



Submitted via email to treecep@adeq.state.ar.us

October 10, 2017

Ms. Tricia Treece
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317
(501)682-0055 / treecep@adeq.state.ar.us

RE: ADOMANI Response to RFI Requesting Comments on Arkansas's Draft Beneficiary Mitigation Plan

Dear Ms. Treece,

The Environmental Mitigation Trust (EMT) and the \$14.6 million it will yield for Arkansas represents an unprecedented opportunity to support long-term investments toward a zero-emission transportation sector while simultaneously prioritizing children and clean air. As the President and CEO of ADOMANI, Inc. (ADOMANI), I have outlined a series of recommendations below that addresses how Arkansas can support innovative and transformative all-electric vehicle projects, which will reduce harmful nitrogen oxide (NOx) and greenhouse gas (GHG) emissions, deliver air quality benefits to disadvantaged communities and areas disproportionately affected by diesel pollution, and reduce our dependence on petroleum fuels.

ADOMANI designs and manufactures zero-emission electric and hybrid vehicle solutions. Our premier product line is medium- and heavy-duty all-electric school buses, one of which (the All American RE electric bus chassis) was developed in conjunction with Blue Bird and operates on an energy-efficient electric drivetrain supplied by Efficient Drivetrains Inc. Our All American RE school bus offers battery capacities between 100 kWh and 150 kWh, with an expected 80- to 100-mile range from a single charge.

ADOMANI has demonstrated experience in the new OEM and conversion markets, the latter of which helps our customers cost-effectively repower their existing fleet with all-electric or hybrid drivetrains. As a testament to our team's long-standing industry leadership, ADOMANI prides itself on our relationships with trusted service partners to address customers' specific needs.

While Arkansas has proposed to allocate 60% to CNG school bus projects, **we believe that all-electric school bus projects will provide the most comprehensive suite of benefits.** This includes zero emission vehicle operations in direct proximity to sensitive receptors and disadvantaged communities, reduced operating costs for budget-constrained school districts, no need for diesel fuel storage or procurement, and improvements to public health, particularly among children.

The market for advanced transportation technologies has grown steadily in recent years and we hope to support Arkansas continue this trend with the deployment of all-electric vehicles. Our recommendations below outline how your state can do just that and we look forward to working with your team to ensure a successful roll-out of funds.

Help Yellow Go Green!™



The EMT Provides Arkansas with the Opportunity to Fund Innovative and Transformative Transportation Projects

The medium- and heavy-duty diesel transportation sector is the leading source of mobile source NOx emissions from in Arkansas, accounting for 61% of the total.¹ By directing funds towards projects that reduce these emissions sources, Arkansas can most effectively mitigate these emissions' harmful air quality and health impacts.

While aging diesel-fueled vehicles generate the most mobile source NOx emissions, some medium- and heavy-duty fleets have turned to gaseous fuels, such as compressed natural gas (CNG) and propane autogas, to help mitigate NOx emissions. These, however, are temporarily solutions – President Barack Obama, in his 2014 State of the Union address, referred to natural gas as a “bridge fuel.”² Fortunately, there are now commercially available all-electric and hybrid-electric medium- and heavy-duty vehicles on the other side of the bridge. Recent technology advancements in the electric vehicle technology market have allowed technology providers heretofore unprecedented access to these markets and fleets can now select from an increasing array of zero-emission and hybrid options.

States across the U.S. have taken strides to fund the advancement of clean transportation solutions. Incentive programs, such as California's Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) and the New York Truck – Voucher Incentive Program (NYT-VIP), catalyze the growth of the electric vehicle market, while providing significant air quality and climate benefits. ADOMANI encourages Arkansas to recognize the merits of these programs and recommends that you support their proliferation by creating a similar program with your state's allocation of Volkswagen funds.

All-Electric School Buses Improve Air Quality and Public Health for Children and Adults via Unparalleled NOx Reductions

By supporting the conversion of school bus fleets to all-electric operations, ADOMANI will support your state's efforts to dramatically reduce NOx emissions. ADOMANI's school buses deliver immediate NOx and GHG emissions reductions, thus improving air quality for child passengers and adult vehicle operators, which are otherwise exposed to respiratory irritants on a regular basis.

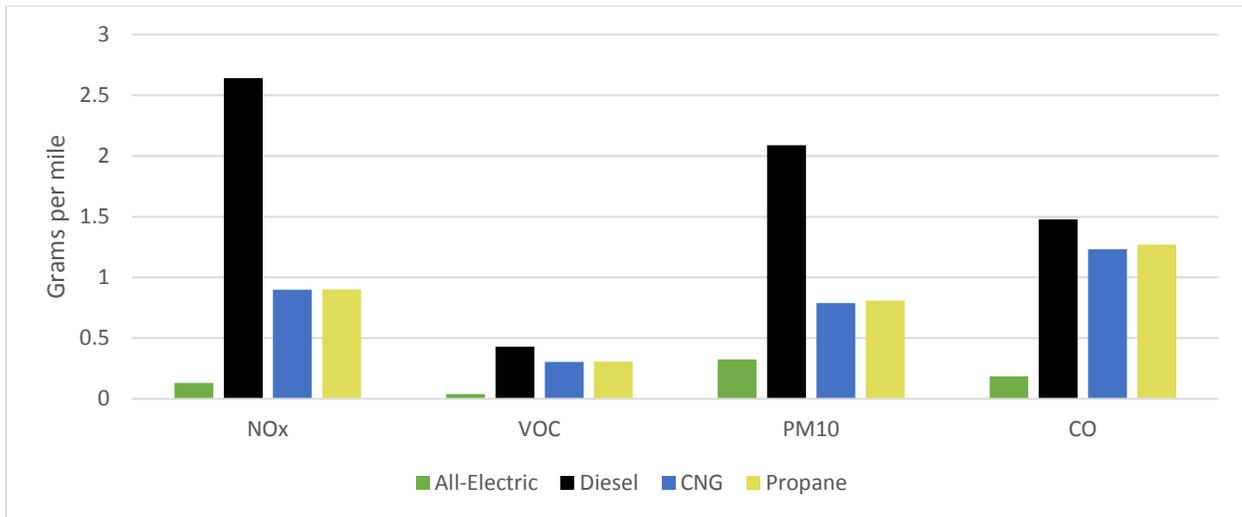
Most relevant to the Volkswagen funds, we find it important to first focus on the settlement's main objective: reduce NOx emissions. Figure 1 below compares the performance of various fuel types in heavy-duty school buses, which makes clear that electric vehicle technologies should be a top priority.

¹ “2014 National Emissions Inventory (NEI) Data”. United States Environmental Protection Agency. <https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data>.

² “President Barack Obama's State of the Union Address”. The White House, Office of the Press Secretary, January 28, 2014. <https://obamawhitehouse.archives.gov/the-press-office/2014/01/28/president-barack-obamas-state-union-address>.



Figure 1: Emissions Benefits (grams per ton) of All-Electric Heavy-Duty School Bus vs. Other Fuel Types³



These emissions reductions correlate directly with air quality and public health benefits. According to the EPA’s Diesel Emissions Quantifier, the replacement of just one diesel school bus with an all-electric model will generate \$20,000 in public health benefits each year.⁴ These benefits represent the dollar value of health benefits generated from reducing the population’s exposure to PM2.5 emissions and include the reduction of premature mortality, chronic bronchitis, asthma attacks, non-fatal heart attacks, and other health problems. In school bus applications, these emissions reductions are particularly important, given that children’s exposure to harmful air pollutants may be 5-15 times higher inside the bus.⁵

A recent study by the University of Delaware evaluated the costs and benefits associated with a V2G-capable electric school bus compared to a traditional diesel school bus.⁶ The study looked at a variety of data points and metrics to compare the fuel types in a school bus application and found that diesel school buses created public health costs of \$0.08 per mile. This is 800% more expensive than the public health costs of an all-electric bus, which is just \$0.0149 per mile.

Arkansas Should Prioritize Projects that Deliver Total Cost of Ownership Benefits to State School Districts

All-electric school buses deliver total cost of ownership benefits that far exceed any of its conventional and alternative fuel competitors. We have provided the infographic below to demonstrate these benefits.

³ Figure 1 contains the best available current data from seventeen different studies and air emission analyses, including emissions data reported by the U.S. Environmental Protection Agency, U.S. Department of Energy, and Argonne National Laboratory.

⁴ “Diesel Emissions Quantifier.” U.S. Environmental Protection Agency, <https://www.epa.gov/cleandiesel/diesel-emissions-quantifier-deq>. Analysis assumes MY 2000 diesel school bus; annual diesel fuel consumption of 1,360 gallons, annual VMT of 14,084, and 107 idling hours per year (these are EPA DEQ default values).

⁵ “Electric School Buses Feasibility in Vermont”. Vermont Energy Investment Corporation, May 2016. <https://www.veic.org/docs/resourcelibrary/veic-electric-school-bus-feasibility-study.pdf>, page 6.

⁶ Noel, L. and McCormack, R. “A Cost Benefit Analysis of a V2G-Capable Electric School Bus Compared to a Traditional Diesel School Bus”. University of Delaware, 2014. <https://www1.udel.edu/V2G/resources/V2G-Cost-Benefit-Analysis-Noel-McCormack-Applied-Energy-As-Accepted.pdf>.

ADOMANI

ALL-ELECTRIC SCHOOL BUSES



PURCHASE

	ALL-ELECTRIC*	DIESEL**
o MSRP (including 8% tax)	\$347,750	\$139,100
o VW Settlement Incentive Amount (at Incremental Cost)	(\$208,650)	N/A
o Customer Cost	\$139,100	\$139,100

\$0

Additional Investment Required
(for Zero-Emission Buses)

OPERATIONS

	ALL-ELECTRIC*	DIESEL**
o Maintenance	\$1,770	\$9,075
o Diesel Fuel	N/A	\$5,930
o Battery Power	\$2,714	N/A
o Cost of Ownership (Annual)	\$4,484	\$15,005

\$10,521

Annual Zero-Emission Savings
(Versus Diesel)

SAVINGS

	ALL-ELECTRIC*	DIESEL**
o Cost of Ownership (Over 15 Years)	\$67,260	\$225,075
o New Battery (at Year 8)	\$45,600	N/A

\$112,215

Zero-Emission Savings
(Over 15-year Lifetime Versus Diesel)

Your state can provide the incentives required to deploy all-electric vehicles at no additional cost to consumers, which will generate substantial annual and full-life total cost of ownership benefits

* Blue Bird All American RE Electric Bus

** Conventional Diesel Bus



As shown above, Arkansas has the opportunity to provide incentive funding capable of generating tremendous annual cost savings for school districts throughout the state. In other words, for every dollar invested in all-electric school buses, Arkansas can mitigate public health concerns for the most susceptible of disadvantaged communities, generate cost savings for budget-constrained school districts, and support the advancement of innovative clean transportation technologies.

Arkansas Should Account for the “Beyond Transportation” Benefits of All-Electric and Hybrid-Electric Vehicles

All-electric vehicles provide benefits beyond emissions reductions and safe transportation. These vehicles’ battery systems serve as a valuable and reliable energy resource that can be exported from the vehicles. For hybrid vehicles, ADOMANI’s hybrid internal combustion engines produce power, which when reversed, would allow utility trucks to plug in to the grid as needed. In other words, ADOMANI’s all-electric and hybrid vehicles can provide utilities and homeowners with access to power during emergencies or peak demand.

Indeed, recent research has shown that vehicle-to-grid (V2G) systems can decarbonize transportation, support load balancing, and increase revenues for electricity companies and create new revenue streams.⁷ V2G and other strategies, including vehicle-to-load and off-grid storage, will play a key role in your state’s energy infrastructure future. We hope to support that future with ADOMANI’s all-electric and hybrid vehicle technologies.

Conclusion – Prioritize our Children and Clean Air

The market for all-electric and hybrid vehicles has grown steadily in recent years due to technology advancements and greater private sector involvement. Furthermore, production costs continue to decrease and battery capabilities have improved.⁸ We anticipate that the demand for these vehicles will continue to grow as further advancements continue to drive down prices.

ADOMANI works closely with industry experts to develop technologies that meet consumer needs and exceed their expectations. The team behind the design, development, and deployment of our vehicles has decades of experience in the school and transit bus and commercial vehicle industries.

Importantly, we have relationships with key school and electric utility officials, which will allow the ADOMANI team to work hand-in-glove with local school transportation officials to ensure their drivers and maintenance personnel are fully trained on the successful operation and ownership of these technologically advanced vehicles. We are also able to work with the local electric utility to advise on any

⁷ Sovacool, B. et al. “The Future Promise of Vehicle-to-Grid Integration: A Sociotechnical Review and Research Agenda”. Annual Review of Environment and Resources, Volume 42, 2017. <http://www.annualreviews.org/doi/abs/10.1146/annurev-environ-030117-020220>.

⁸ Schlosser, N. “Can Electric School Buses Go the Distance?” School Bus Fleet, May 23, 2016. <http://www.schoolbusfleet.com/article/713421/can-electric-school-buses-go-the-distance>.



needed vehicle charging infrastructure. Our goal is nothing less than 100% satisfaction for our customers and a seamless integration of these vehicles into local fleets.

Recognizing the need for Arkansas to reduce NOx emissions, generate economic benefits, and deliver environmental justice benefits while also providing fleets with total cost of ownership benefits, ADOMANI recommends that you create competitive funding opportunities for all-electric and hybrid-electric vehicles.

We offer our support in the rollout of the Environmental Mitigation Trust funds and, towards that end, we request the opportunity to meet with you to discuss our recommendations further. Should you have any follow-up questions please contact me at (949) 200-4613 or via email at jim.r@adomanielectric.com.

Sincerely,

A handwritten signature in black ink that reads "Reynolds". The signature is written in a cursive style and is positioned above a horizontal line.

Jim Reynolds
President & CEO
ADOMANI, Inc.
620 Newport Center Drive, Suite 1100
Newport Beach, CA 92660
(949) 200-4613 / jim.r@adomanielectric.com

Help Yellow Go Green!™