FINANCIAL ASSISTANCE
FUNDING OPPORTUNITY ANNOUNCEMENT

U.S. Department of Energy

Energy Efficiency and Renewable Energy

Golden Service Center

"Turn Key" Open Source Software Solutions for Energy Management of Small to Medium Sized Buildings

Funding Opportunity Announcement Number: DE-FOA-0000822

Announcement Type: Initial

CFDA Number: 81.086

Issue Date:	**03/28/2013**
Concept Paper Due Date:	**04/22/2013, 5:00 PM Eastern Time**
Application Due Date:	**06/24/2013, 5:00 PM Eastern Time**

REGISTRATION REQUIREMENTS

Applicants must complete several one-time actions before submitting a Concept Paper or Application in response to this Funding Opportunity Announcement (FOA), as follows:

- 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.

  The applicant will receive an automated response when the Concept Paper is received. This will serve as a confirmation of receipt. Please do not reply to the automated response. The applicant will have the opportunity to re-submit a revised Concept Paper or Application for any reason as long as the relevant submission is submitted by the specified deadline. The Users' Guide for Applying to the Department of Energy EERE Funding Opportunity Announcements is found at https://eere-exchange.energy.gov/Manuals.aspx.

  The EERE Exchange registration does not have a delay; however, the remaining **registration requirements below could take several weeks to process and are necessary in order for a potential applicant to receive an award under this announcement**. 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**.

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

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

- Register with the System for Award Management (SAM) at https://www.sam.gov. Designating an Electronic Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in SAM registration. Please update your SAM registration annually.

- Register in FedConnect at https://www.fedconnect.net/. To create an organization account, your organization's SAM MPIN is required. For more information about the SAM MPIN or other registration requirements, review the FedConnect Ready, Set, Go! Guide at https://www.fedconnect.net/FedConnect/PublicPages/FedConnect_Ready_Set_Go.pdf

- Register in Grants.gov to receive automatic updates when Amendments to this FOA are posted. However, please note that applications and concept papers will not be accepted through Grants.gov. http://www.grants.gov/

Table of Contents

SECTION I – FUNDING OPPORTUNITY DESCRIPTION

A. Description

Background – The Building Technologies Office

As part of the Department's goal to "catalyze the timely, material, and efficient transformation of the nation's energy system and secure U.S. leadership in clean energy technologies,"[1] the DOE Building Technologies Office (BTO) seeks to develop technologies, techniques, and tools for making buildings more energy efficient, productive, and affordable. BTO is focused on improving commercial and residential building components, energy modeling tools, building energy codes, and appliance standards. BTO's strategic goal is to significantly improve the energy efficiency of new and existing buildings to reduce national energy demand and allow the nation to work toward greater energy independence and a cleaner environment.

The long-term, overarching goal of BTO is to support the development and deployment of technologies and systems with a goal of saving $2.2 trillion in energy-related costs by reducing building energy use 50 percent. To deliver on this goal, BTO employs a three-pronged strategy:

1) Research and develop high-impact energy efficiency products and solutions through the Emerging Technologies (ET) subprogram;

2) Qualify and drive these technology products and solutions to market through promotion and partnerships with manufacturers and users via the Commercial Building Integration (CBI) and Residential Building Integration (RBI) deployment efforts; and 3) Lock in the savings through regulatory efforts that provide clear public benefit through the Codes and Standards subprogram.

The ET subprogram accelerates the research, development and commercialization of emerging, high-impact building technologies that are five years or less to market-readiness. Technologies include HVAC, water heating, appliances, lighting, building envelope, windows, sensors and controls, and building energy modeling. The CBI and RBI programs (as well as the Office of Weatherization and Intergovernmental Program (OWIP) and the Federal Energy Management Program (FEMP)) are "customers" for BTO's ET program and serve as enablers for subsequent regulatory measures developed in BTO's Codes & Standards program.

Background – Building Automation

Buildings consume over 40% of the total energy consumption in the U.S.[2] A significant portion of the energy consumed in buildings is wasted because of the lack of building controls or the inability to use existing Building Automation Systems (BAS) properly. Over 90% of the buildings in the U.S. are either small-sized (<5,000 square feet, or sf) or medium-sized (between 5,000 sf and 50,000 sf); these buildings typically do not use BAS to monitor and control their building systems from a central location.[2] There are a number of reasons why small- and medium-sized buildings do not deploy BAS: 1) lack of awareness; 2) lack of inexpensive packaged solutions; and 3) sometimes the owner is not the tenant, so has no incentive to invest in a BAS.

---

[1] "US Department of Energy Strategic Plan", May 2011, 28 Feb. 2013, <http://energy.gov/sites/prod/files/2011_DOE_Strategic_Plan_.pdf>

[2] "Buildings Energy Data Book", 28 Feb. 2013, <http://buildingsdatabook.eren.doe.gov/ChapterIntro1.aspx?1#4 – November 1, 2011>

In small and medium size buildings in the US, heating consumption is the dominant end use, followed by lighting, plug loads and cooling.[3] Over half (55%) of the energy consumption in buildings less than 50,000 sf is from heating, ventilation, and air conditioning (HVAC) equipment. HVAC, lighting and plug loads account for almost 90% of all consumption for this category of buildings. HVAC and lighting consume over 71% of the electricity consumption for this category of buildings, while the rest of the electricity consumption is from plug loads, water heating and refrigeration.[3] Therefore, the monitoring and control needs for small- and medium-sized buildings are primarily focused on management of HVAC, lighting and miscellaneous plug loads.

The objectives of HVAC controls are to provide thermal conditioning and ventilation services, while minimizing maintenance and operating costs. On one end of the spectrum are simple thermostats that are similar to many home HVAC controls. On the other end, more sophisticated systems exist that can offer a range of functionality to minimize energy costs, provide energy cost feedback, and provide remote monitoring for control and security. Many new Internet-protocol-based controls provide the ability to integrate the building with the grid to make the building more Demand Responsive (DR). Although BASs are the preferred way to implement many energy efficiency and DR strategies in buildings because they allow for automatic programming, the penetration rate of these systems into small commercial buildings is low because they are perceived as expensive and because the building owners are not fully aware of the benefits.

Automated lighting control systems range from simple scheduling, to sensor-based systems that actuate electric lights according to occupancy or ambient light levels; they may also incorporate a variety of occupant personal control options. Dimmable ballasts, lumen maintenance, daylighting, and set point tuning are also possible. Networked control solutions may be capable of providing grid-integrated demand response, interface with and "optimize" HVAC controls, and enable remote monitoring and control. Although there are no published sources, anecdotal evidence shows that lights in small buildings are generally not automatically controlled.[4] Therefore, increasing the penetration of lighting controls in small- and medium-sized commercial buildings presents great energy saving opportunities.

Commercial Miscellaneous and Electronic Loads (CMELs) are a large and growing end use, but little data exists to identify which specific devices consume most of the energy and which control/savings strategies would be most effective to implement. CMELs are diverse and vary by building type, but research shows that some CMELs are more amenable to controls both for energy efficiency and/or demand response.**Error! Bookmark not defined.** Strategies for controls solutions for small- and medium-sized commercial buildings should include scheduling, occupancy-based controls, and grid responsiveness, including: control of personal computers (PCs) in office environments and occupancy-based control of non-essential loads in office and non-office environments.

The major requirements for a BAS for small- and medium-sized commercial buildings are: 1) interoperability; 2) scalability; 3) ease of deployment; 4) open architecture; 5) plug-n-play capabilities; and 6) the ability to provide local or remote monitoring. With only few exceptions, the fundamental building blocks necessary to develop a cost-effective controls solution exist. However, these building blocks have to be packaged in such a way that they are cost-effective, open, standard,

---

[3] "Buildings Energy Data Book", 28 Feb. 2013, http://buildingsdatabook.eren.doe.gov/ChapterIntro3.aspx.
[4] "Small- and Medium-Sized Commercial Building Monitoring and Controls Needs: A Scoping Study," October 2012, http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-22169.pdf

and truly "plug-n-play" in order to motivate deployment of controls technologies into these buildings. In the past most BAS used proprietary architectures, leaving building owners and controls designers with no choice but to specify BAS field devices and controllers from a single vendor for compatibility. The customers did not have the flexibility to choose the best products, controls, and services at optimum prices for the desired performance from different vendors. With the advent of, for example, BACnet, which is an open, standard protocol (American Society of Heating, Refrigerating and Air Conditioning Engineers/American National Standards Institute standard), owners and designers now have a choice.[5] These protocols support integration of the control networks with the Internet. However, these protocols only guarantee that certain minimum compliance specifications, as required by the respective standards, are met.

FOA Successful Applicant Description

The successful applicant will develop a "turn key" BAS open source architecture software solution specifically tailored to small- and medium-buildings to advance opportunities for energy efficiency in this sector. Various existing solutions (some not necessarily found in the buildings sector today) might be considered and leveraged, where appropriate in response to this FOA. The solution should comprise the following components:

1. An open source architecture platform developed and tested initially at the lab scale and then in demonstration buildings; this will also require parallel development of three plug and play devices to demonstrate functionality of the platform
2. A user-interface that showcases the open architecture platform
3. At least three software tools (i.e. "apps") that are accessible through the user-interface and provide the capabilities for: control system set-up, system status display, and control system point auto-mapping.

Open Source Architecture Software Platform

The successful applicant will develop an *open source architecture software solution/platform* that addresses key requirements for a small- and medium-sized commercial building BAS:

1) Interoperability
2) Scalability
3) Ease of deployment
4) Open architecture
5) Plug-n-play capabilities[6]
6) Ability to provide local and remote monitoring

The software will be designed to connect and communicate seamlessly with all the hardware and components prevalent in small- to medium-sized commercial buildings, including stand-alone input devices such as the utility power meter, temperature sensors, occupancy sensors and others. For this solution, the term 'Open' or 'Open Source' as described in Appendix D is used to define a software platform that will be freely available to users such that a community of programmers can continue

[5] "BACnet," 28 Feb. 2013, http://www.bacnet.org/
[6] "Plug-n-play", 28 Feb. 2013,< http://www.techterms.com/definition/plugandplay>

the “long term care and feeding” of the platform. The Applicant must describe how, following the end of this three year project, the proposed open source architecture solution might be sustained as the platform matures and the building controls market adopts and deploys this solution.

To understand how best to design the open source architecture software, one must appreciate the diverse controls needs of small- and medium-sized commercial buildings since flexible and adaptable solutions will be required. For example in many small buildings, it may not be possible to cost effectively control the lighting loads using a central controller. Therefore, a simple control solution for small buildings could consist primarily of programmable thermostats that are connected to HVAC devices (e.g. rooftop units) and may also include controllers for small miscellaneous loads (e.g. plug loads, small exhaust fans). This configuration should have a central (supervisory) coordinating device or gateway controller. The communication between the controller and gateway can either be wired or wireless. While improving the energy efficiency of the building, this controls solution can also be leveraged to make the building and its systems more grid responsive. The control of lighting loads may be achieved with local independent occupancy sensors, standalone contactor timer devices or lighting automation. Control functions should be distributed primarily amongst the programmable controllers (i.e. thermostats and small load controllers). Additionally, there may be various “global” functions (e.g. fault detection, diagnostics, optimization) embedded in a central coordinating device/gateway. These functions may include (but are not necessarily limited to) things like alarm management (i.e. alarm monitoring and alarm notification), data management (i.e. trending, storage and retrieval), and communication with external sources, such as cloud based systems.

In all cases, the open source architecture software solution must support data/information exchange such that devices within the building that provide services (e.g. cooling, ventilation, occupancy information, etc.) can share common data/information and enable a ‘transaction’ to occur against a set of requirements such as cost, comfort or energy consumption. In this way, enhanced strategies that are typically only available to highly sophisticated automation systems (self-commissioning, self-heating and self-optimizing) can be delivered in a cost effective and scalable way.

In parallel to the software solution development, three plug and play devices must be developed to demonstrate functionality of the platform. These include:

1. Thermostat device
2. Lighting controller device
3. General purpose control device

Modification of existing equipment in a bread board fashion that demonstrates the plug and play capability is acceptable. Any underlying software developed to support operation of these devices is also considered Open Source as described in Appendix D.

User Interface and Software Tools

To demonstrate and showcase the capabilities of the open source architecture software platform, a user-interface is a required component of this project. The user-interface should have the following characteristics:

1. Control system set-up – this software tool will enable the user to make various inputs to the BAS, including schedules and set-points.

2. Systems status display – this software tool will be capable of providing a dynamic display of the status of various equipment and devices throughout the building.

3. Control system point auto-mapping – this software tool will be capable of communicating with and querying the equipment and devices in the building so that these systems can be "mapped" automatically.

General Technical Specifications

With only few exceptions, the fundamental building blocks (e.g. the hardware, devices, components, etc.) necessary to develop a cost-effective controls solution for small- and medium-sized commercial buildings actually exist today but are not suitable for deployment into this building sector. It is expected that the open source architecture software solution and associated components will encourage vendors to develop hardware solutions that are compatible, standard and plug-n-play to maximize the automation capabilities of the small- and medium-sized buildings portfolio. Applications must address how the open architecture platform will be tested using three devices: a thermostat, a lighting controller and a general purpose controller. Applicants should consider the following associated specifications for the design and development of the software platform and associated components. These are guidelines (not requirements) for the platform, but proposed solutions that stray from these specifications should explain why alternatives might be preferred.

Thermostat device specifications:

- Configured for wired or wireless communication
- Use of a new or existing industry-recognized communication protocol
- Use of a local display with keypad, touchscreen or laptop computer (for standalone mode) for programming purposes
- Capable of accepting set point changes, schedule changes and time synchronization commands from a gateway/master controller, if connected to them
- Capable of supporting web services
- Capable of handling occupancy and holiday scheduling with the ability to make changes locally at the thermostat, including capabilities for: occupied and unoccupied set points; occupancy sensors; occupancy override (push button and/or web service); optimal start, adaptive recovery, efficient setback recovery or similar; and programmable alarm (temperature and/or equipment)
- Capable of receiving signals from external sources and act on them, for example, demand response, price, reliability, ancillary service signals from utilities or independent system operators/third parties (if not connected to either a gateway device or master controller)
- Multiple zone temperature sensor inputs (average, high or low; wired and wireless)
- Economizer mode (with demand controlled ventilation capability) with the ability to make changes locally at the thermostat
- Spare digital and analog inputs (two each) for monitoring/diagnostics
- Outdoor air temperature inputs (wired, wireless or web-connected)
- Alarm parameters for temperatures (low/high), equipment runtime hours or equipment performance issues
- Capable of sending email or text upon alarm activation via a communication service (if not connected to either a gateway device or master controller)
- Three levels of security via password authorization (i.e. for basic, advanced and administrative functions)

Lighting controller specifications:

- Configured for wired or wireless communication
- Use of a new or existing industry-recognized communication protocol

- Use of a local display with keypad, touchscreen or laptop computer (for standalone mode) for programming purposes
- Capable of accepting set point changes, schedule changes and time synchronization commands from a gateway/master controller, if connected to them
- Capable of supporting web services
- Capable of handling occupancy and holiday scheduling with the ability to make changes locally at the controller, including capabilities for: occupied and unoccupied set points; occupancy sensors; occupancy override (push button and/or web service) with automatic "sweep" off option
- Daylighting control for perimeter spaces with window/natural daylighting (but could include interior spaces with atriums, skylights, etc.) with the ability to make changes locally at the controller
- Exterior lighting control via astrological clock and photocell with the ability to make changes locally at the controller
- Capable of receiving signals from external sources and act on them, for example, demand response, price, reliability, ancillary service signals from utilities or independent system operators/third parties (if not connected to either a gateway device or master controller)
- Alarm parameters for equipment runtime hours (e.g. excessive light circuit "on" hours) or equipment performance issues (e.g. reduced light levels or increased output for dimming systems with light level sensors).
- Capable of sending email or text upon alarm activation via a communication service (if not connected to either a gateway device or master controller)
- Three levels of security via password authorization (i.e. for basic, advanced and administrative functions)

<u>General purpose controller specifications:</u>

- Configured for wired or wireless communication
- Use of a new or existing industry-recognized communication protocol
- Use of a local display with keypad, touchscreen or laptop computer (for standalone mode) for programming purposes
- Capable of supporting web services
- Capable of handling occupancy and holiday scheduling with the ability to make changes locally at the controller, including capabilities for: occupied and unoccupied set points; and occupancy sensors
- Capable of receiving signals from external sources and act on them, for example, demand response, price, reliability, ancillary service signals from utilities or independent system operators/third parties (if not connected to either a gateway device or master controller)
- Three levels of security via password authorization (i.e. for basic, advanced and administrative functions)

<u>User interface and Software Tools specifications and desired features/benefits:</u>

- Setting and changing of schedules
- Adjusting of setpoints and other control properties
- Graphical trending of all important building conditions, including energy and comfort
- Programming of alarms
- Intuitive, comprehensive building operation with dynamic, interactive graphical access
- Designed to open source standards (see Appendix D)

- Uses the language of the web (HTTP) to communicate over the Internet or intranet without special software or plug-ins
- Advanced alarm management capabilities including email, pagers, network printers, etc.
- Multi-level passwords and Secure Sockets Layer (SSL) with 128-bit encryption for security
- Presentation of data to a user in a clear and concise format
- High-resolution color graphics system status display that can be tailored to the requirements of each individual facility and designed to accommodate novice and experienced operators
- Extensive use of menus, toolbars, and icons to allow intuitive navigation and fast access to important information
- Display and control of field equipment
- Acknowledgement of alarms on a priority basis
- Display of point status and history information
- Ability to initiate printing of reports
- Viewing, archiving and retrieval of event logs
- Ability to monitor data communications channels

Applications should also address how the following hardware design requirements may be considered in the design of the software platform:

- Common power source(s)
- Common physical platform(s) (e.g. one device for all RTU configurations or one device per RTU configuration)
- Common physical connections (screw terminals, connectors, etc.)
- Common physical communication layers/standards
- Common wireless communication standards
- Common grid response standards

Additional Project Information

The applicant will propose a three year project encompassing the following deliverables (actual deliverables will be negotiated prior to award):

Year 1:

- Prototypes of the open architecture software platform, user-interface solution and three software tools
- Selection, design and development of three prototype plug and play hardware solutions (thermostat, lighting controller, general purpose controller)

Year 2 (software enhancement, debugging and testing in lab setting):

- Building test-bed results, demonstrating successful BAS operation with three hardware devices (thermostat, lighting controller, general purpose controller)
- Next generation of the open architecture software platform, user-interface solution and three software tools

Year 3 (software enhancement, debugging and testing in building):

- Building test results, demonstrating successful BAS operation with mechanical and electrical equipment
- Successful delivery of the open architecture software platform, user-interface solution and three software tools into the marketplace

It is expected that at the completion of the third year, the project will have led to a market-ready open source software solution available for release and download. The application should address demonstration and associated hardware needs for the third year, and therefore partnerships between software developers, controls/hardware/device experts, and building managers/owners are encouraged. The demonstration phase should involve the testing of the software platform in at least three actual small- and medium-sized buildings. The application must outline the requisite hardware configurations that will be tested during this phase although specific buildings do not need to be identified until year 2. Nonetheless, applications that identify specific buildings as candidates for testing (e.g. through identified partnerships with building owners/managers) may be given preference. All applications should specify general building characteristics and requirements for the demonstration phase.

Although the National Laboratories are eligible to apply to this FOA, individuals at FFRDC's who participated in the development of this FOA may not participate in the application process. A successful awardee may seek to engage building controls experts at the National Laboratories who participated in this FOA as technical advisors during the course of the project, once a notice of award is issued. Such interaction with technical advisors is forbidden without the DOE's prior approval. If input from FFRDC technical advisors is required for an award, DOE will work with the successful applicant during the award phase to implement a collaboration agreement with the relevant parties. The applicant's budget need not reflect costs associated with a potential collaboration with such National Laboratory experts.

The National Laboratories authored a DOE report on small- and medium-sized commercial buildings that can be downloaded here: http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-22169.pdf. This report should be referenced for additional details regarding requirements of the small- and medium-sized BAS.

Project Team:

The applicant should describe the elements/background of the proposed team that makes them uniquely suited to successfully execute the project. The application should address demonstration and associated hardware needs for the second and third years, and therefore partnerships between software developers, controls/hardware/device experts, and building managers/owners are encouraged. The team must involve an individual with project management-related experience who will be largely responsible for project management tasks outlined in the work plan. It is expected that the Principal Investigator (PI) will have both technical and management roles.

SECTION II – AWARD INFORMATION

A. Type of Award Instrument

Cooperative Agreements

- DOE anticipates awarding cooperative agreements under this program announcement (See Part VI.B.4, Statement of Substantial Involvement).

B. Estimated Funding

Amount of New Awards

- Approximately $3,000,000 in Federal Funds is expected to be available for new awards under this announcement, subject to availability and appropriations.

C. Expected Number of Awards

- DOE anticipates making up to 3 awards under this announcement. DOE may choose to make three awards initially and then down-select to one awardee at or around the completion of the first year of the project.

D. Anticipated Award Amount

- Ceiling (i.e., the maximum amount for an individual award made under this announcement): $3,000,000
- Floor (i.e., the minimum amount for an individual award made under this announcement): $1,000,000

E. Period of Performance

Number of Years

- DOE anticipates making an award with duration of three (3) years.
- Projects must be designed with three (3) distinct phases, with a formal go/no-go decision point between each phase. Each phase must have a maximum duration of 12 months. Each go/no-go decision will be made by DOE following a project review and consultation with the applicant. Decision criteria will be established prior to award. To assist with the decision-making process, DOE may use both federal and non-federal experts to provide independent evaluation and advice.

F. Type of Application

New Applications Only

DOE will accept only new applications under this announcement (i.e., applications for renewals of existing DOE funded projects will not be considered).

G. Environmental Review in Accordance with National Environmental Policy Action (NEPA)

The federal funds distributed under this FOA are subject to the National Environmental Policy Act, 42 U.S.C. §§ 4321 et seq. (NEPA). NEPA requires federal agencies to integrate environmental values into their decision-making processes by considering the 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 projects 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.

H. Performance of Work in the United States

EERE strongly encourages interdisciplinary and cross-sectoral collaboration spanning organizational and national boundaries. Such collaboration enables the achievement of scientific and technological outcomes that were previously viewed as extremely difficult, if not impossible.

EERE requires all work under EERE funding agreements to be performed in the United States – i.e., prime recipients must expend 100% of the total project cost in the United States.

Applicants and prime recipients may request a waiver of this requirement. Applicants must include a written waiver request in the Full Application. Prime recipients must submit any waiver requests in writing to the assigned DOE Contracting Officer. The DOE Contracting Officer has discretion to waive this requirement if he/she determines that it will further the purposes of this FOA and is otherwise in the interests of EERE. See Section IV.D.10 of the FOA for waiver request information.

SECTION III - ELIGIBILITY INFORMATION

A. Eligible Applicants

1. Individuals

U.S. citizens and lawful permanent residents are eligible to apply for funding as a prime recipient or subrecipient.

2. Domestic Entities

For-profit entities, educational institutions, and nonprofits[7] 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.

State, local, and tribal government entities are eligible to apply for funding as a prime recipient or subrecipient.

Although DOE/NNSA Federally Funded Research and Development Centers (FFRDCs) and DOE Government-Operated Government-Owned laboratories (GOGOs) are eligible to apply for funding as a prime recipient or subrecipient, individuals from FFRDCs and GOGOs that participated in the preparation of this FOA are not eligible to participate in the application process.

Although non-DOE/NNSA FFRDCs and non-DOE GOGOs are eligible to apply for funding as a prime recipient or subrecipient, individuals from FFRDCs and GOGOs that participated in the preparation of this FOA are not eligible to participate in the application process.

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.

3. 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. 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. Foreign entities may request a waiver of this requirement in the Full Application. See Section IV.C.10 for waiver request information. The DOE Contracting Officer has discretion to waive this requirement if he/she determines that it will further the purposes of this FOA and is otherwise in the interests of EERE.

A foreign entity may receive funding as a subrecipient.

[7]Nonprofit organizations 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.

4. 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.

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 DOE Contracting Officer.

5. 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 DOE 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 20%

- The cost share must be at least 20% of the total allowable costs for research and development projects (i.e., the sum of the Government share 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. (See 10 CFR Part 600 for the applicable cost sharing requirements.)
- Cost share for university, National Laboratories, FFRDCs, and non-profit entities, whether participating as a prime recipient or sub-recipient, is 0% of total project costs.
- Cost share may be incurred in equal installments over the life of the award. In the alternative, the Prime Recipient may accelerate (front-load) cost share amounts in the initial months of the award. DOE will not accept any proposal to pay the entire cost share amount in the final months (back-loaded cost share) of the award.

C. Questions Regarding Eligibility

DOE 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.

SECTION IV – APPLICATION AND SUBMISSION INFORMATION

A. Address to Request 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.

(*e.g. ControlNumber_LeadOrganization_Project_Part_1, Part_2, etc.*)

B. Concept Paper

Concept Paper Required

- Concept Papers must conform to the following form and content requirements, including maximum page lengths, described below. Concept Papers must be submitted via EERE Exchange at https://eere-exchange.energy.gov/. A control number will be issued when an Applicant begins the concept paper submission process. This control number must be included with the Full Application documents, as described in Section C. below.
- Each Concept Paper should be limited to a single concept or technology. Unrelated concepts and technologies should not be consolidated into a single Concept Paper.
- To be eligible to submit a Full Application to this Announcement, Applicants must submit a Concept Paper by the required due date. Following the Concept Paper phase, applicants will receive a notice as to whether or not they are encouraged or discouraged to submit a full application.
- The typical Concept Paper should express a consolidated effort in support of the concepts or ideas outlined in this FOA. No facsimile or hard copy submissions will be accepted; Concept Paper submissions are to be made via the Exchange at https://eere-exchange.energy.gov/.
- The body of the Concept Paper is limited to three (3) pages. If a Concept Paper exceeds the page limitation, only the first three (3) pages will be reviewed. All pages must be formatted to fit on 8-1/2 by 11 inch paper with type not smaller than 12 point font, except in figures and tables, and margins not less than one inch on every side. The Concept Paper must be submitted as a PDF file. The page limitation for Concept Papers includes all figures, tables, and charts (See concept paper structure below). Concept Papers must contain all pertinent information – no external data sources (e.g., websites) should be required for Concept Paper review. All applications must be written in English.

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.

(*e.g. ControlNumber_LeadOrganization_Project_Part_1, Part_2, etc.*)

Concept Paper Structure:

Cover Page: Not included in three (3) page limit.

Include Project Title, Submitting organization, Principal Investigator.

Body: The body of the concept paper is limited to three (3) pages.

1. Project Objectives:
   This section should provide a clear, concise statement of the specific objectives/aims of the proposed project.
2. Project Description:
   Describe the fundamental characteristics of the proposed open source architecture solution, including information about programming language, communication protocols, hardware interface requirements, etc. Explain how software requirements described in this FOA will be met. Describe how the software is envisioned to be employed in a BAS for small and medium-sized buildings, including information about the user-interface and associated hardware and software tools (plug and play devices, system set-up, system status display and auto-mapping) to be developed. Describe how the demonstration phase of the project (year 3) is expected to proceed. Discuss benefits, shortcomings, limitations and challenges. Present an overview of the tasks required to achieve the goals of the project, specifying expected milestones to be reached in the three years of the program.
3. Roles of Participants:
   Describe the specific attributes of the assembled project team that uniquely qualifies it to successfully conduct the proposed project plan. Identify the project coordinator for this project and the role played in execution of the project.

Summary Slide (1 page)

Applicants are required to provide a single slide summarizing the proposed project. A template for the summary slide is provided in Microsoft PowerPoint on the Exchange server and must be submitted in Adobe PDF format. The slide must conform to the format shown in Appendix E. This slide is used during the evaluation process. The slide should include the following information:

- Institution and Principal Investigator
- Summary of the proposed project/solution
- Potential impact of the proposed project relative to the state of the art, i.e., uniqueness of the innovative concept
- Proposed target metrics, relative to the state of the art
- Key graphics or tables showing the impact of the proposed work

C. Content and Form of Application

You 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 receive a Control Number once they "Apply to this FOA" on the EERE Exchange website and should include the Control Number in the file name, as indicated below. This Control Number was issued if a Concept Paper was previously submitted.**

1. **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 year, first phase or other subset of the project period. Save the information in a single file titled "ControlNumber_LeadOrganization_App424."

2. **Project Summary/Abstract File**

   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 identifies 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 if an award is made. The project summary must not exceed 1 page when printed using standard 8.5" by 11" paper with 1" margins (top, bottom, left and right), single spaced, with font not smaller than 11 point. Save the information in a single file titled "ControlNumber_LeadOrganization_Summary."

3. **Project Narrative File**

   The project narrative must not exceed 20 pages, including cover page, table of contents, charts, graphs, maps, photographs, and other pictorial presentations, when printed using standard 8.5" by 11" paper with 1 inch margins (top, bottom, left, and right), single spaced. EVALUATORS WILL REVIEW ONLY THE NUMBER OF PAGES SPECIFIED IN THE PRECEDING SENTENCE. The font must not be smaller than 11 point. Do not include any Internet addresses (URLs) that provide information necessary to review the application. See Section VIII.D for instructions on how to mark proprietary application information.

   The project narrative must contain the following sections in the order specified and carefully address all the questions and content described here. Please use the headings and sub-headings as indicated below in the project narrative so that these sections and sub-sections can be easily located and identified within the document. A different heading numbering/lettering scheme may be used. If, after addressing these sections, the maximum of 20 pages has not been reached, then the applicant may choose to include additional information in the remaining pages.

   Save the information in a single file titled "ControlNumber_LeadOrganization_Project."

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.

(*e.g. ControlNumber_LeadOrganization_Project_Part_1, Part_2, etc.*)

a) Project Objectives:
This section should provide a clear, concise statement of the specific objectives/aims of the proposed project.

b) Technology Description: Present the status of current technology used in the industry and how the work proposed here extends beyond currently available state-of-the-art technology. Present an overview of the tasks required to achieve the technological goals of the project. In all sections discuss benefits, shortcomings, limitations and challenges.

1. *Open Source Architecture Software Solution:*
   Describe the fundamental characteristics of the proposed open architecture solution, including information about programming language, communication protocols, hardware interface requirements, etc. Explain how software requirements, including the need to be open source, described in this FOA will be met or provide justification for alternative approaches. Describe how the software is envisioned to be employed in a BAS for small and medium-sized buildings. Describe characteristics of the three plug and play devices and how they will be developed to demonstrate functionality of the platform.

2. *User Interface and Software Tools*
   Provide information about the proposed user-interface, including detail on the expected display characteristics and user-experience. Provide information as to how the three software tools (system set-up, system status display and auto-mapping) will be developed and what considerations will be made to ensure a robust solution set.

3. *Building Test-bed*
   Describe how plug and play hardware (thermostat, lighting controller and general purpose controller) will interface with the software. Describe how the software solutions will be tested using a lab-scale building test-bed and how results will be used to further refine the software and software tools.

4. *Building demonstration*
   Describe the building and associated mechanical and electrical systems expected to be used for the demonstration phase. Describe how the overall system will be tested in the building and how results will be used to further refine the software and software tools.

c) Work Plan:

Present and discuss the technical tasks required to achieve the goals of the project using the illustrative work plan below as a guide. Include a description or justification to accompany the detailed work plan, explaining how the team expects to accomplish milestones by the designated dates. Include potential barriers to success in the explanation. Provide sufficient detail that specialists in the field can understand and evaluate the relevant steps.

The detailed work plan must propose concrete verifiable milestones/deliverables and go/no-go decision points. Milestones typically relate to product functionality and clearly demonstrate the progress being made. Applicants must establish exactly what the relevant milestones/deliverables for their projects are, and the functionality must be

verifiable. This means that although reports are required as part of the FOA, they cannot not be used as milestones. Reports summarize observations, milestones validate functionality. It is the Applicant's responsibility to convince reviewers that the proposed milestones/deliverables demonstrate clear progress towards the final project goal. Project objectives should be structured in a way that the DOE can verify the achievement of the deliverable. If an Applicant cannot explain how a deliverable would be verified, it is not an acceptable deliverable.

Indicate points of go/no-go decision-making at the end of each full year of the proposed plan. The milestones associated with the work plan tasks, form the foundation for defining and achieving the project go/no-go decision points. It is important that the task structure supports the proposed go/no-go decision point and that the proposed go/no-go decision points are of high value and challenging yet achievable. Applicants should take extreme care in drafting the go/no-go decision points. Achievement and verification of the go/no-go is required for continuation of the award. Conversely, failure to meet the go/no-go decision points or deliverables by the specified deadline may result in DOE's non-participation in subsequent phases of the effort. The applicant should not propose go/no-go decision points that can currently be achieved, or go/no-gos that cannot be achieved in the specified timeframe. The reviewers consider the proposed work plan carefully when assigning scores to evaluation criteria. go/no-go decision points are one of the most, if not the most, important part of this application, and form the basis for award negotiations once a project is selected.

The work plan must also include general budget estimates associated with each task. Any indirect costs, travel or other miscellaneous related expenses may be integrated into requirements of a specific task, as applicable, or be included as a separate line item on the work plan. The total of the estimated task costs should be equal to the total budget request submitted.

Work Plan: Illustrative Template

Task	Key milestone/ deliverable	Required resources to achieve milestone (e.g. equipment, staff, etc.)	Estimated costs	Start date	Planned completion date
Energy modeling analysis to support development of bioreactor prototype.	Energy modeling complete	Senior researcher, software	$ 200,000	9/2012	8/2013 (go/no go point)
First phase of bioreactor development	Achieve initial bioreactor performance metrics (specified in Section X.Y)	Researchers (3), bioreactor component purchases, materials/supplies	$300,000	6/2013	6/2014
Initial assessment of bioreactor performance metrics over five, 10 hour performance runs	Complete testing protocol	Researchers (3), bioreactor testing apparatus purchases	$100,000	3/2014	8/2014 (go/no go point)
Liquid biomass feedstock selection through analysis of nutrient requirements	Select micro-organisms feedstock(s)	Researchers (1), travel	$50,000	3/2014	6/2014
Second phase of bioreactor development	Achieve secondary bioreactor performance metrics (specified in Section X.Y)	Researchers (3), bioreactor component purchases, materials/ supplies	$300,000	4/2014	4/2015
Verify all bioreactor performance metrics for all microorganisms feedstocks over 3, 7 and 14 days of operation	Complete testing protocol	Researchers (3), bioreactor testing apparatus purchases	$100,000	1/2015	6/2015
Experiments to determine optimal conditions for bioreactor operation	Finalize bioreactor operational conditions to achieve 95% energy efficiency	Researchers (3), materials/supplies	$50,000	6/2015	8/2015
Cost model for bioreactor operations	Finalize cost model and design report for bioreactor scale up	Researchers (1), travel	$50,000	6/2015	8/2015

Total budget request: $1,150,000

d) Relevance and Outcomes/Impacts:

This section should explain the relevance of the effort to the objectives in the program announcement and the expected outcomes and/or impacts. The justification for the proposed project should include a clear statement of the importance of the project in terms of the utility of the outcomes and the target community of beneficiaries.

e) Roles of Participants:

Describe the specific attributes of the assembled project team that uniquely qualifies it to successfully conduct the proposed project plan. Identify the project coordinator responsible for project management for this project and his/her role played in the execution of the project. For multi-organizational or multi-investigator projects, describe the roles and the work to be performed by each participant/investigator. Business agreements between the applicant and participants, and how the various efforts will be integrated and managed can be described in more detail in the Management Plan included in the Appendix.

f) Facilities and Other Resources:

Identify the facilities (e.g., office, laboratory, computer, etc.) to be used at each performance site listed, and, if appropriate, indicate their capacities pertinent capabilities, relative proximity, and extent of availability to the project. Describe only those resources that are directly applicable to the proposed work. Provide any information describing the other resources available to the project, such as machine and electronics shops.

g) Merit Review Criterion Discussion:
This section should be formatted to address each merit review criterion and sub-criterion listed in Part V. A. below. Provide sufficient information so that reviewers will be able to evaluate the application in accordance with these merit review criteria. DOE WILL EVALUATE AND CONSIDER ONLY THOSE APPLICATIONS THAT SEPARATELY ADDRESS EACH MERIT REVIEW CRITERION AND SUB-CRITERION.

All the components of your Project Narrative must be within the Narrative page limit specified in paragraph 3 above. Documents listed below may be included as clearly marked appendices to your Narrative and will not count towards the Project Narrative page limit. Please note that some of the required documents listed below may have their own page limits to which you must adhere.

4. Summary Slide (1 page)

Applicants are required to provide a single slide summarizing the proposed project. Save the information in a file titled "ControlNumber_LeadOrganization_Summary_Slide." The slide must be submitted in Adobe PDF format and conform to the format shown in Appendix F. This slide is used during the evaluation process, together with the rest of the application. The slide should include the following information:

- Institution and Principal Investigator
- Summary of the proposed project/solution

- Potential impact of the proposed project relative to the state-of-the-art, i.e., uniqueness of the innovative concept
- Proposed target metrics, relative to the state-of-the-art
- Key graphics or tables showing the impact of the proposed work

5. **Appendices (no page limit).** Save this information in a single file titled "Control#_LeadOrganization_Appendix.pdf."

- **Literature cited:** Provide sufficient reference to the primary research literature to justify claims and approaches made in the text.

- **Management Plan:** Provide a management plan that ensures continuous effective communication between performance team members. The management plan should clearly define the roles of each team member and describe any critical handoffs/interdependencies between team members. In particular, describe the roles and responsibilities of the projectprincipal Investigator. The decision to use multiple PIs for a project is the sole responsibility of the applicant. If multiple PIs will be designated, the application must identify a single Contact PI/Project Coordinator and describe his/her role clearly in the management plan. This plan should, at a minimum, include:
    - Process for making decisions on scientific/technical direction;
    - Process for making decisions regarding publication submissions (if applicable);
    - Intellectual property issues;
    - Communication plans;
    - Procedures for resolving conflicts;
    - Risk mitigation strategies;
    - PIs' roles and administrative, technical, and scientific responsibilities for the project.
- **Biographical sketch for each key participant (Up to two pages).** A key participant is any individual who contributes in a substantive, measurable way to the execution of the project. Each biosketch must include: education/training, employment history, awards/honors, up to 10 peer-reviewed publications specifically related to this project, up to 10 other publications demonstrating capabilities in the broad field. The biographical sketch must not exceed 2 pages when printed on 8.5" by 11" paper with 1 inch margins (top, bottom, left, and right), single spaced, with font not smaller than 11 point.

- **Current and Pending Funding:** BTO seeks to fund high impact projects that can be accelerated through the development and commercialization pipeline where BTO support represents strong additionality and little or no overlap relative to other available sources of funding for the project. Please describe all relevant current and pending sources of support available for the proposed project, if any. Academic and non-profit performers should list all relevant existing sources of support, both

external and internal. For-profit applicants should list all relevant prior, existing and pending financial support that has been or is available for the proposed project, including pending funding applications to public and non-profit sources of support that impinge directly or indirectly on the proposed work, and internal sources of funding for the proposed work or related work that impinges on the proposed program. If no internal sources of funding are available for the proposed work or related work, a clear statement to this effect should still be included.

This appendix item should describe:

- All funding the key participants currently receive from DOE. Explain how the proposed work is not redundant with on-going DOE funded work.
- Identify all other funding sources, whether Federal or not, that the key participants currently receive which support the substance of the proposed work.
- Identify whether the key participants have previously submitted the substance of this work to DOE, regardless of whether it was funded. If so, identify when it was submitted and to what DOE program.

6. Budget File

SF 424 A Excel, Budget Information – Non-Construction Programs File

You must provide a separate budget for each year of support requested and a cumulative budget for the total project period. Use the SF 424 A Excel, "Budget Information – Non Construction Programs" form on the DOE Financial Assistance Forms Page at http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms. The SF424A provides columns for each indiviual budget-year as well as the commulative project-budget.

You may request funds under any of the Object Class Categories as long as the item and amount are necessary to perform the proposed work, meet all the criteria for allowability under the applicable Federal cost principles, and are not prohibited by the funding restrictions in this announcement (see Section IV, G). Save the information in a single file titled "ControlNumber_LeadOrganization_SF424A."

7. Budget Justification File (PMC 123.1)

PMC 123.1 Budget Justification File

You must justify the costs proposed in each Object Class Category/Cost Classification category using the PMC 123.1 Budget Justification File. The total project cost, including cost share (if applicable) and federal funding, must be represented in this document.

Save the budget justification information in a single file titled "ControlNumber_LeadOrganization_Budget."

8. Letters of Commitment

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. **All Letters of Commitment must be attached as an Appendix to the Project Narrative File.** 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 must be included as part of this Appendix to the Narrative. Letters of Commitment will not count towards the Project Narrative page limit. All Letters of Commitment must be attached as an Appendix to the Project Narrative File. Do not include letters of support (letters not associated with cost share).

9. Environmental Questionnaire

You must complete the environmental questionnaire on-line at https://www.eere-pmc.energy.gov/NEPA.asp. Save the questionnaire in a single file titled "ControlNumber_LeadOrganization_Env."

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.

(*e.g. ControlNumber_LeadOrganization_Project_Part_1, Part_2, etc.*)

10. SF-LLL Disclosure of Lobbying Activities

If applicable, complete the SF- LLL. Applicability: If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the grant/cooperative agreement, you must complete and submit Standard Form - LLL, "Disclosure Form to Report Lobbying." If applicable, save the SF-LLL in a single file titled "ControlNumber_LeadOrganization_SF LLL."

11. Waiver Request- (a) Foreign Entities and (b) Performance of Work in the United States (If Applicable)

As set forth in Section III, 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. 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. Section III further requires that all work under EERE funding agreements to be performed in the United States – i.e., prime recipients must expend 100% of the total project cost in the United States.

To seek a waiver of either requirement, the Applicant must submit a waiver request in the Full Application, which includes the following information: entity name, country (or state) of incorporation, description of the work to be performed by that entity, and the location where the work will be performed. If the applicant is seeking a waiver to have a foreign entity serve as the prime recipient, the applicant must explain why it is necessary to have a foreign entity serve as the prime recipient. If the applicant is seeking a waiver of the "Performance of Work in the United States" requirement, the applicant must explain why it is necessary to have the work performed outside of the United States. All waiver requests should explain how the waiver would further the purposes of this FOA and otherwise serve

the interests of EERE. The Contracting Officer may require additional information before considering the waiver request. Save the Waiver Request(s) in a single file titled "ControlNumber_ LeadOrganization_Institution_Waiver."

Summary of Required Forms/Files

Your application must include the following documents:

Name of Document	Format	File Name
1. SF 424 - Application for Federal Assistance	Part of Adobe Application Package	ControlNumber_LeadOrganization_App424
2. Project Summary/Abstract File	PDF	ControlNumber_LeadOrganization_Summary
3. Project Narrative File	PDF	ControlNumber_LeadOrganization_Project
4. Summary Slide	PDF	ControlNumber_LeadOrganization_Summary_Slide
5. Appendix File	PDF	ControlNumber_LeadOrganization_Appendix
6. SF 424A Excel – Budget Information for Non-Construction Programs File	Excel	ControlNumber_LeadOrganization_SF424A
7. PMC 123.1 Budget Justification File	Excel	ControlNumber_LeadOrganization_Budget
8. Letters of Commitment		
9. Environmental Questionnaire	PDF	ControlNumber_LeadOrganization_Env
10. SF-LLL Disclosure of Lobbying Activities, if applicable	PDF	ControlNumber_LeadOrganization_SF LLL
11. Waiver Request: Foreign Entities and / or Performance of Work in the United States, if applicable	PDF	ControlNumber_LeadOrganization_Institution_Waiver

D. Submissions from Successful Applicants

If selected for award, DOE 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
- Commitment Letter from Third Parties Contributing to Cost Share, if applicable
- 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
- Additional supporting materials

E. Submission Dates and Times

1. Concept Paper Due Date

Concept Papers must be received by April 22, 2013, not later than **5:00 PM Eastern Time**. You are encouraged to transmit the Concept Paper well before the deadline. Applicants must submit a Concept Paper by the due date to be eligible to submit an Application.

2. Concept Paper Notification

Following the Concept Paper application phase, applicants will receive a notice as to whether or not they are encouraged or discouraged to submit a full application.

3. Application Due Date

Application Due Date and Submission Time

Applications must be received by June 24, 2013, not later than **5:00 PM Eastern Time**. You are encouraged to transmit your application well before the deadline. **APPLICATIONS RECEIVED AFTER THE DEADLINE WILL NOT BE REVIEWED OR CONSIDERED FOR AWARD.**

F. Intergovernmental Review

Program Not Subject to Executive Order 12372

- This program is not subject to Executive Order 12372 – Intergovernmental Review of Federal Programs.

G. Funding Restrictions

Funding for all awards and future budget periods are contingent upon the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority.

Cost Principles**.** Costs must be allowable in accordance with the applicable Federal cost principles referenced in: 2 CFR 220 for Educational Institutions; 2 CFR 225 for State, Local, and Indian Tribal Governments; 2 CFR 230 for Non Profit Organizations and FAR Part 31 for commercial organizations.

Pre-award Costs**.** Recipients may charge to an award resulting from this announcement pre-award costs that were incurred within the ninety (90) calendar day period immediately preceding the effective date of the award and no earlier than the selection date, if the costs are allowable in accordance with the applicable Federal cost principles referenced in 10 CFR part 600. Recipients must obtain the prior approval of the Contracting Officer for any pre-award

costs that are for periods greater than this 90 day calendar period.

Pre-award costs are incurred at the applicant's risk. DOE is under no obligation to reimburse such costs if for any reason the applicant does not receive an award or if the award is made for a lesser amount than the applicant expected.

If recipients are State or Local Governments, they may not incur pre-award costs prior to award, without prior approval of the DOE Contracting Officer.

H. Submission and Registration Requirements

1. Where to Submit

CONCEPT PAPERS AND APPLICATIONS MUST BE SUBMITTED UNDER THIS ANNOUNCEMENT THROUGH EERE EXCHANGE at

https://eere-exchange.energy.gov/ TO BE CONSIDERED FOR AWARD. You cannot submit a Concept Paper or an application through EERE Exchange unless you are registered. Please read the registration requirements below carefully and start the process immediately. Concept Papers and Applications submitted by any other means will not be accepted.

If you have problems completing the registration process or submitting your application, send an email to the EERE Exchange helpdesk at EERE-ExchangeSupport@hq.doe.gov.

It is the responsibility of the applicant to verify successful transmission, prior to the Application due date and time.

2. Registration Process Requirements

There are several one-time actions that must be completed before submitting an Application in response to this Funding Opportunity Announcement (FOA), as follows:

- 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 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 appropriate contact point for each submission.

  The applicant will receive an automated response when the Concept Paper or Application is received. This will serve as a confirmation of receipt. Please do not reply to the automated response. The applicant will have the opportunity to re-submit a revised Concept Paper or Application for any reason as long as the relevant submission is submitted by the specified deadline. The Users' Guide for Applying to the Department of Energy EERE Funding Opportunity Announcements is found at https://eere-exchange.energy.gov/Manuals.aspx.

  The EERE Exchange registration does not have a delay; however, the remaining **registration requirements below could take several weeks to process and are necessary in order for a potential applicant to receive an award under this announcement**. 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**.

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

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

3. Electronic Authorization of Applications and Award Documents

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

Submission of award documents, including modifications, through electronic systems used by the Department of Energy, including FedConnect, constitutes the authorized representative's approval and acceptance of the terms and conditions of the award. Award acknowledgement via FedConnect constitutes the authorized representative's electronic signature.

SECTION V - APPLICATION REVIEW INFORMATION

A. Criteria

1. Concept Paper Review Criteria

Concept Papers Concept Papers are evaluated based on the following criteria and factors:

(1) Technical:

- Extent to which the solution is both innovative and technically feasible.
- Extent to which the approach and tasks that are summarized are appropriate and can be achieved in the project period.
- Extent to which the solution addresses key requirements for a small- and medium-sized commercial building BAS.
- Extent to which the solution is applicable to the Building Technology Office goals.

(2) Demonstration:

- Extent to which the applicant demonstrates knowledge of the appropriate hardware configurations and building characteristics for the testing phases.
- Quality and feasibility of the demonstration phase.

(3) Project Team:

- Qualifications of the project team
- Extent to which the team demonstrates an ability to ensure that the solution can be market-ready within three years

Submissions will not be evaluated against each other since they are not submitted in accordance with a common work statement. The above criteria will be scored as follows:

Criteria for Concept Papers

1	Applicant has strong potential to meet the requirement(s)
0	Applicant has the potential to meet the requirement(s)
-1	Applicant does not have the potential to meet the requirement(s)

The above criteria will be weighted as follows:

Weighting of Criteria for Concept Papers

(1) Technical	60%
(2) Demonstration	20%
(3) Project team	20%

2. Initial Review Criteria

Application Award Eligibility

- Prior to a comprehensive merit evaluation, DOE will perform an initial review to determine that (1) the applicant is eligible for an award; (2) the information required by

the announcement has been submitted; (3) all mandatory requirements are satisfied; and (4) the proposed project is responsive to the objectives of the funding opportunity announcement. If an application fails to meet these requirements, it may be deemed non-responsive and eliminated from full Merit Review.

3. Merit Review Criteria

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

(1) Technical:

- Level of innovation and disruptive potential for use of the software platform for small- and medium-sized BAS.
- Appropriateness of selected programming language, communication protocols and hardware requirements.
- Extent to which the project is expected to meet software requirements, including the need to be open source.
- Extent to which a robust software architecture platform is presented and degree to which it will address key requirements: 1) interoperability, 2) scalability, 3) ease of deployment, 4) open architecture, 5) plug-n-play play capabilities and 6) the ability to provide local or remote monitoring.
- Quality of the proposed user interface and evidence that the associated software tools will address key requirements for the platform.
- Extent to which limitations and challenges might be met.
- Extent to which the solution is applicable to the BTO goals.
- Extent that the Applicant shows a clear understanding of the importance of verifiable Go/No-Go decision points and proposes go/no-go decision points that demonstrate clear progress.
    - Quality of the applicants proposed Go/No-Go decision point validation methodology.
    - Quality of the detailed project plan and schedule to achieve stated goals;
        - Articulation of tasks and subtask activities including milestones and Go/No-Go decision points; and
        - Completion of the Milestones Table to the specified instructions
    - Adequacy, value, and reasonableness of the schedule and quality of the plan in advancing stated project outcomes, addressing barriers, and risks, and describing approaches to overcoming identified barriers and risks. Extent to which the Applicant understands and discusses the project risks and challenges the proposed work will face, and the soundness of the strategies and methods that will be used to overcome them

(2) Demonstration:

- Extent to which the applicant demonstrates knowledge of the appropriate hardware configurations and building characteristics for the testing phases.

- Quality of the testing plan and protocols proposed to be used.
- Quality and feasibility of the demonstration phase.
- Degree to which there are identified partnerships with building owners/managers.

3) Project Team:

- Qualifications of the Applicant's resources, facilities and credentials, including previously demonstrated innovations, to achieve the project objectives (including proposed Subrecipients).
- Experience and demonstrated performance of the Applicant and Project Team.
- Extent to which the Applicant/Project Team has the experience needed to complete the scope of work.
- Adequacy in demonstrating the ability to complete the proposed work.
- Extent to which the team demonstrates an ability to ensure that the solution can be market-ready within three years.

The above criteria will be weighted as follows:

Weighting of Criteria for Full Applications

Technical	60%
Demonstration	20%
Project Team	20%

Submissions will not be evaluated against each other since they are not submitted in accordance with a common work statement.

4. Other Selection Factors

Program Policy Factors

The selection official may consider the following program policy factors in the selection process:

- Technological diversity of projects (contribution to portfolio diversity)
- Diversity and geographical distribution of institutions and organizations
- Level of cost-share above the minimum required and leveraging of additional resources. Unlike the Merit Review Criteria, these factors are not weighted.

B. Review and Selection Process

1. Merit Review

Applications Subject to Merit Review

Applications that pass the initial review will be subjected to a merit review in accordance with the guidance provided in the "Department of Energy Merit Review Guide for Financial Assistance". This guide is available at http://energy.gov/management/office-management/operational-management/financial-assistance under Financial Assistance Policy and Guidance.

It is very important that the Project Abstract and Project Narrative file used during the Merit Review Process do not contain any Personally Identifiable Information as described in Appendix B.

2. Pre-Selection Clarification

Based upon the results of the merit review of written applications, DOE may determine that pre-selection clarifications are necessary from certain Applicants. These pre-selection clarifications will be for the purposes of clarifying the application and may take the form of one or more of the following procedures: written responses to DOE's written clarification questions, video or conference calls with DOE representatives, in person-meetings or presentations at DOE or applicant site. DOE, based upon the results of the merit review of written applications and in its sole discretion, may decide not to hold any pre-selection clarifications. The information provided by Applicants to DOE through pre-selection clarifications is incorporated in their application and contributes to the merit review evaluation and DOE's selection decisions. Selection for participation in pre-selection clarifications does not signify that Applicants have been selected for negotiation of award. Applicant costs incurred to participate in pre-selection clarifications (such as travel or other presentation costs) are application costs and are only allowable to awardees as indirect expenses to Federally sponsored projects to the extent that those costs are allowable, allocable and reasonable.

3. Selection

Selection Official Consideration

The Selection Official may consider the merit review recommendation, program policy factors, and the amount of funds available.

4. Discussions and Award

Government Discussions with Applicant

The Government may enter into discussions with a selected applicant for any reason deemed necessary, including, but not limited to: (1) the budget is not appropriate or reasonable for the requirement; (2) only a portion of the application is selected for award; (3) the Government needs additional information to determine that the recipient is capable of complying with the requirements in 10 CFR part 600; and/or (4) special terms and conditions are required. Failure to resolve satisfactorily the issues identified by the Government will preclude award to the applicant.

C. Anticipated Notice of Selection and Award Dates

Selection and Award Date

- DOE anticipates notifying applicants selected for award by the end of July 2013 and making awards by the end of September 2013.

SECTION VI - AWARD ADMINISTRATION INFORMATION

A. 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.

Per 10 CFR 600.22 (f):

> (f) Review on appeal. (1) The Senior Procurement Executive shall have no jurisdiction to review (i) Any preaward dispute (except as provided in paragraph (f)(2)(ii) of this section), including use of any special restrictive condition pursuant to § 600.114, § 600.212, or § 600.304;
> (f)(2)(ii) A DOE decision not to make a continuation award based on any of the determinationsdescribed in paragraph (f)(2)(i) of this section

The Contracting Officer sends a notification letter by email to the technical and administrative points of contact designated by the Applicant in EERE Exchange.

2. Concept Paper Notifications

EERE promptly 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. Due to the anticipated volume of applications, EERE is unable to provide technical feedback on Concept Papers.

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.G.2 of the FOA for guidance on pre-award costs.

3. Full Application Notifications

EERE promptly notifies Applicants of its determination. EERE sends 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. 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.

a. SUCCESSFUL APPLICANTS

A notification letter selecting a Full Application for award negotiations does not authorize the Applicant to commence performance of the project. **EERE selects Full Applications for award negotiations, not for award.** Applicants do not receive an award until award negotiations are complete and the Contracting Officer executes the funding agreement.

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

b. 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.

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

c. 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. If the application was not selected, the written notice shall explain why the application was not selected.

4. Notice of Award

A Financial Assistance Award or Assistance Agreement issued by the Contracting Officer is the authorizing award document. It normally includes, either as an attachment or by reference:

(1) Assistance Agreement Form; (2) Special Terms and Conditions; (3) Intellectual Property Provisions; (4) Statement of Project Objectives; (5) Reporting Checklist and Instructions;

(6) Budget Information; (7) National Policy Assurances; (8) Applicable program regulations, if any; (9) Application as approved by DOE; and (10) DOE assistance regulations at 10 CFR part 600.

For grants and cooperative agreements made to universities, non-profits and other entities subject to OMB Circular A-110, the Award also includes the Research Terms and Conditions and the DOE Agency Specific Requirements located at: *http://www.nsf.gov/bfa/dias/policy/rtc/index.jsp*.

B. Administrative Requirements, National Policy Requirements, and Applicant Representations and Certifications

5. **Administrative Requirements**

The administrative requirements for DOE grants and cooperative agreements are contained in Title 10 CFR Part 600 (See: 10 CFR 600). Grants and cooperative agreements made to universities, non-profits and other entities subject to Title 10 CFR Part 600 are subject to the Research Terms and Conditions located on the National Science Foundation web site at: http://www.nsf.gov/bfa/dias/policy/rtc/index.jsp.

DUNS and SAM Requirements

Additional administrative requirements for DOE grants and cooperative agreements are contained in 2 CFR, Part 25 (See: http://ecfr.gpoaccess.gov). Prime awardees must keep their data at the System for Award Management (SAM) current at https://www.sam.gov. SAM is the government-wide system that replaced the SAM. If you had an active registration in the CCR, you have an active registration in SAM. Subawardees at all tiers must obtain DUNS numbers and provide the DUNS to the prime awardee before the subaward can be issued.

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. (See: http://ecfr.gpoaccess.gov). Prime awardees must register with the new FSRS database and report the required data on their first tier subawardees. Prime awardees must report the executive compensation for their own executives as part of their registration profile in the System for Award Management (SAM).

5. Special Terms and Conditions, National Policy Requirements, and Applicant Representations and Certifications

The DOE Special Terms and Conditions for Use in Most Grants and Cooperative Agreements are located at:

http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms.

The National Policy Assurances To Be Incorporated as Award Terms are located at

http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms

Applicant Representations and Certifications

Corporate Felony Conviction and Federal Tax Liability Representations (March 2012)

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

(1) It is **not** a corporation that has been convicted (or had an officer or agent of such corporation acting on behalf of the corporation convicted) of a felony criminal violation under any Federal law within the preceding 24 months,

(2) **No** officer or agent of the corporation have been convicted of a felony criminal violation for an offence arising out of actions for or on behalf of the corporation under Federal law in the past 24 months,

(3) 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.

6. Intellectual Property Provisions

The standard DOE financial assistance intellectual property provisions applicable to the various types of recipients are located at http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms.

7. Statement of Substantial Involvement

Pursuant to the Cooperative Agreement, DOE has the right to intervene in the conduct or performance of project activities for programmatic reasons. Intervention may include the interruption or modification of the conduct or performance of project activities. Please see 10 CFR 600.5 (d) for additional language and authority. In the final award documents, DOE will provide a detailed statement of substantial involvement that articulates DOE's role in the cooperative agreement. Substantial involvement may include, but is not limited to, DOE participation and oversight of the following: review and approval of projects planned by the organization to reach programmatic goals; review of organization progress based on metrics; and participation in go/no go decision points and peer reviews – any of which may

lead to redirecting efforts.

Although the National Laboratories are eligible to apply to this FOA, individuals at FFRDC's who participated in the development of this FOA may not participate in the application process. A successful awardee may seek to engage building controls experts at the National Laboratories who participated in this FOA as technical advisors during the course of the project, once a notice of award is issued. Such interaction with technical advisors is forbidden without the DOE's prior approval. If input from FFRDC technical advisors is required for an award, DOE will work with the successful applicant during the award phase to implement a collaboration agreement with the relevant parties.

C. Reporting

Reporting requirements are identified on the Federal Assistance Reporting Checklist, DOE F 4600.2, attached to the award agreement.

SECTION VII - QUESTIONS/AGENCY CONTACTS

A. Questions

Questions regarding the content of this announcement must be submitted to: BEM@go.doe.gov not later than 3 business days prior to the application due date.

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**. DOE will attempt to respond to a question within 3 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

SECTION VIII - OTHER INFORMATION

A. Amendments

Amendments to this announcement will be posted on the EERE eXCHANGE web site and the Grants.gov system. However, you will only receive an email when an amendment or an announcement is posted on these sites if you register for email notifications for this FOA in Grants.gov. DOE 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 announcements.

B. Government Right to Reject or Negotiate

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

C. 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 other than the Contracting Officer, either explicit or implied, is invalid.

D. Proprietary Application Information

DOE will use data and other information contained in applications strictly for evaluation purposes. Applicants should not include confidential, proprietary, or privileged information in their applications unless such information is necessary to convey an understanding of the proposed project.

Applications containing confidential, proprietary, or privileged information must be marked as described below. Failure to comply with these marking requirements may result in the disclosure of the unmarked information under the Freedom of Information Act 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.

The cover sheet of the application must be marked as follows and identify the specific pages containing confidential, proprietary, or privileged information:

Notice of Restriction on Disclosure and Use of Data:

Pages *[list applicable pages]* of this document may contain confidential, proprietary, or privileged information that 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.

The header and footer of every page that contains confidential, proprietary, or privileged information must be marked as follows: “Contains Confidential, Proprietary, or Privileged Information Exempt from Public Disclosure.”

In addition, every line and paragraph containing proprietary, privileged, or trade secret information must be clearly marked with double brackets or highlighting.

E. 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.

F. Intellectual Property Developed under this Program

Patent Rights. The government will have certain statutory rights in an invention that is conceived or first actually reduced to practice under a DOE award. 42 U.S.C. 5908 provides that title to such inventions vests in the United States, except where 35 U.S.C. 202 provides otherwise for nonprofit organizations or small business firms. However, the Secretary of Energy may waive all or any part of the rights of the United States subject to certain conditions. (See "Notice of Right to Request Patent Waiver" in paragraph G below.)

Rights in Technical Data. Normally, the government has unlimited rights in technical data created under a DOE agreement. Delivery or third party licensing of proprietary software or data developed solely at private expense will not normally be required except as specifically negotiated in a particular agreement to satisfy DOE's own needs or to insure the commercialization of technology developed under a DOE agreement.

G. Notice of Right to Request Patent Waiver

Applicants may request a waiver of all or any part of the rights of the United States in inventions conceived or first actually reduced to practice in performance of an agreement as a result of this announcement, in advance of or within 30 days after the effective date of the award. Even if such advance waiver is not requested or the request is denied, the recipient will have a continuing right under the award to request a waiver of the rights of the United States in identified inventions, i.e., individual inventions conceived or first actually reduced to practice in performance of the award. Any patent waiver that may be granted is subject to certain terms and conditions in 10 CFR 784.

Domestic small businesses and domestic nonprofit organizations will receive the patent rights clause at 37 CFR 401.14, i.e., the implementation of the Bayh-Dole Act. This clause permits domestic small business and domestic nonprofit organizations to retain title to subject inventions. Therefore, small businesses and nonprofit organizations do not need to request a waiver.

H. Notice Regarding Eligible/Ineligible Activities

Eligible activities under this program 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.

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

DOE 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).

J. 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.

K. Lobbying Restrictions

By accepting funds under this award, you agree 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.

L. Retention of Submissions

EERE expects to retain copies of all Letters of Intent, 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.

M. 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 Waiver: Under 42 U.S.C. § 5908, title to subject inventions vests in the U.S. Government and large businesses and foreign entities do not have the automatic right to elect to retain title to subject inventions. However, EERE may issue "class patent waivers" under which large businesses and foreign entities that meet certain stated requirements may elect to retain title to their subject inventions. If a large business or foreign entity elects to retain title to its subject invention, it must file a patent application.
- 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 DOE 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.

N. Government Rights in Subject Inventions

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

O. 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.

P. 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 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. In addition, the Government may grant licenses for use of the subject invention when Recipients, Subrecipients, or their assignees and exclusive licensees refuse to do so.

The U.S. Government may exercise its march-in rights 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.

Q. 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.
- Option 1 (with data protection): 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-E 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.

- Option 2 (without data protection): Government Rights in Technical Data Produced Under Awards: The U.S. Government retains unlimited rights in technical data produced under Government financial assistance awards, including the right to distribute to the public. One exception to the foregoing is that invention disclosures may be protected from public disclosure for a reasonable time in order to allow for filing a patent application.

R. Copyright

The 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, the additional information regarding open-source software in Appendix D must be addressed in the application.

S. Annual Compliance Audits for For-Profit Entities

If a for-profit entity is a Recipient or Subrecipient and has expended greater than $500K of Federal funds in a respective fiscal year, an annual compliance audit performed by an independent auditor may be required. For additional information, please refer to 10 C.F.R. § 600.316 and for-profit audit guidance documents posted under the "Coverage of Independent Audits" heading at

http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms

If an educational institution, non-profit organization, or state/local government is a Recipient or Subrecipient and has expended greater than $500K of Federal funds in a respective fiscal year, then an A-133 audit is required. For additional information, please refer to OMB Circular A-133 link below.

http://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a133/a133.pdf

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

REFERENCE MATERIAL
Appendix A – Definitions

"Amendment" means a revision to a Funding Opportunity Announcement

"**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 Funding Opportunity Announcement.

"**Application**" means the documentation submitted in response to a Funding Opportunity Announcement.

"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 DOE 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 either a Grant or a Cooperative Agreement.

"**Budget**" means the cost expenditure plan submitted in the Application, including both the DOE contribution and the Applicant Cost Share.

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

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

"**Cooperative Agreement**" means a Financial Assistance instrument used by DOE 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 DOE and the Applicant during the performance of the contemplated activity. Refer to 10 CFR 600.5 for additional information regarding cooperative agreements.

"**Cost Sharing**" means the respective share of Total Project Costs to be contributed by the Applicant and by DOE. The percentage of Applicant Cost Share is to be applied to the Total Project Cost (i.e., the sum of Applicant plus DOE Cost Shares) rather than to the DOE contribution alone.

"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.

"E-Find" is a Grants.gov webpage where you can search for Federal Funding Opportunities in FedGrants. http://www.grants.gov/search/searchHome.do

“EERE Exchange” is the Department of Energy, Energy Efficiency and Renewable Energy’s web system for posting Federal Funding Opportunity Announcements and receiving applications.

EERE eXCHANGE website

"**Financial Assistance**" means the transfer of money or property to an Applicant or Participant to accomplish a public purpose of support authorized by Federal statute through Grants or Cooperative Agreements and sub-awards. For DOE, 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.
https://www.fedconnect.net/FedConnect/

“Federally Funded Research and Development Center (FFRDC)” means a research laboratory as defined by Federal Acquisition Regulation 35.017.

“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. Funding opportunity announcements may be known as program announcements, notices of funding availability, solicitations, or other names depending on the agency and type of program.

"Grant" means a Financial Assistance instrument used by DOE 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 no Substantial Involvement is anticipated between DOE 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. http://www.grants.gov

“Indian Tribe” means any Indian tribe, band, nation, or other organized group or community, including Alaska Native village or regional or village corporation, as defined in or established pursuant to the Alaska Native Claims Settlement Act (85 Stat. 688)[43 U.S.C. § 1601 et seq.], which are recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians.

"**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).

"**Participant**" for purposes of this Funding Opportunity Announcement 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 Funding Opportunity Announcement.

“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 DOE for Financial Assistance (whether such Financial Assistance represents all or only a portion of the support necessary to carry out those activities).

“Proposal” is the term used to describe the documentation submitted in response to a Funding Opportunity Announcement. Also see Application.

“Recipient” means the organization, individual, or other entity that receives a Financial Assistance Award from DOE, is financially accountable for the use of any DOE funds or property provided for the performance of the Project, and is legally responsible for carrying out the terms and condition of the award.

“System for Award Management (SAM)” is the primary database which collects, validates, stores and disseminates data in support of agency missions (https://www.sam.gov).

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

"Selection Official" means the DOE official designated to select Applications for negotiation toward Award under a subject Funding Opportunity Announcement.

"**Substantial Involvement**" means involvement on the part of the Government. DOE'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.

“Technology Investment Agreement (TIA)” is a type of assistance instrument used to support or stimulate research projects involving for-profit firms, especially commercial firms that do business primarily in the commercial marketplace. TIAs are different from grants and cooperative agreements in that the award terms may vary from the Government-wide standard terms (See DOE TIA regulations at 10 CFR Part 603). The primary purposes for including a TIA in the type of available award instruments are to encourage non-traditional Government contractors to participate in an R&D program and to facilitate new relationships and business practices. A TIA can be particularly useful for awards to consortia (See 10 CFR 603.225(b) and 603.515, Qualification of a consortium).

"**Total Project Cost**" means all the funds to complete the effort proposed by the Applicant, including DOE funds (including direct funding of any FFRDC) plus all other funds that will be committed by the Applicant as Cost Sharing.

“Tribal Energy Resource Development Organization or Group” 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 – Personally Identifiable Information

In responding to this Announcement, 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 by the Merit Review Committee in the review process to evaluate each application. PII is defined by the Office of Management and Budget (OMB) and DOE 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.

a. **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.

b. **Protected PII:** PII that requires enhanced protection. This information 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 by the Merit Review Committee.

- 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 by the Merit Review Committee:

- 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 program 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

Appendix C – Cost Share Information

Cost Sharing or Cost Matching

The terms "cost sharing" and "cost matching" are often used synonymously. Even the DOE Financial Assistance Regulations, 10 CFR Part 600, use both of the terms in the titles specific to regulations applicable to cost sharing. DOE 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 Part 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 a DOE 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:

- Institutions of Higher Education, Hospitals, and Other Nonprofit Organizations are found at 10 CFR 600.123;
- State and Local Governments are found at 10 CFR 600.224;
- For-profit Organizations are found at 10 CFR 600.313.

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, DOE 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, DOE generally does not allow pre-award costs prior to the signing of the Selection Statement by the DOE Selection Official.

Following is a link to the DOE Financial Assistance Regulations. You can click on the specific section for each Code of Federal Regulations reference mentioned above.

DOE Financial Assistance Rules (10 CFR 600)

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 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 cost principles applicable to the type of entity incurring the cost as follows:

(a) *For-profit organizations.* Allowability of costs incurred by for-profit organizations and those nonprofit organizations listed in Attachment C to OMB Circular A–122 is determined in accordance with the for-profit costs principles in 48 CFR Part 31 in the Federal Acquisition Regulation, except that patent prosecution costs are not allowable unless specifically authorized in the award document. (v) Commercial Organizations. FAR Subpart 31.2—Contracts with Commercial Organizations

(b) *Other types of organizations.* Allowability of costs incurred by other types of organizations that may be subrecipients under a prime award is determined as follows:

(i) *Institutions of higher education.* Allowability is determined in accordance with: 2 CFR 220 Cost Principles for Educational Institutions

(ii) *Other nonprofit organizations.* Allowability is determined in accordance with: 2 CFR 230 Cost Principles for Nonprofit Organizations

(iii) *Hospitals.* Allowability is determined in accordance with the provisions of: Title 45 Appendix E to Part 74—Principles for Determining Costs Applicable to Research and Development Under Grants and Contracts With Hospitals

(iv) *Governmental organizations.* Allowability for State, local, or federally recognized Indian tribal government is determined in accordance with:

(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.

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	Required Federal Share %	Non-federal Cost 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%
	$2,000,000		

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:

Task	Proposed Federal Share	Federal Share %	Required Non-federal Cost Share $	Required Non-federal Cost 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
	$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 – Open Source Software

Open Source Software Distribution Plan

Applicants that are applying to this FOA for which open source software distribution is required must include information in the project narrative describing how software will meet open source requirements associated with the software platform, software tools, user interface and software required to operate the plug and play hardware devices. Successful applicants must then submit a formal plan for consideration during the contract negotiation phase describing how software produced under this FOA will be distributed. The plan submitted at the contract negotiation phase 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.

  The GPL is the first copyleft license for general use, which means that derived works must

be distributed under the same license terms. Under this philosophy, the GPL grants the recipients of a computer program the rights of the free software definition and uses copyleft to ensure the freedoms are preserved, even when the work is changed or additions are made. This aspect distinguishes the GPL from permissive free software licenses, including the BSD licenses.

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).

- **GNU Library or "Lesser" General Public License (LGPLv3)**
  http://www.gnu.org/licenses/lgpl.html

  The GNU Lesser General Public License (formerly the GNU Library General Public License) or LGPL is a free software license published by the Free Software Foundation (FSF). It was designed as a compromise between the strong-copyleft GNU General Public License or GPL and permissive licenses such as the BSD licenses and the MIT License. The GNU Library General Public License (as the LGPL was originally named) was published in 1991, and adopted the version number 2 for parity with GPL version 2. The LGPL was revised in minor ways in the 2.1 point release, published in 1999, when it was renamed the GNU Lesser General Public License to reflect the FSF's position that not all libraries should use it. Version 3 of the LGPL was published in 2007 as a list of additional permissions applied to GPL version 3.

  The LGPL places copyleft restrictions on the program governed under it but does not apply these restrictions to other software that merely link with the program. There are, however, certain other restrictions on this software.

  The LGPL is primarily used for software libraries, although it is also used by some stand-alone applications, most notably Mozilla and OpenOffice.org.

- **The MIT License (MIT)**
  http://opensource.org/licenses/MIT

  The MIT License is a free software license originating at the Massachusetts Institute of Technology (MIT). It is a permissive license, meaning that it permits reuse within proprietary software provided all copies of the licensed software include a copy of the MIT License terms. Such proprietary software retains its proprietary nature even though it incorporates software under the MIT License. The license is also GPL-compatible, meaning that the GPL permits combination and redistribution with software that uses the MIT License.

  Software packages that use one of the versions of the MIT License include Expat, PuTTY, the Mono development platform class libraries, Ruby on Rails, Lua (from version 5.0 onwards), and the X Window System, for which the license was written.

- **Mozilla Public License 2.0 (MPL-2.0)**
  http://www.mozilla.org/MPL/2.0/
  The Mozilla Public License (MPL) is a free and open source software license. Version 1.0 was developed by Mitchell Baker when she worked as a lawyer at Netscape Communications Corporation and version 1.1 at the Mozilla Foundation. Version 2.0 was developed in the open, overseen by Baker and led by Louis Villa. The MPL is characterized as a hybridization of the modified BSD license and GNU General Public License.

  The MPL is the license for the Mozilla Application Suite, Mozilla Firefox, Mozilla Thunderbird and other Mozilla software. The MPL has been adapted by others as a license for their software, most notably Sun Microsystems, as the Common Development and Distribution License for OpenSolaris, the open source version of the Solaris 10 operating system, and by Adobe, as the license for its Flex product line.

Appendix E – Sample Summary Slide For Concept Paper

Project Title

Principal Investigator, Institution + Partner Institution(s)

Control Number

DOE funds: $###K Cost share: ##%

Summary

- *Bullet points that summarize the proposed solution*

Impact

- *Bullet points that summarize the impact the team envisions the solution will have on energy savings in buildings (be quantitative where possible)*

Approach *(List 3 key milestones or deliverables)*

1.	2.	3.

Key illustrations(s), chart(s), and/or tables(s)

ENERGY | Energy Efficiency & Renewable Energy

Appendix F – Sample Summary Slide For Full Application

Project Title

Principal Investigator, Institution + Partner Institution(s)

Control Number

DOE funds: $###K Cost share: ##%

Summary

- *Bullet points that summarize the proposed solution*

Impact

- *Bullet points that summarize the impact the team envisions the solution will have on energy savings in buildings (be quantitative where possible)*

Approach (*List 3 key milestones or deliverables*)

1.	2.	3.

Key illustrations(s), chart(s), and/or tables(s)

ENERGY Energy Efficiency & Renewable Energy