

**2007 GRANT PROPOSAL SOLICITATION  
Alternative Fuel Incentive Program (AFIP)**

## **ATTACHMENT C**

# **Plug-in Hybrid and Alternative Fuel Vehicles: Vehicle Demonstration and Research**

Mobile Source Control Division  
California Air Resources Board  
02/09/07

California Air Resources Board  
**Alternative Fuel Incentive Program (AFIP)**  
**Plug-in Hybrid and Alternative Fuel Vehicles:**  
**Vehicle Demonstration and Research**

February 9, 2007

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## **INTRODUCTION**

The mission of the California Air Resources Board (ARB or Board) is to promote and protect public health, welfare and ecological resources through the effective and efficient reduction of air pollutants while recognizing and considering the effects on the economy of the State. Chapter 48, Statutes of 2006 (Assembly Bill 1811) authorized the California Air Resources Board (ARB) to expend \$25 million (twenty-five million dollars) in the 2006/2007 budget year to incentivize the use and production of alternative fuels. The Board is requesting Alternative Fuel Incentive Program (AFIP) grant proposals from applicants for the fiscal year 2006/2007. All funds must be encumbered by June 30, 2007.

The focus of this grant application packet is to solicit proposals for Plug-in Hybrid Electric Vehicle (PHEV) and Alternative Fuel Vehicle demonstration and research projects. The objective of this category is to fund demonstration and research activities that accelerate the commercialization of clean and efficient plug-in hybrids and alternative fuel vehicles. Priority in this AFIP category will be given to PHEV-related projects that address impediments to commercialization. Projects may include vehicle demonstrations to perform research with pre-commercial vehicles, or to explore consumer response to alternative fuel vehicles in general or plug-in (electric fuel) vehicles in particular.

None of these funds may be used for incentives, grants, or any support of fuels derived from petroleum, petroleum coke, or coal.

As mentioned above, these funds must be encumbered by June 30, 2007.

More information on the Alternate Fuel Incentive Program can be accessed at <http://www.arb.ca.gov/fuels/altfuels/incentives/incentives.htm>

## **BACKGROUND**

Alternative fuel vehicles have been considered for many years as a means of providing reductions in smog-forming emissions. Alternative fuel vehicles may reduce petroleum dependency and provide reductions of climate change pollutants in two ways. First, during the combustion process, alternative fuels may produce lower climate changes emissions. Second, alternative fuels have different upstream emissions than conventional gasoline or diesel. The upstream emissions are the “well-to-tank” emissions and include extraction, transport, processing, distribution, and marketing.

Electric fuel vehicles have the largest potential to reduce climate change emissions and petroleum dependency relative to any other alternative fuel vehicle under consideration. Unfortunately, building and marketing commercially viable PHEVs remains a challenge

for a variety of reasons. It is the purpose of the grants under this category to address these challenges to PHEV commercialization.

## **ELIGIBILITY**

Submitting entity must be registered as a business entity with the California Secretary of State. Entities may submit more than one project proposal under this category. Entities may also submit more than one project proposal addressing the same topic but with varying scope of work and proposed ARB funding levels.

## **ELIGIBLE PROJECTS/SCOPE OF WORK**

**Topic Preference List:** Project proposals submitted under this AFIP category must address one or more of the topics listed below (in order of priority):

### **1. Highest Priority Topics:**

- Passenger car and Light-duty truck plug-in vehicle (PHEV) demonstration-based projects addressing challenges to commercialization, including (but not limited to):
  - Consumer acceptance, user behavior, marketability issues, etc., for example:
    - Consumer behavior – How often will owners plug in?
    - Consumer purchase behavior when offered vehicles with higher initial cost but lower operating cost.
  - PHEV system or component evaluation under real-life conditions.Demonstration project proposals must clearly identify all research objectives (topics to be analyzed or questions to be answered).
- Battery technology readiness for on-vehicle electric fuel storage application in PHEVs, for example, development or testing of battery technologies suitable for use in PHEV applications.
- PHEV certification testing.
- PHEV charging infrastructure issues.

### **2. High Priority Topics:**

- Medium-duty passenger, Medium-duty, or other Heavy-duty PHEV demonstration in applications well suited for PHEVs. Demonstration project proposals must clearly identify all research objectives (topics to be analyzed or questions to be answered).

### **3. Medium Priority Topics:**

- California-specific Light-duty passenger car driving use survey suitable for analysis of PHEV emissions and fuel use (utility factor).

- Analysis must consider multi-vehicle households and distinguish usage profiles between primary, second, and third plus vehicles in California households.
- Assess access to electrical outlets at overnight parking locations.
- Study and/or survey of California electric utility treatment of household customers with electric and alternative fuel vehicles, including special tariff effectiveness and assessment of what existing customers actually pay for electricity and CNG for fueling motor vehicles.
- Public outreach or education activities with exclusive focus on PHEVs.
- Passenger car, Light-duty truck, Medium-duty passenger, Medium-duty, or other Heavy-duty Alternative fuel vehicle demonstration in suitable applications. Demonstration project proposals must clearly identify all research objectives (topics to be analyzed or questions to be answered).

## **AVAILABLE FUNDING**

The total available funding for PHEV and Alternative Fuel Vehicles: Vehicle Demonstration and Research category is approximately \$5 million. It is anticipated that this allocated amount will be distributed as grants within this category. However, should an insufficient number of quality proposals be received, monies may be shifted to other grant categories. Not all monies may be awarded. Maximum suggested grant amount for any single project in this category is \$1.5 million.

## **DEFINITIONS**

**“Alternative Fuel”** means:

- Mixtures containing 85 percent or more by volume of alcohol fuel, including methanol and denatured ethanol
- Natural gas (compressed or liquefied)
- Liquefied petroleum gas (propane)
- Hydrogen
- Fuels derived from biological materials
- Electricity (including electricity from solar energy)
- 100 percent Biodiesel (B100) or Renewable Diesel meeting ASTM D-975.
- Blends of two or more alternative fuels, for example, natural gas and hydrogen

**“Alternative Fuel Vehicle”** (AFV) means a vehicle fueled exclusively by alternative fuels (must be 100 percent alternative fuel use)

**“Hybrid Electric Vehicle”** (HEV) means any vehicle that can draw propulsion energy from both of the following on-vehicle sources of stored energy: 1) consumable fuel, and 2) an energy storage device such as a battery, capacitor, or flywheel.

**“Plug-in Hybrid Electric Vehicle”** (PHEV), (also known as a Grid-connected HEV or GHEV) means a hybrid electric vehicle which has:

- zero emission vehicle range capability,
- on-board electrical energy storage device with useful capacity equivalent to greater than or equal to ten miles of Urban Dynamometer Driving Schedule (UDDS) range on electricity alone,
- is equipped with an on-board charger, and
- is intended to be rechargeable from an off-board electrical source.

**“Passenger car”** means any motor vehicle designed primarily for transportation of persons and having a design capacity of twelve persons or less.

**“Light-duty truck”** means any 2000 and subsequent model motor vehicle certified to the standards in section 1961(a)(1), Title 13, California Code of Regulations (CCR), rated at 8.5 thousand pounds gross vehicle weight or less, and any other motor vehicle rated at 6 thousand pounds gross vehicle weight or less, which is designed primarily for purposes of transportation of property or is a derivative of such a vehicle, or is available with special features enabling off-street or off-highway operation and use.

**“Medium-duty passenger vehicle”** means any medium-duty vehicle with a gross vehicle weight rating of less than 10 thousand pounds that is designed primarily for the transportation of persons. The medium-duty passenger vehicle definition does not include any vehicle which: 1) is an “incomplete truck” i.e., is a truck that does not have the primary load carrying device or container attached, or 2) has a seating capacity of more than 12 persons, or 3) is designed for more than nine persons in seating rearward of the driver’s seat, or 4) is equipped with an open cargo area of 72.0 inches in interior length or more. A covered box not readily accessible from the passenger compartment will be considered an open cargo area, for purposes of this definition.

**“Medium-duty vehicle”** means any heavy-duty low-emission, ultra-low-emission, super-ultra-low-emission or zero-emission vehicle certified to the standards in Section 1961(a)(1) or 1962, Title 13, CCR, having a manufacturer’s gross vehicle weight rating between 8,501 and 14 thousand pounds.

**“Heavy-duty vehicle”** means any motor vehicle having a manufacturer’s gross vehicle weight rating greater than 6 thousand pounds, except passenger cars.

**“Urban bus”** means a passenger-carrying vehicle powered by a heavy heavy-duty diesel engine (33 thousand Gross Vehicle Weight), or of a type normally powered by a heavy heavy-duty diesel engine, with a load capacity of fifteen (15) or more passengers and intended primarily for intra-city operation, i.e., within the confines of a city or greater metropolitan area. These buses are generally 35 feet in length or longer. Urban bus operation is characterized by short rides and frequent stops. To facilitate this type of operation, more than one set of quick-operating entrance and exit doors would normally be installed. Since fares are usually paid in cash or token, rather than purchased in advance in the form of tickets, urban buses would normally have equipment installed for

the collection of fares. Urban buses are also typically characterized by the absence of equipment and facilities for long distance travel, e.g., restrooms, large luggage compartments, and facilities for stowing carry-on luggage.

## **APPLICATION REQUIREMENTS**

All projects shall meet the specific requirements of this solicitation. Applicants must meet these criteria and fully complete project applications to be considered for project funding consideration. Additional information may be requested during the application review process if needed.

## **APPLICATION PROCESS**

This application packet contains the forms and guidelines necessary for submitting complete proposals for funding. The decisions regarding eligible applicants and proposals that are ultimately funded will be the sole discretion of the Air Resources Board. Grant applications must be complete and meet all of the requirements set forth in this application packet.

Two signed original copies and one CD of the proposals, including all the required documents must be received at the Air Resources Board headquarters at 1001 I Street, Sacramento, CA 95812 **no later than 5:00 PM, March 12, 2007.**

Mail or deliver proposals to the following address:

### U.S. Postal Service Deliveries

Ms. Kathy Leuterio

Air Resources Board  
Mobile Source Control Division  
P.O. Box 2815  
Sacramento, CA 95812

### Hand Deliveries

(UPS, Express Mail, Federal Express)

Ms. Kathy Leuterio

Air Resources Board  
Mobile Source Control Division  
1001 I Street  
Sacramento, CA 95814

**Postmark dates will not suffice to meet the stated deadlines.**

**No application documents may be submitted by fax or email.**

### *Timelines*

Public Release of Solicitation	February 9, 2007
Application Deadline	March 12, 2007 5:00 PM
Review/Rating of Proposals	
Grantees Selected	April 12, 2007
Public Posting Notice	
Award Notification	
Deadline for Encumbrance of Funds	June 30, 2007

### *Format Requirements*

The ARB strongly encourages applicants submitting proposals to be accurate, brief and clear in the presentation of their proposal/ideas.

Applications will be initially screened to determine if the application is complete.

## **EVALUATION AND SCORING**

### **Minimum Project Criteria:**

- Proposals requesting grant funds exceeding \$1.5 million will not be considered. There is no minimum project request.
- Project duration should not exceed two years, or alternatively, the portion of the project funded by AFIP grant funds must be planned to conclude prior to the last invoice submission deadline of March 30, 2009.
- Proposed projects must clearly address one or more of the topics listed under the **Eligible Projects: Topic Preference List** (above)
- Proposing entity must be able to encumber grant funds by June 30, 2007.
- For projects which include vehicle demonstrations:
  - Urban Bus or off-road vehicle proposals will not be considered under this category.
  - Projects must include provisions for monitoring the performance and usage of demonstration vehicles, for example, with driver logbooks or data acquisition systems. Proposals must include a detailed description of a data collection plan in the project description.
  - Demonstrations must take place within the State of California.
  - “Clean” Requirement: Demonstration vehicles including those equipped with aftermarket modification “kits” must be certified to meet ARB emissions standards or be operating under the necessary ARB experimental permits for the proposed duration of the project. Demonstration vehicles or modification kits must be certified or designed to meet California emission standards applicable to each vehicle type as described in the table below:

Type	CA Emission Standard
Passenger car/Light-duty truck	SULEV
Medium-duty vehicle and Medium-duty Passenger Vehicle	ULEV (for applicable weight class)
Heavy-duty vehicles (except Medium-duty and Medium-duty Passenger Vehicles)	(A) Vehicle-based: Meet medium-duty vehicle ULEV standards applicable to 10,001-14,000 lbs. wt. class, or (B) Engine-based: Engine certified or tested to meet applicable 2010 standard as described in Title 13, CCR, section 1956.8(a)(2)(A) <sup>1</sup>

PHEVs must certify to or demonstrate emissions performance on worst case (usually non-electric) fuels. If vehicles or modification kits have not yet been certified, the project description must include a detailed plan for obtaining the necessary certification and describe progress made to date. If demonstration vehicles are to be operated instead under an ARB experimental permit, the project description must include a detailed plan for obtaining this permit. This plan should include answers to all questions shown in Appendix B, “Instructions on How to Obtain an Experimental Permit”.

- “Efficient” Requirements: Vehicles must demonstrate significant “tank-to-wheel” and overall “well-to-wheel” energy use reduction relative to existing technology vehicles in the same class and application. For vehicles with no existing in-use data to cite, modeling<sup>2</sup> or analysis must be included in the project description to support efficiency performance claims.
- Demonstration vehicles must be dedicated alternative fuel vehicles or PHEVs. Flex-fuel or bi-fuel vehicles will not be funded in this category unless all possible fuels to be used are alternative fuels.
- Medium-duty and other Heavy-duty dedicated CNG, LNG, or Biodiesel vehicles will not be eligible for AFIP funds unless they qualify as PHEVs.
- None of these AFIP funds may be used for incentives, grants, or any support of fuels derived from petroleum, petroleum coke, or coal. The only vehicles that may be, in part, fueled by petroleum-derived fuels and receive AFIP funds are PHEVs.

<sup>1</sup> This is identified in the regulation table under the Model Year heading as “2007 and subsequent.” For the purposes of this solicitation averaging cannot be used to meet the current standards. The engine must meet the emissions value limits in the table. This is commonly referred to as the 2010 standard since it does not incorporate the averaging allowances provided by U.S. EPA in model years 2007 through 2009. All values are given in grams per brake horsepower hour (g/bhp-hr) Oxides of Nitrogen 0.2; Non-methane Hydrocarbons 0.14; Carbon Monoxide 15.5; Particulates 0.1. Please see the CCR for appropriate footnotes and information.

<sup>2</sup> See the National Renewable Laboratory (NREL) ADVISOR model located at [http://www.nrel.gov/vehiclesandfuels/vsa/vehicle\\_simulation.html](http://www.nrel.gov/vehiclesandfuels/vsa/vehicle_simulation.html).

## Project Scoring Criteria

Proposal scoring will be based on a panel consisting of representatives from the ARB, the California Energy Commission, and from other State Agencies. Project proposals that meet the minimum criteria will then be scored based on the scoring criteria described below. The maximum project score is 100 points. Qualifying projects with the highest overall scores will be eligible for funding.

Scoring Element	Criteria	Score Range	Maximum Score
Project Relevance to Topics (based on preference list, quality, and number of topics addressed)	Project addresses Medium Priority Topic(s)	0-15	25
	Project addresses High Priority Topic(s)	0-20	
	Project addresses Highest Priority Topic(s)	0-25	
ZEV Enabling (relevance to zero emission compatible fuels, for example, electricity & hydrogen)	No relevance to zero-emissions fuels	0	20
	Hydrogen blended fuels	5	
	PHEVs and hydrogen combustion vehicles	5-15	
	Directly involving ZEVs	20	
Project Team Qualification and Experience	Appropriate qualifications and experience relevant to proposed project	0-20	20
Cost Share Percent	No cost share (100 percent AFIP funded project)	0	10
	0 – 50 percent cost share	0-5	
	Greater than 51 percent cost share	10	
California Based Project Team	Some California-based participants	0-5	5
	All project participants are California-based	5	
Environmental Benefits	Reductions in criteria pollutants and global warming gases	0-10	10
Integral Outreach or Education Element	Extent of public education or outreach	0-5	5
Proposal Clarity and Completeness		0-5	5
<b>Maximum Score</b>			<b>100</b>

## **MONITORING AND REPORTING REQUIREMENTS**

Awardees must submit quarterly reports that contain the following information:

- Milestones achieved/schedule status
- Funds expended to date (overall and State funds)
- Quarterly activity summary
- Activities planned for next quarter
- Any proposed deviations from the original project plan

Awardees must schedule and accommodate two onsite project review meetings. ARB or its representatives reserve the right to inspect all funded projects with a 48-hour notice for the life of the project.

## **DISBURSEMENT OF FUNDS**

ARB will award the funds available through this request for grant proposal prior to June 30, 2007. The last invoice must be submitted to ARB on or before March 30, 2009.

## **CONTACT PERSONS**

Please contact Kathy Leuterio or Katrina Sideco for information relating to this grant. Questions and correspondence should be directed to:

Kathy Leuterio  
Air Resources Board  
Mobile Source Control Division  
P.O. Box 2815  
Sacramento, CA 95812  
Phone: (916) 322-1731  
[STTB@arb.ca.gov](mailto:STTB@arb.ca.gov)

Katrina Sideco  
Air Resources Board  
Stationary Source Division  
P.O. Box 2815  
Sacramento, CA 95812  
Phone: (916) 323-1082  
[STTB @arb.ca.gov](mailto:STTB@arb.ca.gov)

## **REQUIRED ELEMENTS**

### **Project Description**

Proponent shall describe project in sufficient detail for evaluation against all minimum and scoring criteria described above under "Evaluation and Scoring".

### **Deliverables**

Proponent shall provide a plan that specifies proposed deliverables. These should include, at a minimum, quarterly status reports and a final report. Projects with a

duration extending beyond June 30, 2009 should include a comprehensive report with the final invoice that describes all results and conclusions obtained up until that time.

### **Timeline/Milestones**

Proponent will be prepared to begin accepting grant funds after June 30, 2007. Proposal must include a project schedule showing all significant milestones.

### **Budget**

Co-funding description – Proponents or partners may provide in-kind services or matching funds. These in-kind or funding contributions should be described in partner commitment letters and be included with the proposal submission. All significant project expenditures should be described in detail.

### **Partners/Project Team Members**

Proponents may partner with other entities. Responsibility for deliverables lies with the primary proponent. This section should provide the names and information for any and all project team members and partners as well as letters of commitment from the partners included in the proposal.

**APPENDIX A**  
**Application Form**

**PLUG-IN HYBRID AND ALTERNATIVE FUEL VEHICLES:  
VEHICLE DEMONSTRATION AND RESEARCH APPLICATION FORM**

Please print clearly or type all information on this application and on all attachments.

**A. APPLICANT INFORMATION**

1. Company Name/Organization Name/Individual Name:		
2. Business Type:		
3. Contact Name and Title:		
4. Person with Contract Signing Authority (if different from above):		
5. Business Mailing Address and Contact Information:		
Street:		
City:	State:	Zip Code:
Phone: (     )		Fax: (     )
E-mail:		

I hereby certify that all information provided in this application and any attachments are true and correct.

Printed Name of Responsible Party:	Title:
Signature of Responsible Party:	Date:

**Third Party Certification** (if applicable)

I have completed the application, in whole or in part, on behalf of the applicant.

Printed Name of Third Party:	Title:
Signature of Third Party:	Date:
Amount Being Paid for Application Completion in Whole or Part:	Source of Funding to Third Party:





**D. IN-KIND SUPPORT AND MATCHING FUNDS**

Describe any expected in-kind support or matching funds to be provided by the applicant, subcontractor, or partner. Include contact information and a commitment letter describing the nature of the commitment.

<b>IN-KIND SUPPORT AND MATCHING FUNDS</b>

*If more room is needed, this form may be copied or recreated.*

**E. STAFF INFORMATION**

Include information for each staff member to be involved in administering the Project. Attach resumes.

Name:	Hourly rate:
Phone:	E-mail:
Title:	
Expected duties:	
Name:	Hourly rate:
Phone:	E-mail:
Title:	
Expected duties:	
Name:	Hourly rate:
Phone:	E-mail:
Title:	
Expected duties:	

*If more room is needed, this form may be copied or recreated.*

**F. SUBCONTRACTOR AND PARTNER INFORMATION**

Proponents may partner with other entities. Responsibility for deliverables lies with the primary proponent. Provide the names and information for any and all subcontractors and partners. Attach resumes and letters of commitment.

Name:	Hourly rate:
Phone:	E-mail:
Title:	
Expected duties:	
Name:	Hourly rate:
Phone:	E-mail:
Title:	
Expected duties:	
Name:	Hourly rate:
Phone:	E-mail:
Title:	
Expected duties:	

*If more room is needed, this form may be copied or recreated.*

## GRANT APPLICATION CHECKLIST

<b>Application Component</b>	<b>Description</b>	<b>Included?</b>
<b>A</b>	<b>Applicant Information</b>	<input type="checkbox"/>
<b>B</b>	<b>Deliverables/Timeline</b>	<input type="checkbox"/>
<b>C</b>	<b>Estimated Cost of Project</b>	<input type="checkbox"/>
<b>D</b>	<b>In-kind Support and Matching Funds</b>	<input type="checkbox"/>
<b>E</b>	<b>Staff Information</b>	<input type="checkbox"/>
<b>F</b>	<b>Subcontractor and Partner Information</b>	<input type="checkbox"/>
<b>G</b>	<b>Project Detailed Description</b>	<input type="checkbox"/>
<b>H</b>	<b>Partner Commitment Letters (if applicable)</b>	<input type="checkbox"/>

## **APPENDIX B**

### **Instructions on How to Obtain an Experimental Permit**

## **Instructions on How to Obtain an Experimental Permit**

These are instructions on how to obtain an experimental permit under the provisions of Health and Safety Code Section 43014.

To apply for an experimental permit, you must submit the following:

1. A brief description of your proposed modification. This description shall include:
  - A. The purpose of the modification.
  - B. Its basic theory of operation and functional characteristics.
2. A defined test program for obtaining pertinent data on driveability, fuel economy, and emission effects as applicable.
3. A statement indicating which, if any, emission control components are removed or modified.
4. The number and description of the test vehicle(s) to include the make, model, year, and (if available) license number or vehicle identification number (VIN) of the vehicle(s) you plan to modify. If you are modifying a heavy-duty vehicle, please include the engine serial number.
5. A statement indicating the disposition of the modified vehicle(s) at the end of the test program.

Please forward all correspondence to:

Annette Hebert, Chief  
Mobile Source Operations Division  
California Air Resources Board  
9480 Telstar Avenue, Suite 4  
El Monte, CA 91731

If you have any questions, please contact Ms. Rose Castro, Manager, Aftermarket Parts Section, at (626) 575-6848.