

NOTICE OF PUBLIC MEETING TO CONSIDER APPROVAL OF THE PROPOSED FISCAL YEAR 2017-18 FUNDING PLAN FOR CLEAN TRANSPORTATION INCENTIVES

Recommendations submitted by: Advanced Engines Development Corp.

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The California Air Resources Board (CARB) urges CO₂ greenhouse gas reduction to the maximum extent possible and by every possible means.

Clean Vehicle Rebate Program

Currently in the **Clean Vehicle Rebate Program** CARB promotes the use of and financially supports: (1) Battery Electric Vehicles (BEVs), (2) Plug-in Hybrid Electric Vehicles (PHEVs), and (3) Fuel Cell Vehicles (FCVs).

We recommend expanding the categories acceptable under the **Clean Vehicle Rebate Program**:

1. New Category or Subcategory under Battery Electric Vehicles (BEVs) – **Autocycles**

Autocycles – are a new class of vehicle that is 3- or 4-wheeled, fully enclosed vehicle, low cost, and zero tailpipe emissions (e.g., 3-wheeled Acrimoto, and 4-wheeled Twzy (currently available in Europe)) .

The reason for proposing this new class is that autocycles can obtain ≥ 200 MPGe which reduces the CO₂ emission by at least 50% compared to current BEV's. They also have a modest/low sticker price (~\$12,000), and would be a great commuting vehicle. Autocycles could be a solution to providing/encouraging disadvantaged community members to buy a zero tailpipe emission vehicle at a reasonable cost, especially if given a rebate. Lastly, for urban commuters, universities, and retirement communities these vehicles take up fewer parking spaces (2-3 could fit into a single standard parking stall) – thus allowing for less parking stalls needed/capita.

2. New Category or Subcategory under Plug-in Hybrid Electric Vehicles (PHEV) – **Autocycles**. To encourage advancement in technology to further reduce overall CO₂ emissions in light weight vehicles. We propose this new category or subcategory that encourages the development of a new hybrid autocycle that employs 4 technologies (perhaps named -Technology Quad Vehicles (TQV)):
 - a. 3- or 4-wheeled Autocycle
 - b. Very fuel efficient hydrocarbon-fueled internal combustion engines that operate $\geq 45\%$ Brake Thermal Efficiency (BTE)
 - c. Hybrid vehicle technology including regenerative braking
 - d. Capable of running on high-blend-rate, low carbon biofuels. Blend rates of $\geq 98\%$ are desired

The reason for promoting this new category or subcategory is for the same reason under #1 above. Plus this new vehicle(s) has the potential to further reduce CO₂ emissions per mile by at least 70% compared to current BEVs being recharged on the California

Electric Grid and by at least 90% compared to the average 25.5 MPG gasoline powered vehicle. The new hybrid autocycle maximum allowable CO₂ emission rate per mile has the potential of being ≤ 0.075 lbs. of CO₂ per mile on fossil fuels.

To encourage the use of low carbon biofuel use in these future vehicles, part of the **Clean Vehicle Rebate Program** could be a \$500 gift card to a local low carbon biofuel filling station (e.g., Propel HPR).

AQIP Program

To further the advancement of technology to reduce CO₂ emissions from vehicles, we recommend under the **AQIP Program** to open up the technology demonstration program to include lightweight vehicles (personal, commuter, and small cargo vehicles). We recommend CARB fund 2-5 projects/year under the **Lightweight Vehicle Demonstrator** projects for a total of \$4,000,000 (average per project \$750,000). These demonstration projects must include all 4 elements of the TQV:

1. 3- or 4-wheeled Autocycle
2. Very fuel efficient hydrocarbon-fueled internal combustion engines that operate $\geq 45\%$ Brake Thermal Efficiency (BTE)
3. Hybrid vehicle technology including regenerative braking
4. Capable of running on high-blend-rate, low carbon biofuels. Blend rates of $\geq 98\%$ are preferred

Ideally, these demonstrators would achieve ≥ 150 MPG and when using low carbon biofuel would emit ≤ 0.049 lbs of CO₂ per mile, resulting in at least 80% less CO₂ emissions than a current BEV charged on the California grid. We believe by encouraging the development of new very fuel efficient and low cost vehicles the potential to further reduce CO₂ emissions of lightweight vehicles is great and will help CARB achieve its mission.