FINANCIAL ASSISTANCE
FUNDING OPPORTUNITY ANNOUNCEMENT

U.S. Department of Energy
Golden Field Office

Energy Savings through Improved Mechanical Systems and Building Envelope Technologies

Topic 1: Energy Saving Heating, Ventilation and Air Conditioning (HVAC) systems

Topic 2: Energy Saving Building Envelope Solutions

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Issue Date:	**03/09/2012**
Concept Paper Due Date:	**04/17/2012, 5:00 PM Eastern Time**
Application Due Date:	**06/12/2012, 5:00 PM Eastern Time**

Applicants must submit a Concept Paper by the due date to be eligible to submit a Full Application

REGISTRATION REQUIREMENTS

There are several one-time actions 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/Registration.aspx.
  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 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 resubmit a revised 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 CCR 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 Central Contractor Registry (CCR) at https://www.ccr.gov/.
  Designating an Electronic Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in CCR registration. Please update your CCR registration annually.

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

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SECTION I – FUNDING OPPORTUNITY DESCRIPTION

A. Description

Background

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, the Department of Energy's (DOE) Building Technologies Program (BTP) seeks to develop technologies, techniques, and tools for making buildings more energy efficient, productive, and affordable. BTP focuses on improving commercial and residential building components, energy modeling tools, building energy codes, and appliance standards. In support of the nation working toward greater energy independence and a cleaner environment, BTP embraces the strategic goal of significantly improving the energy efficiency of new and existing buildings to reduce national energy demand.

BTP's goal is to create marketable technologies and design approaches that address energy consumption in existing and new buildings. For existing buildings, BTP is currently analyzing which retrofit measures are cost-effective and have the largest impact on energy use. Additionally, BTP research ensures that technologies or techniques used in existing buildings improve the quality of the structure and address safety concerns.

For new construction, the ultimate residential goal is to produce homes on a community scale that use on average 40% to 100% less source energy. For commercial buildings, the goal is to achieve 50% to 70% whole building energy improvements, relative to American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1-2004. These are both long-term goals for BTP with a focus on achieving these energy savings in a cost-effective manner.

Introduction

Buildings consume 40% of the primary energy in the United States[1]. Buildings use 72% of the nation's electricity[2] and 55% of the nation's natural gas primary consumption[3]. Energy use by buildings accounts for approximately 40% of CO2 emissions in US.[4] The energy use in the residential and commercial building sector is roughly split in half.[5] From 2006 to 2030, the U.S. population is expected to increase by 21% while the number of households is expected to increase by 27%[6]. Commercial space is expected to increase by 31% over the same period[7]. Therefore, energy efficiency measures in the buildings sector provide a tremendous opportunity to reduce the energy demand and reduction in greenhouse gas (GHG) emissions.

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[1] http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=1.1.1
[2] http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=1.1.9
[3] http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=1.1.10
[4] http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=1.4.1
[5] http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=2.1.1 and http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=3.1.1
[6] http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=2.2.1
[7] http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=3.2.1

Equipment and systems used to provide thermal comfort and adequate indoor air quality consume about 30% of the total primary energy used in residential and commercial buildings[8]. Reducing space conditioning energy usage, which accounts for approximately 39%[9] of primary energy consumption in residential buildings, is essential to achieving DOE BTP goals. Significant space conditioning energy reductions can be achieved by increasing equipment efficiency, distributing thermal energy more efficiently, ensuring that optimal equipment performance is maintained throughout the equipment lifetime, and more closely meeting the comfort needs of building occupants. Reduction in space conditioning energy use can also be achieved through enhancements to the building envelope. Thermal insulation, window technologies and roofing solutions significantly influence the magnitude of heat loss or gain in a building. However, many buildings constructed prior to 1970 were built without much attention to thermal insulation; the current stock of windows on buildings exhibits, on average, relatively low performance; and many low efficiency roofs are the major source for heat gain/loss from buildings. To adequately capture the large potential for energy savings in buildings, building envelope and space conditioning solutions that are high performance, cost effective and attractive to consumers are required.

BTP has identified specific technologies that, through accelerated research, development and commercialization, can lead to tremendous energy savings in buildings while reducing costs incurred by the consumers. These identified technologies are current areas of focus for BTP's Emerging Technologies sub-program. The Program seeks innovative applications in the following high impact areas:

Topic 1: Energy Saving Heating, Ventilation and Air Conditioning (HVAC) systems

- Subtopic 1.1: High performance air source cold climate heat pumps
- Subtopic 1.2: Alternative space-heating systems
- Subtopic 1.3: Next generation heat exchangers for electric vapor-compression heat pumps and air conditioners

Topic 2: Energy Saving Building Envelope Solutions

- Subtopic 2.1: High performance thermal insulation
- Subtopic 2.2: Advanced roofing/attic solutions
- Subtopic 2.3: Highly insulating windows

Technologies which apply to retrofit and replacement applications are of particular interest, especially if they address barriers to retrofits of high efficiency equipment or materials. Because many high-cost, high efficiency solutions already exist, particular emphasis will be placed on concepts that minimize cost premiums and maximize performance. Applications must provide a credible rationale for how projects will meet the targets specified in the subtopic descriptions.

[8] http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=1.1.5
[9] http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=2.1.6

Objectives

The focus of this Funding Opportunity Announcement (FOA) is to develop specifically-identified technologies for buildings that are cost effective and can have a tremendous impact on energy savings overall and lead to a market-ready solution (e.g. at the commercial prototype phase) within five years of project launch. More specifically, the FOA is intended to support prototyping and optimization of proposed technologies for which proof-of-concept scientific demonstration already exists. Projects will be expected to focus on the research, development, demonstration and commercialization paths of the proposed technology while addressing any shortcomings or barriers to market entry. Projects must credibly demonstrate how the proposed technologies will meet the targets specified in the subtopic descriptions. Projects under this FOA must be aimed at *more than progress toward* identified project goals; the project must be aimed at *actual delivery* of these project goals.

Topic Descriptions

Topic 1: Energy Saving Heating, Ventilation and Air Conditioning (HVAC) systems

Topic 1 seeks to dramatically increase the efficiency of specified HVAC systems and components. Projects are requested for systems that promise dramatic improvements in energy efficiency with modest price premiums and that are suitable for both retrofit and new construction applications. Performance, cost and other design requirements are specified in each subtopic area below. An application in the category of Topic 1, should address one of the following subtopics:

Subtopic 1.1: High Performance Air Source Cold Climate Heat Pumps

DOE is seeking the development of high performance air source cold climate heat pumps. Applications must address applicability to commercial heating and cooling applications although residential applications may also be presented concurrently.

In cold climate regions where natural gas in not readily available or where it is expensive to extend gas lines to the building, advanced cold climate air source heat pumps for commercial applications are needed that can maintain both capacity and coefficients of performance (COP) down to very low ambient temperatures. These system designs could include multi-stage units, alternative refrigerants, and other innovative approaches that maintain performance and cost competitiveness. In low-rise commercial buildings, there are few if any options for high efficiency heating, even with high efficiency cooling products. Consequently, resistance heating is sometimes the only option in cold climates. Cold climate heat pumps would address this need and provide an opportunity for substantial energy savings. Cold climate heat pumps for residential single-family applications are currently under development and a few have been introduced for cooling capacities of 5 tons and below. However, no such products are available for commercial rooftop applications. It may be possible to extend the technologies currently under development for residential applications into larger capacities, or new approaches requiring further research and development may be necessary.

Applications must demonstrate how the following performance and cost targets will be met:

Cold Climate Heat Pumps	
Requirements	**Target**
COP at 47ºF / Maximum % capacity degradation from nominal (47ºF)	≥ 4 / 0%
COP at 17ºF / Maximum % capacity degradation from nominal (47ºF)	≥ 3 / 10%
COP at -13ºF / Maximum % capacity degradation from nominal (47ºF)	≥ 2.5 / 25%
Simple payback period[a]	≤ 5 years

[a] Projects are requested to have a simple payback period (from Minimum Efficiency Standard Units) at full commercial production rates no greater than 5 years; it is understood that the economics vary depending on climate and electricity costs and supporting calculations should clearly present assumptions made.

Subtopic 1.2: Alternative Space-Heating Systems

DOE seeks to develop alternative space-heating systems suitable for residential or commercial buildings. Alternative heating systems do not include: systems in which heat is derived *directly* from the combustion of fossil fuels (e.g. gas furnaces) or electric resistive heating systems. Heat derived directly from the combustion of fossil fuels or electric resistive heating could, however, be used as a back-up heating system to an alternative space-heating system.

Alternative space-heating systems are needed because:

- Electric vapor-compression heat pumps may soon reach their practical limits of efficiency while maintaining acceptable physical sizes and first costs
- Conventional heating technologies using heat derived *directly* from the combustion of fossil fuels are performance limited since heat is directly generated either from a low-entropy source such as natural gas or through a direct conversion of electrical to thermal energy without taking advantage of existing thermal energy in the environment

While some alternative space-heating systems are currently available, existing systems are too expensive and may not be sufficiently reliable to achieve widespread use. DOE is specifically interested in types of alternative heating systems that exhibit a coefficient of performance (COP) greater than 1.0 using either electricity or fossil fuels. Compared to state-of-the-art systems using the same fuel, these systems must achieve, in the long term:

- Acceptable reliabilities, maintenance intervals, and life expectancies
- Similar levels of product safety

Applications must demonstrate how the following performance and cost targets will be met:

Alternative Space-Heating Systems	
Requirements	**Targets**
Simple payback period[a]	≤ 5 years
Electricity (fuel type):	
COP at 47ºF / Maximum % capacity degradation from nominal (47ºF)	4 / 0%
COP at 17ºF / Maximum % capacity degradation from nominal (47ºF)	3.5 / 10%
COP at -13ºF / Maximum % capacity degradation from nominal (47ºF)	3 / 25%
Natural Gas (fuel type):	
COP at 47ºF / Maximum % capacity degradation from nominal (47ºF)	1.3[b] / 0%
COP at 17ºF / Maximum % capacity degradation from nominal (47ºF)	1.15[b] / 20%
COP at -13ºF / Maximum % capacity degradation from nominal (47ºF)	1.0[b] / 50%

[a] Projects are requested to have a simple payback period (from Minimum Efficiency Standard Units) at full commercial production rates no greater than 5 years; it is understood that the economics vary depending on climate and electricity costs and supporting calculations should clearly present assumptions made.

[b]COP based on higher heating value of natural gas.

Subtopic 1.3: Next-Generation Heat Exchangers for Electric Vapor-Compression Heat Pumps and Air Conditioners

DOE seeks to develop next-generation heat exchangers to improve the energy efficiency of electric vapor-compression heat pumps and air conditioners over a broad range of operating conditions. DOE seeks heat exchangers suitable for condensers or evaporators in air conditioners or heating-only heat pumps, as well as heat exchangers suitable for both condensing and evaporating for reversible heat pumps. Heat exchangers for air-to-air, water-to-water, air-to-water, and water-to-air heat pumps and air conditioners are of interest, but ground coupled heat exchangers will not be considered since they have been the subject of other recent FOAs.

Current state-of-the art, air-to-refrigerant heat exchangers typically use copper-tube, aluminum-fin construction, with internal enhancement in the tubes and lances or louvers in the fins to promote heat transfer. They may also use converging or diverging refrigerant circuiting to further improve overall heat-exchanger performance. Current state-of-the-art, water-to-refrigerant heat exchangers are typically either tube-in-tube designs or brazed-plate designs—the latter is more common when space is limited. Tube-in-tube designs typically have one or more inner tubes, where the refrigerant can flow either inside the inner tubes or in the annulus between the inner and outer tubes. They typically use enhanced surfaces or turbulence promoters on either the inside or

outside (or both) of the inner tubes. They may also use diverging or converging refrigerant circuiting to further improve overall heat-exchanger performance. Brazed-plate heat exchangers typically use plates having enhanced surfaces, and may also use converging or diverging refrigerant flow paths.

Given the wide range of heat exchangers suitable as a focus this subtopic, specific cost targets are not defined here. However, applications should still outline expected costs of the proposed heat exchanger design, providing analysis to support claims made. Applications must demonstrate how the following performance and cost targets will be met:

Next-Generation Heat Exchangers	
Requirements	**Targets**
Performance	$\geq$ 20% decrease in the difference between the entering air/water temperature and the refrigerant saturation temperature as compared to state-of-the-art heat exchangers, while operating at similar air or water temperature/flow conditions and capacities
Physical size	$\leq$ 10% greater than state-of-the-art designs
Fan, blower or pump parasitic energy consumption	$\leq$ 10% increase in additional energy input required as compared to state-of-the-art designs
Required cleaning intervals, or difficulty of cleaning, to maintain as-new performance	Little to no increase as compared to state-of-the-art designs
Susceptibility to damage or corrosion or performance degradation during manufacture, assembly, transportation, installation, or use	Little to no increase as compared to state-of-the-art designs for relevant applications
Defrost requirements (for applications such as outdoor air-to-refrigerant heat exchangers)	Little to no increase as compared to state-of-the-art designs
Cost	Little to no increase as compared to state-of-the-art designs

The application must also include a description and supporting calculations on the efficiency improvement expected from the relevant system(s) (e.g. air conditioners and heat pumps) in which the innovative heat exchanger will be used.

Topic 2: Energy Saving Building Envelope Solutions

Topic 2 seeks building envelope solutions that are high performance, cost effective and attractive to consumers. Projects are requested for residential and/or commercial systems. Technologies that apply to retrofit and replacement applications are of particular interest, especially if they address barriers to retrofits of high efficiency equipment or materials. Cost targets should be estimated for the time at which full scale production (e.g. one factory operating full time) commences. An application in the category of Topic 2 should address one of the following subtopics:

Subtopic 2.1: High Performance Thermal Insulation

Conventional insulation products used today are typically available in batts, rolls or loose material and can be easily placed in exposed areas (e.g. crawl spaces) or blown in to otherwise enclosed areas of a building (e.g. "drill and fill"). Other options include the use of high R-value sheathing beneath siding or exterior insulation finishing systems (EIFS) that can simultaneously change the façade of a building while providing a significant enhancement in insulation capability. More advanced insulation materials under investigation include, for example, vacuum insulated panels (VIPs) and aerogel materials.

DOE is interested in the development of cost effective, high performance insulation that is particularly appropriate for retrofit opportunities. These technology solutions may be applicable to, for example, the insulation of existing wall cavities or as interior or exterior attachment solutions. Moreover, technologies that demonstrate improvements to the quality and/or ease of installation and address various market barriers are also of interest. For this subtopic, the following performance and cost targets are provided as a guide; applications that demonstrate significant potential impact outside of these targets will be considered. However, accompanying justification must include a convincing, credible and quantitative argument for how the technology will lead to the achievement of great energy savings at reasonable costs and how significant market penetration will be achieved.

High Performance Thermal Insulation	
Requirements	**Targets**
R-value/inch (°F·ft^2·h/Btu-in)	≥ 8
Material cost	$\leq$ \$0.08/ft^2 per *R* value
Installation cost	Equal to or less than installation cost for comparable solutions
Appearance	Aesthetically attractive (if visible) < 1" thickness

Subtopic 2.2: Advanced Roof/Attic Solutions

Energy-efficient roofing products minimize the unwanted heat loss/gain entering a building. For hot climates, cool roofs have a high solar reflectance to reduce the temperature on the surface of the roof, thereby reducing air conditioning costs. Additionally, high performance attic and roof insulation materials are conventionally employed to minimize heat transfer. DOE has been supporting advanced roof and attic design that incorporates above deck ventilation, radiant barriers, insulation and near infra-red reflective pigments. These systems have achieved 75 percent peak load reduction and have had energy savings in the 35 to 50 percent range. The total system cost can be cost effective for many applications, however these new roof systems can be too complex for widespread deployment. For conventional asphalt roofing, labor represents approximately 75 percent of the total cost and materials are only 25 percent.

DOE is interested in dramatic breakthrough designs that would add value to the roofing materials while reducing installed labor cost. The objective is to deliver a high performance roof system with over 35 percent energy savings compared to 2009 International Energy Conservation Code (IECC) Building Code with very little or without any price premium. Applications must demonstrate how the following performance and cost targets will be met:

Advanced Roof/Attic Solutions	
Requirements	**Targets**
Energy Consumed for Roof/Attic System (reduction in roofing related thermal load)	35 percent less than 2009 IECC Building Code
Installed Cost per Square (100 sq ft)	≤ $300 per 100 ft^2
Ease of Installation	Less time than conventional roofs

Subtopic 2.3: Highly Insulating Windows

The present stock of installed windows exhibit relatively poor performance, but a nationwide upgrade to efficient windows represents an opportunity for immense energy savings for the country. Currently available low-emissivity coatings, gas-filled solutions and insulating frames all contribute to higher performance windows. Moreover, triple pane solutions offer the possibility for significant energy savings. The next generation of highly insulating windows will benefit from various innovative and incremental improvements such that performance is enhanced while maintaining cost effectiveness.

DOE is interested in supporting work to develop cost effective, highly insulating windows with *U*-values between 0.14 and 0.10 (R7 to R10). Since the main market for these windows are in cold climates, a solar heat gain coefficient (SHGC) of 0.30 or higher is required. DOE will also consider applications on the topic of highly insulating windows with dynamic control. *U*-values should still fall between 0.14 and 0.10 (R7 to R10) with a SHGC ≤ 0.18 (low transmittance state) and SHGC ≥ 0.45 (high transmittance state). Ultimate performance is dependent upon cost-benefit analysis showing that price premiums compared to current Energy Star windows are market viable. **All applications under this subtopic that involve the development of windows with dynamic control are encouraged to include a task for field evaluation and validation of passive heating benefits in existing buildings in a cold climate.**

Applications must demonstrate how the following performance and cost targets will be met:

Highly Insulating Windows	
Requirements	**Targets**
U-value (1/*R*-value)	0.14 – 0.10 Btu /°F·ft^2·h (R-7 to R-10 in °F·ft^2·h/Btu)
SHGC (no dynamic control) SHGC (with dynamic control)	$\geq$ 0.30 $\leq$ 0.18 and $\geq$ 0.45
Price premium (highly insulating only) Price premium (highly insulating with dynamic control)	$\leq$ \$5/ft^2 $\leq$ \$12/ft^2·

Optional Manufacturing Task

Transforming the nation's energy system and securing U.S. leadership in clean energy technologies requires domestic manufacturing of technologies that produce, move, and use energy at a meaningful scale. While not required, applicants may also include associated tasks that specifically address the development, demonstration and exploitation of energy efficient, rapid, and flexible manufacturing technologies to advance U.S. competitiveness. Manufacturing tasks should be aimed at improved product and process technologies to reduce the life-cycle energy cost of manufactured products while maintaining high quality and low cost production of scalable technologies. An objective of this supplement is to catalyze efforts towards increased deployment of manufacturing technologies and products, U.S. gross domestic product (GDP), U.S. exports, domestic employment and U.S. competitiveness from advanced technologies.. Inclusion of manufacturing tasks must be supplemental to the building technologies focus of the application; the building-technologies-focused task must stand alone with or without inclusion of the manufacturing tasks. This Supplement is available as a result of a partnership between the DOE Advanced Manufacturing Office (AMO) and BTP.

Other Requirements

Application submissions:

- Applications will only be considered if they apply to a single topic area.
- If an applicant wishes to apply under multiple subtopics, a separate and complete application will be required for each subtopic submittal, with no need for application reviewers to refer to another application.
- Applications must clearly identify the subtopic on the cover page of the project narrative.

Target calculations

- As described in Section IV of this FOA, it is expected that all applicants will demonstrate in their application how energy savings, performance and materials and manufacturing costs are estimated to justify how the technology holds promise to approach, meet or

exceed the targets given in this FOA for the different subtopics, as applicable. All calculations must be explained and supported with sources, where applicable. Unsupported calculations or unsubstantiated claims regarding meeting performance targets will be heavily scrutinized.

Commercial Viability, market-readiness and manufacturability

Applicants must demonstrate that the proposed technology has commercial viability, market-readiness and manufacturability which can be accomplished by including some or all of the following:

- including information about the market potential of the technology, cost considerations and an assessment of the competitive market;
- addressing how various market barriers might be overcome;
- a description of the manufacturing approach(es) that will most likely be used to scale up the proposed technologies and an understanding of the associated costs;
- demonstrating reasonable lifetimes comparable to existing technologies through some level of accelerated lifetime testing;
- demonstrating a feasible retrofitting scheme (if applicable);
- involvement of or commitment from a company with a track record in this industry;
- involvement of or commitment from a potential investor with a track record in this industry.

Specific questions that must be addressed in the application that help to demonstrate the commercial viability, market readiness and manufacturability of the proposed technology are further described in Section IV. The applicants must also demonstrate the potential for the technology to be market-ready in less than five years from project launch. This can be accomplished through the presentation of a work plan that outlines reasonable milestones and deliverables. If awarded, this work plan will be used as the basis for the work plan adopted for the project and from which go/no no-go decisions will be made as the project progresses forward.

Strength and composition of performance team:

The applicant should describe the unique elements/background of the proposed technical team that makes them uniquely suited to successfully execute the propose research, development and commercialization project. Preference will be given to multidisciplinary teams where different team members complement each other and have expertise in different aspects of the technology. At least one identified team member must have business-related experience and will be largely responsible for various business-related tasks outlined in the work plan. It is expected that the principal investigator (PI) will have both technical and management roles. He/she will make sure that different elements of the project and technology are well integrated, which making decisions based on technical understanding of the problem. Since this FOA is intended to encourage the development of technologies toward market-readiness, involvement of at least one company (e.g. a manufacturer) throughout the project duration is critical.

SECTION II – AWARD INFORMATION

A. Type of Award Instrument

DOE anticipates awarding both grants and cooperative agreements under this program announcement. If it is determined that a cooperative agreement is the appropriate award instrument, the nature of the Federal involvement will be included in a special award condition.

B. Estimated Funding

Approximately $12 million is expected to be available for new awards under this announcement. Additionally, up to $4 million may be available for manufacturing-focused tasks.

C. Maximum and Minimum Award Size

- Anticipated Ceiling (i.e., the maximum amount of DOE funding for an individual award made under this announcement): $1.5 million (does not include recipient cost share)
- Anticipated Floor (i.e., the minimum amount for an individual award made under this announcement): none

D. Expected Number of Awards

DOE anticipates making approximately 8-10 awards under this announcement.

E. Anticipated Award Size

DOE anticipates that awards will be in the $1.2-1.5 million range for the total project period for awards that do not include a manufacturing component DOE anticipates that awards with a manufacturing component will receive up to an additional $500,000 and the total awards will be in the $1.7-2 million range for the total project period.

F. Period of Performance

DOE anticipates making awards with a maximum 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.

G. Type of Application

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

SECTION III - ELIGIBILITY INFORMATION

A. Eligible Applicants

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

The following entities are eligible to apply for this announcement: (1) institutions of higher education; (2) nonprofit and for-profit private entities; (3) State and local governments; (4) Indian tribe economic development entities and (5) consortia of entities (1) through (4). Eligible applicants include but are not limited to DOE/NNSA National Laboratory Contractors, other Federal agencies, and non-DOE Federally Funded Research and Development Center (FFRDC) Contractors. BTP encourages collaboration and the mix of complementary expertise to perform the proposed work. This may be a single performer or team, may be one or more institutions, and may include operational experts along with the research team.

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 or to be a subrecipient to an eligible applicant.

Foreign entities are not eligible to apply as the prime applicant. However, foreign entities are eligible to apply as subrecipients to a domestic entity provided that, in aggregate, the foreign entities share not receive more than 20% of the total estimated DOE funding and must provide the cost share for their portion of the total project cost.

B. Cost Sharing

In accordance with the Cost Share Waiver granted by the Under Secretary for EERE on February 24, 2012, Recipients and subrecipients that are non-profit organizations (as defined in 10 CFR 600.3), institutions of higher education, U.S. National Laboratories, or U.S. Federally Funded Research and Development Centers (FFRDCs) funded under this FOA are eligible for a waiver of cost share requirements. Eligible entities as listed above are not required to provide a minimum cost share in their applications. (Note that only R&D in Technology Readiness Levels (TRLs) 3 or 4 will be funded under this FOA and see https://eere-exchange.energy.gov for a more detailed explanation of TRLs). While cost share is not a requirement for this category of recipient and subrecipient, it is strongly recommended that a company (to which this waiver does not apply) be identified as an instrumental and participatory member of the team.

For those entities not eligible for a cost share waiver, 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, including FFRDC contractor costs if applicable, and the recipient share of allowable costs equals the total allowable cost of the project) and must come from non-Federal sources unless otherwise allowed by law. (See 10 CFR Part 600 for the applicable cost sharing requirements). If an application is comprised of a combination of members that

are and are not eligible for the cost share waiver, only the portion of the budget attributed to the non-eligible member(s) must include the requisite cost share.

C. Other Eligibility Requirements

DOE/NNSA National Laboratory Contractors and Other Federally Funded Research and Development Center (FFRDC) Contractors

A DOE/NNSA National Laboratory Contractor is eligible to apply for funding under this announcement if its cognizant Contracting Officer provides written authorization and this authorization is submitted with the application. If a DOE National Laboratory Contractor is selected for award, the proposed work will be authorized under the DOE work authorization process and performed under the laboratory's Management and Operating (M&O) contract.

The following wording is acceptable for the authorization:

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

FFRDC contractors may be proposed as team members on another entity's application, subject to the following guidelines:

Authorization for non-DOE FFRDCs. The Federal agency sponsoring the FFRDC contractor must authorize in writing the use of the FFRDC contractor on the proposed project and this authorization must be submitted with the application. The use of a FFRDC contractor must be consistent with the contractor's authority under its award.

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

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

Value/Funding. The value of, and funding for, the FFRDC contractor portion of the work will not normally be included in the award to a successful applicant. Usually, DOE will fund a DOE FFRDC contractor through the DOE field work proposal system and other FFRDC contractors through an interagency agreement with the sponsoring agency.
Responsibility. The applicant, if successful, will be the responsible authority regarding the settlement and satisfaction of all contractual and administrative issues, including but not limited to, disputes and claims arising out of any agreement between the applicant and the FFRDC contractor.

Please be advised that those entities that form teams with National Laboratories in which the Laboratory is a Prime Recipient (i.e., lead participant) will be required to enter into subcontracts with the Laboratory. As such, the terms and conditions of the Management and Operating contract between the Laboratory and the Department of Energy will be in effect for any subcontracts, and not the traditional provisions associated with a financial assistance award. National Laboratories acting as Prime Recipients must make all applicable terms and conditions available to their subcontractors prior to submission of their applications. Any entities considering such teaming arrangements should request the Laboratory to provide the applicable terms and conditions prior to the Prime Recipient submitting a response to this FOA.

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.

B. Concept Paper

Applicants must submit a Concept Paper by the due date to be eligible to submit an Application.

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

The typical Concept Paper should express a consolidated effort in support of one or more related technical concepts or ideas. Disjointed or unrelated efforts should not be consolidated into a single Concept Paper. 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 Concept Paper must be submitted through the web web-based submission system discussed in Section IV.A. 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. 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.

A Concept Paper may contain proprietary data. The Concept Paper will be held in confidence by DOE and will not be shared outside of DOE unless review by a non-government subject matter relevant expert is required. Non-governmental reviewers will be selected based upon outstanding technical credentials, will be screened for any conflict-of-interest, and will be required to sign a nondisclosure agreement.

DOE will use data and other information contained in applications and Concept Papers 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 and Concept Papers 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 Concept Paper or 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.

Patentable ideas, trade secrets, proprietary or confidential commercial or financial information, the disclosure of which may harm the applicant, should not be included in a concept paper or Full Application, unless such information is necessary to convey an understanding of the proposed project. The use and disclosure of such data may be restricted, provided the applicant includes the following legend on the first page of the project narrative and specifies the pages of the application which are to be restricted:

> "The data contained in pages [APPLICANT MUST IDENTIFY PAGES] of this application have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for review and evaluation purposes, provided that if this applicant receives an award as a result of or in connection with the submission of this application, DOE shall have the right to use or disclose the data herein to the extent provided in the award. Any disclosure outside the Government shall be made only to a party subject to an appropriate obligation to the Government to protect the confidentiality of the application. This restriction does not limit the government's right to use or disclose data obtained without restriction from any source, including the applicant."

Applicants are required to identify in the bracketed space above the page numbers on which the patentable ideas, trade secrets, proprietary or confidential commercial or financial information appears. Failure to comply with this requirement will result in the waiver of any right to restricted treatment.

Further, each line or paragraph on the pages containing patentable ideas, trade secrets, proprietary or confidential commercial or financial information must be specifically identified and marked with a legend similar to the following:

"The following contains proprietary information that (NAME OF APPLICANT) requests not be released to persons outside the Government, except for purposes of review and evaluation."

See Section VIII.D and E for instructions on how to mark proprietary application information.

Concept Paper Structure

The body of the concept paper is limited to three (3) pages for the Abstract, Technical, Market and Performance Team Sections.

- ***Abstract*** (limited to 200 words or less): The abstract should summarize the Concept Paper, providing the essence of the concept and what the potential impact of this work is likely to be to the relevant market.
- ***Technical Section***: Describe the proposed technology and/or design concept, including anticipated materials required and method of construction/fabrication. Include a description of the specific applications for which the technology is suitable. Present the current status of the field and how the work proposed here extends beyond currently available state-of-the-art technology. Discuss benefits, shortcomings, limitations and challenges. Present an overview of the tasks required to achieve the technological goals of the project. Provide a discussion (with analysis, as appropriate) of how the proposed technology will meet the performance targets as described in Section I. Describe the expected lifetime of the technology. All calculations must be explained and supported with sources, where applicable.
- ***Market Section:*** Describe the market for this technology including an assessment of the market size and competitive landscape. Explain how this technology might be expected to penetrate into the respective market. Include a discussion about market barriers and explain how the proposed technology might have a distinct competitive advantage or value to the marketplace. Explain how the proposed technology will meet the cost or payback targets as described in Section I. All calculations must be explained and supported with sources, where applicable. Payback period and cost premium calculations should include well defined baselines.
- ***Performance team*****:** Describe the specific attributes of the assembled performance team that uniquely qualifies it to successfully conduct the proposed project plan.

C. Content and Form of Full 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 # once they "Apply to this FOA" on the EERE Exchange website and should include the Control # in the file name, as indicated below.**

All applications must be in the format given below. Nonconforming applications may be rejected without review. The submission of other supporting materials along with the applications is strongly discouraged as they will not be considered for review. All applications must be written in English.

1. **SF424 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
   "Control#_ LeadOrganization_ SF424A.pdf".

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
   "Control#_ LeadOrganization_Summary.pdf".

3. **Project Narrative File**
   The project narrative must not exceed 20 pages, including text, 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), and with type not smaller than 12 point except in figures and tables. EVALUATORS WILL REVIEW ONLY THE NUMBER OF PAGES SPECIFIED IN THE PRECEDING SENTENCE. 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. Save the information in a single file titled
   "Control#_ LeadOrganization_Project.pdf".

   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 (e.g. Concept, Goal, Technology, *Innovation*, etc) 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. Word limits must be adhered to where applicable. If a particular section or sub-section is not relevant to the proposed plan, still include the appropriate heading under which N/A should be indicated. 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.

a. **Topic/Subtopic area:** State the topic and subtopic (as described in Section I) this application is addressing.

b. **Concept**: In 100 words or less, describe the essence of the proposed technology.

c. **Goal**: In 100 words or less, describe the main goal of the proposed project.

d. **Technology**:

   i. ***Innovation:*** Describe the proposed technology and/or design concept, including anticipated materials required and method of construction/fabrication. Include a description of the specific applications for which the technology is suitable. Present the current status of the field and how the work proposed here extends beyond currently available state-of-the-art technology in terms of energy efficiency, reduced lifecycle, and reliability. Also discuss any non-energy related benefits. Clearly describe how the proposed technology differs from others under investigation in the field.

   ii. ***Approach:*** Present the tasks required to achieve the technological goals of the project. Include relevant descriptions of characterization methods to be employed. Provide detailed plans for the completion of the required tasks. This description should align with the work plan table described in Section V.3.g. Provide sufficient detail that specialists in the field can understand and evaluate each and every relevant step.

   iii. ***Preliminary results:*** Provide preliminary data and results if available, that support the feasibility of the project. Include descriptions of the test conditions and measurement methods used.

   iv. ***Performance targets****:* Provide a detailed discussion (with analysis, as appropriate) of how the proposed technology will meet the performance targets as described in Section I. All calculations must be explained and supported with sources, where applicable. Unsupported calculations or unsubstantiated claims regarding meeting performance targets will be heavily scrutinized. Include any additional analysis that supports claims made regarding reliability, maintenance intervals, life expectancy and safety, if applicable.

e. **Market:**

   i. ***Market analysis and commercial viability:*** Describe the market for this technology, including an assessment of the market size, market penetration, competitive landscape and manufacturability. Include a discussion about market barriers and explain how the proposed technology might have a distinct competitive advantage or value to the marketplace. Also describe the nature of any risks that may be associated with this technology's commercial development, including any non-energy related drawbacks. Describe why the technology is manufacturable and can be scaled-up at reasonable costs. Explain how the lifetime of the technology will be assessed and how it compares to existing technologies. If applicable, demonstrate a feasible retrofit scheme. Furthermore, if a company/investor is a key member of the performance team, describe its involvement and commitment to this

technology.

ii. ***Commercialization plan:*** Identify the likely path forward for moving the proposed technology through the research, development and commercialization pipeline and into the marketplace. Describe succinctly the phases of development required for the proposed technology. Describe the manufacturing approach(es) that will most likely be used to scale up the proposed technology. Note that full acceleration through this pipeline is not a requirement of the project plan proposed. However, thought should be given to how the technology might, for example, achieve market penetration once developed and then transition toward commercial deployment.

iii. ***Cost/Payback targets:*** Explain how the proposed technology will meet the cost or payback targets as described in Section I. All calculations must be explained and supported with sources, where applicable. Payback period and cost premium calculations should include well defined baselines. Unsupported calculations or unsubstantiated claims regarding meeting cost/payback targets will be heavily scrutinized.

f. Performance Team: Describe the specific attributes of the assembled performance team that uniquely qualifies it to successfully conduct the proposed project plan. Identify researcher(s) and at least one person who will oversee the business aspects of the project. Include information about company collaboration/partnerships, if applicable. This section should be a narrative description of the relevant strengths, experience and expertise of the team members and not just a synopsis of research or business accomplishments. Here, also include a description of the organizations involved and why they are qualified to accomplish their portion of the work. Address what work will occur outside of the US, if applicable (must not exceed 20%). See Section I for more information about team requirements and recommendations.

g. Work Plan: Using the illustrative template provided below as a guide, please provide details that demonstrate a clear path to completion of the proposed tasks, with specified milestones and deliverables. Milestones should be objective and, where possible, quantitative. Indicate points of "Go/No Go" decision-making at the end of each full year of the proposed plan. The total estimated costs should be equal to the total budget request submitted. 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. Also include a description or justification to accompany the work plan, explaining how the team expects to accomplish these milestones by the designated dates. Include potential barriers to success in the explanation.

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

h. 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. 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 the 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;
- Publications;
- Intellectual property issues;
- Communication plans;
- Procedures for resolving conflicts;
- Risk mitigation strategies;
- PIs' roles and administrative, technical, and scientific responsibilities for the project.

4. Manufacturing Task(s) Narrative (optional):

The manufacturing task(s) narrative must not exceed 4 pages, including text, 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), and with type not smaller than 12 point except in figures and tables. EVALUATORS WILL REVIEW ONLY THE NUMBER OF PAGES SPECIFIED IN THE PRECEDING SENTENCE. 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. Save the information in a single file titled "Control#_ LeadOrganization_Manufacturing.pdf".

a. Technology: Briefly describe the proposed technology and/or design concept, including anticipated materials required and method of construction/fabrication. Include a description of the specific applications for which the technology is suitable. This description should be a brief summary of what has already been presented in the Full Application.

b. Market: Describe the market for this technology, including an assessment of the manufacturability of the product. This description should be a brief summary of what has already been presented in the Full Application.

c. Manufacturability: Identify the likely path forward for moving the proposed technology through the development process to achieve convincing scale that would accelerate market adoption of the technology into the marketplace. Describe current challenges with manufacturing of the technology and how the project will address those challenges. Describe the goals of the project to improve the manufacturability of the technology including cost targets, energy usage, GHG emissions reduction and reduction of other environmental emissions. Describe why the technology is manufacturable and can be scaled-up at reasonable costs while minimizing energy usage. Describe how the manufacturing process(es) will focus on and provide particular advantage to innovations in these areas (as applicable) and increase: deployment of the technology, U.S. GDP, U.S.

exports, domestic employment and U.S. competitiveness; minimizing environmental impacts; and reducing dependence on imported fossil fuels. Innovative strategies to achieve these goals are particularly welcomed.

d. **Work Plan**: Present the related tasks required to achieve the manufacturing goals of the project. Include reference to specific targets, milestones and deliverables expected to be achieved. This description should align with the work plan table presented in the main application. Provide sufficient detail so that specialists in the field can understand and evaluate each and every relevant step. Identify innovative and unique process steps that are an enhancement or improvement over existing manufacturing processes or new processes that will be implemented to manufacture the technology.

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

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

   b. **Two page biographical sketch for each key participant.** 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.

   c. **Facilities and equipment.** Describe facilities and equipment necessary to accomplish the proposed R&D. Detail the quantity and quality of the space the team has access to, highlighting any specialized facilities and/or major equipment. Identify any additional equipment or other facilities that are needed to complete the project that the applicant does not already have access to.

   d. **Current and Pending Funding:** BTP seeks to fund high impact projects that can be accelerated through the research, development and commercialization pipeline where BTP 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, National Laboratory 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:

i. All funding the key participants currently receive from DOE. Explain how the proposed work is not redundant with on-going DOE funded work.

ii. Identify all other funding sources, whether Federal or not, that the key participants currently receive which support the substance of the proposed work.

iii. 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.

iv. Identify all pending funding the key participants are waiting to receive notification on, noting the source of the funding and any overlap in the scope of the work with the tasks in the proposal.

6. Budget File

SF 424A 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 424A Excel, "Budget Information for Non Construction Programs" form under the Required Application Documents section at https://eere-exchange.energy.gov/. The SF 424A 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
"Control#_ LeadOrganization_SF424A.xls".

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.
Save the budget justification information in a single file titled
"Control#_LeadOrganization_Budget.xls".

8. **Letters of Commitment**
   If cost share is required, you must have a letter from each third party contributing cost share (i.e., a party other than the organization submitting the application) stating that the third party is committed to providing a specific minimum dollar amount of cost share. **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.

9. **Subaward Budget File(s) (if applicable)**
   You must provide a separate budget (i.e., budget for each budget year and a cumulative budget) for each subawardee that is expected to perform work estimated to be more than $100,000 or 50 percent of the total work effort (whichever is less). Use the SF 424A Excel for Non- Construction Programs under the Required Application Documents section at https://eere-exchange.energy.gov/. Save each Subaward budget in a single file titled "Control#_Organization_Subaward_SF424A.xls", or

10. **Subaward Budget Justification File(s) (if applicable)** A budget justification for the subaward budget is also required. The budget justification must include the same justification information described in Paragraph 6 above. Save each Subaward budget justification in a single file titled
    "Control#_Organization_Subaward_Budget.xls". .

11. **Authorization for non-DOE or DOE FFRDC(s) (if applicable)**
    Save the Authorization for non-DOE or DOE FFRDCs, as specified in Section III.C. Other Eligibility Requirements, in a single file titled
    "Control#_LeadOrganization_FFRDC_Auth.pdf".

12. **SF-LLL Disclosure of Lobbying Activities (if applicable)**
    If applicable, complete the SF- LLL under the Required Application Documents section at https://eere-exchange.energy.gov/. 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 of Lobbying Activities." If applicable, save the SF-LLL in a single

file titled
"Control#_LeadOrganization_SF-LLL.pdf

Summary of Required Forms/Files
Your Application Must Include the Following Documents

Name of Document	Format	File Name
SF 424 - Application for Federal Assistance	PDF	Control#_LeadOrganization_ SF424.pdf.
Project Summary/Abstract File	PDF	Control#_LeadOrganization_ Summary.pdf
Project Narrative File	PDF	Control#_LeadOrganization_ Project.pdf
Manufacturing Task(s) Narrative File (optional)	PDF	Control#_ LeadOrganization_ Manufacturing.pdf
Appendix File a. Literature cited; b. Two page biographical sketch for each key participant; c. Facilities and equipment; d. Current and pending funding; and Letters of Commitment.	PDF	Control#_Institution_ Appendix.pdf
SF 424A Excel – Budget Information for Non-Construction Programs File	Excel	Control#_LeadOrganization_ SF424A.xls
PMC 123.1 Excel - Budget Justification for SF 424A Budget	Excel	Control#_LeadOrganization_ Budget.xls
Letters of Commitment For Cost Sharing Partners, if applicable	PDF Attach as an Appendix to the Project Narrative File	Contral#_LeadOrganization_ Appendix.pdf
Subaward Budget File(s) SF 424A Excel for Non-Construction Programs, if applicable	Excel	Control#_Organization_ Subaward_SF424A.xls
Subaward Budget Justification File(s), if applicable. Detailed budget spreadsheet for all whose value is estimated to be more than $100,000 or 50 percent of the total work effort (whichever is less).	Excel	Control#_Organization_ Subaward_Budget.xls
Authorization for non-DOE or DOE FFRDC(s), if applicable.	PDF	Control#_Institution _ FFRDC_Auth.pdf
	PDF	Control#_Institution _

SF-LLL Disclosure of Lobbying Activities, if applicable		SF-LLL.pdf

D. Submissions from Applicants

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
- 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
- DOE Field Work Proposal, if applicable
- Additional supporting materials

E. Submission Dates and Times

1. Concept Paper Due Date

Concept Papers must be received by **04/17/2012, not later than 5:00 PM Eastern Time**. You are encouraged to transmit the Concept Paper well before the deadline. **CONCEPT PAPERS MUST BE SUBMITTED VIA EERE EXCHANGE AT** https://eere-exchange.energy.gov/. Applicants must submit a Concept Paper by the due date to be eligible to submit an Application.

2. Full Applications

Following the Concept Paper application phase, applicants will receive a notice as to whether or not they are encouraged to submit a full application. It is expected that these letters will be sent in late April or early May, 2012

3. Full Application Due Date

Application Due Date and Submission Time
Applications must be received by **06/12/2012, 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

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

G. Funding Restrictions

Cost Principles**.** Costs must be allowable in accordance with the applicable Federal cost

principles referenced in 10 CFR Part 600. The cost principles for commercial organizations are in FAR Part 31.

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 or 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 resubmit 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 CCR 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 Central Contractor Registry (CCR) at: https://www.bpn.gov/ccr/default.aspx. Designating an Electronic Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in CCR registration. Please update your CCR registration annually.

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

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. Initial Review Criteria

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.

2. Merit Review Criteria

Concept Papers
Concept Papers will be evaluated against the merit review criteria shown below. Based on the review, applicants will either be encouraged or discouraged to submit a full application.

Criterion 1: Impact of the Proposed Technology Relative to the State of the Art (Weight 50%)

- Degree to which the technology can impact energy savings for buildings and meet specified performance and cost/payback criteria
- Degree to which the Concept Paper demonstrates an awareness of the relevant market and the competing commercial and emerging technologies and identifies how the proposed concept/technology is likely to advance in the marketplace
- Degree to which the Concept Paper supports claims of commercially viability with respect to the technology
- Adequacy of information regarding the performance of the technology, cost considerations, market potential and an assessment of the competitive market
- Likelihood that the technology will be market-ready (e.g. at the commercial prototype phase) in less than five years from project launch

Criterion 2: Overall Scientific and Technical Merit (Weight 50%)

- Degree to which the proposed technology is an improvement over state-of-the-art technologies
- Demonstration of a sound technical approach
- Quality and experience of the performance team

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

Criterion 1: Impact of the Proposed Technology Relative to State-of-the-Art (Weight: 40%)

- Degree to which the technology can impact energy savings for buildings and meet specified performance and cost/payback criteria
- Degree to which the proposal demonstrates an awareness of the relevant market and the competing commercial and emerging technologies and identifies how the proposed concept/technology is likely to advance in the marketplace
- Adequacy of the description of market barriers and the approach to address them
- Feasibility of the identified path for moving the proposed technology through the research, development and commercialization pipeline and into the marketplace.
- Adequacy of the description of the manufacturing approach(es) that will most likely be used to scale up the proposed technology
- Adequacy of the lifetime of the technology, particularly in comparison to existing technologies
- If applicable, adequacy of the retrofit scheme
- Degree to which the application includes involvement of and commitment from a company with a track record in this industry and/or involvement of and commitment from a potential investor with a track record in this industry
- Adequacy of information regarding the cost considerations, market potential and an assessment of the competitive market
- Likelihood that the technology will be market-ready (e.g. at the commercial prototype phase) in less than five years from project launch

Criterion 2: Overall Scientific and Technical Merit (Weight: 40%)

- Degree to which the proposed technology is an improvement over state-of-the-art technologies and meets or exceeds the specified performance targets
- Adequacy of information supporting performance target calculations and analysis
- Demonstration of a sound technical approach to accomplish the proposed tasks and objectives; clarity and completeness of the description of each activity necessary to complete the project
- Impact and feasibility of achieving the proposed milestones and deliverables outlined in the Work Plan
- Adequacy of go/go no no-go decision-making points
- Quality of preliminary results, if applicable

Criterion 3: Qualifications, Experience and Capabilities (Weight: 20%)

- Extent to which the capabilities, experience, and qualifications of the organization and its members are consistent with and support the proposed scope of work and the proposed objectives
- Extent to which the necessary business and technical management for supporting a high likelihood of success of the project have been identified
- Adequacy of the facilities and resources for executing the proposed scope of work
- Adequacy of support as evidenced by letters of commitment from anticipated organization members, partners, suppliers, and customers
- Extent to which the proposed management plan is sound with clearly defined roles and processes as well as clearly identified risk mitigation strategies

3. Other Selection Factors

Program Policy Factors

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

- Technological diversity (Contribution to BTP portfolio diversity)
- Diversity and geographic distribution of institutions and organizations
- Level of cost-share above the minimum required and leveraging of additional resources
- Impact of DOE funds on the project measured by project's increased likelihood of achieving programmatic objectives.

4. Applications Including a Manufacturing Component (Optional Task)

Upon taking into account the technical merit and program policy factors of applications based on the criteria described, The Selection Official will then determine whether DOE funding for proposed manufacturing component, if applicable, will be considered as part of selection for negotiation of award. Following initial selection, the selection official will separately consider the proposed optional manufacturing tasks proposed by the successful applicants only. In determining whether the proposed optional manufacturing components will be considered for negotiation of award. In making this determination, the selection official will utilize the following factors:

- Degree to which the technology can impact energy savings overall and its overall pervasiveness
- Feasibility, technical merit, innovativeness and scalability of the proposed manufacturing approach(es)
- Degree to which the manufacturing process(es) focus on and provide particular advantage to innovations in the technology areas and increase: U.S. GDP, U.S. exports, domestic employment and U.S. competitiveness; minimize environmental impacts; and reduce dependence on imported fossil fuels
- Impact and feasibility of achieving the proposed milestones and deliverables

outlined

The Selection Official may utilize independent reviewers to assist in evaluating how an application addresses the factors described above.

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/sites/prod/files/meritrev.pdf.

2. Selection

Selection Official Consideration

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

3. 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

Applicants will be notified whether they are Encouraged or Discouraged to submit a Full Application in late April or early May. Selections for this FOA expect to be announced in July 2012.

SECTION VI - AWARD ADMINISTRATION INFORMATION

A. Notice of Selection

1. Notice of Selection

Selected Applicants Notification
DOE will notify applicants selected for award. This notice of selection is not an authorization to begin performance. (See Section IV.G with respect to the allowability of pre-award costs.)

Non-selected Notification
Organizations whose applications have not been selected will be advised as promptly as possible. This notice will explain why the application was not selected.

2. 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) Special Terms and Conditions; (2) Applicable program regulations, if any; (3) Application as approved by DOE; (4) DOE assistance regulations at 10 CFR part 600; (5) National Policy Assurances To Be Incorporated As Award Terms; (6) Budget Summary; and (7) Federal Assistance Reporting Checklist, which identifies the reporting requirements.

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 and National Policy Requirements

1. Administrative Requirements

The administrative requirements for DOE grants and cooperative agreements are contained in Title 2 CFR (See: http://ecfr.gpoaccess.gov). Grants and cooperative agreements made to universities, non-profits and other entities subject to Title 2 CFR 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 CCR 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 CCR current. 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 CCR.

2. **Special Terms and Conditions and National Policy Requirements**
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

By submitting an application in response to this FOA the Applicant certifies 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) 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,

(3) If the Applicant's financial assistance application is chosen for award and the award is in excess of $1,000,000, the applicant will, by the end of the fiscal year, upgrade the efficiency of their facilities by replacing any lighting that does not meet or exceed the energy efficiency standard for incandescent light bulbs set forth in Section 325 of the Energy Policy and Conservation Act (42 U.S.C. 6295).

3. **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.

4. Statement of Substantial Involvement

Either a grant or cooperative agreement may be awarded under this announcement. If the award is a cooperative agreement, the DOE Grants Management Specialist and DOE Project Officer will negotiate a Statement of Substantial Involvement prior to award.

C. Reporting

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

Specific reporting requirements for all awards resulting from this announcement will include:

- Quarterly and final Technical Progress Reports
- Quarterly and final Federal Financial Reports
- Annual presentations at the DOE Program's Annual Building Technologies Merit Review and Peer Evaluation Meeting (typically in Washington, D.C.)
- Annual submissions to the DOE Program's Annual Building Technologies Progress Report
- Specific Stage Gate (Go/No-Go) Review Reports

SECTION VII - QUESTIONS/AGENCY CONTACTS

A. Questions

Questions regarding the content of this announcement must be submitted to: btech@go.doe.gov no 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/FAQ.aspx . **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

Notices of any amendments to this announcement will be posted on the EERE Exchange web site. When you create an application record you are then registered to receive notifications of changes. This notice will be delivered by e-mail to the address listed in your application record.

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.

Special Protected Data Statutes. This program is covered by a special protected data statute. The provisions of the statute provide for the protection from public disclosure, for a period of up to 5 years from the date of its development, of first-produced data that would be trade secret, or commercial or financial information that is privileged or confidential, if the information had been obtained from a non-Federal party. Generally, the provision entitled, Rights in Data – Programs Covered Under Special Protected Data Statutes, (10 CFR 600 Appendix A to Subpart D), will apply to an award made under this announcement. This provision will identify data or categories of data first produced in the performance of the award that will be made available to the public, notwithstanding the statutory authority to withhold data from public dissemination, and may also identify data that will be recognized by the parties as protected data. For National Laboratories and FFRDCs, the data rights clause in Applicant's Management and Operating (M&O) Contract will apply.

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.

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 CCR.

"**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.

"Central Contractor Registration (CCR)" is the primary database which collects, validates, stores and disseminates data in support of agency missions.

"**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.

"**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 CCR. 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 CCR registration. This person is the sole authority of the organization with the capability of designating or revoking an individual's ability to conduct CCR 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.
https://eere-exchange.energy.gov

"**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 CCR. The E-Business Point of Contact will need the MPIN to assign privileges to the individual(s) authorized to perform CCR 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.

"**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 CFR600.123;
- State and Local Governments are found at 10 CFR600.224;
- For-profit Organizations are found at 10 CFR600.313.

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 Regulations:
http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=98a996164312e8dcf0df9c22912852b0&rgn=div5&view=text&node=10:4.0.1.3.9&idno=10

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.

(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 OMB Circular No. A-21 -- Cost Principles for Educational Institutions

(ii) *Other nonprofit organizations.* Allowability is determined in accordance with OMB Circular A-122, Cost Principles for Non-Profit Organizations

(iii) *Hospitals.* Allowability is determined in accordance with the provisions of 45 CFR Part 74, Appendix E, 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 OMB Circular No. A-87, Cost Principles for State, Local, and Indian Tribal Governments

(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)