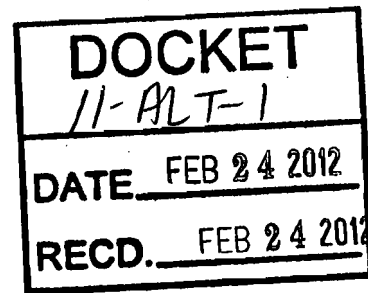


February 24, 2012



To: California Energy Commission
Dockets Office, MS-4
Docket # 11-ALT-1, 2012-13 Investment Plan
1516 Ninth Street
Sacramento, CA 95814-5512

From: John Boesel, President and CEO, CALSTART
David Mazaika, Chief Operating Officer, Quantum Technologies

Subject: Docket No. 10-ALT-1, 2011-2012 Investment Plan

We are jointly writing to recommend that the California Energy Commission (CEC) allocate \$5 million in the 2012-2013 AB 118 Investment Plan to jump-start the market for plug-in hybrid electric pick-up trucks¹. This request is being made because such trucks currently do not qualify for funding under either the CVRP or HVIP programs. Pick-ups remain the bestselling vehicle in the United States, and this targeted incentive program could have a very significant impact.

Introduction:

Transportation accounts for approximately 27% of all greenhouse gas emissions in the United States, 30% of which comes from light duty trucks^{2, 3}. There are currently 4.5 million light duty trucks¹ in fleet operations nationwide and the annual replacement of these vehicles exceeds 550,000 vehicles. Fleets that purchase these vehicles, namely utilities and municipalities, have shown a proclivity towards plug-in hybrid (PHEV) propulsion systems given their improved lifecycle costs. However, these fleets typically have small asset bases and limited capital budgets and therefore require incentives to assist in the higher upfront cost of PHEV vehicles.

Given the critical role that light-duty trucks play in global warming, as well as the elevated interest of fleets to purchase PHEV powertrains, we are proposing the CEC allocate \$5M in its 2012-2013 Investment Plan for this purpose. The funds could be distributed through one of the existing AB 118 incentive programs. The allocation would be \$12,000/vehicle as is offered in the lower weight class category. This would help catalyze the market for PHEV light trucks in its early years by assisting smaller fleets who do not have the buying-power to cover the higher acquisition cost of these vehicles.

Current Gap in State Incentives

The CEC and the California Air Resources Board (ARB) currently provide incentive funding for advanced technology vehicles. The CVRP program funded by ARB is targeted at the passenger car market. For a plug-in vehicle to receive CVRP funding, it must meet, at a minimum, the Advanced Technology Partial Zero Emission Vehicle (AT-PZEV) emission standard. The initial Chevy Volt did not meet this standard, but the new ones produced from February 2012 going forward will. While pick-up trucks are often used as a passenger car, no pick-up truck meets the AT-PZEV emission standard. In the long-run, we believe that the new 2017-2025 light-duty vehicle emission standards will require pick-up trucks to eventually meet this standard, most likely in the 2020-2022 timeframe. Until that time, under current CVRP rules, there will be no funding for plug-in pick-up trucks.

¹ The term plug-in hybrid electric pick-up truck is meant to include a truck that can, for periods of time, operate for some period of time in a zero emission mode. This term is meant to include those pick-up trucks that are also classified as "extended range electric vehicles".

² Light-duty trucks defined as pick-up trucks and vans which are less than 8500 lbs

³ US EPA: *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008*

The Hybrid Vehicle Incentive Program (HVIP) does provide funding for heavier vehicles, but not for vehicles below 8,500 lbs. The smallest vehicle to receive funding under the program is the all-electric Ford Transit Connect manufactured by Azure Dynamics.

Given that pick-up trucks are an immensely popular market, it would be wise for the state to provide funding to help jump-start a strategy that will lead to a product with significantly less petroleum consumption and emission levels. We would recommend that the CEC allocate \$5 million for this purpose for the next 3-4 years.

Target Market

Utility and municipal fleets have demonstrated great interest in plug-in versions of these vehicles, those that operate on battery power for 35-40 miles and have a back-up engine for longer range. These vehicles are attractive because they have low lifecycle and environmental costs due to their battery power, but still allow emergency servicing during extreme weather events due to their back-up engine.

The typical utility or municipal customer has between 500 to 1,000 vehicle assets and annual purchasing/capital budgets from \$5 to \$10 million. There are thousands of these types of fleets in the United States. On average, 50% of one of these types fleet's capital budget is spent on light-duty trucks. These vehicles are used for service and short-haul operations, averaging 75 miles per day. In a recent survey by Fleet Answers, 56% of fleets believe that Plug-In Hybrids will play a bigger role in their fleets, as compared to hybrids, gasoline/diesel vehicles, and other types of alternative fuels.

Benefits of PHEV Pick-Up Trucks/Vans

Lower lifecycle costs:

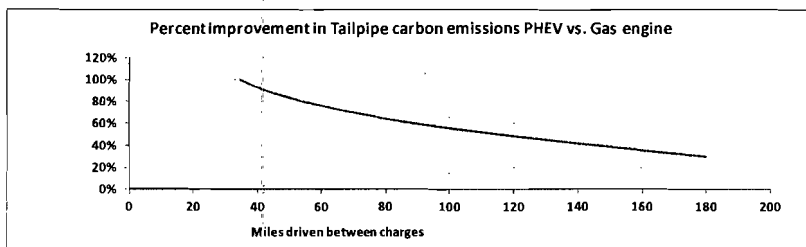
Plug-in hybrid vehicles have lower lifecycle costs than their gasoline or diesel alternatives, due to decreased fuel and maintenance. Due to the regenerative braking achieved through battery power, there is less friction on the breaks and therefore replacements are reduced in half. In addition, oil changes and engine repair are reduced by 1/2 since half of daily driving takes place on battery power.

Dow Kokam has developed a Total Cost of Ownership Model, using maintenance data provided by Utilimarc. Although, the acquisition cost of these vehicles is initially higher, on a total cost basis, savings in fuel and maintenance supersede the higher upfront cost over the life of the vehicle.

Example: Total costs of gasoline vehicle vs. PHEV.

Better Environmental Footprint:

A PHEV pick-up truck will achieve 40-80 miles per gallon fuel economy given a driving range of 55 to 80 miles per day.⁴ This is a vast improvement from the typical 15-18 miles per gallon achieved by its gasoline equivalent. This translates into a 60-80% improvement in carbon emissions, per the graph below.⁵



⁴ Quantum Technologies

⁵ Quantum Technologies

Reducing carbon has a direct linkage to reductions of smog, NOx and other pollutants which are harmful to human health as well as foreign oil imports. The table below shows the reduction in emissions and imported oil from various levels of sales of plug-in hybrid pick-up trucks.

| # Vehicles | Miles/ 7 Years | Tons NOx Reduced | Tons CO2 Reduced | Barrels Oil Not Imported |
|---------------|-------------------|---------------------|---------------------|-----------------------------|
| 1,500 | 196,875,000 | 4 | 84,546 | 119,318 |
| 10,000 | 1,312,500,000 | 29 | 563,640 | 795,455 |
| 100,000 | 13,125,000,000 | 289 | 5,636,400 | 7,954,545 |

Overcoming Market Barriers: The Need for Incentives

Although the market for PHEV light-duty trucks is ripe, there are significant barriers which are inhibiting its growth. The biggest barrier is the upfront cost of a PHEV which is on average three times higher than its gasoline equivalent. This price delta is due to the fact that engineering and development costs are higher in the early years and supply costs (batteries and others) are higher when volumes are low. Once the early market is catalyzed the upfront cost of PHEV's will decline. However, volume sales are needed to achieve cost reduction.

As discussed earlier, the typical customer of a PHEV light-duty truck is a small utility or municipal fleet with limited capital budget. Given budget restrictions, the higher upfront cost of a PHEV would limit the overall sum total of vehicles purchased in a given year. These fleets do not have the buying power to reconcile higher acquisition costs and still meet their replacement targets. Additionally, such fleets require a 3-5 year payback.

A \$12,000 annual incentive would help these smaller fleets reconcile their budgets and still achieve their payback requirements. According to Dow Kokam's TCO model, typical payback of a PHEV without the \$12,000 incentive is 6-7 years. With the incentive, payback is closer to 5 years. This shorter payback period is more likely to result in fleet acceptance of this product.

Need Given New Standards

Although recently CARB voted to adopt the 2017-2025 LDV GHG standards, OEMs are not pursuing this market at this time due to the perceived lower market interest. From discussions with various manufacturers and their public statements, it is unlikely that any major OEM will begin producing a plug-in hybrid pick-up for another six to eight years. This provides a great opportunity for up fitters to jump-start the market by demonstrating the demand is there through strong sales. From many discussions with potential customers, an incentive similar to the one provided for the all electric Transit Connect by the State of California would provide the incentive needed to push a number of these fleet operators over the threshold to purchase significant volumes of vehicles.

Quantum, Via Motors, Alt-E, and others have developed Range Extended Electric F-150 trucks (or similar models) with 35-40 miles all electric range and 400 miles hybrid range. This is a great match to these fleet user requirements. About half of the users would operate this as an all-electric truck due to their less than 35 mile daily range, while the other 50% would cut their fuel use in half (typical driving distance is ~70 miles).

Conclusion

We are strongly recommending the CEC develop a means to provide incentives directly to the fleets in the order of \$12,000/unit to jump-start the market for plug-in hybrid pick-up trucks. Pick-ups are one of the best selling vehicles in the United States and California today. Current incentive programs do not support the purchase of plug-in hybrid pick-up trucks. The CEC can play a very important role in advancing plug-in technology in this key segment.

One additional reason the CEC may want to include a \$5 million allocation in their 2012-2013 AB 118 Investment Plan for this new incentive program is that at least one of the leading up fitters of plug-in hybrid trucks is a California company. This incentive could help that company grow. In addition, with this incentive, there would be a number of fleets interested in pursuing this product now, and not waiting until later this decade.

We would appreciate the chance to meet with CEC to discuss this concept in greater detail, and elaborate on how it supports the over-all goals of the CEC's AB 118 program.