DEPARTMENT OF ENERGY (DOE)
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY (EERE)

"FISCAL YEAR (FY) 2015 VEHICLE TECHNOLOGIES PROGRAM WIDE FUNDING OPPORTUNITY ANNOUNCEMENT"

Funding Opportunity Announcement (FOA) Number: DE-FOA-0001201
FOA Type: Amendment 000003
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FOA Issue Date:	January 22, 2015
Amendment 000001	January 30, 2015
Amendment 000002	February 12, 2015
Amendment 000003	March 17, 2015
Informational Webinar:	February 4, 2015
Submission Deadline for Concept Papers:	February 26, 2015
Concept Paper Notification	March 13, 2015
Submission Deadline for FOA Questions	April 6, 2015
Submission Deadline for Full Applications:	April 10, 2015
Full Application Preliminary Review Notification	June 17, 2015
Expected Submission Deadline for Replies to Reviewer Comments:	June 22, 2015
Expected Date for EERE Selection Notifications:	August 2015
Expected Timeframe for Award Negotiations	September 2015

- Applicants must submit a Concept Paper by 8:00 pm ET the due date listed above to be eligible to submit a Full Application.

- To apply to this FOA, Applicants must register with and submit application materials through EERE Exchange at https://eere-Exchange.energy.gov, EERE's online application portal. Frequently asked questions for this FOA and the EERE Application process can be found at https://eere-exchange.energy.gov/FAQ.aspx.

- Applicants must designate primary and backup points-of-contact in EERE Exchange with whom EERE will communicate to conduct award negotiations. If an application is selected for award negotiations, it is not a commitment to issue an award. It is imperative that the Applicant be responsive during award negotiations and meet negotiation deadlines. Failure to do so may result in cancelation of further award negotiations and no award being issued.

Note: Effective 12/26/2014, the DOE Financial Assistance regulations contained in 10 CFR 600 has been superseded by the Financial Assistance regulations contained in 2 CFR 200 (http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title02/2cfr200_main_02.tpl**) and as amended by 2 CFR 910 (http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=0ad8c722e3f878b7e8133fc80d48fea1&ty=HTML&h=L&r=PART&n=pt2.1.910)**

Questions about this FOA? Email DE-FOA-0001201@netl.doe.gov Problems with EERE Exchange? Email EERE- ExchangeSupport@hq.doe.gov. Include FOA name and number in subject line.

AMENDMENTS

All changes to the Funding Opportunity Announcement as a result of this amendment are highlighted in the body of the FOA.

Amendment No.	Date	Description of Amendment
000001	01/30/2015	The purpose of this amendment is to 1) Revise Area of Interest (AOI) 7 Non-responsive Application Criteria and Section III. D. 1. to clarify that applications will be considered non-responsive if they propose fuels other than EPA certified diesel; and 2) Revise Section III. B. Cost Sharing by deleting the following language: "When the prime applicant receives a cost share reduction any project partner other than a domestic institution of higher education, National Laboratory, or FFRDC shall provide the minimum cost share percentage required for that AOI based upon the total value of the work they will contribute" The language is being removed because it conflicts with the intent of the EERE Cost Share Reduction determination that is applicable to certain entities applying under this FOA.
000002	2/12/2015	The purpose of this amendment is 1) Revise Section I.B Area of Interest (AOI) 7 to clarify that the proposed baseline engine will be a production engine; 2) Revise Section I.B Area of Interest (AOI) 7 Non-Responsive criteria and Section III.D.1 to define the meaning of a "new engine"; and 3) Revise Section I.B Area of Interest (AOI) 9 to clarify natural gas liquids that are typically co-produced at the well (propane, butane, ethane, etc.) are not of interest, and to clarify that acceptable demonstrations include dynamometer testing and in-vehicle tests. Please review the blue highlighted text throughout the document for all changes associated with Amendment 000002.
000003	3/17/2015	The purpose of this amendment is to 1) revise Section IV.D.1 Full Application Content Requirements to emphasize that page limitations must be adhered to for each component of the full application, where applicable; and to 2) revise Section IV.D.2 Technical Volume to clarify that page limitations for each section of the Technical Volume are approximate.

		Please review the green highlighted text throughout the document for all changes associated with Amendment 000003.

NOTE: REGISTRATION/SUBMISSION REQUIREMENTS

Registration Requirements

There are several one-time actions you must complete in order to submit an application in response to this Announcement (e.g., obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number, register with the System for Award Management (SAM), and register with EERE eXCHANGE.gov). Applicants who are not registered with SAM and Grants.gov, should allow at least 44 days to complete these requirements. It is suggested that the process be started as soon as possible.

Applicants must register through the EERE eXCHANGE.
EERE eXCHANGE website: http://eere.energy.gov/financing/exchange

Applicants must obtain a DUNS number.
DUNS website: http://fedgov.dnb.com/webform

Applicants must register with the SAM.
SAM website: http://www.sam.gov/ If you had an active registration in CCR, you should have an active registration in SAM. More information about SAM registration for applicants is found at: **https://www.sam.gov/sam/transcript/Quick_Guide_for_Grants_Registrations_v1.7.pdf.**

Applicants must register with Grants.gov.
Grants.gov website: http://grants.gov/
Applicants must register with Grants.gov in order to receive automatic updates, in the event that Amendments to this FOA are posted. However, please note that applications will not be accepted through Grants.gov.

Applicants must register with FedConnect.
FedConnect website: www.fedconnect.net.
In the event that an application is selected for negotiation of award, Applicants must be registered with FedConnect to receive the award. For more information regarding registration with FedConnect review the FedConnect Ready, Set, Go! Guide at http://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect_Ready_Set_Go.pdf

Submission Requirements

All application submissions are to be made via the EERE eXCHANGE at http://eere.energy.gov/financing/exchange. To gain access to the EERE eXCHANGE system, the applicant must first register and create an account on the main EERE eXCHANGE site. This account will then allow the user to submit an application for open EERE Funding Opportunity Announcements (FOAs) that are currently in eXCHANGE. It is recommended that each organization or business unit, whether acting as a team or a single entity, utilize one account as

the appropriate contact information for each submission.

Applicants will receive an automated response when the Application is received; this will serve as a confirmation of EERE receipt. Please do not reply to the automated response. A "User Guide" for the EERE eXCHANGE can be found on the EERE website at https://eere-Exchange.energy.gov/Manuals.aspx after logging in to the system.

To receive notices via email regarding an FOA in eXCHANGE, such as amendments to the announcement or the posting of new questions and answers from eXCHANGE you must initiate an application submission to the FOA of interest. Please note that you must finalize your application before the specified due date and time to be considered for award.

Questions

Questions related to the use of the EERE eXCHANGE website or technical issues concerning the application submittal should be submitted to: EERE-ExchangeSupport@hq.doe.gov.

Questions related to the content of the Funding Opportunity Announcement must be submitted to DE-FOA-0001201@netl.doe.gov.

The deadline for submission of FOA related questions will be March 30, 2015 at 8:00 PM Eastern time. Any questions submitted after that deadline will NOT be addressed. Questions regarding problems encountered with the application submittal will be answered as time permits. Applicants are encouraged to review the posted questions and answers daily. **Please note that you must first select this FOA Number in order to view the questions and answers specific to this FOA**. Please be as specific as possible when asking questions to insure that questions will be adequately addressed. All questions submitted must clearly identify the Area of Interest (AOI) to insure a timely and accurate response. Failure to identify the AOI, or not being as specific as possible with a question, may result in additional time to address the question or require further correspondence for further clarification regarding the submitted questions.

All questions and answers related to the content of this FOA will be posted at https://eere-exchange.energy.gov/Default.aspx DOE will try to respond to questions within 5 business days, unless a similar question and answer have already been posted on the website.

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EXECUTIVE SUMMARY

Means of Submission	Concept Papers, Full Applications, and Replies to Reviewer Comments must be submitted through EERE Exchange at https://eere-Exchange.energy.gov, EERE's online application portal. EERE will not review or consider applications submitted through other means. The Users' Guide for Applying to the Department of Energy EERE Funding Opportunity Announcements is found at https://eere-Exchange.energy.gov/Manuals.aspx.
Total Amount to be Awarded	$55.8 million
Average Award Amount	EERE anticipates making awards that range from $350,000 to $4,500,000.
Types of Funding Agreements	Cooperative Agreements
Period of Performance	24 to 48 months
Performance of Work in the United States/Eligibility	As a condition of this announcement, all applicants must propose that 100% of the direct labor cost for the project (including contractor/subrecipient labor) will be incurred in the United States. See Section III. A.
Eligible Applicants	Individuals, Domestic Entities, Foreign Entities, Incorporated Consortia, Unincorporated Consortia, subject to the definitions in Section III.A. **Note**: Area of Interest (AOI) 8 entitled "Physics-Based CFD Sub-Model Development and Validation" will be restricted to U.S. colleges, universities, and research institutions which operate as divisions under colleges or universities. Applications in this Area of Interest (AOI) that are not submitted by these types of will be considered non-responsive. See Section III Eligibility Information.
Cost Share Requirements	Refer to the cost share table in Section III.B.
Submission of Multiple Applications	Applicants may submit more than one application to this FOA, provided that each application describes a unique, scientifically distinct project. All applications must be for a stand-alone project that is not dependent or contingent upon another application submitted to this or any other FOA.
Application Forms	Required forms and templates for Full Applications are available on EERE Exchange at https://eere-Exchange.energy.gov.
FOA Summary	The Office of Energy Efficiency and Renewable Energy (EERE) is issuing, on behalf of the Vehicle Technologies Office (VTO), this Funding Opportunity Announcement (FOA) entitled "FY 2015 Vehicle Technologies Program Wide Funding Opportunity Announcement". This FOA 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 activities focus on reducing the cost and improving the performance of a mix of near-and-long-

	term vehicle technologies. Specifically, these activities contribute to achieving the goals and objectives of the EV Everywhere Grand Challenge, with a focus on accelerating the development of advanced batteries, power electronics, and lightweight materials technologies. In addition, this FOA supports technology development to reduce petroleum consumption through fuel economy improvements – specifically, advancements in combustion engines, alternative fuels, and other enabling technologies.

I. FUNDING OPPORTUNITY DESCRIPTION

A. DESCRIPTION/BACKGROUND

The Office of Energy Efficiency and Renewable Energy (EERE) is issuing, on behalf of the Vehicle Technologies Office (VTO), this Funding Opportunity Announcement (FOA) entitled "FY 2015 Vehicle Technologies Program Wide Funding Opportunity Announcement."

The U.S. transportation sector accounts for two-thirds of U.S. petroleum use, and on-road vehicles are responsible for 80 percent of that amount. U.S. dependence on oil for transportation affects the national economy and its potential for future growth – the U.S. continues to send nearly $1 billion a day overseas for oil and the average U.S. household spends nearly one-fifth of its total expenditures on transportation, making it the second-most expensive spending category after housing. Oil price volatility also affects the national economy and household budgets. Over the past ten years, U.S. regular conventional retail gasoline prices have fluctuated from below $1.50 to over $4, resulting in increases to annual household budgets as large as $1,500 per average passenger car. In addition, the U.S. transportation sector accounts for approximately one-third of U.S. energy-related carbon pollution, and, despite recent progress in reducing other emissions, it remains a significant source of air pollution. To address these pressing challenges and help Americans reduce their transportation energy costs, there are two key solution pathways: (1) use conventional fuels more efficiently, and (2) replace them with cost-competitive, domestically-produced alternatives. Public investment in advanced transportation technologies that enable both of these pathways will improve the Nation's energy security, reduce greenhouse gas emissions, and strengthen U.S. global economic competitiveness.

Aligning with the President's Climate Action Plan and all-of-the-above approach to American energy, VTO and the activities in this FOA support both solution pathways. Research, development, and deployment activities focus on reducing the cost and improving the performance of a mix of near-and-long-term vehicle technologies, including advanced batteries, power electronics, lightweight materials, advanced combustion engines, computational fluid dynamics, and other enabling technologies.

Specifically, this FOA supports the President's EV Everywhere Grand Challenge, which seeks to make the United States the first country to produce a wide array of plug-in electric vehicle (PEV) models (including plug-in hybrids and all-electric vehicles) by 2022 that are as affordable and convenient as the gasoline powered vehicles we drive today. The EV Everywhere Blueprint describes the research, development, and deployment needed to meet the overall EV Everywhere goals and other aggressive, technology-specific goals. Specific goals include the following:

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

In addition to vehicle electrification and lightweighting technologies, this FOA supports technology development to reduce petroleum consumption through fuel economy improvements – specifically, these include advancements in combustion engines, alternative fuels, and other enabling technologies, applicable to light-, fuel vehicles with sufficiently long ranges, sufficiently low costs, and broad consumer appeal to result in significant market penetration potential.

This FOA contains a total of 9 Areas of Interest (AOIs) and focuses on advanced light-weighting; advanced battery development; power electronics; advanced combustion technology; and natural gas utilization in transportation. These areas of interest apply to light, medium-, and heavy -duty on-road vehicles.

The Statutory Authorities for this FOA are Public Law 102-486, Energy Policy Act (EPAct) of 1992, as amended by Public Law 109-58, of EPAct 2005; the Energy Independence and Security Act (EISA, Public Law 110-140); and Continuing Appropriations Resolution, and the Consolidated and Further Continuing Appropriations Act 2015, Public Law 113-235.

B. TOPIC AREAS/TECHNICAL AREAS OF INTEREST

The FOA includes nine (9) Areas of Interest, which are reflected in the table below. One or more projects awarded may be managed collaboratively with the U.S. Army Tank Automotive Research Development and Engineering Center (TARDEC).** A separate agreement with TARDEC will not be required. Note that the AOI's support two separate initiatives and are grouped accordingly.

AOI Number	Title
Critical Technologies to Meet the EV Everywhere Grand Challenge	
1	Wide Bandgap (WBG) Power Module R&D – Integrated Power Modules
2	Ultra-Light Door Design, Manufacturing and Demonstration
3	Body-In-White Joining of Carbon Fiber Composites to Lightweight Metals (Aluminum, Advanced High Strength Steel, or Magnesium) at Prototype Scale for High-Volume Manufacturing
4	Advances in Existing and Next-Generation Battery Material Manufacturing Processes
5	Advances in Electrode and Cell Fabrication Manufacturing
6**	Electric Drive Vehicular Battery Modeling for Commercially Available Software
Technology Development to Reduce Petroleum Consumption Through Fuel Efficiency Improvements	
7**	Enabling Technologies for Heavy-Duty Vehicles
8**	Physics-Based Computational Fluid Dynamics (CFD) Sub-Model Development and Validation (***NOTE: Restricted Eligibility***)
9	High-Efficiency, Medium and Heavy-Duty Natural Gas (Dedicated or Dual-Fuel) Engine Technologies

NOTE: APPLICATIONS SUBMITTED TO AOI 8 ENTITLED "PHYSICS-BASED CFD SUB-MODEL DEVELOPMENT AND VALIDATION" ARE RESTRICTED TO U.S. INSTITUTES OF HIGHER EDUCATION, AND NON-PROFIT RESEARCH INSTITUTIONS WHICH OPERATE AS DIVISIONS UNDER .THE U.S. INSTITUTES OF HIGHER EDUCATION. ALL OTHER ENTITIES THAT SUBMIT AN APPLICATION TO THIS AOI WILL BE CONSIDERED NON-RESPONSIVE AND THE APPLICATION WILL NOT BE REVIEWED.

CRITICAL TECHNOLOGIES TO MEET THE EV EVERYWHERE GRAND CHALLENGE

Area of Interest (AOI) 1: Wide Bandgap (WBG) Power Module R&D – Integrated Power Modules

VTO's long-term research and development strategy recognizes that reducing the cost of electric drive vehicles is essential for increasing consumer adoption, and that advanced Wide Bandgap (WBG) Silicon Carbide (SiC) and Gallium Nitride (GaN)) switches may provide a path to obtaining these vehicle benefits. In support of this strategy, VTO funds electric drive technology research to achieve the following vehicle benefits:

- Reducing cost, weight, and volume
- Improving performance, efficiency, and reliability
- Developing innovative modular and scalable designs
- Improving manufacturability and accelerate commercialization

The objective of this AOI is to develop and demonstrate power modules and production processes that incorporate WBG devices, exclusively or in conjunction with other power semiconductors, into electric drive vehicle inverter designs. The packaging of power semiconductors into power modules may include other supporting inverter subcomponents, and should include the elimination of wire bonds. The resulting technology will represent at least one application-specific vehicle inverter, demonstrate increased performance over the baseline inverter technology, and be capable of achieving the targets identified in the table below:

Technical Targets		
Cost	Specific Power	Power Density
$3.3/kilowatt (kW)	14.1 kW/kilogram	13.4 kW/Liter

Projects should also develop and validate mature processes that can efficiently, quickly, reliably, and repeatedly make power modules that show a high level of performance suitable for automotive inverters. Power modules are generally expected to start at a technology readiness level (TRL) of 4 and progress to a TRL of 7 (*http://www.esto.nasa.gov/files/TRL_definitions.pdf). .* These modules should be designed to take advantage of WBG semiconductor benefits, such as higher junction temperature capability, high frequency operation, and high power density. The production processes should be suitable for scale-up to manufacture power modules at low cost and high volumes, and this capability should be demonstrated as part of the Applicant's project using process steps and equipment appropriate for high volume manufacturing.

*http://www.esto.nasa.gov/files/TRL_definitions.pdf

Applicants are encouraged to include automotive original equipment manufacturers (OEMs), automotive suppliers, semiconductor device manufacturers, and supporting suppliers in their teams that demonstrate a strong path to product commercialization.

Additional Application Requirements

Applications must include the following:

1. Identification of at least one application-specific automotive inverter design. This inverter design and corresponding automotive electric drive system application should be used to determine design requirements and performance targets. Additionally, this design should establish a target for improvement over a selected baseline technology and comparison to DOE targets, listed in the technical targets table above.
2. Identification of specific innovations or developments needed for power module packaging, along with a description of how these innovations will impact or improve the targeted inverter application. The packaging of power semiconductors into power modules may include other supporting inverter subcomponents.
3. Identification of the specific process or manufacturing innovations or developments, along with a projection of how these innovations will impact or improve manufacturing of the targeted inverter application.
4. Description of WBG devices that are included in the proposed power module design. The description should include WBG design benefits, considerations, limitations, and/or drawbacks.
5. Separately highlight any other research or development tasks required as part of the overall project that are necessary to successfully complete a WBG power module.
6. Identification of the approaches the project will utilize to demonstrate the performance of the proposed designs.

AOI 1 Non-responsive Application Criteria:

Applications submitted under AOI 1 will be considered non-responsive if they fail to meet any of the general compliance criteria established in Sections III C and D below.

AOI 1 Special Deliverables:

In addition to the deliverables required in the Federal Assistance Reporting Requirements Checklist, the following special deliverables are required:

1. Detailed specifications for WBG power semiconductor requirements and performance in this application, and application-specific component performance requirements.
2. Test plan to demonstrate and confirm power module performance.
3. Power module hardware test results confirming that inverter application specifications and DOE targets are met.
4. Listing of manufacturing equipment and equipment cost required to produce this inverter design.

5. Modular or indentured bill of materials for this inverter design

Area of Interest (AOI) 2: Ultra-Light Door Design, Manufacturing and Demonstration

Reducing the weight of a vehicle is a tremendous opportunity for fuel savings; however, introducing new designs, materials, and lightweight systems is difficult in a high volume production environment. Closures (doors, hood, and trunk lids) are often produced as stand-alone subsystems and are attached late in the manufacturing process. This production approach allows more flexibility in manufacturing of closures compared to body and chassis structures and offers compact platforms for demonstrating new technologies. This AOI seeks to use the driver's-side front door as a demonstration platform for full-system weight reduction of complex automotive structures.

Applications to this AOI must address the following goals:

- Designing, building, and testing a complete driver's side front door ("light door") including all trim features, glazings, and other baseline features while weighing at least 42.5% less than a baseline structure ("baseline door" described further below).
- Demonstrating via physical testing (to be complemented with modeling as appropriate) that the light door meets or exceeds baseline door performance.
- Demonstrating via cost modeling that the door achieves the indicated weight reduction for less than $5 per pound of weight saved

The baseline door will be defined by the applicant but must meet the following requirements:

- A driver's side front door from a Model Year 2010 or newer vehicle
- From a vehicle model with production volume in excess of 20,000 vehicles per year
- From a passenger vehicle (non-commercial); which is defined as any class of passenger vehicle meeting the above requirements, including sedans, vans, pickup trucks, etc.

Design and testing of the door must adhere to the following guidelines:

- The light door must meet all fit and integration requirements of the baseline door such that the light door can be assembled into the baseline vehicle and function properly. The only modifications allowed to the baseline vehicle are to the hinges and attachment points for the door, including the location of the hinges and attachment points and any minor adjustments to the body near the hinges/attachment points as necessary to accommodate new locations and loading.
- The light door must be tested and demonstrated to exceed corrosion and durability performance of the baseline door.
- The light door must be tested and demonstrated to exceed consumer preference performance of the baseline door to include, at least, noise/vibration/harshness, fit/finish, and performance of creature comforts such as speakers, automatic windows, and any other interface features.
- The light door must be assembled into the baseline vehicle and tested to validate that it exceeds the baseline door structural performance including, at least, door sag and static overload/failure load.

- The light door should be assembled into the baseline vehicle and the entire vehicle should be subjected to testing to validate that stiffness and crash performance exceeds the full vehicle with the baseline door. Full vehicle crash testing should at least include side pole impact and side impact tests. Crash performance and vehicle stiffness are functions of the full vehicle design, including the closures, body, and chassis. Since this AOI does not support major modification of the body and chassis, which might be included in a production-intent application of a lightweight door, the Applicant may specify a test plan other than a full-vehicle-crash-and-stiffness-assessment in order to validate crash and stiffness performance. However, preference will be given to those applications that propose a test plan that includes full vehicle crash and stiffness testing for validation.

The cost target of less than $5 per pound of weight saved is somewhat higher than the generally accepted range of $2 - $4 per pound of weight saved. The purpose of targeting a higher cost allowance is to encourage the use of advanced materials, processes, and designs as would be necessary to meet a 42.5% weight reduction for a functionally equivalent door. As a result, preference will be given to applications that emphasize the use of novel materials, manufacturing processes, and designs rather than material substitutions into conventional designs.

As a platform for demonstrating weight reduction technology for a full vehicle, it is critical that the light door include novel technologies for glazings, electronics, noise dampening materials, trim, and comfort features which contribute significantly to total vehicle weight. Consequently, preference will be given to applications that include development, design, and demonstration of novel materials and designs for both significant structural components and all other sources of weight such as functional components, electronics, trim, and glazings.

AOI 2 Non-responsive Application Criteria:

Applications submitted under AOI 2 will be considered non-responsive if they fail to meet any of the general compliance criteria established in Sections III C and D below.

AOI 2 Special Deliverables:

Aside from the deliverables required in the Federal Assistance Reporting Requirements Checklist, there are no special deliverables for AOI 2.

Area of Interest (AOI) 3: Body-in-White Joining of Carbon Fiber Composites to Lightweight Metals (Aluminum, Advanced High Strength Steel, or Magnesium) at Prototype Scale for High-Volume Manufacturing

The objective of this AOI is to develop and demonstrate the capability of multi-material joining techniques for joining carbon fiber (CF) composites to structural light weight metals (Aluminum, Advanced High Strength Steel, or Magnesium) on light-duty, medium-duty or heavy-duty vehicle body-in-white (BIW) joints. In addition to applying and validating new techniques at a production-relevant scale, this AOI seeks applications that include rigorous development of joining process-structure models and characterization of joints at a quality suitable for publication in peer-reviewed journals.

Applications under this AOI must employ multi-material joining techniques that have been demonstrated at coupon-scale or for non-BIW applications. The techniques should have been well characterized and understood in prior work with the technical challenges associated with body-in-white joining clearly explained in the application.

Knowledge of current manufacturing processes and constraints is essential to evaluate technical and economic viability; therefore, Applicant teams must include a Tier 1 or automotive OEM as a partner for prototype design, demonstration, and validation.

Responsive Materials:

For the purpose of this AOI, a light weight metal is one of the following material families: aluminum, advanced high strength steel, or magnesium. Specifically, Table 1 provides the lightweight metals and forms practicable for BIW applications:

Table 1. Responsive lightweight metals, compositions, and forms

Aluminum	1) 5000, 6000, or 7000 series automotive aluminum alloy sheet between 0.5 mm and 5 mm thick; or 2) 5000, 6000, or 7000 series automotive aluminum alloy extrusions; or 3) Sand, permanent mold, or die cast automotive aluminum alloys
Advanced Steel	Automotive sheet steel with tensile strength of greater than 580 MPa and thickness between 0.5 mm and 5 mm.
Magnesium	1) Magnesium alloy sheet between 0.5 mm and 5 mm thick; or 2) Magnesium alloy extrusions; or 3) Sand, permanent mold, or die cast automotive magnesium alloys

For the purposes of this AOI, acceptable carbon fiber composites must have minimum properties specified in Table 2:

Table 2. Responsive Carbon Composite Properties

Carbon Fiber Strength	Greater than or equal to 250 Ksi
Carbon Fiber Modulus	Greater than or equal to 25 Msi
Carbon Fiber Strain	Greater than or equal to 1%
Resin	Automotive grade thermoplastic or thermoset

"BIW joints" refers to joints between the lightweight materials in the BIW where the assembly and access to the joint are constrained by size of the assembly. Because of these limits the joining process must be performed either on a robot-arm, or in such a way that the joining process can be performed on a full size BIW moving through the assembly floor (i.e. the BIW cannot be lifted or rotated significantly to accommodate the needs of the joining process).

Applications under this AOI must address three aspects 1) process development and demonstration; 2) joint characterization; and 3) model development and validation in accordance with the following requirements:

Aspect 1 - Process Development and Demonstration

Applicants must select a single class of joining techniques for development and demonstration during the project. Examples of a "class" of joining techniques include use of adhesives or riveting (these are only examples, other classes may be proposed). After providing a description of the state-of-the-art for the selected technique, the application must provide a discussion of the key technical barriers that prevent application of the technique for dissimilar CF Composites-Lightweight Metal BIW joints; applications must include a discussion of how each technical barrier will be addressed in the project.

While development and demonstration at a coupon-scale is an acceptable component of the proposed work, the emphasis for this AOI is on demonstrations with prototype-scale parts. Applicants must provide a schematic design for a prototype-scale assembly (or assemblies) of at least 2 components (one CF composite, one lightweight metal) that will at least include 4 adjacent joints (for "spot" techniques) or 6" for "linear" techniques.

Applicants must describe how the prototype-scale demonstration assembly (or assemblies) accurately portrays the access and constraint challenges associated with production BIW joining and why the proposed demonstration assembly joints are unachievable without further development of the proposed joining technique. Further, applications must describe how the cost and performance of the proposed structure can be compared to a benchmark using a conventional technique.

Demonstration assembly testing must include characterizing the failure mechanisms and loads for the following modes:

1) Quasi-static overload failure; and

2) Dynamic/crash failure.

Applications may also include characterization of other failure modes, such as fatigue failure or corrosion failure. Applicants must provide quantitative metrics for the target performance of the assembly in each mode, and a detailed discussion regarding the proposed techniques for characterizing each mode and how the proposed testing technique will emulate the service conditions of production vehicle BIW joints.

Aspect 2 - Joint Characterization

Applications must propose development of a sound material science-based understanding of joint characteristics using the proposed joining technique. Applications must include a discussion of how joint structure and mechanical properties will be characterized. Joint structure characterization must at least include microstructure and joint defect measurements. Joint mechanical property characterization must at least include:

- Quasi-static failure strength;
- high-rate (strain rate between 100 s-1 and 2000 s-1) failure strength;
- failure mechanism
- fatigue performance; and
- corrosion performance

These measurements can occur at the coupon-scale during process development and are distinct from the demonstration assembly characterization described in Aspect 1.

The application must provide quantitative targets (e.g. 5 kN quasi-static failure load in lap-shear, etc.) for each of the coupon-level characteristics listed. Joint formability and the interaction between forming processes and joining processes should also be assessed during the project; however, tasks focused particularly on forming base materials without joints are not desired.

Aspect 3 - Model Development and Validation

The third aspect of the AOI is to develop process-structure models for the proposed joining technique. The process-structure models must be sufficiently detailed to predict at least the post-weld microstructure based on the process parameters and input microstructure. Further, existing structure-property models should be applied to use output from the process-structure model developed during this project to predict the quasi-static overload failure strength to within 5% of the experimental value at the coupon scale and to within 10% of the experimental value at the prototype scale. Modeling and prediction of other joint performance characteristics such as fatigue or corrosion behavior is allowed but not required.

Additional Application Requirements:

In addition to the requirements provided in the narrative above specific to this AOI, applications must include the following items.

- A discussion of how the proposed joining technique has been demonstrated for other applications but is still unusable for body-in-white joints owing to specific assembly and production constraints for BIW joining;
- A description of the technical barriers to using the proposed technique for dissimilar CF composite-lightweight metal BIW joints;
- How the proposed prototype scale demonstration assembly accurately emulates the access, constraint, and assembly challenges of BIW joining;
- The role of automotive OEM or tier one suppliers in developing requirements for the joining technique and demonstration assembly;
- A discussion of how the prototype scale demonstration assembly will capture production scale performance challenges such as interaction of adjacent rivets (spot) and the starting/ending points of the adhesives (linear);
- How the proposed prototype scale demonstration assembly and testing methods will emulate the service conditions and performance of a production BIW assembly;
- A listing of the proposed quantitative joint and assembly performance metrics and a discussion of how they will be used to assess the joining technique in a production vehicle;
- A description of the proposed coupon scale development process and characterization techniques;
- A description of the proposed process-structure modeling techniques and a discussion of their usefulness in predicting post-joining properties.

AOI 3 Nonresponsive Application Criteria:

Applications submitted under this AOI will be considered non-responsive if they fail to meet any of the general compliance criteria established in Sections III C and D below and if they:

- Do not conform to the lightweight metals or carbon composite properties provided in Tables 1 and 2 of this AOI;
- Are for systems other than light-duty, medium-duty or heavy-duty vehicle BIW;
- The Applicant's team does not include a Tier 1 supplier or automotive OEM as a partner for prototype design, demonstration, and validation;
- Do not address all three aspects of the scope: 1) Process Development and Demonstration; 2) Joint Characterization; and 3) Model Development and Validation.

AOI 3 Special Deliverables:

Aside from the deliverables required in the Federal Assistance Reporting Requirements Checklist, there are no special deliverables for AOI 3.

Area of Interest (AOI) 4: Advances in Existing and Next-Generation Battery Material Manufacturing Processes

Overcoming the key barriers in battery material manufacturing processes cannot be achieved solely by adopting new materials, or by completely new battery chemistries. The component materials must be capable of being manufactured at a lower cost and with a smaller environmental footprint when compared to present technologies. They should also provide improved control of stoichiometry, morphology, compositional heterogeneity, and impurity level and nature.

The objective of this AOI is to develop innovative improvements to manufacturing processes for battery materials. Applications submitted under this AOI must present a manufacturing approach to a battery material that is a significant improvement to an existing approach and has a rational path to both cost savings and improved materials production.

The following table is included, not as a list of desired topics, but as examples from the desired component/process matrix and to indicate the breadth of materials manufacturing and manipulation technologies sought.

Battery Materials	Example Manufacturing Technologies
Active electrode materials (anode & cathode)	• Liquid (solution, suspension, slurry)-to-powder synthesis approaches could include: - supercritical fluid - microemulsion - fluidized bed - production from waste streams • Aerosol-to-powder synthesis approaches could include: - plasma - pyrolysis - flame - electrospray • Particle handling approaches could include: - differential mobility - size-selective powder handling - energetic nanocomposite formation - electrophoretic separation
Electrolyte components, salts, conductive additives, and binders,	• Green chemistry • Additive manufacturing • Water-based products • Neoteric solvents

AOI 4 Non-responsive Application Criteria:

Applications submitted under AOI 4 will be considered non-responsive if they fail to meet any of the general compliance criteria established in Sections III C and D below.

AOI 4 Special Deliverables:

Aside from the deliverables required in the Federal Assistance Reporting Requirements Checklist, there are no special deliverables for AOI 4.

Area of Interest (AOI) 5: Advances in Electrode and Cell Fabrication Manufacturing

The total cost of battery manufacturing must be lowered by materials production advances and by advances in the production of electrode laminates and battery cells. In addition to cost savings, novel electrode production technologies may lead to better performing, longer-lasting, and more reproducible battery electrodes, while simultaneously reducing the environmental footprint of the production facility. Applications to this AOI must propose a manufacturing approach to either electrodes or cells that shows major cost savings and improved performance and that can be incorporated into a battery manufacturing plant.

The following table is included, not as a list of desired topics, but as examples from the desired component/process/structure matrix and to indicate the breadth of technologies sought.

Battery Component	Example Manufacturing Technologies	Possible Structures
Electrodes	• Water-based processing • Dry processing • Advanced thermal processing • UV and e-beam processing • Novel extrusion processes • Electrodeposition	• Flexible, non-rigid electrodes • electrodes with gradient composition • novel electrode | separator sub-structure
Cells	• Co-extrusion • Mechanically applied SEI • Pre-lithiation • Advanced formation cycling	• 3D, interdigitated electrodes • Novel cell designs

AOI 5 Non-responsive Application Criteria:

Applications submitted under AOI 5 will be considered non-responsive if they fail to meet any of the general compliance criteria established in Sections III C and D below.

AOI 5 Special Deliverables:

Aside from the deliverables required in the Federal Assistance Reporting Requirements Checklist, there are no special deliverables for AOI 5.

Area of Interest (AOI) 6: Electric Drive Vehicular Battery Modeling for Commercially Available Software

The Computer Aided Engineering for Electric Drive Batteries (CAEBAT) activity was initiated by the Vehicle Technologies Office (VTO) to create battery simulation suites/tools that enable acceleration of the design cycle as well as battery (cells and packs) performance and cost optimization. Additional information regarding the CAEBAT open architecture software is located at the following link: http://batterysim.org

The objective of this AOI is to expand upon the current state of electric drive vehicular battery modeling by developing and validating new advanced computational models. Specific technical interests for applications under this AOI include but are not limited to:

- Dramatically improving the computation efficiency of current electrochemical and thermally coupled material, cell, module and battery pack models.
- Developing models capable of predicting the combined structural, electrical, and thermal responses to abusive conditions such as crash-induced-crush, overcharge/overdischarge, thermal ramp, and short circuits.
- Developing a simulation model database of commercially available cells to enable wider evaluation and adoption of computer aided engineering tools for the design of battery packs and cells. It is envisioned that battery developers will construct, or be a part of a team that constructs, battery models for each of their commercially available cells. Battery models for this technical AOI will be made freely available to the public for battery pack design and analysis.
- Developing microstructural models as a tool to design battery electrodes through a better understanding of the basic physics occurring at the particle and electrode level. It is envisioned that this effort would require the use of supercomputers and simulations and would be carried out using geometrically accurate models of particles (morphology and particle size distribution) as well as binders and conductivity enhancers.

Software products at the completion of the Applicant's project could be but are not limited to:

- Software prototypes which significantly advance state of the art but represent an early sample, concept, or early software build that is not sufficiently mature for implementation within the CAEBAT open architecture platform or commercialization. It is expected that development for this software would not require as significant a level of effort as a mature model.
- Software that is ready for implementation within the CAEBAT open architecture platform and/or compatible with existing commercially available software tools.

In addition to the information outlined above applications must address the following:

- Planned software maturity level at the end of the project (prototype or commercialization ready)
- Specific technical area(s) to be developed
- Planned software Interfaces
- Planned implementation into CAEBAT and/or other commercially available software

It is highly encouraged that applicant teams include a battery technology developer or end user, with either as lead. The team should also include at least one member with ownership interests in commercially available battery modeling software. Teaming with universities, national laboratories, other industry partners, etc. is encouraged if it benefits the technology development and final product.

AOI 6 Non-responsive Application Criteria:

Applications submitted under AOI 6 will be considered non-responsive if they fail to meet any of the general compliance criteria established in Sections III C and D below.

AOI 6 Special Deliverables:

In addition to the deliverables required in the Federal Assistance Reporting Requirements Checklist, the following special deliverables are required for awards made under AOI 6:

- The completed model/simulation/tool developed in this project must be delivered to the DOE along with a software description document and a user's manual at the end of the Applicant's project. The software description document must include a high level description of the integrated models along with a description of the input variables, output variables, state variables, and relational databases implemented within the final software deliverable. The user's manual must provide an overall description of the user implementation approach for the software.

Technology Development to Reduce Petroleum Consumption Through Fuel Efficiency Improvements

Area of Interest (AOI) 7: Enabling Technologies for Heavy-Duty Vehicles

DOE has established 55% engine efficiency as a stretch goal for heavy duty engines with a plan to meet this goal by 2020. In order to achieve this breakthrough efficiency goal, DOE recognizes that some of the technologies being considered need further development to achieve cost competitiveness with current technologies and a payback period that is acceptable to the customer.

The objective of this AOI is to research, develop, and demonstrate cost-competitive enabling technologies for Class 8 truck engine systems that can enable the achievement of breakthrough Brake Thermal Efficiency (BTE) using EPA certified diesel fuels while meeting the latest emission standards (see http://www.epa.gov/otaq/standards/heavy-duty/). Increased efficiency may be achieved using one or more proposed enabling technologies on a production engine, which will also serve as the baseline engine. Examples of some of the enabling technologies that could be considered are listed below but not limited to the following:

- technologies capable of modifying in-cylinder charge motion;
- new advanced combustion regimes;
- waste heat recovery devices and systems;
- variable valve actuation and timing mechanisms;
- lightweight components; reduced friction approaches;
- low heat rejection and thermal management approaches;
- low energy penalty emission controls; advanced fuel injectors;
- ignition systems, intake air management systems; and turbomachinery.

Applications to this AOI must include the following:

- Identification of a baseline engine
- Analysis, modeling, or simulation results which support projected efficiencies
- Plans for system requirements analysis, concept development, and component interface specification
- Design, build, and component validation in laboratory setting
- Integration of components onto baseline engines
- Cost analysis of the proposed technologies
- Projections of commercialization and market penetration
- Test plan and data planned to result from testing

Including a heavy duty OEM engine/vehicle manufacturer currently producing in the United States as part of the applicant team is strongly encouraged.

AOI 7 Non-responsive Application Criteria:

Applications submitted under AOI 7 will be considered non-responsive if they fail to meet any of the general compliance criteria established in Sections III C and D below or if they propose new engines, fuels other than EPA certified diesel fuels, or do not include plans for demonstration. For the purpose of this AOI, a new engine is defined as an engine that is not currently in production.

AOI 7 Special Deliverables:

Aside from the deliverables required in the Federal Assistance Reporting Requirements Checklist, there are no special deliverables for AOI 7.

Area of Interest (AOI) 8: Physics-Based Computational Fluid Dynamics (CFD) Sub-Model Development and Validation

NOTE: Applications under this AOI are restricted to U.S. colleges, universities, and non-profit research institutions that operate as divisions under colleges or universities. See Section III (Eligibility Information) of the FOA for further information regarding eligibility. Applications from Applicants, who are not a U.S. college, university, or non-profit research institution operating as a division under a college or university, will be considered non-responsive to this AOI.

The objective of this AOI is the development and validation of more accurate, physics-based, mathematical submodels for use in Computational Fluid Dynamics (CFD) software. The improved-accuracy models must not depend on any specific CFD code for accuracy or validation, i.e. they must be stand-alone mathematical models adaptable for use in any of the available CFD software packages. The submodels will be made available to CFD software developers (vendors) for inclusion in their future software offerings.

CFD software is used by all internal combustion engine developers in the automotive and related industries. While use of the software has led to improved engine designs, it has not yet realized its full potential for attaining the goals of shortened engine development cycle time, minimized fuel consumption, or minimized exhaust emissions from engines. A barrier to achieving these goals is the lack of predictive accuracies of the currently available submodels used in commercial and government-sponsored CFD software codes. Current inaccuracies lead to a lack of confidence in modeling predictions as engine operating parameters change, which creates the need to tune or calibrate the submodels for effective use. This process is very inefficient and time consuming for the engine developer. More accurate submodels need to be more physics-based and predictive in nature, thereby requiring less calibration and tuning than currently available submodels.

Development of new or improved mathematical submodels is expected to yield higher accuracy than those currently employed in commercial and government-sponsored CFD codes (even at the expense of computational speed). Only the following submodel areas are candidates for funding under this AOI:

1. Fuel Injection Spray From Injector Nozzle Outlet to Vaporization for Multicomponent Fuels;
2. Cavitation Within Fuel Injectors;
3. Flash Boiling of Fuel From a Fuel Injector;
4. Fuel Spray/Cylinder Wall Interactions and Associated Fuel Film Dynamics;
5. High-Pressure Supercritical Fuel Injection;
6. In-Cylinder Radiation and Heat Transfer;

7. Engine Knock Prediction;
8. Engine-Out Gaseous and Soot Emissions.

Applicants may submit multiple applications to this AOI as long as each application addresses a different submodel.

Proposed research could relate to a single submodel listed above, or could relate to a combination of those submodels in cases where there are valid technical reasons for the combined approach. If more than one submodel is addressed within a single application, the application must contain a detailed technical rationale for the necessity and efficacy of the joint development of the proposed submodel(s).

To ensure that perspectives of different CFD community experts are included, applications must include a partnership with a DOE Federally Funded Research and Development Center (FFRDC) that has expertise in the proposed submodel(s) research area.

Applications must include details regarding the new or improved technical approach being proposed to overcome the aforementioned inaccuracies and a detailed discussion of the experimental protocols and apparatuses that are being proposed to validate the new or improved submodel(s). Improved accuracies of the developed models as compared with current submodel(s) must be demonstrated through rigorous laboratory experimentation. For this AOI, the goal of the market transformation plan/commercialization plan is to make the new submodel(s) available for use by CFD code vendors thereby making the improved accuracy available to the automotive original equipment manufacturers, enabling reduced engine development time. Plans must address the publication or dissemination of the new or improved mathematical model(s) to make it available for inclusion in all commercial and government-sponsored CFD program codes.

Applications must include specific sections that address the following elements:

1. Submodel(s) Identification - Clear identification of the submodel(s) being proposed for improvement (from the list above); and
2. Identification of Inaccuracies/Uncertainties - In-depth technical explanation of the origins of inaccuracies and uncertainties in the currently employed, related submodel(s), and the identification of which CFD computer codes currently employ this/ these submodel(s).

AOI 8 Non-responsive Application Criteria:

As noted above, applications submitted to AOI 8 by entities other than a U.S. college, university, or non-profit research institution operating as a division under a college or university will be considered non-responsive.

Applications submitted under AOI 8 will also be considered non-responsive to the FOA if they fail to meet any of the general compliance criteria established in Sections III C and D below, or if they:

- Do not include a DOE FFRDC partner.
- Do not include specific sections on submodel identification and identification of inaccuracies/uncertainties.

AOI 8 Special Deliverables:

Aside from the deliverables required in the Federal Assistance Reporting Requirements Checklist, there are no special deliverables for AOI 8.

Area of Interest (AOI) 9: High-Efficiency, Medium and Heavy-Duty Natural Gas (Dedicated or Dual-Fuel) Engine Technologies

The objective of this AOI is development of technologies enabling medium- and heavy-duty engines fueled by natural gas, or a natural gas derived fuel, with diesel-like efficiency. Natural gas liquids that are typically co-produced at the well (propane, butane, ethane, etc.) are not of interest.

Proposed engines can include pilot fuel ignition, but the pilot must be limited to not more than 5% of fuel consumed. Engines must be capable of meeting current emission standards and technologies developed must be demonstrated on an engine. Acceptable demonstrations include dynamometer testing and in-vehicle tests.

Preference will be given to applications with technologies that minimize reliance on exhaust after-treatment systems. The R&D should also address the horsepower, reliability and durability of the engines for safe and efficient operation in consideration of the specific operating conditions of real-world use. Applications must include a financial analysis of the total system cost including hardware, fuel, and other operating and maintenance costs. Applications must present a sound business case for the proposed technology.

AOI 9 Non-responsive Application Criteria:

Applications submitted under AOI 9 will be considered non-responsive if they fail to meet any of the general compliance criteria established in Sections III C and D below.

AOI 9 Special Deliverables:

Aside from the deliverables required in the Federal Assistance Reporting Requirements Checklist, there are no special deliverables for AOI 9.

II. AWARD INFORMATION

A. AWARD OVERVIEW

1. ESTIMATED FUNDING

EERE expects to make approximately $55.8 million of Federal funding available for new awards under this FOA, subject to the availability of appropriated funds. EERE anticipates making approximately 22-33 awards under this FOA. EERE may issue one, multiple, or no awards.

The anticipated total Federal funding and the approximate maximum and minimum Federal Share for any one individual award made under this announcement are set forth in the table below.

One or more projects awarded may be managed collaboratively with U.S. Army Tank Automotive Research Development and Engineering Center (TARDEC)**. A separate agreement with TARDEC will not be required.

AOI Number	Area of Interest	Anticipated Maximum Award Size for Any One Individual Award (Fed Share)	Anticipated Minimum Award Size for Any One Individual Award (Fed Share)	Anticipated Award Size (Fed Share)	Approximate Total Federal Funding Available for All Awards
Critical Technologies to Meet the EV Everywhere Grand Challenge					
1	Wide Bandgap (WBG) Power Module R&D – Integrated Power Modules	$4M	$2M	$3M	$8M
2	Ultra-Light Door Design, Manufacturing and Demonstration	$3M	$1M	$3M	$6M
3	Body-in-white Joining of Carbon Fiber Composites to Lightweight Metals (Aluminum, Advanced High Strength Steel, or Magnesium) at Prototype Scale for High-Volume Manufacturing	$3.5M	$2M	$2.75M	$5.5M

4	Advances in Existing and Next-Generation Battery Material Manufacturing Processes	$3M	$1.5M	$2.5M	$8M
5	Advances in Electrode and Cell Fabrication Manufacturing	$3M	$1.5M	$2.5M	$8M
6**	Electric Drive Vehicular Battery Modeling for Commercially Available Software	$3.5M	$1M	$2M	$8M
Technology Development to Reduce Petroleum Consumption Through Fuel Efficiency Improvements					
7**	Enabling Technologies for Heavy-Duty Vehicles	$4.5M	$2.5M	$3.5M	$6.7M
8**	Physics-Based Computational Fluid Dynamics (CFD) Sub-Model Development and Validation	$750K	$350K	$500K	$2.6M
9	High-Efficiency, Medium and Heavy-Duty Natural Gas (Dedicated or Dual-Fuel) Engine Technologies	$3M	$1M	$1.75M	$3M

EERE may establish more than one budget period for each award and fund only the initial budget period(s). Funding for all budget periods, including the initial budget period, is not guaranteed. Federal funding for all awards is contingent upon the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority (if applicable) for funds provided by DOE.

Period of Performance
EERE anticipates making awards 24 - 48 months in length. Project continuation will be contingent upon satisfactory performance and go/no-go decision review. At the go/no-go decision points, EERE will evaluate project performance, project schedule adherence, meeting milestone objectives, compliance with reporting requirements, and overall contribution to the program goals and objectives. As a result of this evaluation, EERE will make a determination to continue the project, re-direct the project, or discontinue funding the project. Only those projects demonstrating a high probability of successfully meeting the program targets will be continued.

One or more projects awarded may be managed collaboratively with U.S. Army Tank

Automotive Research Development and Engineering Center (TARDEC)**.A separate agreement with TARDEC will not be required.

AOI Number	Area of Interest	Anticipated Number of Awards	Period of Performance
Critical Technologies to Meet the EV Everywhere Grand Challenge			
1	Wide Bandgap (WBG) Power Module R&D – Integrated Power Modules	2-3	Up To 3 Years
2	Ultra-Light Door Design, Manufacturing and Demonstration	3	Up to 4 Years
3	Body-in-white Joining of Carbon Fiber Composites to Lightweight Metals (Aluminum, Advanced High Strength Steel, or Magnesium) at Prototype Scale for High-Volume Manufacturing	2	Up to 4 Years
4	Advances in Existing and Next-Generation Battery Material Manufacturing Processes	2-4	Up to 3 Years
5	Advances in Electrode and Cell Fabrication Manufacturing	2-4	Up to 3 Years
6**	Electric Drive Vehicular Battery Modeling for Commercially Available Software	4-6	Up to 3 Years
Technology Development to Reduce Petroleum Consumption Through Fuel Efficiency Improvements			
7**	Enabling Technologies for Heavy-Duty Vehicles	2	Up to 2 Years
8**	Physics-Based Computational Fluid Dynamics (CFD) Sub-Model Development and Validation	5-7	Up to 4 Years
9	High-Efficiency, Medium	1-2	Up to 3 Years

	and Heavy-Duty Natural Gas (Dedicated or Dual-Fuel) Engine Technologies		

2. NEW APPLICATIONS ONLY

EERE will accept only new applications under this FOA. EERE will not consider applications for renewals of existing EERE-funded awards through this FOA.

B. EERE FUNDING AGREEMENTS

Through Cooperative Agreements and other similar agreements, EERE provides financial and other support to projects that have the potential to realize the FOA objectives. EERE does not use such agreements to acquire property or services for the direct benefit or use of the United States Government. As outlined below EERE intends to issue Cooperative Agreements under this FOA.

1. COOPERATIVE AGREEMENTS

EERE anticipates the use Cooperative Agreements under this FOA to provide financial and other support to Prime Recipients.

Through Cooperative Agreements, EERE provides financial or other support to accomplish a public purpose of support or stimulation authorized by Federal statute. Under Cooperative Agreements, the Government and Prime Recipients share responsibility for the direction of projects.

EERE has substantial involvement in all projects funded via Cooperative Agreement. See Section VI.C.8 of the FOA for more information on what substantial involvement may involve.

III. ELIGIBILITY INFORMATION

To be considered for further substantive evaluation, an applicant's submission must meet the criteria set forth below. If the applicant or application does not meet these initial requirements it will be considered non-compliant and/or non-responsive, removed from further evaluation, and ineligible for any award.

A. ELIGIBLE APPLICANTS

1. RESTRICTED ELIGIBILITY:

a. Applications submitted to AOI 8 entitled "Physics-Based CFD Sub-Model Development and Validation" are restricted to U.S. Institutes of Higher Education, and non-profit research institutions which operate as divisions under the U.S. Institutes of Higher Education. All other entities that submit an application to this AOI will be considered non-responsive and the application will not be reviewed.

b. The National Energy and Technology Laboratory and U.S. Army Tank Automotive Research Development and Engineering Center (TARDEC) are ineligible to participate as a prime applicant or as a team member/sub-recipient on another entities application because of each entities role in developing the requirements for this announcement.

2. PERFORMANCE OF WORK IN THE UNITED STATES

EERE requires all work (100% of all direct labor, including contract/subrecipient labor) under EERE financial assistance agreements to be performed in the United States. This requirement does not apply to the purchase of supplies and equipment; however, the Prime Recipient should make every effort to purchase domestically produced supplies and equipment. If a recipient fails to comply with the Performance of Work in the United States requirement, the EERE Contracting Officer will not, absent express, or prior written approval, subject to limitations and requirements set forth in this subsection, consider such cost for reimbursement or allow them to be recognized as allowable cost share.

There may be limited circumstances where it is in the interest of the project to perform a portion of the work outside the United States. To seek a waiver of the Performance of Work in the Unites States requirement, the Applicant must submit an explicit waiver request in the Full Application, which includes the following information:

- The countries in which the work will be performed;
- A description of the work to be performed outside the U.S.; and
- The rationale for performing the work outside the U.S.

For the rationale, the Applicant must demonstrate to the satisfaction of the EERE Contracting Officer that a waiver would further the purposes of this FOA and is otherwise in the interests of EERE and the United States. For example, an Applicant may seek to demonstrate the United States economic interest will be better served by having certain work performed outside the United States (e.g., demonstrate the expertise to develop the technology exists only outside the United States, but the technology's ultimate commercialization will result in substantial benefits to the United States such as improved electricity reliability or creating domestic jobs). The Contracting Officer may require additional information before considering the waiver request.

3. INDIVIDUALS

U.S. citizens and lawful permanent residents are eligible to apply for funding as a Prime Recipient or Subrecipient.

4. DOMESTIC ENTITIES

For-profit entities, institutions of higher education, and nonprofit entities that are incorporated (or otherwise formed) under the laws of a particular State or territory of the United States are eligible to apply for funding as a Prime Recipient or Subrecipient. Nonprofit entities described in section 501(c)(4) of the Internal Revenue Code of 1986 that engaged in lobbying activities after December 31, 1995, are not eligible to apply for funding.

State, local, and tribal government entities are eligible to apply for funding as a Prime Recipient or Subrecipient.

DOE/NNSA Federally Funded Research and Development Centers (FFRDCs) are eligible to apply for funding as a Subrecipient, but are not eligible to apply as a Prime Recipient.

Non-DOE/NNSA FFRDCs and non-DOE GOGOs are eligible to apply for funding as a Subrecipient, but are not eligible to apply as a Prime Recipient.

Federal agencies and instrumentalities (other than DOE) are eligible to apply for funding as a Subrecipient, but are not eligible to apply as a prime recipient.

5. FOREIGN ENTITIES

Foreign entities, whether for-profit or otherwise, are eligible to apply for funding under this FOA.

Other than as provided in the "Individuals" or "Domestic Entities" sections above, all Prime Recipients receiving funding under this FOA must be incorporated (or otherwise formed) under the laws of a State or territory of the United States and must perform 100% of all work in the United States (100% of all direct labor, including contract/subrecipient labor). If a foreign entity applies for funding as a Prime Recipient, it must designate in the Full Application a subsidiary or affiliate incorporated (or otherwise formed) under the laws of a State or territory of the United

States to be the Prime Recipient. The Full Application must state the nature of the corporate relationship between the foreign entity and domestic subsidiary or affiliate.

If a Foreign entity wishes to forego this requirement and serve as the Prime Recipient itself, it may submit a waiver request to EERE as part of its Full Application requesting permission to do so. The waiver request must include the following information:

- Entity name;
- Country of incorporation;
- Description of the work to be performed by the entity for whom the waiver is being requested; and
- Countries where the work will be performed.

In the waiver request, the Applicant must demonstrate to the satisfaction of EERE that it would further the purposes of this FOA and is otherwise in the interests of EERE to have a foreign entity serve as the Prime Recipient. The Contracting Officer may require additional information before considering the waiver request. Save the waiver request(s) in a single PDF file using the following convention for the title: "ControlNumber_LeadOrganization_Waiver".

A foreign entity may receive funding as a Subrecipient.

6. INCORPORATED CONSORTIA

Incorporated consortia, which may include domestic and/or foreign entities, are eligible to apply for funding as a Prime Recipient or Subrecipient. For consortia incorporated (or otherwise formed) under the laws of a State or territory of the United States, please refer to "Domestic Entities" above. For consortia incorporated in foreign countries, please refer to the requirements in "Foreign Entities" above. All Applicants must perform 100% of all work in the United States (100% of all direct labor, including contract/subrecipient labor).

Each incorporated consortium must have an internal governance structure and a written set of internal rules. Upon request, the consortium must provide a written description of its internal governance structure and its internal rules to the EERE Contracting Officer.

7. UNINCORPORATED CONSORTIA

Unincorporated Consortia, which may include domestic and foreign entities, must designate one member of the consortium to serve as the Prime Recipient/consortium representative. The Prime Recipient/consortium representative must be incorporated (or otherwise formed) under the laws of a State or territory of the United States. The eligibility of the consortium will be determined by the eligibility of the Prime Recipient/consortium representative under Section III.A of the FOA.

Upon request, unincorporated consortia must provide the EERE Contracting Officer with a collaboration agreement, commonly referred to as the articles of collaboration, which sets out

the rights and responsibilities of each consortium member. This agreement binds the individual consortium members together and should discuss, among other things, the consortium's:

- Management structure;
- Method of making payments to consortium members;
- Means of ensuring and overseeing members' efforts on the project;
- Provisions for members' cost sharing contributions; and
- Provisions for ownership and rights in intellectual property developed previously or under the agreement.

B. COST SHARING

Cost share is based on the total allowable costs of the project (i.e. sum of the Government share, including FFRDC costs if applicable, and the recipient share of allowable costs equals the total allowable cost of the project) and must come from non-Federal sources unless otherwise allowed by law.

EERE has issued a Cost Share Reduction determination pursuant to Section 988(b)(3) of the Energy Policy Act of 2005 that is applicable to certain entities applying under this FOA. This determination applies to the following Areas of Interest:

- AOI 1, entitled "Wide Bandgap (WBG) Power Module R&D – Integrated Power Modules"
- AOI 4, entitled "Advances in Next-Generation Battery Material Manufacturing Processes"
- AOI 5, entitled "Advances in Electrode and Cell Fabrication Manufacturing"
- AOI 6, entitled "Electric Drive Vehicular Battery Modeling for Commercially Available Software"
- AOI 8, entitled "Physics-Based Computational Fluid Dynamics (CFD) Sub-Model Development and Validation"

The recipient cost share requirement for applied research and development activities projects is reduced to 10% and applied when the Prime Applicant selected for an award is a domestic institution of higher education and performs more than 50% of the project work as measured by the total project costs. ~~When the prime applicant receives a cost share reduction any project partner other than a domestic institution of higher education, National Laboratory, or FFRDC shall provide the minimum cost share percentage required for that AOI based upon the total value of the work they will contribute.~~

Prime Applicants for the above noted Areas of Interest that are not eligible for the cost share reduction must meet the minimum cost share requirements for the total cost of the project (including that portion of the work performed by subawardees who are educational institutions, Federal laboratories, or FFRDCs) as established in the table below according to the AOI.

The minimum cost share required for each AOI for different types of Applicants is as follows:

One or more projects awarded may be managed collaboratively with U.S. Army Tank Automotive Research Development and Engineering Center (TARDEC) **. A separate agreement with TARDEC will not be required.

AOI Number	Area of Interest	Required Minimum Non-Federal Cost Share for Applicants OTHER than Educational Institutions, Federal Laboratories, and FFRDCs	Required Minimum Non-Federal Cost Share for Educational Institutions, Federal Laboratories, and FFRDCs
Critical Technologies to Meet the EV Everywhere Grand Challenge			
1	Wide Bandgap (WBG) Power Module R&D – Integrated Power Modules	20%	10%
2	Ultra-Light Door Design, Manufacturing and Demonstration	50%	50%
3	Body-in-white Joining of Carbon Fiber Composites to Lightweight Metals (Aluminum, Advanced High Strength Steel, or Magnesium) at Prototype Scale for High-Volume Manufacturing	50%	50%
4	Advances in Existing and Next-Generation Battery Material Manufacturing Processes	20%	10%
5	Advances in Electrode and Cell Fabrication Manufacturing	20%	10%
6**	Electric Drive Vehicular Battery Modeling for Commercially Available	20%	10%

	Software		
Technology Development to Reduce Petroleum Consumption Through Fuel Efficiency Improvements			
7**	Enabling Technologies for Heavy-Duty Vehicles	50%	50%
8**	Physics-Based Computational Fluid Dynamics (CFD) Sub-Model Development and Validation. NOTE: Subject to eligibility requirements on the FOA	N/A	10%
9	High-Efficiency, Medium and Heavy-Duty Natural Gas (Dedicated or Dual-Fuel) Engine Technologies	50%	50%

To assist Applicants in calculating proper cost share amounts, EERE has included a cost share information sheet and sample cost share calculation as Appendices B and C to this Funding Opportunity Announcement.

1. LEGAL RESPONSIBILITY

Although the cost share requirement applies to the project as a whole, including work performed by members of the project team other than the Prime Recipient, the Prime Recipient is legally responsible for paying the entire cost share. The Prime Recipient's cost share obligation is expressed in the Assistance agreement as a static amount in U.S. dollars (cost share amount) and as a percentage of the Total Project Cost (cost share percentage). If the funding agreement is terminated prior to the end of the project period, the Prime Recipient is required to contribute at least the cost share percentage of total expenditures incurred through the date of termination.

The Prime Recipient is solely responsible for managing cost share contributions by the Project Team and enforcing cost share obligation assumed by Project Team members in subawards or related agreements.

2. COST SHARE ALLOCATION

Each Project Team is free to determine how best to allocate the cost share requirement among the team members. The amount contributed by individual Project Team members may vary, as long as the cost share requirement for the project as a whole is met.

3. COST SHARE TYPES AND ALLOWABILITY

Every cost share contribution must be allowable under the applicable Federal cost principles, as described in Section IV.I.1 of the FOA. In addition, cost share must be verifiable upon submission of the Full Application.

Project Teams may provide cost share in the form of cash or in-kind contributions. Cash contributions may be provided by the Prime Recipient or Subrecipients. Allowable in-kind contributions include, but are not limited to: personnel costs, indirect costs, facilities and administrative costs, rental value of buildings or equipment, and the value of a service, other resource, or third party in-kind contribution.

Project teams may use funding or property received from state or local governments to meet the cost share requirement, so long as the funding was not provided to the state or local government by the Federal Government.

The Prime Recipient may not use the following sources to meet its cost share obligations including, but not limited to:

- Revenues or royalties from the prospective operation of an activity beyond the project period;
- Proceeds from the prospective sale of an asset of an activity;
- Federal funding or property (e.g., Federal grants, equipment owned by the Federal Government); or
- Expenditures that were reimbursed under a separate Federal Technology Office.

In addition, Project Teams may not use independent research and development (IR&D) funds to meet their cost share obligations. Project Teams may not use the same cash or in-kind contributions to meet cost share requirements for more than one project or program.

Cost share contributions must be specified in the project budget, verifiable from the Prime Recipient's records, and necessary and reasonable for proper and efficient accomplishment of the project. As all sources of cost share are considered part of total project cost, the cost share dollars will be scrutinized under the same Federal regulations as Federal dollars to the project. Every cost share contribution must be reviewed and approved in advance by the Contracting Officer and incorporated into the project budget before the expenditures are incurred.

Applicants are encouraged to refer to 2 CFR Parts 200 and 910; for additional guidance on cost sharing, reference 2 CFR §§200.29, 200.306, and 2 CFR §§910.130.

4. COST SHARE CONTRIBUTIONS BY FFRDCS AND GOGOS

Because FFRDCs and GOGOs are funded by the Federal Government, costs incurred by FFRDCs and GOGOs generally may not be used to meet the cost share requirement. FFRDCs may contribute cost share only if the contributions are paid directly from the contractor's Management Fee or another non-Federal source.

5. COST SHARE VERIFICATION

Applicants are required to provide written assurance of their proposed cost share contributions in their Full Applications.

Upon selection for award negotiations, Applicants are required to provide additional information and documentation regarding their cost share contributions. Please refer to Appendix B of the FOA for guidance on the requisite cost share information and documentation.

6. COST SHARE PAYMENT

All proposed cost share contributions must be reviewed in advance by the Contracting Officer and incorporated into the project budget before the expenditures are incurred.

EERE requires Prime Recipients to contribute the cost share amount incrementally over the life of the award. Cumulative invoices received must reflect, at a minimum, the cost sharing percentage specified in the award at the conclusion of each budget period or at some negotiated timeframe within each budget period, i.e. every three or six months. If the Award is terminated or discontinued, the Recipient shall refund sufficient funds to the Government in order to achieve the Recipient's cost-share percentage based on total allowable project cost.

C. COMPLIANCE CRITERIA

Concept Papers and Full Applications must meet all Compliance criteria listed below or they will be considered noncompliant. EERE will not review or consider noncompliant submissions, including Concept Papers, Full Applications, and Replies to Reviewer Comments that were: submitted through means other than EERE Exchange; submitted after the applicable deadline; and/or submitted incomplete. EERE will not extend the submission deadline for Applicants that fail to submit required information due to server/connection congestion.

1. COMPLIANCE CRITERIA

i. Concept Papers

Concept Papers are deemed compliant if:

- The Applicant successfully uploaded all required documents and clicked the "Submit" button in EERE Exchange by the deadline stated in this FOA.

ii. Full Applications

Full Applications are deemed compliant if:

- The Applicant submitted a compliant Concept Paper, per the requirements of the concept paper outlined above;

- The Full Application complies with the content and form requirements in Section IV.A thru D of the FOA; and

- The Applicant successfully uploaded all required documents and clicked the "Submit" button in EERE Exchange by the deadline stated in the FOA.

iii. Replies to Reviewer Comments

Replies to Reviewer Comments are deemed compliant if:

- The Reply to Reviewer Comments complies with the content and form requirements in Section IV.F of the FOA; and

- The Applicant successfully uploaded all required documents to EERE Exchange by the deadline stated in the FOA.

D. RESPONSIVENESS CRITERIA

EERE performs a preliminary technical review of Full Applications. Any "Applications Specifically Not of Interest," as described in Section III.D.1. are deemed non-responsive and are not reviewed or considered for a technical merit review of the full application.

EERE intends to notify applicants regarding the status of their full application after the preliminary technical review is completed.

1. APPLICATIONS THAT WILL BE DEEMED NON-RESPONSIVE TO THIS FOA

Applications that fall outside the technical parameters specified in Section I.B of the FOA, including the non-responsive criteria described in Section I.B and reiterated below:

AOI 3 - Applications submitted under AOI 3 will be considered non-responsive to this FOA if they:

- Do not conform to the lightweight metals or carbon composite properties provided in Tables 1 and 2;
- Are for systems other than light-duty, medium-duty or heavy-duty vehicle body-in-white;
- Do not include a Tier 1 supplier or automotive OEM as a partner for prototype design, demonstration, and validation; and/or
- Do not address all three aspects of the scope: 1) Process Development and Demonstration; 2) Joint Characterization; and 3) Model Development and Validation.

AOI 7 - Applications submitted under AOI 7 will be considered non-responsive if they propose new engines, fuels other than EPA certified diesel fuels, or do not include plans for demonstration. For the purpose of this AOI, a new engine is defined as an engine that is not currently in production.

AOI 8 – Applications submitted to AOI 8 by entities other than a U.S. college, university, or non-profit research institution operating as a division under a college or university, will be considered non-responsive.

Applications submitted under AOI 8 will also be considered non-responsive if they:

- Do not include a DOE FFRDC partner.
- Do not include specific sections on submodel identification and identification of inaccuracies/uncertainties.

E. OTHER ELIGIBILITY REQUIREMENTS

1. REQUIREMENTS FOR DOE/NNSA AND NON-DOE/NNSA FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS INCLUDED AS A SUBRECIPIENT

DOE/NNSA and non-DOE/NNSA FFRDCs may be proposed as a Subrecipient on another entity's application subject to the following guidelines:

i. Authorization for non-DOE/NNSA FFRDCs

The Federal agency sponsoring the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The use of a FFRDC must be consistent with its authority under its award.

ii. Authorization for DOE/NNSA FFRDCs

The cognizant Contracting Officer for the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The following wording is acceptable for this authorization:

> Authorization is granted for the _____ Laboratory to participate in the proposed project. The work proposed for the laboratory is consistent with or complementary to the missions of the laboratory, and will not adversely impact execution of the DOE assigned programs at the laboratory.

iii. Value/Funding

The value of, and funding for, the FFRDC portion of the work will not normally be included in the award to a successful applicant. Usually, DOE will fund a DOE/NNSA FFRDC contractor through the DOE field work proposal system and other FFRDC through an interagency agreement with the sponsoring agency.

iv. Cost Share

Although the FFRDC portion of the work is usually excluded from the award to a successful applicant, the applicant's cost share requirement will be based on the total cost of the project, including the applicant's and the FFRDC's portions of the project.

v. Responsibility

The Prime Recipient will be the responsible authority regarding the settlement and satisfaction of all contractual and administrative issues including, but not limited to disputes and claims arising out of any agreement between the Prime Recipient and the FFRDC contractor.

F. LIMITATION ON NUMBER OF CONCEPT PAPERS AND FULL APPLICATIONS ELIGIBLE FOR REVIEW

Applicants may submit more than one concept paper and full application to this FOA, provided that each application describes a unique, scientifically distinct project. All concept papers and applications must be for a stand-alone project that is not dependent or contingent upon another application submitted to this or any other FOA.

G. QUESTIONS REGARDING ELIGIBILITY

EERE will not make eligibility determinations for potential applicants prior to the date on which applications to this FOA must be submitted. The decision whether to submit an application in response to this FOA lies solely with the applicant.

IV. APPLICATION AND SUBMISSION INFORMATION

A. APPLICATION PROCESS

The application process will include two phases: a Concept Paper phase and a Full Application phase. **Only applicants who have submitted an eligible Concept Paper will be eligible to submit a Full Application**. At each phase, EERE performs an initial eligibility review of the applicant submissions to determine whether they meet the eligibility requirements of Section III of the FOA. EERE will not review or consider noncompliant and/or non-responsive or otherwise ineligible submissions. All submissions must conform to the following form and content requirements, including maximum page lengths, described below and must be submitted via EERE Exchange at https://eere-exchange.energy.gov/, unless specifically stated otherwise. **EERE will not review or consider submissions submitted through means other than EERE Exchange, submissions submitted after the applicable deadline, and incomplete submissions**. EERE will not extend deadlines for Applicants who fail to submit required information and documents due to server/connection congestion. A control number will be issued when an Applicant begins the Exchange application process. This control number must be included with all Application documents, as described below.

The Concept Paper, Full Application, and Reply to Reviewer Comments must conform to the following requirements:

- Each must be submitted in Adobe PDF format unless stated otherwise.
- Each must be written in English.
- All pages must be formatted to fit on 8.5 x 11 inch paper with margins not less than one inch on every side. Use Times New Roman typeface, a black font color, and a font size of 12 point or larger (except in figures or tables, which may be 10 point font). A symbol font may be used to insert Greek letters or special characters, but the font size requirement still applies. References must be included as footnotes or endnotes in a font size of 10 or larger. Footnotes and endnotes are counted toward the maximum page requirement.
- The Control Number must be prominently displayed on the upper right corner of the header of every page. Page numbers must be included in the footer of every page.
- Each must not exceed the specified maximum page limit, including cover page, charts, graphs, maps, and photographs when printed using the formatting requirements set forth above and single spaced. If Applicants exceed the maximum page lengths indicated below, EERE will review only the authorized number of pages and disregard any additional pages.

Applicants are responsible for meeting each submission deadline. **Applicants are strongly encouraged to submit their Concept Papers and Full Applications at least 48 hours in advance of the submission deadline**. Under normal conditions (i.e., at least 48 hours in advance of the

submission deadline), Applicants should allow at least 1 hour to submit a Concept Paper, Full Application, or Reply to Reviewer Comments. Once the Application is submitted in EERE Exchange, Applicants may revise or update their application until the expiration of the applicable deadline.

EERE urges Applicants to carefully review their Concept Papers, and Full Applications and to allow sufficient time for the submission of required information and documents. All Full Applications that pass compliance review will undergo comprehensive technical merit review according to the criteria identified in Section V.A.2 of the FOA.

1. ADDITIONAL INFORMATION ON EERE EXCHANGE

EERE Exchange is designed to enforce the deadlines specified in this FOA. The "Apply" and "Submit" buttons will automatically disable at the defined submission deadlines. Should applicants experience problems with Exchange, the following information may be helpful:
Applicants who experience issues with submission PRIOR to the FOA deadline: In the event that an Applicant experiences technical difficulties with a submission, the Applicant should contact the Exchange helpdesk for assistance (EERE-ExchangeSupport@hq.doe.gov). The Exchange helpdesk and/or the EERE Exchange system administrators will assist Applicants in resolving issues.
Applicants that experience issue with submissions that result in late submissions: In the event that an Applicant experiences technical difficulties so severe that they are unable to submit their application by the deadline, the Applicant should contact the Exchange helpdesk for assistance (EERE-ExchangeSupport@hq.doe.gov). The Exchange helpdesk and/or the EERE Exchange system administrators (EERE-ExchangeSupport@hq.doe.gov) will assist the Applicant in resolving all issues (including finalizing submission on behalf of and with the Applicant's concurrence). PLEASE NOTE, however, that Applicants who are unable to timely submit their application due to their waiting until the last minute when network traffic is at its heaviest to submit their materials will not be able to use this process which may result in their full application not being considered.

B. APPLICATION FORMS

The application forms and instructions are available on EERE Exchange. To access these materials, go to https://eere-Exchange.energy.gov and select the appropriate funding opportunity number.

Note: The maximum file size that can be uploaded to the EERE Exchange website is 10MB. Files in excess of 10MB cannot be uploaded, and hence cannot be submitted for review. If a file exceeds 10MB but is still within the maximum page limit specified in the FOA it must be broken into parts and denoted to that effect. For example:
ControlNumber_LeadOrganization_Project_Part_1
ControlNumber_LeadOrganization_Project_Part_2, etc.

C. CONTENT AND FORM OF THE CONCEPT PAPER

To be eligible to submit a Full Application, Applicants must submit a Concept Paper by the specified due date.

Each Concept Paper must be limited to a single concept or technology. Unrelated concepts and technologies should not be consolidated into a single Concept Paper.

1. CONCEPT PAPER CONTENT REQUIREMENTS

The Concept Paper must conform to the following content requirements:

SECTION	PAGE LIMIT	DESCRIPTION
Title Page	1 page maximum	The title page must contain the following: • Applicant Name • Project Title • Area of Interest to which the organization is submitting the concept paper • Control Number • Principal Investigator • Key Team Member(s)
Technology Description	2 pages maximum	Applicants are required to describe succinctly: • The proposed technology, including its basic operating principles and how it is unique and innovative; • The proposed technology's target level of performance (Applicants should provide technical data or other support to show how the proposed target could be met); • The current state-of-the-art in the relevant field and application, including key shortcomings, limitations, and challenges; • How the proposed technology will overcome the shortcomings, limitations, and challenges in the relevant field and application; • The potential impact that the proposed project would have on the relevant field and application; • The key technical risks/issues associated with the proposed technology development plan; and • The impact that EERE funding would have on the proposed project.
Addendum	1 pages maximum	Applicants may provide graphs, charts, or other data to supplement their Technology Description. Applicants are required to describe succinctly the qualifications, experience, and capabilities of the proposed Project Team, including: • Whether the Principal Investigator (PI) and Project Team have the skill and expertise needed to successfully execute the project plan;

		• Whether the Applicant has prior experience which demonstrates an ability to perform tasks of similar risk and complexity; • Whether the Applicant has worked together with its teaming partners on prior projects or programs; and • Whether the Applicant has adequate access to equipment and facilities necessary to accomplish the effort and/or clearly explain how it intends to obtain access to the necessary equipment and facilities.

EERE will not review or consider non-compliant Concept Papers (see Section III of the FOA).

EERE makes an independent assessment of each Concept Paper based on the criteria in Section V.A.1 of the FOA. EERE will encourage a subset of Applicants based upon this assessment to submit Full Applications. Other Applicants will be discouraged based upon this assessment from submitting a Full Application. An applicant who receives a "discouraged" notification may still submit a Full Application. EERE will review all eligible Full Applications. However, by discouraging the submission of a Full Application, EERE intends to convey its lack of programmatic interest in the proposed project in an effort to save the Applicant the time and expense of preparing an application that is unlikely to be selected for award negotiations.

In order to provide Applicants with feedback on their Concept Papers, EERE will include general comments provided from reviewers on an Applicant's Concept Paper in the discourage notification sent to Applicants at the close of that phase.

Applicants who receive an encourage notification will not be provided with comments from reviewers.

Applicants will be notified of EERE's assessment of their concept paper on or around March 13, 2015

While the content and form of the Concept Paper does not require proposing a cost share amount during this concept paper submission phase, the Exchange system will require entering a proposed cost share as a step in the submission process. Any proposed cost share at the Concept Paper stage of the application process can be updated or amended at the time of full application submission.

D. CONTENT AND FORM OF THE FULL APPLICATION

Applicants must submit a Full Application by the specified due date to be considered for funding under this FOA. Applicants must complete the following application forms found on the EERE Exchange website at https://eere-Exchange.energy.gov/, in accordance with the instructions.

Applicants will have approximately 30 days from receipt of the Concept Paper Encourage/Discourage notification to prepare and submit a Full Application. Regardless of the date the Applicant receives the Encourage/Discourage notification, the submission deadline for the Full Application remains the date stated on the FOA cover page.

All Full Application documents must be marked with the Control Number issued to the Applicant. Applicants will receive a control number upon submission of their Concept Paper, and should include that control number in the file name of their Full Application submission (i.e., *Control number_Applicant Name_Full Application*).

1. FULL APPLICATION CONTENT REQUIREMENTS

Each Full Application should be limited to a single concept or technology. Unrelated concepts and technologies should not be consolidated in a single Full Application.

The Full Application must conform to the content and form requirements, including maximum page lengths, as outlined in the table below. If Applicants exceed the maximum page lengths indicated below, EERE will review only the authorized number of pages and disregard any additional pages.

Full Applications must conform to the following requirements:

SUBMISSION	COMPONENTS	FILE NAME (IF NECESSARY)
Full Application (PDF, unless stated otherwise)	Technical Volume (See Chart in Section IV.D.2, 30 page limit, Microsoft Word or Adobe PDF format);	ControlNumber_LeadOrganization_TechnicalVolume
	SF-424 (no page limit);	ControlNumber_LeadOrganization_App424
	Budget Justification (EERE 159) (no page limit, Microsoft Excel format. Applicants must use the template available in EERE Exchange);	ControlNumber_LeadOrganization_Budget_Justification
	Summary for Public Release (1 page max Microsoft Word or Adobe PDF format)	ControlNumber_LeadOrganization_Summary
	Summary Slide (1 page limit, Microsoft PowerPoint format);	ControlNumber_LeadOrganization_Slide
	Subaward Budget Justification (EERE 159) (no page limit, Microsoft Excel format. Applicants must use the template available in EERE Exchange);	ControlNumber_LeadOrganization_Subawardee_Budget_Justification
	Budget for Federally Funded Research and	ControlNumber_LeadOrganization_FWP

	Development Center Contractor File, (if applicable) (EERE 159) (no page limit, Microsoft Excel format. Applicants must use the template available in EERE Exchange);	
	Authorization from cognizant Contracting Officer for FFRDC, if applicable (Microsoft Word or Adobe PDF format);	ControlNumber_LeadOrganization_FFRDC Auth
	Statement of Project Objectives (SOPO) (10 page limit, Microsoft Word)	ControlNumber_LeadOrganization_SOPO
	SF-LLL Disclosure of Lobbying Activities;	ControlNumber_LeadOrganization_SF-LLL
	Foreign Entity and Performance of Work in the United States waiver requests (if applicable) (Microsoft Word or Adobe PDF format);	ControlNumber_LeadOrganization_Waiver
	U.S. Manufacturing Plans (Microsoft Word or Adobe PDF format);	ControlNumber_LeadOrganization_USMP
	Environmental Questionnaire;	ControlNumber_LeadOrganization_EQ
	Letters of Commitment, (if applicable) (Adobe PDF format)	ControlNumber_LeadOrganization_LOC

Note: The maximum file size that can be uploaded to the EERE Exchange website is 10MB. Files in excess of 10MB cannot be uploaded, and hence cannot be submitted for review. If a file exceeds 10MB but is still within the maximum page limit specified in the FOA it must be broken into parts and denoted to that effect. For example:

ControlNumber_LeadOrganization_Project_Part_1
ControlNumber_LeadOrganization_Project_Part_2, etc.

EERE will not accept late submissions that resulted from technical difficulties due to uploading files that exceed 10MB.

EERE provides detailed guidance on the content and form of each component below.

2. TECHNICAL VOLUME

The Technical Volume must be submitted in Adobe PDF format and must conform to the content and form requirements outlined in the table below. This volume must address the Merit Review Criteria as discussed in Section V.A.2 of the FOA. Save the Technical Volume in a single PDF file using the following convention for the title: "ControlNumber_LeadOrganization_TechnicalVolume".

Applicants must provide sufficient citations and references to the primary research literature to justify the claims and approaches made in the Technical Volume. EERE and reviewers may review primary research literature in order to evaluate applications. However, EERE and reviewers are under no obligation to review cited sources (e.g., internet websites).

The Technical Volume to the Full Application may not be more than 30 pages, including the cover page, table of contents, and all citations, charts, graphs, maps, photos, or other graphics, and must include all of the information in the table below. The page limitation does not include the Statement of Project Objectives, which is a separate document and not included as part of the technical volume. The applicant should consider the weighting of each of the evaluation criteria (see Section V.A.2 of the FOA) when preparing the Technical Volume.

SECTION/PAGE LIMIT	DESCRIPTION
Cover Page (1 Page Maximum)	The cover page should include the project title, the specific FOA Area of Interest being addressed both the technical and business points of contact, names of all team member organizations, and any statements regarding confidentiality.
Project Overview (Approximately 2 pages)	The Project Overview should contain the following information: • Background: The Applicant should discuss the background of their organization, including the history, successes, and current research and development status (i.e., the technical baseline) relevant to the technical topic being addressed in the Full Application. • Project Goal: The Applicant should explicitly identify the targeted improvements to the baseline technology and the critical success factors in achieving that goal. • DOE Impact: The Applicant should discuss the impact that DOE funding would have on the proposed project. Applicants should specifically explain how DOE funding, relative to prior, current, or anticipated funding from other public and private sources, is necessary to achieve the project objectives.
Technical Description, Innovation, and Impact (Approximately 10 pages)	The Technical Description should contain the following information: • Relevance and Outcomes: The Applicant should provide a detailed description of the technology, including the scientific and other principles and objectives that will be pursued during the project. This section should describe the relevance of the proposed project to the goals and objectives of the FOA, including the potential to meet specific DOE technical targets or other relevant performance targets. The Applicant should clearly specify the expected outcomes of the project. • Feasibility: The Applicant should demonstrate the technical feasibility of the proposed technology and capability of achieving the anticipated performance targets, including a description of previous work done and prior results. • Innovation and Impacts: The Applicant should describe the current state of the art in the applicable field, the specific innovation of the proposed technology, the advantages of proposed technology over current and emerging technologies, and the overall impact on advancing the state of the art/technical baseline if the project is successful.
Workplan (Approximately 12 pages)	The Workplan should contain the following information: • Project Objectives: The Applicant should provide a clear and concise (high-level) statement of the goals and objectives of the project as well as the expected outcomes. • Technical Scope Summary: The Applicant should provide a summary description of the overall work scope and approach to achieve the objective(s). The overall work scope is to be divided by performance

periods that are separated by discrete, approximately annual decision points (see below for more information on go/no-go decision points). The applicant should describe the specific expected end result of each performance period.

- Work Breakdown Structure (WBS) and Task Descriptions: The Workplan should fully describe the work to be accomplished and how the applicant will achieve the milestones, will accomplish the final project goal(s), and will produce all deliverables. The Workplan is to be structured with a hierarchy of performance period (approximately annual), task and subtasks, which is typical of a standard work breakdown structure (WBS) for any project. The Workplan shall contain a concise detailed description of the specific activities to be conducted over the life of the project. "Detailed" is defined as a full explanation and disclosure of the project being proposed (i.e., a statement such as "we will then complete a proprietary process" is unacceptable). It is the Applicant's responsibility to prepare an adequately detailed task plan to describe the proposed project and the plan for addressing the objectives of this FOA. To this end each task and subtask is to have a unique number and title and an indication of the duration of the task or subtask in months. Each task and subtask is to have a task summary that describes the objectives, what work is to be accomplished, and relationship to project deliverables or expected results. Appropriate milestones should be incorporated into the task and subtask structure. Each task and subtask is to have a technical details section, as appropriate, to discuss how the work will be done, anticipated problems or uncertainties, and any further clarification, such as why a specific approach is being taken. An example Work Breakdown Structure is provided below.
- Milestones: The Applicant should provide appropriate milestones throughout the project to demonstrate success, where success is defined as technical achievement rather than simply completing a task. To ensure that milestones are relevant, Applicants should follow the SMART rule of thumb, which is that all milestones should be **S**pecific, **M**easurable, **A**chievable, **R**elevant, and **T**imely. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one milestone per quarter for the duration of the project (depending on the project, more milestones may be necessary to comprehensively demonstrate progress). The Applicant should also provide the means by which the milestone will be verified. In addition to describing milestones in the Workplan text and including them in the schedule, the Applicant is required to complete the Milestone Summary Table shown below.
- Go/No-Go Decision Points: The Applicant should provide project-wide go/no-go decision points at appropriate points in the Workplan. A go/no-go decision point is a risk management tool and a project management best practice to ensure that, for the current phase or period of performance, technical success is definitively achieved and potential for success in future phases or periods of performance is evaluated, prior to actually beginning the execution of future phases. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one project-wide go/no-go decision point for each year (12-month period) of the project. The Applicant should also provide the specific technical criteria to be used to make the go/no-go decision. In addition to describing the go/no-go decision points in the Workplan text and including them in the schedule, the Applicant is required to complete the Milestone Summary

	Table shown below, which must include go/no-go decision points and their method of verification. • Project Schedule (Gantt Chart or similar): The Applicant should provide a detailed schedule for the entire project, including task and subtask durations, milestones, and go/no-go decision points. • Project Management: The Applicant should discuss the team's proposed management plan, including the following: o The overall approach to and organization for managing the work o The roles of each Project Team member o Any critical handoffs/interdependencies among Project Team members o The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices o The approach to project risk management o A description of how project changes will be handled o If applicable, the approach to Quality Assurance/Control o How communications will be maintained among Project Team members • Market Transformation/Commercialization Plan: The Applicant should provide a market transformation/commercialization plan, including the following: o Identification of target market, competitors, and distribution channels for proposed technology along with known or perceived barriers to market penetration, including a mitigation plan o Identification of a product development and/or service plan, commercialization timeline, financing, product marketing, legal/regulatory considerations including intellectual property, infrastructure requirements, data dissemination, U.S. manufacturing plan etc., and product distribution.

Example Milestone Summary Table and Work Breakdown Structure are provided on following two pages, after which the Technical Volume requirements will continue.

Milestone Summary Table							
Recipient Name:							
Project Title:							
Task Number	Task Title or Subtask Title (If Applicable)	Milestone Type (Milestone or Go/No-Go Decision Point)	Milestone Number* (Go/No-Go Decision Point Number)	Milestone Description (Go/No-Go Decision Criteria)	Milestone Verification Process (What, How, Who, Where)	Anticipated Date (Months from Start of the Project)	Anticipated Quarter (Quarters from Start of the Project)

*Milestone numbering convention should align with Task and Subtask numbers, as appropriate. For example, M1.1, M3.2, etc.

Note 1: It is required that each project has at least one milestone per quarter for the entire project duration. It is not necessary that each task have one milestone per quarter.

Note 2: It is required that each project has at least one project-wide go/no-go decision point each year. If a decision point is not specific to a particular task, then you may leave the task information blank for those decision points.

Note 3: All milestones should follow the SMART rule of thumb: Specific, Measureable, Achievable, Relevant, and Timely

Example Work Breakdown Structure

Technical Summary: Provide a high-level overview of the final result of this project. Explain the final objective, outcome, milestone and/or deliverable that are to be produced and the rationale for why the applicant has organized the tasks in the way they have.

Technical Details (Optional): Describe the relevant management, engineering, design, process, scientific or other principles and aspects of the project that warrant discussion.

Task 1: Distinctive Title, Date range of the task in months (M1-M4)

Task Summary: Task summaries shall explicitly describe what work is to be accomplished, identify the project objectives/outcomes being addressed and provide a concise statement of the objectives of that task. In addition, the description should indicate the project deliverables that this task will help achieve (D1, D2, D5 etc. note that deliverables may be applicable to multiple or all tasks.]

Task Details: Within this section, the barriers and risks should be identified, as well as the approaches for overcoming those barriers and risks. Where appropriate, multiple pathways early in the effort can be outlined for risk reduction.

Milestone 1.1 (if applicable)
Milestone 1.2 (if applicable)
Etc.

Subtask 1.1: Date range (M1-M2)

Subtask Summary: Describe the specific and detailed work efforts that go into achieving the higher-level tasks.

Subtask Details: Describe the evaluation techniques that will be used and the expected result that will be generated from the effort.

Milestone 1.1.1 (if applicable)
Milestone 1.1.2 (if applicable)
Etc.

Subtask 1.2:
(Continue until all Task 1 subtasks are listed)

Task 2: (continue in the format above until all tasks and subtasks are listed)
Subtask 2.1: Description and Discussion
Subtask 2.2: Description and Discussion

Technical Qualifications and Resources (Approximately 5 pages)	The Technical Qualifications and Resources should contain the following information:
	• Describe the Project Team's unique qualifications and expertise, including those of key subrecipients
	• Describe the Project Team's existing equipment and facilities that will facilitate the successful completion of the proposed project; include a justification of any new equipment or facilities requested as part of the project
	• This section should also include relevant, previous work efforts, demonstrated innovations, and how these enable the Applicant to achieve the project objectives.
	• Describe the time commitment of the key team members to support the project.
	• Attach one-page resumes for key participating team members as an appendix. Resumes do not count towards the page limit. Multi-page resumes are not allowed.
	• Describe the technical services to be provided by DOE/NNSA FFRDCs and GOGOs, if applicable.
	• Attach any letters of support from partners/end users as an appendix (1 page maximum per letter). Letters of support do not count towards the page limit.
	• For multi-organizational or multi-investigator projects, describe succinctly:
	  ○ The roles and the work to be performed by each PI and Key Participant;
	  ○ Business agreements between the Applicant and each PI and Key Participant;
	  ○ How the various efforts will be integrated and managed;
	  ○ Process for making decisions on scientific/technical direction;
	  ○ Publication arrangements;
	  ○ Intellectual Property issues; and
	  ○ Communication plans

3. SF-424: APPLICATION FOR FEDERAL ASSISTANCE

Complete all required fields in accordance with the instructions on the form. The list of certifications and assurances in Field 21 can be found at http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms, under Certifications and Assurances. Note: The dates and dollar amounts on the SF-424 are for the complete project period and not just the first project year, first phase or other subset of the project period. Save the SF-424 in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_App424".

4. *BUDGET JUSTIFICATION WORKBOOK (EERE 159)*

Applicants are required to complete the Budget Justification Workbook. This form is available on EERE Exchange at https://eere-Exchange.energy.gov/. Prime Recipients must complete each tab of the Budget Justification Workbook for the project as a whole, including all work to be performed by the Prime Recipient and its Subrecipients and Contractors, and provide all requested documentation (e.g., a Federally-approved forward pricing rate agreement, Defense Contract Audit Agency or Government Audits and Reports, if available). Applicants should include costs associated with required annual audits and incurred costs proposals in their proposed budget documents. The "Instructions and Summary" included with the Budget Justification Workbook will "auto-populate" as the Applicant enters information into the Workbook. Applicants must carefully read the "Instructions and Summary" tab provided within the Budget Justification Workbook. Save the Budget Justification Workbook in a single Microsoft Excel file using the following convention for the title "ControlNumber_LeadOrganization_Budget_Justification".

5. *SUMMARY/ABSTRACT FOR PUBLIC RELEASE*

Applicants are required to submit a one-page summary/abstract of their project. The project summary/abstract must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained document that identified the name of the applicant, the project director/principal investigator(s), the project title, the objectives of the project, a description of the project, including methods to be employed, the potential impact of the project (i.e., benefits, outcomes), and major participants (for collaborative projects). This document must not include any proprietary or sensitive business information as the Department may make it available to the public after selections are made. The project summary must not exceed 1 page when printed using standard 8.5 x 11 paper with 1" margins (top, bottom, left, and right) with font not smaller than 11 point. Save the Summary for Public Release in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_Summary".

6. *SUMMARY SLIDE*

Applicants are required to provide a single PowerPoint slide summarizing the proposed project. The slide must be submitted in Microsoft PowerPoint format. This slide is used during the evaluation process. Save the Summary Slide in a single file using the following convention for the title "ControlNumber_LeadOrganization_Slide".

The Summary Slide template requires the following information:

- A technology Summary;
- A description of the technology's impact;
- Proposed project goals;
- Any key graphics (illustrations, charts and/or tables);
- The project's key idea/takeaway;

- Project title, Prime Recipient, Principal Investigator, and Key Participant information; and
- Requested EERE funds and proposed applicant cost share.

7. SUBAWARD BUDGET JUSTIFICATION (EERE159)

Applicants must provide a separate budget justification, EERE 159 (i.e., budget justification for each budget year and a cumulative budget) for each subawardee that is expected to perform work estimated to be more than $250,000 or 25 percent of the total work effort (whichever is less). The budget justification must include the same justification information described in the "Budget Justification" section, above. Save each subaward budget justification in a Microsoft Excel file using the following convention for the title "ControlNumber_LeadOrganization_Subawardee_Budget_Justification".

8. BUDGET FOR DOE/NNSA FFRDC (IF APPLICABLE)

If a DOE/NNSA FFRDC contractor is to perform a portion of the work, the Applicant must provide a DOE Field Work Proposal (FWP) in accordance with the requirements in DOE Order 412.1, Work Authorization System. DOE Order 412.1 and DOE O 412.1 (Field Work Proposal form) area available at the following link, under "DOE Budget Forms": https://www.directives.doe.gov/directives/0412.1-BOrder-a/view. Save the FWP in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_FWP".

9. AUTHORIZATION FOR NON-DOE/NNSA OR DOE/NNSA FFRDCS

The Federal agency sponsoring the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The use of a FFRDC must be consistent with the contractor's authority under its award. Save the Authorization in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_FFRDCAuth".

10. STATEMENT OF PROJECT OBJECTIVES

The Statement of Project Objectives (SOPO) should provide a clear and concise statement of the project goals and expected outcomes. If the applicant is selected for award negotiations, the DOE funding agreement will incorporate a version of this SOPO (negotiations may result in changes to be incorporated into this document) and may be released to the public. It is therefore required that the SOPO must not contain proprietary or confidential business information.

The statement of project objectives (SOPO) shall be submitted in Microsoft Word format. The SOPO must conform to the following content and form requirements, including maximum page lengths. Save the SOPO in a single Microsoft Word file using the following convention for the title: "Controlnumber_LeadOrganization_SOPO".

The SOPO shall not be more than 10 pages and must utilize the following format:

[Recipient Name]

[Project Title]

A. OBJECTIVES

The objective of this project is…. [*Include a sentence or two on the overall objective(s) of the work. Please make sure the objective aligns with the objective from the FOA and this section should include any measurable "requirements", "specifications, or "metrics" mentioned in the FOA, i.e. efficiency increase of XX%, energy density of YY, etc.]*

B. SCOPE OF WORK

[Insert summary of general project approach]

The project will be conducted in X budget periods:

Budget Period 1: [Title]: Explain what will occur in BP1
Budget Period 2: [Title]: Explain what will occur in BP2
Budget Period X: [Title]: Explain what will occur in BPX

[This section should not exceed one-half page and should summarize the effort and approach to achieve the objective(s) of the work.]

C. TASKS TO BE PERFORMED

[This section should include concisely written task descriptions in a logical sequence and should be divided into the budget periods of the project. This section provides a brief summary of the planned approach to this project avoiding task details that may overly limit flexibility in achieving the overall objectives. Please be sure that the tasks do not include $$$ amounts, dates, time durations, sub or vendor names, etc.]

The following tasks will be conducted:

All Budget Periods

Overall Project Management and Planning

The objectives for the project management portion of the work are to provide project planning, coordination, and reporting as required to successfully achieve the overall objectives of the project.

Task 0.0 – Project Management and Planning

The Recipient will develop and maintain the Project Management Plan (PMP) and manage and report on activities in accordance with the plan. This task includes the

writing of reports, presentation slides, invoice control for subcontractors, and expense tracking. Other aspects include technical updates from subcontractors and attendance at review meetings. The Recipient will maintain an up-to-date Project Management Plan designed to achieve the project objectives and cover the entire Project Period. The content and organization of the PMP is identified in the Federal Assistance Reporting Checklist and Instructions. The PMP will be updated and submitted as part of the continuation application prior to the initiation of each budget period as outlined in the deliverables section below.

Task 0.1- Kick-Off meeting

The recipient will participate in a project kickoff meeting with the DOE within 30 days of project initiation.

[Task 0.2 should only be used when there is national lab participation in the project.

Task 0.2 – Collaboration with National Laboratory

Achievement of overall project objectives is dependent upon tasks performed by a national laboratory under a separately funded DOE award. The Recipient will coordinate and collaboratively conduct work with the selected national laboratory on selected tasks integral to the completion of the project. The results of this collaborative effort with the national laboratory will be included in all project reporting.

Budget Period 1 – [Title]

Task 1.1 – [Title]

Subtask 1.1.1 – [Description]

Subtask 1.1.2 – [Description]

Task 1.2 – [Title]……

Subtask 1.2.1 – [Description]

Subtask 1.2.2 – [Description]

[Each budget period must contain at least 1 milestone per quarter and one Go/No Go Decision.]

Milestone	Type	Description
Milestone Title	Technical	Insert Verbiage
Milestone Title	Technical	Insert Verbiage
Milestone Title	Technical	Insert Verbiage
Milestone Title	Technical	Insert Verbiage
Go/No Go Decision Title	Go/No Go	Insert Verbiage

Continuation: In accordance with the award terms and conditions, specifically the provision named "CONTINUATION APPLICATION AND FUNDING," and the Go/No Go technical criteria outlined above, the Recipient is **NOT** authorized to proceed beyond Budget Period 1 without the Department of Energy (DOE) Contracting Officer's written approval of acceptable technical progress associated with the Go/No Go technical criteria outlined above and the submission of a continuation application submitted no later than ninety (90) days prior to the end of the current Budget Period. If selected to continue into a subsequent Budget Period, the Recipient will continue to perform the overall tasks listed in this Statement of Project Objectives, or, adjusted tasks as deemed necessary and negotiated during the negotiation of subsequent continuation application(s). If the Recipient unilaterally decides to continue into the subsequent Budget Period prior to the DOE Contracting Officer's written approval, all costs are incurred at the Recipient's risk and no DOE funds may be utilized for such costs prior to the DOE Contracting Officer's written approval of the technical Go/No Go criteria and continuation application.

Budget Period 2 – [Title]…….

Task 2.1 – [Title]

Subtask 2.1.1 – [Description]

Task 2.2 – [Title]……

Subtask 2.2.1 – [Description]

[Each budget period must contain at least 1 milestone per quarter and one Go/No Go Decision.]

Milestone	Type	Description
Milestone Title	Technical	Insert Verbiage
Milestone Title	Technical	Insert Verbiage
Milestone Title	Technical	Insert Verbiage
Milestone Title	Technical	Insert Verbiage
Go/No Go Decision Title	Go/No Go	Insert Verbiage

Continuation: In accordance with the award terms and conditions, specifically the provision named "CONTINUATION APPLICATION AND FUNDING," and the Go/No Go technical criteria outlined above, the Recipient is **NOT** authorized to proceed beyond Budget Period 2 without the DOE Contracting Officer's written approval of acceptable technical progress associated with the Go/No Go technical criteria outlined above and the submission of a continuation application submitted no later than ninety (90) days prior to the end of the current Budget Period. If selected to continue into a subsequent Budget Period, the Recipient will continue to perform the overall tasks listed in this Statement of Project Objectives, or, adjusted tasks as deemed necessary and negotiated during the negotiation of subsequent continuation application(s). If the Recipient unilaterally decides to continue into the subsequent Budget Period prior to the DOE Contracting Officer's written approval, all costs are incurred at the Recipient's risk and no DOE funds may be utilized for such costs prior to the DOE Contracting Officer's written approval of the technical Go/No Go criteria and continuation application.

D. DELIVERABLES

Reports will be submitted in accordance with the attached "Federal Assistance Reporting Checklist" and the instructions accompanying the checklist.

In addition to the reports specified in the "Federal Assistance Reporting Checklist", the Recipient will provide the following to the DOE Project Officer (identified in Block 15 of the Assistance Agreement as the Program Manager):

Summary of accomplishments and project work report will be prepared for inclusion in the annual programmatic progress report. Report will be due by October 31 of each year.

E. BRIEFINGS AND TECHNICAL PRESENTATIONS

The Recipient will prepare detailed briefings for presentation to the Project Officer at the Project Officer's facility located in Pittsburgh, PA or Morgantown, WV or Washington, DC. Briefings will be given by the Recipient to explain the plans, progress, and results of the technical effort approximately twice a year. The Recipient will provide and present a technical paper(s) at the Vehicle Technologies Annual Merit Review Meeting held in Washington, DC. Additional technical papers will be developed and delivered as appropriate at technical society meetings, or at technical exchange meetings, which may be organized by DOE (not to exceed two per year). All foreign travel in support of briefings or technical exchange meetings outside the United States requires prior Contracting Officer approval.

11. SF-LLL: DISCLOSURE OF LOBBYING ACTIVITIES

Prime Recipients and Subrecipients may not use any Federal funds to influence or attempt to influence, directly or indirectly, congressional action on any legislative or appropriation matters.

Prime Recipients and Subrecipients are required to complete and submit SF-LLL, "Disclosure of Lobbying Activities" (http://www.whitehouse.gov/sites/default/files/omb/grants/sflllin.pdf) if any non-Federal funds have been paid or will be paid to any person for influencing or attempting to influence any of the following in connection with your application:

- An officer or employee of any Federal agency;
- A Member of Congress;
- An officer or employee of Congress; or
- An employee of a Member of Congress.

Save the SF-LLL in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_SF-LLL".

12. WAIVER REQUESTS: FOREIGN ENTITIES AND PERFORMANCE OF WORK IN THE UNITED STATES

i. Foreign Entity Participation:

As set forth in Section III.A.5, all Prime Recipients receiving funding under this FOA must be incorporated (or otherwise formed) under the laws of a State or territory of the United States. To request a waiver of this requirement, the Applicant must submit an explicit waiver request in

the Full Application. Section III.A.5 lists the necessary information that must be included in a request to waive the requirement that the Prime Recipient be a subsidiary or affiliate incorporated under the laws of a State or territory of the United States.

ii. Performance of Work in the United States

All work under EERE funding agreements must be performed in the United States. This requirement does not apply to the purchase of supplies and equipment, so a waiver is not required for foreign purchases of these items. However, the Prime Recipient should make every effort to purchase supplies and equipment within the United States. Section III.A.1 lists the necessary information that must be included in a request to waive the Performance of Work in the United States requirement.

13. U.S. MANUFACTURING COMMITMENTS

As part of the application, Applicants are required to submit a U.S. Manufacturing Plan. The U.S. Manufacturing Plan represents the applicant's measurable commitment to support U.S. manufacturing of the results from its award.

The nature and specificity of the applicants' U.S. Manufacturing Plans are expected to vary based on the FOA. A higher level of specificity is expected in U.S. Manufacturing Plans for technologies at higher technology readiness levels due to the greater certainty surrounding the commercialization of these awards. U.S. Manufacturing Plans submitted in response to FOAs targeting technologies at high technology readiness levels or demonstration activities should include specific commitments to manufacturing in the U.S. For example, a U.S. Manufacturing Plan may commit to manufacturing products that embody or are made through the use of IP developed under the award in the U.S. or making investments in U.S. facilities to support product manufacture. U.S. Manufacturing Plans submitted in response to FOAs directed at technologies at lower technology readiness levels may have fewer specific manufacturing details and may focus more on licensing and other strategies to promote U.S. manufacturing.

The weight given to the U.S. Manufacturing Plans during the review and selection process varies based on the particular FOA. Applicants should review Section V.A.2 of this FOA to determine the weight given to the U.S. Manufacturing Plans under this FOA.

When an applicant is selected for an award, the U.S. Manufacturing Plan submitted by the applicant becomes part of the terms and conditions of the award. The Recipient may request a waiver or modification of the U.S. Manufacturing Plan from DOE upon a showing that the original U.S. Manufacturing Plan is no longer economically feasible.

14. ENVIRONMENTAL QUESTIONNAIRE

You must complete the Environmental Questionnaire. This form is available on EERE Exchange at https://eere-Exchange.energy.gov/ and can also be found at https://www.eere-pmc.energy.gov/RecipientLogin/EQ_Sample.pdf

Save the Environmental Questionnaire in a single PDF file using the following convention for the title "Control Number_LeadOrganization_EQ."

15. LETTERS OF COMMITMENT

If cost share is required, you must have a letter from each third party contributing cost share (i.e., a party other than the organization submitting the application) stating that the third party is committed to providing a specific minimum dollar amount of cost share. Identify the following information for each third party contributing cost share: (1) the name of the organization; (2) the proposed dollar amount to be provided; (3) the amount as a percentage of the total project cost; and (4) the proposed type of cost share – cash, services, or property.

Letters of Commitment from parties participating in the project, exclusive of vendors, who will not be contributing cost share, but will be integral to the success of the project. Examples include participation support letters from OEMs and Tier 1 suppliers.
Please combine each individual Letter of Commitment into a single file.

Save the Letters of Commitment in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_LOC".

E. POST-AWARD INFORMATION REQUESTS

If selected for award, EERE reserves the right to request additional or clarifying information for any reason deemed necessary, including but not limited to:

- Indirect cost information
- Other budget information
- Name and phone number of the Designated Responsible Employee for complying with national policies prohibiting discrimination (See 10 CFR 1040.5)
- Representation of Limited Rights Data and Restricted Software, if applicable
- Environmental Questionnaire
- Foreign National Involvement
- Commitment Letters from Third Parties Contributing to Cost Share

F. CONTENT AND FORM OF REPLIES TO REVIEWER COMMENTS

EERE will provide Applicants with reviewer comments following evaluation of all eligible Full Applications. Applicants will have approximately three (3) business days to prepare a short Reply to Reviewer Comments responding to comments however they desire or supplementing their Full Application. EERE will notify applicants via email when the Reviewer Comments are available for reply. The expected submission deadline is on the cover page of the FOA; however, it is the applicant's responsibility to monitor email in the event that the expected date changes. The deadline will not be extended for applicants who are unable to timely submit their reply due to failure to check email or relying on the expected date alone.

EERE will not review or consider ineligible Replies to Reviewer Comments (see Section III of the FOA). EERE will review and consider each eligible Full Application, even if no Reply is submitted or if the Reply is found to be ineligible.

Replies to Reviewer Comments must conform to the following content and form requirements, including maximum page lengths, described below. If a Reply to Reviewer Comments is more than three pages in length, EERE will review only the first three pages and disregard any additional pages.

SECTION	PAGE LIMIT	DESCRIPTION
Text	2 pages max	Applicants may respond to one or more reviewer comments. Applicant Replies to Reviewer Comments are limited to clarifying aspects of the application and correcting misunderstandings. The reply may not be used to modify or materially change the submitted application.
Optional	1 page max	Applicants may use this page however they wish; text, graphs, charts, or other data to respond to reviewer comments. Applicant Replies to Reviewer Comments are limited to clarifying aspects of the application and correcting misunderstandings. The reply may not be used to modify or materially change the submitted application.

G. SUBMISSION DATES AND TIMES

Concept Papers, Full Applications, and Replies to Reviewer Comments must be submitted no later than 8:00p.m. Eastern Time on the dates provided on the cover page of this FOA.

H. INTERGOVERNMENTAL REVIEW

This Technology Office and FOA are not subject to Executive Order 12372 – Intergovernmental Review of Federal Programs.

I. FUNDING RESTRICTIONS

1. ALLOWABLE COSTS

All expenditures must be allowable, allocable, and reasonable in accordance with the applicable Federal cost principles.

Refer to the following applicable Federal cost principles for more information:

- 2 CFR 200.400 to 2 CFR 200.475 for awards with Institutes of Higher Education (IHE), Nonprofit Organizations, State Governments, Local Governments or Indian Tribes; and
- 2 CFR 910.352 for awards with For-Profit organizations.

2. PRE-AWARD COSTS

Selectees may charge pre-award costs incurred on R&D awards within the 90-day period immediately preceding the effective date of the award. If the Selectee is a for-profit, non-

profit, or University, and the pre-award costs are more than $25,000, prior approval by the CO to incur pre-award costs is required. If the Selectee is a governmental entity, prior approval from the CO to incur pre-award costs is required, regardless of the amount.

Pre-award costs cannot be incurred prior to the Selection Official signing the Selection Statement and Analysis. Pre-award costs can only be incurred if such costs would be reimbursable under the agreement if incurred after award and are considered to be within scope and in accordance with the applicable Federal Cost principles.

Pre-Award expenditures are made at the Selectee's risk; EERE is not obligated to reimburse costs: (1) in the absence of appropriations; (2) if an award is not made; (3) if an award is made for a lesser amount than the Selectee anticipated or (4) if the cost are not within scope of the project or in accordance with the applicable Federal Cost Principles..

i. Pre-Award Costs Related to National Environmental Policy Act (NEPA) Requirements

EERE's decision whether and how to distribute federal funds under this FOA is subject to NEPA. Applicants should carefully consider and should seek legal counsel or other expert advice before taking any action related to the proposed project that would have an adverse effect on the environment or limit the choice of reasonable alternatives prior to EERE completing the NEPA review process.

EERE does not guarantee or assume any obligation to reimburse costs where the Prime Recipient incurred the costs prior to receiving written authorization from the Contracting Officer. If the Applicant elects to undertake activities that may have an adverse effect on the environment or limit the choice of reasonable alternatives prior to receiving such written authorization from the Contracting Officer, the Applicant is doing so at risk of not receiving Federal funding and such costs may not be recognized as allowable cost share. Likewise, if a project is selected for negotiation of award, and the Prime Recipient elects to undertake activities that are not authorized for Federal funding by the Contracting Officer in advance of EERE completing a NEPA review, the Prime Recipient is doing so at risk of not receiving Federal Funding and such costs may not be recognized as allowable cost share. Nothing contained in the pre-award cost reimbursement regulations or any pre-award costs approval letter from the Contracting Officer override these NEPA requirements to obtain the written authorization from the Contracting Officer prior to taking any action that may have an adverse effect on the environment or limit the choice of reasonable alternatives.

3. CONSTRUCTION

EERE generally does not fund projects that involve major construction (i.e., construction of new buildings, major renovations, or additions to existing buildings). Recipients are required to obtain written authorization from the Contracting Officer before incurring any major construction costs.

4. *FOREIGN TRAVEL*

Foreign travel may be necessary and appropriate for projects. Foreign travel will be approved on a case by case basis with prior written approval by the Contracting Officer.

If international travel is proposed for your project, please note that your organization must comply with the International Air Transportation Fair Competitive Practices Act of 1974 (49 USC 40118), commonly referred to as the "Fly America Act," and implementing regulations at 41 CFR 301-10.131 through 301-10.143. The law and regulations require air transport of people or property to, from, between, or within a country other than the United States, the cost of which is supported under this award, to be performed by or under a cost-sharing arrangement with a U.S. flag carrier, if service is available.

5. *EQUIPMENT AND SUPPLIES*

To the greatest extent practicable, all equipment and products purchased with funds made available under this FOA should be American-made. This requirement does not apply to used or leased equipment.

Property disposition will be required at the end of a project if the property is no longer used by the Prime Recipient for the objectives of the project, and the fair market value of property exceeds $5,000. The rules for property disposition are set forth in the following sections of 2 CFR 200 Subpart D and 2 CFR 910 Subpart D:

- 2 CFR 200.310 to 2 CFR 200.316 for awards with Institutes of Higher Education (IHE), Nonprofit Organizations, State Governments, Local Governments or Indian Tribes;
- and
- 2 CFR 910.360for awards with For-Profit organizations.

6. *LOBBYING*

Recipients and Subrecipients may not use any Federal funds to influence or attempt to influence, directly or indirectly, congressional action on any legislative or appropriation matters.

Recipients and Subrecipients are required to complete and submit SF-LLL, "Disclosure of Lobbying Activities" (http://www.whitehouse.gov/sites/default/files/omb/grants/sflllin.pdf) if any non-Federal funds have been paid or will be paid to any person for influencing or attempting to influence any of the following in connection with your application:

- An officer or employee of any Federal agency;
- A Member of Congress;
- An officer or employee of Congress; or
- An employee of a Member of Congress.

V. APPLICATION REVIEW INFORMATION

A. TECHNICAL REVIEW CRITERIA

1. CONCEPT PAPERS

Concept Papers are evaluated based on the following criteria:

Criterion 1: Impact of the Proposed Technology Relative to State of the Art (50%)
This criterion involves consideration of the following factors:

- Method used to identify current state of the art technology
- If technical success is achieved, the proposed idea would significantly improve technical and economic performance relative to the state of the art.

Criterion 2: Overall Scientific and Technical Merit (50%)
This criterion involves consideration of the following factors:

- The proposed technology is unique and innovative; and
- The proposed approach is without major technical flaws.

2. FULL APPLICATIONS

Applications will be evaluated against the merit review criteria shown below.

Technical Merit and Innovation (45%):

- Extent to which the application demonstrates knowledge of the current state-of-the-art (SOA) or baseline technology;
- Extent to which the proposed innovative technology is consistent with the objectives and achievement of prescribed goals, targets, or metrics as described in the area of interest; and
- Sufficiency of the technical detail to assess whether the proposed project is technically sound, technically viable, and includes relevant data, calculations, technical assumptions, design rationale, alternatives, discussion of prior work, and literature.

Project Approach (25%):

- Extent to which the tasks and task descriptions are comprehensive, appropriate, detailed, and unambiguous in explaining how project goals will be met;
- Extent to which the approach comprehensively and logically addresses research, development, validation, demonstration activities, risks, and risk mitigation strategies;
- Extent to which the project schedule represents a realistic and comprehensive plan for the project and provides the critical path for project completion;

- Degree to which the test plan addresses key and relevant operational and performance evaluations for the proposed project, including details such as proposed test matrices, modeling and simulation, data acquisition, and sampling and analysis protocols; and
- Extent of the comprehensiveness, appropriateness, and clarity of the quantifiable project metrics, milestones, interim deliverables, and Go/No Go Decision Points.

Market Transformation Plan/Commercialization Plan (15%):

- Extent to which the Market Transformation/Commercialization Plan demonstrates knowledge of the target market(s), distribution channels, and competitors as well as the risks and risk mitigation strategies associated with each;
- Comprehensiveness and reasonableness of the Market Transformation/Commercialization Plan and extent to which items such as the following items are addressed:
  - economic viability of the proposed technology
  - the commercialization timeline,
  - alternatives
  - warranty/servicing plans,
  - financing,
  - marketing,
  - distribution,
  - infrastructure requirements,
  - U.S. Manufacturing Plan,
  - Licensing,
  - and legal/regulatory considerations such as intellectual property.

Team and Resources (15%):

- Extent to which the application demonstrates that the proposed team and individuals have the capabilities, qualifications and proven experience to comprehensively address all aspects of the proposed project as well as further development and commercial deployment of the proposed technologies.
- Degree to which the proposed consortia/team demonstrates the ability to facilitate and expedite further development and commercial deployment of the proposed technologies;
- Sufficiency of the proposed equipment and facilities to support all aspects of the proposed project; and
- Level of participationby project participants as evidenced by letter(s) of commitment and how well they are integrated into the workplan.

3. *Criteria for Replies to Reviewer Comments*

EERE has not established separate criteria to evaluate Replies to Reviewer Comments. Instead, Replies to Reviewer Comments are attached to the original applications and evaluated as an extension of the Full Application.

B. Standards for Application Evaluation

Applications that are determined to be eligible will be evaluated in accordance with this FOA, by the standards set forth in EERE's Notice of Objective Merit Review Procedure (76 Fed. Reg. 17846, March 31, 2011) and the guidance provided in the "Department of Energy Merit Review Guide for Financial Assistance," which is available at: http://energy.gov/sites/prod/files/meritrev.pdf.

C. Other Selection Factors

1. *Program Policy Factors*

In addition to the above criteria, the Selection Official may consider the following program policy factors in determining which Full Applications to select for award negotiations:

- The degree to which the proposed project, including proposed cost shares, optimizes the use of available EERE funding to achieve programmatic objectives;
- The level of industry involvement and demonstrated ability to commercialize energy or related technologies;
- Technical, market, organizational, and environmental risks associated with the project;
- Whether the proposed project is likely to lead to increased employment and manufacturing in the United States;
- Whether the proposed project will accelerate transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty;
- The degree to which the proposed project directly addresses EERE's statutory mission and strategic goals.
- The degree to which the proposed project collectively represents diverse types and sizes of applicant organizations while not being detrimental to the overall objectives of the program;
- The degree to which the proposed project represents diverse technology concepts and applications, as well as technical approaches, while not being detrimental to the overall objectives of the program.; and
- Whether the proposed project has significant potential to impact the market while not being detrimental to the overall objectives of the program;

D. EVALUATION AND SELECTION PROCESS

1. OVERVIEW

The evaluation process consists of multiple phases that each include an initial eligibility review and a thorough technical review. Rigorous technical reviews are conducted by reviewers that are experts in the subject matter of the FOA. Ultimately, the Selection Official considers the recommendations of the reviewers, along with other considerations such as program policy factors, in determining which applications to select.

2. PRE-SELECTION CLARIFICATION

EERE may determine that pre-selection clarifications are necessary from one or more applicants. These pre-selection clarifications will solely be for the purposes of clarifying the application, and will be limited to information already provided in the application documentation. The pre-selection clarifications may occur before or during the merit review evaluation process. Information provided by an applicant that is not necessary to address the pre-selection clarification question will not be reviewed or considered.

The information provided by Applicants to EERE through pre-selection clarifications is incorporated in their applications and contributes to the merit review evaluation and EERE's selection decisions. If EERE contacts an applicant for pre-selection clarification purposes, it does not signify that the applicant has been selected for negotiation of award or that the applicant is among the top ranked applications.

EERE will not reimburse applicants for expenses relating to the pre-selection clarifications, nor will these costs be eligible for reimbursement as pre-award costs.

3. SELECTION

The Selection Official may consider the technical merit, the Federal Consensus Board's recommendations, program policy factors, and the amount of funds available in arriving at selections for this FOA.

VI. AWARD ADMINISTRATION INFORMATION

A. ANTICIPATED NOTICE OF SELECTION AND AWARD DATES

EERE anticipates notifying applicants selected for negotiation of award by August 2015 and making awards by September 30, 2015.

B. AWARD NOTICES

1. REJECTED SUBMISSIONS

Noncompliant and nonresponsive Concept Papers and Full Applications are rejected by the Contracting Officer and are not reviewed or considered. The Contracting Officer sends a notification letter by email to the technical and administrative points of contact designated by the Applicant in EERE Exchange. The notification letter states the basis upon which the Concept Paper or the Full Application was rejected.

2. CONCEPT PAPER NOTIFICATIONS

EERE notifies Applicants of its determination to encourage or discourage the submission of a Full Application. EERE sends a notification letter by email to the technical and administrative points of contact designated by the Applicant in EERE Exchange.

Applicants may submit a Full Application even if they receive a notification discouraging them from doing so. By discouraging the submission of a Full Application, EERE intends to convey its lack of programmatic interest in the proposed project. Such assessments do not necessarily reflect judgments on the merits of the proposed project. The purpose of the Concept Paper phase is to save Applicants the considerable time and expense of preparing a Full Application that unlikely to be selected for award negotiations.

A notification letter encouraging the submission of a Full Application does not authorize the Applicant to commence performance of the project. Please refer to Section IV.J.2 of the FOA for guidance on pre-award costs.

3. FULL APPLICATION NOTIFICATIONS

EERE notifies Applicants of its determination via a notification letter by email to the technical and administrative points of contact designated by the Applicant in EERE Exchange. The notification letter may inform the Applicant that its Full Application was selected for award negotiations, or not selected for award. Alternatively, EERE may notify one or more Applicants that a final selection determination on particular Full Applications will be made at a later date, subject to the availability of funds or other factors.

4. *SUCCESSFUL APPLICANTS*

A notification letter selecting a Full Application for award negotiations does not authorize the Applicant to commence performance of the project. If an application is selected for award negotiations, it is not a commitment to issue an award. Applicants will not receive an award until award negotiations are complete and the Contracting Officer executes the funding agreement.

The award negotiation process will take approximately 60 days. Applicants must designate a primary and a backup point-of-contact in EERE Exchange with whom EERE will communicate to conduct award negotiations. The Applicant must be responsive during award negotiations (e.g., provide requested documentation) and meet the negotiation deadlines. If the Applicant fails to do so or negotiations are otherwise unsuccessful, EERE will cancel award negotiations and rescind the Selection. EERE reserves the right to terminate award negotiations at any time for any reason.

Please refer to Section IV.I.2 of the FOA for guidance on pre-award costs.

5. *POSTPONED SELECTION DETERMINATIONS*

A notification letter postponing a final selection determination until a later date does not authorize the Applicant to commence performance of the project. EERE may ultimately determine to select or not select the Full Application for award negotiations.

6. *UNSUCCESSFUL APPLICANTS*

EERE shall promptly notify in writing each applicant whose application has not been selected for award or whose application cannot be funded because of the unavailability of appropriated funds. Written feedback on Full Applications that are not selected will be made available to Applicants. By providing feedback, EERE intends to guide the further development of the proposed technology.

C. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS

1. *REGISTRATION REQUIREMENTS*

There are several one-time actions before submitting an application in response to this Funding Opportunity Announcement (FOA), and it is vital that applicants address these items as soon as possible. Some may take several weeks, and failure to complete them could interfere with an applicant's ability to apply to this FOA, or to meet the negotiation deadlines and receive an award if the application is selected. These requirements are as follows:

i. EERE Exchange

Register and create an account on EERE Exchange at https://eere-Exchange.energy.gov. This account will then 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. Applicants should also designate backup points of contact so applicants may be easily contacted if deemed necessary. **This step is required to apply to this FOA.**

The EERE Exchange registration does not have a delay; however, **the remaining registration requirements below could take several weeks to process and are necessary for a potential applicant to receive an award under this FOA**. Therefore, although not required in order to submit an application through the EERE Exchange site, all potential applicants lacking a DUNS number, or not yet registered with SAM or FedConnect should complete those registrations as soon as possible.

ii. DUNS Number

Obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number (including the plus 4 extension, if applicable) at http://fedgov.dnb.com/webform.

iii. System for Award Management

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.

iv. Fedconnect

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 http://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect_Ready_Set_Go.pdf.

v. Grants.gov

Register in Grants.gov (http://www.grants.gov) to receive automatic updates when Amendments to this FOA are posted. However, please note that Concept Papers, and Full Applications will not be accepted through Grants.gov.

vi. Electronic Authorization of Applications and Award Documents

Submission of an application and supplemental information under this FOA through electronic systems used by the Department of Energy, including EERE Exchange and fedconnect.net, constitutes the authorized representative's approval and electronic signature.

2. AWARD ADMINISTRATIVE REQUIREMENTS

The administrative requirements for DOE grants and cooperative agreements are contained in 2 CFR 200 - UNIFORM ADMINISTRATIVE REQUIREMENTS, COST PRINCIPLES, AND AUDIT REQUIREMENTS FOR FEDERAL AWARDS as amended by 2 CFR 910.
The EERE standard award special terms and conditions can be accessed at http://www1.eere.energy.gov/financing/pdfs/special_terms_conditions.pdf.

3. *FOREIGN NATIONAL INVOLVEMENT*

All applicants selected for an award resulting from this FOA may be required to provide information to the Department of Energy (DOE) in order to facilitate our responsibilities associated with foreign national access to DOE sites, information, technologies, and equipment. Foreign national is defined as any person who was born outside the jurisdiction of the United States, is a citizen of a foreign government, and has not been naturalized under U.S. law. If the selected applicant, including subrecipients/contractors, anticipates utilizing a foreign national person in the performance of an award, the selected applicant may be responsible for providing to the DOE representative specific information of the foreign national(s) to satisfy compliance with all of the requirements for access approval. Access approval for individuals from countries identified on the U.S. Department of State list of State Sponsors of Terrorism may impact project schedule.

4. *LIMITATIONS ON COMPENSATION COSTS*

The annual compensation costs for an individual allowable under this Award are limited to $250,000 (i.e., $250,000 is the maximum amount that EERE will reimburse a Recipient for any one individual's annual compensation and EERE will not recognize such costs above $250,000 as Recipient cost share).

This limitation does not restrict the Recipient or its subrecipients from providing annual compensation to an individual that exceeds $250,000. However, any amount above $250,000 cannot be included in the total project costs (i.e., Federal share or Recipient cost share).

For purposes of this requirement only, the term "annual compensation costs" is defined to include the total amount of wages and salary paid to the employee, which have been approved by the Contracting Officer.

5. *SUBAWARD AND EXECUTIVE REPORTING*

Additional administrative requirements necessary for DOE grants and cooperative agreements to comply with the Federal Funding and Transparency Act of 2006 (FFATA) are contained in 2 CFR Part 170. Prime Recipients must register with the new FFATA Subaward Reporting System database and report the required data on their first tier Subrecipients. Prime Recipients must report the executive compensation for their own executives as part of their registration profile in SAM.

6. *NATIONAL POLICY REQUIREMENTS*

The National Policy Assurances that are incorporated as a term and condition of award are located at: http://energy.gov/management/downloads/national-policy-assurances-be-incorporated-award-terms.

7. *Environmental Review in Accordance with National Environmental Policy Act (NEPA)*

EERE's decision whether and how to distribute federal funds under this FOA is subject to the National Environmental Policy Act (42 USC 4321, *et seq.*). NEPA requires Federal agencies to integrate environmental values into their decision-making processes by considering the potential environmental impacts of their proposed actions. For additional background on NEPA, please see DOE's NEPA website, at http://nepa.energy.gov/.

While NEPA compliance is a Federal agency responsibility and the ultimate decisions remain with the federal agency, all Recipients selected for an award will be required to assist in the timely and effective completion of the NEPA process in the manner most pertinent to their proposed project. The environmental questionnaire can be found at https://www.eere-pmc.energy.gov/RecipientLogin/EQ_Sample.pdf Applicants selected for negotiations leading to award will be required to upload their EQ electronically.

8 *Applicant Representations and Certifications*

i. *Lobbying Restrictions*

By accepting funds under this award, the Recipient agrees that none of the funds obligated on the award shall be expended, directly or indirectly, to influence Congressional action on any legislation or appropriation matters pending before Congress, other than to communicate to Members of Congress as described in 18 U.S.C. §1913. This restriction is in addition to those prescribed elsewhere in statute and regulation.

ii. *Corporate Felony Conviction and Federal Tax Liability Representations (March 2014)*

In submitting an application in response to this FOA, the Applicant represents that:

(1) It is **not** a corporation that has been convicted of a felony criminal violation under any Federal law within the preceding 24 months,

(2) It is **not** a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

For purposes of these representations the following definitions apply:

A Corporation includes any entity that has filed articles of incorporation in any of the 50 states, the District of Columbia, or the various territories of the United States [but not foreign corporations]. It includes both for-profit and non-profit organizations.

9. STATEMENT OF FEDERAL STEWARDSHIP

EERE will exercise normal Federal stewardship in overseeing the project activities performed under EERE Awards. Stewardship Activities include, but are not limited to, conducting site visits; reviewing performance and financial reports, providing assistance and/or temporary intervention in usual circumstances to correct deficiencies that develop during the project; assuring compliance with terms and conditions; and reviewing technical performance after project completion to ensure that the project objectives have been accomplished.

10. STATEMENT OF SUBSTANTIAL INVOLVEMENT

EERE has substantial involvement in work performed under the Cooperative Agreement Awards made following this FOA. EERE does not limit its involvement to the administrative requirements of the Award. Instead, EERE has substantial involvement in the direction and redirection of the technical aspects of the project as a whole. Substantial involvement includes, but is not limited to, the following:

1. EERE shares responsibility with the Recipient for the management, control, direction, and performance of the Project.
2. EERE may intervene in the conduct or performance of work under this Award for programmatic reasons. Intervention includes the interruption or modification of the conduct or performance of project activities.
3. EERE may redirect or discontinue funding the Project based on the outcome of EERE's evaluation of the Project at that the Go/No Go decision point.
4. EERE participates in major project decision-making processes.

The aforementioned substantial involvement language is anticipated by EERE for applications leading to award under this FOA. However, it may be revised during negotiations leading to award if EERE deems necessary.

11. INTELLECTUAL PROPERTY MANAGEMENT PLAN

Within 45 days of the award date, Applicants must submit an executed IP Management Plan between the members of the consortia or team.

The award will set forth the treatment of and obligations related to intellectual property rights between EERE and the individual members. The IP Management Plan should describe how the members will handle intellectual property rights and issues between themselves while ensuring compliance with Federal IP laws, regulations, and policies (see Sections VIII.L-VIII.O of this FOA for more details on applicable Federal IP laws and regulations).

The following is a non-exhaustive list of examples of items that the IP Management Plan may cover:

- The treatment of confidential information between members (e.g., the use of non-disclosure agreements);

- The treatment of background IP (e.g., any requirements for identifying it or making it available);
- The treatment of inventions made under the project (e.g., any requirements for disclosing to the other members, filing patent applications, paying for patent prosecution, and cross-licensing or other licensing arrangements between the members);
- The treatment of data produced, including software, under the project (e.g., any publication process or other dissemination strategies, copyrighting strategy or arrangement between members);
- Any technology transfer and commercialization requirements or arrangements between the members;
- The treatment of any intellectual property issues that may arise due to a change in membership of the consortia or team; and
- The handling of disputes related to intellectual property between the members.

12. Subject Invention Utilization Reporting

To ensure that Prime Recipients and Subrecipients holding title to subject inventions are taking the appropriate steps to commercialize subject inventions, EERE requires that each Recipient holding title to a subject invention submit annual reports for 10 years from the date the subject invention was disclosed to EERE on the utilization of the subject invention and efforts made by Recipient or their licensees or assignees to stimulate such utilization. The reports must include information regarding the status of development, date of first commercial sale or use, gross royalties received by the Prime Recipient, and such other data and information as EERE may specify.

13. Intellectual Property Provisions

The standard DOE financial assistance intellectual property provisions applicable to the various types of recipients are located at http://energy.gov/gc/standard-intellectual-property-ip-provisions-financial-assistance-awards.

14. Reporting

Reporting requirements are identified on the Federal Assistance Reporting Checklist, DOE F 4600.2, attached to the award agreement. A sample checklist can be accessed at http://www1.eere.energy.gov/financing/docs/federal_assistance_reporting_checklist.docx

Additional special deliverable requirements are listed below by AOI, where applicable:

AOI 1 Special Deliverables:
In addition to the deliverables required in the Federal Assistance Reporting Requirements Checklist, the following special deliverables are required:

1. Detailed specifications for WBG power semiconductor requirements and performance in this application, and application-specific component performance requirements.

2. Test plan to demonstrate and confirm power module performance.
3. Power module hardware test results confirming that inverter application specifications and DOE targets are met.
4. Listing of manufacturing equipment and equipment cost required to produce this inverter design
5. Modular or indentured bill of materials for this inverter design

AOI 6 Special Deliverables:
In addition to the deliverables required in the Federal Assistance Reporting Requirements Checklist, the following special deliverables are required for awards made under AOI 6:

- The completed model/simulation/tool developed in this project must be delivered to the DOE along with a software description document and a user's manual at the end of the Applicant's project. The software description document must include a high level description of the integrated models along with a description of the input variables, output variables, state variables, and relational databases implemented within the final software deliverable. The user's manual must provide an overall description of the user implementation approach for the software.

15. Go/No-Go Review and Stage-Gate Review

Each project selected under this FOA will be subject to a period project evaluation referred to as a Go/No-Go or Stage Gate Review. Federal funding beyond the Go/No Go or Stage Gate decision point (continuation funding), is contingent, in part[1], on the outcome of the Go/No Go or Stage Gate Review.

As a result of the Go/No Go or Stage Gate Reviews, DOE may, at its discretion, authorize the following actions: (1) continue to fund the project, contingent upon the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority; (2) recommend redirection of work under the project; (3) place a hold on federal funding for the project, pending further supporting data or funding; or (4) discontinue funding the project because of insufficient progress, change in strategic direction, or lack of funding.

[1] Continuation funding is contingent on (1) the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority; (2) meeting the objectives, milestones, deliverables, decision point criteria, and stage gates of Recipient's approved project and obtaining approval from EERE to continue work on the project; (3) submittal of required reports; and/or (4) compliance with the terms and conditions of the award.

- **Go/No-Go Decision Points**: Go/No-Go decision points are similar to project milestones, in that EERE staff will review the project based on pre-established metrics defined in the award negotiations process following selection.
- **Stage-Gate Reviews**: Stage-Gate reviews are very similar to Go/No-Go decision points, except that EERE will bring in third parties to assist with validation of project progress. These third parties are typically specialized subject matter experts that will allow EERE to evaluate crucial aspects of project performance with a greater degree of specificity and scrutiny.

VII. QUESTIONS/AGENCY CONTACTS

Upon the issuance of a FOA, EERE personnel are prohibited from communicating (in writing or otherwise) with Applicants regarding the FOA except through the established question and answer process as described below. Specifically, questions regarding the content of this FOA must be submitted to: DE-FOA-0001201@netl.doe.gov not later than five (5) business days prior to the application due date. Questions submitted after that date may not allow the government sufficient time to respond.

Therefore, the deadline for submission of FOA related questions will be April 6, 2015 at 8:00 PM Eastern time. Any questions submitted after that deadline will NOT be addressed. Questions regarding problems encountered with the application submittal will be answered as time permits. Applicants are encouraged to review the posted questions and answers daily. Please be as specific as possible when asking questions to insure that questions will be adequately addressed. All questions submitted must clearly identify the Area of Interest (AOI) to insure a timely and accurate response. Failure to identify the AOI, or not being as specific as possible with a question, may result in additional time to address the question or require further correspondence for further clarification regarding the submitted questions.

All questions and answers related to this FOA will be posted on EERE Exchange at: https://eere-exchange.energy.gov. **Please note that you must first select this specific FOA Number in order to view the questions and answers specific to this FOA**. EERE will attempt to respond to a question within five (5) business days, unless a similar question and answer has already been posted on the website.

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

VIII. OTHER INFORMATION

A. FOA MODIFICATIONS

Amendments to this FOA will be posted on the EERE Exchange website and the Grants.gov system. However, you will only receive an email when an amendment or a FOA is posted on these sites if you register for email notifications for this FOA in Grants.gov. **EERE recommends that you register as soon after the release of the FOA as possible to ensure you receive timely notice of any amendments or other FOAs.**

B. INFORMATIONAL WEBINAR

EERE will conduct one informational webinar during the FOA process. It will be held after the initial FOA release but before the due date for Concept Papers.

The purpose of this webinar is to give applicants a chance to ask questions about the FOA process generally. Attendance is not mandatory and will not positively or negatively impact the overall review of any Applicant submissions. As the webinar will be open to all Applicants who wish to participate, Applicants should refrain from asking questions or communicating information that would reveal confidential and/or proprietary information specific to their project. Specific dates for the webinar can be found on the cover page of the FOA.

C. GOVERNMENT RIGHT TO REJECT OR NEGOTIATE

EERE reserves the right, without qualification, to reject any or all applications received in response to this FOA and to select any application, in whole or in part, as a basis for negotiation and/or award.

D. COMMITMENT OF PUBLIC FUNDS

The Contracting Officer is the only individual who can make awards or commit the Government to the expenditure of public funds. A commitment by anyone other than the Contracting Officer, either explicit or implied, is invalid.

E. TREATMENT OF APPLICATION INFORMATION

In general, EERE will use data and other information contained in applications for evaluation purposes only unless such information is generally available to the public or is already the property of the Government.

Applicants should not include trade secrets or commercial or financial information that is privileged or confidential in their application unless such information is necessary to convey an understanding of the proposed project or to comply with a requirement in the FOA. Applications containing trade secrets or commercial or financial information that is privileged or confidential, which the applicant does not want disclosed to the public or used by the Government for any purpose other than application evaluation, must be marked as described in this section.

The cover sheet of the application must be marked as follows and identify the specific pages containing trade secrets or commercial or financial information that is privileged or confidential:

> Notice of Restriction on Disclosure and Use of Data:
> Pages [list applicable pages] of this document may contain trade secrets or commercial or financial information that is privileged or confidential, and is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes or in accordance with a financial assistance or loan agreement between the submitter and the Government. The Government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source. [End of Notice]

The header and footer of every page that contains trade secrets or commercial or financial information that is privileged or must be marked as follows: "May contain trade secrets or commercial or financial information that is privileged or confidential and exempt from public disclosure."

In addition, each line or paragraph containing trade secrets or commercial or financial information that is privileged or confidential must be enclosed in brackets.

The above markings enable EERE to follow the provisions of 10 CFR 1004.11(d) in the event a Freedom of Information Act (FOIA) request is received for information submitted with an application. Failure to comply with these marking requirements may result in the disclosure of the unmarked information under a FOIA request or otherwise. The U.S. Government is not liable for the disclosure or use of unmarked information, and may use or disclose such information for any purpose.

Subject to the specific FOIA exemptions identified in 5 U.S.C. 552(b), all information submitted to EERE by a FOA applicant is subject to public release under the Freedom of Information Act, 5 U.S.C. §552, as amended by the OPEN Government Act of 2007, Pub. L. No. 110-175. It is the applicant's responsibility to review FOIA and its exemptions to understand (1) what information may be subject to public disclosure and (2) what information applicants submit to the Government that are protected by law. In some cases, DOE may be unable to make an independent determination regarding which information submitted by an applicant is releasable and which is protected by an exemption. In such cases, DOE will consult with the applicant, in accordance with 10 C.F.R. §1004.11, to solicit the applicant's views on how the information should be treated.

F. EVALUATION AND ADMINISTRATION BY NON-FEDERAL PERSONNEL

In conducting the merit review evaluation, the Government may seek the advice of qualified non Federal personnel as reviewers. The Government may also use non-Federal personnel to

conduct routine, nondiscretionary administrative activities. The applicant, by submitting its application, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign conflict of interest and non-disclosure agreements prior to reviewing an application. Non-Federal personnel conducting administrative activities must sign a non-disclosure agreement.

G. Notice Regarding Eligible/Ineligible Activities

Eligible activities under this Technology Office include those which describe and promote the understanding of scientific and technical aspects of specific energy technologies, but not those which encourage or support political activities such as the collection and dissemination of information related to potential, planned or pending legislation.

H. Notice of Right to Conduct a Review of Financial Capability

EERE reserves the right to conduct an independent third party review of financial capability for applicants that are selected for negotiation of award (including personal credit information of principal(s) of a small business if there is insufficient information to determine financial capability of the organization).

I. Notice of Potential Disclosure Under Freedom of Information Act

Applicants should be advised that identifying information regarding all applicants, including applicant names and/or points of contact, may be subject to public disclosure under the Freedom of Information Act, whether or not such applicants are selected for negotiation of award.

J. Requirement for Full and Complete Disclosure

Applicants are required to make a full and complete disclosure of all information requested. Any failure to make a full and complete disclosure of the requested information may result in:

- The rejection of a Concept Paper, Full Application, and/or Reply to Reviewer Comments;
- The termination of award negotiations;
- The modification, suspension, and/or termination of a funding agreement;
- The initiation of debarment proceedings, debarment, and/or a declaration of ineligibility for receipt of Federal contracts, subcontracts, and financial assistance and benefits; and
- Civil and/or criminal penalties.

K. Retention of Submissions

EERE expects to retain copies of all Concept Papers, Full Applications, Replies to Reviewer Comments, and other submissions. No submissions will be returned. By applying to EERE for funding, Applicants consent to EERE's retention of their submissions.

L. Title to Subject Inventions

Ownership of subject inventions is governed pursuant to the authorities listed below.

- Domestic Small Businesses, Educational Institutions, and Nonprofits: Under the Bayh-Dole Act (35 U.S.C. § 200 et seq.), domestic small businesses, educational institutions, and nonprofits may elect to retain title to their subject inventions.
- All other parties: The Federal Non-Nuclear Energy Act of 1974, 42. U.S.C. 5908 provides that the Government obtains title to new inventions unless a waiver is granted (see below).
- Class Patent Waiver: EERE has issued a class waiver that applies to this FOA. Under this class waiver, domestic large businesses may elect title to their subject inventions similar to the right provided to the domestic small businesses, educational institutions, and nonprofits by law. In order to avail itself of the class waiver, a domestic large business must agree that any products embodying or produced through the use of a subject invention first created or reduced to practice under this program will be substantially manufactured in the United States, unless DOE agrees that the commitments proposed in the U.S. Manufacturing Plan are sufficient.
- Advance and Identified Waivers: Applicants may request a patent waiver that will cover subject inventions that may be invented under the award, in advance of or within 30 days after the effective date of the award. Even if an advance waiver is not requested or the request is denied, the recipient will have a continuing right under the award to request a waiver for identified inventions, i.e., individual subject inventions that are disclosed to EERE within the timeframes set forth in the award's intellectual property terms and conditions. Any patent waiver that may be granted is subject to certain terms and conditions in 10 CFR 784.
- Determination of Exceptional Circumstances (DEC): Each applicant is required to submit a U.S. Manufacturing Plan as part of its application. If selected, the U.S. Manufacturing Plan shall be incorporated into the award terms and conditions. DOE has determined that exceptional circumstances exist that warrants the modification of the standard patent rights clause for small businesses and non-profit awardees under Bayh-Dole to the extent necessary to implement and enforce the U.S. Manufacturing Plan. For example, the commitments and enforcement of a U.S. Manufacturing Plan may be tied to subject inventions. Any Bayh-Dole entity (domestic small business or nonprofit organization) affected by this DEC has the right to appeal it.

M. GOVERNMENT RIGHTS IN SUBJECT INVENTIONS

Where Recipients and Subrecipients retain title to subject inventions, the U.S. Government retains certain rights.

1. GOVERNMENT USE LICENSE

The U.S. Government retains a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States any subject invention throughout the world. This license extends to contractors doing work on behalf of the Government.

2. MARCH-IN RIGHTS

The U.S. Government retains march-in rights with respect to all subject inventions. Through "march-in rights," the Government may require a Prime Recipient or Subrecipient who has elected to retain title to a subject invention (or their assignees or exclusive licensees), to grant a license for use of the invention to a third party. In addition, the Government may grant licenses for use of the subject invention when a Prime Recipient, Subrecipient, or their assignees and exclusive licensees refuse to do so.

DOE may exercise its march-in rights only if it determines that such action is necessary under any of the four following conditions:

- The owner or licensee has not taken or is not expected to take effective steps to achieve practical application of the invention within a reasonable time;
- The owner or licensee has not taken action to alleviate health or safety needs in a reasonably satisfied manner;
- The owner has not met public use requirements specified by Federal statutes in a reasonably satisfied manner; or
- The U.S. Manufacturing requirement has not been met.

Any determination that march-in rights are warranted must follow a fact-finding process in which the recipient has certain rights to present evidence and witnesses, confront witnesses and appear with counsel and appeal any adverse decision. To date, DOE has never exercised its march-in rights to any subject inventions.

N. RIGHTS IN TECHNICAL DATA

Data rights differ based on whether data is first produced under an award or instead was developed at private expense outside the award.

"Limited Rights Data": The U.S. Government will not normally require delivery of confidential or trade secret-type technical data developed solely at private expense prior to issuance of an award, except as necessary to monitor technical progress and evaluate the potential of proposed technologies to reach specific technical and cost metrics.

Special Protected Data: Government rights in Technical Data Produced Under Awards: The U.S. Government normally retains unlimited rights in technical data produced under Government financial assistance awards, including the right to distribute to the public. However, pursuant to special statutory authority, certain categories of data generated under EERE awards may be protected from public disclosure for up to five years after the data is generated ("Protected Data"). For awards permitting Protected Data, the protected data must be marked as set forth in the awards intellectual property terms and conditions and a listing of unlimited rights data (i.e., non-protected data) must be inserted into the data clause in the award. In addition, invention disclosures may be protected from public disclosure for a reasonable time in order to

allow for filing a patent application. ***EERE intends to offer five (5) years of data protection for certain categories of data generated under selected awards as outlined above under this FOA***.

O. COPYRIGHT

The Prime Recipient and Subrecipients may assert copyright in copyrightable data, such as software, first produced under the award without EERE approval. When copyright is asserted, the Government retains a paid-up nonexclusive, irrevocable worldwide license to reproduce, prepare derivative works, distribute copies to the public, and to perform publicly and display publicly the copyrighted work. This license extends to contractors and others doing work on behalf of the Government. In addition, for those awards requiring distribution of software as Open-Source Software (OSS), the additional information in Appendix D must be addressed in the application.

P. PROTECTED PERSONALLY IDENTIFIABLE INFORMATION

In responding to this FOA, Applicants must ensure that Protected Personally Identifiable Information (PII) is not included in the following documents: Project Abstract, Project Narrative, Biographical Sketches, Budget or Budget Justification. These documents will be used in the review process to evaluate each application. PII is defined by the Office of Management and Budget (OMB) and EERE as:

Any information about an individual maintained by an agency, including but not limited to, education, financial transactions, medical history, and criminal or employment history and information that can be used to distinguish or trace an individual's identity, such as their name, social security number, date and place of birth, mother's maiden name, biometric records, etc., including any other personal information that is linked or linkable to an individual.

This definition of PII can be further defined as: (1) Public PII and (2) Protected PII.

Public PII: PII found in public sources such as telephone books, public websites, business cards, university listing, etc. Public PII includes first and last name, address, work telephone number, email address, home telephone number, and general education credentials.

Protected PII: PII that requires enhanced protection. Protected PII includes data that if compromised could cause harm to an individual such as identity theft.

Listed below are examples of Protected PII that Applicants must not include in the files listed above to be evaluated.

- Social Security Numbers in any form
- Place of Birth associated with an individual
- Date of Birth associated with an individual
- Mother's maiden name associated with an individual
- Biometric record associated with an individual

- Fingerprint
- Iris scan
- DNA
- Medical history information associated with an individual
- Medical conditions, including history of disease
- Metric information, e.g. weight, height, blood pressure
- Criminal history associated with an individual
- Employment history and other employment information associated with an individual
- Ratings
- Disciplinary actions
- Performance elements and standards (or work expectations) are PII when they are so intertwined with performance appraisals that their disclosure would reveal an individual's performance appraisal
- Financial information associated with an individual
- Credit card numbers
- Bank account numbers
- Security clearance history or related information (not including actual clearances held)

Listed below are examples of Public PII that Applicants may include in the files listed above to be evaluated:

- Phone numbers (work, home, cell)
- Street addresses (work and personal)
- Email addresses (work and personal)
- Digital pictures
- Medical information included in a health or safety report
- Employment information that is not PII even when associated with a name
- Resumes, unless they include a Social Security Number
- Present and past position titles and occupational series
- Present and past grades
- Present and past annual salary rates (including performance awards or bonuses, incentive awards, merit pay amount, Meritorious or Distinguished Executive Ranks, and allowances and differentials)
- Present and past duty stations and organization of assignment (includes room and phone numbers, organization designations, work email address, or other identifying information regarding buildings, room numbers, or places of employment)
- Position descriptions, identification of job elements, and those performance standards (but not actual performance appraisals) that the release of which would not interfere with law enforcement programs or severely inhibit agency effectiveness
- Security clearances held
- Written biographies (e.g. to be used in a Technology Office describing a speaker)
- Academic credentials

- Schools attended
- Major or area of study
- Personal information stored by individuals about themselves on their assigned workstation or laptop unless it contains a Social Security Number

Q. ANNUAL COMPLIANCE AUDITS

If a for-profit entity is a Prime Recipient or Subrecipient and has expended greater than $750K of DOE funds in a respective fiscal year, an annual compliance audit performed by an independent auditor may be required. For additional information, please refer to 2 CFR 200 Subpart F.

If an institution of higher education, non-profit organization, state/local government or indian tribe is a Prime Recipient or Subrecipient and has expended greater than $750K of Federal funds in a respective fiscal year, then an a single or program-specific audit must be conducted for that year in accordance with the provisions of 2 CFR 200 Subpart F.

Applicants and sub-recipients (if applicable) should propose sufficient costs in the project budget to cover the costs associated with the audit. EERE will share in the cost of the audit at its applicable cost share ratio.

APPENDIX A – DEFINITIONS

"**Applicant**" means the legal entity or individual signing the Application. This entity or individual may be one organization or a single entity representing a group of organizations (such as a Consortium) that has chosen to submit a single Application in response to a FOA.

"**Application**" means the documentation submitted in response to a FOA.

"**Authorized Organization Representative (AOR)**" is the person with assigned privileges who is authorized to submit grant applications through Grants.gov on behalf of an organization. The privileges are assigned by the organization's E-Business Point of Contact designated in the SAM.

"**Award**" means the written documentation executed by a Contracting Officer, after an Applicant is selected, which contains the negotiated terms and conditions for providing Financial Assistance to the Applicant. A Financial Assistance Award may be a Grant, Cooperative Agreement, or Technology Investment Agreement.

"**Budget**" means the financial plan for the project or program that the Federal awarding agency or pass-through entity approves during the Federal award process or in subsequent amendments to the Federal award. It may include the Federal and non-Federal share or only the Federal share, as determined by the Federal awarding agency or pass-through entity.

"**Compliance**" is an eligibility determination that refers to the non-technical requirements outlined in a FOA (e.g., formatting, timeliness of submission, or satisfaction of prerequisites).

"**Consortium (plural consortia)**" means the group of organizations or individuals that have chosen to submit a single Application in response to a FOA.

"**Contracting Officer**" means the EERE official authorized to execute Awards on behalf of EERE and who is responsible for the business management and non-Technology Office aspects of the Financial Assistance process.

"**Cooperative Agreement**" means a Financial Assistance instrument used by EERE to transfer money or property when the principal purpose of the transaction is to accomplish a public purpose of support or stimulation authorized by Federal statute, and Substantial Involvement (see definition below) is anticipated between EERE and the Applicant during the performance of the contemplated activity. Refer to 2 CFR 200.24 for additional information regarding cooperative agreements.

"**Cost Sharing**" means the portion of project costs not paid by Federal funds (unless otherwise authorized by Federal statute). Cost sharing information can be found in the Code of Federal Regulations at 2 CFR 200.306 and 2 CFR 910.130.

"**Data Universal Numbering System (DUNS) Number**" is a unique nine-character identification number issued by Dun and Bradstreet (D&B). Organizations must have a DUNS number prior to registering in the SAM. Call 1-866-705-5711 to receive one free of charge.

"**E-Business Point of Contact (POC)**" is the individual who is designated as the Electronic Business Point of Contact in the SAM registration. This person is the sole authority of the organization with the capability of designating or revoking an individual's ability to conduct SAM transactions.

"**EERE Exchange**" is the Department of Energy, Energy Efficiency and Renewable Energy's web system for posting Federal FOAs and receiving applications. EERE Exchange may be found at https://eere-exchange.energy.gov.

"**Federal Financial Assistance**" means assistance that non-Federal entities receive or administer in the form of grants or cooperative agreements. For EERE, it does not include direct loans, loan guarantees, price guarantees, purchase agreements, Cooperative Research and Development Agreements (CRADAs), or any other type of financial incentive instrument.

"**FedConnect**" is where federal agencies make awards via the web. It can be found at https://www.fedconnect.net/FedConnect/.

"**Federally Funded Research and Development Center (FFRDC)**" means a government-sponsored operation that exists for the purpose of carrying out various functions related to both basic and applied research and development on behalf of the Government. Typically, most or all of the facilities utilized in an FFRDC are owned by the Government, but the operations are not always managed by the Government; an FFRDC may be managed by a University or consortium of Universities, other not-for-profit or nonprofit organization, or a for-profit organization, with the Government performing an oversight function.

"**Funding Opportunity Announcement (FOA)**" is a publicly available document by which a Federal agency makes known its intentions to award discretionary grants or cooperative agreements, usually as a result of competition for funds. FOAs may be known as FOAs, notices of funding availability, solicitations, or other names depending on the agency and type of program. See 2 CFR 200.203 for more information.

"**Grant**" means a legal instrument of financial assistance between a Federal awarding agency or pass-through entity and a non-Federal entity that, consistent with 31 U.S.C. 6302, 6304, and no Substantial Involvement is anticipated between EERE and the Applicant during the performance of the contemplated activity.

"**Grants.gov**" is the "storefront" web portal which allows organizations to electronically find grant opportunities from all Federal grant-making agencies. Grants.gov is THE single access point for over 900 grant programs offered by the 26 Federal grant-making agencies. It can be accessed at http://www.grants.gov.

"**Indian Tribe**" means any Indian tribe, band, nation, or other organized group or community, including any Alaska Native village or regional or village corporation as defined in or established pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. Chapter 33), which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians (25 U.S.C. 450b(e)). See annually published Bureau of Indian Affairs list of Indian Entities Recognized and Eligible to Receive Services.

"**Key Personnel**" mean the individuals who will have significant roles in planning and implementing the proposed Project on the part of the Applicant and Participants, including FFRDCs.

"**Marketing Partner Identification Number (MPIN)**" is a very important password designated by your organization when registering in SAM. The E-Business Point of Contact will need the MPIN to assign privileges to the individual(s) authorized to perform SAM transactions on behalf of your organization. The MPIN must have 9 digits containing at least one alpha character (must be in capital letters) and one number (no spaces or special characters permitted).

"**Modification**" means a revision to a FOA.

"**Participant**" for purposes of this FOA only, means any entity, except the Applicant substantially involved in a Consortium, or other business arrangement (including all parties to the Application at any tier), responding to the FOA.

"**Principal Investigator**" refers to the technical point of contact/Project Manager for a specific project award.

"**Project**" means the set of activities described in an Application, State plan, or other document that is approved by EERE for Financial Assistance (whether such Financial Assistance represents all or only a portion of the support necessary to carry out those activities).

"**Project Team**" means the team which consists of the Prime Recipient, Subrecipients, and others performing or otherwise supporting work under an EERE funding agreement.

"**Proposal**" is the term used to describe the documentation submitted in response to a FOA. Also see Application.

"**Prime Recipient**" means the organization, individual, or other entity that receives a Financial Assistance Award from EERE (i.e., is the signatory on the award), is financially accountable for the use of any EERE funds or property provided for the performance of the Project, and is legally responsible for carrying out the terms and condition of the award.

"**Responsiveness**" is an eligibility determination that refers to the objective technical requirements (not goals or targets) outlined in a FOA, such as a technology type or technical

parameters. For example, submission of a photovoltaic solar panel design in response to a FOA calling for innovative geothermal drilling technologies should be found nonresponsive. Likewise, an application with a design that incorporates rare earth materials to a FOA that prohibits the use of rare earth materials should be found nonresponsive. Conversely, the belief that a technology will not achieve the technical targets of the FOA will never be used as a proper basis for a rejection as nonresponsive.

"**System for Award Management (SAM)**" is the primary database which collects, validates, stores and disseminates data in support of agency missions. It can be accessed at https://www.sam.gov.

"**Selection**" means the determination by the EERE Selection Official that negotiations take place for certain Projects with the intent of awarding a Financial Assistance instrument.

"**Selection Official**" means the EERE official designated to select Applications for negotiation toward Award under a subject FOA.

"**Substantial Involvement**" means involvement on the part of the Government. EERE's involvement may include shared responsibility for the performance of the Project; providing technical assistance or guidance which the Applicant is to follow; and the right to intervene in the conduct or performance of the Project. Such involvement will be negotiated with each Applicant prior to signing any agreement.

"**Total Project Cost**" means all the funds to complete the effort proposed by the Applicant, including EERE funds (including direct funding of any FFRDC) plus all other funds that will be committed by the Applicant as Cost Sharing. The sum of the allowable direct and allocable indirect costs less any applicable credits.

"**Tribal Energy Resource Development Organization**" means an "organization" of two or more entities, at least one of which is an Indian Tribe (see "Indian Tribe" above) that has the written consent of the governing bodies of all Indian Tribes participating in the organization to apply for a grant or loan, or other assistance under 25 U.S.C. § 3503.

APPENDIX B – COST SHARE INFORMATION

Cost Sharing or Cost Matching

The terms "cost sharing" and "cost matching" are often used synonymously. See 2 CFR 200.306 and 2 CFR 910.130. EERE almost always uses the term "cost sharing," as it conveys the concept that non-federal share is calculated as a percentage of the Total Project Cost. An exception is the State Energy Program Regulation, 10 CFR 420.12, State Matching Contribution. Here "cost matching" for the non-federal share is calculated as a percentage of the Federal funds only, rather than the Total Project Cost.

How Cost Sharing Is Calculated

As stated above, cost sharing is calculated as a percentage of the Total Project Cost. Following is an example of how to calculate cost sharing amounts for a project with $1,000,000 in federal funds with a minimum 20% non-federal cost sharing requirement:

- Formula: Federal share ($) divided by Federal share (%) = Total Project Cost
  Example: $1,000,000 divided by 80% = $1,250,000

- Formula: Total Project Cost ($) minus Federal share ($) = Non-federal share ($)
  Example: $1,250,000 minus $1,000,000 = $250,000

- Formula: Non-federal share ($) divided by Total Project Cost ($) = Non-federal share (%)
  Example: $250,000 divided by $1,250,000 = 20%

See the sample cost share calculation for a blended cost share percentage below. Keep in mind that FFRDC funding is DOE funding.

What Qualifies For Cost Sharing

While it is not possible to explain what specifically qualifies for cost sharing in one or even a couple of sentences, in general, if a cost is allowable under the cost principles applicable to the organization incurring the cost and is eligible for reimbursement under an EERE grant or cooperative agreement, then it is allowable as cost share. Conversely, if the cost is not allowable under the cost principles and not eligible for reimbursement, then it is not allowable as cost share. In addition, costs may not be counted as cost share if they are paid by the Federal Government under another award unless authorized by Federal statute to be used for cost sharing.

The rules associated with what is allowable as cost share are specific to the type of organization that is receiving funds under the grant or cooperative agreement, though are generally the same for all types of entities. The specific rules applicable to:

- 2 CFR 200.29 and 2 CFR 200.306 for awards with Institutes of Higher Education (IHE), Nonprofit Organizations, State Governments, Local Governments or Indian Tribes; and
- 2 CFR 910.130 for awards with For-Profit organizations.

In addition to the regulations referenced above, other factors may also come into play such as timing of donations and length of the project period. For example, the value of ten years of donated maintenance on a project that has a project period of five years would not be fully allowable as cost share. Only the value for the five years of donated maintenance that corresponds to the project period is allowable and may be counted as cost share.

Additionally, EERE generally does not allow pre-award costs for either cost share or reimbursement when these costs precede the signing of the appropriation bill that funds the award. In the case of a competitive award, EERE generally does not allow pre-award costs prior to the signing of the Selection Statement by the EERE Selection Official.

Following is a link to the UNIFORM ADMINISTRATIVE REQUIREMENTS, COST PRINCIPLES, AND AUDIT REQUIREMENTS FOR FEDERAL AWARDS. You can click on the specific section for each Code of Federal Regulations reference mentioned above.

http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title02/2cfr200_main_02.tpl

As stated above, the rules associated with what is allowable cost share are generally the same for all types of organizations. Following are the rules found to be common, but again, the specifics are contained in the regulations and cost principles specific to the type of entity:

(A) Acceptable contributions. All contributions, including cash contributions and third party in-kind contributions, must be accepted as part of the Prime Recipient's cost sharing if such contributions meet all of the following criteria:

1. They are verifiable from the recipient's records.

2. They are not included as contributions for any other federally-assisted project or program.

3. They are necessary and reasonable for proper and efficient accomplishment of project or program objectives.

4. They are allowable under the applicable cost principles in accordance with 2 CFR 200-Subpart E and the Federal Acquisition Regulation Part 31.2

5. They are not paid by the Federal Government under another award unless authorized by Federal statute to be used for cost sharing or matching.

6. They are provided for in the approved budget.

(B) Valuing and documenting contributions

1. Valuing recipient's property or services of recipient's employees. Values are established in accordance with the applicable cost principles, which mean that amounts chargeable to the project are determined on the basis of costs incurred. For real property or equipment used on the project, the cost principles authorize depreciation or use charges. The full value of the item may be applied when the item will be consumed in the performance of the award or fully depreciated by the end of the award. In cases where the full value of a donated capital asset is to be applied as cost sharing or matching, that full value must be the lesser or the following:

    a. The certified value of the remaining life of the property recorded in the recipient's accounting records at the time of donation; or

    b. The current fair market value. If there is sufficient justification, the Contracting Officer may approve the use of the current fair market value of the donated property, even if it exceeds the certified value at the time of donation to the project. The Contracting Officer may accept the use of any reasonable basis for determining the fair market value of the property.

2. Valuing services of others' employees. If an employer other than the recipient furnishes the services of an employee, those services are valued at the employee's regular rate of pay, provided these services are for the same skill level for which the employee is normally paid.

3. Valuing volunteer services. Volunteer services furnished by professional and technical personnel, consultants, and other skilled and unskilled labor may be counted as cost sharing or matching if the service is an integral and necessary part of an approved project or program. Rates for volunteer services must be consistent with those paid for similar work in the recipient's organization. In those markets in which the required skills are not found in the recipient organization, rates must be consistent with those paid for similar work in the labor market in which the recipient competes for the kind of services involved. In either case, paid fringe benefits that are reasonable, allowable, and allocable may be included in the valuation.

4. Valuing property donated by third parties.

    a. Donated supplies may include such items as office supplies or laboratory supplies. Value assessed to donated supplies included in the cost sharing or matching share must be reasonable and must not exceed the fair market value of the property at the time of the donation.

b. Normally only depreciation or use charges for equipment and buildings may be applied. However, the fair rental charges for land and the full value of equipment or other capital assets may be allowed, when they will be consumed in the performance of the award or fully depreciated by the end of the award, provided that the Contracting Officer has approved the charges. When use charges are applied, values must be determined in accordance with the usual accounting policies of the recipient, with the following qualifications:

   i. The value of donated space must not exceed the fair rental value of comparable space as established by an independent appraisal of comparable space and facilities in a privately-owned building in the same locality.

   ii. The value of loaned equipment must not exceed its fair rental value.

5. Documentation. The following requirements pertain to the recipient's supporting records for in-kind contributions from third parties:

   a. Volunteer services must be documented and, to the extent feasible, supported by the same methods used by the recipient for its own employees.

   b. The basis for determining the valuation for personal services and property must be documented.

APPENDIX C – SAMPLE COST SHARE CALCULATION FOR BLENDED COST SHARE PERCENTAGE

The following example shows the math for calculating required cost share for a project with $2,000,000 in Federal funds with four tasks requiring different Non-federal cost share percentages:

Task	Proposed Federal Share	Federal Share %	Recipient Share %
Task 1 (R&D)	$1,000,000	80%	20%
Task 2 (R&D)	$500,000	80%	20%
Task 3 (Demonstration)	$400,000	50%	50%
Task 4 (Outreach)	$100,000	100%	0%

Federal share ($) divided by Federal share (%) = Task Cost

Each task must be calculated individually as follows:

Task 1
$1,000,000 divided by 80% = $1,250,000 (Task 1 Cost)
Task 1 Cost minus federal share = Non-federal share
$1,250,000 - $1,000,000 = $250,000 (Non-federal share)

Task 2
$500,000 divided 80% = $625,000 (Task 2 Cost)
Task 2 Cost minus federal share = Non-federal share
$625,000 - $500,000 = $125,000 (Non-federal share)

Task 3
$400,000 / 50% = $800,000 (Task 3 Cost)
Task 3 Cost minus federal share = Non-federal share
$800,000 - $400,000 = $400,000 (Non-federal share)

Task 4
Federal share = $100,000
Non-federal cost share is not mandated for outreach = $0 (Non-federal share)

The calculation may then be completed as follows:

Tasks	$ Federal Share	% Federal Share	$ Non-Federal Share	% Non-Federal Share	Total Project Cost
Task 1	$1,000,000	80%	$250,000	20%	$1,250,000
Task 2	$500,000	80%	$125,000	20%	$625,000
Task 3	$400,000	50%	$400,000	50%	$800,000
Task 4	$100,000	100%	$0	0%	$100,000
Totals	$2,000,000		$775,000		$2,775,000

Blended Cost Share %
Non-federal share ($775,000) divided by Total Project Cost ($2,775,000) = 27.9% (Non-federal)
Federal share ($2,000,000) divided by Total Project Cost ($2,775,000) = 72.1% (Federal)

APPENDIX D - DATA MANAGEMENT PLANS

A data management plan ("DMP") explains how data generated in the course of the work performed under an EERE award will be shared and preserved or, when justified, explains why data sharing or preservation is not possible or scientifically appropriate.

DMP Requirements

In order for a DMP to be considered acceptable, the DMP must address the following:

At a minimum, the DMP must describe how data sharing and preservation will enable validation of the results from the proposed work, or how results could be validated if data are not shared or preserved.

The DMP must provide a plan for making all research data displayed in publications resulting from the proposed work digitally accessible at the time of publication. This includes data that are displayed in charts, figures, images, etc. In addition, the underlying digital research data used to generate the displayed data should be made as accessible as possible in accordance with the principles stated above. This requirement could be met by including the data as supplementary information to the published article, or through other means. The published article should indicate how these data can be accessed.

The DMP should consult and reference available information about data management resources to be used in the course of the proposed work. In particular, a DMP that explicitly or implicitly commits data management resources at a facility beyond what is conventionally made available to approved users should be accompanied by written approval from that facility. In determining the resources available for data management at DOE User Facilities, researchers should consult the published description of data management resources and practices at that facility and reference it in the DMP. Information about other DOE facilities can be found in the additional guidance from the sponsoring program.

The DMP must protect confidentiality, personal privacy, Personally Identifiable Information, and U.S. national, homeland, and economic security; recognize proprietary interests, business confidential information, and intellectual property rights; avoid significant negative impact on innovation, and U.S. competitiveness; and otherwise be consistent with all laws (e.g., export control laws), and DOE regulations, orders, and policies.

Data Determination for a DMP

The Principal Investigator should determine which data should be the subject of the DMP and, in the DMP, propose which data should be shared and/or preserved in accordance with the DMP Requirements noted above.

For data that will be generated through the course of the proposed work, the Principal Investigator should indicate what types of data should be protected from immediate public disclosure by DOE (referred to as "protected data") and what types of data that DOE should be able to release immediately. Similarly, for data developed outside of the proposed work at private expense that will be used in the course of the proposed work, the Principal Investigator should indicate whether that type of data will be subject to public release or kept confidential (referred to as "limited rights data"). Any use of limited rights data or labeling of data as "protected data" must be consistent with the DMP Requirements noted above.

Suggested Elements for a DMP

The following list of elements for a DMP provides suggestions regarding the data management planning process and the structure of the DMP:

Data Types and Sources: A brief, high-level description of the data to be generated or used through the course of the proposed work and which of these are considered digital research data necessary to validate the research findings or results.

Content and Format: A statement of plans for data and metadata content and format including, where applicable, a description of documentation plans, annotation of relevant software, and the rationale for the selection of appropriate standards. Existing, accepted community standards should be used where possible. Where community standards are missing or inadequate, the DMP could propose alternate strategies for facilitating sharing, and should advise the sponsoring program of any need to develop or generalize standards.

Sharing and Preservation: A description of the plans for data sharing and preservation. This should include, when appropriate: the anticipated means for sharing and the rationale for any restrictions on who may access the data and under what conditions; a timeline for sharing and preservation that addresses both the minimum length of time the data will be available and any anticipated delay to data access after research findings are published; any special requirements for data sharing, for example, proprietary software needed to access or interpret data, applicable policies, provisions, and licenses for re-use and re-distribution, and for the production of derivatives, including guidance for how data and data products should be cited; any resources and capabilities (equipment, connections, systems, software, expertise, etc.) requested in the research proposal that are needed to meet the stated goals for sharing and preservation (this could reference the relevant section of the associated

research proposal and budget request); and whether/where the data will be preserved after direct project funding ends and any plans for the transfer of responsibilities for sharing and preservation.

Protection: A statement of plans, where appropriate and necessary, to protect confidentiality, personal privacy, Personally Identifiable Information, and U.S. national, homeland, and economic security; recognize proprietary interests, business confidential information, and intellectual property rights; and avoid significant negative impact on innovation, and U.S. competitiveness.

Rationale: A discussion of the rationale or justification for the proposed data management plan including, for example, the potential impact of the data within the immediate field and in other fields, and any broader societal impact.

Additional Guidance

In determining which data should be shared and preserved, researchers must consider the data needed to validate research findings as described in the Requirements, and are encouraged to consider the potential benefits of their data to their own fields of research, fields other than their own, and society at large.

DMPs should reflect relevant standards and community best practices and make use of community accepted repositories whenever practicable.

Costs associated with the scope of work and resources articulated in a DMP may be included in the proposed research budget as permitted by the applicable cost principles.

To improve the discoverability of and attribution for datasets created and used in the course of research, EERE encourages the citation of publicly available datasets within the reference section of publications, and the identification of datasets with persistent identifiers such as Digital Object Identifiers (DOIs). In most cases, EERE can provide DOIs free of charge for data resulting from DOE-funded research through its Office of Scientific and Technical Information (OSTI) Data ID Service.

Definitions

Data Preservation: Data preservation means providing for the usability of data beyond the lifetime of the research activity that generated them.

Data Sharing: Data sharing means making data available to people other than those who have generated them. Examples of data sharing range from bilateral communications with colleagues, to providing free, unrestricted access to anyone through, for example, a web-based platform.

Digital Research Data: The term digital data encompasses a wide variety of information stored in digital form including: experimental, observational, and simulation data; codes, software and algorithms; text; numeric information; images; video; audio; and associated metadata. It also encompasses information in a variety of different forms including raw, processed, and analyzed data, published and archived data.

Research Data: The recorded factual material commonly accepted in the scientific community as necessary to validate research findings, but not any of the following: preliminary analyses, drafts of scientific papers, plans for future research, peer reviews, or communications with colleagues. This 'recorded' material excludes physical objects (e.g., laboratory samples). Research data also do not include:

A. Trade secrets, commercial information, materials necessary to be held confidential by a researcher until they are published, or similar information which is protected under law; and

B. Personnel and medical information and similar information the disclosure of which would constitute a clearly unwarranted invasion of personal privacy, such as information that could be used to identify a particular person in a research study."

Validate: In the context of DMPs, validate means to support, corroborate, verify, or otherwise determine the legitimacy of the research findings. Validation of research findings could be accomplished by reproducing the original experiment or analyses; comparing and contrasting the results against those of a new experiment or analyses; or by some other means.

APPENDIX E – OPEN SOURCE SOFTWARE

Open Source Software Distribution Plan.

Applicants that are applying to one or more Topic Areas for which open source software distribution is required must submit a plan describing how software produced under this FOA will be distributed. For a DOE National Laboratory or a FFRDC, the data rights clause, including rights and requirements pertaining to computer software, in its Management and Operating (M&O) Contract shall apply and shall take precedence over any requirement set forth in this Appendix. The plan must include the following elements:

1. A complete description of any existing software that will be modified or incorporated into software produced under this FOA, including a description of the license rights. The license rights must allow the modified or incorporated software to be distributed as open source.

2. A discussion of the open source license that the Applicant plans to use for the software it plans to produce under the FOA, and how that choice furthers the goals of this FOA. The discussion must also address how the license conforms to the conditions listed below.

3. A method for depositing the software in a source code repository.

4. A method for sharing and disseminating the software and other information to team members or others when multiple parties will contribute to the development of the software or the FOA requires that the software or other information be shared or disseminated to others.

Open Source Definition: Open source licenses must conform to all of the following conditions:

Free Redistribution
The license shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license shall not require a royalty or other fee for such sale. The rights attached to the software must apply to all to whom the software is redistributed without the need for execution of an additional license by those parties.

Source Code
The program must include source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed with source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable reproduction cost preferably, e.g., downloading via the Internet without charge. The source code must be the preferred form in which a programmer would modify the program.

Deliberately obfuscated source code and intermediate forms such as the output of a preprocessor or translator are not allowed.

Derived Works
The license must allow modifications and derived works, and permit the option of distributing the modifications and derived works under the same terms as the license of the original software.

Integrity of the Author's Source Code
The license may restrict source-code from being distributed in modified form only if the license allows the distribution of "patch files" with the source code for the purpose of modifying the program at build time. The license must explicitly permit distribution of software built from modified source code. The license may require derived works to carry a different name or version number from the original software.

No Restriction Against Fields of Endeavor
The license must not restrict anyone from making use of the program in a specific field of endeavor. For example, it may not restrict the program from being used in a business, or from being used for genetic research.

License Must Not Be Specific to a Product or Technology
The rights attached to the program must not depend on the program's being part of a particular software distribution. If the program is extracted from that distribution and used or distributed within the terms of the program's license, all parties to whom the program is redistributed should have the same rights as those that are granted in conjunction with the original software distribution. No provision of the license may be predicated on any individual technology or style of interface.

License Must Not Restrict Other Software
The license must not place restrictions on other software that is distributed along with the licensed software. For example, the license must not insist that all other programs distributed on the same medium must be open-source software.

Examples of Acceptable Licenses
Apache License, 2.0
http://www.apache.org/licenses

The 2.0 version of the Apache License was approved by the Apache Software Foundation in 2004. The goals of this license revision were to reduce the number of frequently asked questions, to allow the license to be reusable without modification by any project (including non-ASF projects), to allow the license to be included by reference instead of listed in every file, to clarify the license on submission of contributions, to require a patent license on contributions that necessarily infringe the contributor's own patents, and to move comments regarding Apache and other inherited attribution notices to a location outside the license terms

The result is a license that is compatible with other open source licenses, while remaining true to and supportive of collaborative development across both nonprofit and commercial organizations.
All packages produced by the ASF are implicitly licensed under the Apache License, Version 2.0, unless otherwise explicitly stated.

GNU General or Public License (GPLv3)
http://www.gnu.org/licenses/gpl.html

The GNU General Public License (GNU GPL or simply GPL) is the most widely used free software license, originally written by Richard Stallman for the GNU Project.

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The license's copyright disallows modification of the license. Copying and distributing the license is allowed because the GPL requires recipients to get "a copy of this License along with the Program". According to the GPL FAQ, anyone can make a new license using a modified version of the GPL as long as he or she uses a different name for the license, does not mention "GNU", and removes the preamble, though the preamble can be used in a modified license if permission to use it is obtained from the Free Software Foundation (FSF).

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