OVERVIEW SECTION

AGENCY: ENVIRONMENTAL PROTECTION AGENCY (EPA)

TITLE: "COLLABORATIVE EFFORTS TO REFINE HYDRAULIC HYBRID DRIVETRAINS TO OPTIMIZE FUEL ECONOMY, EMISSIONS, AND PERFORMANCE"

ACTION: Request for Applications (RFA) - Initial Announcement

RFA NO: OAR-ATD-05-11

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

DATES: The closing date and time for receipt of Applications is May 31, 2005, 4:00 p.m. EDT. 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 May 17, 2005. Submission of an 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 proposals from eligible entities utilizing state-of-the-art experimental techniques to refine hydraulic hybrid drivetrains to optimize fuel economy, emissions, and performance. This project is part of the *Clean Automotive Technology Program's* efforts to refine hydraulic hybrid drivetrains, for highway vehicle applications, that not only meet today's Clean Air standards, but also establish the building blocks for future environmental and economic benefits. EPA will propose a series of technical challenges in optimizing hydraulic hybrid vehicles for fuel economy, emissions, and performance. Grant recipients will choose one or more technical areas on which to focus their work.

FUNDING/AWARDS: The total estimated funding for this competitive opportunity shall not exceed $1,350,000. In FY2005, total funding shall not exceed $450,000. EPA anticipates award of two to five cooperative agreements, whose annual value shall not exceed $450,000, resulting from this competitive opportunity. The cooperative agreements 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.

Contents by Section

Section I - Funding Opportunity Description.

A. Background.

Understanding the hydraulic hybrid drivetrains is essential to reaching the goal of improving fuel economy and reduce emissions. This project will investigate methods of improving the fuel economy of highway vehicles. Improving fuel economy offers a wide range of societal benefits such as lowering consumers' fuel expenditures, reducing our national dependence on imported oil, conserving capital for our domestic economy, and reducing emissions of carbon dioxide, the most prevalent greenhouse gas. The average fuel economy of new personal vehicles has declined about six percent since the late 1980s as consumers have moved toward vehicles that are heavier and more powerful. Automakers are in a global race to develop new technologies that can satisfy the performance attributes desired by consumers, while improving fuel economy in a practical and cost-effective manner. Some of the technologies being investigated include improvements to conventional gasoline and diesel engines, alternative fuels, hybrid drivetrains, and advanced energy devices such as fuel cells.

This project relates to EPA's involvement with the Clean Automotive Technology Program applicable to development of hydraulic hybrid drivetrains, as an additional technology pathway, that could offer practical and cost-effective fuel economy improvements. EPA began its development of hydraulic hybrid drivetrains in the mid-1990s with the goal of optimizing hydraulic components for highway vehicle applications. EPA has successfully demonstrated the viability of hydraulic hybrid drivetrains for highway vehicle applications and is recognized as a world leader. EPA currently has cooperative research and development agreements (CRADAs) with three private sector organizations–Ford Motor Company, Eaton Corporation, and Parker-Hannifin–with the goal of transferring this technology to the private sector for possible commercialization. EPA recently displayed the world's first-ever series hydraulic hybrid sport utility vehicle at the Society of Automotive Engineers World Congress in Detroit.

B. EPA Strategic Plan Linkage and Anticipated Outcomes/Outputs.

1. ***Linkage to EPA Strategic Plan.*** This project supports progress towards 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). 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 carbon dioxide and greenhouse gas emissions.
2. ***Outcomes.*** Through this project EPA anticipates increasing fuel efficiency and reducing emissions in its hybrid vehicles to continue improving and demonstrating advanced hydraulic hybrid vehicle technology to meet Clean Air Act (CAA) emission standards and climate program goals.
3. ***Outputs.*** The anticipated output for this project is a refinement of existing, and identification of new hydraulic hybrid components and systems needed to achieve ultra clean and efficient hybrid vehicles.

C. Scope of Work.

EPA is soliciting proposals from eligible entities to join in partnership projects to further optimize hydraulic hybrid technology. There are many areas where technical improvements could make hydraulic hybrids more practical and cost effective. EPA has identified several vehicle control microprocessor and

operational strategy development and implementation areas that are the preferred focus of this work.

Although we encourage technological innovation in hydraulic hybrid drivetrains, EPA has identified the following technical areas as particularly worthy of additional attention. We recommend applicants consider one or more of these areas to investigate. EPA is particularly interested in seeing proposals which address these elements, however, we will consider independent suggestions regarding other areas worthy of further investigation.

1. **Low-permeation accumulator bladders (specifically bladders or gas-oil separation in general).** Current state-of-the-art materials used for accumulator bladders are subject to low levels of gas permeation which, over long periods of time, could lower system effectiveness and possibly require "re-charging" of the charge gas, which would add a maintenance cost This would involve a fundamental investigation of alternative **(bladder or gas-oil separation)** materials with the goal of essentially zero long-term permeation.

2. **Filtration/de-aeration of hydraulic oil.** Gas permeation may lead to the presence of dissolved gas in the hydraulic fluid, which decreases its effectiveness and poses engineering difficulties. Also, "dry sump" pump/motors tend to cause aeration of fluid. For these reasons there is a need for a simple, inexpensive, and durable mechanism to de-aerate the hydraulic oil.

3. **Low compressible fluids.** This would involve a fundamental investigation of various fluids alternatives to conventional hydraulic oil, to determine whether there is an alternative fluid which would retain the advantages of hydraulic oil but have a lower compressibility.

4. **High energy density mechanisms.** This would involve consideration of hydraulics energy storage options other than the different types of accumulators that have been used for decades in agricultural, construction, and industrial equipment.

5. **Mechanisms for using hydraulics to drive accessories, such as on-demand power steering.** This is important for two reasons. As drivetrain efficiency increases, accessories take a greater percentage of the energy needed to operate a vehicle. In addition, with hydraulic energy storage, it would be preferable to run accessories (such as power steering) with hydraulics, rather than off of the engine power, especially if the engine management strategy dictates that the engine be shut off at times. This would involve investigation of engine management strategies.

6. **Practical variable valve timing for pump/motors.** While EPA has investigated many areas that affect efficiency of hydraulic pump/motor designs, one additional area that holds promise for efficiency improvements is variable valve timing for the pump/motor units. This would involve investigation of practical strategies and designs for pump/motor units with variable valve timing.

Applicants should choose one or more of these or other technical areas to focus on in their proposals. The proposals must: (1) address the methods, approaches, new technology and analysis necessary to obtain significant reduction in engine emissions and noise, and fuel economy advantage; and (2) consist of such activities as research, investigations, experiments, modeling, demonstrations, and similar activities.

After final selections and award of the resultant cooperative agreements, EPA will provide an introductory briefing to all recipients summarizing the current state-of-the-art of hydraulic hybrid drivetrains, and a list of technical areas where EPA believes that further technical advancements are desirable. EPA will also provide a hydraulic hybrid "mule" vehicle– probably a large sport utility

vehicle– which will be used to integrate improvements developed by the recipients for evaluation by EPA.

EPA recommends applicants give important consideration to their proximity to the National Vehicle and Fuel Emissions Laboratory (NVFEL) in Ann Arbor, MI, in their decision to compete for funding under this project. Participants from the recipient organization will be required to travel frequently, or spend extended periods of time at NVFEL, site of the hydraulic hybrid "mule" vehicle which will be used to integrate improvements developed by the recipients for evaluation by EPA, and the primary location for EPA's hydraulic hybrid technology development program.

D. Supplementary Information.

The statutory authority for this action is Clean Air Act, Section 103 (b)(3) which authorizes the award of grants for research, investigation, experiments, demonstrations, surveys and studies related to the causes, effects, extent, prevention and control of air pollution.

Section II - Award Information.

A. What is the amount of available funding?

The total estimated funding for this competitive opportunity shall not exceed $1,350,000. In FY2005, total funding shall not exceed $450,000.

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

EPA anticipates award of two to five cooperative agreements, whose value shall not exceed $450,000, resulting from this competitive opportunity.

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. approving substantive terms of proposed contracts;
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 August 1, 2005 through July 31, 2008. All projects must be completed within the negotiated project performance period of one to three years.

D. Can funding be used to acquire services or fund partnerships?

Funding may be used to acquire services or fund partnerships, provided the recipient follows procurement and subaward or subgrant procedures contained in 40 CFR Parts 30 or 31, as applicable. Successful applicants must compete contracts for services and products and conduct cost and price analyses to the extent required by these regulations. The regulations also contain limitations on consultant compensation. Applicants are not required to identify contractors or consultants in their proposal. Moreover, the fact that a successful applicant has named a specific contractor or consultant in the proposal EPA approves does not relieve it of its obligations to comply with competitive procurement requirements.

Subgrants or subawards may be used to fund partnerships with non profit organizations and governmental entities. 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 to carry out its cooperative agreement. For profit organizations are not eligible subgrant recipients under this announcement. The nature of the transaction between the recipient and the 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.

Section III - Eligibility Information.

A. Eligible Entities.

Proposals will be accepted from states, 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 nonprofit 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.

Cost sharing or matching is not required as a condition of eligibility, or otherwise, for proposals selected for award.

Section IV - Application and Submission Information.

A. How to Obtain Application Package.

Applicants may download individual grant application forms, or electronically request a paper application package and an accompanying computer CD of information related to applicants/grant recipients roles and responsibilities from EPA's Grants and Debarment website by visiting: http://www.epa.gov/ogd/grants/how_to_apply.htm.

B. Content and Form of Application Submission.

Applications must contain a narrative proposal, and one completed and signed federal grant application package. The narrative proposal must explicitly describe the applicant's proposed project and specifically address each of the evaluation criteria disclosed in *Section V(A), Evaluation Criteria*.

1. A complete application must contain the following, in the sequential order shown:

    a. SF-424 Application for Federal Assistance, with original signature.
    b. Narrative Statement, in the format detailed below.
    c. Other supporting documentation.
    d. SF-424 A, Budget by categories and indirect cost rate.
    e. SF-424 B, Assurances for non-construction programs.
    f. Certification Regarding Lobbying and SF LLL, if applicable.
    g. EPA Form 4700-4 Preaward Compliance review report.
    h. Quality Assurance Narrative Statement, if applicable.
    i. Copy of Negotiated Indirect Cost Rate Agreement, if applicable.
    j. Biographical Sketch.
    k. E-mail address or self-addressed envelope (to receive notification of receipt of application).

2. The narrative proposal should conform to the following outline:

    a. Cover Letter: Describe your organization's qualifications for the project; must be signed by an official with the authority to commit your organization to the project; and written on your organization's official letterhead.
    b. Summary Information Page.
        1. Project Title.
        2. Applicant Information. Include applicant (organization) name, address, contact person, phone number, fax and e-mail address.
        3. Funding Requested. Specify the amount you are requesting from EPA.
    c. 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).

        The narrative workplan must discuss how the proposal addresses each of the selection criteria in Section V and include:
        1. A detailed project summary, describing specific actions and methods to be undertaken and the responsible institutions, including estimated time line for each task;
        2. The associated work products to be developed (e.g. partnership agreements, if any);
        3. An explanation of project benefits to the public;
        4. An explanation of how project outcomes (e.g., fuel economy and emissions benefits) will be designed for reinvestment;
        5. A detailed explanation of how project success will be evaluated; *(Refer to Section V(A),*

Evaluation Criteria, "Performance Measurement.")

6. A description of the roles of the applicant and partners, if any;
7. Biographical information on key personnel identified;
8. A discussion of the applicant's:
   i. past performance in successfully completing federally and/or non-federally funded projects similar in size, scope, and relevance to the proposed project;
   ii. history of meeting reporting requirements on prior or current assistance agreements with federal and/or non-federal organizations and submitting acceptable final technical reports;
   iii. organizational experience and plan for timely and successfully achieving the objectives of the project,
   iv. staff expertise/qualifications, staff knowledge, and resources or the ability to obtain them, to successfully achieve the goals of the project;

d. Detailed Itemized Budget. The proposal must include a detailed budget which clearly explains how funds will be used for the following categories:
   1. Personnel
   2. Fringe Benefits
   3. Contractual Costs
   4. Travel
   5. Equipment
   6. Supplies
   7. Other (including intern stipends)
   8. Total Indirect Costs (must include documentation of accepted indirect rate)
   9. Total Cost

   If not self-evident, entries under each category must be explained in the budget itself or in the project description. Costs proposed in the budget should be linked directly to the proposal.

e. Key Personnel. The applicant should submit an appendix with the resumes of up to three (3) key personnel who will be significantly involved in the project.

f. Applicants must submit information relating to the programmatic capability evaluation criteria to be evaluated under Section V of this announcement. EPA will consider information provided by the applicant and may consider information from other sources including Agency files.

Applicants are strongly advised to avoid submission of non-essential materials unrelated to the proposal's requirements. Upon receipt, applications will be reviewed for content. Applications which do not conform to the specific outline and content detailed above may not be considered for award. **Incomplete applications will not be considered for award.** All application materials must be completed in English.

C. Submission Dates and Times.

1. To allow for efficient management of the competitive process, EPA requests eligible entities submit an informal notice of "Intent to Apply" by May 17, 2005, to the agency contact identified under *Section VII, Agency Contact.* Submission of an 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. Eligible entities not submitting an "Intent to Apply" are still eligible to apply by the closing date and time.

   The written notice of "Intent to Apply" may be submitted via electronic mail. Please provide the name of your organization, a point of contact, phone number, email address, and the title of your project.

2. The closing date and time for submission of completed application packages is May 31, 2005, 4:00 p.m. EDT. All applications, however transmitted, must be received in the Program Office by the closing date and time to receive consideration. Applications received after the closing date and time will not be considered for funding.

3. **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.

4. Because of the unique situation involving U.S. mail screening. EPA highly recommends that applicants use an express mail option to submit their applications. The application must be addressed to:

   Express Delivery Address (FedEx, UPS, DHL, etc.) or U.S. Postal Service
   U.S. EPA
   Attn: Kimberly Derksen, (ATD)
   2565 Plymouth Road
   Ann Arbor, MI 48105

Section V - Application Review Information.

A. Evaluation Criteria.

Each eligible proposal, based on Section III, Eligibility Information, will be evaluated according to the criteria set forth below. Proposals that are best able to directly and explicitly address the evaluation criteria below will have a greater likelihood of being selected for award. Each proposal will be rated under a points system, with a total of 100 points possible.

Criterion	Maximum Points per Criterion

Project Description. Extent to which the proposal advances the understanding of the hydraulic hybrid drivetrain's technology to optimise fuel economy emissions and performance. Consideration under this criterion will focus on: • Significance. Applicants proposal should demonstrate the significant advances and impact on engine technology developments, environmental benefits, and effective utilization of natural resources. • Approach. Applicants proposal should demonstrate the analytical, engineering, and scientific approaches and methods adequately developed, and well integrated to the aims of the project. The applicants should demonstrate well-planned and documented evidence of achieving the research goals, and disseminate the technology developed. • Innovation. Applicants proposal should discuss new approaches, explore new research paradigms, or represent new concepts that combine engineering and sciences. New approaches or concepts that could solve current scientific or technical problems in novel way. • Environment. Applicants proposal should demonstrate that the scientific and technological environment in which the work will be done contribute to the probability of success. And, the proposed work takes advantage of the unique features of the scientific environment or employs useful collaborative arrangements within the partnership.	30
Experience: • Extent to which the proposal demonstrates applicant's expertise and experience in managing similar programs; and, how administration of the proposed project will further the recipient's mission. • Investigators. Applicant's proposal demonstrates that the principal investigator is capable of coordinating and managing effectively the proposed work and partners. • Experience of key personnel. Extent to which the experience of key personnel, described in detail, is related to the project proposed and demonstrates a level of expertise or proficiency. EPA will review biographical sketches to determine if staff experience is commensurate with activities proposed. Applicants must designate a primary contact, who will be responsible for the implementation of the cooperative agreement and serve as a liaison with EPA staff..	25
Programmatic Capability. Extent to which proposal demonstrates the applicant's technical capability to successfully carry out this project. This factor will evaluate the applicant's: • past performance in successfully completing federally and/or non-federally funded projects similar in size, scope, and relevance to the proposed project; • history of meeting reporting requirements on prior or current assistance agreements with federal and/or non-federal organizations and submitting acceptable final technical reports; • organizational experience and plan for timely and successfully achieving the objectives of the project, • staff expertise/qualifications, staff knowledge, and resources or the ability to obtain them, to successfully achieve the goals of the project	20

Resources: • Is the budget clearly stated, detailed, and appropriate to achieve the project's objectives?	15
Performance Measurement. Applicant's proposal includes a description of design concept(s) for improving vehicle fuel economy and reducing emissions with planning of the process to produce data/results demonstrating the effectiveness of the design concept(s).	10

B. Other Factors.

EPA reserves the right to make award decisions based on factors that help ensure geographic equity and demonstration of a variety of technical approaches.

C. Review and Selection Process.

Each application will be evaluated by a team chosen to address the range of activities associated with hydraulic hybrid drivetrain technology developments and air quality matters. The Evaluation Team will base its evaluation solely on the selection criteria disclosed in this notice *(see Section V(A), Evaluation Criteria)*.

Completed evaluations will be referred to a Selection Committee that is responsible for further consideration and final selection. The highest numerically-ranked proposal(s) (subject to the quality of proposals, availability of funds, and consideration of *Section V(B), Other Factors*) will be recommended for award.

Section 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 June 23, 2005. 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 June 23, 2005. In either event, the notification will be sent to the original signer of the application.

B. Administrative and National Policy Requirements.

1. 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/applicable_epa_regulations_and_description.htm.

2. 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. This review is not required with the Initial Proposal and not all states require such a review.

3. 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.

D. Disputes.

Assistance 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://a257.g.akamaitech.net/7/257/2422/01jan20051800/edocket.access.gpo.gov/2005/05-1371.htm. Copies of these procedures may also be requested by contacting the Agency contact identified in Section VII of this solicitation.

E. Pre-Award Administrative Capability Review.

Non-profit applicants recommended for funding under this solicitation, depending on the size of the award, may be required to complete and submit, with supporting documentation, an "EPA Administrative Capability Questionnaire."

Section VII - Agency Contact.

FOR FURTHER INFORMATION CONTACT: Kimberly Derksen, U.S. EPA, Office of Transportation and Air Quality, 2565 Plymouth Rd., Ann Arbor, MI 48105; Fax (734) 214-4573; or email derksen.kimberly@epa.gov; or,

Mike Safoutin, U.S. EPA, Office of Transportation and Air Quality, 2565 Plymouth Rd., Ann Arbor, MI 48105; Fax (734) 214-4573 or email safoutin.mike@epa.gov.

All questions or comments must be communicated in writing via postal mail, facsimile, or electronic mail to the 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).

Section VIII - Other Information.

EPA reserves the right to reject all proposals or 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.