

US EPA ARCHIVE DOCUMENT

**AGENCY:** ENVIRONMENTAL PROTECTION AGENCY (EPA)

**TITLE:** “ENGINE RESEARCH AND DEVELOPMENT FOR FUTURE ADVANCED VEHICLE TECHNOLOGIES THAT WILL IMPROVE FUEL EFFICIENCY AND REDUCE EMISSIONS”

**ACTION:** Request for Applications (RFA)

**RFA NO:** EPA-OAR-OTAQ-10-03

**CATALOG OF FEDERAL DOMESTIC ASSISTANCE (CFDA) NO:** 66.034

**DATES:** The closing date and time for receipt of applications is March 5, 2010, 5:00 EST. All applications, however transmitted, must be received in the Program Office by the closing date and time to receive consideration.

To allow for efficient management of the competitive process, EPA requests eligible organizations submit an informal notice of “Intent to Apply” by February 3, 2010. Submission of Intent to apply is optional; it is a process management tool that will allow EPA to better anticipate the total staff time required for efficient review, evaluation, and selection of submitted proposals.

**SUMMARY:** This notice announces the availability of funds and solicits applications from eligible entities utilizing state-of-the-art experimental techniques and numerical simulations focusing on comprehensive research to develop new cutting-edge engine technologies. This effort is part of the Advanced Vehicle Program, to develop advanced combustion systems that not only meets today’s Clean Air standards, but also establishes a critical foundation of support to ensure U.S. leadership in developing and producing the next generation of advanced vehicle technologies. This exciting program provides support for commercially viable vehicle of the future through innovation in cleaner and more efficient technologies that will help achieve energy independence and reduce greenhouse gas emissions. EPA partners with industry to maximize the viability of targeted technologies for commercial production through cooperative research and development agreements (CRADAs).

**FUNDING/AWARDS:** The total estimated funding for this competitive opportunity shall not exceed \$800,000. In FY 2010, total funding shall not exceed \$200,000. EPA anticipates award of one cooperative agreement, whose annual value shall not exceed \$200,000, resulting from this competitive opportunity. The cooperative agreement will be funded incrementally. Additional funds may be added in each subsequent year of the agreement, subject to satisfactory performance and the availability of funds.

TABLE OF CONTENTS		PAGE
I.	Funding Opportunity Description	4
	A. Background	4
	B. Project Overview	4
	C. Scope of Work	5
	D. EPA Strategic Plan Linkage and Anticipated Outcomes/Outputs	7
	E. Supplementary Information	8
II.	Award Information	9
	A. What is the amount of funding available?	9
	B. How many agreements will EPA award in this competition?	9
	C. What is the project period for awards resulting from this solicitation?	9
III.	Eligibility Information	9
	A. Eligible Entities	10
	B. Cost-Sharing or Matching	10
	C. Threshold Eligibility	11
IV.	Application and Submission Information	12
	A. How to Obtain Application Package	12
	B. Mode of Application Submission	12
	C. Content of Application Package Submission	13
	D. Can Funding be Used for the Applicant to Make Subawards Acquire Contract Services of Fund Partnerships?	16
	E. How will an Applicant’s Proposed Subawardees/Subgrantees and Contractors be Considered During Process Described in Section V of the Announcement?	17
	F. Submission Dates and Times	17
	G. Confidential Business Information	18
	H. Pre-Application Assistance and Communications	18
V.	Application Review Information	18
	A. Evaluation Criteria	18
	B. Review and Selection Process	20
	C. Other Factors	21
VI.	Award Administration Information	21
	A. Award Notices	21
	B. Administrative and National Policy Requirements	21
	C. Reporting Requirement	22
	D. Disputes	22
	E. Non-Profit Administrative Capability	22

VII. Agency Contacts	22
VIII. Other Information	23

## **I - Funding Opportunity Description**

### **A. Background**

Development of innovative technologies is important for all types of engines to meet global demand for increased fuel efficiency and reduce harmful emissions. Reducing our nation's dependence on foreign oil and ensuring that American vehicle technology is in the frontier of the global competition is essential for our economy and creating American jobs. Although alternatives to the internal combustion engine continue to be proposed, it will remain one of the mainstream power plants for the next decade or longer. This suggests that engine technology needs to be further researched and developed for wide scale utilization and cost effectiveness. To explore all the benefits of engines, future research should include advanced structural design for reliability and higher pressure, multi-stage injection events and targeting, to control the combustion process for different loads and operations.

This project relates to EPA's involvement with the Clean Advanced Vehicle Technology program applicable to vehicles, specifically, high-efficiency hybrids, plug-in hybrids, and light and heavy duty trucks. The program includes short-term goals such as improved manufacturing capabilities, compliance with future emissions, fuel economy, and safety regulations. The most visionary goal, however, is to develop and evaluate advanced engines as power plants for future advanced vehicles with increased fuel efficiency and manufacturing cost effectiveness, while meeting current or future emission standards. EPA's National Vehicle and Fuel Emissions Laboratory (NVFEL) in Ann Arbor, Michigan, have limited capability to investigate, design, fabricate, and analyze the feasibility of new advanced engine components to achieve the program goals. This project is designed to support a coordinated effort between EPA and the private sector to continue advanced engine research and development by providing federal funding that could yield a significant contribution to maintain our Nation's competitiveness in key emerging cost-effective energy-saving technologies, and to preserve our manufacturing leadership in the world.

### **B. Project Overview**

Under this competitive opportunity, EPA is requesting applications to support engine research and development for future Advanced Vehicle Technologies that will increase fuel efficiency and decrease emissions. Understanding combustion process and its elements is essential to achieve clean and complete combustion process. The investigation will consider the effect of the piston bowl design on fuel-air mixing and combustion in direct injection engines. Additionally, this effort will provide comprehensive details on the influence of in-cylinder fuel spray injection pressure, spray patterns, liquid and vapor fuel penetration, injection timing and duration, nozzle

geometry, ignition timing for best performance, as well as the effect of exhaust gas recirculation (EGR) on combustion process and emissions. The technology that will be developed and evaluated as part of this effort will be of benefit to directly injected engines that use hydrocarbon fuels. In particular, stratified charge gasoline, homogenous charge compression ignition, and clean diesel engines may benefit by the development of technologies that allow a good evaluation of mixture formation and combustion.

The in-cylinder mixture preparation in direct injection engines is determined mainly by the injection pressure, combustion chamber configuration, turbulence intensity and boost pressure. The ensemble flow field and local turbulent structure of air-fuel is very complicated in engines. It is known that small direct injection engines require swirl. This is usually accomplished by designing intake ports that impart the swirling motion to inducted air into the cylinder. The performance of the direct injection engine is strongly dependent on the bowl-in-piston shape. Especially in diesel engines where there is a strong interaction of mixture formation and combustion since both processes occur simultaneously. The most important phenomena are the fuel spray liquid core atomization, collision and secondary break-up of fuel droplets, their momentum, energy and mass exchange with gas phase and the droplet-wall-interaction. Experimental efforts have investigated the effects of combustion chamber shape on the combustion process. The results of these studies showed that the combustion chamber design significantly influences the combustion process. However, because not all of the important parameters that affect combustion could be measured, it was difficult to interpret the results. Hence, numerical simulations in engines are becoming more accepted as an adjunct in investigating and optimizing engine designs.

### **C. Scope of Work**

EPA is soliciting applications from eligible entities to work on engine technologies to foster innovation in the development and deployment of future Advanced Vehicle Technologies. Proposed planning activities must address and identify new technologies and comprehensive methods to obtain significant fuel economy advantage, and reduction in engine emissions and noise to meet future emissions and environmental standards. Project activities must involve characterizing in-cylinder flow, mixture formation, liquid and vapor fuel characteristics, multi-stage injection and subsequent combustion events, using advanced experimental techniques and numerical simulations.

Investigations over the past several decades have generated a large number of tools and techniques to continue improving engine efficiency. For instance, controlling mixture formation and combustion process by using multi-stage injection, boost pressure and EGR could lead to innovative solutions, which will meet the clean air and global climate change objectives. The important key elements of controlled combustion are a short exothermic reaction process and minimum contact with the walls during exothermic reactions. For example, if the wall heat loss is reduced by a small factor the benefits of the fuel economy and emissions would be significant. Based on previous research this efforts will focus on new technologies to make engines more energy efficient and much less polluting.

EPA seeks to support demonstration projects, ranging up to \$800,000 depending upon the project application and other assistance, to advance and improve engine technology. EPA encourages applicants to explore innovative approaches for engine development to enhance the execution of the exothermic process of combustion in the engine cylinder. A controlled execution of the combustion process in engines could lead to a major breakthrough technology to improve engine fuel economy and reduce emissions.

Demonstration projects should provide systematic procedure for engine development, which includes thermodynamic and thermo-chemical combined with in cylinder analysis of the turbulent flow field. Advanced engine combustion technology has the potential to achieve demanding environmental and economical targets, particularly clean diesel combustion, homogeneous charge compression ignition, emissions and noise reduction, and; to expand education and training opportunities at research facilities. An important aspect of the evaluation of proposals will be an assessment of the techniques, innovative technology, and their potential effectiveness to improve fuel economy and reduce emissions.

EPA is particularly interested in seeing applications which address the following elements:  
*(Strong applications that contain elements other than those listed below will also be considered.)*

1. **Experimental work:** In-cylinder flow, fuel-air mixture formation, and combustion will be investigated and characterized by using advanced non-intrusive techniques for different engines and fuel systems. This will require providing liquid and vapor fuel information, flow field during the engine cycle and quantifying cycle-to cycle variability of fuel-air mixture. Finding methods to control the parameters that influence fuel-air mixing before combustion process could lead to capture the full potential of engine efficiency and lower emissions. In-cylinder pressure traces will be acquired at different engine speeds and loads to provide reference and validation data for numerical simulations.
2. **Firing Engine:** A modular single cylinder engine assembly with full optical access through engine valves and piston is required to test several new concept combustion systems. This will allow evaluation of different approaches and key factors that influence the combustion process and emissions. In-cylinder pressure and temperature diagnostics are required in the setup to obtain information on start of combustion, duration, heat release and combustion efficiency. The proposal should demonstrate the capability and expertise to design and build full range of engine configurations and components for a demonstration project.
3. **Multidimensional modeling of in-cylinder flow and combustion process:** In this effort, fuel-air mixing and combustion process will be simulated in a stratified charge gasoline, homogenous charge compression ignition, and clean diesel engines to provide comprehensive data on in-cylinder flow motion and its interaction with the fuel spray dynamics, and subsequent combustion events. Simulation of several engine combustion chamber shapes, intake manifolds, valve arrangements, and fuel injection systems will be considered in this effort. Commercially available codes could be used for in-cylinder flow,



mixture formation and combustion studies; however particular emphasis must be focused on the accuracy of results including mesh generation and adaptive meshing technique to adapt to the nature of the physical problem that is being simulated. Also, grid independence is to be verified by using grid refinement and error estimation. Numerical results will be compared with the experimental results for validation under same engine speed and boundary conditions before any engine optimization process.

4. **Combustion Analysis:** It requires innovative experimental and numerical methods to understand the behaviors in which fuel is consumed in the engine and make necessary adjustments to control fuel-air mixing, distributions and concentration in order to improve its efficiency. Evaluation of the combustion process can be challenging however, new techniques could enable better understanding of the phenomena taking place inside the engine cylinder during the entire combustion process. What takes place in the combustion chamber are exothermic chemical reactions occurring within a turbulent flow field. It may, therefore, be possible to refine the execution of the combustion process by controlling this field.
5. **Participation:** Participants from the recipient organization will be required to spend a portion of their time at EPA's National Vehicle and Fuel Emissions Laboratory.

#### **D. EPA Strategic Plan Linkage and Anticipated Outcomes/Outputs**

Pursuant to Section 6a of EPA Order 5700.7, "Environmental Results under EPA Assistance Agreements," EPA must link proposed assistance agreements to the Agency's Strategic Plan. EPA also requires that grant applicants and recipients adequately describe environmental outputs and environmental outcomes to be achieved under assistance agreements (see EPA Order 5700.7, Environmental Results under Assistance Agreements, <http://www.epa.gov/ogd/grants/award/5700.7.pdf>).

1. **Linkage to EPA Strategic Plan:** All applications must support EPA Strategic Plan Goal 1 (Clean Air and Global Climate Change), Objective 1.6 (Enhance Science and Research), Sub-Objective 1.6.2 (Conduct Air Pollution Research, Technology Development and Assessment), of EPA's 2006-2011 Strategic Plan, which states, "Through 2011...[EPA will]...protect human health and the environment by attaining and maintaining health-based air-quality standards and reducing the risk from toxic air pollutants." ([http://www.epa.gov/ocfo/plan/2006/goal\\_1.pdf](http://www.epa.gov/ocfo/plan/2006/goal_1.pdf)). This project supports EPA efforts to develop advanced clean and fuel-efficient technology for a wide range of societal benefits including reducing our national dependence on imported oil, conserving capital for domestic economy and reducing greenhouse gas (GHG) emissions.
2. **Outcomes:** The term "outcome" means the result, effect or consequence that will occur from carrying out an environmental program or activity that is related to an environmental or programmatic goal or objective. Outcomes may be environmental, behavioral, health-related, or programmatic in nature, but must be quantitative. They may not necessarily be achievable within an assistance agreement funding period.

Through this project EPA anticipates increasing engine fuel efficiency and reducing exhaust emissions, mainly particulate matter (PM) and nitrogen oxides (NO<sub>x</sub>) to meet Tier II Clean Air Act (CAA). Engine innovation and design will play a major role to meet upcoming CAA standards and energy future needs while developing new energy sources.

3. **Outputs:** The term “output” means an environmental activity, effort, and/or associated work product related to an environmental goal and objective that will be produced or provided over a period of time or by a specified date. Outputs may be quantitative or qualitative but must be measurable during an assistance agreement funding period.

The anticipated outputs for this project are to establish quantitative information on in-cylinder air motion, fuel air mixing and combustion process (i.e. velocity, pressure, heat release), and identify new ways to build a clean, efficient and affordable engine for the Advanced Vehicle Technology program.

Progress reports and a final report will also be a required output, as specified in Section VI(C) of this announcement, “Reporting Requirement.”

4. **Performance Measures:** To be eligible for consideration for funding the applicant must develop performance measures they expect to achieve through the proposed activities. These performance measures will help gather insights and will be the mechanism to track progress concerning successful process and outcome strategies and will provide the basis for developing lessons to inform future recipients. It is expected that the description of performance measures will include illustrating efficient and clean combustion process in a single cylinder engine. Air concentration, fuel mass fraction, fuel vaporization, temperature and pressure will be calculated to determine the effect of engine configurations on combustion. New concepts of fuel injection strategy and combustion chamber geometry will be explored and tested to increase fuel efficiency and lower NO<sub>x</sub> and PM emissions to meet upcoming CAA standards.

The following are questions to consider when developing output and outcome measures of quantitative and qualitative results:

- i) What are the measurable short term and longer term results the project will achieve?
- ii) How does the plan measure progress in achieving the expected results (including outputs and outcomes) and how will the approach use resources effectively and efficiently?

**E. Supplementary Information:**

The statutory authority for this action is Clean Air Act, Section 103(b)(3) which authorizes the award of grants for research, investigations, experiments, demonstrations, surveys, and studies



related to the causes, effect, extent, prevention and control of air pollution.

Demonstrations must involve new or experimental technologies, methods, or approaches, where the results of the project will be disseminated so that others can benefit from the knowledge gained in the demonstration project. A project that is accomplished through the performance of routine, traditional, or established practices, or a project that is simply intended to carry out a task rather than transfer information or advance the state of knowledge, however worthwhile the project might be, is not considered a demonstration project. Implementation activities are not eligible for funding under this announcement.

## **II - Award Information**

### **A. What is the amount of funding available?**

The total estimated funding for this competitive opportunity shall not exceed \$800,000. In FY 2010, total funding shall not exceed \$200,000.

### **B. How many agreements will EPA award in this competition?**

EPA anticipates award of one cooperative agreement, whose annual value shall not exceed \$200,000 resulting from this competitive opportunity. In addition, EPA reserves the right to make additional awards under this announcement, consistent with Agency policy, if additional funding becomes available after the original selections. Any additional selections for awards will be made no later than six months from the date of the original selections.

Cooperative agreements permit substantial involvement between the EPA Project Officer and the selected applicants in the performance of the work supported. Although EPA will negotiate precise terms and conditions relating to substantial involvement as part of the award process, the anticipated substantial Federal involvement for this project will be:

1. close monitoring of the successful applicant's performance to verify the results proposed by the applicant;
2. collaboration during performance of the scope of work;
3. monthly technical discussions to determine if the best direction and sources of information on the latest efficient technologies are being utilized;
4. in accordance with 40 CFR 31.36(g), review of proposed procurement;
5. approving qualifications of key personnel (EPA will not select employees or contractors employed by the award recipient);
6. review and comment on reports prepared under the cooperative agreement (the final decision on the content of reports rests with the recipient);

### **C. What is the project period for awards resulting from this solicitation?**

The estimated project period for awards resulting from this solicitation is June 30, 2010 through

June 30, 2014. All projects must be completed within the negotiated project performance period of one to four years.

### **III - Eligibility Information**

#### **A. Eligible Entities**

In accordance with CFDA 66.034, applications will be accepted from States, local governments, territories, Indian Tribes, and possessions of the U.S., including the District of Columbia, international organizations, public and private universities and colleges, hospitals, laboratories, other public or private non-profit institutions, as defined by [OMB Circular A-110](#) and [OMB Circular A-122](#).

Non-profit organization, as defined by OMB Circular A-122, means any corporation, trust, association, cooperative, or other organization which: (1) is operated primarily for scientific, educational, service, charitable, or similar purposes in the public interest; (2) is not organized primarily for profit; and (3) uses its net proceeds to maintain, improve, and/or expand its operations. For this purpose, the term "non-profit organization" excludes (i) colleges and universities; (ii) hospitals; (iii) state, local, and federally-recognized Indian tribal governments; and (iv) those non-profit organizations which are excluded from coverage of this Circular in accordance with paragraph 5 of the Circular.

Non-profit organizations described in Section 501(c)(4) of the Internal Revenue Code that engage in lobbying activities as defined in Section 3 of the Lobbying Disclosure Act of 1995 are not eligible to apply.

#### **B. Cost-Sharing or Matching**

There is no required cost-share or match for this solicitation. Although cost sharing or matching is not required as a condition of eligibility under this competition, under Section V of this announcement EPA will evaluate applications based on a leveraging criterion. In order to be considered for evaluation, any leveraged funds/resources, and their source, must be identified in the proposal. Leveraged funding or other resources need not be for eligible and allowable project costs under the EPA assistance agreement unless the Applicant proposes to provide a voluntary cost share/match. If EPA accepts an offer for a voluntary cost share/match, applicants must meet their sharing commitment as a condition of receiving EPA funding. The recipient is legally obligated to meet any proposed voluntary cost share/match that is included in the approved project budget because the grant agreement includes the voluntary cost share/match. Applicants may use their own funds or other resources for a voluntary cost share/match if the standards at 40 CFR 30.23 or 40 CFR 31.24, as applicable, are met. Only eligible and allowable costs may be used for voluntary cost shares/matches. Other Federal grants may not be used as voluntary cost shares/matches without specific statutory authority (e.g. HUD's Community Development Block Grants).

The voluntary cost share/match can be in the form of cash or as in-kind contributions, such as use of volunteers and/or donated time, equipment, expertise, etc. All matching funds are subject to the regulations governing matching fund requirements at 40 CFR 31.24. In-kind contributions often include salaries or other verifiable costs which must be carefully documented. In the case of salaries, applicants may use either minimum wage or fair market value. Voluntary cost share/match are considered part of the total grant funds and must be included in the total award amount. Voluntary cost share/match and should be used for the reasonable and necessary expenses of carrying out the workplan. All grant funds are subject to federal audit. Any restrictions on the use of grant funds also apply to the use of voluntary cost share/match.

### C. Threshold Eligibility

These are requirements that if not met by the time of application submission will result in elimination of the application from consideration for funding. Only applications from eligible entities (see above) that meet all of these criteria will be evaluated against the ranking factors in Section V of this announcement. Applicants deemed ineligible for funding consideration as a result of the threshold eligibility review will be notified within 15 calendar days of the ineligibility determination.

1.
  - a. Applications must substantially comply with the application submission instructions and requirements set forth in Section IV of this announcement or else they will be rejected. However, where a page limit is expressed in Section IV with respect to the application, pages in excess of the page limitation will not be reviewed.
  - b. In addition, applications must be received by the EPA as specified in Section IV of this announcement on or before the application submission deadline published in Section IV of this announcement. Applicants are responsible for ensuring that their application reaches the designated person/office specified in Section IV of the announcement by the submission deadline.
  - c. Applications received after the submission deadline will be considered late and returned to the sender without further consideration unless the applicant can clearly demonstrate that it was late due to EPA mishandling. For hard copy or e-mailed submissions, where Section IV requires application receipt by a specific person/office by the submission deadline, receipt by an agency mailroom is not sufficient. Applicants should confirm receipt of their application with **Fakhri Hamady** as soon as possible after the submission deadline—failure to do so may result in your application not being reviewed.
2. Applications must support Goal 1 “*Clean Air and Global Climate Change*”, “*Protect and improve the air so it is healthy to breathe and risks to human health and the environment are reduced. Reduce greenhouse gas intensity by enhancing partnerships with businesses and other sectors*” of EPA’s Strategic Plan.
3. Hard copy applications will only be accepted via an **express delivery service**. EPA will not accept applications submitted via fax or standard 1<sup>st</sup> Class Mail delivery by U.S.

Postal Service.

4. Applications must address and identify new technologies and comprehensive methods to obtain significant fuel economy advantage, and reduction in engine emissions and noise to meet future emissions and environmental standards.
5. Applicants' proposed project activities must involve characterizing in-cylinder flow, mixture formation, liquid and vapor fuel characteristics, multi-stage injection and subsequent combustion events, using advanced experimental techniques and numerical simulations.
6. All application materials must be completed in English.
7. Congress has prohibited EPA from using its FY 2010 appropriations to award grants to the Association of Community Organizations for Reform Now (ACORN) or any of its subsidiaries and therefore in order to be eligible for funding consideration under this competition all applicants must affirmatively indicate in their proposal that they are not subject to this prohibition. In addition, since this funding prohibition applies to subawards/subgrants and contracts awarded by grantees, applicants must consider it when preparing proposals.

#### **IV - Application and Submission Information**

##### **A. How to Obtain Application Package**

Applicants can download individual grant application forms from EPA's Office of Grants and Debarment website at: [http://www.epa.gov/ogd/grants/how\\_to\\_apply.htm](http://www.epa.gov/ogd/grants/how_to_apply.htm) .

To obtain a hard copy of materials, please send an email or written request to the Agency contact listed in Section VII of this announcement.

##### **B. Mode of Application Submission**

Applicants have the following options to submit their applications: 1) Hard copy by express delivery service to the specified EPA contact below, 2) Hand Delivery, or 3) electronically through email to the specified EPA contact below. Applications will not be accepted via fax or standard 1<sup>st</sup> class mail delivery by U.S. Postal Service. All applications must be prepared, and include the information, as described below in Section IV.C "Content of Application," regardless of mode of transmission

##### **1. Hard Copy or Hand Delivery Submission**

Please provide one original of the application package (including signed and completed SF 424 and SF 424A forms) and four copies--**no binders or spiral**

**binding--to:**

**Hand Delivery and Hard Copy via Express Delivery (FedEx, UPS, DHL, USPS etc.)**

U.S. Environmental Protection Agency  
Attn: Fakhri Hamady, (ATD)  
2565 Plymouth Road  
Ann Arbor, MI 48105  
Phone: (734) – 214-4330

**Hard Copy and Hand Delivery Application Submission Deadline**

All hard copies of application packages must be received by Fakhri Hamady March 5, 2010, **5:00 p.m. EST.**

**2. E-mail Submission**

E-mail submissions must be submitted to [engine\\_rfa@epa.gov](mailto:engine_rfa@epa.gov) and be received by **March 5, 2010, 5:00 p.m. EST.** All required documents listed in Section IV.C of the announcement must be attached to the e-mail as separate Adobe PDF files. Please note that if you choose to submit your materials via e-mail, you are accepting all risks attendant to e-mail submission including server delays and transmission difficulties. E-mail submissions exceeding 15MB will experience transmission delays which will affect when they are received by the Agency. For these size submissions, applicants should submit their application materials via hardcopy because if they are sent via e-mail they may be received late and not considered for funding. Applicants submitting their application materials through e-mail should confirm receipt of the materials with Fakhri Hamady as soon as possible after submission.

**C. Content of Application Package Submission**

All application submissions, regardless of mode of submission, must contain completed and signed grant application forms, as well as a Narrative Proposal, as described below.

**Grant Application Forms.** Please be sure to include organization fax number and email address in Block 5 of the Standard Form SF 424. The forms are available at <http://www.epa.gov/ogd/forms/forms.htm>.

- Standard Form 424, *Application for Federal Assistance*
- Standard Form 424A, *Budget Information – Non-Construction Programs*
- Standard Form 424B, *Non-Construction Programs*
- Standard Form 6600-06, *Certification Regarding Lobbying*

- EPA Form 4700-4, *Pre-Award Compliance Review Report for All Applicants Requesting Federal Financial Assistance*
- EPA Form 5700-54, *Key Contacts Form*
- Narrative Proposal (**including sections 1-3 below**)

## Narrative Proposal

The Narrative Proposal (**including sections 1-3 below**) cannot exceed a maximum of 20 single-spaced typewritten pages, including the Summary Page. Supporting materials, such as resumes and letters of support, can be submitted as attachments and are not included in the 20-page limit.

### 1. Summary Information

Describe your organization's qualifications for the project; Summary Information Page must be signed by an official with the authority to commit your organization to the project; and written on your organization's official letterhead.

- a. Project Title.
- b. Applicant Information. Include applicant (organization) name, address, contact person, phone number, fax and e-mail address.
- c. Funding Requested. Specify the amount you are requesting from EPA.
- d. Project Description. The project description must provide a concise overview of how the applicant will implement and conduct its operation and include a Project Work Plan (including a description of all tasks, dates of completion, products and deliverables, and proposed budget).

### 2. Narrative Proposal Work-Plan

**The narrative proposal work-plan must explicitly describe how the proposed project meets the guidelines established in Sections I-III (including the threshold eligibility criteria in Section III.C) of this announcement, and must address each of the evaluation criteria set forth in Section V.**

- a. **Project Summary/Approach:** The summary shall contain the following components:
  - I. Detailed project summary, description of specific actions and methods to be undertaken and the responsible institutions, including estimated time line for each task.
  - II. Description of the associated work products to be developed.
  - III. Explanation of project benefits to the public, and specifically the potential audience(s) served.
  - IV. Description of the roles of the applicant and partners.



- V. Description of the applicant's organization and experience related to the proposed project.
- VI. Description of staff expertise/qualifications, staff knowledge, and resources or the ability to obtain them, to successfully achieve the goals of the proposed project. *Example; Expertise in fluid dynamics, spray atomization, combustion, engine technology and emission controls.*
- VII. Budget and estimated funding amounts for each work component/task.

**\*Selected applicant(s) will need to submit a copy of their current indirect cost rate that has been negotiated with a federal cognizant agency.**

#### **b. Environmental Results—Outcomes, Outputs, and Performance Measures**

Identify the expected quantitative and qualitative outcomes of the project (See Section I.C.3), including what performance measurements will be used to track your progress towards achieving the expected outcomes (greenhouse gas reductions and one or more additional environmental, behavioral, social, health or programmatic benefit) and how the results of the project will be evaluated. Identify the expected project outputs (See Section I.C.2) including environmental activities, efforts and work products; progress reports; and final report that will be achieved during the funding period and how progress towards achieving the expected outputs will be tracked and measured.

#### **c. Programmatic Capability and Past Performance**

Submit a list of federally funded assistance agreements (assistance agreements include Federal grants and cooperative agreements but not Federal contracts) similar in size, scope and relevance to the proposed project that your organization performed within the last three years (no more than 5 agreements, and preferably EPA agreements) and describe (i) whether, and how, you were able to successfully complete and manage those agreements and (ii) your history of meeting the reporting requirements under those agreements including whether you adequately and timely reported on your progress towards achieving the expected outputs and outcomes of those agreements (and if not, explain why not) and whether you submitted acceptable final technical reports under the agreements. In evaluating applicants under these factors in Section V, EPA will consider the information provided by the applicant and may also consider relevant information from other sources, including information from EPA files and from current/prior grantors (e.g., to verify and/or supplement the information provided by the applicant). If you do not have any relevant or available past performance or reporting information, please indicate this in the proposal and you will receive a neutral score for these factors (a neutral score is half of the total points available in a subset of possible points). If you do not provide any response for these items, you may receive a score of 0 for these factors.

D. Voluntary cost share/match and leveraged funds:

Demonstrate how you will coordinate the use of EPA funding with other Federal and/or non Federal sources of funds/resources to leverage additional resources to carry out the proposed project(s) and/or that EPA funding will complement activities relevant to the proposed project(s) carried out by the applicant with other sources of funds or resources. Describe the type of leveraging proposed, how you will obtain the leveraged resources, the likelihood the leveraging will materialize during grant performance, and what role it will play in the overall project. Selected applicants are expected to abide by their proposed leveraging commitments during grant performance and the failure to do so may affect the legitimacy of the award.

**3. Detailed Budget Narrative**

Clearly explain how EPA funds will be used. This section provides an opportunity for narrative description of the budget found in the SF-424A. Applicants must itemize costs related to personnel, fringe benefits, contractual costs, travel, equipment, supplies, other direct costs, indirect costs, and total costs. For applicants that provide a cost share and/or match, the budget narrative must clearly specify the amount of federal funding and the cost-share amount for each category of total project costs for each category. Include an explanation of how the match described in Section III.B will be met. All matching funds are subject to the regulations governing matching fund requirements at 40 CFR 31.24.

Management Fees: When formulating budgets for applications, applicants must not include management fees or similar charges in excess of the direct costs and indirect costs at the rate approved by the applicants cognizant audit agency, or at the rate provided for by the terms of the agreement negotiated with EPA. The term "management fees or similar charges" refers to expenses added to the direct costs in order to accumulate and reserve funds for ongoing business expenses, unforeseen liabilities, or for other similar costs that are not allowable under EPA assistance agreements. Management fees or similar charges may not be used to improve or expand the project funded under this agreement, except to the extent authorized as a direct cost of carrying out the scope of work.

**4. Attachments.** These are not included in the 20-page limit.

**a. Biographical Sketch.** Provide resumes or curriculum vitae for all principal investigators and any other key personnel.

**b. Quality Assurance Narrative Statement.**

**c. Support Letters.** Specifically indicate how the supporting organization will assist in the project.

**D. Can Funding be Used for the Applicant to Make Subawards Acquire Contract Services or Fund Partnerships?**

EPA awards funds to one eligible applicant as the recipient even if other eligible applicants are named as partners or co-applicants or members of a coalition or consortium. The recipient is accountable to EPA for the proper expenditure of funds.

Funding may be used to provide subgrants or subawards of financial assistance, which includes using subawards or subgrants to fund partnerships, provided the recipient complies with applicable requirements for subawards or subgrants including those contained in 40 [CFR](#) Parts 30 or 31, as appropriate. Applicants must compete contracts for services and products, including consultant contracts, and conduct cost and price analyses to the extent required by the procurement provisions of the regulations at 40 CFR Parts 30 or 31, as appropriate. The regulations also contain limitations on consultant compensation. Applicants are not required to identify subawardees/subgrantees and/or contractors (including consultants) in their proposal/application. However, if they do, the fact that an applicant selected for award has named a specific subawardee/subgrantee, contractor, or consultant in the proposal/application EPA selects for funding does not relieve the applicant of its obligations to comply with subaward/subgrant and/or competitive procurement requirements as appropriate. Please note that applicants may not award sole source contracts to consulting, engineering or other firms assisting applicants with the proposal solely based on the firm's role in preparing the proposal/application.

Successful applicants cannot use subgrants or subawards to avoid requirements in EPA grant regulations for competitive procurement by using these instruments to acquire commercial services or products from for-profit organizations to carry out its assistance agreement. The nature of the transaction between the recipient and the subawardee or subgrantee must be consistent with the standards for distinguishing between vendor transactions and subrecipient assistance under Subpart B Section .210 of [OMB Circular A-133](#) , and the definitions of subaward at 40 CFR 30.2(ff) or subgrant at 40 CFR 31.3, as applicable. EPA will not be a party to these transactions. Applicants acquiring commercial goods or services must comply with the competitive procurement standards in 40 CFR Part 30 or 40 CFR Part 31.36 and cannot use a subaward/subgrant as the funding mechanism.

**E. How will an Applicant's Proposed Subawardees/Subgrantees and Contractors be Considered During the Evaluation Process Described in Section V of the Announcement?**

Section V of the announcement describes the evaluation criteria and evaluation process that will be used by EPA to make selections under this announcement. During this evaluation, except for those criteria that relate to the applicant's own qualifications, past performance, and reporting history, the review panel will consider, if appropriate and relevant, the qualifications, expertise, and experience of:

- (i) an applicant's named subawardees/subgrantees identified in the proposal/application if the applicant demonstrates in the proposal/application that if it receives an award that the

subaward/subgrant will be properly awarded consistent with the applicable regulations in 40 CFR Parts 30 or 31. For example, applicants must not use subawards/subgrants to obtain commercial services or products from for profit firms or individual consultants.

(ii) an applicant's named contractor(s), including consultants, identified in the proposal/application if the applicant demonstrates in its proposal/application that the contractor(s) was selected in compliance with the competitive Procurement Standards in 40 CFR Part 30 or 40 CFR 31.36 as appropriate. For example, an applicant must demonstrate that it selected the contractor(s) competitively or that a proper non-competitive sole-source award consistent with the regulations will be made to the contractor(s), that efforts were made to provide small and disadvantaged businesses with opportunities to compete, and that some form of cost or price analysis was conducted. EPA may not accept sole source justifications for contracts for services or products that are otherwise readily available in the commercial marketplace.

EPA will not consider the qualifications, experience, and expertise of named subawardees/subgrantees and/or named contractor(s) during the proposal/application evaluation process unless the applicant complies with these requirements.

#### **F. Submission Dates and Times**

To allow for efficient management of the competitive process, EPA requests eligible entities submit an informal notice of "Intent to Apply" by February 3, 2010, to the agency contact identified under *Section VII, Agency Contact*. Submission of Intent to apply is optional; it is a process management tool that will allow EPA to better anticipate the total staff time required for efficient review, evaluation, and selection of submitted proposals.

The closing date and time for receipt of application submissions, regardless of mode of submission is March 5, 2010, **by 5:00 p.m., Eastern Standard Time (EST)**. All hard copies of application packages must be received by Fakhri Hamady March 5, 2010 **by 5:00 p.m.** Electronic submissions must be addressed to [engine\\_rfa@epa.gov](mailto:engine_rfa@epa.gov) and include, "Announcement title or RFA #" – [name of applicant] in the subject line and must be received by March 5, 2010 **by 5:00 p.m. EST**. Applications received after the closing date and time will not be considered for funding.

#### **G. Confidential Business Information**

In accordance with 40 CFR 2.203, applicants may claim all or a portion of their application/proposal as confidential business information. EPA will evaluate confidentiality claims in accordance with 40 CFR Part 2. Applicants must clearly mark applications/proposals or portions of applications/proposals they claim as confidential. If no claim of confidentiality is made, EPA is not required to make the inquiry to the applicant otherwise required by 40 CFR 2.204(c) (2) prior to disclosure. However, the agency considers competitive proposals/applications confidential and protected from disclosure prior to the completion of the competitive selection process.

**H. Pre-Application Assistance and Communications**

In accordance with EPA's Assistance Agreement Competition Policy (EPA Order 5700.5A1), EPA staff will not meet with individual applicants to discuss draft application packages, provide informal comments on draft narrative proposals, or provide advice and/or guidance to applicants on how to respond to ranking criterion. Applicants are responsible for the contents of their applications. However, EPA will respond to questions in writing from individual applicants regarding threshold eligibility criterion, administrative issues related to the submission of the application, and requests for clarification about the announcement.

**V - Application Review Information**

**A. Evaluation Criteria**

Only eligible entities whose application(s) meet the threshold criteria in Section III of this announcement will be reviewed according to the evaluation criterion set forth below. Applicants should explicitly address these criteria as part of their application package submittal. Each application will be rated under a points system, with a total of 100 points possible.

Criteria	Points
<p><b>Project Description.</b> Under this criterion, the Agency will evaluate the extent and quality to which the narrative proposal includes a well-conceived strategy for demonstrating an understanding of the exothermic combustion process in engines, for improving the control of the combustion, and for enhancing in-cylinder fuel air distribution as stated in the requirements and objectives in <b>Section I, Part B (Scope of Work) and Part C (EPA Strategic Plan Linkage and Anticipated Outcomes, Outputs and Performance Measures)</b> related to the following factors:</p> <ol style="list-style-type: none"> <li><b>1. (10 points)</b> Significance. The Agency will evaluate the extent and quality to which the Applicant’s narrative proposal demonstrates how the proposed project will help achieve significant advances and impacts on engine technology developments, environmental benefits, and effective utilization of natural resources.</li> <li><b>2. (15 points)</b> Approach. The Agency will evaluate the extent and quality to which the Applicant’s narrative proposal demonstrates that analytical, engineering, and scientific approaches and methods will be adequately developed and well integrated to the aims of the project, and whether the narrative proposal demonstrates how the research goals will be achieved and the technology that is developed disseminated.</li> <li><b>3. (10 points)</b> Innovation. The Agency will evaluate the extent and quality to which the Applicant’s narrative proposal discusses new approaches or</li> </ol>	45



<p>research paradigms to improve engine technology in order to become more efficient and cleaner, and/or represents new concepts that combine engineering and sciences. In addition, the evaluation will focus on whether the new approaches, paradigms, or concepts have the potential to solve current scientific or technical problems in a novel way.</p> <p><b>4. (10 points) Environment.</b> The Agency will evaluate the extent and quality to which the Applicant’s narrative proposal demonstrates that the scientific and technological environment in which the work will be done contribute to the probability of success and whether the proposed work takes advantage of the unique features of the scientific environment or employs useful collaborative arrangements within the partnership.</p>	
<p><b><u>Programmatic Capability and Past Performance:</u></b> Under this criterion, applicants will be evaluated based on their ability to successfully complete and manage the proposed project taking into account the applicant’s:</p> <ol style="list-style-type: none"> <li>1. <b>(6 pts)</b> past performance in successfully completing and managing the assistance agreements identified in the narrative proposal as described in Section IV.C of the announcement.</li> <li>2. <b>(7 pts)</b> history of meeting the reporting requirements under the assistance agreements identified in the narrative proposal as described in Section IV.C of the announcement including whether the applicant submitted acceptable final technical reports under those agreements and the extent to which the applicant adequately and timely reported on their progress towards achieving the expected outputs and outcomes under those agreements and if such progress was not being made whether the applicant adequately reported why not.</li> <li>3. <b>(7pts)</b> organizational experience and plan for timely and successfully achieving the objectives of the proposed project.</li> <li>4. <b>(10 pts)</b> principal investigator expertise/qualifications, staff knowledge, and resources or the ability to obtain them, to successfully achieve the goals of the proposed project.</li> </ol> <p>Note: In evaluating applicants under items 1 and 2 of this criterion, the Agency will consider the information provided by the applicant and may also consider relevant information from other sources including agency files and prior/current grantors (e.g., to verify and/or supplement the information supplied by the applicant). If you do not have any relevant or available past performance or reporting information, please indicate this in the proposal and you will receive a neutral score for these subfactors (items 1 and 2 above-a neutral score is half of the total points available in a subset of possible points). If you do not provide any response for these items, you may receive a score of 0 for these factors.</p>	<p>30</p>
<p><b>Budget:</b> The Agency will evaluate the proposed project budget to determine whether,</p>	



<p>1. (5 pts) costs are reasonable to accomplish the proposed goals, objectives, and measurable environmental outcomes,</p> <p>2. (5 pts) the proposed budget provides a detailed breakout of the approximate funding used for each major activity.</p> <p>An applicant’s budget and budget narrative must account for both federal funds and non-federal funds (e.g. any voluntary cost share/match). Applicants must precisely describe in their budget narrative how they will account for their cost share/match and what role EPA funding will play in the overall project.</p>	10
<p><b>Resources:</b></p> <p>Under this criterion, applicants will be evaluated based on the extent they demonstrate (i) how they will coordinate the use of EPA funding with other Federal and/or non Federal sources of funds/resources to leverage additional resources to carry out the proposed project(s) and/or (ii) that EPA funding will complement activities relevant to the proposed project(s) carried out by the applicant with other sources of funds or resources. Applicants will also be evaluated based on the type of leveraging proposed, how the applicant will obtain the leveraged resources, the likelihood the leveraging will materialize during grant performance, and what role it will play in the overall project.</p>	5
<p><b><u>Environmental Results—Outcomes and Outputs:</u></b></p> <p>Under this criterion, the Agency will evaluate the effectiveness of the applicant’s plan for tracking and measuring its progress toward achieving expected project outputs and outcomes, including those identified in <b>Section I</b> of this announcement.</p>	10

**B. Review and Selection Process**

Applications will first be evaluated against the threshold factors listed in Section III. Only those applications which meet all of the threshold factors will be evaluated using the evaluation criteria listed above by an EPA evaluation team. Each application will be given a numerical score and will be rank-ordered according to the numerical score. Preliminary funding recommendations will be provided to the Approving Official based on this ranking.

**C. Other Factors**

Final funding decisions will be made by the Approving Official based on the rankings and preliminary recommendation of the EPA evaluation team. In making the final funding decisions, the Approving Official may also consider programmatic priorities and geographic diversity of

funds. Once final decisions have been made, a funding recommendation will be developed and forwarded to the EPA Award Official.

## **VI - Award Administration Information**

### **A. Award Notices**

Following final selections, all applicants will be notified regarding their application's status.

1. EPA anticipates notification to *successful* applicant(s) will be made via telephone, electronic or postal mail by March 26, 2010. This notification, which advises that the applicant's proposal has been selected and is being recommended for award, is not an authorization to begin performance. The award notice signed by the EPA grants officer is the authorizing document and will be provided through postal mail. At a minimum, this process can take up to 90 days from the date of selection.
2. EPA anticipates notification to *unsuccessful* applicant(s) will be made via electronic or postal mail by March 26, 2010. In either event, the notification will be sent to the original signer of the application.

### **B. Administrative and National Policy Requirements**

A listing and description of general EPA Regulations applicable to the award of assistance agreements may be viewed at: <http://www.epa.gov/ogd/AppKit/index.htm>.

1. Executive Order 12372, Intergovernmental Review of Federal Programs may be applicable to awards, resulting from this announcement. Applicants *selected* for funding may be required to provide a copy of their proposal to their [State Point of Contact](#) (SPOC) for review, pursuant to Executive Order 12372, Intergovernmental Review of Federal Programs. This review is not required with the Initial Proposal and not all states require such a review.
2. All applicants are required to provide a Dun and Bradstreet (D&B) Data Universal Numbering System (DUNS) number when applying for a Federal grant or cooperative agreement. Applicants can receive a DUNS number, at no cost, by calling the dedicated toll-free DUNS Number request line at 1-866-705-5711, or visiting the D&B website at: <http://www.dnb.com>.

### **C. Reporting Requirement**

The recipient agrees to submit quarterly progress reports to the EPA Project Officer within thirty days after each reporting period. These reports shall cover work status, work progress, difficulties encountered, preliminary data results and a statement of activity anticipated during the subsequent reporting period, including a description of equipment, techniques, and materials to be used or evaluated. A discussion of expenditures along with a comparison of the percentage

of the project completed to the project schedule and an explanation of significant discrepancies shall be included in the report. The report shall also include any changes of key personnel concerned with the project. The final technical report shall be completed within 90 calendar days of the completion of the period of performance. The final technical report should include: summary of the project or activity, advances achieved and costs of the project or activity. In addition, the final technical report shall discuss the problems, successes, and lessons learned from the project or activity that could help overcome structural, organizational or technical obstacles to implementing a similar project elsewhere. The schedule for submission of quarterly reports will be established by EPA, after award.

#### **D. Disputes**

Assistant agreement competition-related disputes will be resolved in accordance with the dispute resolution procedures published in 70 FR (Federal Register) 3629, 3630 (January 26, 2005) located on the web at: [http://frwebgate.access.gpo.gov/cgi-bin/getpage.cgi?position=all&page=3629&dbname=2005\\_register](http://frwebgate.access.gpo.gov/cgi-bin/getpage.cgi?position=all&page=3629&dbname=2005_register)

#### **E. Non-profit Administrative Capability**

Non-profit applicants that are recommended for funding under this announcement are subject to pre-award administrative capability reviews consistent with Section 8b, 8c and 9d of EPA Order 5700.8 - Policy on Assessing Capabilities of Non-Profit Applicants for Managing Assistance Awards ([http://www.epa.gov/ogd/grants/award/5700\\_8.pdf](http://www.epa.gov/ogd/grants/award/5700_8.pdf)). In addition, non-profit applicants that qualify for funding may, depending on the size of the award, be required to fill out and submit to the Grants Management Office the Administrative Capabilities Form, with supporting documents, contained in Appendix A of EPA Order 5700.8.

### **VII - Agency Contact**

**FOR FURTHER INFORMATION CONTACT:** Fakhri Hamady, U.S. EPA, Office of Transportation and Air Quality, 2565 Plymouth Rd., Ann Arbor, MI 48105; Telephone (734) 214-4330; Fax: (214) 214-4573, or email to: [hamady.fakhri@epa.gov](mailto:hamady.fakhri@epa.gov), or;

Tricia Bosler; U.S. EPA, Office of Transportation and Air Quality, 2565 Plymouth Rd., Ann Arbor, MI 48105; Telephone (734) 214-4731; Fax (214) 214-4573, or email [bosler.tricia@epa.gov](mailto:bosler.tricia@epa.gov).

All questions or comments must be communicated in writing via postal mail, facsimile, or electronic mail to a contact person listed above. Answers will be posted, bi-weekly, until the closing date of this announcement at the OAR Grants/Funding webpage: [http://www.epa.gov/air/grants\\_funding.html](http://www.epa.gov/air/grants_funding.html)

### **VIII - Other Information**

EPA reserves the right to reject all applications and make no award as a result of this announcement. The EPA Grant Award Officer is the only official that can bind the Agency to the expenditure of funds for selected projects resulting from this announcement.