



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

November 1, 2017

Ms. Tricia Treece
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

Re: Using Volkswagen settlement funds for cost-effective corridor-based NOX reductions

Dear Ms. Treece,

The U.S. Department of Justice has finalized partial settlements with Volkswagen, which will result in Arkansas receiving approximately \$14.6 million in funding that must be used to implement projects that reduce smog-forming nitrogen oxide ("NOx") emissions. This represents a tremendous opportunity to accelerate the clean-up of older, dirtier diesel buses in Arkansas, especially in communities that have been disproportionately burdened by these vehicles.

As the Director of School Bus Sales of Central States Bus Sales (CSBS), Inc., I write to thank the Department of Environmental Quality for its efforts in developing a Beneficiary Mitigation Plan and the opportunity to recommend that it 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. Specifically, we request that the state also include propane as an eligible fuel type under the proposed CNG School Bus Pilot Program.

CSBS pledges to support your efforts, with the assistance of our partnership with ROUSH and a national network of Blue Bird dealerships, including Central State Bus Sales of Arkansas, that have helped deploy over 10,000 propane-fueled buses in more than 750 school districts nationwide.

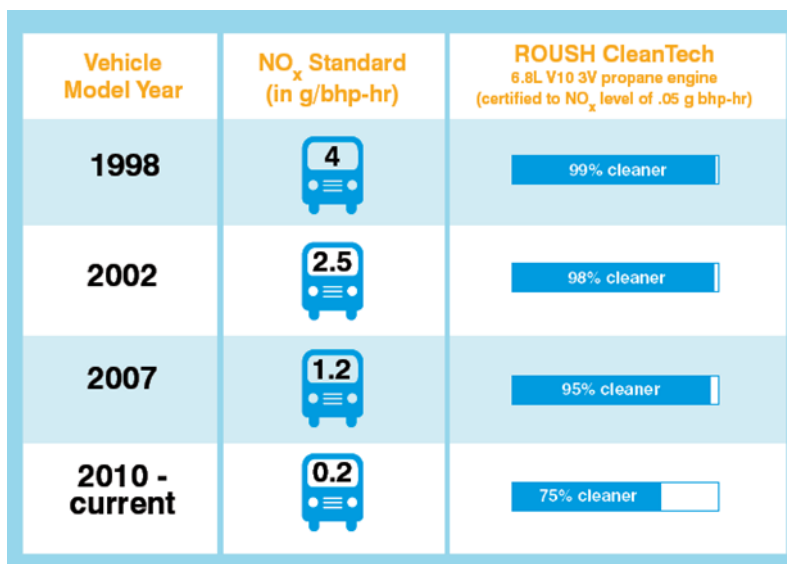
Based on our most recent conversation, we have provided information on a number of different key points, including corridors, NOx emission reduction potential, and economic development impacts. We look forward to continued dialogue with you and your team, and to a future collaboration that will help Arkansas meet its air quality goals.

Expanding Arkansas' Proposed School Bus Pilot Program Will More Effectively Achieve NOx Reduction Goals

We applaud the Arkansas Department of Environmental Quality's (ADEQ) focus on alternative fuel vehicles and infrastructure to achieve and sustain significant NOx reductions. Additionally, the focus on a school bus pilot program is a smart investment for the state of Arkansas. Over 5,000 school buses transport 250,000 children to and from school in Arkansas. Many of these are pre-2007 school buses, which are 6 times or 95% dirtier than 2010 or newer school buses. However, we find that the state's limiting of eligibility to only CNG school buses reduces the amount of cost-effective NOx reductions it could achieve.

Propane-fueled school buses exist today that are much cleaner than even the cleanest diesel school buses. In fact, ROUSH's model year 2017 propane school buses recently received its California Air Resources Board certification at 0.05 grams NO_x per brake horsepower-hour (g/bhp-hr).¹ This new propane engine is 75 percent cleaner than today's cleanest diesel engines that are compliant with the model year 2010 standard of 0.2 g NO_x / bhp-hr. What's more, our new propane buses will be 99 percent cleaner than the oldest, pre-2007 model year buses still operating in many school districts today.²

Figure 1: Nitrogen Oxide Standard for the Roush CleanTech low NO_x engine as compared to the EPA emissions standards dating back to 1998.



We understand the need for investment in CNG vehicles and infrastructure in order to jump-start the market. However, we request ADEQ expand the eligibility of the proposed pilot program to include propane school buses. Propane school buses often have improved cost-effectiveness versus CNG due to its lower incremental vehicle cost, lower infrastructure costs, and no required upgrades to maintenance facilities.

As evidence of this, we used the 2016 version of AFLEET, developed by Argonne National Laboratory, to model NO_x reductions and cost effectiveness. Our analysis compares the replacement of a model year 2007 diesel school bus with new diesel, propane, CNG or electric school buses. It is clear that propane is the most cost-effective option at reducing NO_x emissions.

¹ "Executive Order A-344-0074". California Environmental Protection Agency, Air Resources Board, May 15, 2017. https://www.arb.ca.gov/msprog/onroad/cert/mdehdehdv/2017/roush_hdoe_a3440074_6d8_0d05_lpg.pdf.

² For model year 1998 to 2003 diesel engines, EPA established a NO_x emission standard of 4.0 g NO_x / bhp-hr. Please refer to EPA's [summary table](#) of diesel engine exhaust emission standards for further detail.

Figure 2: Propane school buses are shown to be 33% more cost-effective vs diesel and 28% more cost-effective than CNG school buses.

Standard Argonne AFLEET Emissions Outputs				
Fuel	Purchase Price	NOx Reduced	\$/lb	Cost Effectiveness vs. Propane
Propane	\$ 93,000	537.0	\$ 173	
Diesel	\$ 85,000	330.5	\$ 257	-33%
Electric	\$ 350,000	593.4	\$ 590	-71%
CNG	\$ 125,000	518.3	\$ 241	-28%

In sum, we request ADEQ open up the alternative fuel grant program to include propane vehicles as a priority in addition to CNG and electric. We also request that when reviewing applications that ADEQ prioritize actions that achieve the best cost effectiveness and are sustainable beyond the states investment. It is important that the alternative fuel program is able to continue after grant funding is depleted.

Propane is a Key Economic Driver for Arkansas

Arkansas' propane market is a source of economic growth across a variety of industries, including production, transportation, storage, wholesale, and retail. In 2012, the propane market contributed over 600 jobs and \$270 million in the state's gross domestic product (GDP).³ Specific to labor, the propane market supplied nearly \$24 million in direct labor income to Arkansas workers. We have provided a detailed analysis of the Arkansas market in the attached Appendix A – Arkansas Propane Market Analysis.

Specific to propane vehicles, ADEQ's focus on a statewide alternative fuel grant program is a smart investment as it will provide school districts, counties, and other fleets with the support needed to begin or expand their alternative fuel vehicle programs. Other states that have provided similar grant or incentive programs have shown a measurable increase in deployment activities, and over time, many of the original fleets that took advantage no longer need grant assistance to justify alternative fuel vehicle growth in their fleet.

As stated above, if ADEQ would expand eligibility to include propane, even more vehicle replacements and corresponding NOx reductions could be achieved. We have developed the following analyses that assumes that Arkansas invest 60% of its Volkswagen settlement funding in a propane school bus program. Further, it assumes that the state provided a 25% rebate per bus to the school districts. We have made these assumptions based on our experience that shows that school districts are willing to make the switch when alternative fuels are equitable or a little less than diesel. For example, propane school buses save districts over \$2,500 per year per bus in fuel and maintenance savings (national average). Also, infrastructure rarely cost a school district or the state upfront. No maintenance facility upgrades are required either. Once the initial

³ "Arkansas Propane Market". ICF International, November 2016. Please see Appendix A for additional details.

aversion to change through a lower capital cost is achieved, the district typically sees the other benefits within one year of operation.

With these assumptions, ADEQ could deploy 378 propane school buses, which is over 17% of the total pre-2009 school bus fleet operating in Arkansas currently. If the state were to limit propane solely to CNG, these funds would only be able to replace 281 CNG school buses.

Table 1: Arkansas can more cost-effectively replace school buses by including propane as an eligible fuel.⁴

60% of AR Funding / 25% Rebate Scenario	TOTAL
Total Buses Operating in State (# Units)	5,263
Est. Pre-2009 Buses in Operation (# Units)	2,177
Est. Cost of 2019 Model Year Diesel Bus (\$)	\$85,000
Est. Cost of 2019 Model Year Propane Bus (\$)	\$93,000
Est. Cost of 2019 Model Year CNG Bus (\$)	\$125,000
Propane Bus Incentive (\$), Based on 25% of Total Bus Cost	\$23,250
CNG Bus Incentive (\$), Based on 25% of Total Bus Cost	\$31,250
Number of Estimated Bus Replacements, Propane Scenario	378
Number of Estimated Bus Replacements, CNG Scenario	281

Over the 15-year service life of a school bus, the following total program impacts could be achieved using the propane school bus scenario.

Table 2: Total program impacts assuming a 60% funding investment in a propane school bus pilot program.⁵

	POTENTIAL IMPACT
# of Propane School Bus Replacements	378
% of Pre-2009 AR Bus Fleet Replaced	17.36%
Total Funding Proposed: 60% of AR VW Allocation (\$)	\$8,788,625.40
Total NOx Reduction (lbs)	203,002
Petroleum Reduction (gallons)	10,206,146

Corridor-Focused Funding Will Generate More Effective Public Health Benefits

School buses are a captive fleet in that they operate along dedicated corridors each day and repeatedly expose the same population to harmful emissions. Thus, cleaning them up by replacing with CNG or propane versions will yield air quality benefits in areas that bear a disproportionate share of the air pollution burden. Their localized operations also make the measurement of their benefits easier in that all of the emissions reductions can be attributed

⁴ Pricing is an estimate for the average base cost for a 2019 model year diesel, propane and CNG school bus. Costs do not include infrastructure, maintenance facility upgrades, etc.

⁵ Assumptions: 378 school buses replaced, 2007 average model year replaced with 2019 model year Vision propane bus, 15-year service life, 12,600 miles per year

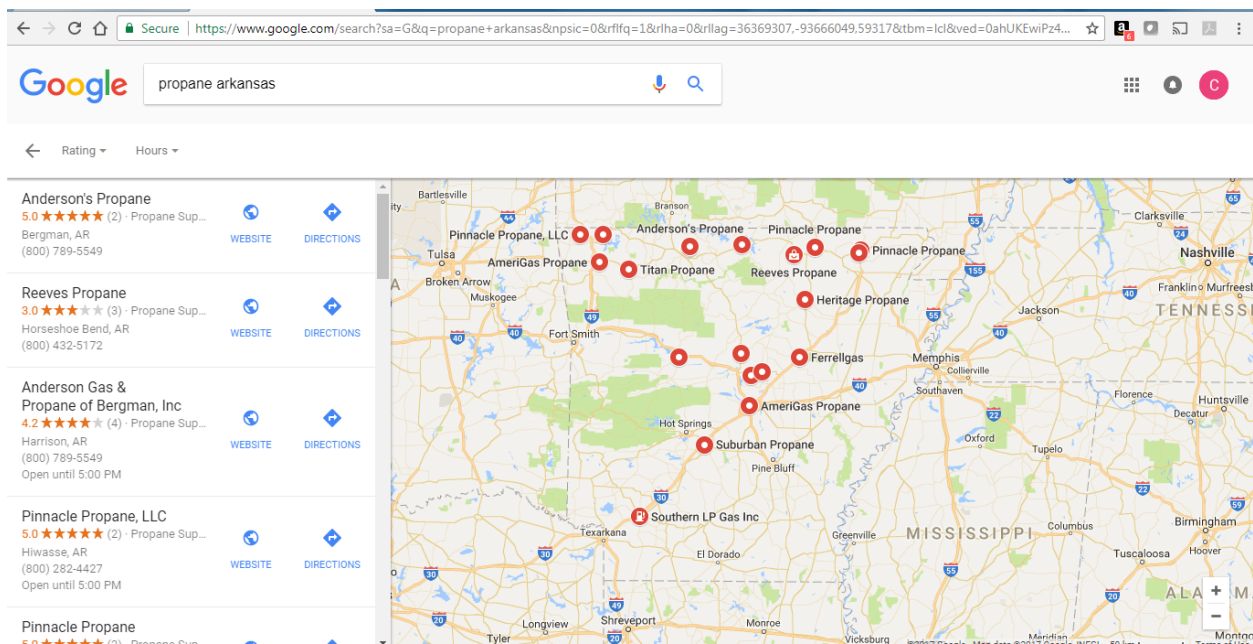
directly to these areas. Other vehicle types, such as long-haul trucks and non-road equipment, cannot claim such directly attributable benefits.

These alternative fuel school buses significantly reduce children's, operators', and the general public's exposure to emissions that are associated with pre-2007 diesel buses, including increased asthma emergencies, bronchitis, and school absenteeism, especially among asthmatic children. CNG and propane school buses also 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.

With this corridor focus in mind, we commend Arkansas on its efforts to prioritize counties in Appendix B of its RFI. While Arkansas' proposed method of county prioritization via vehicle registrations of the offending vehicles is an important metric, we encourage the state to align with EPA's National Priority County List. Specifically, this would add Craighead, Crittenden, and Miller counties to the list of counties already identified in the RFI.

While Arkansas does not list propane fueling stations on the Alternative Fueling Station Locator developed by the Department of Energy, there are indeed retail locations across the state and specifically along certain corridors that are capable of filling vehicles. A simple google map search shows multiple locations along the I-30 corridor, shown below in *Figure 3*. The site would just need an adapter to allow for autogas vehicle refueling, which can be accomplished easily and inexpensively.

Figure 3: Simple google map search of propane retail locations in Arkansas.





Summary

We would like to work with you and your team to ensure the most cost-effective and environmentally beneficial use of Arkansas's Volkswagen Settlement Funds. We thus request a phone or in-person meeting with the most appropriate member of your staff to discuss propane's opportunities further, specifically a collaborative plan for designating propane corridors in Arkansas.

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 Arkansas meet its air quality goals.

Sincerely,

A handwritten signature in black ink that reads "Joseph P. Wright".

Joseph P. Wright
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