To: Jack Kitowski, Andrew Panson

cc: Peter Christensen, Jason Crow, Michelle Buffington, Ryan Murano, Bill Van Amburg Joe Dalum, Bill Mammen, Matt Jarmuz,

From: John R Petras

Subject: Odyne Systems LLC Comments: ARB FY 2017-18 Funding Plan for Clean Transportation Incentives

To all concerned,

Thank you for the opportunity to participate in the development of the FY 2017-18 Funding Plan for Clean Transportation Incentives. Odyne commends the state of California for its leadership in accelerating the development and early commercial deployment of the cleanest mobile source technologies.

Odyne Systems, LLC develops and manufactures plug-in hybrid drive and jobsite electrification systems for medium and heavy-duty vehicles. Odyne's advanced plug-in hybrid technology enables trucks over 14,000 pounds to have substantially lower emissions, improved performance, quieter job site operation, lower fuel consumption, and reduced operating and maintenance costs. Third party testing paid for by the U.S. Department of Energy and the state of California shows that Odyne technology delivers CO2 reductions of 41% to 64% and NOx emissions reductions of 71% to 95% for typical full-day duty cycles (based on a customer's full workday, depending on vehicle configuration and duty cycle) in comparison to non-hybrid medium and heavy duty trucks meeting current standards.

Since 2012, Odyne has produced over 300 PHEV work truck systems with 28 currently active in California and another 13 systems in the fulfillment process. The company's modular system is highly scalable and is approved to interface directly with the truck transmission produced by Allison Transmission, the world's largest manufacturer of fully automatic transmissions for medium and heavy duty vehicles. Due to on-going advances that have created cost reductions for power electronics and battery systems, the Odyne PHEV system is on a path to deliver an excellent return on investment (ROI) for vocational vehicle fleets and is poised for expansion into new markets and to develop additional inroads in the advancement in PHEV technology for Medium-Heavy-Duty vehicles. It is with our pleasure that we submit the following comments:

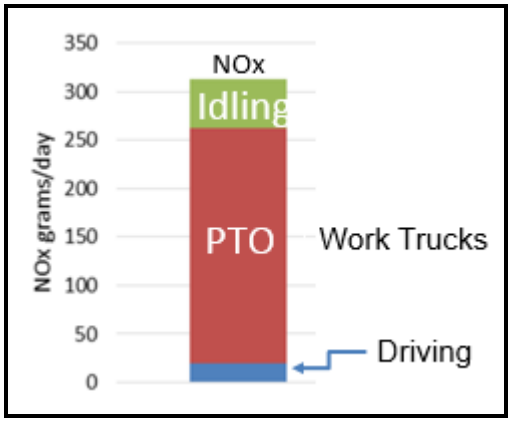
W237 N2878 Woodgate Road Suite 2 Pewaukee, WI 53072

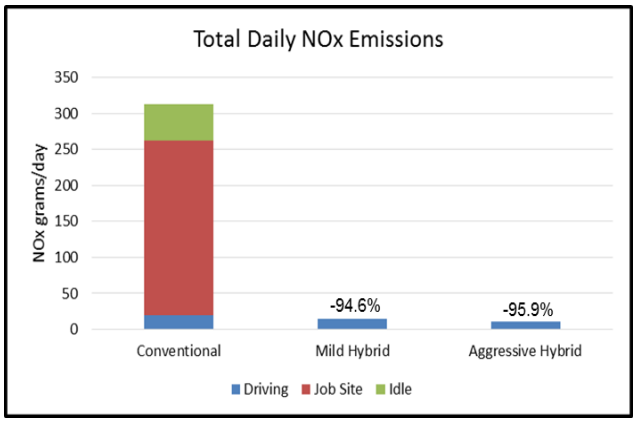
P: (262) 544-8405 F: (262) 544-8421 / Website: www.odyne.com

HVIP:

Odyne applauds ARB for the continued support of the HVIP funding and the proposed changes included in the 2107-18 funding plan. Specific areas of comment include:

Expand Eligibility for ePTO Systems (I-84): Odyne strongly supports this expansion. The figure below is derived from the data generated from the 2013-2015 DOE/SCAQMD ARA project[1] that Odyne participated in and illustrates that the current work truck can produce twenty times more NOx in the stationary work cycle. The figure on the right illustrates the NOx improvement of the Odyne PHEV work truck on an average day





While the funding plan mentions expansion beyond boom trucks, Odyne wishes to stress that there is a very wide range of MHD vocational vehicles that produce significant jobsite emissions during the working day. Not all of these are hydraulic applications. Vehicles such as air compressor trucks or the mobile work trucks pictured below eliminate the need for primary and secondary power sources during the workday and contribute to the NOx and GHG emissions reductions of electrified PHEV Vocational vehicles. Odyne believes that technologies eliminating secondary emissions sources should be identified in the ePTO voucher program and would be happy to work with ARB on the expanded definition of ePTO eligibility.

[1] http://www.osti.gov/scitech/biblio/1234437

Improve Eligibility for Hybrid Conversion Vehicles (I-85): Odyne agrees in general with ARB's assessment of the timing issue described in the proposal with one exception. It is Odyne's experience that the ARB classification as " Conversion" vehicles falling under the "Aftermarket" category is being utilized for systems being installed in the intermediate stage manufacturing stage of the MHD build process (as recognized by NTEA and NHTSA). This is due, in part, because there is no provision within the California regulations which addresses systems added during the multi-stage build process typical of MHD vocational vehicle production. In the case of the Odyne system, the functional components are installed during the intermediate stage build of the certified chassis in order to enable the ePTO functionality of the Odyne system upon delivery to the customer. The hybrid functionality is not engaged until Odyne receives the E.O. – months or years later.

In the current state, Odyne agrees with ARB's updates to allow "conversions" to take place up to a maximum of 25,000 miles and on vehicles one year later (earlier?) than the current model vehicle year, however, Odyne believes that this still falls short of resolving the issues implicit in intermediate stage addition of hybrid systems. In Odyne's case, the system is bought, produced and paid for during the vehicle build with no guarantees that the HVIP money's would be available after the lengthy E.O. process is complete This may mean that the HVIP program may not be an incentive for customers to purchase a PHEV Hybrid/ePTO work truck.

While this situation may be unique to Odyne, we would like to point out that the Odyne system is the only PHEV/ePTO work truck solution providing both drive and stationary GHG and NOx improvements available for sale at this time. While true retrofits can be accomplished, installation at the intermediate stage represents the most efficient point of installation of a fully functional, platform agnostic, PHEV/ePTO system for vocational work trucks. Odyne wishes to continue to work with ARB in both the legislative and funding capacities to resolve the issues of both the recognition of intermediate stage applications for advanced hybrid solutions along with the timing of the E.O. process for such systems.

Part II: Three Year Investment Strategy for Heavy Duty Vehicles:

Once again, Odyne applauds ARB's vision in developing long term investment strategies to resolve the issues created by Heavy Duty vehicles and appreciates the ability to participate in the workshops leading to the development of the Three-Year Investment Strategy. It is with our pleasure that we submit the following comments on the final plan:

Introduction (II-1):

Odyne agrees with ARB's premise that substantial incentives are needed to transform the heavy duty and off-road sector. This sector is extremely diverse in application and duty cycle and contains many, many more producers than the light duty sector; most producing in a low volume environment. Many solutions will be required to cover the needs of this sector in order to achieve California's 2030 and 2050 environmental goals. Odyne encourages ARB to continue to support development, deployment and commercialization of low emissions technology across the complete range of vehicles encompassed by this sector.

Hybrid Electric Vehicles (II-22-24, Figure II-7):

Odyne wishes to comment on the categorization PHEV work trucks While Odyne remains the only producer of a PHEV work truck offering both hybrid drive and ePTO functionality, we believe that the hybridization and electrification of the work truck market is still at the early stages of development. Odyne believes that most vehicles considered in the "commercial" phase offer limited ePTO advantage and no driving efficiency improvements. Odyne does not agree that "Advance PHEV work trucks" should be defined as those with exportable power – these are available today. While these solutions are available and offer immediate available improvements, Odyne believes that a truly advanced PHEV solution for work trucks would offer jobsite electrification (zero emission regardless of hydraulic, pneumatic, or electrical work), hybrid drive functionality, and a stretch goal of limited full electric drive. Odyne believes that development of these types of solutions should be prioritized for the advancement of the work truck market and supported by development and demonstration projects.

Low NOx (II-25-27, Figure II-8)

Odyne wishes to again point out that 75-90% of work truck NOx emissions can come from the stationary work portion of the work truck duty cycle and requests that jobsite electrification be included as a Low NOx strategy for this sector of the MHD market

Efficiencies (II-28-33, Figure II-9)

The efficiencies area covers a wide range of activity yet does not seem to encompass an area in which Odyne has focused: The efficiency of combining limited aspects of other focus areas into a single solution delivering greater combined results. In Odyne's case, as the only manufacturer delivering hybrid drive improvements with electrification of the jobsite, we often fall outside the range of hybrid drive goals, yet produce superior vehicle results than other available solutions. Further development focuses on all-electric drive, however we may not be able to deliver the full range envisioned by ARB due to the need to support full electric jobsite at a cost appropriate to the customer. Discussed later in the beachheads section, Odyne requests that the efficiencies generated by combining aspects of many ARB initiatives be considered, in general, in the efficiencies discussion of future funding.

Efficiency Beachheads: Controlled Ecosystems and Vocational Hybridization (II-39-41, Figure 13)

Odyne commends the ARB and authors of the report on the depiction of a very complex ecosystem which we feel is of primary interest to Odyne. On a small note, we believe the Drive Cycle Path should be identified as MHD as opposed to MD. Within this beachhead, we believe that significant progress can be made by recognizing the cross connections and supporting programs that advance and integrate multiple efficiency technology bubbles into vehicle solutions. Additionally, the diversity of markets and vehicle types within this area lends it to further cross connection and we believe that projects which adapt early commercial technologies into new market spaces should be positioned as Technology

R&D/Early Stage Demos and can enhance the propagation of efficiency technologies across multiple segments. Odyne notes that the current development and demonstration funding plans focus almost entirely on freight transportation which significantly limits Odyne's ability to participate in the advancement of solutions in this area. While the focus is understandable considering the Sustainable Freight Action Plan, Odyne requests that future funding be made available to develop the integration and advancement of capabilities represented in this section in sectors outside of sustainable freight.

Recommendation Section, 3-year plan (II41-46, Table II-1):

Recognizing the need for solutions in Drayage and Delivery sectors, Odyne notes that there appears to be no funding identified for development of solutions not specific to these areas. Odyne requests that some consideration be made for other-market solutions which fall within the beachhead path identified in Figure II-13.

Summary:

Odyne welcomes the opportunity to participate in the development of the ARB funding plans. Our three main areas of interest are:

1) Expansion of the definition of ePTO systems within HVIP to include all aspects of worksite electrification resulting in significant GHG and NOx reductions
2) Continued work with ARB on the recognition of Hybrid systems installed in the intermediate stage of MHD truck assembly and the resolution of barriers in both the approval and HVIP processes
3) Funding support for the development and demonstration of systems which integrate multiple efficiency technologies within the vocational vehicle market.

We look forward to continuing to work with the ARB on the development funding plans and approval procedures which support the hybridization and electrification of the vocational vehicle market. Please feel free to contact me with any questions or further information needs.

Best Regards,

John Petras
Director, Business Development
Principal Investigator
Odyne Systems, LLC