

Notice of Intent No. DE-FOA-0001462

Notice of Intent to Issue Funding Opportunity Announcement No. DE-FOA-0001384

The Office of Energy Efficiency and Renewable Energy (EERE) intends to issue, on behalf of the Vehicle Technology Office (VTO), a Funding Opportunity Announcement (FOA) entitled “FY 2016 Vehicle Technologies Program Wide Funding Opportunity Announcement”.

The Vehicle Technologies Office supports a broad technology portfolio aimed at developing and deploying cutting-edge advanced highway transportation technologies that reduce petroleum consumption and greenhouse gas emissions, while meeting or exceeding vehicle performance and cost expectations. Research, development, and deployment efforts are focused on reducing the cost and improving the performance of a mix of near- and long-term vehicle technologies including advanced batteries, power electronics and electric motors, lightweight and propulsion materials, advanced combustion engines, advanced fuels and lubricants, and other enabling technologies.

Specifically, activities are aimed at meeting the goals and objectives of the President’s EV Everywhere Grand Challenge as well as improvements in other vehicle technologies such as powertrains, fuel, tires, and auxiliary systems. The EV Everywhere Grand Challenge seeks to make the United States the first country to produce a wide array of plug-in electric vehicle (PEV) models (PEVs, including plug-in hybrids and all-electric vehicles) that are as affordable and convenient as the gasoline powered vehicles we drive today by 2022. The [EV Everywhere Blueprint](#) outlines the goals and describes the research, development, and deployment needed to meet the overall EV Everywhere goal as well as other aggressive, technology-specific goals. The technical targets for the DOE PEV program fall into three areas: battery R&D; electric drive system R&D; and vehicle lightweighting. Key technical goals include:

- Cutting battery costs from their current \$500/kWh to \$125/kWh
- Eliminating almost 30% of vehicle weight through lightweighting
- Reducing the cost of electric drive systems from \$30/kW to \$8/kW

Investment in advanced vehicle technologies, like vehicle electrification, lightweighting, and combustion engines will yield benefits to conventional vehicles, as well as yielding the technologies necessary for alternative fuel vehicles with sufficiently long ranges, sufficiently low costs, and broad consumer appeal to result in significant market penetration potential. Analysis shows that VTO’s combined portfolio of technologies could reduce petroleum consumption by nearly 20% from projected 2030 levels in the Energy Information Agency (EIA) Annual Energy Outlook.

It is anticipated that the FOA may include the following Areas of Interest:

This is a Notice of Intent (NOI) only. EERE may issue a FOA as described herein, may issue a FOA that is significantly different than the FOA described herein, or EERE may not issue a FOA at all.

Critical Technologies to meet the EV Everywhere Grand Challenge

1.) EV Everywhere Plug-in Electric Vehicle (PEV) and Infrastructure Showcases

The objective of this effort is to establish pilot PEV customer showcases and experience centers in high-traffic areas that will be a one-stop resource center for customers allowing interested individuals to test drive a range of PEVs and allow electricity providers, infrastructure providers, original equipment manufacturers (OEMs), dealers, and others to provide education to consumers, local government, property managers, workplaces and fleets. Funds may not be used for the purchase or installation of fueling infrastructure or vehicles.

2.) Grid Modernization for Electric Vehicles

The objective of this effort is to research, develop, and demonstrate grid modernization technologies for a smooth transition to the mass adoption of electric vehicles including grid-based load control technology using vehicle to grid (V2G) communication, vehicle-based reverse power flow technology, and evaluation of the impact of grid-managed vehicle charging.

3.) Accelerated Development and Deployment of Low-Cost Automotive Magnesium (Mg) Sheet Components

The objective of this effort is to apply an integrated suite of experimental, computational, and data tools to accelerate research, development, and demonstration of a magnesium sheet component (or components) on a model year 2013 or newer vehicle at a manufacturing cost of less than \$2.50 per pound of weight saved.

4.) Corrosion Protection and Dissimilar Material Joining for Next-Generation Lightweight Vehicles

The objective of this effort is to identify specific dissimilar material joining and/or corrosion protection challenges preventing near term introduction of lightweight materials, and to bring novel technologies addressing these challenges to near-commercial readiness. Dissimilar metal joint systems are limited to aluminum, steel, magnesium, and carbon fiber composites.

5.) Advances for the Production of Low Cost Electric Drive Vehicle Motors

The objective of this effort is to develop and show technology readiness for advanced electric machine technologies with a focus on motor design, material, and production pathways to significantly lower cost. Projects should emphasize materials-based developments that link to manufacturing and scale-up of materials and machine designs that can meet cost, specific power, and power density for electric drive vehicle motors.

6.) Development of Advanced High-Voltage Electrolytes and Additives, Solid State Electrolytes and Lithium Metal Protection

The objectives of this effort are to develop: 1) Advanced electrolytes and additives that are stable above 4.3V, safe and low cost without sacrificing performance; 2) Conformable and self-healing solid state electrolytes; and 3) Novel approaches to protect the metallic lithium electrode from dendrite formation.

7.) Advanced Battery Component Material Diagnostics

The objective of this effort is to develop *in situ* microscopy and spectroscopy tools to identify physical and chemical changes of Li battery components during charging and discharging with time, depth, and space resolution that allows detailed monitoring of processes at relevant length scales. When combined with advanced electrochemical techniques, especially at the single particle level, these suites of techniques can provide a rich understanding of battery behavior during operation.

8.) Advanced Battery Materials Modeling

The objective of this effort is to develop advanced models to assess emerging Li-Ion and beyond Li-Ion systems in order to understand the challenges impeding their full potential. Models will include electrochemical/chemical and transport processes (kinetics, thermodynamics, phase transitions, ion transport, etc.) that occur in a wide range of length and time scales. The focus of this effort will be on pushing the boundary of modeling techniques and to use the knowledge gained to suggest solutions to relevant problems.

Technology Development to Reduce Petroleum Consumption through Fuel Efficiency Improvements and Alternative Fuel Utilization in Passenger and Commercial Vehicles

9.) Enabling Technologies for Engine and Powertrain Systems

The objective of this effort is to develop advanced enabling technologies for engine and powertrain systems for heavy-duty and light-duty vehicles that are capable of supporting the achievement of breakthrough thermal efficiencies while meeting future emissions standards. These novel approaches and ideas should address existing barriers and limitations which inhibit using advanced technologies on a mass market basis to address national energy concerns. Some of the enabling technologies to be considered include but are not limited to low-cost, robust sensors for engine exhaust constituents and in-cylinder phenomena; waste heat recovery; variable valve actuation and timing; lightweight components; reduced friction; low heat rejection and thermal management; low energy penalty emission controls; advanced fuel injection; intake air management; and turbomachinery.

10.) Emission Control Strategies for Advanced Combustion Engines

The objective of this effort is to advance the state-of-the-art catalysis and aftertreatment strategies for advanced combustion regimes with breakthrough thermal efficiencies including, but not limited to, Homogeneous-Charge Compression-Ignition, Lean Stratified Combustion, and Compression-Ignition Gasoline applications for passenger and commercial vehicle applications. Projects proposed will enable vehicles with advanced combustion engines to meet Tier 3 emissions standards and minimize the energy penalty of the aftertreatment system.

11.) Alternative Fuel Vehicle Workplace Safety Programs

The objective of this effort is to provide safety training and guidance related to maintenance and garage facility upgrades and building modifications that are required in order to use alternative fuel vehicles (AFVs). Workshops will include site tours showcasing facilities that have been properly designed/upgraded for AFV code-compliance and safety. Each project will include 5-7 regional workshops, develop written handbooks and online technical guidance, videos, and reports on best practices for insuring safety compliance while keeping construction costs reasonable and appropriate. This effort is focused only on EPACT-defined gaseous fuels (natural gas, propane, and hydrogen).

Exploratory Topics

12.) Open Topic/Exploratory Research

The objective of this effort is to bring to market a novel, non-incremental technology that facilitates one or more of the overall VTO goals but are not represented in a significant way in the Office's existing Multi-Year Program Plan (MYPP) or current portfolio. The full spectrum of technologies and non-hardware solutions relevant to efficient and environmentally friendly transportation technologies that will enable America to use less petroleum will be considered.

EERE envisions awarding multiple financial assistance awards in the form of cooperative agreements. The estimated period of performance for each award will be approximately 2-5 years.

This notice is issued so that interested parties are aware of the EERE's intention to issue a FOA in the near term. All of the information contained in this notice is subject to change. It should be noted that the NOI (DE-FOA-0001462) number and FOA number (DE-FOA-0001384) are different, as outlined in the heading on the cover page of this notice. EERE will neither respond to questions nor accept applications under this notice. Once the FOA has been released, EERE will provide an avenue for potential Applicants to submit questions.

EERE plans to issue the FOA in mid-January 2016 via the EERE Exchange website <https://eere-exchange.energy.gov/>. If Applicants wish to receive official notifications and information from

EERE regarding this FOA, they should register in EERE Exchange. When the FOA is released, applications will be accepted only through EERE Exchange.

In anticipation of the FOA being released, Applicants are advised to complete the following steps, which are **required** for application submission:

- Register and create an account in EERE Exchange at <https://eere-exchange.energy.gov/>. This account will allow the user to register for any open EERE FOAs that are currently in EERE Exchange. It is recommended that each organization or business unit, whether acting as a team or a single entity, use only one account as the contact point for each submission.

Questions related to the registration process and use of the EERE Exchange website should be submitted to: EERE-ExchangeSupport@hq.doe.gov

- Obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number (including the plus 4 extension, if applicable) at <http://fedgov.dnb.com/webform>
- Register with the System for Award Management (SAM) at <https://www.sam.gov>. Designating an Electronic Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in SAM registration. Please update your SAM registration annually.
- Register in FedConnect at <https://www.fedconnect.net/>. To create an organization account, your organization's SAM MPIN is required. For more information about the SAM MPIN or other registration requirements, review the FedConnect Ready, Set, Go! Guide at https://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect_Ready_Set_Go.pdf
- Register in Grants.gov to receive automatic updates when Amendments to a FOA are posted. However, please note that applications will not be accepted through Grants.gov. <http://www.grants.gov/>. All applications must be submitted through EERE Exchange.