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## **Responses to Draft White Paper Questions , Goals of SB 1383**

Please see following appendices as well

*Additional submitted attachment is included below.*

# NORTH AMERICAN REPOWER

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July 13, 2017

The Honorable Robert Weisenmiller, Chair  
California Energy Commission  
1516 Ninth Street  
Sacramento, CA 95814

## **Re: Comments on the 2017 IEPR – Renewable Gas**

Dear Chair Weisenmiller,

North American Repower is a California based cleantech company that builds the lowest carbon footprint, lowest emission heavy duty transportation engines available for the California market. By utilizing RNG, our engines are capable of replacing existing in use heavy duty diesel engines in existing on road vehicles and equipment (buses, trucks, vocational vehicles and TRUs- trailer refrigeration units), thereby modernizing these vehicles into the lowest carbon, lowest PM (Black Carbon) vehicles. By ARB LCFS table estimates, our technology is lower carbon, lower NOx, lower SO4 and lower PM than an equivalent electric vehicle, if electrics were available as class 6-8 trucks and buses.

I thank you for the opportunity to address the questions as asked in the white paper draft “**Senate Bill 1383, Renewable Gas Requirements: Challenges, Considerations, and Questions for Stakeholders to Address**”. I will limit my comments to questions posed about transportation and RNG, but also encourage the commission to pay particular attention to comments submitted by the Coalition for Renewable Natural Gas and by Cambrian Energy, as these two entities represent the core of experience and expertise in renewable natural gas projects, are based here in California, and represent the best source for answers to the questions posed in the white paper.

I will address the questions in the order that they appear in the White Paper draft, and limit my response lengths as much as possible. I and the team here at NAR are available to the staff and commission to assist in any manner that we can to help develop the road map for SB 1383. Please contact me via the contact information provided at the end of this comment.

- What types of data are needed to monitor and maximize the development and use of biomethane/biogas/renewable gas and optimize government activities to achieve 40 percent reduction of short-lived climate pollutants (SLCP) by 2030?

In terms of RNG use as a transportation fuel, centralizing and automating the process of obtaining LCFS credits BY THE END CONSUMER would go a long way towards documentation. Currently, LCFS credits are only obtained by end users IF they own the fuel dispenser. Currently, the Department of Weights and Measures closely monitors the accuracy of fuel dispensers, and 100% of all public CNG dispensers have automated payment capability. By allowing all end users to obtain LCFS credits, rather than just the owners of dispensers, by creating a group purchasing pool for RNG contracts for consumers, the state can allow the small businesses that comprise the majority of commercial truck ownership in the state an opportunity to participate.

The high cost of building fueling infrastructure prevents the majority of commercial truck owners to participate in the LCFS credit. As most all RNG purchases are by contract and are dispensed from the natural gas mains supply, and the dispensing into vehicles is tracked electronically by point of sale credit card machines, the means to allow non owners of fueling infrastructure (or direct RNG supply from a digester or landfill source) to obtain LCFS credits is readily possible. *Clean Energy* stations in California dispense 100% RNG, yet the end users do not directly see any benefit from the LCFS credits.

While the price at the pump at *Clean Energy* stations may reflect these credits, fueling at other public CNG stations do not currently allow participation in the use of RNG. Until the owners of these stations make the same commitment as *Clean Energy*, fossil derived natural gas will be the fuel dispensed. The majority of these public stations are owned by Utilities. These Utilities also have CPUC mandated rate cards for compression and pipeline tariffs for natural gas transportation fuel users. It can be seen that all the pieces are in place to allow for a state or nonprofit entity to establish an RNG contract pool for small fleets to buy into through use of a fuel dispensing credit card that automatically tracks the fuel used, where dispensed, and can credit the station owners for compression and pipeline use, and debit the RNG supply agreement. Incentives could be put in place by CEC and CPUC to encourage Utilities and other owners of public CNG stations to participate in such a fuel card program.

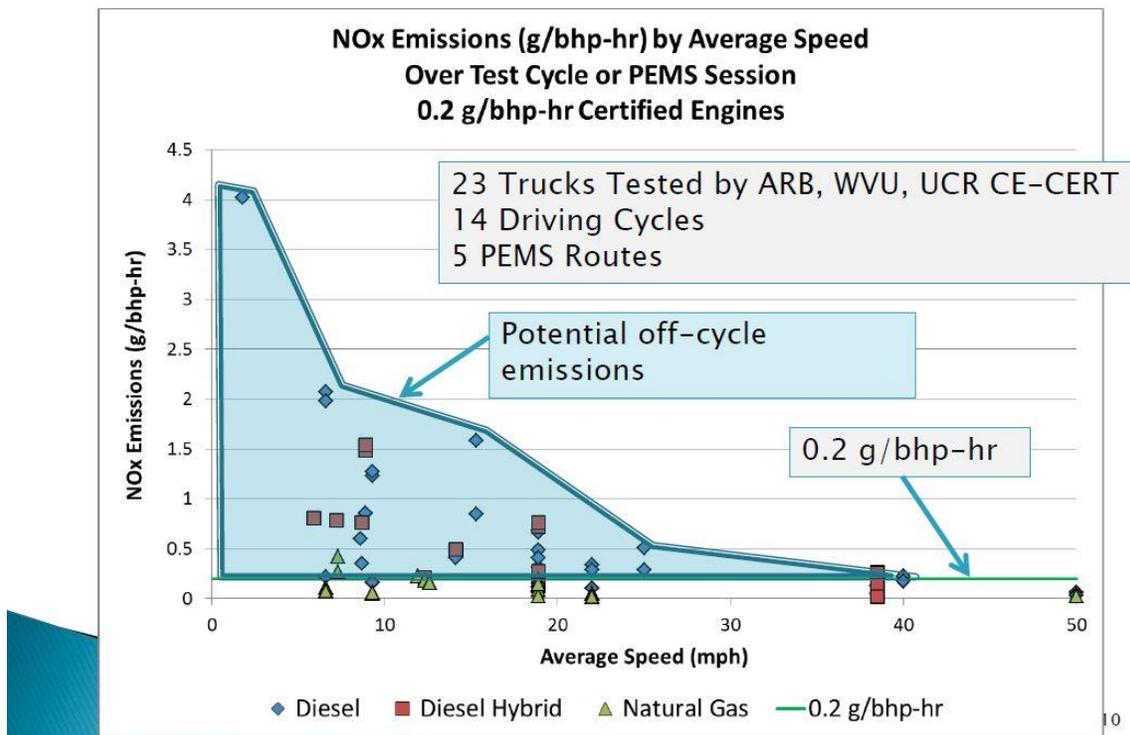
As a further nuance on this scheme, RFS RINS credits could also be managed through this program, potentially allowing end users to participate in these incentives through reduced fuel costs. Essentially if the state desires a large portion of RNG to be used for transportation, by purchasing an allotment of California sourced RNG and making it available to all consumers via fuel card contracts, the State can guarantee the economics of using RNG as a transportation fuel.

- What are the near term opportunities for transportation?
- What are the near-term, opportunities for alternative transportation end uses?

RNG utilization in transportation in a meaningful impactful amount is dependent on increasing RNG availability to small businesses and increasing the number and type of heavy duty natural gas engines available. Cummins and North American Repower are currently the only Manufacturers of Record that can supply ARB certified HD natural gas fueled engines for California Fleets. CEC’s support of HD natural gas engine development has been the key element in making these engines a reality, and continued engine development support by CEC and the state is crucial in bringing more solutions to market.

\$300 million dollars from the VW Mitigation fund is to be dispersed in California over the next three years to “offset” the excess NOx emitted in California by the VW 2.0 liter diesel engine. These funds are currently earmarked to be used to pay 80% to 100% of the cost of purchasing a replacement new class 5-8 HD diesel, CNG or Electric HD vehicle. A separate fund, just for new Electric vehicle purchases is also being created. Sadly, when this settlement went through, ARB ignored its own research and put new HD diesels on the same standing as natural gas powered HD vehicles in terms of emissions mitigation. The fact remains that there is no such thing as a clean diesel, and these funds will not offset excess NOx, but instead will guarantee that dirty diesel remains the primary fuel of choice in the HD sector.

## Potential Excess NOx Emissions



Current HD diesels emit the worst under low load, low speed operation as is the primary type of operation in disadvantaged highly impacted communities, furthering environmental injustice. It is ironic that the same researchers that exposed VW also documented the failure of new HD diesels to meet emissions, and that Natural Gas powered HD vehicles DO meet emissions under ALL driving conditions, yet nothing has been done about it. Why? Because the certification test for on road HD diesels “carve out” these areas of operation specifically because it was known that diesel exhaust treatment technologies fail under these operating conditions. If these were light duty engines, the certification test is different, and none of the current diesel engines on the market today would have obtained certification and be allowed on our roads.

**The best and most effective course of immediate action would be for the CEC and ARB to agree to mandate that the California administrator of the VW mitigation funds NOT be allowed to spend these funds for purchases of HD diesel vehicles.** Is within the scope of the settlement that each state may modify the qualifications for these mitigation expenditures, so there is no barrier beyond the lobbying efforts of diesel advocates to make these funds available only for those technologies PROVEN to mitigate NOx emissions- Natural Gas and Electric operation.

As part of this mandate, CEC and ARB should also make further investments in Natural Gas and Electric fueling infrastructure. There are funds in the settlement to allow California to make this happen.

(See Appendix D, attached)

- What do fleet owners/managers need to see to make commitments and purchase/lease vehicles that can use biogas, biomethane, and renewable gas as a fuel?

The primary barriers are fuel availability and an economically viable means to move to Natural Gas powered HD vehicles. NAR was created to primarily address the latter, as well as reduce several other barriers for fleet owners to move to RNG.

In an effort to meet federal air quality mandates, ARB imposed the retroactive In Use Truck and Bus Regulations, mandating California fleets replace all MY2009 and older HD diesels by 2024. Only those large commercial fleets that normally lease for typically three years, or have multi-state operations so they can move their older fleet out of state, were not concerned. The remaining 92% of commercial HD truck and bus owners screamed foul and tried their best to stop these regulations as they rightly pointed out that the cost to replace would be crippling to small businesses and municipalities, especially since the market for resale of their current HD vehicles would now become none existent. Essentially ARB wiped out 100's of millions of dollars in capital asset value for California businesses and cities with this action.

NAR has specifically developed technology to remanufacture these existing older diesel vehicles into dedicated natural gas vehicles partly in response to these regulations. Remanufacturing of diesel engines and vehicles is a standard process in the industry to keep fleet vehicle replacement rates low. UPS and the Armed Services are two main examples of this practice. You can't buy a used Brown Van from UPS as they "reman" these vehicles to keep them in use for 30 years. The Armed Services do the same for their fleets after deployment to maintain full combat readiness. "Downtime" is the scourge of all fleets, as any truck not working is an asset just costing money, so the diesel reman business in the USA is robust. In fact, CAT does more reman engine sales than new diesel engine sales inside the USA.

Beyond the additional cost of purchasing a new HD vehicle, and the additional premium for a new natural gas HD vehicle, is the cost of servicing these vehicles. For large fleets that service their own vehicles, it many times means moving to a new brand of engine and vehicle, which then entails a new parts supply chain, additional training or hiring of new personnel, and an unknown rate of repair due to lack of experience with these vehicles. For fleets that are serviced by dealerships and service companies (Penske etc), it means sticking to a servicing protocol dictated by the new vehicle warranty and generally having to have this done by the dealership at a higher cost. Again, the unknown rate of repair is a factor that makes budgeting for fleet costs very difficult. In short, fleet managers see moving to natural gas from diesel as a gamble of precious capital that is costly to obtain. The Cummins 15 liter HPDI LNG engine that was pulled from the market is often cited as a reason to not take this gamble, as the losses could be very high.

NAR has sought to lower this barrier by allowing fleet owners to keep their current vehicles, their current parts supply chain, and to build upon their current repair knowledge in terms of mechanic's skills and rate of repair experience. Reducing these "changes" lowers the barrier to adoption. By remanufacturing and modernizing the engine and replacing the fuel tanks, not the entire vehicle, the capital outlay is dramatically reduced, and the technology is introduced in a familiar manner and through a truck they already know.

**The State can aid in moving the legacy fleet to RNG operation by making "repowering" of older vehicles with RNG capable engines that are certified to meet the same or better emission standard than the original diesel eligible for Carl Moyer funding, VW Mitigation funding, and for the state's low interest loan program for fleet replacements.**

For 65% of the HD engines still on the road, these engines were not continued to be manufactured after 2009 (or earlier). So even though NAR technology could make these engine meet MY2010 emissions, the ARB regulations for conversion to alternative fuel operation for HD engines do not allow certification of engines to a newer standard without extensive and costly durability testing that would make creating these engines economically untenable. As a small volume manufacturer,

NAR is able to bring its product to market by voluntarily adding an additional 30% emissions “Degradation Factor” to its official FTP emissions certification results, allowing NAR to forego long term durability testing. This type of testing is needed to determine the longevity of catalytic convertor life. NAR’s technology does not use catalytic convertors or any aftertreatment technology that can degrade in use, so we are certain of our engine’s long term emissions profile. **By placing language in funding incentive programs specifically allowing “conversion or repowering to a natural gas engine that is certified to meet or improve on the original diesel’s emissions”, rather than mandating they meet MY2010 or newer emissions, the carbon reduction and PM benefits of RNG use can be realized, and the critical mass of HD vehicles operating on RNG needed to make the fueling infrastructure economically viable can be created at the lowest possible cost to both fleet owners and the state.**

- What key factors (such as incentives, technology advances, business maturity) are required to be in place to achieve 2030 SLCP targets in California?

**In terms of transportation, incentives to move the legacy fleet to RNG is the most cost effective manner to produce a meaningful mass of RNG capable HD vehicles to achieve the emissions and fossil fuel dependence reductions goals of the state, as well as the fastest and most cost effective method to make the fueling infrastructure economically self sustaining.** Diesel has a 115 year head start on RNG. Piecemeal efforts at buydowns of new HD CNG vehicles and occasional funding of CNG stations has failed to make a significant dent in diesel’s dominance. Use of the VW mitigation funds to allow state, municipal and private fleets to get even more diesel vehicles- for free- will only ensure it’s continued dominance and continued threat to the public’s health, especially in highly impacted DACs.

**Allowing technology such as NARs to participate in state funded buydown programs will allow NAR’s market approach to mature and encourage more diesel OEM remanufacturing divisions to participate with NAR and others in providing legacy fleet RNG solutions.**

- What project enhancements or additional benefits can emerging technologies provide?

**NAR, with the aid of CEC, SCAQMD and SoCal Gas R&D funding, is developing Ultra Low NOx high efficiency HD natural gas engines.** This emerging technology will be very costly to develop. As a small volume manufacturer that currently must rely upon diesel OEM remanufacturing division participation to provide product on a meaningful scale, our technology must not only pass the vetting of the ARB, but must also be capable of attracting VC and Private Equity investment on a scale to either create our own large scale production capability, or encourage current OEM diesel manufacturers to dedicate a production line to our engines. While several OEM remanufacturing divisions do currently work with NAR, the ability to control our IP to guarantee this Ultra Low NOx technology makes it to market in new HD engines while having to rely

on the participation of Diesel OEMs whose product we would be displacing is a slippery slope.

**The state can best aid in the introduction of this technology for use in RNG capable vehicles by adopting the the NOx standard of .02 grams/horsepower-hour for all HD engines by 2020, and by changing the certification testing requirement of HD engines to include ALL driving cycles that are seen in typical use by HD vehicles.** Staff at ARB and EPA having been threatening to do this at the Diesel Technology Forum for years. Now is the time to make good on that promise. Stopping the certification of faulty diesel emissions technology will do more to move diesel OEMs to create natural gas capable HD engines than any vehicle buydown program.

- What are the future prospects of using biomethane, biogas, and renewable gas with different vehicle technologies (e.g., compressed natural gas, dimethyl ether, hydrogen)?

CNG capable vehicles are the lowest cost and only currently available technology type. Dimethyl Ether (DME) use would require ARB certified HD engines specifically certified for use on DME. Volvo has done some work with this fuel, but has not certified an engine with ARB. It is doubtful that for as long as .2 grams NOx is the emission standard, and the current FTP certification test is allowed, that any OEM will move to bring a DME HD engine to market in California. DME and Hydrogen for HD vehicle use must also overcome a complete lack of fueling infrastructure for either fuel for HD vehicles.

Based on current technology, it would be wiser to plan on using future excess Hydrogen produced from renewable sources (solar, wind) to make RNG and use RNG as a transportation fuel. BMW has fully developed the Hydrogen to RNG technology.

Using Hydrogen as a fuel for combustion engines creates even higher levels of in cylinder NOx than other fuels, and range would be severely limited. Given these factors, it is doubtful that any OEM HD diesel manufacturer will develop a hydrogen engine for sale in California.

As fuel cell technology improves, it may become economically viable to produce electric HD vehicles, but issues of cylinder safety (10,000PSI) will still exist until a better storage solution is created. Given these challenges, and the slow rate of HD vehicle replacement (less than 5% per year on average), it is doubtful that either DME or Hydrogen will have a significant impact on the HD vehicle market in California for the next two decades even if major technology breakthroughs are realized in the next 5 years.

1. What is needed to increase the number of vehicle product offerings and vehicle volume sales to achieve SB 1383 goals?

The ARB In Use Truck and Bus regulations create a unique opportunity to create the critical mass of RNG capable HD vehicles needed to meet the goals of SB 1383. Converting/repowering of existing legacy fleet HD vehicles, especially those that are typically low miles per year but operate at low load and speed load in highly impacted communities, such as school buses, package delivery vehicles, Cash in Transit (Armored trucks), municipal service vehicles, etc. can be done at low cost and allow the owners to realize the full life of these long lived vehicles. Repowering /converting to RNG exempts these vehicles from the Diesel regulations, allowing them to continue operation in California. Currently 45,000 vehicles are in operation in California that utilize the diesel engine that NAR has certified for use in California. All of these vehicles must be out of the state by 2024, effectively exporting our pollution to other states. Conversion by NAR eliminates 99% of the PM, reduces NOx 65%, and with RNG reduces CO2 by 70%.

**Creating a program to encourage these conversions through incentives or financed repayment through RNG purchases would allow financially strapped businesses, school districts and municipalities to participate in meeting the state's goal of emissions reductions and reduced use of fossil derived fuels, while allowing these entities to avoid the additional costs of maintaining complex diesel emissions equipment that fail under these operating conditions.**

**Funding by CEC to encourage development of HD natural gas engines has proven successful and should be continued.**

**Adopting the NOx standard of 0.02grams NOx/horsepower-hour and creating a certification testing protocol for HD diesel engines that includes all typical driving operation conditions will spur development of alternative fueled engines and interest by private investors.**

Thank you for the opportunity to respond these key issues and questions.

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