VW Settlement Comments Received

This document is a compilation of all comments received by DEEP regarding the VW Settlement that were received through deep.mobilesources@ct.gov and www.ct.gov/deep/vw.

Usage: Use the bookmark bar on the left side of the window to navigate to each comment or click the bookmark link below.

Comments Received

Comments Received, cont.

2017-02-27 - Proton OnSite
2017-02-27 - Airlines for America
2017-02-27 - American Idle Reduction
2017-02-27 - NGVAmerica
2017-02-27 - Stephen Johnston
2017-02-28 - Global Automakers
2017-02-28 - Juice Bar
2017-03-01 - XL Hybrids
2017-03-01 - Eversource
2017-03-02 - Simon Levesque
2017-03-02 - Jonathan Malazzi
2017-03-02 - John Ell
2017-03-02 - John McNamara
2017-03-03 - Alternative Fuels Coalition of Connecticut
2017-03-03 - Caterpillar
2017-03-06 - Shorepower Technologies
2017-03-06 - Yborra & Associates
2017-03-06 - ICOM North America
2017-03-06 - Proterra
2017-03-06 - Acadia Center
2017-03-06 - Bozzuto's
2017-03-06 - Sardilli Produce & Dairy
2017-03-06 - Joe Wettemann, DEEP
2017-03-06 - Connecticut Green Bank
2017-03-06 - Clean Future Inc.
2017-03-06 - Fuel Cell Energy
2017-03-06 - Fuel Cell and Hydrogen Energy Association

Comments Received After Public Comment Period:
2017-03-17 - Jon Raymond
2017-03-23 - WestCOG
2017-04-03 - Alaina Bisson
2017-04-03 - Yi Liu
2017-04-12 - Viosimo LLC
2017-04-16 - KEW Consultants
2017-04-19 - Hug Engineering (updated on 5/15/2017)
2017-04-28 - Greater New Haven Clean Cities Coalition
2017-05-12 - KEW Consultants
2017-05-22 - T. Michael Morrissey
2017-05-24 - CNG Cylinders International
2017-05-31 - Orange EV
2017-06-19 - WestCOG
2017-06-20 - Lighting Systems
2017-06-27 - Redding Highway Department
2017-06-30 - EB Start Consulting
2017-07-06 - Auto Alliance
2017-07-13 - WestCOG
2017-07-14 - Blue Gas Marine
2017-08-03 - Peter Damrosch
2017-08-11 - EV Connect Inc.
2017-08-14 - OrangeEV

Comments Received, cont.

2017-08-18 - Michael Kryzanski
2017-08-21 - Sylvain Beloin
2017-09-22 - Penske
2017-10-16 - Clean Energy
2017-10-23 - EnSave Inc.
2017-11-01 - Connecticut EV Coalition
2017-11-06 - Orange EV
2017-12-15 - Enervee
2018-01-11 - Medicaire
2018-01-22 - The Lion Electric Co

VW Settlement Comments

Grannis <lgrannis@snet.net>

Sat 12/3/2016 5:23 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: 'Lee Grannis' <lgrannis@snet.net>;

Name: Lee Grannis
Job Title: Coordinator
Company: Greater New Haven Clean Cities Coalition, Inc.

Comments: My coalition's comments are focused on the Department of Justice Consent Decree, Appendix D2 (Eligible Mitigation and Actions and Mitigation Action Expenditures). We are listing our suggested priority for the listed actions. Since a significant amounts of funding has already been designated for the light duty electric vehicle sector as part of the agreement we believe the medium to heavy duty transportation sector should be focused on by the state for this funding. Below is the priority from Appendix D-2, we believe would achieve a greater level of NOx (Oxides of Nitrogen) and GHG (Green House Gas) reduction to include, achieving a better return on investment (ROI) and environmental justice benefits. The GNHCCC request that private fleets, companies and organizations get the priority for the funding over state and municipal organizations because they drive more miles over greater areas and emit more NOx, criteria emissions and GHGs then municipal and government vehicles. There is one exception to this and that is Section 2 vehicles, which includes school buses, shuttle buses, and transit buses. School buses are our number one priority, being both privately and school owned and operated. Shuttle buses should be awarded funding based on miles driven making them excellent systems for propane, natural gas power and hybrid trains. Transit buses are mostly municipal operations and are excellent platforms that can use alternative fuels to reduce significant amounts of NOx.

Priority 1. Section 2-Class 4-8 School Bus, Shuttle Bus and Transit Bus (Eligible Buses).

Several school districts are already considering propane/autogas school buses as well as currently deploying them. The new school bus propane/Autogas engine technology makes them a good fit both in terms of emission reduction, cost and operational efficiency. In addition many children have a variety of childhood health issues that propane/Autogas powered buses mitigate by providing a clean breathing environment, and have no emission generated particulates. Because of the economics of propane/Autogas fuel, and the related ease of infrastructure deployment this has made these propane/Autogas powered buses the best use of the funding. More specifically the most popular school bus propane engines will be certified at 0.05 grams of NOx per brake horsepower-hour (g/bhp-hr), which is 75% cleaner than today's cleanest diesel school buses. Since school buses get 100 % funding under the settlement, this is an excellent use of the funding for local schools and Connecticut tax payers.

Propane/Autogas and CNG (Compressed Natural Gas) fueled alternative fuels used in shuttle buses is very advantageous in the terms of NOx, GHG and other criteria emission reduction, return a better return on investment (ROI), achieve noise reduction, better operational/maintenance efficiency and environmental justice benefits. The same health issue that effect children on school

buses applies to senior population that use the transit and paratransit buses, and is mitigated by the use of clean propane/Autogas and CNG.

This section allows for the use of transit buses to deploy new EV powered transit buses. Electric buses that exceed all other powered buses in terms of "Made in the USA" are available in fast charge and long range electric bus versions for deployment along traditional transit bus routes should be a priority use of the funds. These buses have all the emission reduction advantages that light duty vehicles have, plus helping to reduce the number of single occupancy gasoline powered vehicles on the road. This funding could be made available to municipal transit agencies and private companies to defer the higher capital cost of these vehicles as an example. Connecticut needs to start running electric transit buses on the road in order to address the heavy duty electric vehicle charging challenges, as well as giving the utilities and regulators a bench mark to determine their requirements related to providing heavy vehicle charging. CT DOT has been trying to find the funding to deploy electric transit buses with little luck, and this would be a great way to get the funding to deploy these buses.

Priority 2. 1. Local Freight Trucks and Port Drayage Trucks (Eligible Larger Trucks

Class 8 especially private companies have not been offered any funding assistance in years, except by Clean Cities grants. Congestion Mitigation and Air Quality (CMAQ) from the Federal Highway Administration (FHWA) funding has been withheld from private companies by the state since the 1990s, even though it is allowed by CMAQ federal rules. This section allows funding for a sector of vehicles like CNG heavy duty vehicles, which travel a lot more miles than a government/municipal vehicle. NOx and GHG would be reduced more per vehicle, especially in our state, which is not in attainment for ozone, and trying to maintain the PM2.5 attainment maintenance status which would be easier to achieve by using this fuel. There are three refuse companies deploying CNG heavy duty trucks in central Connecticut and attempting to expand their fleets. The infrastructure is available to support these type vehicles in several parts of the state, and this funding would stimulate the growth of more CNG refuse/trash vehicles by more companies and municipalities deploying the technology.

Priority 3. 6. Class 4-7 Local Trucks (medium)

This section is our third choice and lends itself to propane/Autogas powered vehicles. This could be in the form of dedicated or bi-fuel (gasoline & Propane) trucks. These trucks are usually in the form of box trucks making the last mile delivery to small and midsize stores. They may also be in the form of vehicle delivering work clothes, hospital or hotel linen, or even potato chips. These vehicles operate in around buildings that are in congested areas, to include schools and medical facilities. These are areas that NOx accumulation can stimulate an unhealthy ozone levels as well as adding to noise pollution. Propane can reduce a whole host of unhealthy criteria emissions as we as cutting NOx, GHG as well as reducing reduce noise levels. If and when creditable electric trucks in this category are available in any quantity, they would be an excellent choice when deployed, but because of their premium cost, which can be twice as much as a propane powered vehicle, the funding will be needed. CNG vehicles can be an excellent choice if fueling infrastructure is near to the fleet garage facility. Either CNG or propane/Autogas power vehicles provides an option that alleviates the maintenance issues, and down time associated with the maintenance intensive diesel regeneration requirement on today's diesel vehicles.

Priority 4. 8. Forklifts

Forklifts are listed in this section listing them as electric eligible. We think that the newly emerging

fuel-cell forklift technology is a viable choice. It is a non-road electric vehicle with a fuel-cell axillary power unit to charge it. Many of the large companies like Wal-Mart are starting to use fuel-cell powered forklifts due to their predictability of full run time. Batteries can run out of operating power without notice, and do require time consuming battery exchanges. The fuel-cell forklift industry has gained popularity over the last few years, because of how they operate and lower vehicle costs. From industry reports the big box company warehouses are increasingly turning to fuel-cell forklifts, and we see no reduction in their deployment. Hopefully they will have to be allowed under this category.

Priority 5. 7. Eligible Airport Ground Support Equipment

We support deploying most All-Electric powered equipment as long as it makes economic and operational sense. Replacement of older electric equipment that is not maintaining required operational efficient and has safety concerns might be considered.

Priority 6. 9. Light Duty Zero Emission Vehicle Supply Equipment

We support EVSEs especially Fast Charger on major vehicle corridors easily assessable to the public. In the case of hydrogen infrastructure, we believe that incentive support will be essential to support the high cost of the systems. This is an excellent opportunity to try multiple technologies that produce sustainable hydrogen if allowed.

Priority 7. 10. The GNHCCC is supportive of Freight Switcher, Ferries/Tugs and Ocean Going technologies listed in other sections, and reducing their NOx profile. The Clean Cities program does not include these technologies in their list of technologies, and we do not focus as much on them. We think these technologies and industry sectors are important, and should be considered for funding if applicable.

Lee

Lee Grannis

Coordinator

Greater **N**ew **H**aven

Clean **C**ities **C**oalition**, I**nc.

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VOLKSWAGEN SETTLEMENT

MOVE FORWARD WITH PROPANE AUTOGAS SCHOOL BUSES

The unique benefits of this clean, American fuel make it the perfect solution for schools to cut emissions while saving more for what counts.

THE GOAL

The Volkswagen Environmental Mitigation Trust Fund will financially support actions that reduce Nitrogen Oxide (NO_x) emissions in the United States. The amount of funds distributed will vary by state or territory, depending on the number of non-compliant Volkswagen vehicles that were registered there.

THE OPPORTUNITY

States can utilize these funds to encourage school districts to purchase new propane autogas school buses, which reduce the amount of harmful diesel emissions — known aggravators of asthma and other breathing issues — around students. Depending on a school's situation, it can significantly reduce NO_x emissions with propane autogas school buses.

THE SWITCH	REDUCED NO_x EMISSIONS
Replace all older than model year-2007 diesel buses with new propane autogas bus.	More than 92 percent[1]
Purchase a new propane autogas bus instead of a modern, lower-emissions diesel bus.	More than 11 percent[2]
Purchase a modern, best-in-class for NO_x emissions propane bus instead of a modern diesel bus.	81 percent[3]

1. Source: AFLEET model using Polk Registration data by state for diesel buses — 12/31/2015. By removing 255,627 of pre-2007 diesel fueled buses from the road across the country and replacing them with new propane autogas school buses, NO_x emissions would be reduced by 92 percent.
2. MY2016 certification data for PSI 8.8L propane model compared with Cummins 6.7L diesel model.
3. CARB low NO_x certification data for MY2017 Roush 6.8L propane model compared with MY2016 Cummins 6.7L diesel model.

Schools that use propane can reach their sustainability goals without additional, costly emissions technology.

"I think the environmental aspect of it is important to a lot of people, especially parents with young children."

Brian Woods
Superintendent, Northside Independent School District

THE PROPANE AUTOGAS SOLUTION

Modern diesel buses come with a hefty price tag for complicated emissions-reduction technology. Propane autogas buses reduce NO_x emissions while helping schools save for what matters most — classroom supplies, more teachers, extracurricular programs, and more.

LOWEST TOTAL COST-OF-OWNERSHIP

The costs of diesel add up quickly: expensive fuel, additional fluids, and pricey particulate filters. These are the most influential reasons why propane buses save schools more money, from purchase to retirement of the asset.

MORE UPTIME

With propane, schools can eliminate downtime linked directly to maintenance and unexpected repairs. Propane buses also provide superior cold-weather performance compared with diesel.

SAFE FOR EVERYONE

Propane buses operate noticeably quieter than diesel models, allowing drivers to better focus on their passengers and the road. Standard safety features designed into propane bus fuel systems provide added peace of mind for everyone.

AFFORDABLE INFRASTRUCTURE

School districts can choose private, on-site refueling infrastructure scaled for their needs, or take advantage of existing public or private refueling networks. Go to **propane.com** to learn more about standard private stations and advanced private stations, including typical costs.

AMERICAN FUEL

Using propane school buses supports our country's economy — nearly 90 percent of propane supplies are produced in the U.S.

SAVE ON THE 3 F'S

Propane buses lower total cost-of-ownership by saving money in these three key areas:

1. **FUEL**

The cost of wholesale propane falls between the price of oil and natural gas, the fuel's two sources. As a result, propane is historically less expensive than conventional fuels, even as fuel prices fluctuate.

2. **FLUIDS**

New, lower-emissions diesel technology comes with an added inconvenience: diesel emissions fluid to purchase, store, and change. This is on top of needing more oil by volume compared with propane. In cold temperatures, diesel vehicles also require anti-gelling agents to prevent clogging of fuel filters and lines. Propane provides reliable performance without additional fluids.

3. **FILTERS**

To meet emissions requirements, new diesel technology requires diesel particulate filters that must be cleaned periodically. Excessive idling will accelerate cleaning intervals. Either way, extra maintenance expenses are piled on top of additional lifecycle costs.

OTHER CONSIDERATIONS FOR PROPANE

MAINTENANCE FACILITY NEEDS

Switching from conventional fuel to propane is quick and cost-effective, because the requirements for a propane vehicle repair facility are generally the same as those for conventionally fueled vehicles. Other alternative fuels, however, may require different facility requirements than conventional fuels, like additional gas detection and ventilation equipment — costing fleets more to switch.

Contact your local Authority Having Jurisdiction for applicable codes regarding building or modifying a propane-powered vehicle repair or maintenance facility.

To learn more about the benefits of propane school buses, visit **propane.com**.

	NMHC	NO_x	CO	PM	HCHO
Standard	**0.14**	**0.2**	**14.4**	**0.01**	**0.01**
LPG - Blue Bird (Gen 3)	0.07	0.08	2.2	0	0
LPG - Blue Bird (Gen 4)	0.02	0.04	1.2	0	0
LPG - Thomas	0.1406	0.1599	5.392	0.0013	0.00154
LPG - IC	0.08	0.1	5.6	*	0.004
CNG - Blue Bird	0.02	0.04	7.1	0	0
CNG - IC	0.027	0.102	5.6	0	0.00106
CNG - ISL	0.1	0.1	7.8	0	*
Gasoline - Blue Bird	0.08	0.08	12.9	0.002	0
Diesel - ISB (2017)	0.03	0.14	0.02	0.002	*
Diesel - ISL	0.01	0.2	0.1	0	*

GNHTD RFP #10-016 Joint Procurement PARATRANSIT VEHICLES

Optional Propane Power

Dear Transit Operator: as a Consortium Member of this RFP, you have an option to specify your vehicle purchase to be powered by propane. In almost all cases, a transit operator deploying the use of propane will need to deploy the fuel dispensing infrastructure to fuel your new propane powered vehicles. Hocon Gas, Connecticut's leading supplier of propane vehicle fuel offers the following fuel dispenser equipment to support your fueling needs.

Propane 1990 Gallon Autogas Dispensing System for Lease or Purchase Features:

- One SES Provend 1000 Dispenser UL & CSA approved with a MID:COM display panel and electronics & a mass flow measuring chamber. Dispenser can connect to any Fuel Management System. Dispenser can be field upgraded to accommodate an optional ticket printer, dual hose, web based Fuel Management System and more.
- Hose Hanger with hose retractor and Gas Guard Nozzle
- New QUALITY built Autogas Tank with remote tank monitor specifically designed for autogas operations maximizing flow rates especially for liquid injection engine vehicle tanks with desired differential pressures especially during hot weather operations. Additional storage tanks can be easily manifolded for increased propane storage capacity.
- Pneumatic Emergency Shutdown Device utilizing Nitrogen gas.
- One 3 Horsepower 220 volt Single phase 21.25 amp, high velocity Ebsray RC-20 turbine pump and motor with a maximum flow of 15 Gallons/minute. (Requires 30 amp circuit). Dispenser/Tank comes on support stand and is pre-assembled & pre-wired with piping is configured to allow for future additional storage.
- Hocon will assist with town permitting and provide complete start up and operator training.

TRANSIT OPERATOR REQUIRED TO PROVIDE: House wiring to pump / motors junction box, concrete slab, fencing, vehicle protection, fire extinguisher, nitrogen tank, data subscriptions & data cable from building if applicable, remote Electrical Shutdown Device and exterior lighting.

HOCON LEASE OR PURCHASE OPTIONS & Autogas Price

Dispenser Lease Option	
Monthly Equipment Lease	$381.92
Permit Fee to be Advanced to Lessor	Yes
Hocon Exclusive Fuel Supplier	Yes
Lease Term in Months	60
Sales Tax if applicable	Yes
Dispenser Purchase Option	
Purchase Price	$40,542.50
Permit Fee to be Advanced to Lessor	Yes
Sales Tax if applicable	Yes
Federal Tax Credit of 30% Available *	Yes
Autogas Price Illustration 12-28-2016	
MT Belvieu Average Previous Day WSJ[1]	$0.663
Cost to Hocon Plant	$0.340
Selling Margin**	$0.450
Gross Earnings Tax	$0.128
Total Selling Price	$1.581
Federal Tax Credit per Gallon *	$0.370
Net Customer Price	$1.211

*Will expire 12/31/2016 subject to renewal
**Negotiable contingent on volume

For Additional Information contact:

David Gable 203-856-1703 or dgable@hocongas.com

HOD 726-30

www.hocongas.com

HOCON propane

Corporate Offices:
6 Armstrong Road – 3rd Floor
Shelton, CT 06484
Phone: (203) 925-0600
Fax: (203) 944-0300

33 Rockland Rd.
Norwalk, CT 06854
(203) 853-1500

20 Railroad Hill St.
Waterbury, CT 06708
(203) 754-7601

736 Boston Post Rd.
Guilford, CT 06437
(203) 458-2790

86 Payne Rd.
Danbury, CT 06810
(203) 744-4000

2407 Winsted Rd.
Torrington, CT 06790
(860) 626-0900

1242 South St. (RT 75)
Suffield, CT 06078
(860-254-5862

[1] http://www.wsj.com/mdc/public/page/2_3023-cashprices.html

Pursuant to the authority vested in the Air Resources Board by Health and Safety Code Division 26, Part 5, Chapter 2; and pursuant to the authority vested in the undersigned by Health and Safety Code Sections 39515 and 39516 and Executive Order G-14-012;

IT IS ORDERED AND RESOLVED: The engine and emission control systems produced by the manufacturer are certified as described below for use in on-road motor vehicles with a manufacturer's GVWR over 14,000 pounds. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	ENGINE SIZES (L)	FUEL TYPE [1]	STANDARDS & TEST PROCEDURE	INTENDED SERVICE CLASS [2]	ECS & SPECIAL FEATURES [3]	DIAGNOSTIC 5
2016	GRIIE06.8BWZ	6.8	LPG	Otto	HDO	TWC, SFI, 2WR-HO2S, HO2S	EMD+

PRIMARY ENGINE'S IDLE EMISSIONS CONTROL 4	ADDITIONAL IDLE EMISSIONS CONTROL [4]
N/A	N/A

ENGINE (L)	ENGINE MODELS / CODES (rated power, in hp)
6.8	E450 Incomplete / GGE418NR5, GGE418MR5, GGE41LNR5, GGE41LMR5, GGE418SR5, GGE418PR5, GGE41LSR5, GGE41LPR5 (305 for all codes)

* =not applicable; **GVWR**=gross vehicle weight rating; **13 CCR xyz**=Title 13, California Code of Regulations, Section xyz; **40 CFR 86.abc**=Title 40, Code of Federal Regulations, Section 86.abc; **L**=liter; **hp**=horsepower; **kw**=kilowatt; **hr**=hour;

[1] **CNG/LNG**=compressed/liquefied natural gas; **LPG**=liquefied petroleum gas; **E85**=85% ethanol fuel; **MF**=multi fuel a.k.a. **BF**=bi fuel; **DF**=dual fuel; **FF**=flexible fuel;

[2] **L/M/H HDD**=light/medium/heavy heavy-duty diesel; **UB**=urban bus; **HDO**=heavy duty Otto;

[3] **ECS**=emission control system; **TWC/OC**=three-way/oxidizing catalyst; **NAC**=NOx adsorption catalyst; **SCR-U / SCR-N**=selective catalytic reduction – urea / -- ammonia; **WU (prefix)** =warm-up catalyst; **DPF**=diesel particulate filter; **PTOX**=periodic trap oxidizer; **HO2S/O2S**=heated/oxygen sensor; **HAFS/AFS**=heated/air-fuel-ratio sensor (a.k.a., universal or linear oxygen sensor); **WR-HO2S**=wide range oxygen sensor; **TBI**=throttle body fuel injection; **SFI/MFI**=sequential/multi port fuel injection; **DGI**=direct gasoline injection; **GCARB**=gaseous carburetor; **IDI/DDI**=indirect/direct diesel injection; **TC/SC**=turbo/ super charger; **CAC**=charge air cooler; **EGR / EGR-C**=exhaust gas recirculation / cooled EGR; **PAIR/AIR**=pulsed/secondary air injection; **SPL**=smoke puff limiter; **ECM/PCM**=engine/powertrain control module; **EM**=engine modification; **2 (prefix)**=parallel; **(2) (suffix)**=in series;

[4] **ESS**=engine shutdown system (per 13 CCR 1956.8(a)(6)(A)(1); **30g**=30 g/hr NOx (per 13 CCR 1956.8(a)(6)(C); **APS** =internal combustion auxiliary power system; **ALT**=alternative method (per 13 CCR 1956.8(a)(6)(D); **Exempt**=exempted per 13 CCR 1956.8(a)(6)(B) or for CNG/LNG fuel systems; **N/A**=not applicable (e.g., Otto engines and vehicles);

[5] **EMD**=engine manufacturer diagnostic system ; **OBD(F) / (P) / ($)**=full / partial / partial with fine / on-board diagnostic; **(2012-08-20)**

Following are: 1) the FTP exhaust emission standards, or family emission limit(s) as applicable, under 13 CCR 1956.8; 2) the SET and NTE limits under the applicable California exhaust emission standards and test procedures for heavy-duty diesel engines and vehicles (Test Procedures); and 3) the corresponding certification levels, for this engine family. "Diesel" CO, SET and NTE certification compliance may have been demonstrated by the manufacturer as provided under the applicable Test Procedures in lieu of testing. (For flexible- and dual-fueled engines, the CERT values in brackets [ ] are those when tested on conventional test fuel. For multi-fueled engines, the STD and CERT values for default operation permitted in 13 CCR 1956.8 are in parentheses.).[4]

in g/bhp-hr	NMHC		NOx		NMHC+NOx		CO		PM		HCHO	
	FTP	SET	FTP	SET	FTP	SET	FTP	SET	FTP	SET	FTP	SET
STD	0.14	*	0.20	*	*	*	14.4	*	0.01	*	0.01	*
CERT	0.10	*	0.11	*	*	*	2.8	*	0.002	*	0.000	*
NTE	*		*		*		*		*		*	

[4] **g/bhp-hr**=grams per brake horsepower-hour; **FTP**=Federal Test Procedure; **SET**= supplemental emissions testing; **NTE**=Not-to-Exceed emission limit; **STD**=standard or emission test cap; **FEL**=family emission limit; **CERT**=certification level; **NMHC/HC**=non-methane/hydrocarbon; **NOx**=oxides of nitrogen; **CO**=carbon monoxide; **PM**=particulate matter; **HCHO**=formaldehyde;)

BE IT FURTHER RESOLVED: The manufacturer has demonstrated compliance with the Greenhouse Gas Emission Standards as specified in Title 13 CCR 1956.8 and the incorporated "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy Duty Otto Cycle Engines and Vehicles" (HDOE Test Procedures) adopted Dec. 27, 2000, as last amended Oct. 21, 2014 using the 2014 model year National Heavy-Duty Engine and Vehicle Greenhouse Gas Program as specified in Section 1036.108 of the HDOE Test Procedures. The manufacturer has submitted the required information and therefore has met the criteria necessary to receive a California Executive Order based on the Environmental Protection Agency's Certificate of Conformity for the above listed engine family.

	EPA CERTIFICATE OF CONFORMITY		PRIMARY INTENDED SERVICE CLASS	
	RII-ONHWY-16-01		*	
In g/bhp-hr	CO_2		CH_4	N_2O
	FTP	SET		
STD	*	*	*	*
FCL	*	*	*	*
FEL	*	*	*	*
CERT	*	*	*	*

[4] **g/bhp-hr**=grams per brake horsepower-hour; **FTP**=Federal Test Procedure; **SET**=Supplemental emissions testing; **STD** = standard or emission test cap; **FEL**=family emission limit; **FCL**=family certification level; **CERT**=certification level; **CO_2**=carbon dioxide; **CH_4**=methane; **N_2O**=nitrous oxide; **VOCATIONAL**=vocational engine; **TRACTOR**=tractor engine

BE IT FURTHER RESOLVED: Certification to the FEL(s) / FCL(s) listed above, as applicable, is subject to the following terms, limitations and conditions. The FEL(s) / FCL(s) is the emission level declared by the manufacturer and serves in lieu of an emission standard for certification purposes in any averaging, banking, or trading (ABT) programs. It will be used for determining compliance of any engine in this family and compliance with such ABT programs.

BE IT FURTHER RESOLVED: For the listed engine models the manufacturer has submitted the materials to demonstrate certification compliance with 13 CCR 1965 (emission control labels), 13 CCR 2035 et seq. (emission control warranty) and 13 CCR 1971.1 (on-board diagnostic).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

The Bureau of Automotive Repair will be notified by copy of this Executive Order.

Executed at El Monte, California on this 4 day of December 2015.

Annette Hebert, Chief
Emissions Compliance, Automotive Regulations and Science Division

California Environmental Protection Agency Air Resources Board	ROUSH INDUSTRIES INC.	EXECUTIVE ORDER A-344-0060 New On-Road Heavy-Duty Motor Vehicles

Pursuant to the authority vested in the Air Resources Board by Health and Safety Code Division 26, Part 5, Chapter 2; and pursuant to the authority vested in the undersigned by Health and Safety Code Sections 39515 and 39516 and Executive Order G-14-012;

IT IS ORDERED AND RESOLVED: The following on-road motor vehicles with a manufacturer's GVWR over 14000 pounds are certified as described below. Production vehicles shall be in all material respects the same as those for which certification is granted.

ENGINE DESCRIPTION									
MANUFACTURER	EXECUTIVE ORDER	MODEL YEAR	ENGINE FAMILY	ENGINE SIZES (L)	FUEL TYPE [1]	STANDARDS & TEST PROCEDURE	INTENDED SERVICE CLASS [2]	ECS & SPECIAL FEATURES [3]	OBD COMPLIANCE [4]
ROUSH INDUSTRIES INC.	A-344-0059	2016	GRIIE06.8BWZ	6.8	LPG	Otto	HDO	TWC, SFI, HO2S 2WR-HO2S,	EMD+

Gasoline, LPG or Alcohol Vehicles Only			VEHICLE DESCRIPTION			
EVAPORATIVE FAMILY	EVAPORATIVE UL (K)	FUEL TANK CAPACITY (gallons)	VEHICLE MODEL YEAR	VEHICLE MAKE & MODELS	ENGINE (L)	ENGINE MODELS / CODES (rated power, in hp)
GRIIF0265LPG	150	41, 64	2016	Roush E450 Incomplete	6.8	E450 Incomplete / GGE418NR5, GGE418MR5, GGE41LNR5, GGE41LMR5, GGE418SR5, GGE418PR5, GGE41LSR5, GGE41LPR5 (305 for all codes)

* =not applicable; **GVWR**=gross vehicle weight rating; **13 CCR xyz**=Title 13, California Code of Regulations, Section xyz; **40 CFR 86.abc**=Title 40, Code of Federal Regulations, Section 86.abc; **L**=liter; **K**=1000 miles; **hp**=horsepower; **kw**=kilowatt;

[1] **CNG/LNG**=compressed/liquefied natural gas; **LPG**=liquefied petroleum gas; **E85**=85% ethanol fuel; **MF**=multi fuel a.k.a. **BF**=bi fuel; **DF**=dual fuel; **FF**=flexible fuel;

[2] **L/M/H HDD**=light/medium/heavy heavy-duty diesel; **UB**=urban bus; **HDO**=heavy duty Otto;

[3] ECS=emission control system; TWC/**OC**=three-way/oxidizing catalyst; **WU (prefix)** =warm-up catalyst; **WR-HO2S**=wide range oxygen sensor ; **DPF**=diesel particulate filter; **HO2S/O2S**=heated/oxygen sensor; **HAFS/AFS**=heated/air-fuel-ratio sensor (a.k.a., universal or linear oxygen sensor); **TBI**=throttle body fuel injection; **SFI/MFI**=sequential/multi port fuel injection; **DGI**=direct gasoline injection; **GCARB**=gaseous carburetor; **IDI/DDI**=indirect/direct diesel injection; **TC/SC**=turbo/super charger; **CAC**=charge air cooler; **EGR**=exhaust gas recirculation; **PAIR/AIR**=pulsed/secondary air injection; **SPL**=smoke puff limiter; **ECM/PCM**=engine/powertrain control module; **EM**=engine modification; **2 (prefix)**=parallel; **(2) (suffix)**=in series;

[4] **EMD**=engine manufacturer diagnostic system; **OBD(F) / (P) / ($)**=full / partial / partial with fine / on-board diagnostic; **(2012-08-20)**

Following are: 1) the FTP exhaust emission standards or family emission limit(s) as applicable under 13 CCR 1956.1 (urban bus) or 13 CCR 1956.8 (other than urban bus); 2) the SET and NTE limits under the applicable California exhaust emission standards and test procedures for heavy-duty diesel engines and vehicles (Test Procedures); and 3) the corresponding certification levels, in g/bhp-hr, for this engine family. "Diesel" CO, SET and NTE certification compliance may have been demonstrated by the manufacturer as provided under the applicable Test Procedures in lieu of testing. (For flexible- and dual-fueled engines, the CERT values in brackets [ ] are those when tested on conventional test fuel. For multi-fueled engines, the STD and CERT values for default operation permitted in 13 CCR 1956.1 or 13 CCR 1956.8 are in parentheses.) [4]

	NMHC		NOx		NMHC+NOx		CO		PM		HCHO	
	FTP	SET	FTP	SET	FTP	SET	FTP	SET	FTP	SET	FTP	SET
STD	0.14	*	0.20	*	*	*	14.4	*	0.01	*	0.01	*
CERT	0.10	*	0.11	*	*	*	2.8	*	0.002	*	0.000	*
NTE	*		*		*		*		*		*	

[4] **g/bhp-hr**=grams per brake horsepower-hour; **FTP**=Federal Test Procedure; **EURO**=Euro III European Steady-State Cycle; **NTE**=Not-to-Exceed emission limit; **STD**=standard or emission test cap; **FEL**=family emission limit; **CERT**=certification level; **NMHC/HC**=non-methane/hydrocarbon; **NOx**=oxides of nitrogen; **CO**=carbon monoxide; **PM**=particulate matter; **HCHO**=formaldehyde;

BE IT FURTHER RESOLVED: For the listed vehicle models the manufacturer has submitted the materials to demonstrate certification compliance with 13 CCR 1965 (emission control labels), 13 CCR 1971.1 (on-board diagnostic), 13 CCR 1976(b)(1)(F) {evaporative emission standards}, 13 CCR 2035 et seq. (emission control warranty), and 13 CCR 2235 [fill pipes and openings of motor vehicle fuel tanks]. (The braces **{ }** are for gasoline, LPG or alcohol fueled vehicles only. The brackets **[ ]** are for gasoline or alcohol fueled vehicles only.)

Vehicles certified under this Executive Order must conform to all applicable California emission regulations.

The Bureau of Automotive Repair will be notified by copy of this Executive Order.

Executed at El Monte, California on this 4 day of December 2015.

Annette Hebert, Chief
Emissions Compliance, Automotive Regulations and Science Division

Pursuant to the authority vested in the Air Resources Board by Health and Safety Code Division 26, Part 5, Chapter 2; and pursuant to the authority vested in the undersigned by Health and Safety Code Sections 39515 and 39516 and Executive Order G-14-012;

IT IS ORDERED AND RESOLVED: The engine and emission control systems produced by the manufacturer are certified as described below for use in on-road motor vehicles with a manufacturer's GVWR over 14,000 pounds. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	ENGINE SIZES (L)	FUEL TYPE [1]	STANDARDS & TEST PROCEDURE	INTENDED SERVICE CLASS [2]	ECS & SPECIAL FEATURES [3]	DIAGNOSTIC [6]
2017	HCEXH0408BAT	6.7	Diesel	Diesel	MHDD	DDI, TC, CAC, ECM, EGR, OC, PTOX, SCR-U, AMOX	OBD($)

PRIMARY ENGINE'S IDLE EMISSIONS CONTROL [5]	ADDITIONAL IDLE EMISSIONS CONTROL [5]
30g	N/A

ENGINE (L)	ENGINE MODELS / CODES (rated power, in hp)
6.7	See attachment for engine models and ratings

* =not applicable; **GVWR**=gross vehicle weight rating; **13 CCR xyz**=Title 13, California Code of Regulations, Section xyz; **40 CFR 86.abc**=Title 40, Code of Federal Regulations, Section 86.abc; **L**=liter; **hp**=horsepower; **kw**=kilowatt; **hr**=hour;

[1] **CNG/LNG**=compressed/liquefied natural gas; **LPG**=liquefied petroleum gas; **E85**=85% ethanol fuel; **MF**=multi fuel a.k.a. **BF**=bi fuel; **DF**=dual fuel; **FF**=flexible fuel;

[2] **L/M/H HDD**=light/medium/heavy heavy-duty diesel; **UB**=urban bus; **HDO**=heavy duty Otto;

[3] **ECS**=emission control system; **TWC/OC**=three-way/oxidizing catalyst; **NAC**=NOx adsorption catalyst; **SCR-U / SCR-N**=selective catalytic reduction – urea / – ammonia; **WU (prefix)** =warm-up catalyst; **DPF**=diesel particulate filter; **PTOX**=periodic trap oxidizer; **HO2S/O2S**=heated/oxygen sensor; **HAFS/AFS**=heated/air-fuel-ratio sensor (a.k.a., universal or linear oxygen sensor); **TBI**=throttle body fuel injection; **SFI/MFI**=sequential/multi port fuel injection; **DGI**=direct gasoline injection; **GCARB**=gaseous carburetor; **IDI/DDI**=indirect/direct diesel injection; **TC/SC**=turbo/super charger; **CAC**=charge air cooler; **EGR / EGR-C**=exhaust gas recirculation / cooled EGR; **PAIR/AIR**=pulsed/secondary air injection; **SPL**=smoke puff limiter; **ECM/PCM**=engine/powertrain control module; **EM**=engine modification; **2 (prefix)**=parallel; **(2) (suffix)**=In series;

[5] **ESS**=engine shutdown system (per 13 CCR 1956.8(a)(6)(A)(1); **30g**=30 g/hr NOx (per 13 CCR 1956.8(a)(6)(C); **APS** =internal combustion auxillary power system; **ALT**=alternative method (per 13 CCR 1956.8(a)(6)(D); **Exempt**=exempted per 13 CCR 1956.8(a)(6)(B) or for CNG/LNG fuel systems; **N/A**=not applicable (e.g., Otto engines and vehicles);

[6] **EMD**=engine manufacturer diagnostic system (13 CCR 1971); **OBD(F) / (P) / ($)**=full / partial / partial with a fine / on-board diagnostic;);

Following are: 1) the FTP exhaust emission standards, or family emission limit(s) as applicable, under 13 CCR 1956.8; 2) the SET and NTE limits under the applicable California exhaust emission standards and test procedures for heavy-duty diesel engines and vehicles (Test Procedures); and 3) the corresponding certification levels, for this engine family. "Diesel" CO, SET and NTE certification compliance may have been demonstrated by the manufacturer as provided under the applicable Test Procedures in lieu of testing. (For flexible- and dual-fueled engines, the CERT values in brackets [ ] are those when tested on conventional test fuel. For multi-fueled engines, the STD and CERT values for default operation permitted in 13 CCR 1956.8 are in parentheses.).[4]

In g/bhp-hr	NMHC		NOx		NMHC+NOx		CO		PM		HCHO	
	FTP	SET	FTP	SET	FTP	SET	FTP	SET	FTP	SET	FTP	SET
STD	0.14	0.14	0.20	0.20	*	*	15.5	15.5	0.01	0.01	*	*
CERT	0.03	0.01	0.14	0.11	*	*	0.02	0.00	0.002	0.001	*	*
NTE	0.21		0.30		*		19.4		0.02		*	

[4] **g/bhp-hr**=grams per brake horsepower-hour; **FTP**=Federal Test Procedure; **SET**=Supplemental emissions testing; **NTE**=Not-to-Exceed; **STD**=standard or emission test cap; **FEL**=family emission limit; **CERT**=certification level; **NMHC/HC**=non-methane/hydrocarbon; **NOx**=oxides of nitrogen; **CO**=carbon monoxide; **PM**=particulate matter; **HCHO**=formaldehyde;

BE IT FURTHER RESOLVED: The manufacturer has demonstrated compliance with the Greenhouse Gas Emission Standards as specified in Title 13 CCR 1956.8 and the incorporated "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy Duty Diesel-Engines and Vehicles" (HDDE Test Procedures) adopted Dec. 12, 2002, as last amended Oct. 21, 2014 using the 2014 model year National Heavy-Duty Engine and Vehicle Greenhouse Gas Program as specified in Section 1036.108 of the HDDE Test Procedures. The manufacturer has submitted the required information and therefore has met the criteria necessary to receive a California Executive Order based on the Environmental Protection Agency's Certificate of Conformity for the above listed engine family.

	EPA CERTIFICATE OF CONFORMITY		PRIMARY INTENDED SERVICE CLASS	
	HCEXH0408BAT-008		TRACTOR / VOCATIONAL	
In g/bhp-hr	CO_2		CH_4	N_2O
	FTP	SET		
STD	576	487	0.10	0.10
FCL	528	494	*	*
FEL	544	509	0.10	0.10
CERT	527	493	0.02	0.07

[4] **g/bhp-hr**=grams per brake horsepower-hour; **FTP**=Federal Test Procedure; **SET**=Supplemental emissions testing; **STD** = standard or emission test cap; **FEL**=family emission limit; **FCL**=family certification level; **CERT**=certification level; **CO_2**=carbon dioxide; **CH_4**=methane; **N_2O**=nitrous oxide; **VOCATIONAL**=vocational engine; **TRACTOR**=tractor engine

BE IT FURTHER RESOLVED: Certification to the FEL(s) / FCL(s) listed above, as applicable, is subject to the following terms, limitations and conditions. The FEL(s) / FCL(s) is the emission level declared by the manufacturer and serves in lieu of an emission standard for certification purposes in any averaging, banking, or trading (ABT) programs. It will be used for determining compliance of any engine in this family and compliance with such ABT programs.

BE IT FURTHER RESOLVED: Except in vehicle applications exempted per 13 CCR 1956.8(a)(6)(B), engines in this engine family certified under 13 CCR 1956.8(a)(6)(C) [30 g/hr NOx] and section 35.B.4 of the incorporated "California Exhaust Emissions Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" (HDDE Test Procedures) adopted Dec. 12, 2002, as last amended Oct. 21, 2014, shall be provided with an approved "Certified Clean Idle" label that shall be affixed to the vehicle into which the engine is installed.

BE IT FURTHER RESOLVED: For the listed engine models the manufacturer has submitted the materials to demonstrate certification compliance with 13 CCR 1965 (emission control labels), 13 CCR 1971.1 (on-board diagnostic, full or partial compliance) and 13 CCR 2035 et seq. (emission control warranty).

BE IT FURTHER RESOLVED: That the manufacturer has elected to include engine models in this engine family which are identified for "emergency vehicle use only". These "emergency vehicle use only" engines are exempt from requirements imposed pursuant to California law and the regulations adopted pursuant thereto for motor vehicle pollution control devices per California Vehicle Code Section 27156.2. The manufacturer must clearly label these engines for "emergency vehicle use only" on the engines' emission control label.

BE IT FURTHER RESOLVED: The listed engine models are conditionally certified in accordance with 13 CCR Section 1971.1(k) (deficiency and fines provisions for certification of malfunction and diagnostic system) because the heavy-duty on-board diagnostic (HD OBD) system of the listed engine models has been determined to have ten deficiencies. The listed engine models are approved subject to the manufacturer paying a fine of $325 per engine for the third through tenth deficiencies in the listed engine family that is produced and delivered for sale in California. On a quarterly basis, the manufacturer shall submit to the Air Resources Board reports of the number of engines produced and delivered for sale in California and pay the full fine owed for that quarter pursuant to this conditional certification. Payment shall be made payable to the State Treasurer for deposit in the Air Pollution Control Fund no later than thirty (30) days after the end of each calendar quarter during the 2017 model-year production period. Failure to pay the quarterly fine, in full, in the time provided, may be cause for the Executive Officer to rescind this conditional certification, effective from the start of the quarter in question, in which case all engines covered under this conditional certification for that quarter and all future quarters would be deemed uncertified and subject to a civil penalty of up to $5000 per engine pursuant to HSC Section 4315.

Engines certified under this Executive Order must conform to all applicable California emission regulations.

The Bureau of Automotive Repair will be notified by copy of this Executive Order.

Executed at El Monte, California on this 7th day of October 2016.

Annette Hebert, Chief
Emissions Compliance, Automotive Regulations and Science Division

9-27-2016

A-021-0657

Attachment: Page 1 of 3

Engine Model Summary Template

Engine Family	1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fuel Rate: mm/stroke @ peak HP (for diesel only)	5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6.Torque @ RPM (SEA Gross)	7.Fuel Rate: mm/stroke@peak torque	8.Fuel Rate: (lbs/hr)@peak torque	9.Emission Control Device Per SAE J1930
HCEXH0408BAT	4660;FR94746	B6.7 360	360@2600	146	128	800@1800	148	90	SCRC, PTOX, PF
HCEXH0408BAT	4660;FR94745	B6.7 340	340@2600	138	121	700@1600	134	73	SCRC, PTOX, PC
HCEXH0408BAT	4660;FR94744	B6.7 325	315@2600	127	112	750@1800	143	87	SCRC, PTOX, PC
HCEXH0408BAT	4660;FR94743	B6.7 300	300@2600	121	106	660@1600	125	67	SCRC, PTOX, PC
HCEXH0408BAT	4661;FR94749	B6.7 300	300@2600	121	106	660@1600	125	67	SCRC, PTOX, PC
HCEXH0408BAT	4660;FR94741	B6.7 280	270@2600	109	96	660@1600	125	67	SCRC, PTOX, PC
HCEXH0408BAT	4661;FR94742	B6.7 280	270@2600	109	96	660@1600	125	67	SCRC, PTOX, PC
HCEXH0408BAT	4569;FR94738	B6.7 260	250@2600	109	96	660@1600	122	66	SCRC, PTOX, PC
HCEXH0408BAT	4570;FR94739	B6.7 260	250@2600	109	96	660@1600	122	66	SCRC, PTOX, PC
HCEXH0408BAT	4569;FR94736	B6.7 250	245@2600	107	94	660@1600	122	66	SCRC, PTOX, PC
HCEXH0408BAT	4570;FR94737	B6.7 250	245@2600	107	94	660@1600	122	66	SCRC, PTOX, PC
HCEXH0408BAT	4569;FR94734	B6.7 240	235@2600	103	90	560@1600	104	56	SCRC, PTOX, PC
HCEXH0408BAT	4570;FR94735	B6.7 240	235@2600	103	90	560@1600	104	56	SCRC, PTOX, PC
HCEXH0408BAT	4569;FR94733	B6.7 220	215@2600	95	83	520@1600	97	52	SCRC, PTOX, PC
HCEXH0408BAT	4569;FR95098	B6.7 220	215@2600	95	83	600@1600	111	60	SCRC, PTOX, PC
HCEXH0408BAT	4570;FR94748	B6.7 220	215@2600	95	83	520@1600	97	52	SCRC, PTOX, PC
HCEXH0408BAT	4570;FR95099	B6.7 220	215@2600	95	83	600@1600	111	60	SCRC, PTOX, PC
HCEXH0408BAT	4569;FR94732	B6.7 200	195@2600	87	76	520@1600	97	52	SCRC, PTOX, PC
HCEXH0408BAT	4570;FR94747	B6.7 200	195@2600	87	76	520@1600	97	52	SCRC, PTOX, PC
HCEXH0408BAT	4660;FR94746	PX-7 360	360@2600	146	128	800@1800	148	90	SCRC, PTOX, PC
HCEXH0408BAT	4660;FR94745	PX-7 340	340@2600	138	121	700@1600	134	73	SCRC, PTOX, PC
HCEXH0408BAT	4660;FR94744	PX-7 325	315@2600	127	112	750@1800	143	87	SCRC, PTOX, PC
HCEXH0408BAT	4660;FR94743	PX-7 300	300@2600	121	106	660@1600	125	67	SCRC, PTOX, PC
HCEXH0408BAT	4661;FR94749	PX-7 300	300@2600	121	106	660@1600	125	67	SCRC, PTOX, PC
HCEXH0408BAT	4660;FR94741	PX-7 280	270@2600	109	96	660@1600	125	67	SCRC, PTOX, PC
HCEXH0408BAT	4661;FR94742	PX-7 280	270@2600	109	96	660@1600	125	67	SCRC, PTOX, PC
HCEXH0408BAT	4569;FR94738	PX-7 260	250@2600	109	96	660@1600	122	66	SCRC, PTOX, PC
HCEXH0408BAT	4570;FR94739	PX-7 260	250@2600	109	96	660@1600	122	66	SCRC, PTOX, PC

DPI, TC, CAC, ECM, EGR, OC, PTOX, SCR-U, AMOX

9-27-2016

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Attachment. Page 2 of 3

Engine Model Summary Template

Engine Family	1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fuel Rate: mm/stroke @ peak HP (for diesel only)	5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6.Torque @ RPM (SEA Gross)	7.Fuel Rate: mm/stroke@peak torque	8.Fuel Rate: (lbs/hr)@peak torque	9.Emission Control Device Per SAE J1930
HCEXH0408BAT	4569;FR94736	PX-7 250	245@2600	107	94	660@1600	122	66	SCRC, PTOX, PC
HCEXH0408BAT	4570;FR94737	PX-7 250	245@2600	107	94	660@1600	122	66	SCRC, PTOX, PC
HCEXH0408BAT	4569;FR94734	PX-7 240	235@2600	103	90	560@1600	104	56	SCRC, PTOX, PC
HCEXH0408BAT	4570;FR94735	PX-7 240	235@2600	103	90	560@1600	104	56	SCRC, PTOX, PC
HCEXH0408BAT	4569;FR94733	PX-7 220	215@2600	95	83	520@1600	97	52	SCRC, PTOX, PC
HCEXH0408BAT	4569;FR95098	PX-7 220	215@2600	95	83	600@1600	111	60	SCRC, PTOX, PC
HCEXH0408BAT	4570;FR94748	PX-7 220	215@2600	95	83	520@1600	97	52	SCRC, PTOX, PC
HCEXH0408BAT	4570;FR95099	PX-7 220	215@2600	95	83	600@1600	111	60	SCRC, PTOX, PC
HCEXH0408BAT	4569;FR94732	PX-7 200	195@2600	87	76	520@1600	97	52	SCRC, PTOX, PC
HCEXH0408BAT	4570;FR94747	PX-7 200	195@2600	87	76	520@1600	97	52	SCRC, PTOX, PC
HCEXH0408BAT									
HCEXH0408BAT	Emergency	Vehicle	Ratings	Below					
HCEXH0408BAT	4661;FR94751	B6.7 360 EV	360@2600	146	128	800@1800	148	90	SCRC, PTOX, PC
HCEXH0408BAT	4661;FR94750	B6.7 340 EV	340@2600	138	121	700@1600	134	73	SCRC, PTOX, PC
HCEXH0408BAT	4660;FR94744	B6.7 325 EV	315@2600	127	112	750@1800	143	87	SCRC, PTOX, PC
HCEXH0408BAT	4660;FR94743	B6.7 300 EV	300@2600	121	106	660@1600	125	67	SCRC, PTOX, PC
HCEXH0408BAT	4660;FR94741	B6.7 280 EV	270@2600	109	96	660@1600	125	67	SCRC, PTOX, PC
HCEXH0408BAT	4569;FR94738	B6.7 260 EV	250@2600	109	96	660@1600	122	66	SCRC, PTOX, PC
HCEXH0408BAT	4661;FR94751	PX-7 360 EV	360@2600	146	128	800@1800	148	90	SCRC, PTOX, PC
HCEXH0408BAT	4661;FR94750	PX-7 340 EV	340@2600	138	121	700@1600	134	73	SCRC, PTOX, PC
HCEXH0408BAT	4660;FR94744	PX-7 325 EV	315@2600	127	112	750@1800	143	87	SCRC, PTOX, PC
HCEXH0408BAT	4660;FR94743	PX-7 300 EV	300@2600	121	106	660@1600	125	67	SCRC, PTOX, PC
HCEXH0408BAT	4660;FR94741	PX-7 280 EV	270@2600	109	96	660@1600	125	67	SCRC, PTOX, PC
HCEXH0408BAT	4569;FR94738	PX-7 260 EV	250@2600	109	96	660@1600	122	66	SCRC, PTOX, PC
HCEXH0408BAT									
HCEXH0408BAT	Stop/Start		Ratings						
HCEXH0408BAT	4663;FR94904	B6.7 300	300@2600	121	106	660@1600	125	67	SCRC, PTOX, PC
HCEXH0408BAT	4663;FR94903	B6.7 280	270@2600	109	96	660@1600	125	67	SCRC, PTOX, PC

DDI, TC, CAC, ECM, EGR, OC, PTOX, SCR-U, AMOX

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Attachment: Page 3 of 3

9/27/2016

Engine Model Summary Template

Engine Family	1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fuel Rate: mm/stroke @ peak HP (for diesel only)	5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6.Torque @ RPM (SEA Gross)	7.Fuel Rate: mm/stroke@peak torque	8.Fuel Rate: (lbs/hr)@peak torque	9.Emission Control Device Per SAE J1930
HCEXH0408BAT	4662;FR94902	B6.7 260	250@2600	109	96	660@1600	122	66	SCRC, PTOX, PC
HCEXH0408BAT	4662;FR94901	B6.7 250	245@2600	107	94	660@1600	122	66	SCRC, PTOX, PC
HCEXH0408BAT	4662;FR94900	B6.7 240	235@2600	103	90	560@1600	104	56	SCRC, PTOX, PC
HCEXH0408BAT	4662;FR94899	B6.7 220	215@2600	95	83	520@1600	97	52	SCRC, PTOX, PC
HCEXH0408BAT	4662;FR94898	B6.7 200	195@2600	87	76	520@1600	97	52	SCRC, PTOX, PC

DDI, TC, CAC, ECM, EGR, OC, PTOX, SCR-U, AMOX

Pursuant to the authority vested in the Air Resources Board by Health and Safety Code Division 26, Part 5, Chapter 2; and pursuant to the authority vested in the undersigned by Health and Safety Code Sections 39515 and 39516 and Executive Order G-14-012;

IT IS ORDERED AND RESOLVED: The following on-road motor vehicles with a manufacturer's GVWR over 14000 pounds are certified as described below. Production vehicles shall be in all material respects the same as those for which certification is granted.

ENGINE DESCRIPTION									
MANUFACTURER	EXECUTIVE ORDER	MODEL YEAR	ENGINE FAMILY	ENGINE SIZES (L)	FUEL TYPE [1]	STANDARDS & TEST PROCEDURE	INTENDED SERVICE CLASS [2]	ECS & SPECIAL FEATURES [3]	OBD COMPLIANCE [4]
ROUSH INDUSTRIES INC.	A-344-0065-2	2016	GRIIE06.8BWL	6.8	LPG	Otto	HDO	TWC, HO2S, 2WR-HO2S, SFI	EMD+

Gasoline, LPG or Alcohol Vehicles Only		VEHICLE DESCRIPTION			
EVAPORATIVE FAMILY	EVAPORATIVE UL (K)	FUEL TANK CAPACITY (gallons)	VEHICLE MODEL YEAR	VEHICLE MAKE & MODELS	ENGINE (L)	ENGINE MODELS / CODES (rated power, in hp)
HRIIF0265LPG	150	45, 67.5, 79	2017	Roush Step Van	6.8	Step Van / GHF410TR5, GHF417TR5, GHF41ATR5, GHF416TR5, GHF4178R5, GHF4168R5, GHF417MR5, GHF416MR5 (320 for all codes)
		89, 49, 50, 73, 67.5, 79, 93, 53		Roush F-650/750 Chassis Cab		F650/750 Chassis Cab / GHFC10AR5, GHFC17AR5, GHFC10KR5, GHFC17KR5, GHFC11KR5, GHFC10PR5, GHFC17PR5, GHFC11PR5, GHFC10RR5, GHFC17RR5, GHFC178R5, GHFC17MR5, GHFC17HR5, GHFC10NR5 (320 for all codes)
		67.5, 93, 47		Blue Bird Vision School Bus		Blue Bird Vision Bus / GHF618BR5, GHF61HBR5, GHF61JBR5, GHF618FR5, GHF61HFR5, GHF61JFR5 (320 for all codes)
		35, 67.5		Roush F-450/550 Chassis Cab		F-450/550 Chassis Cab / GHFA10CR5, GHFA17CR5, GHFA178R5 (320 for all codes)

* =not applicable; GVWR=gross vehicle weight rating; 13 CCR xyz=Title 13, California Code of Regulations, Section xyz; 40 CFR 86.abc=Title 40, Code of Federal Regulations, Section 86.abc; L=liter; K=1000 miles; hp=horsepower; kw=kilowatt;
[1] CNG/LNG=compressed/liquefied natural gas; LPG=liquefied petroleum gas; E85=85% ethanol fuel; MF=multi fuel a.k.a. BF=bi fuel; DF=dual fuel; FF=flexible fuel;
[2] L/M/H HDD=light/medium/heavy heavy-duty diesel; UB=urban bus; HDO=heavy duty Otto;
[3] ECS=emission control system; TWC/OC=three-way/oxidizing catalyst; WU (prefix) =warm-up catalyst; WR-HO2S=wide range oxygen sensor ; DPF=diesel particulate filter; HO2S/O2S=heated/oxygen sensor; HAFS/AFS=heated/air-fuel-ratio sensor (a.k.a., universal or linear oxygen sensor); TBI=throttle body fuel injection; SFI/MFI=sequential/multi port fuel injection; DGI=direct gasoline injection; GCARB=gaseous carburetor; IDI/DDI=indirect/direct diesel injection; TC/SC=turbo/super charger; CAC=charge air cooler; EGR=exhaust gas recirculation; PAIR/AIR=pulsed/secondary air injection; SPL=smoke puff limiter; ECM/PCM=engine/powertrain control module; EM=engine modification; 2 (prefix)=parallel; (2) (suffix)=in series;
[4] EMD=engine manufacturer diagnostic system; OBD(F) / (P) / ($)=full / partial / partial with fine / on-board diagnostic; (2012-08-20)

Following are: 1) the FTP exhaust emission standards or family emission limit(s) as applicable under 13 CCR 1956.1 (urban bus) or 13 CCR 1956.8 (other than urban bus); 2) the SET and NTE limits under the applicable California exhaust emission standards and test procedures for heavy-duty diesel engines and vehicles (Test Procedures); and 3) the corresponding certification levels, in g/bhp-hr, for this engine family. "Diesel" CO, SET and NTE certification compliance may have been demonstrated by the manufacturer as provided under the applicable Test Procedures in lieu of testing. (For flexible- and dual-fueled engines, the CERT values in brackets [ ] are those when tested on conventional test fuel. For multi-fueled engines, the STD and CERT values for default operation permitted in 13 CCR 1956.1 or 13 CCR 1956.8 are in parentheses.) [4]

	NMHC		NOx		NMHC+NOx		CO		PM		HCHO	
	FTP	SET	FTP	SET	FTP	SET	FTP	SET	FTP	SET	FTP	SET
STD	0.14	*	0.20	*	*	*	14.4	*	0.01	*	0.01	*
CERT	0.03	*	0.05	*	*	*	2.3	*	0.002	*	0.000	*
NTE	*		*		*		*		*		*	

[4] g/bhp-hr=grams per brake horsepower-hour; FTP=Federal Test Procedure; EURO=Euro III European Steady-State Cycle; NTE=Not-to-Exceed emission limit; STD=standard or emission test cap; FEL=family emission limit; CERT=certification level; NMHC/HC=non-methane/hydrocarbon; NOx=oxides of nitrogen; CO=carbon monoxide; PM=particulate matter; HCHO=formaldehyde;

BE IT FURTHER RESOLVED: For the listed vehicle models the manufacturer has submitted the materials to demonstrate certification compliance with 13 CCR 1965 (emission control labels), 13 CCR 1971.1 (on-board diagnostic), 13 CCR 1976(b)(1)(F) {evaporative emission standards}, 13 CCR 2035 et seq. (emission control warranty), and 13 CCR 2235 [fill pipes and openings of motor vehicle fuel tanks]. (The braces **{ }** are for gasoline, LPG or alcohol fueled vehicles only. The brackets **[ ]** are for gasoline or alcohol fueled vehicles only.)

Vehicles certified under this Executive Order must conform to all applicable California emission regulations.

The Bureau of Automotive Repair will be notified by copy of this Executive Order.

This Executive Order hereby supersedes Executive Order A-344-0068 dated July 28, 2016.

Executed at El Monte, California on this 21 day of December 2016.

Annette Hebert, Chief
Emissions Compliance, Automotive Regulations and Science Division

VW Settlement Comments

Klimas, Martha <Klimas.Martha@Bridgeportct.gov>

Thu 12/8/2016 9:37 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: Martha Klimas
Job Title: Project Manager
Company: Bridgeport Port Authority

Comments: Question – would replacement of an on road diesel truck used to transport equipment for dive (search and rescue) teams be eligible under this opportunity? The vehicle is older (>20 years old) and its primary use is to move equipment to "incident" locations (waterfront) within the State.

VW Settlement Comments

Lisa J. <lisajane@schoollinesinc.com>

Thu 12/8/2016 2:28 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: DEEP Commissioner <DEEP.Commissioner@ct.gov>;

1 attachment

CTDEEPletter.docx;

Name: David Lintern
Job Title: President
Company: School Lines, Inc., North Branford, CT

Comments: Please see our attached letter regarding VW Settlement Funds

12/8/2016

CT DEEP Commissioner
Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127
Re: Using Volkswagen Settlement Funds to fund propane-fueled school buses

Dear Commissioner,

On October 25, 2016, the U.S. Department of Justice entered into a partial settlement with Volkswagen that will result in Connecticut receiving $51,635,237., which must be used to implement projects that reduce smog-forming nitrogen oxide ("NOx") emissions (the "Volkswagen Settlement Funds").[1] This represents a tremendous opportunity to support local businesses and school districts in accelerating the clean-up of older, pre-emission diesel buses in Connecticut, especially in communities that have been disproportionately burdened by these vehicles.
North Branford, CT, I write to recommend that the CT DEEP, as part of its potential role as Beneficiary, implement programs that increase the use of propane school buses because they offer a cost-effective strategy to reduce NOx emissions and improve public health. School Lines, Inc. would like to support your efforts, with the assistance of our partnership with ROUSH CleanTech, which has helped deploy over 9,500 propane-fueled buses in more than 650 school districts nationwide.

Propane school buses can be a smart investment for Connecticut. Our propane school bus customers, developed through our 25 years of alternative fuel experience, have seen tremendous benefits, including fuel cost reductions of 60 percent per gallon and operations and maintenance savings of $0.37 per mile, as compared to diesel.[2] Propane school buses can thus support the CT DEEP's efforts to achieve cost-effective NOx emissions reductions.

Propane-fueled school buses exist today that are much cleaner than even the cleanest diesel school buses. In fact, starting with model year 2017, we will offer the propane-fueled Vision Type C school bus, in partnership with ROUSH CleanTech and Ford Motor Company. This bus will be certified at 0.05 grams NOx per brake horsepower-hour (g/bhp-hr), which is 75 percent cleaner than today's cleanest diesel buses.[3] What's more, these new propane school buses will be 99 percent cleaner than the oldest, dirtiest buses still operating in many of our state's school districts.[4]

[1] United States, In Re: Volkswagen "Clean Diesel" Marketing, Sales Practices, and Products Liability Litigation. Order Granting the United States' Motion to Enter Proposed Amended Consent Decree, MDL No. 2372 CRB (JSC). http://www.cand.uscourts.gov/crb/vwmdl, October 25, 2016.
[2] "Propane Testimonials." Blue Bird. http://www.blue-bird.com/blue-bird/propane-testimonials.aspx.
[3] For model year 2010 and newer diesel engines, EPA established a NOx emission standard of 0.2 g NOx / bhp-hr. Please refer to EPA's summary table of diesel engine exhaust emission standards for further detail.
[4] For model year 1998 to 2003 diesel engines, EPA established a NOx emission standard of 4.0 g NOx / bhp-hr. Please refer to EPA's summary table of diesel engine exhaust emission standards for further detail.

Propane buses also significantly reduce children's exposure to emissions that are associated with increased asthma emergencies, bronchitis, and school absenteeism, especially among asthmatic children.[5] Propane school buses effectively eliminate diesel particulate matter emissions that are associated with cancer and thousands of premature deaths nationwide every year. These vehicles are also a safe transportation solution because propane is non-toxic, non-carcinogenic and non-corrosive, and because their vehicle fuel tanks are 20 times more puncture-resistant than gasoline or diesel tanks.[6]

School Lines, Inc. would like to work with you and your team to ensure the most cost-effective and environmentally beneficial use of CT's Volkswagen Settlement Funds. Towards that end, we request that CT DEEP implement programs that increase the use of propane school buses.

Thank you for considering our request. We look forward to continued dialogue with you and your team, and to a future collaboration that will help Connecticut meet its air quality goals.

Sincerely,

David Lintern
President
School Lines, Inc.
203-488-1382
Dave.lintern@hotmail.com
Lisajane@schoollinesinc.com

cc: Dannel P. Malloy

[5] Adar, S. et al. "Adopting Clean Fuels and Technologies on School Buses. Pollution and Health Impacts in Children." ATS Journals, Volume 191, Issue 12. http://www.atsjournals.org/doi/abs/10.1164/rccm.201410-1924OC#.WA-HlNUrJhE, June 15, 2015.
[6] "Propane Autogas – Safe and Reliable." Blue Bird. https://www.blue-bird.com/blue-bird/Propane-is-safe.aspx.

VW Settlement Comments

Katherine Stainken <kstainken@pluginamerica.org>

Mon 12/19/2016 6:10 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

Plug In America Comments on VW Settlement for Appendix D_161212v1_Connecticut.pdf;

To Whom it May Concern:

Attached please find comments from Plug In America on Appendix D of the VW Settlement. Plug In America is the leading non-profit representing the current and future EV driver across the nation.

If you have any questions, please do not hesitate to contact me. We look forward to working with you!

Thank you!
Best,

Katherine Stainken
--
Katherine Stainken
Policy Director
Plug In America
908-229-7837
kstainken@pluginamerica.org

Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

December 6, 2016

Re: Comments on Appendix D of the VW Settlement

To Whom it May Concern:

Thank you for the opportunity to provide comments on Appendix D (Form of Environmental Mitigation Trust Agreement) of the Consent Decree of the VW Settlement. Appendix D requires the Settling Defendants to pay a total of $2.7 billion to fund Eligible Mitigation Actions that will reduce emissions of NOx where the 2.0 Liter Subject Vehicles were, are, or will be operated.[1] The funding also allows for each Beneficiary to use up to fifteen percent (15%) of its allocation of Trust Funds on the installation of new light-duty zero emission vehicle supply equipment, including electric vehicle charging infrastructure.

Plug In America is the national consumer voice for plug-in electric vehicles (PEVs) and works to promote policies and programs nationwide that put more PEVs on the road.[2] Our members are passionate PEV advocates and have driven PEVs for many years, affording Plug in America a unique perspective on how consumers think about PEVs and what actually inspires a consumer to purchase a PEV.

Though the circumstances that resulted in the VW Settlement are extremely unfortunate, we are enthused to see that VW must invest $2 billion over 10 years on Zero-Emission Vehicle (ZEV) programs under Appendix C. Likewise, we are encouraged that 15% of the settlement funds for each Beneficiary under Appendix D may be spent on electric vehicle charging infrastructure. The PEV market is quickly growing, but needs additional support to achieve the national goal for PEVs of 1 million PEVs on the road by 2020.

From 2010 to November 2016, consumers have purchased more than 534,000 cars,[3] with sales expected to accelerate as new vehicle makes and models become available, such as the Chevy Bolt.[4] In California alone, the state has gone from about 10,000 total PEVs on the road in 2012 to more than 117,000 battery electric vehicles (BEVs) and 111,000 plug-in hybrid electric vehicles (PHEVs) on the road, for a

[1] See page 5 of the Amended Consent Decree: https://www.epa.gov/sites/production/files/2016-10/documents/amended20lpartial-cd.pdf
[2] More information available at: www.pluginamerica.org
[3] Vehicle count based on HybridCars.com count of U.S. sales of 523,525 plug-in vehicles (BEVs, PHEVs) from December 2010 through the end of October 2016.
[4] More on the Chevy Bolt can be found at: http://www.chevrolet.com/bolt-ev-electric-vehicle.html

total of 228,000 PEVs in California.[5] More and more drivers nationwide are making the switch to drive electric simply because PEVs are convenient and save consumers money.

We respectfully offer the following comments on Appendix D of the Consent Decree:

1. **We encourage Connecticut to develop a Beneficiary Mitigation Plan as outlined in Appendix D, and apply for the full funding allocated to Connecticut as stated in Appendix D-1 Initial Allocation of the Amended Consent Decree.[6]**

As stated in the Amended Consent Decree, "Not later than 90 Days after being deemed a Beneficiary pursuant to subparagraph 4.0.2.1 hereof, each Beneficiary shall submit and make publicly available a "Beneficiary Mitigation Plan" that summarizes how the Beneficiary plans to use the mitigation funds allocated to it under this Trust."[7] We urge Connecticut to develop a Beneficiary Mitigation Plan that fully utilizes the amount of funding allocated to the state.

2. **Of the allocation of Trust Funds that may be used for the installation of zero emission vehicle supply equipment, we urge that Connecticut use the full 15% on electric vehicle charging station projects.**

Under item 9 of Appendix D-2, Eligible Mitigation Actions and Mitigation Action Expenditures, the Amended Consent Decree states, "Each Beneficiary may use up to fifteen percent (15%) of its allocation of Trust Funds on the costs necessary for, and directly connected to, the acquisition, installation, operation and maintenance of new light duty zero emission vehicle supply equipment for projects as specified below."[8]

The PEV market is ready to expand, yet needs significant deployment of charging infrastructure. Investing in charging infrastructure should be prioritized for the multiple benefits from PEVs that accrue to all citizens, regardless of who may purchase the car or the type of PEV purchased.

From the consumer perspective, more and more drivers are making the switch to drive electric simply because PEVs are convenient and save consumers money. There's no trip to the gas station needed, and the battery can be charged overnight and be ready to go first thing in the morning. In addition,

[5] http://www.zevfacts.com/sales-dashboard.html
[6] See Appendix D-1 of the Amended Consent Decree: https://www.epa.gov/sites/production/files/2016-10/documents/amended20lpartial-cd.pdf
[7] Ibid.
[8] Ibid.

maintenance for PEVs costs much less than for gasoline vehicles.[9] On average, fueling a car with locally produced electricity is roughly the same as fueling with gas at $1 per gallon, thanks to a PEV's performance efficiency and the lower cost of electricity.[10] Electricity prices are also far more stable than gasoline prices, allowing drivers to avoid the risk of future price spikes.

PEVs are also more cost-effective than gas-powered vehicles. Should gas prices hover at the recent summer price of $3.50 per gallon, the average electric vehicle will save its owner nearly $9,000 over the vehicle's lifetime, which is a significant amount for the driver in the middle class.[11] As PEVs are fueled from electricity from the local grid, which is cheaper for all consumers, money not spent on gas or on maintenance can be invested back into the local economy, especially in the inner cities.[12] Furthermore, these vehicles promote national security by heavily reducing our dependence on oil and imported fuels, as the electricity is produced domestically and locally.

There is also significant job creation potential with the acceleration of the PEV market. Currently, the U.S. manufactures PEVs and other advanced technology vehicles and components in at least 20 states, creating thousands of new, good jobs.[13] The PEV market keeps America competitive with countries such as China, which is moving aggressively towards electrification of their transportation sector.

Therefore, the full 15% of Trust Funds that may be used for the installation of zero emission vehicle supply equipment should be spent on electric vehicle charging infrastructure.

3. **With regards to the types of charging infrastructure that may be installed, we urge Connecticut to consider the driver perspective and prioritize the installation of the electric vehicle charging infrastructure in the following order: L1 and L2 at homes and workplaces, DCFC and finally L2 in other public places.**

We recommend that the various types of charging stations to be installed be prioritized to reflect actual PEV driving behavior. The first point to consider is that most charging, around 85%, occurs at home.

[9] Plug In Hybrid Electric Vehicles (PHEVs) require fewer oil changes, while Battery Electric Vehicles (BEVs) require none. PEVs also have 10 times fewer moving parts than gasoline vehicles; there's no engine, transmission, spark plugs, valves, fuel tank, tailpipe, distributor, starter, clutch, muffler, or catalytic converter.
10 http://energy.gov/eere/eveverywhere/ev-everywhere-saving-fuel-and-vehicle-costs
[11] The analysis was performed by Environment California in the report, "Drive Clean and Save: Electric Vehicles are a Good Deal for California Consumers and the Environment." However, similar incentives are already in place in dozens of other states across the country, and gas prices are similar in dozens of other states as well, suggesting a similar result in savings for other states. The report is available here:
http://www.environmentcalifornia.org/sites/environment/files/reports/Drive%20Clean%20and%20Save%20June%202016.pdf
[12] Roland-Holst, David. 2012. Plug-in Electric Vehicle Deployment in California: An Economic Assessment https://are.berkeley.edu/~dwrh/CERES_Web/Docs/ETC_PEV_RH_Final120920.pdf and Stroo, Hans. 2015. Bills to Advance Electric Vehicles Make Good Economic and Environmental Sense http://planwashington.org/blog/archive/bills-to-advance-electric-vehicles-make-good-economic-and-environmental-sense/
[13] http://sierraclub.typepad.com/compass/2012/06/fuel-economy-jobs.html

Even as we consider the future of PEV charging, it is likely that most drivers will choose to charge at home in order to maintain the most control over when the vehicle is charged. The next place consumers will choose to charge is at the workplace, where vehicles will typically spend 8 or more hours parked, representing a perfect opportunity to charge. This is especially important for those people living in multi-unit dwellings (MUDs) who may not be able to charge at home. The second point to consider is that 93% of drivers commute less than 35 miles one way to work each day.[14]

With these two considerations of PEV charging behavior in mind, it's next important to evaluate the types of charging available. Charging stations come in a variety of power levels which fall into three basic categories by increasing charge speed: Level 1, Level 2 and DC charging. While faster charging is generally preferable, slower charging can be less expensive and serve more vehicles. The best power for a given installation depends on how much charge the target users will need and how long they will want to stay at the charging location, their "dwell time." As noted above, employee vehicles at the workplace will typically be parked for 8 hours.

Since the average commute is around 35 miles per day one way, and the current size of batteries can support a drive to the workplace and back on a single charge, Level 1 charging stations at the workplace become an attractive option. Level 1 is AC charging at 120V, the level of power that is supplied by a normal household outlet. This will supply 3 to 5 miles of range per hour to a typical electric vehicle, or up to 40 miles of range for an 8-hour connection during a typical work day. That's enough to replenish the charge for the majority of U.S. drivers.

Level 1 charging can be implemented with a simple outlet on a dedicated 15A or 20A circuit, with GFCI if outdoors. In that case, the driver is required to use the charging cable that comes with all PEVs, to connect the vehicle to the outlet. This can be a hassle for the driver, having to expose a $300 - $600 charge cable to a dirty environment and potential theft, depending on the location.

A more convenient way to implement Level 1 charging is with a charging station. Although marginally more expensive than a regular outlet, the additional expense is small when amortized over the lifetime of the installation and compared to the cost of electricity dispensed. A Level 1 charging station is more convenient and more secure for the PEV driver. Stations equipped with multiple charge ports combined with proper positioning of the station can serve multiple parking spaces in a variety of facilities (e.g., garage, open lot and curbside).

Plug In America sees a major opportunity for the widespread use of L1 charging at workplaces, homes and MUDs. A recent report from the U.S. Department of Energy also explored how L1 charging can

[14] Source: U.S. Department of Transportation, Bureau of Transportation Statistics, Omnibus Household Survey (2014)

provide a successful workplace charging solution.[15] Prioritizing charging at the workplace will help speed adoption of these clean vehicles. Studies show that employers with charging stations have employees who are 20 times more likely to buy an electric vehicle.[16] Furthermore, L1 charging at the workplace may be more desirable over L2 in the long run in order for the vehicle to provide grid services over a longer dwell time.

Following L1 and L2 charging at homes, workplaces and MUDs, DC Fast Charging (DCFC) stations should be installed, particularly where concentrations of PEV drivers live in MUDs without access to garage based home charging. In addition, siting DC Fast Chargers at locations along highway corridors approximately 50 miles from urban PEV concentrations will be advantageous for range extension opportunities.

The installation of DCFC stations are higher upfront investments than some small workplaces and MUDs can likely afford. Therefore, investment in DCFC should be supported by the VW Settlement funds available under Appendix D. These DCFC should be located along the recently designated PEV Corridors.[17]

With third party charging companies very active in promoting L2 in many public places, it is critical to keep PEV driving behavior in mind in determining which infrastructure to invest in and install. This will avoid costly investment in charging stations at locations where the stations are underutilized and unnecessary.

4. **Consumer protection principles should be adhered to for all electric vehicle charging infrastructure installed.**

The total sum of funds available for investment in electric vehicle charging infrastructure through Appendix C and D is more than has ever before been publicly available for investment in the sector. Plug In America urges the Connecticut to include the below consumer protection issues as part of any PEV charging station project:

a) *Open Access* – This is defined as the ability to get a charge at any public charger - including L1, L2 and DCFC - either via a credit card swipe or mobile app to enable the charge. PEV drivers should never be stranded at a public charging location where they cannot actually charge.

b) *Transparency* – The price of a charge should be clear when the PEV driver connects to the charger. This price should also be reported in mapping API so that drivers can select a charging station even before they reach a charging station.

[15] http://energy.gov/sites/prod/files/2016/07/f33/WPCC_L1ChargingAtTheWorkplace_0716.pdf
[16] http://www.energy.gov/eere/articles/survey-says-workplace-charging-growing-popularity-and-impact
17 The Alternative Fuels Corridors can be found here: http://www.fhwa.dot.gov/environment/alternative_fuel_corridors/

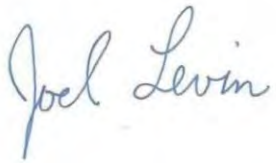
c) *Interoperability* - This is a key principle for the entire charging infrastructure ecosystem. Currently, many companies have their own card or key, which means drivers must either join multiple "clubs" or risk being unable to charge. There's no need for a separate system of payment specific to charging stations other than the standard methods of payment used in everyday financial transactions today, such as credit cards, ApplePay, etc.

d) *Mapping data* - All electric vehicle service providers (EVSPs) should provide mapping data for charging locations, including costs for charging (both in and out of network). Charging station locations should be provided regardless if the charging station is part of a larger EVSP network or a stand-alone single public charging station.

e) *Signage* – There is a critical need for charging station signage, from highway visibility down to the last several hundred feet where the charging station is. While the charging station may be listed on a smartphone, car navigation, or web-based maps, the stations are still challenging to locate as the physical hardware is not that large. Directional signage installed on streets around the stations would help immensely, and also reduce consumer range anxiety. Furthermore, signage can play a huge role in familiarizing non-PEV drivers with the ubiquity of the charging stations.

We would be happy to discuss these recommendations further with you. Please send any questions to Katherine Stainken, Policy Director, at kstainken@pluginamerica.org. We thank you for this opportunity to provide comments on Appendix D of the Consent Decree of the VW Settlement, and look forward to working with you.

Best regards,



Joel Levin
Executive Director
Plug In America

Sierra Club VW Settlement comments

Joshua Berman <josh.berman@sierraclub.org>

Thu 12/22/2016 3:04 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: Katherine Clements <katherine.clements@sierraclub.org>; Mark Kresowik <mark.kresowik@sierraclub.org>;

1 attachment

2016 12 22 Sierra Club VW Settlement Comments.pdf;

Please find attached Comments of the Sierra Club Regarding Use of Volkswagen Partial Consent Decree Environmental Mitigation Trust Funding for the Purpose of NOx Emissions Reductions in the State of Connecticut.

Thank you for your consideration,

Joshua Berman
Staff Attorney
Sierra Club Environmental Law Program
50 F St. NW, 8th Floor
Washington, DC 20001
Tel: (202) 650-6062
Fax: (202) 547-6009

December 22, 2016

VIA ELECTRONIC MAIL

Connecticut Dept. of Energy & Envtl. Protection
79 Elm Street
Hartford, CT 06106
Email: deep.mobilesources@ct.gov

RE: Comments of the Sierra Club Regarding Use of Volkswagen Partial Consent Decree Environmental Mitigation Trust Funding for the Purpose of NOx Emissions Reductions in the State of Connecticut

On behalf of the Sierra Club and its more than 8,000 members in Connecticut, we respectfully submit the following comments regarding the use of funding allocated to the State of Connecticut through the Volkswagen Partial Consent Decree Environmental Mitigation Trust (Mitigation Trust). Volkswagen's installation of defeat devices on diesel vehicles sold in Connecticut resulted in emissions of nitrogen oxides (NOx) from these vehicles that exceeded limits established under the Clean Air Act by up to 3,400%. As a primary component of ground-level ozone (smog), as well as a source of fine particulate matter and acid rain, the excess NOx emissions contributed to diminished air quality levels in Connecticut and impeded the State's efforts to bring its air quality into attainment of health-based National Ambient Air Quality Standards for ozone. The funding provided in the Mitigation Trust is intended to support programs that mitigate and reduce emissions of NOx. To maximize the emission reductions that can be achieved using the Mitigation Trust funding allocated to Connecticut we offer the following recommendations:

(1) Connecticut should allocate the maximum amount authorized by the settlement (15% of total state funding) to programs designed to expand access to electric vehicle (EV) charging in the State. Light-duty vehicles are the single greatest contributor of NOx emissions in Connecticut.[1] Electrification of the vehicle fleet is the most effective way to mitigate emissions from this source category. And access to electric vehicle charging is a key barrier that must be overcome in order for EV adoption in Connecticut to rapidly expand. We recommend that the charging infrastructure investments target access to fast chargers on major highways (including those recently designated as EV corridors), and charging infrastructure to multi-unit dwellings and workplaces with a focus on ensuring that benefits redound to disadvantaged communities.

(2) For the remainder of the funds, Connecticut should prioritize electric trucks, buses, and port vehicles. Indeed, heavy duty road vehicles are the second and third largest contributors of NOx pollution in the state. Specifically, the Sierra Club recommends

[1] https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data.

spending the remaining funds on electric transit buses and electric school buses and providing funding for electric drayage and forklifts at ports. These investments will most benefit low-income communities and communities of color who disproportionately bear the burden of air pollution. Vehicle electrification benefits will only grow as the electricity used to power them continues to become cleaner. Specifically, Sierra Club strongly recommends NOT using the funds to invest in new diesel or natural gas vehicles. These investments would lock us into many more years of using fossil fuels dangerous for our air quality and climate stability. Additionally, while electric vehicles and equipment may have higher up-front costs than their diesel counterparts, they typically have lower maintenance costs and can be highly cost-effective on a life-cycle basis. These lower maintenance costs are particularly relevant to the extent they are not covered by settlement funds.

Consistent with the above recommendations, we believe the Mitigation Trust funds have the opportunity to advance Connecticut's environmental justice goals and should be targeted in a manner that will do so. CT DEEP's Environmental Equity Policy, established in 1993, explicitly demands that no Connecticut resident should disproportionally bear the impacts of pollution due to race or economic status. To support this goal, the Public Act No. 08-94 identifies environmental justice communities throughout the state and ensures they have ample access for meaningful public participation when new polluting facilities propose to build in these communities. As discussed in these comments, people of color in Connecticut bear a disproportionate share of the NOx-driven ozone pollution in the state and Connecticut's five major cities are home to over half of the State's population in poverty. Funding from the Volkswagen Settlement can support the state's goals of cleaning up the air in these areas by focusing on programs that will electrify vehicles in these cities and municipalities, including electrification of buses and of vehicles in these cities' ports.

While the focus of the Mitigation Trust is on reducing NOx emissions in Connecticut—which is critical given Connecticut's present unhealthy ozone levels—strategies to mitigate NOx emissions can also have substantial climate co-benefits. In this respect as well, electrification is a superior strategy to trading one fossil fuel for another by replacing diesel with diesel or diesel with gas.

I. Nitrogen Oxides and Their Impacts in Connecticut

The term nitrogen oxides (NOx) refers to a group of highly reactive gases produced during combustion of fossil fuels.[2] Not only is NOx a pollutant in its own right, it is also a contributor to several other harmful forms of pollution including fine particulate matter, acid rain, and ground-level ozone. Acid rain is particularly damaging to the land and water ecosystems,[3] such as the Connecticut and Quinnipiac Rivers, where the nitrogen from acid precipitation upsets the delicate chemical balances in these habitats, jeopardizing populations of shellfish and bony fish,[4] industries that bring tens of millions of dollars to the state each year and depend on unpolluted environments.

[2] https://www.epa.gov/no2-pollution/basic-information-about-no2#Effects
[3] https://www.epa.gov/no2-pollution/basic-information-about-no2#Effects, http://pubs.acs.org/doi/abs/10.1021/es401046s
[4] http://www.nrcresearchpress.com/doi/abs/10.1139/f09-002#.WEBOt7IrJph

Ground-level ozone also represents a serious public health issue in Connecticut. Ozone forms when NOx reacts with volatile organic compounds in the presence of heat and sunlight. It is a potent asthma trigger and a powerful irritant to lungs, especially in the most vulnerable populations: children, asthmatics, and the elderly. Ozone is also linked to reproductive impacts, and premature mortality.[5] Reducing ozone-forming pollution is especially critical for Connecticut, which continues to suffer from some of the highest ozone levels in the Eastern United States. Ten of the twelve ozone monitors in Connecticut, located in six different counties, recorded 2013-15 ozone levels that exceed EPA's recently promulgated National Ambient Air Quality Standards for ozone of 70 parts per billion (ppb).[6] Nine of those ten monitors recorded ozone levels that also exceeded EPA's prior, less-health-protective 75 ppb standard, highlighting the significant additional work still required to make Connecticut's air safe for all residents to breathe.

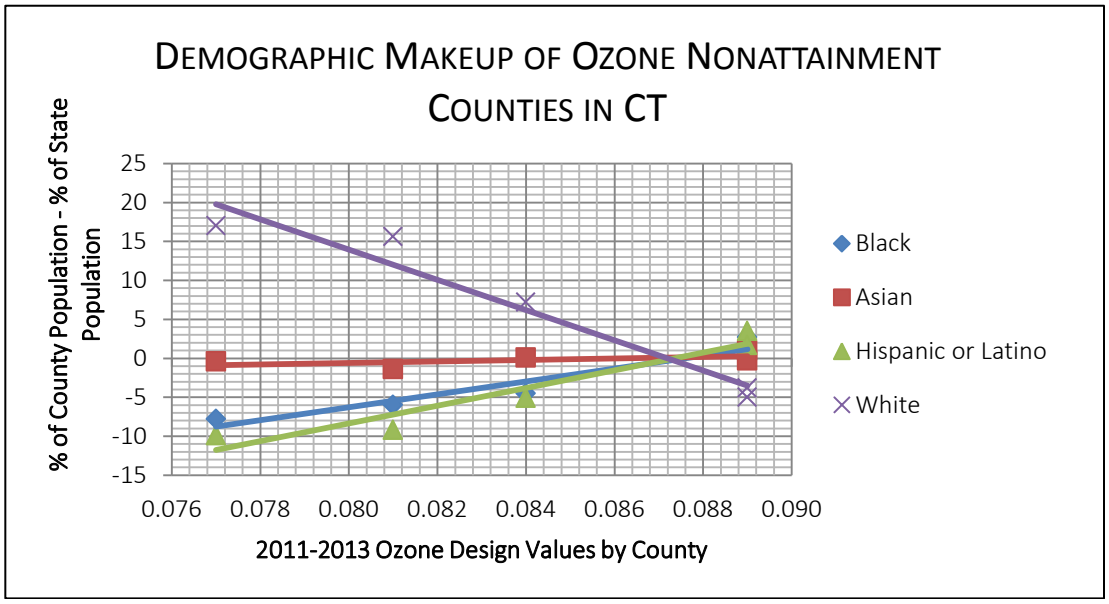
Moreover, ozone's impacts in Connecticut are not equally distributed. Connecticut's most severe ozone impacts are unjustly falling on people of color, raising environmental justice concerns. The figure below compares monitored ozone levels for a county with that county's demographic composition relative to the state as a whole using U.S. Census Bureau data. The data show that black and Hispanic residents are under-represented in the counties with less severe ozone problems and over-represented in the county with the most severe ozone problem. And this trend is observed nationwide – a census of the US near-roadway populations found that 19.3% of US population lives near a high volume road, and minorities and low-income households are over represented in this population.[7] Therefore, addressing transportation related NOx pollution will address the environmental justice inequities observed.

[5] Hansen et al. (2006). Maternal exposure to low levels of ambient air pollution and preterm birth in Brisbane, Australia. BJOG.113: 935-941. http://dx.doi.org/10.1111/j.1471-0528.2006.01010.x. (finding a 26% increase in risk of pre-term birth at maximum smog levels of only 61.1 parts per billion); *see generally* E.P.A. Integrated Science Assessment for Ozone (2013) at 2-22 (summarizing existing research).

[6] EPA 2013 – 15 Ozone Design Values. Table 4. County-Level Design Values for the 2015 8-hour Ozone NAAQS

[7] http://www.sciencedirect.com/science/article/pii/S1361920913001107

Figure 1: Over/Under-Representation of Groups By County Ozone Level in Connecticut – This graph compares monitored ozone levels for a county with that county's demographic composition relative to the state as a whole using U.S. Census Bureau data.



In Connecticut, the primary sources of NOx are mobile sources (on-road and non-road vehicles and equipment), fuel combustion (including electric generating equipment) and waste disposal, of which the mobile sector accounts for approximately two-thirds of total NOx.

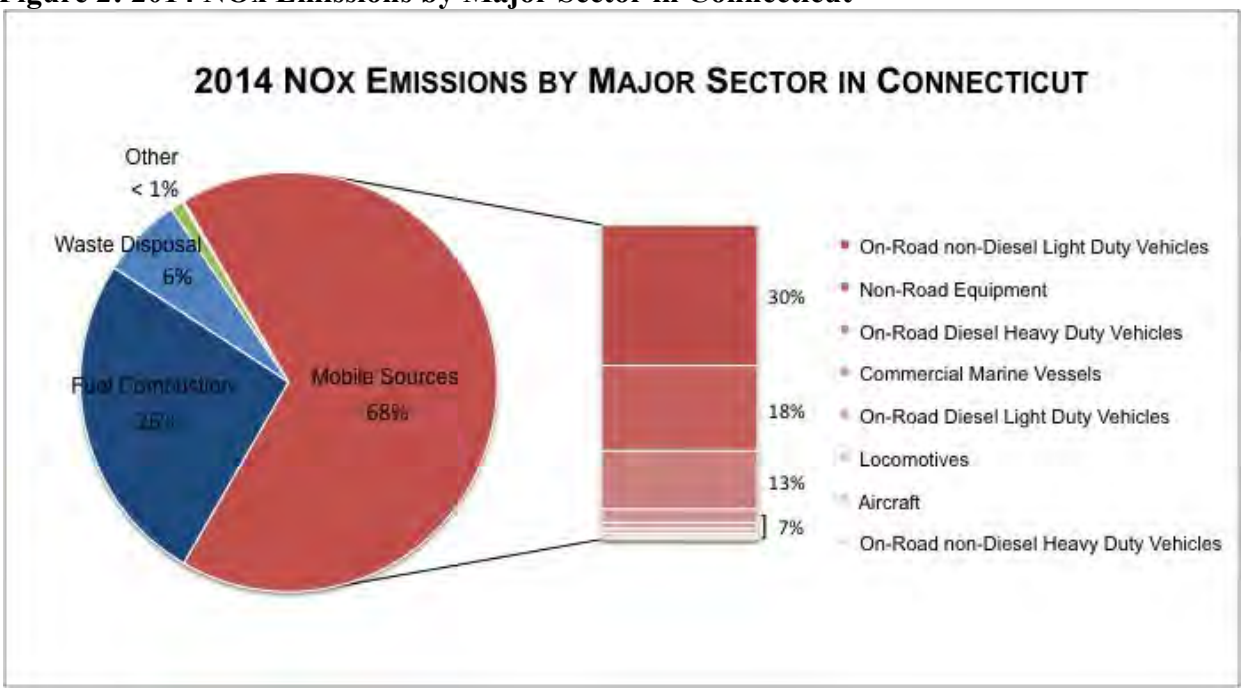
Table 1: 2014 NOx Emissions in Connecticut by Major Source Sector

Major Sector Sources	2014 NOx Emissions (tons)	Percentage of Total
Mobile	39315.67	66.79%
Fuel Combustion	15184.08	25.79%
Waste Disposal	3695.72	6.28%
Biogenics	576.08	0.98%
Miscellaneous Non-Industrial NEC	63.63	0.11%
Fires	16.87	0.03%
Industrial Processes	13.99	0.02%

Source: U.S. EPA 2014 National Emissions Inventory

The following table breaks down the mobile source component in more detail. As the table shows, more than 70% of the mobile source NOx emissions (and nearly 50% of total statewide emissions) come from on-road diesel heavy-duty vehicles and non-road equipment, making these source categories particularly important for the State to target in allocating Mitigation Trust funds.

Figure 2: 2014 NOx Emissions by Major Sector in Connecticut



II. Connecticut Should Use the Full 15% of Allowable Mitigation Trust Funding to Foster Development of Electric Vehicle Charging Infrastructure

In order to maximize reductions in NOx emissions while significantly advancing progress toward meeting state climate goals and fostering demand for EVs consistent with Connecticut Zero Emission Vehicle Memorandum of Understanding (ZEV MOU) commitments, Connecticut should utilize the full 15% of allowable Mitigation Trust funding for EV charging infrastructure. On-road non-diesel light duty vehicles presently account for 30% of all NOx emissions in the state, exceeding emissions from power plants (26%) and all other mobile source categories. Strategic investments in EV charging infrastructure targeting this mobile source segment can simultaneously advance multiple state goals.

A. Investments in EV Charging Infrastructure Will Produce Significant NOx Benefits

Transportation plays a significant role in driving unsafe levels of smog and other pollution that adversely affects public health. 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.[8]

Sierra Club retained Sonoma Technology Inc. to conduct photochemical modeling using the Comprehensive Air Quality Model with Extensions (CAMx) ozone source apportionment tool to understand, among other things, the contribution of tailpipe NOx emissions from the

[8] 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/

passenger vehicle fleet to observed ozone levels. The model, which uses emission data from U.S. EPA's 2011 National Emissions Inventory, provides information on the relative proportion of observed ozone levels that attributable to different sources and source sectors. This helps inform the magnitude of the potential air quality benefit achievable through reducing NOx emissions from those sources and source sectors.

On-road vehicles in Connecticut are major contributors to observed ozone levels in the State, as highlighted by the table below. Of the 62 monitor-exceedance days of EPA's 70 ppb 2015 ozone NAAQS during the 2011 ozone season, the modeling indicates that on 55 of these days in-state on-road mobile sources significantly contributed to the nonattainment (defined by EPA as contributing more than 1% of the NAAQS). Indeed, maximum contributions from in-state on-road vehicles for most monitors exceeded 10% of the NAAQS (i.e., 7 ppb), with maximum modeled contributions from in-state on-road vehicles of 10 ppb or more at five of Connecticut's 12 monitors. And in-state on-road vehicles contributed more than 1% of the NAAQS on as many as 102 of the 152 ozone season days in 2011 at certain Connecticut monitor locations.

Table 2

AQS Site	Monitor County	Number of Modeled Days in Exceedance	Number of Modeled Days in Exceedance w/ Significant Impact from On-Road Sourc	Max Modeled Apportionment 8-hour Avg O3 (ppb)	Max Modeled On-Road O3 Contribution	Number of Days with Significant Impact* from On-Road Sourc
90159991	Windham	3	3	84.9	6.6	81
90131001	Tolland	5	5	102.3	10.5	85
90110124	New London	3	3	90.9	7.4	62
90099002	New Haven	12	11	94.7	10.4	86
90090027	New Haven	8	8	95.5	9.9	94
90070007	Middlesex	4	4	88.3	10.0	100
90050005	Litchfield	2	0	83.2	7.9	50
90031003	Hartford	2	2	102.5	11.4	102
90019003	Fairfield	8	7	97.7	10.0	84
90013007	Fairfield	10	9	99.8	9.2	83
90011123	Fairfield	5	3	98.0	9.8	67
90010017	Fairfield	0	0	71.0	5.8	37
		62	**55**	**102.5**	**11.4**	**931**

B. Investments in EV Charging Infrastructure Will Produce Significant Climate Co-Benefits

Not only will accelerating vehicle electrification reduce tailpipe NOx emissions, it will also generate significant climate benefits. Well-to-wheel studies (studies that consider all sources of greenhouse gases, including fuel production, fuel storage, fuel delivery, and vehicle energy use) agree that electric vehicles emit the far fewest amounts of pollutants into the air.[9] Additionally, as the power grid becomes cleaner, EVs will leave a continually declining carbon footprint.

[9] http://www.energy.ca.gov/2007publications/CEC-600-2007-004/CEC-600-2007-004-F.PDF

Connecticut, through the Governor's Council on Climate Change (GC3), is currently grappling with strategies to achieve Connecticut's long-term 2050 climate goals. Under the Global Warming Solutions Act, Connecticut has committed reduce its GHG emissions by 80% from 2001 levels.[10] Based on Connecticut's most recent GHG emission inventory, the transportation sector accounts for 36.1% of the State's emissions (calculated on a consumption basis). The GC3 has identified GHG reductions from transportation as a core building block in its strategy to achieve its 2050 climate goals and is looking for emissions from this sector to account for 39% of the additional emission reductions needed between 2015 and 2050.[11]

Based on lifecycle emission data, from a GHG gas emission perspective, EVs in New England already achieve the equivalent of 86 miles per gallon,[12] and as noted above, this figure will increase as Connecticut and other New England states continue to decarbonize the power sector. Widespread strategic deployment of EV charging infrastructure (as discussed below) will accelerate EV deployment and help to drive significant reductions in GHGs.

C. Investments in EV Charging Infrastructure Will Facilitate Achievement of Connecticut's ZEV MOU Commitments

Connecticut has not only committed to reducing greenhouse gas emissions within the state, it has specifically committed to rapidly accelerating the number of zero emission vehicles (ZEVs) on the road. In 2013, the governors of eight states including Connecticut signed a memorandum of understanding committing to coordinated action to ensure the successful implementation of their state ZEV programs and put 3.3 million zero emission vehicles on the road by 2025.[13] Under the ZEV MOU, between model years 2018 and 2025, the ZEV sales mandate will cumulatively require auto manufacturers to sell 154,000 ZEVs in Connecticut.

Investments in EV charging infrastructure are critical to putting zero emission vehicles on the road in Connecticut. Studies have concluded that the absence of an adequate, existing charging infrastructure for light-duty vehicles ("LDV") EVs is an impediment to rapidly increasing EV adoption.[14] This is true for several reasons. First, it creates a higher up front capital cost to an EV user to install a charger. Second, many potential EV owners neither own nor operate a parking space that they can install a charger in. Third, the lack of a robust charging infrastructure on highways contributes to range anxiety. Fourth, the lack of visible, installed charging infrastructure results in lower public awareness of electric vehicles. Using the settlement funding to build out charging infrastructure in appropriate locations can overcome these hurdles and support the trends already observed throughout Connecticut.

[10] https://www.cga.ct.gov/2008/ACT/PA/2008PA-00098-R00HB-05600-PA.htm
[11] Connecticut Dept. of Energy and Envtl. Protection, GC3 Meeting November 14, 2016 Slide Presentation, at Slide 8.
[12] Union of Concerned Scientists, "Cleaner Cars from Cradle to Grave: How Electric Cars Beat Gasoline Cars on Lifetime Global Warming Emissions" (Nov. 2015), at 2.
[13] https://www.zevstates.us/
[14] International Energy Agency, "Technology Roadmap: Electric and Plug-in Hybrid Electric Vehicles," June 2011, available at: http://www.iea.org/publications/freepublications/publication/EV_PHEV_Roadmap. pdf ; UBS Report. See also, National Academy of Sciences ("federal financial incentives to purchase PEVs should continue . . . .").

D. In Order to Strategically Build out Connecticut's LDV Charging Infrastructure, the State Should Target the Following Areas: Highways, Multi-unit Dwellings, Workplaces, and Disadvantaged Communities

Several factors provide helpful guidance in determining where to build out charging infrastructure: (1) Is there an impediment to the market providing charging in these locations; (2) Are the locations places where the parked vehicles have long "dwell" times (i.e., are parked for periods of time sufficient to charge the vehicle); (3) Are the locations accessible by large numbers of potential EV drivers; (4) Are the locations likely to increase public awareness; and (5) Are the investments providing benefits equitably, including to disadvantaged communities. Based on consideration of these factors, we believe prudent near-term investments in LDV EV charging infrastructure should be made in the following types of locations: Highways, Multi-Unit Dwellings, Workplaces, and Disadvantaged Communities.

1. LDV Charging Priorities: Highways

Mitigation Trust funding should be used to build out high speed direct current ("DC") charging infrastructure on highways. To do so will be critical to resolving range anxiety and increasing public awareness.

Access to DC fast charging influences consumer's choices and is therefore an important part of a comprehensive charging network. One critical benefit of DC fast charging is that it enables planning inter-city and long-distance travel that is otherwise impossible or impractical for battery-only electric vehicle drivers.[15] In addition to inhibiting distance travel and exacerbating range anxiety, consumer research indicates that a "lack of robust DC fast charging infrastructure is seriously inhibiting the value, utility, and sales potential" of typical pure-battery electric vehicles.[16] Consequently, increased access to DC fast charging stations must be achieved in order to build an effective EV infrastructure that will drive EV adoption.

As with many network industries, the development of DC fast charging networks suffers from a "chicken-or-the-egg" market coordination problem. Prospective EV owners are reluctant to purchase an electric car in the face of limited access to charging infrastructure because the EV's range and use would be limited. Likewise, prospective hosts and private funders of EV charging infrastructure cannot see a business case for EV charging station investment where too few EVs are in use to provide a return on investment.

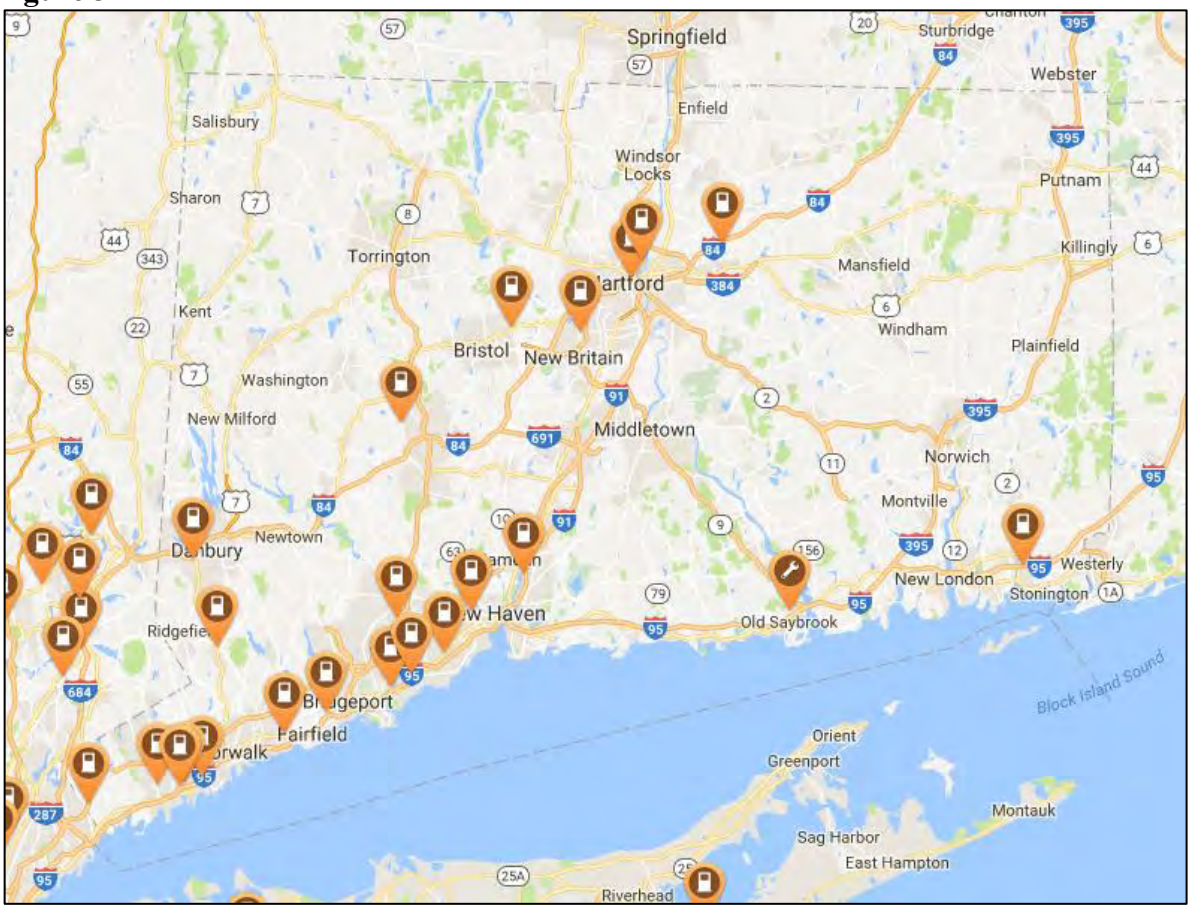
The market coordination problem is acute for DC fast charging stations, which have high upfront costs and require significant revenues for the owner-operator to achieve profitability.[17] However, quantitative research on this "chicken-or-the-egg" problem in the EV context not only indicates that the increased supply of more EVs would drive the deployment of more public charging and vice-versa, but that a financial subsidy given to infrastructure investment will

[15] Nick Nigro et al. *Strategic Planning to Implement Publicly Available EV Charging Stations: A Guide for Businesses and Policymakers* (2015) at 11.
[16] PlugShare*, New Survey Data: BEV Drivers and the Desire for DC Fast Charging* (March 2014).
[17] Nick Nigro et al. *Strategic Planning to Implement Publicly Available EV Charging Stations: A Guide for Businesses and Policymakers* (2015).

increase EV sales by more than twice the amount of the increase if the financial incentive is provided for EV purchase.[18]

Given the discrete number of high-traffic commuting corridors in Connecticut and their modest length, a robust network of DC fast chargers could be established fairly easily in the State. Indeed, the Department of Transportation has already recognized four highway corridors as electric vehicle charging corridors: all portions of I-84, I-91 and I-95, and I-395 from Waterford, Connecticut to the Massachusetts border. As the figure below illustrates, there are significant gaps in coverage on these corridors, including I-95 east of New Haven, I-84 both east and west of Hartford, I-91 between New Haven and Hartford, and I-395 throughout its entire length.

Figure 3



Adopted from PlugShare, a map of DC fast charger or super charger stations available in Connecticut to EV drivers. (Note that this map excludes Tesla fast chargers, which are not available to non-Tesla drivers)

Connecticut should use a portion of the Mitigation Trust funding to help advance the buildout of DC fast chargers along these four heavily-used highway corridors.

[18] Li S et al, *The Market for Electric Vehicles: Indirect Networks Effects and Policy Design*.

2. LDV Charging Priorities: Multi-unit dwellings

Mitigation Trust funds should also be used to build out charging infrastructure at multi-unit dwellings. Studies have shown that most charging is done at locations with long term "dwell times" during which batteries can recharge, such as homes. The National Research Council of the National Academy of Sciences characterizes home charging as a "virtual necessity" for all EV drivers, and that residences without access to electric vehicle charging "clearly [have] challenges to overcome to make PEV ownership practical."[19] Drivers are very unlikely to purchase an EV if they cannot charge at home.[20]

Unfortunately, many people living in urban environments do not own or otherwise control their parking shared space. In fact, research shows that fewer than half of all vehicles in the U.S. have access to a dedicated off-street parking space at a residence where a charging station could be installed by the owner.[21] These include people that live in large multi-unit dwellings and park in garages or parking lots, as well as people that rely on street parking. The industry term for such people is "garage orphans," and they often either lack the ability to install a charger or face serious challenges to doing so. One such study conducted for Eversource Utility in Boston, Massachusetts, found that the garage orphan effect resulted in most EV owners being individuals who live in single family homes, often clustered in more 'leafy' suburban neighborhoods.[22]

Meanwhile, the owner or operator of the garage or parking lot may lack sufficient incentive to spend capital to install chargers. The investment in charging infrastructure may not be recoverable within the expected tenure of renters. Moreover, costs of charging infrastructure at a distance from the building, such as in a parking lot, will likely be higher than installation in a single-family house.

Connecticut should use a portion of the Mitigation Trust funds to overcome the unique barriers to access infrastructure faced by residents of multi-unit dwellings by establishing programs to subsidize its development. Doing so will unlock the ability for people living in multi-unit dwelling in urban areas to charge their vehicle overnight while they sleep.

3. LDV Charging Priorities: Workplaces

Mitigation Trust funds should also be used to build out charging at workplaces. Workplaces offer another location with long dwell times to recharge batteries, and access to electricity fuel at workplaces reduces "range anxiety," improves the EV value proposition, and

[19] National Research Council of the National Academies of Sciences, *Overcoming Barriers to the Deployment of Plug-in Electric Vehicles*, the National Academies Press at 9 (2015).
[20] See Adam Langton and Noel Crisotomo, *Vehicle-Grid Integration*, California Public Utilities Commission at 5 (October 2013).
[21] Traut, Elizabeth et al., *US Residential Charging Potential for Electric Vehicles,* Transportation Research Part D 25 (November 2013): 139-145.
[22] *Accommodating Garage Orphans in Boston, Cambridge, and Somerville*, by WXY, available at http://wxystudio.com/uploads/1700017/1441308185862/GarageOrphanReport_v2.1_08182015.pdf

greatly increases consumer awareness of EVs. According to the U.S. Department of Energy, people who have access to workplace charging stations are 20 times more likely to become EV owners.[23] Likewise, the National Research Council study also reports that charging at workplaces offers an important opportunity to increase EV adoption and to increase electric miles driven.[24]

4. LDV Charging Priorities: Disadvantaged Communities

In both siting charging infrastructure and in education and outreach, Connecticut should seek to serve disadvantaged communities. As noted in a 2011 report by The Greenlining Institute, such communities are more heavily impacted by air pollution and are more concerned by it. They are a natural but largely untapped market for EVs.[25] Moreover, as section 5.2.10 of the Settlement Agreement provides, in approving plans states must provide:

> A description of how the Eligible Mitigation Action mitigates the impacts of NOx emissions on communities that have historically borne a disproportionate share of the adverse impacts of such emissions.

Ensuring that multi-unit dwellings and workplaces in disadvantaged and environmental justice communities are provided charging infrastructure is a critical component of any plan to use Mitigation Trust funds.

Use of funding for LDV charging infrastructure should be conditioned on a load management tool, such as time-of-use rates, and should result in opportunities for fuel cost savings compared to fossil fuels.

In addition, electricity is a fundamentally cheaper fuel than gasoline, and that advantage for PEV drivers should not be overridden, particularly using settlement funds intended for public benefit. Fuel cost savings are a key driver of EV purchases. One survey of over 16,000 EV drivers found that "saving money on fuel costs" was the most important motivator of their EV purchase.[26] The use of Mitigation Trust funds should therefore be conditioned on charging rates being reasonable and delivering the fuel cost savings that electricity can provide.

E. An Investment in EV Charging Infrastructure Will Produce In-State Economic Benefits, Increase In-State Jobs, and Save Connecticut Residents Money

To electrify Connecticut's transportation sector, the state will have to build out the charging network and other assets. Doing so creates well-paying construction jobs. For example, NRG estimated that just its initial buildout of charging infrastructure in California

[23] U.S. Department of Energy, *Workplace Charging Challenge Progress Update 2014: Employers Take Charge*, 5 (2014), available at: http://www.energy.gov/sites/prod/files/2015/11/f27/WPCC_2014progressupdate_1114.pdf
[24] National Research Council of the National Academies of Sciences, *Overcoming Barriers to the Deployment of Plug-in Electric Vehicles*, the National Academies Press at 9 (2015).
[25] C.C. Song, *Electric Vehicles; Who's Left Stranded?*, The Greenlining Institute at 4 (August, 2011).
[26] Center for Sustainable Energy, *California Plug-in Electric Vehicle Owner Survey Dashboard*

would generate 1,500 in-state jobs.[27] NRG expects that its $102.5 million investment to build electric vehicle (EV) charging infrastructure in California will also "create a gross output of more than $185 million when the employment and procurement of goods and services are factored together, equating to an additional $83.3 million in indirect economic activity by 2016."[28] As Terry O'Day, NRG Director of California Business Development, explained, the project will "build out the California EV infrastructure . . . while also contributing to the California economy through job creation and infrastructure spending."[29]

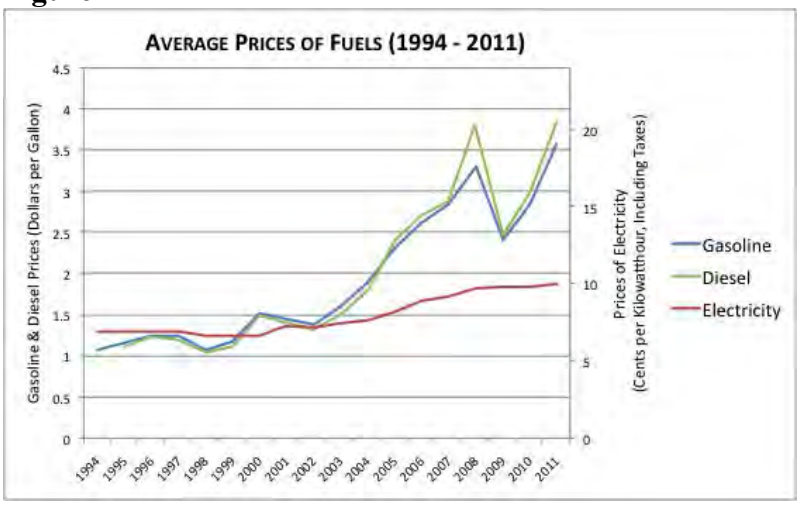
Jobs are also created as people are needed to manufacture the charging equipment itself. Rocky Mountain Institute reports that EnerDel added 1,400 jobs at its Indiana- based EV lithium-ion battery plant and plans to add another 3,000 to meet growing demand.[30] California-based charging station manufacturers Coulomb Technologies has grown from two to 100 jobs over the early stages of vehicle electrification efforts, according to a company representative.[31]

Electrifying Connecticut's transportation will also save residents money on fuel costs. It is cheaper to fuel a vehicle with electricity than with oil, or even natural gas. As the US Department of Energy ("USDOE") explains, using gasoline as a surrogate, "[o]n average, it costs about half as much to drive an electric vehicle" in terms of cost per gallon of gasoline versus the cost per "gallon equivalent" of electricity. In Connecticut, despite persistent low gas prices and higher than average retail electric rates, an "e-gallon" retails for $1.73, while regular gasoline costs $2.26.[32]

Furthermore, the price volatility of fossil fuels is notorious and subjects Connecticut's residents and businesses to expected fluctuations in the costs of living and conducting business. In comparison, electricity prices are highly stable and consistent over time. This is evident in the graph below comparing the fluctuating cost of diesel versus electricity since 2008, using data from the EIA:

[27] EVgo. (2012) *NRG Investment in California EV Charging Stations to Create More Than 1,500 Local Jobs*. < https://www.nrgevgo.com/about/news/nrg-investment-in-california-ev-charging-stations-to-create-more-than-1500-local-jobs/ >
[28] Id.
[29] Id.
[30] Mattila, M., Bellew, J.L. (2011) "Do EVs Create Jobs and Improve the Economy?" Rocky Mountain Institute; http://www.rmi.org/DoEVsCreateJobsImproveEconomy
[31] Id.
[32] *See* https://www.energy.gov/maps/egallon#.

Figure 4



Using the Mitigation Trust funds to advance engine electrification therefore keeps Connecticut's hard earned money in state. It leads to lower fuel costs for Connecticut's residents and businesses. And it will help protect them from the price shocks that come from fossil fuel price volatility.

Investment in electric transportation also saves Connecticut's electric customers money by placing downward pressure on electricity rates. This benefits all utility customers, regardless of whether they own electric transportation vehicles. Electric vehicle charging will increase electricity sales, which if well integrated into the electric power system can dilute the fixed costs of electricity transmission and distribution and lower electricity rates for all utility customers.[33] Vehicles are used for transportation during only a small fraction of the day, and therefore an EV can be charged nearly any time. Connecticut's electricity grid – from the poles and wires to the power plants – is designed for the heaviest electricity demands, which rarely occur. If vehicle charging is managed to occur during off-peak periods (when the electric grid is underutilized and there is plenty of spare capacity in the generation, transmission, and distribution system) this new load can be served by existing and often underutilized infrastructure without proportionally increasing a utility's costs. In turn, this can reduce the average cost of power for all utility customers. Similarly, EV load can be shifted to facilitate the integration of variable generation from renewable sources.[34] By managing EV charging to match electricity demand with renewable generation, we can stabilize power flows and reduce the average cost of power.

[33] *See, e.g.,* Rocky Mountain Institute, *Electric Vehicles as Distributed Energy Resources* at 19 (2016); Natural Resources Defense Council, *Driving Out Pollution*: *How Utilities can Accelerate the Market for Electric Vehicles* at 10 (2016); Regulatory Assistance Project*, In the Drivers Seat: How Utilities and Consumers Can Benefit From the Shift to Electric Vehicles* at 5, 13 (April 2015); CAISO, *California Vehicle-Grid Integration (VGI) Roadmap: Enabling Vehicle-Based Grid Services* at 5; ICF International and Energy+Environmental Economics, *California Transportation Electrification Assessment, Phase I* at 38 (2014); ICF International and Energy+Environmental Economics, *California Transportation Electrification Assessment, Phase II* at 55-70 (2014).

[34] Regulatory Assistance Project*, In the Drivers Seat: How Utilities and Consumers Can Benefit From the Shift to Electric Vehicles* at 5, 13 (April 2015); CAISO, *California Vehicle-Grid Integration (VGI) Roadmap: Enabling Vehicle-Based Grid Services* at 5. (2014).

Analysis performed by the Pacific Northwest National Laboratory shows that large numbers of EVs charging during off-peak hours could significantly lower the marginal cost of energy.[35] The same analysis found that there is sufficient spare generation capacity in the nation's electric grid to power nearly the entire light-duty passenger fleet if vehicle load is integrated during off-peak hours and at lower power levels.[36]

III. For the Remainder of the Mitigation Trust Funds, Connecticut Should Prioritize Electrification Over Alternate-Fueled Options, and Prioritize Electrification of Buses, Drayage Trucks and Forklifts at Ports, and Other Heavy-Duty Trucks

In addition to investing 15% of the Mitigation Trust funds towards EV infrastructure, we recommend that Connecticut invest in electrification of diesel buses, drayage trucks and forklifts at ports, and heavy duty trucks. These categories of vehicles contribute the largest fraction of Connecticut's NOx pollution. At the same time, diesel buses and port equipment disproportionately impact disadvantaged communities, meaning that these communities stand to benefit the most from investments in electrification. We emphasize the importance of electrifying these vehicles, rather than switching from diesel to alternate-fueled engines such as new diesel and compressed natural gas. As discussed above, electrification of Connecticut's transportation sector keeps money in state, saves money through lower electricity rates, drastically reduces NOx, smog, and greenhouse gas levels to protect health and environmental justice communities, and likewise reduces GHG emissions throughout the state. The same benefits apply when upgrading non-road equipment and heavy-duty vehicle engines. Electrification also makes good economic sense. Although the cheaper upfront costs for new-diesel and alternate-fueled engines may be initially attractive, the more important costs for the State to consider are the lifetime costs of these vehicles. This is particularly true because the Mitigation Trust funds will contribute to covering the upfront program costs to replace and repower engines, while subsequent fuel and maintenance costs will fall on the State, its residents, and its companies. Electrifying vehicles and equipment is a good investment since the lifetime costs are significantly cheaper than those of alternate-fueled vehicles and new diesel engines.

A. Electrifying Connecticut's Non-Road Equipment: Drayage Trucks and Forklifts at Ports

Within the mobile sector, non-road equipment accounts for the second greatest source of NOx emissions in Connecticut (18%).[37] Within this category, there are a variety of opportunities to electrify and therefore completely eliminate the exhaust emissions derived from these sources—including electric drayage trucks and electric forklifts. Both of these vehicle types are very commonly used around ports, which are particularly dirty and often situated in close proximity to lower-income communities. Based on a review of available data, EPA approximates that 40% of "Principal Ports" are located in or near areas that have violated a NAAQS (nonattainment areas) or have previously violated but are now meeting a NAAQS (maintenance

[35] Michael Kintner-Meyer, Kevin Schneider, & Robert Pratt, *Impacts Assessment of Plug-in Hybrid Vehicles on Electric Utilities and Regional U.S. Power Grids*, November, 2007.
[36] *Id.*
[37] https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data

areas),[38] including Connecticut's ports. This therefore presents an opportunity for the State to address environmental justice concerns by electrifying drayage and forklift engines.

Drayage trucks, the short-haul transport vehicles used to move "cargo to and from ports and intermodal rail yards," are now available with clean, electric engines.[39] Many existing drayage trucks are retired long-haul vehicles repurposed to serve shorter routes.[40] Due to this practice, the drayage fleet is made up of old, outdated, high emitting vehicles. Indeed, EPA estimates that in 2011 50% of the national drayage fleet was made of pre-1997 models, and that the same category will still comprise 24% of the fleet in 2020.[41] Drayage operators expect trucks to last an average of 10 years.[42] Replacing these old models with all electric trucks will therefore deliver lasting reductions in NO_x, PM and CO_2.[43]

Emission reductions from drayage trucks are largely dependent on the model year of the vehicle being replaced.[44] However, as a general matter, one can expect to achieve between 840 and 1,105 lbs per year of NO_x reductions by electrifying a single drayage vehicle.[45] PM and CO_2 reductions are similarly significant: 21.7 lbs/year of PM and 12 tons of CO_2 reductions per year.[46]

Electric drayage trucks are currently more expensive than traditional diesel models. However, electric drayage trucks have far lower fuel and maintenance costs than diesel vehicles—a more important consideration with respect to the Mitigation Trust. Indeed, variable costs for all-electric drayage trucks are 50-85% lower than for their diesel counterparts.[47] The owner of a diesel truck must regularly change oil, pass emissions tests, repair/replace brakes, and pay for diesel fuel. The owner of an electric truck can expect reduced or eliminated costs for each of these areas. TransPower estimates that the energy cost per mile of a diesel drayage truck is $1.49/mile while a TransPower electric drayage truck registers a per mile cost of only $0.23.[48] Additionally, the cost of these zero emission vehicles is expected to dramatically decrease over the next fifteen years due to advances in battery production. As the capital requirements for drayage vehicles draw closer to equivalence, the economic benefits of electric trucks become even more pronounced.

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[38] https://www.epa.gov/sites/production/files/2016-09/documents/420s16002.pdf
[39] Partial Consent Decree, *supra* note 8 at Appendix D-2 p. 11.
[40] National Port Strategy Assessment, *supra* note 2 at 14.
[41] *See* National Port Strategy Assessment, *supra* note 2 at tbl. 5-6.
[42] Andrew Papson & Michael Ippoliti, CALSTART, *Key Performance Parameters for Drayage Trucks Operating at the Ports of Los Angeles and Long Beach* 15 (Nov. 15, 2013) (providing results of Drayage Operator Usage Survey).
[43] EPA's emission standards for pre-2004 trucks allowed more than four grams of NO_x/bhp-hr, a rate that has since been lowered to .2 g/bhp-hr. *See* U.S. EPA, *Emission Standards Reference Guide*, available at https://www.epa.gov/emission-standards-reference-guide (last visited Sep. 29, 2016).
[44] Mitigation funds are available to target trucks with model years between 1992 and 2006. If state regulations already require replacing vehicles with these model years, then the eligible class expands to include model year 2007-2012 trucks. *See* Partial Consent Decree, *supra* note 8 at Appendix D-2 p. 1.
[45] National Port Strategy Assessment, *supra* note 2 at 43.
[46] National Port Strategy Assessment, *supra* note 2 at 43.
[47] Ambrose Hanjiro & Miguel Jaller, *Electrification of Drayage Trucks: On Track for a Sustainable Freight Path* at 14, Transportation Research Board 95th Annual Meeting, No. 16-5924 (Aug. 1, 2015).
[48] *High Power Electric Systems for Transportation and Storage*, Transpower, slide 10 (Dec. 2, 2015) *available at* http://steps.ucdavis.edu/files/12-03-2015-Joshua-GoldmanTransPower.pdf.

These technologies have already been successfully demonstrated. In 2012, the Southern California Air Quality Management District engaged nine battery-electric trucks in a pilot project. SCAQMD has subsequently reinvested in 43 more electric drayage vehicles.[49] Electric drayage trucks are available from Mack[50] and TransPower.[51]

Another electric non-road equipment program option would be replacing diesel and propane forklifts with all-electric models. Only forklifts with greater than 8,000 lbs. of lift capacity are eligible to receive funding.[52] Though electric forklifts require a greater up-front capital investment they already represent a large portion of the forklift fleet.[53] They also exhibit lower life-cycle costs when accounting for fuel and O&M than their diesel powered alternatives. The Energy Policy Research Institute estimates that an electric forklift with an 8,000 lb. lift capacity costs roughly $37,500 less than a similar propane model and $48,000 less than a similar diesel model over a projected six-year lifespan. This is in spite of over $9,000 more in upfront capital cost.[54] The reasons for this significant economic advantage are a large decrease in fuel and maintenance costs associated with electrification. Additionally, electric models can save up to 137,000 lbs. of CO_2 over its lifetime and entirely eliminate the local emission of carbon monoxide and toxics.[55]

B. Zero-Emission Buses

On-road diesel heavy-duty vehicles, such as buses and trucks, are accountable for 13% of Connecticut's 2014 NOx pollution. As a result, zero-emission buses and their charging infrastructure are fantastic options for use of the VW Settlement funds. Nationwide, fleets of school, transit, and shuttle buses are already being converted to these clean, cost-effective, alternatives to traditional diesel power. Transit agencies in Shreveport, Lexington, Louisville, Reno, Columbus, Dallas, Oakland, and the Quad-Cities area of Illinois, are just a handful of those investing in electric and hydrogen fuel cell buses.[56] Outside of the U.S., Tel Aviv,[57] London,[58] Barcelona,[59] and a number of Chinese cities[60] have invested in electric buses and

[49] Press Release, *State to Award $23.6 Million for Zero-Emission Trucks at Seaports*, SCAQMD, May 4, 2016, http://www.aqmd.gov/home/library/public-information/2016-news-archives/drayage-trucks
[50] Mack Trucks Inc., *Mack Trucks Demonstrating Zero-Emission Capable Drayage Trucks*, May 23, 2016, http://www.oemoffhighway.com/press_release/12210909/mack-trucks-demonstrating-zero-emission-capable-drayage-trucks.
[51] Transpower, *Electric Drayage Truck*, http://www.transpowerusa.com/downloads/Data-Sheet-Electric-Drayage-Truck-Utilizing-the-Electruck-Drive-System-1-3-14.pdf.
[52] Partial Consent Decree, *supra* note 8 at Appendix D-2 p. 7-8.
[53] The current composition of the lift truck fleet is estimated at 60% electric, 40% combustion. Yale Materials Handling Corp., *The Truth About Electric Lift Trucks* (2010).
[54] Electric Power Research Institute, *Lift Truck Comparison with Capital Costs*, http://et.epri.com/Calculators_LiftTruckComparison_with_cap2.html (last visited Sep. 30, 2016).
[55] *Id.*

[56] *See* Proterra, *Our Customers*, https://www.proterra.com/our-story/our-customers/, for a full list of just one company's sales.
[57] Sharon Udasin, *Five Electric Buses to Begin Running in Tel Aviv*, Jerusalem Post, Sept. 16, 2016, http://www.jpost.com/Business-and-Innovation/Tech/Five-electric-buses-to-begin-running-in-Tel-Aviv-467873.
[58] *Mayor Unveils First Fully Electric Bus Routes for Central London*, Sept. 9, 2016, https://www.london.gov.uk/press-releases/mayoral/mayor-unveils-first-fully-electric-bus-routes.

charging stations. As of 2015 there were over 170,000 electric buses on the road worldwide.[61] Navigant Research projects that "the battery EV (BEV) is expected to be the leading type of electric powertrain for buses through 2026."[62]

Mitigation Trust funds are available to further support the adoption of these highly efficient alternatives to fossil fueled transportation. In addition the Mitigation Trust covers installation of charging infrastructure. As described in greater detail below, the economics already favor widespread investment in zero emission buses and their supporting infrastructure. Investment in these buses today will speed further integration as these technologies come to scale, bringing measurable economic and environmental benefits to the communities they service.

By using Mitigation Trust funds to procure zero emission buses now, our transit agencies can lock in annual savings on fuel ($40,000-$45,000 per year per bus over diesel) and maintenance. The agencies can then procure additional zero emission buses, which will lock in yet further cost savings going forward for the agency.

1. EV Buses Already Have Lower Comparative Lifetime Costs Than Diesel Buses and CNG Buses—And Costs Continue To Drop Rapidly

As discussed below, even today the lifetime cost of an electric bus is significantly lower than that of a new diesel or alternative fuel bus, though the upfront cost is higher. The all-in cost of buses--that is, the upfront cost of the bus purchase, fuel costs and maintenance costs--for electric buses is around $1,000,000, and around $1,400,000 for diesel and CNG buses.[63] Moreover, as EV bus manufacturing scales up, and as battery costs--the most expensive part of an EV--plummet over time, EV bus prices will fall rapidly as well.

a. Up Front Costs

The current sticker price of a new electric bus is about $750,000.[64] A comparable new diesel vehicle costs $480,000 and a compressed natural gas (CNG) bus $490,000, while a Fuel Cell Bus (FCB) costs over $1,000,000.[65] Transitioning to electric technology can also be

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[59] Katie Sadler, *Barcelona Unveils Two New Electric Buses and a Rapid-Charging Station*, EuroTransport, Sept. 21, 2016, http://www.eurotransportmagazine.com/20655/news/industry-news/barcelona-electric-buses-rapid-charging-station/.

[60] *See* Lindsay Dodgson, *Buses and Batteries: A Rising Sector*, May 31, 2016, http://www.power-technology.com/features/featurebuses-and-batteries-a-rising-sector-4904956/.

[61] International Energy Agency, *Global EV Outlook 2016*, 24-25 *available at* https://www.iea.org/publications/freepublications/publication/Global_EV_Outlook_2016.pdf.

[62] Electric drive buses include hybrid, fuel cell, and all-electric vehicles. Navigant Research, *Electric Drive Buses*, https://www.navigantresearch.com/research/electric-drive-buses (last visited Oct. 10, 2016).

[63] *The Business Case For the Proterra Electric Bus*, Aug. 3, 2015, http://ecomento.com/2015/08/03/business-case-proterra-electric-bus/

[64] Proterra's Catalyst bus cost $749,000 in 2016 while BYD's all-electric bus costs $770,000. Draft, Cost Model Discussion with ACT Cost Subgroup, slides 9-10 (Aug. 23, 2016) *available at* http://cafcp.org/sites/default/files/5_CARB-ACT-Cost-Model-Discussions_CaFCP-Bus-Team-Meeting-Aug2016.pdf (hereinafter "Air Resources Board Cost Model").

[65] *Id.* at slides 9 (CNG), 10 (diesel), 12 (Hydrogen Fuel Cell).

accomplished through repowering existing diesel vehicles with all-electric components, a process that costs around $500,000.[66]

Government estimates of zero-emission bus prices sharply decline as advances in battery manufacturing and increased demand drive down costs. By 2025—within the 10-year timeframe of the VW Mitigation Trust grant program—an electric bus is expected to cost $480,000, equal to or less than the cost of a new diesel vehicle.[67] Much of this decrease is attributable to projected reductions in battery costs. A California Air Resources Board-conducted literature review concluded that studies consistently place the cost of batteries below $500/kWh by 2020, and approaching $200/kWh by 2030.[68] These estimates are already outdated and clearly understate the rate of reductions in battery costs, which again are the most expensive part of an EV. GM announced that already, even in 2016, it was procuring batteries for its Bolt EV for $145/kWh.[69]

As explained below, even without future reductions in costs, EV buses, with their far lower fuel, operating, and maintenance costs, exhibit lower lifetime costs than diesel and CNG buses.

b. Fuel Savings

Electric buses offer tremendous fuel savings. For example, Proterra's all-electric Catalyst bus registers a fuel efficiency averaging 17.48 miles per diesel gallon equivalent (MPDGe) of electric charge.[70] By contrast, diesel buses average 3.26 miles per gallon (MPG)[71] and CNG buses average 4.51 MPDGe.[72] Electric costs vary by market but average $0.12/kWh nationally[73], or about $1.17 per gallon diesel equivalent[74]. By contrast, average diesel fuel prices are between $2-3 per gallon[75] and CNG costs approximately $2.05 per gallon diesel equivalent.[76] Based on these prices, an electric bus will consume about $5,000-$10,000 in electricity annually,

[66] Repowering refers to the removal of the existing motor and drivetrain and replacement with all-electric components. *See* Rich Piellisch, *21 All-Electric ZEPS Buses for IndyGo*, Dec. 8, 2014, http://www.fleetsandfuels.com/fuels/evs/2014/12/21-all-electric-zeps-buses-for-indygo/ (21 rebuilds at a total cost of $12.2 million).
[67] Air Resources Board Cost Model, slide 10 (all values in 2016 dollars).
[68] *Id.* slide 11.
[69] Jay Cole, *GM: Chevrolet Bolt Arrives in 2016, $145/kWh Cell Cost, Volt Margin Improves $3,500*, http://insideevs.com/gm-chevrolet-bolt-for-2016-145kwh-cell-cost-volt-margin-improves-3500/.
[70] NREL, *Foothill Transit Battery Electric Bus Demonstration Results*, vii, Jan. 2016, *available at* http://www.nrel.gov/docs/fy16osti/65274.pdf.
[71] U.S. Department of Energy, Alternative Fuels Data Center, *Average Fuel Economy of Major Vehicle Categories*, http://www.afdc.energy.gov/data/10310.
[72] *Id.*
[73] U.S. Department of Transportation, *Zero Emissions Bus Benefits* https://www.transportation.gov/r2ze/benefits-of-ZEBs (last visited Oct. 10, 2016). It is important to consider that, for high power charging, additional costs beyond volumetric electricity use may be incurred depending on the applicable utility rate structure. In particular, demand charges – costs incurred for high rate of power flow – can make a significant difference in determining fuel costs.
[74] https://www.energy.gov/maps/egallon#
[75] Average national price as of October 3, 2016 was $2.389/gallon, but varies greatly with underlying crude oil prices, *see* http://www.eia.gov/petroleum/gasdiesel/.
[76] U.S. Department of Energy, *Clean Cities Alternative Fuel Price Report* 4, tbl 2 (July 2016) *available at* http://www.afdc.energy.gov/uploads/publication/alternative_fuel_price_report_july_2016.pdf.

far lower than the $50,000/yr spent on diesel[77] or $30,000/yr spent on CNG[78] to fuel a similar vehicle. FCBs are currently more expensive. FCBs are fueled by hydrogen, which costs approximately $8/kg in 2016.[79] Notably, long-range electric buses are available on the market. Proterra offers electric buses with mileage ranges of 49-350 miles per charge,[80]and BYD sells a bus that goes approximately 155 miles.[81] New Flyer is testing a hydrogen fuel cell bus with 300 miles of range.[82] Companies such as Complete Coach Works offer rebuilt electric buses for lower cost than new buses.[83]

Variability in fuel supply also increases the difficulty of predicting an operating budget for a diesel, or CNG dependent transportation fleet. While long-term fuel contracts can insulate against these fluctuations, shifts in real world prices can still impact operations when negotiating those contracts.

c. Operating & Maintenance Costs:

Electric buses also have substantially lower operating and maintenance (O&M) expenses as compared to their diesel and CNG alternatives. With an electric or hydrogen fuel cell bus, there are no oil changes or emissions tests, fewer parts that can break, and less wear on braking systems. The average lifetime maintenance cost for an electric bus is just $0.60/mile. This is a significant reduction from the $0.85/mile associated with diesel and CNG fueled vehicles.[84] Hydrogen fuel cell buses have an average maintenance cost of $1.00/mile.[85] Proterra estimates that over a 12 year lifetime, an all-electric bus will save its operator $448,000 as compared to a traditional diesel vehicle, $408,000 as compared to a CNG vehicle, and $459,000 as compared to a diesel-hybrid vehicle.[86]

d. Charging Infrastructure Costs:

There are two options for electric bus charging infrastructure. First, a typical Class 3 slow charger can charge a bus in 3-5 hours. These chargers cost around $65,000 to purchase and install.[87] Again, this cost can be covered by Mitigation Trust funds. With advances in battery technology increasing bus ranges, new models can achieve up to 350 miles on a single charge,

[77] California Air Resources Board, *Literature Review on Transit Bus Maintenance Cost (Discussion Draft)* at 7 (Aug. 2016) *available at* https://www.arb.ca.gov/msprog/bus/maintenance_cost.pdf.
[78] California Air Resources Board, *Technology Assessment: Medium and Heavy-Duty Battery Electric Trucks and Buses*, Draft, IV-5 (Oct. 2015).
[79] Air Resources Board Cost Model, slide 20.
[80] *See* Proterra Catalyst Bus Specifications, https://www.proterra.com/wp-content/uploads/2016/08/Proterra-Catalyst-Vehicle-Specs.pdf.
[81] BYD, *Electric Bus,* http://www.byd.com/na/old/auto/ElectricBus.html.
[82] Alex Roman, *What's New in Electric Buses?* Metro Magazine *available at* http://www.metro-magazine.com/sustainability/article/711947/what-s-new-in-electric-buses.
[83] Complete Coach Works, *ZEPS Electric Remanufactured Transit Bus* http://completecoach.com/zeps-timelapse/.
[84] Air Resources Board Cost Model, slide 13.
[85] Air Resources Board Cost Model, slide 16.
[86] Proterra, *The Proterra Catalyst 35-Foot Transit Vehicle*, https://www.proterra.com/products/35-foot-catalyst/ (last visited Oct. 11, 2016).
[87] Air Resources Board Cost Model, slide 24.

enough to allow an operator to charge its buses overnight and then operate all day without needing to stop to refuel.[88]

Alternatively, fast chargers can provide 30 miles worth of charge in 8-13 minutes.[89] This design allows a bus to charge during the course of its normal route, eliminating the need to come out of circulation to refuel.

2. Mitigation Trust Funds Can Be Used To Purchase and Install Electric Buses and Charging Equipment; Locked in O&M Savings Can Then Be Used to Expand the EV Bus Fleet, Generating Further Savings

Mitigation Trust funds are available to meet the higher capital requirements of an electric bus fleet, allowing a transit agency to then lock in the lower lifetime costs of EV buses. The agency can then use the lifetime savings on fuel and maintenance to procure additional EV buses and build on lifetime savings going forward.

For the reasons discussed above and depicted in the table below, once costs are viewed on a lifetime basis, investing in electricity is far preferable to diesel or CNG vehicles.

Costs (Capital + O&M) for Diesel, CNG, Electric Buses

	Diesel	CNG	Electric
Purchase Price	$480,000	$490,000	$750,000
Fuel Cost (DGe)	$2-3	$2.05	$1.29
Fuel Cost (annual)	$50,000	$30,000	$5,000-$10,000
Fuel Efficiency(MPDGe)	3.26	4.51	17.48
O&M cost ($/mile)	$0.85	$0.85	$0.60
Additional Lifetime O&M (compared to electric)[90]	$448,000	$408,000	--
Approximate Lifetime Cost	$1,348,000[91]	--	$1,180,000[92]

These savings are not exclusive to transit buses. Electric School Buses are in use by a number of municipalities throughout the country.[93] School buses are ideal fits for electrification.

[88] *See* Proterra Catalyst Bus Specifications, https://www.proterra.com/wp-content/uploads/2016/08/Proterra-Catalyst-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/.
[89] NREL, *Foothill Transit Battery Electric Bus Demonstration Results*, 13, Jan. 2016, *available at* http://www.nrel.gov/docs/fy16osti/65274.pdf.; *see also* Proterra Catalyst Bus Specifications, https://www.proterra.com/wp-content/uploads/2016/08/Proterra-Catalyst-Vehicle-Specs.pdf.
[90] Includes savings from fuel and maintenance, *see* Proterra, *The Proterra Catalyst 35-Foot Transit Vehicle*, https://www.proterra.com/products/35-foot-catalyst/ (last visited Oct. 11, 2016).
[91] Judah Aber, *Electric Bus Analysis for New York City Transit*, Columbia University, May 2016, 16 fig 7, http://www.columbia.edu/~ja3041/Electric%20Bus%20Analysis%20for%20NYC%20Transit%20by%20J%20Aber%20Columbia%20University%20-%20May%202016.pdf.
[92] *Id.*

Buses typically operate two shifts each day, once in the morning and again in the afternoon. Down time between shifts allows buses to fully recharge. In King County, California, two electric school buses were estimated to save roughly 16 gallons of fuel per bus per day. This amounted to an annual fuel saving of over $11,000 per bus.[94]

C. Electric Trucks

Similar to electric buses, electric trucks are a smart option for Mitigation Trust funds and have the opportunity to provide great NOx emissions reductions for the state of Connecticut. Electric medium duty trucks (Class 4-6) are widely used and in active service on the road today. With plummeting battery costs, heavy duty and long haul (Class 7 and higher) electric vehicles are already in pilots and on their way to market. Class 4-7 diesel trucks are eligible for Mitigation Trust funds. These trucks weigh between 14,001 and 33,000 lbs. and include, but are not limited to, delivery trucks, box trucks, beverage distribution trucks, rack trucks, and refuse vehicles.[95]

1. Electric trucks are already being used by businesses across America.

Staples, Frito-Lay, FedEx, UPS, and Coca-Cola are a few of the private firms that have successfully integrated on-road medium size electric trucks into their fleets. Electric medium trucks are available from Smith Electric, ZeroTruck, Boulder Electric Vehicle, EVI-USA, and Freightliner Customer Chassis Corp.[96] These companies offer a number of configurations, primarily for localized/urban (so-called "last mile") delivery and goods/refuse hauling.[97] Because of limited battery range --typically a 100-mile maximum—today's electric medium duty trucks are most effectively deployed in urban or short haul settings.[98]

Larger auto manufacturers are also developing these technologies to meet both growing market demand and environmental regulations. Mercedes recently unveiled its Urban eTruck

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[93] *See e.g.,* James Ayre, *Massachusetts Puts $1.4 Million into Electric School Bus Pilot Program*, Aug. 16, 2016, https://cleantechnica.com/2016/08/16/massachusetts-puts-1-4-million-electric-school-bus-pilot-project/; Nicole Schlosser, *Can Electric School Buses Go the Distance?* May 23, 2016, http://www.schoolbusfleet.com/article/713421/can-electric-school-buses-go-the-distance (providing an overview of state and local pilot projects); Larry Hall, *Tech: The Yellow School Bus Is Going All Electric*, Clean Fleet Report, Mar. 26, 2016, http://www.cleanfleetreport.com/tech-yellow-school-bus-going-electric/.

[94] Larry Hall, *Tech: The Yellow School Bus Is Going All Electric*, Clean Fleet Report, Mar. 26, 2016, http://www.cleanfleetreport.com/tech-yellow-school-bus-going-electric/.

[95] The Partial Consent Decree allows funding for Class 4-7 Local Freight Trucks with model years 1992-2006 unless state regulations already require upgrades to 1992-2006 model years. For a description of truck classes see Oak Ridge National Lab, 2015 Vehicle Technologies Market Report, Chapter 3: Heavy Trucks at 109 *available at* http://cta.ornl.gov/vtmarketreport/pdf/2015_vtmarketreport_full_doc.pdf.

[96] Sean Lyden, *The State of All-Electric Trucks*, Green Fleet, Jan/Feb 2014, 22 *available at* http://zerotruck.com/wp-content/downloads/GRN_medium.pdf.

[97] *See e.g.*, ZeroTruck, *Specs*, http://zerotruck.com/our-fleet/ (last visited Oct. 18, 2016); Smith Electric, *Models and Configurations*, http://www.smithelectric.com/smith-vehicles/models-and-configurations/ (last visited Oct. 18, 2016); Boulder Electric Vehicle, *Models*, http://www.boulderev.com/models.php (last visited Oct. 18, 2016); EVI-USA, *Vehicles*, http://www.evi-usa.com/PRODUCTS/Vehicles.aspx (last visited Oct. 18, 2016).

[98] *Id.*

concept[99] as well as its first fully electric heavy-duty truck.[100] Tesla has similarly indicated its intention to apply its all-electric technology to the heavy-duty truck market.[101] Both companies are focusing on larger Class 7/8 Heavy Duty trucks, meaning that the technology may become available within the ten-year lifespan of the Mitigation Trust.

2. Electric trucks save money compared to their diesel counterparts.

Converting to electric medium trucks makes economic sense. A 2013 study placed the total cost savings of electric versus diesel truck ownership at 22%.[102] That study assumed a cost premium of $25,000 to $37,000 for electric compared to diesel trucks. Notably, since that study was published, battery prices have dropped from $625/kWh, the value used in the study, to under $200/kWh.[103] Because the up-front cost of an electric truck is significantly influenced by the cost of the battery pack, the study likely understates current lifetime cost savings of switching to electric trucks.

Electric delivery trucks also offer significant savings in fuel and maintenance costs as compared to diesel vehicles. Fuel cost savings from switching to electric trucks are tremendous. For example, diesel costs between $2-3 per gallon[104] and "last mile" diesel vehicles are extremely inefficient: the average fuel economy ranges from 4.6 MPG to 9.6 MPG depending on route characteristics.[105] Electricity prices average approximately $1.29 per gallon of diesel equivalent, though prices vary by region and electric utility provider. Electric delivery trucks average between 16.7 MPGe and 34.3 MPGe for those same routes.[106]

These improvements in efficiency add up to significant real world savings in fuel and maintenance costs. EVI estimates that the owner of an electric Class 6 truck should expect to spend only $2,022 per year on electricity while the owner of a similar model diesel vehicle would spend $6,036 on diesel at current prices. Over a projected ten-year lifespan, the cost savings are even greater with an electric vehicle requiring only $17,901 of electricity versus $144,632 spent to fuel a diesel truck.[107]

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[99] Stephen Edelstein, *VW e-Crafter, Mercedes Urban e-truck concept: electric vans for Europe*, Green Car Reports, Sep. 28, 2016 http://www.greencarreports.com/news/1106348_vw-e-crafter-mercedes-urban-e-truck-concept-electric-vans-for-europe.

[100] Danielle Muoio, *Mercedes-Benz just revealed its first fully electric truck*, Business Insider, Sep. 21, 2016 http://www.businessinsider.com/mercedes-electric-urban-truck-photos-2016-9.

[101] Joseph White & Paul Lienert, *Musk 'master plan' expands Tesla into trucks, buses and car sharing*, Jul. 20, 2016 http://www.reuters.com/article/us-tesla-masterplan-idUSKCN1002Q4.

[102] Dong-Yeon Lee, et al., *Electric Urban Delivery Trucks: Energy Use, Greenhouse Gas Emissions, and Cost-Effectiveness*, Environ. Science & Tech. 47, 8022 (2013).

[103] John Voelcker, *Electric-car battery costs: Tesla $190 per kwh for pack, GM $145 for cells*, Green Car Reports, Apr. 28, 2016, http://www.greencarreports.com/news/1103667_electric-car-battery-costs-tesla-190-per-kwh-for-pack-gm-145-for-cells. The decreases have not been as significant for larger electric vehicles which rely on a different battery chemistry than electric passenger vehicles. *See* California Air Resources Board, *Technology Assessment: Medium and Heavy-Duty Battery Electric Trucks and Buses*, Draft, V-3 (Oct. 2015).

[104] Average national price as of October 3, 2016 was $2.389/gallon, but varies greatly with underlying crude oil prices, *see* http://www.eia.gov/petroleum/gasdiesel/.

[105] Electric Urban Delivery Trucks, *supra* note 9 at 8027.

[106] *Id*.

[107] Cost estimates from First Priority GreenFleet assuming national average diesel price of $2.57/gallon and electricity $0.12/kWh.

Electric trucks also save significant maintenance costs over their lifetime. For example, a diesel "last mile" truck registers maintenance costs around $0.22/mile.[108] These costs include oil changes, break repairs, belt replacements, and regular inspections. An electric delivery truck, by contrast, costs only $0.056-$0.111/mile.[109] Electric trucks simply have fewer parts to replace and repair. Additionally, electric drive trains and regenerative breaking reduce wear and tear on remaining parts like brake pads. Because delivery trucks make frequent stops and travel in congested urban areas, brakes are historically one of the most frequent and expensive costs. With electric drive trains break repairs can be reduced by 20-30%.[110]

3. Electric trucks reduce air pollution.

Diesel powered class 4-7 trucks emit, on average, between 4.35 and 7.47 grams of NO_x per mile traveled.[111] Electric vehicles have zero tailpipe emissions. Converting to electricity therefore has a significant impact on local air pollution. Additionally, from a well-to-wheels perspective, electric delivery trucks can reduce greenhouse gas emissions by 27-61%, and they keep improving their environmental performance as our electricity grids get cleaner and cleaner.[112]

Lots of pollution from class 4-7 trucks stems from their unique operational requirements. Many of these vehicles register significant idling times, during which they continue to pollute without any additional vehicle miles traveled. A diesel truck uses between 0.40 and 0.85 gallons of diesel per hour of idling.[113] This costs operators money and contributes to air pollution. To address this issue from long-haul trucks states have electrified truck stops.[114] However, this has not addressed the issue of idling in the local freight and parcel delivery fleets. It is important to address these emissions because they have a tendency to occur in populated urban and suburban settings. Electric vehicles can idle without emitting, and have more efficient start-up/shut-down abilities that may further reduce the need to idle.

4. Mitigation Trust funds can be used to realize the benefits of electric trucks

The life time cost savings from investing in electric trucks means that using Mitigation Trust funds for the up-front cost of these vehicles can actually reduce long-term operating and maintenance expenses, freeing up budget space for additional investment in electric vehicles.

D. Multiplying funds through the DERA Program

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[108] *Id.* at 8025.
[109] *Id*.
[110] *Id*.
[111] U.S. EPA Office of Transportation and Air Quality, *Average In-Use Emissions from Heavy-Duty Trucks*, Oct. 2008, 5 https://www3.epa.gov/otaq/consumer/420f08027.pdf.
[112] Electric Urban Delivery Trucks, *supra* note 9 at 8028-29. This variation depends on the operational characteristics of the diesel truck being replaced. If a diesel truck runs a small route and uses less fuel/day then there are less GHGs to reduce. *Id*.
[113] Oak Ridge National Lab, 2015 Vehicle Technologies Market Report, Chapter 3: Heavy Trucks at 123 *available at* http://cta.ornl.gov/vtmarketreport/pdf/2015_vtmarketreport_full_doc.pdf.
[114] *Id.* at 124.

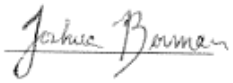
States have the option to apply for its Volkswagen funding through a partnership with the Federal Diesel Emissions Reductions Act ("DERA"), a program enacted by Congress in 2011 to help reduce diesel engine emissions nationwide. Through this suggested partnership of Volkswagen Settlement and DERA Programming, Connecticut could receive additional funding for electrification of its mobile sector. To achieve this, VW Settlement funds may be used for the DERA Program's voluntary non-federal matching option. Specifically, we encourage Connecticut to apply for program funding through DERA from the EPA, and then use Volkswagen Settlement funds to participate in the DERA voluntary match program. As a result, the EPA will increase their DERA Program funding by an additional 50%.

For example, suppose Connecticut submits a zero-emission transit bus program proposal and receives $200,000 through DERA. If the state matches this amount with $200,000 from VW Settlement funds, the EPA will add a bonus $100,000 to the total program funding. Consequently, Connecticut would receive a total of $500,000 for its zero-emission transit bus proposal, as compared to the initial $200,000.

The goal of eligible DERA programs is to reduce vehicle or vessel NOx emissions, so many of the eligible programs are comparable to those outlined in the VW Settlement. There are some additional programs, however, included in DERA but not included in the Settlement. These include repowering non-road engines (e.g. agricultural irrigation pump engines, bull dozer engines), building up Truck Stop Electrification (or "Electrified Parking Spaces"), and programming for increased Idle Reduction Technology. Ultimately, we support any action that will increase the available funds, so long as the funds are directed towards electrification of Connecticut's mobile source sector.

Thank you for your consideration.

Respectfully submitted,



Joshua Berman
Katherine Clements
Sierra Club
50 F St. NW, 8th Floor
Washington, DC 20001
Tel: (202) 650-6062
Email: Josh.Berman@sierraclub.org

VW Settlement Comments

frank@medicaire.net

Tue 1/3/2017 1:59 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: Frank Podgwaite
Job Title: mgr.
Company: Medicaire, LLC / Medidock

Comments: January 3, 2017

Use of Volkswagen settlement funds for Ambulance/Emergency Vehicle Idle Reduction:

Idling of ambulances is a significant contributor to air pollution, particularly as the majority of the idling occurs adjacent to healthcare facilities with their sensitive populations exposed. Reducing this idling provides a direct air quality improvement. Problematic to not idling the ambulance is the fact that interior temperatures and medical equipment must be maintained in a state of readiness, requiring power. My firm's product, the Medidock, provides a real solution to this problem by allowing an ambulance to remain 'mission-ready' without idling.

Our system is a kiosk, installed at Emergency Departments and other medical facilities and at remote locations where ambulances are 'posted' to improve response times and improve air quality. The Medidock requires no special equipment to be installed onboard the vehicle – any & all ambulances can use it. In addition to electrical power for the onboard emergency medical equipment it also provides vehicle interior climate control - without the need to run the engine. Our units ease of operation encourages EMT's to actually use the machines, resulting in fuel and maintenance savings for the vehicle operators and environmental benefits for everyone. On our website www.medicaire.net you will find a study done by the Ozone Transport Commission (OTC) which indicates a significant NOx reduction as noted from sites in VT & NH.

Medidocks are presently successfully operating in northern New England and locations in the Midwest.

While vehicle idle reduction is not specifically indicated in the settlement, augmentation of DERA is, allowing a pathway for funding this important public health/air quality improvement.

I urge you to consider earmarking funding for the Medidock in the final Beneficiary Mitigation Plan. Thank you for your consideration.

Frank Podgwaite
MedicAire, LLC
Medidock
North Haven, CT 06473
203-887-0209 cell
frank@medicaire.net

www.medicaire.net
“Exclusive Distributors of the Medidock”

VW Settlement Comments

Kevin Miller <kevin.miller@chargepoint.com>

Thu 1/12/2017 7:11 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

2017.01.12 - CT DEEP VW Settlement Comments, ChargePoint.pdf;

To Whom it May Concern:

Please accept the attached comments submitted on behalf of ChargePoint with regard to the VW Settlement.

Sincerely,
Kevin

Kevin George Miller
Director, Public Policy
ChargePoint | chargepoint.com
+1.917.836.4954 mobile

January 12, 2017

Rob Klee, Commissioner
Department of Energy & Environmental Affairs
79 Elm Street
Hartford, CT 06106

RE: Comments on VW Settlement Funding Opportunities

Dear Commissioner Klee,

Thank you for the opportunity to provide comments on how Connecticut engages with the funding opportunities associated with the Volkswagen (VW) "Dieselgate" settlement. ChargePoint is the world's largest and most open EV charging network with more than 31,000 level 2 and DC fast charging spots. Every 4 seconds, a driver connects to a ChargePoint station and by initiating over 20 million charging sessions, ChargePoint drivers have driven over 505 million gas free miles.

The approach taken by the State of Connecticut to leverage funds associated with the VW settlement is critical to the long-term health of its electric vehicle ("EV") and EV charging markets. If state plans are appropriately structured to encourage the growing industries around EVs, these funds could accelerate electric vehicle adoption. Conversely, poorly designed funding plans could actually inhibit the rapid deployment of the very EV infrastructure it was designed to support.

The comments in this letter will focus on Connecticut's engagement in the deployment of Appendix C and Appendix D funds and suggest an approach to coordinating those efforts in a manner that promotes long-term growth in electrified transportation. Supporting a competitive and healthy EV charging market is the most sustainable and scalable way to achieve Connecticut's greenhouse gas emissions reductions goals and fulfill its commitment under the 2015 Memorandum of Understanding to deploy 155,000 ZEVs by 2025.

Background on VW Settlement

Volkswagen has entered into a consent decree with the federal government and the State of California to resolve damages, penalties, and mitigation actions associated with "Dieselgate". Appendix C of the consent decree provides $2 billion for electric vehicle infrastructure, access, and education. Of the $2 billion of Appendix C funds, $800,000 will be designated for California and $1.2 billion will be designated for the 49 remaining states. Separately, Appendix D establishes a $2.7 billion trust fund for environmental mitigation.

Appendix C – ZEV Investment Plan

The approach by VW to solicit project proposals through its website, ElectrifyAmerica.com, has garnered interest around the country. ChargePoint understands the

interest in maximizing funds allocated within a state, but it is essential that proposals be generated transparently to avoid unintentional disruptions to the EV and EV charging markets. Should Connecticut consider to submit a statewide proposal to VW, ChargePoint would encourage DEEP to make all submissions publicly available so that the competitive market may also freely engage with these opportunities.

ChargePoint supports NESCAUM's proposal to establish guiding principles for VW's ZEV investments in the Northeast Corridor states. As noted by NESCAUM, identifying such principles can help shift from the focus of ZEV investments from "quick wins" to providing "a solid foundation for the strategic long-term build out of ZEV infrastructure in the region that will foster a sustainable ZEV market."[1]

Efforts to establish comprehensive guiding principles are underway in California at the California Air Resources Board, which could serve as a model for a process in Connecticut. As Connecticut considers how to engage, ChargePoint encourages DEEP to consider submitting guidelines and principles (example attached) by which VW must engage in the state to provide a level playing field for all market participants.

Appendix D – Environmental Mitigation Trust

Appendix D of the VW Settlement allows each beneficiary to invest up to fifteen percent (15%) of its allocation of Trust Funds on costs associated with deploying new, light duty EVSE. ChargePoint recommends that Connecticut dedicate its entire 15% carveout towards electric vehicle charging infrastructure. We recommend that the following features be included in a light duty EVSE program:

1. Incentives should be structured simply through rebates, vouchers, or a straightforward grant program;
2. Support competition and allow multiple vendors and business models to participate in any program;
3. Require 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. Coordinate with other state and utility programs;
6. Seek to coordinate with neighboring states to establish EV fast charging corridors, including those identified by the FAST Act; and
7. Focus funding on areas of greatest need include workplaces, multifamily housing, and disadvantaged communities.

For the non-EV charging station Environmental Mitigation Trust funding, ChargePoint encourages the state to focus all 85% on electrification over other fuel sources, which will lead to the greatest transportation emissions reductions. Given currently available technology,

[1] NESCAUM letter to VW dated December 9, 2016. http://www.nescaum.org/topics/zero-emission-vehicles/

ChargePoint encourages the state to focus on electric buses and medium duty transit vehicles. While we support all forms of electrification, ChargePoint particularly encourages investment in vehicles that have the ability to charge on standard EV charging stations, such as Proterra, which uses an SAE combo plug for charging its electric buses. This 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.

We respectfully request a meeting with you and your team to further discuss a process and guidelines to help Connecticut more effectively engage on these and other transportation electrification issues. Thank you for your attention, and we look forward to hearing from and being a resource for you on this matter. If you have any questions, please contact me at kevin.miller@chargepoint.com or (669) 237-3358.

Respectfully,

Kevin George Miller
Director, Public Policy
ChargePoint

Proposed Guidelines for VW Appendix C Investments in Connecticut

- Creates new opportunities and does not duplicate work being undertaken by existing state or utility programs, or projects that are otherwise already in development;
- Investments must be "brand neutral" for vehicles *and* charging station networks; and
- Incentives should be structured simply through rebates, vouchers, or a straightforward and open grant program;
- Allows site host the ability to own and have choice over equipment and services, and set pricing and access controls;
- Supports competition and allow multiple vendors and business models to participate in any program;
- 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;
- 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;
- Focuses funding on areas of greatest need include workplaces, multifamily housing, and disadvantaged communities.

VW Settlement Comments

Eugene DeJoannis <gdejo@sbcglobal.net>

Mon 1/16/2017 11:55 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: Roger Smith <roger@fleetinglightmedia.com>; Bernard Pelletier <bernard.pelletier@comcast.net>; Henry Link <hlinkage@yahoo.com>;

Name: Eugene DeJoannis
Job Title: Co-President
Company: Solar Energy Association of CT

Comments: There is a technology for large diesel engines that converts them from pure diesel to Bi-fuel operation. With a fairly inexpensive conversion kit the engine can be operated on a mix of diesel and compressed natural gas. Some diesel fuel is required for compression-ignition, since the engine does not have spark ignition, however the total diesel used is much less than 100% of the fuel energy. I am not sure what this ratio would be for a mobile engine with varying load, but it would surely cut diesel fuel used.

Proposal 1: Use VW fund for incentive payments to fund conversion to bi-fuel operation of CT registered heavy duty diesel engines. Such trucks could be offered tax breaks in addition to the conversion costs, since they would reduce toxic emissions statewide.

Proposal 2: Use VW fund to add high-quality particle exhaust filters to vehicles with large diesel engines. I believe CT Transit has tested these filters and found them about as effective as conversion to natural gas. They would probably be very willing to engage in a pilot program. School buses would be another worthy recipient.

Proposal 3: Use VW fund for total conversion of diesel to CNG operation by addition of fuel storage, handling and spark ignition to existing engines or subsidize engine replacement. These conversions would be more costly than Bi-fuel conversions which do not require the ignition system.

Proposal 4: Use VW fund for incentive payments to offset the added initial cost of Hybrid-diesel or Hybrid-CNG vehicles or all electric busses.

Proposal 5: Use VW fund for incentive payments to offset conversion of some bus routes to short-range all-electric busses with rapid recharging at selected bus stations by overhead pantograph or wireless in-pavement equipment. This system has been developed by the large Swiss-Swedish industrial company ABB. Perhaps CT Transit would be willing to do a pilot program.

Proposal 6: Fund electrification of the New Haven - Hartford - Springfield rail line to eliminate diesel engines on that line. Another option is to incentivize diesel-electric hybrid locomotives for that line.

Gene *D*eJoannis

gdejo@sbcglobal.net
860-375-3356

Any society that can conceive of and execute something
as recklessly ambitious as tar-sands mining should find the
transformation to a clean-energy economy to be a walk in the park.

VW Settlement Comments

John Elsesser <jelsesser@coventryct.org>

Tue 1/17/2017 12:47 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: John Elsesser
Job Title: Town Manager
Company: Town of Coventry

Comments: Funds for Natural gas school buses and natural gas fueling stations

VW Settlement Comments

Robert O'Connor <robert.oconnor8@gmail.com>

Thu 1/19/2017 9:35 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: Robert O'Connor

Job Title:

Company:

Comments:

I'd like to see the State of CT fully fund the Putnam Bridge Multimodal Trail. The study is done, the plans are there, the path is already on the bridge. This would potentially alleviate a variety of emissions from all types of vehicles while encouraging walking and bicycling across the CT River.

http://www.ct.gov/dot/cwp/view.asp?a=3535&q=518198

--

Rob O'Connor
180 Main Street
Wethersfield, CT 06109
Cell: 860-614-0759

VW Settlement Comments

Katharine Cohen <kcohen@connpirg.org>

Fri 1/20/2017 5:47 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: Farrell, Paul <Paul.Farrell@ct.gov>;

2 attachments

ConnPIRG_Public Comments Re-VW Settlement.pdf; ConnPIRG Final Paper.pdf;

Name: Kate Cohen
Job Title: State Director
Company: ConnPIRG

Comments:

1/20/2017
Connecticut Dept of Energy & Environmental Protection
79 Elm St
Hartford, CT
06106

Dear Commissioner,

As you are aware, $51.6 million is now available to Connecticut for cleaning up our dirty transportation system. This money is the result of the recent civil settlement from Volkswagen's diesel emissions scandal. While we have no way of clawing back the pollution caused by Volkswagen's deception, taking advantage of this money can help Connecticut reduce dangerous pollution, improve health outcomes, diminish global warming pollution, support our state's clean air goals, and accelerate the transition to a modern, electric transportation system.

As you know, in order for Connecticut to receive this money, DEEP must submit its plan to distribute this funding within 90 days of being designated the beneficiary, consistent with the terms of the trust.

With regards to developing such a plan, ConnPIRG Education Fund recently released a report, attached here as well, that recommends the state use 15 percent of the funds (the maximum allowable in the terms of the settlement) on fast charging electric stations along state highways. That level of investment is sufficient to install up to 154 fast charging stations, enough to cover Connecticut's entire state highway system with a charger every 50 miles or less. The remaining 85 percent should be spent on replacing aging, dirty, diesel transit buses with clean, all-electric buses. With our share of the funds, that can purchase up to 54 zero-emissions, all-electric buses.

As our report explains in greater detail, we believe these investments will best help Connecticut reduce harmful pollution, save lives, protect the environment, combat global warming, and accelerate the market shift toward complete electrification of our transportation system. Spending any of this money on dirty alternatives, like newer diesel, compressed natural gas, or even hybrid buses would not accomplish these goals and would lock in more pollution for the future.

Thank you for your attention and we hope that your plan will support investments that will deliver the greatest benefits to all people in Connecticut. If you have any questions or require any other information, please do not hesitate to contact us.

Sincerely,

Kate Cohen
State Director
ConnPIRG
kcohen@connpirg.org
(c)201-616-8370

From Deceit to Transformation:

How Connecticut Can Leverage Volkswagen Settlement Funds to Accelerate Progress to a Clean Transportation System

Authors:
Kate Cohen, Director, ConnPIRG Education Fund
John Olivieri, National Campaign Director for 21st Century Transportation, U.S. PIRG Education Fund
Lauren Aragon, Transportation Fellow, U.S. PIRG Education Fund

ConnPIRG Education Fund

Acknowledgments

We thank Sean Doyle, U.S. PIRG Education Fund Digital Organizer, for his review of this report and the Southwest Energy Efficiency Project (SWEEP) for their work highlighting the importance of this issue.

The authors bear responsibility for any factual errors. Policy recommendations are those of the Connecticut Public Interest Research Group Education Fund. The views expressed in this report are those of the authors and do not necessarily reflect the views of our funders.

With public debate around important issues often dominated by special interests pursuing their own narrow agendas, the Connecticut Public Interest Research Group Education Fund offers an independent voice that works on behalf of the public interest. Connecticut Public Interest Research Group Education Fund works to protect consumers and promote good government. We investigate problems, craft solutions, educate the public, and offer citizens meaningful opportunities for civic participation. For more information about http://www.connpirgedfund.org/.

Cover Image: SanJoaquinRTD | Wikimedia, CC BY-SA 3.0 Unported

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Environmental Mitigation Trust: An Opportunity for Transformation

Volkswagen (VW) perpetuated a fraud on the American people, deceiving consumers into believing that they were getting the best possible combination of performance and sustainability. But VW's promises were nothing more than lies that significantly harmed our collective health and the health of our environment. Yet, their deceit now represents a historic opportunity to drastically reduce harmful pollution that makes us sick and destroys the planet, while also providing an essential down payment toward the transition to a clean and modern 21st century transportation system.

This future, however, is not assured.

There remains a real risk that these funds will be wasted on outdated and polluting technologies, including those that rely on diesel and natural gas, while foregoing the transition to clean, all-electric vehicles (EVs) and supporting infrastructure. Indeed, of the numerous possible uses outlined in the VW settlement, many allow for the replacement of older, dirty diesel technology with new, still dirty, diesel technology, compressed natural gas (CNG) or diesel-electric hybrids.[1]

Relative to all-electric vehicles, diesel and natural gas produce significantly more tailpipe nitrogen oxides (NO_X) and greenhouse gas (GHG) emissions as well as more total emissions over their lifecycle. In fact, in 2012, the International Agency for Research on Cancer classified diesel engine exhaust as carcinogenic to humans based on evidence that exposure increased the risk for lung cancer, highlighting the importance of transitioning away from diesel in particular.[2]

Accordingly, investing in diesel and natural gas technologies with VW settlement funds would represent a significant missed opportunity to accelerate the transformation to an all-electric, clean-running transportation network that could help reduce illness, save lives and protect the planet. The VW settlement[3] clearly envisions and encourages such a use. For instance, the Environmental Mitigation Trust (EMT), established under the VW settlement, can be used to subsidize 100 percent of the purchase of clean all-electric buses for use in public transit agencies throughout the country. Similarly, up to 15 percent of each state's VW EMT funds may also be invested in the acquisition, installation, operation and maintenance of electric vehicle charging infrastructure, including along the states' highways.[4] Placing these publicly available charging stations on government owned property would allow the state to take advantage of the 100 percent subsidy provided under the VW settlement, while reducing key impediments to the transition to an all-electric vehicle fleet.[5]

Given the structure of the VW settlement and its available uses, the overwhelming need to reduce harmful emissions that make us sick and destroy the planet, along with the opportunity to accelerate a market transformation toward an electrified transportation system, our report recommends that the maximum allowable amount (15 percent) be invested in fast charging electric vehicle infrastructure and the remaining amount (85 percent) be spent on new, all-electric transit buses to replace older, outdated diesel buses.

Ensuring that the funds are used in this way has several distinct benefits including, but not limited to:

- Drastically reducing NO_X, ground-level ozone (smog) and particulate matter to protect our health and environment;
- Significantly reducing CO_2 and other greenhouse gas (GHG) emissions;
- Reducing long-term fuel consumption, maintenance and operation costs of public fleet vehicles;
- Adding needed stability to the price of energy inputs for vehicles;
- Increasing public awareness and adoption of EVs as cleaner alternatives to traditional gas-powered vehicles.

Volkswagen's Emissions Cheating

In 2014, researchers at West Virginia University discovered that Volkswagen Jettas and Passats were emitting nitrogen oxides over the legal limit. Upon further investigation, the Environmental Protection Agency (EPA) discovered VW had installed "defeat devices" in some 567,000 "clean diesel" cars in the United States to avoid emissions control laws. These cars, model years 2009 to 2016, were found to be illegally emitting NO_X pollution, up to 40 times allowable U.S. compliance levels in some cases.

In 2015, the EPA officially filed a complaint against VW, with other parties soon following suit. The defeat devices installed use elaborate software to turn on emissions controls when a vehicle's emissions are tested, to ensure they meet clean air standards, and then turn them off during regular driving.

Figure I. Impacted Models[6]

Volkswagen Beetle, Beetle Convertible (2013-2015)	Volkswagen Touareg (2009-2016)	Porsche Cayenne (2014-2016)
Volkswagen Gold (2010-2015)	Audi A6 Quattro (2014-2016)	Audi A8/A8L (2014-2016)
Volkswagen Golf Sport Wagen (2015)	Audi A7 Quattro (2014-2016)	Audi Q5 (2014-2016)
Volkswagen Jetta, Jetta Sport Wagen (2009-2014)	Audi A3 (2010-2013, 2015)	Audi Q7 (2009-2016)
Volkswagen Passat (2012-2015)		

Volkswagen marketed these "clean diesel" cars to their customers as vehicles that could meet clean air standards while also maintaining high levels of fuel economy and performance. Unfortunately, these vehicles were meeting the marketed fuel economy and performance standards only by disabling the emissions controls causing elevated levels of harmful emissions to enter the environment.

Health and Environmental Impacts

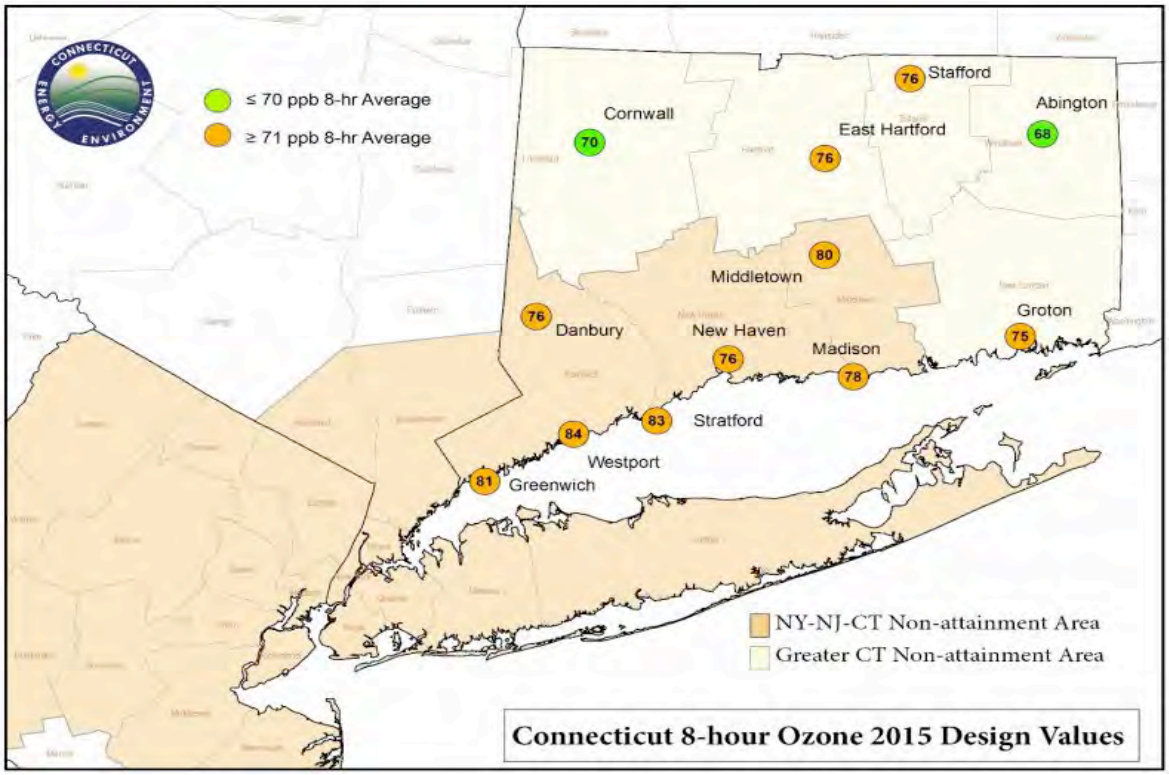
NO_X represents a family of seven compounds, of which NO_2 is the most prevalent and the only one regulated by the EPA. NO_2 is largely produced from the oxidation of nitric oxide that occurs in combustion engines, mostly from motor vehicles.[7] According to a report from the World Health Organization, NO_2 concentrations so closely follow vehicle emissions that in many situations, NO_2 levels are a reasonable marker of exposure to traffic-related emissions.[8] Reducing vehicle emissions has a direct impact on NO_X emissions.

Unfortunately, nitrogen oxides pose a serious threat to human health. The EPA warns that, "Breathing air with a high concentration of NO_X can irritate airways in the human respiratory system. Such exposures over short periods can aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing or difficulty breathing), hospital admissions, and visits to the emergency room. Longer exposures to elevated concentrations of NO_2 may contribute to the development of asthma and potentially increase susceptibility to [other] respiratory infections."[9] Even worse, NO_2 emissions are particularly dangerous for the most vulnerable among us. The EPA has concluded that, "people with asthma, as well as children and the elderly, are generally at greater risk for the health effects of NO_2."[10]

In addition to direct health impacts, high concentrations of NO_X also mix with volatile organic compounds (VOC) to create ground-level ozone (smog), which has a negative impact on both our health and the environment.[11] Breathing smog can trigger various health issues, such as chest pain, coughing, throat irritation and airway inflammation, while reducing lung functions and harming lung tissue.[12] NO_X also contributes to acid rain, nutrient pollution in coastal waters and adds to fine particulate matter in the air.[13] Particulate matter, which forms as a result of complex reactions from chemicals such as nitrogen oxides and sulfur dioxide, can also have harmful effects on heart and lung health.[14]

For these reasons, reducing NO_X emissions must be a crucial part of the larger goal to ameliorate Connecticut's pollution problem, especially since the state suffers from some of the highest ozone levels in the eastern United States.[15] Between 2013 and 2015, ten of the twelve ozone monitors in Connecticut recorded ozone levels that exceeded the EPA's National Ambient Air Quality Standards for ozone of 70 parts per billion (ppb).[16]

Figure II. Ozone Monitors in Connecticut with 2015 Design Values[17]



Mobile sources (on-road vehicles, off-road vehicles and equipment) account for approximately two-thirds of total NO_X emissions in the state, with fuel combustion from electricity generation coming in a distant second with 25.8 percent of NO_X emissions.[18] In 2013, transportation accounted for 42 percent of all CO_2 emissions in the state or 14.4 million metric tons of CO_2.[19] Taking steps to accelerate the electrification of Connecticut's transportation system is therefore a necessary part of any emissions reduction plan and a critical component of building a 21st century transportation network capable of meeting current and future challenges.

Partial Volkswagen Settlement – October 2016

When Volkswagen was caught systematically cheating on emissions tests, the U.S. Department of Justice (DOJ) filed suit for violations of the Clean Air Act. On October 25, 2016, the company and the DOJ reached a partial settlement on 2.0-liter vehicles, covering about 475,000 cars, which was then approved by U.S. District Court Judge Charles Breyer in San Francisco.[20] The settlement allocates $10 billion in available compensation for owners of noncompliant Volkswagens and $4.7 billion for use in environmental mitigation actions.[21]

Figure III. 2.0-Liter Noncompliant Vehicles[22]

Volkswagen Beetle, Beetle Convertible (2013-2015)	Volkswagen Golf (2010-2015)	Volkswagen Golf Sport Wagen (2015)
Volkswagen Jetta, Jetta Sport Wagen (2009-2014)	Audi A3 (2010-2013, 2015)	Volkswagen Passat (2012-2015)

Pursuant to the settlement, the $4.7 billion available for environmental mitigation actions will be split into two funds:

1. $2.7 billion for an Environmental Mitigation Trust (EMT), designed to support programs and actions that reduce NO_X emissions. These funds will be allocated to each state via a formula, based on how many eligible VW cars were registered in the state at the time of the settlement. The funds can be used in a number of ways detailed in the VW settlement, leaving open the possibility of squandering this opportunity to truly lower NO_X emissions and transform the transportation sector for years to come.

2. $2 billion for a Zero Emission Vehicle (ZEV) Fund, of which $800 million is specifically earmarked for use in California to be distributed in equal 30-month installments of $200 million. The remaining $1.2 billion is for use in the rest of the country and will also be distributed in 30-month installments over the next 10 years. Investments will be proposed by VW and reviewed by the California Air Resources Board (CARB) for California-related projects and the EPA for all others.

How Does Connecticut Get its Share of Funding?

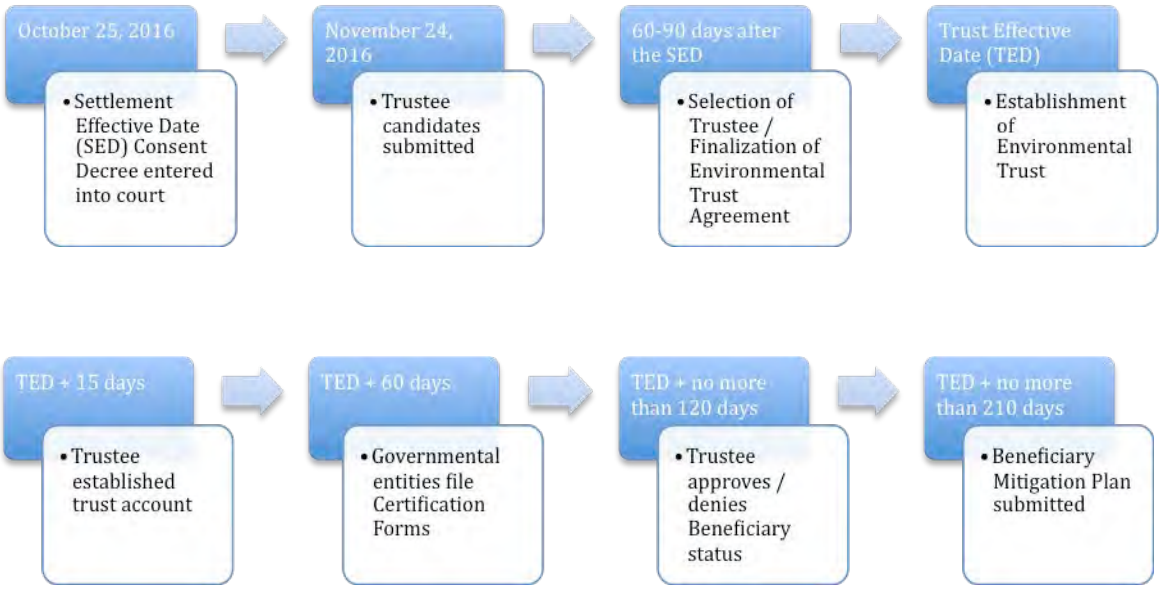
Pursuant to the VW settlement, the Environmental Mitigation Trust is distributed to each state via a formula based on how many noncompliant diesel cars were registered in that state. Each state may decide how to allocate their funds in order to "reduce emissions of NO_X where the 2.0-liter vehicles were, are, or will be operated."[23]

Figure IV. Environmental Mitigation Funds: Connecticut and Neighboring States[24]

Connecticut	$51.6 million
New York	$117.4 million
Massachusetts	$69.1 million
Rhode Island	$13.5 million
Vermont	$17.8 million
New Hampshire	$29.5 million

It will be up to the governor in each state to designate a lead agency to manage the funds. This is achieved by submitting a Beneficiary Certification Form and must be done within the first 60 days following the Environmental Mitigation Trust Effective Date, which is expected to be in January 2017.[25] The beneficiary agency will then have 90 days after being deemed a Beneficiary to submit and make public a Beneficiary Mitigation Plan describing how the state would spend its EMT funds.[26] Beneficiaries can expect to have access to trust funds within about six months of the Trust Effective Date and can plan to spend those funds over no less than 3 years and no more than 10 years.[27]

Figure V. Environmental Mitigation Trust Timeline



Already in Connecticut, the Department of Energy & Environmental Protection (DEEP) is seeking input on how the funds allocated to Connecticut should be spent and residents have been invited to submit comments and suggestions to DEEP.mobilesources@ct.gov. This is similar to steps taken in Colorado and California, where open comment periods allowed public input on uses for the EMT funds and ZEV funds.

The Case for Electrifying Connecticut's Highways

The VW settlement is a unique opportunity for Connecticut to make a substantial down payment on its commitment to increase the adoption of electric vehicles by making them more accessible and practical for trips anywhere in the state. Doing so has substantial economic, health and environmental benefits, including assisting in the reduction of GHG emissions and air pollution. In 2015, the Natural Resources Defense Council and the Electric Power Research Institute reported that switching 53 percent of U.S. vehicles to electric by 2050 would reduce GHG emissions from transportation by 52 to 60 percent.[28]

Yet, to meet this goal, it will be essential to provide consumers with the required infrastructure to support electric vehicle adoption. The best way to do this is through the use of fast chargers, which can fully charge a vehicle in fewer than 30 minutes. Such chargers are ideal for high-traffic commercial locations, gas stations, or along major transportation corridors, such as highways. In contrast, slow chargers are better suited for charging at home or work.

Not surprisingly, consumers have strong preferences for what kind of chargers they would like to see. A survey by NRG eVgo, a leading charge provider, found that drivers preferred fast charging 12-to-1 over Level 2 slow charging when both options were available at one site.[29] However, according to the U.S. Department of Transportation (U.S. DOT), only about 30 of the approximately 290 publicly available charging stations in the state, or about 10 percent, are fast charging stations. Given these advantages, the lack of substantial fast charging infrastructure, and the need for greater adoption of electric vehicles, funds invested in charging stations should focus on providing a fast charge along high-traffic corridors.

Reducing Range Anxiety

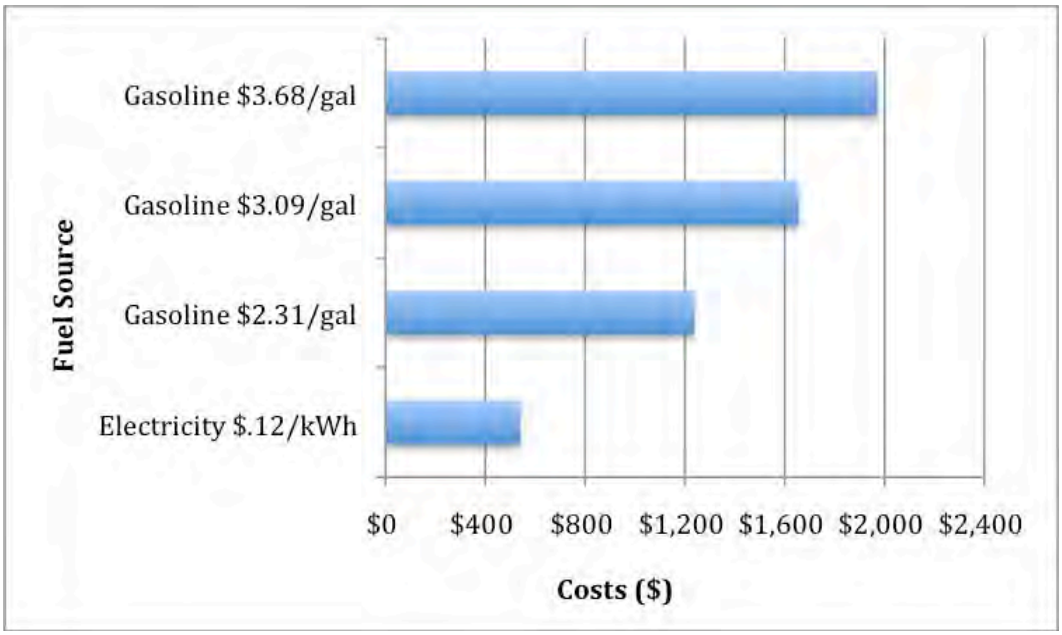
Even though most daily trips are easily within the current range of an EV, many people want assurances that they can take longer trips with their vehicle. In fact, one of the biggest challenges to electric vehicle adoption in Connecticut and the U.S. is the lack of charging infrastructure. According to the U.S. Department of Energy's Alternative Fueling Station Locator, there are only 1,981 publicly available fast charging stations in the entire country, or 1 fast charger for every 393 miles of state highway.[30] This failure creates apprehension on behalf of consumers in a phenomenon known as range anxiety, one of the biggest impediments to widespread adoption of electric vehicles.

There is strong evidence that increased investment in charging infrastructure leads to greater adoption of EVs. A 2016 study from Cornell University found that a 10 percent increase in charging stations leads to an 11 percent increase in EV sales.[31] Another analysis by the International Council for Clean Transportation also found a strong correlation between public charging infrastructure density and EV uptake.[32]

Creating Economic Savings

Owning an electric vehicle, including the initial purchase of the car, saves consumers money over time, mainly due to decreased fuel and maintenance costs. According to the U.S. Department of Energy, "on average, it costs about half as much to drive an electric vehicle" in terms of cost-per-gallon of gasoline versus the cost-per-gallon equivalent of electricity.[33] As of December 31, 2016, when prices were an average of $2.31 per gallon of gasoline, the gallon equivalent of electricity only cost $1.16.[34]

Figure VI: Fuel-related Savings[35]



At recent prices, assuming a consumer drives their vehicle 15,000 miles a year,[36] those owning EVs would spend only about $540 per year to charge their car.[37] In comparison, the owner of a gasoline-powered vehicle would spend $1,238 in fuel, more than twice as much as the EV owner.[38] If gas prices rose to $3.09 per gallon, representing the average price of gasoline nationwide over the last five years, the gas-powered car owner would spend $1,655 on gas yearly while the EV owner would save over $1,100 annually.[39] When prices reached their highest point in the last five years, about $3.68 per gallon, gasoline-powered vehicle owners were spending about $1,970 on fuel, while EV owners were saving $1,430 comparatively.[40] While gas prices are unpredictable and can fluctuate wildly, electric prices remain stable over time and give EV owners the added bonus of being able to calculate their long term input costs.

In addition to fuel savings, consumers can also save on yearly maintenance costs when they switch to an EV. In a recent study, electric vehicles saved the average driver about 46 percent in annual maintenance costs.[41] Given that the average yearly maintenance cost of a car is $766.50 a year, these savings equate to over $350 a year per consumer.[42] Taken together with the fuel savings, the total combined yearly economic savings would be between $1,050 and $1,782, depending on current gas prices.[43] Those savings amount to as much as six percent of median per capita income in the U.S.[44]

Critics of EVs frequently point to their higher upfront costs. However, the average price of an electric vehicle has dramatically decreased in recent years due to lower battery costs and increased competition between car manufacturers. In fact, since 2010, the global average cost of an electric car battery fell from $1,000 per kWh to $350 per kWh, a 65 percent decrease in price.[45] Today, a consumer can purchase a new all-electric vehicle for as little as $23,000.[46]

Moreover, almost all electric cars are eligible for a federal tax credit of $7,500 as well as state-specific incentives that can be used to further decrease initial costs.

In Connecticut, the Hydrogen and Electric Automobile Purchase Rebate (CHEAPR) incentivizes purchase or lease of electric vehicles by offering up to $3,000 per vehicle in state-funded rebates to customers.[47]

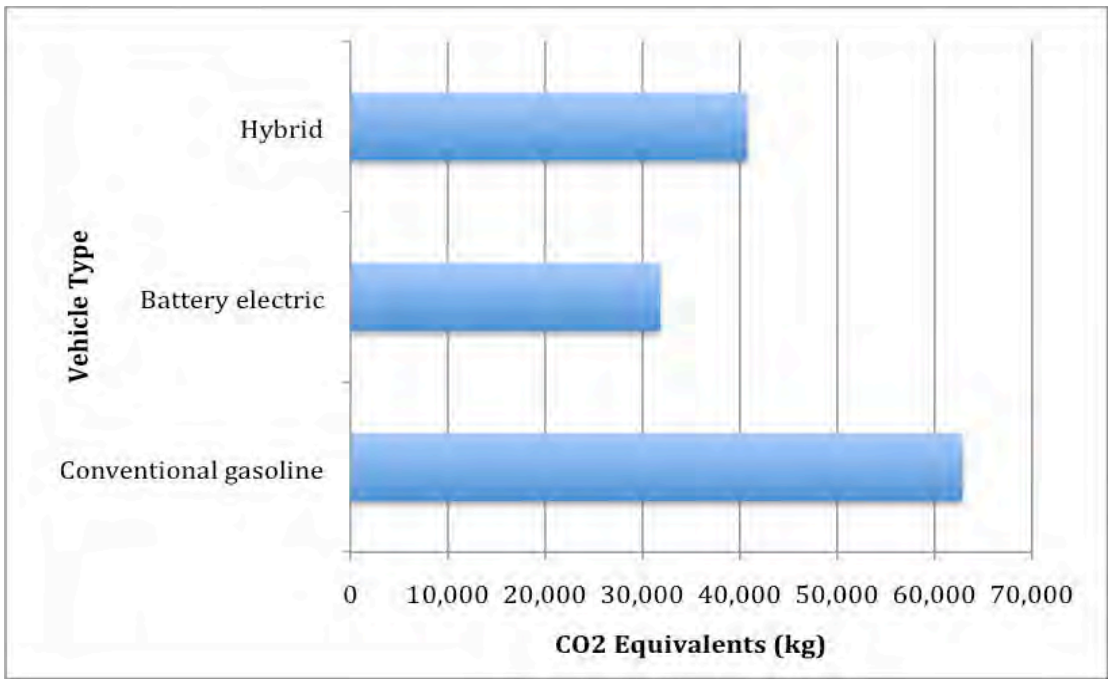
Emission Reductions

Electric vehicles are cleaner than traditional gas-powered vehicles, especially when lifecycle emissions are considered.[48] According to the "Model Year 2016 Fuel Economy Guide," the average vehicle releases seven to nine tons of GHG emissions per year, most of it in the form of CO_2.[49] It would take between 6.6 and 8.5 acres of U.S. forest, or between five and seven football fields worth of forest, one year to sequester the CO_2 emitted by one car in one year.[50]

On the dirtiest regional electric grid in the U.S., EVs produce the same global warming emissions as a 35-mpg gasoline car – almost 15 miles per gallon better than the current fleet mix (21.4-mpg), which represents the average mpg of light duty vehicles currently on the road.[51] Meanwhile on the cleanest grid, electric vehicles emit lower global warming emissions than 85-mpg gasoline cars, roughly four times the current fleet mix.[52]

Moreover, unlike gas-powered cars, EVs already on the road will become cleaner over time as the electric grid draws less power from coal and other fossil fuels and more from renewable resources. Already, between 2009 and 2012, emissions from charging an electric vehicle decreased in 76 percent of the U.S. as a result of cleaner electricity grids and more efficient EVs.[53]

Figure VII: CO_2 Equivalents Lifecycle Comparison[54]

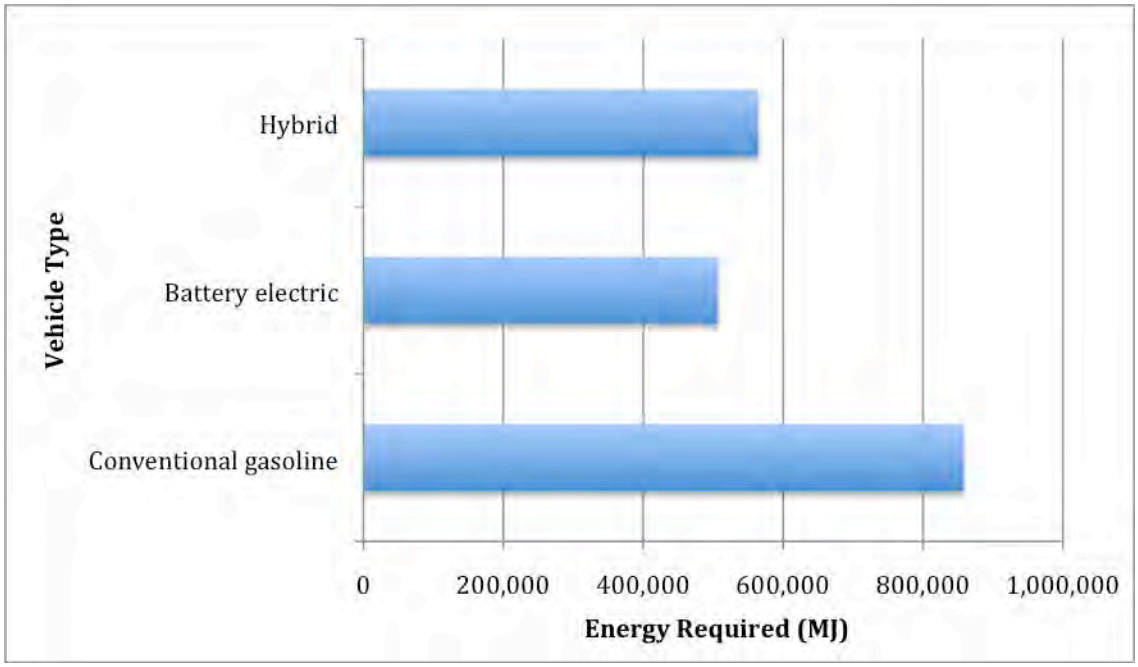


According to a lifecycle analysis of emissions by vehicle type, a gasoline-powered vehicle produces almost twice as much in CO_2 equivalent emissions compared to an all-electric vehicle. While the electric car produced only 31,821 kilos CO_2 equivalents, the gas-powered car produced 62,866 kilos CO_2 equivalents or about twice as much.[55] In terms of pollution, the extra emissions from the gas-powered car over its lifecycle would take 805 trees seedlings 10 years of growing time to sequester.[56] Emissions are drastically higher for the gas-powered vehicle because of the emissions produced from the production, refining and combustion of gasoline as compared to the cleaner nature of electricity production and the lack of tailpipe emissions from EVs.

Saving on Energy Use

Over their lifecycle, EVs also use less energy overall, compared to gasoline-powered and hybrid vehicles.[57] Becoming more energy efficient is a key part of lowering emissions and creating longterm cost savings for consumers and entire communities.

Figure VIII: Energy Input Requirements Lifecycle Comparison[58]



According to an analysis from the University of California Los Angeles, over their lifecycle, including vehicle part and battery/engine manufacturing, transportation, use, and disposal, a gasoline-powered vehicle uses the most energy at 858,145 MJ followed by a hybrid vehicle at 564,251 MJ of energy.[59] An electric vehicle uses by far the least energy at 506,988 MJ, or 41 percent less than the gas-powered vehicle.[60]

Improving Connecticut's Existing Charging Infrastructure

Recently, the federal government came out with a plan for electric charging corridors throughout the country. This included new signage designating areas with charging stations, similar to how we currently sign gasoline stations on highways, that were publicly available with EV charging stations within five miles of the highway.[61] Four routes in Connecticut were identified as alternative fuel corridors - corridors where EV charging stations are available, including: I-95 from the Rhode Island border to the New York border, I-91 from the Massachusetts border to New Haven, I-84 from the New York border to the Massachusetts border, and I-395 from Waterford to the Massachusetts border.[62]

How Much Progress Can We Make with VW Settlement Funds?

Assuming Connecticut invests the maximum allowable amount of EMT funds in EV charging stations, Connecticut could spend $7.7 million on further electrifying its highway system. This would be a significant down payment toward electrifying the state's entire transportation

network, easing range anxiety, increasing the public awareness of electric vehicles, and ultimately accelerating market transformation.

A 2014 survey by the Rocky Mountain Institute placed the real price of each new fast charge station between $50,000 and $100,000.[63] Both standard fast charging options, CHAdeMO and Combined Charge System (CCS), can be provided at the same charging station and will allow all EV owners to charge while on the road, much like a regular gas stop for conventional gasoline-powered vehicles.[64]

At these prices and with the $7.7 million in available EMT funds for charging infrastructure, Connecticut could provide between 77 and 154 additional fast charging stations.[65] This would be a significant improvement to the state's current network of about 30 fast charging stations. If one of these stations were placed every 50 miles in Connecticut, it would be enough to cover between 3,850 to 7,700 additional miles of roadway. As of 2011, Connecticut had 3,722 miles of road owned by the state highway agency, much less than most states, meaning that it's possible Connecticut's *entire* state highway system could be equipped with fast chargers.[66]

The Case for Electrifying Public Transit Buses

Investing 15 percent of the available EMT funds in EV charging infrastructure still leaves Connecticut with approximately $43.9 million for additional investments. Under the terms of the VW settlement, there are a number of ways these funds may be allocated. Yet, not all allowable uses are created equal. Spending Connecticut's share of the remaining funds on new diesel technology, compressed natural gas, or diesel-electric hybrids would represent a critical misstep that will move us further away from achieving several essential goals. These goals include reducing pollution, costs and fuel consumption; increasing public awareness of the benefits of electrification; achieving market transformation; and addressing the needs of a broad and diverse set of consumers.

Why Transit Buses?

Bus transit accounts for the largest percentage of public transportation trips and total passenger miles. Nationally, bus trips represent 48.7 percent, or 5.19 billion, of all unlinked passenger trips, 1.37 billion more than its closest competitor, heavy rail.[67] Bus trips also account for the greatest number of total vehicle miles (VMT), 2.2 billion miles, or 41 percent of total transit VMT.[68] Each year, millions of people rely on transit buses to get to school, work and for recreation. For those that rely heavily on transit buses (particularly daily commuters), this can mean nearly a dozen instances of exposure to toxic fumes each week. These ramifications are especially hard felt by the most economically vulnerable consumers and extend to a broad swathe of the populace, including those who may not live in urban centers, but rely on buses for travel, making the consequences geographically diverse. Because transit buses are used in rural, suburban and urban areas, they represent the best opportunity to increase consumer awareness of the benefits of transforming the transportation system to electric. Given this, electrifying public bus fleets is likely to offer the most comprehensive and consequential pollution reduction benefits and the greatest opportunity for public visibility and market transformation.[69]

To accompany the purchase of electric buses, transit agencies would also invest some EMT funds in chargers for their new electric buses.[70] Public transit buses lend themselves well to planning electric charging stations because they follow fixed itineraries and often have intersecting routes over the course of a day. Charging stations for buses could be planned at depots and common intersection points where buses cross, easily allowing electric buses to travel the full length of their routes throughout the day. The installation of electric bus charging infrastructure now will also facilitate the future adoption of additional buses for transit agencies in the state.

Reducing Exposure to Pollution

Nationally, more than 45 million people in the U.S. live, work, or attend school within 300 feet of a major road, airport or railroad and are therefore exposed to elevated levels of air pollution on an almost constant basis.[71] In Connecticut, where about 88 percent of residents live in urban areas, the percent is likely to be even higher.[72] While all individuals would benefit from reduced pollution, riders who regularly take public transit, those that find themselves in compact urban areas and those that live close to major transit hubs would especially benefit from buses that do not contribute to air pollution while idling or in transit. Neither diesel nor CNG buses lead down that better path.

Figure IX. Annual Tailpipe Emissions by Bus Type[73]

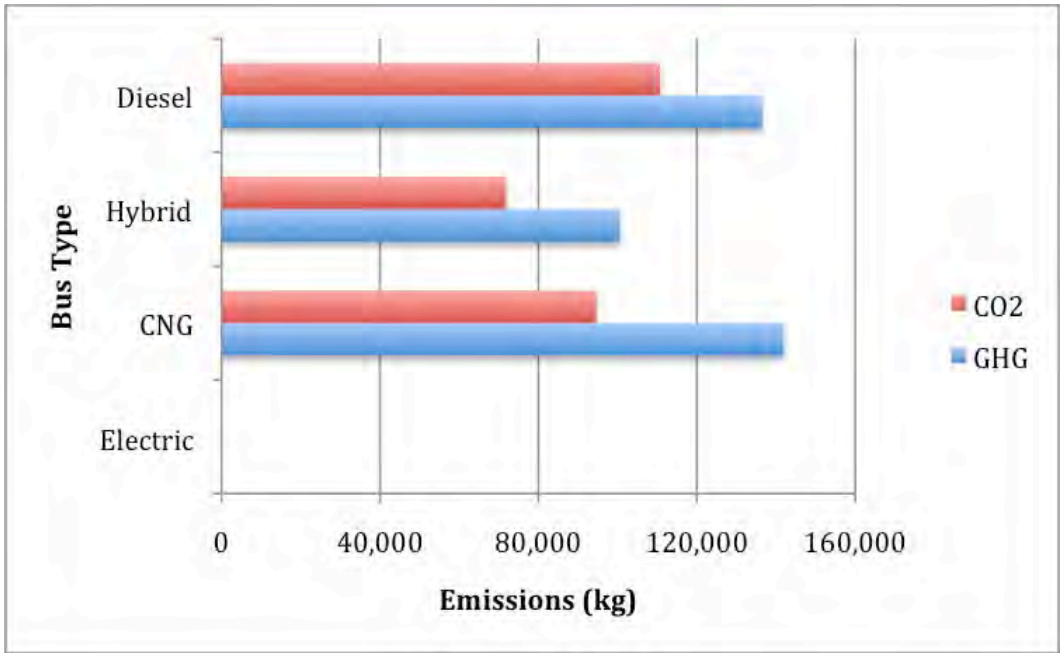
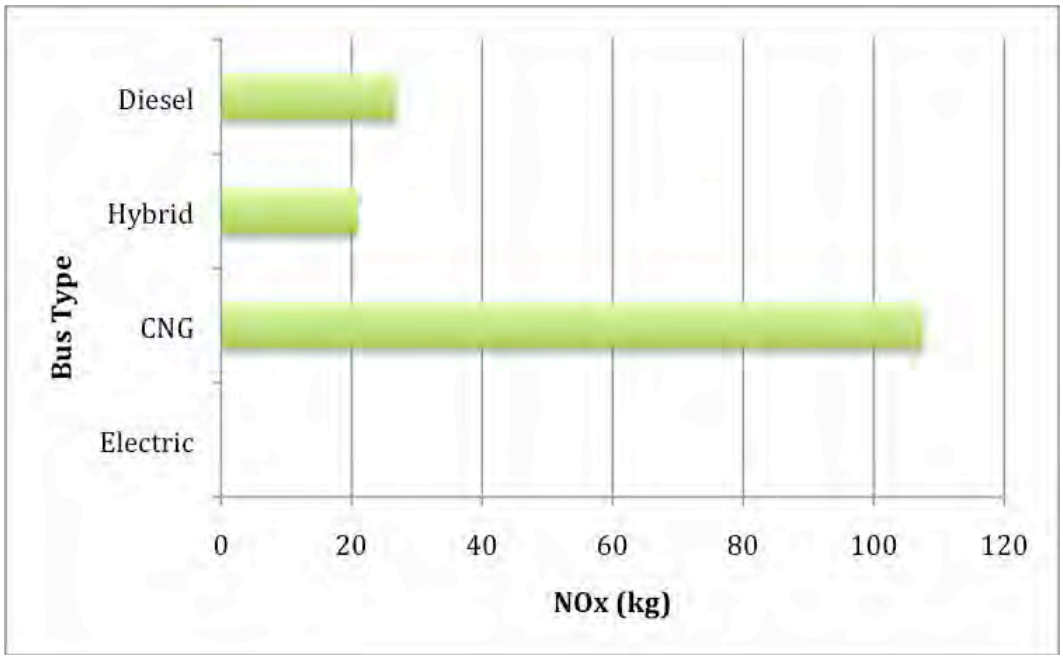


Figure X. Annual Tailpipe NO_X *Emissions by Bus Type*[74]



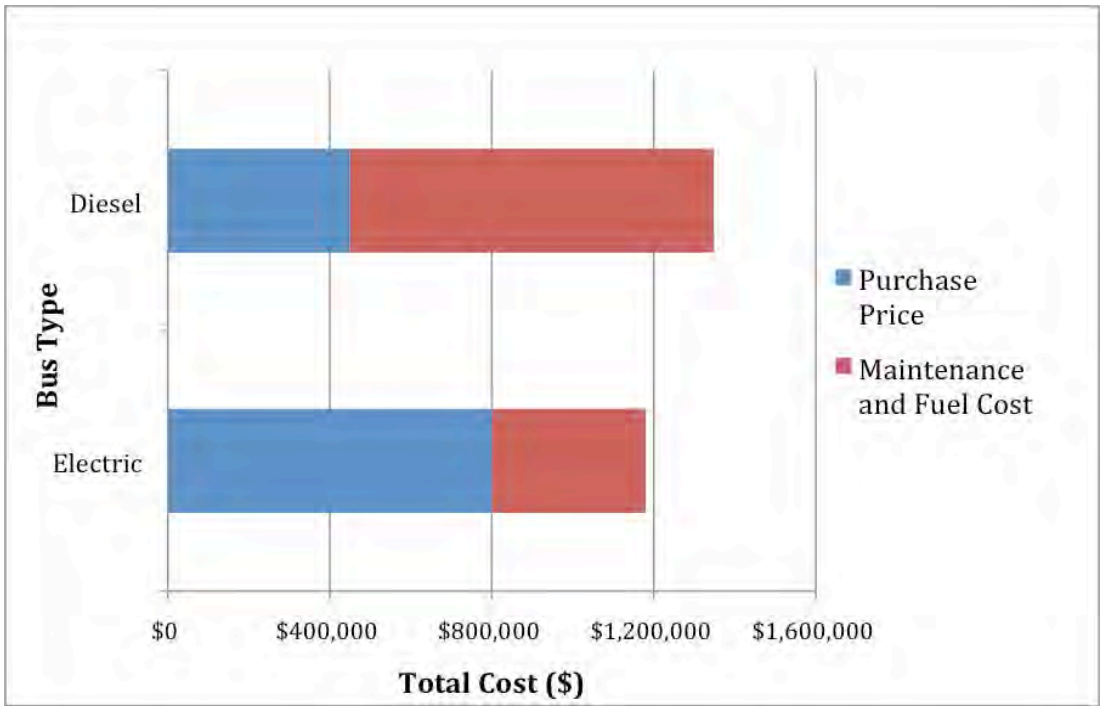
Compared to CNG, diesel and diesel-electric hybrids, all-electric buses produce no tailpipe emissions. CNG and diesel buses both produce over 120,000 kilos of GHG emissions annually, which is equal to the CO_2 emissions from about 1.8 tanker trucks worth of gasoline.[75] In terms of NO_X emissions, CNG buses emit appoximately 107 kilos of NO_X annually, more than four times as much as a diesel bus.[76] The lack of tailpipe emissions from electric buses helps improve air conditions on roads and near bus transit passengers, allowing them to breathe cleaner air on their daily commutes and other travels.

According to the U.S. DOT, switching from a diesel bus to an electric bus eliminates 10 tons of nitrogen oxides over a 12-year lifecycle, as well as 1,690 tons of CO_2 and 158 kilos of diesel particulate matter from the air.[77] Diesel and CNG buses emit very similar levels of CO_2 from their tailpipes, because while CNG has lower carbon content, the emissions reduction is offset by the higher average fuel economy of diesel buses.[78] In terms of carbon dioxide reduction over a 12-year lifecycle, switching *one* diesel bus to electric is the equivalent of removing about 357 gas-powered cars from the road for one year.[79]

Increasing Cost Savings

Over their lifecycle, electric buses lower expenditures for transit agencies. A recent Columbia University analysis for New York City Transit calculated that the all-in cost of transit buses – from the upfront bus procurement cost to lifetime fuel and maintenance costs – for electric buses is around $1,180,000. In comparison, diesel buses have a lifetime cost of $1,348,000, $168,000 more per bus over their 12 years of use.[80]

Figure XI: Lifetime Cost of Diesel vs. Electric Bus[81]



Even with higher initial purchase prices, electric buses are cheaper over their lifecycle due to large maintenance and fuel cost savings. Electric bus manufacturers claim large savings in maintenance costs year-over-year for all electric buses in comparison to conventional diesel buses. Proterra, an American electric bus manufacturer, estimates at least $135,000 in maintenance cost savings over the lifetime of a bus.[82]

As an added benefit, switching to all-electric vehicles will allow transportation agencies to accurately predict the future cost of energy inputs for their vehicles. Unlike diesel and natural gas, electricity prices do not fluctuate on international markets and are therefore much easier to predict into the future. This will allow agencies to better estimate future costs and determine with more precision their expenditures and revenue flows leading to better investment planning in the long-term.

Transit agencies that have started adopting electric buses, such as Albuquerque Rapid Transit and Dallas Area Rapid Transit, have realized substantial operational and maintenance cost savings compared to conventional buses. In Worcester, Mass., the transit agency has six fully operational electric buses and it is expecting the buses to cut operating costs by nearly $3 million over 12 years.[83] In Eugene, Ore., the Lane Transit Districts expects electric buses will cost $300,000 less to operate compared to a hybrid diesel-electric model during the 12-year life of the bus.[84]

Increasing Energy Efficiency

While VW settlement funds can be used to invest in newer diesel and compressed natural gas buses, they represent a misstep away from a cleaner transportation. A 2016 report from the National Renewable Energy Laboratory found that electric buses can be nearly four times more fuel-efficient than comparable CNG buses.[85] The report found that electric buses got about 17.48 miles per diesel-gallon-equivalent, while CNG buses were only at 4.51 miles per diesel-gallon-equivalent.[86]

Connecticut's Down Payment on a Clean Transit System

Assuming an initial cost of $800,000 for an electric bus, Connecticut's share of the EMT funds could purchase about 54 electric buses to replace existing diesel buses.[87] This would eliminate 91,260 tons of CO_2 and 8,532 kilos of diesel particulate matter from the air over their lifecycle.[88] In terms of CO_2 reductions, this is equivalent to removing 1,606 cars from the road for 12 years. These significant emissions reductions would help Connecticut lower air pollution, allowing residents to breathe less polluted air in both the short and long term.

In terms of cost savings, these new electric buses could save Connecticut's transit agencies about $9 million over their 12 years of use. Such savings would allow these agencies to invest in more electric buses over time, further increasing progress toward full electrification of the transit system and transportation sector.

How Recommended VW Settlement Investment Complement State's Existing Clean Air Goals

Governor Malloy has encouraged efforts to provide Connecticut with a more reliable, cleaner, and cheaper transportation system that supports the state's clean air goals. In accordance with Connecticut's Air Toxics Control Regulation law passed in 1986 and the 1990 Clean Air Act Amendments, the state focuses on lowering toxic pollution from mobile and other sources.[89] In furtherance of these efforts, Connecticut has already increased the number of electric vehicle charging stations to meet growing demand and accelerate the adoption of EVs in the state. Along with California, Maryland, Massachusetts, New York, Oregon, Rhode Island, and Vermont, Connecticut is part of a groundbreaking initiative to put up to 3.3 million additional zero emission vehicles on the road by 2025.[90]

Such action is urgently needed.

In 2012, greenhouse gas emissions from the transportation system accounted for almost 40 percent of the total emissions in Connecticut, making it more than twice as polluting as the electric power sector, which produced only 18 percent of the state's GHG emissions.[91] By powering vehicles with electricity instead of gasoline, Connecticut could drastically reduce emissions from its transportation sector, especially as the state's electric grid is increasingly

powered by renewable sources. Indeed, Connecticut has set itself on a timeline to get 23 percent of the state's electricity from renewable energy source by 2020, meaning that lifecycle emissions from electric vehicles will only continue to decrease in the future.

Taken together, statewide adoption of the recommendations in this report will substantially further Connecticut's existing clean air strategies.

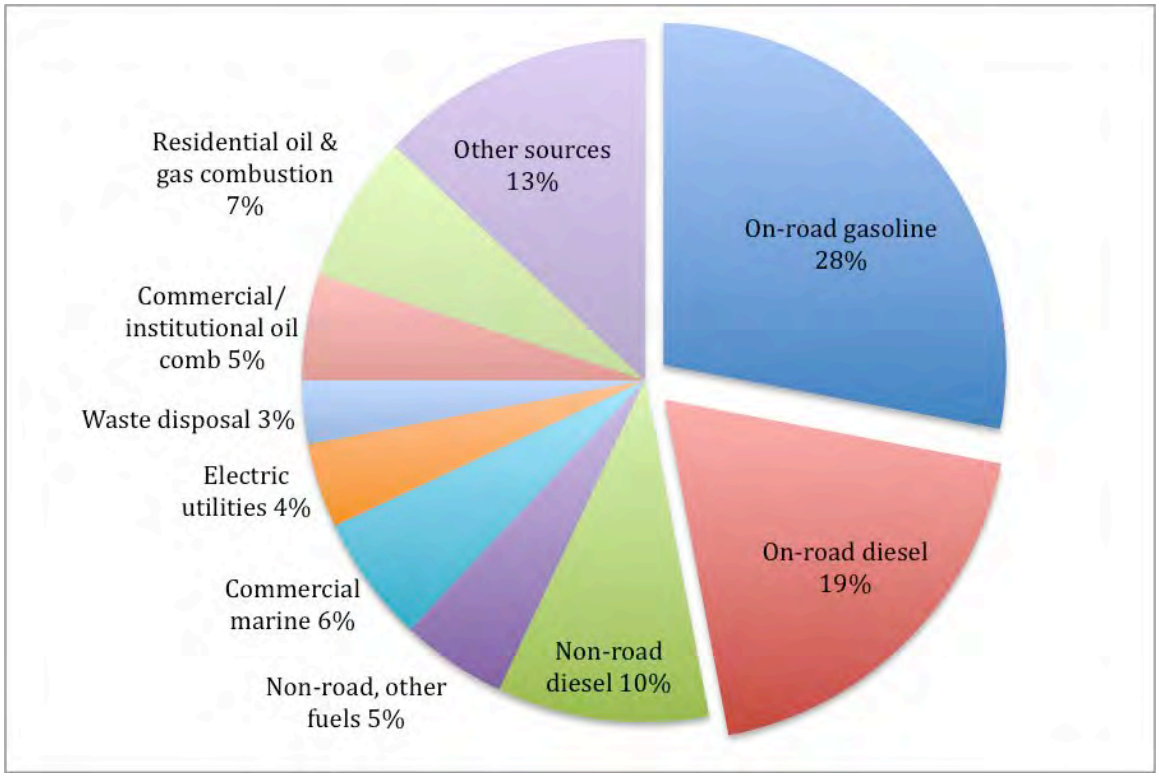
Zero Emission Vehicle (ZEV) Fund

In addition to the EMT funds, Volkswagen will also have to commit $2 billion to a Zero Emission Vehicle fund. Of this, $800 million will go to California and $1.2 billion to the rest of the country. This is intended to promote the development and use of clean vehicle technologies.

The current framework sets out that VW must propose the investments and the EPA must review and accept the plans for these funds before VW can move forward with them. Volkswagen Group of America recently announced it would focus ZEV fund investments in EV charging infrastructure and increasing awareness and fostering education of EVs.[92]

Connecticut and the rest of the northeastern states should immediately identify ways to maximize the likelihood of significant, well-targeted investments that further expand zero emissions vehicle infrastructure and sales across the region and aggressively pursue these objectives, working together with other neighboring states to leverage additional funds. To do this, the state should submit a proposal for ZEV fund use and cooperate with other states to ensure the final plan best accomplished the vision of increasing EV sales throughout the state and country.

Figure XII: Percent of NO_X Emissions by Sector in New England, 2011[93]



States in New England would have much to gain from working together to reduce their on-road emissions by accelerating the adoption of electric vehicles. Together, on-road gasoline and diesel account for 47 percent, or 170,238 tons, of all NO_X emissions in the region.[94]

Conclusion

Volkswagen's systematic emissions cheating resulted in 567,000 Americans purchasing a "clean diesel" vehicle that emitted NO_X pollution at up to 40 times the legal limit. Thankfully, VW was caught and the recently announced settlement is one way the company is being held accountable.

Connecticut has no way of clawing back the unnecessary and damaging pollution that spewed into its air because of Volkswagen's defeat devices. Therefore, we need to ensure that any money VW pays in settlements is invested in moving the transportation system toward a cleaner and cheaper future. Focusing this investment in electrification significantly reduces pollution from vehicles now and in the future, leading to a market transformation toward a zero-emission transportation system.

Connecticut is expected to receive $51.6 million from the Environment Mitigation Trust, which the Department of Energy and Environmental Protection will invest over the next three to 10 years. Connecticut should invest 15 percent of that money to build out an electric vehicle

charging station grid along our highways and the rest should be invested to replace older diesel buses with electric buses and build the accompanying infrastructure for electrified transit.

In addition, Connecticut should actively compete for additional funds from the $1.2 billion available in the Zero Emission Vehicle Fund, working with neighboring states if that leverages additional money.

This approach will maximize the long-term benefits to Connecticut's air quality and create a fundamental market transformation towards electrifying transportation, leading us to a zero-emissions future, and further tipping the scale toward a cleaner, electrified transportation system.

Notes

[1] Allowable uses include replacing or repowering Class 8 Local Freight Trucks and Port Drayage Trucks; Class 4-8 School Bus, Shuttle Bus, or Transit Bus; Freight Switchers; Ferries/Tugs; Ocean Going Vessels (OGV) Shorepower; Class 4-7 Local Freight (Medium Trucks); Airport Ground Support Equipment, Forklifts, and Light Duty Zero Emission Vehicle Supply Equipment. See United States District Court Northern District of California, Partial Consent Decree, Appendix D-2, accessed at https://www.justice.gov/opa/file/871306/download (pg. 208-220).

[2] World Health Organization, International Agency for Research on Cancer, *IARC: Diesel Engine Exhaust Carcinogenic (press release),* 12 June 2012, accessed at http://www.iarc.fr/en/media-centre/pr/2012/pdfs/pr213_E.pdf.

[3] The VW settlement refers to the partial consent decree between Volkswagen and the U.S. Department of Justice over the affected 2.0-liter vehicles.

[4] United States District Court Northern District of California, Partial Consent Decree, Appendix D-2, accessed at https://www.justice.gov/opa/file/871306/download (pg. 216).

[5] United States District Court Northern District of California, Partial Consent Decree, Appendix D-2, accessed at https://www.justice.gov/opa/file/871306/download (pg. 216).

[6] Jeff Bartlett and Michelle Naranjo, "Guide to Volkswagen Emissions Recall," *Consumer Reports*, 25 July 2016. List includes both 2.0-liter and 3.0-liter vehicles.

[7] World Health Organization, *Health Aspects of Air Pollution with Particulate Matter, Ozone and Nitrogen Dioxide,* 13-15 January 2015, accessed at http://www.euro.who.int/__data/assets/pdf_file/0005/112199/E79097.pdf (pg. 47).

[8] World Health Organization, *Health Aspects of Air Pollution with Particulate Matter, Ozone and Nitrogen Dioxide,* 13-15 January 2015, accessed at http://www.euro.who.int/__data/assets/pdf_file/0005/112199/E79097.pdf (pg. 46).

[9] U.S. Environmental Protection Agency, *Nitrogen Dioxide (NO2) Pollution*, accessed at https://www.epa.gov/no2-pollution/basic-information-about-no2.

[10] U.S. Environmental Protection Agency, *Nitrogen Dioxide (NO2) Pollution*, accessed at https://www.epa.gov/no2-pollution/basic-information-about-no2.

[11] U.S. Environmental Protection Agency, *Region 1: EPA New England: Ground-level Ozone (Smog) Information*, accessed at https://www3.epa.gov/region1/airquality/.

[12] U.S. Environmental Protection Agency, *Ozone Pollution: Effects on Health and the Environment*, accessed at https://www.epa.gov/ozone-pollution/ozone-basics#effects.

[13] U.S. Environmental Protection Agency, *Nitrogen Dioxide (NO_2) Pollution*, accessed at https://www.epa.gov/no2-pollution/basic-information-about-no2.

[14] U.S. Environmental Protection Agency, *Particulate Matter (PM) Pollution*, accessed at https://www.epa.gov/pm-pollution/particulate-matter-pm-basics#PM.

[15] Connecticut Department of Energy and Environmental Protection Bureau of Air Management, *Ozone Designation Recommendation For the 2015 Ozone National Ambient Air Quality Standards,* October 2016, accessed at https://www.epa.gov/sites/production/files/2016-11/documents/ct-rec-tsd.pdf (pg. 7).

[16] Connecticut Department of Energy and Environmental Protection Bureau of Air Management, *Ozone Designation Recommendation For the 2015 Ozone National Ambient Air Quality Standards,* October 2016, accessed at https://www.epa.gov/sites/production/files/2016-11/documents/ct-rec-tsd.pdf (pg. 7).

[17] Chart: Connecticut Department of Energy and Environmental Protection Bureau of Air Management, *Ozone Designation Recommendation For the 2015 Ozone National Ambient Air Quality Standards,* October 2016, accessed at https://www.epa.gov/sites/production/files/2016-11/documents/ct-rec-tsd.pdf (pg. 7).

[18] U.S. Environment Protection Agency, *State and County Emission Summaries: State Summary*, accessed at https://www3.epa.gov/cgi-bin/broker?_service=data&_debug=0&_program=dataprog.dw_do_all_multi.sas&stfips=09.

[19] U.S. Energy Information Administration, *State Carbon Dioxide Emissions, Transportation Emissions by State (1980-2013),* 26 October 2015; U.S. Census, "Table 1. Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2014", accessed at www.census.gov/popest/data/state/totals/2014/.

[20] A settlement for approximately 83,000 3.0-liter vehicles has yet to be finalized. In the proposed 3.0-liter settlement, VW and two of its subsidiaries, Porsche and Audi, would agree to fix about 60,000 vehicles and buy back about 20,000 older vehicles that cannot be fixed. $225 million would also be set aside for NO_X emission mitigation projects. Criminal investigations into wrongdoing by VW executives are still ongoing.

[21] U.S. Department of Justice, *Volkswagen to Spend Up to $14.7 Billion to Settle Allegations of Cheating Emissions Tests and Deceiving Customers on 2.0 Liter Diesel Vehicles* (press release), 28 June 2016, accessed at https://www.justice.gov/opa/pr/volkswagen-spend-147-billion-settle-allegations-cheating-emissions-tests-and-deceiving.

[22] United States District Court Northern District of California, Partial Consent Decree, accessed at https://www.justice.gov/opa/file/871306/download (pg. 8).

[23] United States District Court Northern District of California, Partial Consent Decree, Appendix D, accessed at https://www.justice.gov/opa/file/871306/download (pg. 183).

[24] United States District Court Northern District of California, Partial Consent Decree, Appendix D-1, accessed at https://www.justice.gov/opa/file/871306/download (pg. 207).

[25] United States District Court Northern District of California, Partial Consent Decree, Appendix D, accessed at https://www.justice.gov/opa/file/871306/download (pg. 192).

[26] United States District Court Northern District of California, Partial Consent Decree, Appendix D, accessed at https://www.justice.gov/opa/file/871306/download (pg. 192-193).

[27] Beneficiary may not request more than one-third of its allocation during the first year after VW makes the first deposit, or two-thirds of its allocations during the first two years after VW makes the first deposit into the EMT; see United States District Court Northern District of California, Partial Consent Decree, Appendix D, accessed at https://www.justice.gov/opa/file/871306/download (pg. 192-201);

[28] Electric Power Research Institute and Natural Resources Defense Council, *Environmental Assessment of a Full Electric Transportation Portfolio,* 17 September 2015.

[29] Stephen Edelstein, "Electric-Car Drivers Will Pay for DC Fast-Charging 12-to-1 Over Level 2," *Green Car Reports*, 9 November 9 2015, accessed at http://www.greencarreports.com/news/1100804_electric-car-drivers-will-pay-for-dc-fast-charging-12-to-1-over-level-2.

[30] Calculations of average number of state highway agency miles per 1 fast charging stations based on total of 790,046 miles of state highway owned roads in the U.S. (excluding Puerto Rico) and total number of publicly available fast charging stations as of 6 January 2017; see U.S. Department of Energy, Energy Efficiency & Renewable Energy, *Alternative Fueling Station Location,* 6 January 2017, accessed at

http://www.afdc.energy.gov/locator/stations/; U.S. Department of Transportation: Bureau of Transportation Statistics, "Table 1-2: Public Road Length, Miles by Ownership: 2011", accessed at http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/state_transportation_statistics/state_transportation_statistics_2012/html/table_01_02.html.

[31] Shanjun Li, Tang Long, Jianwai Xing, Yiyi Zhou, Cornell University, *The Market for Electric Vehicles: Indirect Network Effects and Policy Design*, May 2016.

[32] Sarah Chambliss, International Council on Clean Transportation, *Electric vehicle incentives, chargers, and sales: What we see and what we don't (yet),* 25 March 2015.

[33] Gasoline gallon equivalent is the amount of alternative fuel it takes to equal the energy content of one liquid gallon of gasoline.

[34] U.S. Department of Energy, *eGallon: Compare the costs of driving with electricity,* 31 December 2016, accessed at https://energy.gov/maps/egallon.

[35] See notes 36-40 for input costs at $0.12 kWh, $2.31 per gallon, $3.09 per gallon, and $3.68 per gallon; s. See U.S. Energy Information Administration, *Petroleum & Other Liquids: U.S. All Grades All Formulations Retail Gasoline Prices,* 3 January 2016, accessed at https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emm_epm0_pte_nus_dpg&f=a.

[36] 15,000 miles a year is about the average number of miles driven by those between 20 and 54 years of age. See Federal Highway Administration, *Average Annual Miles per Driver by Age Group,* 13 July 2016, accessed at https://www.fhwa.dot.gov/ohim/onh00/bar8.htm.

[37] Calculations based on assumption of a $.12 per kilowatt hour rate. $.12 per kWh is the average kilowatt-hour cost for residential areas in 2014 based on total annual electric utility retail revenue divided by the total annual retail sales.

[38] Calculations based on assumption of a $.12 per kilowatt hour rate, $2.31 per gallon of gasoline, and a 28 mpg gasoline-powered vehicle.

[39] Continuing assumptions above but with $3.09 per gallon of gasoline. $3.09 average over past five years calculated using data from U.S. Energy Information Administration, *Petroleum & Other Liquids: U.S. All Grades All Formulations Retail Gasoline Prices,* 3 January 2016, accessed at https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emm_epm0_pte_nus_dpg&f=a.

[40] Continuing assumptions above but with $3.68 per gallon of gasoline from U.S. Energy Information Administration, *Petroleum & Other Liquids: U.S. All Grades All Formulations Retail Gasoline Prices,* 3 January 2016, accessed at https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emm_epm0_pte_nus_dpg&f=a.

[41] Touchstone Energy Business Energy Advisor, *Getting Charged Up Over Electric Vehicles*, accessed at http://touchstoneenergy.coopwebbuilder2.com/content/getting-charged-over-electric-vehicles.

[42] AAA Association Communication, *Your Driving Costs: How much are you really paying to drive?* 2015, accessed at http://exchange.aaa.com/wp-content/uploads/2015/04/Your-Driving-Costs-2015.pdf.

[43] Using calculations for total fuel savings based on the lowest gas price of $2.31/gal and the highest gas price of $3.68/gal as well as yearly maintenance savings of $766.50.

[44] In 2015, the median income in the U.S. was $29,930.13; see U.S. Department of Health and Human Services Social Security Administration, *Measures of Central Tendency for Wage Data,* accessed at https://www.ssa.gov/oact/cola/central.html.

[45] Frankfurt School-United Nations Environmental Programme Centre, *Global Trends in Renewable Energy Investment 2016,* 2016, accessed at http://fs-unep-centre.org/sites/default/files/publications/globaltrendsinrenewableenergyinvestment2016lowres_0.pdf (pg. 36).

[46] Based on Mitsubishi i-MiEV, see Mitsubishi Motors, *2017 i-MiEV,* accessed at http://www.mitsubishicars.com/imiev#hero-area.

[47] State of Connecticut Department of Energy and Environmental Protection, "EVConnecticut: CHEAPR," last updated 28 July 2016, accessed at http://www.ct.gov/deep/cwp/view.asp?a=2684&q=561422&deepNav_GID=2183.

[48] Lifecycle emissions include pollution emitted during vehicle production, fuel production and transportation, and pollution that is released when the fuel is used. Lifecycle emissions from a gasoline vehicle include emissions released during production, refining and transportation of the oil and tailpipe pollution produced from combustion in the vehicle.

[49] U.S. Department of Energy Office of Energy Efficiency and Renewable Energy and U.S. Environmental Protection Agency, *Model Year 2016 Fuel Economy Guide*, 12 December 2016, accessed at https://www.fueleconomy.gov/feg/pdfs/guides/FEG2016.pdf (pg. 2).

[50] U.S. Environmental Protection Agency, *Energy and the Environment: Greenhouse Gas Equivalencies Calculator,* May 2016, accessed at https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

[51] MPG values refer to combined city and highway operation estimates. U.S Department of Transportation Bureau of Transportation Statistics, "Table 4-23: Average Fuel Efficiency of U.S. Light Duty Vehicles", accessed at https://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/html/table_04_23.html; Rachael Nealer, David Reichmuth, and Don Anair, *Cleaner Cars from Cradle to Grave: How Electric Cars Beat Gasoline Cars on Lifetime Global Warming Emissions,* November 2015, accessed at http://www.ucsusa.org/sites/default/files/attach/2015/11/Cleaner-Cars-from-Cradle-to-Grave-full-report.pdf (pg. 11).

[52] Rachael Nealer, David Reichmuth, and Don Anair, *Cleaner Cars from Cradle to Grave: How Electric Cars Beat Gasoline Cars on Lifetime Global Warming Emissions,* November 2015, accessed at http://www.ucsusa.org/sites/default/files/attach/2015/11/Cleaner-Cars-from-Cradle-to-Grave-full-report.pdf (pg. 11); U.S. Department of Transportation Bureau of Transportation Statistics, "Table 4-23: Average Fuel Efficiency of U.S. Light Duty Vehicles", accessed at https://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/html/table_04_23.html.

[53] Rachael Nealer, David Reichmuth, and Don Anair, *Cleaner Cars from Cradle to Grave: How Electric Cars Beat Gasoline Cars on Lifetime Global Warming Emissions,* November 2015, accessed at http://www.ucsusa.org/sites/default/files/attach/2015/11/Cleaner-Cars-from-Cradle-to-Grave-full-report.pdf (pg. 11).

[54] Kimberly Aguirre, Luke Eisenhardt, Christian Lim, Brittany Nelson, Alex Norring, Peter Slowik, and Nancy Tu, University of California Los Angeles, *Lifecycle Analysis Comparison of a Battery Electric Vehicle and a Conventional Gasoline Vehicle*, June 2012, accessed at http://www.environment.ucla.edu/media/files/BatteryElectricVehicleLCA2012-rh-ptd.pdf (pg. 8).

[55] Kimberly Aguirre, Luke Eisenhardt, Christian Lim, Brittany Nelson, Alex Norring, Peter Slowik, and Nancy Tu, University of California Los Angeles, *Lifecycle Analysis Comparison of a Battery Electric Vehicle and a Conventional Gasoline Vehicle*, June 2012, accessed at http://www.environment.ucla.edu/media/files/BatteryElectricVehicleLCA2012-rh-ptd.pdf (pg. 8).

[56] U.S. Environmental Protection Agency, *Energy and the Environment: Greenhouse Gas Equivalencies Calculator,* May 2016, accessed at https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

[57] Lifecycle energy inputs includes energy required to extract and process gasoline as well as the generation of electricity needed to charge the electric battery.

[58] Authors calculated energy requirements by assuming each vehicle would be driven 180,000 miles over 15 years; see Kimberly Aguirre, Luke Eisenhardt, Christian Lim, Brittany Nelson, Alex Norring, Peter Slowik, and Nancy Tu, University of California Los Angeles, *Lifecycle Analysis Comparison of a Battery Electric Vehicle and a Conventional Gasoline Vehicle*, June 2012, accessed at http://www.environment.ucla.edu/media/files/BatteryElectricVehicleLCA2012-rh-ptd.pdf (pg. 7).

[59] Authors calculated energy requirements by assuming each vehicle would be driven 180,000 miles over 15 years; see Kimberly Aguirre, Luke Eisenhardt, Christian Lim, Brittany Nelson, Alex Norring, Peter Slowik, and Nancy Tu, University of California Los Angeles, *Lifecycle Analysis Comparison of a Battery Electric Vehicle and a Conventional Gasoline Vehicle*, June 2012, accessed at http://www.environment.ucla.edu/media/files/BatteryElectricVehicleLCA2012-rh-ptd.pdf (pg. 7).

[60] Authors calculated energy requirements by assuming each vehicle would be driven 180,000 miles over 15 years; see Kimberly Aguirre, Luke Eisenhardt, Christian Lim, Brittany Nelson, Alex Norring, Peter Slowik, and Nancy Tu, University of California Los Angeles, *Lifecycle Analysis Comparison of a Battery Electric Vehicle and a Conventional Gasoline Vehicle*, June 2012, accessed at http://www.environment.ucla.edu/media/files/BatteryElectricVehicleLCA2012-rh-ptd.pdf (pg. 7).

[61] Mary Fitzpatrick, Connecticut Office of Legislative Research, *Electric Vehicle Charging Stations*, 29 November 2016, accessed at https://www.cga.ct.gov/2016/rpt/pdf/2016-R-0302.pdf.

[62] Mary Fitzpatrick, Connecticut Office of Legislative Research, *Electric Vehicle Charging Stations*, 29 November 2016, accessed at https://www.cga.ct.gov/2016/rpt/pdf/2016-R-0302.pdf.

[63] Josh Agenbroad and Ben Holland, "Pulling Back the Veil on EV Charging Station Costs," Rocky Mountain Institute blog, 29 April 2014, accessed at http://blog.rmi.org/blog_2014_04_29_pulling_back_the_veil_on_ev_charging_station_costs.

[64] Charge Point, *ChargePoint Express 200,* accessed at https://www.chargepoint.com/products/commercial/cpe200/.

[65] Number of locations afforded calculated by dividing $43.9 million by $50,000 (as the lower cost estimate per charging station) and $100,000 (as the higher cost estimate per charging station).

[66] State highway agency owned roads do not include roads owned by counties, towns, townships, municipalities, other jurisdictions (includes state park, state toll, other State agency, other local agency and other roadways not identified by ownership), and federal agencies (includes roadways in federal parks, forests, and reservations that are not part of the State and local highway systems); see U.S. Department of Transportation, Bureau of Transportation Statistics, "Table 1-2: Public Road Length, Miles by Ownership: 2011", accessed at http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/state_transportation_statistics/state_transportation_statistics_2012/html/table_01_02.html.

[67] American Public Transportation Association, *2015 Public Transportation Fact Book,* 66th Edition, November 2015, accessed at https://www.apta.com/resources/statistics/Documents/FactBook/2015-APTA-Fact-Book.pdf (pg. 10).

[68] See Table 6 from American Public Transportation Association, *2015 Public Transportation Fact Book,* 66th Edition, November 2015, accessed at https://www.apta.com/resources/statistics/Documents/FactBook/2015-APTA-Fact-Book.pdf (pg. 12).

[69] Other all-electric options that result in comparable pollution reduction benefits and similarly advance the goals of market transformation could be properly considered based on state needs.

[70] We did not provide cost estimates for the bus charging infrastructure because costs will be dependent on existing infrastructure, number of electric buses used by each transit agency, and the location of those bus routes.

[71] U.S. Environmental Protection Agency Office of Transportation and Air Quality, *Near Roadway Air Pollution and Health: Frequently Asked Questions,* August 2014, accessed at https://nepis.epa.gov/Exe/ZyPDF.cgi/P100NFFD.PDF?Dockey=P100NFFD.PDF.

[72] Iowa State University, Iowa Community Indicators Program, "Urban Percentage of the Population for States, Historical," accessed at http://www.icip.iastate.edu/tables/population/urban-pct-states.

[73] Based on calculations from Proterra, *Creating a Cleaner Earth with Zero Tailpipe Emissions*, accessed at https://www.proterra.com/performance/sustainability/.

[74] Based on calculations from Proterra, *Creating a Cleaner Earth with Zero Tailpipe Emissions*, accessed at https://www.proterra.com/performance/sustainability/.

[75] Based on calculations from Proterra, *Creating a Cleaner Earth with Zero Tailpipe Emissions*, accessed at https://www.proterra.com/performance/sustainability/; U.S. Environmental Protection Agency, *Energy and the Environment: Greenhouse Gas Equivalencies Calculator,* May 2016, accessed at https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

[76] Based on calculations from Proterra, *Creating a Cleaner Earth with Zero Tailpipe Emissions*, accessed at https://www.proterra.com/performance/sustainability/.

[77] U.S. Department of Transportation, *Zero Emissions Bus Benefits, updated 8 December 2016,* accessed at https://www.transportation.gov/r2ze/benefits-zero-emission-buses.

[78] M.J. Bradley & Associates LLC, *Comparison of Modern CNG, Diesel and Diesel Hybrid-Electric Transit Buses: Efficiency & Environmental Performance*, accessed at http://mjbradley.com/sites/default/files/CNG%20Diesel%20Hybrid%20Comparison%20FINAL%2005nov13.pdf (pg .4).

[79] Based on switching from a diesel to electric bus and eliminating 1,690 tons of carbon dioxide. See U.S. Environmental Protection Agency, *Energy and the Environment: Greenhouse Gas Equivalencies Calculator,* May 2016, accessed at https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

[80] Judah Aber, Columbia University, *Electric Bus Analysis for New York City Transit*, May 2016, accessed at http://www.columbia.edu/~ja3041/Electric%20Bus%20Analysis%20for%20NYC%20Transit%20by%20J%20Aber%20Columbia%20University%20-%20May%202016.pdf (pg. 16).

[81] Graph assumes an average of $.12 per kWh and $3.00 per gallon of diesel over the next 12 years. See Judah Aber, Columbia University, *Electric Bus Analysis for New York City Transit*, May 2016, accessed at http://www.columbia.edu/~ja3041/Electric%20Bus%20Analysis%20for%20NYC%20Transit%20by%20J%20Aber%20Columbia%20University%20-%20May%202016.pdf (pg. 16).

[82] California Environmental Protection Agency Air Resources Board, *Advanced Clean Transit Program: Literature Review on Transit Bus Maintenance Cost (Discussion Draft),* August 2016, accessed at https://www.arb.ca.gov/msprog/bus/maintenance_cost.pdf (pg. 1).

[83] Klark Jessen, Massachusetts Department of Transportation, *Worcester Regional Transit: Electric Transit Bus Fleet*, accessed at https://blog.mass.gov/transportation/greendot/worcester-regional-transit-electric-transit-bus-fleet/.

[84] Christian Hill, "LTD Ordering Fleet's First All-electric Buses," *The Register-Guard,* 2 November 2015, accessed at http://projects.registerguard.com/rg/news/local/33651784-81/ltd-ordering-fleets-first-all-electric-buses.html.csp.

[85] U.S. Department of Transportation, *Zero Emissions Bus Benefits, updated 8 December 2016,* accessed at https://www.transportation.gov/r2ze/benefits-zero-emission-buses.

[86] U.S. Department of Transportation, *Zero Emissions Bus Benefits, updated 8 December 2016,* accessed at https://www.transportation.gov/r2ze/benefits-zero-emission-buses.

[87] Calculated based on 85 percent of the remaining Connecticut EMT funds after fast charging stations are bought, divided by $800,000 for lowest bus price and $1,000,000 for the total bus price over lifetime (not including fast charging stations for the electric buses); although the number could be lower depending on what additional money was needed to build the necessary charging infrastructure or potentially higher depending on what outside funding could be attained through state and federal grants.

[88] Calculations based on U.S. DOT reduction numbers from each bus switched (see note 76) and multiplying by 54 buses for the total emissions reductions that could be achieved

[89] Connecticut Department of Energy and Environmental Protection, *Ev Connecticut: CT's Path,* November 2005, accessed at http://www.ct.gov/deep/cwp/view.asp?a=2684&q=322230&deepNav_GID=1619.

[90] Connecticut Department of Energy and Environmental Protection, *Ev Connecticut: CT's Path,* November 2005, accessed at http://www.ct.gov/deep/cwp/view.asp?a=2684&q=322230&deepNav_GID=1619.

[91] Connecticut Department of Energy and Environmental Protection, *Greenhouse Gas Emissions from the Transportation Sector,* November 2005, accessed at http://www.ct.gov/deep/cwp/view.asp?a=4423&q=544460.

[92] Electrify America, LLC, *Our Plan,* accessed at https://www.electrifyamerica.com/our-plan.

[93] U.S. Environmental Protection Agency, *Region 1: EPA New England, Sources of Hydrocarbon and* NO_X *Emissions in New England,* accessed at https://www3.epa.gov/region1/airquality/piechart.html.

[94] U.S. Environmental Protection Agency, *Region 1: EPA New England, Sources of Hydrocarbon and* NO_X *Emissions in New England,* accessed at https://www3.epa.gov/region1/airquality/piechart.html.

VW Mitigation funds

A Salo <asalomark@gmail.com>

Mon 1/23/2017 8:37 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Dear DEEP,

This is my public written comment regarding use of the VW mitigation funds. I would be interested in seeing them go toward electrifying our school buses. There are kits that retrofit gas-powered buses to electric. Because the majority of buses travel short distances and then return to the bus yard, they are ideal for electrification. In addition, our children will not have to inhale diesel fumes every school day.

Thank you for your attention to this issue.

Anna Salo-Markowski
Middletown, CT

VW Settlement Comments

Giannotti, Laurie

Mon 1/23/2017 8:32 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: Bruce Donald (bruce@greenway.org) <bruce@greenway.org>; Tyler, Tom <Tom.Tyler@ct.gov>; Cimochowski, John <John.Cimochowski@ct.gov>;

Name: Laurie Giannotti
Job Title: Trails & Greenways Program Coordinator
Company: DEEP

Comments: Last year, The CT Greenways Council (CGC) (Per CGS Section 23-103 as amended by Public Act No. 15-190) assisted DEEP with its CT Recreational Trails Grants Program. 7 million dollars were distributed statewide of which, $400,000.00 remained unobligated. In addition, it was anticipated that 5 million dollars would be available for this year's grant round. Unfortunately, those funds were deauthorized during the last budget session. Consequently, The CGC and DEEP are left with 9.8 million dollars requested in this grant round and just $400,000.00 to distribute.

These 9.8 million dollars' worth of bicycle and pedestrian projects offer alternative transportation options, provide environmental benefits and reduce air pollution. The CT Recreational Trails Grants Program has been historically over requested and typically receives between 5-7 million dollars' worth of proposals. There is clearly a statewide demand for these type of projects. The current unfunded projects can be a good fit for the VW Settlement funds: as mentioned, they can satisfy goals of the fund; they will provide quick results as most of the projects are completed within a year or two of authorization; there can be an annual distribution of funds resulting in projects that, in conjunction with the CT DOT's Transportation Alternatives programs, could complete CT's bicycle and pedestrian network.

I would love to discuss potential opportunities.

Please contact me at 860-424-3578 or laurie.giannotti@ct.gov

Laurie

Laurie Giannotti
Try our CT Rail Trail Explorer!
CT State Parks Trails & Greenways Program
Office Hours: M-W 7-4:30; Th 7-3:30
Connecticut Department of Energy and Environmental Protection
79 Elm Street, Hartford, CT 06106-5127 P: 860-424-3578 | F: 860-424-2030 | E: laurie.giannotti@ct.gov
Recreational Trails Program
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Ensuring a clean, affordable, reliable, and sustainable energy supply.

Public Comment for CT's Proposed VW State Mitigation Plan

Robert Dickinson <rldickinson@snet.net>

Wed 1/25/2017 11:59 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

I would favor use of the VW state mitigation money in the following ways.

1) To build Multi-use paved trails separate from roads following such routes as pipe line and power line right of ways.

Using this money to build Multi use trails would be a very effective way for mitigation to reduce nitrogen oxide air pollution by providing alternate ways to get to work or go shopping by walking or bicycling.

2) To build multi-modal ways parallel to busy state routes wide enough for both pedestrians and bicycles especially in Industrial and commercial areas.

This will result in people avoiding use of cars when going from store to store or business employees going to a place for lunch.

3) To provide Safe Ways to Schools such as multi-use paved paths, protected bike lanes, and sidewalks that will allow increased numbers of students to walk and bike to school eliminating some need for buses and parents delivering students to school.

Robert Dickinson
19 Birch Road
South Windsor, CT 06074

860-644-1986

VW Settlement Comments

Austin Dziki <austindziki@gmail.com>

Thu 1/26/2017 9:59 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: Austin Dziki
Job Title: Research Assistant
Company: Woods Hole Oceanographic Institute

Comments: I am a resident of Northeast Connecticut and was happy to see that you were polling the public to help develop a strategy with the funds. However, I was disappointed to see that it only pertained to reducing future N2O emissions from mobile sources. Is there a reason N2O/Carbon sequestration strategies are not included in the mitigation strategy? Was it part of the settlement that the funds only be allocated to reduce future emissions? It seems to me that remediation and sequestration initiatives should be included as part of the settlement to account for the falsified N2O emissions that are now in the atmosphere. Nitrous oxide is nitrous oxide; if the issue is that we now, unlawfully, have sustained increased emissions then we should be allocating the money to any and all solutions that address reducing current and future levels. Please let me know if there are any plans to explore non-mobile mitigation strategies or if there is any reason it is restricted to only reducing future mobile emissions.

Thank you for your time,

Austin Dziki
(860) 617-8910

Concerning the settlement from VW of $51 Million Dollars

Smith, Clay <Clay.Smith@GenesisHCC.com>

Fri 1/27/2017 12:58 PM

To:DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc:Clay Smith <ccsct203@gmail.com>;

This quick note is a suggestion on how to spend the $51 million dollars the State of Connecticut will receive from VW.
There are tens of thousands of antique and classic cars and trucks in Connecticut, many of which are pre-emission control.
If the State of Connecticut offered a full or partial rebate to these car and truck owners for the installation of an electronic fuel injection system,
the air pollution from these vehicles would be greatly reduced. The savings would benefit the owners with better performance, better fuel mileage and increased reliability,
while reducing unburned CO and other harmful emissions.
Based on Summit Racing large car and truck performance website, the cost of these EFI units range in price $800 and up, excluding installation. With an average price of around $2000, a settlement of $51,000,000 would retrofit roughly 25,000 Connecticut cars.
At these numbers, we will all benefit.

Thanks,
Clay Smith
203.804.6404
Ccsct203@aol.com
Thanks,
Clay Smith
203.804.6404
Ccsct203@aol.com

VW Settlement Comments - Put Funding into Complete Streets & Promoting Zero-Emissions, Active Transportation

Kelly Kennedy <kelly.kennedy@snet.net>

Fri 1/27/2017 1:32 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: Kelly Kennedy, West Hartford
Job Title: Audit Section Chief
Company: State of Vermont, Department of Taxes

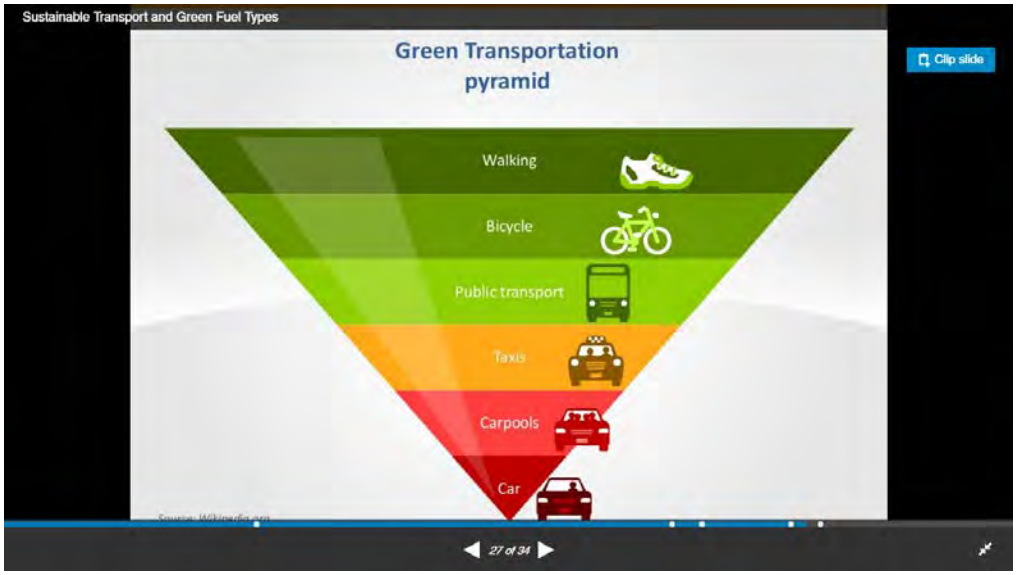
Comments:
Thank you for creating this opportunity to comment. A majority of these funds should be dedicated to promoting zero-emissions active transportation--walking and biking. Most of our emissions are from transportation, and most of our transportation emissions are from passenger cars.

Although EVs should be part of the solution, it seems we are putting too many eggs in that basket and avoiding taking a proactive approach to active transportation. After all, we could replace every car on the road with an EV, but we'd still have huge, very expensive problems with traffic congestion and road maintenance from all that vehicle use. Plus, we're not really acknowledging what's going to generate all the electricity that EVs would use. But every person who chooses to bike or walk to get where they're going means one less car on the road, and that's good for emissions and congestion. So even if you don't want to walk or bike, making it safer and more practical for other people to bike and walk will ease congestion on your route. We need to set goals to increase mode share rates for walking and biking, and execute a plan to achieve those goals.

Millennials and knowledge workers do not want to spend their free time driving to work alone in a car, as 80+% of CT residents do. (How dreadfully stodgy, in keeping with our image!) Connecticut government must be truly *proactive* about (versus merely tolerant of or agreeable to) active transportation. We should *promote* biking and walking for transportation at every opportunity. Connected sidewalks, separated bike lanes, and off road trail networks within and between towns would be fantastic for residents, attracting a younger workforce, keeping seniors, and drawing tourism. Complement that infrastructure with a top notch Share the Road campaign, and see to it that law enforcement actually enforces traffic safety laws.

For more on the business case for active transportation and QALYs (quality-adjusted life years), please see this Bloomberg Business Week article: https://www.bloomberg.com/news/articles/2016-11-07/this-bike-lane-can-save-your-life. See also the green transportation pyramid, which prioritizes pedestrian and bike travel over cars. Portland, Oregon uses this policy for its transportation planning and demand management.

Thanks again for this opportunity to comment.


Sustainable Transport and Green Fuel Types
Green Transportation pyramid
Clip slide
Walking
Bicycle
Public transport
Taxis
Carpools
Car
27 of 34

Comment on CT's Proposed State Mitigation Plan for the Volkswagen Partial Consent Decree

Mike Saxton <MikeS@OrangeEV.com>

Fri 1/27/2017 10:07 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: 'Mike Saxton ' <MikeS@OrangeEV.com>; 'Julie Brooks' <JulieB@orangeev.com>;

4 attachments

Orange EV Brochure.pdf; Informal_Public_Notice_of_State_Mitigation_Plan.pdf; Comments regarding VW Mitigation Trust Appendix D Funds - Orange EV 12-28-2016.pdf; CT_VW_Proposed_State_Mitigation_Plan_-_PREPROPOSAL.pdf;

Please see Orange EV's attached comments on propose usage of the VW Settlement funding. Our brochure is also attached – see slide 4 for where you see them used. Importantly, the way your plan is written, you may unintentionally preclude funding desirable projects.

Our firm makes the first and only comercially deployed, 100% electric class 8 truck. Its used mostly off road, but can also plated to meet DOT standards. And you find it everywhere. Terminal Trucks move cargo containers within logistics yards, around the clock with more hourly usage that the semi tractors which pull the cargo containers between states. Please in your plan correct the following:

- On and Off Highway (but mostly off): Terminal Trucks are heavy duty, class 8 trucks. Accordingly please include them for funding as "Class 8 Local Freight Trucks and Port Drayage Trucks (Large Trucks)" both on and off highway AND as "Cargo Handing Equipment", both on and off highway.
- All logistics hubs: Terminal Trucks are used in many sites, not just "ports". Please allow them to be funded at any site where used (e.g. railroad, distribution center, manufacturing plant, etc)
- Fuller clarification is in the comment letter attached.

Since the original Consent Decree was drafted defining Funding Allocation Categories, both Federal and State funding programs have already revised their language to correct the oversight. Accordingly now our truck have already been funded by grant and voucher programs around the U.S. deploying our trucks to railroads, warehouses, distribution centers, waste transfer sttions, manufacturing sites, and more.

Respectfully,
Mike Saxton, Chief Commercial Officer
ORANGE EV, Pure Electric Terminal Trucks
"Spend 90% Less in Fuel to Haul the Same Load with No Diesel and No Emissions"
Address: 500 NW Business Park Lane, Riverside, Missouri 64150 (10 *minutes from Kansas City)*
Phone: 816.210.9669 **eMail**: MikeS@OrangeEV.com **Website**: www.OrangeEV.com

[OrangeEV.com] [twitter.com/orange_ev]

December 28, 2016

Subject: Volkswagen Settlement – Appendix D Mitigation Trust Funds

To whom it may concern,

Regarding each state's mitigation plan for Appendix D funds from the VW settlement, we respectfully request that language be further clarified to include yard trucks (aka drayage trucks, terminal trucks, hostlers, spotters) in any cargo handling operation.

As written, Appendix D-2 of the VW Partial Consent Decree could preclude many impactful applications. Item one of the ten eligible mitigation actions refers to "Class 8 Local Freight Trucks and Port Drayage Trucks" where:

- "Class 8 Local Freight, and Port Drayage Trucks (Eligible Large Trucks)" shall mean truck tractors with a Gross Vehicle Weight Rating (GVWR) greater than 33,000 lbs used for port drayage and/or freight/cargo delivery (including waste haulers, dump trucks, concrete mixers).
- "Drayage Trucks" shall mean trucks hauling cargo to and from ports and intermodal rail yards.

This language is both limiting and open to interpretation inviting further clarification. A broader definition would better serve state interests, reducing harmful emissions in non-attainment areas and disadvantaged communities. Looking to California's Goods Movement Program which has a similar goal to reduce air pollution from freight activities, eligible Cargo Handling Equipment includes any "existing diesel yard truck" operating "at a seaport (port), intermodal railyard, or freight facility." This general language allows for broad inclusion resulting in greater emissions reductions.

Yard trucks operate predominantly in industrial areas with poorer air quality, moving goods in ports, railroad inter-modal, LTL freight, manufacturing, retail distribution, waste management, warehouse, and other container and trailer handling operations. Replacing existing diesel trucks with all-electric models provides emissions reductions that are immediate and dramatic. As a specific example, when upgrading to an Orange EV all-electric terminal truck compared to a Tier 3 diesel engine operated 6,000 hours at 2.5 gallons/hour, there is an estimated per vehicle annual reduction of 1.7 tons NOx, 1.6 tons CO, 81.5 kg PM, and 166 tons CO2.

Broader language also ensures that both on-road and off-road heavy-duty yard trucks are eligible. Yard trucks are one example of off-road heavy-duty vehicles that in spirit seem eligible for incentive funding, but in practice are often precluded. While yard trucks can be built DOT-compliant and operate on-road/on-highway, the dominant use is off-road and un-plated (non DOT) within the yards of container handling facilities.

We further request that states adopt streamlined, first-come first-served funding mechanisms:

- For vehicles and charging stations: A point-of-sale discount program similar to Chicago's user-friendly "Drive Clean Truck" program.
- For infrastructure projects: A rolling approval process with pre-approved funding amounts/percentages.

Traditional competitive grant application processes can be labor and resource intensive with uncertain outcomes. In direct contrast, voucher incentive programs (VIPs) simplify administration and eliminate uncertainty by pre-approving eligible solutions and amounts. This enables companies to plan and budget with confidence, removing barriers and speeding deployment. First-come, first-served VIPs will direct and invest VW funds quickly, efficiently and effectively.

Thank you for your consideration. Please contact us if we can be of assistance.

Respectfully,
Mike Saxton
Orange EV, Chief Commercial Officer
MikeS@OrangeEV.com
816-210-9669

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- Save $10k-$30k annually on fuel and maintenance with moderate use
- Save $30k-$60k annually on fuel and maintenance with heavy use

Eliminate Diesel Emission Control Equipment.

- Mitigate the need for costly and problematic diesel emissions control technology
- Save even more avoiding maintenance, repair, and downtime due to emission control systems

Eliminate Emissions and Exceed Tier 4 Standards.

- Reduce emissions: 1.7 tons NOx, 1.6 tons CO, 81.5 kg PM, 166 tons CO2
  (estimate of annual reduction compared to Tier 3 diesel engines operated 6,000 hours at 2.5 gallons / hour)
- Reduce carbon footprint while avoiding fees and penalties

Get the Job Done. Use the truck of choice, operating 24x7 up to 24+ hours / charge

Win Customers. Grow through leadership and differentiation

About Orange EV

Orange EV designs and delivers pure electric industrial strength vehicles

Our Team: Team record of developing innovative, industry-leading products and services including conventional and electric vehicles.

The T-Series: Our flagship offering meets the harsh demands of industrial markets.

- **New**: Built to your specifications with all new components
- **Remanufactured**: Giving new life to old trucks by reusing chassis elements. Deploy more quickly at reduced cost.

The Industry Leader:

- First commercially deployed
- First approved for sale in California
- First funded by top incentive programs
- First and only with real world data proving operational and financial claims

Terminal Truck

The terminal truck is known by many names including:

- *Hostler*
- *Spotter*
- *Shifter*
- *Yard dog*
- *Buggy*
- *Jockey*
- *Tractor*
- *UTR*
- *Stevedoring tractor*
- *Trailer mover*
- *And more…*
- *Yard truck*
- *Goat*
- *Mule*
- *Shunter*
- *Tug*
- *Shag*
- *Switcher*

TERMINAL TRUCKS

USED IN CONTAINER HANDLING OPERATIONS

Terminal trucks operate in rail intermodal, retail distribution, warehouse, port, parcel, manufacturing, military supply, waste transfer, and more.

Users: Firms supporting supply chain logistics and goods movement

- 3rd party logistics firms
- Retail and industrial distributors
- Warehouse operators and manufacturers
- LTL freight carriers, railroads, parcel, etc.

Uses: Movement of cargo containers and trailers, positioning for loading and unloading

- At building docks,
- On/off rail cars,
- For semis to take back on highway
- As-needed for repositioning

T-SERIES TERMINAL TRUCK SOLUTION

BUILT TO MEET THE NEEDS OF SITE OPERATIONS

Orange EV's complete solution includes everything needed to begin operations: trucks, charging capabilities, telematics, training, manuals, customized operator settings, warranty, technical support and more.

Configuration Options

- Truck: New and Remanufactured
- Charging: Standard to Fast
- Battery: Standard Duty to Extended Duty
- DOT: Off-road and On-road (DOT)

Supporting 24x7 Operations

- Capacity: 81,000 lbs GCWR
- Speed: Up to 25 mph

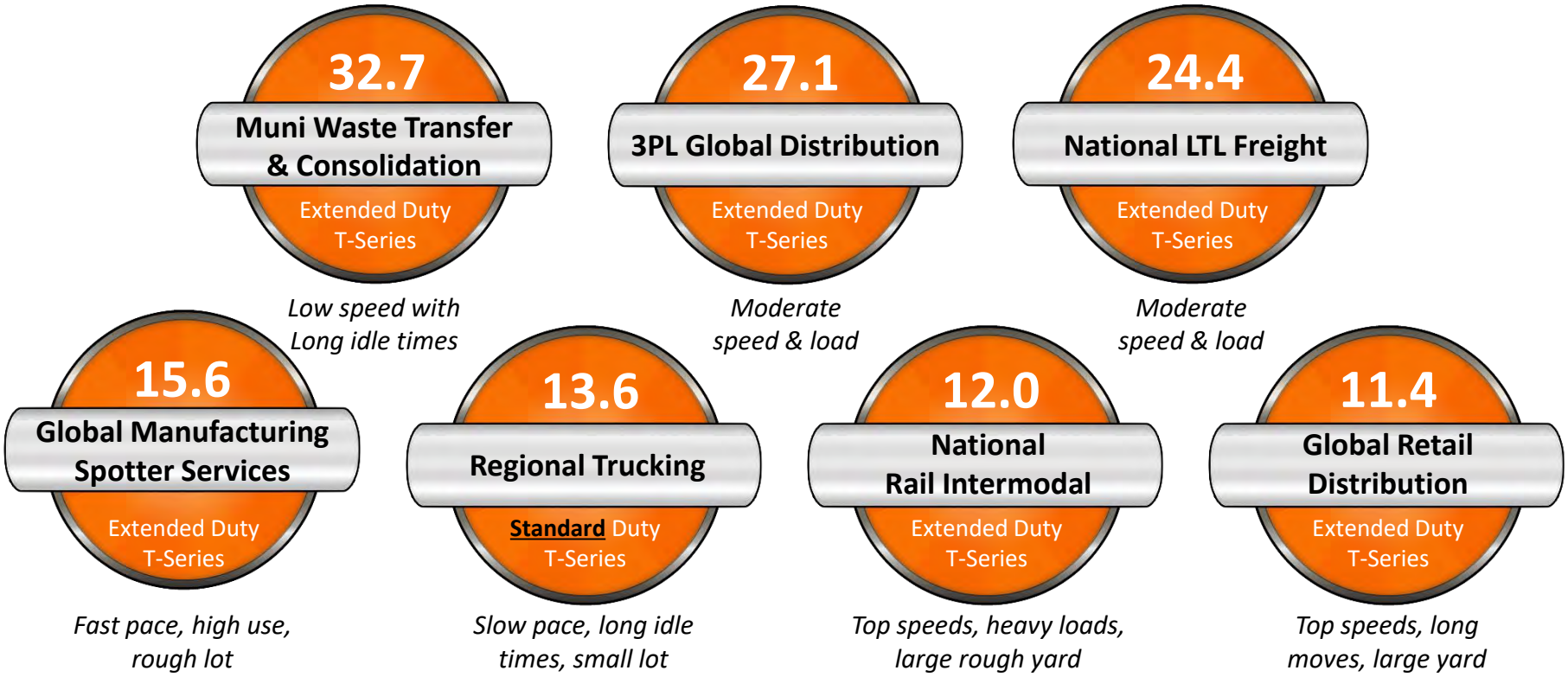
Orange EV trucks have torque on demand, smooth acceleration & deceleration, can be used indoors (no emissions), and are driver-friendly with low noise and vibration.

FROM DIESEL TO PURE ELECTRIC, IN NEW TRUCKS YOU ALREADY KNOW

PROVEN TO GO THE DISTANCE

SUPPORTING 24X7 OPERATIONS ACROSS ENVIRONMENTS

Operating Hours on a Single Charge. Shift coverage hours are even greater.



This performance is based on operating data from Orange EV's deployed fleet. Plugging in during down-time ("opportunity charging") extends endurance. Results will vary by site and corresponding duty cycle.

CHARGING SOLUTIONS

DESIGNED FOR YOUR ENVIRONMENT AND SHIFT SCHEDULE

Get back to work quickly with both standard and fast-charging options, and stay topped up with "**opportunity charging**", plugging in during downtime (breaks, lunch, shift changes, waiting for assignments, etc.).

Fast Charge

- Offboard, fast-charging station (FCS)
- 440-480 VAC
- Max full charge time: 2 hrs*

Standard and Enhanced Charge

- Onboard and offboard
- 220-240 or 440-480 VAC
- Max full charge time: 8 or 4 hrs*

* Charge times shown are for a full charge starting at 15% (lowest expected) and charging up to 95%. In practice, charging typically starts from higher charge (due to opportunity charging) and takes less time.

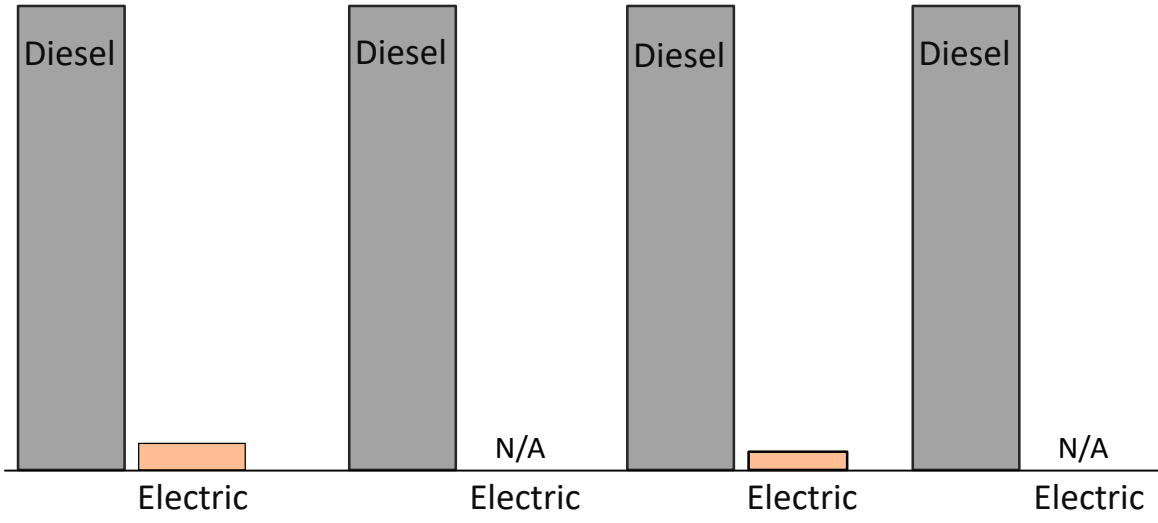
INCREASE PROFITS

GROW REVENUE WHILE REDUCING COSTS

Going electric wins the support of local communities and green customers while lowering costs.

Maintenance

Fuel	*Power Train*	*Brakes*	*Tier 4*	**"Other"**
Save up to 90% *Electricity is the most efficient vehicle fuel*	***Save 100%*** *No engine and no transmission*	***Save ~ 95%*** *Regenerative braking recharges battery*	***Save 100%*** *No Tier 4 emissions gear*	***Save even more*** *on a broad range of other costs incurred when using diesel including:*



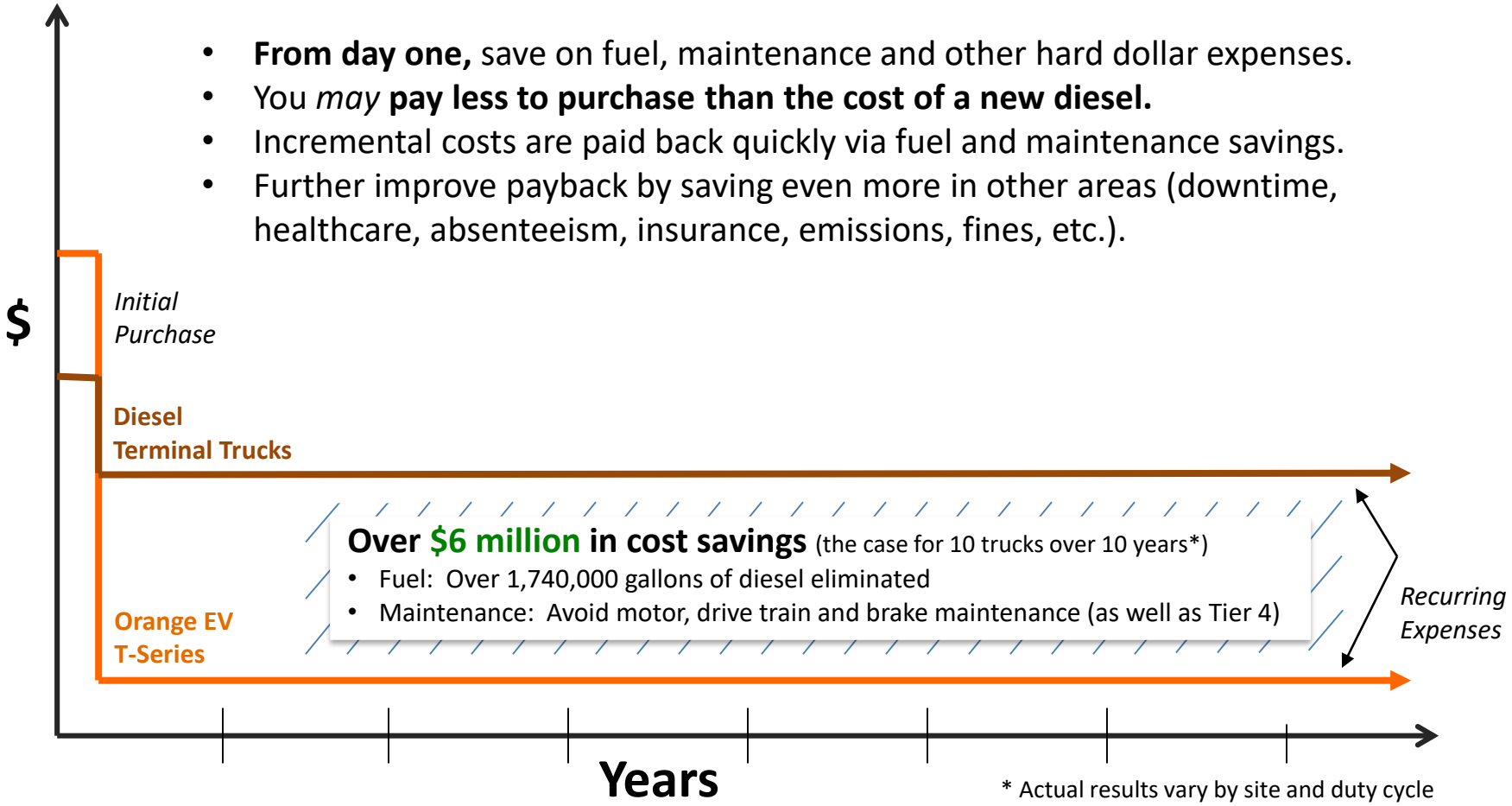
- Liability/work comp
- Health care
- Absenteeism and retention
- Fuel management
- Safety
- Emissions compliance
- Tier 4 related downtime

Orange EV terminal trucks are smoother, cooler, quieter, and cleaner

Reduce Total Cost of Ownership

Enjoy significant savings with lower cost of ownership than today's diesels

- **From day one,** save on fuel, maintenance and other hard dollar expenses.
- You *may* **pay less to purchase than the cost of a new diesel.**
- Incremental costs are paid back quickly via fuel and maintenance savings.
- Further improve payback by saving even more in other areas (downtime, healthcare, absenteeism, insurance, emissions, fines, etc.).



* Actual results vary by site and duty cycle

RUN THE NUMBERS

BUY FOR LESS, OPERATE FOR LESS

Sample Truck Solution:

Extended Duty T-Series, Standard Onboard Charging (Repower)

Save at Purchase:

T-Series Price:	$239,950 + donor truck
POS Discount*:	- $150,000 (ranges from $95k-$150k)
Net Price:	**$89,950 + donor truck**
New Ottawa Tier 4 Diesel:	$125,000

NOTE: Standard Duty T-Series (reman) price before discounts is $199,950 + donor truck

Save in Operations:

- Save **up to 90% net in fuel**, plus an estimated **$1.53/engine hour** (Tier 3 and below)
- Annual savings for heavy use is **$30k-$60k**; moderate use saves $10-30k
- Save even more by avoiding Tier 4 costs, both in maintenance and downtime.

***Point-of-sale (POS) discounts take minutes to request and are approved within days.** With no obligation to purchase, fleets are acting now to secure discounts, simplifying planning and budgeting. You have up to a year to deploy funded trucks and can walk away without penalty.

- Discounts (via vouchers) help grow fleets.
- The discounts cited above are for CA, CHI and NY. Grant applications are also being accepted for funding programs in other areas.
- To be ready for these and more, complete and return the 2017 planning template.

FINANCIAL INCENTIVES

DISCOUNTS AND GRANTS SAVE YOU MONEY (TABLE REVISED 1-23-17)

Emissions Reduction Incentives for Orange EV Electric Trucks

Region	Program	Savings	Type	Due Date
Chicago area (6 Counties)	Drive Clean Chicago (DCC)	Up to $150,000 / truck (fleets public & private)	POS Discount (Pre-approved)	First come, first served. Open now. Apply via Orange EV.
New York (30 counties)	NYT-VIP	Up to $150,000 / truck (fleets public & private)	POS Discount (Pre-approved)	First come, first served. Apply via Orange EV.
California (state-wide)	HVIP	Up to $140,000+ / truck (fleets public, private & federal)	POS Discount (Pre-approved)	First come, first served. Open now. Apply via Orange EV.
Bay Area, NoCal BAAQMD	Carl Moyer via BAAQMD	Up to 85% of truck cost	Competitive Application	First come, first served. Open now.
SoCal SCAQMD	Carl Moyer via SCAQMD	Up to 80% incremental cost / truck	Competitive Application	Applications taken annually. Now closed. Opening Apr 2017. Start planning now.
California (state-wide)	Prop 1B Goods Movement: Cargo Handling Equipment	Up to $100,000 / truck	Competitive Application	Varies by air district. South Coast & Bay Area open ~Feb 2017, due ~Mar 2017.
Texas (27 areas)	Drayage Truck Incentive Program (DTIP)	Varies based on equip. replaced + operation; up to ~$84k / truck	Competitive Application	First come, first served. Open now. Due May 26, 2017.
Texas (39 counties)	Rebate Grants Program	Varies based on equip. replaced; up to ~$38k / truck	Pre-Determined Grants	First come, first served. Opens ~ Feb 2017. Due May 26, 2017.
National (by EPA Region)	DERA	Up to 60% total solution (truck, charging, electrical)	Competitive Application	Opens Feb 2017. Due late April.

Buy for less. Save up to 90% in fuel. Goodbye Tier 4.

Summarizes current priority programs. ***Call us for help*** *with agencies and air districts to find additional incentive funding.*

Prepare projects <u>now</u> for upcoming funding programs. Financing is available to help fleets buy with existing budgets, even without incentives. Call Orange EV's Mike Saxton @ 866-688-5223 ext. 702

GET STARTED

CONTACT ORANGE EV

- ❑ Complete and return the Site and Vehicle Information (SAVI) form to confirm your truck solution
- ❑ **Secure your point-of-sale discounts now** – they won't last forever
  - No obligation to buy
  - Simple and quick, 3-4 pages each
  - Approval in days, and up to one year to deploy
- ❑ Also apply for grant and incentive funding in non-discount/voucher markets
- ❑ Place orders and deploy initial trucks
- ❑ Grow your fleet with pre-secured discounts and other funds

TESTIMONIALS

THE TRUCK OF CHOICE FOR DRIVERS AND OPERATORS

"Loved the truck"

"Easy to use"

"Demonstrated it has the endurance and power we need"

"I believe it will be much less maintenance"

"Super quiet and drives me crazy to get back in regular hostler"

"Will take less of a toll on your body in the long run**. Less noise, heat, and shaking**"

"I can hear the radio!"

"Easy to plug in and unplug"

"Very short learning curve"

*"Temperature was **much, much cooler** by at least 30 degrees"*

"Instant heat – no waiting for engine warm-up"

"I feel ALIVE at the end of my shift"

"Enthusiastic about driving a cooler, quieter, low-vibration, zero-emission vehicle"

"Better impact on driver health with **no black smoke particles** to breathe"

"Battery location makes for much smoother, more stable ride (especially when cornering)"

"The regenerative brakes make braking simpler. I can go hours without using the regular brakes"

"Will do the job"

"Really enjoyed electric deceleration"

FLEET AND MAINTENANCE MANAGERS, SUSTAINABILITY TEAMS, AND COST-MINDED EXECUTIVES CHOOSE ORANGE EV'S PURE ELECTRIC TERMINAL TRUCK SOLUTION TO REDUCE COSTS, IMPROVE PERFORMANCE AND SAFETY, AND ELIMINATE EMISSIONS.

RE: Volkswagen Settlement Funds

DEEP MobileSources

Mon 1/30/2017 1:09 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

From: Ronald Roberts [mailto:rdroberts63@yahoo.com]
Sent: Monday, January 30, 2017 6:41 AM
To: DEEP Webmaster <DEEP.Webmaster@ct.gov>
Cc: Ronald Roberts <rdroberts63@yahoo.com>
Subject: Volkswagen Settlement Funds

I concur with Governor Malloy's and the states intention to use the $51 million dollars, from the settlement, to be use for improving public health.

Not air quality as we cannot control what air quality enters from outside of our state borders.

Respectfully,

Ronald D. Roberts
39 Kondracki Lane
Wallingford, CT 06492

203-265-3620

VW Settlement Comments

Liz <epwalter@att.net>

Wed 2/1/2017 8:01 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: Elizabeth P. Walter
Job Title: Former VW Diesel Owner
Company: Retired State Employee and One Who Appreciates our State Parks - Especially by the Shore

Comments: Dear Sirs: My VW was one of the many in the State of CT that was part of the VW Settlement. Because of us purchasing VW Diesel Cars and the state receiving a Hugh settlement on our backs, I believe that we should have more input where this money is allocated. I would like to see the money being spent on our State Parks. Since many people in our state cannot afford to take get a way vacations and have to stay closer to home. I believe that the funds should be used to clean up, repair the state parks hire lifeguards , park assistants and maintain the grounds, . Also, this settlement would keep the parks open especially the camping grounds through out the summer months. This would be money well spent for all the citizens in the State of CT.

Thank you

Elizabeth Walter

Comments on CT's Proposed State Mitigation Plan VW Settlement Funding

Doug Holcomb <DHolcomb@gogbt.com>

Mon 2/6/2017 9:20 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: Doug Holcomb <DHolcomb@gogbt.com>;

1 attachment

Public Comment to DEEP RE VW Settlement Mitigation Plan February 6 2017 Final.pdf;

February 6, 2017

Greetings:

Attached please find comments from Greater Bridgeport Transit regarding Connecticut's Proposed mitigation Plan.

If you have any questions or require additional information, please feel free to call.

Best regards,

Doug

Doug Holcomb, AICP
Chief Executive Officer
t: 203-366-7070 X 124
f: 203-335-9813
Greater Bridgeport Transit
One Cross Street, Bridgeport, CT 06610
www.gogbt.com

Public Comment on Proposed State Mitigation Plan
Connecticut Department of Energy and Environmental Protection
February 6, 2017

To:

Bureau of Air Management
Mobile Sources Division
Connecticut Department of Energy and Environmental Protection
79 Elm Street, 5th Floor
Hartford, CT 06106

From:

Douglas C. Holcomb, AICP
Chief Executive Officer
Greater Bridgeport Transit
One Cross Street
Bridgeport, Connecticut 06610
Tel: (203) 366-7070 Ext. 124
Email: dholcomb@gogbt.com

This letter is in response to the DEEP's request for public input regarding projects to be used in the development of a mitigation plan under the partial Volkswagen (VW) settlement. More specifically, it is in support of the elements of the proposed mitigation plan (2017) related to the use of a portion of the settlement funds for the costs associated with the deployment of all electric vehicles – *"Up to 100% of the cost of a new all-electric vehicle, including charging infrastructure associated with the new all-electric vehicle."* (Pg. 10)

Greater Bridgeport Transit (GBT) and other bus operations in the State have been working to reduce the environmental impact of their operations and to extend the community benefits of public transportation beyond those already derived from shared rides, to new environmental benefits, resulting from the use of cleaner equipment and facilities. To this end, GBT began operating two hybrid diesel-electric buses in 2012 and by September 2017, 38% of GBT's fleet will consist of buses with cleaner hybrid diesel-electric propulsion systems. GBT would like to continue that commitment.

The Benefits

For the past sixteen months, GBT, in partnership with the Connecticut Department of Transportation, has been working to secure funding to conduct a pilot project for

the deployment of full electric public buses in Connecticut. The availability of settlement funding presents an opportunity to implement an electric bus program and meet the goals of the proposed mitigation plan.

Full electric buses provide for a cleaner, quieter ride with reduced fuel costs and reduced emissions. GBT supports the contents of the proposed mitigation plan as it relates to the deployment of full electric city buses and their benefits:

- Pollution reduction over the lifetime of the engines/vehicles, specifically NOx, and green house gasses;
- A net reduction in gallons of diesel fuel used;
- Improved air quality and human health in communities located in nonattainment areas, areas with a history of air quality issues, or in areas that bear a disproportionate share of the air pollution burden;
- Reduced public exposure to diesel particulate matter, which EPA has classified as a likely human carcinogen.

In additional the benefits cited in the proposed mitigation plan, full electric buses also provide for:

- Reduced lifetime maintenance costs over diesel propulsion systems;
- Reduced dependence on foreign fuel;
- Quieter rides benefiting riders and neighborhoods;
- Improvements to the quality of bus transit service in the State and the potential for attracting new riders (further reducing pollutants born from personal automobile usage);
- The introduction of cleaner technology into Connecticut Environmental Justice communities.

Leveraging Funding

There will likely be more projects proposed for the settlement funding than can be supported. It will be important to use the settlement proceeds to leverage other sources of funding. In Connecticut, this may consist of the use of funding from the Federal Transit Administration (FTA) - Section 5307 formula funding or from the Federal Highway Administration's (FHWA) - *Congestion Mitigation Air Quality*

(CMAQ) funding. While the proposed mitigation plan allows for up to 100% of the cost of the electric vehicles and the requisit charging and maintenance infrastructure, the use of other funding sources in combination would allow for a larger project (or projects) in multiple Connecticut cities or regions.

"Shovel Ready"

The Connecticut Department of Transportation and GBT have partnered over the past eighteen months to develop a pilot program for the deployment of buses with full electric propulsion systems. Some pre-procurement work has been completed, including the preparation of a general scope of the projects, the development of draft specifications and preliminary opinions of probable costs.

The initial project scope consists of the deployment of twelve electric buses, six in the Hartford Region and six in the Bridgeport Region, along with the necessary infrastructure. The initial project cost estimate is $12.9 million and includes the vehicles, charging equipment at the maintenance facilities, on-route charging equipment, design services and project management and assistance in the evaluation of the true impact of the vehicles including energy cost savings.

Public Support

The proposed project described above is consistent with current Regional Plans of Conservation and Development. Further, during the development of the initial project, public support was gained from a number of sources including the Metro Council of Governments, The Center for Transportation and the Environment (CTE), the Capitol Region Council of Governments and members of Connecticut's legislative delegation. The project is also commensurate with the State *Zero-emission Vehicle Programs Memorandum of Understanding* (MOU) to which Connecticut is a signatory.

From the MOU:

"…the Signatory States will seek to support and facilitate the successful commercialization of ZEVs and efforts to maximize the electric miles driven by these vehicles through actions such as promoting electric vehicle readiness through consistent statewide building codes and standards for installing charging infrastructure, developing streamlined metering options for homes equipped with electric vehicle chargers, evaluating opportunities to reduce vehicle operating costs and increasing electric system efficiency through time-

of-use electricity rates and net metering for electric vehicles, and strengthening the connection between ZEVs and renewable energy."

It is for these reasons that GBT supports the use of a portion of the settlement funding for the deployment of full electric buses in Connecticut.

Respectfully submitted,

Douglas C. Holcomb, AICP
General Manager
Greater Bridgeport Transit

Proposal to increase public use of CT State Parks and to promote well being and education programs in our CT Parks partly from VW Settlement funds.

DEEP MobileSources

Wed 2/8/2017 2:54 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

From: Alan DiCara [mailto:alandicara@gmail.com]
Sent: Monday, February 06, 2017 11:28 AM
To: DEEP Commissioner <DEEP.Commissioner@ct.gov>
Cc: Pamela Adams <pamela_aey_adams@sbcglobal.net>
Subject: Proposal to increase public use of CT State Parks and to promote well being and education programs in our CT Parks partly from VW Settlement funds.

February 6th, 2017

Re: Proposal for use of VW settlement monies for well-being and education initiatives at CT State parks

Hello Governor Malloy and Commissioner Klee,

Please find a written proposal regarding the below info which is also accompanied by a proposed budget for about five "demonstration" initiatives at 5 CT State Parks for this Summer.

After reading a recent news report that indicated Governor Malloy and the State would entertain ideas/proposals for use of some of the $50 million awarded to Connecticut from the VW settlement for various programs including "health", I put together a proposal and a budget which I attach for you herein. After Communicating with Pam Adams of the Friends of CT Parks, I believe it makes sense for personnel of our CT State Parks to assist in coordinating these programs if you all find the funding and adopt at least some of them while also allowing the use of some funds to hire people and organizations to participate, such as the CT Red Cross, which I have contacted but have yet to hear back from its Director - to teach swimming and water safety lessons in both English and Spanish, and to hire CT Parks lifeguards with WSI certifications to assist. And for grammar and high school science and physical ed teachers as well as CT Parks staff and people from Audubon for instance to bring classes to study wildlife and biology and to enjoy the recreational opportunities in our CT State Parks not otherwise open to them perhaps. And private experts in exercise classes - yoga, tai chi, etc. - to lead classes for adults and for children accompanied by parents, in State Park settings.

The GOAL of all this is simple: great exercise means less obesity which translates into less disease-diabetes, heart and cancer, for all of us, and to reduce much higher state and personal costs for the latter by investing relatively little (compared to the costs of treating these and related diseases) for new programs envisioned here. Also, swimming and safety lessons can and will prevent drownings and science

lessons out 'in the field' can help teachers help students improve their science skills. And of course the pavilions in many of our state parks are often under-used during the week and even on some weekends! This creates opportunities for the communities - like Torrington, Winsted, Norfolk, Old Lyme and others to encourage local musicians and other artists to rent and use these resources, while also creating new fun events for the public to enjoy and support. I did contact Yale Norfolk Music Festival and Mike DeWire at Burr Pond and know Yale might be interested in having some of its musicians play some concerts over at Dennis Hill in Norfolk for instance. There are other orchestras and musicians and artists who could also participate in the Torrington with support coming from those attending, supported in part by CT State Parks.

Thanks for sharing this with Governor Malloy and Pam and for letting me know what you think. I am not seeking funds personally but envision the State coordinating these efforts if funding is approved - which funding can be supplemented by funds from participating organizations perhaps?

Regards-
Alan DiCara. South Rd, Winsted, CT 860 379 5260
-copy to Governor Malloy via his site-

Proposal for Friends of CT State Parks to Encourage Use of CT Parks to Promote Well-being of the Public and to Reduce Health Care Costs of Diabetes, Heart and other ailments by Friends of CT State Parks

Inroduction and Goals

Friends of CT State Parks herein applies for state funds from the settlement of the "VW" case and from other sources in order to improve utilization by the public and various stakeholders in neighboring communities – schools, nonprofits including hospitals and health care agencies, employers and others, as well as by individuals and families interested in using our state parks to improve their health. We hope to sponsor and fund – with partners we will seek to help us – **exercise programs**, **sports** (compatible with use of state parks) – perhaps with cosponsors like YMCAs, **education** – such as **science and physical education classes** from nearby schools; **swimming lessons and safety programs** with cooperation and help from the Red Cross or from the ranks of lifeguards employed at the State Parks and DEEP to offer swimming lessons to anyone in need of these as well as advice and lessons for parents and other visitors on how to avoid drownings while enjoying our state parks. Also, we are interested in and hope to fund **broader use of pavillions at our state parks for music, drama and other entertainment-related activities** so as to add to the mix of available local activities and events for the public to enjoy and for private and public groups, schools and others to offer.

Friends of CT State Parks would need to hire personnel or otherwise contract with other organizations in order to help conduct and coordinate some of all of the proposed activities and so we seeks funds to do this. In particular, we would seek participation and help from organizations like the YMCA, Boy and Girl Scout troops and organizations, Audobon, interested and WSI-certified lifeguards and the Red Cross, community groups to help provide leadership and lessons on safety with help from the Red Cross and other groups who teach and are knowledgeable about swimming, camping and outside activities.

We would plan to find ways to fund broader use of our CT State Parks for the above and related activities during times when our parks have the capacity and personnel to accommodate these activites. Our funding might be used to pay for more staff, or more staff time, for both maintenance and public safety such as by ENCONN and qualified lifeguards and also for program experts in wildlife, botany and biology and general science. The simple goal is to increase use of CT State Parks and participation by the public in order to promote well-being and the enjoyment of the outdoors in doing so. This might include learning, exercising, enjoying presentations from area muscians or drama club members and others.

The amount of funds we estimate we might need to begin this effort for 2017 is about $1 million , to be used for hiring or subcontracting of labor to administer and to lead and present these programs at state parks and to promote the use of our CT State Parks for these (and other related) purposes, especiall during "off" times such as during the week as opposed to busy weekends for instance. And there is no reason to exclude the months in Winter or Fall, or in May and June and September and October, when schools are in session and when we might partner up with nearby schools and teachers/principals to offer "lab" days or "field" days the schools themselves would coordinate, organize and operate – with our help. Our proposed, initial budget follows below and is by no means final but is a work in progress. We welcome any comments or recommendations from any staff at our CT State Parks on this new set of programs we believe will postively impact the lives of the public as

well as the ongoing operations of our CT State Parks!

Why the State of CT Should Help Fund and Sponsor these Efforts:

-to reduce health care and health insurance costs, for the State, its residents and others;

-to promote well-being by expanding outdoor and other activities for the public so as to make CT and its State Parks more inviting, more rewarding and more valuable to all stakeholders, especially to all those who can and should benefit by using and enjoying our parks more;

-to help ALL State employees – full-time, part-time, seasonal and others, employed at CT State Parks in their daily work and to support them in all ways, including financial, if possible, so as to serve the public better by increasing access and by opening and maintaining more parks and park land for public use and enjoyment.

It is expected that the benefits of increased use and support of CT State Parks will far exceed the costs in that the large and growing health care costs of treating diabetes, obesity, heart disease and cancer can and will be delayed and prevented by increased physical exercise and the enjoyment of our CT State Parks by participation in the various activities proposed and promoted.

Proposed Budget (so far): see attached please.

	Totals:	
Labor		
Lifeguards-to fund time for lessons and increased hours	$2,400.00	5 parks x 4 lifeguards x $15/hr * 8 hours
Maintenance-overtime or more hirees as needed	$2,400.00	5 parks x 4 maintainers x $15/hr * 8 hours
ENCONN & Public Safety-overtime if needed	$5,000.00	estimated overtime
Park Administration-extra time	$2,500.00	est amount
	$12,300.00	
Program Fees		
YMCA fees	$50,000.00	5 parks, $10,000/park
Entertainment fees	$25,000.00	5 parks, $5,000/park
Education fees to support science & other teachers	$5,000.00	5 parks, $1,000/park
Travel-to support area schools	$2,500.00	5 parks, $500/park
Audobon & Park Employees for Wildlife studies	$5,000.00	5 parks, $1,000/park
Boating, Fishing, Hiking, Yoga, Dance, Tai Chi-private vendor fees, est.	$25,000.00	5 parks, $5,000/park
	$112,500.00	
Administration, Organization and Coordination tasks:		
by Friends of CT Parks staff and contractors	$0.00	
by nearby school personnel	$0.00	
by Red Cross and similar orgs-swimming & safety lessons	$5,000.00	5 parks, $1,000/park
by YMCAs	$5,000.00	5 parks, $1,000/park
by Boy/Girl Scouts	$0.00	
by nearby Senior Centers & Rec Depts-bus money & passes	$2,500.00	5 parks, $500/park
	$12,500.00	
Miscellaneous:		
Increased insurance	$0.00	
Equipment rental if needed to support speakers, music, etc.	$1,000.00	
Speakers fund – to hire people to come talk...	$10,000.00	5 parks, $2,000/park
	$11,000.00	
Grand Total of above estimates:	**$148,300.00**	

Comments on CT's Proposed VW State Mitigation Plan

Jim Stewart <JStewart@naugatuck-ct.gov>

Wed 2/8/2017 12:40 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: Samantha Stewart <samannestewart@gmail.com>;

It does not appear that agriculture is adequately represented in your estimate for greenhouse gas emissions in CT, The report shows 1% while EPA estimates 9%, Dose the report address animal agriculture or just equipment emissions?

James R. Stewart P.E. & L.S.
Director of Public Works
Borough of Naugatuck
246 Rubber Ave
Naugatuck, CT 06770
jstewart@naugatuck-ct.gov
p (203) 720-7071
d (203) 720-7072
f (203) 720-5680

VW Mitigation Plan Informational Meeting feedback.

Kryzanski, Michael

Wed 2/8/2017 1:09 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Hello,

I would like to see some funding from the VW Settlement used to build more EV charging stations in Connecticut, particularly at state workplaces. Automobile exhaust is a large portion of NOx emissions. Electric vehicles do not emit any NOx. I believe that building more EV charging stations will make it easier for owners of electric vehicles to drive to places they need to go without having to worry about running out of charge with nowhere to "refill". In addition, by increasing the number of charging stations you will encourage more people to buy electric vehicles as finding a charging station when needed will be less of a hindrance. I also think that by building more charging stations you will indirectly encourage renewable energy as many of the owners of those charging stations will want to power them with renewable energy (most likely solar power). This will also have a beneficial effect on reducing NOx emissions as electricity generated by the sun does not increase NOx emissions, unlike fossil fuel sources of energy. Charging stations can also have a beneficial effect on the area where they are installed. When electric vehicle owners know that there is a charging station in a particular area, they are more likely to frequent that area and spend money around that area. In fact, retail establishments are installing charging stations to attract and retain customers. I should mention that I am the proud owner of a 2017 all electric Nissan Leaf automobile. Switching from a gasoline vehicle to an electric vehicle has been a great decision for me so far. Thank you!

My phone number is 860-893-5251
My home address: 27 Hitching Post Drive, Southington, CT 06489

Michael Kryzanski
I.T. Analyst III
Department of Rehabilitation Services

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Propane's Role in Connecticut's Volkswagen Settlement Environmental Mitigation Plan

Frank Kasmarski <frank@airsolutionspropane.com>

Thu 2/9/2017 9:55 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Frank Kasmarski
430 Fairfield Avenue
Stamford, CT 06902

February 9, 2017

Dear Rob Klee,

As a propane marketer in Connecticut, I am contacting you to discuss how propane vehicles can have a critical role in offsetting the harmful emissions caused by the Volkswagen diesel scandal. Vehicles operating on propane - also known as autogas - are proven to be clean, safe, and affordable for transportation fleets across the country. As you develop Connecticut's Environmental Mitigation Plan, I encourage you to include propane-powered vehicles.

From 2009 to 2015, German automaker Volkswagen programmed certain vehicles to deliberately cheat laboratory emissions testing, resulting in approximately 500,000 vehicles in the United States emitting nitrogen oxide (NOx) up to 40 times greater than the U.S. standards allow. In October 2016, a judge approved a partial settlement between the Justice Department and Volkswagen, resulting in Volkswagen setting up a $2.7 billion environmental mitigation trust fund to offset the excess emissions from the affected vehicles. Connecticut is eligible to receive $51,635,238, some of which can be effectively spent on clean-burning propane vehicles.

One of the best ways our state could use these dollars is to replace older, diesel-powered school buses with new propane-powered versions. School districts across the country have adopted propane school buses to safely transport their children. In these instances, the benefits of propane have been realized almost immediately. From cleaner emissions and quieter rides to lower maintenance costs and fuel savings, propane school buses are a proven winner for school districts.

The main purpose of the Volkswagen Settlement funds is to offset the extra NOx emissions caused by the scandal. Propane vehicles have a long track record as a clean, alternative fuel. I know that there is great interest in how Connecticut will allocate its share of the Volkswagen Settlement funds. As you continue to examine the best ways to reduce emissions and benefit our communities, please include propane-powered vehicles in your Environmental Mitigation Plan.

Sincerely,
Frank Kasmarski

Propane's Role in Connecticut's Volkswagen Settlement Environmental Mitigation Plan

William Cummings <wcummings@hocongas.com>

Thu 2/9/2017 4:45 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

William Cummings
1511 Essex Road
Wetsbrook, CT 06498

February 9, 2017

Dear Rob Klee,

As a propane marketer in Connecticut, I am contacting you to discuss how propane vehicles can have a critical role in offsetting the harmful emissions caused by the Volkswagen diesel scandal. Vehicles operating on propane - also known as autogas - are proven to be clean, safe, and affordable for transportation fleets across the country. As you develop Connecticut's Environmental Mitigation Plan, I encourage you to include propane-powered vehicles.

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Sincerely,
William Cummings

Propane's Role in Connecticut's Volkswagen Settlement Environmental Mitigation Plan

T. Michael Morrissey <morrissey.consulting@cox.net>

Thu 2/9/2017 4:15 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

T. Michael Morrissey
332 Strickland Street
Glastonbury, CT 06033

February 9, 2017

Dear Rob Klee,

As a propane marketer in Connecticut, I am contacting you to discuss how propane vehicles can have a critical role in offsetting the harmful emissions caused by the Volkswagen diesel scandal. Vehicles operating on propane - also known as autogas - are proven to be clean, safe, and affordable for transportation fleets across the country. As you develop Connecticut's Environmental Mitigation Plan, I encourage you to include propane-powered vehicles.

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Sincerely,
T. Michael Morrissey

using CT's share of VW settlement toward lowering CT's greenhouse gas emissions

Geremy Schulick <geremys@hotmail.com>

Thu 2/9/2017 5:41 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Hello,

I would like to submit my support in using CT's share of the VW settlement toward lowering CT's greenhouse gas emissions. Furthermore, I support the CT Roundtable on Climate and Jobs' priorities on the matter:

Environmental Mitigation Trust Fund Coalition Priorities for Allocating CT’s Share of the VW Settlement Money

1. Use 15% of funds (maximum allowed) for EV charging infrastructure for lightduty vehicles: Fast charging corridors – deployment of DC Fast Charging infrastructure along Connecticut corridors per Federal Highway Administration (FHWA) guidelines (I- 91, I-95, I-84, and I-395). Workplace, Commercial and Residential Charging – prioritizing development of public sites such as city and town centers, schools, state office buildings, and other workplaces, ensuring that a significant proportion of these sites are in urban areas. (We also support augmented state rebates on EV purchases for low-income residents as a complementary measure to the installation of charging infrastructure in urban areas.) Pilot projects that address multi-unit dwellings and workplaces without onsite parking.

2. Prioritize investment in urban areas that have suffered from the poorest air quality and where emissions reduction will have greatest health impact. At least 75% of the non-EV charging infrastructure funds should be allocated to these communities.

3. Prioritize zero-emissions technology over hybrids, CNG or propane. At least 75% of the non-EV charging infrastructure funds should be allocated to zero-emissions technology. Hybrids, CNG and propane should only be considered where there are no zeroemissions technology options available to meet specific needs for equipment upgrades that will produce substantial emissions reductions.

4. Prioritize zero-emissions buses. At least 50% of the non-EV charging infrastructure funds should be allocated to buses and related charging infrastructure. We have some preference for transit buses, but we encourage cities to apply the funds where they will achieve the greatest emissions reduction.

5. We are not opposed to having a portion of the funds used to cover DEEP's administrative costs for implementing the program (as allowed by the settlement).

Thank you, Geremy Shulic , Ne Haven, CT

Comments on CT's Proposed VW State Mitigation Plan

Brett Barry <Brett.Barry@cleanenergyfuels.com>

Thu 2/9/2017 2:50 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

VW Connecticut Comments.pdf;

Good afternoon,

Attached are Clean Energy's comments regarding Connecticut's VW state mitigation plan. Please let me know if you have any questions or require anything further.

Regards,

Brett Barry
Senior Policy Advisor

(562) 522-7427
bbarry@cleanenergyfuels.com

Proposal for Structuring the Environmental Mitigation Fund Allocation

February 9, 2017

Thank you for the opportunity to provide comments on structuring Connecticut's Environmental Mitigation Trust (EMT) allocation under the Volkswagen settlement.

As North America's largest provider of natural gas transportation fuel with almost 20 years of leading industry experience, Clean Energy provides construction, operation and maintenance services for refueling stations and is a producer of renewable natural gas (RNG). We have a deep understanding of the growing marketplace, and our portfolio includes 589 stations in 43 states including several in the Constitution State.

The EMT was established to promote reductions of NOx emissions in the medium and heavy-duty vehicle sectors in order to mitigate the air quality damage caused by Volkswagen's non-compliant light-duty diesel vehicles. Reductions are to be achieved, in part, by providing grants for the scrappage and replacement of older diesel vehicles with new diesel, hybrids or alternative fuel vehicles. The question presents itself: How should these funds be spent in order to provide the greatest overall benefit?

Recommendation #1: A majority of the EMT funds should be used to deploy vehicles that perform below today's federal NOx emissions standard of 0.2 g/bhp-hr (low-NOx, near –zero and zero emission vehicles)

The EMT fund provides a unique opportunity to transform the medium and heavy-duty truck sector by deploying the most cutting edge engine technologies. While new diesel engines simply meet the required federal NOx standard, many natural gas engines have gone farther and are certified to either the California Air Resources Board's optional low NOx or near-zero emissions standards. These engines are therefore certified to produce 50-90 percent fewer NOx emissions than new diesels, respectively. Additionally, a recent study[1] conducted by the University of California Riverside, found the actual in-use NOx emissions of the near-zero natural gas engine to be up to 95 percent cleaner than diesel (0.001g/bhp-hr). Given the EMT has been created because of the NOx pollution associated with non-compliant diesel vehicles, we believe that the majority of the funding should be set aside for vehicle projects which make improvements beyond the current federal NOx standards.

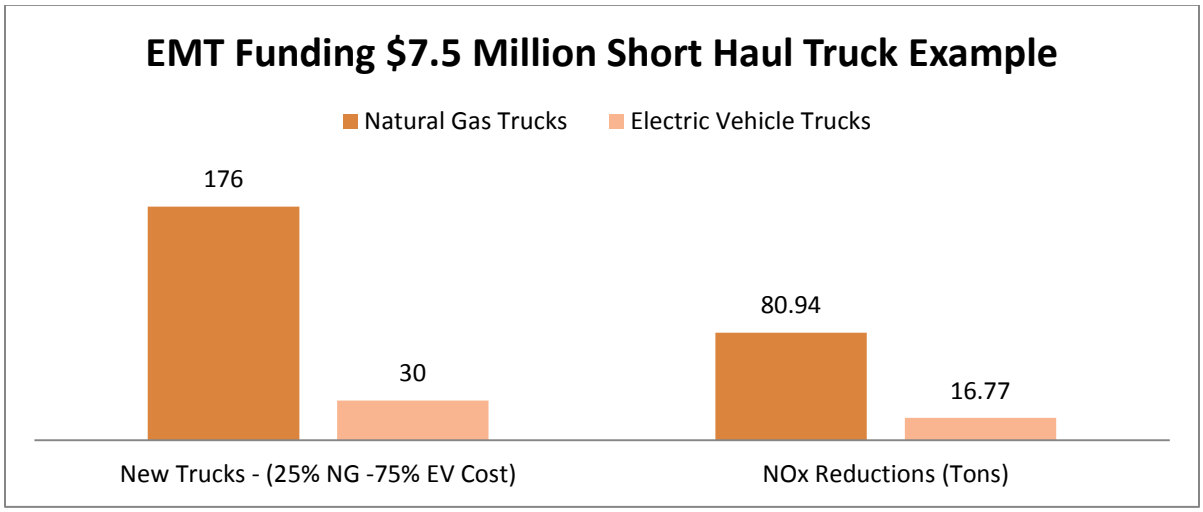
Recommendation #2: Grants should cover the same percentage of the vehicle cost for all alternative fueled vehicles which perform below today's federal NOx emissions standard

A report from the California Energy Commission[2] indicates that the near-zero natural gas engine produced by Cummins-Westport can reduce the life-cycle emissions of medium and heavy duty

[1]" Ultra Low-NOx Natural Gas Vehicle Evaluation ISL G NZ", College of Engineering for Environmental Research and Technology, University of California at Riverside, February 2016.

[2] "2017-2018 Investment Plan Update for the Alternative and Renewable Fuel and Vehicle Technology Program" California Energy Commission, page 4, www.energy.ca.gov/2016publications/CEC-600-2016-007/CEC-600-2016-007-SD.pdf, October 2016

vehicles to levels near or equal to those of zero emission electric vehicles. For example, the South Coast Air Quality Management District of California views the near-zero NOx standard to be zero emission equivalent[3] based on the district's mix of electric generation supplying their grid. Moreover, their electric generation mix is one of the cleanest in the country and therefore Conneticut will benefit further. While comparable in regard to NOx emissions, natural gas and electric vehicles (EVs) are miles apart on cost. An all-electric medium or heavy duty vehicle can cost twice the amount or more of a similar vehicle powered by a near-zero natural gas engine. Yet, under EMT guidance, EVs may receive a grant up to 75 percent of the total vehicle cost while natural gas vehicles (NGVs) may only receive a grant for up to 25 percent of the total vehicle cost. Funding the more expensive EV and at a greater percentage will result in fewer vehicles being deployed and therefore fewer reductions in NOx emissions. Below is a chart illustrating these points by showing the benefits of a $7.5 million investment in NGVs versus that same investment in EVs.



Source: NGVAmerica compiled from Gladstien, Neandross and Associates Game Changer Report Data

There is no policy reason for providing a 500% larger incentive (in terms of dollars) for an EV truck which has similar life-cycle NOx emissions as a low-NOx or near-zero natural gas truck.

Example

	Vehicle Cost	Funding Percentage	Grant
Class 8 EV Truck	$300,000[4]	75%	$225,000

[3] "Comments and Responses to Comments on the Revised Draft AQMP Plan", Southern California Air Quality Management District, page 692: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/response-to-comments/2016-aqmp-rtc-4-of-4.pdf?sfvrsn=4, November 2016

[4] The vehicle cost provided by BYD Motors Inc. to the State of New York for their 2016 Class 8 T9A truck: https://truck-vip.ny.gov/NYSEV-VIF-vehicle-list.php

Class 8 Nat. Gas Truck	$170,000	25%	$42,500

The funding percentage for both natural gas trucks and EVs which perform below federal NOx emissions standard should be the same. Therefore, both EVs and NGVs should be funded at 25 percent of the total vehicle cost.

Example of Recommended Approach

	Vehicle Cost	Funding Percentage	Grant
Class 8 EV Truck	$300,000	25%	$75,000
Class 8 EV Nat. Gas Truck	$170,000	25%	$42,500

Our recommendation is more than fair to EVs as under this approach an EV will receive close to twice as much funding per vehicle as an NGV.

Recommendation #3: Either no more than 20 percent of all funds should be used for government fleets or the funding percentage for government vehicles should be reduced to 50 percent of the total cost

The 100 percent funding level for government vehicles provides a great opportunity for public fleets to reduce their emissions. However, the allure of "free" vehicles for the government should not be permitted to dissipate the greater potential deployment of cleaner vehicles in the private sector. The full funding of government vehicles results in fewer vehicles being deployed per dollar and therefore a reasonable cap must be put in place. A proper balance can be achieved by limiting the funding for government fleets to 20 percent of all EMT funds or by reducing the funding per vehicle to 50 percent of the total cost.

Recommendation #4: Mass transit, para transit and refuse fleets should be the main focus of funding for government vehicles

Mass transit, para transit and refuse fleets are high mileage fleets and are therefore a key target for achieving meaningful NOx reductions. They also directly serve the community thereby making them highly visible investments. Moreover, these fleets also return to a central hub for refueling which makes them ideal for cleaner alternative fuel applications since only a single station is required rather than an expansive network. Over the past decade many mass transit agencies have recognized the unique positioning of their fleets for utilization of alternative fuels. L.A. Metro operates the largest natural gas bus fleet with over 2,000 buses. It is important to note that grants for public mass transit buses should take into consideration the 80 percent matching funds from the federal government for capital maintenance investments. Therefore, public mass transit grants should not exceed 20 percent of the vehicle cost where the federal match is applicable. In the refuse industry, over half of all newly purchased trucks now operate on natural gas due in part by funding made available by states.

Conclusion

Low NOx and near-zero NGVs produce 50-95 percent fewer NOx emissions than diesels and are the most economical alternative. From an implementation standpoint, NGVs are the only alternative fuel vehicle option that offers commercially available vehicles for all the categories that qualify for funding under the EMT. Therefore, we urge you to provide significant funding for the deployment of medium and heavy-duty natural gas vehicles in Connecticut's mitigation plan and take into consideration the foregoing recommendations. Thank you for the opportunity to submit comments on this truly unique opportunity.

Re: Public Comment for CT's Proposed VW State Mitigation Plan

Robert Dickinson <rldickinson@snet.net>

Wed 2/22/2017 9:08 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

I would like to make this additional comment regarding the VW State Mitigation Plan.

That if electric car charging stations are installed that they include a plug for electric bicycles. I would also favor bicycle charging stations alone.
Thank You

Robert Dickinson
19 Birch Road
South Windsor, CT 06074

860-644-1986

From: Robert Dickinson <rldickinson@snet.net>
To: "deep.mobilesources@ct.gov" <deep.mobilesources@ct.gov>
Sent: Wednesday, January 25, 2017 11:56 AM
Subject: Public Comment for CT's Proposed VW State Mitigation Plan

I would favor use of the VW state mitigation money in the following ways.

1) To build Multi-use paved trails separate from roads following such routes as pipe line and power line right of ways.

Using this money to build Multi use trails would be a very effective way for mitigation to reduce nitrogen oxide air pollution by providing alternate ways to get to work or go shopping by walking or bicycling.

2) To build multi-modal ways parallel to busy state routes wide enough for both pedestrians and bicycles especially in Industrial and commercial areas.

This will result in people avoiding use of cars when going from store to store or business employees going to a place for lunch.

3) To provide Safe Ways to Schools such as multi-use paved paths, protected bike lanes, and sidewalks that will allow increased numbers of students to walk and bike to school eliminating some need for buses and parents delivering students to school.

Robert Dickinson
19 Birch Road

Comments Regarding CT's Proposed State Mitigation Plan for the Volkswagen Partial Consent Decree

Paul Aresta <paresta@ccat.us>

Wed 2/22/2017 4:31 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: Joel Rinebold <jrinebold@ccat.us>;

1 attachment

CCAT Comments on CT Mitigation Plan for VW 2-22-17.docx.pdf;

The Connecticut Center for Advanced Technology, Inc. (CCAT), on behalf of the Connecticut Hydrogen and Fuel Cell Coalition, is in strong support of the draft 2017 State of Connecticut Mitigation Plan that includes provisions to support the use of zero-emission, fuel cell electric vehicles (FCEV) and hydrogen infrastructure.

Please find attached Comments Regarding CT's Proposed State Mitigation Plan for the Volkswagen Partial Consent Decree.

Please let me know if you have any questions. Regards, Paul.

Paul Aresta
Connecticut Center for Advanced Technology, Inc.
222 Pitkin Street - Suite 101
East Hartford, CT 06108
Phone: (860) 282-4206 (Direct)
Fax: (860) 291-8874
Email: paresta@ccat.us
Web: www.ccat.us
Web: www.chfcc.org

Comments Regarding CT's Proposed State Mitigation Plan for the Volkswagen Partial Consent Decree

The Connecticut Center for Advanced Technology, Inc. (CCAT), on behalf of the Connecticut Hydrogen and Fuel Cell Coalition, is in strong support of the draft 2017 State of Connecticut Mitigation Plan that includes provisions to support the use of zero-emission, fuel cell electric vehicles (FCEV) and hydrogen infrastructure.

CCAT is a nonprofit corporation that provides services and resources to entrepreneurs, businesses, industry, academia, and government. The Energy Initiative of CCAT has been established to improve the economic competitiveness of the region through solutions that lower energy costs, increase sustainability, and improve long-term energy reliability. The CCAT Energy Initiative promotes use of sustainable and renewable energy, and is engaged with the DOE-supported H2USA effort to develop hydrogen infrastructure to support fuel cell electric vehicles in the Northeast States.

The draft Connecticut Mitigation Plan identifies funding priorities, which include, but are not limited to:

- Projects scaled to achieve the greatest NOx emission reduction or offset;
- Transformative projects that promote other statewide energy, environmental and economic development goals while also taking into account environmental justice considerations;
- Projects in areas that receive a disproportionate quantity of air pollution from diesel fleets such as but not limited to ports, rail yards, truck stops, airports, terminals, and bus depots;
- Projects that can be implemented within eighteen months of the award date; and
- Projects located in nonattainment areas, or areas with historical issues concerning compliance with federal air quality standards.

The use of hydrogen and FCEV technology can achieve significant reductions in NOx emissions and can be implemented consistent with the priorities identified in the draft Connecticut Mitigation Plan. FCEVs are emission free, convenient for consumer use, powerful with no voltage drop after use, easily refueled in 3 to 5 minutes consistent with conventional refueling, and have a range of 300+ miles to avoid refueling anxiety.

CCAT supports DEEP's decision to fund projects at the highest levels allowed, consistent with the Volkswagen 2.0L Vehicle Partial Consent Decree, for the proposed uses:

- ***Expenditures for Non-Government Owned Eligible Large and Medium Trucks, and Eligible Buses:***
    - Up to 40% of the cost of a repower with a new diesel or alternate fueled engine, including the costs of installation of the engine,
    - Up to 25% of the cost of a new diesel or alternate fueled vehicle,
        - The only exception to this limit is for eligible drayage trucks, which are eligible for up to 50% of the cost of a new diesel or alternate fueled vehicle,
    - Up to 75% of the cost of a repower with a new all-electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new all-electric engine; and
    - Up to 75% of the cost of a new all-electric vehicle, including charging infrastructure associated with the new all-electric vehicle.

- ***Expenditures for Government Owned Eligible Large and Medium Trucks, and Eligible Buses:***
    - Up to 100% of the cost of a repower with a new diesel or alternate fueled engine, including the costs of installation of such engine,
    - Up to 100% of the cost of a new diesel or alternate fueled vehicle,
    - Up to 100% of the cost of a repower with a new all-electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new all-electric engine; and
    - Up to 100% of the cost of a new all-electric vehicle, including charging infrastructure associated with the new all-electric vehicle.
- ***Expenditures for Non-Government Owned Eligible Airport Ground Support Equipment, Forklifts and Port Cargo Handling Equipment:***
    - Up to 75% of the cost of a repower with a new all-electric engine, including the costs of installation of the engine, and charging infrastructure associated with the new all-electric engine, and
    - Up to 75% of the cost of new all-electric equipment, including charging infrastructure associated with the new all-electric airport ground support equipment, forklifts or port cargo handling equipment.
- ***Expenditures for Government Owned Eligible Airport Ground Support Equipment, Forklifts and Port Cargo Handling Equipment:***
    - Up to 100% of the cost of a repower with a new all-electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new all-electric engine, and
    - Up to 100% of the cost of new all-electric equipment, including charging infrastructure associated with the new all-electric airport ground support equipment, forklifts or port cargo handling equipment.
- ***Expenditures for Non-Government Owned Eligible Ferries, Tugs and Shorepower for Ocean-going Vessels:***
    - Up to 40% of the cost of a repower with new diesel or alternate fueled (e.g., CNG, propane, hybrid) engines, including the costs of installation of the engines for ferries or tugs,
    - Up to 75% of the cost of a repower with new all-electric engines, including the costs of installation the engines and associated charging infrastructure, and
    - Up to 25% for the costs associated with the shore-side system, including cables, cable management systems, shore power coupler systems, distribution control systems, installation, and power distribution components.
- ***Expenditures for Government Owned Eligible Ferries, Tugs and Shorepower for Ocean-going Vessels:***
    - Up to 100% of the cost of a repower with new diesel or alternate fueled (e.g., CNG, propane, hybrid) engines, including the costs of installation,

- Up to 100% of the cost of a repower with new all-electric engines, including the costs of installation of the engines and associated charging infrastructure, and

- Up to 100% for the costs associated with the shore-side system, including cables, cable management systems, shore power coupler systems, distribution control systems, installation, and power distribution components.

- ***Expenditures for Eligible Light Duty ZEV Supply Equipment:***
  - Up to 33% of the cost to purchase, install and maintain eligible hydrogen fuel cell vehicle supply equipment capable of dispensing at least 250 kilograms per day (kg/day) that will be available to the public, and

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

CCAT supports the implementation of these provisions in coordination with a multi-stakeholder educational initiative to enhance awareness. This educational initiative would help target funding to appropriate areas in non-attainment for ground level ozone, meet provisions for environmental justice, and encourage deployment of advanced technologies that meet the state's goals for energy reliability and economic development.

CCAT will make itself available to DEEP to assist in the implementation of the Connecticut Mitigation Plan. CCAT is a non-governmental entity with demonstrated experience and existing administrative and programmatic structure in place for implementing diesel reduction or offset projects.

Respectfully submitted,

Joel M. Rinebold
Director of Energy Initiatives

Comments on CT's Proposed VW State Mitigation Plan

Dennis Palmer <dpalmer@applustech.com>

Fri 2/24/2017 10:03 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

My name is Dennis Palmer, VP of Corporate Development for Applus Technologies. Applus manages periodic vehicle emissions inspections programs for states throughout the country in accordance with both US EPA and State regulations. In fact, Applus has been is under contract since 2003 to manage and maintain Connecticut's vehicle emissions inspection program. We thank you for the opportunity to provide our comments pursuant to the Proposed State of Connecticut Mitigation Plan under the Volkswagen 2.0L Vehicle Partial Consent Decree.

We respectfully suggest the committee consider allocating a portion of the funding toward a comprehensive public information campaign targeting the goals of the program and the positive effects it continues to have on air quality. There are two reasons for this.

First, as a provider of program management services to 8 jurisdictions throughout the United States, we see a great deal of confusion on the part of the public as to how the VW scandal affects their obligations under state-mandated emissions inspections. As media coverage of the issue continues, owners of vehicles affected by the settlement contact our call centers with increasing frequency questioning the need for an emission inspection based on the fact that their vehicle produces unacceptable levels of emissions and will either be repaired or returned to VW at some point in the future.

Our conversations with motorists clearly show that they do not understand the nuances between the manufactures' attempts to cheat the testing for Federal vehicle certification purposes versus the very different inspection conducted on their vehicle here in Connecticut. It is our position that a targeted message would assist motorists in their understanding of both the nature of the VW actions that lead up to the settlement and underscore the goals and effectiveness of the Connecticut vehicle inspection program.

More important, in our opinion, is the second reason to consider this allocation. While the manufacturer's cheating was designed to provide false passing of the emissions test for certification purposes under the Federal Test Procedure, we are seeing the proliferation of aftermarket simulator devices and temporary "fixes" designed to cheat periodic vehicle emissions inspections in programs throughout the United States. Such devices are designed to fraudulently pass vehicles which would otherwise fail under the On-Board Diagnostic testing protocol for vehicle model years 1996 and newer. These devices and tactics are now readily found through internet searches and in all types of social media.

These simulation devices and methods can undermine the very purpose of an emissions inspection program by allowing polluting vehicles to continue to emit harmful emissions into the atmosphere. The devices are often used or sold by loosely organized criminals. In some cases,

the consumer or motorist is a part of the scheme, in others, the motorist is unsuspecting, believing the repair technician fixed their vehicle, when in fact the technician installed a simulator so the car would pass its next inspection. These activities are illegal and are no less severe than a manufacturer cheating the emission certification testing at the time of new vehicle model introductions.

I delivered a conference presentation to a nationwide audience of emission and safety inspection program administrators and automotive industry professionals on the potential effectiveness of public education campaigns against cheating schemes in inspection programs. The point was and still is, by making the public aware of the environmental impact and legal ramifications of vehicle emissions testing fraud, they are more likely to refuse to participate in such schemes in order to pass a test. In the best case, they will report individuals who attempt to sell them a simulating device. In other scenarios, those already engaged in such rogue activities, may think twice once they are made aware of the severe penalties they face once caught and prosecuted.
These activities violate Federal and State laws and can result in thousands of dollars in fines and multiple years in imprisonment. In fact, a number of people across the US have already been prosecuted and sentenced to significant jail time. We are also aware of other active ongoing investigations.

Overall, we see this issue as potentially having a positive outcome for both emission program effectiveness and consumer protection. It's an opportunity for the state to leverage the public's awareness of the VW scandal to reinforce that no type of cheating is tolerated and that attempts to defeat the system comes with significant consequences.

We believe addressing these issues with messaging on websites and in pamphlets at point of sale locations, such as at emissions inspection stations or repair facilities, would reach the targeted audience directly. Directing a modest amount of the mitigation funds to raise public awareness will have a significant impact on reporting and deterring this illegal activity and therefore have a positive impact in cleaning the air.

Regards,

Dennis Palmer
Vice President, Corporate Development
Applus+ Technologies, Inc.
120 S. LaSalle Street, Suite 1450
Chicago, IL 60603
Office: (312) 644-3005
Fax (312) 661-0070
Cell: (847) 687-8499
dpalmer@applustech.com

BYD Comments on the Proposed State of Connecticut Mitigation Plan

zach.kahn@byd.com

Fri 2/24/2017 2:40 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

Connecticut_BYD VW Outreach Letter FINAL.pdf;

Please see the attached comments from BYD.

Thanks,

Zachary S. Kahn
Director of Government Relations — North America

BYD HEAVY INDUSTRIES | Build Your Dreams®
1800 S Figueroa St. Los Angeles, CA 90015
C: (213) 400-7279 | zach.kahn@byd.com | www.byd.com

Submitted via email to deep.mobilesources@ct.gov

February 24, 2017

Paul Farrell, Assistant Director
Planning and Standards Division, Bureau of Air Management
Department of Energy & Environmental Protection
(860) 424-3389 / paul.farrell@ct.gov

Re: BYD Comments on the Proposed State of Connecticut Mitigation Plan

Dear Assistant Director Farrell:

BYD America ("BYD") appreciates the opportunity to submit the following comments that align with and build upon the state's priorities of achieving broad, multi-sector deployments of zero-emission vehicles and equipment. Such deployments will take advantage of this unprecedented opportunity to reduce mobile source emissions and, in particular, provide both near- and long-term nitrogen oxide (NOx) emissions reductions in those 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.

Following Superstorm Sandy, resiliency and sustainability are increasingly important environmental issues. Conventionally fueled vehicles, including those supporting first responders and public transport, were rendered all but useless as delivery of fuel was impossible in the days and weeks following the storm. In those trying times, electric vehicles capable of supporting multiple power transfer pathways – vehicle-to-grid (V2G), vehicle-to-vehicle, and vehicle-to-load – would have proven invaluable.

BYD's technology and charging system provides just such flexibility, effectively turning each BYD vehicle into a mobile power plant capable of supporting first responders in emergency scenarios or utilities in power outages. This yields substantial benefits in safety, durability, cost-effectiveness, and facility factors, while still meeting the demands of heavy-duty fast charging.

Our North American headquarters and manufacturing facilities are located in Southern California. We are vertically integrated in order to better control the quality and costs throughout the manufacturing chain – we produce every major vehicle component, including our 100% recyclable batteries, inverters, and traction motors. This business structure ensures seamless communication and efficiency across components, which creates a better operational experience and competitive pricing.

Our recommendations for Connecticut fall into three categories:

- Concentrate funding for projects based on the largest sources of statewide NOx emissions
- Provide support for transformative technologies in areas disproportionately burdened with air pollution
- Leverage Volkswagen funds by aligning projects with other state initiatives to yield economic, emissions, and energy benefits

BYD urges the Department of Energy & Environmental Protection to take these recommendations into consideration, which will enable Connecticut to most efficiently and effectively make the most of its allocation of Volkswagen funds.

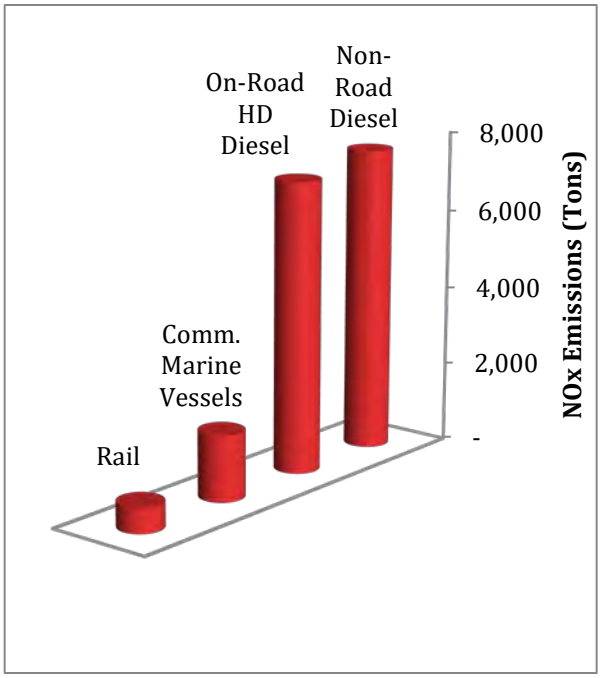
Connecticut Should Concentrate Funding for Projects Based on the Largest Sources of Statewide NOx Emissions

Connecticut's mobile sources inventory, which was analyzed in the Proposed State Mitigation Plan, aggregates ten emissions sources in order to display the largest contributors. However, because the state plans to use its maximum 15% allocation for electric vehicle charging infrastructure, we recommend that Connecticut distribute the remaining funds to only those mitigation actions eligible under the Volkswagen settlement – on-road heavy-duty diesel vehicles, non-road diesel equipment, commercial marine vessels, and locomotives.[1]

As Figure 1 shows at right, on-road heavy-duty diesel vehicles and non-road diesel equipment (excluding locomotives and marine) should be the state's primary focus for these funds as they account for 87% of the state's NOx emissions.

The on-road sector is particularly important as over 40% of the state's NOx emissions come from 5% of the vehicles registered in state.[2] Connecticut should ensure that its funds are allocated to address these sources.

Figure 1: Connecticut NOx Emissions from Settlement-Eligible Sources (2014)



[1] "2014 National Emission Inventory (NEI) Data". United States Environmental Protection Agency, 2014. https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data.

[2] "2016 Connecticut Comprehensive Energy Strategy". Connecticut Department of Energy and Environmental Protection, May 24, 2016. http://www.ct.gov/deep/lib/deep/energy/ces/CES_Public_Scoping_Presentation_May_24_2016.pdf, page 73.

Connecticut can target transit and shuttle buses as well as delivery, cab forward, bucket, and tractor trucks, many of which are "captive" fleets that operate almost entirely within dense communities or areas overburdened with air pollution (e.g., ports and terminals) and are thus capable of delivering immediate environmental benefits.

Allocating funds to cargo handling equipment will address non-road diesel equipment emissions. These pieces of equipment operate entirely within ports, rail yards, depots, and terminals – areas that Connecticut has consistently addressed due to environmental justice concerns stemming from disproportionate air pollution impacts.

In particular, focusing funds on terminal tractors (also referred to as yard tractors, yard hostlers, or yard trucks,) present Connecticut with a viable solution to addressing non-road diesel emissions. Terminal tractors move freight quickly and efficiently through Connecticut's ports of Bridgeport, New Haven, and New London; however, this efficiency is at the cost of clean air because terminal tractors typically use older, high-emitting diesel engines. Connecticut can therefore make an immediate and lasting impact on local air quality in these disproportionately burdened areas by electrifying these terminal tractors.

Connecticut Should Provide Support for Transformative Technologies in Areas Disproportionately Burdened with Air Pollution

Connecticut's air quality issues have led to the designation of two ozone nonattainment areas in the state, which include eight counties – Fairfield, Hartford, Litchfield, Middlesex, New Haven, New London, Tolland, and Windham – that are home to 3.6 million residents.[3] Within these areas are Connecticut's leading population centers of Bridgeport, New Haven, Stamford, Hartford, and Waterbury. By directing funding to vehicles operating in these areas, Connecticut can immediately reduce harmful NOx emissions, thereby generating environmental, health, and economic benefits.

One such funding strategy is to electrify trucks and transit buses operating in Connecticut's population centers or along key corridors, such as I-84, I-91, and I-95. Electrified vehicle technologies produce zero emissions, eliminate the need for expensive-to-maintain particulate traps, and mitigate the need for oil changes. To combat non-road diesel emissions, Connecticut can allocate funds to electrify the state's cargo handling equipment projects.

BYD Solutions

Electrified on-road trucks, such as BYD's various Class 5, 6, and 8 models, create additional benefits for the environment and operators alike, as shown in Table 1 below. Each of these models presents customers with a basic chassis readily available for customization. BYD works with top outfitters and upfitters to meet customer

[3] "Green Book 8-Hour Ozone (2008) Area Information". United States Environmental Protection Agency, February 3, 2017. https://www.epa.gov/green-book/green-book-8-hour-ozone-2008-area-information.

specifications; thus, each of our chassis can be outfitted into a dry box, flatbed, stake bed, refrigerated unit, refuse body, and bucket truck version.

Table 1: What Sets BYD On-Road Trucks Apart

Vehicle Type	Models[4]	Battery Performance	CO2 Reduced per Truck (tonnes)	Annual Fuel Savings	Annual Maintenance Savings
Class 5 Medium-Duty Truck	5D, 5F	155 mile range	340	$ 6,000	$ 4,000
Class 6 Medium-Duty Truck	6B, 6D, 6F, 6R	124 mile range	450	$ 8,200	$ 4,600
Class 8 Heavy-Duty Truck	8TT, 8R, 8TS, and 8TT	92 mile range	636	$ 9,600	$ 4,500

As the world's largest producer of battery electric buses, BYD has demonstrated experience and established customer delivery and deployment processes. Indeed, BYD has deployed more than 12,000 zero-emission buses internationally and has received orders for over 20,000 additional buses. These buses have accumulated more than 130 million miles of service, saved over 27 million gallons of diesel, and reduced 625 million pounds of greenhouse gases (GHGs).

BYD's product line of seven bus and coach models, ranging from 23' coach buses to 60' articulated transit buses and everything in between, are American Disabilities Act and Buy America-compliant. They can therefore help transit agencies in Connecticut reduce fuel costs and minimize maintenance expenses, thereby increasing reliability and performance. Due to the increased miles put on transit buses, these vehicles see even more substantial maintenance and fuel savings than our trucks. BYD's standard 40' bus experiences yearly savings on the order of $45,000 per bus. Further, BYD's recyclable battery technology enables these vehicles to operate as much as 200 miles on a single charge, all while producing zero emissions.

BYD's model 8Y terminal tractor is a 100% battery-electric class 8 truck that is capable of 15 hours of continuous operation between charges with minimal battery degradation. Each terminal tractor eliminates 1,590 metric tons of CO2 over its deployment lifetime. Related to the vehicle's hugely beneficial total cost of ownership, the T8Y saves operators $19,100 in fuel costs and $8,800 in maintenance costs per truck each year – lower downtime, fewer moving parts, less wear and tear, and improved environmental efficiency are the hallmarks

[4] "B" stands for "Bucket." "D" stands for "Delivery." "F" stands for "Forward / Cab Forward." "R" stands for "Refuse." "TS" stands for "Tractor Single." "TT" stands for "Tractor Tandem."

of BYD's T8Y terminal tractor. Further, they are able to be deployed immediately as they are compliant with Federal Motor Vehicle Safety Standards (FMVSS).[5]

Finally, as electric vehicles required dedicated charging infrastructure, Connecticut has already created initiatives such as EVConnecticut and CHEAPR to tackle this issue, and BYD stands ready to align with and further support those initiatives. Where BYD's technology exceeds the capabilities of our competitors is the design and capability of our AC chargers; specifically, our AC charging is all done on-board the vehicle. This on-board charging approach:

- Eliminates installation of large, expensive, hot DC charging stations with external converters, since that conversion is done internally;
- Virtually eliminates heat loss, so the charging system converts more of the current to motive energy;
- Virtually eliminates overheating, so charging can occur in all temperatures – in other words, there are no cold weather limitations on the technology;
- Eliminates the need for costly charger cooling systems;
- Virtually eliminates charger maintenance and increases charger durability, so there's no need for replacement during the life of the vehicle or for many years after;
- Significantly diminishes electrical and heat hazards to staff; and
- Allows the chargers to be compact, easy to operate, easily installed with minimal space, engineering or permitting and even easily moved as needs change.

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

The $55.7 million allocated to Connecticut is an opportunity for the state to transform its transportation sector. 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.

To that end, Connecticut should allocate funding to align with its key state and environmental agency initiatives; specifically, this includes EVConnecticut, the International ZEV Alliance and 8-State MOU and Action Plan, and the state's Comprehensive Energy Strategy.

EVConnecticut[6]

To accelerate the adoption of zero-emission vehicles in Connecticut, BYD's electric vehicle deployment experience will provide the state with the means to cost-effectively and

[5] The T8Y is also compliant with Canadian Motor Vehicle Safety Standards (CMVSS).
[6] "EVConnecticut". Department of Energy & Environmental Protection, State of Connecticut. http://www.ct.gov/deep/cwp/view.asp?a=2684&q=525224&deepNav_GID=1619.

efficiently meet its goals. As an example, BYD has deployed over 12,000 transit bus and motor coaches internationally.

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.[7]

International ZEV Alliance and 8-State MOU & Action Plan[8]

Connecticut has committed to provide cleaner, cheaper, and more reliable transportation energy, which will in turn help the state meet its air quality goals. To that end, Connecticut joined the International ZEV Alliance[9] and the ZEV MOU[10] to increase the number of electric vehicles in the state and build out its electric vehicle charging infrastructure.

While these efforts target the light-duty vehicle passenger vehicle market, BYD offers commercially available products in three specific markets – transit buses, on-road trucks, and cargo handling equipment – that will lead to dramatic NOx emissions reductions in Connecticut. With multiple equipment models in each of those markets, BYD can thus immediately provide Connecticut with a variety of transportation options that will yield tremendous and cost-effective environmental and economic benefits. Further, Connecticut can use its allocated Volkswagen settlement funds to take the next step by creating opportunities for electric vehicles in the medium- and heavy-duty markets.

Comprehensive Energy Strategy[11]

As identified in the 2016 iteration of the Comprehensive Energy Strategy, Connecticut's transportation sector continues to largely rely on petroleum products as the primary fuel source – in fact, 99.5% of fuel consumed is oil or gasoline. To reduce Connecticut's petroleum dependence, Connecticut established a multi-faceted approach to address transportation issues, among others, which included a call for investments in clean fuels, vehicles, and infrastructure.

Electrified vehicles, particularly those using advanced battery technologies, seamless align with the Comprehensive Energy Strategy. BYD's mission to create safer and more environmentally friendly battery technologies has led to the development of the BYD Iron Phosphate ("Fe") Battery. This fire-safe, completely recyclable and incredibly long-lasting technology has become the core of BYD's clean energy platform and is used across our

[7] "Why Electric Drive?" Electric Drive Transportation Association. http://electricdrive.org/ht/d/sp/i/27103/TPL/LandingPageTechIss/pid/27103.
[8] "CT's Path". Department of Energy & Environmental Protection, State of Connecticut. http://www.ct.gov/deep/cwp/view.asp?a=2684&q=538646&deepNav_GID=2183.
[9] Signing partners include Netherlands, Norway, United Kingdom, Germany, California, Maryland, Massachusetts, New York, Oregon, Rhode Island, Vermont, and Quebec,
[10] Signing partners include California, Maryland, Massachusetts, New York, Oregon, Rhode Island, and Vermont.
[11] "Comprehensive Energy Strategy". Department of Energy & Environmental Protection, State of Connecticut. http://www.ct.gov/deep/cwp/view.asp?a=4405&Q=500752&deepNav_GID=2183.

product lines, including automobiles, buses, trucks, utility vehicles, and energy storage systems. The battery is the only environmentally-friendly option available on the market today as it contains no heavy metals or toxic electrolytes. Additionally, BYD batteries can be recycled or repurposed into energy storage systems for other applications. This broad but in-depth expertise is a reflection of our commitment to sustainability and reducing our carbon footprint.

Closing Remarks

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 Connecticut's residents, as well as build the groundwork for a sustainable electric transportation marketplace.

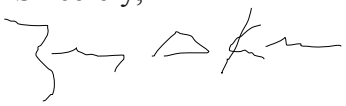
The economic, emission, and energy-specific benefits of electrified equipment are clear – all-electric trucks, buses, and equipment generate no tailpipe emissions while, over the lifetime of the vehicles, deliver a lower total cost of ownership than conventional petroleum fuels and natural gas.

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. We have committed to and successfully delivered substantial price reductions from our first generation of products. We hope to continue this progress in Connecticut and support the state in addressing a broad spectrum of environmental issues, resiliency and sustainability chief among them.

BYD thanks the State of Connecticut and the Department of Energy & Environmental Protection 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 Connecticut Mitigation Plan.

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

Sincerely,



Zachary S. Kahn
Director of Government Relations
BYD America

Written Comments - Proposed State Mitigation Plan for VW Partial Consent Decree

Brendan Fox <bfox@gbact.com>

Fri 2/24/2017 5:00 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

VW Settlement Proposal Public Comment 022417.pdf;

Attached find written comments in response to the invitation to provide comments to Connecticut's proposed State Mitigation Plan for the VW Partial Consent Decree.

If you have any questions, do not hesitate to contact me.

Brendan Fox
Gaffney, Bennett & Associates on behalf of USA Hauling & Recycling Inc.
1 Liberty Square
New Britain, CT 06051

(860)229-0301 - office
bfox@gbact.com – e-mail

Public Comment on the Environmental Mitigation Fund Allocation

Connecticut Department of Energy and Environmental Protection

February 24, 2017

To:

Bureau of Air Management
Mobile Sources Division
Connecticut Department of Energy and Environmental Protection
79 Elm Street, 5th Floor
Hartford, CT 06106

From:

Brendan M. Fox, Jr.
Gaffney, Bennett & Associates
1 Liberty Square
New Britain, CT 06051
Email: bfox@gbact.com

On behalf of USA Hauling & Recycling Inc. and its affiliated companies, thank you for the opportunity to provide comments on structuring Connecticut's Environmental Mitigation Trust (EMT) allocation under the Volkswagen settlement.

The EMT was established to promote reductions of NOx emissions in the medium and heavy-duty vehicle sectors in order to mitigate the air quality damage caused by Volkswagen's non-compliant light-duty diesel vehicles. Reductions are to be achieved, in part, by providing grants for the scrappage and replacement of older diesel vehicles with new diesel, hybrids or alternative fuel vehicles. The question presents itself: How should these funds be spent in order to provide the greatest overall benefit?

Recommendation #1: A majority of the EMT funds should be used to deploy vehicles that perform below today's federal NOx emissions standard of 0.2 g/bhp-hr (low-NOx, near –zero and zero emission vehicles)

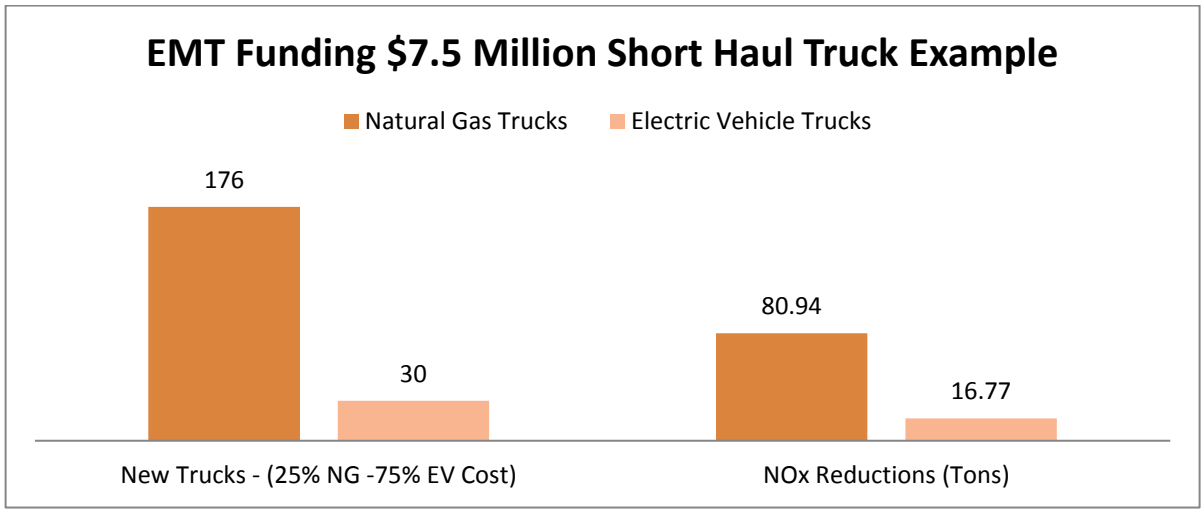
The EMT fund provides a unique opportunity to transform the medium and heavy-duty truck sector by deploying the most cutting edge engine technologies. While new diesel engines simply meet the required federal NOx standard, many natural gas engines have gone farther and are certified to either the California Air Resources Board's optional low NOx or near-zero emissions standards. These engines are therefore certified to produce 50-90 percent fewer NOx emissions than new diesels, respectively. Additionally, a recent study[1] conducted by the University of California Riverside, found the actual in-use NOx emissions of the near-zero natural gas engine to be up to 95 percent cleaner than diesel (0.001g/bhp-hr). Given the EMT has been created because of the NOx pollution associated with

[1]" Ultra Low-NOx Natural Gas Vehicle Evaluation ISL G NZ", College of Engineering for Environmental Research and Technology, University of California at Riverside, February 2016.

non-compliant diesel vehicles, we believe that the majority of the funding should be set aside for vehicle projects which make improvements beyond the current federal NOx standards.

Recommendation #2: Grants should cover the same percentage of the vehicle cost for all alternative fueled vehicles which perform below today's federal NOx emissions standard

A report from the California Energy Commission[2] indicates that the near-zero natural gas engine produced by Cummins-Westport can reduce the life-cycle emissions of medium and heavy duty vehicles to levels near or equal to those of zero emission electric vehicles. For example, the South Coast Air Quality Management District of California views the near-zero NOx standard to be zero emission equivalent[3] based on the district's mix of electric generation supplying their grid. Moreover, their electric generation mix is one of the cleanest in the country and therefore Connecticut will benefit further. While comparable in regard to NOx emissions, natural gas and electric vehicles (EVs) are miles apart on cost. An all-electric medium or heavy duty vehicle can cost twice the amount or more of a similar vehicle powered by a near-zero natural gas engine. Yet, under EMT guidance, EVs may receive a grant up to 75 percent of the total vehicle cost while natural gas vehicles (NGVs) may only receive a grant for up to 25 percent of the total vehicle cost. Funding the more expensive EV and at a greater percentage will result in fewer vehicles being deployed and therefore fewer reductions in NOx emissions. Below is a chart illustrating these points by showing the benefits of a $7.5 million investment in NGVs versus that same investment in EVs.



Source: NGVAmerica compiled from Gladstien, Neandross and Associates Game Changer Report Data

There is no policy reason for providing a 500% larger incentive (in terms of dollars) for an EV truck which has similar life-cycle NOx emissions as a low-NOx or near-zero natural gas truck.

Example

	Vehicle Cost	Funding Percentage	Grant

[2] "2017-2018 Investment Plan Update for the Alternative and Renewable Fuel and Vehicle Technology Program" California Energy Commission, page 4, www.energy.ca.gov/2016publications/CEC-600-2016-007/CEC-600-2016-007-SD.pdf, October 2016

[3] "Comments and Responses to Comments on the Revised Draft AQMP Plan", Southern California Air Quality Management District, page 692: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/response-to-comments/2016-aqmp-rtc-4-of-4.pdf?sfvrsn=4, November 2016

Class 8 EV Truck	$300,000[4]	75%	$225,000
Class 8 Nat. Gas Truck	$170,000	25%	$42,500

The funding percentage for both natural gas trucks and EVs which perform below federal NOx emissions standard should be the same. Therefore, both EVs and NGVs should be funded at 25 percent of the total vehicle cost.

Example of Recommended Approach

	Vehicle Cost	Funding Percentage	Grant
Class 8 EV Truck	$300,000	25%	$75,000
Class 8 EV Nat. Gas Truck	$170,000	25%	$42,500

Our recommendation is more than fair to EVs as under this approach an EV will receive close to twice as much funding per vehicle as an NGV.

Recommendation #3: Either no more than 20 percent of all funds should be used for government fleets or the funding percentage for government vehicles should be reduced to 50 percent of the total cost

The 100 percent funding level for government vehicles provides a great opportunity for public fleets to reduce their emissions. However, the allure of "free" vehicles for the government should not be permitted to dissipate the greater potential deployment of cleaner vehicles in the private sector. The full funding of government vehicles results in fewer vehicles being deployed per dollar and therefore a reasonable cap must be put in place. A proper balance can be achieved by limiting the funding for government fleets to 20 percent of all EMT funds or by reducing the funding per vehicle to 50 percent of the total cost.

Recommendation #4: Mass transit, para transit and refuse fleets should be the main focus of funding for government vehicles

Mass transit, para transit and refuse fleets are high mileage fleets and are therefore a key target for achieving meaningful NOx reductions. They also directly serve the community thereby making them highly visible investments. Moreover, these fleets also return to a central hub for refueling which makes them ideal for cleaner alternative fuel applications since only a single station is required rather than an expansive network. Over the past decade many mass transit agencies have recognized the unique positioning of their fleets for utilization of alternative fuels. L.A. Metro operates the largest natural gas bus fleet with over 2,000 buses. It is important to note that grants for public mass transit buses should take into consideration the 80 percent matching funds from the federal government for capital maintenance investments. Therefore, public mass transit grants should not exceed 20 percent of

[4] The vehicle cost provided by BYD Motors Inc. to the State of New York for their 2016 Class 8 T9A truck: https://truck-vip.ny.gov/NYSEV-VIF-vehicle-list.php

the vehicle cost where the federal match is applicable. In the refuse industry, over half of all newly purchased trucks now operate on natural gas due in part by funding made available by states.

Conclusion

Low NOx and near-zero NGVs produce 50-95 percent fewer NOx emissions than diesels and are the most economical alternative. From an implementation standpoint, NGVs are the only alternative fuel vehicle option that offers commercially available vehicles for all the categories that qualify for funding under the EMT.

Therefore, we urge you to provide significant funding for the deployment of medium and heavy-duty natural gas vehicles in Connecticut's mitigation plan and take into consideration the foregoing recommendations.

Thank you for the opportunity to submit comments on this truly unique opportunity.

VW Settlement Comments

Ezra Finkin <efinkin@dieselforum.org>

Fri 2/24/2017 5:34 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

Comments to DEEP (CT)- VW Settlement.pdf;

Name: Ezra Finkin
Job Title: Director – Policy
Company: Diesel Technology Forum

Comments: I thank you for the opportunity to provide comments to DEEP regarding Connecticut's plan to take advantage of the Environmental Mitigation Trust on behalf of the Diesel Technology Forum. Our comments are attached to this email.

Thank you,

Ezra Finkin
Policy Director
Diesel Technology Forum
Efinkin@dieselforum.org

DIESEL TECHNOLOGY FORUM

February 24, 2017

Ms. Anne Gobin
Director
Bureau of Air Management
Mobile Sources Division
Connecticut Department of Energy and Environmental Protection
79 Elm Street, 5th Floor
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By Email: deep.mobilesources@ct.gov

IN RE: Request for Public Comment Regarding the Volkswagen and Audi Partial Settlement

Dear Ms. Gobin:

I am writing in reference to the $2.7 billion Environmental Mitigation Trust ("Trust") established in the VW settlement, and specifically the $51.2 million in funding designated for the State of Connecticut. The Connecticut Department of Energy and Environmental Protection (DEEP) is seeking public comment concerning how the settlement money should be distributed, accounted for and how to maximize the air quality benefits generated by projects funded through the Trust.

By way of background, the Diesel Technology Forum represents manufacturers of diesel engines, vehicles and equipment. The Forum is a not-for-profit educational organization dedicated to raising awareness of the clean air and economic benefits of clean diesel technology. More information on the Forum is at www.dieselforum.org.

We appreciate the opportunity to comment on this important issue. As you know, the purpose of the Trust is to reduce emissions of oxides of nitrogen (NOx) as a mitigation measure against the excess emissions from the almost 600,000 VW vehicles found to have been deployed with technology that sidesteps NOx emission controls.

As Connecticut evaluates the options for the over $51 million provided through the Trust, we believe that it is vital that the selected approach be one that ensures near term proven NOx benefits to residents. The State will undoubtedly receive many arguments and proposals about investing in various fuels and technologies and even charging infrastructure investments for electric vehicles.

Summary

According to the proposed state mitigation plan released by DEEP, the largest sources of NOx emissions in Connecticut are attributable to engines that power heavy-duty vehicles and equipment. Therefore, the most important opportunity for NOx mitigation in Connecticut is attributable to replacing heavy-duty engines or the vehicles and equipment they power with new technology. Recent studies conclude that the most cost effective strategy to reduce NOx emissions from heavy-duty sources are investments in the latest clean diesel technology.

Replacing older heavy-duty vehicles and off-road engines and equipment with the latest clean diesel technology is the most proven near-term strategy that will reduce NOx emissions and improve air quality for Connecticut residents.

Investing Trust revenues in replacing older commercial vehicles with clean diesel technology will allow for greater immediate term air quality benefits beyond that of investments in other technologies, and will provide more direct benefits to more small businesses and regions of Connecticut than would other technologies and approaches. Upgrading older engines that power large off-road equipment including switch locomotives and marine applications yield enormous air quality benefits and are one of the most cost effective near term NOx investments that also yield very little administrative costs for DEEP relative to other projects. Lastly, we urge you to investigate the option to use Trust revenue as part of non-federal matching grants through the Diesel Emission Reduction Act option that will greatly help introduce new clean technology in the wide variety of off-road construction equipment throughout Connecticut.

1. **Clean Diesel Yields Proven Clean Air Benefits**

As a result of decades of research and investment, clean diesel technology yields near-zero emissions and is widely available today to provide immediate term air quality benefits. Clean diesel refers to a system of cleaner diesel fuel, advanced engine designs and after-treatment technologies to meet the most stringent emissions requirements established by the U.S. Environmental Protection Agency (EPA) for heavy-duty on-road vehicles and off-road equipment. Those standards require near-zero emissions, including NOx, for commercial vehicles beginning in model year 2010 and off-road equipment beginning in 2014. A new heavy-duty truck powered by a clean diesel engine certified to the model year 2010 EPA emissions standard on the road for one year can reduce emissions of NOx by 1.1 tons relative to a truck manufactured to meet the previous emissions standard.

> *It takes more than 60 clean diesel trucks (2016 model year) to generate the same level of NOx emissions as a single truck manufactured in 1988.*

Equally impressive emission reductions are achievable from the latest clean diesel engines that power off-road equipment including construction and agricultural equipment, locomotives and marine vessels. Depending on horsepower range, these clean diesel "Tier 4" engines reduce NOx emission by 90 to 94 percent relative to the oldest generations of engines. Many of the oldest engines are in use in rail operations and marine applications including push boats and other workboats, and replacing these engines with "Tier 4" engines yields enormous air quality improvements.

2. **Clean Diesel Delivers Greater Emission Reductions**

Recent research suggests that new technology clean diesel commercial vehicle engines deliver greater emission reduction benefits than required under the standard. According to the Advanced Collaborative Emissions Study: Phase 2, clean diesel engines that power a Class 8 truck generate NOx emissions that are cleaner than the required standard. That study subjected three model year 2011 heavy-duty diesel truck engines manufactured by three different engine manufacturers to rigorous testing and found that NOx emissions were 60 percent below the standard.[1] Separately, in the transit bus fleet, the Clean Air Task Force compared the emissions performance of a clean diesel engine and a comparable natural gas engine (CNG). That study determined that greater NOx reductions can be achieved by replacing an old transit bus with a clean diesel model versus a comparable CNG bus.[2]

3. **Diesel Powers Connecticut's Commercial Vehicle Fleet**

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[1] Advanced Collaborative Emissions Study: Phase 2. Coordinating Research Council. November 2013.
[2] Clean Diesel Versus CNG Buses: Cost, Air Quality & Climate Impacts. Clean Air Task Force. February 2012

According to recent commercial vehicle-in-operation data collected by the Diesel Technology Forum, there are 75,169 Class 3-8 vehicles in use in Connecticut powered by a diesel engine and 111 powered by natural gas (CNG) as of 2015. Connecticut truckers are choosing to invest more in clean diesel than alternative fuel technologies. Of the diesel vehicle fleet, 22.5 percent or 16,858 are powered by a clean diesel engine deployed with the latest NOx reduction control technology (i.e. 2011 and newer model vehicles). This leaves 58,311 commercial vehicles in Connecticut's fleet that do not come with the latest near-zero NOx emissions control technologies.

4. Clean Diesel is the Most Cost Effective Investment of Trust Fund Dollars

While the settlement presents Connecticut with an unexpected source of revenue, how the state choses to invest the dollars can maximize and expand the $51.2 million through the investment in cost-effective strategies. The most cost effective strategy to replace older commercial vehicles is investments in clean diesel technology. On a dollar-for-dollar basis, recent evidence suggests that investments in proven and available clean diesel technology are a more cost effective investment to reduce NOx and achieve the clean air priorities established by the Trust to generate immediate term benefits for Connecticut residents.

The state should weigh the utilization and availability of the technologies vying for the settlement funding.

- Consider investments in electric vehicle charging infrastructure. What is the incremental increase in utilization of such infrastructure by a relatively small population of vehicles traveling low annual mileage?
- Compare those investments to a replacement strategy for a single heavy-duty diesel truck that is 8 years old and travels 80,000 to 100,000 miles a year, with a majority of the portion being in Connecticut. The truck has far higher NOx emissions than many multiples of passenger vehicles. Replacing an older heavy-duty truck with a newer technology truck will greater the NOx emissions reduction than investments in electric vehicle charging infrastructure.

According to key sources, clean diesel technology is the most cost effective means to reduce NOx emissions from a variety of commercial vehicles.

U.S. Department of Transportation: CMAQ Program (2015)

The U.S. Department of Transportation, using the latest emissions model generated by the U.S. Environmental Protection Agency found that 1 ton of NOx emissions may be eliminated by investing, on average, $20,000 in clean diesel technology versus, on average, $1 million in electric infrastructure.[3] Replacing a model year 2000 engine found in a Class 8 truck, a school bus and a transit bus with a model year 2015 diesel engine is a more cost effective strategy than investments in electric vehicle charging infrastructure.

[3] Congestion Mitigation and Air Quality (CMAQ) Improvement Program Cost-Effectiveness Tables Development and Methodology (December 3, 2015)

Investment Choice	Emission Reduction ($/Ton of NOx)
Diesel Engine Replacement: Heavy-Duty Truck	$13, 748
Diesel Engine Replacement: Transit Bus	$51,131
Diesel Engine Replacement: School Bus	$77,315
Electric Vehicle Charging Infrastructure	$1,462,694

U.S. Environmental Protection Agency: National Port Strategy Assessment: Reducing Air Pollution and Greenhouse Gases at U.S. Ports (October 2016)

The U.S. Environmental Protection Agency similarly concluded recently that investments in clean diesel technology are a more cost effective strategy to immediately reduce NOx emissions from older port trucks than emerging alternatives such as battery electric commercial trucks.[4] Investments in clean diesel generate greater NOx reduction benefits.

	Replacing a pre-1991 Class 8 port truck with….**Model year 2010 or newer Diesel**	Replacing a pre-1991 Class 8 port truck with….**CNG**	Replacing a pre-1991 Class 8 port truck with….**Battery-Electric**
Lbs of NOx reduced	1,282	1,292	1,326
Cost of technology	$110,000	$140,000*	$220,000
$/Lbs of NOx	**$86/lbs**	$107/Lbs	$165/Lbs
* Based on average $30,000 price premium of a new Class 8 CNG tractor relative to a comparable new diesel tractor			

Clean Air Task Force

Examining the benefits of clean diesel relative to CNG in the transit bus fleet, the Clean Air Task Force reached a similar conclusion – greater NOx reduction can occur by replacing older transit buses with new clean diesel models as opposed to investments in CNG equipment.[5] New diesel engines, while generating slightly less NOx than a comparable CNG transit bus, also come at much lower expense. The Clean Air Task Force estimates that a comparable CNG bus costs about $70,000 more and also requires an investment of $25,000 in specialized fuel infrastructure and equipment. For a $10 million investment, more clean diesel buses can be put into service to retire older buses and generate greater air quality benefits than investments in CNG.

[4] National Port Strategy Assessment: Reducing Air Pollution and Greenhouse Gases at U.S. Ports (September 21, 2016)

[5] Clean Diesel Versus CNG Buses: Cost, Air Quality & Climate Impacts. Clean Air Task Force. February 2012

$10 Million Investment to Replace Model Year 2000 Transit Buses		
	Number of Older Buses Replaced	NOx Reduced (kg)
Clean Diesel	25.6	12,698
CNG	20.6	8,639

5. Upgrading the Largest Engines Generates Enormous Air Quality Benefits

The U.S. Environmental Protection Agency recently concluded that replacing the oldest engines that power some of the largest equipment can generate enormous NOx reductions. From switch locomotives to tug boats and ferryboats, "Tier 4" clean diesel engines can eliminate between 37,000 and 96,000 lbs of NOx each year when replacing the oldest generations of engines. Many of the oldest engines in these large applications are still in service given the longevity and durability of large diesel engines, and replacing these engines with proven and available clean diesel technology will provide immediate term NOx reduction. The U.S. Environmental Protection Agency estimates that by 2020, the latest "Tier 4" clean diesel engines will only power between 3 to 5 percent of this equipment.

Upgrading this large equipment using the Environmental Trust revenue will generate enormous air quality benefits but with minimal administrative costs. A single switch locomotive engine upgrade project yields the same air quality benefits as managing 30,000 passenger vehicle purchase incentives or 29 truck replacement projects. These large applications are in operation in fixed locations, typically urban centers or other areas located near priority air quality designations.

Option	Annual NOx Reduction (lbs) per Project	Equivalent to replacing the oldest port trucks with new diesel models	Equivalent to replacing gasoline passenger cars with a zero emission option*
Ferry: Oldest to Newest Engine Replacement	62,000	48 trucks	48,000 EV cars
Tug Boat: Oldest to Newest Engine Replacement	96,000	76 trucks	74,000 EV cars
Switch Locomotive: Oldest to Newest Engine Replacement	37,602	29 trucks	30,000 EV cars

Source: National Port Strategy Assessment: Reducing Air Pollution and Greenhouse Gases at U.S. Ports (September 21, 2016)

* replacing T2 B5 with a zero emission option

6. The Diesel Emission Reduction Act Program is a Proven Mechanism to Administer a NOx Reduction Program, and Will Greatly Minimize the Administrative Burdens on Connecticut

Clean diesel technology has a proven track record when it comes to improving the environmental performance of older equipment through the Diesel Emission Reduction Act (DERA) program, and DERA is a familiar and proven program within many air agencies. The DERA program is a proven, established and ready means to quickly execute projects funded under the Trust with minimal administrative impacts. Since 2008, a variety of State agencies have received an EPA DERA award for retrofitting or replacing trucks and marine vessels.

The $2.7 billion Environmental Mitigation Trust includes specialized or niche off-road applications, such as forklifts and airport ground equipment, as eligible categories of funding. However, the Trust does not directly include the enormous variety and population of the most used pieces of off-road equipment including construction and agricultural equipment as eligible projects.

However, the Trust does include a DERA option that allows states to use Trust revenue as the non-federal match in DERA project applications. This would allow Connecticut to utilize a proven and established system for funding new technology projects and to dramatically leverage the $51.2 million into far greater investments and impact through an approach centered on the non-federal DERA match.

This key provision is available to designated lead agencies like DEEP in the Trust program that enables you to replace or repower a wider variety of off-road equipment and ultimately gives the state greater flexibility for its investment, and the potential to leverage the investment for greater benefits for the state and the project recipients.

CONCLUSION

Thank you for the opportunity to provide insights concerning the benefits of greater investments in clean diesel technology. The Environmental Mitigation Trust represents a historic opportunity to provide clean air benefits to communities across the country including those in Connecticut. The cost effectiveness of investments in proven and available diesel technology makes clean diesel a compelling technology to make the most of this historic opportunity to do the most to improve air quality immediately.

Recently, the Minnesota Pollution Control Agency estimated that the fleet of VW cars in operation in the state found to be deployed with a defeat device for the purpose of skirting emission controls is estimated to have generated 600 tons of NOx emissions. Investments in clean diesel technology are a cost effective strategy to provide immediate air quality benefits to reduce NOx emission today.

PROJECT	# of Projects to Generate 600 Tons of NOx Reduction	Cost Per Project	Total Cost
Tug Boat: Engine Upgrade	13	$500,000	$6,500,000
Heavy-Duty Truck: Replacement	936	$110,000	$102,960,000
Car Replacement with EV Technoloogy	923,077*	$35,000**	**$32,307,695,000**

Source: National Port Strategy Assessment: Reducing Air Pollution and Greenhouse Gases at U.S. Ports (September 21, 2016)

* replacing T2 B5 with a zero emission option

** Retail price of a Nissan Leaf (MY 2017)

Going forward, the Diesel Technology Forum looks forward to providing any additional analysis or insight to DEEP as the state considers efforts to implement strategies to make the most of Trust. Please contact us at (301) 668-7230 with any questions or concerns.

Very truly yours,

Allen R. Schaeffer
Executive Director

Comment, CT DEEP - Harvard Climate Governance Initiative

Sanjay Seth <sseth@gsd.harvard.edu>

Sun 2/26/2017 1:36 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: McCarthy, Gina <gina_mccarthy@hks.harvard.edu>; Matthew Coogan <coogan.matthew@gmail.com>; Fernandez-Monge Cortazar, Fernando <Fernando_Fernandez-Monge_Cortazar@hks17.harvard.edu>; Caroline Lauer <clauer@gsd.harvard.edu>; njoseph@gsd.harvard.edu <njoseph@gsd.harvard.edu>;

1 attachment

02.23.2017 Comments on CT DEEP Proposed Plan - Harvard CGI.docx;

Attached to this email is a comment in relation to Connecticut's Proposed State Mitigation Plan for the Volkswagen Partial Consent Decree, submitted on behalf of the Climate Governance Initiative at Harvard University.

Please contact us if you have any questions.

Best,

Sanjay

– –

Sanjay Seth | Master's in Urban Planning '18
Harvard University, Graduate School of Design

President, Climate Governance Initiative

Member, Council of Student Sustainability Leaders

Connecticut Department of Energy and Environmental Protection
Bureau of Air Management – Mobile Sources Division
79 Elm Street, 5th Floor
Hartford, CT 06106

February 23, 2017

To Whom It May Concern:

We are writing to submit comments in relation to Connecticut's Proposed State Mitigation Plan for the Volkswagen Partial Consent Decree, in response to the informal comment period that ends on February 28, 2017.

For the portion of funds that will be directed toward light duty electric vehicle supply equipment and light duty hydrogen fuel cell vehicle supply equipment, we ask that the State of Connecticut consider methods, plans, financing arrangements, and other forms of formal and informal cooperation with other states in the Northeast and elsewhere, to ensure the most efficient and effective implementation of such equipment along major interstate transportation corridors in the region.

Further, we suggest that an interstate implementation and prioritization framework for such investments could more optimally secure a transition to lower-emissions transportation, as the State of Connecticut could ensure that its investment in electric and hydrogen vehicle supply equipment is augmented by similar investments in neighboring states – and especially on the I-95 corridor.

Moreover, coordinating investment within the region and along major corridors could ensure a seamless user experience that would avoid fragmentation of the vehicle supply equipment network once a driver crosses state lines.

Within the Climate Governance Initiative at Harvard University, our team is developing a series of analyses related to the use of funds from the Environmental Mitigation Trust of the Volkswagen Partial Consent Decree. Our analyses focus on achieving more effective outcomes through interstate cooperation in the provision of light duty vehicle supply equipment.

We will share our analyses with relevant stakeholders at DEEP later this year. Please feel free to reach out to us to engage our team more directly in such analytical and planning efforts, if desired. Additionally, we would be happy to host a presentation at Harvard from DEEP on the Proposed Plan, if there is interest.

Signed:
Sanjay Seth, President, Climate Governance Initiative, Harvard University
Matthew Coogan, Juris Doctor/Master's in Urban Planning '19, Harvard University
Fernando Fernandez-Monge Cortazar, Master's in Public Administration '17, Harvard University
Caroline Lauer, Master's in Urban Planning '18, Harvard University
Neha Joseph, Master's in Urban Planning '18, Harvard University

VW Settlement Comments

Gus Block <gblock@nuvera.com>

Sun 2/26/2017 8:14 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

Nuvera VW EMT Comments.pdf;

Name: Gus Block
Job Title: Director, Government Affairs
Company: Nuvera Fuel Cells, LLCr

Comments: Please see letter attached for recommendations regarding zeo-emissions non-road equipment used primarily in ports, terminals, and airports.

23 February 2017

Robert Klee, Commissioner
Connecticut Dept. of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106

Dear Mr. Klee,

Thank you for the opportunity to provide comment on the use of funds from the VW settlement in today's public hearing. I am writing to reiterate my company's strong support of projects funded by the VW Environmental Mitigation Trust (EMT) for diesel emissions reduction from non-road equipment used primarily in ports, terminals, and airports. According to DEEP, these sources account for 19% of NOx emissions in Connecticut.

Nuvera Fuel Cells, LLC, headquartered in Billerica, Massachusetts, manufactures fuel cell engines for transportation as well as hydrogen refueling stations. Our parent company, Hyster-Yale Group, is one of the world's largest forklift truck manufacturers.

Hyster-Yale Group and other companies offer zero emissions battery and fuel cell versions of heavy duty materials handling equipment. Focusing the use of EMT funds on large-scale projects involving container handlers, forklifts, and ground support equipment would have a major impact on reducing NOx emissions in the state. It would also benefit economically disadvantaged communities located in close proximity to areas such as ports and other concentrated emissions sources.

We also encourage the highest level of investment possible from the VW settlement or other sources for establishing a network of hydrogen fueling stations. Doing so will not only enable specific projects of the type mentioned above, but will also facilitate the more widespread adoption of on-road fuel cell vehicles. Since transportation represents over two-thirds of Connecticut's NOx emissions, it is vital that the infrastructure to support zero emissions options such as fuel cell vehicles – which have the range and the refueling characteristics of conventional cars, trucks, and buses – be developed as soon as possible in order for the state to attain the ozone National Ambient Air Quality Standard.

Please do not hesitate to contact me if there is any further information I can provide.

Best regards,

Gus Block, Director of Government Affairs
(617) 245-7553
gblock@nuvera.com

Dear Commissioner Rob Klee,

I would like to comment on the use of funds from the Volkswagon Clean Air Settlement. Connecticut should use the funds to start seriously transitioning to clean renewable energy.

According to the governer's report, the subject vehicles emitted higher levels of an air pollution, nitrogen oxide (NOX), that contributes to the formation of smog, which impairs lung function and cardiovascular health.

The Towantic Gas Power Plant, being built in Oxford, will generate 194 tons per year of dangerous pollutants (NOx emissions that chemically transform in the atmosphere to produce fine particle pollution.) These fine particles have the greatest impact on human health because they by-pass our bodies' natural respiratory filters and end up deep in the lungs. (David Suzuki Foundation)

Connecticut should start expanding clean renewable energy and stop building fracked gas power plants and fracked gas pipelines for cleaner air and also to slow climate change.

As electric cars become more widely adopted they can then be charged from true clean energy sources which will put Connecticut on the path to clean air for all Connecticut residents.

Please use these funds to start seriously transitioning to clean renewable energy for cleaner air today and a healthy planet tomorrow.

Thank you for your time.

Sincerely, Susan Cote-DeMilia

scotedemilia47@yahoo.com

136 Jacob Rd. Southbury, CT 06488 203-262-1693

Comments on CT's Proposed VW State Mitigation Plan

Szymanski, Steve <sszymanski@protononsite.com>

Mon 2/27/2017 1:08 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

Proton comments to DEEP mitigation fund proposal.pdf;

Dear DEEP Bureau of Air Management:

Please see our comments attached.

Thank you,

Stephen Szymanski ◊ Director, Business Development
Proton OnSite ◊ The Leader in OnSite Gas Generation™
10 Technology Drive ◊ Wallingford, CT 06492
Office: 203.678.2338 ◊ Mobile: 203.980.3182
E-mail: sszymanski@protononsite.com ◊ Web: www.protononsite.com

February 27, 2017

From:
Stephen Szymanski, Director – Business Development
Proton OnSite
10 Technology Drive
Wallingford, CT 06492
203-678-2338
sszymanski@protononsite.com

To:
Bureau of Air Management
Mobile Sources Division
Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106

Subject: Comments on Proposed VW Mitigation Plan

I am providing the following comments on behalf of Proton OnSite in Wallingford, CT. Our company has been developing and manufacturing hydrogen generation equipment for more than 20 years in this state. In addition to providing nearly 100 clean-tech jobs, Proton has been supporting the commercial deployment of fuel cell electric vehicles (FCEV's), by operating the state's only public-access hydrogen fueling station. For the past 6 and ½ years, FCEV drivers have been able to fill at our station through a simple process that takes less than 5 minutes. The "H70" fill available at this station provides a light duty FCEV a range in excess of 300 miles, and a fueling experience that is comparable to a gasoline fill. Thanks to our efforts and our partners at Toyota and Air Liquide, a network of hydrogen fueling stations is being built in the Northeast to support initial deliveries of FCEV's to retail dealerships in Connecticut and surrounding states. Proton's equipment will be providing hydrogen at two of the retail stations in the Northeast, as well as other sites in California, Michigan, Hawaii, and the District of Columbia.

When DEEP contemplates how to distribute the VW mitigation funds, we would ask that the following points be considered:

1. Hydrogen fueling stations at the 250 kg/day scale can support about 100 FCEV's. When you consider the driving range of 60 miles per kg of hydrogen, one station at this scale provides up to 15,000 miles of zero emission driving per day. We would ask that DEEP consider the driving miles provided by individual infrastructure projects, and ensure that the mitigation funds maximize the number of zero emission miles, and in return the NOx reduction benefit.

2. The partnership of Toyota, Air Liquide, and Proton is making a significant investment in hydrogen fueling stations in the Northeast. The utilization of mitigation funds to expand this network will be directly leveraging private investment to support the commercial rollout of FCEV's. Funding strategically located stations (such as in Fairfield County) will enable faster development of target markets, and accelerate the deployment of the vehicles.

3. As a growing and vibrant participant in the Connecticut economy, Proton directly contributes to job and revenue growth for the state through its manufacturing activity. Most of our supply chain is also located in Connecticut, so there is an excellent economic multiplier that comes along with our equipment sales. We hope that DEEP will put some kind of economic impact factor on project selections, so that there is both a positive environmental and economic benefit to be derived from these mitigation funds.

Thank you for the opportunity to provide these comments, and I will be happy to answer any follow up questions.

Sincerely,

Stephen C. Szymanski
Director – Business Development

Airlines for America Comments regarding Connecticut's Proposed State Mitigation Plan for the Volkswagen Partial Consent Decree

Bradley, Veronica <vbradley@airlines.org>

Mon 2/27/2017 11:45 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: kdillon <kdillon@ctairports.org>; Pohle, Timothy <TPohle@airlines.org>;

1 attachment

A4A Comments to CT DEEP re VW Mitigation Trust.pdf;

Dear Sir or Madame:

Please find attached comments from Airlines for America regarding Connecticut's Proposed State Mitigation Plan for the Volkswagen Partial Consent Decree. Please let us know if you have any questions or concerns regarding our submission. Thank you.

Best,
Veronica

Veronica C.K. Bradley
Manager, Environmental Affairs
Airlines for America
We Connect the World
1275 Pennsylvania Ave. NW, Suite 1300
Washington, DC 20004
(p) 202.626.4152 | (e) vbradley@airlines.org
airlines.org | Facebook | Twitter | Instagram | LinkedIn

Airlines for America®

We Connect the World

February 27, 2017

Submitted via email to deep.mobilesources@ct.gov

Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

Re: Comments on Connecticut's Proposed Mitigation Plan for the Volkswagen Partial Consent Decree

To Whom It May Concern:

Airlines for America® ("A4A") would like to thank the Department of Energy and Environmental Protection for the opportunity to comment on its Proposed State Mitigation Plan for the Volkswagen Partial Consent Decree.

A4A is the principal trade and service organization of the U.S. airline industry.[1] A4A and its airline members have a strong record of advancing environmental goals, including actively supporting efforts to achieve and maintain clean air, while also driving economic growth. For example, emissions from the commercial aviation sector constitute less than two percent of domestic greenhouse gas emissions nationally and have had much slower growth from 1990 levels (5%) compared to the transportation sector overall (17%) and on-road sources in particular (24%).[2] At the same time, our industry drives the national and state economies. In Connecticut, civil aviation contributed over $19 billion in economic output, added over 106,000 jobs and contributed 4.3 percent to the state's gross domestic product in 2012 alone. An additional $13.4 billion of economic output was generated from aviation-related manufacturing that same year.[3]

U.S. airlines have achieved this level of simultaneous economic and environmental performance because we have relentlessly pursued and implemented technology, operational, and infrastructure measures to minimize our environmental impact. Among these measures, A4A member airlines have proactively worked with airports around the country to reduce emissions through cost-effective electrification of

[1] A4A's members are: Alaska Airlines, Inc., American Airlines, Inc., Atlas Air, Inc., Federal Express Corporation, Hawaiian Airlines, JetBlue Airways Corp., Southwest Airlines Co., United Continental Holdings, Inc., and United Parcel Service Co. Air Canada, Inc. is an associate member.
[2] *See* U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2014 (April 2016), Table A-115. Moreover, this lower rate of growth is from a much smaller base.
[3] Federal Aviation Administration. The Economic Impact of Civil Aviation on the U.S. Economy: Economic Impact of Civil Aviation by State (2015), available at https://www.faa.gov/air_traffic/publications/media/2015-economic-impact-report.pdf. Nationally, commercial aviation drives 10.2 million U.S. jobs, $1.5 trillion per year in economic activity and 5 percent of U.S. gross domestic product.

airport ground support equipment ("GSE").

The United States and California have recognized the significant contribution GSE electrification can provide and have named it as an "Eligible Mitigation Action" ("EMA") that qualifies for funding from the Environmental Mitigation Trust ("Trust") established under the Volkswagen Partial Consent Decree. A4A and its members are committed to continuing our effort to contribute to Connecticut's economic prosperity and environmental progress and view the Partial Consent Decree as a unique opportunity to accelerate those efforts, particularly in disproportionately impacted communities. Our industry looks forward to working with DEEP and the State to optimize this opportunity, and it is in this spirit that we offer these preliminary comments on Connecticut's proposed mitigation plan for the Trust's funds.

General comment

A4A and its members have a long history of undertaking cost-effective projects that achieve significant reductions in oxides of nitrogen ("NOx") and other local air pollutants such as carbon monoxide, volatile organic compounds, oxides of sulfur, and particulate matter, as well as greenhouse gas emissions. We are confident that our industry will continue in this manner by developing multiple proposals to electrify GSE at commercial airports in Connecticut.

Proposed mitigation plan goals and funding priorities

GSE electrification is positioned to provide the public health benefits envisioned by the Partial Consent Decree as evidenced by GSE electrification's close alignment with the goals and funding priorities outlined in Connecticut's proposed mitigation plan. The proposed plan states its primary goal is to improve and protect ambient air quality by implementing EMAs that will:

> Improve air quality by achieving significant and sustained cost effective reductions in NOx emissions, [e]xpedite deployment and widespread adoption of zero emission . . . vehicles and engines, and [s]upport statewide energy, environmental, and economic development goals while also taking into account environmental justice considerations . . . .[4]

In alignment with this goal, electrification of GSE provides the unique opportunity to achieve sustained emissions reductions in predetermined locations because GSE operate exclusively on airport grounds. Connecticut's major airport is located in Hartford County, which has the highest highway NOx emissions in the State,[5] so ensuring Trust funds are allocated to GSE electrification projects will in turn ensure that local air quality will improve in Hartford County.

GSE electrification projects also align with the funding priorities laid out in the proposed mitigation plan. First, GSE electrification projects A4A members envision implementing with funding from the Trust are cost-effective. Member airlines have successfully obtained state grant funds subject to cost-effectiveness thresholds in the past,[6] and that experience readies them to propose equally cost-effective projects to make real differences in the local air quality surrounding airports in Connecticut.

Second, member airlines and the airports they partner with have demonstrated experience and programmatic structures in place to effectively and efficiently implement GSE electrification projects to reduce emissions. Member airlines have experience with the Federal Aviation Administration's Voluntary

[4] Connecticut Department of Energy& Environmental Protection, Proposed State of Connecticut Mitigation Plan under Volkswagen 2.0L Vehicle Partial Consent Decree, Appendix D (2017), 5.
[5] Ibid., Figure 5 at 8.
[6] *See e.g.*, Carl Moyer Program Guidelines (2011), Appendix G, available at https://www.arb.ca.gov/msprog/moyer/guidelines/current.htm.

Aircraft Low Emissions ("VALE") Program, California's Carl Moyer Program, and other state and local programs, and have implemented their qualifying projects effectively and efficiently. VALE and other state and local funding has allowed our airlines to convert equipment at airports in Arizona, New Mexico, Washington, Texas, Florida, and California among others. Securing funding from the Trust for GSE electrification will allow the airlines to realize similar air quality benefits for Connecticut.

Third, Connecticut's major commercial airport, Bradley International, is located in a county receiving a disproportionate quantity of air pollution from diesel fleets as noted in Figure 5 of the proposed plan. As noted above, providing funds for GSE electrification projects will ensure that NOx emissions reductions are realized and sustained in that county.

Fourth, our member airlines recognize that as non-government entities they may have to share the capital costs of replacing airline-owned GSE with electric alternatives. Electric GSE cannot be deployed without supporting infrastructure such as onsite power distribution and sufficient point of use recharging equipment, which typically is owned and operated by airport operators. As such, airlines envision partnering with airport operators in integrated GSE electrification projects that will enable cost-effective investments in electric GSE.

Given this close alignment between the benefits projects to electrify GSE bring and the funding priorities outlined in the proposed mitigation plan, A4A strongly encourages DEEP and the State to maintain GSE electrification as an option in its mitigation plan and to ensure an effective and efficient process for disbursement of Trust funds for this highly beneficial EMA.

Expected benefits of GSE electrification

A4A agrees with the expected benefits DEEP provides for in cost-effectively converting non-road equipment to all electric. In addition to the benefits DEEP has stated, A4A would like to note that GSE electrification in particular has additional benefits. First, because GSE are only operated on airport grounds, the State will have peace of mind knowing that when it funds GSE electrification projects the emissions benefits will be realized in a defined area that is a funding priority due to its disproportionate share of the State's air pollution burden. Second, emissions reductions from GSE electrification will improve air quality not only for the surrounding residents but also for workers on airport grounds. Lastly, to qualify for funding under the Trust, airlines must replace or repower GSE with zero emission equipment, not simply lower emission equipment. As such, this fact further aligns GSE electrification projects with Connecticut's interest in reducing emissions of greenhouse gases and other criteria pollutants.

Proposed distribution of funding for the categories of eligible mitigation actions

A4A encourages Connecticut to develop policies and procedures that will, at the very least, allow full and fair consideration of projects that are consistent with the EMAs in Appendix D-2 of the Trust. While A4A recognizes that the Partial Consent Decree requires states to include the allocation of funds to each category of EMA,[7] we note that the Decree also affords Beneficiaries great flexibility. We respectfully recommend that Connecticut adopt policies that will allow it to take full advantage of this flexibility.

The mitigation plan is intended to provide the public with insight into the State's high-level vision for use of the mitigation funds and may be adjusted at its discretion as its priorities evolve.[8] A4A urges the State to reflect this intent in its finalized mitigation plan. For example, Connecticut should carefully consider allocation of funds to the DERA Option. The requirements projects must meet to fulfill program requirements under DERA decrease the scope of projects that could possibly be funded through the Trust. Projects that may not fit within the project criteria of DERA may nonetheless effectively reduce

[7] Appendix D Form of Environmental Mitigation Trust Agreement, § 4.1 Beneficiary Mitigation Plan, 11.
[8] Ibid.

emissions. Similarly, the locational data the proposed mitigation plan relies on only focuses on highway NOx emissions, while the EMAs in Appendix D-2 to the Trust have a broader scope to ensure beneficiaries can mitigate emissions from all the various NOx emission sources in its jurisdiction. Connecticut should not limit the types of projects applicants can use by over-allocating funds to the DERA Option or over-emphasizing on-road vehicle replacement projects which may not sustain emission reductions in priority locations. The State should instead allocate funds across the full array of EMAs suggested by the Partial Consent Decree and allow for changes to the allocation of funds as priorities evolve.

* * * * *

We greatly appreciate the opportunity to comment on Connecticut's proposed state mitigation plan and thank you for your consideration of the points we have outlined above. Please let us know if you have any questions regarding our comments, and we look forward to working with DEEP and the State moving forward.

Sincerely,

Veronica Bradley
Manager
Environmental Affairs
Airlines for America

CC: Kevin Dillon
State Aviation Administrator
Bradley International Airport
Terminal A, 3rd Floor, Administrative Offices
Windsor Locks, CT 06096
kdillon@bradleyairport.com

VW Settlement Comments

Andy Warcaba <andy@warcaba.com>

Mon 2/27/2017 5:07 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: Andy Warcaba
Job Title: President
Company: American Idle Reduction, Inc. – Website is: www.americanidlereduction.com

Comments:

Truck drivers idle their engines for a variety of reasons. For long haul trucks, the truck driver must have 10 hours off duty after driving 11 hours. There are also conditions where a driver must stay at a truck stop or rest area facility for 34 hours if they have been on duty for 70 hours in one week. Ideally, the driver would be able to reach his home base prior to meeting this situation but that is not always the case. Surveys have found that 70 to 80 percent of truck drivers say the need for heating or air conditioning is the main reason they idle their trucks during their 10 hours off duty. They also cite the need to operate on-board electrical appliances, such as a television or refrigerator, and to ensure the engine block, fuel, and oil remain warm. Long duration truck idling occurs at truck stops, travel centers, distribution hubs, airports, borders, ports, and roadsides. The advantages of our Truck Stop Electrification Equipment (TSE) Unit is that it reduces NOx Emissions and PM 2.5 Emissions for a total project cost that is cost effective and provides state and local governments help to meet the requirements of the Clean Air Act (CAA).

We would like to have our TSE technology be considered at part of this funding opportunity. Thank you

Andy Warcaba

President

American Idle Reduction, Inc.

www.americanidlereduction.com

(815) 652-6690

NGVAmerica Comments on the VW EMT Funding for CT

Sherrie Merrow <SMerrow@NGVAmerica.org>

Mon 2/27/2017 5:05 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: Matt Godlewski <MGodlewski@NGVamerica.org>; Clarke, Jeff <jclarke@ngvamerica.org>;

1 attachment

NGVAmerica CT VW Mitigation Plan Comments - Feb 27 2017 - Final.pdf;

Dear Commissioner Klee:

Natural Gas Vehicles for America is pleased to submit comments to the Connecticut Department of Energy and Environmental Protection regarding Connecticut's "Proposed State of Connecticut Mitigation Plan" to use funds from the Volkswagen Partial Consent Decree. As the national trade association for natural gas vehicles, we know 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 Connecticut 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
Chair, State Government Advocacy Committee

NGVAmerica
400 N. Capitol St. NW STE 450, Washington, D.C. 20001
303-883-5121 [m]
smerrow@ngvamerica.org
ngvamerica.org | ngv.com

February 27 , 2017

Commissioner Rob Klee
Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

RE: NGVAmerica Comments on the Volkswagen Environmental Mitigation Trust Implementation for the States

Dear Commissioner Klee:

Natural Gas Vehicles for America (NGVAmerica) respectfully submits the following comments on how the Connecticut Department of Energy and Environmental Protection (CT DEEP) can best use the Environmental Mitigation Trust (EMT or Trust) funds ($55.7 million) that the state will receive as part of the Volkswagen (VW) diesel emission settlement.

The CT DEEP states that its CT VW Mitigation Plan has as its primary goal to "improve and protect ambient air quality by reviewing, analyzing and implementing eligible mitigation projects that will:

- Improve air quality by achieving significant and sustained cost effective reductions in NOx emissions,
- Expedite deployment and widespread adoption of zero emission and near-zero emission vehicles and engines, and
- Support statewide energy, environmental and economic development goals while also taking into account environmental justice considerations associated with each proposed eligible mitigation project."

NGVAmerica concurs with this focus and believes that natural gas vehicles offer the best solutions for these projects.

The following pages outline key facts related to vehicle emissions, total cost of ownership, and current availability, as well as NGVAmerica's recommendations on how EMT funds should be allocated to maximize results.

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 they are considered "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)[1]. 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.

[1] 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

Critical Insight:

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*[2], 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

[2] *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.

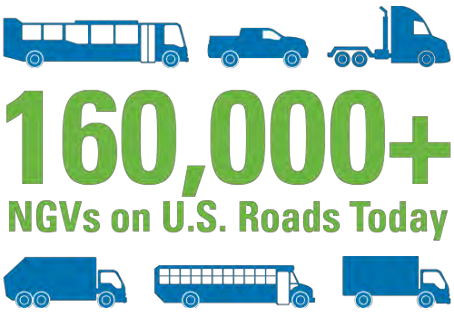
Due to lower fuel and maintenance costs, NGVs offer an 18 to 24 month payback. As production increases and fuel tank prices come down, vehicles will become less expensive and enjoy a shorter payback period

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 is currently $0.50 to $1.00 less per gallon. 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.

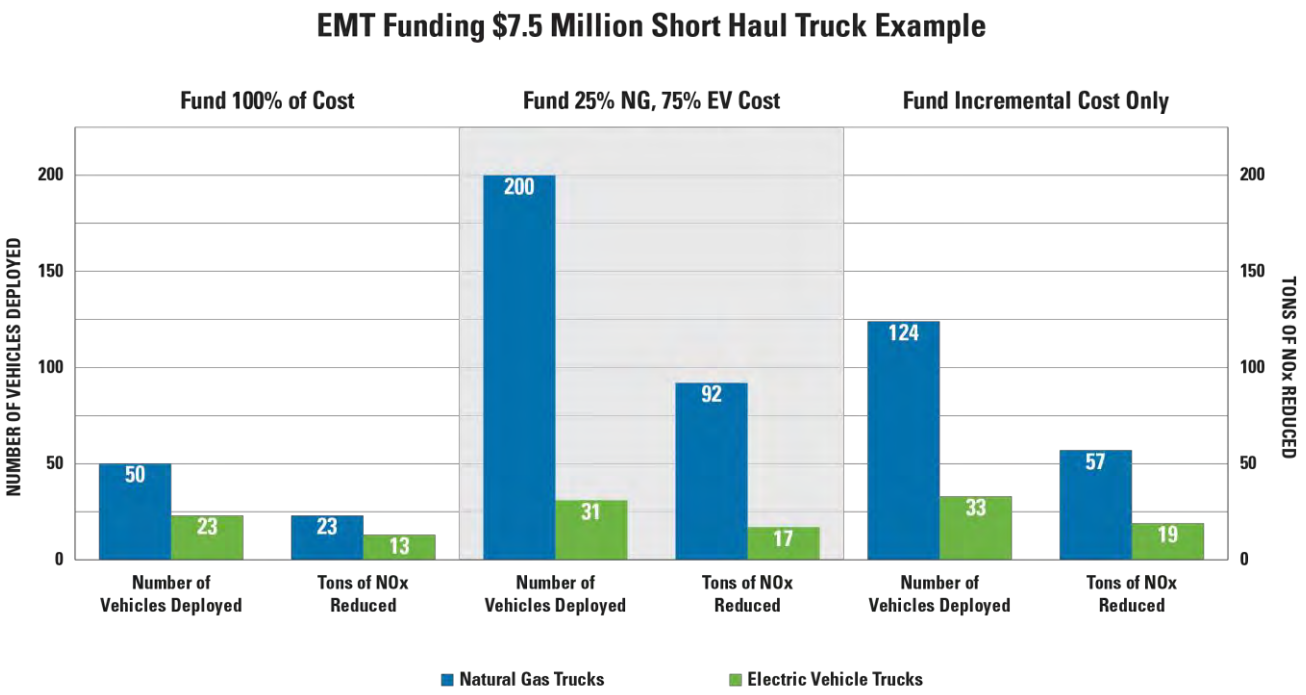
Given the significant fuel and emission reductions realized by early adopters, the popularity of NGVs has continued to build in the U.S., with 20% of all U.S. transit buses now running on CNG or LNG, 35 airports operating NGVs in their private fleets or championing policies that encourage use by private fleets, and more than 50% of new refuse trucks running on natural gas.

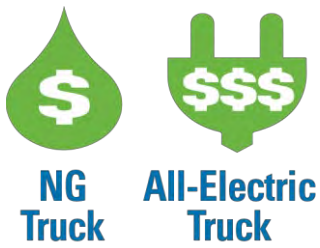
To fuel these vehicles, natural gas infrastructure is rapidly expanding with more than 1,640 CNG and 123 LNG fueling stations operating today.

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 of new, cleaner vehicles, as well as to address the fact that replaced vehicles must be scrapped

✓ **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 or very difficult. 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 CT DEEP in their evaluation and development of Connecticut'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 Connecticut. 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

Comment / Questions to the State of Ct

Stephen Johnston <sdjohnstonsr@att.net>

Mon 2/27/2017 1:43 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

Conn State of .docx;

Attached please see my questions and comments to the request.

Thank you for the opportunity,
Steve Johnston
313 506-4921

State of Connecticut:

My name is Steve Johnston and I am a consultant for companies working in the alternative fuel arena. Armed with over 30 years of OEM automotive experience from Detroit my clients and I understand what is required to put a product on the road that will not only meet customer objectives while meeting all regulatory and cost/weight/investment targets from an agreed upon budget. I do have some basic questions listed below starting with a definition of terms that may seem elementary but they will be the foundation to our upcoming opportunities.

In your request for information I do have some questions to fully understand the scope of the settlement package and who could benefit.

Below are the definitions as I understand them from the EPA. Would these definitions apply to this project???

Definitions/Glossary of Terms from Appendix D-2 to Partial Consent Decree MDL No. 2672 CRB (JSC)

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

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

"Alternate Fueled" shall mean an engine, or a vehicle or piece of equipment which is powered by an engine, which uses a fuel different from or in addition to gasoline fuel or diesel fuel (e.g., CNG, propane, diesel-electric Hybrid).

"Certified Remanufacture System or Verified Engine Upgrade" shall mean engine upgrades certified or verified by EPA or CARB to achieve a reduction in emissions.

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

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

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

“Drayage Trucks” shall mean trucks hauling cargo to and from ports and intermodal rail yards.
“Forklift” shall mean nonroad equipment used to lift and move materials short distances; generally includes tines to lift objects. Eligible types of forklifts include

reach stackers, side loaders, and top loaders.
“Freight Switcher” shall mean a locomotive that moves rail cars around a rail yard as compared to a line-haul engine that move freight long distances.

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

“Government” shall mean a State or local government agency (including a school district, municipality, city, county, special district, transit district, joint powers authority, or port authority, owning fleets purchased with government funds), and a tribal government or native village. The term ‘State’ means the several States, the District of Columbia, and the Commonwealth of Puerto Rico.

“Gross Vehicle Weight Rating (GVWR)” shall mean the maximum weight of the vehicle, as specified by the manufacturer. GVWR includes total vehicle weight plus fluids, passengers, and cargo.

Class 1: < 6000 lb; Class 2: 6001-10,000 lb; Class 3: 10,001-14,000 lb; Class 4: 14,001-16,000 lb; Class 5: 16,001-19,500 lb; Class 6: 19,501-26,000 lb; Class 7: 26,001-33,000 lb; Class 8: > 33,001 lb

“Hybrid” shall mean a vehicle that combines an internal combustion engine with a battery and electric motor. **“Intermodal Rail Yard”** shall mean a rail facility in which cargo is transferred from drayage truck to train or vice-versa.

“Port Cargo Handling Equipment” shall mean rubber-tired gantry cranes, straddle carriers, shuttle carriers, and terminal tractors, including yard hostlers and yard tractors that operate within ports.

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

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

“Tier 0, 1, 2, 3, 4” shall refer to corresponding EPA engine emission classifications for nonroad, locomotive and marine engines.
“Tugs” shall mean dedicated vessels that push or pull other vessels in ports, harbors, and inland waterways (e.g., tugboats and towboats).

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

Fork lift replacement is listed:

I assume that H2 (hydrogen) as the fuel source as an option to run a fuel cell would fall into the ZEV side of the settlement. Is that correct? I believe that fuel cell forklift technology is a viable choice. It is a non-road electric vehicle with a fuel cell axillary power unit to charge it. Many of the large companies like Walmart are starting to use fuel cell powered forklifts due to their predictability of full run time. Batteries can run out of operating power without notice, and do require time consuming battery exchanges. The fuel cell forklift industry has gained popularity over the last few years, because of how they operate and lower vehicle costs. From industry reports the big box company warehouses are increasingly turning to fuel cell forklifts.

My third question relates stationary engines

Is there any opportunity to replace the large stationary industrial engine that I assume was running on gasoline or diesel with CNG?

As I read it the money is available for replacements only but there are engines which could be retrofit with CNG and would of course meet the emission requirements. I'm thinking that Nitrous Oxide is Nitrous Oxide so, allocating money to aid and assist to any solution that may allow the emission standards to be met and or improved that we should indeed go after that solution.

Forth Question:

Is there a clearing house to help perspective innovators with additional resources, no matter if those resources would be engineers, technicians, engineering tools (CFD, FEA, wind tunnels) etc.? If not could there be and if so how would we go about determining who that clearing house could be? In fact, an independent person like this could help in the verification of the solution being suggested for a retrofit or upgrade.

Fifth Question:

Will there be any funding available for educational needs and requirements for industry people in general? Knowing ways to handle Innovation and how to improve your growth potential under the new rules, regulations and changing technology. Class would stress:

1. Development of corporate innovation strategy
2. Applying the concept to specific problem solving
3. Create new innovative products
4. Innovation of Business processed
5. Reinforce the key elements of a corporate innovation culture
6. Cost Reduction via extensive idea generation
7. Cost Effective = Yield immediate results
8. More focused group
9. Everyone working together with a single process based method to achieve desired goals

Sixth Question:

Because the program is 10 years long and many components are just now finishing up their design verification testing and would not be available for 18 to 24 months. How would this be accounted for and should we have a separate list for those types of projects?

My next and probably last question – More of a statement

Low NOx and near-zero NGVs produce 55-95 percent fewer NOx emissions than diesels and are the most economical alternative. From an implementation standpoint, NGVs are the only alternative fuel vehicle option that offers commercially available vehicles for all the categories that qualify for funding under the settlement. Therefore, I urge you to provide significant funding for the deployment of medium and heavy-duty natural gas vehicles.

Public Comments: VW Proposed State Mitigation Plan

David Garriepy <dgarriepy@globalautomakers.org>

Tue 2/28/2017 2:39 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

Global Automakers - Mitigation Plan.pdf;

Please see the attached comments. If you have any questions, please do not hesitate to contact me.

Dave

David J. Garriepy
Manager, State Government Affairs
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GlobalAutomakers

Aston Martin • Ferrari • Honda • Hyundai • Isuzu • Kia
Maserati • McLaren • Nissan • Subaru • Suzuki • Toyota

February 28, 2017

Rob Klee
Commissioner, Department of Energy & Environmental Protection
79 Elm Street
Hartford, CT 06106

SUBJECT: SUPPORT – FUNDING OF ELECTRIC VEHICLE SUPPLY EQUIPMENT – PROPOSED MITIGATION PLAN

Dear Commissioner Klee:

The Association of Global Automakers, www.globalautomakers.org, represents the U.S.-operations of international motor vehicle manufacturers, original equipment suppliers, and other automotive-related trade associations. We work with industry leaders, legislators, regulators, and other stakeholders in the United States to create public policy that improves motor vehicle safety, encourages technological innovation and protects our planet. In 2015, our members manufactured 54% of all new motor vehicles and 69% of green technology vehicles sold in Connecticut.

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 technology, including being the first to successfully launch hybrid electric vehicles 25 years ago, and since then plug-in and fuel cell electric vehicles. We are proud that the number of plug-in and fuel cell electric vehicles, in a variety of options and price points, are increasing every year.

As you are aware, Connecticut has committed to vehicle electrification, both through its adoption of California's Zero Emission Vehicle (ZEV) mandate, which requires automakers to sell increasing volumes of electric vehicles by 2025 and as one of eight signatories to the Zero Emission Vehicles Memorandum of Understanding (the ZEV MOU), which to collectively put 3.3 million ZEVs on public roads by 2025.

Global Automakers appreciates Connecticut's efforts to date but believe additional action is needed going forward to help support electric vehicles. For example, Connecticut was the first ZEV MOU state to adopt a consumer purchase incentive and launched a consumer education effort with its electric vehicle public service announcement. Yet, the marketplace for ZEVs has been slow to progress. Currently, electric vehicle sales represent less than one percent (0.8%) of total new vehicle sales, generally tracking with the national average (0.8%) but well behind California's 3.6% sales.[1] By the end of 2025, the cumulative number of Connecticut ZEV sales needed to meet the MOU target is around 154,000, but since 2011, only about 5,000 ZEVs have been sold in Connecticut.[2] Given the mandate that the state has placed and lagging sales numbers, Global Automakers

[1] For more information about electric vehicle sales and incentives, please visit www.drivingZEV.com.
[2] Acadia Center, Conservation Law Foundation, and Sierra Club, "Charging Up: The Role of States, Utilities, and the Auto Industry in Dramatically Accelerating Electric Vehicle Adoption in Northeast and Mid-Atlantic States." 2015. Page 7. 2 IHS Global Automotive Vehicle Registration Data, January-December, 2015.

strongly supports public investment in both infrastructure and incentives for electric vehicles to help attract and support customer purchase decisions.

In the upcoming months, Connecticut is due to receive $51M, a maximum of 15% of which can be used for the acquisition, installation, operation and maintenance of electric vehicle infrastructure. Global Automakers urges the state of Connecticut to allocate the full 15% towards this effort and to support all electric vehicle infrastructure – charging stations *and* hydrogen refueling stations – with this allocation. The state needs to be working now to develop and expand its network of charging and hydrogen refueling stations to support future increased sales of electric vehicles. In fact, this goes beyond just supporting the vehicles, but also ensuring the state has sufficiently supported its constituents who buy and use plug-in and fuel cell electric vehicles daily and to further local improvements in air quality and reduced carbon use. Increased infrastructure is critical to the state's ability to advance electrification. As such, we encourage the state to spend the 15% allowed for electric vehicle infrastructure.

Building a robust electric vehicle market – for plug-in electric vehicles and fuel cell electric vehicles – cannot be accomplished by the automobile manufacturers alone; it is a shared responsibility. Substantial and ongoing state support is needed to help grow the market, and even then, may not guarantee that the state's 2025 regulatory requirements will be reached. The public and private sectors must work together to build the foundation for an electric vehicle market that is ultimately both organic and sustainable and should take immediate action to support electric vehicles as viable, affordable and convenient options for customers.

Should you have any questions, please do not hesitate to contact us.

Sincerely,

David J. Garriepy
Manager, State Government Affairs
Association of Global Automakers

Paul Young Juice Bar DEEP Meeting Comments

Paul Young <paul@juicebarev.com>

Tue 2/28/2017 2:53 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

CT DEEP Meeting Comments 2 16 2017.pdf;

DEEP Team,

Enclosed are my comments from the Feb 23 meeting, thanks for your efforts to save our environment.

Respectfully,

Paul Young
Senior Account Executive
North America
Garage Juice Bar
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paul@juicebarev.com | www.juicebarev.com
One Technology Drive | Tolland CT 06084

CT DEEP
February 23 VW Informational Meeting Comments Request

Juice Bar EV Charging
February 28, 2017

Louis Corsino, Paul Farrell

Thank-you for your efforts regarding the state's proposed VW mitigation plan, this organized approach and very informative website are really setting the standard for a state's approach to this great VW opportunity.

Juice Bar is a CT based EV Charging equipment manufacturer that is a long term participant in this new industry, thanks in part to Juice Bar, CT is very involved in the clean tech community. We look forward to working with CT DEEP on many projects going forward.
Our team is committed to providing public agencies, property owners and managers with the custom fit option best suited for their overall business objectives and budget.

My brief comments from the meeting are listed below,

I introduced myself as Juice Bar Senior Acct Executive with responsibility for business development in the USA.
I thanked everyone in attendance for what they are doing for the environment
I mentioned that Juice Bar and EVSE LLC are EVSE manufacturers based in CT, please consider using our products
Complimented CT DEEP for a great job on the VW initiative, said that I am involved with Clean Cities groups across the USA all the way to Hawaii and that Clean Cities uses the CT DEEP website as an example of "what good looks like"

Said Thank You and returned the microphone.

Respectfully,

Paul Young
Senior Account Executive, North America

Comments on Proposed State of Connecticut VW Mitigation Plan

Edward Lovelace <elovelace@xlhybrids.com>

Wed 3/1/2017 9:56 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: Joseph Annotti <joe.annotti@gladstein.org>;

2 attachments

2017.03.01 - XL Hybrids Submission to Connecticut.pdf; ATT00001.htm;

Edward Lovelace
Chief Technology Officer
XL Hybrids Inc

The attached comments are provided on the proposed State of Connecticut VW Mitigation Plan. Please feel free to reach out if there are any questions.

March 1, 2017

Paul Farrell, Assistant Director
Planning and Standards Division
Bureau of Air Management
Department of Energy & Environmental Protection
(860) 424-3389 / paul.farrell@ct.gov

Subject: Comments on Proposed State of Connecticut Mitigation Plan

Dear Assistant Director Farrell,

XL Hybrids, Inc. ("XL Hybrids") is pleased to submit the following comments and recommendations, which Connecticut can use to protect and improve the state's air quality. We have outlined a strategic vision for eligible mitigation actions that will cost-effectively fund shovel-ready, large-scale deployments of zero and near-zero emissions vehicles, which will provide immediate and sustained reductions of smog-forming nitrogen oxides (NOx) in communities disproportionately affected by diesel pollution. Further, our recommendations align with existing Connecticut programs, thereby enabling continuity across state initiatives.

XL Hybrids currently leads the U.S. market in fleet electrification solutions and our products stem from a core goal: Create a reliable and widely applicable technology that delivers unparalleled value and reduces the overall cost of ownership. Our efforts to realize that goal have led to demonstrated experience reducing diesel use and offsetting emissions. Our customers – PepsiCo, UniFirst, Harvard University, and ThyssenKrupp, to name a few – have aggregated nearly 39 million miles and continue driving 1.5 million miles each month. In recent years, Coca-Cola has installed an XL Hybrids system on every van deployed nationwide.

We have saved our customers approximately 710,000 gallons of fuel, reduced 6,300 tons of carbon dioxide (CO2), and saved 5,700 hours of driver productivity. Further, we have developed and nurtured long-term relationships with industry-leading experts, including Ford Motor Company, Argonne National Laboratory, and CALSTART, to design, analyze, test, construct, and deploy our electrified powertrains and vehicles.

Specific to the Volkswagen settlement, XL Hybrids' electrified vehicle technology offers the most cost-effective, high-quality solution for Class 4-6 fleets, including service, delivery, school bus, and transit vehicles. Our currently available hybrid-electric vehicle (HEV) technology can be installed on Ford, GM, and Isuzu models (with more OEMs to follow) and is available on both new vehicles and repowers. We pride ourselves on cost-effective service – installation takes approximately 4-6 hours and immediately yields a 20% savings on fuel and greenhouse gases.[1]

[1] Emissions data measured on the EPA Urban Dynamometer Driving Schedule (UDDS).

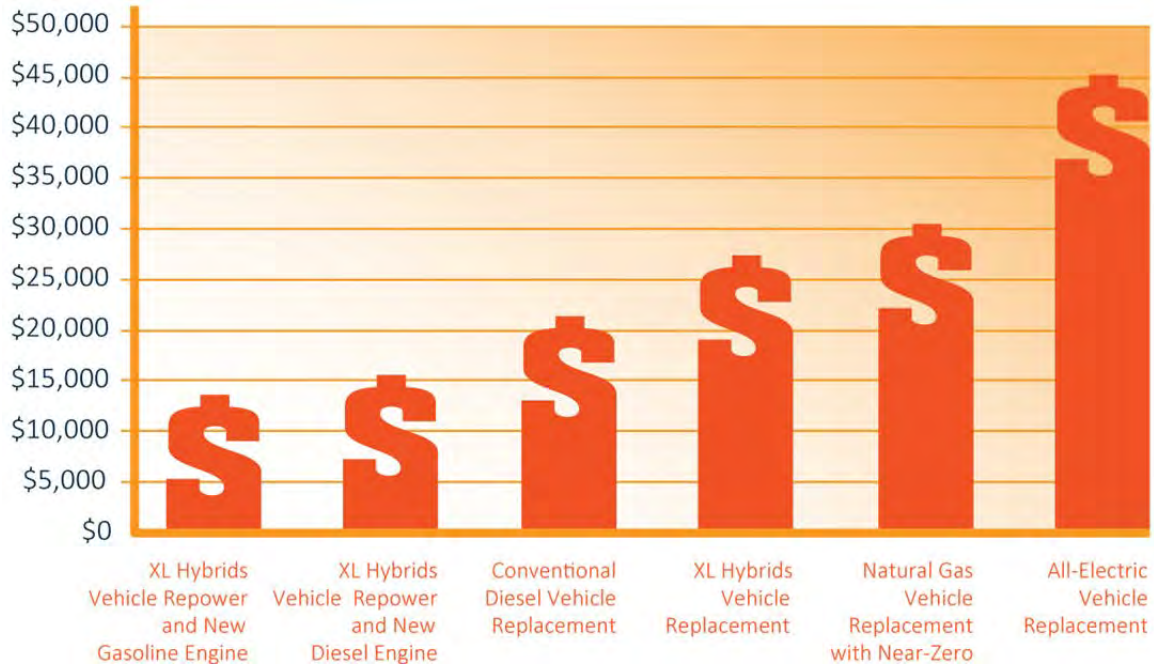
Later in 2017, XL Hybrids will release to the national medium-duty vehicle market our plug-in hybrid-electric vehicle (PHEV) technology. This technology will dramatically increase fuel savings while lowering the total cost of ownership, all the while retaining the emissions reduction benefits of other vehicle technology solutions at higher price points.

Recommendation 1: Facilitate Cost-Effective, Immediate, and Sustained Emissions Reductions

Vitally important to the health of its citizens, Connecticut must ensure the Volkswagen funds are used to finance projects that bring about immediate and sustained NOx emissions reductions that are the result of diesel transportation sources. The state is crisscrossed with highways – I-84, I-91, and I-95 – that serve as key transportation corridors for the Northeast U.S. Further, Connecticut is home to eight counties with ozone emissions levels that exceed the 8-hour ozone Nonattainment Air Quality Standards (NAAQS) – Fairfield, Hartford, Litchfield, Middlesex, New Haven, New London, Tolland, and Windham.[2]

Hybrid-electric vehicles are a smart investment for Connecticut because they can yield tremendous benefits. Indeed, in comparison with other eligible project types under the Volkswagen settlement, XL Hybrids' system demonstrates significant cost-effectiveness benefits in terms of NOx reduction emissions, as shown in Figure 1 below.

Figure 1: XL Hybrids Can Help Connecticut Achieve the Lowest $ per NOx ton Cost-Effectiveness[3]



[2] "Connecticut (Region 1)". 8-Hour Ozone (2008) Designated Area State/Area/County Report, United States Environmental Protection Agency, September 22, 2016. https://www3.epa.gov/airquality/greenbook/hbcs.html#CT.

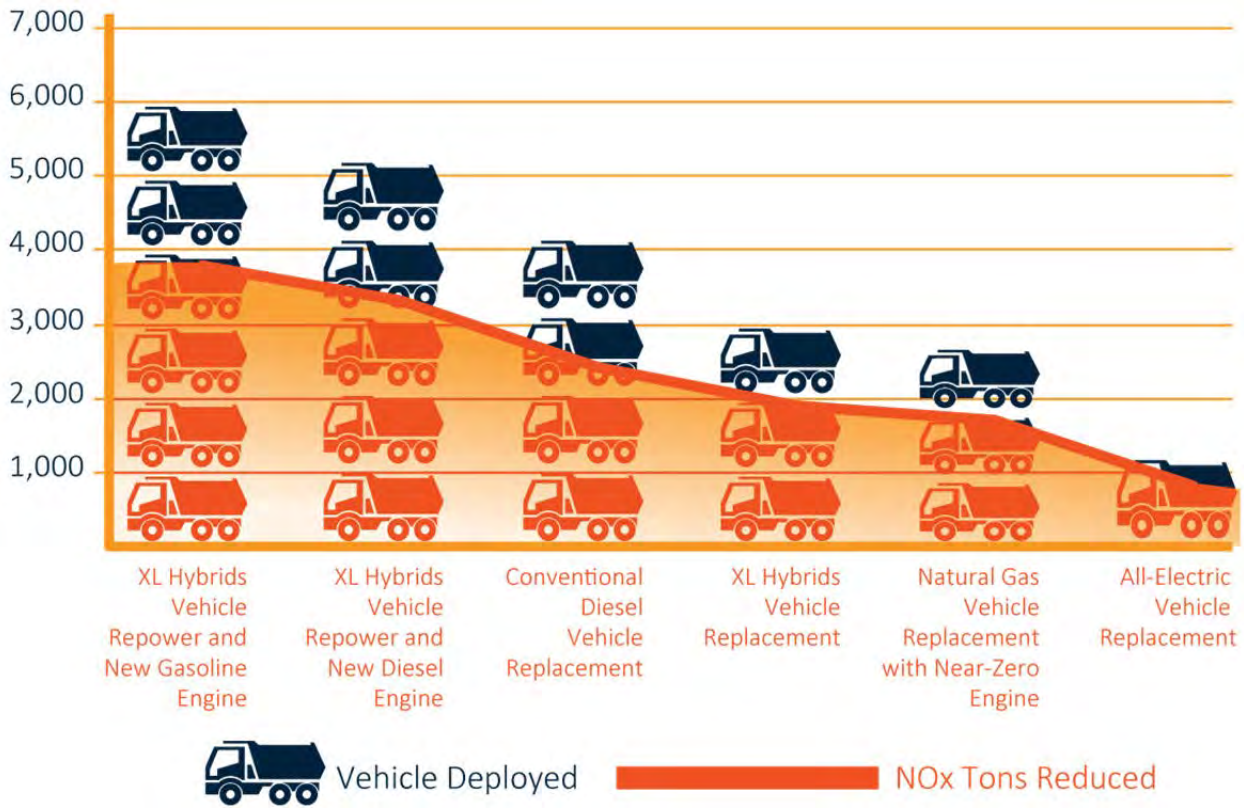
[3] Analysis generated using the EPA's Diesel Emissions Quantifier (DEQ). Key assumptions: (a) existing vehicle is MY 2006 class 4-5 short-haul single unit vehicle replaced with a similar size and function MY 2017 vehicle, (b) XL Hybrids' system reduces 99% of NOx and 20% of CO2 emissions after new diesel replacement or repower, and (c) Connecticut provides an incentive level of 25%.

Figure 1 clearly shows that XL Hybrids' technology provides cost-effective competition to conventional diesel replacements and it far outpaces the cost-effectiveness of most advanced natural gas and all-electric vehicles.

We find it worth noting that allowing funds to be used for new gasoline-fueled vehicles equipped with hybrid technologies will result in far superior cost-effectiveness and emission reduction benefits. By replacing an existing diesel vehicle with a gasoline-hybrid vehicle, Connecticut can dramatically lower the incremental cost and thereby increase the cost-effectiveness of the replacement, more effectively "right size" the horsepower and torque suitable to the application, and reduce emissions across the spectrum of pollutants. We appreciate that there is not yet any published guidance that has defined whether such projects would be eligible. In that light, we hope to engage further with Connecticut to demonstrate the benefits of these gasoline-hybrid vehicles and ensure their eligibility for competition.

By extrapolating these cost-effectiveness numbers, the results are even more staggering. Figure 2 below shows six hypothetical scenarios in which Connecticut dedicated $50 million to each. The graphic makes clear the large-scale deployment and emissions reduction potential of various XL Hybrids replacement and repower solutions.

Figure 2: $50 Million in Dedicated Funding for Hybrid Technology Would Generate the Most Vehicle Deployments and NOx Tons Reduced



We appreciate Connecticut's intentions to take a broad focus with its allocation of Volkswagen funds. However, we recommend that Connecticut structure all RFPs using Volkswagen funds so as to allow each applicant to propose competitive cost-share levels lower than those prescribed in the Volkswagen settlement. By doing so, Connecticut can more realistically fund large-scale, transformative projects that will be capable of achieving the greatest amount of emissions reductions per state dollar.

Recommendation 2: Prioritize NOx Cost-Effectiveness, but also Give Credence to Other Cost-Effectiveness Metrics

While NOx cost-effectiveness is certainly important, we also recommend that Connecticut expand the definition of cost-effectiveness to address other attributes. We have highlighted several of these attributes below, which have proven to be critical issues for our customers and are thus vital to ensuring that projects can be replicated across the state, region, and nation.

Table 1: XL Hybrids' Expanded Cost-Effectiveness Benefits

Cost-Effectiveness Attribute	XL Hybrids System Installation and Repower	Vehicle Replacement
Deployment Window	1 day to upfit the vehicle	6 to 12 months for new OEM vehicle
Cost for Medium-Duty Vehicle	$40,000 for diesel and $35,000 for gasoline, which includes installation of the hybrid system and new engine	$50,000 - $100,000
Wells to Wheels NOx Savings on City Drive Cycle	As much as 99%, due to regenerative braking and engine improvements	Variable, depending on technology and grid electricity source
Infrastructure	None	None, though other alternative fuels require cost-intensive dedicated stations
Availability	Available nationwide with MA public fleet contract VEH102	Variable; Other alternative fuels may not be available in all markets and vehicle classes

The benefits of alternative fuel technologies, particularly for municipal fleets, cannot be overstated. While not only delivering emission reduction benefits, these fleets also face increasingly stringent compliance requirements for deploying such vehicles. Fortunately, the Alternative Fuel Provider Fleet Program of the Energy Policy Act (EPAct) was recently expanded so as to allow hybrid-electric vehicles to qualify as one-half credit. This effectively provides municipal fleets (which also include state, utility, and university fleets) with additional options to meet their procurement standards and reduce emissions. XL Hybrids is proud of its coordination with and support from the Department of Energy on this effort.

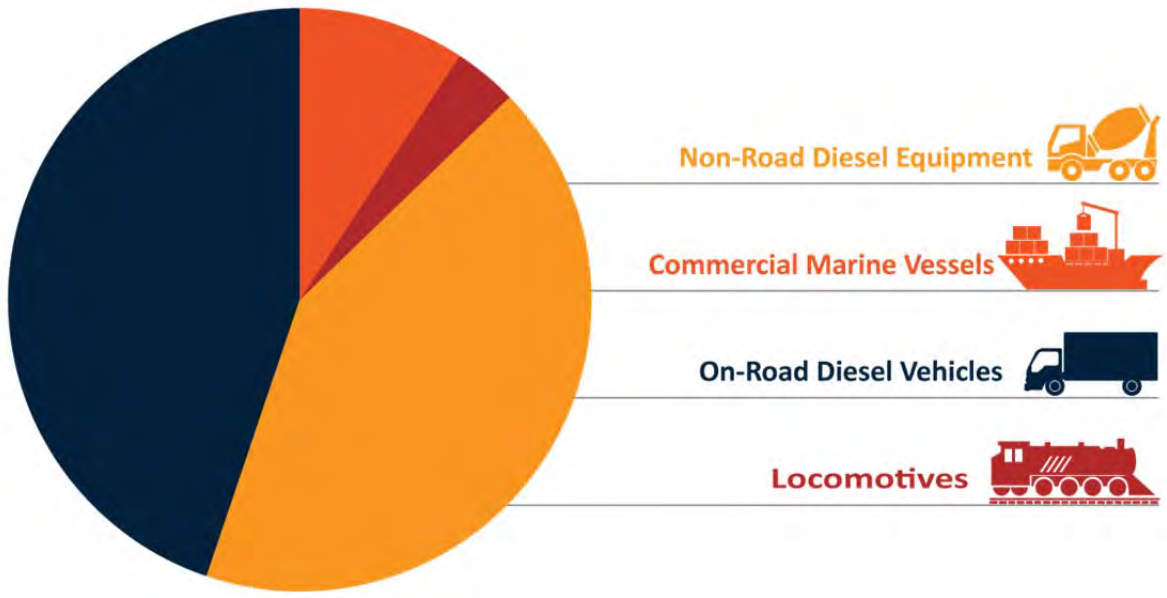
Recommendation 3: Focus Funding to Address the Largest Existing Sources of Diesel Emissions

The Environmental Mitigation Trust is designed to fund projects that reduce NOx emissions from diesel vehicles and equipment in order to address Volkswagen's illegal use of defeat devices. Connecticut's proposed mitigation plan has based the categories of eligible mitigation projects on mobile NOx emissions sources in the state, which (per Figure 3 and Section B of the proposed plan) includes gasoline, diesel, and alternative fuel sources.[4]

While we appreciate the intent, we find that this approach is not wholly consistent with the design of the Environmental Mitigation Trust. Instead, we recommend that Connecticut allocate funds by focusing solely on the diesel sources of NOx emissions that are eligible under the Environmental Mitigation Trust. In other words, the state should not base NOx emissions percentages across all mobile sources.

By allocating funds based on the diesel-generated sources of NOx emissions, the revised apportionment of these funds, shown in Figure 3 below, makes clear that Connecticut should prioritize funding for on-road diesel projects and the remainder to address non-road, locomotive, and marine projects. In other words, while light-duty created the NOx emissions problem, medium- and heavy-duty vehicles present the most beneficial solution.

Figure 3: NOx Emissions from Mobile Diesel Emissions Sources[5]



[4] "Proposed State of Connecticut Mitigation Plan under Volkswagen 2.0L Vehicle Partial Consent Decree, Appendix D". Connecticut Department of Energy and Environmental Protection, 2017. http://www.ct.gov/deep/lib/deep/air/mobile/vw/CT_VW_Proposed_State_Mitigation_Plan_-_PREPROPOSAL.pdf, page 6.

[5] "2014 National Emissions Inventory (NEI) Data". United States Environmental Protection Agency, 2016. https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data.

Further, on-road transportation projects have the most potential to mitigate the harmful health impacts of these emissions as these vehicles typically operate in communities with dense populations. We certainly appreciate that Connecticut has other sources of diesel emissions (e.g., non-road equipment and marine vessels), but these are not likely to contribute substantial NOx emissions in the state's priority areas. Rather, these are more commonly found in lightly populated areas or along waterways. In other words, only on-road transportation projects can yield the air quality and environmental justice benefits required by the Volkswagen settlement and desired by Connecticut.

We thus recommend that Connecticut dedicate at least 60% of the Volkswagen settlement funds to on-road transportation projects. This will help the state establish the framework needed to achieve its three key goals:

(1) Improve air quality via significant and sustained cost-effective NOx reductions
(2) Expedite deployment and adoption of zero and near-zero emission technologies
(3) Align with statewide energy, environmental and economic development goals and account for environmental justice considerations

Recommendation 4: Align with Statewide Initiatives and Prioritize Electrified Vehicle Projects

For many fleets and consumers alike, the up-front investment in alternative fuel vehicles is cost-prohibitive without sufficient incentives, leading to missed opportunities to reduce harmful air pollutants. With this $51.6 million infusion, Connecticut has the opportunity to address this critical issue and fund the next generation of clean transportation technology projects while also creating beneficial economic and energy implications.

Electric vehicles have been identified by a number of states, including Connecticut, as the means of addressing transportation and air quality issues. The state's recent investments in light-duty zero-emission vehicles and the associated infrastructure stands testament to that commitment.

In contrast to the light-duty segment, hybrid-electric technologies in particular offer the ideal suite of attributes today for the heavier loads and higher utilization rates of the medium-duty sector. Hybrid-electric vehicles can cost-effectively reduce harmful emissions and can be quickly installed on new or existing vehicles. Moreover, these technologies also align perfectly across a variety of statewide policies, initiatives, regulations, and programs, as shown below. Finally, hybrid-electric solutions provide a catalyst and pathway towards greater electrification as the market grows.

Table 2: Hybrid-Electric Technologies Align with Connecticut Initiatives

Statewide Initiative	How Support for Hybrid Technologies Supports the Initiative
Global Warming Solutions Act: Established GHG targets of at least 10% below the level emitted in 1990 by 2020 and at least 80% below the level emitted in 2001 by 2050	XL Hybrids' system uses regenerative braking to increase fuel economy by 25% and reduce CO2 emissions by 20%.
EVConnecticut: Established a partnership program between state government and consumers to fund widespread deployment of electric vehicles and infrastructure	The cost-effectiveness of the hybrid system mitigates the need for cost-intensive grant funding and increases the opportunity for large-scale, replicable projects that have the capacity to transform the state's transportation profile.
Environmental Justice Program and Environmental Equity Policy: Protects the public health and welfare, encourages social and economic development, and ensures that no community bears a disproportion burden of environmental pollution	XL Hybrids' products are designed to be used across multiple vehicle platforms, including shuttle buses and delivery vans that operate in densely populated urban communities. Further, our XL Link technology ensures that the environmental benefits are being delivered as promised via a cloud-based communications platform.

Recommendation 5: Prioritize Projects that Accrue High Percentage of Mileage within Overburdened Counties

XL Hybrids fully supports Connecticut's prioritization of funding for projects in areas that receive a disproportionate quantity of air pollution from diesel fleets. Transportation hubs, such as airports, terminals, and depots are concentrated sources of diesel emissions and, as such, every effort should be made to prioritize projects that address these specific geographies. Further, these areas are most often found in densely populated areas – for Connecticut, the communities of Hartford, Fairfield, and New Haven have been particularly overburdened with diesel pollution.

However, to ensure that funding for air quality projects is most effectively directed to the areas that most need them, we recommend that Connecticut limit eligibility to vehicles that operate a high percentage of mileage within the priority counties. By setting a minimum threshold requirement (e.g., "75% of mileage must be accrued with Connecticut's nonattainment counties"), this recommendation directly addresses the state's need to fund projects in communities that bear a disproportionate share of diesel pollution.

Because Connecticut has established environmental justice as a core responsibility and as it is one of the foundational elements of the Volkswagen settlement, combining Connecticut's county prioritization and our recommendation to require settlement-funded vehicles to operate primarily within these counties can ensure that funds are directed most efficiently and cost-effectively. Alternative-fuel vehicles, such as hybrids, can significantly reduce vulnerable population's exposure to emissions that are associated with older diesel trucks – these risks include increased asthma emergencies, bronchitis, and school absenteeism, especially among asthmatic children.[6]

Recommendation 6: Promote Proactivity and Accountability by Funding with an Eye to the Future

Hybrid vehicles continue to integrate transformational transportation technology. As an example, each of our vehicles is equipped with the cloud-based XL Link™ Connected Vehicle System ("XL Link"). Our fleet customers currently use XL Link for fleet management and analytics, though we note the potential importance of this technology as it pertains to the settlement's stringent reporting, compliance, and accountability requirements.

XL Link reports fuel consumption, mileage, idling time, speed, and vehicle performance – in fact, you can see these statistics tracked in real time on our website. XL Link will help considerably in our efforts to support Connecticut's grant reporting requirements and is a standard feature in all new vehicle offerings. In addition, we install XL Link on existing vehicles to help our customers generate actionable intelligence on powertrain performance and drive cycle utilization.

XL Hybrids notes the hybrid technology can also be integrated with alternative fuel vehicles, thereby expanding the potential market and creating opportunity for additional emissions reduction and increased cost-effectiveness. As the technology is ultimately separate from the engine, XL Hybrids has identified no barriers to hybridizing alternative gaseous fuel vehicles, such as those powered by CNG and propane. This type of fuel flexibility is technologically possible and XL Hybrids estimates that new OEM products of this type could be delivered to the market in as few as nine months.

Summary

XL Hybrids appreciates the opportunity to support Connecticut in meeting its NOx emission reductions, social and environmental justice, and economic and energy stimulus goals. Our recommendations will cost-effectively yield energy and economic benefits for the state, including tax revenue generation, improved vehicle efficiency and decreased maintenance, and the redirection of cost savings into the state's economy. Moreover, they promote the widespread use of low emitting vehicles that will transform Connecticut's transportation network, increase efficiencies, and play a vital role in the state's efforts to mitigate GHG and NOx emissions.

[6] Adar, S. et al. "Adopting Clean Fuels and Technologies on School Buses. Pollution and Health Impacts in Children." ATS Journals, Volume 191, Issue 12. http://www.atsjournals.org/doi/abs/10.1164/rccm.201410-1924OC#.WA-HlNUrJhE, June 15, 2015.

We would like to work with you and your team to ensure the effective rollout of the Proposed State of Connecticut Mitigation Plan. Towards that end, we request an in-person meeting with the most appropriate member of your staff to discuss our comments and suggestions further. We look forward to continued dialogue with you and to future collaboration that will help Connecticut meet its air quality, cost-effectiveness, and environmental justice goals.

Sincerely,

Ed Lovelace
Chief Technology Officer
elovelace@xlhybrids.com
617-718-0329

Comments to DEEP on CT State Mitigation Plan

toni.rose@eversource.com

Wed 3/1/2017 12:01 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

Eversource Comments 03.01.17.final.docx;

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107 Selden Street, Berlin, CT 06037
P.O. Box 270, Hartford, CT 06141-0270

Vincent P. Pace
Associate General Counsel

(860) 665-5426
vincent.pace@eversource.com

March 1, 2017

Bureau of Air Management
Mobile Sources Division
Department of Energy and Environmental Protection
79 Elm Street, 5th Floor
Hartford, CT 06106
E-mail: deep.mobilesources@ct.gov

Re: Notice of Informal Public Comment Period Regarding CT's Proposed State Mitigation Plan for the Volkswagen Partial Consent Decree

1. Introduction

Eversource Energy ("Eversource") respectfully submits the following comments in response to the Notice of Informal Public Comment Period Regarding Connecticut's Proposed State Mitigation Plan for the Volkswagen Partial Consent Decree, which requested that interested parties file comments with the Connecticut Department of Energy and Environmental Protection ("DEEP") by February 28, 2017.

In these comments, Eversource submits its proposal for how DEEP can maximize the Volkswagen Environmental Mitigation Trust ("Trust") funds that the State of Connecticut will manage as part of the Volkswagen diesel emission settlement ("Settlement"). The Trust funds can be used to support Eligible Mitigation Actions ("Actions")[1] for projects that reduce emissions of nitrogen oxides ("NOx"). Eversource thanks DEEP for providing it with the opportunity to comment on the future investment of Trust funds, and it strongly encourages DEEP to recognize the integral role that electrification and natural gas vehicles can play in delivering NOx emissions reductions required by the Settlement.

Connecticut has a unique opportunity to make significant progress on reducing harmful NOx emissions from mobile sources through the use of funds from the Settlement, especially in areas currently classified as Serious Non-Attainment for ozone (Fairfield County). According to the 2014 National Emissions Inventory, the transportation sector is the largest contributor to NOx emissions in Connecticut. Transportation emissions significantly impact the State's air quality and attainment designation, being the source of 67% of the State's NOx emissions, an ozone precursor, as well as the source of 41% of its greenhouse gas (GHG) emissions.

2. Utilize 15 Percent Of Available Funds Under The Trust For EV Charging Infrastructure

The Trust provides funding for environmental mitigation projects that reduce NOx emissions, and light-duty vehicles are the single largest mobile source of NOx emissions in Connecticut, being the source of

[1] The ten types of Eligible Mitigation Actions are defined in Appendix D-2 of the October 25, 2016 Trust Agreement. Appendix D-2 also defines the funding parameters for each of the actions.

more than 46% of the State's NOx emissions. For these reasons, Eversource recommends that Connecticut's Mitigation Plan allocate the maximum allowable 15 percent of funds from the Trust for light-duty zero emission vehicles ("ZEV") charging infrastructure. Specifically, Eversource recommends funding Direct Current ("DC") Fast Charging and Level 2 charging infrastructure, which are the fastest means to charge plug-in electric vehicles ("EVs").[2] Additionally, these charging systems are suitable for EVs, which are commercially available today.

Investments in EV charging infrastructure have been shown to increase both consumer EV purchase behaviors and purchase intentions. Automakers such as Nissan and Tesla have been analyzing customer survey data and monitoring the influence of EV charging infrastructure on EV sales activity. Nissan's market research has indicated that availability of sufficient charging infrastructure would double the number of Nissan Leaf owners who state they would repurchase an EV.[3] In addition, Nissan experienced an increase in Leaf sales in 2013 when Nissan installed DC Fast Charging stations in select markets.[4] Tesla has witnessed similar results through its investments in DC Fast Charging stations, identifying their presence as critical to growing sales of the Model S sedan.[5]

Consumers must have access to charging that is sufficient to accommodate their everyday and occasional travel needs. By requesting the maximum funding for EV infrastructure, Connecticut will improve the economic return of current and future public investments in infrastructure while also reducing NOx emissions significantly.

In addition, Eversource recommends that DEEP utilize the following guiding principles to establish project priorities:

- Collaborate with electric utilities and other EV stakeholders on infrastructure that makes it easy for consumers to charge their vehicles with grid-connected infrastructure that is accessible, affordable, and reliable.
- Fund DC fast charging at the following locations to reduce range anxiety and enable travel access:
    - Along major highway corridors at intervals between 25 and 50 miles;
    - Near multi-family housing units where overnight EV charging access is unavailable; and
    - In urban areas in support of EV ride-hailing and car sharing.

[2] Level II chargers rely on a 240 volt connection and are capable of fully charging most existing EVs in approximately 8 hours or less depending battery capacity. Lastly, DC Fast Chargers utilize direct current and are the fastest method for charging an EV. However, DC Fast Chargers are also the most expensive form of charger. Existing DC Fast Chargers permit a typical EV drive to obtain a full charge over lunch.
[3] Peterson, David, "1700 Fast Chargers". Approximately 36% of owners were likely or very likely to repurchase with the existing charging infrastructure, whereas approximately 80% are likely or very likely to repurchase ideal infrastructure.
[4] Rovito, M., "Will Nissan's No Charge to Charge Program Drive Leaf Sales?", Charged Electric Vehicles Magazine, July 3, 2014.
[5] Baumhefner, M., Hwang, R. And Bull, P., "Driving Out Pollution: How Utilities Can Accelerate the Market for Electric Vehicles," Natural Resources Defense Fund, June 2016, citing Lankton, Cal, Director of EV Infrastructure, Tesla Motor Company, "Plenary Panel: Technology Marches On – The Impact of New Vehicle and Infrastructure Technologies," EPRI Plug-in 2014 conference, San Jose, California, July 2014.

- Fund Level 2 charging infrastructure in order of priority: workplaces, multi-family housing units, long-dwell publicly accessible spaces (such as shopping centers and tourist destinations) and single-family residential homes.

3. Accelerate Deployment Of Alternative Fuel Vehicles Over Diesel

The remaining portion of the funds from the Settlement provide an unprecedented opportunity to accelerate the use of alternative fuels in Connecticut. The repowering of existing diesel-powered vehicles with alternate fueled (e.g., compressed natural gas ("CNG"), propane, Hybrid) engines or new vehicles powered by alternate fuels (e.g., CNG, propane, Hybrid, Electric) should take priority over new diesel fueled options. For example, natural gas vehicles are currently available in all of the on-road applications identified in the Settlement's list of Eligible Mitigation Actions, and all-electric vehicles are available in many of the Eligible Mitigation Actions in the Settlement list. This means that Connecticut can act quickly to deploy new, cleaner natural gas or all-electric trucks and buses resulting in cost effective NOx reductions.

Eversource recommends that DEEP consider scaling the incentives based on the NOx reduction levels to provide greater funding for medium-duty and heavy-duty engines that deliver NOx reductions below current federal requirements. This will provide a greater incentive for fleets to acquire even cleaner vehicles. Moreover, given that the Trust has been created because of the NOx pollution associated with older higher emitting diesel vehicles, Eversource believes that a portion of the funding from the Trust should be set aside for clean, alternative fuel vehicle projects. If funding from the Trust is provided for diesel vehicles that meet current standards, that should set the baseline for funding with any technology producing lower emissions receiving a larger share of its cost. There also should be a higher level of funding for technologies that historically have demonstrated lower in-use emissions even if they are certified to the same baseline standard as new diesel vehicles.

In the case of publicly-funded vehicles, Eversource recommends adjusting the funding levels available under the Trust to maximize the benefit of the program and accelerate the deployment of additional alternative fueled vehicles. While it might be tempting to fund public vehicles at the 100% level, this will obviously lessen the overall effectiveness of the projects by limiting the total number of deployed vehicles. Funding levels for different alternative fuel technologies should be commensurate with the level of NOx emissions provided by the fuel technology.

4. Conclusion

Eversource wishes to thank DEEP for its consideration of these comments. The following representative of Eversource is available to work with DEEP and project developers to ensure that the infrastructure to support these projects is done in a coordinated fashion: Watson R. Collins, Manager-Research and Business Development (tel: 860.728.4843; e-mail: watson.collins@eversource.com).

Sincerely,

Vincent P. Pace

Vincent P. Pace
Associate General Counsel
On Behalf of Eversource Energy

VW Settlement Comments

Simon Levesque <simon.levesque@uconn.edu>

Thu 3/2/2017 11:50 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: Simon Levesque
Email: simon.levesque@uconn.edu
Job Title: Undergraduate Student
Company: University of Connecticut, Storrs
Telephone: 860-280-6337

To whom it may concern,

My name is Simon Levesque and I'm an environmental science major here at Uconn. I'm currently working with a small team of environmental science students to improve Uconn's green infrastructure. All of Uconn's buses run on diesel fuel, emitting tons of CO2, NOx, and other greenhouse gases every year. My team and I believe that if Uconn wants to be considered a green campus, it needs a sustainable transportation initiative. Our vision is to incorporate fully-electric buses on campus to revolutionize local transportation and reduce uconn's greenhouse gas emissions.

If the mitigation effort from the Volkswagen 2.0 liter settlement would cover some or all of the cost of purchasing and installing electric buses and charging stations, Uconn could drastically reduce its NOx emissions. Uconn currently has several diesel buses built before 2009, which as I understand, may qualify for replacement with all-electric buses of model years 2016 or 2017.
Feel free to call me at any time to seek further information. Thank you for any help you can provide.

Sincerely,
Simon Levesque

Simon Levesque
University of Connecticut, '18
College of Agriculture, Health, and Natural Resources, Environmental Science Major
www.linkedin.com/in/simon-levesque
860-280-6337

Propane's Role in Connecticut's Volkswagen Settlement Environmental Mitigation Plan

Jonathan Malazzi <malazzi@sbcglobal.net>

Thu 3/2/2017 7:16 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Jonathan Malazzi
359 East Main St
Clinton, CT 06413

March 2, 2017

Dear Rob Klee,

As a propane marketer in Connecticut, I am contacting you to discuss how propane vehicles can have a critical role in offsetting the harmful emissions caused by the Volkswagen diesel scandal. Vehicles operating on propane - also known as autogas - are proven to be clean, safe, and affordable for transportation fleets across the country. As you develop Connecticut's Environmental Mitigation Plan, I encourage you to include propane-powered vehicles.

From 2009 to 2015, German automaker Volkswagen programmed certain vehicles to deliberately cheat laboratory emissions testing, resulting in approximately 500,000 vehicles in the United States emitting nitrogen oxide (NOx) up to 40 times greater than the U.S. standards allow. In October 2016, a judge approved a partial settlement between the Justice Department and Volkswagen, resulting in Volkswagen setting up a $2.7 billion environmental mitigation trust fund to offset the excess emissions from the affected vehicles. Connecticut is eligible to receive $51,635,238, some of which can be effectively spent on clean-burning propane vehicles.

One of the best ways our state could use these dollars is to replace older, diesel-powered school buses with new propane-powered versions. School districts across the country have adopted propane school buses to safely transport their children. In these instances, the benefits of propane have been realized almost immediately. From cleaner emissions and quieter rides to lower maintenance costs and fuel savings, propane school buses are a proven winner for school districts.

The main purpose of the Volkswagen Settlement funds is to offset the extra NOx emissions caused by the scandal. Propane vehicles have a long track record as a clean, alternative fuel. I know that there is great interest in how Connecticut will allocate its share of the Volkswagen Settlement funds. As you continue to examine the best ways to reduce emissions and benefit our communities, please include propane-powered vehicles in your Environmental Mitigation Plan.

Sincerely,
Jonathan Malazzi

Propane's Role in Connecticut's Volkswagen Settlement Environmental Mitigation Plan

John Ell <jell@newenglandpropane.com>

Thu 3/2/2017 10:29 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

John Ell
242 Sterling Rd
Trumbull, CT 06611

March 2, 2017

Dear Rob Klee,

As a propane marketer in Connecticut, I am contacting you to discuss how propane vehicles can have a critical role in offsetting the harmful emissions caused by the Volkswagen diesel scandal. Vehicles operating on propane - also known as autogas - are proven to be clean, safe, and affordable for transportation fleets across the country. As you develop Connecticut's Environmental Mitigation Plan, I encourage you to include propane-powered vehicles.

From 2009 to 2015, German automaker Volkswagen programmed certain vehicles to deliberately cheat laboratory emissions testing, resulting in approximately 500,000 vehicles in the United States emitting nitrogen oxide (NOx) up to 40 times greater than the U.S. standards allow. In October 2016, a judge approved a partial settlement between the Justice Department and Volkswagen, resulting in Volkswagen setting up a $2.7 billion environmental mitigation trust fund to offset the excess emissions from the affected vehicles. Connecticut is eligible to receive $51,635,238, some of which can be effectively spent on clean-burning propane vehicles.

One of the best ways our state could use these dollars is to replace older, diesel-powered school buses with new propane-powered versions. School districts across the country have adopted propane school buses to safely transport their children. In these instances, the benefits of propane have been realized almost immediately. From cleaner emissions and quieter rides to lower maintenance costs and fuel savings, propane school buses are a proven winner for school districts.

The main purpose of the Volkswagen Settlement funds is to offset the extra NOx emissions caused by the scandal. Propane vehicles have a long track record as a clean, alternative fuel. I know that there is great interest in how Connecticut will allocate its share of the Volkswagen Settlement funds. As you continue to examine the best ways to reduce emissions and benefit our communities, please include propane-powered vehicles in your Environmental Mitigation Plan.

Sincerely,
John Ell

Propane's Role in Connecticut's Volkswagen Settlement Environmental Mitigation Plan

John McNamara Woods <jckwoods@gmail.com>

Thu 3/2/2017 10:40 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

John McNamara Woods
52 Rocky Rapids Rd
Stamford, CT 06903

March 2, 2017

Dear Rob Klee,

As a propane marketer in Connecticut, I am contacting you to discuss how propane vehicles can have a critical role in offsetting the harmful emissions caused by the Volkswagen diesel scandal. Vehicles operating on propane - also known as autogas - are proven to be clean, safe, and affordable for transportation fleets across the country. As you develop Connecticut's Environmental Mitigation Plan, I encourage you to include propane-powered vehicles.

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Sincerely,
John McNamara Woods

ALTERNATIVE FUELS COALITION OF CONNECTICUT TMM Final VW Comment.docx

T. Michael Morrissey <morrissey.consulting@cox.net>

Fri 3/3/2017 11:53 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

ALTERNATIVE FUELS COALITION OF CONNECTICUT TMM Final VW Comment.docx;

DEEP: we respectfully submit our attached comment. Regards, Mike

T. Michael Morrissey
Director of Government Affairs & Business Development
Alternative Fuels Coalition of Connecticut

C/O Morrissey Consulting, LLC
332 Strickland Street
Glastonbury, CT 06033

860-280-8027 ~ Cell*
860-633-8781 ~ Tel
860-633-8781 ~ Fax

EMAIL: morrissey.consulting@cox.net

PIN: 2C1AE75B

ALTERNATIVE FUELS COALITION OF CONNECTICUT

T. Michael Morrissey
Managing Partner ~ Government Affairs Consultant
Morrissey Consulting, LLC
332 Strickland ST
Glastonbury, CT 06033

Telephone: 860-633-8781 ~ Mobile: 860-280-8027 ~ Fax: 860-633-8781 ~ PIN 2C1AE75B

March 3, 2017 **VIA EMAIL**: **deep.mobilesources@ct.gov**

Commissioner Robert Klee
VW Settlement Comments
DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION
79 Elm Street
Hartford, CT 06106

Commissioner Klee:

Our organization and its members strongly support all priority recommendations made by the **New Haven Clean Cities Organization** dated December 3, 2016 and posted on DEEP's website. Although medium and heavy duty vehicles represent 4% of the total vehicle population they contribute a whopping 29% of all carbon emissions in our country[1]. Most if not all of these vehicles especially Class 4 – 7 vehicles can efficiently be re-powered and or originally ordered to operate on clean burning propane autogas.

Propane autogas was designated as a "Clean Fuel" in the 1992 Energy Policy Act. Today, over 23 million vehicles operate on propane and it is the third leading transportation fuel in the world. Our Coalition is supportive of all alternate fuels including electricity. However, electrification technology does **not** exist for Class 4 – 7 vehicles and adoption of propane to power these vehicles is the best way to almost overnight, reduce both NOx and non-criteria emissions like GHGs.

We understand that there are some well-known organizations who oppose the use of any fossil fuel for transportation including propane. Although we respect these organizations we believe such an advocacy is harmful to our environment. Without electrification solution especially for

[1] https://energy.gov/eere/vehicles/fact-951-november-14-2016-medium-and-heavy-trucks-account-about-quarter-highway

Class 4 – 7 vehicles, there is no practical way to reduce vehicle emissions[2] and by default, the continued use of gasoline and diesel fuel is unwisely perpetuated. Propane is the world's cleanest fossil fuel and the use of it, absent electrification technology, should be supported through the use of VW Mitigation funding.

Propane is "Shovel Ready" and can get to work today to reduce NOx emissions. Propane is not an experimental fuel; it is a fuel that has been used in transportation for more than 100 years. Ford Motor[3] offers a vast truck line of vehicles that operate on propane and other alternative fuels. These vehicles are ideal for transit, paratransit, shuttle and package delivery vehicles. We do not have to wait years for an electrification solution. Propane is ready **NOW**, to reduce NOx emissions especially with these vehicle types[4].

Focusing on Class 4 – 7 vehicles and incentivizing them with VW Mitigation funds will reduce vehicle emissions in a short period of time. Many of these types of vehicles use in excess of 5 to 6 thousand gallons of gasoline/diesel per vehicle per year. We need to get these fuel guzzlers operating on propane and or natural gas to reduce NOx and other non-criteria emissions. Our environment will be the greatest beneficiary of such action.

[2] Manufacturers electrification focus will for some time, be limited to passenger vehicles and light duty trucks based on production quantities and sales objectives. Class 4-7 trucks representing 4% of the total vehicle population, "by the numbers" lend them to low electrification priority.

[3] http://www.fleet.ford.com/resources/ford/general/programs/alternative-fuel-vehicles/2016_Alternative_Fuel_HiRes.pdf

[4] There are thousands of EPA certified systems available today to retrofit gasoline powered trucks to operate on propane or natural gas and in some instances producing NOx level as low as .051 to .039 (ICOM) CARB certificates pending agency issuance.

If you are still not convinced, let's hear what the kids are telling us about propane…

The fastest growing use of propane in the transportation sector has been in school bus transportation. Here are some facts you should know;

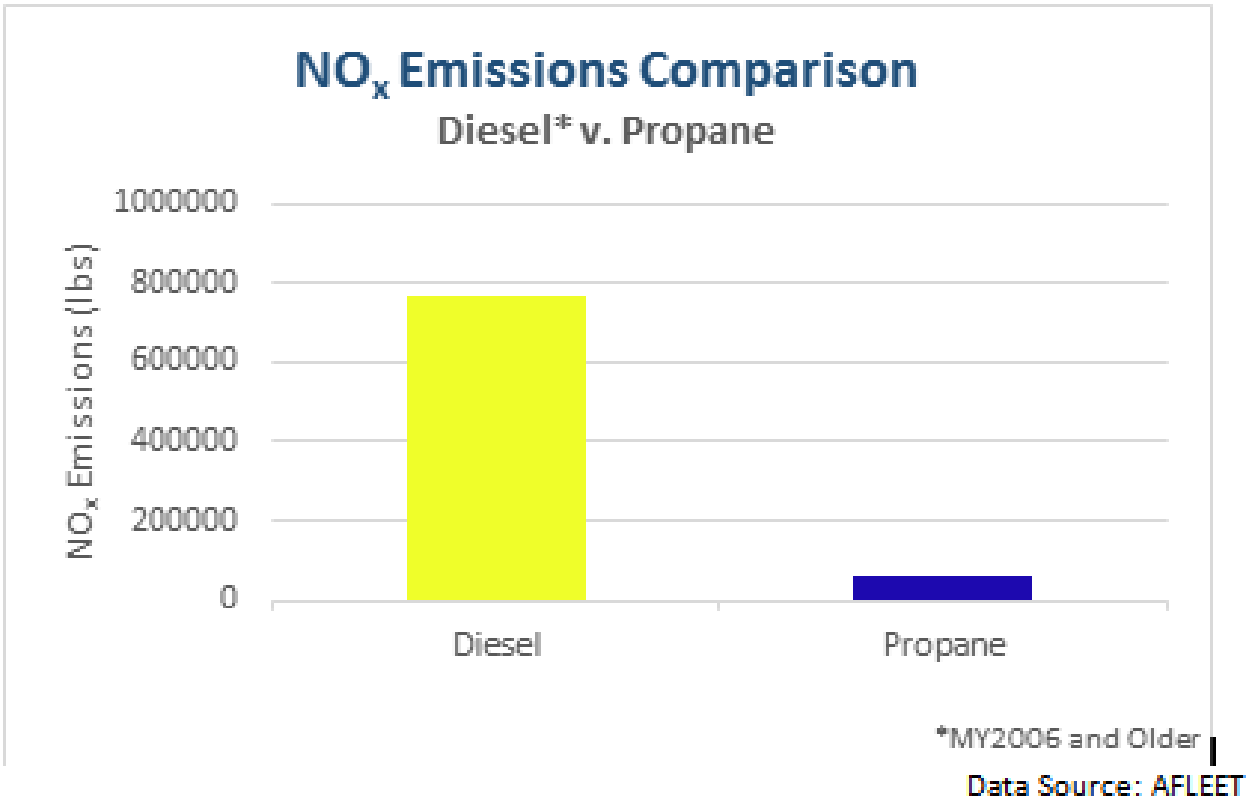
- Over 12,000 school buses operate on propane transporting over 700,000 kids daily today.
- 600 school districts, private schools, and bus contractors use propane school buses to safely transport their children.
- Blue Bird, IC Bus, Collins and Thomas all offer a propane fuel option on OEM orders.
- Locally, Shelton, Torrington, Waterbury and New Milford are all operating propane powered school buses. Danbury has ordered 125 propane buses for the next school year and by the end of this year, there will be over 500 propane school buses operating in our state. Waterbury's fleet of 149 buses represents the fourth largest fleet of school buses operating in the nation.
- 2017 Blue Bird Bus emits 81% less NOx compared to a modern diesel powered school bus[5]

[5] CARB low NO_x certification data for MY2017 Roush 6.8L propane model compared with MY2016 Cummins 6.7L diesel model. CARB CERTIFICATION EXECUTIVE ORDER A-021-0657

When factoring in all of the benefits, there is no doubt that investing Volkswagen Settlement funds into propane powered school buses would be one of the most cost effective ways of reducing the excess NO_x caused by Volkswagen.

It is important to highlight that as part of the Volkswagen Settlement, propane school buses are eligible for **100 percent** of the replacement costs[6]. This makes their adoption using these funds very attractive to school districts in Connecticut.

When considering the use of the Volkswagen settlement dollars, it is important to highlight potential NO_x reductions. This is where propane-powered school buses are a winning choice for Connecticut. According to data from Argonne National Laboratory, if Connecticut were to replace all 2,014 buses eligible for this settlement with new, clean-burning propane models, there would be a **92 percent reduction in NO_x**. As an additional benefit, there would be a 98 percent reduction in particulate matter (PM) and a 91 percent reduction in tailpipe Volatile Organic Compounds (VOC)[7].



[6] Supra Partial Consent Decree at Appendix D-2

[7] Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) 2016 tool (provided by Argonne National Laboratory) as well as U.S. school bus fleet data (provided by PERC) to calculate the emissions reduction potential associated with replacing diesel-fueled school buses with new (2016) propane autogas school buses

PROPANE POWERED SCHOOL BUSES = EVERYBODY WINS

Let's do some quick math. (BACKROUND: a new diesel bus cost about $91,000. For an incremental cost of an additional $9000 it can be ordered to operate on propane). So a Type C Blue Bird school bus cost about $100,000. VW will pay **100%** to cost of a new propane powered vehicle. This frees up a $100,000 for the school district or its contract operator. The savings of $100K can be applied to the purchase of 9 additional buses at no additional cost to the community or its contractor. With the first bus and the nine additional buses we have a fleet of 10 buses operating on propane. The savings in fuel, electricity, maintenance is about $3,400[8] dollars per bus per year or approximately $34,000 per year for the 10 buses in operations. The annual savings grows rapidly as more buses are added to operate on propane[9].

In the above example, everyone wins;

- School system and or its bus operator saves money
- The kids get a healthier, cleaner, quieter[10] and safer ride on a propane bus
- The propane industry grows with the potential for more job creation and greater utilization of an American made source of clean energy
- Infrastructure costs are relatively low and very affordable comparable to gasoline or diesel (or a fraction of the cost of comparable natural gas dispenser) offering the lowest total cost of ownership solution
- The State of Connecticut gets a cleaner environment
- Because propane is almost a 100% domestically produced fuel, we enhance our energy independence and reduce our reliance on foreign fuels.

[8] Assumes continuance of 37 cent/gal Federal Alt Fuel credit (prior to 2015 credit was 50 cents/gal) which has been in place for the last 10 years and scheduled for Congressional renewal in 2017

[9] This concept is even more dramatic for Municipal owned transit and paratransit vehicles who consume considerably more annual gallons of diesel or gasoline / vehicle.

[10] The Blue Bird Propane Vision school bus cuts vehicle and engine noise by producing sound 11 decibels lower than diesel fueled buses.

VOLKSWAGEN SETTLEMENT

MOVE FORWARD WITH PROPANE AUTOGAS SCHOOL BUSES

The unique benefits of this clean, American fuel make it the perfect solution for schools to cut emissions while saving more for what counts.

THE GOAL

The Volkswagen Environmental Mitigation Trust Fund will financially support actions that reduce Nitrogen Oxide (NO_x) emissions in the United States. The amount of funds distributed will vary by state or territory, depending on the number of non-compliant Volkswagen vehicles that were registered there.

THE OPPORTUNITY

States can utilize these funds to encourage school districts to purchase new propane autogas school buses, which reduce the amount of harmful diesel emissions — known aggravators of asthma and other breathing issues — around students. Depending on a school's situation, it can significantly reduce NO_x emissions with propane autogas school buses.

THE SWITCH	REDUCED NO_X EMISSIONS
Replace all older than model year-2007 diesel buses with new propane autogas bus.	More than 92 percent[1]
Purchase a new propane autogas bus instead of a modern, lower-emissions diesel bus.	More than 11 percent[2]
Purchase a modern, best-in-class for NO_x emissions propane bus instead of a modern diesel bus.	81 percent[3]

1. Source: AFLEET model using Polk Registration data by state for diesel buses — 12/31/2015. By removing 255,627 of pre-2007 diesel fueled buses from the road across the country and replacing them with new propane autogas school buses, NO_x emissions would be reduced by 92 percent.
2. MY2016 certification data for PSI 8.8L propane model compared with Cummins 6.7L diesel model.
3. CARB low NO_x certification data for MY2017 Roush 6.8L propane model compared with MY2016 Cummins 6.7L diesel model.

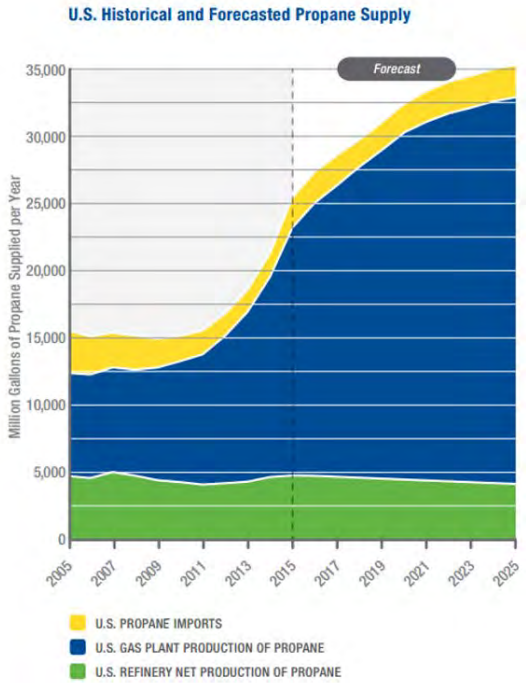
Schools that use propane can reach their sustainability goals without additional, costly emissions technology.

"I think the environmental aspect of it is important to a lot of people, especially parents with young children."

Brian Woods
Superintendent, Northside Independent School District

Fuel Availability

America's current domestic energy renaissance has meant drastic increases in the production of propane. Propane has traditionally been viewed as a byproduct of the oil refining process. However, the increase in production from natural gas processing has shifted this perception. In 2014, there was enough propane produced from the domestic natural gas supply to meet about 98 percent of the U.S.'s consumer and petrochemical demand. The increase of domestic production has led to record high levels of propane in recent years. Production is forecasted to continue to increase[11], ensuring a steady supply of this American-made fuel.



Source: ICF International

In the last ten years, the United States as gone from being a net importer to a net exporter of propane. In fact, we are currently exporting nearly 10 billion gallons of propane annually. That's the equivalent of the fuel needed for 4 million fleet vehicles. Energy security and independence has been a goal of the United States for many years. By using more of our domestically produced propane, we can continue to decrease the reliance on foreign-sourced fuel.

In order to get this large propane supply to the consumer transportation market, the industry relies on a network of public and private refueling stations. Nationwide, there are more than 3,600 stations ready to supply consumers with propane. In Connecticut, there are already 22 public and private stations[12]. As you can see, propane

[11] *2016 Propane Market Outlook* ICF International
[12] http://www.afdc.energy.gov/fuels/stations_counts.html

infrastructure is already in place to facilitate Connecticut's Environmental Mitigation Plan.

And for price, wholesale propane falls between the price of oil and natural gas, the two sources of the fuel. This makes propane price competitive with the conventional fuels. For comparison, according to the most recent Clean Cities data, the price of propane is almost 50 cents-per-gallon cheaper than diesel[13]. This figure does not take into account the savings that occur from individual propane marketers negotiating favorable pricing with fleet managers.

Working with Connecticut

This comment is a continuation of our dialogue on how propane can play a role in your state's environmental mitigation plan. Already in Connecticut, there are 445 people employed by the propane industry. The propane industry also is a significant contributor to Connecticut's economy, adding $380,879,000 to the state's GDP[14].

Please use our organization and the vast resources available from the National Propane Gas Association (**NPGA**) and Propane Education Research Counsel (**PERC**) as you examine the best ways to use Connecticut's allocation. I am happy to connect you with propane businesses, propane users, and experts to better inform you of propane vehicles' role in Connecticut.

Sincerely,

Mike Morrissey
Director of Government Affairs and Business Development

[13] http://www.afdc.energy.gov/uploads/publication/alternative_fuel_price_report_oct_2016.pdf
[14] *Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2012* ICF International

Comments on CT MTF Plan

Glenn M. Luksik <Luksik_Glenn_M@cat.com>

Fri 3/3/2017 3:20 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

4 attachments

2017.02.10 CT comments letter.pdf; Cat PR EMD Loco.pdf; Machine Repowers.pdf; PEHJ0271 - 3500 Emissions Upgrade Kits.pdf;

Please find attached Caterpillar's comments and product offerings. Let me know if you have any questions.

Best Regards,
Glenn

Glenn M Luksik / Verifications Manager / Global Regulatory Affairs
Ph: 309 494 6937 / Cell: 614 563 8927 / Fax: 309 992 7709

March 3, 2017

Bureau of Air Management
Mobile Sources Division
Connecticut Department of Energy and Environmental Protection
79 Elm Street, 5th Floor
Hartford, CT 06106

RE: Comments on the Connecticut Mitigation Trust Plan

To Whom it may concern,

This letter is to provide you with information and Caterpillar's comments on Connecticut's Mitigation Trust Plan to spend the $51.6 Mil in VW Settlement Funds. Caterpillar appreciates the opportunity to comment and to share information on our products.

The $2.7 Bil Mitigation Trust Fund was established under the Volkswagen Consent Decree, with its primary goal of reducing NOx. Caterpillar is capable of assisting States in obtaining those emissions reductions. **NOx emissions can be offset immediately, by applying diesel repowers, replacements, and upgrades to the legacy diesel nonroad fleet.** US EPA and CARB both state that repowers of existing diesel engines are the "low hanging fruit". Clean diesel is a more cost effective approach than some of the alternative options in the Mitigation Trust Fund.

Within the Mitigation Trust Fund's list of funding opportunities, Caterpillar is able to offer Repowers for Marine, Switcher Locomotives, and Nonroad Machines (construction equipment). Find attached to this cover letter marketing materials that provide details on Caterpillar products.

NOx emissions reductions that are produced through repowering from unregulated to Tier 4:

Locomotive - 50 to 80 tons NOx/year/engine
Cost effectivity Locomotive of approx. $8/lb of NOx

Marine – 50 to 80 tons NOx/year/engine
Cost effectivity Marine of approx. $16/lb of NOx

Nonroad Machines – 3 to 60 tons NOx/year/engine (Tier 3)
Cost effectivity of approx. $15/lb of NOx

For large engines, as used in locomotive, marine, and construction equipment, nothing can lower NOx more than repowering to a higher Tier engine. Competing technologies; batteries, hydrogen, CNG/LP, and hybrids cannot produce the needed power, over the work period, while lowering emissions. Additionally, cost effectivity is much lower or the technology does not exist for large engines.

The Caterpillar Marine Group has US EPA certified upgrade kits, for both Caterpillar and EMD engines, which reduce NOx emissions, as well as verified Emissions Upgrade Groups. They can also repower tugs, crew boats, and service vessels with Tier 4 engines. Caterpillar, through its Dealer network has been accomplishing these upgrades and repowers since 2010.

Progress Rail is Caterpillar's Rail services and equipment provider. Progress Rail recently purchased Electro-Motive Diesel (EMD), and offers switcher locomotives with both Caterpillar and EMD Tier 4 engines. Progress Rail has installed hundreds of US EPA certified engine upgrade kits, as well as repowered switcher locomotives to Tier 4.

The Caterpillar Emissions Solutions Group has been accomplishing retrofits since 2004. They have created engineered solutions that upgrade nonroad machines from unregulated to Tiers 1, 2, 3, and 4. The Mitigation Trust Fund provides for the use of Diesel Emissions Reduction Act (DERA) funding under option 10. By replacing only the engine, as opposed to the entire machine, cost effectivity is lowered. This action will extend the life of the machine another 20 to 30 years.

Caterpillar appreciates the opportunity to offer our suggestions and products. If you have any questions or would like to have further discussions, please contact me.

Sincerely,

Glenn M. Luksik
Verification Manager
Emissions, Regulations, and Conformance
Caterpillar Inc.
Telephone: (309) 494-6937
Fax: (309) 992-7709
E-mail: **Luksik_Glenn_M@cat.com**

Enclosures:

Caterpillar/Progress Rail/EMD Locomotive
Caterpillar Marine Emissions Upgrade Kits
Caterpillar Nonroad Machine Repowers

Tier 4 PR24B [RE]powered Locomotive

The PR24B is an EMD GP-style locomotive powered by a Cat® 3512C HD engine and Kato alternator. Designed with flexibility in mind, this unit allows customers to choose options without extensive engineering. The PR24B utilizes rebuilt GP-style trucks with rebuilt D78 traction motors and has been constructed with a new crashworthy underframe, cab and fuel tank.

- Reliable and fuel efficient Cat® 3512C HD 2000 HP engine
- New HVC with Zeit SAL V locomotive control system
- New Atlas Copco rotary screw air compressor
- New Progress Rail PowerView event recorder with LDVR
- Offered with a 2-year warranty for new content

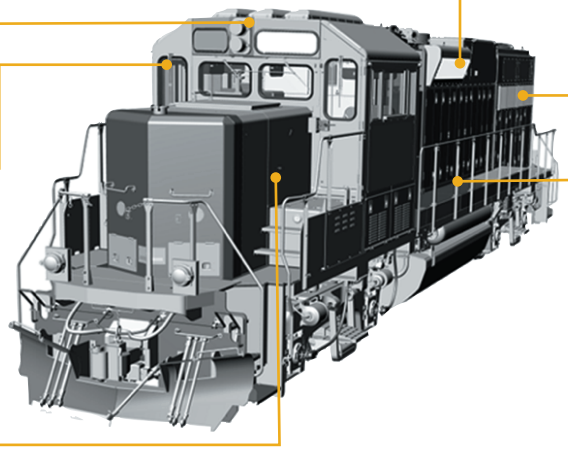
Locomotive Model	PR24B Repower
Engine Model	Cat® 3512C HD
Brake Horsepower	2,100
No. of Cylinders	12
Low Idle Speed RPM	600
Full Speed RPM	1,800
Exhaust Aftertreatment Type	SCR and DPF
Emissions Certification	Tier 4 switch
Radiators	Mech. bonded
Traction Alternator	Kato – 1,530 kW
Companion Alternator	Kato – 250 kW
Air Compressor	Atlas Copco GAR 37

Progress Rail
A Caterpillar Company

PR24B [RE]powered Locomotive

- Zeit SAL V control system provides increased adhesion over the conventional Dash 2 control system
- Filter change intervals increased from 92 days to 184 or 368 days, see specifications below
- Equipped with electric operated handbrake

  Set and release signals are provided to the control system for increased AESS shutdown when the handbrake is set

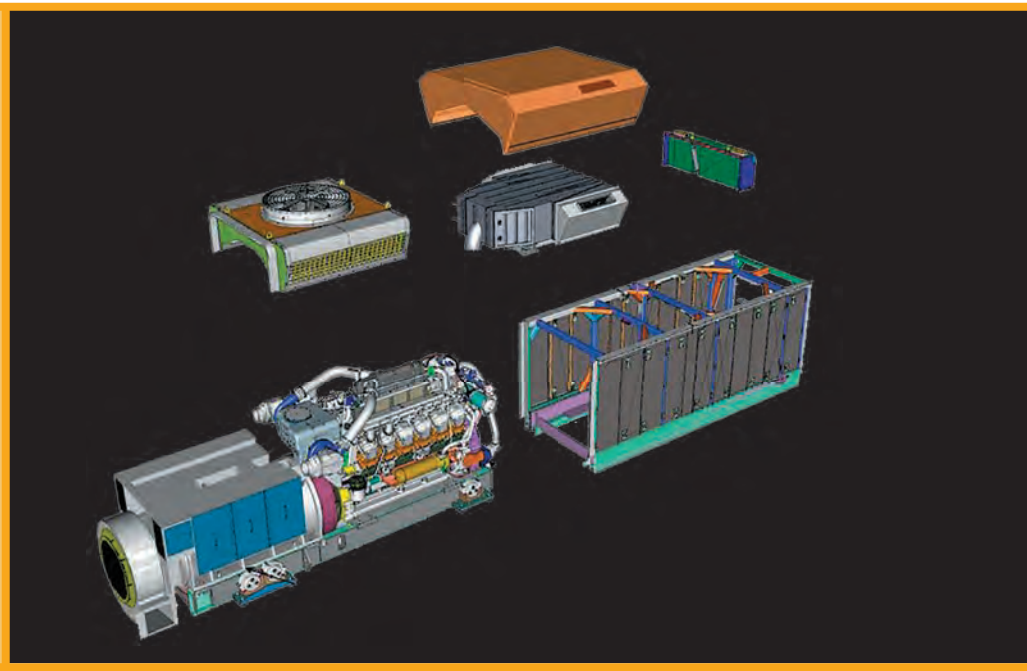


- Can be equipped with extended range dynamic braking and self load capability

  Isolation-mounted engine for reduced noise and vibration, as well as improved ride quality
- Anti-freeze protection is provided in the new cooling system and increases AESS shutdown time
- Configured for switch duty cycle Tier 4 emissions with a new, state-of-the-art aftertreatment device, which includes SCR, DOC, and DPF technology

Cat® 3512C HD Engine

- **Caterpillar has produced over 170,000 of its 3500 series engines since 1980**
- **Decrease in fuel consumption of up to 15% from a typical GP38-2**
- **Oil change interval can be extended to 368 days from 184 days with proper oil sampling**
- **Fully integrated engine and aftertreatment protection by Zeit SAL V control system and the ECM**
- **Demonstrated engine system reliability (includes engine and aftertreatment)**
- **Supported by Progress Rail and your Local Cat® Dealer.**



Progress Rail
A Caterpillar Company

Real Innovation. Real Results. That's Progress.

progressrail.com • @Progress_Rail

160089

LOCOMOTIVES

710 ECO™ REPOWER

710ECO™ Repowers extend locomotive life for up to 40 years and lower life cycle costs by equipping older models with EMD 710 engines.

For more than 90 years we have produced the most durable, reliable and sustainable locomotive products and services in the rail industry. We design and manufacture diesel-electric locomotives for all commercial rail applications, with 65,000 EMD-powered locomotives delivered to more than 75 countries. Our technology leadership and superior performance drive our reputation for exceptional quality, service and innovation.

Repower locomotives available from Progress Rail provide the greatest flexibility of any provider in the marketplace. By replacing old, inefficient engines, and antiquated control systems with new, state-of-the-art, clean technology, the next generation of single-engine locomotives are ready to provide reliable service for decades to come. Packages can be tailored to provide kits for customer installation or as complete turnkey solutions, both using the latest generation of EMD or Cat engines meeting the latest emissions standards along with a choice of control systems.

710 ECO™ REPOWER
Features and Benefits

- Low emissions
- Fuel savings up to 25%
- Lube oil savings over 50%
- Increased all-weather adhesion
- 90% parts commonality with existing fleet
- Predictable 184-day maintenance intervals
- 30 years of demonstrated 710 engine reliability
- Available as a kit or repowered locomotive

EM2000™ Microprocessor Control System

- Excitation and load control
- Adhesion control
- Engine control
- Diagnostic system
- Archived unit history data

710ECO™ Repower Kit Contents

- 8 or 12-cylinder 710 engine
- AR10 / CA6 alternator
- Separate loop aftercooling system
- EM2000™ Microprocessor Control System
- Automatic Engine Start Stop (AESS™)

[RE] use new manufacture invest cycle

Typical Improvement with a REpower

	EXISTING LOCOMOTIVE	REPOWER LOCOMOTIVE
Control System	Manual Control by Operator	EMD Microprocessor
Emissions	Unregulated	Up to US EPA Tier 3
NOx	Baseline	Over 50% NOx Reduction
Particulate Matter	Baseline	Over 70% PM Reduction
Nominal Traction Power	1,119 kW / 1,500 hp	1,491 kW / 2,000 hp
Starting Tractive Effort	274 kN / 61,500 lbf	390 kN / 87,500 lbf
Adhesion	Baseline	30% Improvement
Fuel Consumption	Baseline	25%+ Reduction

710ECO™ REPOWER TECHNICAL DETAILS

Engine Model	8-710G3A-T3 / 12-710G3A-T3
Engine Type	Two Cycle - 45° Vee
Brake Power	2,320 hp / 3,150 hp
Number of Cylinders	8 / 12
Displacement Per Cylinder	710 cu. in.
Compression Ratio	18:1
Bore and Stroke	9.06 x 11 in.
Fuel Injectors	Electronic Unit Injection
Charge Air	Single Turbocharger
Low Idle Speed	200 rpm
Full Speed	904 rpm
Emissions Certification	US EPA Tier 3 and EU Stage III A
Alternator	AR10
Companion Alternator	CA6

EMD 8-710 Engine

EMD 12-710 Engine

CERTIFIED EMISSIONS KITS FOR EMD LOCOMOTIVES

Progress Rail provides emissions solutions for EMD engines and continues to lead the industry in emissions compliance. One of the EPA's guiding principles for the 40 CFR Part 1033 rule was to achieve sizable reductions in emissions as early as possible. Progress Rail's skilled emissions research team met this challenge using extensive analysis and testing to develop the most advanced emissions solutions for locomotive applications for EMD 710 and 645 engines.

Systems Integration

Progress Rail's complete OEM systems knowledge allows for the most reliable and fuel efficient emission kits. Meeting emissions is not a piece-part activity, but a finely-tuned balance between emissions compliance and fuel efficiency for a locomotive system. Reverse engineered parts lack the proven reliability, locomotive systems integration, and support that only Progress Rail as the OEM can provide.

EPA Compliance

EPA 40 CFR Part 1033 requires locomotive engines, including all EMD models originally manufactured in 1973 or later, to meet stringent particulate matter and NOx standards when overhauled. Installing an EPA certified EMD emissions kit ensures full regulatory compliance with Part 1033 requirements throughout a locomotive's useful life.

EMD Emissions Kit Contents

- UL Power Assemblies
- OEM Emissions Specification Fuel Injectors
- Aftercoolers and Plumbing (as needed)
- Software Upgrade (as required)
- Oil Separator and Fittings (as needed)
- Engine Emissions Label
- Locomotive Emissions Label
- Installation Instructions
- Kit Registration Card

EMD Emissions Kit Benefits

- OEM engineered, designed, and tested upgrades, providing particulate matter and NOx reductions throughout the locomotive's useful life
- Significantly cuts lube oil consumption
- Reduces or maintains previous fuel consumption levels
- Application of the kits per the Engineering Test Instructions and Maintenance Instructions achieves full compliance with EPA regulations per 40 CFR Part 1033

EMD Emissions Kit Availability

Kits are available for all EMD Model 710 and 645 locomotive engines.

Progress Rail
A Caterpillar Company

800-476-8769

progressrail.com

@Progress_Rail

160089

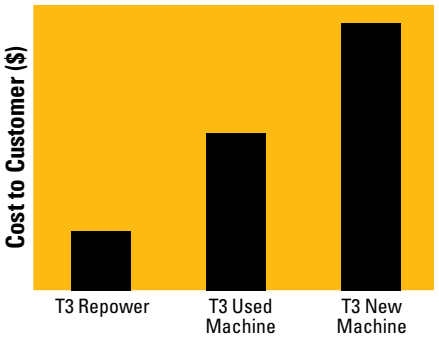
Tier 3 Repower Solution

For D8R Series I Track Type Tractor

Emissions Repower Benefits:

- Updated components similar to those found in a Tier 3 D8T with comparable overhaul costs
- Significant reductions in engine out emissions
- EPA / CARB Tier 3 replacement engine
- Enables work in areas with site requirements for strict emissions levels
- Most cost effective technology to comply with state and federal emissions requirements
- Preservation of comfort level with machine operation
- Funding may be available from local, state or federal sources
- Special financing programs may apply
- Newer technology engine parts improve availability

Cost effective method to achieve emissions compliance



D8R T3 repower is approximately 25% the cost of a new D8T

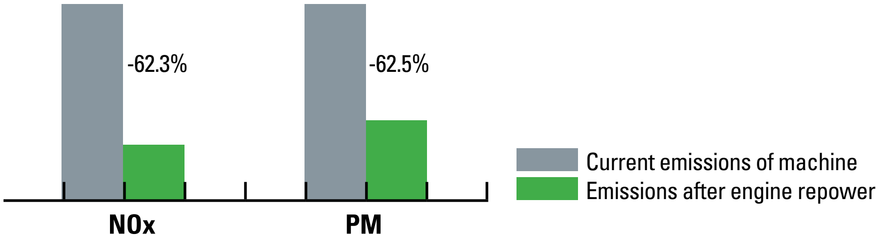
Tier 3 Repower Solution

How it works: Your Cat dealer will remove the existing engine and replace it with a lower emissions integrated Tier 3 solution

Rating Match / Performance and Emissions:

- Longer maintenance intervals
  (S•O•S should be used to confirm oil change interval)
- Matched to original power train
- Repower engine performance is matched to original engine rating
- Engine load acceptance / transient response

D8R TTT to Tier 3



Data calculated through Diesel Emissions Quantifier

Repower Features

- Tier 3 - C15 ACERT engine

- Engine monitoring / diagnostics
- On demand fan / reverse fan control
- Increased resale value
- Complete engineered solution
- All service parts supported through CAT parts system
- Cost-effective solution

CAT® DEALERS DEFINE WORLD-CLASS PRODUCT SUPPORT.

We offer you the right parts and service solutions, when and where you need them.

The Cat Dealer network of highly trained experts can help you maximize your equipment investment.

PEHJ0272
www.cat.com

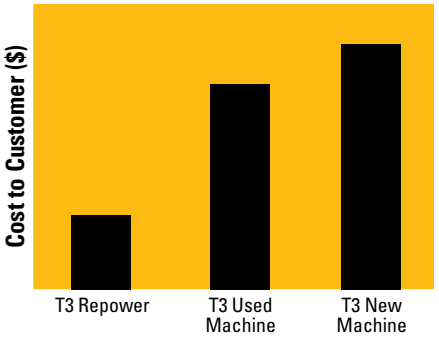
Tier 3 Repower Solution

For 140G Motor Grader

Emissions Repower Benefits:

- Significant reductions in engine out emissions
- EPA / CARB Tier 3 replacement engine
- Enables work in areas with site requirements for strict emissions levels
- Most cost effective technology to comply with state and federal emissions requirements
- ACERT technology engine parts improve availability
- Preservation of comfort level with machine operation
- Funding may be available from local, state or federal sources
- Special financing programs may apply

Cost effective method to achieve emissions compliance



140G T3 repower is approximately 25% the cost of a new 140M

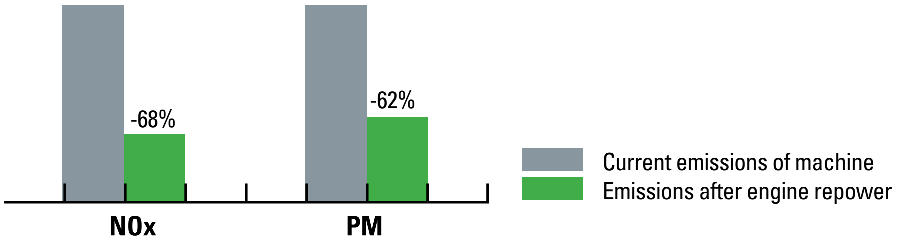
CATERPILLAR®

Tier 3 Repower Solution

How it works: Your Cat dealer will remove the existing engine and replace it with a lower emissions integrated Tier 3 solution

Rating Match / Performance and Emissions:

- Longer maintenance intervals
  (S.O.S. should be used to confirm oil change interval)
- Matched to original power train
- Excellent performance and response



Data calculated through EPA Diesel Emissions Quantifier

Repower Features

- Tier 3 - C7 ACERT engine

- Engine monitoring / diagnostics
- Redesigned air / water lines
- Improved cooling system and components
- Cost-effective solution
- Increased resale value
- Complete engineered solution
- All service parts supported through CAT parts system

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CATERPILLAR®
TODAY'S WORK. TOMORROW'S WORLD.™

Cat® Tier 2 Emissions and Performance Repower

For Select D11R Track-Type Tractors

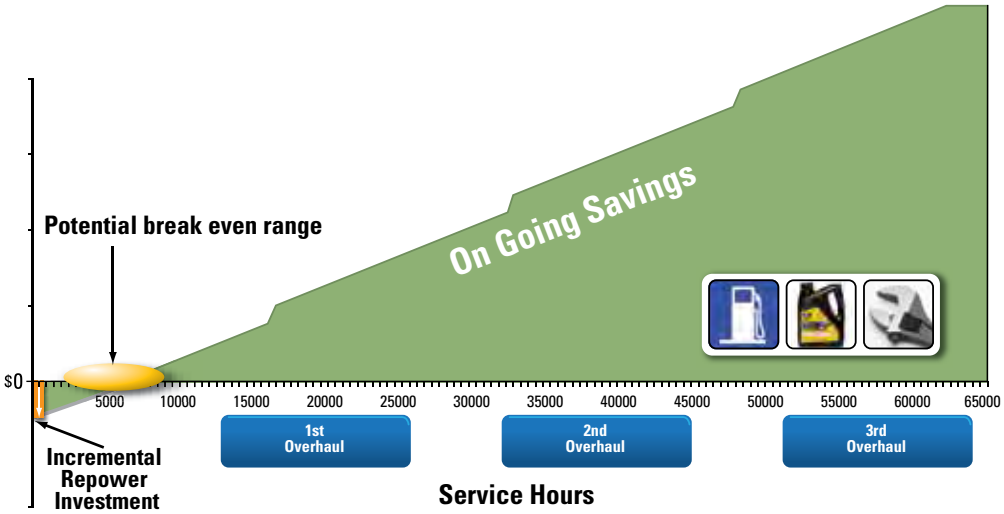
Reduce Emissions. Stay Competitive.

- Replacement engine system improves performance
- Uses system components proven in newer D11T production models
- Performance enhanced and matched to existing power train
- Potential 10 percent fuel savings
- Lower overhaul costs due to common platform parts
- Equipped with an EPA Replacement engine label
- **Bottom Line**: This repower can achieve a short return on investment, savings throughout the lifecycle of the machine, increased resale value, and Tier 2 level emissions compliance

Results may vary based on operational conditions

Tier 2 Repower Solutions

Short Return on Investment and Ongoing Savings



Graphic compares the performance repower against a reman direct replacement or standard overhaul scenario. Green area represents the estimated cumulative savings over time. Results may vary based on operational conditions.

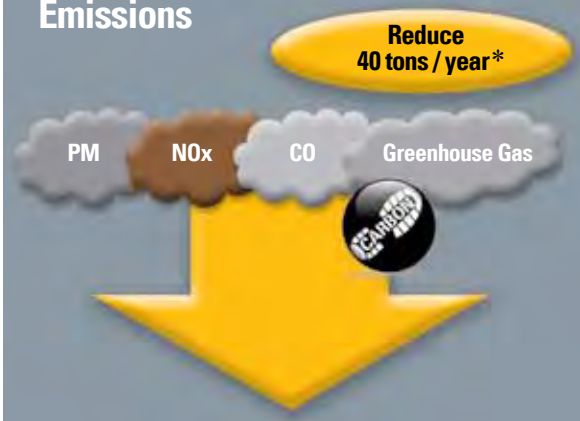
Features & Benefits

- Performance matched with proven D11T parts
- Potential 10% fuel savings demonstrated in a side by side field study
- Customer reported sound level improvements
- 60% increase in altitude capability (before de-rate)
- Capable of longer routine maintenance intervals (operation dependent)
- Lower overhaul costs due to common platform parts

How it works

The existing engine system will be removed and replaced with a production D11T engine system. Most conversion parts are available as a kit.

Emissions



*Estimates based on 5000 hours per year

Applicability

Applies to D11R machines with the serial number prefixes 9TR, 9XR, 7PZ, and AAF.

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We offer you the right parts and service solutions, when and where you need them.

The Cat Dealer network of highly trained experts keeps your entire fleet up and running to maximize your equipment investment.

PEHJ0307-01
www.cat.com

Cat® Emissions Upgrade Kits

For Select 3508, 3512, and 3516 Marine Engines

Today's Technology. Yesterday's Engines.

Cat® Emissions Upgrade Kits for select Marine 3500 engines offer significant benefits for your next overhaul.

- Kit includes proven system parts required to convert to EPA equivalent Tier 1 or Tier 2 configurations
- Certified for compliance with the US EPA Marine Final Rule (Remanufacturing Program) under 40 CFR Part 1042
- Upgrades can be accomplished in hull without major modifications to the vessel
- Kit design simplifies the installation process
- Provides exceptional life with Genuine Cat® parts

Bottom Line: Emissions Upgrade Kits can help you achieve emissions compliance, and provide many operational benefits.

Cat® Emissions Upgrade Kits for Select 3500 Marine Engines

Impact on Your Business

Sustainability and Compliance

- Demonstrated significant reductions of particulate matter, nitrogen dioxide, hydrocarbons, and carbon monoxide
- U.S. Environmental Protection Agency (EPA) certified the Cat® 3500 Series Marine Emissions Kits according to EPA Rule 40 CFR Part 1042

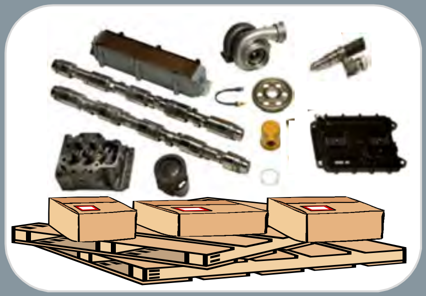
  The EPA adopted an emissions program for many marine engines already in operation. The rule requires a 25% PM reduction at the time of major overhaul. It applies to engines manufactured between 1973 and the last Tier 2 model year, powered at or above 600 kilowatts, have a displacement of less than 30 liters per cylinder, and installed on a vessel that is flagged or registered in the U.S. Refer to the EPA for details.

Features and Benefits

- Can implement during a scheduled major overhaul
- Gain benefits of a new engine at a lower cost
- Improve acceleration and load acceptance
- Less vibration and noise
- Improved diagnostic capability
- Live messages and alarms
- Optional user configured display with real time information to: **www.cat.com/EmissionsSolutions**

How it works

Installation of the Cat® Emissions Upgrade Kits can be accomplished in hull without major modifications to the vessel, and the kit design simplifies the process. The primary components are listed below.



Electronic Control
Camshafts
Cylinder Heads
Water Lines
Exhaust Manifold
Turbo Oil Lines
Oil, Fuel, & Air Lines
Aftercooler
Valve Mechanisms
Cylinder Packs
Flywheel Housing
Fuel Injectors
Heat Shields*
Turbocharger
Wiring

Applicability

Solutions apply to many 3508, 3512, and 3516 marine engines. Consult with your Cat® Dealer for application requirements.

*ordered separately

CAT® DEALERS DEFINE WORLD-CLASS PRODUCT SUPPORT.

We offer you the right parts and service solutions, when and where you need them.

The Cat Dealer network of highly trained experts keeps your entire fleet up and running to maximize your equipment investment.

PEHJ0271
www.cat.com

VW Settlement

Jeff Kim <jkim@shorepower.com>

Mon 3/6/2017 1:26 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

We are writing to request that Electrified Parking Spaces (EPS) be eligible for funding through Connecticut's VW Mitigation Plan. Specifically, we encourage the eligibility of Truck Stop Electrification (TSE) and electric standby transport refrigeration units (eTRU), both of which reduce diesel engine run time while the vehicle is parked stationary. This is also known as an idle reduction technology.

Overnight idling by diesel trucks is a major source of NOx pollution, which has a disproportionate impact on disadvantaged communities where many truck stops and fleet terminals tend to be located. EPA's Diesel Emission Reduction program flags the communities surrounding truck stops for programmatic priority. Moreover, the Federal Highway Administration rates truck stop electrification (idle reduction) as the #1 cost effective solution to mitigate NOx emissions, at $2k/ton of NOx.

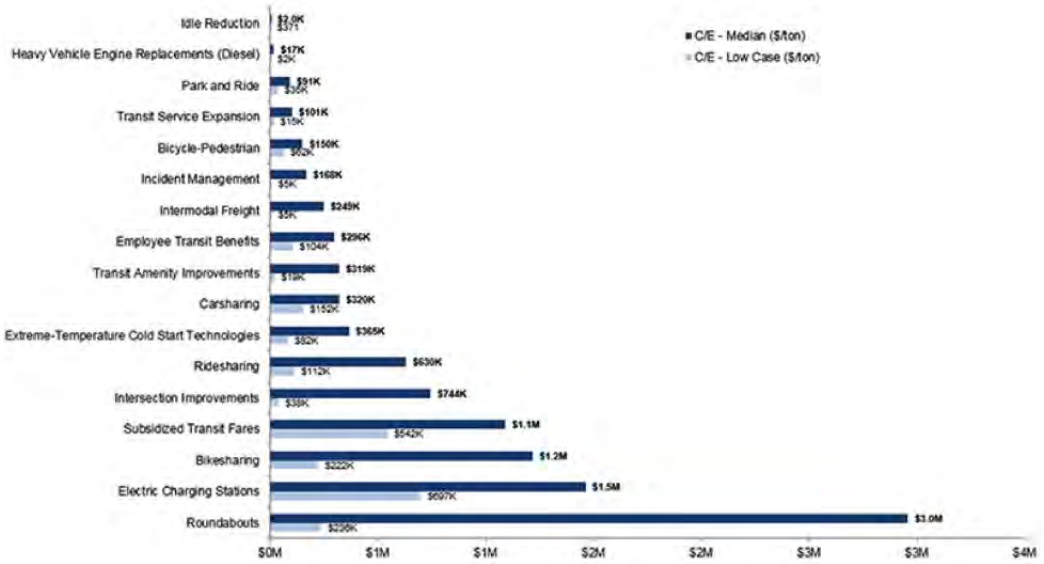


Figure . Median Cost-Effectiveness Estimates (Cost per Ton Reduced) of NOx Emission Reductions. Entire report can be found here and select pages here. See also EPA report specifically scoring TSE as the most cost effective on page 13 at median $1.7k/ton of NOx (scoring diesel retrofit at a median cost of $5,950/ton of NOx).

We note that this report, while published in 2007, is the most recent EPA analysis on point. Total installation costs for the company supplying the data, has decreased by around 50% from the stated assumptions. We also note that sales data demonstrates that even better cost effectiveness can be achieved if limited vouchers are distributed to truck drivers for higher utilization of existing infrastructure during this period of relatively inexpensive fuel.

Most people are unaware that over a million heavy duty diesel trucks idle for about 40% of engine run time because drivers who sleep in their cabs are unable to heat or cool their home away from home without idling a 500HP diesel engine. (Huai, T., et al., 2006. "Analysis of heavy-duty diesel truck activity and emissions data," Atmospheric Environment, 40, 2333-2344) (See alsohttps://youtu.be/3oLsyLHUNqA). The Argonne National Laboratory estimates that rest-period idling results in the emission of about 11 million tons of carbon dioxide, 55,000 tons of nitrogen oxides (NOx), and 400 tons of particulate matter released annually in the U.S. See the report here.

Two verified providers from the EPA SmartWay Verified List of Idle Reduction Technologies, operate a combined network over 3500 electrified truck parking spaces nationwide. Heavy duty zero emission supply equipment is known under the EPA SmartWay program

as Electrified Parking Spaces or Truck Stop Electrification. EPS/TSE uses electricity-powered components to provide the operator with climate control and auxiliary power without having to idle the main engine.

Too often, drivers idle their engines during overnight stays in order to maintain a safe and comfortable interior environment. The practice takes place on a large scale and has a disproportionate impact on disadvantaged communities where truck stops and fleet terminals tend to be located. DERA's own guidelines flag the communities surrounding truck stops for programmatic priority. The Argonne National Laboratory estimates that rest-period idling wastes about 1 billion gallons of diesel and results in the emission of about 55,000 tons of nitrogen oxides released annually in the US. The EPA rates Truck Stop Electrification as the single most cost effective activity to mitigate mobile sources of NOx emissions (less than one third of the cost per ton achieved through diesel retrofits). Truck Stop Electrification, an EPA SmartWay verified technology, provides long-haul truck drivers an alternative to idling their diesel engines during their overnight stays. Significant NOx mitigation can be achieved through 1) installation of new TSE locations; and 2) TSE vouchers for truck drivers to encourage more truckers to use existing TSE facilities.

We also encourage the state fund projects at up to 80% (20% or more cost share) if allowable through the DERA option. This will make the projects cost effective and give them the greatest ability for success.

Thank you for your consideration!

Sincerely,

Jeff Kim
President & CEO
Shorepower Technologies
(503) 686-8844
jkim@shorepower.com
http://www.shorepowerconnect.com

+ Watch our Driver Training Video
+ View images

Comments re: CT' VW EMT program plan draft

Stephe Yborra <stephe@yborraservices.com>

Mon 3/6/2017 2:09 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Dear Commissioner Klee and Cognizant DEEP Staff:

While I am a Maryland resident, I represent clients who operate vehicles registered in the State of Connecticut and thus who are directly impacted by DEEP's proposed plan regarding VW EMT funding allocation. The plan that CT has proposed should be revised to place greater emphasis on reducing NOx emissions. The present draft plan "puts a thumb on the scale" in favor of all-electric technologies over more cost-effective, more readily available and lower NOx emitting propane and natural gas vehicle technologies. For example, the plan provides private fleets with 75% of replacement cost for electric vehicles while only providing 25% for NGVs and LPGVs; furthermore, it includes funding for EVSE for those electric HD bus and trucks, further throwing money at a more expensive and LESS COST-EFFECTIVE option. The consent decree ALLOWS for these uneven reimbursements but Connecticut is NOT REQUIRED to reimburse at these unfair/uneven amounts. I suggest that, for private fleets, the reimbursement/voucher for new alt fuel vehicles (electric, NGV, LPGV, H2) be EQUAL at 25 for new replacements/40% for repowers.

Furthermore, I suggest that the state set a lower reimbursement/voucher for government fleets than the allowed 100%. Any fleet manager (private or public/gov't) should have "skin in the game" with a percentage of the investment coming from their own budgets. Giving govt fleets 100% will result in them becoming dependent on this type of windfall before taking affirmative steps on their own. I suggest a reimbursement/voucher system that pays govt entities 60-75% of the replacement cost with monetary caps set for different vehicles GVWs. This would allow the state to stretch the impact of its dollars and achieve greater overall NOx reductions.

HD all-electric trucks and buses cost FAR MORE than comparable natural gas-powered trucks and buses; this results in fewer electric vehicles being deployed and less total NOx reductions. The CT plan, as currently written, appears to focusing more on assisting less-than-fully-commercialized electric vehicle technology than in reducing NOX, which is what the funds are being distributed to the states to achieve. Furthermore, the interests that are lobbying the state so hard for greater funding for EVs and EVSE conveniently ignore the upstream emissions of EV power. Calling PHEVs "zero emissions" vehicles is disingenuous; the total energy/emissions profile (often referred to as "well-to-wheels") should be considered. When this more comprehensive emissions analysis is used, dollar for dollar, natural gas trucks, buses and shuttles (propane shuttles too) are the most cost-effective approach to removing NOx for the least amount of money per ton of emissions removed. There's plenty of unbiased information available to the DEEP staff to support this approach (i.e., independent environmental studies).
Thank you for allowing me to provide input on this matter.
Respectfully Submitted,
Stephe
Stephen C. Yborra
Managing Director

Yborra & Associates, LLC
304 Dorsey Avenue
Mount Airy, MD 21771
301-829-2520 ofc
240-446-2584 mobile
www.yborraservices.com

VW Settlement Comments

Bruce Pinto <bruce@icomnorthamerica.com>

Mon 3/6/2017 12:43 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

DEEP Comment Cusson ICOM Final.docx;

We respectfully submit our comments regarding the Volkswagen Settlement and NOx mitigation in Connecticut.

Thank you

Don Cusson, Cusson Automotive

Bruce Pinto, ICOM North America

March 4, 2017

To: Commissioner Robert Klee
VW Settlement Comments
DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION
79 Elm Street
Hartford, CT 06106

Commissioner Klee:

The United Propane Autogas Solutions Group (UPAS) and ICOM North America along with our Connecticut Distributor Installer, Cusson Alternative Fuel Solutions appreciate the opportunity to respond to the Connecticut Department of Energy and Environmental Protections request for public comment on Connecticut's proposed mitigation plan.

The United Propane Autogas Solutions Group (UPAS), www.upasgroup.com, of 809 River Rd Marshall, MI 49068, was formed to facilitate the utilization of Clean and Domestic Propane by fleets. UPAS is an ICOM Group Company: www.icomnorthamerica.com. ICOM is the leading manufacturer of patented Propane Liquid Injection Systems. ICOM's headquarters and manufacturing are located at 54790 Grand River Avenue, New Hudson, MI 48165. Cusson Automotive and Alternative Fuel Solutions located at 29 Mascolo Road in South Windsor, Connecticut, 06074.

There are approximately 28,000 vehicles utilizing the ICOM Technology in North America, primarily in the USA. Key fleet clients include: UPS, DHL, Fedex, The US Forest Preserve and hundreds of fleets across the USA. ICOM has the industry leading 250 EPA Certifications covering over 1000 fleet vehicle platforms including for the latest model years Class 4 to 7 trucks.

Propane is not an experimental fuel; it has been used in transportation for more than 100 years. Ford Motor[1] offers a vast truck line of vehicles that can operate on propane. Ford Motor understands that there are many buyers that wish to run a Ford vehicle on something other than gasoline or diesel fuel. Ford offers the availability for Up-Fitters to convert vehicles to be powered by liquid propane. These vehicles are ideal for Transit, Paratransit, Shuttle and Package delivery. Propane infrastructure is in-place and ready to start today reducing NOx emissions, especially with these vehicle types[2]

[1] http://www.fleet.ford.com/resources/ford/general/programs/alternative-fuel-vehicles/2016_Alternative_Fuel_HiRes.pdf
[2] There are thousands of EPA certified systems available today to retrofit gasoline powered trucks to operate on propane or natural gas and in some instances producing NOx level as low as .051 to .039 (ICOM) CARB certificates pending agency issuance.

Propane Autogas was designated as a "Clean Fuel" in the 1992 Energy Policy Act. Today, more than 23 million vehicles operate on propane worldwide and it is the third leading transportation fuel in the world. For vehicles in Class 4 – 7 the adoption of propane as a fuel source is the best way to immediately reduce NOx, Particulate Matter (PM) and non-criteria emissions like GHGs. The utilization of Propane Autogas reduces Particulate Matter to ZERO. NOx is reduced approximately 70% compared to the diesels noted for replacement.

Medium and heavy duty vehicles represent 4% of the total vehicle population and contribute an extraordinary 29% of all carbon emissions in our country[3]. Most, if not all of these, vehicles in Class 4 – 7 can efficiently be re-powered, up-fitted or originally ordered to operate on clean burning propane Autogas. Vehicles in this Class include Shuttle Buses, Transit Buses, School Buses and Freight / Package Delivery Vehicles all of which have elevated idling levels during their daily operation.

UPAS/ ICOM are focused on several key areas in Connecticut that best fit the VW Profile our Certified Distributor Installer, Cusson Automotive and Alternative Fuel Solutions, 29 Mascolo Road South Windsor, is in place to install and service ICOM EPA Certified Systems for Class 4 - 7 vehicles:

1. A Connecticut major road side assistance company (AAA Allied Group) servicing over 1 million customers made the commitment in 2015 to start converting their fleet of Ford vehicles to ICOM Bi-Fuel propane power. With seven Trucks currently converted, AAA has been able to service their customers more efficiently by staying on call longer and using gasoline as only a backup fuel. With vehicles that put on 50,000 miles annually and thousands of hours idling, AAA will soon see the financial benefits (ROI) along with much cleaner tail pipe emissions, 20% NOx reduction and up to 29% GHG emissions. 2017 will bring more conversions to AAA and with that a cleaner environment.

2. The Town of Greenwich has converted ten Ford Trucks to ICOM Bi-Fuel propane systems. The Town trucks operate in three different sectors of daily use; Public Works Department, Board of Ed and Parks and Rec. The vehicles demonstrate the versatility of daily use, to include the demands of snow removal. The Town of Greenwich was an early adopter doing their part for air quality mitigation and reducing NOx emissions and damaging GHG emissions.

[3] https://energy.gov/eere/vehicles/fact-951-november-14-2016-medium-and-heavy-trucks-account-about-quarter-highway

3. The Transit and Paratransit vehicles in Connecticut providing daily access to transportation for those in need while helping eliminate overcrowding on our highways. In 2016 Yale University put into service three, 2016 Ford E450 shuttle buses that were converted by Cusson Alternative Fuel Solutions to ICOM Bi-Fuel propane. These vehicles run from 6am to 11pm 7 days a week, vehicles of this type can have fuel mileage range from 4 to 9 miles per gallon. Transit Vehicles are some of the biggest polluters on the road due to the daily use and extended idle periods. These buses converted to run on propane also have a 20% NOx reduction along with other GHG reduction. Currently Yale University has chosen to decommission a 2014 E450 that ran on CNG (Compressed Natural Gas) they have Cusson Alternative Fuel Solutions now converting this bus to ICOM's Mono-Fuel Propane injection. The singular fuel system will increase the overall emission savings plus allow for a quicker ROI.

4. School Buses: UPAS is a key advocate of Propane School Buses and ICOM has manufactured thousands of Propane Systems for School Buses. However, we believe that the vehicles in items 1 - 3 above have a much better ratio of Dollars In to Reduced Emissions Out because of the very high fuel usage utilized in these sectors which is often 2 to 5 times more than a school bus.

Currently, Connecticut has many ICOM propane conversions on its highways with installations performed by Cusson Alternative Fuels, in both the Private and Public sector.

We look forward to helping minimize the fallout from VW and stand ready to supply a solution to NOx mitigation. That solution is here today, in use on our highways right now with proven technology worldwide. Propane offers all sectors of fleet transportation a way to green their fleet, decrease overall fuel and maintenance costs and have the fastest Return On Investment in the alternative fuel industry. We would like to work with you and the DEEP team to ensure the effective rollout of the Proposed State of Connecticut Mitigation Plan.

Respectfully,

Don Cusson, Cusson Alternative Fuel Solutions,
Connecticut Business Owner and Resident, Ellington 860-289-2389

Bruce Pinto, ICOM North America, New England Fleet Development Specialist
Connecticut Resident, Thomaston 860-319-9420

Informal Comments VW Settlement

Kent Leacock <KLeacock@Proterra.com>

Mon 3/6/2017 11:16 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: Steve O'Neil <SO'Neil@Proterra.com>;

1 attachment

VW CT Letter.docx;

Dear Sir or Madam,
Please find attached Proterra comments on the VW Settlement.
Sincerely.
Kent Leacock

PROTERRA

F. Kent Leacock
Director Government Relations, PROTERRA
P:650.689.8256|M:925.698.1431| F:650.689.8271 | kleacock@proterra.com
www.proterra.com | 1815 Rollins Rd. Burlingame, CA 94010

March 6, 2017

Connecticut Department of Energy & Environmental Protection
79 Elm Street
Hartford, CT 06106

RE: Proterra Comments on VW Settlement Appendix D & C

Proterra appreciates the opportunity to provide comments on the funding allocated under Appendix D & C of the Volkswagen (VW) Consent Decree.

Proterra designs and manufactures the world's most fuel-efficient battery electric bus and features on-route, fast-charge technology that offers functionally unlimited range, as well as an extended range version that enables transit agencies to travel 350 miles on a single charge. Proterra's CATALYST™ bus achieves 22+ MPGe performance, 500%+ better than diesel and CNG buses, eliminating toxic diesel particulate matter and reducing carbon emissions by 70% or more compared to CNG or diesel buses. In addition, the cost of maintenance differential is substantial in comparison to fossil fueled buses. Using the APTA average of 34,000 miles per year and the FTA required 12-year life, a Proterra bus will save a transit agency over $200,000.00 per bus on average compared to a fossil fuel transit bus.

Our mission is simple: to deliver clean, quiet transportation to all communities by replacing heavy-duty, fossil-fueled transit buses with zero-emission public transit buses. The harmful effects of vehicle exhaust from medium and heavy-duty trucks are on the rise and have been for years. The EPA reports that medium and heavy duty vehicles account for 20% of GHG emissions and oil use in the United States' transportation sector, but represent only 5% of the vehicles on the road. Similarly, GHG emissions from heavy duty vehicles across the globe are growing rapidly and are expected to surpass emissions from passenger vehicles by 2030. There is thus a strong need to not only mitigate past criteria pollutant emissions, but to continue to reduce toxic air pollutants in the medium and heavy duty sector.

The Volkswagen settlement provides a much-needed opportunity to address this growing environmental concern and further demonstrate that commercially available zero-emission technologies have the lowest cost of ownership, improved maintenance and performance, and better serve a diverse range of communities' public transit needs, including the reduction of GHG and the elimination of criteria emissions.

We strongly recommend that Connecticut direct 85% of the Appendix D settlement funds to incentivize the deployment of zero emission, battery electric transit buses and medium duty vehicles to help reduce GHG emissions and vehicle miles traveled, as well as provide other health and associated benefits throughout Connecticut.

We propose that Connecticut adopt two specific funding programs that have significantly accelerated the adoption of heavy duty EVs and, as a direct result, helped reduce NOx and GHG emissions. First, we urge Connecticut to adopt the competitive funding programs in place in CA and at the federal level. The CA Zero-Emission Truck and Bus Program is a competitive funding program that allows all manufacturers of zero-emission technology to partner with transit agencies and compete for project funding. It is very much modeled after the highly competitive Federal Transit Administration's Low or No Emission Program, which has helped fund the purchase of zero-emission transit buses across the US. The CA program is important in that it allows newcomers to receive funding for not only buses, but also chargers (EVSE). Second, the Hybrid

& Zero-Emission Truck and Bus Voucher Incentive Program (HVIP) is a pool of money that is used by transit agencies on a first come, first served basis to bridge the gap between purchasing a fossil fuel vehicle and a zero-emission vehicle. For example, the transit bus OEM can receive a voucher for up to $160,000 per EV vehicle, which amount is then deducted from the cost of the bus. New York City (New York Truck Voucher Incentive Program) and Chicago (Drive Clean Truck Voucher Program) have implemented similar programs. These programs have proven valuable in allowing agencies (and commercial properties) to grow their fleets of zero-emission buses.

Appendix D of the VW Settlement allows each beneficiary to invest up to 15% of its allocation of Trust Funds on costs associated with deploying new, light duty EVSE. Proterra recommends that Connecticut dedicate its entire 15% towards electric vehicle charging infrastructure. Proterra's newly-introduced extended range bus, the E2, supports SAE J1772 CCS charging, which is also the standard adopted by many light duty OEMs. Accordingly, the additional investment in charging infrastructure has the added benefit of accelerating EV adoption across the light duty sector as well.

Appendix C proposes an investment of $1.2 billion for zero-emission vehicle programs. Although VW ultimately controls all of the $1.2 billion to be spent outside of California, EPA and VW are expected to receive public comments on how this funding should be spent on encouraging ZEV adoption. The National Investment Plan does not currently include heavy-duty ZEV fueling infrastructure as a credible cost. But we urge Connecticut to advocate for competitive funding programs that allow states, businesses, and technology providers to compete on a technology neutral basis for charging station funding. We also strongly support the inclusion of zero-emission public transit buses in this program to accelerate the adoption of zero-emissions technologies that can provide communities the greatest benefit in the elimination of mobile source pollutants.

Thank you for the opportunity to provide comments on the VW Consent Decree programs. We look forward to continuing to work together to help carry out the goals and initiatives of the Environmental Mitigation Trust and the ZEV Investment Commitment. Please feel free to contact me directly at (925) 698-1431 or kleacock@proterra.com.

Sincerely,

F. Kent Leacock

F. Kent Leacock
Director Government Relations
Proterra, Inc.

Coalition Comments on Draft Mitigation Plan

Emily Lewis <elewis@acadiacenter.org>

Mon 3/6/2017 3:48 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

Final Coalition Comments VW Mitigation Plan 3.6.17.pdf;

Hello,

Please find attached shared comments on CT's Proposed State Mitigation Plan for the Volkswagen Partial Consent Decree. I am happy to address any questions or comments on behalf of the signatories regarding this submission.

Thank you,

Emily

Emily Lewis O'Brien, Ph.D.
Policy Analyst
Acadia Center
21 Oak Street, Suite 202
Hartford, CT 06106-8015
elewis@acadiacenter.org
Phone: 860-246-7121 x207
Cell: 774-230-0905
www.acadiacenter.org

March 6, 2017

Bureau of Air Management
Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106

Comments on the Draft Proposed State of Connecticut Mitigation Plan under the Volkswagen 2.0L Partial Consent Decree, Appendix D

Thank you for the opportunity to submit written comments on the draft Proposed State of Connecticut Mitigation Plan under the Volkswagen 2.0L Partial Consent Decree, Appendix D ("Proposed Plan"). On behalf of the undersigned organizations and our members, we write to identify key priorities that we support for allocating Connecticut's share of the VW Mitigation Trust Funds. We appreciate the state's leadership in developing the plan in advance of Volkswagen naming a trustee and in facilitating a transparent public process.

There are many positive aspects of the Proposed Plan that the undersigned organizations support. First, we fully endorse DEEP's proposal to allocate 15% of the Environmental Mitigation Trust ("Trust") funds, the maximum allowed, to the development of electric vehicle supply equipment ("EVSE").[1] As DEEP illustrates in the Proposed Plan, non-diesel light duty vehicles make up nearly 45% of mobile NOx emissions in the state.[2] NOx emissions react with other pollutants to form ground level ozone, which has been demonstrated to impair lung function and produce many respiratory symptoms. Connecticut's eight counties all received failing grades for high ozone days from the American Lung Association.[3] Increasing charging infrastructure will help bolster adoption of electric vehicles ("EVs"), which produce no tailpipe NOx emissions, by providing a charging network that supports long-range and local driving and visibly promotes EVs across the state.

This coalition also supports DEEP's plan to pursue eligible mitigation projects that maximize the funding for EVSE.[4] Beyond allocating the entire 15% allowed for EVSE, DEEP should also leverage EVSE from other eligible projects funded through the Trust. For example, charging stations installed for electric transit buses could be open to public charging when buses are in use. We appreciate DEEP's decision not to limit the scope of eligible projects in the Proposed Plan, but we encourage DEEP to invest the majority of the Trust funds on zero-emission buses to maximize this opportunity to leverage infrastructure while achieving maximum emissions reduction.

We support DEEP's giving funding priority to projects in environmental justice communities and would like to see investment maximized in urban areas that have suffered the greatest health impacts from pollution. Zero-emission buses will have a positive impact on air quality in these priority communities due to their frequent operation.

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[1] *See:* "Proposed State of Connecticut Mitigation Plan under the Volkswagen 2.0L Partial Consent Decree, Appendix D" Connecticut Department of Energy and Environmental Protection, pages 9 and 18.
[2] *See:* "Proposed State of Connecticut Mitigation Plan under the Volkswagen 2.0L Partial Consent Decree, Appendix D" Connecticut Department of Energy and Environmental Protection, page 6.
[3] *See:* "State of the Air 2016" American Lung Association, page 64. http://www.lung.org/assets/documents/healthy-air/state-of-the-air/sota-2016-full.pdf
[4] *See:* "Proposed State of Connecticut Mitigation Plan under the Volkswagen 2.0L Partial Consent Decree, Appendix D" Connecticut Department of Energy and Environmental Protection, page 8.

We urge Connecticut not to adopt the narrow NOx-per-dollar cost-effectiveness funding priority suggested in the Proposed Plan.[5] Such a criterion would be inconsistent with the structure of the Volkswagen settlement—NOx cost efficacy has already been factored into developing the list of eligible categories, and thus it is not an appropriate metric for further distinguishing between the eligible mitigation actions.[6] Moreover, adopting an overly restrictive NOx-per-dollar cost-efficacy test could be counterproductive to Connecticut's broader environmental, public health, and climate goals, as it ignores the other air quality and climate benefits of the investments. For example, replacement of older diesel vehicles with newer models may provide robust short-term NOx reductions per dollar, but may be incompatible with the deeper NOx and greenhouse gas reductions that will be necessary for Connecticut to achieve.

To the extent that costs and benefits are considered, we recommend it should be done holistically, considering the full range of lifecycle benefits and costs of alternative uses of the mitigation trust funds. For example, while electric transit buses have a higher purchase price than diesel buses, recent analysis has shown that their lifecycle costs are about $165,000 less due to lower fuel, operation, and maintenance costs[7]—these savings only grow as environmental, climate, and public health benefits are considered. These savings are passed on to taxpayers, who in turn reinvest in the local economy.

In addition to cost savings, investment in zero emission vehicles and non-road equipment instead of diesel or alternative fuel upgrades provides the added benefit of helping to achieve the state's greenhouse gas (GHG) emissions mandates. Connecticut is required by the Global Warming Solutions Act to reduce GHG emissions in the state to 10% below 1990 levels by 2020 and 80% below 2001 levels by 2050. Yet, GHG emissions in the state have risen 7.5% from a low in 2012, largely due to increased vehicle use.[8] As electrification is the only option across the eligible mitigation projects that results in both zero NOx and GHG tailpipe emissions, we support DEEP giving funding priority to zero emission vehicle projects based on consistency with state energy and environmental goals.[9] Further, to ensure that these benefits are captured in the Proposed Plan, we suggest the addition of another bullet to section VI. A. Environmental Benefits.[10] The new bullet would state that "Replacement or repowering of any eligible vehicle or non-road equipment with an all-electric model or engine will provide 100% reduction in tailpipe NOx emissions."

In the same vein, it is important that DEEP acknowledge the local economic benefits that zero emission vehicles and their associated infrastructure will bring to the state. While DEEP recognizes that eligible mitigation projects may result in "increased sales of both diesel vehicles and non-road equipment and other eligible equipment,"[11] it does not explicitly recognize that

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[5] *See:* "Proposed State of Connecticut Mitigation Plan under the Volkswagen 2.0L Partial Consent Decree, Appendix D" Connecticut Department of Energy and Environmental Protection, pages 7 and 17.
[6] *See:* DOJ Response to Comments on the Proposed Settlement, page 17 (Sept. 30, 2016)
[7] *See:* "From Deceit to Transformation: How Connecticut Can Leverage Volkswagen Settlement Funds to Accelerate Progress to a Clean Transportation System" ConnPIRG, page 14. http://connpirg.org/sites/pirg/files/reports/ConnPIRG%20Final%20Paper.pdf.
[8] *See:* "Updated Greenhouse Gas Emissions Inventory for Connecticut: Recent Increases and Underlying Factors" Acadia Center http://acadiacenter.org/document/updated-greenhouse-gas-emissions-inventory-for-connecticut/.
[9] *See:* "Proposed State of Connecticut Mitigation Plan under the Volkswagen 2.0L Partial Consent Decree, Appendix D" Connecticut Department of Energy and Environmental Protection, page 7.
[10] *See:* "Proposed State of Connecticut Mitigation Plan under the Volkswagen 2.0L Partial Consent Decree, Appendix D" Connecticut Department of Energy and Environmental Protection, page 17.
[11] *See:* "Proposed State of Connecticut Mitigation Plan under the Volkswagen 2.0L Partial Consent Decree, Appendix D" Connecticut Department of Energy and Environmental Protection, page 18.

sales of electric vehicles and non-road equipment, EVSE, and fuel cells, will generate state tax revenue and support local businesses—there are local car dealerships selling EVs, Connecticut companies manufacturing hydrogen fuel cell technologies, and at least one Connecticut-based company producing EV charging stations. We request that DEEP revise the language in this section on "Energy and Economic Benefits" to be more inclusive of technologies beyond diesel upgrades.

The undersigned also recommend that the Proposed Plan be amended to remove the commitment to giving funding priority to entities with experience in implementing diesel reduction projects.[12] While our organizations understand that experience with these projects can be valuable, it would be counterproductive for funding to be limited to only established entities. For example, if DEEP also adopts the funding priority of having transformative projects that consider environmental justice goals (among others), then prioritizing established applicants could be antithetical to this outcome by limiting projects to traditional ideas and demographic groups. Further, as new technologies emerge and new companies develop to support them, it would be unfortunate to limit the competitiveness of these proposals because of inexperience.

Our organizations appreciate the analytical work that went into developing the emissions charts in the report. However, we would like to see the most recent data used. It appears that older data on GHG emissions is used in Figure 2 than in the NOx emissions charts in Figures 1, 3, 4, and 5. We suggest that the GHG emissions figure be updated using DEEP's "2013 Connecticut Greenhouse Gas Emissions Inventory."[13]

Finally, we are pleased that DEEP has recognized the potential benefits that EVs and associated infrastructure may bring to the grid and local electric distribution system.[14] There are multiple load management benefits that EVs and their associated infrastructure can generate, including integration of variable generation and use of off-peak resources.[15] The state should consider these benefits in their planning efforts, especially as the Trust funds enable greater adoption of these technologies.

Thank you for the opportunity to provide these comments. We look forward to engaging with you on future versions of the State of Connecticut Mitigation Plan, DEEP's actions to deploy the Trust funds, and other actions related to the Volkswagen Settlement.

Respectfully submitted,

Emily Lewis O'Brien†
Acadia Center*

Mustafa S. Salahuddin
Amalgamated Transit Union, Local 1336

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[12] *See:* "Proposed State of Connecticut Mitigation Plan under the Volkswagen 2.0L Partial Consent Decree, Appendix D" Connecticut Department of Energy and Environmental Protection, page 7.
[13] *See:* "2013 Connecticut Greenhouse Gas Emissions Inventory" Connecticut Department of Energy and Environmental Protection http://www.ct.gov/deep/lib/deep/climatechange/2012_ghg_inventory_2015/ct_2013_ghg_inventory.pdf
[14] *See:* "Proposed State of Connecticut Mitigation Plan under the Volkswagen 2.0L Partial Consent Decree, Appendix D" Connecticut Department of Energy and Environmental Protection, page 17-18.
[15] *See e.g.* Electric Vehicles as Distributed Energy Resources, Rocky Mountain Institute (June 2016), available at http://www.rmi.org/Content/Files/RMI_Electric_Vehicles_as_DERs_Final_V2.pdf

Ruth Canovi
American Lung Association in Connecticut

Kevin George Miller
ChargePoint*

Anne Hulick
Connecticut Clean Water Action/Clean Water Fund*

Claire Coleman
Connecticut Fund for the Environment*

Kate Cohen
ConnPIRG*

Megan Herzog
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Jeff Gross
Sierra Club*

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* Member Connecticut Electric Vehicle Coalition

Diesel Emissions Reduction Act (DERA)

Bob Hamilton <bhamilton@bozzutos.com>

Mon 3/6/2017 4:14 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

To: deep.mobilesources@ct.gov

VW Settlement Comments
Name: Bob Hamilton
Job Title: Director of Fleet Maintenance
Company: Bozzuto's Inc.
Comments:
For the "Proposed State of Connecticut Mitigation Plan under Volkswagen 2.0L Vehicle Partial Consent Decree, Appendix D" we urge the state to put maximum funding towards the Diesel Emission Reduction Act (DERA) Option to support a wider range of cost-effective projects. This allows greater flexibility for Connecticut businesses to access VW Mitigation Funding for eligible technologies like:

- Electrified parking spaces (EPS) and shore power for idle reduction of diesel engines.
- Replacement of transport refrigeration units (TRUs) with hybrid electric TRUs that can be plugged-in to shore power while parked.
- Other eligible equipment replacements as allowed under DERA.

Our business operates transport refrigeration units and we're interested in such technology as it is cleaner, quieter, and less expensive to operate than conventional diesel-only TRUs.

Please maximize the funding to support flexibility of eligible mitigation actions with the DERA Option.

Thank you,

Bob Hamilton
Director of Fleet Maintenance
224 Sandbank Road Cheshire, CT 06410
Office 203-250-5511

Bozzuto's Inc.
Others Promise. We Deliver.

DREAM RIDE
DREAMRIDE.ORG

Good Stuff! Trucks Bring It!

VW Settlement Comments

Devin Sardilli <DevinS@sardilliproduce.com>

Mon 3/6/2017 4:23 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

We are interested in learning about the VW Settlement

Devin Sardilli
Vice President
Sardilli Produce & Dairy

Our business operates transport refrigeration units and we're interested in this technology as its cleaner, quieter, and less expensive to operation than conventional diesel-only TRUs.

Please maximize the funding to support flexibility of eligible mitigation actions with the DERA Option.

Devin Sardilli
Sardilli Produce & Dairy Co., Inc.
212 Locust St
Hartford, CT 06114
860-525-3237

Visit our web site
www.sardilliproduce.com

VW Settlement Comments

Wettemann, Joe

Mon 3/6/2017 5:48 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Importance: Low

Name: Joe Wettemann
Job Title: Sanitary Engineer III
Company: DEEP

Comments: Provide grants for anaerobic digester projects on farms in Ct.

Benefits:

- Reduce greenhouse gas emissions
- Produce renewable energy
- Production of value-added- products to redistribute nutrients
- Support working landscapes
- Improve sustainability of farms in the state supporting open space
- Remove source separated organics from the waste stream

Comments on CT's Proposed VW State Mitigation Plan

Matt Macunas <Matt.Macunas@ctgreenbank.com>

Mon 3/6/2017 4:25 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

Green Bank VW comments.pdf;

To the Bureau,

Please see the attached written input on behalf of the Connecticut Green Bank into DEEP's public comment period on the State's Proposed VW Mitigation Plan.

Please let us know if you should have any questions.

Thanks so much,

Matt Macunas
Legislative Liaison & Marketing Manager
Connecticut Green Bank

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Statement of the Connecticut Green Bank on DEEP Proceedings
on the Proposed State of Connecticut Mitigation Plan
Under Volkswagen 2.0L Vehicle Partial Consent Decree, Appendix D
March 6, 2017

As the nation's first green bank, the Connecticut Green Bank ("Green Bank") leverages the limited public resources it receives to attract multiples of private investment to scale up clean energy deployment. Recently the Green Bank celebrated its 5-year anniversary, to which it has mobilized over $1 billion of investment into Connecticut's clean energy economy, supported the creation of nearly 13,000 direct, indirect and induced jobs, reduced the energy burden on over 20,000 households and businesses, deployed over 215 MW of clean energy, and helped reduce over 2.6 million metric tons of CO2 emissions over the life of the projects. The Green Bank supports the policy vision of cleaner, cheaper and more reliable energy sources for Connecticut – while creating jobs and supporting local economic development.

The Green Bank appreciates the opportunity to provide input into Connecticut's proposed State of Connecticut Mitigation Plan, developed under the Volkswagen 2.0L Vehicle Partial Consent Decree, Appendix D. With the Green Bank's ability to use limited public funds to attract multiples of private investment, we have the demonstrated ability to channel five-to-ten times the amount of investment for each dollar of public funds. We are pleased to support DEEP in its efforts to devise strategies that put VW settlement funds into productive use. In order to maximize the impact of these funds, the Green Bank suggests the addition of language in the Proposed Mitigation Plan stating that VW settlement funds could be offered in the form of financing to eligible projects.

We also want to use this commenting opportunity to describe a current state of play with the Green Bank's activities in the field of transit electrification.

The Board of Directors for the Green Bank met in January to review and develop strategic directions for the Green Bank. As part of this strategic retreat, Commissioner Klee presented the initial findings of the Governor's Council on Climate Change – that to achieve the long-term target significant efforts will need to be made to decarbonize the electric grid while increasing the usage of electric vehicles and deployment of renewable heating and cooling. Of the concepts discussed among the members of the Board, one of the foremost to achieve consensus was the concept that the Green Bank should involve itself in the strategic electrification of mobility systems, starting with light duty passenger vehicles and

the charging infrastructure needed to support electric vehicles (EVs). This vision is consistent with the Green Bank's definition of clean energy[1] and with existing state statute.[2]

This determination of our Board of Directors was informed by our efforts to scope the market potential for alternative fuel vehicles in our September 2016 report "Moving Forward With Green Energy: Market Potential Assessment for Alternative Fuel Vehicles in Connecticut."[3] The report concluded that the increased deployment of plug-in electric vehicles is the most promising approach to reduce emissions from Connecticut's transportation sector and to meet the state's energy and climate goals. This conclusion was based on the criteria of 1) near-term market feasibility; 2) environmental performance; 3) cost-effectiveness when considering current federal and state incentives; and 4) local economic benefit.

Examples of Green Bank Activity with Electric Vehicles and Associated Infrastructure

Electric Vehicle Charging Infrastructure Carbon Credit Offset Methodology

The Green Bank is part of an initiative to develop a voluntary carbon offset methodology which will allow for carbon offset credits from EV charging infrastructure. This initiative is being guided and financed in partnership with the Climate Neutral Business Network, the Climate Neutral Cities Alliance, Audi, EVGo, Exelon, Siemens, GM, and the Connecticut Green Bank.

The offset methodology will allow owners of EV charging infrastructure to monetize offset credits in the voluntary carbon markets based on the annual usage of the charging infrastructure, providing an additional revenue stream to owners of EV chargers. Preliminary modeling has shown that, despite relatively low voluntary carbon credit prices the additional revenue provided will be of benefit to EV infrastructure owners.

In terms of status, a white paper outlining the structure and requirements for the methodology has been completed and a draft methodology, based on input into and feedback on the white paper, is well underway. A handful of pilot projects are currently being scoped by the seven program members to guide the development and approvals process associated with the new methodology. As part of these pilot projects, the Green Bank is exploring the feasibility of becoming an aggregator to facilitate the issuance of offset credits from eligible EV chargers within the state of CT.

[1] The Green Bank's Comprehensive Plan includes in its definition of clean energy "projects that seek to deploy electric, electric hybrid, natural gas or alternative fuel vehicles and associated infrastructure." Our Comprehensive Plan for Fiscal Years 2017 and 2018 is available here: http://www.ctgreenbank.com/wp-content/uploads/2016/11/CTGreenBank-Comprehensive-Plan-Fiscal-Years-2017-2018-11232016.pdf

[2] The Green Bank observes Connecticut General Statute § 4a-59(c)(C) in defining "clean alternative fuel" when used for motor vehicles as natural gas, electricity, hydrogen or propane, and C.G.S. § 14-212 in defining motor vehicle as including all vehicles used on public highways.

[3] The report is available here: http://www.ctgreenbank.com/wp-content/uploads/2016/09/CTGreenBank-Market-Potential-Assessment-Alternative-Fuel-Vehicles-090816-FF.pdf

"Solarize EV"

The Green Bank carries substantial expertise in running group purchase campaigns for residential rooftop solar PV, setting strategy and directing marketing campaigns. These Solarize campaigns[4] lower the customer acquisition costs for solar installers – and thus allow for solar PV installed cost reductions – by creating grassroots campaigns to publicize time-limited offers for discounted solar PV installations. The whole group of customers – typically clustered by municipality - receives pricing advantages that scale up as the volume of customers signing up for installations increases.

The Green Bank is currently exploring a partnership to apply this same framework on a limited basis to the sale of electric vehicles. Our observations suggest that this group purchase model may be conducive to a Solarize-styled campaign that makes deeply discounted vehicles available to targeted customer groups. The Green Bank is exploring methods of sponsoring such a campaign to leverage our public dollars to attract multiples of private investment. This may take the form of 1) promoting goods that are complementary to end use EV customers such as solar PV, backup battery storage, or high efficiency water heaters; 2) demonstration projects for public charging that combine DC fast charging with solar PV and battery storage, preferably proximate to federally-designated "charging corridors," and/or 3) marketing support.

In addition to these efforts, the Green Bank is monitoring market developments in California, where utilities are deploying networks of EV charging station infrastructure. Many EV infrastructure projects currently struggle to pay for themselves. This is especially acute with DC fast charging, which most closely resembles the consumer experience of conventional refueling. Therefore we believe that deploying charging station infrastructure through a centralized, competitive planning and bid process could be a way to help ensure optimal charging station deployment while minimizing costs. The Green Bank is interested in exploring partnerships with other participants in this input process to learn more about how such a model could function in Connecticut.

In conclusion, thank you for the opportunity to submit comments into this process. The Green Bank can and should be considered a useful tool for State of Connecticut transit electrification – one that can innovate and act as a force multiplier on proposed projects intended for funding under the Volkswagen 2.0L Vehicle Partial Consent Decree.

[4] A summary of our SolarizeCT activities can be found here: http://trendct.org/2015/10/20/commentary-can-a-groupon-like-model-lower-the-cost-of-solar-power/

VW Settlement Comments

John Thornton <John@CleanFuture.us>

Mon 3/6/2017 4:46 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

CleanFuture comments re Connecticut VW "Clean Diesel" Mitigation Trust.pdf;

Name: John Thornton
Job Title: Principal
Company: CleanFuture, Inc.

Comments:

Please find attached comments to the "Proposed State of Connecticut Mitigation Plan under Volkswagen 2.0L Vehicle Partial Consent Decree, Appendix D" urging Connecticut to put maximum funding towards the Diesel Emission Reduction Act (DERA) Option to support a wider range of cost-effective mitigation projects.

This allows greater flexibility for Connecticut businesses to access VW Mitigation Funding for eligible technologies like:

- Electrified parking spaces (EPS) and shore power for idle reduction of diesel engines.
- Replacement of transport refrigeration units (TRUs) with hybrid electric TRUs that can be plugged-in to shore power while parked.
- Other eligible equipment replacements as allowed under DERA.

Please maximize funding to support flexibility of eligible mitigation actions with the DERA Option as outlined in the attached letter.

Thanks,

John

John A. Thornton
President / Principal Consultant

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March 6, 2017

Bureau of Air Management
Mobile Sources Division
Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106
Email: deep.mobilesources@ct.gov

Subject: Comments on Proposed State of Connecticut Mitigation Plan under Volkswagen 2.0L Vehicle Partial Consent Decree, Appendix D

CleanFuture, Inc. (CleanFuture) appreciates an opportunity to submit comment on Connecticut's Proposed Mitigation Plan under Volkswagen 2.0L Vehicle Partial Consent Decree, Appendix D. CleanFuture encourages Connecticut to maximize funding to the Diesel Emission Reduction Act (DERA) Option for cost-effective emission reduction actions not recognized in Appendix D-2.

CleanFuture recommends Connecticut's Mitigation Plan allow **idle reduction,** the cleanest, most cost-effective clean diesel mitigation action. Idle reduction can save between 900 to 1,400 gallons of fuel each year per truck. [1] Idling diesel engines are epidemic, particularly affecting environmental justice communities that can be near freight, goods movement, and port facilities with excessive diesel idling of heavy duty trucks and other equipment.

The cleanest diesel engine is one that does not run. Idle Reduction Technology (IRT) reduces long-duration idling of the diesel engine by using an alternative technology. [2] According to U.S. EPA each year, long-duration truck idling results in an estimated or approximated 1 billion gallons of fuel consumption producing 180,000 tons of nitrogen oxides (NOx), 11 million tons of carbon dioxide (CO2) and 5,000 tons of particulate matter (PM). [2]

The omission of a verified idle reduction technology known as **Electrified Parking Spaces (EPS) / Truck Stop Electrification (TSE)** [2] contradicts other eligible mitigation actions allowed in

Appendix D-2 of the partial consent decree. EPS / TSE is cost-effective mesure to reduce emissions and also could be used as heavy duty zero emission supply equipment as more heavy duty vehicles come to market. Therefore, Connecticut is urged to maximize funding of DERA Option so that electrified parking spaces (EPS), transport refrigeration units (TRUs) and other eligible equipment be eligible for funding along with other cost-effective diesel mitigation actions.

The EPA definition of Electrified Parking Spaces (EPS) / Truck Stop Electrification (TSE) is [2]:

> Electrification refers to a technology that uses electricity-powered components to provide the operator with climate control and auxiliary power without having to idle the main engine. This can be on-board equipment (e.g., power inverters, plugs), off-board equipment (e.g., electrified parking spaces or systems that directly provide heating, cooling or other needs), or a combination of the two.
> An EPS system (also known as Truck Stop Electrification) operates independently of the truck's engine and allows the truck engine to be turned off as the EPS system supplies heating, cooling, and electrical power.
> The EPS system provides off-board electrical power to operate the following:
>
> - Independent heating, cooling, and electrical power system;
> - Truck-integrated heating and cooling system; and/or
> - Plug-in refrigeration system that would otherwise be powered by an engine.

Mobile transport refrigeration systems powered by diesel engines are subject to long-duration diesel engine idling at distribution centers and other goods movement facilities. [3] Transport refrigeration units (TRUs) powered by diesel engines are used to refrigerate temperature-sensitive products transported in insulated semi-trailer vans, truck vans, shipping containers, and rail cars. Transport refrigeration units use small diesel engines that emit more diesel particulate matter (PM) and nitrogen oxides (NOx) on a grams per horsepower basis than larger engine categories used in motor vehicles.

Substantial diesel fuel is burned by these idling diesel engines in TRUs to keep temperature-controlled cargo at proper temperature. Electrification of these refrigeration units when parked offers the promise of substantially lower operating costs, engine wear, and reduced toxic air pollution, and lower greenhouse gas emissions. Hybrid electric TRUs and all-electric TRUs can be plugged-in while parked to grid-supplied electricity provided by electrified parking spaces. [4]

Moving perishable products requires TRUs to provide necessary cooling. In the normal course of goods movement, transport refrigeration units accumulate significant stationary engine run hours (engine idling hours) to pre-cool trucks and trailers, for controlling cargo temperatures during loading and unloading, and for temperature control while staging loaded trucks and trailers for dispatch.

Freight and goods movement facilities are commonly in urban areas for local food distribution. Environmental Justice communities are often located nearby heavily traveled freeways, food distribution centers and warehouses, freight terminals, railyards, and ports; it is common for such goods movement facilities to be in disadvantaged communities. California Air Resources

Board recognizes the higher exposure of disadvantaged communities to TRU idling in the "Initial Statement of Reasons for the Proposed Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, and Facilities where TRUs Operate" staff report:

> The proposed Airborne Toxic Control Measure (ATCM) is consistent with the ARB's Environmental Justice (EJ) Policy to reduce health risks from toxic air contaminants in all communities, including low-income and minority communities. Many communities are located near where TRUs operate, such as heavily traveled freeways, storage and distribution facilities, railyards, and ports. By reducing emissions of diesel PM, other known toxic air contaminants, and other air pollutants from TRUs and TRU gen sets, the proposed ATCM will provide air quality benefits by reducing exposure to and associated health risk from these pollutants near facilities where TRUs and TRU generator sets operate. **These neighborhoods are frequently co-located with low-income and minority communities.** [5]

Diesel idling in TRUs at freight and goods movement facilities is a common occurrence in the normal course of goods movement with TRUs commonly accumulating half of the TRU diesel engine's run hours at distribution centers in local distribution fleets. [6] Furthermore TRUs produce more NOx and other pollutants than many other diesel engines. The auxiliary engines generally installed on TRUs can emit over twice as much the NOx and particulate matter of a truck's main propulsion engine.[1] These TRU engines can run while parked (idling) at distribution centers for 700 to 1,200 hours per year.

Idle reduction is the most cost-effective emission reduction yet the allowed mitigation measures in the partial consent decree per D-2 favors technologies substantially less impactful per dollar. According to a US DOT report, truck stop electrification is the lowest cost mitigation strategy in cost/ton of NOx/HC reduced. [7] Another report affirms idle reduction strategies such as Electrified Parking Spaces to be the most cost effective in NOx reduction with cost-effectiveness greater than diesel retrofits or heavy vehicle diesel engine replacements. [8]

Truck stop electrification can include high voltage electrified parking spaces to plug-in TRUs, however there are distinctions between TSE and EPS for TRUs. TSE is mainly used for mandatory rest periods for long haul carriers and owner-operators to avoid idling the truck diesel engine during rest periods. Selected TSE sites include high voltage power for electrified parking spaces for TRUs. Electrified parking spaces for TRUs serve local distribution at food distribution centers, food manufacturers, cold storage warehouses and terminals where refrigerated goods are loaded, unloaded and staged for local deliveries. Stationary operation of TRUs to keep goods at proper temperature is necessary for food quality, integrity and food safety, yet idle reduction with electrified parking spaces is a cleaner, cheaper and quieter alternative. [9]

[1] For heavy duty truck engines the current standard level for PM and NOx+NMHC is .01 PM / 2.4 NMHC+NOx g/bhp-hr standards, while most trailer TRU engine are either in the <25 hp category (0.22 PM / 5.6 NMHC+NOx per g/hp-hr) or the 25-50- hp category (0.22 PM / 3.5 NMHC+NOx per g/hp-hr) so the <25 hp trailer TRU engines produce 2.33 times the NOx.

Recommendation:

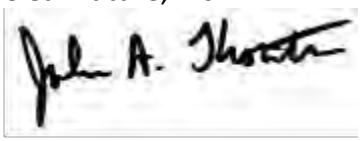
1. Eligibility of Electrified Parking Spaces (EPS) / Truck Stop Electrification (TSE) with the use of DERA Option (which allows greater flexibility for other cost-effective mitigation actions allowed under DERA not otherwise allowed in Appendix D-2 under the partial consent decree).

2. Eligibility of equipment replacement using hybrid electric or all-electric TRUs to replace diesel TRUs when combined with electrified parking spaces (EPS) with the use of DERA Option.

In conclusion, CleanFuture appreciates the opportunity to comment on Connecticut's Proposed Mitigation Plan. We share your desire to maximize the air quality mitigation and urge the most cost-effective use of Mitigation Funding to do the greatest good. Thank you for considering our perspective, we urge Connecticut to maximize funding for DERA Option for flexibility and cost-effectiveness.

We invite an opportunity for follow-up discussion. If you have questions, please contact me at john@CleanFuture.us, or 503-427-1968.

Sincerely,
CleanFuture, Inc.



John A. Thornton

References

[1] EPA SmartWay, "Idle Reduction: A Glance at Clean Freight Strategies," June 2016. [Online]. Available: https://www.epa.gov/sites/production/files/2016-06/documents/420f16025.pdf. [Accessed 13 July 2016].

[2] EPA SmartWay, "Learn About Idling Reduction Technologies (IRTs) for Trucks," [Online]. Available: https://www.epa.gov/verified-diesel-tech/learn-about-idling-reduction-technologies-irts-trucks. [Accessed 10 July 2016].

[3] Pollution Prevention Technical Assistance for Idle Reduction and Electrification of Transport Refrigeration Units, "U.S. EPA, Fiscal Year 2015 Pollution Prevention Grant Summaries," [Online]. Available: at https://www.epa.gov/p2/fiscal-year-2015-pollution-prevention-grant-summaries#region10. [Accessed 1 March 2017].

[4] Electric Power Research Institute (EPRI), "Market and Technology Assessment of Electric Transport Refrigeration Units," EPRI, Palo Alto, 2015. 3002006036.

[5] California Air Resoures Board (CARB), "AIRBORNE TOXIC CONTROL MEASURE FOR IN-USE DIESEL-FUELED TRANSPORT REFRIGERATION UNITS (TRU) AND TRU GENERATOR SETS, AND FACILITIES WHERE TRUS OPERATE. STAFF REPORT: INITIAL STATEMENT OF REASONS," October 2003. [Online]. Available: http://www.arb.ca.gov/regact/trude03/isor.pdf. [Accessed 14 July 2016].

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[8] U.S. Department of Transportation (US DOT), "Congestion Mitigation and Air Quality (CMAQ) Improvement Program - Cost Effectiveness Tables Development and Methodology," 3 December 2016. [Online]. Available: http://www.fhwa.dot.gov/environment/air_quality/cmaq/reference/cost_effectiveness_tables/report/costeffreport.pdf. [Accessed 13 July 2016].

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Generation and Transmission Association, Inc. Case Study Report, Palo Alto, EPRI, 2016. 3002003528.

[10] EPA, "SmartWay – Learn About Idle Reduction Technologies (IRT) for Trucks," [Online]. Available: https://www.epa.gov/verified-diesel-tech/learn-about-idling-reduction-technologies-irts-trucks. [Accessed 5 July 2016].

VW Settlement Comments

Leo, Tony <tleo@fce.com>

Mon 3/6/2017 4:56 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: Wolak, Frank <fwolak@fce.com>;

1 attachment

CT VW Mitigation Plan Comments FuelCell Energy.pdf;

FuelCell Energy is pleased to submit the attached comments to the proposed mitigation plan.

Tony Leo

Anthony Leo | Vice President - Advanced Applications & Technology Development
Direct: 203.825.6035 | tleo@fce.com

FuelCell Energy | 3 Great Pasture Rd | Danbury, CT 06810
www.fuelcellenergy.com |

March 6, 2017

Connecticut Department of Energy and Environmental Protection
Bureau of Air Management, Mobile Sources Division
79 Elm Street
Hartford, CT 06106

RE: FuelCell Energy comments to the Proposed State of Connecticut Mitigation Plan

FuelCell Energy (FCE) is pleased to submit the following comments to the "Proposed State of Connecticut Mitigation Plan (Plan) under Volkswagen 2.0L Vehicle Partial Consent Decree, Appendix D." The Plan describes a rational approach to utilizing funds received from the Consent Decree to support initiatives that reduce NOX and GHG emissions. As stated in the Plan, zero emission vehicles can avoid tons of NOX and GHG emissions and reduce exposure to harmful particulate matter.

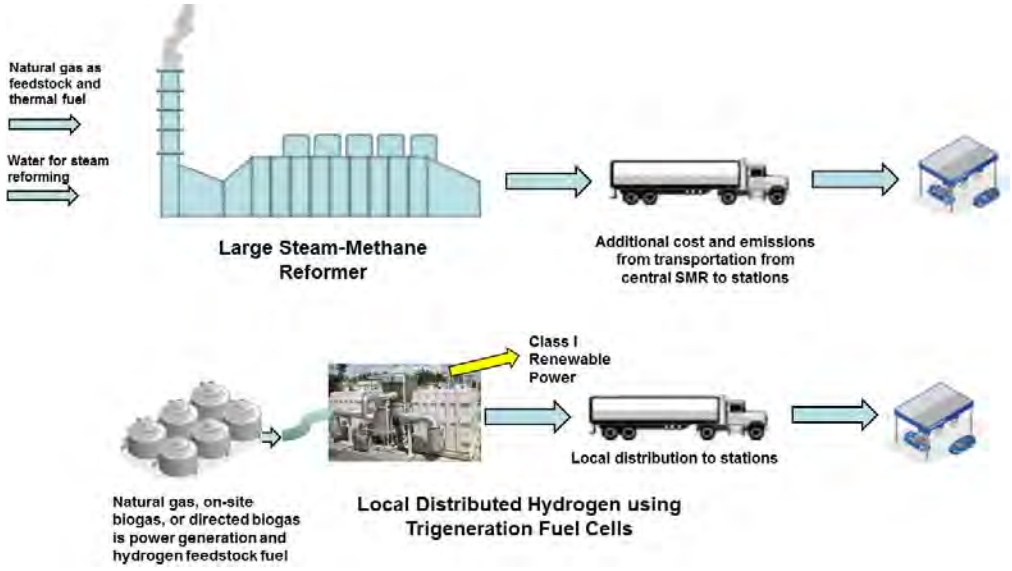
We believe the Plan can be improved by enhancing the support for hydrogen fuel cell vehicle infrastructure. While the Plan does provide some support for hydrogen dispensing stations (25% to 33% of hydrogen dispensing station costs, depending on size), we believe more can be done in the form of production based incentives to accelerate the deployment of these vehicles in the state, and to maximize the environmental benefits by ensuring that the hydrogen is produced as cleanly as possible.

Vehicle manufacturers are prepared to produce new hydrogen vehicles in significant numbers, and there are existing state and federal tax rebates that apply to offset the cost of the vehicles. But even if the effective cost of ownership was zero, there will be no significant adoption unless a fueling infrastructure with reasonably priced hydrogen is put into place.

Hydrogen fuel cell vehicles offer compelling emissions reductions combined with the excellent vehicle range that consumers demand. Hydrogen is typically produced from methane (natural gas) in large plants that produce hydrogen from a reaction of steam and methane called reforming. These plants, called Steam-Methane Reformers (SMR), burn additional fuel to produce heat for the reforming reaction and steam production. Hydrogen produced in these large plants is distributed to users in trucks as liquid or pressurized gas. Even with the fuel burned at the plant and the transportation emissions, hydrogen vehicles using this fuel emit less than 1% of the NOX of a conventional vehicle and half the GHG per mile. Additional emissions reductions are possible using locally produced hydrogen in Trigeneration fuel cell systems, where hydrogen is produced from natural gas or renewable biogas as a co-product of electricity and heat.

Trigeneration systems also produce hydrogen through a reforming reaction, but the heat and steam needed for the reforming process come from the fuel cell power generation reaction, so no additional fuel is burned and no water is consumed. NOX emissions are negligible, and GHG

emissions per kg of hydrogen produced are about 30% less than conventional SMR production when using natural gas fuel. When using biogas fuel the hydrogen is carbon-free. The price of the hydrogen is reduced and the benefits to the state are increased by the co-production of power from these fuel cell systems. While producing clean hydrogen, Trigeneration systems provide Class I renewable power in projects that can provide local tax revenue, improve grid reliability, and support microgrid systems.



Comparison of Central and Distributed Hydrogen Production

Understanding that hydrogen offers significant opportunities for avoided emissions, and that some forms of hydrogen production avoid more emissions than others, FCE recommends that the State consider a production based hydrogen incentive that takes into account the avoided emissions. One model for such an incentive is California's Low Carbon Fuel Standard (LCFS), in which production life cycle emissions are evaluated by the California Air Resources Board and a carbon intensity value is assigned, comparing GHG emissions for that fuel vs conventional hydrocarbon fuel. The LCFS incentive is a function of this carbon intensity, with lower intensities deriving higher LCFS payments. Trigeneration has a negative carbon intensity rating in the program, meaning that vehicles operating on trigeneration derived fuels avoid the emissions of conventional vehicles entirely, plus they avoid additional emissions because of other offsets from power generation.

The State could also tailor a hydrogen production incentive program to include a focus on NOX, by including a NOX intensity factor in the incentive calculation.

The capital cost of hydrogen dispensing stations combined with low station utilization and high hydrogen transportation costs results in hydrogen cost to the consumer of many times the equivalent $/gallon gasoline price. To be competitive with $2.40/gallon gasoline, hydrogen needs to be priced at $6/kg. Hydrogen prices at filling stations in California range from $14 to $17/kg, and prices in Connecticut will be even higher as new infrastructure is rolled out for an emerging

fleet. A production based incentive directly reduces hydrogen price to the consumer to help close the gap between high initial hydrogen costs and gasoline parity. The Northeast Electrochemical Energy Storage Cluster (NEESC) has recommended a goal for initial deployment of FCEVs in the State of 477 fuel cell vehicles (445 light duty and 32 buses). A production based incentive of $5/kg applied to this fleet would cost about $2.5 Million per year, and it would significantly enhance deployment by bringing hydrogen price at the dispensing station closer to gasoline equivalence.

This type of incentive program would directly address the State's goals as listed in the Plan:

- *Improve air quality by achieving significant and sustained cost effective reductions in NOx emissions.* Deployment of hydrogen fuel cell vehicles will provide significant NOX emissions reductions, and a production incentive with a NOX intensity factor would help maximize those reductions

- *Expedite deployment and widespread adoption of zero emission and near-zero emission vehicles and engines.* Hydrogen fuel cell vehicles are beginning to be produced in significant numbers, but as these products are introduced low fleet numbers and high station costs result in hydrogen prices several times the equivalent gasoline cost. Incentive programs that reduce hydrogen price to the consumer will enhance adoption, and widespread adoption will alleviate the need for these incentives in the future

- *Support statewide energy, environmental and economic development goals while also taking into account environmental justice considerations associated with each proposed eligible mitigation project.* Distributed Trigeneration systems would be in-state resources, producing very clean hydrogen in addition to clean Class-I renewable power. FCE is a Connecticut-based manufacturer so manufacturing, construction, and service jobs contribute to the State economic development goals in these projects

Thank you for your consideration of these comments.

Respectfully Submitted,

Anthony Leo
Vice President - Advanced Applications & Technology Development
FuelCell Energy, Inc.
3 Great Pasture Road
Danbury, CT 06810
Phone: (203) 825-6035 Email: tleo@fce.com

VW Settlement Comments

Bill MacLeod <emeraldadvisoryllc@gmail.com>

Mon 3/6/2017 4:36 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

170305 CT DEEP Testimony Final.pdf;

Name: Morry Markowitz
Job Title: President
Company: Fuel Cell and Hydrogen Energy Association

Comments: See attached comments

Regards,

Bill MacLeod
Project Director, FCHEA Volkswagen Settlement Working Group
Principal, Emerald Advisory, LLC
703-489-4438 (M)

March 6, 2017

Commissioner Robert Klee
Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

RE: Comments Regarding Proposed Beneficiary Mitigation Plan

Dear Commissioner Klee:

The Fuel Cell and Hydrogen Energy Association (FCHEA) appreciates the opportunity to comment the Connecticut Department of Energy and Environmental Protection's (DEEP) proposed Beneficiary Mitigation Plan ("Plan"). The plan is provided by Appendix D of the Partial Consent Decree stemming from Volkswagen "Clean Diesel" Marketing, Sales Practices and Products Liability litigation (United States of America v. Volkswagen AG et al., Case No. 16-cv-295 (N.D. Cal.).

The Fuel Cell and Hydrogen Energy Association is the trade association dedicated to the commercialization of fuel cells and hydrogen energy technologies. FCHEA member organizations[1] represent the full global supply chain for hydrogen and fuel cells, including automakers; material, component, stack and system manufacturers; hydrogen producers and energy companies; government laboratories and agencies; trade associations; utilities; and end users. Members have the capability and capacity to successfully deliver the kind of projects DEEP envisions funding under the Plan.

[1] Members include Air Liquide, Air Products, Altergy Systems, American Honda Motor Company, Anglo American Marketing Limited, Applied Research Center, AREVA, Black & Veatch, Bloom Energy, BMW of North America, California Air Resources Board, California Fuel Cell Partnership, CERES Power, CHANGE, Connecticut Hydrogen-Fuel Cell Coalition, CSA Group, Daimler, Doosan Fuel Cell America, Edgewise Energy, Fuel Cell Energy, Fuel Cell Seminar & Energy Exposition, Fuji Electric, GE-Fuel Cells, General Motors, Gore Fuel Cell Technologies, Hydrogenics, Hyundai, Idaho National Laboratory, Intelligent Energy, ITM Power, Johnson Matthey Fuel Cells, LG Fuel Cell Systems, McPhy Energy, Methanol Institute, myFC, National Renewable Energy Laboratory, Nebraska Public Power District, Nel Hydrogen, Nissan North America, Nuvera Fuel Cells, Ohio Fuel Cell Coalition, Pajarito Powder, PDC Machines, Plug Power, Sandia National Laboratories, Savannah River National Laboratory, Shell Oil, South Coast Air Quality Management District, 3M, The Linde Group, Toyota Motor North America, TreadStone Technologies, and United Hydrogen

FCHEA endorses the Plan's goal of improving ambient air quality by seeking significant and sustained cost effective reductions in nitrogen oxide (NOx) emissions; expediting deployment and adoption of zero emission and near-zero emission vehicles and engines; and supporting statewide energy, environmental and economic development goals.

To enhance fulfillment of the Plan's economic development goal, FCHEA recommends an economic impact factor be added to the Plan's anticipated project selection criteria. Doing so will help promote further growth in Connecticut's fuel cell industry. The State's $600 million fuel cell industry includes an estimated 600 companies that produce, store and supply hydrogen fuel; manufacture fuel cell stacks, peripherals and controls; and provide related integration, service and support to state, national and international customers.[2]

FCHEA supports zero emission vehicles (ZEV) as a key pathway to advancing energy independence and to reducing the carbon intensity of transportation fuels. Because fuel cell vehicles (FCV) combine the emissions-free driving of battery electric vehicles (BEV) with the range and convenience of gasoline-powered vehicles, FCHEA supports building refueling infrastructure ("networks") that support bringing these cars to market.

To expedite the deployment and adoption of ZEV as called for by the Plan, FCHEA recommends available ZEV supply equipment-related funds[3] be allocated in coordination with the private sector-funded hydrogen refueling network now being established by Air Liquide and its partners.[4] Those partners include Toyota Motor Company and Wallingford-based Proton Onsite.

Also, FCHEA recommends a "zero emissions miles dispensed" factor be added to the Plan's anticipated project selection criteria. By giving added preference to those projects capable of dispensing greater zero emissions driving miles, NOx reduction benefits can be maximized.

Thank you for your consideration of these comments. If you have any questions, please contact me at mmarkowitz@fchea.org.

Sincerely,

Morry Markowitz
President

[2] See http://chfcc.org/wp-content/uploads/2014/10/StatusandDirection_Brochure_4-8-15.pdf
[3] See Consent Degree, Appendix D-2, Eligible Mitigation Actions, Page 8
[4] See https://energy.gov/sites/prod/files/2016/08/f33/fcto_h2usa_2016_sts_breakout_3c_edwards.pdf

The following comments were received after the informal public comment period which ended on March 6, 2017

Propane's Role in Connecticut's Volkswagen Settlement Environmental Mitigation Plan

Jon Raymond <jonraymond@att.net>

Fri 3/17/2017 8:46 AM

To:DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Jon Raymond
5 Cornell Road
New Milford, CT 06776

March 17, 2017

Dear Rob Klee,

As a propane marketer in Connecticut, I am contacting you to discuss how propane vehicles can have a critical role in offsetting the harmful emissions caused by the Volkswagen diesel scandal. Vehicles operating on propane - also known as autogas - are proven to be clean, safe, and affordable for transportation fleets across the country. As you develop Connecticut's Environmental Mitigation Plan, I encourage you to include propane-powered vehicles.

From 2009 to 2015, German automaker Volkswagen programmed certain vehicles to deliberately cheat laboratory emissions testing, resulting in approximately 500,000 vehicles in the United States emitting nitrogen oxide (NOx) up to 40 times greater than the U.S. standards allow. In October 2016, a judge approved a partial settlement between the Justice Department and Volkswagen, resulting in Volkswagen setting up a $2.7 billion environmental mitigation trust fund to offset the excess emissions from the affected vehicles. Connecticut is eligible to receive $51,635,238, some of which can be effectively spent on clean-burning propane vehicles.

One of the best ways our state could use these dollars is to replace older, diesel-powered school buses with new propane-powered versions. School districts across the country have adopted propane school buses to safely transport their children. In these instances, the benefits of propane have been realized almost immediately. From cleaner emissions and quieter rides to lower maintenance costs and fuel savings, propane school buses are a proven winner for school districts.

The main purpose of the Volkswagen Settlement funds is to offset the extra NOx emissions caused by the scandal. Propane vehicles have a long track record as a clean, alternative fuel. I know that there is great interest in how Connecticut will allocate its share of the Volkswagen Settlement funds. As you continue to examine the best ways to reduce emissions and benefit our communities, please include propane-powered vehicles in your Environmental Mitigation Plan.

Sincerely,
Jon Raymond

VW Settlement Comments

Carl Zimmerman <czimmerman@westcog.org>

Thu 3/23/2017 9:51 AM

To:DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: Carl Zimmerman
Job Title: Senior GIS Manager
Company:

WestCOG

Comments:

Hi, just wanted to let you know that we are finishing an analysis of EV ownership and recharging within the state and specifically for the Western CT region. It turns out that Western CT region has by far the highest ownership of EVs in the state.

We would be happy to come down and show you our results.

Carl Zimmerman

CARL ZIMMERMAN
Senior GIS Manager, Western Connecticut Council of Governments
tel 203-965-4976 · *fax* 253-252-8543 · czimmerman@westcog.org

web westcog.org · *post* 1 Riverside Road, Sandy Hook, CT 06482

VW Settlement Comments

Alaina Bisson <alaina.bisson@uconn.edu>

Mon 4/3/2017 4:43 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: Alaina Bisson
Email: alaina.bisson@uconn.edu
Job Title: Undergraduate Student
Company: University of Connecticut, Storrs
Telephone: 860-716-4988

To whom it may concern,

My name is Alaina Bisson and I currently a sophomore at the University of Connecticut. I am an Environmental Science major and I am currently working with a small team environmental science students to improve UConn's green infrastructure. Currently the entire UConn bus fleet runs on diesel fuel, which when burned emits tons of CO2, NOx, and other greenhouse gases annually. In order for UConn to be considered a green campus, the university needs a sustainable transportation initiative. My team and I believe that incorporating fully-electric buses on campus would revolutionize local transportation and reduce UConn's greenhouse gas emissions.

If the mitigation effort from the Volkswagen 2.0 liter settlement covered at least some or all of the costs for purchasing and installing electric buses within the UConn community, UConn would be able to drastically reduce its greenhouse gas emissions. The current UConn bus fleet has several diesel buses built before 2009, which may qualify for replacement with all-electric buses of model years 2016 or 2017. If you seek further information, please feel free to call me or email me at any time. Thank you for any possible help you can provide.

Sincerely,
Alaina Bisson

VW Settlement Comments

Yi Liu <yi.liu@uconn.edu>

Mon 4/3/2017 5:00 PM

To:DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: Yi Liu
Email: yi.liu@uconn.edu
Job: Student
Company: University of Connecticut
Telephone: 860-786-8625

Dear Sir/ Madam,

My name is Yi Liu. I am an international student with the environmental science major in the University of Connecticut. I am working with a group of students to improve the environmental sustainability in Uconn. Currently in Uconn, all the campus buses are running on diesel which produce a large amount of carbon emission and byproduct pollution every year. My team and I are working on if we can get electric buses on campus on the first step. I believe it will be good to see how the buses work on campus if it is possible to take a transform of the transportation in CT.

It will help a lot if the Volkswagen 2.0 liter settlement can help to cover some of the cost of purchasing the buses or the supporting facilities. Uconn has diesel buses in 2009 which are available to be replaced.

Thank you.

Best,
Yi Liu

Proposed State of Connecticut Mitigation Plan under Volkswagen 2.0L Vehicle Partial Consent Decree.

Krysia Solheim <kristina.solheim@aya.yale.edu>

Wed 4/12/2017 12:08 PM

To:DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Hello,

I've looked over the proposed plan and am wondering - would an EV carsharing system for residents qualify given that it enables residents to be car-free car-light and therefore avoids those NOx/GHG emissions?

Best,
Krysia

--
Kristina A. Solheim

Viosimo, LLC
Owner, Sustainability Consultant

CT- VW EMTF

Allison Wurtz <awurtz@kewconsultants.com>

Sun 4/16/2017 7:40 PM

To:DEEP MobileSources <DEEP.MobileSources@ct.gov>;

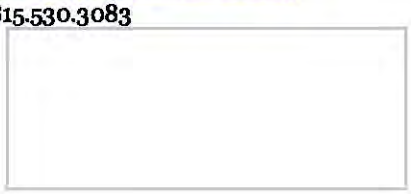
I would highly recommend freight switcher locomotive projects as they are one of the highest polluters as most cost effective when the emissions are reduced because if a freight switcher is operating and it isn't tier 4, it is probably unregulated.

Thanks,

Allison W.

--

Allison Wurtz
Principal Grant Writer | Partner
e: awurtz@kewconsultants.com
c: 815.530.3083



VW Settlement Comments

Sapp, Carlton <Carlton.Sapp@hug-engineering.com>

Wed 4/19/2017 6:56 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

4 attachments

Exhaust Gas Purification Stationary Engines (combikat).pdf; nauticlean_broschure_aug_2012_EN_PDF_US LETTER_15.10.12.pdf; prospekt_mobiclean_EN_high.pdf; School Buses (mobiclean R advanced).pdf;

Name: Carlton Sapp
Job Title: Sales Manager US West
Company: Hug Engineering

Comments: Who can I reach out to at DEEP to discuss NOx reductions and how HUG can Help The State of Connecticut reach its Emission Reduction Goals for NOx and PM utilizing the VW Settlement Money? Ive attached several of the products we offer to reach those goals.

Best Regards,

Carlton Sapp
Sales Manager-US West

hugengineering.
A Company of the ElringKlinger Group

Cell +1 916 203 4937

Phone +1 470 326 2020
Fax +1 470 326 2021

Hug Engineering, Inc. | 4961 Golden Parkway | Buford, GA 30518 | www.hug-engineering.com
A Company of the ElringKlinger-Group | www.elringklinger.com

From: Sapp, Carlton [mailto:Carlton.Sapp@ElringKlinger.com]
Sent: Monday, May 15, 2017 4:32 PM
To: Gobin, Anne <Anne.Gobin@ct.gov>
Subject: VW Settlement Mitigation State Funding Allocations

Dear Anne,

The US court has approved dollar settlements for each state from VW as settlement for VW's installing "defeat devices" on diesel cars to bypass NOx emissions standards. This settlement money will be used by each state on programs to promote or reduce NOx emissions within their state.
Hug Engineering, with US operations based in the Atlanta, GA area, has several verified and proven technologies that are available today to reduce NOx emissions on both mobile and stationary applications. Applications can range from marine including ferries, barges, and other vessels; locomotive engines, and generators and other stationary diesel equipment. These products can be easily retrofitted or added to existing equipment to reduce NOx emissions. By retrofitting equipment verses replacement, your state will obtain greater NOx emissions reductions with dollars spent since retrofit is significantly lower in costs than replacing the equipment.
Attached is information on Hug Engineering's NOx reduction retrofit products. Hug Engineering has supplied emissions control technologies for over 30 years. Thousands of Hug Engineering systems have been installed in the US to reduce diesel emissions. Hug Engineering systems are EPA and CARB verified.
Hug Engineering is available to discuss our programs and provide guidance on getting the most out of your state's VW settlement mitigation dollars. Please contact me to learn more about our products and programs at 916-203-4937 and Carlton.Sapp@hug-engineering.com. Thank you for considering Hug Engineering emission control technologies.

Best regards,

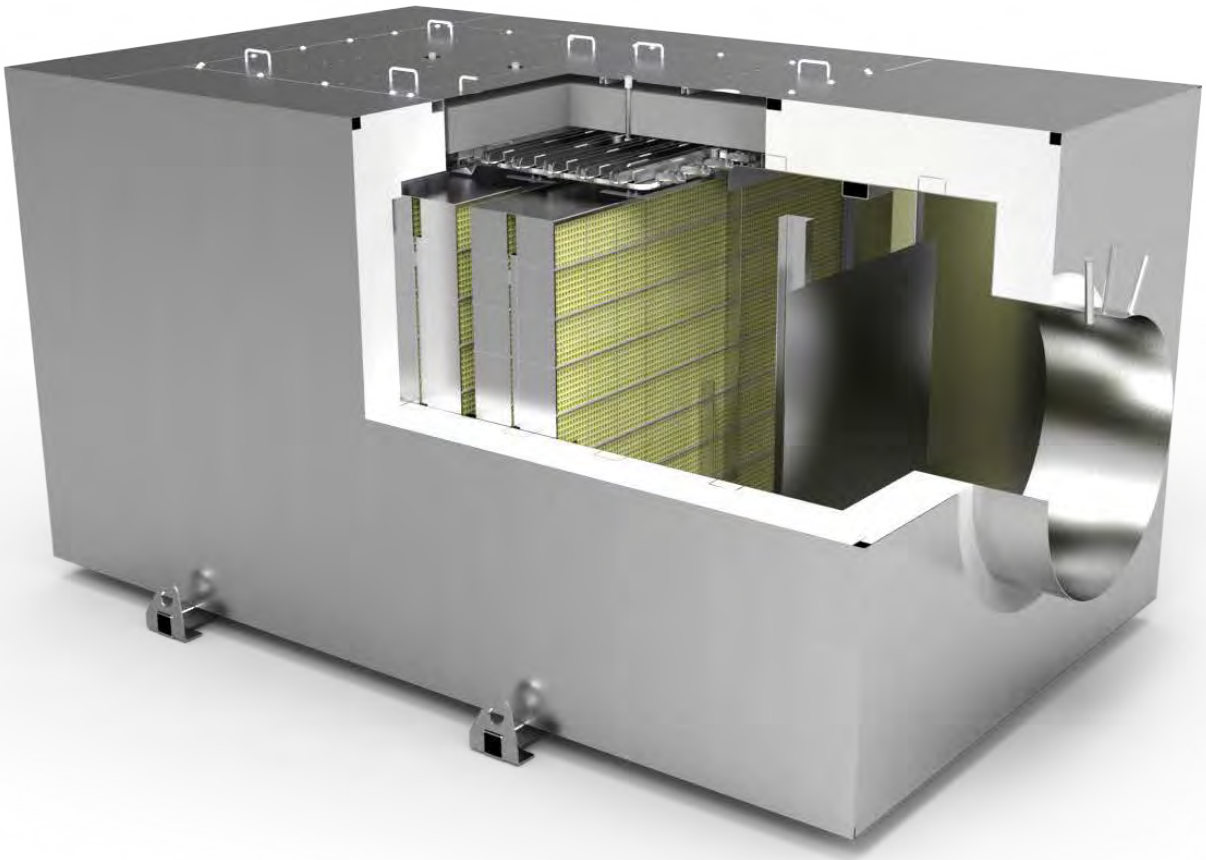
Carlton Sapp
Sales Manager-US West

hugengineering.
A Company of the ElringKlinger Group

Exhaust Gas Purification
Stationary Engines

200 kW - 40 MW





combikat™

hugengineering.
A Company of the ElringKlinger Group

Driving Down Emissions: NO_X, CO, NMHC, PM, NH_3

HUG COMBIKAT™: COMPREHENSIVE AFTER-TREATMENT FROM THE TECHNOLOGY LEADER

In stationary engine installations, Hug Engineering was the pioneer in the introduction of urea as an SCR reducing agent for exhaust gas aftertreatment and is the major global source-of-supply of emissions abatement units for large spark and compression ignition engines. Applications range from standard installations to the ultra-low NOx reduction systems required in carbon dioxide (CO_2) fertilization plants for greenhouses, or to reach high purification of the exhaust gas emitted by engines installed in non-attainment areas in the USA.

Hug systems overall capabilities include the simultaneous elimination of NOx, NH_3, CO, Particulate Matter (PM) and volatile organic compounds (VOC).

Drawing on know-how from more than 30 years in the design, development, manufacture and application of selective catalytic reduction systems, oxidation units and particulate filters for large engines, Hug Engineering has developed combikat™, a flexible, modular after-treatment technology capable of reducing the major types of exhaust pollutants to legislation compliant levels.

POWER PLANTS & COGENERATION FACILITIES

Hug has supplied SCR, oxidation units and particulate filters to a wide spectrum of electrical power generation, co-generation and tri-generation plants in a broad range of energy supply contexts:

- utility, municipal, IPP and industrial process
- base-load, load-following and standby (including black start)
- grid stability and merchant power (peaking and mid-merit)
- vital support for greenhouse
- district heating for communities
- cooling facilities for data centers
- civil applications such as CHP in hospitals and universities

VERSATILE AND INCLUSIVE

combikat™ targets stationary engine power systems such as power and cogeneration plants in a power range from 200 kW to 40 MW. It is designed to minimize emissions from diesel, gas and dual-fuel engines burning a full range of liquid and gaseous fuels:

Fossil fuels
- distillates (e.g. diesel, MGO, MDO)
- heavy residual oils (HFO)
- natural gas including well-head, associated and flare gases
- process streams such as tail gas, coke oven vents and low-BTU fuels.

Renewables
- bio-fuels including biogases, bio-methane, bio-diesel (FAME), vegetable oils (exhaust, refined and crude), animal fats
- syngas from the gasification processes of different biomasses.

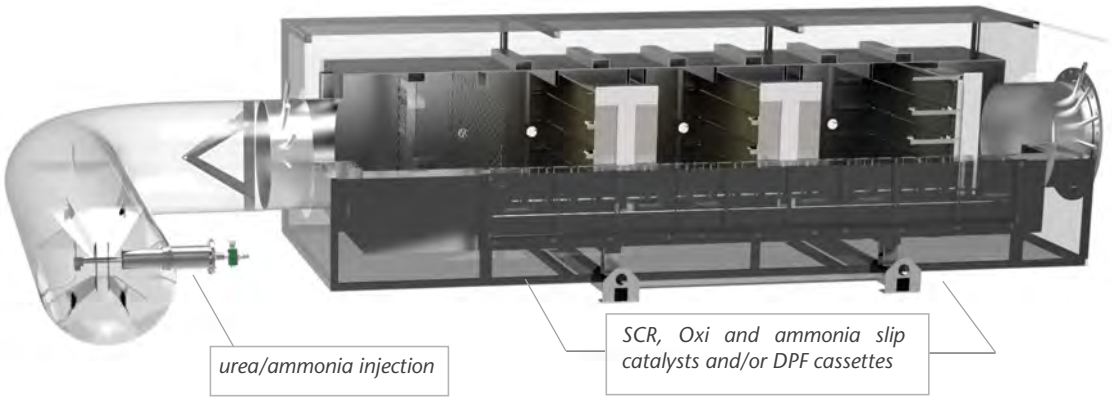
In this way, Hug Engineering's combikat™ emissions reduction system enables operators of large engines to comply with the strictest clean air legislation applicable, while also contributing to international environmental commitments such as greenhouse gas reduction.

MODULAR AND CONFIGURABLE

Following the proven Hug philosophy, combikat™ consists of modular SCR and oxidation catalysts, combined with optional particulate filter cassettes, configured by Hug`s engineers to meet the emissions regulations in force and the customer's own specifications. The total system is packaged in robust, easily transportable, acoustically and thermally insulated casings, ready for quick installation on site.

Customized Turnkey Solutions

COMBIKAT™ CONVERTER



COMPREHENSIVE AND PRE-TESTED

Hug Engineering aims to deliver complete emissions abatement systems for large engines which are immediately ready-to-use, thus minimizing expensive on-site activities and accelerating commissioning and start-up. A vital contribution to this capability is Hug's longstanding specialization in the development and manufacturing of standardized and pre-commissioned control systems for aftertreatment units, including open and closed-loop dosing of urea/ammonia for SCR systems. The closed-loop systems are based on a proprietary, built-in emissions measuring system, also available in versions for high-sulfur fuels such as HFO, syngas and biogas.

Built-in measuring system for NO_x and CO

ADVANCED TECHNOLOGY

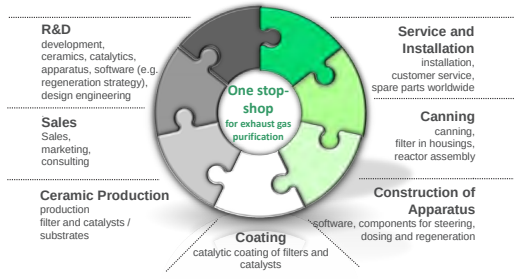
Hug's best-in-class technology is based on significant annual investments in R&D and extensive field experience in the science of ultra-low NOx emissions. As a result, we can guarantee emissions simultaneously lower than 3 ppm* for oxides of nitrogen (NO_x) and 1 ppm* for ammonia (NH_3) from gas engines, and up to 97 % reductions in particulate matter (PM) and NOx from diesel engines. (* at 15% O_2).

QUALITY FOR PERFORMANCE

As a developer, designer, producer, packager and installer of both standard and tailor-made emissions reduction systems for a full spectrum of large engine applications on land and sea, Hug maintains comprehensive in-house R&D, manufacturing, application and plant engineering capabilities. In this way Hug secures the maximum quality control over its entire product supply chain, hence always ensuring optimum performance from the installed systems.

TECHNOLOGY AND PRODUCTION

On the technology side, Hug maintains its technical leadership via multiple applied engineering functions covering chemistry, materials science for catalysts and substrates, automation for advanced controls, bi-phase fluid dynamics and structural mechanics. Likewise, as well as the design, engineering and production of complete emissions reduction systems like combikat™, Hug ensures its manufacturing quality by maintaining in-house capabilities in critical areas.



This policy dictates the manufacture of key components such as unconventional catalytic elements and process controllers at Hug's works in Switzerland, and the capability to execute basic and detailed engineering from the company's own resources. This ranges from the leanest licensor package to complete design and manufacturing of the whole emissions reduction system on a turn-key basis. Complementing this in-house manufacturing philosophy is procurement of basic constituents from qualified sub-contractors under the implementation of the strictest quality assurance procedures.

HUG EMISSIONS REDUCTION:
Competence, Technology and Experience

FROM CONSULTATION TO COMMISSIONING AND SERVICE

Hug Engineering's offering covers everything from simple system supply to full turn-key contracts and full after-sales support.

Hug's customer engagement starts with close consultation to determine the correct solutions in terms of commercial viability and regulatory compliance, including accurate assessments and optimization of the entire life cycle performance of Hug products.

In line with the agreed scope-of-supply, following manufacture of the emissions reduction systems, Hug offers execution of all on-site activities by Hug's own highly qualified and experienced personnel – from pre-erection inspections to site supervision, commissioning and long-term supply of spares and service. Accordingly, aftermarket activities include management of operating and capital spare parts inventories in accordance with the operator's specific needs.

ABOUT HUG

With over 30 years of experience with stationary, mobile and marine applications, Hug Engineering has a unique level of know-how in the reduction of emissions.

This success is based on intensive, targeted R&D and a wide and flexible scope of supply in advanced emissions reduction systems – from standardized modules to customized systems, based on the customers' specifications and applicable legislation, and supplied and installed according to their individual preferences.

According to the application-specific configuration, the Hug combikat™ system is capable of significantly reducing pollutant exhaust gas constituents:

TECHNOLOGY / PRODUCTS

- selective catalytic reduction (SCR)
- particulate filter
- oxidation catalyst

EMISSIONS

- oxides of nitrogen (NO_X)
- particulate matter (PM)
- unburnt hydrocarbons (HC)
- carbon monoxide (CO)
- overall volatile organic compounds (VOC)
- formaldehyde ethylenenon and methane hydrocarbons (NMHC)
- ammonia slip

EMISSIONS RESULTS:

NO_x	**< 3ppm***
PM	**> 97 %**
NMHC	**> 90 %**
CO	**> 99 %**
NH_3	**< 1 ppm***

* at 15% O_2

M.40100 v.01_US

combikat™

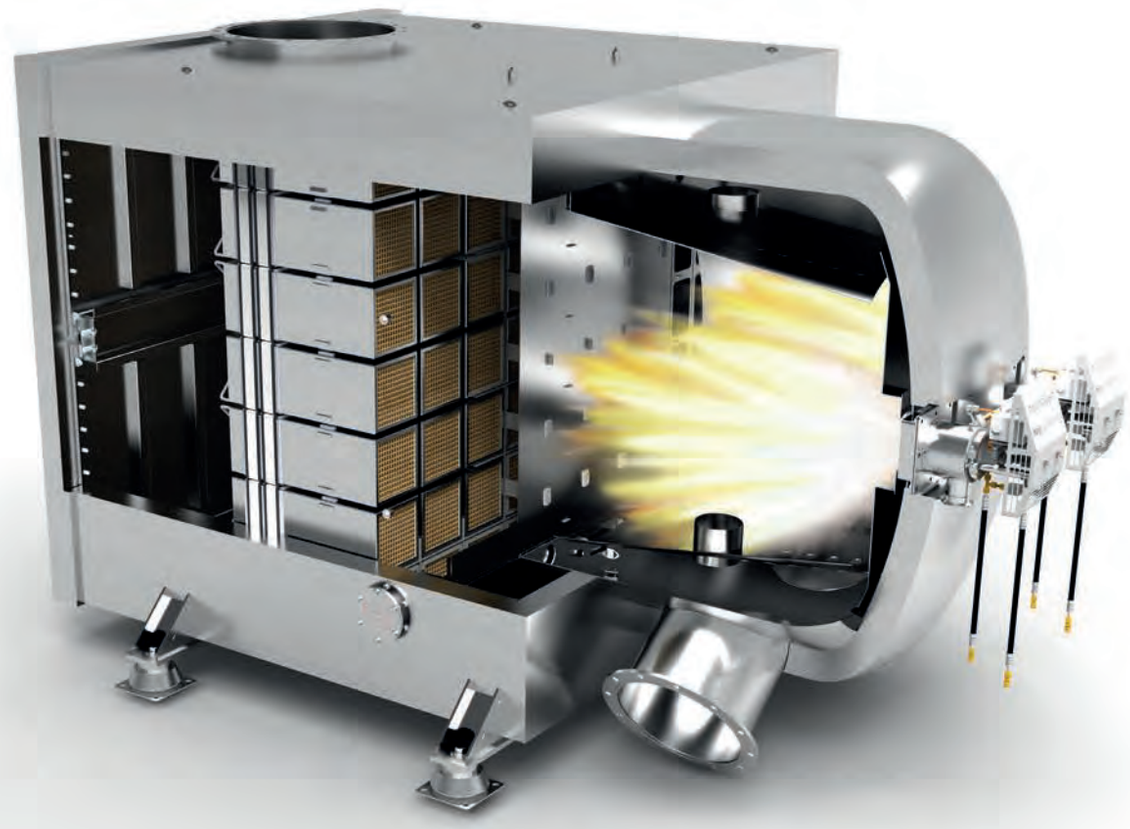
Exhaust Gas Purification Systems for Stationary Engines

Hug Engineering, Inc. | 123 Holmes Road Unit #1-3 | Liberty Hill, TX 78642 | U.S.A.
Phone +1 512 548 6710 | Fax +1 512 548 6709

info.us@hug-engineering.com | www.hug-engineering.com

Exhaust Gas Purification

Ship Diesel Engines

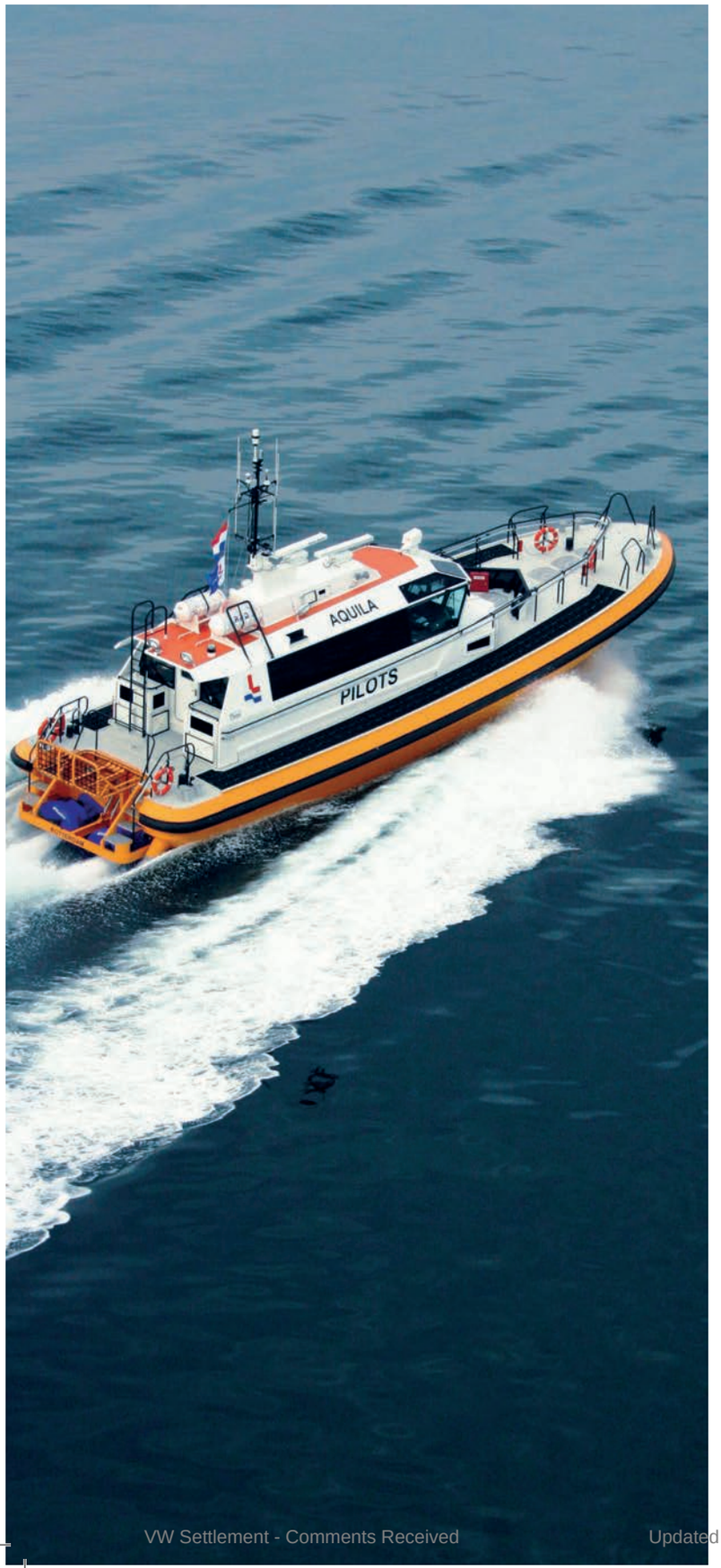


nauticlean™

hugengineering.

A Company of the ElringKlinger Group

Efficient Exhaust Gas Aftertreatment for Diesel Engines on Ships



EXHAUST GAS PURIFICATION FOR ENGINES FROM 150 - 9000 KW

The exhaust gas purification system nauticlean not only removes soot. It also efficiently eliminates dangerous and malicious pollutants, such as nitrogen oxides and hydrocarbons.

The modularly designed nauticlean exhaust gas purification system is made of:

- Particulate filter
- Soot regeneration
- DeNOx- and Oxidation system

SOOT PARTICULATE FILTER

The nauticlean filter system is based on a ceramic honeycomb structure. The exhaust gases flow through the porous honeycomb walls so that more than 99 percent of the particulates with a size of 20-300 nanometre are retained.

SOOT REGENERATION

Due to the sophisticated catalytic coating of the filters, soot will be continously burned off. The coating will not be affected by sulfur. For limiting the maximum ash load, sulfur content of fuel should be less than 5000 ppm (0.5%).

Soot Regeneration with Full-Flow Diesel Burner:
The full-flow diesel burner will guarantee an active regeneration under all operating conditions, without interrupting the operating procedure. Thanks to the fact that our full-flow regeneration system is not electrically powered like some other systems, the generator‘s output is entirely available for the ships requirement.

Depending on the design of the DPF system, long operation intervals are possible; thus, operating costs are low.

DENOX- AND OXIDATION SYSTEM

With the selective catalytic reduction the downstream DeNOx- and Oxidation system reduces other harmful substances in the exhaust gas, such as NOx and HC, compliant to requested regulation levels.

Thanks to the short injection distance of the reactant and the direct installation of the catalytic converter elements directly behind the soot filter elements in the filter housing, the exhaust gas purification system can even be used where space is very limited.

Swiss State of the Art Technologies

Standard urea solutions (e.g. Ad Blue) are used as reactants.

The control unit doses the urea injection by monitoring the exhaust gas emissions. Thus, the system adapts continuously to different fuel qualities. This enables an efficient reduction of noxious emissions without additional interventions.

SERVICE & QUALITY

Nauticlean products are designed to ensure low maintenance cost and durability. Its mechanical parts are robust, vibration- and shock-resistant. Worldwide maintenance of our systems is available by Hug Engineering's dedicated service teams.

The housings of the filter and DeNOx-Oxidation cartridges are made of high-grade stainless steel and allow easy access for smooth installation and removal of the filter cartridges during maintenance intervals.

Spare parts and customer service are available worldwide at short notice. To maintain excellence, all key-components from control units to catalytic honeycombs are designed, developed and produced by highly skilled and qualified personnel in the factory in Elsau/Winterthur in Switzerland.

Very few manufacturers offer this level of product control and vertical integration. Our customers can therefore rest assured he is using superbly engineered and finely tuned Swiss components.

CERTIFICATIONS

The technology used by Hug Engineering AG corresponds to all current maritime normative rules, certificates and specifications (Lloyd's Register, German Lloyd, VERT).

This world-class nauticlean gas purification system by Hug Engineering AG incorporates the best possible technology for your ships engine.

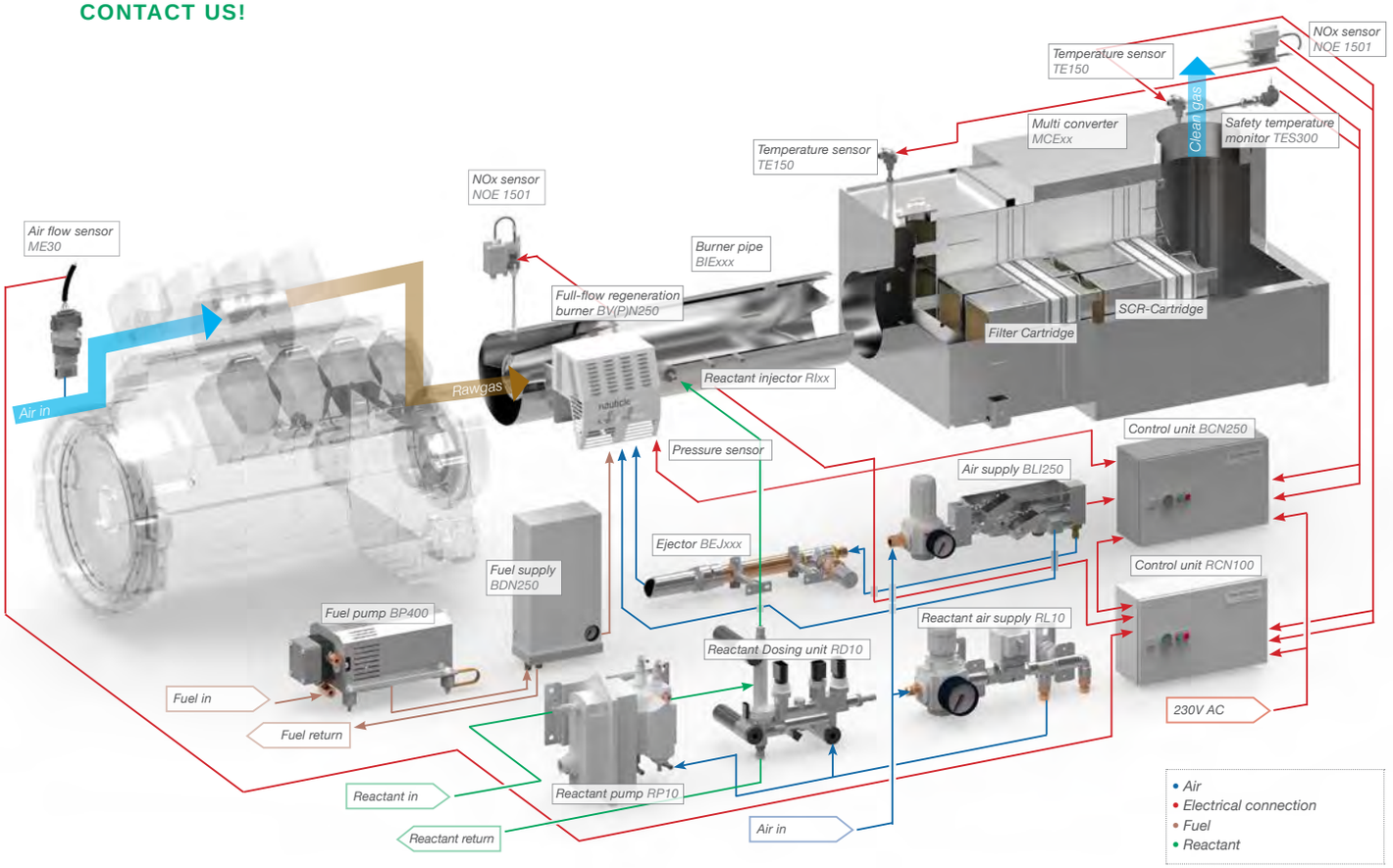
WHY NAUTICLEAN?

- Effective reduction of particulate matter in excess of 99%
- No exhaust soot on deck, furniture or clothes
- No soiling on the yacht‘s surface
- No visible oil contamination in the water
- Reduction of HC and NOx emissions
- Certified to all current normative rules and specifications to meet future limits
- Easy access into the DPF and DeNOx housing
- Requires a minimum of space - partly replaces the silencer

EXISTING INSTALLATIONS ARE PROOF OF THE EFFICIENCY AND RELIABILITY OF THE NAUTICLEAN EXHAUST GAS PURIFICATION SYSTEM.

NAUTICLEAN - THE RIGHT AND LOGICAL SOLUTION FOR EXHAUST GAS AFTERTREATMENT!

CONTACT US!



nauticlean™

Filter and Regeneration System combined with DeNOx

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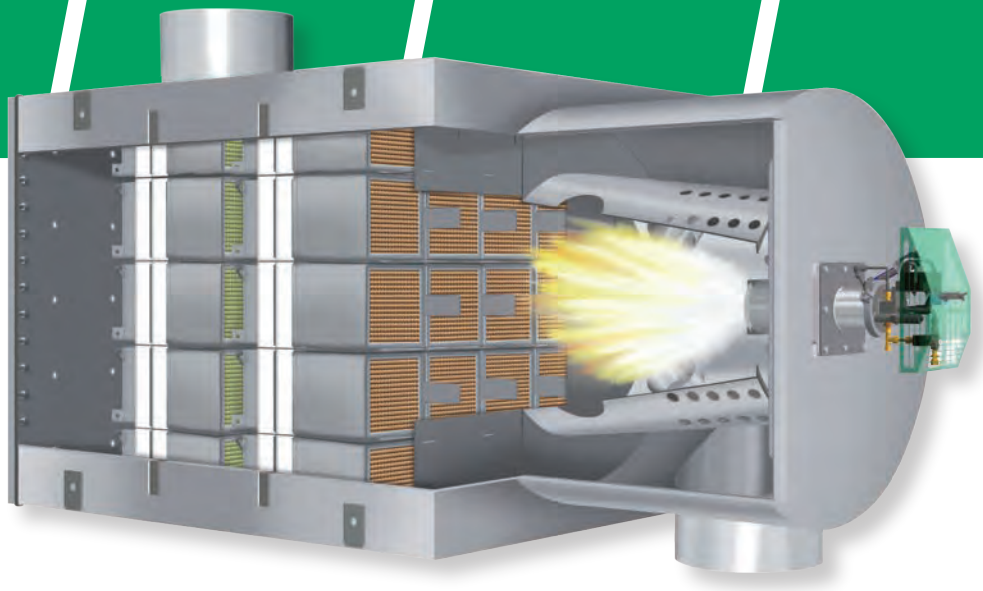


mobiclean®

Soot particle filter – DeNOx system

for mobile diesel engines.

150 - 3000 kW

hugengineering.

Exhaust gas purification systems for train vehicles

Advanced environmental technology for mobile diesel engines

Our mobiclean exhaust gas purification systems are especially designed for all kinds of rail vehicles with a performance of 150-3000 kW, such as mainline and shunting locomotives, construction shunters or track construction machines.

It is our objective to achieve and surpass the required emission standards with our products despite the limited space available and extreme influences from mobile use.

We have developed systems, which – depending on the customer's requirements – reduce the relevant harmful substances in the exhaust gas (soot particles, NOx, CO and HC) below the limits of the future emission standards.

The modular designed mobiclean exhaust gas purification system consists of:

- Soot particle filter
- Soot regeneration
- DeNOx system

Soot particle filter

Our mobiclean filter system is based on a ceramic silicon carbide (SiC) honeycomb structure. The exhaust gases stream through the porous honeycomb walls, where 99 percent of the finest particles – with a size of 20-300 nanometre – are trapped.

The filter housings are made of high-grade stainless steel. The VERT certificate proves the efficiency of our filters even after long operational periods.

Soot regeneration

Self-regeneration: Due to the catalytically coated design of our filters, the soot retained in the filter can be burned off. The coating allows a sulfur content of up to 5'000 ppm. Self-regeneration is possible at a temperature of 350°C.

Soot regeneration with full-flow burner: Where exhaust gas temperatures are lower than 350°C, we offer regeneration with full-flow burners. Autonomous regeneration is carried out across a wide range of applications, including those operating at a low temperature, whilst the locomotive continues in service, thus avoiding down time.

DeNOx-Oxi

With our selective catalytic reduction and oxidation the downstream DeNOx-Oxi system reduces to a minimum other harmful substances in the exhaust gas, i.e. NOx, HC and CO. The DeNOx-Oxi system is designed to comply with the demanding future emission standards (e.g. stage IIIB of directive 97/68/EC, US EPA Nonroad Rule).

Our DeNOx-Oxi system consists of catalytic converter elements which differ in their numbers depending on the engine size, requirements, and space available.

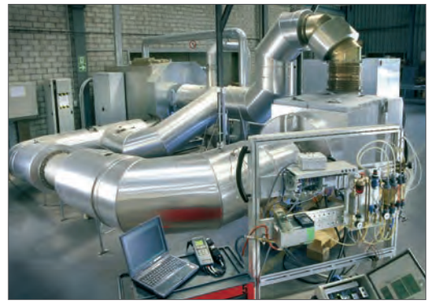
We use standard urea solutions (e.g. Ad Blue) as reactants.

Due to the short injection distance for the reactant and the direct installation of the catalytic converter elements into the filter housing, the exhaust gas purification system can even be used in extremely restricted spaces.

Complies with demanding future emission standards

All steel parts are manufactured in-house according to ISO 9001

Tm234, 550 KW with soot particle filter and DeNOx



In-house test bed for filters and regeneration systems

G2000, mainline locomotive with 2700 kW with particle filter and regeneration system

Use in the railway industry

Our mobiclean soot particle filters perform reliably even under the most extreme conditions (such as shunting strokes, dust, vibrations and extreme temperatures). Mobiclean has a proven track record within the rail industry. By requiring very little maintenance operating cost are kept to a minimum.

Thanks to ISO certification, as well as to our technical know-how and tests, the mobiclean filter systems comply with all standards in the railway industry. Our expertise ensures that not only customers' individual requirements and standards are met, but also the requirements of multiple units' serial production.

Swiss quality

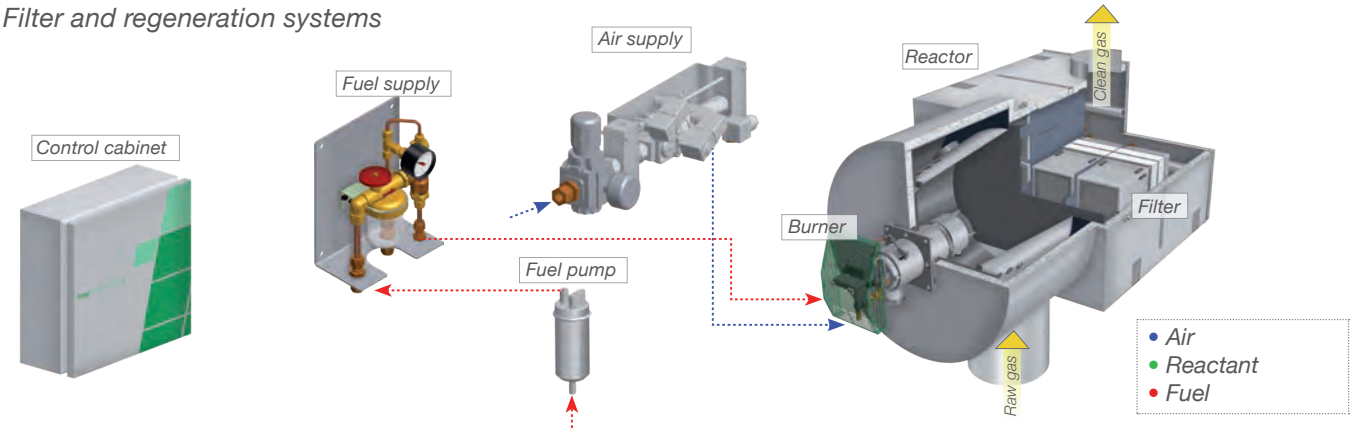
The first class mobiclean exhaust gas purification systems of Hug Engineering pass all common tests with flying colours and guarantee to the users the best possible technology for their diesel engines.

In addition, most of the components are developed and produced in-house. Our broad range of products comprises everything from control units, housings to soot filters and catalytic honeycombs.

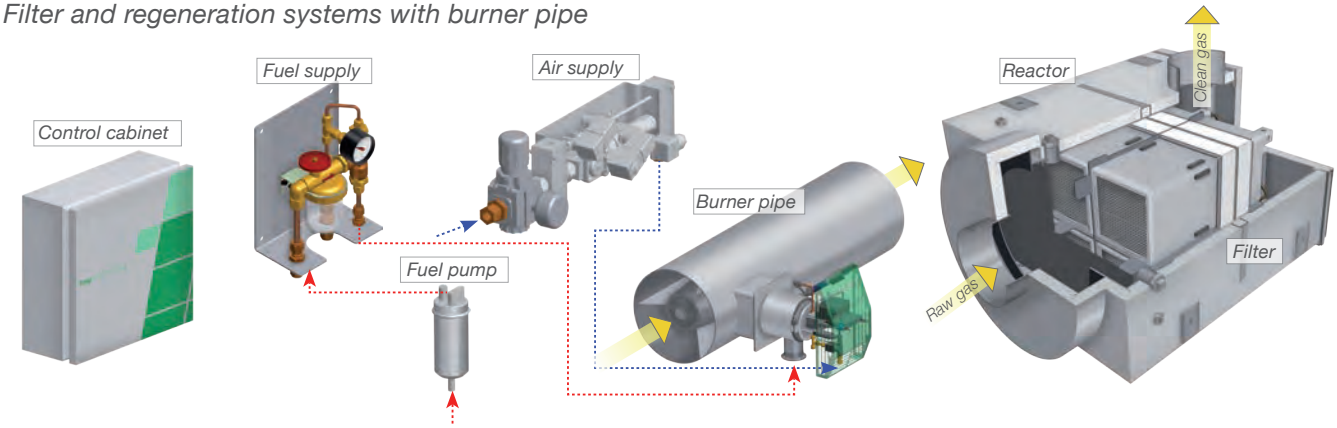
As one of the few manufacturers worldwide, we offer all these components out of one hand. Hug represents first class, reliable Swiss precision engineering. To maintain excellence all components are designed, developed and produced in our factory in Elsau/Winterthur in Switzerland by our highly skilled and qualified personnel. Very few manufacturers offer this level of product control and vertical integration. The customer can therefore rest assured they are using bespoke, superbly engineered and finely tuned components with best Swiss quality.

System options

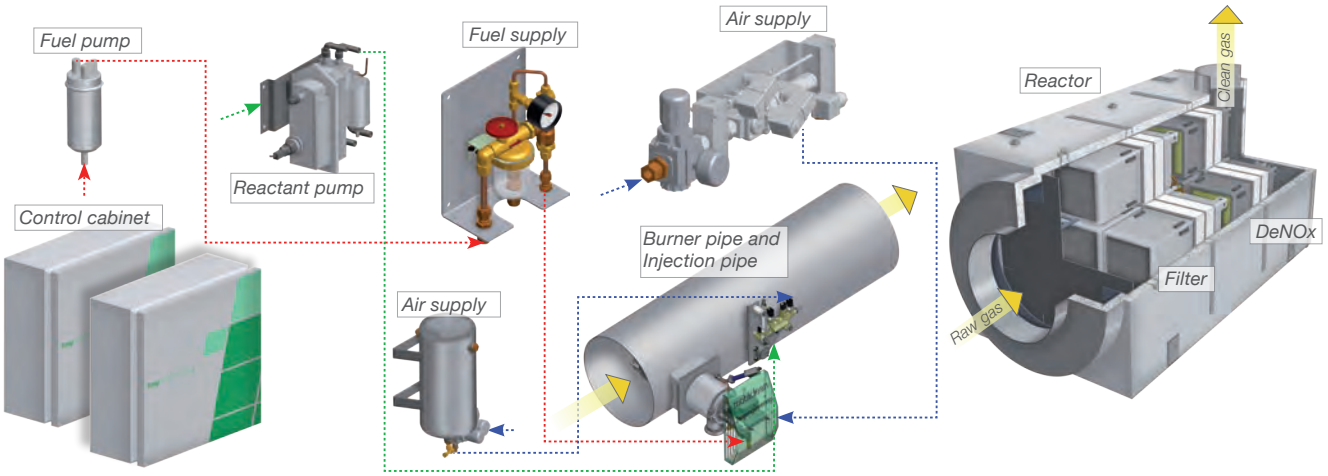
Filter and regeneration systems



Filter and regeneration systems with burner pipe



Filter and regeneration systems combined with DeNOx



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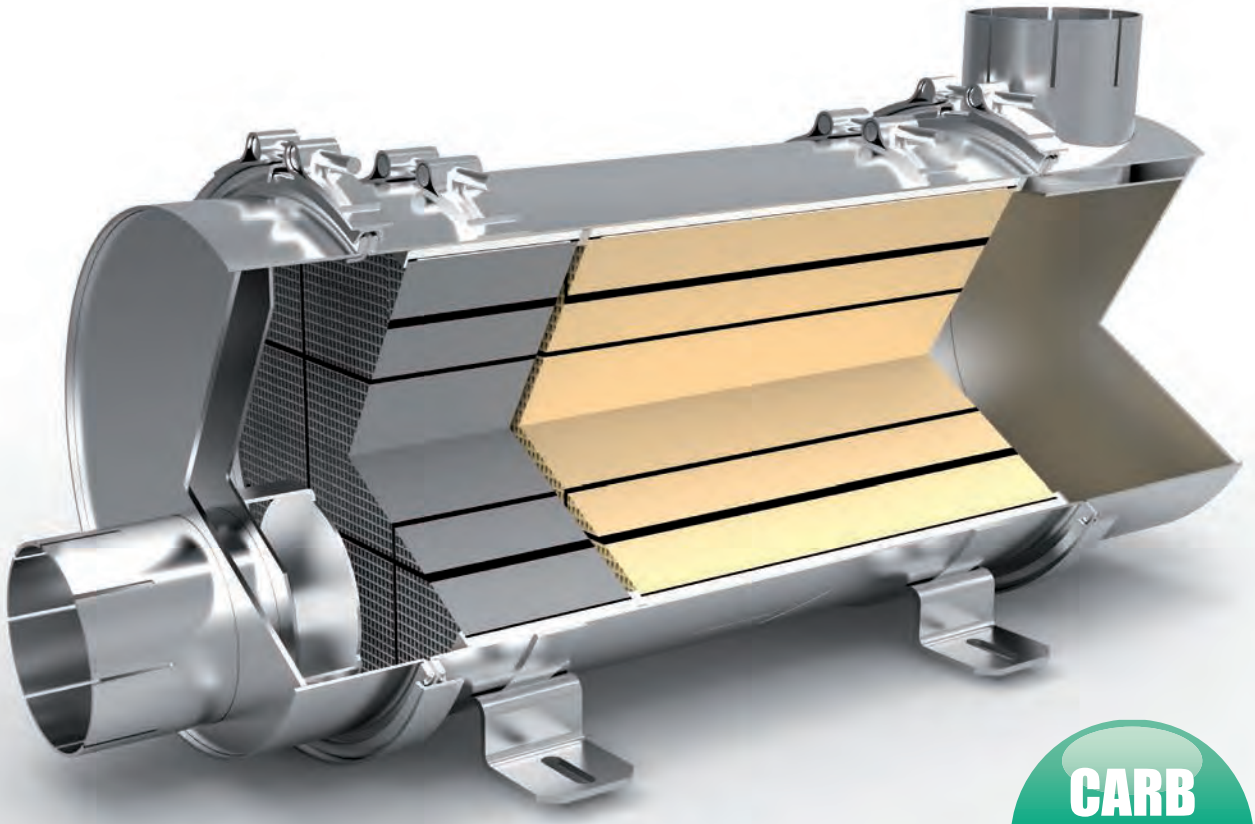
Particulate Filter Systems

School Buses



CARB Level 3+ Verified

mobiclean™ R advanced

hugengineering.

A Company of the ElringKlinger Group

Leading Diesel Emission Reduction Technology for a Green and Clean School Bus Fleet

Helping kids breathe easy

Diesel exhaust is a major source of combustion particles that contribute to poor air quality nationwide. Since almost all school buses are operated with diesel engines, diesel engine exhaust can thus also be a source of concern, specifically with regard to exposure to children. Diesel particulate matter emissions (PM) are a complex and unhealthy mixture of inorganic and organic carbon particles with adhered toxic substances and metals.

It is well known that children are particularly susceptible to air pollution and therefore are at even higher risk for particulate matter exposure than adults. Health researchers believe that children are more susceptible than adults to the adverse health effects of air pollution for a variety of reasons. For example, children are more active than adults and therefore breathe more rapidly. Children have more lung surface area compared to their body weight and therefore inhale more air pound-for-pound than adults.

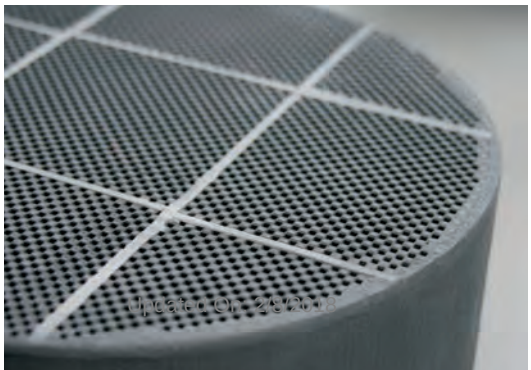
DPF or DOC - Making the Right Choice

Diesel Oxidation Catalysts (DOC) are widespread and inexpensive, but do nothing to reduce neither the most dangerous ultrafine soot particles nor black carbon. The Clean Air Task Force (www.catf.us) considers DOCs as one of the least effective retrofit options, reducing particulate matter by only approximately 20% under full load. DOCs do not remove black carbon, the climate-forcing component of diesel particulate matter, and are ineffective under idle conditions at bus stops when the emissions typically enter the bus.

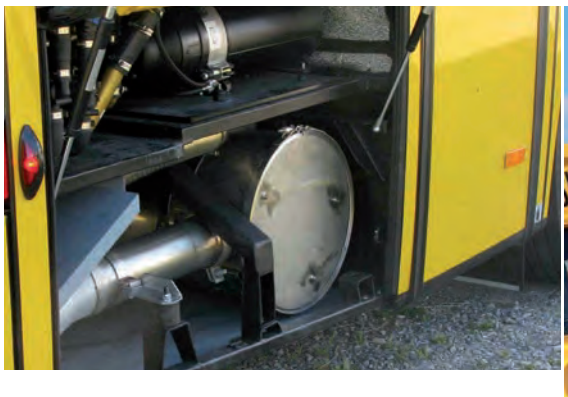
A retrofit with a diesel particulate filter (DPF) offers a comprehensive elimination of diesel particulate matter emissions and black carbon soot by almost 100% and is the most effective solution for addressing school bus cabin air quality as well as improving conditions outside of schools.

Full Flow Diesel Particulate Systems against Smoke

Only Full Flow Diesel Particulate Systems are an effective tool against smoke. Our mobiclean R advanced systems retain particles of the exceptionally dangerous zone of 20 - 300 nanometres.



The Right Diesel Particulate Filter Systems for Your School Bus



Proven. Effective. Reliable

mobiclean R advanced Filter Systems are based on a ceramic honeycomb structure made of silicon carbide (SiC). The exhaust gases flow through the porous walls between the channels that are blocked at alternate ends. During this process more than 99% of particles of all sizes will be deposited in the walls.

Outstanding emission reduction results:

- 99% Particulate Matter (PM) reduction
- 90% Carbon Monoxide (CO) reduction
- 70% Hydrocarbon (HC) reduction

Fuel savings:

- Up to 6% in fuel savings in comparison to commercially available diesel particulate filter

Choosing a mobiclean R advanced Filter System, your fleet can be assured of having the best available technology.

The Appropriate Regeneration Technology for Each School Bus

In order to burn off the collected soot, all our filters are equipped with the innovative CleanCoat catalyst. To initiate a regeneration, temperatures over 200°C are needed in only 15% of the duty cycle, which is the lowest temperature requirement in the industry.

Diesel Particulate Filter (DPF) should work without you worrying about it. Without vehicle downtime, without operator interaction, without having to plug in to an electric power source and without unplanned cleaning due to plugged DPFs. – That is what you can expect from us!

Particulate Filter Systems Made in Switzerland with Outstanding Emission Results

CARB Level 3+ Verified

Why mobiclean R advanced is the Better Solution:

- Regeneration temperature over 200°C is needed in only 15% of the duty cycle (lowest in industry)
- Fuel saving up to 6% (in comparison to commercially available diesel particulate filter)
- Available for model years 1991-2006
- Compatible with EGR engines
- No need to push a button to regenerate
- No need to plug in to regenerate
- No infrastructure needed

Economical and Dependable

Mobiclean R filter systems also perform reliably under extreme conditions. Maintenance is minimal and overhead cost low. Due to the minimal operating backpressure of our filter the mobiclean R advanced can save up to 6% in fuel consumption in comparison to any commercially available diesel particulate filter.

Swiss Quality

All components of our mobiclean filter systems are developed and manufactured to the highest quality standards at our factory in Switzerland. While we only use extremely high-temperature-resistant stainless steel for the housings, the honeycombs are made of finest silicon carbide.

We are one of the very few manufacturers worldwide to offer all components made in-house. You as a customer can always rest assured to use customized, finely tuned components with best Swiss quality.

Hug Engineering

Hug Engineering, Inc. based in Liberty Hill, TX is one of the leading manufacturer of exhaust aftertreatment systems for today's diesel engines whose exhaust aftertreatment systems are successfully used in thousands of applications worldwide.

Hug Engineering belongs to the German ElringKlinger Group, a globally operating development partner and supplier for basically all automotive and engine manufacturer.

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From: Grannis [mailto:lgrannis@snet.net]
Sent: Friday, April 28, 2017 8:03 PM
To: Reilly, Jennifer
Cc: T. Michael Morrissey
Subject: Michigan School Bus Program-VW Funding
Jenn,
Still looking for the other information that goes state by state. Mike Morrissey got this from a friend of mine at Roush Motors.
Lee
Lee Grannis
Coordinator
Greater New Haven
Clean Cities Coalition, Inc.
203-627-3715
www.NHCleancities.org
Lgrannis@snet.net

MICHIGAN CLEAN SCHOOL BUS PROGRAM

CURRENT SITUATION

The VW Settlement creates a unique opportunity for the state of Michigan to modernize its school bus fleet to lower emission vehicles and air quality and support school districts across the state. Under the parameters of the settlement Michigan is eligible to receive $60, 329,906.41. The funds are to be used to offset the damage created by VW vehicles that operated in the state in violation the Clean Air Act. One of the central components of eligible funding is the replacement of older diesel school buses with alternatively fueled school buses, including CNG and propane. In order to receive this funding, the state of Michigan must file a plan with US EPA and that plan needs to include the state's general ideas for use of the funding. This proposal outlines the parameters of a program that will replace up to 5% of the school buses in Michigan, with alternative fuel versions and leveraging limited school district funds.

The State of Michigan operates approximately 16,000 school buses to transport almost 700,000 students to and from school each day. The average service life of each school bus is 15 years, meaning some Michigan school districts have buses operating in the field dating back to 2000, well before the most recent emissions regulations on diesel engines.

Most school buses are currently powered by diesel fuel. Pre-emission diesel buses contain ozone-forming nitrogen oxides (NOx) and toxic pollutants. Students who ride these older generation diesel school buses are at risk of accelerating asthma, respiratory illnesses and heart disease[1]. Pre-emission diesel buses have also been linked to ground-level ozone formation and climate change. One way to reduce the volume of diesel emissions released into Michigan's atmosphere is to replace those diesel buses with clean-burning, alternatively fueled models.

WHY ALTERNATIVE FUELS

Alternatively fueled school buses, specifically, propane, are gaining popularity in Michigan. Currently, there are 28 school districts running propane school buses in the state, out of 900 total school districts. While adoption is increasing, only 3 percent of the school districts in Michigan operate propane school buses to date.

Propane autogas is an excellent fuel choice for school buses because it assist in reducing harmful emissions from the environment. Compared to diesel, propane school buses emit 60 percent fewer NOx emissions, 80 percent fewer smog-producing hydrocarbons, and provide a 100 percent reduction in particulate matter (PM). School bus manufacturer Blue Bird currently offers a propane school bus that is four times cleaner than the standard when comparing NOx levels. This means children who ride in propane school buses breathe cleaner air every day.

Propane school buses provide financial and maintenance benefits to districts operating them. A district does not need to purchase and install pricey diesel after-treatment, such as maintenance parts and fluids. Those

[1] Appendix A

components are completely eliminated with buses powered by propane because of the clean-burning properties of the fuel.

Propane autogas also costs less per gallon. For more than 30 years, the cost of propane autogas has been, on average, 30 to 40 percent less than the cost of gasoline. The cost differential between propane autogas and diesel is 40 to 50 percent.

PROGRAM OUTLINE

Utilizing funds from the VW settlement, the proposal is for the establishment of the Michigan Clean School Bus program that would:

- Replace 5 percent of the diesel buses in the state with clean-burning propane autogas buses by investing approximately $32 million from Michigan's share of the VW settlement.
- Provide a 50 percent rebate for the total cost of a new propane autogas school bus.

Every school bus removes approximately 36 cars off the road, which results in less traffic congestion and reduced carbon footprint[2]. The Michigan Clean School Bus program represents an opportunity to accelerate replacement of 5 percent of Michigan's school buses with alternative fuel-powered replacements. By targeting pre-2007 model year school buses, the program would reduce emissions by 630 tons of NOx emissions per year and 18 tons of PM emissions per year from the atmosphere.

Not only would this program result in a cleaner environment for our children and communities, it would create jobs and infrastructure to support the mass deployment of new buses. Further, additional fleet operators in Michigan would benefit from the increase in propane infrastructure throughout the state, allowing them to replace diesel engines with propane, thus compounding the air quality improvements through this investment.

ENERGY AND EMISSIONS IMPACT

Replacing 800 diesel school buses with propane alternatives would reduce Michigan's petroleum usage by 2 million diesel gallons.

Potentially, the Michigan Clean School Bus program could achieve significant NOx and PM reductions. By removing 800 pre-2006 model-year diesel school buses from the road, 571,680 kg or 630 tons per year of NOx would not be emitted. Additionally, 16,128 kg or 18 tons of PM per year would be reduced.

See Appendix A for the model used to determine the emissions values. We targeted approximately 800 school buses, or 5 percent of the Michigan school bus population. Seventy-five percent (75%) of the targeted older diesel bus population was assumed to be between 1998 and 2003 model years, while the other twenty-five percent (25%) to be between 2004 and 2006 model years. The result was compared to a 2017 model-year propane school bus.

[2] Appendix B

ADMINISTRATION

Michigan's dealer for Blue Bird school buses is Holland Bus Company, located in Holland. They would work with school districts to determine candidates for funding. As interested school districts decide to move forward, Holland would submit a 'request for purchase' form the administering body of the funds to explain how many buses that district would replace. The administrator would have the authority to approve or deny the request.

Once approved, the school district would submit a purchase order for the number of school buses they'd like to purchase, minus the funding amount, to Holland Bus Company.

After the new propane buses are delivered, Holland Bus would submit a proof of delivery form for the number of buses purchased to the administrator. The form includes the VIN number of the bus being replaced, the VIN of the new bus being put into service, and the scrappage information for the old bus.

Once all paperwork has been approved, the administrator will provide the rebate to Holland Bus Company.

REPORTING

Reporting will be required annually for the school districts that receive funding for new buses. There will be a template created that requests the following information:

1. VIN number of the new propane bus
2. Total miles currently on the bus
3. Total miles driven that year
4. Maintenance costs by bus for the year
5. Fuel costs for each bus for the year

With the mileage information, the administrator can demonstrate the NOx reduction achieved in that year with the new propane buses in operation. To promote the story, the administrator can use the maintenance and fuel cost savings to explain the financial benefits of the propane school buses.

Scrappage information on the old diesel bus will also be linked to the VIN number of the new bus so that can be referenced in the future if needed.

EXECUTIVE SUMMARY

The Michigan Clean School Bus program will be an excellent way to propel the State of Michigan into a leader in the movement to replace diesel school buses that are polluting the environment. This program provides an environmentally responsible effort that will also help create local jobs in the alternative fuels and infrastructure industries.

Because the program also helps reduce maintenance and fuel costs for school districts, those savings can be put back where they're most important — our classrooms. Schools can reallocate those funds toward school supplies, books and other materials that will help our children get more out of their education.

APPENDIX A: SCHOOL BUS DIESEL EXHAUST STUDY

See attached study performed by Environment & Human Health, Inc.

APPENDIX B: ZEELAND PUBLIC SCHOOLS TESTIMONIAL

See attached testimonial by the Propane Education & Research Council.

Children's Exposure to Diesel Exhaust on School Buses

Research and publication of this report was made possible by the Beldon Foundation, the Tortuga Foundation, the Dome Foundation, and the Alida R. Messinger Charitable Lead Trust, No. 2.

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Children's Exposure to Diesel Exhaust on School Buses

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Environment and Human Health, Inc.
February 2002

Air Quality Monitoring and Analysis Provided by:
Environmental Research Institute
University of Connecticut
Kevin Hood, Michael Trahiotis, and Jared Yellen

Abstract

In the United States nearly 600,000 school buses transport 24 million students to school daily. Each year buses travel 4.3 billion miles as children take nearly 10 billion school bus rides. In Connecticut, 387,000 students ride to school each day on 6,100 buses. If rides average 30 minutes in each direction, students will spend 180 hours on buses each year. Collectively, U.S. children spend 3 billion hours on school buses each year. Connecticut children annually spend more than 50 million hours on school buses.[1]

A vast majority of U.S. school buses are powered by diesel fuel. Diesel exhaust is comprised of very fine particles of carbon and a mixture of toxic gases. Federal agencies have classified diesel exhaust as a probable human carcinogen. Benzene, an important component of the fuel and exhaust, is designated to be a known human carcinogen. Components of diesel exhaust are genotoxic, mutagenic, and can produce symptoms of allergy, including inflammation and irritation of airways. There is no known safe level of exposure to diesel exhaust for children, especially those with respiratory illness.

The Centers for Disease Control and Prevention (CDC) estimates that 4.5 million U.S. children have asthma. This figure includes nearly 44,500 school-aged children in Connecticut diagnosed with the illness. Diesel exhaust can adversely affect children with underlying respiratory illnesses such as asthma, bronchitis, and infections. Diesel emissions may enhance the effects of some allergens among sensitive individuals. Children's airways are not yet fully developed and have a smaller diameter than those of adults. If airways are inflamed or constricted by asthma, allergies or infections, diesel exhaust may make breathing more difficult.

Fine particulate concentrations ($PM_{2.5}$) measured on buses in this study were often 5-10 times higher than average levels measured at the 13 fixed-site $PM_{2.5}$ monitoring stations in Connecticut. Levels of fine particles were often higher under certain circum - stances: when buses were idling with windows opened, when buses ran through their routes with windows closed, when buses moved through intense traffic, and especially when buses were queued to load or unload students while idling.

This study concludes that the laws intended to control air pollution in the U.S. and Connecticut must be strengthened to protect the health of children in several important respects. First, fixed monitoring facilities do not capture the variability in air pollution experienced by children. Second, air quality indoors and within vehicles is not regulated by EPA or the State of Connecticut, while Americans spend on average between 80-90% of their time indoors. Third, tougher diesel regulations adopted by EPA last year are insufficient to protect health. Under the new provisions, they will be phased in between 2006-2010. This delay means that children may be exposed to increasing levels of diesel exhaust for nearly a decade, as truck and bus traffic are likely to continue their steady rate of increase. Fourth, Connecticut is already beyond compliance with federal air quality standards for ozone, which may exacerbate respiratory illnesses. Given the limited monitoring facilities and extended averaging periods allowed by current law, state "compliance" with federal standards offers little assurance of sufficient health protection. Fifth, routine emissions testing for school buses is not required by federal law, and school buses are specifically exempted from testing in Connecticut. Sixth, Connecticut adopted idling regulations, limiting idling time to 3 minutes, however, few know of the restriction, and it is neither monitored nor enforced.

It is possible to reduce children's exposure to diesel emissions immediately. We suggest prohibition of bus idling, especially while loading and unloading students. Exposures could also be reduced by limiting the amount of time students spend on buses. The dirtiest buses should be identified by testing emissions and air quality within passenger compartments. The cleanest buses could then be assigned to the longest routes.

These interventions would provide some relief, but additional steps are needed to protect the respiratory health of children, and provide the "adequate margin of safety" required by the Clean Air Act. The current fleet of diesel-powered buses should soon be retrofitted with interior air filters, particle traps, catalytic converters, and be powered by ultra low sulfur fuels. These strategies, if adopted together, would substantially reduce pollution levels in the air students breathe on their way to and from school.

1. Summary of Findings

1. ***Diesel Buses:*** Each day, nearly 600,000 school buses transport 24 million students to schools in the U.S. Within Connecticut, nearly 387,000 children ride 6,100 school buses, and a vast majority are powered by diesel fuel.

2. ***Children's Time on Buses:*** The time spent on buses by individual students varies between 20 minutes and several hours per day. For one child, a half-hour ride to school, and a half-hour ride home each day amounts to 180 hours per school year—90 full 24-hour-days over 12 years of school. Annually, U.S. children spend 3 billion hours on school buses. Connecticut children spend 50 million hours on buses each year.

3. ***Background Particulates:*** Connecticut background fine particulate matter levels ($PM_{2.5}$) are near or above national standards, when averaged over 24 hours. Children's exposure to diesel exhaust from school buses constitutes an additional exposure beyond background levels of particulates reported from current monitoring efforts.

4. ***Background Ozone:*** Connecticut is not in compliance with current federal ozone standards. In 2001, portions of the state exceeded the 8-hour limit on 26 days, and the 1-hour limit was exceeded on 9 days. Ozone is known to exacerbate asthma, and is normally highest in the afternoon, when children's exposure to diesel particulates from school bus rides is also likely to be high. NO_x precursors to ozone have increased over the past 10 years. In 2001, nearly 109 million people lived in 272 counties where federal ozone limits were exceeded.[2]

5. ***Carcinogenicity of Diesel Exhaust:*** Diesel exhaust is classified as a probable human carcinogen by many governmental authorities, including the International Agency for Research on Cancer (WHO), the U.S. National Toxicology Program, the U.S. Environmental Protection Agency, and as a known carcinogen by the State of California. The California South Coast Air Quality Management District recently estimated that nearly 71% of the cancer risk from air pollutants in the area is associated with diesel emissions. Diesel exhaust includes benzene, 1,3-butadiene, and soot, all classified as known human carcinogens. Nearly 33 studies have explored the association between diesel exhaust exposure and bladder cancer. A recent meta analysis of this literature found increased risk between 18-76%. These findings are based primarily upon studies of truck drivers, railroad workers, bus drivers and shipyard workers.[3]

6. ***Diesel Exhaust Contains 40 Hazardous Air Pollutants:*** In addition, diesel exhaust contains both carbon particulates and 40 chemicals that are classified as "hazardous air pollutants" under the Clean Air Act.

7. ***Particulates and Respiratory Diseases:*** Exposure to particulates has been associated with: increased mortality among those with cardiopulmonary diseases; exacerbation of symptoms for asthma, bronchitis, and pneumonia; decreased lung function; and retarded lung development. It has also been correlated with increased hospital admissions and emergency room visits for respiratory illnesses.

8. ***Children's Susceptibility:*** Children may be especially susceptible to adverse respiratory effects following exposure to fine-diameter particulate matter ($PM_{2.5}$) emitted from diesel engines. Nearly 94% of diesel particulates have diameters less than 2.5 micrometers (um).[4] The average diameter of diesel particulates is 0.2 micrometers. Smaller particles are able to penetrate children's narrower airways reaching deeply within the lung, where they are more likely to be retained. Higher rates of respiration among children may lead to their higher exposure, when measured per unit of their bodyweight.

9. ***No Known Safe Exposure to Diesel Exhaust:*** There is no known safe exposure to diesel exhaust for children, especially those with asthma or other chronic respiratory disease. There is no single standard for acceptable cancer risk from diesel exhaust in the U.S.

10. ***Asthma Prevalence:*** Nationally, 4.8 million children have asthma. More than 44,500 Connecticut school children have the disease.

11. ***Asthma Costs:*** Asthma costs an average of $500 per child per year for medications, physician care, and hospital treatment. Annual direct medical costs are estimated to be nearly $22 million for Connecticut school students alone. This estimate does not account for other costs that often include school absenteeism, lost parental work while caring for ill children, psychological effects, and abnormal social development.

12. ***Children's Exposure to Particulates on Buses:*** Children were exposed to airborne particulate concentrations in tested buses that were sometimes 5-15 times higher than background levels of $PM_{2.5}$.

13. ***Variability Within Buses:*** Particulate and black carbon levels vary within individual buses over time. The most important influences on variability include: bus idling behavior, queuing practices, bus ventilation via windows, and outdoor concentrations on bus routes. Particulate and carbon concentrations did not vary by sampling location within diesel buses, e.g., front vs. rear. Engine model, age of engine, number of miles since last overhaul, maintenance cycles, location of bus engine (front, next to driver, or rear), elevation change, passenger load, and climate may all influence levels of interior pollutants and children's exposure.

14. ***Exhaust From Other Traffic:*** The intensity and type of traffic along bus routes significantly affects air quality on buses. Buses following diesel-powered vehicles, *including other buses,* have increased levels of carbon and particulate concentrations within passenger compartments. Particulate levels rose rapidly within the passenger cabin when buses pulled behind other diesel vehicles in traffic. No buses tested had air filtration equipment capable of removing the fine particles detected in the buses.

15. ***Idling Buses:*** Idling buses tested had higher concentrations of particulates and carbon than moving buses. Higher concentrations occurred when idling buses had open windows when compared with buses with closed windows. There is a current Connecticut Department of Environmental Protection (DEP) regulation, DEP 22a-174-18 (a)(5), that limits idling time to 3 minutes, yet it is neither monitored nor enforced.

16. ***Queued Idling Buses:*** Queued idling buses had the highest levels of particulates and black carbon measured. Idling buses tend to accumulate diesel exhaust which may be retained during the ride, depending upon bus ventilation rates. Particulate and carbon concentrations rise rapidly once idling begins.

17. ***Length of Bus Route:*** The length of bus routes affects the magnitude of children's exposure to air pollutants in the interior compartment. Time in transit between home and school spent by Connecticut students varied between 20-180 minutes per day in the towns sampled. The longest routes may occur in the rural parts of the state, especially in large regional school districts.

18. ***Lower Emissions From Natural Gas Buses:*** Natural gas buses studied emitted 60-98% less carbon than diesel-powered buses.

19. ***Findings Are Likely to Underestimate Exposure:*** Exposures to carbon and particulates found in this study were measured in environments with exceptionally low traffic and few other sources of pollution. Most children are exposed to additional pollution from traffic and other residential, commercial and industrial activities. These findings therefore are likely to underestimate levels of fine particulates and carbon found in more urban areas and routes with higher traffic intensity.

20. ***Additional Sources of Particulate Exposure Threaten Children:*** Residential use of tobacco products, wood stoves, candles, kerosene heaters, and poorly ventilated cooking stoves are for many children additional sources of exposure to carbon-based particulates and organic gases that result from combustion. Federal and state monitoring efforts fail to account for these exposures despite the fact that most people spend more than 80% of their time indoors. Most epidemiological studies that associate PM_{10} levels with adverse respiratory health effects consider particles measured by outdoor stationary monitoring facilities, neglecting indoor air exposures.

21. ***School Buses Are Exempt From Emissions Testing:*** School buses are currently exempt from routine emissions testing in Connecticut.[5] There is no federal requirement that all state governments monitor school bus emissions, although some states require testing.

22. ***Federal Particulate Standards Exceeded:*** EPA estimates that in 2000, 11 million U.S. children lived in areas that exceeded one or more federal air quality standard. Nearly 3.5 million children lived in areas where the particulate standards were exceeded in 1998. Within Connecticut, bus exposures when combined with background outdoor particulate levels may elevate children's average daily exposure beyond the current federal 24-hour $PM_{2.5}$ standard.

23. ***Absence of Passenger Cabin Air Quality Standards:*** Current law does not regulate air quality within buses.

24. ***Federal Monitoring vs. Personal Monitoring:*** Federal law and regulation permit the testing of air quality by means of fixed monitors. In Connecticut, 13 fixed monitors measure $PM_{2.5}$. This sampling design fails to capture the local variability and severity of air pollution in the state. National standards permit averaging particulates over 24-hour periods. These practices ensure that shorter episodes of intense pollution—such as those experienced in bus rides—are neither recognized nor regulated by the state or federal government.

25. ***Tougher Federal Diesel Standards Delayed Until 2006:*** Tougher new diesel emissions standards will not be phased in until 2006. This delay poses respiratory health threats to Connecticut citizens, who now experience air pollution at levels above acceptable federal standards for ozone. Compliance with current standards does not ensure health protection. EPA estimated that the new standards would result in 8,300 fewer premature deaths, 17,600 fewer cases of childhood acute bronchitis, and 360,000 fewer asthma attacks. These estimates demonstrate the scale of respiratory health threat EPA believes exist under current conditions.

26. ***Federal Particulate Standards:*** The exposures identified in this study will not be affected by the tougher federal PM standards adopted in 1997 (which are different from the diesel standards described in 26 above), since monitoring to determine compliance with the PM standards is done outdoors.

27. ***Bus Parking Yards:*** Bus parking and maintenance facilities have the potential to create localized particulate air pollution that far exceeds ambient outdoor levels reported from State monitoring efforts. Pollution may routinely migrate to adjacent properties, as buses are left idling, or during periods of peak use—early mornings and afternoons. If vehicles are parked near schools, both outdoor and indoor school air quality may be diminished.

28. ***Bus Drivers:*** Bus drivers' exposure to motor vehicle and diesel exhaust is significantly higher than children's, due to longer periods of time spent on buses.

6. Recommendations By Level of Government

Recommendations for the Federal Government

1. ***Retrofit Diesel Buses To Lower Emissions:*** The federal government should require the retrofit of existing school buses with particle traps and catalytic converters designed to reduce emissions. Retrofit of the existing fleet should be completed by 2003.
2. ***Require Buses to Use Ultra Low Sulfur Fuels:*** The federal government should require the use of ultra low sulfur diesel fuel (<15 ppm) on school buses. The effect would be to substantially reduce acid aerosols, ozone precursors, and fine particulate emissions in the immediate vicinity of children.
3. ***Replace Bus Fleet With Low Emission Vehicles:*** The federal government should require and provide financial support for eventual replacement of existing diesel fleets with low emission vehicles, especially in areas of the country beyond compliance with current federal pollution standards.
4. ***Test Tailpipe Emissions:*** The federal government should require periodic tailpipe emissions testing of all school buses, unless they have been retrofitted with particulate traps and converters, and use ultra low sulfur fuels.
5. ***Set Passenger Cabin Air Quality Standards:*** The federal government should establish health protective standards for air quality within vehicles. Standards should provide an ample margin of safety for children.
6. ***Require School Bus Air Filtration Equipment:*** The federal government should require the design and installation of air filtration equipment capable of removing vehicle exhaust from air entering bus passenger cabins. This is especially important when buses travel in areas with high traffic intensity, or high outdoor background concentrations of pollutants such as urban environments.
7. ***Federal Standards Should Assume Indoor and Vehicular Exposures:*** EPA should adjust outdoor air quality standards to account for probable indoor and within-vehicle exposures to air pollution. The Clean Air Act demands that standards be set to provide "an adequate margin of safety," yet governments' neglect of particulate levels within homes, schools, and vehicles makes it impossible to conclude that current standards protect health.
8. ***Expand Air Quality Monitoring Network:*** The federal government should require states to develop air quality monitoring programs that capture variability in regulated air pollutants. The existing stationary monitoring network should be supplemented with both additional stationary sources, and with personal monitoring data collection to better understand variability in exposure, especially among susceptible populations.

Recommendations for State Governments

1. ***Prohibit School Bus Idling:*** Idling should be restricted by State law. Bus drivers should be required to turn off bus engines immediately upon reaching their destinations. Buses should not be turned on until fully loaded. This is especially important when buses are queued while loading and unloading at schools and transfer stations. Exceptions should include conditions that would compromise passenger safety—e.g., extreme weather conditions, idling in traffic. In cases where engine operation is necessary to activate safety equipment such as flashing lights, buses should be retrofitted to permit battery operation. Idling restrictions should be defined by state statute and include enforcement power, rather than by the present DEP regulation 22a-174-18 (a)(5).

2. ***Retrofit Diesel Buses To Lower Emissions:*** The State should plan and implement a school bus retrofit program to ensure that buses are refitted with particle traps and catalytic converters designed to reduce emissions. Retrofit of the existing fleet should be completed by 2003.

3. ***Require School Buses to Use Ultra Low Sulfur Fuels:*** The state should facilitate and monitor the suggested federal requirement that school buses use low sulfur diesel fuel (<15 ppm).

4. ***Replace Bus Fleet With Low Emission Vehicles:*** The state should work with federal agencies (EPA, DOE, DOT) to plan for the replacement of the existing diesel fleet with new low-emission and alternative-fueled vehicles.

5. ***Set Priorities to Reduce Emissions and Exposure:*** The State should plan for, guide, and set priorities to retrofit buses and convert to ultra low sulfur fuels. Priority should be assigned to communities with the poorest outdoor air quality. Within communities, priority should be assigned to the routes that have highest traffic intensity.

6. ***Require Routine Maintenance:*** The State should require that routine maintenance be conducted to ensure that emissions remain at their lowest possible level. Special care should be taken to be certain that exhaust systems are fully intact and secure, and that engine compartments are completely sealed from interior passenger space.

7. ***Test Tailpipe Emissions:*** The State should be responsible for periodic tailpipe emissions testing of all school buses.

8. ***Expand $PM_{2.5}$ Monitoring Network:*** The State should substantially expand its monitoring network to more fully capture local variability of air pollutants.

Recommendations for Local Governments

1. ***Prohibit Bus Idling:*** Local governments and school districts should immediately adopt policies that require drivers to turn off bus engines upon reaching their destinations. Buses should not be turned on until fully loaded. This is especially important when buses are queued while loading and unloading at schools and transfer stations. Exceptions should include conditions that would compromise passenger safety—e.g., extreme weather conditions, idling in traffic. In cases where engine operation is necessary to activate safety equipment such as flashing lights, buses should be retrofitted to permit battery operation. School districts should inform drivers about the effects of idling on both indoor and outdoor air quality. This idling restriction will improve air quality within buses, and in the vicinity of schools.

2. ***Adjust Contract Provisions to Lease Retrofitted Vehicles and Require Clean Fuels:*** School districts should adjust their contracts with bus service companies and fuel providers to require the use of ultra low sulfur fuels, particle traps and catalytic converters, without waiting for federal or state requirements to take effect.

3. ***Set Priorities:*** School districts and local governments should allocate buses with the lowest emissions to the longest routes.

4. ***Limit Ride Duration:*** School districts should reduce students' exposure to air pollution by limiting time spent on buses. This is already regulated by some town policies. Limiting ride duration would reduce exposure to pollution generated by diesel buses, and by other traffic.

5. ***Require Routine Maintenance:*** Local governments should ensure that buses are monitored and maintained so that emissions remain at their lowest possible level. Special care should be taken to be certain that exhaust systems are fully intact and secure, and that engine compartments are completely sealed from interior passenger space. Maintenance requirements to ensure health protective air quality should become a routine contract provision between bus companies and local governments.

6. ***Reconsider Location of Bus Parking Lots:*** Local governments should consider whether the location of bus parking facilities contribute to routine air pollution in the vicinity of schools, playgrounds, and residential areas. Some relief may be provided by setting limits on bus idling within parking lots.

ZEELAND PUBLIC SCHOOL DISTRICT'S SUSTAINABLE SOLUTION

A PROPANE AUTOGAS CASE STUDY

BUSES FUELED BY PROPANE AUTOGAS OFFER SCHOOL DISTRICT HIGH-PERFORMING, COST-EFFECTIVE OPTION TO INCREASE SUSTAINABILITY

Zeeland Public School District in western Michigan, like many school districts across the country, is finding ways to incorporate environmentally friendly practices in its operation. The district has upheld its commitment to sustainability by using alternative fuels, including propane autogas, in its school bus fleet.

"Zeeland has been on the cutting edge of green practices for a while," explains David Meeuwsen, Zeeland Public School District transportation director. "We are always looking for new ways to improve the environment."

CHOOSING BUSES FUELED BY PROPANE AUTOGAS

Zeeland Public School District buses transport 9,000 students daily and travel 750,000 miles annually. Since 2003, the district has used biodiesel to power the majority of its school buses. District officials recently became interested in the advantages propane autogas could provide as an alternative fuel.

School officials learned that propane autogas burns cleaner than diesel, thus reducing the amount of harmful emissions released into the atmosphere and inhaled by the district's students and staff. They also found propane autogas to be more cost-effective than biodiesel and to perform better, too.

"Propane autogas is one of the cleanest burning fuels of all fossil fuels, resulting

COMPANY
Zeeland Public School District
Zeeland, Mich.

INDUSTRY

School Bus

CHALLENGE & SOLUTION

To reduce costs and emissions, while expanding use of alternative fuels, through the purchase of nine Blue Bird Vision school buses fueled by propane autogas.

RESULT

- Lower emissions.
- Lower operating costs.
- Longer maintenance intervals.
- The same horsepower and torque as diesel-fueled buses.

in less pollution from our buses," Meeuwsen says. "Propane vehicles emit fewer emissions than gasoline and diesel vehicles, reducing short-term and long-term health effects in passengers."

Zeeland Public School District bought nine new Blue Bird Propane-Powered Vision school buses with CleanFuel USA's liquid propane autogas injection system from Holland Bus Co. in August 2010.

Zeeland Public School District received a grant to fund half the cost of the new school buses through the Diesel Emissions Reduction Act, part of a clean air campaign launched by the U.S. Environmental Protection Agency. The district worked with AmeriGas, a partner in the grant, to supply propane autogas for the new buses. AmeriGas installed a refueling station on-site at no extra cost to the district and provided Zeeland Public School District with the option of buying the refueling system in the future.

GETTING EVERYONE ON BOARD

The district's bus technicians were trained by CleanFuel USA at Holland Bus Co. and learned how to maintain the pressurized propane autogas system on the buses. The technicians quickly became comfortable with the new system and began to see the operational and maintenance advantages of the fuel.

"The technicians are impressed by how much longer the oil stays clean in the bus," Meeuwsen says. "Based on our oil analysis program, we anticipate the buses fueled by propane autogas will need oil changes only every 20,000 to 30,000 miles. Also, the filters won't have to be changed as frequently as the diesel-fueled buses."

After receiving refueling training from AmeriGas and spending time in the buses, the drivers quickly saw the value of the new buses fueled by propane autogas as well.

"The propane-autogas-fueled buses also warm up faster, have greater power, and are quieter than the diesel buses," Meeuwsen explains. "My drivers now enjoy the new buses so much they are disappointed when they have to drive a diesel bus for a day when their propane-autogas-fueled bus is being serviced."

CUTTING COSTS AND HARMFUL EMISSIONS

The district has been able to cut costs as well as emissions by adding the nine buses fueled by propane autogas. Meeuwsen says the school district averages a savings of 80 cents per gallon with propane autogas vs. biodiesel fuel. Additionally, the district is hoping to take advantage of a 50-cent-per-gallon government tax credit available for the use of propane autogas.

"Once we apply for this tax credit, we approximate fuel savings of 30 percent, contributing to a major cost reduction," Meeuwsen explains.

SUSTAINABLE FUTURE

Meeuwsen already has had conversations about expanding the use of propane autogas in the district's fleet. His decision to use propane autogas is influenced by Zeeland Public School District's broader sustainability efforts, he says, and by the fact that 90 percent of propane autogas is domestically sourced.

"The buses fueled by propane autogas fit into the environmental standard we are trying to accomplish here at Zeeland," says Meeuwsen. The continued support and positive feedback the buses have garnered from staff, students, and the community also will influence the future of the school district's green fleet.

FOR MORE INFORMATION

To learn more about propane-fueled lawn care equipment and the Propane Education & Research Council, visit **autogasusa.org**.

Propane Education & Research Council / 1140 Connecticut Ave. NW, Suite 1075 / Washington, DC 20036
P 202-452-8975 / **F** 202-452-9054 / propanecouncil.org

The Propane Education & Research Council was authorized by the U.S. Congress with the passage of Public Law 104-284, the Propane Education and Research Act (PERA), signed into law on October 11, 1996. The mission of the Propane Education & Research Council is to promote the safe, efficient use of odorized propane gas as a preferred energy source.

PROPANE EDUCATION & RESEARCH COUNCIL

VW Mitigation Trust Fund Project Ideas for Beneficiary Agency Mitigation Strategy Plans

Katherine Wurtz <kwurtz@kewconsultants.com>

Fri 5/12/2017 2:05 PM

To:Corsino, Louis <Louis.Corsino@ct.gov>; Ellen.Pierce@ct.gov <Ellen.Pierce@ct.gov>;

Cc:Allison Wurtz <awurtz@kewconsultants.com>;

4 attachments

ARB DEQ Unregulated A to KLW Tier 4.xlsx; BAAQMD locomotives.pdf; KLW a new breed of repowers.pdf; Railway Age.pdf;

Good Afternoon Mr. Corsino and Ms. Pierce,

At KEW Grant Services LLC, our mission is to present and procure federal, state and municipal grant funding opportunities for companies who design and manufacture products that make a difference in our nation's air quality. We believe strongly that our environmental tax dollars need to be directed, in large measure, toward advanced technology solutions that provide the greatest benefit to the public. To date, our greatest success has been in securing funding for the advancement of emissions reductions technology in the transportation sector, with a particular focus on rail-road technology and, more specifically, **freight switching locomotives**. As this is one of the eligible mitigation trust activities, we wanted to express a strong interest on behalf of private sector operators in participating in locomotive replacement or re-power projects. We understand your timeframe of 3-10 years to administer this funding and, with our experience in drafting EPA mitigation plans, a locomotive replacement or repower project such as a freight switcher locomotive provides the greatest emissions reductions per dollar spent. It is also a great way to ease the burden of administrative paperwork by blending larger dollar value locomotive projects with smaller dollar value single bus or truck repower projects.

Traditionally, locomotive replacement packages and related diesel engine repowers offer the most cost effective return on grant investment dollars when comparing capital equipment procurement costs (grant dollars expended) to annualized tonnage reduction of NOx and PM emitted to the atmosphere. For example, in the South Coast Region of California, a repower and conversion of one unregulated locomotive to an EPA certified Tier 4 locomotive will generate more **than 60 tons of annualized reductions in NOx + ROG + WF* PM** (see Exhibit I). Grant dollars expended for locomotive repower projects range from $750,000 to $3,500,000 each, dependent on funding eligibility and the horsepower rating of the locomotive.

Locomotives typically range from 1000 bhp to 4400 bhp in four and six axle equipment configurations. Based upon diesel engine development and design improvements over the past 50 years and after-treatment exhaust solutions developed in the most recent 10 year period, 95%+ reductions in both NOx and PM are easily achievable. The primary focus is to identify currently operating unregulated switcher and road-switcher units (normally built prior to 1973) and then to replace or repower these units to newly remanufactured Tier 4 freight locomotives.

Markets

- Government freight transport facilities (federal, state and local)

- Department of Defense
- U.S. Army arsenals
- U.S. Navy arsenals
- Port Authorities
- State docks
- Class 1 railroads
- Short line railroads
- Industrial operations
- Switch yards
- Rail car switching providers
- Lease equipment providers

Our administrative and grant management experience allows us to provide relevant and compelling project proposals for eligible end users as well as assist in post-award contracts and reporting requirements. KEW Grant Services offers cradle to grave services, beginning with the research and discovery of available funds, end-user applications, and post-award contracts and disbursements. We work closely and in conjunction with federal and state environmental and air quality agencies. Our employees have assisted in the development of incentive projects, guidelines, and applications for the Air Resources Board of California, the Texas Commission on Environmental Quality, the Environmental Protection Agency, the U.S. Department of Transportation, the Federal Railroad Administration and the Department of Energy. End user applicants include both small and large companies and corporations throughout the North American transportation industries.

KEW Grant Services LLC and Knoxville Locomotive Works would like to set up a conference call with your office to further explore the VW Mitigation Trust Fund. We are aware of numerous locomotive Tier 4 repower opportunities which would significantly reduce NOx emissions from freight switcher locomotives within the state of Connecticut.

Please contact us at your earliest convenience to set up a time that best fits your schedules.

Thanks in advance for your consideration.

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All Aboard the New High-Efficiency Locomotives

How Texans are Supporting Lower Emissions

Choo Choo! Chevron Phillips Chemical Company is adding sophisticated, high-efficiency locomotives that produce 90 percent less air emissions to its rail operations.

Since Knoxville Locomotive Works in Tennessee debuted the green locomotives in December 2016, Chevron Phillips Chemical has committed to outfitting its domestic polyethylene plants and rail yards with these high-efficiency locomotives by mid-2017.

“Industry is constantly looking for ways to meet state and federal air quality standards,” said Jerry Jarboe, environmental supervisor at Chevron Phillips Chemical’s Baytown facility. “Industry has already made great strides in reducing air emissions over the last decade. Incorporating new technology, such as these high-efficiency locomotives, into our daily operations is just the next step in our already robust environmental practices.”

Switcher Locomotives

These new high-efficiency locomotives are called “switcher locomotives” and are used in rail yards and within small communities as opposed to larger locomotives that travel across the country. Although these new locomotives will not directly transport the expanded polyethylene capacity from the company’s new US Gulf Coast Petrochemicals Project, they are critical to moving product within the plants.

In addition to an air emissions reduction, these trains also reduce fuel consumption compared to similar horsepower locomotives up to 50 percent and provide real-time diagnostics information for operating and maintenance crews.

Locomotives Powered by Texans

These repowered, repurposed locomotives were able to be built thanks to funding from a Texas Emissions Reduction Plan (TERP) grant from the Texas Commission on Environmental Quality, which can help pay for the replacement or repower of old conventional engines into high-efficiency, low-emission engines. TERP is funded by Texans through several dedicated fees and surcharges, including an added fee to title a vehicle, surcharges on sale or use of heavy-duty diesel vehicles and off-road equipment, and fees on the registration and inspection of certain commercial vehicles. TERP funds are then allocated every two years to programs such as these by the Texas Legislature.

“TERP is the single most important tool the state has to achieve meaningful emissions reductions from cars and other mobile sources. Our industry has been strong supporters of TERP and I applaud efforts to extend TERP until the entire state meets attainment,” said Texas Chemical Council President Hector Rivero.

Monday, December 19, 2016

From KLW, a new breed of repowers

Written by William C. Vantuono, Editor-in-Chief

KLW

Knoxville Locomotive Works (KLW) has repowered, refurbished, remanufactured, and/or upgraded more than 400 locomotives since its establishment in 1998. The company's most recent offering is a fleet of nine SE Series switchers constructed with the assistance of Texas Emissions Reduction Program (TERP) funds.

KLW offers its own line of low-emission, single-engine repowered locomotives, from 1,000 hp four-axle switchers up to 3,200 hp six-axle linehaul locomotives. KLW also offers locomotive rebuilding and refurbishment services for older locomotives.

The project, conducted for Locomotive Solutions of Houston and Baton Rouge, originated from applications submitted under the TERP program, which is administered by a funding department within the TCEQ (Texas Commission on Environmental Quality). TERP is a biennium funding program for obtaining ERIG (Emissions Reduction Incentive Grants). Under the TERP program, Locomotive Solutions was awarded a contract for nine repowered units using KLW's drive train system, which consists of an MTU Tier 4i engine platform for 1,050 BHP (brake horsepower) and 1,560 BHP engines. The company says that, effectively, 80% of the cost of the top-deck repower is reimbursed through the award of emissions reduction incentive grants.

The nine KLW SE Series switchers, models SE15B and SE10B, are destined for Chevron refineries in the Houston and Beaumont-Port Arthur, Tex., non-attainment areas. The first unit was christened on Friday, Dec. 16.

The KLW SE15B and SE10B are switcher locomotives that are 1,560 BHP and 1,050 BHP respectively. Utilizing four-axle EMD and GE cores, both models weigh up to 276,000 pounds and are fitted with an MTU Series 2000 diesel engine, ZF Friedrichshafen AG reduction gearbox, a TMV Control Systems Inc. Traction and Engine Control Unit (TECU), and other modern technology. "These switcher locomotives are some of the lowest-emitting units ever created and offer superb fuel savings," the company says. "The SE15B and SE10B models are also the only switcher locomotives in existence to use a high-speed diesel engine with the low-speed AR10 alternator."

The MTU engines are made in Aiken, S.C. Currently certified to EPA Tier 4i off-highway standards, the 12V and 16V Series 2000 engines offer estimated emissions reductions of up to 90%, making them "excellent solutions for switching in highly populated areas, which is one reason why they qualify for many government-funded emissions-reduction programs," the company says.

KLW says that, in addition to ultra-low emissions, the SE15B and SE10B reduce fuel consumption by 30-50% compared to similar horsepower locomotives and up to 60% (SE10B) when replacing a higher horsepower locomotive, "thanks to improvements in tractive effort. In many operations, this means savings in the tens of thousands of

dollars or more per year."

The TMV TECU controls the traction alternator, engine speed/power, wheelslip, cooling fans, direction control, automatic engine start-stop (AESS), among other functions. KLW says the TECU is about one-fourth the size of a typical Dash-2 module rack "and as a result features much less wiring than older electronic systems." A touchscreen is also provided so that operating and maintenance crews can monitor the locomotive's diagnostics, including faults, in real-time.

One of the key features of TMV's TECU system is wheelslip control. "By monitoring the traction motors and each axle, the TECU can prevent wheelslips from occurring," the company says. "This increases the starting tractive effort significantly, up to 40% in certain conditions, compared to older wheelslip control systems. Increasing the starting tractive effort allows the locomotive to do more work than it could before the repower process. Preventing wheelslips and increasing traction also reduces the wear and tear on wheels and on track."

"What sets KLW locomotives apart is our unique approach to locomotive repowers," the company says. "Each KLW model uses a single MTU high-speed engine with a low-speed AR10 traction alternator. This is possible by using a ZF 2:1 reduction gearbox with the MTU engine. The gearbox converts the RPMs from the MTU engine (up to 1,800 RPM) down to a lower speed (up to 900 RPM), making the MTU engine compatible with the AR10. The ZF gearbox is joined to the AR10 with a double-bearing adapter (designed and patented by KLW) and a Geislinger Butterfly or Centa coupling, for higher or lower-horsepower applications, respectively.

"Although the engine and gearbox setup is unique to our product line, KLW actually re-utilizes many of the unit's original components. In addition to the AR10, the trucks, traction motors, wheels, and other items are retained and rebuilt if possible. By retaining common components, the KLW line of locomotives are more familiar to the railroad industry than much of the competition and consequently require minimal training. This approach also reduces costs and makes it easy to find replacement parts.

"KLW is the only single-engine green locomotive manufacturer that offers locomotives from 1,050 hp up to 3,200 hp. As a result, we are able to offer products for operations big or small. For example, many short line and industrial operations have no need for large 3,000-plus horsepower units as they are too big, consume too much fuel, and are overkill for the work that needs to be done. On the other hand, large operations such as Class I switching yards would have no interest in anything under 2,000 or even 3,000 hp, as they need this extra horsepower and size to move large cuts of freight cars. KLW is proud to be the only single-engine manufacturer that offers green locomotives for everyone."

Tagged under ZF Friedrichshafen AG TMV Control Systems Inc TMV MTU Locomotive Solutions Knoxville Locomotive Works KLW Sustainability Locomotives Geislinger Centa

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RailwayAge

Thursday, August 13, 2015

For New York New Jersey Rail, new KLW power

Written by: William C. Vantuono, Editor-in-Chief

KLW SE10B *KLW*

New York New Jersey Rail, LLC (NYNJR), a rail-barge short line wholly owned by the Port Authority of New York & New Jersey, has taken delivery on three new ultra-low-emissions SE10B diesel-electric switcher locomotives from Knoxville Locomotive Works (KLW). The contract, valued at $5.25 million, marks the first collaboration between the Port Authority and KLW.

Design, engineering and production of these 1,050-hp, single-engine locomotives originated in KLW's manufacturing facilities in Knoxville, Tenn. They're equipped with drive train systems patented by KLW and MTU. KLW describes them as "designed to reduce locomotive emissions and to mitigate fuel waste. These benefits are achieved without compromising reliability performance or power degradation through the deployment of enhanced electronic control systems and improved tractive effort capabilities."

NYNJR is operating its SE10Bs at its terminals in Jersey City, N.J. and Brooklyn, N.Y., primarily for positioning railcars for cross-harbour freight operations. KLW says the locomotives, compared to the

units they are replacing, will reduce emissions levels and fuel consumption by more than 90% and 60%, respectively, and significantly reduce engine noise levels.

“For Knoxville Locomotive Works, this venture underscores our long-term commitment to deliver advanced technology locomotive power to the North American and international rail markets,” said KLW Chairman Pete Claussen. “It is gratifying we can do this with a localized Tennessee work force and with a predominance of U.S. manufactured assemblies and components.”

“Our customers have consistently told us that two of the most significant challenges they currently face are increasingly stringent emissions standards and increasing fuel costs,” said MTU America Inc. Director of Industrial Sales Scott Woodruff. “Knoxville Locomotive Works has been on the leading edge of designing the best locomotive solutions to meet those challenges, and MTU is committed to helping locomotive builders like KLW deliver the cleanest, most efficient new products to their customers.”

Project Number	Applicant	Year of Funding	Source of Funding	Guideline Year	Railroad Class	E J Score	Project Address (Street Address)	Project Location (City)	Project Location (County)	Project Location (Zip Code)	Equipment Type	UNIT ID Number	BASELINE Category Type (Line-Haul, Switcher, Short-Line	Baseline Cost	Reduced (LEE) Engine/Retro fit Cost per Unit	GPS and / or ILD Only - Installation Cost	Applicant's Grant Request per Unit	ARB's Max Percentage Award Allowed	Eligible Grant Amount per Equipment	Number of Locomotives	Total Project Eligible Grant Amount	Emission Calculation Methodology (fuel, hours: must have hour meter)	Baseline Fuel Consumption (gal/yr)	Baseline Annual Hours of Operation	Percent Operation in District	Baseline Engine Serial Number	Baseline Fuel Type	Baseline Engine Model	Baseline Model Year	Preliminary Baseline Load Factor Moyer Table (%) (default 0.43)	Adjusted Baseline Load Factor (%)
	Locomotive OEM	2017-2019	Carl Moyer	2017	Industrial		[redacted]		San Bernardino	[redacted]	Locomotive	EMD Road-Switcher	Industrial	n/a	$3,208,500	$0	$2,500,000	85%	$2,727,225	1	$2,727,225.00	Fuel	92,500	N/A	100%	71-J3-7003	Dyed Diesel #3 PG3	16-645-D3	1971	0.43	0.43

Baseline Horsepower	Baseline Energy Consumption Factor (default 20.8 hp-hr/gal)	Baseline NOx EF (g/bhp-hr)	Baseline ROG EF (g/bhp-hr)	Baseline PM (g/bhp-hr)	REDUCED Category Type (Line-Haul, Switcher, Short-Line etc.)	Reduced (LEV) Engine Serial Number	Reduced Engine Fuel Type	Reduced Engine Model or Retrofit Kit Name	Executive Order	Reduced Unit Tier ?	Reduced Fuel Consumption (gal/year)	Reduced Hour of Operation (hr/year)	Reduced Engine/ Retrofit Model year	Number of REDUCED engines	HP of EACH reduced engine	Reduced (LEE) Engine TOTAL Horsepower	Reduced (LEE) Engine Load Factor %	Reduced (LEE) Energy Consumption Factor (default 18.5 hp-hr/gal)	Reduced NOx (g/bhp-hr) Certification Standard from EO	Reduced ROG EF (g/bhp-hr)	Reduced PM (gm/bhp-hr)	Project Life (years)	Cost per Unit	Cost for Total Project	Maximum Award Based on Incremental Cost and Grant Request	% Increase in Horse Power	Interest Rate for Capital Recovery Factor Calculatio	Capital Recovery	Per Equipment Baseline NOx Emissions (tons/year)
2800	20.8	17.40	2.84	0.440	Industrial	TBA	Dyed Diesel #3 PG3	KLW-MTU 16V4000 R54 T4L	TBA	4	62,500		2017-2018	1	3218	3218	0.37	18.5	0.27	0.00	0.020	15	$3,208,500	$3,208,500	$2,727,225	15%	2%	0.078	36.902

Per Equipment Baseline ROG Emissions (tons/year)	Per Equipment Baseline PM Emissions (tons/year)	Per Equipment Reduced NOx Emissions (tons/year)	Per Equipment Reduced ROG Emissions (tons/year)	Per Equipment Reduced PM Emissions (tons/year)	% Reduction NOx	Per Equipment NOx Reduction (ton/year)	Per Equipment ROG Reduction (ton/year)	Per Equipment PM Reductions (tons/year)	Total Project NOx Reductions (total tons/year)	Total Project ROG Reductions (total tons/year)	Total Project PM Reductions (total tons/year)	% Reduction PM	PM Emissions Weighting Factor	TOTAL PROJECT Weighted Emissions Reductions (NOx+ROG+ WF * PM) (tons per year)	Cost-Effectiveness Limit ($/ton)	Weighted Cost-Effectiveness ($/ton)	Maximum Award considering CE Limit AND funding request	Project Cost-Effectiveness based on Maximum Award ($/ton)	NOTES
6.023	0.933	0.344	0.00	0.025	**98%**	**36.56**	**6.02**	**0.908**	**36.558**	**6.023**	**0.908**	**97%**	20	**60.734**	$18,261	$3,495	$2,727,225.00	$3,495	Repower Locomotive

RE: Propane Buses - One Additional Attachment

From: T. Michael Morrissey [mailto:morrissey.consulting@cox.net]
Sent: Monday, May 22, 2017 11:26 AM
To: Farrell, Paul <Paul.Farrell@ct.gov>
Cc: Dave Gable <dgable@hocongas.com>; Lee Grannis <lgrannis@snet.net>; Andrea T. McCarthy <McCarthy@nhcleancities.org>; Reilly, Jennifer <Jennifer.Reilly@ct.gov>; T. Michael Morrissey <morrissey.consulting@cox.net>
Subject: Propane Buses - One Additional Attachment

Paul: here is one additional document to support propane powered buses in CT. Regards, Mike

T. Michael Morrissey
Director of Government Affairs & Business Development
Alternative Fuels Coalition of Connecticut

C/O Morrissey Consulting, LLC
332 Strickland Street
Glastonbury, CT 06033

860-280-8027 ~ Cell*
860-633-8781 ~ Tel
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PIN: 2C1AE75B
EMAIL: morrissey.consulting@cox.net
WEB: T.Michael Morrissey

VOLKSWAGEN SETTLEMENT

MOVE FORWARD WITH PROPANE AUTOGAS SCHOOL BUSES

The unique benefits of this clean, American fuel make it the perfect solution for schools to cut emissions while saving more for what counts.

THE GOAL

The Volkswagen Environmental Mitigation Trust Fund will financially support actions that reduce Nitrogen Oxide (NO_x) emissions in the United States. The amount of funds distributed will vary by state or territory, depending on the number of non-compliant Volkswagen vehicles that were registered there.

THE OPPORTUNITY

States should consider including propane-powered school buses in their plans to utilize the Volkswagen settlement funds. School districts that have the opportunity to purchase new propane autogas school buses reduce the amount of harmful diesel emissions — known aggravators of asthma and other breathing issues — around their students. Depending on a school's situation, it can significantly reduce NO_x emissions with propane autogas school buses.

THE SWITCH	REDUCED NO_x EMISSIONS
Replace all older than model year-2007 diesel buses with new propane autogas buses.	More than 92 percent[1]
Purchase a new propane autogas bus instead of a modern, lower-emissions diesel bus.	More than 11 percent[2]
Purchase a modern, best-in-class for NO_x emissions propane bus instead of a modern diesel bus.	81 percent[3]

1. Source: AFLEET model using Polk Registration data by state for diesel buses — 12/31/2015. By removing 255,627 of pre-2007 diesel fueled buses from the road across the country and replacing them with new propane autogas school buses, NO_x emissions would be reduced by 92 percent.
2. MY2016 certification data for PSI 8.8L propane model compared with Cummins 6.7L diesel model.
3. CARB low NO_x certification data for MY2017 Roush 6.8L propane model compared with MY2016 Cummins 6.7L diesel model.

Schools that use propane-powered school buses can reach their sustainability goals without additional, costly emissions technology.

"I think the environmental aspect of it is important to a lot of people, especially parents with young children."

Brian Woods
Superintendent, Northside Independent School District
San Antonio, Texas

THE PROPANE AUTOGAS SOLUTION

Modern diesel buses come with a hefty price tag for complicated emissions-reduction technology. Propane autogas buses reduce NO_x emissions while helping schools save for what matters most — classroom supplies, more teachers, extracurricular programs, and more.

LOWEST TOTAL COST-OF-OWNERSHIP

The costs of diesel add up quickly: expensive fuel, additional fluids, and pricey particulate filters. These are the most influential reasons why propane buses save schools more money, from purchase to retirement of the asset.

MORE UPTIME

With propane, schools can eliminate downtime linked directly to maintenance and unexpected repairs. Propane buses also provide superior cold-weather performance compared with diesel.

SAFE FOR EVERYONE

Propane buses operate noticeably quieter than diesel models, allowing drivers to better focus on their passengers and the road. Standard safety features designed into propane bus fuel systems provide added peace of mind for everyone.

AFFORDABLE INFRASTRUCTURE

School districts can choose private, on-site refueling infrastructure scaled for their needs, or take advantage of existing public or private refueling networks. Go to **propane.com** to learn more about standard private stations and advanced private stations, including typical costs.

AMERICAN FUEL

Using propane school buses supports our country's economy — nearly 90 percent of propane supplies are produced in the U.S.

SAVE ON THE 3 FS

Propane buses lower total cost-of-ownership by saving money in these three key areas:

1. **FUEL**

The cost of wholesale propane falls between the price of oil and natural gas, the fuel's two sources. As a result, propane is historically less expensive than conventional fuels, even as fuel prices fluctuate.

2. **FLUIDS**

New, lower-emissions diesel technology comes with an added inconvenience: diesel emissions fluid to purchase, store, and change. This is on top of needing more oil by volume compared with propane. In cold temperatures, diesel vehicles also require anti-gelling agents to prevent clogging of fuel filters and lines. Propane provides reliable performance without additional fluids.

3. **FILTERS**

To meet emissions requirements, new diesel technology requires diesel particulate filters that must be cleaned periodically. Excessive idling will accelerate cleaning intervals. Either way, extra maintenance expenses are piled on top of additional lifecycle costs.

OTHER CONSIDERATIONS FOR PROPANE

MAINTENANCE FACILITY NEEDS

Switching from conventional fuel to propane is quick and cost-effective, because the requirements for a propane vehicle repair facility are generally the same as those for conventionally fueled vehicles. Other alternative fuels, however, may require different facility requirements than conventional fuels, like additional gas detection and ventilation equipment — costing fleets more to switch.

Contact your local Authority Having Jurisdiction for applicable codes regarding building or modifying a propane-powered vehicle repair or maintenance facility.

To learn more about the benefits of propane school buses, visit **propane.com**.

VW Mitigation Trust Comments from CNG Cylinders International

Martin Abbott <mabbott@cng.us.com>

Wed 5/24/2017 6:34 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: Corsino, Louis <Louis.Corsino@ct.gov>;

Good Afternoon,

CNG Cylinders International (CNGci) is pleased to submit these comments to the State of Connecticut on using Connecticut's Mitigation Trust funds under the Volkswagen 2.0L Vehicle Partial Consent Decree, Appendix D. These comments should inform the decision-making process as Connecticut is developing the state's Environmental Mitigation Plan as required by the Environmental Mitigation Trust (EMT).

CNGci provides complete compressed natural gas (CNG) fuel system solutions for back-of-cab and frame rail applications for heavy duty and vocational vehicles. Vehicle applications include vocational trucks (heavy haulers, cement mixers, dump trucks, snow plows, off-road and mining), drayage trucks at shipping ports, roll-off / refuse trucks, quarry trucks, and over-the-road trucks. CNGci designs and manufactures large Type 3, carbon fiber-on-aluminum cylinders, for superior heat dissipation when fueling which allows for significantly more gas and thus more usable diesel gallon equivalent (DGE) in the cylinder under fast-fill conditions, which is an industry game-changer. CNGci offers a modular fuel system design with over 6,000 units / systems operating on medium- and heavy-duty vehicles.

Funding from the VW EMT provides an extraordinary and unprecedented opportunity for the State of Connecticut to put significantly cleaner, lower-polluting vehicles on the road in public and private fleets. This funding can and should be used by the State of Connecticut to continue its commitment to accelerating the use of cleaner, alternative fuels as a cost-effective alternative to funding diesel vehicles. Superior nitrogen oxide (NOx) emission reduction of natural gas compared to diesel engines supports the tenets of the partial consent decree to mitigate local NOx emissions.

The latest natural gas engines offer a 90% reduction in nitrogen oxide (NOx) emissions over the strictest EPA emission standards, providing a clean commercially available technology to reduce pollution from diesel engines. These modern natural gas engines are certified to perform at 0.02 g/bhp-hr of NOx as

compared with the diesel engines certified to the 2010 EPA standard of 0.2 g/bhp-hr NOx. It is the lowest level currently recognized under California's optional Low-NOx Standard for engines. With the EMT created to mitigate excess NOx emissions, we urge prioritizing EMT funds towards impactful, cost-effective technologies such as CNG medium- and heavy-duty vehicles.

Today's natural gas vehicles 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-use emission benefits of natural gas engines could be even more significant. A recent report published in Environmental Science and Technology[1], evaluated in-use emissions of earlier model year natural gas vehicles and found that natural gas engines performed much better in real world

conditions (i.e., operating within city limits in low-speed, high-idling situations), registering NOx levels 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 diesel in-use certification limits in some cases.

Recommendations

- 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.
- 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, heavy-duty vocational vehicles and refuse trucks).
- 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, the funding should be set aside for clean, alternative fuel vehicle projects that focus on maximizing NOx reduction for the funds spent.

CNG powered vehicles are the clear champions effective in maximizing pollution cost reduction effectiveness since dollar-for-dollar, NGVs deliver the most cost-effective NOx emissions reductions.

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. Funding natural gas vehicles is the logical choice and will lead to the largest total reduction in NOx emissions.

Thank you for the opportunity to provide comments on the State of Connecticut, DEQ's Environmental Mitigation Plan for the VW 2.0L Vehicle Partial Consent Decree, Appendix D programs.

We look forward to continuing to work together to help carry out the goals and initiatives of the Environmental Mitigation Trust. Please contact me directly at (805) 278-8060 or mabbott@cng.us.com.

Martin Abbott
Director of Sales

The largest diameter Type 3 cylinders in the world!

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Web: www.cng.us.com

VW Beneficiary Mitigation Plans - Please include our HDEVs

Mike Saxton @ Orange EV <mikes@orangeev.com>

Wed 5/31/2017 10:07 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

To our partners in improved air quality -
please read and act on this letter.

Please ensure that your state's VW Beneficiary Mitigation Plan doesn't inadvertently preclude electric yard trucks. Due to ambiguous terminology, past grant programs have inadvertently made yard trucks ineligible. Through efforts like this letter, national and regional incentive programs are now funding yard trucks as outlined here. This letter explains the ambiguities in the Consent Decree Appendix D-2 language and requests clarifications. **Electric yard trucks operating in any goods movement operation should be eligible for VW Mitigation Trust Funds.**

- Orange EV's T-Series electric terminal truck is a "Zero Emission Vehicle (ZEV)", defined in Appendix D-2 as a "vehicle that produces no emissions from the onboard source of power (e.g., All-Electric or hydrogen fuel cell vehicles)."
- Yard trucks are used in a wide range of goods movement operations from waste transfer stations to warehouses, distribution centers, manufacturing plants, rail intermodal yards and more - not just ports.
- Orange EV's electric yard trucks are already in commercial use at such sites.
- Fleets hope to use VW funds to deploy more Orange EV electric yard trucks.
- We believe the Consent Decree intends for yard trucks to be eligible wherever they operate to completely eliminate emissions from yard trucks.

Going into more detail:

The relevant Appendix D-2 categories are:

- Category 1 "Class 8 Local Freight Trucks and Port Drayage Trucks", and
- Category 8 "Forklifts and Port Cargo Handling Equipment".

The term "yard truck" is used to mean the same vehicle known by many names including: terminal truck, UTR, drayage truck, hostler, spotter, shifter, shunt and more. These can all refer to the same truck type.

Please ensure that yard trucks are eligible wherever they are used. This eligibility can be explicitly defined in both Categories 1 and 8 of your state's Mitigation Plan and/or identified in internal implementation guidelines. Eligibility could also be achieved by proactively seeking further clarification with Wilmington Trust.

A. For both Categories 1 and 8, please consider these clarifications:

- **Ensure that yard trucks are eligible as both on-road** (DOT-compliant and on-highway) **and off-road** (non-plated and off-highway) **with NOx reductions demonstrated through either** mileage-based OR **hours-based methods.** Yard trucks are heavy duty, Class 8 vehicles used to move cargo trailers around container-handling facilities. While they can be DOT-compliant and operate on-road/on-highway, the dominant use is off-road and un-plated within yards at low speeds, typically under 25mph and often in 24x7 operations. As a result, yard trucks have high engine hours and often significant idle time but with lower annual mileage than high speed semis. Historically, many incentive programs put mileage or plating restrictions on Class 8 trucks thinking only of the high-speed tractors though low-speed yard trucks are heavy polluters. By broadening eligibility and tracking methods, greater NOx reductions can be achieved.

- **Instead of restricting operations to "ports" or "port drayage", expand eligibility to "ports and goods movement operations".**

  "Ports" have become challenging to define given that transportation and freight approaches are constantly changing.

  Nationwide, container-handling facilities have moved away from seaports essentially becoming inland ports. These inland ports are often located in disadvantaged communities and non-attainment areas.

  Yard trucks do the same work no matter the location. Diesel yard trucks add significant emissions negatively impacting areas already overburdened with poor air quality. Yard trucks operate in LTL freight, manufacturing, retail distribution, waste management, warehouse, railroad inter-modal, and other container-handling operations.

- **For repowers, ensure that only destruction of the diesel engine is required.**

  This enables reuse/recycling of non-emitting durable elements such as the cab and frame. When repowering vehicles, Orange EV carefully inspects donor trucks to ensure that durable elements can be made like new again

B. For Category 1 (Class 8 Local Freight Trucks and Port Drayage Trucks), **please specify that "Eligible Large Trucks" include yard trucks operating in any goods movement operation**.

- Consider these Appendix D-2 definitions:

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

- Orange EV's yard truck is a Class 8 with GVWR of 40,900 lbs, well over the prescribed 33,000 lbs.

- The phrase “used for port drayage and/or freight/cargo delivery” can be open to interpretation. If dump trucks are included, certainly yard trucks should be as well. Substituting the phrase “used in goods movement operations” would ensure emissions reductions from more Class 8 heavy duty trucks.
- The definition for “Drayage Truck” should likewise be expanded to include “trucks hauling cargo at ports, intermodal rail yards, or other goods movement operations”.

C. For Category 8 (Forklifts and Port Cargo Handling Equipment), **please specify that yard trucks are eligible whether operating in a port or other goods movement operation**.

- Appendix D-2 defines **“Port Cargo Handling Equipment”** as “rubber-tired gantry cranes, straddle carriers, shuttle carriers, and terminal tractors, including **yard hostlers and yard tractors** that operate within ports.”
- While yard hostlers and yard tractors are specifically identified, they are in this category restricted to “port” operations. Please see the discussion above regarding “port” restrictions.
- Looking to existing incentive programs for guidance: California’s Goods Movement Program, an incentive grant program that has a similar goal to reduce air pollution from freight activities, defines eligible Cargo Handling Equipment (CHE) as any “existing diesel yard truck” operating “at a seaport (port), intermodal railyard, or freight facility.” This general language allows for broad inclusion resulting in greater emissions reductions.

Repowering or replacing existing diesel yard trucks with Orange EV electric yard trucks accomplishes the intended benefits:

- **Significantly reduces emissions**: When eliminating diesel trucks that have Tier 3 engines operated 6,000 hours at 2.5 gallons/hour, the per vehicle annual emission reductions can be 1.7 tons NOx, 1.6 tons CO, 81.5 kg PM, and 166 tons CO2.
- **Benefits disadvantaged communities and non-attainment areas**: Yard trucks operate predominantly in industrial areas with poorer air quality. Replacing existing diesel trucks with all-electric models provides emissions reductions that are immediate and dramatic.
- **Deploys proven, 100% electric ZEVs**: Orange EV’s T-Series electric yard trucks have been commercially available since 2014, commercially deployed since 2015, with 75% of Orange EV's fleet customers re-ordering in less than six months. They’re proven to do the job, deployed from California to New York and operating up to 24+ hours on a single charge.

As written, Appendix D-2 of the Volkswagen Settlement could preclude many impactful mitigation actions. **Thank for your help to ensure that yard trucks in all operating environments may be repowered and replaced with electric yard trucks using VW Mitigation Trust Fund dollars.**

Please contact us if we can be of assistance.

Respectfully,

Mike Saxton, Chief Commercial Officer
Orange EV, **Pure Electric Terminal Trucks**
"Spend 90% Less in Fuel to Haul the Same Load with No Diesel and No Emissions"
Phone: 816-210-9669 **eMail**: MikeS@OrangeEV.com **Website**: www.OrangeEV.com

Orange EV

Facebook Twitter LinkedIn

VW Settlement Comments

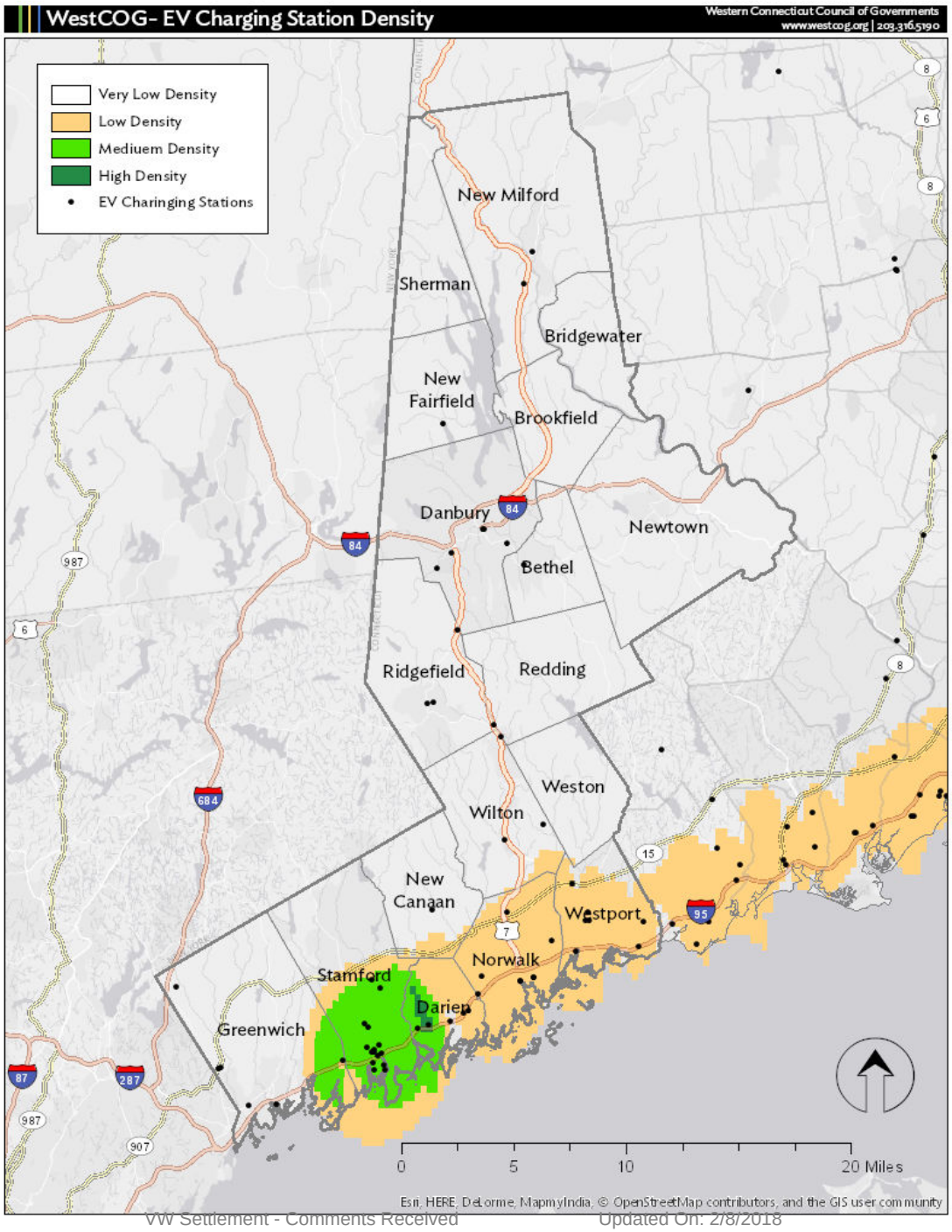
Carl Zimmerman <czimmerman@westcog.org>

Mon 6/19/2017 7:02 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: Carl Zimmerman
Job Title: Senior GIS Manager
Company: WestCOG

Comments: Significant gaps for charging stations exist in the busy western CT gateway roads for the Merritt Parkway and I-84 East of Danbury.



VP Mitigation Trust recommendation

Bonnie Trowbridge <bonnie.trowbridge@lightningsystems.com>

Tue 6/20/2017 3:39 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

Lighting Systems Outreach Letter to Connecticut DEP.PDF;

Name: Bonnie Trowbridge
Job Title: Vice President of Communication
Company: Lightning Systems

Comments: We appreciate the opportunity to submit these recommendations as to how Connecticut can develop and administer Environmental Mitigation Trust grant programs that most efficiently yield cost-effective NOx reductions, which will in turn generate air quality and public health benefits.

Bonnie Trowbridge
VP Communication

Lightning Systems

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319 Cleveland Avenue
Loveland, CO 80537
USA
As of July 1, 2017: 815 14th Street, SW - Building A, Loveland, CO 80537

June 20, 2017

Submitted via email to deep.mobilesources@ct.gov

Anne Gobin, EEP Bureau Chief
Bureau of Air Management
Connecticut Department of Energy and Environmental Protection

Re: VW Settlement Comments from Lightning Systems

The Volkswagen settlements and the Environmental Mitigation Trust present Connecticut with the opportunity to reduce oxides of nitrogen (NOx) emissions, particularly in those areas already burdened with diesel pollution. As the Chief Executive Officer and Co-Founder of Lightning Systems, I encourage you to create competitive programs that prioritize the need for cost-effective NOx reductions. In other words, projects funded by the Environmental Mitigation Trust should reduce the largest amount of NOx emissions for the least amount of state investment. We have provided recommendations below that address how Connecticut can do just that and we look forward to supporting you in your efforts to develop and administer the funding programs.

Lightning Systems is based in Loveland, CO, and is a global leader in efficiency and emissions improvement solutions for medium- and heavy-duty commercial fleets. The company's premier product is *LightningHybrids*, a hydraulic hybrid energy recovery system for delivery trucks, shuttle and paratransit buses, refuse trucks, and rear-engine transit buses. We have deployed *LightningHybrids* in fleets across the U.S., India, and the United Kingdom. Notably, we were recently named an Advanced Fuel Qualified Vehicle Modifier (QVM) by Ford Motor Company.

The *LightningHybrids* technology provides end users with a cost-effective means of deriving NOx emission reductions and fuel savings. Our technology harnesses the vehicle's braking energy by pumping hydraulic fluid into a high-pressure tank. This effectively stores that energy until it can be used to drive the hydraulic motors during acceleration. By doing so, the *LightningHybrids* technology improves fuel economy by 15-35% and reduces NOx emissions by 50%.

Hydraulic hybrid technology, due to its ease of installation and competitive pricing, presents Connecticut with a viable pathway for widespread proliferation of advanced vehicle technologies – our technology is already installed on over 25 different types of medium- and heavy-duty vehicle platforms. Hydraulic hybrids also do not require additional investments in refueling infrastructure, which would be required for other alternative fuel or electric hybrid technologies. This means that, with support from Connecticut and its allocation of Volkswagen settlement

funds, hydraulic hybrid technology will be a means to deliver cost-effective NOx reductions among a broad and diverse number of fleets.

Lightning System's market experience has identified an often-overlooked element of the clean transportation industry: our biggest competitors are not other technology manufacturers; rather, our competition stems from apathy and lack of awareness from the diesel fleets. In other words, many diesel fleets may express preliminary interest or even go so far as to pilot projects, but most stop short of fully integrating new technologies into their operations. It is worth noting that this condition is not isolated to the hybrid space – examples of it can be found across the alternative fuel and clean transportation industry.

Fortunately, we have found that the best way to move the market is to incentivize the "fence sitters" and provide them with the means to integrate new emission reduction technologies and operations in a cost-effective manner. Lightning Systems is thus in alignment with your agency's efforts to stimulate the clean transportation market. Our goal with the following recommendations is to support Connecticut in creating competitive funding programs that will yield the most cost-effective NOx reductions possible, while also lightening the Connecticut's administrative burden.

Connecticut Should Create Fuel-, Vehicle Type-, and Technology-Agnostic Funding Programs to Encourage Competition

The Environmental Mitigation Trust's overarching goal is to fully mitigate the total, lifetime excess NOx emissions from the offending Volkswagen vehicles. As such, we recommend that Connecticut create funding programs designed to reduce the greatest amount of NOx reductions for the least amount of state investment. We have found that the most effective path to achieve this goal is to structure funding programs to be fuel-, vehicle type-, and technology-agnostic. This design puts the impetus on the applicant to deploy the most cost-effective vehicle projects, in terms of NOx reductions.

This program structure has several benefits for your state. First, it would allow end-users and customers to choose the right technology for their fleets – this strategy has proven to be far more likely to succeed in producing large-scale adoption, which would help sustain the success of the state's investment after the funding program has closed. Second, a fuel-, vehicle-, and technology-agnostic funding program mirrors the approach taken by the EPA in its mobile source regulations, under which the agency sets overarching goals, regardless of fuel or technology, that industry must then achieve.

Third, and relevant to the administration of the grant programs, this program structure can reduce the administrative burden on the Connecticut's application review team. We certainly appreciate the constraints that the Volkswagen settlement may put on each state's funding

agencies. Thus, by implementing a fuel-, vehicle type-, and technology-agnostic funding program, your team can use standardized metrics to simplify the RFP development and application review process, which would effectively remove the time- and cost-intensive subjective review period. We further identify how Connecticut can do so in the next recommendation.

Connecticut Should Create Scoring Criteria to Mirror the Goals of the Environmental Mitigation Trust

The success of the Environmental Mitigation Trust lies in Connecticut's ability to reduce the greatest amount of NOx emissions and focus projects in areas disproportionately burdened by diesel pollution. Connecticut can not only design funding programs that will achieve both of these goals, but also design them in a way so as to reduce the administrative burden on your team.

To do so, we recommend that Connecticut develop and implement a clear set of scoring criteria for its funding programs. These criteria will provide applicants with a clear understanding of the priorities while also providing guidance on the structure and data that need to be submitted as part of the application. In addition, the scoring criteria also provide your application review team with an objective template that will reduce the time needed to identify the awardees.

First, Provide Motivation for Applicants to Achieve Cost-Effective NOx Emissions Reductions

We recommend that Connecticut rank applications based on the cost-effectiveness of each applicant's NOx emissions. By using similarly styled programs in California and Texas, Connecticut could express this cost-effectiveness in dollars of state investment per ton of NOx reduced ("$ / ton"). That way, the potential emission reduction benefits of each application ultimately could be expressed as a simple metric.

Second, Incentivize Projects in Areas Disproportionately Burdened by Diesel Pollution

Whether it be nonattainment areas, densely populated areas, ports, or transportation corridors, Connecticut should create an incentive in its funding programs for applicants to locate their projects in areas disproportionately burdened by diesel pollution. There are a number of ways that Connecticut could incorporate this recommendation. For instance, the RFP could, within the scoring criteria, provide an increased number of points awarded to projects in such areas versus those outside of them. Alternatively, if the Connecticut opted for a more focused approach, the RFP could limit eligibility to only those projects located in these areas – this would ensure the most focused emissions reductions.

Appendix D of the Second Partial Consent Decree provides insufficient guidance on the list of eligible fuel types – e.g., "diesel or Alternate Fueled (e.g. CNG, propane, Hybrid)". To remedy that situation and clarify eligibility, we recommend that Connecticut specifically include hydraulic hybrids in its funding programs to avoid confusion or exclusion.

Hydraulic hybrid technology captures energy from the motion of the vehicle as the driver brakes. This energy is returned to the vehicle during acceleration in order to reduce the amount of fuel used, thereby improving the overall efficiency of the vehicle. This technology design is capable of delivering multiple key benefits:

- *NOx emissions reductions:* Lightning's hydraulic hybrid can reduce up to 50% of baseline NOx emissions
- *Rapid return on investment:* Operators typically recoup investments in one to five years
- *Broad applicability:* The technology can be applied across a wide variety of urban vehicles
- *Efficient project timelines:* The technology can be installed in under one day on existing vehicles

These benefits are not only available for new vehicles, but are also available to fleets seeking to repower existing vehicles. In fact, we have found that this repower solution is particularly effective for budget-conscious fleets with substantial remaining vehicle lives – many fleets keep their vehicles for 20 years or longer. Thus, by allowing applicants to propose repower projects with hydraulic hybrid technology, we expect that Connecticut can stimulate a more widespread adoption of clean transportation technologies, which will have more significant NOx reductions pursuant to the principal goal of the Decree.

We find it worth noting that the clean transportation technology landscape is filled with myriad fuel options, many of which are extremely cost-intensive. The use of hydraulic hybrid technology, however, provides extremely cost-effective NOx reductions. This means that, for any given level of funding, state investment in hydraulic hybrid projects will deliver far more NOx reductions and their beneficial impact on the environment and human health than with state investments in more cost-intensive (and potentially unproven) vehicle technologies or fuel types. Further, all-electric and gaseous fuel vehicles require significant infrastructure that may difficult to attain for many fleets. This is not the case with hydraulic hybrid vehicles, which do not require any additional refueling infrastructure.

Summary

We appreciate the opportunity to submit these recommendations as to how Connecticut can develop and administer Environmental Mitigation Trust grant programs that most efficiently yield cost-effective NOx reductions, which will in turn generate air quality and public health benefits. Hydraulic hybrid technologies are just one of a concert of advanced vehicle and fuel technologies capable of delivering NOx reduction benefits; however, based in the information and data presented above, we find that they are the most cost-effective for a variety of vehicle platforms.

We look forward to future collaboration with Connecticut and thus request a meeting to discuss the Environmental Mitigation Trust opportunity further. Please respond with your preferred method of scheduling this meeting and we will follow-up as requested.

Sincerely,

Tim Reeser
Chief Executive Officer and Co-Founder
Lightning Systems

VW Settlement Comments

Will Whitman <will-whitman@snet.net>

Tue 6/27/2017 5:17 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name:Will Whitman
Job Title:Fleet Manager
Company:Redding Highway Dept

Comments:We would like to use some of the grant $$ to replace some of our older diesel trucks and heavy equipment...We are currently using a Vac truck that is 28 years old and our water truck is almost 30 years old....We have a backhoe and a loader that are both 15 years old...As budgets get tighter and tighter, the highway Dept has always been the sacrificial lamb when it comes to $$$....And our fleet reflects this with it's antiquated equipment.please consider us for some of the grant monies when it comes to pass.

Sent from my Verizon 4G LTE Droid

VW Settlement Comments - Electric Bus

Judah Aber <judah@ebstart.com>

Fri 6/30/2017 3:20 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: Judah Aber
Job Title: Principal
Company: EB START Consulting

Comments: Diesel, hybrid-diesel and CNG transit buses all emit particulate matter, nitrous oxides and other chemicals that are harmful to the heart and respiratory systems of our citizens. Transit buses that run in more densely populated regions, cities, impact more people than in more rural settings. Switching to electric buses in the larger, more densely populated cities, would have the most beneficial impact to the state.

My suggestion is to use a portion of the VW Settlement funds to provide transit agencies in the most densely populated regions with the money required to get them started on using electric buses. Transit agencies are normally hesitant, like many of us, to make significant changes in technology because there are many challenges and unknowns. Once the transit agencies understand the new technology, they would have no issue with continuing to add more electric buses to the fleet. So the state should ask each of the larger transit agencies to put together a plan, describing their needs to get started with electric buses. This will force the transit agencies across the first knowledge hurdles. Then, by funding the transit agencies for their initial capital and infrastructure needs to get started with electric buses, the transit agency knowledge will continue to grow as they make use of the technology and there will be no more hesitation to buy more.

Costs are roughly as follows. Electric buses cost about $200K each more than current buses. As an aside, maintenance costs and fuel costs are lower, so the total cost of ownership of electric buses is cheaper. The transit agencies will also need to install charging stations at a cost of about $60K each for depot chargers. On Route chargers are also available, but at a cost closer to $400k each installed. Some transit agencies may also need some funds for depot reconfiguration. Assuming that the transit agency determines that they want to start with 3 buses, that would cost about $600K for the excess bus cost plus about $180K for depot chargers plus perhaps $200K for depot reconfiguration for a total of about $980K. If 1 on route charger is added, that would be about $1,380K total. As an alternative, the state could decide that the transit agency is more heavily incented if the state pays for the total electric bus. That would add $1,650K to the other totals. So the total for the transit agency would be $2,630K with 3 buses and 3 depot chargers and would be $3,030K for 3 buses, 3 depot chargers and 1 on route charger.

Please let me know if you have any questions or would like to discuss.

Regards,
Judah Aber, Principal
EB START Consulting
www.ebstart.com
www.linkedin.com/in/judahaber
(914) 420-4780

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202.326.5500 | www.autoalliance.org

July 6, 2017

Mr. Paul Farrell - DEEP Assistant Director of Air Planning
Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

Re: Environmental Mitigation Trust Fund Allocation – ZEV Infrastructure

Dear Mr. Farrell:

On behalf of the Alliance of Automobile Manufacturers (Alliance)[1], I am writing to you today to encourage the State of Connecticut to apply for Environment Mitigation Trust (EMT) funds from the Volkswagen settlement agreement, and to allocate 15 percent of that funding to electric vehicle charging stations and hydrogen refueling 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. Connecticut is eligible to receive $55,721,169. This funding is available and requires no matching funding from the state 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, 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 $8,358,175) of its allocation for electric vehicle charging stations and hydrogen refueling stations.

Automakers have made enormous investments to promote electric and fuel cell vehicle technologies, spending tens of billions of dollars on research and development, assembly plant modifications, production and promotion of plug-in hybrid electric vehicles, battery electric vehicles and fuel cell electric vehicles (hereafter referred to collectively as "electric vehicles").

Automakers currently offer 32 different electric vehicle models in the United States, and over 70 models are expected by 2021. Electric vehicles are offered in all different shapes and sizes – mini-compacts, two-seaters, subcompacts, compacts, midsize and large sedans, station wagons, SUVs, mini-vans – with both two-wheel drive and six different all-wheel drive options.

[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.

Customer acceptance to date, however, suggests product offerings alone will not suffice to build a self-sustaining, robust, and growing 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 fuel.

Public infrastructure for electric vehicles charging stations or hydrogen fueling stations not only relieves "range anxiety," but also raises consumer awareness of the technology. Connecticut's infrastructure is currently falling behind current vehicle offerings and in desperate need of a kick-start. For perspective, Connecticut has 2,117 gasoline stations (and vastly more "pumps"), but only has 292 public electric charging stations and one public hydrogen/fuel cell station.

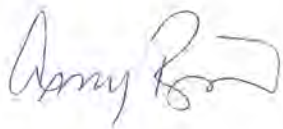
As you know, Connecticut is one of nine states that adopted California's Zero Emission Vehicle (ZEV) Mandate, which requires rapidly increased sales of electric vehicles within a very short timeframe. In 2013, Governor Malloy joined the Governors of seven other ZEV states to sign a Memorandum of Understanding that sets the goal of having 3.3 million electric vehicles on collective roads by 2025. For example, Connecticut's share is 149,473 vehicles. Unfortunately, today, Connecticut is only 3.4 percent towards that sales goal.

As automakers offer more electric vehicles, Connecticut must focus on developing both electric charging station and hydrogen fueling infrastructure. A comprehensive roadmap should be developed and implemented in cooperation with state and local governments, fuel providers (both electric and hydrogen), and workplaces.

Infrastructure is vital to the ZEV market now and in the future. The Alliance and our members recommend Connecticut apply for funding under Appendix D of the EMT Fund, and allocate 15 percent toward electric vehicle infrastructure.

We will continue working with the Governor, the Department of Energy and Environmental Protection, and the legislature 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/

VW Settlement Comments

Carl Zimmerman <czimmerman@westcog.org>

Thu 7/13/2017 10:24 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: Carl Zimmerman
Job Title: Senior GIS Manager
Company: WestCOG

Comments: An analysis of CT DMV EV vehicle data by the Western Connecticut Council of Government show ownership location data and distribution of charging stations that are very unevenly distributed in CT. There is a disconnect between state subsidies and ownership patterns. We believe that a metric should be developed to establish a ratio between EV ownership and number of charging stations both on a per town basis and per transportation corridor basis . Those locations that are underserved by charging stations or have a comparatively larger number of EVs should get a weighted advantage in terms of statewide funding and subsidies.

Also, the primary advantage in terms of greenhouse gases for EVs and PHEVs involves the life cycle savings and location reduction of pollutants. Therefore, an emphasis should be placed on providing annual incentives or mileage incentives to encourage maximum EV usage within a vehicle life cycle. This would encourage vehicle usage and provide less incentive for lifestyle or recreational usage. Also, a weighted advantage should go to vehicle owners in the locations with the highest amounts of air pollutants or owners who utilize multimodal transportation.

CARL ZIMMERMAN
Senior GIS Manager, Western Connecticut Council of Governments
tel/fax 475-323-2061 · czimmerman@westcog.org

web westcog.org · *post* 1 Riverside Road, Sandy Hook, CT 06482

VW Settlement Comments

Edward May <edward@energyintelpartners.com>

Fri 7/14/2017 3:24 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: Edward May
Job Title: CFO
Company: Blue Gas Marine

Comments: All CNG marine engines, not just ferries and tugs, should be eligible to receive funds under the settlement. Marine engine burn more than 10x as much fuel per mile as on road, and marine diesel engines are far more polluting than on road. Installing CNG engines and on water refueling stations will have a disproportionate benefit to emissions in the state.

VW Settlement Comments -

Peter D <peter.damrosch@gmail.com>

Thu 8/3/2017 8:43 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: Peter Damrosch
Job Title: Graduate Student - Law and Transportation
Company: Yale Law School/MIT Department of Urban Studies and Planning

Comments:

I'm a graduate student in law and urban planning. As a law student, I understand how hard the state's environmental regulators and AG's office work to enforce our air-quality laws and ensure that everyone in our state can breathe clean and healthy air. As a transportation planner, I'm excited by the possibility to use the VW money in a way that not only mitigates the direct harms from VW's pollution but also catalyzes broader excitement for getting rid of tailpipe emissions altogether.

To that end, I would urge the state to use the VW money to replace dirty diesel buses with zero-emission electric school buses. Zero-emission school buses can be a home run for Connecticut. By replacing diesel engines with electric power, the state can reduce the rates of asthma and respiratory illnesses while providing new vehicles to help get kids to school. With reduced fuel and maintenance costs, electric buses offer long-term operating savings, helping us transform a one-time expenditure (the VW settlement money) into a stream of on-going costs savings. And by charging at off-peak times, electric school buses will ease the pressure on the grid, smoothing energy ramp-up curves and saving us all money on our bills.

Reaching our climate and zero-emission vehicle goals requires seizing opportunities when they arise. Electric school buses are a strong candidate for the VW settlement funds given both the immediate and long-term benefits they offer for kids, public health, and the environment.

Sincerely,
Peter Damrosch

MCP '19, MIT / JD '20, Yale Law School
peter.damrosch@yale.edu
917-863-9952

The Environmental Mitigation Trust

Avery Arzu <avery.arzu@gmail.com>

Fri 8/11/2017 7:37 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

To whom this may concern,

EV Connect Inc. proposes Connecticut utilize the total allowable funds for development of EV charging infrastructure to support EV travel within and through the state.

Best,
Avery Arzu
(EV Connect)

VW Mitigation Plan - Highest NOX reduction for $ invested

Julie Brooks <julieb@orangeev.com>

Mon 8/14/2017 10:42 AM

To: Corsino, Louis <Louis.Corsino@ct.gov>; DEEP MobileSources <DEEP.MobileSources@ct.gov>;

2 attachments

Comments from Orange EV re VW Mitigation Funds - Highest Emission Reduction for $ invested - 100% Electric Heavy Duty Class 8 Trucks.pdf; ATT00001.htm;

Good morning,

As you continue to develop your state plan, please consider the following updated information from Orange EV:

Orange EV manufactures 100% electric heavy duty (Class 8) yard trucks, a proven solution to replace diesel yard trucks, currently deployed in fleets from California to New York with 75% of fleets re-ordering within 6 months of receiving their first truck.

Diesel yard trucks are heavy emitters releasing more than one ton of NOx per truck per year (and much more in high usage operations). As such, they are a natural fit for Volkswagen funding given the primary goal to reduce NOx emissions. Yard trucks are currently eligible for funding under Categories 1 and 8 of the Consent Decree. Some of the Consent Decree wording is undefined, however, and may unintentionally preclude ~80% of these valuable projects.

Please see the attached letter for a brief overview of yard truck operations, where they fit under the VW Consent Decree, and how they can deliver cost effective emission reductions for your state mitigation plan. **Note that this is a different letter from the one previously submitted in May 2017 and offers new/expanded information.**

Thank you for your time and consideration.

Respectfully,

Julie Brooks
Orange EV, **Pure Electric Terminal Trucks**
"Spend 90% Less in Fuel to Haul the Same Load with No Diesel and No Emissions"
Address: 500 NW Business Park Lane, Riverside, Missouri 64150 (10 *minutes from Kansas City)*
Phone: 503-544-8694 **Office:** 866-688-5223 x720 **eMail**: JulieB@OrangeEV.com
Website: www.OrangeEV.com

July 31, 2017

Subject: **Highest NOx reduction for $ invested. 100% electric yard trucks (class 8 / heavy duty)**
Developing VW Mitigation Plans to deploy HDEVs

Orange EV electric yard trucks are eligible for Volkswagen funding under Categories 1 and 8 of the Consent Decree and will generate highly desirable projects:

- **Diesel yard trucks** operate mostly in industrial areas surrounded by disadvantaged communities. These diesels are Class 8, heavy duty trucks that can work around the clock (24 x 7 x 365), producing high noise levels and diesel emissions - greater than a ton of NOx per truck annually in the moderate uses. Many times that in older diesel trucks and heavier usage sites.

- **Electric yard trucks** deliver very high emissions reduction for the money invested and are safer and healthier for employees and neighborhoods.

- **Orange EV electric yard trucks are**:
    1. Proven and commercially deployed from California to New York
    2. Emission-free, eliminating 100% of diesel and diesel emissions
    3. Cooler, smoother, quieter and cleaner as there's no engine, transmission or tailpipe

Leading fleets are ready to commit to larger deployments of Orange EV trucks using VW funds. Orange EV is the first and only to commercially deploy pure-electric yard trucks; 75% of fleets have re-ordered within 6 months of receiving their first truck.

Please read this commentary to better understand where yard trucks fit under the VW Consent Decree and how they can deliver cost effective emission reductions for your state mitigation plan.

Please contact us if we can be of any assistance.

Respectfully,
Mike Saxton
Orange EV, Chief Commercial Officer
MikeS@OrangeEV.com
816-210-9669

Please note: "yard truck" is used to mean the same vehicle known by many names including: terminal truck, UTR, drayage truck, hostler, spotter, shifter, shunt and more. These can all refer to the same truck type.

Where and How Yard Trucks are used

Yard trucks are used in a wide range of goods movement operations from waste transfer stations to warehouses, distribution centers, manufacturing plants, rail intermodal yards, seaports and more. As a result, they typically operate in highly impacted non-attainment areas. Replacing heavy-emitting diesel yard trucks with 100% electric vehicles dramatically reduces NOx emissions and other pollutants. Given the immediate emissions reductions and positive impact of switching to 100% electric trucks, it's clear that **Volkswagen Mitigation Plan funding dollars will be well spent on yard truck replacement (and repower) projects**.

Yard trucks generally move cargo containers within the confines of a facility's freight/cargo yard. They are often confused with higher speed, long distance semi-tractors (semis) that haul cargo containers over-the-road. When a loaded semi arrives at a facility yard, it unhooks from its cargo container and the yard truck takes over to re-position that same container within the yard for unloading, reloading, and positioning for the next long-haul trip, all at speeds under 25 mph. While semis generate high mileage, they operate fewer hours (10-12 per day) compared to yard trucks which work 24x7 generating up to 2-3x the engine hours. With yard trucks operating around the clock, they have high hours of operation, high diesel emissions, and often high idle time but low mileage since they operate in a relatively constrained environment.

Eligibility for Volkswagen Mitigation Funds

Orange EV's T-Series electric terminal truck is a "Zero Emission Vehicle (ZEV)", defined in Appendix D-2 of the VW Consent Decree as a "vehicle that produces no emissions from the onboard source of power (e.g., All-Electric or hydrogen fuel cell vehicles)."

Orange EV yard trucks are eligible for VW funding under two Appendix D-2 Categories:

- **Category 1 "Class 8 Local Freight Trucks and Port Drayage Trucks"**
  - Orange EV's truck is a Class 8 truck with GVWR of 40,900 lbs, over the prescribed 33,000 lbs.
  - Yard trucks hauling cargo containers meet the definition of trucks "…used for port drayage and/or freight/cargo delivery…" where drayage trucks are defined as "trucks hauling cargo to and from ports and intermodal rail yards".
- **Category 8 "Forklifts and Port Cargo Handling Equipment"**
  - Port Cargo Handling Equipment is defined as "rubber-tired gantry cranes, straddle carriers, shuttle carriers, and terminal tractors, including yard hostlers and yard tractors that operate within ports."
  - In this category, terminal tractors, yard hostlers, and yard tractors (all the same vehicle) are specifically identified.

As described above, yard trucks are clearly eligible for VW funding under Categories 1 and 8. Some states may however inadvertently preclude ~80% of sites with yard trucks due to interpretation of the word "port" in both categories. Yard trucks do the same job - and achieve similar emissions reductions - whether at a port or other busy container handling facility. If yard truck replacements and repowers are limited to traditional "seaports", desirable projects in highly impacted communities will be missed. Please consider:

- The term "port" in common usage now includes inland container handling sites. Nationwide, container-handling facilities have moved away from coastal seaports and are often clustered at transportation hubs that are essentially "inland ports".
- These inland ports are often located in disadvantaged communities and non-attainment areas.
- Diesel yard trucks add significant emissions, negatively impacting areas already overburdened with poor air quality.
- On average, 80% of yard trucks operate in LTL freight, manufacturing, retail distribution, waste management, warehouse, railroad inter-modal, and other container-handling operations; only 20% operate in traditional seaports.
- Specifically defining a "port" to include inland container handling sites (essentially any goods movement operation) achieves state and Mitigation Fund goals of rapidly reducing NOx emissions in highly impacted areas.

Emissions Reductions

Figures vary by site and usage but when replacing a heavy-emitting diesel with 100% electric, emissions reductions are dramatic. Orange EV estimates that compared to Tier 3 diesel engines operated 6,000 hours at 2.5 gallons per hour that the annual, per-truck emissions eliminated can be:

166 tons CO2 **1.7 tons NOx** 1.6 tons CO 81.5 kg PM

These figures are higher for older diesel trucks (being repowered or replaced). In lighter-use operations with diesels operating 2,800 hours at 1.5 gallons per hour, annual emissions reductions have been estimated around 77 tons CO2, 0.8 tons NOx, 0.7 tons CO, and 37.9 kg PM.

California's South Coast Air Quality Management District (SCAQMD) has corroborated these calculations in their incentive funding contract with a national freight carrier utilizing Orange EV trucks. SCAQMD estimated that replacing a 2008 Tier 3 diesel operating 3,200 hours with an Orange EV electric reduces annual NOx emissions by 1.0 ton, and replacing a 2005 Tier 2 diesel operating 1,200 hours reduces annual NOx emissions by 1.2 tons.

Cost and Incentives

Currently a new Orange EV T-Series Terminal Truck with a 160 kWh battery pack and standard onboard charging costs $284,950; a similar remanufactured T-Series costs $239,950. Depending on the site, the required electrical infrastructure can cost a few thousand up to tens of thousands of dollars per truck. With a new Tier 4 diesel priced between $100,000 to $125,000 (and used, legal diesel trucks from $25,000 to $50,000), incentive funding continues to be critical to encourage companies to adopt electric. **Incentives reduce the higher costs of the truck, charging, and electrical infrastructure** while also helping mitigate the "risk premium" assigned by fleets when considering new technology since **under VW, grants can pay for up to 75% of the entire project**.

Accelerate Deployment of Heavy Duty Electric Trucks

Both regional and national fleets hope to use VW funds to deploy electric yard trucks nationwide. The VW Mitigation Fund provides the opportunity to: 1) expand rapidly into states that don't have significant sources of incentive funding; and 2) help pay for potentially steep infrastructure costs which aren't always eligible under current incentive programs.

Yard trucks operate out of the public eye, but word can spread quickly within companies and among fleet operators. Successful truck deployments are newsworthy and generate interest in a way that overcomes pre-conceived notions about the viability of heavy-duty electric vehicles. Press releases and site visits promote electrics and speed adoption of green technologies – seeing is believing and success begets more deployments.

Orange EV manufactures the first commercially deployed Class 8, 100%-electric vehicles. **75% of Orange EV's fleet customers have re-ordered in less than six months of receiving their first truck.** VW funding will accelerate this trend.

Reduce NOx: Ensure Yard Truck Eligibility

Repowering or replacing existing diesel yard trucks with Orange EV electric yard trucks accomplishes state and Mitigation Plan goals of significantly reducing NOx emissions and other pollutants, benefiting disadvantaged communities and non-attainment areas, and deploying proven, 100% electric ZEVs. Accordingly, we believe the Consent Decree intends for yard trucks to be eligible wherever they operate today.

Please ensure that all yard truck operations are eligible under your state VW Beneficiary Mitigation Plan, not just seaport operations. Eligibility can be explicitly demonstrated in both Categories 1 and 8 of your state's Mitigation Plan and/or identified in internal implementation guidelines. Eligibility could also be achieved by proactively seeking further clarification with Wilmington Trust.

Thank you for your help. Together we can reduce harmful NOx emissions and create a healthier environment.

vw settlement funds

Michael Kryzanski <mkryzanski@yahoo.com>

Fri 8/18/2017 11:34 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Name: Michael Kryzanski
Job Title: I.T. Analyst III State of CT
Company: Department of Rehabiliation Services, State of CT
Comments: I would like to see some of this funding used to install an EV charging station in parking spaces directly adjacent to the town green in Southington where I live. There is a need for this as this area is a focal point for the community. It is our downtown; there are many shops and restaurants; many people go to this area; this would help draw more people to the downtown; it sends the proper message that our town is serious about the environment and the issues of global warming.

Please let me know if there is something I can do (like writing a grant proposal) to make this happen.

Thank you!

VW Settlement

Sylvain B <slyy67@yahoo.com>

Mon 8/21/2017 7:58 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

The town of Granby, CT, is in need of EV Charging stations. We don't even have one! I drive an electric Fiat 500e. I've seen other EV's in Granby and nearby towns. The Granby Public Library would be a perfect location for an EV Charging Station.

Thanks.

Sylvain Beloin
860-895-7959

September 22, 2017

Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

Re: Penske Comments on VW Funding Planning

To Whom It May Concern:

Penske would like to thank the Connecticut Department of Energy and Environmental Protection (DEEP) for the opportunity to provide comments on the Volkswagen settlement funding plan for the state. DEEP 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 don't 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's 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

VW Settlement Comments

Brett Barry <Brett.Barry@cleanenergyfuels.com>

Mon 10/16/2017 12:05 PM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

1 attachment

VW Coalition Letter Connecticut.pdf;

Name: Brett Barry
Job Title: Senior Policy Advisor
Company: Clean Energy

Comments: A coalition letter from 13 nationwide companies and organizations is attached. We welcome any opportunity to further discuss the letter.

Regards,

Brett Barry
Senior Policy Advisor
Clean Energy
(562) 522-7427
bbarry@cleanenergyfuels.com

October 16, 2017

Commissioner Rob Klee
Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106

RE: Volkswagen Settlement Emissions Mitigation Plan

Dear Commissioner Klee:

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 Connecticut. 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.

We encourage Connecticut 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 Connecticut'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 Connecticut. 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
psquair@npgra.org

Marcus Gillette
Director of Public and Government Affairs
Coalition for Renewable Natural Gas
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Mike Goscinski
Director, Government Relations
American Bakers Association
mgoscinski@americanbakers.org

From: Kyle Clark
Sent: Monday, October 23, 2017 1:52 PM
To: 'deep.mobilesources@ct.gov' <deep.mobilesources@ct.gov>
Subject: VW Settlement Comments

Name: Kyle Clark
Job Title: Vice President, Business Development
Company: EnSave, Inc.

Comments:

We are interested in running a project to replace and/or retrofit diesel fueled agricultural tractors with electric tractors. Tractor replacement would result in a 100% reduction in diesel use for on-farm tractors (which typically require 5-7gallons per acre per year). NOx reductions could further be enhanced by expanding the scope of the project to include agricultural practices such as no-till (or reduced tillage), precision fertilizer application, etc. While these latter activities may not qualify for incentives through the VW funds, they would enable us to bring in other third-party grants or financing to enhance the project (e.g. USDA grants).

The project would be extremely innovative in that agricultural vehicle electrification is just now becoming possible. There would be a 100% reduction in on-farm GHG emissions from tractors, and the possibility of powering tractors with distributed generation (e.g. on-farm solar PV or anaerobic digester). We are working closely with several entities including the Innovation Center for U.S. Dairy and National Rural Electric Cooperative Association to explore the potential and benefits of tractor electrification, and we would be very excited to utilize our expertise to run a NOx reduction project in Connecticut. EnSave has designed and implemented agricultural energy and GHG reduction programs throughout the US for the past 25 years.

Thank you for your consideration. Please feel free to contact me if you'd like to discuss further.

Best regards,

Kyle Clark
VP, Business Development
EnSave, Inc.
Direct: 802-434-1827 Toll-free: 800-732-1399
www.ensave.com

November 1, 2017

Governor Dannel P. Malloy
State Capitol
210 Capitol Avenue
Hartford, CT 06106

RE: Connecticut Electric Vehicle Coalition Recommendations Regarding Volkswagen Mitigation Trust Fund

Dear Governor Malloy:

The Connecticut Electric Vehicle (EV) Coalition[1] is pleased to write you to share our excitement regarding the recent progress with the Volkswagen Settlement, and to urge the state to move forward as quickly as possible to take advantage of and begin benefiting from settlement funds available to expand Connecticut's EV charging infrastructure and make other critical advancements toward electrifying our transportation sector.

As you are aware, in October 2016, a federal court in California entered a consent decree resolving claims that Volkswagen (VW) had installed defeat devices in certain diesel vehicles—including those sold in Connecticut—designed to cheat emissions tests. Vehicles equipped with these devices emitted smog-forming nitrogen oxides at levels up to 34 times those permitted under the Clean Air Act. Connecticut continues to struggle with unsafe levels of smog, which is a potent asthma trigger and disproportionately affects low-income communities and communities of color in the state. The transportation sector is responsible for two-thirds of the state's smog forming nitrogen oxide emissions. To help mitigate the impacts of VW's unlawful emissions, the consent decree establishes a mitigation trust for use by states to replace dirty diesel vehicles and advance electric vehicle charging infrastructure. These funds are an important opportunity for Connecticut to advance cleaner transportation, promote air quality, and protect public health in Connecticut.

On October 2, 2017, the United States filed the fully executed trust agreement with the court, triggering a 60-day window for states like Connecticut to elect to become beneficiaries. We fully support Connecticut's plan to claim its $55.7 million share of the mitigation trust funds by submitting a Certification for Beneficiary Status with the court and designating a lead agency by no later than December 1, 2017. We then urge the state to finalize and implement a mitigation plan to expeditiously invest in clean, electric vehicle options, and help curb harmful smog levels in Connecticut. We previously commended your Department of Energy and Environmental Protection (DEEP) for proactively preparing a Proposed Draft State of Connecticut Mitigation Plan for public input even before the Trust Effective Date, and for proposing to allocate 15

[1] The Connecticut EV Coalition supports policies that will put more electric vehicles ("EVs") on the road in Connecticut to achieve significant economic, public health, and climate benefits for our state. The current EV Coalition Steering Committee includes: Acadia Center, Chargepoint, Clean Water Action, Connecticut Fund for the Environment, CT Roundtable on Climate & Jobs, Environment Connecticut, the International Brotherhood of Electrical Workers, and the Sierra Club. More information is available at http://www.ctenvironment.org/ct-electric-vehicle-coalition.

percent of the state's VW settlement mitigation trust funds to light duty electric vehicle charging infrastructure—the full amount authorized under the settlement.[2] We now urge you to take the next steps to advance electric vehicles by finalizing a State Mitigation Plan that maximizes investment in electric vehicle conversions, and submitting this plan to the trustee as soon as possible to begin the flow of settlement dollars into Connecticut.

The VW settlement funds present an unparalleled opportunity to accelerate vehicle electrification in Connecticut. Electric vehicle investments – which will keep money in the state – are the right choice for Connecticut. Since Connecticut neither produces nor refines petroleum products in-state, the majority of the spending on petroleum fuels for transportation—$4.6 billion in 2015[3]—leaves the state. Moreover, investments in electrification, particularly electrification of transit buses, will help benefit some of the communities that have been the most adversely affected by air pollution. Through your Governor's Council on Climate Change, analysis has been developed showing that Connecticut must almost completely electrify its transportation sector in order to meet the state's Global Warming Solutions Act's 2050 goal. You have also advanced vehicle electrification through programs like the Connecticut Hydrogen and Electric Automobile Purchase Rebate (CHEAPR), which is a best-in-class, successful electric vehicle rebate program. We hope you will continue to build on these achievements with a State Mitigation Plan that supports expeditious transportation electrification in Connecticut.

The Connecticut EV Coalition looks forward to engaging with you and DEEP on the final State of Connecticut Mitigation Plan and advancing our shared goals of a cleaner, healthier, cheaper and more equitable transportation sector in Connecticut.

Sincerely,

The Connecticut Electric Vehicle Coalition

- Acadia Center
- Connecticut Automotive Retailers Association
- Connecticut Fund for the Environment
- Connecticut Roundtable on Climate & Jobs
- ConnPIRG
- Conservation Law Foundation
- ChargePoint
- Chispa
- Clean Water Action
- Drive Electric Cars New England
- Energy Solutions, LLC
- Environment Connecticut
- Greater New Haven Clean Cities Coalition
- Hamden Land Conservation Trust

[2] Connecticut Electric Vehicle Coalition, Comments on the Draft Proposed State of Connecticut Mitigation Plan under the Volkswagen 2.0L Partial Consent Decree, Appendix D (submitted to CT DEEP, Mar. 6, 2017).
[3] U.S. Energy Information Administration, State Energy Data 2015, Total Petroleum Price and Expenditure Estimates, 2015, available at (https://www.eia.gov/state/seds/sep_fuel/html/pdf/fuel_pr_pa.pdf)

- International Brotherhood of Electrical Workers
- People's Action for Clean Energy (PACE)
- Proton OnSite
- Plug In America
- RENEW Northeast
- Sierra Club
- Solar Connecticut, Inc.
- Tesla Motors
- Union of Concerned Scientists
- Westport Electric Car Club

Cc: Rob Klee, Commissioner, DEEP
Anne Gobin, Chief, Bureau of Air Management, DEEP

New comments from Orange EV re Connecticut's VW Beneficiary Mitigation Plan

Julie Brooks <julieb@orangeev.com>

Mon 11/6/2017 3:26 PM

To: Corsino, Louis <Louis.Corsino@ct.gov>; DEEP MobileSources <DEEP.MobileSources@ct.gov>;

Cc: Mike Saxton <MikeS@OrangeEV.com>;

2 attachments

Comments from Orange EV re VW Beneficiary Mitigation Plan 11-2-17.pdf; ATT00001.htm;

Hi Lou,

Since we last spoke, we've compiled new information that you might find useful. Please see the attached letter for updated comments from Orange EV. Thank you for considering input as you develop your state Volkswagen Beneficiary Mitigation Plan.

The attached letter provides new information not contained in previous Orange EV submissions. Items that may be of particular interest include:

- **Owner/operator complexities**: There is a complex tapestry of ownership and operations associated with third party logistics and yard management companies. Frequently, several parties pay for different aspects of one project creating a need for: 1) separate incentive funding for all aspects of a project (truck, charging, and infrastructure); and 2) a unique incentive funding structure allowing multiple contracts under one project umbrella.
- **Cost parity calculations:** We provide a detailed table comparing the cost of an Orange EV pure electric yard truck vs. the cost of a Tier 4 diesel refurbishment, including the incentive level required to achieve cost parity.
- **Greater emissions reductions:** A 2017 analysis found that in diesel trucks with significant idling, low speeds, or low loads, the engine temperatures do not reach levels that support sustained selective catalytic reduction (SCR) performance, resulting in emissions up to 10x higher than the 2010 EPA NOx standard. Current emissions calculations for yard trucks estimate average reductions of 1-2 tons of NOx per truck per year, but given that yard trucks typically operate 10-15 mph, actual reductions may be far higher.

Each of these topics is discussed in more detail in the attached letter, along with other requests and recommendations.

As you know, 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. We would be happy to set up another conference call to answer questions and/or provide further information.

Thank you!
-Julie

Julie Brooks
Orange EV, Pure Electric Terminal Trucks
"Spend 90% Less in Fuel to Haul the Same Load with No Diesel and No Emissions"
Address: 500 NW Business Park Lane, Riverside, Missouri 64150 (10 minutes from Kansas City)
Phone: 503-544-8694 Office: 866-688-5223 x720 eMail: JulieB@OrangeEV.com
Website: www.OrangeEV.com

November 2, 2017

Subject: Developing the state's Volkswagen Beneficiary Mitigation Plan

Thank you for considering these comments regarding the development of your 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 the 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
MikeS@OrangeEV.com
816-210-9669

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 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

OrangeEV.com 500 NW Business Park Lane, Riverside, MO 64150 866-688-5223

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.

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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, the state 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.

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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.

OrangeEV.com 500 NW Business Park Lane, Riverside, MO 64150 866-688-5223

Summary

To realize cost effective emissions reductions in the state'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.

OrangeEV.com 500 NW Business Park Lane, Riverside, MO 64150 866-688-5223

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15 December 2017

Enervee Comments to the attention of the Connecticut Department of Energy and Environmental Protection
VW Settlement – Beneficiary Mitigation Plan

Enervee appreciates the opportunity to contribute to the Beneficiary Mitigation Plan that the Connecticut Department of Energy and Environmental Protection 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 Connecticut Department of Energy and Environmental Protection lay the groundwork for a self-sustaining market for clean vehicles in Connecticut 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 Connecticut Department of Energy and Environmental Protection 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.

VW Settlement Comments

frank@medicaire.net

Thu 1/11/2018 3:24 PM

To: bmcgregor@aidea.org <bmcgregor@aidea.org>; matthew.hanson@azdoa.gov <matthew.hanson@azdoa.gov>; treecep@adeq.state.ar.us <treecep@adeq.state.ar.us>; lisa.williams@arb.ca.gov <lisa.williams@arb.ca.gov>; Christine.hoefler@state.co.us <Christine.hoefler@state.co.us>; Corsino, Louis <Louis.Corsino@ct.gov>; VW_Mitigation_Plan@state.de.us <VW_Mitigation_Plan@state.de.us>; Preston.McLane@dep.state.fl.us <Preston.McLane@dep.state.fl.us>; margaret.s.larson@hawaii.gov <margaret.s.larson@hawaii.gov>; dbedt.vwsettlement@hawaii.gov <dbedt.vwsettlement@hawaii.gov>; g.michael.brown@deq.idaho.gov <g.michael.brown@deq.idaho.gov>; brad.frost@illinois.gov <brad.frost@illinois.gov>; stuart.anderson@iowadot.us <stuart.anderson@iowadot.us>; angela.poole@iowadot.us <angela.poole@iowadot.us>; jim.mcgraw@dnr.iowa.gov <jim.mcgraw@dnr.iowa.gov>; kdhe.ksvwsettlement@ks.gov <kdhe.ksvwsettlement@ks.gov>; Rick.Bender@ky.gov <Rick.Bender@ky.gov>; lona.brewer@ky.gov <lona.brewer@ky.gov>; tim.shepherd@maryland.gov <tim.shepherd@maryland.gov>; vw.settlement@state.ma.us <vw.settlement@state.ma.us>; swartzd@michigan.gov <swartzd@michigan.gov>; jacksonr20@michigan.gov <jacksonr20@michigan.gov>; rocky.sisk@state.mn.us <rocky.sisk@state.mn.us>; kmaki@mt.gov <kmaki@mt.gov>; randy.smith@nebraska.gov <randy.smith@nebraska.gov>; jperreira@ndep.nv.gov <jperreira@ndep.nv.gov>; timothy.white@des.nh.gov <timothy.white@des.nh.gov>; Rita.Bates@state.nm.us <Rita.Bates@state.nm.us>; vwcomments@dep.nj.gov <vwcomments@dep.nj.gov>; vw.append@dec.ny.gov <vw.append@dec.ny.gov>; Carolyn.watkins@epa.ohia.gov <Carolyn.watkins@epa.ohia.gov>; vwsettlement@deq.ok.gov <vwsettlement@deq.ok.gov>; Andrew.E.DICK@odot.state.or.us <Andrew.E.DICK@odot.state.or.us>; Kevin.downing@state.or.us <Kevin.downing@state.or.us>; saharmon@pa.gov <saharmon@pa.gov>; Rachel.Andes@phila.gov <Rachel.Andes@phila.gov>; Allison.Callahan@dem.ri.gov <Allison.Callahan@dem.ri.gov>; Barb.Regynski@state.sd.us <Barb.Regynski@state.sd.us>; Alexa.Voytek@tn.gov <Alexa.Voytek@tn.gov>; Molly.cripps@tn.gov <Molly.cripps@tn.gov>; lburr@utah.gov <lburr@utah.gov>; vwmitigation@deq.virginia.gov <vwmitigation@deq.virginia.gov>; Brett.rude@ecy.wa.gov <Brett.rude@ecy.wa.gov>; michael.boyer@ecy.wa.gov <michael.boyer@ecy.wa.gov>; 'mailto:AndrewG@pscleanair.org' <>; perry.j.McCutcheon@wv.gov <perry.j.McCutcheon@wv.gov>; Alexandra.catena@dc.gov <Alexandra.catena@dc.gov>; jsimpson@lakeems.org <jsimpson@lakeems.org>;

Cc: blavelle@medicaire.net <blavelle@medicaire.net>;

1 attachment

IMG_3541 Medidock new.jpg;

Beneficiary Mitigation Plan for Volkswagen Settlement
Comments: January 11,2018
Use of Volkswagen settlement funds for Medidocks to advance Ambulance/Emergency Vehicle Idle Reduction:
Idling of ambulances is a significant contributor to air pollution, particularly as the majority of the idling occurs adjacent to healthcare facilities with their sensitive populations exposed. Reducing this idling provides a direct air quality improvement. Problematic to not idling the ambulance is the fact that interior temperatures and medical equipment must be maintained in a state of readiness, requiring power. My firm's product, the Medidock, provides a real solution to this problem by allowing an ambulance to remain 'mission-ready' without idling.
Our system is a kiosk, installed at Emergency Departments and other medical facilities and at remote locations where ambulances are 'posted' to improve response times and improve air quality. The Medidock requires no special equipment to be installed onboard the vehicle – any & all ambulances can use it. In addition to electrical power for the onboard emergency medical equipment it also provides vehicle interior climate control - without the need to run the engine. Our units ease of operation encourages EMT's to actually use the machines, resulting in fuel and maintenance savings for the vehicle operators and environmental benefits for everyone. On our website www.medicaire.net you will find a study done by the Ozone Transport Commission (OTC) which indicates a significant NOx reduction as noted from sites in VT & NH. Medidocks are presently successfully operating in northern New England and locations in the Midwest.
While vehicle idle reduction is not specifically indicated in the settlement, augmentation of DERA is, allowing a pathway for funding this important public health/air quality improvement.

I urge you to consider earmarking funding for the Medidock in the final Beneficiary Mitigation Plan. Thank you for your consideration.
Link to video : https://youtu.be/bdZaE0YNbhw
Frank Podgwaite
MedicAire, LLC
Medidock
North Haven, CT 06473
203-887-0209 cell
frank@medicaire.net
www.medicaire.net
“The ambulance idle reduction solution”
“Exclusive Distributors of the Medidock”

Volkswagen Mitigation Plan - All-Electric Buses Solution

Marie Bédard <marie.bedard@thelionelectric.com>

Mon 1/22/2018 10:03 AM

To: DEEP MobileSources <DEEP.MobileSources@ct.gov>;

2 attachments

eLionSerieM.PDF; eLionC_ONEPAGER.PDF;

Hello,

I hope this email finds you well. My name is Marie Bedard and I am the Business Relationship Manager at The Lion Electric Co., an all-electric bus manufacturing company.

I am contacting you with regards to the Volkswagen mitigation plan and was wondering if you had a few minutes to discuss the potential of replacing diesel school buses (type C and Type A) with all-electric buses? I read the draft beneficiary plan and believe we may be able to help with reducing the number of on-road heavy duty diesel vehicles in Connecticut with an immediate, all-electric solution.

Attached please find additional information on the all-electric vehicles we currently offer as well as a link to our website.

Please let me know if you have a few minutes to discuss or if you have any questions. Thank you.

Warm Regards,
Marie

Marie Bedard
Business Relationship Manager

C 514.717.3703
T 450.432.5466 ext 281
1.855.546.6706 ext 281

thelionelectric.com

THE LION ELECTRIC CO. - Power in Progress

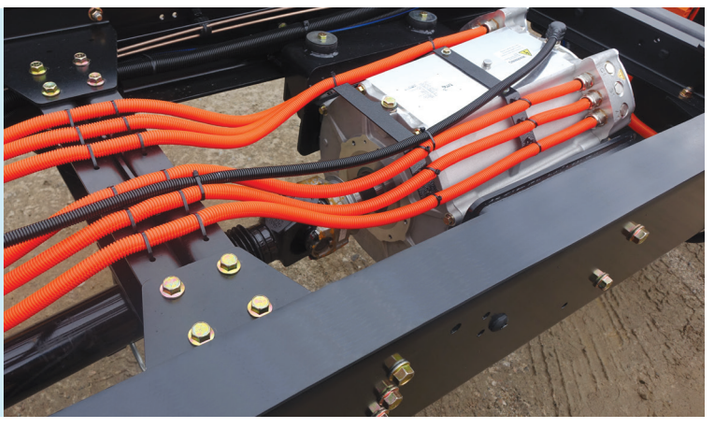
The First Original Equipment Manufacturer to Build an All-Electric School Bus

All-Electric Purpose-Built Chassis & Body

- Unique Lion battery packs with safe & high-performance LG Chem batteries
- Several range options to optimize return on investment and school bus route planning:
  - 50 miles (90 km)
  - 75 miles (120 km)
  - 100 miles (150 km)
- Capacity up to 72 passengers

Innovative Single-speed Electric Powertrain

- Electric motor delivering up to 250 kW (335 HP)
- 19.2 kW AC on-board charger
- J1772 charging protocol – A standard North American charging system compatible with most public charging stations in North America



WE LOOK FORWARD TO PARTNER WITH YOU IN ORDER TO ELECTRIFY THE SCHOOL TRANSPORTATION INDUSTRY AND **REDUCE GREENHOUSE GAS EMISSIONS** FOR OUR KIDS & NEXT GENERATIONS.

thelionelectric.com
1 (800) 546-6706

LION

Discover the eLION
All-Electric School Bus

The eLion is more than just an electric school bus. In addition to its many economic benefits, the eLion stands out as the only zero-emission solution available.

The eLion instills important values in younger generations by educating them on the importance of protecting the environment by using clean and renewable energy.

TOGETHER, LET'S DRIVE POWER IN PROGRESS.

OVER **1,000,000 KILOMETERS** OF OPERATION WITHIN NUMEROUS ELECTRIC SCHOOL BUS DEPLOYMENTS ACROSS NORTH AMERICA.

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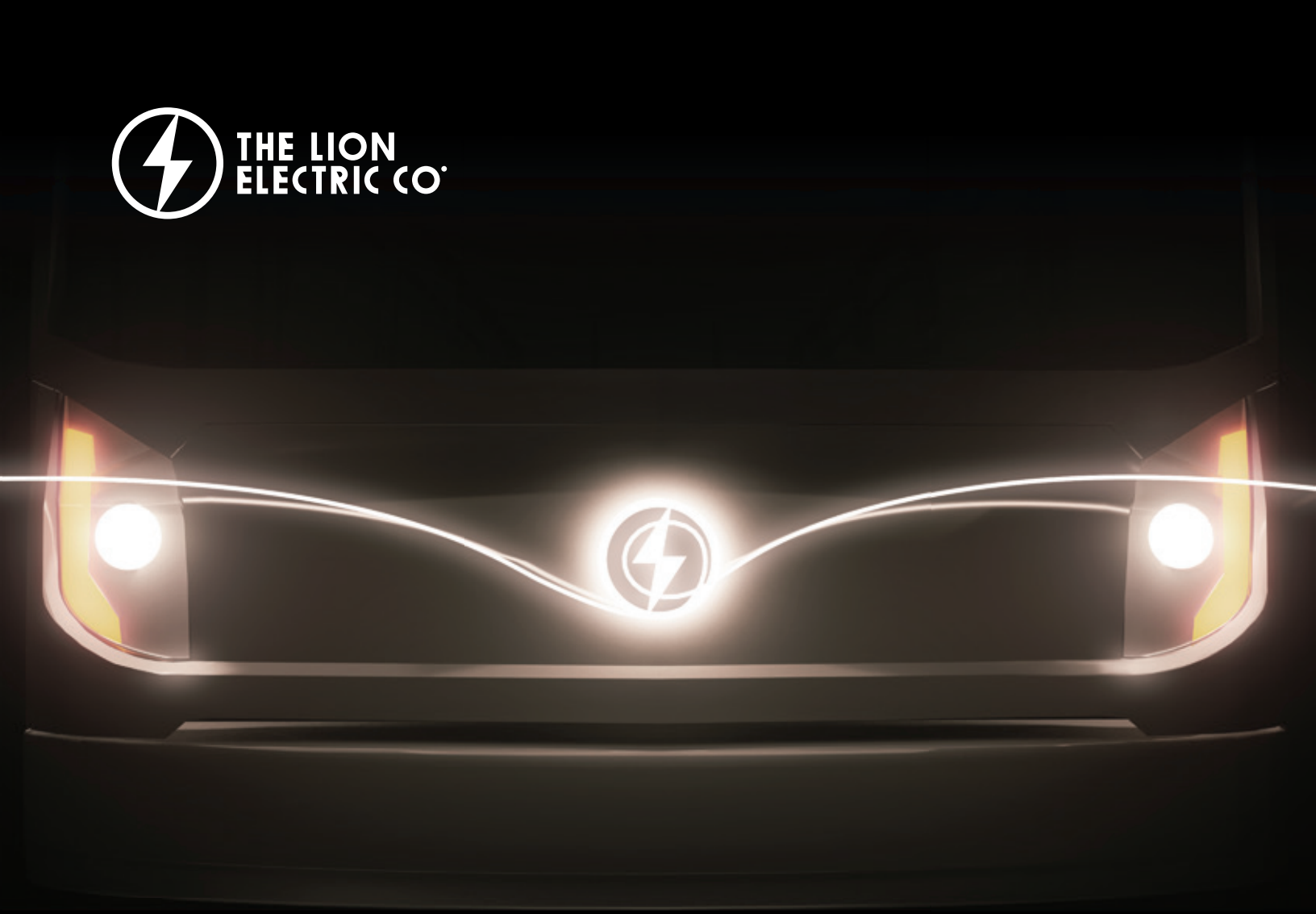


Power in Progress | eLIONM

The Lion Electric Company manufactures innovative zero emission vehicles. Since its inception in 2008, Lion's mission has been to develop durable and integrated solutions while continuing to reduce its environmental footprint.

Always actively seeking new technologies, Lion vehicles have unique features that are specifically adapted to its users and their everyday needs. The Company believes that transitioning to all-electric vehicles will lead to major improvements in our society, environment and overall quality of life.

Lion is currently developing a minibus that will meet paratransit, school, and public transportation requirements. The minibus will go-to-market during the Summer of 2018. Furthermore, Lion is broadening its vehicle offering by developing class 5 to 8 all-electric trucks. Class 8 vehicles will launch during the Fall of 2018.

We are convinced that Lion will be able to exceed your expectations with the introduction of its new all-electric vehicles which will help foster a healthier and greener world.

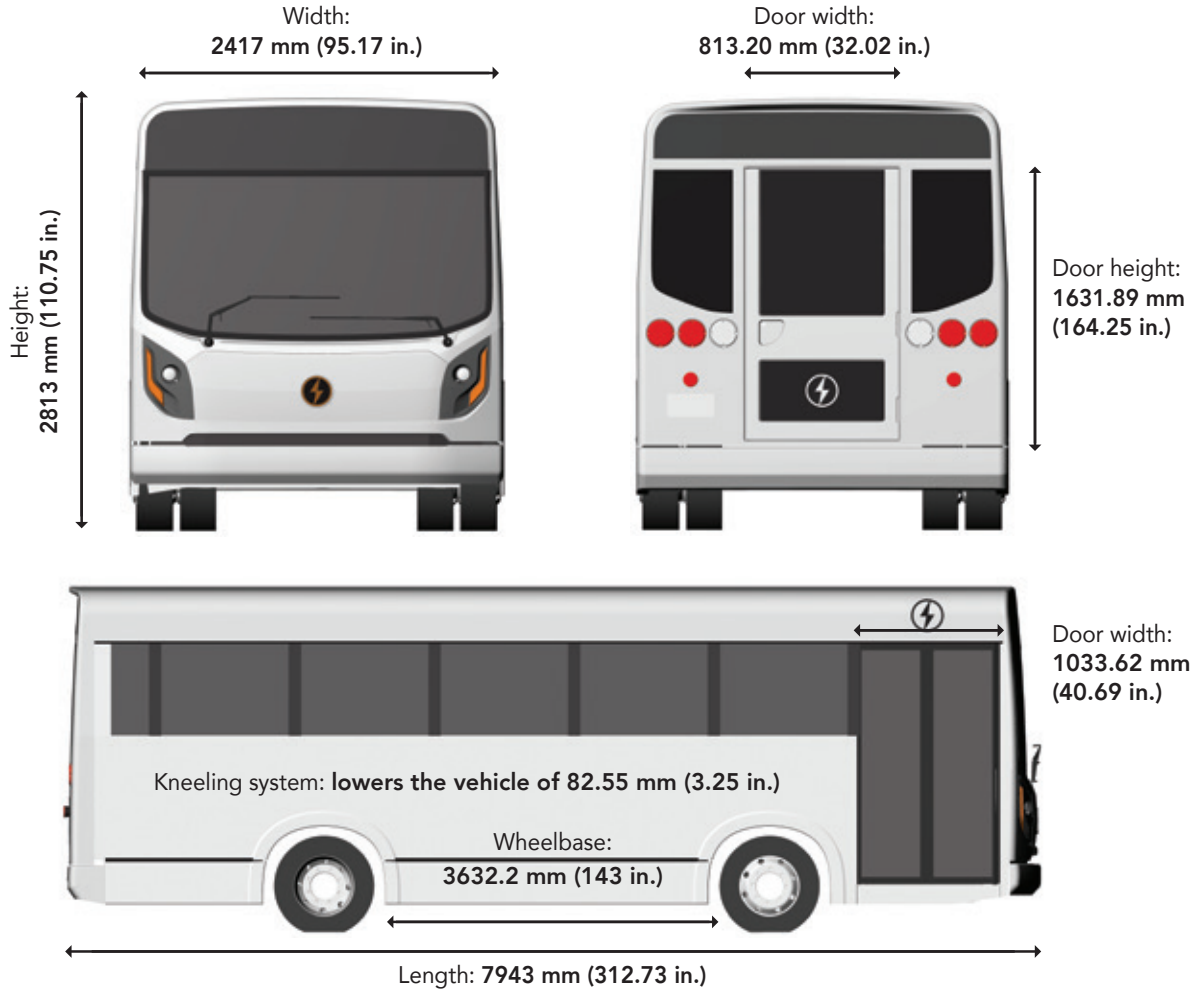
TOGETHER, LET'S DRIVE POWER IN PROGRESS.

LION'S NEW PRODUCT LINE

Entirely designed and manufactured by the Original Equipment Manufacturer (OEM), the eLIONM will meet the paratransit/urban transportation requirements while reducing the environmental footprint.

VEHICLE SIZE AND SPECIFIC FEATURES

Created and designed specifically for the paratransit market, the eLIONM is spacious and offers unique features that provide enhanced security and accessibility to the end-users.



PERFECTLY TAILORED TO PASSENGERS NEEDS

The eLIONM is without a doubt the most accessible, custom-built and energy-efficient solution in the paratransit/urban transportation industry.

Rapid and efficient boarding

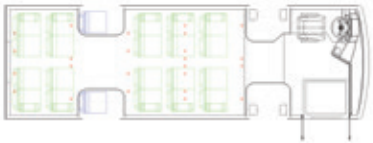
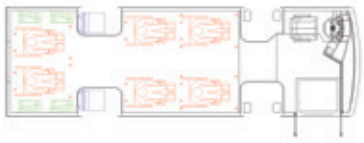
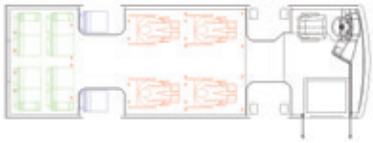
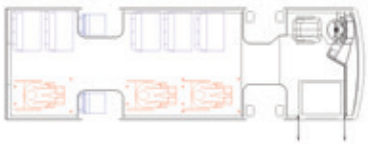
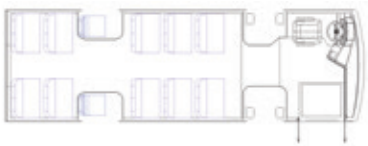
- The passenger boarding process is completed in seconds with the integrated Bi-Fold access ramp and vehicle kneeling system
- Possibility to board without deploying the Bi-Fold ramp

Interior width: 2290 mm (90 in.)

- Design optimized for paratransit
- Low floor to improve accessibility

CONFIGURATION EXAMPLES

The eLIONM offers various flexible configuration options that enhance the interior space and allow rapid and efficient seat configuration transitions.

	RAISED SEATS	LOWERED SEATS	
A			– 10 double foldaway seats – 6 wheelchair spaces – 2 fixed single seats
CAPACITY	**6 W/C + 2 AMBULATORY P.S.***	**22 AMBULATORY P.S.***	
B			– 4 double foldaway seats – 6 wheelchair spaces – 2 fixed single seats
CAPACITY	**6 W/C + 2 AMBULATORY P.S.***	**4 W/C + 10 AMBULATORY P.S.***	
C	Foldaway		– 5 fixed double seats – 3 wheelchair spaces – 2 fixed single seats
CAPACITY	—	**3 W/C + 12 AMBULATORY P.S.***	
D	Foldaway		– 10 fixed double seats – 2 fixed single seats
CAPACITY	—	**22 AMBULATORY P.S.***	

* Ambulatory passenger seat.

POWERTRAIN AND BATTERIES

The eLIONM stands out with its powerful, efficient and innovative electric motor.

All-electric powertrain

– Electric motor offers up to 149 kW (200 HP)

– Equivalent or better performance than same category and combustion-engine vehicles

Safe and high-performance lithium-ion (NMC) batteries from LG Chem

– Same battery technology as the automobile industry

– Range options:
  • 120 km / 75 miles or 240 km / 150 miles (1 or 2 battery packs, 80 kWh each)*

* Distance may vary based on certain conditions.

BATTERY SWAP AND CHARGING OPTIONS

Multiple options are available to make the eLIONM experience unforgettable.

Quick battery swap

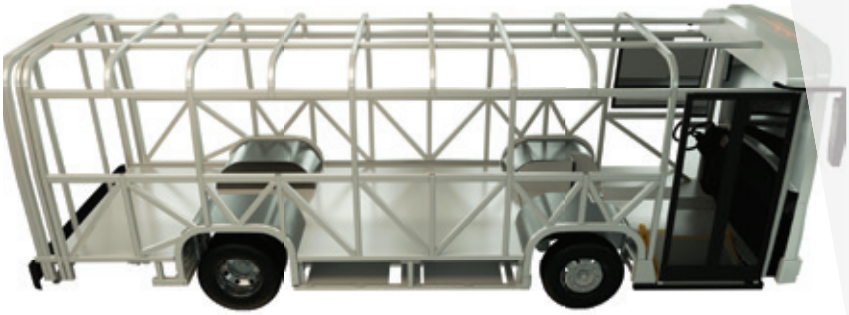
- Possibility to swap batteries in a few minutes, leveraging the unique technology offered
- The battery swapping technology enhances the operation process as well as the fleet and charging infrastructure management

Charging options

- The eLIONM is equipped with an embedded 19.2 kW charger that leverages the standard J1772 charging protocol
- The DC fast charging is also available as an option (SAE-Combo) and can reduce the overall recharge time

UNIQUE MONOCOQUE CHASSIS

The eLIONM is built with innovative and high-quality materials to enhance performance and durability.



LIGHTER VEHICLE

OPTIMAL USE OF ALUMINUM

Custom-made chassis designed specifically for an all-electric vehicle

- The chassis structure is made of the perfect blend of aluminium and steel to maximize strength and minimize weight
- The materials chosen reduce the risk of corrosion and significantly extends the vehicle lifespan
- Using aluminium reduces the weight of the vehicle and increases its range

Adjustable innovative suspension

- Allows kneeling of 82.55 mm (3.25 in.) to ease passenger boarding process
- Pleasant and steady ride for both the passengers and driver

FOUR-WHEEL
ADJUSTABLE SUSPENSION

DRIVER'S COMFORT AND PEACE OF MIND

The eLIONM will help the driver enhance and improve his or her eco-driving behaviors as well as provide the most ergonomic driving experience possible.

Ergonomic driver station

- Enhanced comfort and maximized visibility to provide optimal working conditions
- Several adjustments are available to create the best ergonomic driving position possible
- Additional options and access to switches facilitate overall bus operations management and improve usability/overall driver experience

Custom-built driver information center designed for an all-electric vehicle

- The combination of the standard analogue dial and digital display screen offer a variety of options and management tools that will allow real time view of the following options:
  - Remaining driving range
  - Battery charge level
- Possibility to remote access the vehicle with the embedded telemetry system, enabling faster and easier analysis
- Access to additional informations, such as a driving performance indicator, is available on the optional touchscreen

LION

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