipment for Light-duty Zero-emission vehicles
Comments on Missouri's Environmental Mitigation Trust	Please see attached documents from the Missouri EV Collaborative. You should find two MS Word files: 1) Missouri VW Letter Final 2) Missouri VW Corridor Plan Final We would also like to make a short ppt presentation on Dec 7 at the Advisory Committee mtg. We will send that ppt file separately. On behalf of the Missouri EV Collaborative, thank you for taking our comments. Pat Justis
Document Upload Option	Attachment Below

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Proposal For

Development of Missouri Statewide

Highway Corridor DC-Fast Charging

December 6, 2017

Submitted by the
Missouri EV Collaborative

Section 1: Executive Summary

The "Missouri EV Collaborative" (EV Collaborative) recognizes that the VW Mitigation Trust represents a unique opportunity to accelerate the adoption of electric vehicles by eliminating the long-distance charging barrier for EV drivers traveling within and through Missouri. Electric vehicles represent a major opportunity for reducing net emissions of NOx.

The EV Collaborative presents this proposal for consideration by Missouri's Mitigation Trust Beneficiary, Missouri DNR Air Pollution Control Program (APCP). The proposal describes the case and basic plan for development of a minimum practical network for corridor charging and requests consideration for funding for the full 15%, or approximately $6M, allowed under the settlement agreement for development and installation of electric vehicle (EV) charging stations.

The draft plan includes up to 40 public charging "islands" that could serve all types of EVs and that are distributed strategically to enable EV travel throughout Missouri. The initial estimated cost of such a project is in the broad range of $6.8-14.4M with utilities and communities making investments leveraged by the settlement funding and maximizing impact of mitigation funds on behalf of Missourians.

If this proposal is well received by APCP, the EV Collaborative will establish appropriate oversight with APCP, develop more detailed planning over 6-9 months, and then implement the detailed plan over the following 12-18 months.

Section 2: Background

2.1 VW Settlement – Mitigation Trust

Through the VW Settlement, Missouri will receive approximately $41M for mitigation actions. One of the eligible actions is the installation of **Light Duty Zero Emission Vehicle Supply Equipment**, otherwise known as EV charging stations. According to the settlement requirements, Beneficiaries may utilize up of to 15% of their allocation of Trust Funds on the costs to acquire, install, operate and maintain new light duty ZEV supply equipment. Eligible projects include: Level 1, Level 2 or DC fast chargers located in a public place, workplace, or multi-unit dwelling. For Missouri, 15% of the $41M total is approximately $6M.

More detail about EV charging equipment is in section 2.5 below.

2.2 Missouri EV Collaborative

Since November 2016 a voluntary group of utilities and non-profits has been collaborating on the topic of electric vehicle infrastructure. The following companies and organizations have been part of the discussions:

- Ameren Missouri
- City Utilities - Springfield
- Clean Cities-KC
- Columbia Water and Light
- Empire District
- Kansas City Power & Light
- Kirkwood Electric
- Missouri Public Utility Alliance
- NRDC
- Sierra Club

This "Missouri EV Collaborative" (EV Collaborative) recognizes that the VW Mitigation Trust represents a unique opportunity to eliminate the long-distance charging barrier for EV drivers in and through Missouri. The EV Collaborative has worked together and presents this proposal for consideration by Missouri's Mitigation Trust Beneficiary, Missouri DNR Air Pollution Control Program (APCP). The proposal describes the case and basic plan for development of a minimum practical network for corridor charging and requests consideration for funding for the full 15%, or approximately $6M allowed under the settlement agreement.

2.3 Environmental Benefits of EVs

Electric vehicles are inherently more efficient and less polluting than their internal combustion engine (ICE) counterparts. In fact, according to government figures[1], "EVs convert about 59%–62% of the electrical energy from the grid to power at the wheels. Conventional gasoline vehicles only convert about 17%–21% of the energy stored in gasoline to power at the wheels." In fact, EVs boast fuel economy figures that exceed 100 MPGE, or miles per gallon equivalent, for fuel usage by the vehicle. Because EVs are charged from utility electricity, it is important to also consider the source energy mix in Missouri, which includes coal, nuclear, gas, wind, solar, and hydro.

[1] USDOE's www.fueleconmy.gov, All-Electric Vehicles page.

Even when accounting for the largely fossil-based source energy mix for Missouri, EVs emit approximately **50% less NOx** than ICE vehicles, as calculated using the following assumptions and the eGRID2014v2 Missouri emissions rate of 1.7lbs/MWh:

	ICE	**EV**
Miles per year	12,000	12,000
Fuel economy	37.2 mpg	3.3 miles/kWh
NOx in lbs/yr	11.87	6.12

In addition to less overall NOx emissions, EVs emit zero tailpipe emissions at ground level where drivers, cyclists, and pedestrians are subject to direct tailpipe emissions while in traffic. Though most of the electricity consumed in Missouri is produced from fossil fuel, the generators typically have control devices and, as stated above, provide lower overall NOx emissions than those from ICE tailpipes. Further, as utilities add more renewable, zero-emission sources to the energy mix, the fueling of EVs becomes proportionally cleaner.

For Missouri consumers, charging an EV at home costs roughly half of fueling with gasoline. From a utility perspective, EVs charging at home or work represent a flexible load that can also put downward pressure on retail electricity rates. This downward rate pressure results from the vast majority of charging that can occur during "off-peak" hours and increased utilization of existing grid resources.

2.4 Accelerating Adoption of Light Duty Electric Vehicles

Given the customer choice, environmental and economic benefits of EVs, enabling the adoption of EVs is worthy of significant effort. There exist several barriers to widespread EV adoption. And there are many approaches to accelerate adoption, with some having quick but limited impact while other approaches have slower but much more significant impact in the medium to long run. While automakers are steadily working to increase the range of EVs, with at least three relatively affordable models having ranges over 150 miles available by early 2018, one practical barrier that will still exist is long-distance corridor charging stations. As more long range models appear in the marketplace, one factor that will certainly slow consumer purchase of EVs is the lack of long-distance corridor charging along Missouri's highways. A well-planned minimum practical network of DC fast charging infrastructure would eliminate this barrier for Missourians and establish Missouri as an "EV friendly" state for drivers and serve to accelerate adoption of EVs.

Properly placed in communities along the interstates and multilane highways, and in areas accessible to the public, these charging stations would also increase adoption in those communities due to visibility and local access, especially for those without charging capability at home nor their workplace.

2.5 EV Charging Types

Today there are three common levels of EV charging in existence today:

Level	Power	Range added /hour
1 AC	1.5 kW	Up to 5 miles
2 AC	7 kW	Up to 25 miles
3 DCFC	50 kW	Up to 150 miles
	150 kW	Up to 450 miles

Note that power levels for DCFC are rising to reduce driver dwell times for charging, but 50 kW is the most common DCFC power rating today. The near future's higher power DCFC, from 100kW – 350kW, will be backward compatible and will accommodate today's EVs, and may be available for this proposed project.

Commercial grade charging equipment is able to withstand outdoor environments, provide cellular or Ethernet connectivity, and take customer payments via credit card, RFID membership, or smartphone app. Most EV drivers locate charging stations via mobile smartphone apps or through their EV's touchscreen menu. Networked charging stations make available their status (available or unavailable) to mobile apps, such as PlugShare and ChargePoint, so that drivers can make informed decisions about where and when to stop. *Key to a **practical** long-distance DCFC corridor is having more than a single charging stop option along their long-distance route rather than the minimum **possible.** In these early years when there will be few options, it is important that there is reliability through redundancy as well as distribution to make long distance travel practical.*

SECTION 3: Proposal for Highway Corridor DC-Fast Charging

3.1 DC Fast Charging Currently Insufficient

There is currently a lack of sufficient DCFC equipment along highway corridors in Missouri, with just a few instances of charging stations established in urban areas that are coincidentally near highways (as shown in the figure to the right). The EV Collaborative recognizes the importance of a minimum practical network of corridor DCFC along highways for accelerating growth in electric vehicle adoption, but realizes that the private

market likely does not view a network of corridors in Missouri as a viable business at this time. Thus, a classic “chicken and egg” dilemma exists.

3.2 Minimum Practical Network for Corridor EV Charging

The EV Collaborative suggests that development of a minimum practical network of DCFC along Missouri’s highways requires not just financial support but also coordinated statewide planning to cost-effectively ensure sufficient number and appropriate placement of charging stations occurs rather than only having DCFC near higher population urban areas.

This vision for a minimum practical network for corridor DCFC in Missouri is a public network that makes long-distance EV travel across Missouri **not only possible but, practical**, for EVs having a nominal range of 100 miles or greater. The following specifications include important requirements to achieve the "minimum practical network" goal:

- Minimum of 2 DCFC having the following capability:
  - 150kW charging rate, but minimum of 50 kW, DC output
  - Both CHAdeMO and CCS Combo connectors
- Minimum 2 Level 2 ports having ~7kW AC output
- Credit card capability
- Spacing of islands no less than 25 miles and no more than 75 miles apart
- Located in communities within approximately 3 miles of interstates or multilane state highways
- Located on real estate having a "no cost easement"
- Located within walking distance of amenities
- High reliability/availability

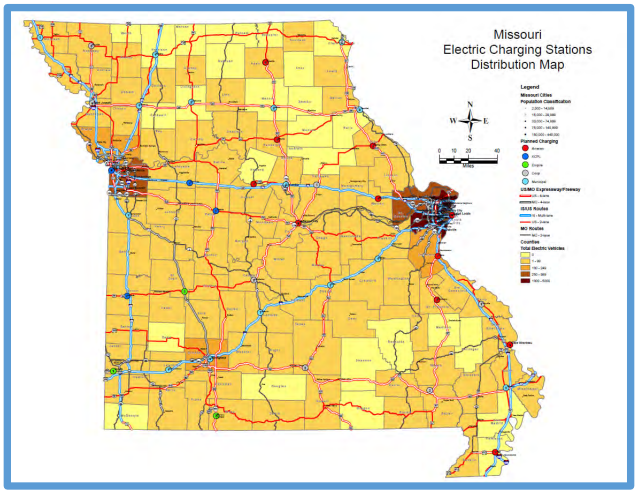
The EV Collaborative has drafted a map of recommended DCFC island locations to cover the majority of Missouri. These initial draft locations were developed without regard for which utility serves the location. Factors for initial locations were developed as follows:

1)	Along Interstates	Priority 1
2)	Along multi-lane highways having >10,000 daily trips	Priority 2
3)	Along multi-lane highways having <10,000 daily trips	Priority 3
4)	All located in communities with populations >2,000	

The resulting number of charging islands by priority level is:

Priority 1	Interstates	24
Priority 2	Multi-lane "heavy"	10
Priority 3	Multi-lane "light"	6

Note that the map below does not show locations of any Electrify America charging islands that will be constructed under the ZEV portion of the VW Settlement. The EV Collaborative anticipates that Electrify America will provide charging islands at some locations in Missouri but the locations have not been publicly identified. Once these locations have been identified and confirmed, the EV Collaborative would avoid those locations to avoid duplication. Avoiding Electrify America locations would reduce the number of charging islands required and associated cost.



(Larger map provided at the end of this document).

3.3 Estimated Cost and Sustainability

Missouri's electric grid is comprised of many operating companies, municipalities, and cooperatives. For this reason, it is important to plan this practical corridor charging network in a collaborative and coordinated manner to maximize benefit for the driving public.

The estimated turn-key cost of each charging island is as follows:

2 L2AC + 2 DCFC @ 50kW	$170,000 to $240,000	(150 miles range/hour)
2 L2AC + 2 DCFC @150kW	$270,000 to $360,000	(450 miles range/hour)

There are several factors that play into the turn-key cost of developing charging islands. Factors include:

- -Charging rate/capacity of equipment
- -Line extension size and complexity
- -Location of site
- -Site development complexity

The range of cost for the full network is $6.8M to $14.4M for development of 40 DCFC islands. Beyond the initial cost for the equipment, there are ongoing operation and maintenance costs (O&M), not including energy, to ensure connectivity and reliability. The estimated annual cost for non-energy O&M is $5,000-$10,000 per island.

Because the goal of building this minimum practical network for corridor EV charging is to break down the long-distance barrier to accelerate adoption of EVs, it is imperative that the equipment has high reliability so that drivers can

rely on getting refueled in these early years of EV infrastructure development. Utilities will ensure that the equipment has high reliability and that repair issues are dealt with in a timely manner and commit to maintaining the equipment long-term.

3.5 Ownership Models

There are three types of utilities within the EV Collaborative: Investor Owned Utilities (IOU), Municipal Utilities, and Cooperative Utilities. Each type has its own governance and/or regulatory requirements and, therefore, the process from planning under the EV Collaborative to project completion will likely have at least three different paths. For example, municipals and cooperatives may be able to get approval to own and operate the equipment, while the IOUs will likely have to pursue a third-party operational model due to current regulatory rules and restrictions.

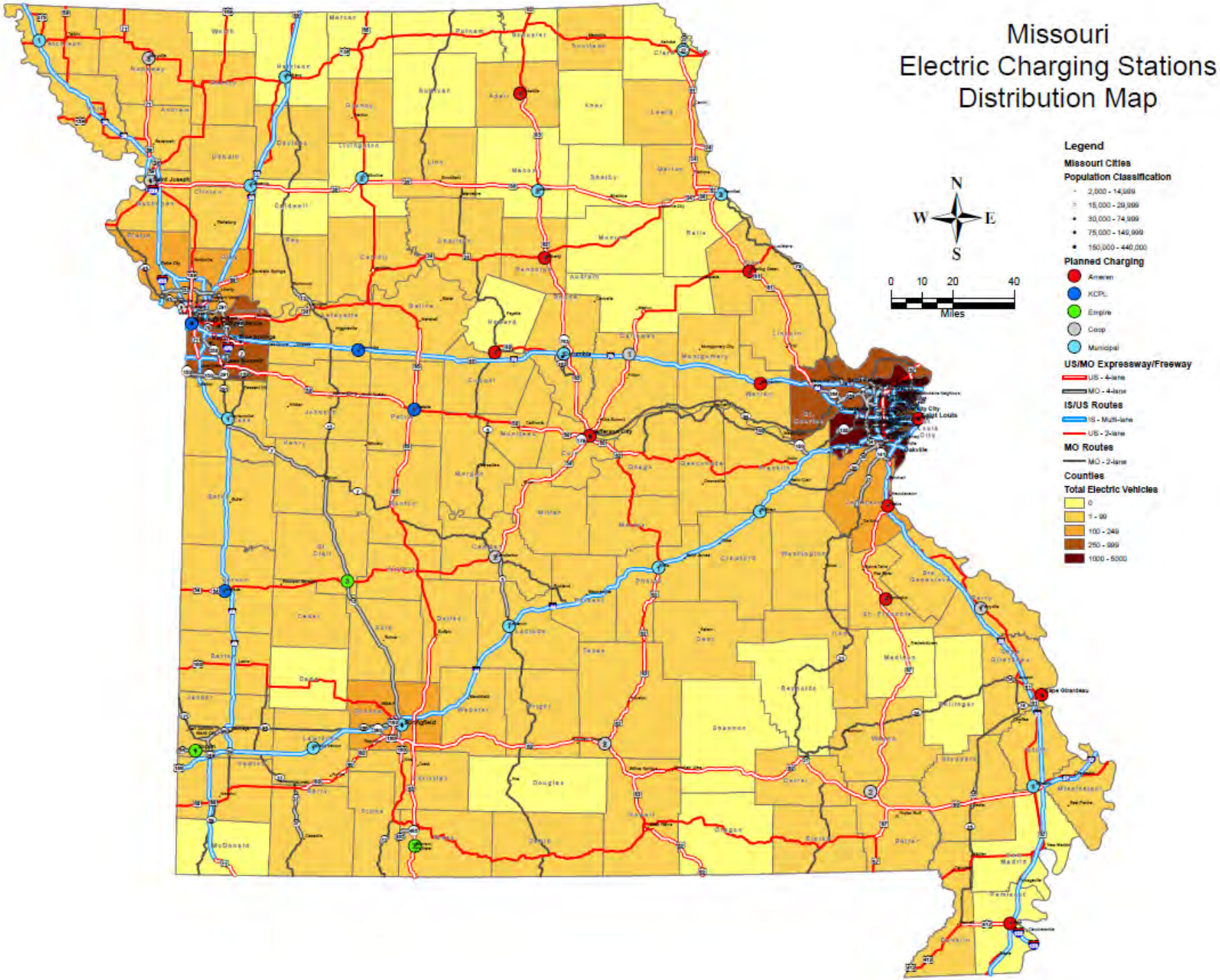
These differences should not impact the ability of the EV Collaborative utilities to jointly plan, build, and make operational the corridor charging network.

3.6 Next Steps

The EV Collaborative has provided this draft plan in this document for consideration for funding. If the APCP can provide an indication that the project is likely to receive the funding requested, then the EV Collaborative will pursue the following next steps:

1. Formalize expectations between EV Collaborative utilities and APCP and establish APCP-approved oversight plan;
2. Further develop the corridor plan with specific locations and designate lead utilities for each site;
3. Determine an equitable division of funding needed to develop the network;
4. Develop a coordinated approach to sourcing the equipment and any necessary services;
5. Develop final plan with timeline for approval and implementation.

Depending upon the APCP requirements, these steps will take 6-9 months to complete and then design and construction would begin with completion of the entire network in 12-18 months.


Missouri
Electric Charging Stations
Distribution Map
Legend
Missouri Cities
Population Classification
2,000 - 14,999
15,000 - 29,999
30,000 - 74,999
75,000 - 149,999
150,000 - 440,000
Planned Charging
Ameren
KCPL
Empire
Coop
Municipal
US/MO Expressway/Freeway
US - 4-lane
MO - 4-lane
IS/US Routes
IS - Multi-lane
US - 2-lane
MO Routes
MO - 2-lane
Counties
Total Electric Vehicles
0
1 - 99
100 - 249
250 - 999
1000 - 5000
N
W
E
S
0
10
20
40
Miles

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#14]
Date: Monday, October 23, 2017 1:49:31 PM

Name	Paul Brugmann
Email Address	
Address	
City	Columbia
State	MO
Zip Code	65203
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Engine/Vehicle Manufacturer or Vendor
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 8: Local Freight Trucks and Port Drayage Trucks • Freight Switchers • Ferries/Tugs • Option Involving the Diesel Emission Reduction Act

Comments on Missouri's Environmental Mitigation Trust

My primary suggestion as a Missouri taxpayer is to evaluate options based on the price/lb of reduction. As an example I've attached an Emission Reduction Comparison Tool. This type of approach will allow to prioritize projects for "biggest bang for the buck" and select the primary "low hanging fruit" projects that will allow Missouri to make the longest strides towards goals in the most cost effective way.
Secondarily, once significant reduction of NOx and PM is captured through "low hanging fruit" projects, then actions such as Class 8 Trucks, Transit Buses, and DERA eligible options could be considered. Perhaps consideration should first be given to government owned vehicle since Appendix D-2 indicates that 100% of the cost can be covered, allowing the greatest relief for the State budget and Missouri taxpayers.
I would express caution at this time in the area of fully electric vehicles, simply because the cost is currently so high at this time that something like 3 near zero emission buses can be purchase for the price of one full electric bus.
Thank you for seeking citizen input!

Document Upload Option	A Microsoft Excel-based emission reduction calculation tool was included as an attachment. It is not listed below, but is available upon request.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#68]
Date: Thursday, January 11, 2018 10:25:50 AM

Name	Randy Warner
Email Address	
Address	
City	Kingsville
State	MO
Zip Code	64061
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Individual • Small Business • Advocate for Alternative Fuels
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses

Comments on Missouri's Environmental Mitigation Trust

• One diesel school bus certified at the current Environmental Protection Agency's emissions standard produces more NOx than four Blue Bird Vision Propane buses. One diesel bus manufactured before 2007 emits more NOx than 73 Blue Bird Vision Propane buses.
• In a dollar-for-dollar comparison of Type C school buses, propane autogas buses reduce NOx the most.
o Propane autogas buses cost $177 per pound of NOx reduced.
o Diesel buses cost $272 per pound of NOx reduced, making propane autogas 33 percent more cost effective.
o Electric buses cost $506 per pound of NOx reduced, making propane autogas 65 percent more cost effective.
• Missouri students, bus drivers and personnel who ride propane autogas school buses not only have significantly reduced exposure to NOx, but also to carbon monoxide, soot and particulate matter.
• Diesel emissions have been linked to respiratory difficulties, especially in children, and have been noted by the World Health Organization as carcinogenic.
• In the developing lungs of children, exposure to NOx causes negative health effects like asthma, which is the leading cause of school absenteeism.
• The Missouri Propane Education & Research Council proposes that at least 50 percent of state Environmental Mitigation Trust funds be assigned to the Clean Bus Replacement Plan. At 50-percent funding, with a 25-percent local match, school districts could purchase more than 900 buses fueled by propane autogas. At 100-percent funding, that total rises to more than 1,800 buses.
• At the proposed minimum 50-percent funding level, these propane autogas buses would lower NOx by 490,000 pounds and reduce petroleum usage by almost 25 million gallons (assuming a 15-

year lifetime with an average of 12,600 miles per year). At 100-percent funding, the reductions are almost 1 million pounds of NOx and 50 million gallons of petroleum.

o No other investment of Missouri's Environmental Mitigation Trust funding — whether diesel, CNG or electric buses — would result in this level of NOx reduction.

• ROUSH CleanTech's propane engine, used in the Blue Bird Vision Propane bus, has the lowest NOx levels of any fuel system engine in class 4-7 engines. This includes engines fueled by natural gas, diesel, biodiesel and gasoline.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#41]
Date: Wednesday, November 29, 2017 3:46:06 PM

Name	Ranjith Udawatta
Email Address	
Address	
City	Columbia
State	MO
Zip Code	65211
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government

Comments on Missouri's Environmental Mitigation Trust

I have three main suggestions on Improving Missouri Environmental Quality (air, water, and soil)

Vegetation also can be used to improve air quality and it has been proven that certain particles are filtered by the vegetation. Vegetation also has been proved to remove odor from CAFOs. Selected tree species combinations in a strategically designed buffers remove particles and odor and reduce dispersion. Similar approaches can be used to purify air quality. Furthermore, research can be developed to quantify the effectiveness of vegetative barriers (what species, spacing, heights, etc) along roads and industry facilities to remove particles and odor.

Disseminations of knowledge: Extension, outreach, and workshops. Funds also can be used to improve our understanding among K12 and college populations through educational activities.

I strongly suggest allocation of funds for research and education that can help us develop environmentally friendly, economically appealing, and sustainable practices for the improvement of air, water, and soil qqality. Specifically vegetation management to improve air quality. These practices will also help improve soil and water quality while educating K12-college population.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#65]
Date: Wednesday, January 03, 2018 2:57:51 PM

Name	Rick Higgins
Email Address	
Address	
City	O'Fallon
State	MO
Zip Code	63368
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Forklifts and Other Equipment for Handling Port Cargo • Option Involving the Diesel Emission Reduction Act
Comments on Missouri's Environmental Mitigation Trust	We have a diesel generator that could be upgraded with a catalytic converter to improve its emission during all times of operations. this would also give us the option of using the gen set to do load shedding for the local utility during their times of peak demand. the approximate cost to upgrade is $40,000 How do I apply? The "apply" button on your website doesn't work.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#13]
Date: Monday, October 23, 2017 10:54:44 AM

Name	Ryan Rowden
Email Address	
Address	
City	Jefferson City
State	MO
Zip Code	65101
What type of organization/business/agency/association best applies to you (Select all that apply)	• Trade Association
Document Upload Option	Attachment Below

October 11, 2017

Carol S. Comer, Director
Missouri Department of Natural Resources
1101 Riverside Drive
Jefferson City, MO 65102

Dear Director Comer:

As a condition of its settlements with the U.S. Environmental Protection Agency (EPA), Volkswagen must establish a $2.7 billion Mitigation Trust to offset the company's Clean Air Act violations. As a result of this Settlement Missouri is currently in the process of collecting stakeholder input for development of the Beneficiary Mitigation Plan which will summarize how Missouri plans to use the trust funds.

With the Mitigation Trust, the state has the opportunity to reduce pollution by replacing eligible engines and vehicles with newer model diesel engines that make full use of ultra-low sulfur diesel. When ULSD was introduced, tests completed by EPA, the California Air Resources Board, engine manufacturers and others showed that using the advanced emissions control devices enabled by the use of ULSD fuel would reduce emissions of hydrocarbons and oxides of nitrogen (precursors of ozone), as well as particulate matter to near-zero levels. As an additional environmental benefit, ULSD fuel enabled diesel-powered passenger cars and light trucks to meet the same stringent emissions standards as gasoline vehicles and diesel-powered vehicles tend to be more fuel efficient than gasoline-powered vehicles.

When the EPA developed rules to reduce the sulfur in diesel fuel to 15 ppm, it predicted that when the current heavy-duty vehicle fleet was completely replaced in 2030, the use of ULSD would provide annual emission reductions equivalent to removing the pollution from more than 90 percent of the [2006] trucks and buses. The Mitigation Trust affords the state the opportunity to meet these goals in advance of 2030 by replacing those vehicles with newer diesel engines.

ULSD was introduced in 2006, and by December 2010, it was required in all highway uses. It was required in all non-road, locomotive and marine uses by December 2014. ULSD fuel enables the use of cleaner technology diesel engines and vehicles with advanced emissions control devices, resulting in significantly improved air quality. The newest diesel engines might even take advantage of the benefits provided by the new API FA-4 diesel engine oil. FA-4 oils are blended to a different high-temperature high-shear (HTHS) viscosity range to assist in

reducing greenhouse gas emissions. In addition to the environmental benefits identified above, it remains a high energy density fuel with a robust installed supply infrastructure that is familiar to both users and mechanics. The Mitigation Trust has created an opportunity for your state to reduce emissions and improve the environment and we encourage you to consider repowering your existing vehicles with newer clean diesel engines.[1]

If Missouri believes it is necessary to utilize an "alternative fuel," natural gas is a good choice. The U.S. is now the world's largest producer of petroleum and natural gas, so natural gas vehicles help to achieve the public policy goal of maintaining energy and national security. Natural gas is also a clean burning fuel that can have environmental benefits at the local level reducing ground-level localized pollution. Natural gas primarily consists of methane (around 90 percent), with small amounts of ethane, propane, and other gases. Methane is lighter than air and burns almost completely, creating carbon dioxide and water as byproducts.

As you develop your application to the Mitigation Trust, we encourage you to consider the benefits of repowering your existing fleet with newer efficient diesel engines. If you have any questions, please don't hesitate to contact me.

Sincerely,

Ryan C. Rowden /s/

Ryan C. Rowden
Executive Director, Missouri Petroleum Council

cc: Dru Buntin, Deputy Director

Kyra L. Moore, Director, MDNR Air Pollution Control Program

[1] U.S. EPA, "Detailed Comparison of VW Eligible Mitigation Action 1-9 and Eligible Mitigation Action #10 (DERA Option) https://www.epa.gov/sites/production/files/2017-01/documents/vw-dera-option-elgble-mitig-compar-2017-01.pdf

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#48]
Date: Tuesday, December 05, 2017 12:06:02 PM

Name	Sara fields
Email Address	
Address	
City	Springfield
State	MO
Zip Code	65807
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses • Charging Equipment for Light-duty Zero-emission vehicles
Comments on Missouri's Environmental Mitigation Trust	We favor the replacement of diesel buses with electric buses

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#59]
Date: Monday, December 11, 2017 9:31:17 AM

Name	Scott Kersey
Email Address	
Address	
City	Rogersville
State	MO
Zip Code	65742
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-7: Local Freight Trucks

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#30]
Date: Wednesday, November 08, 2017 7:52:37 AM

Name	Sheila Kimlinger
Email Address	
Address	
City	Swasnea
State	IL
Zip Code	62226
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Small Business
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses
Comments on Missouri's Environmental Mitigation Trust	I am an engineering manager at a consulting engineering company, and also a member of the Citizens for Modern Transit Board. I strongly support transit in the St. Louis region. It would be great to see Missouri fund transit to the same level Illinois is able to. This settlement would be a great start - the more people who use public transit, the bigger the reduction to the air pollution in the St. Louis Metro area. Please consider this use!

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#50]
Date: Wednesday, December 06, 2017 4:11:31 PM

Name	Stan Perkins
Email Address	
Address	
City	Jefferson City
State	MO
Zip Code	65109
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 8: Local Freight Trucks and Port Drayage Trucks • Class 4-8: School Buses, Shuttle Buses or Transit Buses • Class 4-7: Local Freight Trucks • Airport Ground Support • Forklifts and Other Equipment for Handling Port Cargo • Charging Equipment for Light-duty Zero-emission vehicles • Option Involving the Diesel Emission Reduction Act

Comments on Missouri's Environmental Mitigation Trust

Missouri State Fleet Management is particularly supportive of funding EV Charging Infrastructure at state facilities. Electric vehicles are becoming much more readily available, more competitively priced (relative to petroleum fueled, and more widely accepted by the public. Making EV charging available at state facilities -- including state offices, state universities, interstate rest stops, etc -- shows support of EVs plus increases potential for state agencies and universities to acquire them. Additionally the public that drives EVs would have greater access to charging.

Without funding from sources like the VW settlement, installing EV charging infrastructure at state facilities must compete with other budgetary requirements -- and is unlikely to win.
Thank you.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#66]
Date: Monday, January 08, 2018 11:42:12 AM

Name	Steve Ahrens
Email Address	
Address	
City	Jefferson City
State	MO
Zip Code	65109
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Small Business • Interest Group • Operator of Private Fleet • Trade Association • Advocate for Alternative Fuels
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses

Comments on Missouri's Environmental Mitigation Trust

I'm writing today to update our comments regarding disposition of the VW Settlement monies. Previously, we had requested that at least half of the available funding be committed to replace pre-2007 diesel school buses in Missouri with cleaner models. After careful consideration of the benefits and options available to the agency under the Settlement guidelines, we now believe that it would be appropriate to allocate 100% of these funds for school bus replacement.
The reasons are numerous and compelling:
• Emissions from diesel school buses that are 10 years or older contribute significantly to NOx. If Missouri replaced the 5500 pre-2007 and older diesel school buses in service today with propane models, for instance, it would remove 1.9 million pounds of NOx emissions annually.
• The agency's initial survey found that most stakeholders were interested in school bus replacement.
• Missouri's contributions to student transportation were reduced by $39 million last year, a sum that could be offset by application of the $40 million VW proceeds.
• Another DNR survey finding showed equal interest in making funds available to both public and private fleets. Each of these interests—school districts and transportation providers—would be able to access funds under this program.
• School buses represent the fairest, most widely available type of NOx-reducing application. This would not favor any region or entity. Many of the comments DNR received have been from school districts asking for assistance with their transportation costs. This is an actual, not speculative, market.

• Schools already apply to replace diesel buses using DERA grants which require a 75% match. Under a Missouri VW Clean Bus program, the minimum match would be 25%, making buses much more affordable. There are presently more DERA applications than funding which confirms a compelling need.
• Weighting applications based on the match percentage—giving greater weight to a higher match—would stretch the funding significantly. Missouri's $40 million effectively becomes $50 million at 25% and $60 million at 50%.
• Weighting applications based on dollars-per-pound NOx reduction would also extend the available funding.
• The types of buses available would include propane, electric, natural gas or low-emission diesel. No fuel provider is favored, and all have incentives to be as competitive as possible to leverage this opportunity. There are potential customers for every fuel source today, depending on local needs, and vehicles are available today in every category.
• It would be possible to deploy these funds quickly—perhaps in as little as three year—given the drive-ready nature of alternative fuel school bus technology. There would be no delays for development, siting or other unknowns that make other uses problematic. The faster these funds are deployed, the more NOx reduction is achieved.
• Setting aside VW funding specifically for electric vehicles, in a state which derives 75% of its electricity from coal-fired generation, will not reduce NOx and should not be considered responsive to the requirements of the Settlement. While electric vehicles are becoming more prevalent, they do not reduce NOx and only shift the emissions from the tailpipe to the generation site. There is already a dedicated EV fund under the Settlement which can address electric vehicles and charging infrastructure.
• Several states have already announced that they intend to focus VW Settlement funds specifically for school bus replacement. Oregon's Initial Mitigation Plan will replace at least 450 diesel-powered buses. Louisiana will first give preference to publicly owned school buses (or old state heavy equipment) and deploy any remaining funding to other segments.
• DNR staff already handle school bus grants under the DERA program. The administrative responsibilities of adopting a Clean Bus program using VW monies would take advantage of current processes and expertise.
We're grateful for the opportunity to participate in the Settlement process and look forward to contributing to a state plan that addresses the requirements of measurable NOx reduction through a fair, inclusive statewide application process.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#53]
Date: Friday, December 08, 2017 11:34:24 AM

Name	ted hillmer, jr.
Email Address	
Address	
City	Repulbic
State	Missouri
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Government
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Charging Equipment for Light-duty Zero-emission vehicles

Comments on Missouri's Environmental Mitigation Trust

Missouri should be a demonstration state. Be a cleaner state. Show case: may be one cities maintenance vehicles, maybe a federal fleet of US mail vehicles in one city (all electric), showcase the vehicles at state and federal parks within the State. This way, the visitors to the parks could see these vehicles and want to purchase them for their individual needs. What track the State takes we must provide an educational component for the general public. Allow the electric vehicles to be seen, touched, used, and promoted is a solution in being good stewards of these VW funds. I believe the greater Springfield area is an excellent location to promote these types of vehicles especially with the Branson area. The most visited located within the State of Missouri.

Wilson's Creek National Battlefield would like to continue to showcase our electric vehicles and hybrids to the general public. We have been working with Clean Cities from KC and could continue this relationship with them to educate the public and decrease our carbon emissions in southern Missouri.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#45]
Date: Thursday, November 30, 2017 4:33:02 PM

Name	Terry O'Day
Email Address	
Address	
City	Los Angeles
State	California
Zip Code	90064
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Small Business • Advocate for Electric Vehicle Charging Stations
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses • Charging Equipment for Light-duty Zero-emission vehicles
Document Upload Option	Attachment Below

Comments of EVgo Services, LLC

Volkswagen Settlement Proposed Beneficiary Mitigation Plan
Missouri Department of Environmental Quality
Submitted November 30th, 2017

Thank you for the opportunity to make recommendations as Missouri's Department of Environmental works to craft a Beneficiary Mitigation Plan through the Environmental Mitigation Trust (EMT). As a charging infrastructure leader—with the largest public fast charging network in the country—EVgo continues to believe that any and all additional funding for fast charging infrastructure is welcome and vital to help make electric vehicle (EV) adoption more accessible for Missouri residents.

Transportation electrification necessitates a robust charging infrastructure to unlock its benefits for Missouri. Below are EVgo's comments and recommendations for the Environmental Mitigation Plan:

Light Duty EV Supply Equipment (EVSE)

EVgo recommends the max 15% utilization of total settlement funds allotted to light duty EV Supply equipment. EVgo believes that ZEV charging infrastructure investments are critical to bringing needed ZEV driving capabilities to communities across the state. This settlement provides the opportunity for a large injection of additional capital into ZEV infrastructure, and EVgo views this as necessary and beneficial for Missouri drivers, EV deployments, and existing charging industry participants. Accordingly, we have been supportive of the infrastructure investments planned under the VW 2.0 liter settlement, as we have of the investments of any automaker looking to tackle EV infrastructure.

EVgo continuously sets industry best practices and recommends the following elements to Missouri's light duty EV charging infrastructure deployment program:

- Incentives should be structured through rebates, grants, and/or competitive programs;
- Promote public-private partnerships that support industry competition and allow a variety of business models to participate in the program;
- And seek a balanced approach between highway (DC-Fast Charging) and residential (Level 2) charging infrastructure.

Non-EVSE Appendix D Funding

EVgo recommends Missouri to prioritize electrification over other alternative fuel sources for the remaining 85% of the trust funding available. Electrification achieves the greatest influence on transportation greenhouse gas (GHG) emissions. The electrification of public transit (e.g. buses, medium duty transit vehicles) has the potential to yield major additional reductions in GHG emissions. As we see the market pivoting towards this transition, there are many additional co-benefits to add. Many jurisdictions are now committing to 100% ZEV buses, so there will be purchasing groups that reduce

costs. The electric fleets are also significantly quieter than diesel, which is an important urban quality of life issue. As battery costs decline, there will be continued benefits from choosing the path of electrification for state residents and businesses.

Administration of Funds

EVgo supports the administration of funding and projects through existing Missouri programs to ensure a streamlined process and effective timeline. Our longstanding industry experience shows that the complete charging installation process from time of funding to fully operational station can run from 12-24 months. Thus, the importance of Missouri to streamline and begin processes as soon as possible could not be more important.

Geography of Project Allocations

Through Appendix C settlement funds, VW, through its Electrify America efforts, will be building highway charging corridors across the United States. **Additionally, given that studies have shown the most ardent effects of the Volkswagen NOx emissions were in urban areas, EVgo recommends the Missouri DEQ to focus Appendix D Environmental Mitigation Trust funding on intra-urban charging stations for multifamily communities.** By providing publicly accessible urban chargers, the State of Missouri can effectively mitigate the harmful effects of the vehicle emissions while simultaneously helping alleviate the barrier of owning an electric vehicle when home charging is not an option.

Thank you for considering our comments and recommendations. As you work toward drafting the Beneficiary Mitigation Plan, please consider EVgo as a resource for insight into both the EV charging industry and the broader EV industry. We offer ourselves as continuing partners in an effort to usher in a new era of transportation innovation in Missouri.

Best Regards,

Terry O'Day
Vice President, Market Development
11390 West Olympic Boulevard, Suite 250
Los Angeles, CA 90064

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#71]
Date: Monday, January 15, 2018 9:40:46 AM

Name	Zach Baugher
Email Address	
Address	
City	Bloomington
State	IL - Illinois
Zip Code	61702
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Trade Association • Advocate for Alternative Fuels
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 4-8: School Buses, Shuttle Buses or Transit Buses
Comments on Missouri's Environmental Mitigation Trust	Better our Buses and our children's futures. Remove the old diesel buses and replace with clean burning propane autogas.

From: Wufoo
To: Reimer, Shelly
Subject: DNR - VW Settlement [#51]
Date: Thursday, December 07, 2017 10:59:25 AM

Name	Zachary Kahn
Email Address	
Address	
City	Bronx
State	NY
Zip Code	10461
Phone Number	
What type of organization/business/agency/association best applies to you (Select all that apply)	• Engine/Vehicle Manufacturer or Vendor
Which project categories do you prefer the Department considers funding as part of its mitigation plan? See Appendix D-2 for category descriptions. (Select all that apply.)	• Class 8: Local Freight Trucks and Port Drayage Trucks • Class 4-8: School Buses, Shuttle Buses or Transit Buses • Class 4-7: Local Freight Trucks • Forklifts and Other Equipment for Handling Port Cargo
Comments on Missouri's Environmental Mitigation Trust	See BYD's attached letter.
Document Upload Option	Attachment Below

Submitted as an attachment via https://dnr.mo.gov/env/apcp/vw/vwcommentform.htm

December 7, 2017

Carol S. Comer, Director
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

Re: BYD Comments on Missouri's Use of Volkswagen Settlement Funds

Dear Director Comer:

BYD America ("BYD") appreciates the opportunity to submit the following comments that align with and build upon the state of Missouri's priorities of achieving broad, multi-sector deployments of zero-emission vehicles. Such deployments will take advantage of the Volkswagen settlement's unprecedented opportunity to reduce mobile source emissions and, in particular, provide both near- and long-term nitrogen oxide (NOx) emissions reductions in areas that bear a disproportionate share of the state's air pollution burden.

BYD is a global company that is changing what is possible in zero-emission transportation. Our commitment to "solve the whole problem" has made BYD an industry pioneer and leader in not only the transportation sector, but also high-efficiency energy storage, solar power, LED lighting, and information technology. BYD and its shareholders, including Warren Buffett, see these environmentally and economically forward products as the way of the future.

BYD would like to take this opportunity to provide additional information on the availability of all-electric medium and heavy-duty buses. Our recommendations for Missouri fall into three categories:

- Maximize the cost-effectiveness and cost of ownership benefits by ensuring that the maximum amount of Missouri's $41 million allocation be dedicated to all-electric vehicles;
- Provide support for transformative transportation technologies in areas disproportionately burdened with air pollution; and
- Leverage Volkswagen funds by aligning projects with other state initiatives to yield economic, emissions, and energy benefits.

BYD urges the Department of Natural Resources to take these recommendations into consideration, which will enable Missouri to most efficiently and effectively make the most of its allocation of Volkswagen funds.

Missouri Should Focus Funding on Electric Vehicles to Maximize Total Cost of Ownership Benefits

BYD's product line of transit and coach buses, ranging from 23' coach buses to 60' articulated transit buses, are American Disabilities Act and Buy America-compliant. They are therefore eligible to help transit agencies in Missouri reduce fuel costs and minimize maintenance expenses, increasing reliability and performance.

Transit buses, by virtue of their high mileage, see even more substantial maintenance and fuel savings than other on-road vehicles. For example, BYD's standard 40' bus can generate yearly savings on the order of $45,000 per bus. Over a 15-year vehicle lifetime, that can add up to $675,000 in reduced maintenance and fuel costs. Further, BYD's recyclable battery technology enables these vehicles to operate as much as 250 miles on a single charge, all while producing zero emissions.

In other words, for every dollar invested in all-electric transit buses, Missouri can generate tremendous savings for public transit agencies and their customers while also accomplishing the Environmental Mitigation Trust's goal of reducing emission-caused public health concerns. With these added savings, transit agencies have the option to offer increased services for riders, providing more alternatives to private transportation and thereby further displacing vehicle emissions.

BYD SHUTTLES AT KANSAS CITY AIRPORT

Missouri's own Kansas City International Airport has taken delivery of its first 30-foot all-electric coach buses. The four BYD vehicles – fully customized to perform as parking lot shuttles – provide Kansas City Airport with a reliable, emissions-free solution capable of generating not only a return on investment but also cost savings within the vehicle's lifetime.

The BYD-designed and built iron phosphate batteries come with an industry leading 12-year warranty and allow the buses to run for a full day of driving between terminals and parking lots. The buses were built in the USA at BYD's Coach and Bus manufacturing facility in Lancaster, CA.

Transit Projects Generate Health Benefits in Areas Disproportionately Burdened by Diesel Pollution

Missouri's air quality issues have led to the designation of several ozone nonattainment counties – Franklin, Jefferson, St. Charles, and St. Louis – that are home to almost 2 million residents including the large population center of St. Louis.[1] By directing funding to vehicles operating in these areas, Missouri can immediately reduce harmful NOx emissions, thereby generating environmental, health, and economic benefits.

One such funding strategy is to electrify transit buses operating in Missouri's population centers or along key

[1] "Green Book 8-Hour Ozone (2008) Area Information". United States Environmental Protection Agency, October 5, 2017. https://www.epa.gov/green-book/green-book-8-hour-ozone-2008-area-information.

corridors, such I-29, I-44, and I-70. As the world's largest producer of battery electric buses, BYD has demonstrated experience and established customer delivery and deployment processes in similar cases. Indeed, BYD has deployed more than 27,000 zero-emission buses internationally and has received orders for over 20,000 additional buses. These buses have accumulated more than 300 million miles of service, saved millions gallons of diesel, and reduced hundreds of millions of pounds of greenhouse gases (GHGs).

BYD TRANSIT BUSES IN COLUMBIA

The City of Columbia has long prided itself on its commitment to public health and sustainability. As a reflection of that commitment, the City began in 2015 to turnover its public bus fleet and has now deployed nine of BYD's battery-electric transit buses.

This is the first and only battery-electric fleet in revenue service in Missouri and is one of the largest in the Midwest. Columbia is committed to continuing to expand its electric fleet and, by leveraging Volkswagen settlement funds, plans to acquire additional buses in the coming years.

Missouri Should Leverage Volkswagen Funds by Aligning Projects with Other State Initiatives to Yield Economic and Energy Benefits

Simply replacing existing diesel vehicles with new (but still conventional fuel) technology may yield limited benefits, but it will do very little in leading the state towards a cheaper, cleaner, and more reliable energy future with greater energy independence. Electric vehicles, however, offer the means to achieve energy security and environmental sustainability while simultaneously creating a driver for economic growth.

Electric vehicle deployments will also increase domestic energy security by offering drivers and operators a choice of fueling options. According to the Electric Drive Transportation Association, domestically produced grid electricity, on average, can power plug-in vehicles at the equivalent of $1 a gallon of gasoline. Importantly, this pricing structure is stable as it is insulated from the global volatility that impacts diesel.[2]

Missouri has already created initiatives, such as Kansas City Power and Light's Clean Charge Network and the state's Alternative Fueling Infrastructure Tax Credit, to tackle the need for dedicated charging infrastructure for electric vehicles. The state can ensure that different funding and incentive programs work together by funding electric vehicle projects to complement new charging infrastructure. BYD stands ready to align with and further support those initiatives.

Closing Remarks

The economic, emission, and energy-specific benefits of electrified equipment are clear – all-electric vehicles generate no tailpipe emissions while deliver a lower total cost of

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[2] "Why Electric Drive?" Electric Drive Transportation Association. http://electricdrive.org/ht/d/sp/i/27103/TPL/LandingPageTechIss/pid/27103.

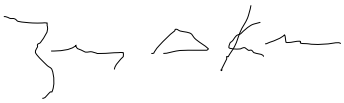
ownership over the lifetime of the vehicle than conventional petroleum fuels and natural gas. Further, the commercial-scale heavy-duty electric transportation market is rapidly maturing, as demonstrated by the price reduction of more than 20% in our bus products over the last five years. This Volkswagen opportunity represents a unique chance to create immediate emission and economic benefits for Missouri's residents, as well as build the groundwork for a sustainable electric transportation marketplace.

While the Volkswagen settlement provides Missouri the flexibility to fund a variety of conventional and alternative fuel on- and off-road vehicle projects, BYD believes early-market incentive funding is critical to achieving more favorable upfront economics and that increasing sales will lead to cost-competitive purchase prices of all-electric vehicles. We have committed to and successfully delivered substantial price reductions from our first generation of products. We hope to continue this progress in Missouri and support the state in addressing a broad spectrum of environmental issues, resiliency and sustainability chief among them.

BYD thanks the State of Missouri and the Department of Natural Resources for the opportunity to submit these recommendations. We would like to work with you and your team to ensure an efficient and effective rollout of the State of Missouri's Environmental Mitigation Trust funds.

Towards that end, we request an in-person meeting to discuss our recommendations further. We look forward to future collaboration that will help Missouri meet its environmental, fiscal, and social justice goals.

Sincerely,



Zachary S. Kahn
Director of Government Relations
BYD America

Written Comments Received via Mail or Email

OFA Climate Team

January 23, 2018

Missouri Department of Natural Resources
ATTN: Carol Comer, Director
1101 Riverside Drive
Jefferson City, MO 65102

Re: Comments on use of Volkswagen Environmental Mitigation Trust funds by Missouri

Dear Ms. Comer,

The Ethical Society of St. Louis, League of Women Voters of Metro St. Louis, Mid-Missouri Peaceworks, Midwest Coalition for Responsible Investment, Missouri Coalition for the Environment, Natural Resources Defense Council, Organizing For Action - Missouri Climate Team, Renew Missouri and Sierra Club, (collectively, "Commenters") appreciate the opportunity to provide input to the Missouri Department of Natural Resources ("MDNR") on the use of the $40M+ available to Missouri under the Volkswagen ("VW") Environmental Mitigation Trust ("EMT").

Our overarching aim is to ensure that investments pursued and made by MDNR through the EMT result in meaningful, long-term and cost-effective reductions in nitrogen oxides ("NOx") and other polluting emissions from Missouri's transportation sector, particularly in nonattainment areas and communities that are heavily burdened by such pollution.

To meet this objective, **we strongly recommend that MDNR prioritize the use of electric technologies under the EMT.** Electric vehicles offer superior emissions benefits today, and would transform Missouri's transportations sector in the long-term, locking-in reductions that go well beyond those which would likely occur absent the EMT through business-as-usual vehicle replacements.

We make this recommendation for the following reasons, explained in more detail below:

- The terms of the VW Settlement establish that the EMT should be used to address NOx pollution and achieve meaningful emissions reductions, particularly for burdened communities; the State should follow that guidance and seize this opportunity to transform Missouri's transportation sector;

- Missouri suffers from air quality and transportation pollution problems which seriously impact the health and well-being of our residents and communities;

- Electric technologies are demonstrated, market-ready and can out compete other technologies on total cost of ownership and least-cost NOx reductions.

I. The EMT presents Missouri with a unique opportunity to lock-in immediate and lasting emissions reductions from polluting vehicles, and to jumpstart the transformation of its transportation sector; the State should seize that opportunity.

The EMT presents Missouri with a unique opportunity to reduce NOx and other polluting vehicle emissions, to improve the health of all Missourians, and to accelerate the transformation of its transportation sector.

To fully capitalize on this opportunity, Commenters submit that MDNR must focus on reducing emissions in nonattainment areas burdened by NOx and other transportation pollution, and prioritize funding for projects that will yield NOx reductions that are both immediate and lasting.

This approach is consistent with the terms of the VW Settlement, which not only establishes that the goal of the EMT is to "achieve reductions of NOx emissions in the United States,"[1] but also requires that, in drafting Beneficiary Mitigation Plans, beneficiary States include a description of how the plan will consider benefits to "air quality in areas that bear a disproportionate share of air pollution burden."[2]

MDNR should also prioritize funding of projects that promote environmental and social justice. Transportation emissions, particularly diesel emissions, are a primary culprit in adverse lung impacts on children, especially African American children. Studies have shown the link between diesel emissions and asthma in children.[3]

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[1] VW Partial Consent Decree at 5.
[2] VW Partial Consent Decree at 21.
[3] Weir, Erica, "Diesel exhaust, school buses and children's health, "Canadian Medical Association Journal, September 3, 2002, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC121970/

The number of children in the St. Louis region suffering from asthma is nearly three times the national average.[4] At the St. Louis Children's Hospital, asthma is the number one reason for hospitalizations.[5] In 2008, African-American children accounted for 92 percent of asthma-related emergency room visits in St. Louis City, a rate nine times greater than that among white children.[6]

As explained in Section II, below, Missouri suffers from air quality and transportation pollution issues. MDNR should prioritize projects in these areas, and in doing so should weigh the cost-effectiveness of vehicle replacements and NOx reductions on a total cost of ownership basis. With this approach, Missouri can ensure that the portfolio of investments delivers long-term benefits and not just limited, short-term gains.

One way to consider the issue is to assess transportation sector NOx emissions outcomes in a scenario leveraging EMT funds relative to the status quo. An investment in replacing diesel vehicles with newer diesel models will result in low incremental NOx reductions as those vehicles will likely be replaced with diesel in the short term even in the absence of these funds. By contrast, an investment that builds momentum for large-scale transportation electrification will have lasting emissions reductions impacts that achieve the objectives of the EMT.

As explained in Section III, below, demonstrated, market-ready technologies exist for the majority of the vehicle types eligible for replacement. The superior emissions benefits that electric vehicles offer today will only improve as Missouri's generation mix becomes cleaner.

In addition to allocating the full 15% for light-duty vehicle charging infrastructure, MDNR should focus the remaining funds on replacing old medium and heavy-duty vehicle diesel vehicles with qualified electric versions of those vehicles and associated charging infrastructure.

II. Missouri has serious air quality and transportation pollution concerns

Transportation emissions play a considerable role in undermining the public health of Missouri residents and impacting Missouri's environment.

Missouri is currently violating the 2008 and 2015 National Ambient Air Quality Standards ("NAAQS") for ozone—also known as smog.[7] Ozone is a corrosive gas that inflames the lungs, constricts breathing, and is increasingly understood to cause premature death.[8]

Strikingly, nearly 50 percent of Missouri's NOx emissions—a primary precursor of smog—come from its transportation sector.[9] The illegal software used by Volkswagen caused

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[4] Green, Emma; "The Makings of an Asthma Epidemic in St. Louis," The Atlantic, December 14, 2012, http://www.theatlantic.com/health/archive/2012/12/the-makings-of-an-asthma-epidemic-in-st-louis/266289/

[5] *Ibid*

[6] *Ibid*

[7] St. Louis, in particular, has struggled to meet the 2008 and 2015 ozone standards. In the St. Louis area, the "design value" for ozone levels from 2012-2014 was 78 parts per billion ("ppb"), and from 2013-2015 was 71 ppb, compared to 75 ppb for the 2008 standard and 70 ppb for the 2015 standard, respectively.

[8] See Am. Trucking Ass'ns v. EPA, 283 F.3d 355, 359 (D.C. Cir. 2002) ("ATA"); 80 Fed. Reg. 65,308/3-09/1.

[9] EPA, National Emissions Inventory, 2011 data, https://www.epa.gov/air-emissions-inventories/2011-national-emissions-inventory-nei-data

affected vehicles to emit NOx at 10-40 times higher than federal limits, worsening this problem and contributing to ozone formation. An American Lung Association report found that, from 2014-2016, the 20 Missouri counties with ozone monitors experienced 449 "high ozone days," meaning that ozone concentrations on those days were unhealthy for all residents or unhealthy for sensitive populations according to EPA guidance.[10]
At the same time, the emissions of NOx and other pollutants from Missouri's power sector are generally declining. In 2015, for example, annual power sector NOx emissions were 84 percent lower than 1990 levels.[11] This occurrence is due to the gradual shift of Missouri's generation mix away from coal-fired power and toward cleaner resources and greater energy efficiency. Given this trend, the emissions benefits of electric transportation will only improve over time; the same cannot be said for conventional or other alternative transportation fuels.

In addition to ozone precursors, gas and diesel vehicles emit a host of pollutants and toxins, including known carcinogens. For example, fine particulate matter, another pollutant for which St. Louis is in nonattainment[12], can result in harms ranging from reproductive and developmental harms to cardiovascular damage and early death.

A 2013 MIT study found that, of all sectors, the transportation sector was the greatest contributor to premature emissions–related deaths in the U.S., resulting in 53,000 early deaths per year from vehicle tailpipe emissions.[13] In Missouri alone, researchers estimated that 1,192 premature deaths occur each year due to fine particulate matter and ozone from tailpipe emissions. In St. Louis, this amounts to 235 premature deaths each year.

Transportation also plays a tremendous role in Missouri's emission of carbon dioxide. Transportation is the single largest energy use sector in the state[14], and, in 2013, the transportation sector accounted for 27 percent of Missouri's carbon dioxide emissions.[15]

In short, investments in zero-emission transportation benefit Missouri communities in nonattainment and overburdened areas through improved health outcomes.

III. Electric technologies are demonstrated, market-ready and can out-compete other technologies on total cost of ownership and least-cost NOx reductions.

Demonstrated electric technologies exist for the majority of the vehicle categories targeted by the program, the immediate NOx reductions of electric vehicles are superior to alternate technologies, and a transition to electric technologies is critical in the long-term to meet federal air quality standards. The EMT should spark that transition.

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[10] American Lung Association, State of the Air 2016 Report at 104.
[11] U.S. Energy Information Administration. 2017. U.S. Electric Power Industry Estimated Emissions by State (EIA-767, EIA-906, EIA-920, and EIA-923). 1990-2015. Available at https://www.eia.gov/electricity/data/state/
[12] U.S. EPA. (2015). Current Nonattainment Counties for All Criteria Pollutants. http://www.epa.gov/airquality/greenbook/ancl.html
[13] Massachusetts Institute of Technology Laboratory for Aviation and the Environment (2013) Air Pollution Causes 200,000 early deaths each year in the U.S. http://lae.mit.edu/air-pollution-causes-200000-early-deaths-each-year-in-the-u-s/
[14] Missouri Comprehensive State Energy Plan (2015) Department of Economic Development, Division of Energy, p.99. https://energy.mo.gov/energy/docs/MCSEP.pdf
[15] U.S. Energy Information Administration. (2015). State Carbon Dioxide Emissions. http://www.eia.gov/environment/emissions/state/

California's Air Resources Board ("CARB"), in formulating a strategy to accelerate broader transportation electrification, called for a focus on "deploying zero-emission vehicles in heavier applications that are currently well-suited for broad market development, such as transit buses, airport shuttles, and last mile delivery [trucks]."[16] In the off-road categories, CARB's initial targets for electrification are airport ground support equipment, forklifts, and cargo-handling equipment at ports.[17] CARB's various technology assessments have also found that these categories are ripe for electrification.[18] In short, each of the vehicle classes eligible for EMT funding has a demonstrated electrified technology.

Below, we use the example of electric transit buses to illustrate how use of EMT funds to defray the upfront cost premium on these vehicles can unlock lifetime savings and move the market, while providing least-cost NOx emissions reductions. We are supportive of investments in other eligible electric mitigation vehicle categories.

a. Electric Transit Buses

Switching transit buses to electric fuel is more cost-effective on a total cost of ownership basis than diesel or alternative fuel options, and the resulting operations and maintenance ("O&M") savings allow for additional investment in clean buses while driving down costs. At the same time, electrifying bus fleets will also work to advance and transform the market, thereby contributing to already sharply falling battery and electric bus costs. Moreover, electric buses offer the most cost-effective NOx reductions.

b. Electric buses already have lower comparative lifetime costs than diesel buses and CNG buses—and costs continue to fall sharply.

Currently, there is an up-front cost premium to purchasing an electric bus over a diesel, CNG bus or hybrid bus. For example, in 2017, a Proterra electric bus costs approximately $789,000, a hybrid bus costs $673,693, a CNG bus costs $542,378, and a diesel bus costs $483,155.

Nonetheless, even factoring in the cost premium, electric buses are already a cheaper, more cost-effective vehicle. As modeling under Argonne National Laboratory's AFLEET model demonstrates[19], electric buses have a **total cost of ownership 18% lower than new diesel buses,** and would save Missouri's transit agencies $200,000 over a new diesel bus purchase.

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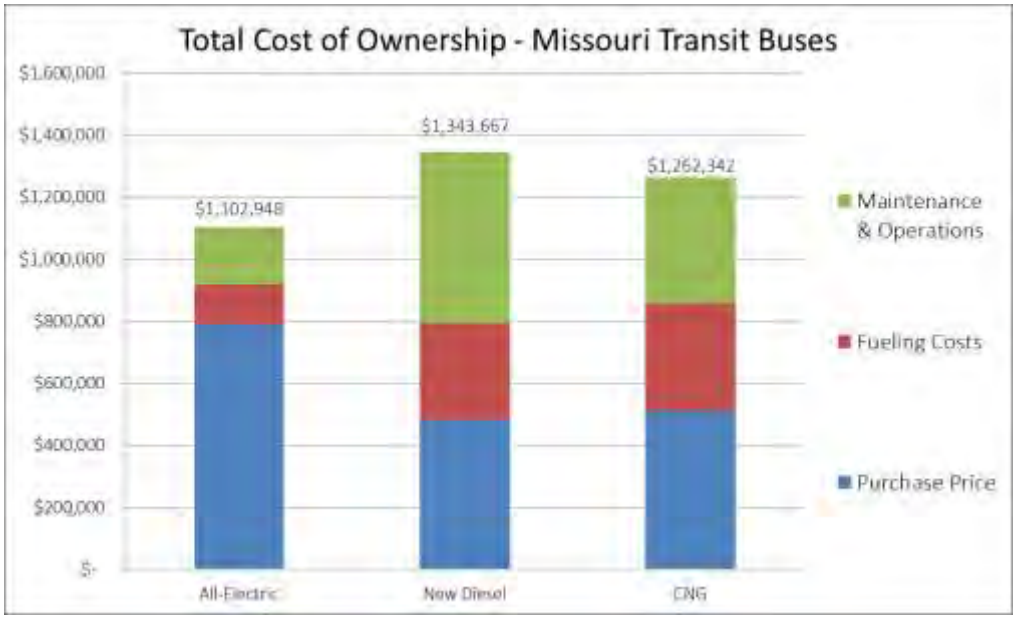
[16] ARB, "Revised Proposed 2016 State Strategy for the State Implementation Plan" at 83.

[17] *Id.* at 105 (forklift rule commitment) and 112 (airport ground support equipment commitment); *see also* Addendum to 2016 State Strategy for the State Implementation Plan, Resolution No. 17-7 2016 Air Quality Management Plan For Ozone and PM2.5 in the South Coast Air Basin and the Coachella Valley, Resolution No. 17-8 (cargo handling equipment commitment).

[18] *See, e.g.*, ARB, "Draft Technology Assessment: Medium- and Heavy-Duty Battery Electric Trucks and Buses" (Oct. 2015) (noting availability of electric buses and last mile delivery trucks) (https://www.arb.ca.gov/msprog/tech/techreport/bev_tech_report.pdf); ARB, "Technology Assessment: Mobile Cargo Handling Equipment" (Nov. 2015) (https://www.arb.ca.gov/msprog/tech/techreport/che_tech_report.pdf) (noting availability of electric forklifts and other cargo handling equipment, including rubber tire gantries in particular).

[19] AFLEET is a tool developed by Argonne National Lab to examine light-duty and heavy-duty vehicles' petroleum use, greenhouse gas and air pollutant emissions and costs of ownership. Model inputs are populated using averages of fuel economy and maintenance costs reported directly by transit agencies from the years 2014 to 2017 (See Appendix A: AFLEET Inputs and Sources).



Argonne National Laboratory's AFLEET Model (2017); fuel and electricity costs adjusted for St. Louis, MO

Maintenance costs for electric buses are between 70% and 79% lower than for compressed natural gas (CNG) and new diesel buses respectively, contributing to significant cost savings over the lifetime of a bus. Moreover, all-electric buses are fueled by regionally generated electricity, which has demonstrated far more reliable pricing as compared to diesel oil and natural gas.[20]

	Fuel Economy (MPGDE)	Maintenance & Repair ($/mi)
Electric	**19.44**	**$0.17**
Diesel	4.16	$0.80
CNG	3.87	$0.56

By using EMT funds to meet the higher upfront capital requirements of an electric bus fleet, a transit agency can lock in the lower lifetime costs of EV buses. Lifetime savings can be re-invested into additional purchases of electric buses, creating a positive economic cycle, where a transit agency can continue to electrify its bus fleet, and further drive down operational costs as electric buses replace the entire fleet.

This virtuous cycle improves as battery and bus costs fall, which is occurring rapidly.[21] A recent CARB study shows that every year the price premium for electric buses decreases and, by 2022, they will be at cost parity with and continue to decrease as compared to diesel buses. Therefore, every new bus bought will continue to shift the premium down. Meanwhile, CNG and diesel bus capital cost trends are continually increasing.[22]

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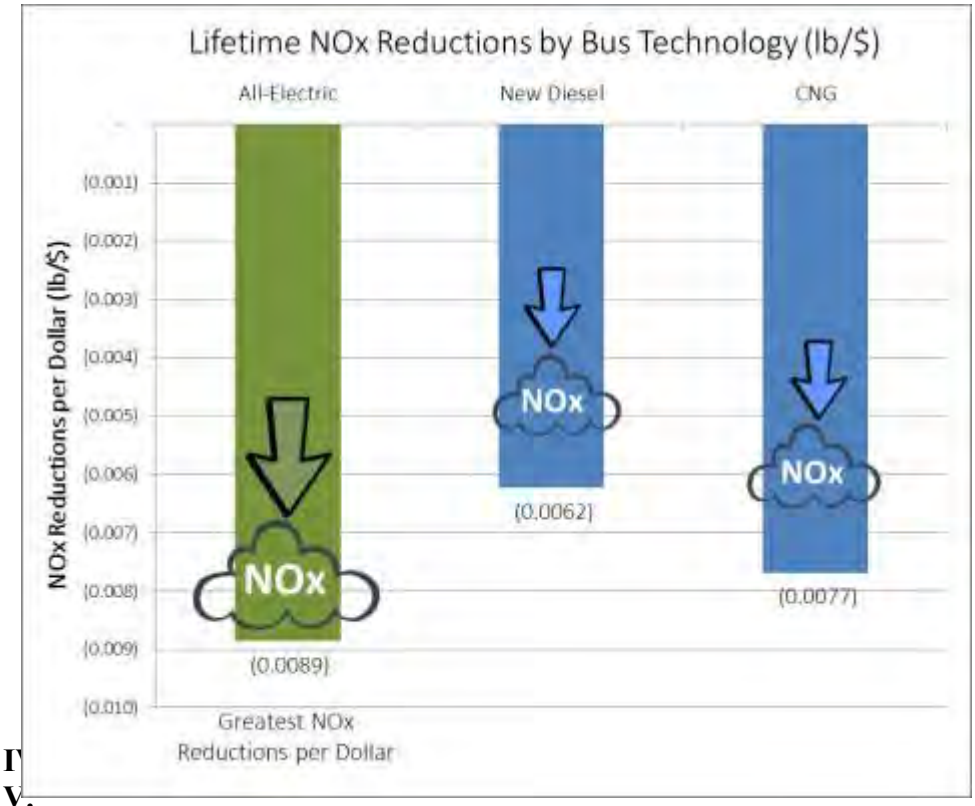
[20] https://www.afdc.energy.gov/fuels/prices.html
[21] California Air Resources Board (ARB). (2016) *Total Cost of Ownership to Advance Clean Transit*. Presentation Prepared for the 4th Meeting of the Advanced Clean Transit Working Group. <https://www.arb.ca.gov/msprog/bus/4thactwgmtng_costs.pdf>
[22] California Air Resources Board. (2016) T*otal Cost of Ownership to Advance Clean Transit*. Presentation Prepared for the 4th Meeting of the Advanced Clean Transit Working Group. <https://www.arb.ca.gov/msprog/bus/4thactwgmtng_costs.pdf>

c. **On a total cost of ownership basis, investing in transit buses is the cost-effective choice for NOx emissions reductions.**

Under the VW EMT, administering agencies must report the anticipated NOx emissions reductions from use of the EMT funds. In considering the cost-effectiveness of NOx emissions reductions by vehicle fuel type, we urge MDNR to weigh total lifetime vehicle costs, rather than solely the upfront purchase price. Under that scenario, the bus technology with the greatest NOx lb/$ ratio is a zero-emission bus. See graph below.



IV.

Argonne National Laboratory's AFLEET Model (2017); fuel and electricity costs adjusted for St. Louis, MO

IV. Conclusion

Commenters thank MDNR for the opportunity to submit these comments. We look forward to continued work with the Department and other stakeholders to support forward-looking, transformative, cost-effective use of the Volkswagen EMT in Missouri that meaningfully reduces NOx and other polluting emissions from Missouri's transportation sector.

Respectfully submitted,

Kate Lovelady
Leader
Ethical Society of St. Louis
9001 Clayton Rd
St. Louis, MO 63117
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Senior Campaign Representative
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2818 Sutton Blvd
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andy.knott@sierraclub.org

cc: Kyra Moore, Environmental Quality Deputy Division Director
Darcy Bybee, Air Quality Planning Section Chief
Emily Wilbur, State Implementation Plan Unit Chief

Attachment

Electric Transit Bus Studies

Eudy, L., & Post, M. (2015). *American Fuel Cell Bus Project Evaluation: Second Report* (No. NREL/TP--5400-64344). National Renewable Energy Lab.(NREL), Golden, CO (United States). <https://www.nrel.gov/docs/fy15osti/64344.pdf>

Eudy, L., & Jeffers, M. (2017). *Foothill Transit Battery Electric Bus Demonstration Results: Second Report* (No. NREL/TP-5400-67698). National Renewable Energy Laboratory (NREL), Golden, CO (United States).

Eudy, L., & Post, M. (2015) *Zero Emission Bay Area (ZEBA) Fuel Cell Bus Demonstration Results: Fourth Report*. <https://www.nrel.gov/docs/fy15osti/63719.pdf>

J. Aber (2016) *Electric Bus Analysis for New York City Transit*. Columbia University, New York, NY, Rep. Available at: www.columbia.edu

Metro, F. P. K. C. (2017) *King County Metro Battery Electric Bus Demonstration—Preliminary Project Results*. National Renewable Energy Laboratory. https://www.afdc.energy.gov/uploads/publication/king_county_be_bus_preliminary.pdf

Literature Reviews & Presentations:

California Air Resources Board (ARB). (2016) *Advanced Clean Transit Program – Literature Review on Transit Bus Maintenance Cost (Discussion Draft)*. Prepared for the 3rd Meeting of the Advanced Clean Transit Working Group. <https://www.arb.ca.gov/msprog/bus/maintenance_cost.pdf>

California Air Resources Board (ARB). (2016) *Advanced Clean Transit – Battery Cost for Heavy-Duty Electric Vehicles (Discussion Draft)*. Prepared for the 3rd Meeting of the Advanced Clean Transit Working Group. https://www.arb.ca.gov/msprog/bus/battery_cost.pdf

California Air Resources Board (ARB). (2016) *Total Cost of Ownership to Advance Clean Transit*. Presentation Prepared for the 4th Meeting of the Advanced Clean Transit Working Group. <https://www.arb.ca.gov/msprog/bus/4thactwgmtng_costs.pdf>

Additional Resources:

Live Tracking of King County Metro's Electric Buses: http://energy.proterra.com/KCM/

Proterra's Electric Bus Spec Sheet: https://www.proterra.com/performance/fuel-economy/

Attachment A

AFLEET Inputs and Sources:

	Maintenance ($/mi)		Fuel Economy (MPDGE)		Purchase Price ($)	
	Average	**Source(s)**	**Average**	**Source(s)**	**2015 Value**	**Source(s)**
Electric	$0.17	Foothill Transit Battery Electric Bus Demonstration (2017) Electric Buses at Stanford (2015) King County Metro Battery Electric Bus Demonstration (2017)	19.44	Foothill Transit Battery Electric Bus Demonstration (2017) Proterra Catalyst Performance Spec Sheet (2017)	$789,000	Foothill Transit Battery Electric Bus Demonstration (2017)
Diesel	$0.80	CARB Literature Review on Transit Bus Maintenance Cost (2016)	4.155	Zero Emission Bay Area (ZEBA) Fuel Cell Bus Demonstration Results: Fourth Report (2015)	$483,155	CARB Total Cost of Ownership to Advance Clean Transit (2016)
CNG	$0.56	CARB Literature Review on Transit Bus Maintenance Cost (2016)	3.87	American Fuel Cell Bus Project Evaluation: Second Report (2015) Foothill Transit Battery Electric Bus Demonstration (2017)	$509,756	CARB Literature Review on Transit Bus Maintenance Cost (2016) American Fuel Cell Bus Project Evaluation: Second Report (2015)

2114 Narcissus Court
Venice, CA 90291, USA
+1 844.363.7833
Enervee.com/business

15 December 2017

Enervee Comments to the attention of the Missouri Department of Natural Resources VW Settlement – Beneficiary Mitigation Plan

Enervee appreciates the opportunity to contribute to the Beneficiary Mitigation Plan that the Missouri Department of Natural Resources is developing under the Volkswagen (VW) settlement.

The Beneficiary Mitigation Trust presents the opportunity for states to invest in transportation infrastructure, paving the way for cost effective options for vehicle and fleet owners, a more competitive auto industry, employment and economic growth, less reliance on conventional fuels, grid and electric market improvements, reduction in range anxiety, as well as significant reductions in air pollution.

But infrastructure is not enough. Transformation of the transportation sector rests in large part on the choices of consumers, so it will be critical to prioritize projects that eliminate market barriers – making it as easy as possible for individuals to research and purchase clean vehicles and access related incentives and services.

To this end, we wish to highlight technological advances and behavioral science insights that can help the Missouri Department of Natural Resources lay the groundwork for a self-sustaining market for clean vehicles in Missouri and across the country.

Enervee is a cleantech company with a mission to make it simple and compelling for people to shop energy smart. We operate a cloud-based data and engagement platform

that analyzes consumer product markets in real time – and makes use of that and other sources and types of data to engage shoppers, activate clean energy markets and drive energy savings and pollution reductions. Published academic research has proven that making the energy attributes of consumer products visible – in the form of a zero to 100 Energy Score, within a market-based platform – shifts people's product choices towards significantly more efficient models[1]. Further behavioral insights can be found on the Enervee Blog. This unique platform can be invaluable to empower all car shoppers to make more eco-efficient choices that suit their needs.

Enervee currently operates white-labelled online marketplaces for leading utilities and statewide clean energy programs, serving over 11% of all US households, and this will increase significantly by the end of 2017[2].

Autovee is Enervee's latest evolution – our mobile-first online energy-smart marketplace for passenger vehicles – which is fully integrated with our Level 2 EV charger marketplace, EV charger installation service and rooftop solar concierge service, offering the type of seamless user experience that can give consumers confidence and make the unfamiliar task of purchasing an electric vehicle much simpler.

The Missouri Department of Natural Resources can rest assured that the technology is available, and we hope to have the opportunity to provide further information on and ultimately deploy Autovee to speed transportation emissions reductions in your state.

Sincerely,

Anne Arquit Niederberger, Ph.D.
VP, Market Development
707.590.8660 | anne@enervee.com

[1] Arquit Niederberger, A. & Champniss, G. *Energy Efficiency* (2017). https://doi.org/10.1007/s12053-017-9542-3

[2] The California Public Utilities Commission, for example, has mandated all investor-owned utilities in the State have such public marketplaces online by the end of 2017. See SDG&E Marketplace for an example.

RECEIVED
2017 OCT -4 AM 11:19
AIR POLLUTION
CONTROL PGM

Gupta, Ashok

Subject: FW: electric vehicles

Below is a short summary on the opportunity for utilizing federal tax credits by public and tax exempt entities.

Leveraging Federal Tax Credits to Support EV Acquisition by Public Sector and Tax-Exempt Entities

Federal law authorizes a credit against federal taxes of up to $7,500 per vehicle for Qualified Plug-in Electric Drive Motor Vehicles for the first 200,000 qualifying vehicles sold by a manufacturer in the United States.[1] The credit has been instrumental in spurring the market for electric vehicle (EV) sales and leases. However, despite their potential to significantly lower prices, provisions in the law that enable the public sector and other tax exempt entities to benefit from the credit when purchasing EVs have not been widely utilized.

The law (26 USC 30D (f)(3)) enables tax exempt entities to benefit from EV tax credits by authorizing the *seller* of a qualified vehicle to a tax exempt person or entity to "be treated as the taxpayer that placed such vehicle in service…" and claim the credit, provided the seller discloses the amount of credit for which the vehicle is eligible. Permitting the seller to claim the credit can benefit the public sector and other tax exempt entities by creating the opportunity for sellers to pass along the credit value (or some portion thereof) in the form of a lower purchase price.

Auto manufacturers who sell vehicles directly to some public sector customers do not appear to be using credits to support EV sales to those customers, likely due in part to the manufacturers' limited tax liability. In addition, many auto dealers may not be structured or have sufficient tax liability to absorb credits. In fact, only one out of seven responders to a recent Alameda County, California solicitation to purchase 90 EVs included the EV tax credit in their proposal. A subsequent analysis suggested that dealers may (1) perceive risk in passing on the value of the tax credit because they can only recover the credit at a future date, and (2) lack enough taxable income for their retail departments to be able to us the full value of the credit for large volume EV purchases.[2]

There is an opportunity for government agencies to engage with the private sector and structure EV procurement solicitations in a way that enables new partnerships that can unlock

the value of federal tax credits for public sector EV customers and reduce EV acquisition costs for state and local agencies.

---

[1] The credit applies to new cars and is equal to $2,500 for any vehicle placed in service that has a battery capacity of at least 5 kilowatt hours, plus $417 for each kilowatt hour of battery capacity in excess of 5 kilowatt hours, not to exceed a total tax credit of $7,500 per vehicle.

[2] EV Smart Fleets, Capturing the Federal EV Tax Credit for Public Fleets, A Case Study of a Multi-Jurisdictional Electric Fleet Procurement in Alameda County, California, April 2017

[1] The credit applies to new cars and is equal to $2,500 for any vehicle placed in service that has a battery capacity of at least 5 kilowatt hours, plus $417 for each kilowatt hour of battery capacity in excess of 5 kilowatt hours, not to exceed a total tax credit of $7,500 per vehicle.

[2] EV Smart Fleets, Capturing the Federal EV Tax Credit for Public Fleets, A Case Study of a Multi-Jurisdictional Electric Fleet Procurement in Alameda County, California, April 2017

From:	Moore, Kyra
To:	Bybee, Darcy; Wilbur, Emily; Allen, Stacy; Reimer, Shelly; Leath, Mark
Subject:	FW: VW Coalition Letter
Date:	Thursday, December 21, 2017 5:54:32 AM
Attachments:	VW Coalition Letter Missouri 12-18-17.pdf

fyi

From: Alexander, Jennifer
Sent: Monday, December 18, 2017 1:19 PM
To: Comer, Carol; Moore, Kyra; Galbraith, Ed
Cc: Buntin, Dru; Wheeler, Katie Jo
Subject: FW: VW Coalition Letter

Please see the attached letter.

Thanks,
Jennifer

From: Brett Barry
Sent: Monday, December 18, 2017 12:58 PM
To: Alexander, Jennifer
Subject: VW Coalition Letter

Jennifer,

Per our discussion on the phone, please see the attached coalition letter signed by 20 state and nationwide companies and organizations regarding the development of the Volkswagen Settlement spending plan. We would be more than happy to further discuss these comments in person should the opportunity arise. At your convenience, please confirm receipt.

Regards,

Brett Barry
Senior Policy Advisor
Clean Energy

December 18, 2017

Director Carol S. Comer
Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

RE: Volkswagen Settlement Emissions Mitigation Plan

Dear Director Comer:

We the undersigned represent an array of alternative fuel vehicle and renewable fuel stakeholders united by a common desire for the development of an effective and equitable emissions mitigation plan under the Volkswagen Settlement (Settlement) in the State of Missouri. We submit the following two recommendations for your consideration.

1. **All vehicles that are certified to one of CARB's low NOx emissions standards, CARB's near-zero emission standard or have zero tailpipe emissions should be eligible for an equal percentage of funding per vehicle.**

The main directive of the mitigation plan is to reduce NOx emissions. Vehicles certified to CARB's standards produce 50 to 100 percent fewer NOx tailpipe emissions than the current federal standard and thus 50-100 percent less than new diesel vehicles. One of the newest engines in this class of certifications is the low-NOx 6.8 liter propane engine from Roush announced in June of this year. Given the significant improvement that all vehicles with these certifications present and the varying needs of both public and private fleets, which

require different sizes and engine capabilities, we encourage equal treatment in terms of funding.

Under the Settlement all private sector vehicle grants are capped at 25 percent of the total vehicle cost, except those for electric vehicles (EVs), which can receive up to 75 percent. There is no basis for skewing the funding in favor of EVs. While EVs have zero tailpipe emissions, emissions are created in generating the electricity which powers them. Let us be clear; we are not against electric vehicles. Rather, the array of technologies and fuels deserve equal treatment given the clear goal of the mitigation plan to reduce NOx emissions.

The South Coast Air Quality Management District of California views the new heavy duty near-zero natural gas engines from Cummins-Westport to be zero-emission equivalent based on the district's mix of electric generation supplying their grid. It is important to note that they have one of the cleanest grids in the country. Therefore, the new near-zero natural gas engine is likely even cleaner than an EV in Missouri since the state produces a majority of its electricity from coal.

We encourage Missouri to create a level playing field for all sources of alternative fuel by funding all private sector low-NOx, near-zero and zero tailpipe emission vehicles at 25 percent of the total vehicle cost under the Settlement.

2. **A majority of Missouri's mitigation funds should be used for low NOx, near-zero and zero-emission vehicle grants.**

Out of all the eligibility categories under the Settlement, Class 4-8 vehicles are the largest contributors of NOx emissions. Furthermore, unlike rail and marine applications, medium and heavy-duty vehicles operate throughout Missouri. Therefore, reduction of emissions in vehicles will provide a benefit for all areas: urban, suburban and rural alike. Concentrating funding in this category will accelerate the transition by a wide variety of fleets to these cleaner lower NOx engines, thereby multiplying the positive effect well beyond the grant program.

Thank you for considering our recommendations and we look forward to continuing the conversation.

Phil Squair, Senior Vice-President
Public and Government Affairs
National Propane Association

Marcus Gillette
Director of Public and Government Affairs
Coalition for Renewable Natural Gas

Jeffrey L. Clarke
Legal Counsel
NGVAmerica

Kathryn Clay
Vice-President, Policy Strategy American Gas Association

Dan Jameson, Vice President
Government and Regulatory Affairs
Republic Services

William A. Zobel, Vice President
Market Development and Strategy
Trillium CNG

Chelsea Jenkins
Executive Director, Government Affairs
Roush

Brett Barry
Senior Policy Advisor
Clean Energy

Mike Goscinski
Director, Government Relations
American Bakers Association

Audra Kosinski
General Manager
Midwest Bus Sales, Inc.

Trey Peck
Chief Operating Officer
Thunder Ridge Transport Inc.

John Glascock
Deputy City Manager
City of Columbia Missouri

Susan Robinson
Federal Public Affairs Director
Waste Management

Bill Bliem
Senior Vice President Fleet Services
NFI Trucking, Inc.

Charles Musgrove
Vice-President
Dillon Transport, Inc.

Gary Maresca
Senior Director-Transportation Services
Bimbo Bakeries USA

Robert Mayer
President
MR Capital Advisors, LLC

Will Rosa
Director of Transportation
Parkway School District

Dan Warner
Executive Vice-President
Midway Ford Truck Center, Inc.

Lon Waterman
Director of Transportation Services
North Kansas City Schools

Empire's EV Initiative

In July 2016, we launched our electric vehicle initiative, EVOLVe.

The initiative involved public education on the benefits of electric vehicles, rebates to Empire electric customers, and installation of a public charging network within Empire's service area.

Rebates were offered for the purchase/lease of a new or used total electric and plug-in hybrid electric vehicles through July 31, 2017.

EVOLVe

(Front)

(Back)

Charging Stations

Currently there are 11, Level 2 charging stations installed.

In the upcoming year, the emphasis will be on large employers for fleet and employee charging.

EV Benefits

EVs are very responsive and have very good torque.

EVs can save money, with much lower fuel costs on average than conventional gasoline vehicles.

EVs can help the United States have a greater diversity of fuel choices available for transportation thus reducing our reliance on petroleum. This reliance makes us vulnerable to price spikes and supply disruptions; EVs help reduce this threat because almost all U.S. electricity is produced from domestic sources.

EVs can also reduce the emissions that contribute to climate change and smog, improving public health and reducing ecological damage. Charging your EV on renewable energy such as solar or wind minimizes these emissions even more.

VW Funding

Empire wishes to see:

The establishment of a robust stakeholder process to receive guidance on the development of its state plan.

The maximum allocation allowed (15 percent, or roughly $6.2 million) to deploy light duty plug-in electric vehicle charging stations throughout the state targeting highway corridors, multifamily housing, and workplaces to increase Missouri residents' access to electricity as a transportation fuel.

The creation of Highway Charging Corridors are necessary to enable long distance EV travel and eliminate the "range anxiety" that would-be EV drivers may confront when embarking on long distance trips. It is critical these highway charging corridors include DC Fast Charging stations - which can refuel EVs much more quickly than 110 volt or 240.

VW Funding

Empire wishes to see:

The state should also seek to encourage the alignment of investments by electric utilities and public-private partnerships to create a more robust, reliable, and comprehensive network where possible.

> *As fuel and infrastructure providers for EVs, electric utilities can also play a significant role in charging infrastructure investment, customer education and outreach, and other market acceleration programs.*

A heavy focus on medium- and heavy- duty electrification investments for the remaining 85 percent.

> *The replacement of the heaviest-polluting diesel transportation that operates in close proximity to humans that offers the greatest cost-effectiveness over the vehicle lifecycle and will result in the greatest market transformation.*

Missouri
Talking Points for VW Settlement Fund Discussion
March 2017

The refuse industry is a perfect industry for natural gas trucks since they run similar routes each day and always return to the same spot. Transitioning to a natural gas fleet requires significant capital investment – over $300,000 per truck and $1.5 - $3.0 million per station. This investment results in significant reduction in NOx – which is what the VW Settlement is intended to specifically remedy, as well as GHG emissions.

Natural gas trucks are a proven technology with quantifiable environmental benefits. WM has the largest industrial fleet of natural gas trucks – many of these trucks are the result of state grants and incentives.

We have a significant opportunity in Missouri to make a real impact in reducing NOx, as well as the associated "free" GHG emissions reductions, in the state. We have focused much of investment in areas with incentives, which means we have a long way to go in Missouri:

NOx benefits of CNG refuse trucks

- CNG vehicles are 26% more cost effective on a $/ton of NOx reduced basis than a new diesel trucks
- A new, near-zero NOx CNG truck will emit about 0.04 tons of NOx over its lifetime versus an existing diesel, which emits 1.11 tons of NOx
- New diesel trucks emit 0.4 tons of NOx over their lifetime – 10 times that of a new CNG truck
- WM has 58 NGV's in Missouri – but we have 138 diesel trucks that still to be replaced. The diesel trucks are an older fleet (and thus higher emissions) because we are investing in natural gas trucks in areas with incentives. This means that there is a significant opportunity for reduced emissions in Missouri.

Benefit of Natural Gas on a per tons of NOx reduced

- Vehicle cost comparison
  - ✓ Cost of a new diesel refuse truck = $270,000
  - ✓ Cost of a new CNG refuse trucks = $300,000 +

- The VW program settlement funds would allow the state to fund 25% of the new vehicle cost for each – to $75,000 for CNG and $67,500 for a diesel truck. In other words, the funding would go 4x as far by taking advantage of private investment.

- If the state spent all of its ~$40 million on new privately purchased CNG refuse trucks, it could purchase 533 trucks and save 570 tons of NOx over their 15-year useful lives.

- The 533 refuse trucks that the settlement funds could purchase in Missouri would reduce the state's use of diesel fuel by 64 million gallons over that same 15-year period.

Using VW Settlement Funds in Missouri to grow the fleet of NGVs in the state also moves the state closer to a Zero Emissions Fleet (ZEV) with the growth of Renewable Natural Gas (RNG) in refuse trucks.

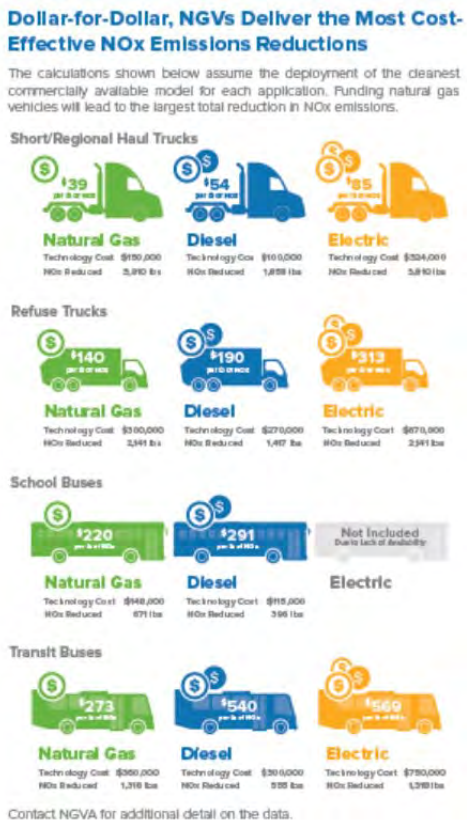
Once trucks with natural gas engines are in place, the use of Renewable Natural Gas (RNG) becomes possible. RNG is growing as a renewable fuel in the refuse industry. With three facilities producing RNG, and a new one scheduled to come on line in 2017, we are fueling 40% of our fleet nationwide with RNG – a renewable gas with 80% fewer GHG emissions than diesel fuel. Using RNG combined with near-zero CNG trucks, we are well on our way to a zero emissions fleet in some states.

Comparison to other fleets

According to the Natural Gas Vehicle Association of America (NGVA), NGVs deliver the most cost effective NOx emissions reductions, dollar for dollar, of all vehicles eligible for VW Settlement Funds:

While many trucks are, and should be transitioning to natural gas engines for many reasons, including refuse trucks in the mix of trucks eligible for VW Settlement funds is prudent in Missouri to encourage additional investment in the state in NGVs with the greatest opportunity to reduce NOx, on a dollars-per-ton basis.

The $2.9 Billion VW Environmental Settlement is specifically designed to mitigate the impacts of NOx emissions associated with their vehicles. Funding natural gas vehicles will lead to the largest dollar-for-dollar total reduction in NOx emissions associated with this funding.



Questions?

Susan Robinson - WM

Sean Turner - GNA

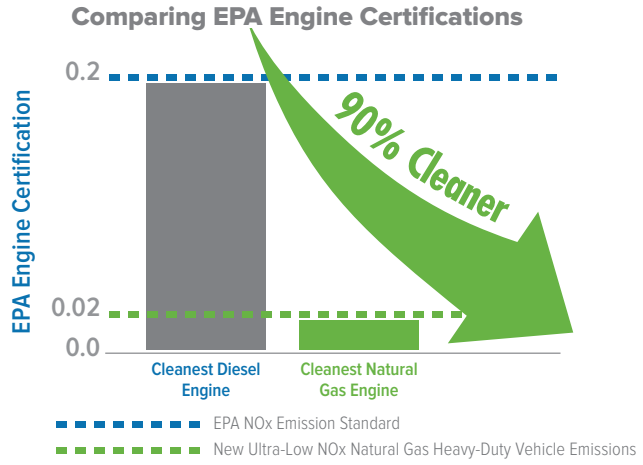
Make a Bold Impact on Air Quality Today

More than 50% of Americans are exposed to unhealthful levels of ozone and particulate pollution, putting them at greater risk for asthma, lung cancer, cardiovascular disease, and premature death. Volkswagen's $2.9 billion Environmental Mitigation Trust fund provides each state an incredible opportunity to make an immediate and tangible impact on air quality by targeting medium- and heavy-duty vehicles—the leading source of these toxic air contaminants in almost every metropolitan area.

Natural gas vehicles (NGVs) can transform the medium- and heavy-duty transportation sector.

Sustainable:

NGVs Offer the Cleanest Heavy-Duty Truck Engines in the World



Natural gas medium- and heavy-duty engines provide unmatched reductions of smog-forming emissions of nitrogen oxides (NOx). In 2015, a revolutionary natural gas engine was certified by the U.S. Environmental Protection Agency and California Air Resources Board to a level 90% below the EPA's current exhaust standard and 90% below the cleanest diesel engine. A truck with this engine has an emission profile equivalent to that of a heavy-duty battery electric truck.

Available:

NGVs are Commercially Available Today Across All Applications Qualified for Funding

NGVs are commercially available from traditional truck OEMs with established sales and service networks. Retrofit and repower options are also available from a variety of manufacturers.

Applications Include:

- Cement Mixer
- City Delivery Truck
- Conventional Van
- Dump Truck
- Fuel Truck
- Heavy Semi Tractor
- Large Walk In Van
- Motor Coach
- Rack Truck
- Refrigerated Van
- Refuse Truck
- Single Axle Van
- School Bus
- Shuttle Bus
- Transit Bus
- Tow Truck
- Utility Truck

Responsible:

Dollar-for-Dollar, NGVs Deliver the Most Cost-Effective NOx Emissions Reductions

The calculations shown below assume the deployment of the cleanest commercially available model for each application. Funding natural gas vehicles will lead to the largest total reduction in NOx emissions.

Short/Regional Haul Trucks

	Natural Gas	Diesel	Electric
$ per lb of NOx	$39	$54	$85
Technology Cost	$150,000	$100,000	$324,000
NOx Reduced	3,810 lbs	1,858 lbs	3,810 lbs

Refuse Trucks

	Natural Gas	Diesel	Electric
$ per lb of NOx	$140	$190	$313
Technology Cost	$300,000	$270,000	$670,000
NOx Reduced	2,141 lbs	1,417 lbs	2,141 lbs

School Buses

	Natural Gas	Diesel	Electric
$ per lb of NOx	$220	$291	Not Commercially Available
Technology Cost	$148,000	$115,000	
NOx Reduced	671 lbs	396 lbs	

Transit Buses

	Natural Gas	Diesel	Electric
$ per lb of NOx	$273	$540	$569
Technology Cost	$360,000	$300,000	$750,000
NOx Reduced	1,318 lbs	555 lbs	1,318 lbs

NGVAMERICA
Natural Gas Vehicles for America

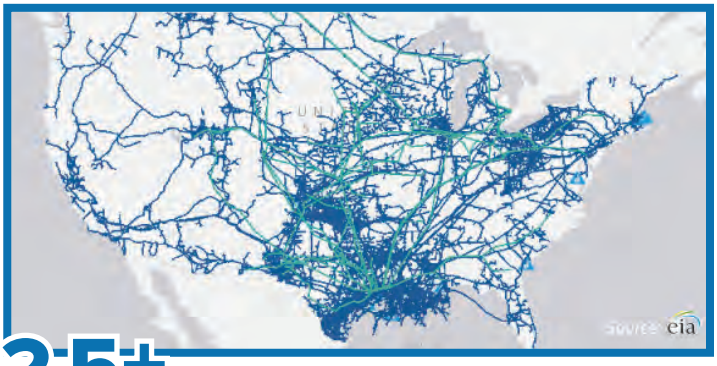
For more information visit: **www.ngvamerica.org/vwsettlement**

#1 Natural Gas Producer in the World

90+ years supply of recoverable natural gas

Continual supply by harnessing **renewable sources**

Source: U.S. Energy Information Administration



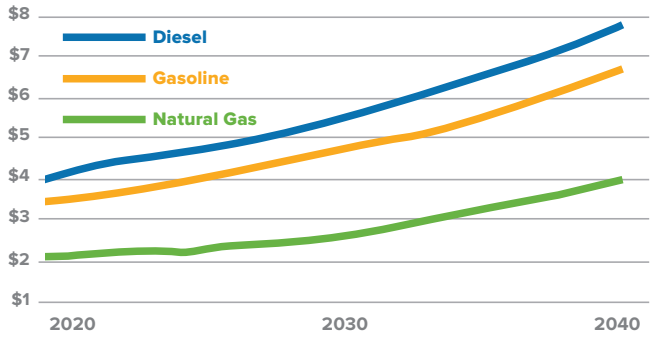
2.5+ million miles of U.S. pipeline infrastructure

The U.S.' expansive natural gas pipeline system is well poised to support a national network of natural gas fueling stations. Nearly 2,000 CNG and LNG fueling stations are operating today, with continual expansion underway.

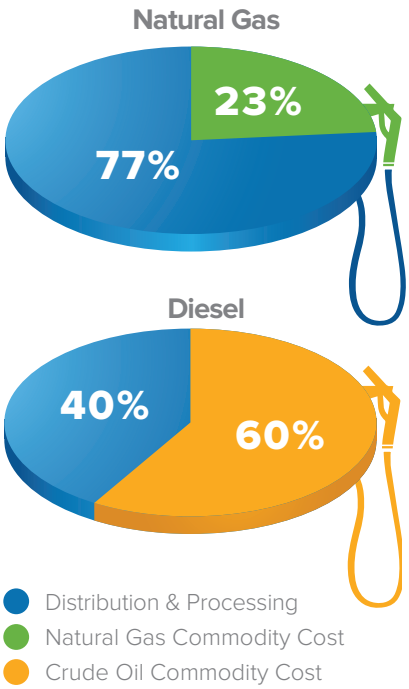
Natural gas is a clean, low-cost, and domestically abundant transportation fuel.

Natural Gas Provides Long-Term Fuel Price Stability and Cost Savings

Projected Fuel-Price Differentials (prices per $DGE)



Source: U.S. Energy Information Administration



Currently, natural gas prices are $0.75 to $1 or more lower than diesel at the pump, with a firm price advantage expected to remain for decades as shown in the chart above.

Beyond the fuel-price differential, the pump price of natural gas remains relatively stable for two reasons. First, it is domestically sourced. Second, the commodity cost of natural gas only makes up 23% of the pump price so price fluctuations have minimal impact.

In contrast, approximately 60% of the price of diesel fuel is impacted by the market cost of crude oil, which is largely sourced from politically unstable, high-conflict regions. When crude oil prices increase, diesel prices follow suit which can lead to significant swings in a fleet's fuel costs.

Natural Gas Reduces WTW Greenhouse Gas Emissions

Compared to Diesel:

GHG

- LNG **11% reduction**
- CNG **17% reduction**
- RNG **115% reduction**

Source: NGVAmerica Fleets Run Cleaner on Natural Gas White Paper 2016

Volkswagen EMT Funding Recommendations

- Fund alternative fuel vehicle projects that cost effectively maximize NOx reductions for both public and private fleets
- Provide higher funding levels for medium- and heavy-duty engines that deliver NOx reductions greater than current EPA standards
- Target funding for technologies that have demonstrated lower in-use emissions
- Prioritize funding for commercially available products and projects that are ready to begin

Natural gas vehicles can fulfill all of these recommendations today!

NGVAMERICA
Natural Gas Vehicles for America

For more information visit: **www.ngvamerica.org/vwsettlement**

From:	Moore, Kyra
To:	Bybee, Darcy; Wilbur, Emily; Leath, Mark; Reimer, Shelly; Allen, Stacy
Subject:	FW: IPL Letter To Director Carol S. Comer
Date:	Monday, December 18, 2017 11:16:11 AM
Attachments:	Mo EV Collaborative Support.pdf Missouri VW Letter Final.pdf
Importance:	High

FYI

From: Eric Holder
Sent: Monday, December 18, 2017 10:49 AM
To: DNR WEB Contact
Cc: Moore, Kyra
Subject: IPL Letter To Director Carol S. Comer
Importance: High

Dear Ms. Comer,

Please find attached the City of Independence, Power & Light Department's (IPL) Letter of Support for the Missouri EV Collaborative. This letter follows the Collaborative's December 6, 2017 letter (also attached) to the Department and announces the addition of IPL to the Collaborative. We are excited to join the Collaborative's grant proposal to build EV Charging Infrastructure along Missouri's Highways and thereby encourage the growth of zero emission vehicles. Thank you for your consideration.

Eric Holder, BCES, LEED
Environmental Program Supervisor
City of Independence – Power & Light

City of Independence

POWER & LIGHT DEPARTMENT
17221 E. 23RD ST. S. • P.O. BOX 1019 • INDEPENDENCE, MISSOURI 64051-0519 • (816) 325-7500
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December 18, 2017

Carol Comer, Director
Missouri Department of Natural Resources
1101 Riverside Drive
Jefferson, City, MO 65102

Re: City of Independence, Power & Light Department Joins Missouri EV Collaborative

Dear Ms. Comer,

The City of Independence, Power & Light Department is proud to announce our participation in the Missouri EV Collaborative. IPL fully supports the Collaborative's recommendations that, 1) Environmental Mitigation Trust (EMT) funding be allocated in a way that meaningfully lowers barriers to the adoption of electric transportation and achieves substantial, targeted NOx emissions reduction; and, 2) that the Department invest the full 15 percent cap on charging infrastructure enabling long-distance electric vehicle travel and unlocking light-duty electric vehicle growth in areas underserved by the current charging station market.

As one of the largest suburbs in the Kansas City Metropolitan area with nearly 80 square miles of territory, 1,200 miles of roadway and 117,000 people, the City of Independence, Queen City of the Trails and home to our nation's 33rd President, has a great deal to offer the Collaborative's plan of building EV Charging Infrastructure along Missouri's major highways. Our City-owned electric utility, Independence Power & Light (IPL), founded in 1901, has a long tradition of supplying our citizens with reliable power and is a leader in creating a sustainable future through an established commitment to renewable energy sources. Currently over 13% of IPL's generation comes from clean, renewable sources and by 2018 this will increase to nearly 17% with the 8.5 MW expansion of our 3.0 MW community solar farm within our city limits to a total of 11.5 MW. We believe that EV Charging Infrastructure is an important piece of creating a sustainable future and we enthusiastically support the Collaborative's goal of supporting long-distance electric vehicle travel across the state by building, with the assistance of EMT funding, publicly-available DC fast charging stations on major Missouri highway corridors.

Sincerely,

Andrew Boatright, PE
Acting Director

cc: Kyra Moore, Director APCP

December 6, 2017

Carol Comer, Director
Missouri Department of Natural Resources
Main Department Office
1101 Riverside Drive
Jefferson City, MO 65102

Comments on the Missouri Volkswagen Settlement Environmental Mitigation Trust Funds

Director Comer:

We submit these following comments on behalf of the following companies and organizations:

Ameren Missouri	City Utilities
Clean Cities of Kansas City	Columbia Water & Light
Empire District	Independence Power & Light
Kansas City Power & Light	Kirkwood Electric
Missouri Public Utility Alliance	NRDC
Sierra Club	

We provide the following recommendations on the use of the $41.2 million in funds that the state of Missouri will receive from the environmental mitigation trust (EMT) established by the Volkswagen (VW) consent decree. In brief, the EMT presents a significant opportunity for Missouri to reduce harmful nitrogen oxide (NOx) emissions, reduce the state's dependence on petroleum-based fuels, and offer greater customer choice to Missouri residents by modernizing Missouri's transportation sector. We recommend that the Missouri Beneficiary establish a formal stakeholder process, allocate the maximum 15 percent of funds for light-duty electric charging infrastructure, and prioritize use of remaining funds to replace old diesel vehicles with qualified electric versions of those vehicles and associated charging infrastructure.

Introduction

The VW EMT should be allocated to support a critical transformation of the transportation sector in Missouri. This transformation should meaningfully reduce transportation NOx emissions in the short term as well as make investments that will enable large-scale reductions in the mid- to long-term. To the

extent practical, funds should benefit all areas of Missouri. To achieve these objectives, we ask that the Beneficiary consider:

1) **The establishment of a robust stakeholder process to receive guidance on the development of its state plan**. We appreciate that the Missouri Department of Natural Resources (DNR) is now receiving preliminary input on the use of the EMT funds, and recommend that the agency take additional action to foster transparency and meaningful engagement on the development of its mitigation plan (for example: making all submitted comments available for review, and issuing a draft plan for public comment after initial input is received). The stakeholder processes facilitated by other states in the region and across the country may provide a useful model or guidance for the Missouri DNR and some good examples include efforts by sister agencies in Ohio, Minnesota, Iowa and Michigan.

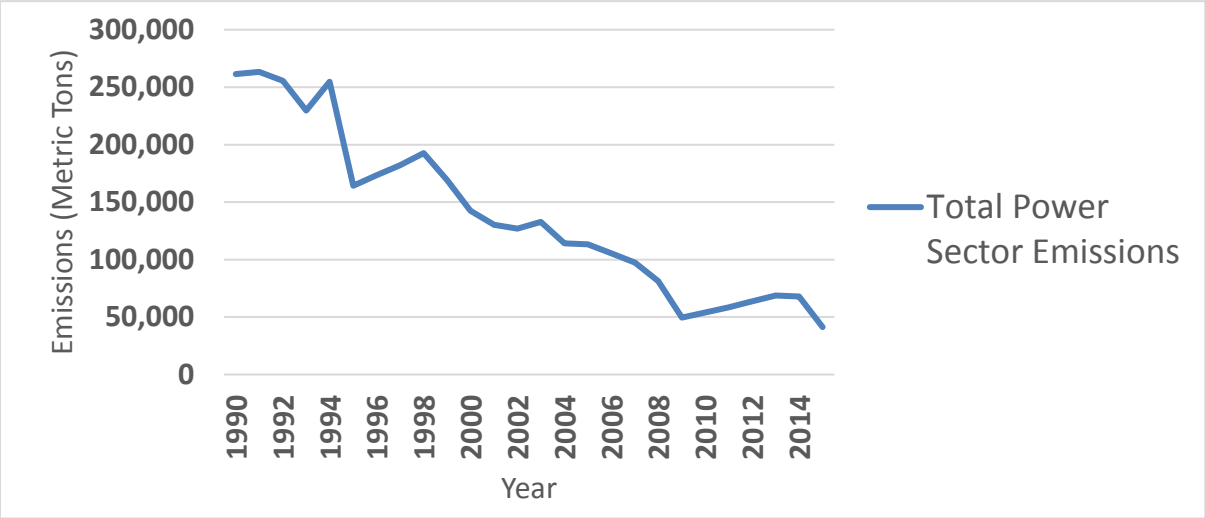
2) **The maximum allocation allowed (15 percent, or roughly $6.2 million) to deploy light duty plug-in electric vehicle charging stations.** Charging station deployment should target highway corridors, multifamily housing, and workplaces to increase Missouri residents' access to electricity as a transportation fuel. The state should also seek to encourage the alignment of investments by electric utilities and public-private partnerships to create a more robust, reliable, and comprehensive network where possible.

3) **A heavy focus on medium- and heavy- duty electrification investments for the remaining 85 percent – or $35 million.** Given the current state of the market, the greatest near-term opportunity could be to replace diesel engines with electric technologies spanning from school and transit buses to material handling equipment such as forklifts and shipping port and airport ground support equipment. However, the state should avoid investments that merely replace existing diesel vehicles with newer diesel vehicles. While this might accelerate vehicle replacements by a few years, ultimately these replacements will occur anyway, leading to a very limited NOx mitigation benefit relative to electric transportation.

The foundation of these recommendations lies in the understanding that emissions of NOx and other pollutants from the electric sector are generally declining. In the graph below, Energy Information Administration data reveals that Missouri's power sector has markedly reduced NOx emissions, even as generation has generally increased: relative to 1990 levels, annual NOx emissions were 84 percent lower in 2015.[1] We expect these emissions – and the emissions of other criteria pollutants will continue to decline in Missouri as the region's generation portfolio includes additional low-emission energy resources like renewables and energy efficiency. Given this underlying trend and the greater fuel efficiency of electric transportation relative to petroleum powered transportation, switching from diesel to electric can yield substantial NOx and co-pollutant reductions and fuel cost savings.

[1] U.S. Energy Information Administration. 2017. U.S. Electric Power Industry Estimated Emissions by State (EIA-767, EIA-906, EIA-920, and EIA-923). 1990-2015. Available at https://www.eia.gov/electricity/data/state/

Missouri Power Sector NOx Emissions



Data from Energy Information Administration

Unlocking Investment in Plug-In Electric Vehicle Charging Infrastructure

Regrettably, transportation policy rivals the environmental policy in its use of acronyms. The charging infrastructure component of the EMT can be used to support plug-in electric vehicles (PEVs), which can be charged with electricity from the grid. This includes both battery electric vehicles (BEVs) that rely entirely upon electricity and plug-in hybrid electric vehicles (PHEVs) that rely on electricity for daily driving needs, but can also use gasoline to complete trips. Because PHEVs produce tailpipe emissions when driving on gasoline, they cannot be considered zero emission vehicles (ZEVs).

Light-duty vehicles are the second highest emitter of mobile source NOx emissions in Missouri after heavy-duty vehicles.[2] Any comprehensive strategy to reduce transportation sector NOx and co-pollutant emissions should consider the electrification of the light-duty vehicle fleet as a key mitigation strategy. The development of a robust, strategic charging station network is critical to achieving that goal. However, a dearth of this supporting infrastructure currently presents a barrier to a broader, more diverse PEV market.[3] To overcome this hurdle, investment in charging stations along key highway corridors, in multifamily housing and at workplaces in communities currently most affected by air pollution should play a role in the Beneficiary's allocation of EMT funds.

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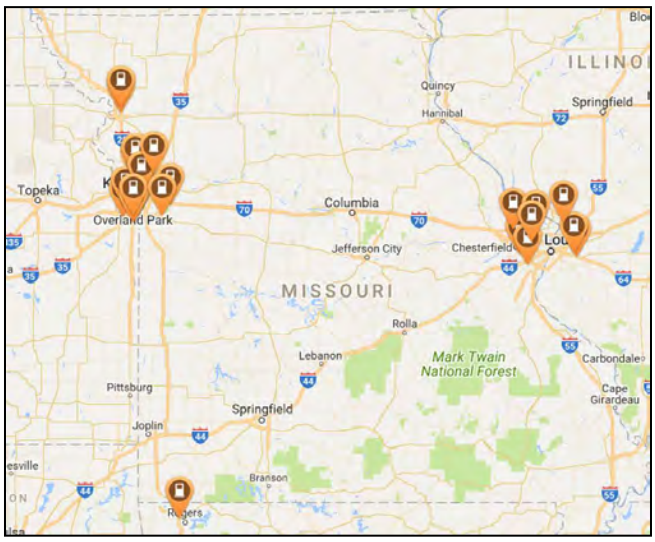
[2] Light-duty vehicle NOx emissions accounted for 28 percent (65,000 tons) of Missouri's mobile source NOx emissions. Heavy-duty NOx emissions accounted for 39 percent (91,000 tons). https://app.powerbi.com/view?r=eyJrIjoiMjk3YTdiYTAtZTA2Yi00MmIxLWIyM2QtZjhiYzk1YzM1Y2Y5IiwidCI6IjFiYjQ4ZGE0LTMxNDMtNDAzMS1iZGFlLWNjYzA0MDc1MDhmZSIsImMiOjF9&pageName=ReportSection

[3] John G. Kassakian, David Bodde, and Jeff Doyle. "Overcoming Barriers to Deployment of Plug-in Electric Vehicles." The National Academies Press. 2015.

Highway Charging Corridors are Necessary to Support Light-Duty NOx Reductions

The deployment of DC Fast Charging stations – which can refuel PEVs much more quickly than 110 volt or 240 volt AC charging stations – are necessary to enable long distance PEV travel and eliminate the "range anxiety" that would-be PEV drivers may confront when embarking on long distance trips.[4] DC Fast Charging typically provides 80% of full charge in 20-30 minutes for light-duty PEVs and is minimally disruptive to travel plans. Below, a map generated by the Plugshare website reveals the location of existing non-Tesla DC Fast Charging stations in Missouri.[5] High priority should be placed on publicly-available DC fast charging equipment on major highway corridors, to allow long-distance travel across the state.



While DC Fast Charging stations are clustered in the St. Louis and Kansas City metro areas, there is very little deployment along highway corridors in rural areas that enable PEV drivers to complete longer trips that would otherwise have occurred in a gasoline vehicle. Would-be PEV drivers need to know they can drive from, for example, St. Louis to Springfield, Joplin, Jefferson City, Columbia, Kansas City, and any other Missouri destinations before making the decision to purchase a PEV.

To this end, Missouri should also coordinate with Volkswagen on Appendix C ZEV Investment Plan activities and surrounding states on their use of EMT funds to build out a more robust, complementary fast charging network. In short, DC Fast Charging deployment is a critical strategy for accelerating the light-duty PEV market and driving NOx emissions reductions statewide and particularly where there is a density of vehicles, including non-attainment areas.

We have developed a draft corridor DC Fast Charging plan that the MO EV Collaborative will continue to develop and submit to the Beneficiary. Below is a draft map of a statewide corridor network that would make PEV travel across Missouri not only possible, but practical.

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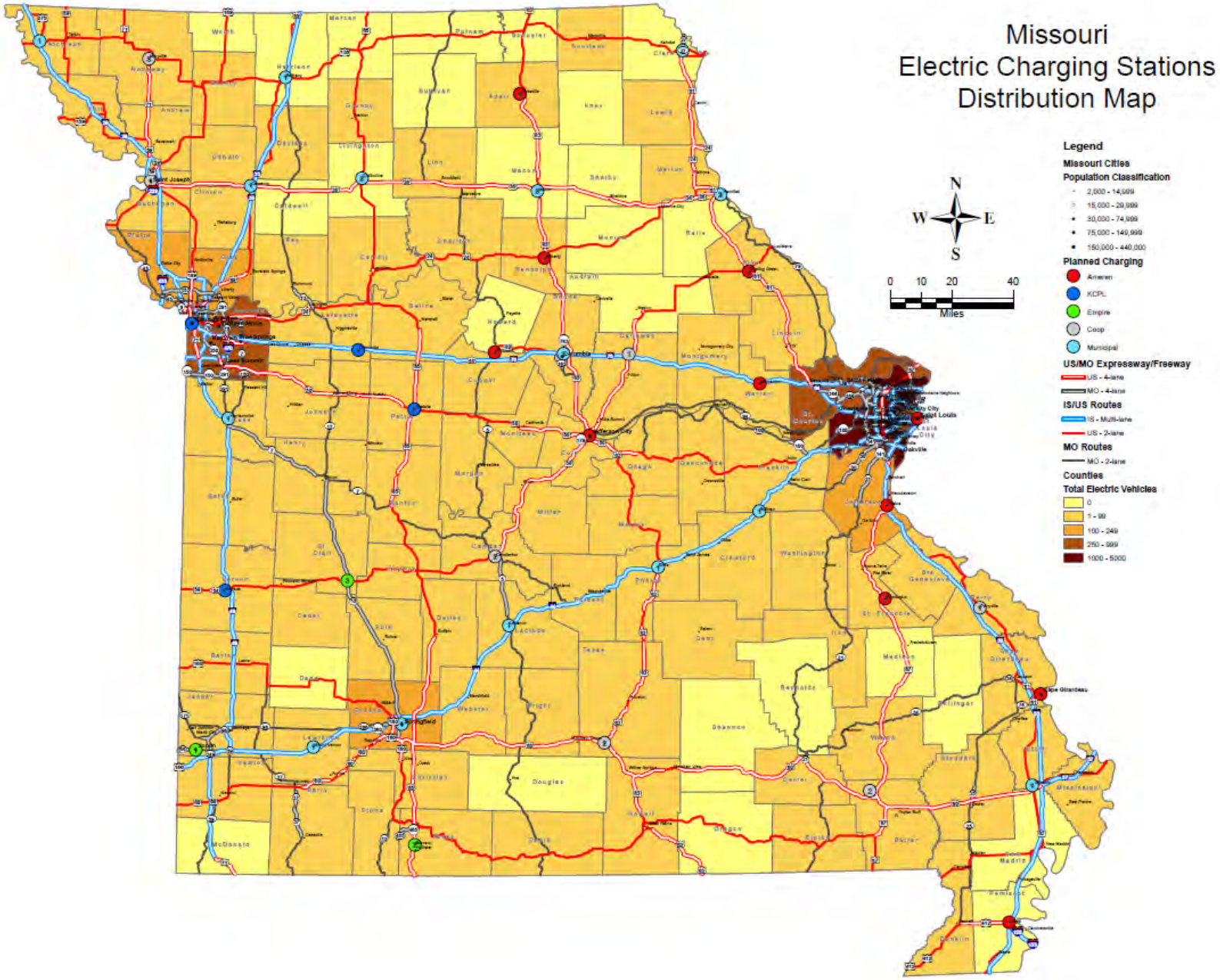
[4] While AC Level 2 charging is able to deliver up to 25 miles of range per hour of charging, DC fast charging can deliver 150-210 miles of range per hour of charging. See Alternative Fuels Data Center, "Developing Infrastructure to Charge Plug-In Electric Vehicles," U.S. Department of Energy available at: http://www.afdc.energy.gov/fuels/electricity_infrastructure.html

[5] *See* https://www.plugshare.com/ There is a focus on non-Tesla DC Fast Charging stations because Tesla employs proprietary charging technology that is only accessible to owners of Tesla vehicles. In order to assuage range anxiety and meaningfully accelerate the PEV market, access to fast and reliable highway corridor charging is a necessity for all PEV models.


Missouri
Electric Charging Stations
Distribution Map
Legend
Missouri Cities
Population Classification
2,000 - 14,999
15,000 - 29,999
30,000 - 74,999
75,000 - 149,999
150,000 - 440,000
Planned Charging
Ameren
KCPL
Empire
Coop
Municipal
US/MO Expressway/Freeway
US - 4-lane
MO - 4-lane
IS/US Routes
IS - Multi-lane
US - 2-lane
MO Routes
MO - 2-lane
Counties
Total Electric Vehicles
0
1 - 99
100 - 249
250 - 999
1000 - 5000
N
W
E
S
0 10 20 40
Miles

Multi-unit Dwellings

The Beneficiary should target a portion of funds towards multifamily housing. Access to overnight residential charging is critical to support PEV adoption; it is highly unlikely that a prospective driver would purchase a PEV without the ability to plug in at home. Unlike single-family homeowners, multifamily housing tenants face unique market barriers that may limit reliable access to overnight charging and ultimately impede the decision to drive a PEV. For this reason, targeting the multifamily housing segment can help spur PEV adoption where it otherwise would not have occurred.

Deployment of charging infrastructure in economically disadvantaged communities can also help residents overcome impediments to PEV adoption and improve local health outcomes.

Workplace Charging

Finally, workplaces present another key opportunity for charging infrastructure deployment. Outside of the home, workplaces are where PEVs sit for the longest period during the day. It has been demonstrated that employees of companies that provide charging are significantly more likely to purchase a PEV than an average worker. The Department of Energy recently concluded that employees of companies who participated in its "Workplace Charging Challenge" were 20 times more likely to purchase a PEV than an average worker.[6] Workplace charging can also increase electric vehicle miles traveled (eVMT) of plug-in hybrid electric vehicles and provide greater visibility for PEVs generally.

Utility Engagement

As fuel and infrastructure providers for PEVs, electric utilities can also play a significant role in charging infrastructure investment, customer education and outreach, and other market acceleration programs. We encourage the Beneficiary to work with Missouri's electric utilities to ensure appropriate electric distribution infrastructure is in place to support the integration of charging stations into the target markets discussed above. This coordination ensures that investments made by VW and utilities are complementary, efficiently allocated, and effective in spurring PEV growth.

With the introduction of new long range, relatively affordable, all electric vehicles such as the Chevy Bolt EV, now available nationwide, Missouri should ensure that a robust long distance charging network is in place to support widespread transportation electrification. To the extent VW invests in charging infrastructure in certain target segments described above as part of Appendix C in the VW Consent Decree, the Beneficiary should focus its efforts on deploying infrastructure in other areas not covered by Appendix C or other available funding.

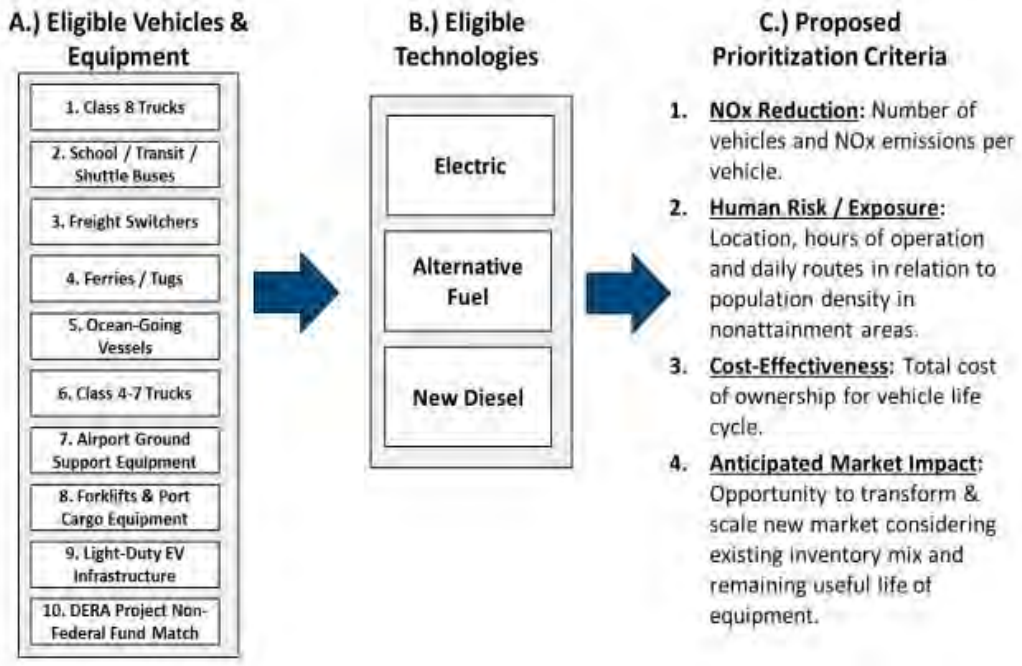
Driving Opportunities for Clean, Electric Transportation

The remaining 85 percent of Missouri's EMT could be allocated to accelerate the transition to transportation with zero tailpipe emissions. In order to achieve improved environmental and human health outcomes in an equitable manner, the Beneficiary should generally target a) the replacement of the heaviest-polluting diesel transportation; b) that operates in close proximity to humans, with some emphasis in ozone and PM2.5 non-attainment areas; c) that offers the greatest cost-effectiveness as

[6] U.S. Department of Energy, Workplace Charging Challenge – Progress Update 2014: Employers Take Charge

measured by the total cost of ownership over the vehicle lifecycle; and d) that will result in the greatest market transformation.

Framework for Assessing EMT Funding Decisions



Electric Transit Buses

Another reliable source of deep NOx reductions is the replacement of diesel transit buses with electric buses. Advances in battery technologies can now propel electric buses up to 350 miles before needing to recharge, making them a reliable transit option.[7] St. Louis Metro transit service has had the opportunity to test several electric buses, noting that the buses' driving range exceeds the mileage needed for some daily routes and that fuel and maintenance costs are markedly lower than that of diesel buses.[8] Because transit agency buses travel hundreds of miles per day while in service, electrifying this source of criteria pollutant emissions can yield substantial NOx mitigation results to the benefit of the cities and communities it serves. All Missouri transit authorities may also benefit from the ability to pilot and operate electric buses with EMT funds.

To the extent it is necessary for the successful operation of an electric bus fleet, the Beneficiary should permit the allocation of eligible funding for associated fleet charging infrastructure and associated utility

[7] See Proterra Catalyst Bus Specifications, https://www.proterra.com/wp-content/uploads/2016/08/ProterraCatalyst-Vehicle-Specs.pdf. See also Aarian Marshall, This New Electric Bus Can Drive 350 Miles on One Charge, Wired, Sept. 12, 2016, https://www.wired.com/2016/09/new-electric-bus-can-drive-350-miles-one-charge/

[8] http://www.stltoday.com/business/local/metro-begins-test-driving-electric-bus-on-downtown-st-louis/article_e4a529e2-8a18-5a76-aae7-6c145c99d4a8.html

line extensions and stretch EMT funds further by covering the difference in upfront cost between diesel and electric buses, rather than covering the full cost of the bus. This may include the replacement of several buses in an agency's fleet, or the purchase of only one electric bus as a pilot project to allow agencies to become more comfortable with future adoption of these technologies.

Electric School Buses

Electric school buses present a unique and practical opportunity to reduce NOx emissions. Regrettably, children are often the most exposed and most vulnerable to diesel emissions from school buses. Children breathe diesel fumes while riding and getting on and off diesel school buses. Asthma, which diesel pollution exacerbates, is now the most common chronic condition among U.S. children, affecting approximately 1 in 10 in the U.S.[9] Asthma attacks are triggered by pollutants like NOx emissions from diesel school and transit buses. Attacks can cause hospitalizations and even deaths.

The opportunity to use VW settlement funds towards electric school bus pilots means that school districts would have time to test the technology now while the initial purchase price is relatively higher than diesel buses and potentially be ready to make more substantial investments in the technology as up-front costs drop. State mitigation funds could be used to fund the purchase of multiple school buses as a pilot to gain experience and increase future adoption of the technology. For future purchases, the funds could be leveraged to greater effect if they are used to cover the difference between the purchase price of electric school buses and conventional buses for districts that have already slated fleet replacement in their budgets.

Electric Trucks

Another vehicle category ripe for electrification - medium duty trucks (Class 4-8) i.e. street sweepers, trash haulers, switch engines, and terminal trucks. Because battery technology to date keeps the electric range of these vehicles around 100 miles, these trucks are best suited for short or medium distance applications. Vehicle range notwithstanding, electric trucks can offer enormous fuel cost savings relative to their inefficient diesel counterparts. Diesel delivery trucks have been observed to register a maintenance cost of 22 cents per mile while electric delivery trucks typically run around 5.6 – 11.1 cents per mile.[10] In accounting for these variable costs as well as the up-front cost of the vehicle, median total cost of ownership of an electric delivery truck was 22 percent lower than that of a diesel equivalent – while eliminating all tailpipe NOx emissions.[11] Missouri is already a leader in industrial EV truck manufacturing: Orange EV, based out of Kansas City, became the first U.S. company to build and commercially deploy Class 8 heavy-duty EV trucks.[12] In short, investments in EV trucks can lower fleet ownership and operating costs while growing the local economy.

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[9] https://www.cdc.gov/healthyschools/asthma/

[10] Dong-Yeon Lee, et al., Electric Urban Delivery Trucks: Energy Use, Greenhouse Gas Emissions, and Cost Effectiveness, Environ. Science & Tech. 47, 8022 (2013).

[11] *Ibid.*

[12] https://orangeev.com/company-info/

Conclusion

Missouri's portion of the overall EMT presents the state with a significant opportunity to reduce its transportation sector emissions now and for years to come. We recommend that this funding be used to accelerate the adoption of electric transportation across a suite of end uses. To effectively drive down light-duty NOx emissions, we strongly recommend the Beneficiary invest the full 15 percent cap on charging infrastructure that enables long-distance PEV corridor travel and unlocks light-duty PEV growth in areas underserved by the current charging station market. The State should also seek to leverage partnerships with the electric utility industry to further stretch VW funds to develop charging infrastructure networks. With the remaining funds, the agency should include opportunities to electrify transportation such as transit and school buses and medium- and heavy-duty work trucks as well as material handling equipment. Though the upfront costs of these transportation technologies exceed those of diesel, the fuel and maintenance cost savings realized over the life of the vehicle can make up for, or even exceed, the incremental purchase cost. **With this in mind, EMT funding should be allocated in a way that meaningfully lowers barriers to the adoption of electric transportation, yet balances this objective with the goal of achieving substantial, targeted NOx emissions reductions.**

We look forward to working with the Beneficiary and other interested stakeholders to develop a robust, comprehensive, and equitable mitigation plan. Thank you for your consideration.

Missouri EV Collaborative Members

(specific names listed on next page)

Ameren Missouri Warren Wood, Vice President External Affairs and Communications	City Utilities of Springfield Cara Shaefer, Director Energy Services & Renewables
Kansas City Clean Cities/ Metropolitan Energy Center Kelly Gilbert, Executive Director	Columbia Water & Light Tad Johnsen, Director
Empire District Brent Baker, Vice President Customer Experience	Independence Power & Light Andrew Boatright, Acting Director
Kansas City Power & Light Chuck Caisley, Vice President Marketing & Public Affairs	Kirkwood Electric Mark Petty, Director
Municipal Public Utility Alliance Ewell Lawson, Vice President Government Affairs & Member Relations	NRDC Ashok Gupta, Senior Energy Economist
Sierra Club Andy Knott, Sr. Campaign Representative	

This comment letter is intended to reflect the shared recommendations of signatory parties for the use of the VW EMT funds in Missouri. However, the letter does not necessarily represent the full extent of the signatory parties' recommendations or concerns with respect to use of the VW EMT funds. Some signatory parties may submit additional comments or recommendations to DNR during this public process.

From: Bybee, Darcy
To: Allen, Stacy; Reimer, Shelly; Leath, Mark; Wilbur, Emily
Subject: FW: VW project
Date: Tuesday, December 19, 2017 3:59:36 PM

FYI

Thanks,
Darcy

From: Bybee, Darcy
Sent: Tuesday, December 19, 2017 3:58 PM
To: 'Kozak, Jeannie'
Cc: charles shell
Subject: RE: VW project

Thanks so much Jeannie! We are really excited about this project as well—I'm looking forward to your comments!

Yes, I'll put you on the list for the next survey—we were hoping for 'mid-December' but time is flying by. Hopefully soon, and I'll get you a link.

If you have any other questions in the meantime, just let me know. Take care—and thanks for the update!

Thanks,
Darcy

From: Kozak, Jeannie
Sent: Tuesday, December 19, 2017 3:30 PM
To: Bybee, Darcy
Cc: charles shell
Subject: VW project

Hi Darcy!

I reviewed the meetings, and we will be sending in an initial Comment Form in this week (through the website). We are trying to assess the possibilities with the priorities you guys outlined in the presentations and explanations.

We hope to develop emissions estimations through our monitoring and modelling to help **determine benefits vs. costs** for some initial replacement projects, or possibly to rate the need for replacements in certain localities.

We are even thinking of getting the students involved with monitors near their schools. We have a unique opportunity because, I'm not sure if you know, but I have teaching certification in chemistry and physics and have two other part-time teaching jobs right now!

We checked the progress of states further ahead like Colorado and were excited to see that they also have sensor companies interested in similar applications. I hope there won't be a

cap on the DERA category because I see such a huge potential there. I can't believe there weren't more comments on that category in Missouri!

I was wondering if you guys could send me one of the second-round comment forms once they become available? If you guys ever think of any ideas we could look in to we are open to suggestion!

Thank you so much for all your guidance on this!
Best,
Jeannie

Jeannie Kozak, P.E.
Chemical Engineer
Shell Engineering and Associates, Inc.
Columbia, MO

From: Kelly Gilbert
Sent: Monday, January 22, 2018 4:32 PM
To: Bybee, Darcy; Leath, Mark; Moore, Kyra
Cc: Kevin Herdler
Subject: VW EMT comments

Well, that was interesting! I discovered most of the way through the meeting that the web audio is very good, and attendees came through very well, whereas my phone audio was poor by comparison. However, I THINK I had to also call in by phone to speak. I'm not sure of that, though, and it would be handy to clarify that for any future meetings. The chat option works ok but is less convenient for a real-time discussion.

I have a couple of concerns I didn't air at the meeting, partly because of the audio confusion but also because I think I know just enough to perhaps step on toes far more than I intend. And I'm following that up with some additional thoughts. Let me know if I should submit this through the comment portal, for any reason.

1. I am very concerned about the overall response from the first survey regarding cost-share—specifically the overwhelming % of respondents who desired no cost sharing above the "up to" percentages. As you know, more good can be done by requiring cost sharing across the board, where possible. Some thoughts:
    a. If I were a private company responding, I would not want to put in more than 60 or 75%, depending on the technology, and I might have answered no to that, contributing to the high percentage of "no additional cost sharing" respondents.
    b. I imagine it would be possible to require cost-sharing from every applicant, unless they can show financial need through some means available to every municipal or other unit of government. For instance: 1) A fleet inventory validating a high percentage of older fleet units, 2) An approved current annual budget showing low/no capital equipment budget, and 3) Annual budget for previous 3-5 fiscal years to establish a trend.
    c. It is worth reminding ourselves that the EMT funding is not public money that is under consideration of being shared without merit to private companies, but private money that is being allocated to the public good, no matter who the direct recipient is. It is a temporary windfall that should not derail public policy, nor affect public budget allocations--in the short or long term.
2. In my opinion the state's budget should not come into the discussion, whether state fleet, pupil transportation, or any other related bucket. I am especially not in favor of appearing to let the state off the hook for funding programs required by statute. For instance, I don't fully understand the state statutes regarding pupil transportation, but just as we shouldn't financially support federally mandated alt fuel purchases, we also shouldn't use this money to assist the state government with budget gaps where the state has failed to make provisions. Clean Cities often works with school districts on pupil transportation projects, and we know there are excellent reasons to do so, but advancing a budget gap argument in favor of school projects is dangerous. See historical effect of "adding" funds from the lottery, for instance. This topic is perhaps academic, in that I'm

    talking about the language and justifications we use, rather than how the funds are allocated, but I believe it is important.

While I'm writing, I believe you received a letter from Steve Ahrens, likely in his capacity as executive director of the Missouri Propane Council. The draft letter he shared with me is very well reasoned with a ton of merit, and except for the budget gap issue I generally support his arguments and think there are avenues to merge it with the survey results. For instance, regardless of what NAAQS scores or social conditions may generally exist in a given area, school-aged children could be considered a sensitive population, so any "points" benefit given for air quality or environmental justice could also be accorded to school district applications, especially for busses. Obviously (given my previous comments to DNR) I don't support allocating 100% of EMT funds to school districts; however, applied this way, preference is given to school applications without a specific set-aside.

Speaking of set-asides, given the way the data looks I'd now support a specific set-aside for tugs, ferries and locomotive applications. Off the cuff, perhaps 15%, or similar to an EVSE set-aside.

On another topic, will you be posting information about resources that might make it easier for a constituent to procure vehicles under the EMT? Such as cooperative purchasing avenues that reduce red tape, incentive programs that can further reduce costs of acquisition or of alternative fuel operations, links for information and location of alt fuel stations, etc? If so, I'd like to provide some resources for consideration.

Thanks for all your work analyzing the data, survey responses and other comments!

Kelly Gilbert | Executive Director | Clean Cities Coordinator |
Metropolitan Energy Center | | www.metroenergy.org

Transform energy use in America's Heartland by joining our efforts.

Volkswagen Environmental Mitigation Trust

Recommendations for the State of Missouri

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BY THE CLEAN CITIES COALITIONS OF KANSAS CITY REGION AND ST. LOUIS REGION

CONTACTS:
Kelly Gilbert, kelly@metroenergy.org
www.metroenergy.org
Kevin Herdler, clnfuel@gmail.com
www.stlcleancities.org

Overview of VW Settlement

The U.S. EPA filed a complaint against Volkswagen, AG alleging that the defendants violated the Clean Air Act with regard to approximately 580,000 model year 2009 to 2016 motor vehicles containing 2.0- and 3.0-liter diesel engines. EPA's complaint alleges that each vehicle contains computer algorithms that cause the emissions control system of those vehicles to perform differently during normal vehicle operation and use than during emission testing, and that during normal operation and use the vehicles emit levels of nitrogen oxides (NOx) significantly in excess of EPA's compliance levels.

Volkswagen agreed to spend $14.7 billion to settle these allegations (the Settlement). $10 billion of Settlement funds will be used to buy back and/or modify vehicles through dealerships; $2 billion will support national projects to increase Zero Emission Vehicle Infrastructure and reduce NOx emissions (VW's ZEV Investment); and $2.7 billion for state projects.

The $2.7 billion will be placed in an Environmental Mitigation Trust (the Trust), and will be allocated to beneficiaries (states, tribes, and certain territories) based on the number of impacted VW vehicles in their jurisdictions. The Trust will support projects that reduce NOx emissions where the VW vehicles were, are, or will be operated.

According to the Settlement, for 2009 to 2016 vehicles using 2.0-liter diesel engines registered in the state, Missouri is slated to receive an allocation of $39,084,815 from the Trust. After being designated as a beneficiary, states must submit a high-level Beneficiary Mitigation Plan that summarizes how the funds will be spent in the state.

Kansas City Regional and St. Louis Regional Clean Cities Coalitions (the Coalitions) respectfully submit this white paper and recommendations in support of this planning effort.

Considerations for Use of Funds

We offer the following considerations for creating a program plan to fund projects with Trust dollars:

- Long-Term Economic Impacts
- Alternative Fuel Planning
- Areas of Concentrated Diesel Exhaust
- Upgrade Public Fleets
- Include Private Fleet Operators
- Improve Transportation Systems
- Leverage Planned State and Local Program Investments

Long-Term Economic Impacts

Transportation and Manufacturing Sector Opportunities

Transportation is one of Missouri's major industries; according to the Bureau of Labor Statistics, 529,100 Missourians worked in Trade, Transportation and Utilities sector during 2015, or 15.7% of the state's total labor force for the year.[1] Of that total, 95,600 were

[1] http://www.bls.gov/sae/#data

directly employed in transportation and warehousing in the same year. In addition, the state's biggest single manufacturing sector is automotive. In 2015, assembly and component companies accounted for 42,014 direct and indirect jobs, with a total economic output of $5.12 billion, benefiting from six years of direct investment totaling $2.6 billion.[2] While alternative fuel vehicles remain a small part of the state's vehicle mix, support and build-out of alternative fuels fleets and infrastructure now is a critical step in supporting the next generation of fuel and vehicle technologies, and the capital and jobs this new sector will support.

Alternative Fuel Planning

The Trust offers an unprecedented opportunity to incorporate American alternative fuels[3] into Missouri's public and private fleets through comprehensive planning and strategic expenditures. A preliminary test of a survey, described later in this paper, shows a substantial interest in using the Trust to invest in alternative fuel vehicle purchases. Through a series of planned stakeholder forums, the Coalitions will use the survey and on-site dialogues to enhance our knowledge of current use of alternative fuels by state fleets and assess the appetite for increased use by existing and new alternative fuel users.

This opportunity complements a national priority for zero emission and alternative fuel corridors. Section 1413 of the Fixing America's Surface Transportation Act (FAST Act) calls on the U.S. Department of Transportation (USDOT) to designate zero-emission and alternative fuel corridors to ensure our nation's transportation system meets the modern and future needs of fleets and drivers. In response to USDOT's request for corridor nominations, the Missouri Division of Energy worked with key partners to designate I-70, I-29, I-55, and I-44 as Alternative Fuel Vehicle Highway Corridors. These Corridors were confirmed by the federal government,[4] but at this time there is no direct funding support for them.

The state can use the Trust to directly invest only in electric or hydrogen corridors and supplement the 28 DC Fast Charging (not including Tesla-only) stations concentrated around Kansas City and St. Louis. However, the Trust can be leveraged to increase use of existing, and create a market for new, CNG and propane stations. There are already 9 public natural gas stations, concentrated on and around I-70, and many propane stations available on Missouri highways and in metro areas that can easily be upgraded to encourage more use of propane as a transportation fuel. These strategies will strengthen the marketplace for American-produced alternative fuels, and raise our nation's energy security, while reducing air pollution.

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[2] https://governor.mo.gov/sites/governor/files/AutoEcoIMPACT20152go.pdf

[3] The Energy Policy Act of 1992 defines an alternative fuel as: Biodiesel (B100); Natural gas and liquid fuels domestically produced from natural gas; Propane (liquefied petroleum gas); Electricity; Hydrogen; Blends of 85% or more of methanol, denatured ethanol, and other alcohols with gasoline or other fuels; Methanol, denatured ethanol, and other alcohols; Coal-derived, domestically produced liquid fuels; Fuels (other than alcohol) derived from biological materials; P-Series fuels

[4] www.whitehouse.gov/the-press-office/2016/11/03/obama-administration-announces-new-actions-accelerate deployment

- Judicious distribution of vehicle replacement funds around areas with established stations will start new and enhance existing alternative fuel fleets.
- With deliberate planning involving station installers and fleet operators, encourage third-party investment in new CNG and propane stations along heavily traveled corridors. Such third-party investments will increase the number of locations across the state where fleets can use American alternative fuels.

Areas of Concentrated Diesel Exhaust

Expressed in terms of Cancer Risk per million people, the USEPA's National Air Toxics Assessment tool shows some of the highest overall air toxins in St. Louis City, followed by sections of the urban core in Kansas City, MO. Cancer risk specific to on-road diesel emissions are as follows:

	St. Louis City	**Kansas City Downtown**
On-road Heavy Duty Diesel emissions:	5.68 / million	2.25 / million
On-road Light Duty Diesel emissions:	.24 / million	.26 / million
On-road Diesel emissions:	5.92 / million	2.51 / million

Highway Corridors

The urban core neighborhoods and business districts adjacent to major highway corridors are disproportionately impacted by diesel emissions, since vehicles drive through the community. In these communities, replacing individual aging diesel vehicles will have a disproportionate impact on the population's health and air quality.

- Replace local vehicles in these neighborhoods, including for example municipal and utility vehicles, delivery vehicles, public transit and school buses. While these vehicles may not be the worst emission sources, their frequent and prolonged presence in communities can result in more concentrated exposures to diesel emissions over time.
- Many communities either have alternative fuel refueling available or can attract an alternative fuel retailer with a concentration of customers. In these areas, it is ideal to replace diesel with American fuels, i.e. electric, propane or natural gas vehicles.

Since aging diesels cannot all be individually improved, another excellent solution is to reduce overall emissions from diesels along major highway corridors by increasing the use of biodiesel through incentives or mandates requiring higher biodiesel blends be sold at diesel retail locations. Six U.S. states require a year-round minimum 5% biodiesel blend[5] with diesel sold within their states and offer several different models for state regulation. Biodiesel is primarily manufactured from soybean oil, and increasing its use would also undoubtedly have a positive impact on Missouri's economy.

Freight Handling Clusters

Another area of concentrated impact from diesel emission are freight handling facilities, such as ports, airports, rail yards, and intermodal facilities. With a constant flow of high-emitting truck, barge, or rail traffic, as well as numerous smaller diesel vehicles loading or

[5] Found by performing a search of Alternative Fuels Data Center's Federal and State Laws and Incentives tool, using the parameters "All" (deselect "federal"), "biodiesel", and "renewable fuel standard or mandate". http://www.afdc.energy.gov/laws/

unloading freight, these facilities represent major opportunities for targeted reductions in diesel emissions.

We recommend investments that represent systemic upgrades at these locations, such as investments to electrify freight handling equipment at a facility. In addition, electrification of yard trucks will not only decrease emissions but may have a direct impact on economic development in the state, since one of only 2 market-ready solutions nationwide is headquartered and manufacturing vehicles in Riverside, MO.[6]

Improve Transportation Systems

Maximize Investment in Transportation Electrification

States may use up to 15% of Trust funds on electric vehicle charging and hydrogen fuel stations. The State can leverage the Trust to invest in DC Fast Charging infrastructure to electrify Missouri's ZEV corridors, as recognized by USDOT. Additional DC Fast Charging is also necessary in metropolitan areas to support electrified high-utilization fleets such as taxis, livery, Transportation Network Companies (e.g. UBER, Lyft), and delivery vehicles. (DC Fast Chargers installed cost between $30,000 and $60,000 per unit[7].)

In addition to national priorities, the electrification of I-70 is a major component of the Missouri Department of Transportation's Road2Tomorrow initiative (R2T) and would serve as support and precursor to several other components of R2T, including the Solar Roadway Project and its Internet of Things project. In addition, the State's two largest electric utilities, Ameren UE and KCP&L have agreed to work with MoDOT to build out I-70 charging infrastructure.

We encourage the State to maximize this unprecedented opportunity to invest in a state-wide network of charging stations, especially along key transportation routes such as I-70. An electrified transportation system will greatly reduce diesel emissions, as well as greenhouse gases and other pollutants, invest in domestic fuel industries, and reduce vehicle operating and fueling costs. Access to easy charging in Missouri can expand and accelerate the EV market.

EV drivers do not expect a free ride, and simultaneous implementation of smart policies will ensure the state does not lose income for transportation infrastructure maintenance due to electrification. A coalition of neighboring states is planning coordinated electrification of the I-70 corridor and will be sharing best practices for policy development, among other key concepts.

VW is also required to spend an additional $2 billion nationwide on Zero Emission Vehicle Infrastructure under the ZEV Investment section of the Settlement. It is recommended that any work we do with the I-70 Corridor Coalition be offered to influence its plans, so that we can leverage VW's ZEV Investment to the maximum extent (if allowed) before expending funds from the Trust.

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[6] Orange EV Pure Electric Terminal Truck Solution: https://orangeev.com/

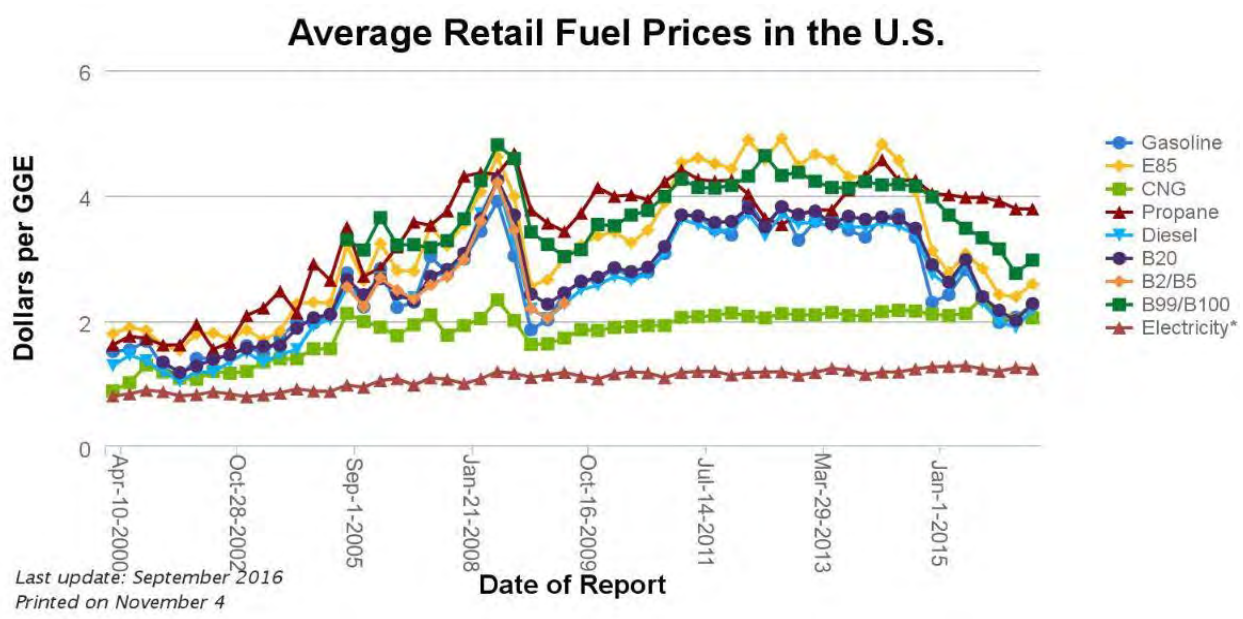
[7] http://www.afdc.energy.gov/uploads/publication/evse_cost_report_2015.pdf

Upgrade Public Fleets

The structure of the Trust is clearly intended to favor the upgrade or replacement of public fleets. The Trust will pay up to 100% of the costs to purchase or repower government-owned Class 8 Large Trucks or Class 4-8 busses (including school busses) as compared to 25% - 75% of privately owned vehicles, depending upon vehicle types. The State should use this opportunity to upgrade government fleets in Missouri, but with a local match requirement to maximize impact and strategically in areas of greater need, whether financial or emission-related.

Diversify Fuels Used

Rather than simply purchasing new diesel vehicles to replace aging ones, Missouri has an opportunity to diversify fuel types to include electric, natural gas, biofuels, and propane vehicles where it makes sense to do so. Alternative fuel vehicles reduce or remove diesel emissions and also stabilize fueling costs in times of volatile fuel prices. The graphic in Figure 1 shows that electricity and natural gas, in particular, have a relatively low and very stable price compared to other fuel options.



Notes: Fuel volumes are measured in gasoline-gallon equivalents (GGEs).
*Electric prices are reduced by a factor of 3.4 because electric motors are 3.4 times more efficient than internal combustion engines.

Figure 1: Average retail fuel prices in the U.S. Does not include pricing for public agency or private companies using a fuel contract. Clean Cities Alternative Fuel Price Reports (http://www.afdc.energy.gov/fuels/prices.html). Data from September 2016.

Integrate with Fleet Planning

Many government fleets are unable to purchase all of their planned replacements in a year due to unforeseen losses during operations, causing interruptions and delays. These add up over time, and often fleets are years behind their purchasing schedule, operating aging

equipment well beyond its typical planned lifetime. Additionally, funding a portion of the planned vehicle replacements through Trust funds reduces pressure on general fund sources for state and local governments, allowing some fleets to get up-to-date on vehicle replacement and other fleets to improve services to government departments and the general public. However, fleet operators should take time to plan vehicle replacement schedules, as well as for the fueling, maintenance and service support necessary to optimize use of the vehicle. Planning ensures a better, more lasting impact. Compared to quick, one-off purchases that are forced in some funding opportunities, the duration of the Trust program allows the state to step back and plan accelerated vehicle replacement schedules for state and local government fleets. Even given a planning period, most fleets will be ready to replace or upgrade some diesel vehicles almost immediately. A recent survey of a small sample[8] of school bus fleets across the U.S. showed that in fleets ranging from 30 to 400 buses, 90% are ready to start purchasing within 1 year.

Include Private Fleet Operators

Given Missouri's status as the nation's #1 state for new business creation and its strong position with the automotive industries, it is clear that Missouri businesses are an important priority. We recommend allocating a percentage of Trust funds to private fleet operators and using strategic considerations and requirements to ensure the best outcomes. For instance, consider location relative to population centers and volume of fuel used by its diesel equipment, and require that the vehicles operate within Missouri for a minimum of five years and be fueled by American alternative fuels.

Leverage Planned State and Local Investments

In addition to utilizing Trust funds to support the MoDOT Road2Tomorrow and economic development, we recommend leveraging the following program investments:

Missouri Clean Diesel Program

Utilizing national Diesel Emission Reduction Act (DERA) grants as well as state program funds, the Missouri Department of Natural Resources Air Quality Division has run several successful school bus retrofit or replacement programs and works closely with several major metro areas to minimize the impact of diesel operations in those communities. These programs target emission reductions in a manner that has direct and measurable impacts on the exposure of children and families to diesel emissions. We recognize the benefits of these programs and encourage the State to build on them. The scale and duration of the Trust funding allow an expansion of these programs to reduce diesel emissions from school buses in a more comprehensive manner across the State.

However, simply expanding the DERA program in the state may impose some limits that may not contribute to the best possible outcomes. For instance, EPA's rules require a one to one replacement, where the replacement vehicle is the same or less horsepower as the original and does the same or similar job. If the Mitigation Trust funds were used only with that approach, an agency might not pursue vehicle replacement strategies that right-size

[8] At the National Association of Pupil Transportation conference, November 7, 2016, about 30 districts attended a session on alternative fuels; 8 responded to the survey. It is not scientific but representative. None of the respondents are Missouri districts. See the questions at http://tinyurl.com/z4r4a7l

the fleet, such as replacing two or more smaller vehicles with one larger vehicle to do the job of both other vehicles.

In addition, we suggest that the State balance short-term results with longer term investment in our transportation future. Diesel engine idle reduction technologies allow for a quick impact on diesel emissions and spread funding impact more broadly, but focusing on this strategy does little to address aging fleets, fuel diversity or the introduction of new transportation systems, all of which can more greatly reduce emissions for the long-term. Funding decisions should balance short and long-term goals, and the Missouri Clean Diesel Program should be leveraged where it best fits such a strategic approach.

Public Transit

The KC Area Transportation Authority and other public transit agencies in the State are working to upgrade their bus fleets, diversify their use of fuels and enhance ridership. Reducing diesel emissions from public transit has direct implications for public health, particularly in urban neighborhoods with the most concentrated diesel emissions. Additionally, enhancing ridership of public transit takes private vehicles off the road, reducing diesel and gasoline emissions particularly in urban communities. Investment in upgrades to public transit buses and vans would be well placed.

Program Management

Local planning and local match

While government vehicles may be replaced or repowered with Trust funds at 100% of cost, we encourage the State of Missouri to establish a local match requirement to receive funds for projects under its program plan. Requiring local matching funds not only stretches the funds and increases the impact on emissions, but also ensures local buy-in, which is very important. Our experience is that if people—even our local government agencies—receive something for free, it is valued less and maintained less carefully. If local funding is involved in the purchase or retrofit of vehicles, the funds provided through the Trust are more likely to be used optimally. As a consequence, gains made through the investment are more likely to be sustained over the longer term.

Similarly, we encourage the State to require that entities receiving funds should present planning documents (such as fleet studies and replacement schedules, capital improvement plans, and/or urban or regional planning documents) to demonstrate that the funds can be used as part of a larger improvement strategy.

The above-mentioned school district survey also indicated that 75% of respondents will need only partial funding, while fewer than 25% will need full or nearly full funding support. In addition, 75% would like to have alternative fuel fleet planning assistance.

Set Limits

Maximum numbers of vehicle replacements should be set for both public and private entities. This ensures that many different entities can benefit from the funds, and also mitigates any supply chain issues that could otherwise delay purchases and deployment, anyway. Our experience with a major alternative fuel project funded by the Recovery Act

taught us that it takes time for the supply chain to catch up with demand, when demand suddenly skyrockets. Plan for raising the limits in case funds are not expended as quickly as anticipated, or as orders are fulfilled in a timely fashion.

Set minimum monthly mileage (or operating hours) for vehicles to be replaced, based on averages for each duty cycle. It would not be beneficial, for instance, to replace a vehicle that is near the end of its useful life and is not in regular service; nor one that is operated only for special purposes and doesn't use much fuel in a year.

Set a minimum number of years (we like 5) for the new vehicle to operate in Missouri.

Distribution of Funds

Kansas City Regional and St. Louis Regional Clean Cities have the latest list of the affected VW vehicles by zip code and county, totaling approximately 7000 vehicles affected. Based on those numbers, funds could be distributed fairly across the state based upon the vehicle count. Figure 2 shows the relative concentration by zip code in Missouri, with IHS Polk data.

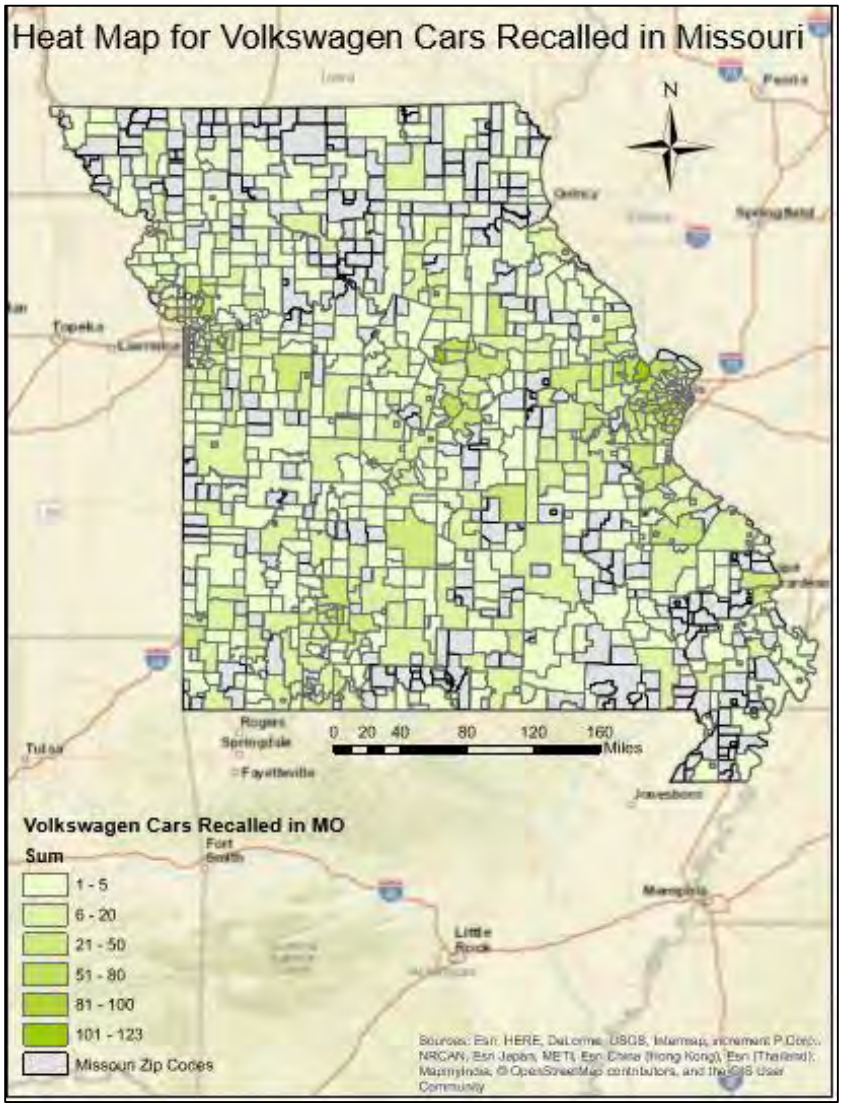


Figure 2: Shows the relative concentration of affected diesel-powered 2.0 liter VW cars in Missouri, based on IHS Polk data.

See also the map in Figure 3, which shows locations of public-access EV, CNG and propane stations, where Trust funds could be allocated for alternative fuel vehicle deployments.

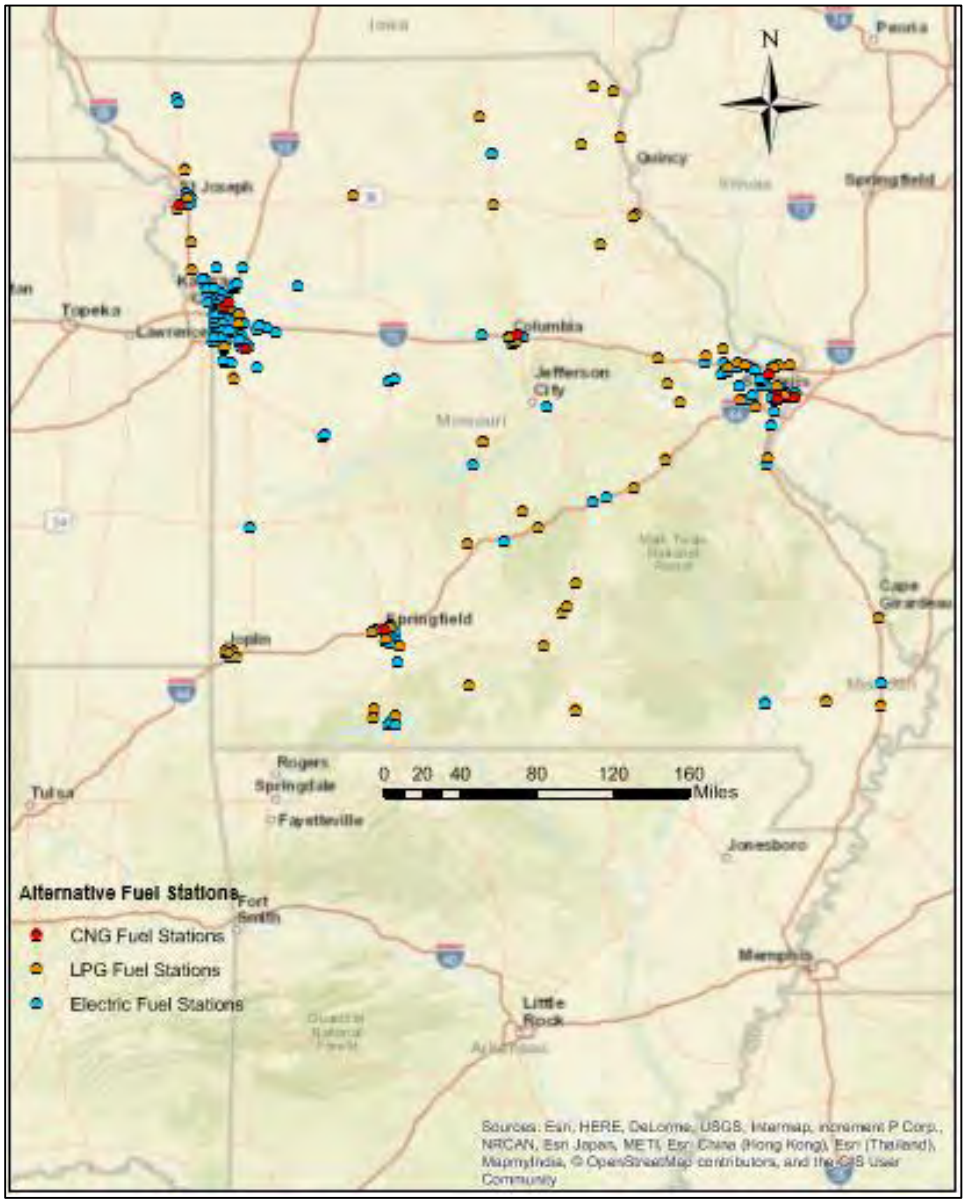


Figure 3: Shows locations of public-access EV, CNG and propane stations, using data from the Alternative Fueling Station Locator. AFDC.energy.gov.

Vehicle Purchasing Considerations

Emphasize the purchase of American fuels

Prioritize CNG (compressed natural gas), propane, hydrogen, electricity and biofuels. By prioritizing American fuels, the program will create energy security; boost economics by creating jobs; and assist in meeting air quality standards across the State by reducing particulate matter, greenhouse gas emissions, and NOx.

Replacing a diesel engine with a diesel engine does nothing to reduce our dependence on foreign oil. In instances of diesel for diesel replacement, mandate

- a local match higher than if purchasing an American-fueled replacement;
- and certified idle reduction technology.

Use a rating system

Funding requests should be evaluated using a rating system which, similar to the EPA diesel emission quantifier, awards points to vehicles based upon their efficiency and level of emissions, but also awards points for American fuels. Alternative Fuels Data Center[9] offers one or more tools that meet that criterion.

Require EPA and/or CARB emissions certification.

Ensure that all alternative fuel technology purchased meets emission standards by requiring agencies/companies to turn in certificates from either EPA or CARB (California Air Resources Board).

"Buy Missouri"

Give priority to the purchase of vehicles or fuel conversations from qualified Missouri-owned businesses.

The Scrap Steel Market and Unintended Consequences

Due to a flood of steel imports and slowing economies in much of the developing world, scrap steel is currently at extremely low prices. The DERA program requires the scrapping of existing diesel vehicles as a way of ensuring that emissions are reduced, not increased, by the program. To the extent that the Trust requires scrapping of existing diesel vehicles around the country, the Trust will add to the glut of scrap steel in the U.S., resulting in a large number of vehicles sitting in scrap yards for an extended period of time—an unintended consequence with other environmental implications. We encourage the State to address this unintended consequence by

- looking at a broader array of strategies for diesel emissions reduction, such as those described above that don't rely solely upon the DERA formula and framework; and/or
- developing plans for donating or discounting the scrap steel generated by this program to manufacturers of environmentally constructive products: racking for solar arrays, public transit kiosks and benches, alternative fuel signage for highways.

Contract for Program Administration

We strongly encourage the State of Missouri to work with existing organizations with expertise and relationships that can be put to use in implementing the Trust in Missouri, as opposed to adding state personnel to oversee the program. Contracted program administration avoids an unsustainable expansion of state payroll, taps into existing expertise and networks, and ensures the sustainability of programs by creating a mix of local government and nonprofit dollars from the start. In that regard, we urge you to consider working with the St. Louis and Kansas City Regional Clean Cities Coalitions.

[9] Alternative Fuels Data Center: http://www.afdc.energy.gov/tools.

These Coalitions have a wide array of industry stakeholders, and staff have administered U.S. Department of Energy Recovery Act funds, EPA DERA grants, worked with public and private fleets to introduce alternative fuel vehicle technologies, and provided outreach and education on a variety of transportation related issues.

Summary of Recommendations

Vehicle Replacement

Encourage replacement diesel vehicles with vehicles fueled by American fuels, i.e. electric, propane or natural gas vehicles.

Judiciously distribute vehicle replacement funds in communities with established AFV stations.

Replace vehicles in urban neighborhoods, where frequent and prolonged presence in communities can result in more concentrated exposures to diesel emissions over time, including transit operators.

Fairly distribute vehicle replacement funds throughout the state based on where the violating vehicles were/are registered, and not just concentrated in urban areas.

In freight-handling districts, electrify yard trucks (i.e. yard hostlers, terminal trucks, etc).

Upgrade government fleets
- require a local match to maximize impact of funds
- strategically in areas of greater financial need

Require fleet operators to engage in, or provide documentation of, reasonable fleet planning activities

Set limits on the number of vehicles any fleet or fleet unit can replace in a calendar year.

Strategically allocate a percentage of Trust funds to private fleet operators for replacement with AFVs.

Require replaced vehicles to remain in service in Missouri for a minimum of five years.

Station Investment

Indirect / leveraged

With deliberate planning involving station installers and fleet operators
- leverage the Trust to encourage third-party investment in new CNG and propane stations in freight handling districts, and
- use FHWA-designated AFV Corridors as a guide along heavily traveled corridors.

Reduce overall emissions from new and older diesels along major highway corridors by increasing the use of biodiesel at diesel retail locations through incentives or mandates requiring higher biodiesel blends.

Direct

In freight handling districts, invest in systemic upgrades to electrify freight handling equipment.

Maximize investment (15% of Trust) in a state-wide network of electric charging stations

- DC Fast Chargers (DCFC) along key routes such as I-70, I-44 and I-49
- Level 2 charging stations in communities and at destination locations, as well as support at DCFC locations
- Leverage VW's ZEV Investment to the maximum extent before expending funds from the Trust.
- Encourage leveraged investment in Level 1 charging stations at workplaces

Program Management

Ensure maximum impact of funds by creating an evaluation system that rates applicants based on the above recommendations in addition to

- Monthly mileage (or operating hours) for vehicles to be replaced
- Buy Missouri
- EPA and/or CARB Certification

Strategically leverage the Missouri Clean Diesel Program. To the extent the Trust supplements the Missouri Clean Diesel Program

- increase long-term solutions, such as vehicle replacement
- judiciously use short term solutions, such as engine retrofits

Where diesel for diesel replacements or upfits are allowed

- mandate a local match higher than if purchasing an American-fueled replacement; and
- require a certified idle reduction technology.

Mitigate the impact on the scrap steel market by planning investments over at least 5 years.

Minimize impact on state government staffing by contracting for program administration.

Missouri Public Transit Association

911 Washington, Ste. 200, St. Louis, MO 63101 kcella@mopublictransit.org

October 9, 2017

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AIR POLLUTION CONTROL PGM

Kyra L. Moore, Director
MDNR Air Pollution Control Program
1659 E. Elm Street
Jefferson City, MO 65102

Dear Ms. Moore:

The Volkswagen Environmental Mitigation Trust is an opportunity for Missouri to invest in public transit. On Monday, October 2, 2017, the Department of Justice filed the executed trust documents with the court, finalizing the Volkswagen Environmental Mitigation Trust. In accordance with the trust agreement, Missouri will facilitate the distribution of more than $41 million in funds to reduce mobile source air pollution emissions. Public Transit can be an integral part of the mitigation solution.

The Missouri Public Transit Association provider members provide more than 62 million rides almost everywhere for everybody every day in Missouri and they employ thousands in our communities. In addition, transit service in this state has a direct impact on our environment. According to national transit experts, public transportation produces 95% less carbon monoxide, 90% less volatile organic compounds (vocs) and about half as much carbon dioxide and nitrogen oxide per mile compared to private vehicles. With more people using public transit, we decrease our reliance on fossil fuels. If one in 10 Americans used transit regularly, U.S. reliance on foreign oil could decline by more than 40%, or nearly the amount of oil imported from Saudi Arabia each year. In addition, according to the American Public Transit Association the state receives a $4 return for every one dollar invested in transit.

Missouri currently provides little assistance for transit providers even though transit provides significant benefits for this state. Last year, the Missouri Legislature allocated only $1.7 million for transit providers across the state. The Volkswagen Environmental Mitigation Trust is an opportunity for Missouri to make a significant difference in our environment and the state's economy by investing in transit. Please consider transit as a part of your solution when developing the plan for investment. Thank you for your consideration and please feel free to reach out with any questions. Sincerely,

Kimberly Cella, Executive Director

The Missouri Public Transit Association values personal mobility as a basic quality of life by promoting access to public transit services.

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MODERN TRANSIT
MAKING TRANSIT A PRIORITY

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November 7, 2017

Kyra L. Moore, Director
MDNR Air Pollution Control Program
1659 E. Elm Street
Jefferson City, MO 65102

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Citizens for Modern Transit represents more than 22,000 transit riders and constituents in the St. Louis region interested in the expansion of transit to improve access to jobs, education and healthcare. Transit in Missouri provides millions of rides each year and they employ thousands in our communities. In addition, transit service in this state has a direct impact on our environment. According to national transit experts, public transportation produces 95% less carbon monoxide, 90% less volatile organic compounds (vocs) and about half as much carbon dioxide and nitrogen oxide per mile compared to private vehicles. With more people using public transit, we decrease our reliance on fossil fuels. If one in 10 Americans used transit regularly, U.S. reliance on foreign oil could decline by more than 40%, or nearly the amount of oil imported from Saudi Arabia each year. In addition, according to the American Public Transit Association the state receives a $4 return for every one dollar invested in transit.

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Kimberly Cella, Executive Director

911 Washington, Ste. 200 • St. Louis, MO 63101 • P: 314.231.7272 • F:314.231.7300 • info@cmt-stl.org • www.cmt-stl.org

From:	Kimberly Bonhart
To:	Moore, Kyra; Wilbur, Emily; Bybee, Darcy; Manning, Kristy; Wilbers, Brenda; Popp, Andy
Cc:	UPS Comments - Missouri VW Settlement Mitigation Plan
Subject:	Thursday, April 27, 2017 12:28:44 PM
Date:	High
Importance:	

April 27, 2017

Missouri Department of Natural Resources Department of Natural Resources, Air Pollution Control Program
Missouri Department of Economic Development, Division of Energy

RE: UPS Comments – Missouri VW Settlement Mitigation Plan

Thank you for the opportunity to provide comments on the Missouri VW Settlement Mitigation Plan. We also like to thank you for an opportunity to be considered as a participant on the Missouri Workgroup, which will prepare and review the initial plan summary (if one Is created).

UPS was founded almost 110 years ago as messenger service and has turned into one of the largest package delivery companies in the world. We currently operate in 220 countries and deliver over 4.7 billion packages each year. With a fleet of over 110,000 vehicles, efficiency is key to our operational success. At the same time, UPS is committed to reducing greenhouse gas emissions. UPS began with electric vehicles in New York City in the 1930s. We have now grown to over 8,000 alternative fuel vehicles that run on compressed natural gas, liquefied natural gas, propane, electric and even e-bicycles. To date our alternative fueled vehicles have driven over 1 billion miles. These vehicles don't just reduce greenhouse gas emissions but ensure UPS is being more efficient; thus, more sustainable.

The VW Settlement provides an opportunity for UPS and other carriers to make an investment in alternative fuel technologies because the funds will help drive down the cost differential for the equipment. While prices have come down some, natural gas and electric vehicles are sometimes two or three times the cost of a gasoline or diesel vehicle. This is why the VW Settlement funds will provide much needed incentives to those wishing to switch to a cleaner burning vehicle.

<u>UPS recommendations on the Missouri VW Settlement Mitigation Plan:</u>

Recommendation #1: Funding for government entities should be the same as those for non-government entities.
UPS believes that states can have a bigger impact, dollar for dollar, by deploying as many low emitting vehicles on the road as possible. If government entities use all of the funds, the impact will be muted as opposed to allowing more cost-share and maximizing the vehicles deployed.

Recommendation #2: While the VW Settlement states electric vehicles can receive up to 75% reimbursement and 25% for natural gas, that doesn't mean it can't be negotiated.
UPS and other carriers who can make a large impact on air quality and have the capital to deploy large quantities of vehicles should have the ability to negotiate with the state agency on an

arrangement that benefits the state and the private companies wishing to make the investment. For example, a company that wants to deploy both natural gas vehicles and electric vehicles could negotiate with the state for 50% reimbursement on electric vehicles and a 20% reimbursement for natural gas or some other variation. This would allow for the IDOT to fund large scale projects while preserving money for other smaller projects. This would also be more manageable than providing a generic number and being held to it for all projects. Projects that have the biggest impact should get the largest amount of incentives.

Thanks again for the opportunity to provide comments and I look forward to working with the Missouri Department of Natural Resources and Missouri Department of Economic Development to use these funds in a manner that will reduce the most amount NOx and maximize the funding.

Sincerely,

Kimberly Bonhart
Vice President State Government Affairs
UPS
Overland Park, KS 66210

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From: Moore, Kyra
To: Bybee, Darcy; Wilbur, Emily; Reimer, Shelly; Allen, Stacy; Leath, Mark
Subject: FW: VW Settlement Survey -- response follow up
Date: Tuesday, December 12, 2017 5:15:00 PM
Attachments: image011.png
FINAL_ ZEV-Missouri.pdf

FYI – I responded to him so he knew we received this.

From: Leighton Yates
Sent: Wednesday, December 06, 2017 12:28 PM
To: Moore, Kyra
Subject: RE: VW Settlement Survey -- response follow up

Director Moore,

Good afternoon, my name is Leighton Yates and I am the Manager of State Affairs for the Alliance of Automobile Manufacturers. Our local representative, Jewell Patek previously passed along the email below regarding MoDNR's request for input on the VW settlement funds. A few month ago, we submitted the attached letter regarding our request on how a portion of the funds be spent, but I used the survey link last week to share the same request again.

I did not receive a confirmation email from Survey Monkey of any sort so I wanted to resend the letter just to be safe. If you have any questions feel free to contact either of us at your earliest convenience.

I look forward to seeing how the future stakeholder meetings go and hope that MoDNR considers our request.

Best,
-Leighton Yates

Leighton J. Yates
Manager of State Affairs

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Kyra Moore
Director, MoDNR Air Pollution Control Program
1659 E. Elm St.
Jefferson City, MO 65102

Re: Environmental Mitigation Trust Fund Allocation – ZEV Infrastructure

The Alliance of Automobile Manufacturers (Alliance)[1], is writing to recommend Missouri apply for Environment Mitigation Trust (EMT) funds from the Volkswagen settlement funding and then allocate 15 percent of that funding to electric vehicle charging stations.

As part of their settlement agreement, Volkswagen established a $3 billion irrevocable trust (paid over 3 years) under Appendix D. Each state receives its proportional share of the $3 billion based on sales of non-compliant vehicles in that state. Missouri is eligible to receive $41,152,051.74. This funding is available and requires no matching funding from the Missouri budget now or in the future.

Of the several funds established as a result of the Volkswagen settlement, only the EMT allows states to determine how the funding is allocated among 10 different eligible projects specified in Appendix D-2. However, to claim the EMT funding, state governors must first appoint a "Lead Agency" (typically the agency responsible for air quality), and then that "Lead Agency" must formally apply for the funds within 60 days of the trust effective date. The application, in Appendix D-3, is a 5-page form. **Missing this 60-day deadline will permanently exclude the state from receiving any Appendix D funding now or in the future**.

Once it has applied for the funding and received approval, the state has sole discretion over how it is allocated among the 10 eligible projects identified in Appendix D-2. Of particular importance, Appendix D-2 Project #9 allows each state to use up to 15 percent (approximately $6,172,807.76) of its allocation for electric vehicle fueling stations.

Automakers have made enormous investments to promote electric vehicle technologies, spending tens of billions of dollars on research and development, assembly plant modifications, production and promotion of plug-in hybrid electric vehicles and battery electric vehicles (hereafter referred to collectively as "plug-in electric vehicles").

Automakers currently offer 29 different electric vehicle models in the United States, and over 70 models are expected by 2021. Plug-in electric vehicles are offered in all different shapes and sizes – mini-compacts, two-seaters, subcompacts, compacts, midsize and large

[1] The Alliance is a trade association representing twelve of the world's leading car and light truck manufacturers, including BMW Group, FCA US LLC, Ford Motor Company, General Motors Company, Jaguar Land Rover, Mazda, Mercedes-Benz USA, Mitsubishi Motors, Porsche, Toyota, Volkswagen Group of America (VWGoA), and Volvo Car USA. Together, Alliance members account for roughly 70% of the cars and light duty trucks sold in the United States.

sedans, station wagons, SUVs, mini-vans – with both two-wheel drive and six different all-wheel drive options.

However, customer acceptance to date suggests product offerings alone will not suffice to build a self-sustaining, robust, and growing plug-in electric vehicle market. Among other vital complementary policies, adequate infrastructure to fuel the vehicles is absolutely essential for long-term growth of this market.

Survey after survey reveals that lack of infrastructure is one of the number one reasons for not considering an electric vehicle purchase. For example, a survey of 2,500 consumers by Altman Vilandrie & Company in the summer of 2016 found the top reasons customers gave for not wanting to purchase a plug-in electric vehicle was a perceived lack of charging stations (85%) and uncertainty over the range (74%).[2] Simply put, consumers do not buy vehicles they cannot refuel.

Public charging infrastructure for plug-in electric vehicles not only relieves "range anxiety," but also raises consumer awareness of the technology. Like all states, Missouri's infrastructure is currently falling behind current vehicle offerings and in desperate need of a kick-start. For perspective, Missouri has 3,934 gasoline stations (and vastly more "pumps"), but only has 293 public electric charging stations. To advance the electric vehicle market, Missouri must invest in the infrastructure, and the EMT funding is available for this infrastructure and does not require the state to commit any funding from the general budget.

EVs are important for a state's economy, energy security, and environmental sustainability. And infrastructure is vital to enabling this EV market now and in the future. The Alliance and our members recommend Missouri apply for funding under Appendix D of the EMT Fund, and allocate 15 percent toward electric vehicle infrastructure. We will continue working with Missouri's Department of Natural Resources, legislature, and Governor to secure appropriate and sufficient infrastructure.

Sincerely,

Amy Brink
Vice President, State Government Affairs

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[2] Hanley, Steve (2017, January 1), *60% of Americans Unaware Electric Cars Exist*, retrieved from http://gas2.org/2017/01/01/60-americans-unaware-battery-cars-exist/

My name is Mark Brown. I am the Public Works Director for the City of Perryville, Missouri. I am speaking regarding the VW settlement funds and the apparent omission of natural gas vehicle incentives. Though I am somewhat biased toward natural gas, I am attempting to simply deliver facts.

It appears that much of these funds have a tendency to veer towards electric vehicles. I personally and professionally believe that electric vehicles are wrong for Missouri and the United States. Media, marketing and lobbyists have somehow convinced the masses that electric cars are emission free. Nothing could be further from the truth. To begin with, electric is not even a power source, it is a transmission method. The power comes mostly from coal. And coal emissions are among the worst of any fossil fuels but it is abundant and will continue to be used to produce electric for the foreseeable future. Nuclear energy is used in some locales and hydroelectric power is available in some parts of the country but even in these parts, coal still plays a major role. The power that comes from electric transmission is only 60% efficient at the source and another 10-12% is lost in transmission, meaning that twice as much power must be generated by coal to equal the power that comes from natural gas. I will be the first to tell you that when some of the other alternatives such as solar or wind or cold fusion are perfected and can be generated economically in mass, I will be a huge fan but that is NOT in the foreseeable future. Natural gas is TODAY.

Natural gas vehicles run on compressed natural gas, produced in America, resulting in 100's of thousands of jobs. Natural gas is safe, the vehicle technology has been perfected and these vehicles have been on the road for over 30 years. Many companies rely on natural gas, in fact, here in Missouri, Anheiser Busch fuels all of their semi's with natural gas. Nationally, companies such as UPS and FedEx rely on CNG in many locations. Do they do it because it is environmentally friendly? Or do they do it because they are saving money? Both. An equivalent gallon of CNG costs around $1.00 compared to diesel prices rising towards $3.00 per gallon. How clean? Well, with natural gas vehicles, you no longer have to change the oil when it gets dirty because it doesn't get dirty. You change the oil when it loses viscosity, usually 4 -5 times longer than normal oil changes.

So why doesn't everyone drive a natural gas vehicle. Infrastructure. While you can cross the country driving solely on natural gas, it is not convenient. And the fueling stations cost quite a bit up front to build. Without fleets of natural gas vehicles, it is hard to justify the investment and similarly, it is hard to invest in natural gas vehicles without an infrastructure in place. Chicken and egg situation. The state of Oklahoma, admittedly a natural gas producing state, has several state incentives for NGV's including a NGV Weight exemption, an Alternative fueling infrastructure tax credit and an alternative fuel vehicle tax credit. What does Missouri have? What will we have? How will we invest the VW money? Will we fall in with the lobbyists, marketers and media and buy in to electric as clean power? Or will we use the facts we have and clean up our state and our country, while saving trillions of dollars that will be used for investment, by supporting TRUE alternative green technology vehicles. Many of my facts can also apply to LNG and propane as well. While neither is as clean as natural gas, they each have their place and are still far cleaner than electric as a vehicle fuel.

In my town of Perryville Missouri, we have built a fueling station for our city fleet and are investing in natural gas vehicles. There are local companies with truck fleets of up to 1000 trucks and they are very interested in converting. But it always comes back to the chicken and the egg. Let's don't be chicken, afraid the sky may fall and lets invest in our future with natural gas. Thank you.

November 21, 2017

City of Perryville Department of Public Works
215 North West Street * Perryville, MO 63775 * (573) 547-2500

From:	Paul Brugmann
To:	Bybee, Darcy
Subject:	Stop-Start Technology, A Win-Win for Reducing Emissions & Operating Costs
Date:	Wednesday, June 21, 2017 6:45:43 PM
Attachments:	StopStart_CumminsB6.7_30Mar2017_AS edits.pptx

Darcy,

Thanks again for taking the time to discuss what's happening with the VW Settlement!

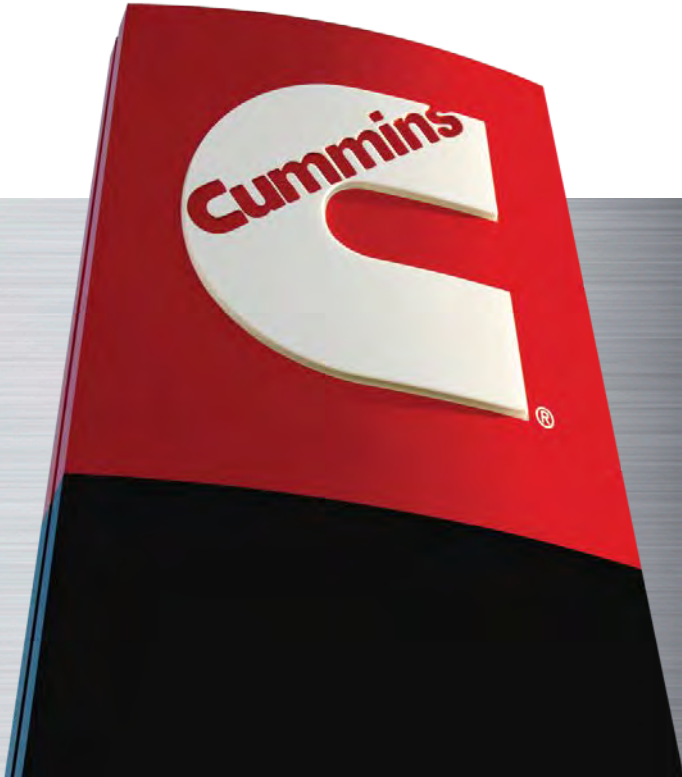
As discussed, attached is a copy of a presentation that shows the features and benefits of Stop-Start Technology for applications such as school bus fleets. As offered, would be glad to present at an Air Conservation Meeting. Could run through it easily in under 15 minutes highlighting general ideas, providing good orientation to one option to improve Air Quality, and demonstrating how engine idling contributes to exhaust emissions, as well as money wasted out of the tail-pipe.

Thank You,

Paul Brugmann
Cummins Sales & Service
Area Manager
Columbia, MO 65202

Stop-Start Technology

Cummins

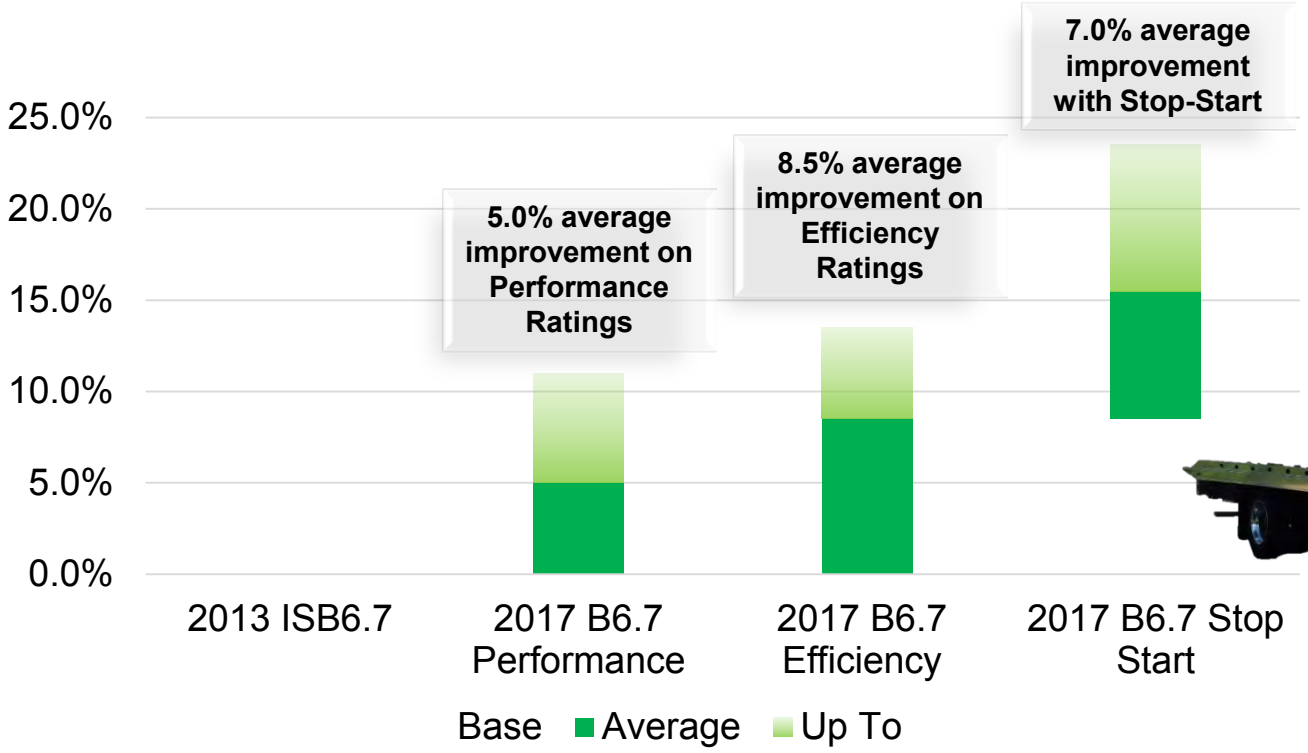


Stop-Start

An opportunity to set the bar

- Reduce costs while minimizing carbon footprint and improving image
- Significant Fuel Economy benefit
- Differentiation in the marketplace with adoption of unique integration
- Economical option to improve CO_2 footprint for a fleet as compared to other green technologies like hybrid systems
- Meet future GHG regulations far in advance
- Key technology in the medium duty commercial vehicle market as evidenced by its rapid rise in the passenger car market

B6.7 Fuel Economy Improvement



The Range of Savings Will Depend on the Specific Duty Cycle

Idle time	15%	30%	45%
Additional time with engine off	12%	24%	36%
Engine/Trans. hours saved[1] (hrs. per year)	187.2	374.4	561.6
Fuel saving[2]	5%	10%	15%
CO_2 savings per year (lbs.)	2494	4988	7481
Productivity[3] Man hrs. per year for 100 bus fleet	92.9	185.7	278.6

Notes:

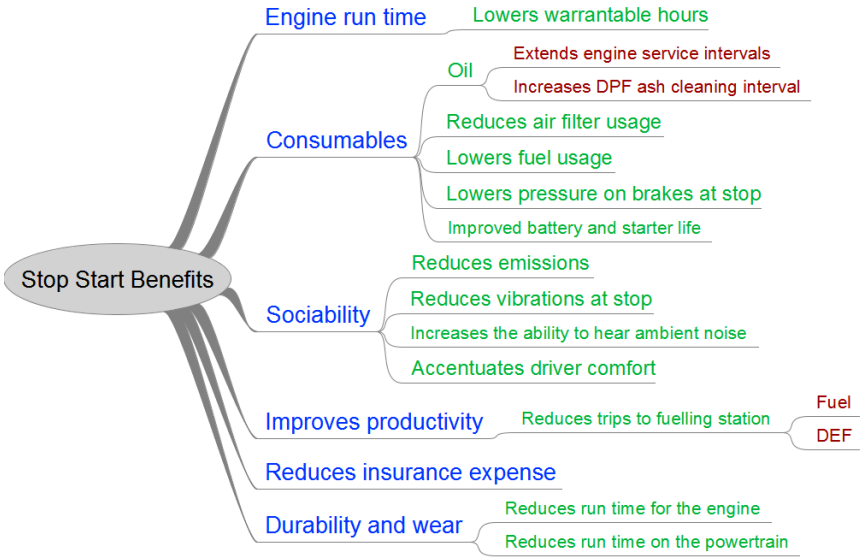
1. *Assuming school bus usage of 6 h/day, 260 days/year, 10 mph avg. speed, 60 miles/day*
2. *Dependent on duty cycle, baseline 7 mpg*
3. *Assuming 60 gal. fuel tank and 1/2 hr. to get bus back in service, varies per fleet*

It's More than Fuel Economy Improvement

- **Improved sociability** for vehicles: lower emissions, lower noise (50% reduction) at bus stops: safety, environmental value and health impacts that can be recognized by the community
- Lesser **capital cost** investment than alternate fuel (example propane) powered vehicles for emissions or noise containment
- Lower amount of time with engine/transmission use:
  - Positive impact on **maintenance costs** & **resale** value for both transmission and engine
- **Productivity** improvement due to less frequent need to refill vehicle with fuel and DEF

Stop-Start Benefits

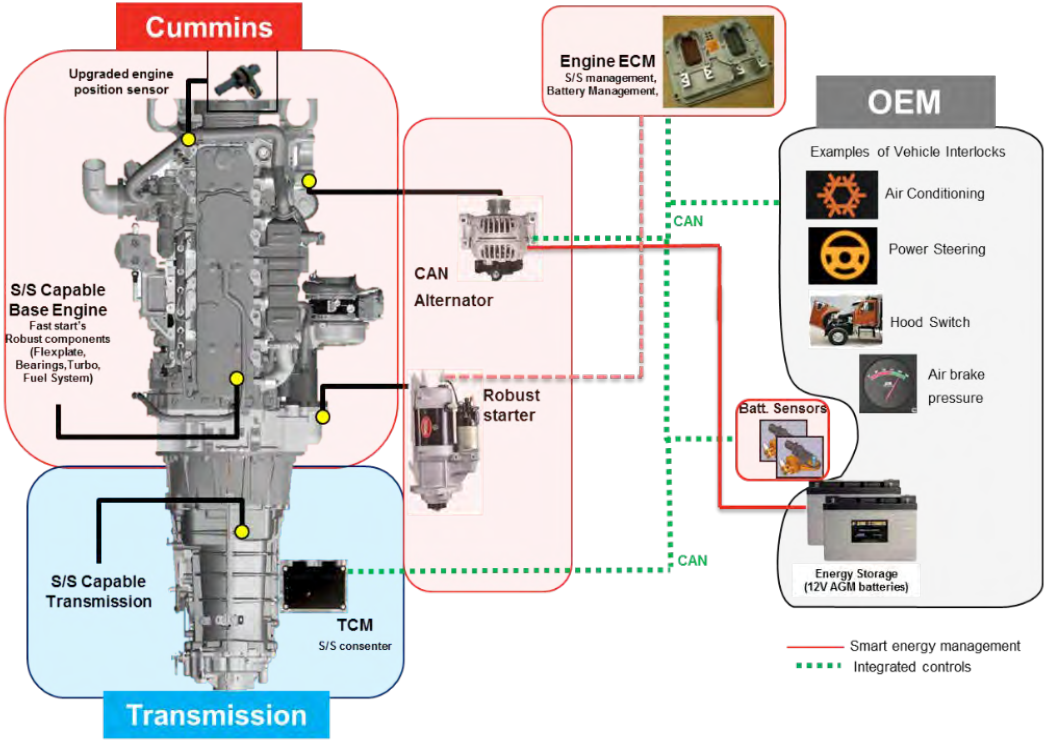
- Reduced Consumables
  - Extends engine service intervals
  - Lowers fuel and DEF usage
  - Decreased pressure on brakes at stop
  - Improves battery and starter life
- Increased Durability
  - Reduced run time on engine and powertrain
- Enhanced Sociability
  - Lower emissions
  - Reduced noise and vibrations at stop
  - Accentuated driver comfort
- Improved Productivity



Operation Overview

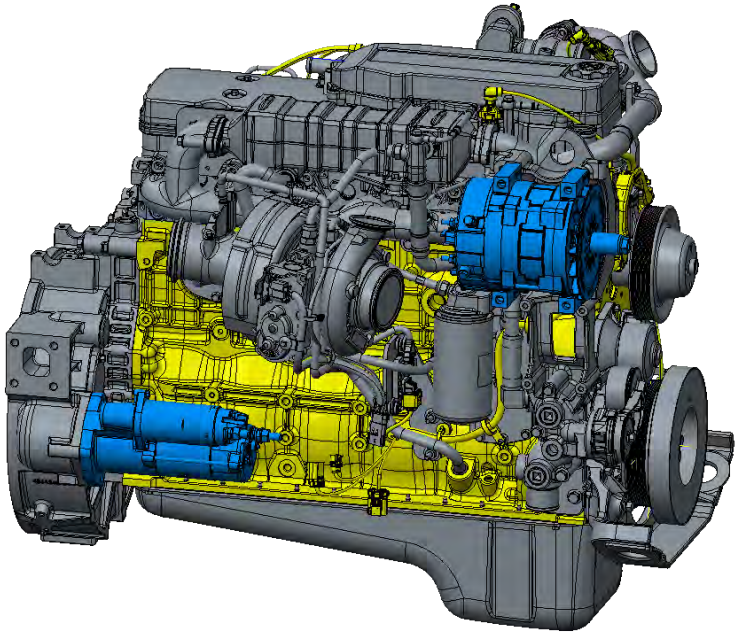
- Engine shuts down at idle opportunity when following conditions are met
  - Vehicle is ready (Vehicle at stop, in forward range, brake pedal depressed , no accelerator pedal input, no interlocks/inhibits)
  - System is ready (Example: Battery is capable of next start)
  - Transmission is ready
  - Engine is ready (Example: No after treatment regeneration in progress)
- Engine starts as soon as Brake pedal is released
  - OR if there are other start requests (Example: Battery state of charge reached a minimum threshold)
- Stop-Start operation is also allowed for a vehicle in park mode

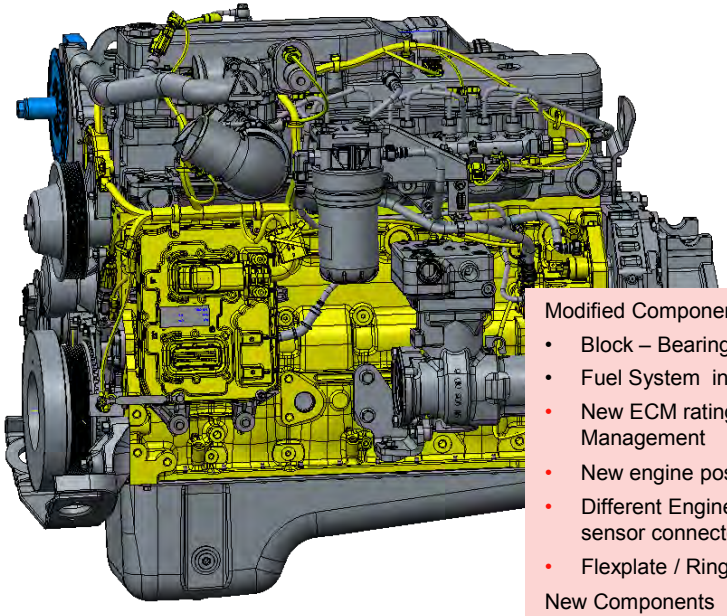
Stop-Start Architecture



Stop-Start

BOM vs Base 2017 ISB





Modified Component list

- Block – Bearings rod, main and thrust
- Fuel System injector, fuel pump ., rail
- New ECM rating cals that has S/S Management
- New engine position sensor
- Different Engine Harness (position sensor connector)
- Flexplate / Ring gear

New Components

- Robust Starter, Alternator(240 or 350 amp), Battery sensors(2 or 3)

Carry Over **Modified** **New**

NTEA Customer Feedback

- **Navistar Management:** Concerned about AGM battery pricing but generally impressed with NVH, no negative comments expressed outwardly to Cummins
  - Work being done with customers to gauge market adoption, so far customer council feedback has been positive
- **Utility Company Rep:** “Will this be available on L9 for Utility Trucks? We have a lot of idle time”
  - Currently only available on B6.7, but work is being done to extend to other platforms in the future once the market adopts the technology
- **Scania CTO:** “Performance is similar to my Audi. The commercial vehicles in Europe that I drove felt sluggish”
  - Impressed with progression of technology on the diesel front and the responsiveness of the engine

NTEA Customer Feedback

- **Ford Engineers:** “Vibration is harsh”
  - This was their only negative comment, but it is important to remember they were comparing diesel to gasoline (not an apples to apples comparison)
- **Booth Customers:** Repeated questions about ability to meet durability requirements, centered around concern with the starter
  - Very interested in technology despite initial “this may be too good to be true” mentality
  - How we answered concerns: a Stop-Start capable B6.7 has a more robust starter, which is capable of 200,000 starts (a typical starter is capable of 30,000-40,000 starts). Additionally, the engine does not do Stop-Start when cold, preventing unnecessary wear and tear. The engine only shuts down during idle when coolant is warmed up.
- **Customers were in general impressed with quick response time, not anticipating how fast the engine started up and moved after engine shut down.**
  - It takes less than a second after your foot leaves the petal for the truck to kick into gear and start moving
- **Customers were in general surprised by how quiet the diesel was**
  - Almost disorienting how quiet the truck gets: “other cars looked around for where I went or jumped when the engine started back up beside them because they didn’t realize I was still there”

KCATA
Kansas City Area Transportation Authority

November 13, 2017

Missouri Dept. of Natural Resources
1101 Riverside Drive
Jefferson City, MO 65101

Re: VW Settlement Mitigation Trust

Dear Sirs:

The Kansas City Area Transportation Authority (KCATA) is the regional transit authority for the Kansas City metropolitan area. KCATA directly operates transit service in the region, manages services operated by others, and coordinates transit services throughout the region.

KCATA is hereby recommending that the Missouri Department of Natural Resources includes replacing older diesel public transit buses with new buses as an activity eligible for funding from the VW Settlement Agreement. Removing older diesel buses from service and replacing them with new buses will reduce emissions and is consistent with the intent of the VW Settlement and the settlement funding made available to states.

It is being submitted for the following reasons:

- New transit buses are significantly cleaner than older diesel buses.
- Transit buses operate in areas where many of the VW diesel vehicles with inaccurate emissions data were sold.
- Transit buses operate in urban areas with the state's most significant air quality issues and operate in these areas for prolonged period of time.
- New transit buses provide added emissions benefits by attracting more persons to transit who would otherwise operate single occupancy vehicles.

This position was also discussed with the Kansas City area's Regional Transit Coordinating Council (RTCC) earlier this month. The RTCC is an advisory group with representatives from the four fixed route transit providers, local elected officials and transit stakeholders in the Kansas City metropolitan area. The RTCC endorsed this recommendation.
We appreciate your consideration of this recommendation.

Sincerely,

Robbie Makinen
President and CEO

From:	Moore, Kyra
To:	Bybee, Darcy; Wilbur, Emily; Leath, Mark; Reimer, Shelly; Allen, Stacy
Subject:	FW: Courtesy Copy: VW Settlement Survey -- response requested by Dec. 1, 2017
Date:	Thursday, December 07, 2017 12:31:38 PM
Attachments:	20171207121216.pdf

FYI

From: Ronald J. Leone
Sent: Thursday, December 07, 2017 11:18 AM
To: Moore, Kyra
Cc: Galbraith, Ed
Subject: RE: Courtesy Copy: VW Settlement Survey -- response requested by Dec. 1, 2017

Kyra: Attached please find MPCA's comments regarding the $41+ million VW settlement. Please make sure our comments become part of the official record.

How many copies should I bring to today's meeting?

Thank you, Ron

Ronald J. Leone, Esq.
Executive Director
Missouri Petroleum Marketers & Convenience Store Association (MPCA)
205 East Capitol Avenue, Suite 200 • Jefferson City, MO 65101 |
PACE 2018 • February 22 & February 23 • Kansas City, MO
PACE 2019 • February 7 & February 8 • Kansas City, MO
PACE 2020 • February 27 & February 28 • Kansas City, MO
www.PACEshow.com

MPCA
MISSOURI PETROLEUM MARKETERS & CONVENIENCE STORE ASSOCIATION

205 East Capitol Avenue, Suite 200 • Jefferson City, Missouri 65101
Phone 573.635.7117 • Fax 573.635.3575 • www.mpca.org

To: Missouri Department of Natural Resources (DNR)
From: Ronald J. Leone, MPCA Executive Director
Date: December 7, 2017
Subject: $41+ Million VW Settlement

I. MPCA. The Missouri Petroleum Marketers & Convenience Store Association (MPCA) is a 300+ member statewide trade association, established in 1937 and located in Jefferson City, Missouri, which represents the majority of the convenience stores, gas stations, truck stops, petroleum marketers and their suppliers all across Missouri.

Many MPCA members are small, second or third generation family owned businesses.

Please accept this communication as MPCA's formal and public comments regarding the issue commonly referred to as the "$41+ Million VW Settlement."

II. DNR'S WEBSITE. "How will Missouri use funds from the VW settlement?

Missouri expects to receive more than $41 million under the settlement. The Missouri Department of Natural Resources is our state's lead agency. The department will administer funds to eligible businesses and government entities in an effort to reduce air pollution from mobile sources.

The department's Air Pollution Control Program is hosting public meetings and proactively seeking comments from the public and interested stakeholders. The department will use stakeholder input to help it develop a 10-year plan for using the funds. Eligible projects must reduce NO_x pollution and correspond with one of the following classifications, as stipulated in the settlement.

Class 8: Local freight trucks and port drayage trucks.
Class 4-8: school buses, shuttle buses or transit buses.
Freight switcher locomotives.
Ferries/tugs.
Shore power for ocean-going vessels.
Class 4-7: Local freight trucks.
Airport ground support.
Forklifts and other equipment for handling port cargo.
Charging equipment for light-duty, zero-emission vehicles.
Option involving the U.S. Diesel Emissions Reduction Act (DERA)."
(Emphasis added.)

III. GENERAL POSITION. MPCA supports the equal taxing and equal regulating of any and all motor vehicles and motor fuels, including alternative motor fuels like electricity, hydrogen, propane, and natural gas (CNG and LNG). MPCA opposes public dollars being used to directly compete with private sector industries and private sector businesses.

IV. POSITION ON THE "$41 MILLION VW SETTLEMENT". The "$41 Million VW Settlement" is public money that should not be used to fund whatever is part of the next generation of motor vehicles and motor fuels - including but not limited to natural gas (CNG and LNG), electric, hydrogen, propane, etc. - because it directly competes with more traditional and mature existing motor vehicles and motor fuel retailers such as gas stations and convenience stores that sell gasoline, diesel and ethanol blends.

MPCA members have spent hundreds of millions of their own dollars over multiple generations to ensure that Missourians have ready access to a wide variety of reasonably priced motor fuels and convenience items. This private sector investment has generated tens of thousands of jobs and hundreds of millions of local and state tax dollars – sales taxes, motor fuel taxes, tobacco taxes, property taxes, business taxes and fees, income taxes, etc.

For the State of Missouri to use public dollars to fund the direct private or public sector competitors of MPCA members is bad public policy that is fundamentally unfair, unwise, and counter-productive because these small businesses will thereafter generate less of the critical local and state tax revenues we all rely on.

The next generation of motor vehicles and motor fuels should be left up to the private sector and the free market, including supply and demand. The State of Missouri should not be involved in choosing and funding private sector winners and losers.

V. WHAT DNR SHOULD DO WITH THE "$41 MILLION VW SETTLEMENT". MPCA believes that the "$41 Million VW Settlement" should be used to replace some of the state's existing fleet of vehicles with new, cleaner burning gasoline and diesel vehicles.

In the alternative, the settlement money should be used to fund a public good that benefits all Missourians and that the State should actually be funding such as roads, schools, parks, prisons, highway patrol, etc.

Sincerely,

Ronald J. Leone, Esq.
Executive Director,
Missouri Petroleum Marketers & Convenience Store Association (MPCA)
205 E. Capitol Avenue, Suite 200, Jefferson City, MO 65101

From:	Moore, Kyra
To:	Bybee, Darcy; Leath, Mark; Wilbur, Emily; Reimer, Shelly; Allen, Stacy; Graf, Wayne
Subject:	Fwd: Volkswagen Environmental Mitigation Trust
Date:	Wednesday, October 11, 2017 2:22:41 PM
Attachments:	image001.png ATT00001.htm VW Settlement Letter_DNR_final-signed.pdf ATT00002.htm

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Sent from my iPhone

Begin forwarded message:

From: Ryan Rowden
Date: October 11, 2017 at 1:45:13 PM CDT
To: "Carol S. Comer
Cc: "Moore, Kyra"

Subject: Volkswagen Environmental Mitigation Trust

Director Comer,

Attached you will find a copy of our official stakeholder input for the development of the Beneficiary Mitigation Plan. I have also uploaded our input to the Department's webpage devoted to the Volkswagen Environmental Mitigation Trust.

If you have any questions please do not hesitate to contact me..

Thanks

Ryan C. Rowden
Executive Director
Missouri Petroleum Council
Jefferson City, MO 65101
www.api.org

October 11, 2017

Carol S. Comer, Director
Missouri Department of Natural Resources
1101 Riverside Drive
Jefferson City, MO 65102

Dear Director Comer:

As a condition of its settlements with the U.S. Environmental Protection Agency (EPA), Volkswagen must establish a $2.7 billion Mitigation Trust to offset the company's Clean Air Act violations. As a result of this Settlement Missouri is currently in the process of collecting stakeholder input for development of the Beneficiary Mitigation Plan which will summarize how Missouri plans to use the trust funds.

With the Mitigation Trust, the state has the opportunity to reduce pollution by replacing eligible engines and vehicles with newer model diesel engines that make full use of ultra-low sulfur diesel. When ULSD was introduced, tests completed by EPA, the California Air Resources Board, engine manufacturers and others showed that using the advanced emissions control devices enabled by the use of ULSD fuel would reduce emissions of hydrocarbons and oxides of nitrogen (precursors of ozone), as well as particulate matter to near-zero levels. As an additional environmental benefit, ULSD fuel enabled diesel-powered passenger cars and light trucks to meet the same stringent emissions standards as gasoline vehicles and diesel-powered vehicles tend to be more fuel efficient than gasoline-powered vehicles.

When the EPA developed rules to reduce the sulfur in diesel fuel to 15 ppm, it predicted that when the current heavy-duty vehicle fleet was completely replaced in 2030, the use of ULSD would provide annual emission reductions equivalent to removing the pollution from more than 90 percent of the [2006] trucks and buses. The Mitigation Trust affords the state the opportunity to meet these goals in advance of 2030 by replacing those vehicles with newer diesel engines.

ULSD was introduced in 2006, and by December 2010, it was required in all highway uses. It was required in all non-road, locomotive and marine uses by December 2014. ULSD fuel enables the use of cleaner technology diesel engines and vehicles with advanced emissions control devices, resulting in significantly improved air quality. The newest diesel engines might even take advantage of the benefits provided by the new API FA-4 diesel engine oil. FA-4 oils are blended to a different high-temperature high-shear (HTHS) viscosity range to assist in

reducing greenhouse gas emissions. In addition to the environmental benefits identified above, it remains a high energy density fuel with a robust installed supply infrastructure that is familiar to both users and mechanics. The Mitigation Trust has created an opportunity for your state to reduce emissions and improve the environment and we encourage you to consider repowering your existing vehicles with newer clean diesel engines.[1]

If Missouri believes it is necessary to utilize an "alternative fuel," natural gas is a good choice. The U.S. is now the world's largest producer of petroleum and natural gas, so natural gas vehicles help to achieve the public policy goal of maintaining energy and national security. Natural gas is also a clean burning fuel that can have environmental benefits at the local level reducing ground-level localized pollution. Natural gas primarily consists of methane (around 90 percent), with small amounts of ethane, propane, and other gases. Methane is lighter than air and burns almost completely, creating carbon dioxide and water as byproducts.

As you develop your application to the Mitigation Trust, we encourage you to consider the benefits of repowering your existing fleet with newer efficient diesel engines. If you have any questions, please don't hesitate to contact me at rowdenr@api.org.

Sincerely,

Ryan C. Rowden /s/

Ryan C. Rowden
Executive Director, Missouri Petroleum Council

cc: Dru Buntin, Deputy Director

Kyra L. Moore, Director, MDNR Air Pollution Control Program

[1] U.S. EPA, "Detailed Comparison of VW Eligible Mitigation Action 1-9 and Eligible Mitigation Action #10 (DERA Option) https://www.epa.gov/sites/production/files/2017-01/documents/vw-dera-option-elgble-mitig-compar-2017-01.pdf

From: Sherrie Merrow
Sent: Friday, April 28, 2017 9:28 AM
To: Moore, Kyra; Leath, Mark
Cc: Matt Godlewski; Clarke, Jeff
Subject: NGVAmerica VW Comment Letter for the State of Missouri

Dear Director Moore and Mr. Leath:

Natural Gas Vehicles for America (NGVAmerica) is pleased to submit comments to the State of Missouri for consideration as the State prepares its VW Beneficiary Mitigation Plan to use funds from the Volkswagen Partial Consent Decree. As the national trade association for natural gas vehicles, NGVAmerica knows that natural gas vehicles play an unmatched role among alternative fuel vehicles in delivering the most NOx reductions for the lowest cost and therefore should have a strong role in the Missouri Mitigation Plan.

Please contact us with any questions or if you would like to meet in person to discuss our comments.

Thank you,

Sherrie Merrow

Sherrie Merrow
Chair, State Government Advocacy Committee
NGVAmerica
Washington, D.C. 20001
ngvamerica.org | ngv.com

NGVAMERICA
Natural Gas Vehicles for America

400 North Capitol Street, N.W.
Washington, D.C. 20001
ngvamerica.org

April 28, 2017

Director Kyra Moore
Mr. Mark Leath
Air Pollution Control Program
P.O. Box 176
1101 Riverside Drive
Jefferson City, MO 65102-0176

RE: NGVAmerica Comments on the Volkswagen Diesel Emissions Settlement and the Environmental Mitigation Trust Implementation for the States

Dear Director Moore and Mr. Leath:

Natural Gas Vehicles for America (NGVAmerica), the national trade association for the natural gas vehicle industry, respectfully submits the following comments on how the State of Missouri can best use the Environmental Mitigation Trust (EMT or Trust) funds ($41.2 million) that the state will receive as part of the Volkswagen (VW) diesel emission settlement. These comments are intended to inform the decision-making process as Missouri begins to consider and develop the Environmental Mitigation Plan required by Trust.

The VW EMT funds provide an extraordinary opportunity for Missouri and other states to put significantly cleaner, lower-polluting vehicles on the road in public and private fleets. This funding can and should be used by Missouri to continue its commitment to accelerating the use of cleaner, alternative fuels that offer a cost-effective alternative to funding diesel vehicles.

The latest natural gas engines are the only "near-zero" engines that are certified to perform at 0.02 g/bhp-hr of nitrogen oxide (NOx) emissions or better and should not be confused with diesel engines certified to the 2010 EPA standard of 0.2 g/bhp-hr NOx standard.[1] The 0.02 g/bhp-hr NOx standard requires that engines outperform the federal standard by 90 percent and is the cleanest heavy-duty engine standard today. It also is the lowest level currently recognized under California's Optional Low-NOx Standard (OLNS) for engines.

NGVAmerica's comments rely on data generated by evaluating the latest commercially available technology when comparing emissions benefits between natural gas, diesel and electric vehicle and engine types. Natural gas engines are the only available internal combustion engines that have been certified to California's 0.02 OLNS and thus are the only true Near Zero engines available in the marketplace today. Additionally, if renewable natural gas (RNG) is used, life cycle emissions from NGVs are reduced further. Putting more NGVs on the road today provides a strong customer base for the growing RNG market.

[1] See SCAQMD press release from June 3, 2016 providing details on the petition filed by state authorities urging the U.S. EPA to adopt the 0.02 NOx standard (http://www.aqmd.gov/home/library/public-information/2016-news-archives/nox-petition-to-epa) (*Today's action follows a March 4 vote by the SCAQMD's Governing Board to formally petition the U.S. EPA to adopt a so-called "near-zero" or "ultra-low" emissions standard for heavy-duty truck engines that is 90 percent cleaner than the current standard)*.

Compared to other alternative fuels and to diesel vehicles, natural gas vehicles that are commercially available today, offer the best solution for addressing the goals of the EMT and delivering the most nitrogen oxide (NOx) emission reductions for the lowest cost.

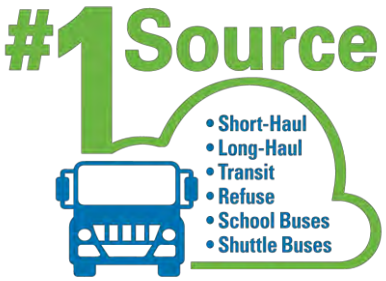
The following pages outline key facts related to vehicle emissions, total cost of ownership, and current availability, and NGVAmerica's recommendations on how EMT funds can be allocated effectively for reducing emissions.

The Need to Take Meaningful Action Today

The funding available through Volkswagen's Environmental Mitigation Trust comes at a time when it is critical to address transportation emissions. The American Lung Association's "State of the Air 2016" report found that air pollution continues to be a pressing concern with more than half of all Americans—166 million people—living in counties where they are exposed to unhealthful levels of ozone and particulate pollution.

Medium- and heavy-duty on-road vehicles are the number one source of ozone-forming emissions of nitrogen oxides (NOx) in almost every metropolitan region in the U.S., therefore there is considerable opportunity to develop and deploy funding programs that make an immediate and tangible impact on air quality and related public health issues.

Approximately 50% of Americans live in areas with air that is unhealthy to breathe



Medium- and heavy-duty vehicles are the #1 source of smog

Sustainable, Responsible, Available: Natural Gas Vehicles

Today's natural gas vehicles (NGVs) are proven technologies that can uniquely, immediately, and cost-effectively transform our nation's medium- and heavy-duty transportation sector. The advantages of natural gas as a transportation fuel include its domestic availability, widespread distribution infrastructure, low cost, and inherently clean-burning qualities.

In these comments NGVAmerica presents the compelling reasons that states should prioritize funding for NGVs to *maximize the impact* of the available funding. As your organization is aware, the EMT was set up to fund projects that make an impactful reduction on NOx emissions to mitigate the excess emissions currently in our air from the non-compliant light-duty diesel vehicles VW sold. NGVAmerica strongly believes that NGVs are the best solution to meet the core goals put forth by the Volkswagen EMT funding. NGVs are:

1. **Sustainable:** NGVs maximize long-term emission reductions
2. **Responsible:** NGVs extend the funding and foster economic development
3. **Available:** NGVS meet the diverse operating requirements of every fleet application

1. Sustainable: NGVs Maximize Long-Term Emission Reductions

- **Key Point:** Today's natural gas medium- and heavy-duty engines provide *unmatched* reductions of smog-forming emissions of nitrogen oxides (NOx).

"Near Zero-Emissions": EPA and CARB Certified a Heavy-Duty Natural Gas Engine to 0.02 g Standard

In September 2015, the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) certified the world's first heavy-duty engine that emits oxides of nitrogen (NOx) at levels so low that they are considered at "near-zero" (0.02g NOx/bhp-hr). This is the cleanest commercially available heavy-duty truck engine available in the market today, offering the ability to reduce emissions 90% below even the most stringent U.S. EPA standards.

Today's natural gas engines offer a 90% NOx reduction over the EPA's strictest emission standards, making them the cleanest commercially available technology

The "Game Changer" report shows that "Near-Zero" NGVs are cleaner than "Zero-Emission" All-Electric trucks

NGVs Have Lower NOx Emissions Than All-Electric Trucks

The emission benefits of the new "Near-Zero" engine are well documented in the 2016 *Game Changer* report issued by Gladstein, Neandross and Associates (GNA)[2]. The GNA report indicates that a truck or bus equipped with a natural gas engine that has been certified to the 0.02 g/bhp-hr Optional Low NOx Standard has tailpipe NOx emissions that are comparable to – or possibly lower than – the amount of NOx emitted to produce electricity used to charge a comparable heavy-duty All-Electric Truck.

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

Heavy-duty drayage trucks:

Diesel trucks tested in study exceed certification level

<u>Critical Insight</u>:
Study Finds that Natural Gas Engines Outperform Diesel Engines in Real World Situations

Natural gas (NG) engines today meet an optional Low NOx standard that is ten times cleaner than the standard required for new diesel and natural gas engines. However, the in-use emission benefits of NG engines could be even more significant.

A recent report published in *Environmental Science and Technology*[3], evaluated in-use emissions of earlier model year NG vehicles and found that NG engines performed much better in real world conditions (i.e., operating within city limits in low-speed, high-idling situations), registering NOx levels that were 96% lower than levels produced by tested diesel engines equipped with the latest emissions controls. The study found that diesel NOx emissions operating in similar conditions produced emissions that were 5 -7 times higher than in-use certification limits in some cases.

Related Recommendations for EMT Funding

- ✓ **Provide a higher level of funding for technologies that are proven to exceed federal emission levels for nitrogen oxides**
  - Vehicles with engines certified to California's Optional Low-NOx Standard should receive the highest level of funding (e.g., 25% in the case of private sector vehicle replacements)
  - Use the state's approved DERA plan to fund low-NOx natural gas trucks (i.e., 35% of the replacement cost for private vehicles equipped with low-NOx engines)

- ✓ **Provide the highest level of funding to applications that will reduce the largest share of NOx emissions**
  - Evaluate the main mobile source(s) of NOx emissions in urban and non-attainment areas (Note: In most regions, this means prioritizing funding for short-haul, regional-haul, and refuse trucks)
  - Do not segment the funding – fund the projects that best achieve the most NOx reductions

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

2. Responsible: NGVs Extend the Funding and Foster Economic Development

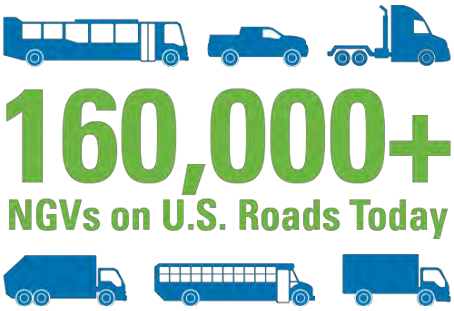
- **Key Point:** NGVs are far more cost-effective in delivering emission reductions than other alternative fuel options, such as hybrid and electric vehicles.

Due to lower fuel and maintenance costs, NGVs offer an 18 to 24 month payback. As production increases and fuel tank prices come down, vehicles will become less expensive and enjoy a shorter payback period

NGVs Offer a Fast Return on Investment

While NGVs typically cost more than gasoline or diesel vehicles upfront (largely due to the cost of high-pressure and insulated fuel tanks which are necessary to store CNG or LNG), owners and operators of high mileage vehicles typically see a pay back in as little as 18–24 months. This is due to:

- **Lower Fuel Costs**: Natural gas fuel prices have historically had a significant discount relative to gasoline and diesel and offer more stability compared to the costs of petroleum based fuels. Lower oil prices have recently reduced the differential in price, but according to the Energy Information Agency, the long-term outlook is for natural gas prices to remain stable and low, while volatility and higher prices return for gasoline and diesel fuels. For many users, the savings in fuel costs can translate into significant savings over the life of a vehicle, depending on fuel efficiency and the number of miles driven. The greatest savings are currently being seen in heavy-duty, high mileage fleets.
- **Lower Maintenance Costs**: NGVs are easier and cheaper to maintain than diesel trucks because they have:
    - No diesel particulate filter (DPF)
    - No DPF regeneration or waste disposal
    - No selective catalytic reduction (SCR)
    - No diesel emission fluid (DEF)



High-profile fleets across the U.S. are using natural gas vehicles in their everyday operations, transporting passengers, and hauling waste, packages, beverages, and other goods

NGVs Have Been Road-Tested by Leading Fleets

There are more than 160,000 NGVs on U.S. roads today, spanning all weight classes and vehicle applications. The adoption of NGVs has been pioneered by several high-profile fleet operators, including UPS, Anheuser-Busch, Kroger, FedEx, Frito Lay, Waste Management, LA Metro, all of which performed exhaustive analysis to determine the best vehicle and fueling options for their fleet based on application, range, duty cycle, and payload.

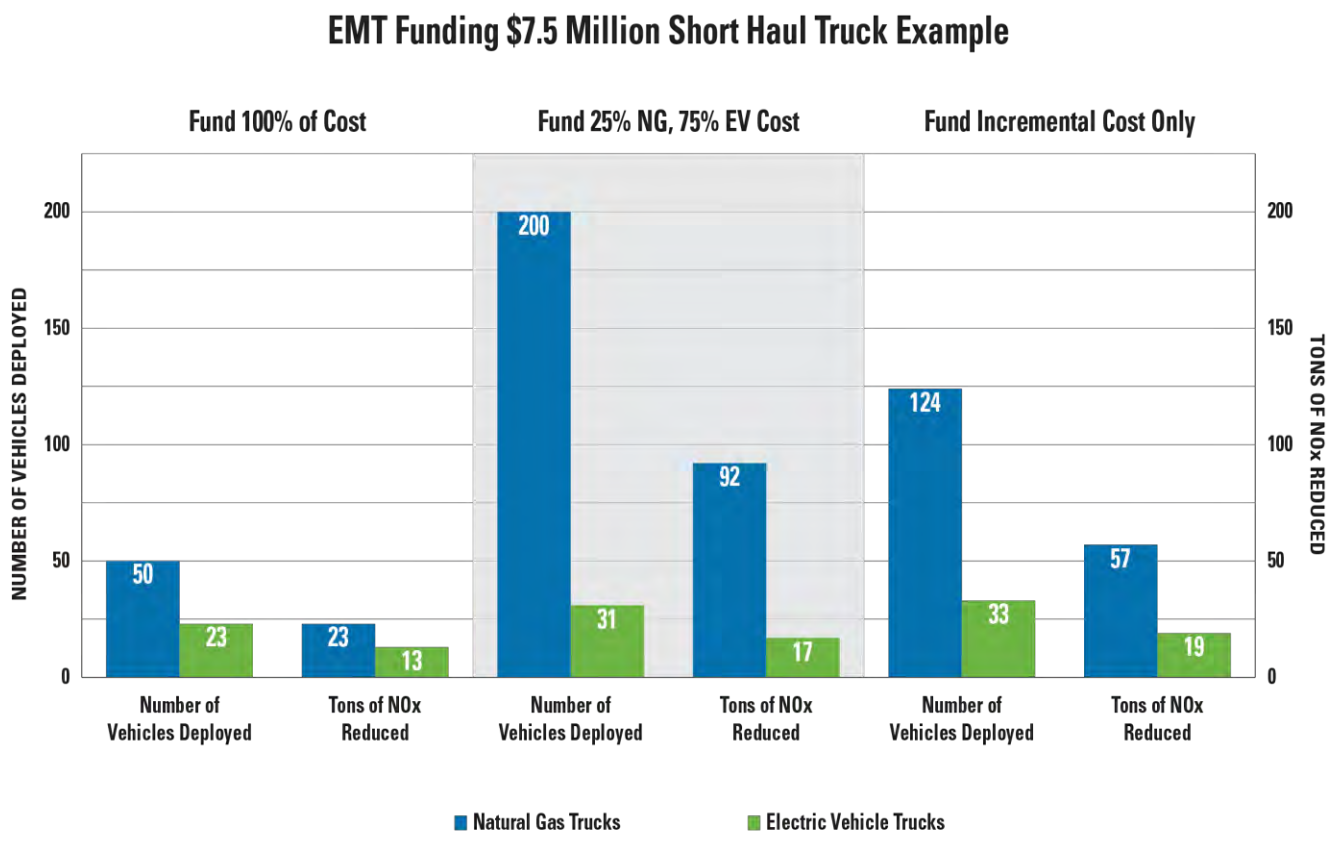
Given the significant fuel and emission reductions realized by early adopters, the popularity of NGVs has continued to build in the U.S., with 20% of all U.S. transit buses now running on CNG or LNG, 35 airports operating NGVs in their private fleets or championing policies that encourage use by private fleets, and more than 50% of new refuse trucks running on natural gas.

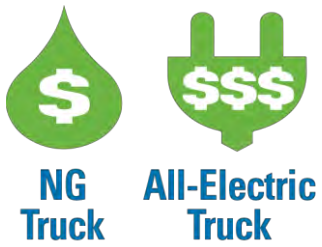
To fuel these vehicles, natural gas infrastructure is rapidly expanding with more than 1,640 CNG and 123 LNG fueling stations operating today.

Dollar-for-Dollar Natural Gas Delivers Greater Numbers of Total Vehicles and Greater Total Tons of NOx Emission Reductions

This is illustrated by the chart below which looks at several different funding options for natural gas and electric vehicles including providing 100% of the cost of new, replacement vehicles for public fleets, using the maximum funding levels specified in the settlement for natural gas and electric vehicles purchased by private fleets, or funding only the incremental cost of new, replacement vehicles. In each case, the deployment of natural gas vehicles (e.g., regional haul trucking, refuse trucks, and transit buses) will provide the most NOx emissions reduction to comply with the EPA's latest national ozone standards.

Chart: Heavy-Duty Truck Deployment & NOx Reduction Comparisons Under Different Funding Scenarios





<u>Critical Insight:</u>

Comparable All-Electric Vehicles Cost 2-3x More Than an NGV

While actual cost depends on the application, an all-electric medium- or heavy-duty vehicle usually costs two to three times the amount of a comparable vehicle powered by a 0.02 g NOx natural gas engine. As noted above, funding heavy-duty NGVs delivers greater emission reductions than similar projects involving all-electric trucks, and they offer the best ability to reduce emissions on a large scale because the funding will extend further.

Related Recommendations for EMT Funding

✓ **Ensure that funding incentivizes adoption by both public and private fleets**

- While it might be tempting to fund public vehicles at the 100% level, this will limit the total number of deployed vehicles and therefore lessen the overall emission reductions
- Funding levels should be large enough to offset the incremental cost (as compared to cost of a new diesel vehicle) of new, cleaner vehicles, as well as to address the fact that replaced vehicles must be scrapped
- For private fleets, use available state funding sources to supplement the Volkswagen funds to ensure that new, cleaner trucks are truly incentivized by covering the full incremental cost (compared to baseline diesel vehicles) and to address economic loss associate with scrappage

✓ **Prioritize funding for clean vehicles rather than fueling infrastructure**

- Funding should be used to incentivize fleets and vehicle acquisitions where existing fueling infrastructure exists to better support investments that have already been made
- If fueling infrastructure needs to be developed, funding should be secured as part of private-public partnerships. Using the funding in this way will encourage additional economic development in the state and increase the availability of stations for future deployments

3. Available: NGVs Meet the Diverse Operating Requirements of Every Fleet Application

❖ **Key Point:** Dozens of models of medium- and heavy-duty low-emission natural gas vehicles and engines are commercially available from reputable, world-known OEMs with established sales and service networks.

Wide Array of NGV Options Commercially Available

There are many natural gas vehicle options available from several original equipment manufacturers (OEM). These vehicles can be purchased from the dealership through a process that has been streamlined for the customer.

Many other medium- and heavy-duty vehicle options are available through small vehicle modifiers (SVM). These companies manufacture conversion systems that have been certified and approved by the U.S. Environmental Protection Agency and/or the California Air Resources Board. These approved systems can be installed on new and used vehicles to run on natural gas.

Additionally, Cummins Westport currently offers the 6.7L ISB-G, 8.9L ISL-G and the 11.9L ISX-G natural gas engines. These spark-ignited engines are used in a variety of applications, including refuse trucks, transit buses, cement trucks, short- and regional-haul tractors, delivery trucks, school buses, and shuttles. Roush offers a school bus engine that is certified to the Low-NOx standard of 0.10. Retrofit and repower options are also available from a variety of manufacturers.

For a full list of EPA and CARB certified engines, visit www.ngvamerica.org/vehicles/vehicle-availability. A list of available NGV manufacturers and conversion companies follows.

HD Vocational OEMs
- Autocar Truck
- Capacity
- Crane Carrier
- Elgin
- Johnston
- Kalmar
- McNeilus
- Mack
- Peterbilt
- Power Solutions Int'l.
- Schwarze
- Tymco

HD Truck OEMs
- Cummins Westport
- Freightliner
- Kenworth
- Mack
- Peterbilt
- Volvo

HD Bus OEMs
- Blue Bird Bus
- DesignLine
- El Dorado
- Gillig
- New Flyer/NABI Bus
- NOVA Bus
- Motor Coach Industries
- Thomas Built Bus

HD Retrofit/ Repowers
- American Power Group
- Clean Air Power
- Diesel 2 Gas
- Fyda Energy Solutions
- NGV Motori
- Omnitek Engineering

MD Retrofits
- AGA Systems
- Altech-Eco
- Crazy Diamond Performance
- Greenkraft
- Landi Renzo USA/Baytech
- M-Tech Solutions
- NAT G
- NGV Motori USA
- PowerFuel Conversions
- Roush CleanTech
- STAG
- Westport Fuel Systems
- Zavoli

Fuel Systems
- Agility Fuel Systems
- Mainstay
- Momentum Fuel Technologies

Critical Insight: Heavy-Duty Electric and Fuel Cell Vehicles are Not Commercially Available

As of today, three unique fuel-technology combinations hold the most promise to successfully transform America's HDV transportation sector to zero and near-zero emissions:

1. Near-zero-emission internal combustion engines fueled by conventional or renewable natural gas
2. Zero-emission battery-electric-drive systems
3. Zero-emission hydrogen fuel cell systems

While battery-electric and hydrogen fuel cell systems can offer extremely low emissions profiles, the lack of commercially available heavy-duty and limited medium-duty products and charging/fuel distribution networks makes implementation in the near future impractical. Furthermore, these vehicles are being developed by niche, start-up companies and have only been used in early test programs; comparatively, medium- and heavy-duty NGVs from major OEMs have been widely, commercially available in dozens of applications for over two decades. Near-zero-emission internal combustion engines fueled by conventional or renewable natural gas are the only option to immediately and cost-effectively provide extremely low NOx and GHG emissions in high-impact HDV sectors.

Related Recommendations for EMT Funding

✓ **Prioritize funding for commerically available products**
- Given that the NOx emissions from Volkwagen vehicles are already in the air, funding should be concentrated to projects that allow us to deploy the cleanest vehicles available today (i.e., not pre-commercial or research and development projects)

✓ **Scale funding to incentivize the cleanest engines available**
- Provide greater funding for medium- and heavy-duty engines that deliver NOx reductions over and above what is currently required for new diesel vehicles
- Given that the EMT was created because of NOx pollution associated with non-compliant diesel vehicles, we believe that the funding should be set aside for clean, alternative fuel vehicle projects and should not be used to fund more diesel fueled vehicles

Let's Transform Clean Transportation Together

NGVAmerica and its members are eager to serve as a resource to assist the State of Missouri in its evaluation and development of the state's Beneficiary Mitigation Plan. We strongly encourage the state to recognize the superior and unmatched role that natural gas vehicles can play in delivering nitrogen oxide (NOx) emissions reductions required by the settlement and Trust.

NGVAmerica welcomes the opportunity to meet with you to provide further information and analysis on the economic and environmental benefits of natural gas vehicles in Missouri. Please contact Jeff Clarke, NGVAmerica General Counsel & Director Regulatory Affairs at 202.824.7364 or jclarke@NGVAmerica.org, or Sherrie Merrow, NGVAmerica State Government Advocacy Committee Chair at 303.883.5121 or smerrow@NGVAmerica.org to set up a meeting and for additional information.

Sincerely,

Matthew Godlewski
President

Summary of NGVAmerica's Recommendations for EMT Funding

- ✓ Provide a larger incentive and greater overall funding for medium- and heavy-duty engines that deliver greater NOx reductions than currently required for new vehicles and engines
- ✓ Target funding for technologies that have demonstrated the ability to deliver actual lower in-use emissions when operated in real-world conditions
- ✓ Provide the highest level of funding to applications that produce the largest share of NOx emissions (in most regions this means prioritizing for short-haul, regional-haul and refuse trucks)
- ✓ Prioritize funding for commercially available products that are ready to begin
- ✓ Prioritize funding for clean vehicles rather than fueling infrastructure
- ✓ Scale funding to incentivize the cleanest engines available
- ✓ Ensure that funding incentivizes adoption by both public and private fleets
- ✓ Accelerate the funding in the early years to maximize the NOx reduction benefits
- ✓ Given that the EMT was created because of NOx pollution associated with non-compliant diesel vehicles, we believe that the funding should be set aside for clean, alternative fuel vehicle projects that focus on maximizing NOx reduction for the funds spent

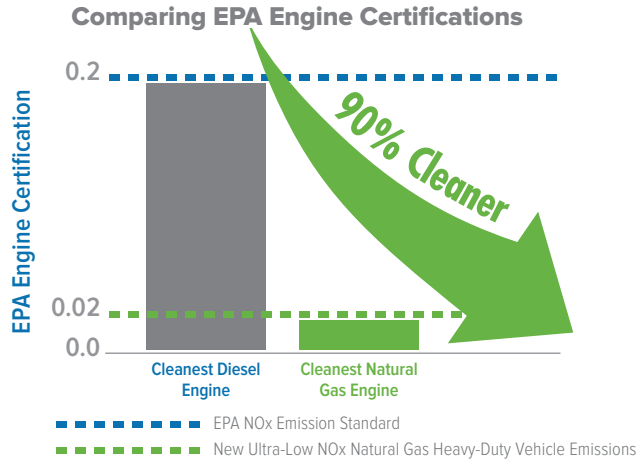
Make a Bold Impact on Air Quality Today

More than 50% of Americans are exposed to unhealthful levels of ozone and particulate pollution, putting them at greater risk for asthma, lung cancer, cardiovascular disease, and premature death. Volkswagen's $2.9 billion Environmental Mitigation Trust fund provides each state an incredible opportunity to make an immediate and tangible impact on air quality by targeting medium- and heavy-duty vehicles—the leading source of these toxic air contaminants in almost every metropolitan area.

Natural gas vehicles (NGVs) can transform the medium- and heavy-duty transportation sector.

Sustainable:

NGVs Offer the Cleanest Heavy-Duty Truck Engines in the World



Natural gas medium- and heavy-duty engines provide unmatched reductions of smog-forming emissions of nitrogen oxides (NOx). In 2015, a revolutionary natural gas engine was certified by the U.S. Environmental Protection Agency and California Air Resources Board to a level 90% below the EPA's current exhaust standard and 90% below the cleanest diesel engine. A truck with this engine has an emission profile equivalent to that of a heavy-duty battery electric truck.

Available:

NGVs are Commercially Available Today Across All Applications Qualified for Funding

NGVs are commercially available from traditional truck OEMs with established sales and service networks. Retrofit and repower options are also available from a variety of manufacturers.

Applications Include:

- Cement Mixer
- City Delivery Truck
- Conventional Van
- Dump Truck
- Fuel Truck
- Heavy Semi Tractor
- Large Walk In Van
- Motor Coach
- Rack Truck
- Refrigerated Van
- Refuse Truck
- Single Axle Van
- School Bus
- Shuttle Bus
- Transit Bus
- Tow Truck
- Utility Truck

Responsible:

Dollar-for-Dollar, NGVs Deliver the Most Cost-Effective NOx Emissions Reductions

The calculations shown below assume the deployment of the cleanest commercially available model for each application. Funding natural gas vehicles will lead to the largest total reduction in NOx emissions.

Short/Regional Haul Trucks

	Natural Gas	Diesel	Electric
$ per lb of NOx	$39	$54	$85
Technology Cost	$150,000	$100,000	$324,000
NOx Reduced	3,810 lbs	1,858 lbs	3,810 lbs

Refuse Trucks

	Natural Gas	Diesel	Electric
$ per lb of NOx	$140	$190	$313
Technology Cost	$300,000	$270,000	$670,000
NOx Reduced	2,141 lbs	1,417 lbs	2,141 lbs

School Buses

	Natural Gas	Diesel	Electric
$ per lb of NOx	$220	$291	Not Commercially Available
Technology Cost	$148,000	$115,000	
NOx Reduced	671 lbs	396 lbs	

Transit Buses

	Natural Gas	Diesel	Electric
$ per lb of NOx	$273	$540	$569
Technology Cost	$360,000	$300,000	$750,000
NOx Reduced	1,318 lbs	555 lbs	1,318 lbs

NGVAMERICA
Natural Gas Vehicles for America

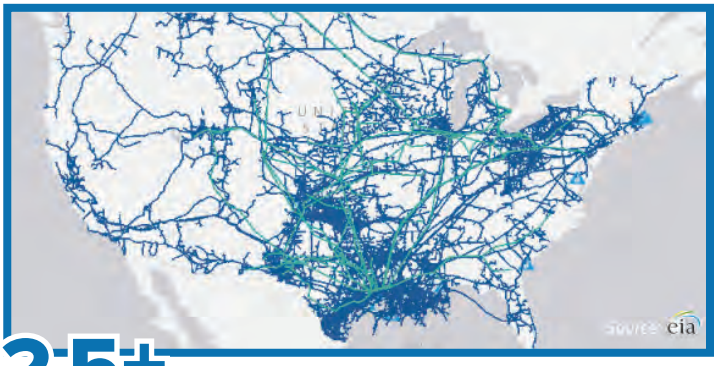
For more information visit: **www.ngvamerica.org/vwsettlement**

#1 Natural Gas Producer in the World

90+ years supply of recoverable natural gas

Continual supply by harnessing **renewable sources**

Source: U.S. Energy Information Administration



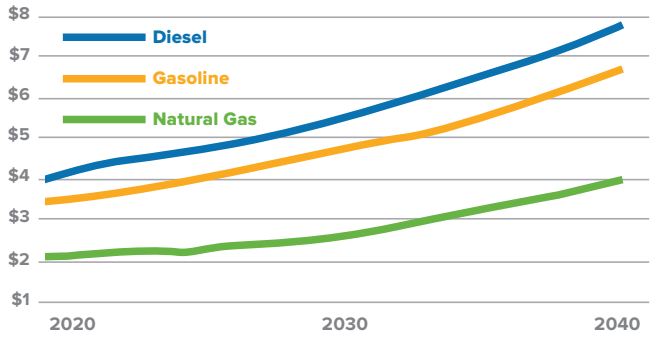
2.5+ million miles of U.S. pipeline infrastructure

The U.S.' expansive natural gas pipeline system is well poised to support a national network of natural gas fueling stations. Nearly 2,000 CNG and LNG fueling stations are operating today, with continual expansion underway.

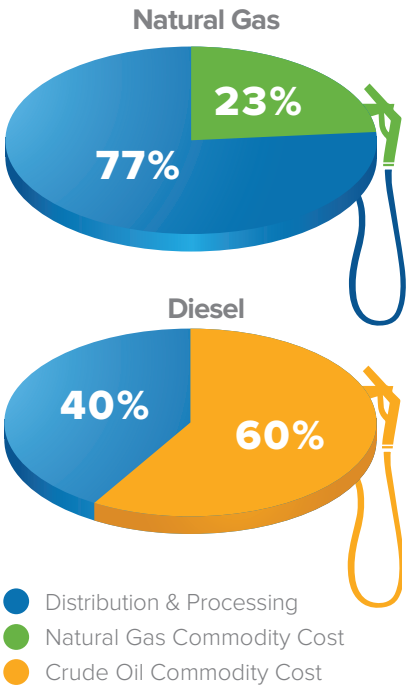
Natural gas is a clean, low-cost, and domestically abundant transportation fuel.

Natural Gas Provides Long-Term Fuel Price Stability and Cost Savings

Projected Fuel-Price Differentials (prices per $DGE)



Source: U.S. Energy Information Administration



Currently, natural gas prices are $0.75 to $1 or more lower than diesel at the pump, with a firm price advantage expected to remain for decades as shown in the chart above.

Beyond the fuel-price differential, the pump price of natural gas remains relatively stable for two reasons. First, it is domestically sourced. Second, the commodity cost of natural gas only makes up 23% of the pump price so price fluctuations have minimal impact.

In contrast, approximately 60% of the price of diesel fuel is impacted by the market cost of crude oil, which is largely sourced from politically unstable, high-conflict regions. When crude oil prices increase, diesel prices follow suit which can lead to significant swings in a fleet's fuel costs.

Natural Gas Reduces WTW Greenhouse Gas Emissions

Compared to Diesel:

GHG

- LNG **11% reduction**
- CNG **17% reduction**
- RNG **115% reduction**

Source: NGVAmerica Fleets Run Cleaner on Natural Gas White Paper 2016

Volkswagen EMT Funding Recommendations

- Fund alternative fuel vehicle projects that cost effectively maximize NOx reductions for both public and private fleets
- Provide higher funding levels for medium- and heavy-duty engines that deliver NOx reductions greater than current EPA standards
- Target funding for technologies that have demonstrated lower in-use emissions
- Prioritize funding for commercially available products and projects that are ready to begin

Natural gas vehicles can fulfill all of these recommendations today!

NGVAMERICA
Natural Gas Vehicles for America

For more information visit: **www.ngvamerica.org/vwsettlement**

From: Perkins, Stan
Sent: Thursday, December 07, 2017 4:27 PM
To: Leath, Mark; Moore, Kyra; Bybee, Darcy
Cc: Dixon, Cindy
Subject: VW Mitigation Settlement for Electric Vehicle (EV) Charging Infrastructure

VW Team,

The purpose of this email is to inform you of Missouri State Fleet Management's position that a significant portion of Missouri's available VW Mitigation Settlement funds should be targeted to developing EV charging infrastructure at State facilities. These stations would preferably be available to state employees, citizens doing business with the state, and the general public.

EVs have become increasingly available; are demonstrating ranges suitable for more than just in-town use; are being more competitively priced; and public acceptance is increasing. Considering these factors we anticipate opportunities in the near future to include EVs in state vehicle fleets – provided there is adequate infrastructure to make them viable. Additionally, individuals that own, or acquire, EVs and work or do business with the state will reap the benefits of station availability.

One major advantage of funding EV infrastructure is that it is not a one-to-one emissions reducing scenario. Instead, a one-time investment in infrastructure facilitates one to many emissions reductions as the number of EVs on the road can, and is likely to, increase as a result of charging station availability.

Thank you.

Stan Perkins

Acting State Fleet Manager
(573)751-2235

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AIR POLLUTION CONTROL PGM

Kyra L. Moore
Program Director, DNR Air Pollution Control Program
PO Box 176, Jefferson City MO 65102-0176

January 8, 2018

Dear Director Moore:

I'm writing today to update our comments regarding disposition of the VW Settlement monies.

Previously, we had requested that at least half of the available funding be committed to replace pre-2007 diesel school buses in Missouri with cleaner models. After careful consideration of the benefits and options available to the agency under the Settlement guidelines, we now believe that it would be appropriate to allocate 100% of these funds for school bus replacement.

The reasons are numerous and compelling:

- Emissions from diesel school buses that are 10 years or older contribute significantly to NOx. If Missouri replaced the 5500 pre-2007 and older diesel school buses in service today with propane models, for instance, it would remove 1.9 million pounds of NOx emissions annually.
- The agency's initial survey found that most stakeholders were interested in school bus replacement.
- Missouri's contributions to student transportation were reduced by $39 million last year, a sum that could be offset by application of the $40 million VW proceeds.
- Another DNR survey finding showed equal interest in making funds available to both public and private fleets. Each of these interests—school districts and transportation providers—would be able to access funds under this program.
- School buses represent the fairest, most widely available type of NOx-reducing application. This would not favor any region or entity. Many of the comments DNR received have been from school districts asking for assistance with their transportation costs. This is an actual, not speculative, market.
- Schools already apply to replace diesel buses using DERA grants which require a 75% match. Under a Missouri VW Clean Bus program, the minimum match would be 25%, making buses much more affordable. There are presently more DERA applications than funding which confirms a compelling need.
- Weighting applications based on the match percentage—giving greater weight to a higher match—would stretch the funding significantly. Missouri's $40 million effectively becomes $50 million at 25% and $60 million at 50%.
- Weighting applications based on dollars-per-pound NOx reduction would also extend the available funding.
- The types of buses available would include propane, electric, natural gas or low-emission diesel. No fuel provider is favored, and all have incentives to be as competitive as possible to leverage this opportunity. There are potential customers for every fuel source today, depending on local needs, and vehicles are available today in every category.

- It would be possible to deploy these funds quickly—perhaps in as little as three year—given the drive-ready nature of alternative fuel school bus technology. There would be no delays for development, siting or other unknowns that make other uses problematic. The faster these funds are deployed, the more NOx reduction is achieved.
- Setting aside VW funding specifically for electric vehicles, in a state which derives 75% of its electricity from coal-fired generation, will not reduce NOx and should not be considered responsive to the requirements of the Settlement. While electric vehicles are becoming more prevalent, they do not reduce NOx and only shift the emissions from the tailpipe to the generation site. There is already a dedicated EV fund under the Settlement which can address electric vehicles and charging infrastructure.
- Several states have already announced that they intend to focus VW Settlement funds specifically for school bus replacement. Oregon's Initial Mitigation Plan will replace at least 450 diesel-powered buses. Louisiana will first give preference to publicly owned school buses (or old state heavy equipment) and deploy any remaining funding to other segments.
- DNR staff already handle school bus grants under the DERA program. The administrative responsibilities of adopting a Clean Bus program using VW monies would take advantage of current processes and expertise.

We're grateful for the opportunity to participate in the Settlement process and look forward to contributing to a state plan that addresses the requirements of measurable NOx reduction through a fair, inclusive statewide application process.

Sincerely,

Steve Ahrens
President, Missouri Propane Education and Research Council

FLOURISH

Missouri Department of Natural Resources
Volkswagen Environmental Mitigation Trust Fund Public Meeting
Re: Missouri Beneficiary Mitigation Plan

Testimony for Public Meeting in St. Louis – Tuesday November 21, 2017

Good afternoon, I am Kendra Copanas with the Transportation Action Team of FLOURISH St. Louis. Thank you to the Missouri Department of Natural Resources for the opportunity to testify.

A thriving community begins with healthy moms and babies. However, hundreds of St. Louis babies don't live to see their first birthday. In St. Louis, black infants are almost three times more likely than white infants to die in their first year, and the overall infant mortality rate is nearly twice the national average. Peer reviewed studies have identified particulate matter air pollution as a risk factor for respiratory-related postneonatal mortality and have associated ozone with Sudden Infant Death Syndrome.[1,2] In fact, research amplified this week by the National Institutes of Health found that - even before birth - exposure to common air pollutants, such as ozone and fine particles, have been linked to increased risk of miscarriage and infant loss.[3]

FLOURISH St. Louis is a community-driven, cross-sector initiative focused on reducing St. Louis' devastatingly high infant mortality rates. We bring together families and community leaders from education, faith, business and health care to create long-lasting and substantial change by addressing the *conditions and systems* that prevent families from having healthy pregnancies and babies.

Walkable, bikeable, transit-oriented communities improve population health by promoting more physical activity, lower body weight, lower rates of traffic injuries, less air pollution and improved mobility for non-drivers.[4] As such, FLOURISH encourages the Missouri Department of Natural Resources to prioritize public transit buses as part of the Beneficiary Mitigation Plan and investment of funds yielded from the Environmental Mitigation Trust Fund. Public transportation is a *race equity issue in St. Louis*, where over 80% of the city's public transit commuters are black.[5] Decades of discriminatory migration and jurisdictional fragmentation have made St. Louis a rigidly segregated region, leaving many racial minorities isolated in areas of concentrated poverty and crime that lack health promoting resources (e.g., fresh foods, safe green spaces). Almost one in four (24%) black households in St. Louis have no vehicle access (compared to 5% of white households).[6] The Ferguson Commission also identified transportation as one of five *urgent* areas that impact the Opportunity to Thrive in St. Louis.[7]

We need to improve the efficiency and reliability of public transportation for pregnant women, new moms and families in St. Louis. Public transit provides critical access to health care, as well as non-medical essentials that impact the health and well-being of families such as grocery stores, prescriptions, education, childcare and work. Given the disturbing correlation between air pollutants and infant mortality, we believe it is crucial that Missouri's Beneficiary Mitigation Plan prioritize public transit investments that will improve air quality and personal mobility to promote the health and vitality of vulnerable mothers and infants living in our urban centers.

Thank you.

Background

In September 2017, FLOURISH St. Louis was selected by a coalition of 12 foundations to participate in the BUILD Health Challenge, a national program that provides small seed funding, technical assistance and peer network support for multi-sector partnerships that work to address upstream social determinants to improve community health. BUILD selected FLOURISH St. Louis because of its Bold, Upstream, Integrated, Local, and Data-driven (BUILD) strategy to improve maternal and infant health outcomes by targeting transportation access for pregnant women and new parents in two contiguous zip codes of 63106 and 63107 in the City of St. Louis. Through this effort, additional partners have been folded into the Transportation Action Team to promote a common agenda for improved transportation access and cross-sector data sharing.

Through BUILD, FLOURISH St. Louis has engaged a team of academic and industry researchers to integrate new and existing qualitative and quantitative data, (e.g., CHNAs) to examine how transportation influences health and the impact of transportation changes on social and health indicators. FLOURISH and its partners are working to build durable systems for linking data across sectors and assess relationships such as the mediating pathways between transportation services, missed appointments and birth outcomes. This data will help advise the development of a transportation policy agenda, co-created with partners, grassroots organizations and residents living in the focus neighborhoods. We would be happy to share our findings as they become available, as well as consider requests for specific research and data that could advise the work of the Missouri Department of Natural Resources.

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Transportation Action Team Co-Chairs: Bethany Johnson-Javois, CEO, St. Louis Integrated Health Network
Lou Gianquinto, President, Missouri Care

Transportation Action Team / BUILD Health Challenge Partners:

Alive and Well STL
Barnes Jewish Hospital
Bi-State Research Institute, Metro
Community Leaders
Home State Health
Integrated Health Network
Legal Services of Eastern Missouri
Mercy Hospital - Neighborhood Ministries
Missouri Care
Project LAUNCH / Vision for Children at Risk
Regional Health Commission
Saint Louis University REACH Center
SSM Health
St. Louis City Department of Health
St. Louis County Department of Public Health
St. Louis Children's Hospital / Raising St. Louis
St. Louis Fire Department Paramedics
United Healthcare Community and State Plan
Urban Strategies
Washington University in St. Louis
Women's Voices Raised for Social Justice

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