

To:

California Energy Commission  
Dockets Office, MS-4  
Re: Docket No. 10-ALT-1  
1516 Ninth Street  
Sacramento, CA 95814-5512

**DOCKET**

**10-ALT-1**

DATE

RECD. DEC 08 2010

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

Quantum Technologies requests the CEC to consider 2 programs to the CEC 2011-2012 Investment Plan.

Program No. 1: Support the engineering, manufacturing and production of a Range Extended Electric Light Duty Truck based on the Ford F-150 (Quantum PHEV F-150)

Program No.2: Institute a Pilot Project for the manufacturing and production of an Electric Driven USPS Long Life Vehicle (LLV)

### **Program No.1: Range Extended Electric Light Duty Truck (Quantum PHEV F-150)**

There are currently 4.5 Million Class 1&2 Light duty trucks<sup>1</sup> in Fleet operations nationwide. Based on typical user driving durations of 10 years in Government Fleets and 7 years in Private Fleets<sup>2</sup>, the replacement requirements of those vehicles exceed 550,000 vehicles each year. Even with a moderate penetration of 1% of new vehicles being PHEV/EV vehicles in 2012 that would present a total of 5,500 Class 1 & 2 PHEV/EV trucks. Estimating that in the years to follow the penetration will rise significantly, the numbers could reach more than 20,000 PHEV/EV Class 1 & 2 trucks every year. As an example, even a still moderate 5% penetration of PHEV/EV trucks in Fleet usage in 2020 is totaling up to 27,500 Class 1 & 2 trucks driving either fully electrical or range extended electrical.

In addition, the driving profiles of Class 1&2 trucks in Fleet operations strongly support the usage of electric drive vehicles. Average driven miles per day in Light Government is 22 miles and 75 miles in private fleets<sup>3</sup>.

1 Fleet Electrification Roadmap, Nov 2010, Electrification Coalition: Class 1 trucks up to 6000 lbs GVWR, Class 2 trucks from 6,001 to 10,000lbs GVWR

2 Fleet Electrification Roadmap, Nov 2010, Electrification Coalition

3 Fleet Electrification Roadmap, Nov 2010, Electrification Coalition

Fleet vehicles are, from a charging infrastructure point of view, so called A to A vehicles due to their central charging profile. No external charging infrastructure would be required.

There is currently no PHEV/EV light duty truck available which meets the Fleet Operators specifications. For the OEM the yearly production numbers are still too low and for many Upfitters the vehicle add-on price is still too high for Fleet operators to accept.

The Ford F-150 is a Class 2 truck and represents the one light duty truck which sticks out the most:

- Most Fleets operate the F-150 due to its work profile (rugged workhorse)
- The most sold vehicle in the US exceeding 600,000 vehicles every year

Based on the proliferation of the F-150 it is estimated that conservatively 25% of the total volume of the 5,500 annual PHEV/EV Class 1&2 trucks is represented by the PHEV/EV F-150. Being able to provide a technical solution using already in production power electronics, Quantum is working on a Range Extended Electric F-150 truck with 35+ miles all electric range and 400 miles hybrid range using its F-Drive Technology.

For this project Quantum is seeking matching funds to design, engineer and manufacture up to 5,500 PHEV based on the Ford F-150 within the next 3 years to enable Fleet operators to add a light duty truck to their fuel efficient fleets.

This 3-year period will establish and demonstrate the market for this vehicle. After that time frame the volume will be high enough for the OEM to fully engage which will bring the per vehicle cost down even further.

The total amount of funds required is \$6.8 Million including all engineering and the set up of the manufacturing facility. Quantum is seeking a 50% share of matching funds to aid in the execution of this program.

The manufacturing facility would be at Quantum Technologies in Lake Forest, CA. Start of Production is targeted for the First Quarter of 2012 with Pre-production vehicles being available for Fleet usage in the second half of 2011.

Current projections add 85 new employees to Quantum's production facility which in turn would create additional 260 – 750 indirect and induced new employment opportunities for California<sup>4</sup>.

The fuel efficiency of the F-150 PHEV will be at 70 mpg for all travel up to 65 mile per day which will reduce the CO<sub>2</sub> emission to 75 g/km (see chart 1).

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4 Based on RIMS II from the Bureau of Economic Analysis

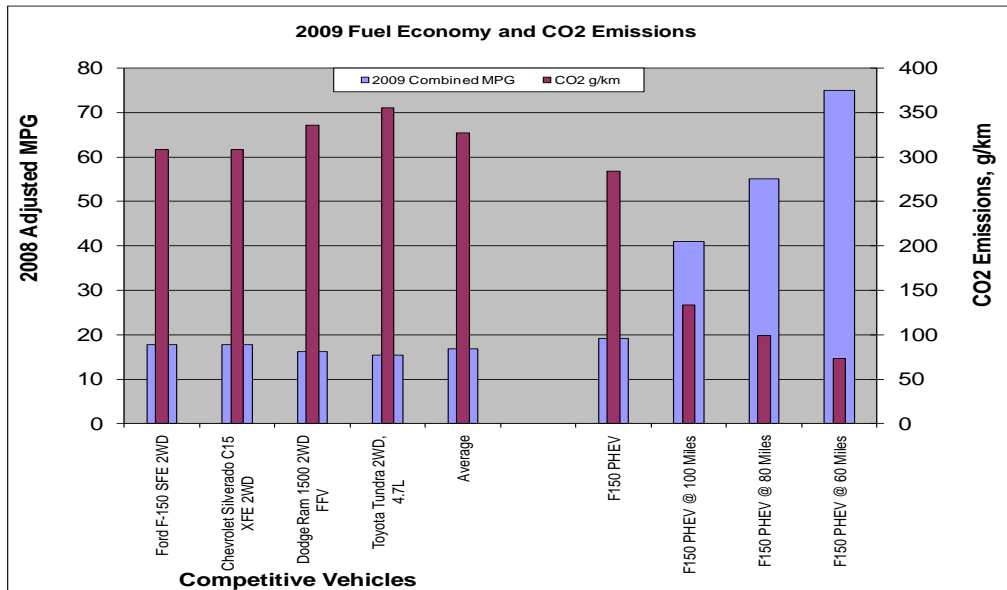


Chart 1

The Fleet customer is purchasing the base F-150 and Quantum Technologies will be converting the F-150 into the Quantum PHEV F-150 at its Lake Forest facilities. From there the finished vehicle will be shipped to the Fleet customer's destination.

Current Fleet demand drives the Range extended Electric version of the F-150, but some Fleets already show interest in an electric only version. The PHEV provides the platform for an easy evolution to an electric only F-150.

The current HVIP program covers vehicles higher than 8500 lbs GVWR. Quantum is requesting an exception for Fleet users only to extend the weight limit down to 6,700 lbs GVWR to match up with the Quantum PHEV F-150.

## Program No. 2: Electric conversion of the USPS LLV

Quantum Technologies is among 4 other companies currently engaged in an USPS project to prove the performance of an Electric Drive Vehicle for the US Post office. The vehicle chosen from the USPS was the Grumman Long Life Vehicle (LLV) due to its daily drive cycle of about 25 miles. This is a perfect application for an EV.

Quantum is applying its all-electric QuietDrive™ System to the vehicle as a full replacement of the current ICE.

There are about 142,000 LLV's in operation today.



*The Grumman Long Life Vehicle*

To convert all 142,000 LLV's into EV within the next ten years a total of 2,600 jobs could be created directly, indirectly and induced<sup>5</sup>.

Furthermore, the conversion of the total LLV Fleet would save over 9,000 tons of NOx, over 7 Million tons of CO<sub>2</sub> and over 13 million barrels of oil in 10 years of operation.

Quantum Technologies proposes a pilot program to convert 100 LLV's in California into EV's using the QuantumQuitDrive™ and deploy the vehicles at 2-5 Post office demonstration sites. The conversion of the 100 vehicles would cost \$35,000 each to total of \$3.5 Million.

This pilot program would prove out the EV's in actual mail delivery schedules, proves out the charging infrastructure and the grid effect, and verifies the production and labor requirements.

At the same time the pilot project aids in the effort to bring the whole conversion project to California to take full advantage of the job creation.

For the execution of this pilot project Quantum Technologies is looking for 2 partners which contribute 1/3 each of the total cost of \$3.5 Million the pilot project.

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5 Using RIMS II from the Bureau of Economic Analysis