FINANCIAL ASSISTANCE
FUNDING OPPORTUNITY ANNOUNCEMENT

U.S. Department of Energy
Energy Efficiency and Renewable Energy
Golden Field Office

Foundational Program to Advance Cell Efficiency II (FPACE II) – Model Systems

Funding Opportunity Announcement Number: DE-FOA-0000806

Announcement Type: Initial

CFDA Number: 81.087

FOA Issue Date	**January 25, 2013**
Q&A Webinar for Applicants	**February 22, 2013**
Submission Deadline for Letters of Intent to Apply (mandatory)	**5:00 PM ET, March 7, 2013**
Submission Deadline for Full Application Questions to FPACE2ModelSystems@go.doe.gov	**5:00 PM ET, April 1, 2013**
Submission Deadline for Full Applications (mandatory)	**5:00 PM ET April 8, 2013**
Expected Date for Release of Reviewer Comments	**May 9, 2013**
Submission Deadline for Replies to Reviewer Comments (optional)	**Anticipated 5 PM ET, May 14, 2013**
Expected Date of Pre-Selection Conference Calls and Presentations	**June 3-7, 2013**
Expected Date for Selection Notifications	**June - July 2013**

REGISTRATION REQUIREMENTS

There are several one-time actions Applicants must complete 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 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 re-submit 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 Office of Energy Efficiency and Renewable Energy (EERE) Funding Opportunity Announcements is found at https://eere-exchange.energy.gov/Manuals.aspx after logging in to the system.

  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 the System for Award Management (SAM) or FedConnect should complete those registrations as soon as possible**.
  Questions related to the registration process and use of the EERE Exchange website should be submitted to: EERE-ExchangeSupport@hq.doe.gov

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

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

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

- Register in Grants.gov at http://www.grants.gov.to receive automatic updates when Amendments to this FOA are posted. Please note that applications will not be accepted through Grants.gov.

Table of Contents

SECTION I – FUNDING OPPORTUNITY ANNOUNCEMENT (FOA) DESCRIPTION

A. SunShot Program Overview

The U.S. Department of Energy's (DOE) SunShot Initiative[1] is a collaborative national initiative to make solar energy cost competitive with other forms of energy by the end of the decade. By reducing the price of utility scale installations by about 75 percent to roughly $1 per peak watt ($1/W_{DC}), which would correspond to approximately 6 cents per kilowatt-hour (kWh), solar electricity systems could be broadly deployed across the country. Meeting this target would enable large scale deployment of solar installations without subsidies. It is envisioned that one way to achieve this goal is for photovoltaic (PV) module prices to reach $0.50/$W_{DC}$, total balance of systems (BOS) prices to be reduced to $0.40/$W_{DC}$, and power electronics prices to reach $0.10/$W_{DC}$.

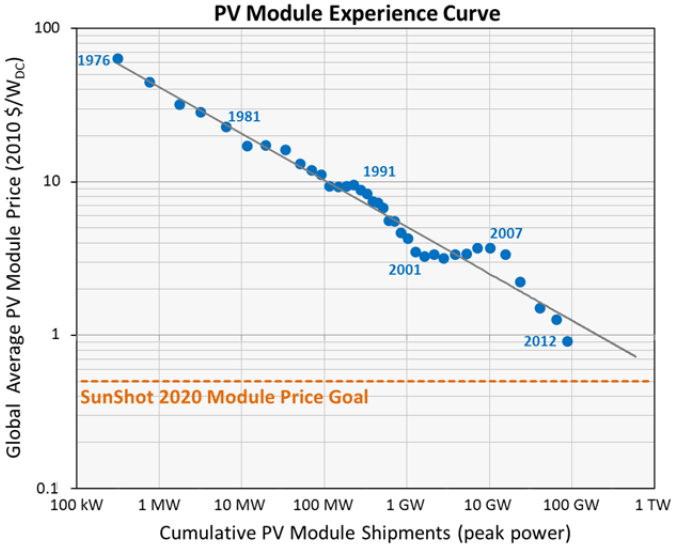
The SunShot program builds on the legacy of President Kennedy's 1960's "moon shot" goal, which planned to regain the country's lead in the space race and land a man on the moon. The SunShot program aggressively drives innovations in the ways that solar systems are conceived, designed, manufactured, and installed. Pursuing the $1/$W_{DC}$ goal puts the United States (U.S.) in a scientific and technical race with other nations to develop, commercialize, and scale-up new PV technologies.

B. Background

In this Funding Opportunity Announcement (FOA), the SunShot Initiative is aiming to increase the efficiencies of p-n junction[2] solar cells. Due to price reductions in the solar energy industry and the goals of the SunShot Initiative, there is a need to increase the efficiency of the highest performing laboratory cells. Module power conversion efficiencies of 25% may be required to achieve the SunShot target.[1] Driven by technology development, manufacturing capacity scale-up, increased competition, global demands, and maturing markets, the average selling price of crystalline silicon (c-Si) modules dropped about 50% in 2011 and current spot prices are near $0.65/W, representing an unprecedented decline of the average price of PV cells (Figure 1). Thin film companies are aiming to compete in the same price range. Technology pathways have been identified for 18% efficient modules with $0.57/W manufacturing costs for cadmium telluride (CdTe) thin film technology.[3] Similar projections have been made for c-Si with a long-term manufacturing cost potential of $0.68/W for advanced cell architectures and a module efficiency of about 21.5%.[1] To meet the SunShot target for module price as well as hardware balance of

[1] SunShot Vision Study, February 2012 http://www1.eere.energy.gov/solar/sunshot/vision_study.html
[2] p-n junction refers to the junction between p-type and n-type semiconducting materials
[3] Woodhouse M. et al., "Perspectives on the pathways for CdTe PV module manufacturers to address expected increases in the price for tellurium", *Solar Energy Materials & Solar Cells*, **2012**, In Print.

systems, manufacturing cells with efficiencies as high as 27-28% may be needed to produce modules that achieve power conversion efficiencies of 25% (considering an average cell-to-module loss of 2% for all technologies). Through the creation of high-efficiency cells supported by this FOA, DOE plans to facilitate the development of model cells whose properties can be studied and eventually translated into commercial products.



Sources: For 2012: SPV Market Research, Q4 2012 PV Technology Price Update (Dec. 2012). For 2011: Navigant Consulting (2012), Photovoltaic Manufacturer Shipments, Capacity & Competitive Analysis 2011/2012, Report NPS-Supply7 (April 2012). For 1984-2009: Navigant Consulting (2010), Photovoltaic Manufacturer Shipments, Capacity & Competitive Analysis 2009/2010, Report NPS-Supply5 (April 2010). For 1980-1984: Navigant Consulting (2006), Photovoltaic Manufacturer Shipments 2005/2006, Report NPS-Supply1 (August 2006). For 1976-1980: Strategies Unlimited (2003), Photovoltaic Manufacture Shipments and Profiles, 2001-2003, Report SUMPM 53 (September 2003).

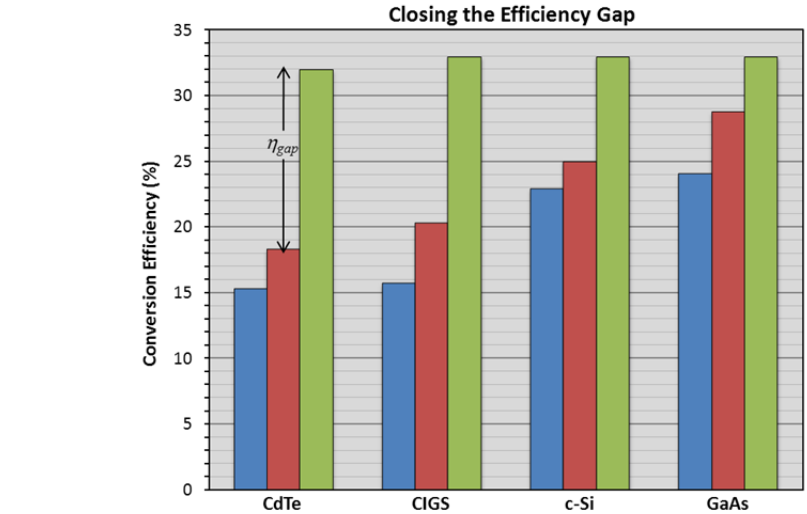
Figure 1: The average price of PV modules as a function of cumulative shipments. Between 1976 and 2012, the price reduced by about 20% for every doubling of cumulative shipments. The gray curve represents this trend. Meeting the 2020 SunShot price target of $0.50/W$_{DC}$ requires this decade's rate of technological progress for PV cells and modules to deviate from this historical trend.

The DOE SunShot Initiative seeks to support research towards ultra-high efficiency solar cells with the end goal being the experimental achievement of efficiencies near the Shockley-Queisser (SQ) Limit (under 1 sun) for manufacturable PV technologies. The Shockley-Queisser theoretical efficiency limit for a p-n junction is ~33% assuming an ideal case in which the only recombination mechanism of hole-electron pairs is radiative, unity quantum efficiency (QE), full light absorption, and a bandgap (E_g) optimized for the solar spectrum (E_g = 1.4 eV).[4,6] With this FOA, DOE seeks to fund teams to achieve SQ limits for PV cells for the chosen absorber system. For example, researchers have outlined the effect of parallel non-radiative processes in terms of external radiative efficiency (a fraction of total dark current recombination in the device).[5] Gallium Arsenide (GaAs, E_g = 1.43 eV) cells have demonstrated the best research cell

[4] Shockley W. and Queisser H. J., "Detailed balance limit of efficiency of p-n junction solar cells", *J. Appl. Phys.*, **1961**, vol. 32, pp. 510.
[5] Green M. A., "Radiative efficiency of state-of-the-art photovoltaic cells", *Prog. in PV: Res and Appl.*, **2011**.

efficiencies that are close to the theoretical maximum conversion efficiencies (28% single junction cell). As the external radiative efficiency (ERE) is improved towards 100%, an additional gain of up to 40 mV in open circuit voltage (V_{oc}) is expected, as well as corresponding fill factor (FF) improvements. Furthermore, with light management strategies that redirect light at the angle corresponding to the disk of the sun, V_{oc} can be increased by several hundred mV so that the efficiency of a single-junction solar cell beyond 40% is achievable.

Through this FOA, FPACE II: Model Systems, the SunShot Initiative seeks experimental demonstration of SQ efficiency limits through a fundamental approach of materials design; defect engineering; device simulations; and materials growth and characterization. Technologies like c-Si (E_g = 1.15 eV), CdTe (E_g = 1.48 eV), indium phosphide (InP) (E_g = 1.3 eV) and copper indium gallium diselenide (CIGS) (E_g = 1.15 eV) have a large discrepancy between record research cell and theoretical maximum efficiencies (Figure 2). Furthermore, as shown in Figure 3, CIGS and CdTe record cell efficiencies have increased by only about 2% and 0.7%, respectively, between 2001 and 2012. Record efficiency for c-Si was reported at 24.7% in 1998 and has not improved since (Figure 3).



	CdTe	CIGS	c-Si	GaAs
Best Module[1]	15.3 ± 0.5	15.7 ± 0.5	22.9 ± 0.6	24.1 ± 1.0
Best Research Cell[2]	18.3 ± 0.5	20.3 ± 0.6	25.0 ± 0.5	28.8 ± 0.9
Schockley-Queisser Limit[3, 4]	32	33	33	33

[1] Green, M. A. *et al.*, "Solar cell efficiency tables (version 41)", *Progress in Photovoltaics: Research and Applications*, 2013, vol. 21, pp. 1-11. [2] Best Research-Cell Efficiencies, Rev 12-2012, National Renewable Energy Laboratory. [3] Green, M. A., "Radiative efficiency of state-of-the-art photovoltaic cells", *Progress in Photovoltaics: Research and Applications*, 2012, vol. 20, pp. 472-476. [4] Shockley, W. and Queisser, H. J., "Detailed Balance Limit of Efficiency of p-n Junction Solar Cells," *Journal of Applied Physics*, 1961, vol. 32, pp. 510-519.

Figure 2: The FPACE II research program seeks to close the efficiency gap between the best research cells and the theoretical conversion limits. For example, the current state-of-the-art CdTe cells have an efficiency of about 18%. FPACE II seeks dramatic increases that achieve the 32% SQ limit.

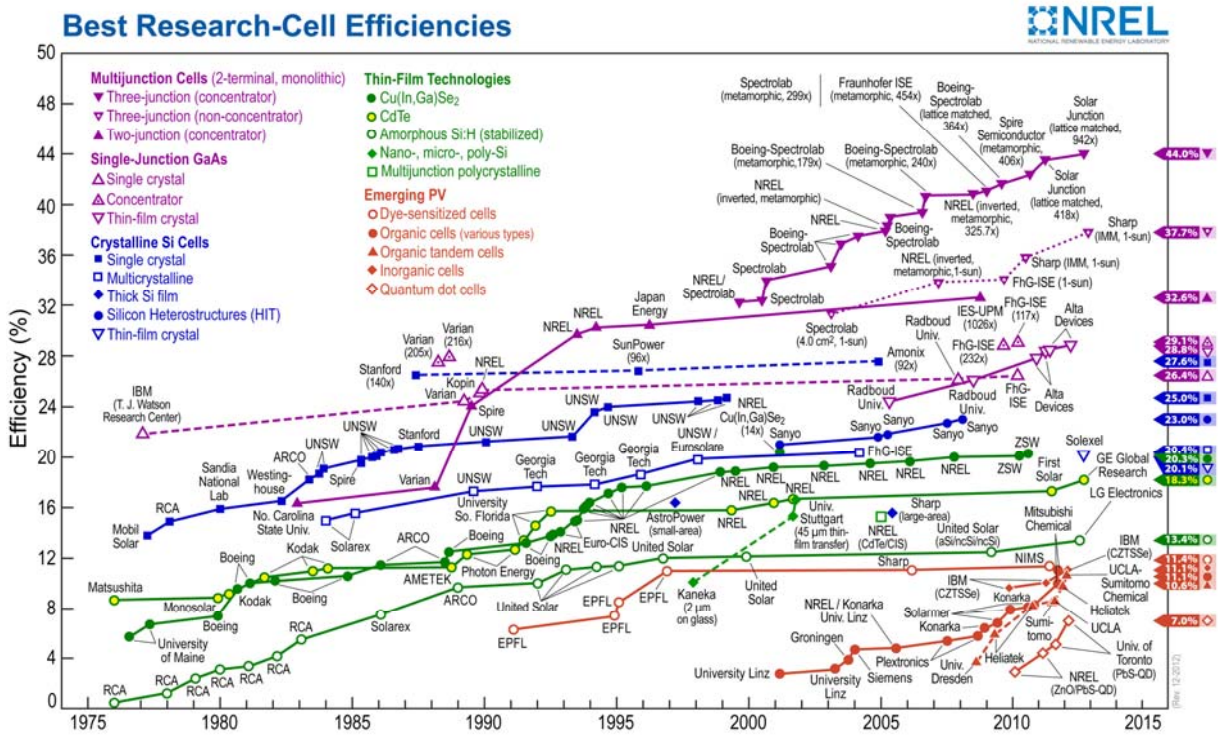


Figure 3: Best research cell efficiencies over time

Through the development of systems that achieve SQ efficiency limits, PV researchers will likely develop fundamental knowledge concerning issues such as point defects, extended defects, hetero-interfaces, band offsets, surface passivation, intrinsic doping limit, and factors affecting electron-hole (donor-acceptor) recombination mechanisms. For example, CdTe should have a similar efficiency to GaAs on theoretical grounds (E_g = 1.43- 1.45 eV), but so far, the actual efficiency of CdTe is considerably lower than the SQ limit of 32% efficiency. Bridging this efficiency gap will require an understating of the materials properties that are responsible for such losses. Furthermore, there are several active loss mechanisms for CIGS cells that reduce the achievable efficiency from the theoretical maximum of 33% (E_g = 1.15 eV). Such loss mechanisms include optical and collection losses, recombination current limited by Shockley-Read-Hall (SRH) recombination, and inhomogeneity in polycrystalline absorbers.[6] Concerning Si solar cells, non-radiative recombination is significant and light management can be used to enhance the QE by enhancing the optical density of states. The challenge is more significant for ultrathin kerfless Si technologies with higher surface recombination compared to conventional

[6] Siebentritt S., "What limits the efficiency of chalcopyrite solar cells?" *Sol. Energy Mat. & Sol. Cells*, **2011**, vol. 95, pp. 1471-6.

thick wafer technologies. FPACE II: Model Systems takes a fundamental and aggressive approach to developing proof of concept devices that experimentally achieve SQ limits for PV devices at the laboratory scale. This FOA will address the currently unfulfilled need for a significant Federal funding program to design and build model PV devices using a comprehensive approach of modeling, growth, and probing.

With this FOA, the DOE SunShot Initiative is soliciting collaborative research teams to define and fabricate model systems. A model system is defined as a single p-n junction device structure that can achieve SQ limits (for a chosen bandgap and absorber material) and approach the thermodynamic limits of solar conversion efficiency. The emphasis of this FOA is assembling cohesive and highly diverse teams of experts (within and outside the PV community) who can achieve the goals of creating a model system concept and subsequent device approaching SQ limits. DOE SunShot anticipates significant collaboration between experts in fundamental materials, characterization, device physics, ab-initio simulations, and PV device integration to adequately address these fundamental issues.

A few specific (but not prescriptive) examples of potential questions to address when building the model system in various technologies might include:

1. Influence of extended defects like dislocations ($\perp$s), stacking faults (SFs), grain boundaries (GBs) on junction properties, and bulk recombination. Crystalline GaAs devices have bulk and interface dislocation densities of $< 10^4/cm^2$ and $< 10^6/cm^2$ respectively, but what is the required number for CdTe or CIGS? What is an ideal substrate?
2. If grain boundaries truly improve charge collection in poly-CdTe and CIGS, is it possible to design an absorber to enhance charge separation and transport? What is the optimal grain boundary width to prevent tunneling?
3. What are "ideal" interfaces for ideal band offsets and minimal interface recombination? Would it be possible to design a hetero/homo-junction with optimized band alignment (close to ideal band offsets)? Would this be measurable?
4. What are the dominant transport mechanisms (free carriers or excitons); recombination mechanisms; role of interfaces; etc. in bulk heterojunction solar cells?
5. Are there fundamental reasons for the lower power conversion efficiencies of ultrathin kerfless Si epitaxial films? What is an ideal surface passivation? What is an ideal light management method?

C. FOA Objectives

The goal of this program is to fund research on materials growth, characterization and modeling on a sub-cell or cell level. Synergistic teams from universities, national laboratories, and/or companies will be funded to conduct integrated research to demonstrate proof-of-concept device efficiency near theoretical limits. The teams are intended to be collaborations between leading researchers sharply focused on designing and building a model system device. Applicants must

propose teams with at least 3 key members from at least 2 institutions (universities, national laboratories, and/or companies), but more are expected to form a comprehensive team.

An example (but not prescriptive) team structure is shown in Figure 4. This FOA will emphasize the team building process with the overarching goal of making a model system device.
FPACE II funds are intended to facilitate collaborative aspects of the team research effort and may be used to support shared postdoctoral fellows and early career researchers between team members, equipment and materials, travel between member institutions, team coordination meetings, or other appropriate activities that will enable the team to work together.

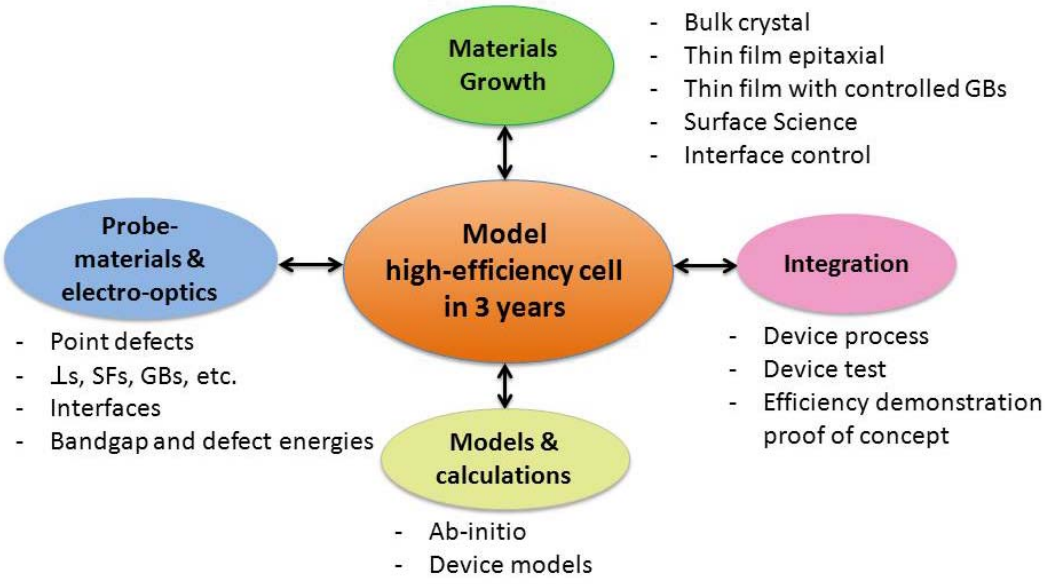


Figure 4: Example (but not prescriptive) of a collaborative research program for fabricating a single junction model system.

Applications to this FOA must include a preliminary model system approach and concept, and include an explanation of why the team assembled will be able to achieve proposed results. Because the successful completion of this research requires collaborative teams, Applicants should consider team members from within and outside the PV community and are encouraged to review the Merit Review Criteria (Section V.A) when constructing their team.

The application should include (see Section IV.C for more information):

- A comprehensive approach to a model system concept outlining the approach, challenges, and possible solutions for making devices approaching SQ efficiency limits.
- The identification of performance metrics that define critical parameters (in addition to first level metrics like open-circuit voltage, short-circuit current, and fill-factor) relevant

to the success of the project, and identify target values for these metrics. For example: defect density, doping density, band alignment, surface passivation, and interfaces

- A description of the precise areas of expertise and special capabilities of the team members and facilities involved in the collaboration.
- A research plan that demonstrates the unique benefits of the collaboration.
- An analysis of how insights from this research could lead to efficiency improvements for manufactured cells and increased system performance. This FOA does not require the use of manufacturable processes, however, a line of sight to commercialization is favorable.

Impact, Publication and Intellectual Property

Successful Applicants will demonstrate that the proposed project is likely to significantly contribute to the overall economic competitiveness of the U.S. solar industry and the deployment of solar technologies in the U.S. Specifically, an applicant should demonstrate at least one of the following: 1) a high level of interest from U.S. industry partners and/or U.S. research institutions in the proposed project; 2) a high likelihood that the research results could be commercialized in the U.S. (within 3–5 years after completion of the project); or 3) that the likely results will be new research tools that will increase the overall knowledgebase from which the U.S. PV industry may develop commercial and proprietary technologies. Applicants are encouraged to refer to Section V.A for more information on how their applications will be evaluated. **DOE expects that all research results from the projects funded under this FOA will be published in peer-reviewed journals, either during the course of the project or within 3-5 years after completion, by the awardees.** (See Section VIII.F - Intellectual Property Developed under this Program for more information on the treatment of data and inventions developed under an award)

D. Areas of Programmatic Interest

- The fabrication of a cell that meets SQ efficiency limits using a manufacturable PV absorber material.
- Research focusing on a PV technology for which a minimum device efficiency of 11% has been demonstrated at cell or module level. For example (but not prescriptive): c-Si, kerfless or thin Si technologies, CdTe, CIGS, copper zinc tin sulfide/selenide ($Cu_2ZnSnSe_xS_{4-x}$, CZTS), InP, GaAs, etc.
- A comprehensive approach to fabricating PV devices that achieve SQ limits. A comprehensive approach could include:
    - Materials growth (e.g. single crystal, homo- and hetero- epitaxy for single crystal and controlled polycrystalline films, interface control, surface passivation, etc.).
    - Electro-optical characterization of point defects, extended defects, surfaces and interfaces, as well as correlation to relevant device metrics
    - Ab-initio materials system design and computing capabilities
    - Device fabrication, characterization, and modeling.

E. Areas NOT of Programmatic Interest

If an application focusing on any of the items described below is received by DOE, DOE will deem the application non-responsive to the FOA, the application will not be considered for funding, and the application will be eliminated from further review as described in Section V.A.

- Absorber materials with less than 11% proven efficiency
- Basic fundamental research without direct translational character to manufacturable PV technologies
- Existing commercial hardware technologies, products, and solutions
- Research leading to incremental improvements over the current state of the art (For example: use of cadmium chloride ($CdCl_2$) treatment in CdTe or sodium (Na) in CIGS for improved device efficiency. It is understandable that incremental improvements to existing products can be extremely compelling and offer significant advantages; however, DOE is not seeking applications of this type, and they will be considered nonresponsive.)
- Module level research (such as encapsulants, contacting, module casing, soiling, anti-reflection coating, etc.)
- Systems level research (such as mounting, tracking, power electronics, etc.)
- Research on heating (DOE is not seeking applications for solar hot water applications.)

SECTION II – AWARD INFORMATION

A. Type of Award Instrument

DOE anticipates awarding grants and/or cooperative agreements under this FOA. If it is determined that a cooperative agreement is an appropriate award instrument, the nature of Federal involvement will be included in a special award condition. DOE will negotiate a Statement of Substantial Involvement prior to the award. Please refer to 10 CFR 600.5 (b) for additional information describing substantial involvement. DOE has the right to intervene in the conduct or performance of project activities for programmatic reasons. Intervention includes the interruption or modification of the conduct or performance of project activities". Refer to 10 CFR 600.5 (d) for additional language and citations.

B. Estimated Funding

FPACE-II: Model Systems
Award Duration (years)
DOE anticipates making awards with duration of up to 3 years.
Maximum Award (Total Project Costs per Award)
Estimated maximum amount of DOE funding per award is up to $4.8M, with mandatory 20% non-Federal cost share ($6M Total Project Costs per award)
Approximate DOE Share ($)
Approximately $12 M of Federal funding will be made available for awards under this FOA, subject to the availability of appropriated funds.

Applicants may propose a three year award up to $1,600,000 a year from the DOE ($4,800,000 over 3 years) with a mandatory 20% non-Federal cost share, making the total project costs up to $6,000,000 over three years. The projects will have three budget periods of 12 months each. At the end of each budget period, DOE will make a go/no-go decision (as described in Section II.D) on the project based on accomplishment of the proposed milestones and adequate progress toward the final goals of the project. Milestones will be proposed in the Applicant's Project Narrative and Statement of Project Objectives (SOPO) as described in Section IV.C, which will be negotiated if selected for an award. For example, the milestone for the end of budget period one will be a comprehensive model system concept. The fabrication of a model system with

device efficiency approaching the SQ limit is a final goal of this FOA. At the end of three years, there may be the opportunity for competitively awarded follow-on funding.

Amount of New Awards

Approximately $12,000,000 is expected to be available for new awards under this announcement.

Maximum and Minimum Award Amount

Anticipated Ceiling (i.e., the maximum amount for an individual award made under this announcement): $4,800,000

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

C. Expected Number of Awards

DOE anticipates making approximately 2-3 awards under this announcement.

D. Period of Performance

- DOE will support projects at award levels up to $1,600,000 per year for up to 3 years. Funding for all awards and future budget periods are contingent upon the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority.
- Each project will be divided into three budget periods. The first budget period will cover a period of one year. Upon the completion of budget period one, DOE expects that the teams will have reached the milestone of having a comprehensive model system concept for their material system of choice. Continuation to the next, one-year budget period will be contingent upon satisfactory performance of the first budget period and subject to annual appropriations. Finally, a third budget period/year may be allowed contingent upon satisfactory performance of the previous budget period and subject to annual appropriations. At the end of three years, the awardees may have an opportunity to apply for further funding.
- At the go/no-go decision points, DOE will use the Statement of Project Objectives (SOPO), phone conference reports, and submitted financial and technical reports to evaluate project performance, project schedule adherence, meeting milestone objectives, compliance with reporting requirements, and overall contribution to the SunShot goals and objectives. As a result of this evaluation, DOE will make a determination to continue the project, re-direct the project, or discontinue funding the project. Only those projects that meet all of the requirements listed above for the go/no-go review, obtain DOE approval of the continuation application, and demonstrate a high probability of successfully meeting the SunShot Initiative targets will be continued.

E. 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).

F. Application Process Overview

1. Letter of Intent to Apply

To facilitate the timely review of applications, applicants are required to submit a mandatory Letter of Intent (LOI). See Section IV.B for more information. Full Applications received from an Applicant who has not submitted a Letter of Intent by the deadline stated in Section IV.B will be considered ineligible and will not be reviewed or considered for an award under this FOA. Applications may include team members who have not submitted an individual Letter of Intent, but these members may not act as the Principle Investigator (PI). Because the successful completion of this research requires collaborative teams, Applicants should consider team members from within and outside PV community and are encouraged to review the Merit Review Criteria (Section V.A) when constructing their team.

2. FPACE II- Model Systems Application

The second step in applying for funding under this FOA is the submission of a Full Application. The FPACE-II Model Systems application requires documents that describe the proposed project, its novelty, and the team's ability to meet or exceed the FOA objectives outlined in Section I.C. Refer to Section IV.C for details on Full Application submission.

3. Replies to Reviewer Comments (Optional)

Reviewer comments on compliant and responsive Full Applications will be made available to Applicants via EERE Exchange. An Applicant, and only that applicant, will be able to view the comments provided to their own application. Applicants have a brief opportunity (4-5 days) to review these comments and prepare a short Reply to Reviewer Comments. Applicants may elect to respond to one or more Reviewer comments or to supplement their Full Application. See Section IV.D for more information.

4. Pre-Selection Clarification

Based upon the results of the merit review of written applications, DOE may determine that pre-selection clarifications are necessary from certain Applicants. These pre-selection clarifications will be for the purposes of clarifying the application and may take the form of one or more of the following procedures: written responses to DOE's written clarification

questions, video or conference calls with DOE representatives and/or merit reviewers panel, in person-meetings or presentations at DOE with DOE representatives and/or merit reviewers. See Section V.B.2 for more information.

5. Selection

The Selection Official may consider the merit review recommendation, program policy factors, and the amount of funds available in selecting applications for negotiation of an award.

DOE reserves the right to choose an application, in whole or in part, for negotiation of an award.

Applicants will be promptly notified of DOE's determination. Please refer to Section VI of the FOA for guidance on award notices.

6. Award Negotiations

Applicants selected for negotiation of award will be provided with a schedule for award negotiations upon selection. Failure to meet the specific and rapid deadlines stated in the schedule may result in the termination of award negotiations and the selection of another meritorious Applicant.

7. Anticipated Notice of Selection and Award Dates

DOE anticipates notifying Applicants selected for negotiation of an award under this FOA by July 2013 and making awards by August 2013.

SECTION III - ELIGIBILITY INFORMATION

A. Eligible Applicants

1. Individuals

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

2. Domestic Entities

For-profit entities, educational institutions, and nonprofits[7] that are incorporated (or otherwise formed) under the laws of a particular State or territory of the United States are eligible to apply for funding as a prime recipient or subrecipient.

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

DOE/NNSA Federally Funded Research and Development Centers (FFRDCs) and DOE Government-Operated Government-Owned laboratories (GOGOs) are eligible to apply for funding as a prime recipient or subrecipient.

Non-DOE/NNSA FFRDCs and non-DOE GOGOs are eligible to apply for funding as a subrecipient, but are not eligible to apply as a prime recipient.

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

3. Foreign Entities

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

Other than as provided in the "Individuals" or "Domestic Entities" sections above, all prime recipients receiving funding under this FOA must be incorporated (or otherwise formed) under the laws of a State or territory of the United States. If a foreign entity applies for funding as a prime recipient, it must designate in the Full Application a subsidiary or affiliate incorporated (or otherwise formed) under the laws of a State or territory of the United States to be the prime recipient. The Full Application must state the nature of the corporate relationship between the foreign entity and domestic subsidiary or affiliate. Foreign entities may request a waiver of this

[7]Nonprofit organizations described in section 501(c)(4) of the Internal Revenue Code of 1986 that engaged in lobbying activities after December 31, 1995, are not eligible to apply for funding.

requirement in the Full Application. See Section IV.C.9 for waiver request information. The DOE Contracting Officer has discretion to waive this requirement if he/she determines that it will further the purposes of this FOA and is otherwise in the interests of EERE.

A foreign entity may receive funding as a subrecipient.

4. Incorporated Consortia

Incorporated consortia, which may include domestic and/or foreign entities, are eligible to apply for funding as a prime recipient or subrecipient. For consortia incorporated (or otherwise formed) under the laws of a State or territory of the United States, please refer to "Domestic Entities" above. For consortia incorporated in foreign countries, please refer to the requirements in "Foreign Entities" above.

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

5. Unincorporated Consortia

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

Upon request, unincorporated consortia must provide the DOE Contracting Officer with a collaboration agreement, commonly referred to as the articles of collaboration, which sets out the rights and responsibilities of each consortium member. This agreement binds the individual consortium members together and should discuss, among other things, the consortium's:

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

6. Performance of Work in the United States

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

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

Applicants and prime recipients may request a waiver of this requirement. Applicants must include a written waiver request in the Full Application. Prime recipients must submit any waiver requests in writing to the assigned DOE Contracting Officer. The DOE Contracting Officer has discretion to waive this requirement if he/she determines that it will further the purposes of this FOA and is otherwise in the interests of EERE. See Section IV.D.9 of the FOA for waiver request information.

B. Cost Sharing

The Cost Share for all applicants must be at least 20% of the total allowable costs of the project (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 costs 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.)

C. Special Qualification Criteria

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

Team Requirements:

In order to be eligible for this award, a collaborative research team with complimentary theoretical, computational, and/or experimental expertise, with a **minimum of three team members (ideally 4-5) from at least 2 institutions** (e.g. universities, national laboratories, and/or companies) must be formed to appropriately address the objectives of the FOA.
A key purpose of the FPACE II-Model Systems funding is the expansion of the breadth of expertise being applied to PV device fundamentals and characterization. **As described in the Merit Review Criteria (Section V.A.2), the Reviewers will determine if the proposed team includes at least one individual with demonstrated capability in PV cell fabrication within 3% (absolute) of world record cells (Figure 3) for the technology**

addressed in the application based on the information provided in the Full Application. For purposes of this FOA, world record cell efficiency shall be the world records identified in Figure 3. "Demonstrated capability" means that the individual was part of the team which fabricated the cell that is within 3% of the world record. This could be verifiable through authorship on a peer reviewed publication about the given cell or a letter from an institution or company stating the nature of the individual's involvement and that such involvement was integral in in the production of the given cell. The Applicant must provide a 1 page appendix to the Project Narrative that describes which team member has such demonstrated capacity and how the identified member meets the criterion. This criterion ensures the applicability of proposed research to PV cell fabrication and will be reviewed as described in Section V.A. Additional expertise should be demonstrated in ab-initio calculations, crystal growth, interfaces, passivation, characterization, etc. through extensive collaboration with top researchers (PV experience may or may not be necessary).

Applicants should designate a lead organization and PI with strong scientific leadership. Applications must be submitted, on behalf of the team members, by the lead organization and DOE will enter into a prime award relationship with the designated lead organization. DOE envisions PV cell fabrication will be a small portion of the proposal primarily for proof of concept devices, and major effort will be spent on device and materials design, growth, modeling and characterization to identify and overcome key roadblocks to achieving SQ theoretical efficiency limits. If an individual decides to be a PI on one application, he/she can qualify as a subcontractor to **only one** additional application and cannot qualify as a PI on another application received for this FOA. **If an individual exceeds the application limits stated above, any later Full Application received chronologically in EERE Exchange beyond the limit may be deemed non-responsive and will be rejected.**

Lab Authorization Requirements:

A DOE National Laboratory Contractor is eligible for funding as a prime applicant or a subcontractor on another entity's application if its cognizant contracting officer provides written authorization and this authorization is submitted with the application. If a DOE National Laboratory Contractor is selected as a prime recipient for an 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 assigned DOE programs at the laboratory."

A Non-DOE FFRDC is eligible for funding as a subcontractor on another entity's application. If a non-DOE FFRDC is selected for award, the proposed work will be authorized through an Interagency Agreement. 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 FFRDC's authority under its award. 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 assigned programs at the laboratory. THIS LABORATORY IS AUTHORIZED TO PERFORM THE WORK PROPOSED IN THE APPLICATION SUBMITTED UNDER DOE FUNDING OPPORTUNITY ANNOUNCEMENT # DE-FOA-0000806 BY THE FOLLOWING STATUTORY AUTHORITY [insert Statute name, citation, and section] _____."

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.

Value/Funding. The value of, and funding for, the FFRDC contractor portion of the work will be included in the award to a successful applicant.

Cost Share. Recipients and sub-recipients must provide a sum of at least 20% of the total allowable project costs (i.e., the sum of the Government share and the recipient share of allowable costs equals the allowable cost of the project) which must come from non-Federal sources unless otherwise allowed by law (see also Appendix B titled "Cost Share Information").

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.

SECTION IV – APPLICATION AND SUBMISSION INFORMATION

A. Address to Request Application Forms

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

Note: The maximum file size that can be uploaded to the EERE Exchange website is 10MB. Files in excess of 10MB cannot be uploaded, and hence cannot be submitted for review. If a file exceeds 10MB but is still within the maximum page limit specified in the FOA it must be broken into parts and denoted to that effect.
(*e.g. ControlNumber_LeadOrganization_Project_Part_1, Part_2, etc.*)

B. Letter of Intent (*Mandatory*)

Applicants are required to submit a Letter of Intent by 03/07/2013, no later than 5:00PM Eastern Time. Formal applications received from a lead applicant who has not submitted a Letter of Intent by the above deadline will be considered ineligible and will not be reviewed or considered for an award under this FOA. The letters should not contain any proprietary or sensitive business information. The letters will not be used for down-selection purposes, and do not commit an applicant to submit an application. Applications may include team members who have not submitted an individual letter of intent, but these members may not act as the lead recipient or PI. Letters of Intent must be submitted via EERE Exchange at https://eere-exchange.energy.gov/. A control number will be issued when an applicant begins the application submission process. This control number must be included with the Application documents, as described below.

The Letter of Intent must conform to the following requirements:

- Letters of Intent must be submitted via EERE Exchange at https://eere-exchange.energy.gov/ .
- The Letter of Intent must be submitted as a single document in Adobe PDF format.
- The Letter of Intent must be written in English.
- All pages must be formatted to fit on 8.5 by 11 inch paper with 1" margins (top, bottom, left, and right) and font not smaller than 11 point.
- The control number must be prominently displayed on the upper right corner of the header of every page. Page numbers must be included in the footer of every page.
- The Letter of Intent is to include a cover sheet containing the name and mailing address of the potential applicant institution, title of the project, name and email address of the PI,

listing of team members expected to be involved in the planned application. (PI's will have the flexibility to add any additional expertise to their Full Application).

- Letters of Intent should be a 2-3 page narrative (excluding the cover page) containing the following:
  - An overview of the limitations and challenges of the technology of choice, research plan, including the vision, goals, and objectives for the three-year period of the award;
  - A brief overview of the team partners' expertise.
  - An overview of infrastructure plan including laboratories, computing facilities, etc. available through the multi-disciplinary/ high impact team assembled.

In addition to the contents of the 2-3 page narrative described above**,** the Appendix identified below must be attached. The information provided in Potential Reviewer Conflicts of Interest Appendix will not count toward the page limitation identified above.

Appendix 1: Potential Reviewer Conflicts of Interest

Provide the following information for the Principal Investigator(s), and each senior/key person proposed as a team member or consultant to allow for the identification of potential conflicts of interest or bias in selection of reviewers:

Collaborators and Co-editors: In alphabetical order, list all persons outside of your home institution, including their current organizational affiliations, who are or who have been collaborators or co-authors with you on a project, patent, report, book or book article, abstract, or paper most closely related to the proposed project during the 48 months preceding the submission of this application. Also, list any individuals who are currently or have been co-editors with you on a special issue of a journal, compendium, or conference proceedings most closely related to the proposed project during the 24 months preceding submission of this application. If there are no collaborators or co-editors to report, state "None".

Graduate and Postdoctoral Advisors and Advisees: List the names and current organizational affiliations of your graduate advisor(s) and principal postdoctoral sponsor(s) during the last three years. Also, list the names and current organizational affiliations of your graduate students and postdoctoral associates during the last three years.

Save the LOI and Appendix 1 as a single file and upload to the appropriate corresponding field in EERE Exchange.

C. Content and Form of Full Application

Only applicants who have submitted a Letter of Intent before the deadline stated in Section IV.B will be eligible to submit a Full Application.
Applications must conform to the following requirements:

- All Applications must be written in English.
- All pages must be formatted to fit on 8.5 by 11 inch paper with margins not less than one inch on every side. Use Times New Roman typeface, a black font color, and a font size of 11 points or larger (except in figures and tables). (A Symbol font may be used to insert Greek letters or special characters; the font size requirement still applies.)
- The control number must be prominently displayed on the upper right corner of the header of every page. Page numbers must be included in the footer of every page.

You must complete the following application forms found on the EERE Exchange website at https://eere-exchange.energy.gov/, in accordance with the instructions. **Applicants will receive a Control Number once they "Apply to this FOA" on the EERE Exchange website and should include the Control Number in the file name, as indicated below. [This Control Number was issued when the Letter of Intent was previously submitted.]**

Applicants must complete the mandatory forms and any applicable optional forms, in accordance with the instructions on the forms and the additional instructions below, as required by this FOA. **Files that are attached to the forms must be in Adobe Portable Document Format (PDF) unless otherwise specified in this announcement**.

Applicants must complete the following application forms by **04/08/2013, no later than 5:00PM Eastern Time**, found on the EERE Exchange website at https://eere-exchange.energy.gov/, in accordance with the instructions. **When constructing the Full Application, applicants are encouraged to consider the Merit Review Criteria of this FOA as described in Section V.A.2.**

1. SF-424 – Application for Federal Assistance *(Mandatory)*

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 SF-424 as a single file and upload the file to the appropriate corresponding field in EERE Exchange as indicated in the "Summary of Required Forms/Files" at the end of Section IV.C.

2. Project Summary / Abstract File for Public Release (*Mandatory*)

The Project Summary / Abstract must contain a summary of the proposed activity suitable for dissemination to the public. The description should be understandable by the non-specialist, technically literate, readers. It should be a self-contained document that identifies the following information:

- EERE Exchange Control #;
- Principal Investigator(s);
- Title of research;
- Model system concept;
- Research team with respective expertise to ensure requirements of Special Qualification Criteria described in Section III.C are met;
- Objectives and description of the project;
- Potential impact of the project (i.e., benefits, outcomes);
- Dollar value (by percent of overall project cost) of the effort to be performed by each participant organization over the three-year project period (DOE funds and non-federal cost-share funds), and a brief description of the capacity in which the organization(s) will be participating.

This document must not include any proprietary or sensitive business information as the DOE may make it available to the public. The project summary must not exceed **1 page** when printed single spaced using standard 8.5" by 11" paper with 1" margins (top, bottom, left, and right) and font not smaller than 11 point.

Save the Project Summary as a single file and upload the file to the appropriate corresponding field in EERE Exchange as indicated in the "Summary of Required Forms/Files" at the end of Section IV.C.

3. Summary Slide (*Mandatory*)

Provide a **1 page** Project Summary Slide in Power Point format (a template may be offered). The Summary Slide may be released to the public by DOE, in whole or in part, at any time, and therefore, it is required that the Project Summary Slide not contain proprietary or confidential business information. The slide should include the following information: Description of proposed project for demonstration of SQ limits or beyond

for the technology of choice; uniqueness of the innovative concept; team expertise uniquely best suited to address the key issues; period of performance with brief year-end milestones and final project deliverable; requested DOE funding; proposed cost share; and total budget.

Save the Summary Slide as a single file and upload the file to the appropriate corresponding field in EERE Exchange as indicated in the "Summary of Required Forms/Files" at the end of Section IV.C.

4. Project Narrative File (*Mandatory*)

The project narrative **must not exceed 20 pages**, including charts, graphs, photographs, and other pictorial presentations, when printed using standard 8.5" by 11" paper with 1 inch margins (top, bottom, left, and right). **EVALUATORS WILL ONLY REVIEW THE NUMBER OF PAGES SPECIFIED IN THE PRECEDING SENTENCE**. The font must not be smaller than Times New Roman 11 point. No Internet addresses (URLs) providing information necessary to review the application will be allowed. See Section VIII.D for instructions on how to mark proprietary application information.

Save the Project Narrative as a single file and upload the file to the appropriate corresponding field in EERE Exchange as indicated in the "Summary of Required Forms/Files" at the end of Section IV.C.

Title Page (1 page maximum)

A Title Page must be included at the beginning of the project narrative that will not count against the page limit for the Project Narrative. The Title Page should state the application control number; the project title; relevant funding level; name of Principal Investigator (with postal address, telephone and fax numbers, and email address); names and affiliations of team members; and the identification of the team member that the applicant believes meets the Special Qualification Criteria (Section III.C).

The project narrative must include:

i) Project Objectives

This section should provide a clear, concise overview of the project plan summarizing the vision to accomplish the goal of a solar cell with an efficiency approaching Shockley-Queisser limits. This section should include:

- The technology addressed and the proposed solar cell model system for physical demonstration of SQ efficiency limits;
- A description of the research methods employed, e.g. material growth, ab-initio and device modeling, materials and electro-optics measurements, device process and tests (list not prescriptive) and how this effort will result in a synergistic effort;
- An outline of potential scientific, engineering, and technical obstacles / risks to achieving the research objectives and approaches (mitigation strategies) to be used to overcome them; and
- An explanation of how the applicant (PI) will integrate and balance the unique technical strengths of each participant (including leveraged facilities and resources) to reach the proposed research goals with highest degree of team synergy;

ii) *Project Milestones and Timeline*

This section should provide an overview of the research plan, including the vision, goals and objectives of the award. The section should complement the Statement of Project Objectives (SOPO, Section IV.C.5) and outline, as a function of time, year by year, all the important activities/phases of the project, including any activities planned beyond the project period. Clearly stated short, intermediate, and long-term critical success metrics, for both materials and devices, must be included, including an explanation as to how these will ensure that the program remains focused. The intended critical success metrics might include, but are not limited to V_{oc}, short-circuit current (J_{sc}), FF, lifetime, doping density, intrinsic defect levels, grain size, dislocation density, etc. Milestones, decision points, critical review criteria, or go/no-go criteria should be quantifiable to the largest extent possible, along with the associated deliverables schedule/ tasks.

The proposed milestones must also be stated in the Statement of Project Objectives (Section IV.C.5) of the application and will be reviewed according to the Merit Review Criteria described in Section V.A.2.

iii) *Technical Qualifications and Resources (7 pages maximum)*

(Two page resumes will not count towards the overall page limit of the project narrative and should not be included in this section. Resumes should be submitted in a Resume File as described in Section IV.C.6)

As this FOA requires multi-disciplinary participation, this section should describe the team structure, the role of each team member, how the various efforts will be integrated and managed, and what will make this team uniquely best suited to successfully execute

the proposed research and to address the previously mentioned challenges. The section should include:

- A description of the relevant scientific and technical expertise and experience of the proposed research team members applicable to project success, including any plans for collaboration with scientists outside the core team;
- A description of the plan for the integration of team members including plans for communication and coordination;
- A description of the relevant experience and aptitude of the lead institution and the Principal Investigator to manage a diverse team of professionals with different backgrounds, to ensure the success of a project of such magnitude;
- A description of the role and intellectual contribution of each PI, co-PI and senior/key personnel and team synergy;
- A plan for external collaboration and partnerships, including facilities, if applicable; and
- A list of equipment available for this project, and if appropriate, note the location and pertinent capabilities of each. If equipment purchase is being proposed, describe comparable equipment, if any, at an existing organization and explain why it cannot be used. Describe other resources available to the project (e.g., machine shop, electronic shop) and the extent to which they would be available to the project. List major items of equipment and instrumentation already available for this project and, if appropriate, identify location and pertinent capabilities.

For Multiple Principal Investigators: The Applicant, must indicate if the project will include multiple PIs. 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 provide a "Coordination and Management Plan" that describes the organization structure of the project as it pertains to the designation of multiple PIs. This plan should, at a minimum, include:

- Process for making decisions on scientific/technical direction;
- Publication issues;
- Communication plans;
- Procedures for resolving conflicts; and
- PIs' roles and administrative, technical, and scientific responsibilities for the project.

iv) Bibliography and References

Provide a bibliography of any references cited in the Project Narrative. Each reference must include the names of at least the first three authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number,

page numbers, and year of publication. Include only bibliographic citations. Applicants should be especially careful to follow scholarly practices in providing citations for source materials relied upon when preparing any section of the application.

Project Narrative Appendices

In addition to the contents of the Project Narrative described above, **a separate section for each of the Appendices identified below (1 through 4) must be attached to the Project Narrative. The information provided in Appendices 1 through 4 will not count toward the Project Narrative page limitation.**

Appendix 1: Intellectual Property (IP) Management Plan

Each Applicant must include within their application an IP Management Plan between the Applicant institution and the team members' organizations or a draft version of an IP Management Plan that will form the basis of the final IP Management Plan. The award will set forth the treatment of and obligations related to intellectual property rights between DOE and the Applicant Team members. The IP Management Plan should describe how the Applicant will handle intellectual property rights and issues between the Applicant and its members. The plan should ensure and facilitate compliance with Federal IP laws, regulations, and policies (see Section VIII.F for more details on applicable Federal IP laws and regulations), to encourage participation in Applicant team and to support collaboration between the team members.

The plan should address the following:

- The treatment of confidential information between the Applicant team members (e.g., the use of non-disclosure agreements);
- The treatment of background IP (e.g., any requirements for identifying it or making it available);
- The treatment of inventions made as a result of the proposed research project (e.g., any requirements for disclosing to members, filing patent applications, paying for patent prosecution, and cross-licensing or other licensing arrangements between the members);
- A plan for to use the inventions made as a result of the proposed research project to support domestic manufacturing and/or positively impact the U.S. PV industry;
- The treatment of data generated, including software (e.g., any publication process or other dissemination strategies, copyrighting strategy or arrangement between Applicant team members);
- The handling of disputes related to intellectual property between the Applicant team members.

Appendix 2: Demonstrated Capacity Within 3% (Absolute) of World Record PV Power Conversion Efficiency (1 page maximum)

The Applicant must provide a 1 page description of which team member has **demonstrated capability in PV cell fabrication within 3% (absolute) of world record cells (Figure 3) for the technology addressed in the application.** For purposes of this FOA, world record cell efficiency shall be the world records identified in Figure 3. "Demonstrated capability" means that the individual was part of the team which fabricated the cell referenced that is within 3% of the world record. This could be verifiable through authorship on a peer reviewed publication about the given cell or a letter from an institution or company stating the nature of the individual's involvement and that such involvement was integral in in the production of the given cell. Reviewers will review the provided description when considering the Merit Review Criteria stated in Section V.A.

Appendix 3: Individual Letters of Commitment

The Applicant Team must have a letter from each source of cost share, including the third party contributing cost share (i.e., a party other than the organizations 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. Researchers or professional organizations that have decided to join a project team, are also required to submit a Letter of Commitment.

Appendix 4: Current and Pending Support

Provide a list of all current and pending support (both Federal and non-Federal) for Principal Investigator(s) and senior/key persons, including sub-awardees and paid consultants, for ongoing projects and pending applications. For each entry, list the title of the project, source of the support and award number (if applicable), the award period, the total award amount for the entire award period (including indirect costs), the associated portion of funding for the senior/key person's research activities, and the number of

person-months per year to be devoted to the project by the senior/key person. Include an abstract of less than 150 words stating how the application for FPACE II: Model Systems is different from existing sources of funding.

A brief description of any synergies or overlaps with this application must be included for each entry. Concurrent submission of an application(s) for simultaneous consideration must be acknowledged.

5. Statement of Project Objectives (SOPO) and Project Management Plan (PMP) (*Mandatory*)

The Statement of Project Objectives is limited to **8 pages** maximum excluding the PMP.

The Statement of Project Objectives (SOPO) must describe the work to be completed. SOPOs are used during the merit review process to determine the suitability of the work plan towards the successful achievement of a project's proposed objectives. The SOPO forms the basis for negotiations with DOE in such case that an application is selected for negotiation. Following selection and negotiation, the SOPO provides an outline of the work plan that will be evaluated during project monitoring. The SOPO is organized into three main sections: title page, brief/concise project overview, and technical work plan. The information in the SOPO must be consistent with the Project Narrative. The SOPO should be brief and concentrate on substantive information. **The following items should NOT be included in the SOPO: budgets, costs, specific dates, names of subcontractors, or intellectual property.**

The SOPO must include a technical work plan. The plan must be divided into three, 12-month performance periods. The content of the technical work plan includes tasks, subtasks, milestones, go/no-go decision points, and final deliverables. Full instructions for composing a SOPO and an example SOPO are available through the EERE Exchange website. The SOPO should be provided in a format similar to the example provided in Exchange. The SOPO must:

- Provide a concise detailed description of the specific activities to be conducted over the proposed period of performance. "Detailed" is defined as a full explanation and disclosure of the project being proposed (i.e., statements such as "we will then complete a proprietary process" are unacceptable). It is the Applicant's responsibility to prepare an adequately detailed task plan to convince reviewers that the proposed project can meet the objectives outlined in the current FOA.
- It is critical that the overall project objective is broken into separate task sections that are clearly linked to, and combine to result in, the project objective.

- Each task must be broken out into component subtask sections to specify the activities that will be conducted to accomplish the task.
- Specific verifiable milestones that are intermediary steps toward the project objectives must be identified in each subtask. The milestones must demonstrate that a detailed plan has been constructed. Milestones should consist of quantifiable metrics that represent reasonable progression towards project objectives. Milestones are DOE's way of tracking progress and the Applicant's way of showing reviewers that a detailed plan to reach meaningful results has been constructed.
- Project-level go/no-go milestones that are key metrics at the end of each budget period which demonstrate the progress of the project and likelihood to meet the overall project objective must be proposed.

Save the SOPO as a single file and upload the file to the appropriate corresponding field in EERE Exchange as indicated in the "Summary of Required Forms/Files" at the end of Section IV.C.

Project Management Plan

Instructions for composing a PMP and an example PMP are available through the Exchange website. The PMP should be provided in a format similar to the example provided in Exchange.

- The PMP summarizes the work to be completed in a tabular format.
- The PMP is a summary of the SOPO technical work plan that includes additional information about the work timeline, identifies the points of contact for each task and projects dates for completion of milestones.
- The PMP must also contain statements that clearly outline the time commitments of all team members.
- PMPs are used during the merit review process to determine the suitability of the work plan towards the successful achievement of a project's proposed objectives.

Save the PMP as a single file and upload the file to the appropriate corresponding field in EERE Exchange as indicated in the "Summary of Required Forms/Files" at the end of Section IV.C.

6. Resume File (*Mandatory*)

Provide a biographical sketch for Principal Investigator(s), and each senior/key person proposed as a team member or consultant. The designation of multiple Principal Investigators, including Principal Investigators employed by teaming partners is allowed.

A key person is any individual who contributes in a substantive, measurable way to the execution of the project.

The compiled resume file does not have a page limitation; however, the biographical information for **each individual resume must not exceed 2 pages** when printed on 8.5" by 11" paper with 1 inch margins (top, bottom, left, and right), with font larger than 11 point. Reviewers will not review any pages beyond the second of each resume. Each resume should include the following information, if applicable:

1) Education and Training. Undergraduate, graduate, and postdoctoral training; provide institution, major/area, degree, and year.
2) Professional Experience: Beginning with the current position list, in chronological order, management, and technical / academic positions with a description of responsibilities and accomplishments. Emphasize experience that is relevant to the person's position within the proposed team structure.
3) Publications. Provide a list of the relevant publications that are most closely related to the proposed project. For each publication, identify the names of all authors (in the same sequence in which they appear in the publication), the article title, book or journal title, volume number, page numbers, year of publication, and website address, if available electronically.
4) Patents, copyrights, and software systems developed may be provided in addition to, or substituted for, publications.
5) Synergistic Activities. List selected professional and scholarly activities related to the effort proposed.

Save the Resume File as a single file and upload the file to the appropriate corresponding field in EERE Exchange as indicated in the "Summary of Required Forms/Files" at the end of Section IV.C.

7. Budget Files (*Mandatory*)

i) Prime Recipient SF-424A (Mandatory)

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

Save the SF-424A as a single file and upload the file to the appropriate corresponding field in EERE Exchange as indicated in the "Summary of Required Forms/Files" at the end of Section IV.C.

ii) Prime Recipient Budget Justification File PMC 123.1 (Mandatory)

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

- Key persons and personnel categories and the estimated costs for each person or category, amounts of time (e.g., hours or % of time) to be expended, the composite base pay rate, total direct personnel compensation and identify the rate basis (e.g., actual salary, labor distribution report, technical estimate, state civil service rates, etc.);
- Provide a list of equipment and cost of each item providing a basis of cost such as vendor quotes, catalog prices, prior invoices, etc., and briefly justifying its need as it applies to the Statement of Project Objectives;
- Identify proposed subrecipient/consultant work and cost of each subrecipient/consultant;
- Describe purpose of proposed travel, number of travelers, and number of travel days;
- List general categories of supplies and amount for each category providing a basis of cost such as vendor quotes, catalog prices, prior invoices, etc., and briefly justifying the need for the supplies as they apply to the Statement of Project Objectives; and provide any other information you wish to support your budget;
- Provide the name of your cognizant/oversight agency, if you have one, and the name and phone number of the individual responsible for negotiating your indirect rates; and
- Identify all sources of cost share, including third parties and identify (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.

Save the PMC 123.1 as a single file and upload the file to the appropriate corresponding field in EERE Exchange as indicated in the "Summary of Required Forms/Files" at the end of Section IV.C.

iii) *Subrecipient SF- 424A (If Applicable)*

Applicants must also provide a separate budget (i.e., budget for each year and a cumulative budget) for each subrecipient or team member that is expected to perform work estimated to be more than $100,000 or 50% of the total work effort (whichever is less). Applicants 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.

Save the Subrecipient SF- 424A upload the file(s) to the appropriate corresponding field in EERE Exchange as indicated in the "Summary of Required Forms/Files" at the end of Section IV.C.

iv) *Subrecipient Budget Justification PMC 123.1 (If Applicable)*

Each subrecipient or team member that is expected to perform work estimated to be more than $100,000 or 50% of the total work effort (whichever is less) is also required to submit a subrecipient budget justification.

Save the Subrecipient PMC 123.1 and upload the file(s) to the appropriate corresponding field in EERE Exchange as indicated in the "Summary of Required Forms/Files" at the end of Section IV.C.

8. SF-LLL Disclosure of Lobbying Activities (*If Applicable*)

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

Save the SF-LLL as a single file and upload the file to the appropriate corresponding field in EERE Exchange as indicated in the "Summary of Required Forms/Files" at the end of Section IV.C.

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

As set forth in Section III, all prime recipients receiving funding under this FOA must be incorporated (or otherwise formed) under the laws of a State or territory of the United States. If a foreign entity applies for funding as a prime recipient, it must designate in the Full Application a subsidiary or affiliate incorporated (or otherwise formed) under the laws of a State or territory of the United States to be the prime recipient. Section III further requires that all work under EERE funding agreements to be performed in the United States – i.e., prime recipients must expend 100% of the total project cost in the United States.

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

Save the Waiver Request(s) as a single file and upload the file to the appropriate corresponding field in EERE Exchange as indicated in the "Summary of Required Forms/Files" at the end of Section IV.C.

Summary of Required Forms/Files

Application must include the following documents:	Format	Due Date
Letter of Intent	PDF	03/07/2013
SF 424 - Application for Federal Assistance	PDF	04/08/2013
Project Summary/Abstract File	PDF	04/08/2013
Summary Slide	PowerPoint	04/08/2013
Project Narrative File	PDF	04/08/2013
Statement of Project Objectives	PDF	04/08/2013
Project Management Plan	Excel	04/08/2013
Resume File	PDF	04/08/2013
Prime Recipient SF-424A	Excel	04/08/2013
Subrecipient SF – 424A(s)	Excel	04/08/2013
Prime Recipient PMC123.1 Budget Justification File	Excel	04/08/2013
Subrecipient PMC123.1 Budget Justification File(s)	Excel	04/08/2013
SF-LLL Disclosure of Lobbying Activities	PDF	04/08/2013
Waiver Request, if applicable)	PDF	04/08/2013

D. Replies to Reviewer Comments (Optional)

Reviewer comments on compliant and responsive Full Applications will be made available to Applicants via EERE Exchange. An applicant, and only that applicant, will be able to view the comments provided to their own application. Applicants have a brief opportunity (4-5 days) to review these comments and prepare a short Reply to Reviewer Comments. Applicants may elect to respond to one or more Reviewer comments to supplement their Full Application.

Please note that the reviewer comments do not constitute a "debriefing" on the strengths and weaknesses of the Full Application. EERE will not offer or provide debriefings under this FOA.

Submitting a Reply to Reviewer Comments is optional. Each compliant and responsive Full Application will be considered on the merits regardless of whether a Reply to Reviewer Comments is submitted. If submitted, the Reply to Reviewer Comments is considered an extension of the application and is not scored separately, but will be considered as part of the final decision.

DOE will perform a preliminary review of the Reply to Reviewer Comments to determine whether they are compliant, as described in Section V.A. Noncompliant Replies to Reviewer Comments will be rejected by the DOE Contracting Officer and are not considered for award determination. Compliant and responsive Full Applications are reviewed on the merits even if a Reply to Reviewer Comments is rejected as noncompliant.

Following receipt of a Reply to Review Comments, DOE will convene a panel of reviewers to discuss the merits of compliant and responsive Full Applications and Replies to Reviewer Comments.

The Reply to Reviewer Comments must conform to the following requirements:

- The Reply to Reviewer Comments must be submitted in Adobe PDF format submitted as a single attachment in EERE Exchange.

- In addition to uploading the Reply as a PDF, the text of the Reply must be inserted into the relevant textbox in EERE Exchange system where the reviewer comments appear. The text must be identical. Any graphics or images do not need to be inserted into the textbox.

- The Reply to Reviewer Comments must be written in English.

- All pages must be formatted to fit on 8-1/2 by 11 inch paper with margins not less than one inch on every side. Use a Times New Roman a black font color, and a font size of 11 points or larger (except in figures and tables). (A Symbol font may be used to insert Greek letters or special characters; the font size requirement still applies.)

- The control number, which is the same number used for the Full Application,[8] must be prominently displayed on the upper right corner of the header of every page. Page numbers must be included in the footer of every page.

[8] Upon login to EERE Exchange (https://eere-exchange.energy.gov/login.aspx), the Applicant may access its submissions by clicking the "My Submissions" link in the navigation on the left side of the page. Every application that it has submitted to EERE and the corresponding control number is displayed on this page. If the Applicant submits more than one application to this FOA, a unique control number is assigned to each application.

The Reply to Reviewer Comments must conform to the following content and form requirements, including maximum page lengths, described below. If the Reply to Reviewer Comments text or image sections exceed the page lengths stated below, DOE will review only the first two pages of text and one page of images. Any additional pages will be disregarded.

Content Requirements for Replies to Reviewer Comments

SECTION	PAGE LIMIT	DESCRIPTION
Text	2 pages maximum	Applicants may respond to one or more Reviewer comments or supplement their Full Application.
Images	1 page maximum	Applicants may provide graphs, charts, or other data to respond to Reviewer Comments or supplement their Full Application.

Applicants will be provided at least 4 calendar days after the reviewer comments are released to submit the Reply to Reviewer Comments. It is anticipated that the deadline for the Reply to Reviewer Comments will be 5:00 pm on 5/14/13.

E. Submissions from Successful Applicants

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

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

F. Submission Dates and Times

1. Letter of Intent Due Date

Letters of Intent must be received by 03/07/2013, no later than 5:00 PM Eastern Time. Applicants are strongly encouraged to transmit the Letter of Intent well before the deadline. Letter of Intent submission must be made via EERE Exchange at https://eere-exchange.energy.gov/. **Applicants must submit a Letter of Intent by the due date to be eligible to submit an Application.**

2. Full Application Due Date

Applications must be received by 04/08/2013, no later than 5:00PM Eastern Time. Applicants are encouraged to transmit their application well before the deadline.

APPLICATIONS RECEIVED AFTER THE DEADLINE ARE NONCOMPLIANT AND WILL NOT BE REVIEWED OR CONSIDERED FOR AWARD.

3. Replies to Reviewer Comments Due Date

Applicants will be provided at least 4 calendar days after the reviewer comments are released to submit the Reply to Reviewer Comments. It is anticipated that the deadline for the Reply to Reviewer Comments will be 5:00 pm on 5/14/13.

G. Intergovernmental Review

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

H. Funding Restrictions

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

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

2. National Environmental Policy Act (NEPA) Requirements**:** The Federal funds distributed under this FOA are subject to NEPA. Applicants should carefully consider and should seek legal counsel or other expert advice before taking any action related to the proposed project that would have an adverse effect on the environment or limit the choice of reasonable alternatives prior to DOE completing the NEPA review process.

DOE does not guarantee or assume any obligation to reimburse costs where the recipient incurred the costs prior to receiving from the DOE Contracting Officer a written authorization. If the applicant carries out activities that may have an adverse effect on the environment or limit the choice of reasonable alternatives prior to receiving such written authorization from the DOE Contracting Officer, the applicant is doing so at risk of not receiving Federal funding and such costs may not be recognized as allowable cost share. Likewise, if a project is selected for negotiation of award, and the recipient moves forward with activities that are not authorized for Federal funding by the DOE Contracting Officer in advance of the NEPA determination, the recipient is doing so at risk of not receiving Federal funding and such costs may not be recognized as allowable cost share. Nothing contained in the pre-award cost reimbursement regulations or any pre-award costs approval letter from the

DOE Contracting Officer override these NEPA requirements to obtain the written authorization from the DOE Contracting Officer regarding a final NEPA determination prior to taking any action that may have an adverse effect on the environment or limit the choice of reasonable alternatives.

3. 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.

I. Submission and Registration Requirements

1. Where to Submit

Applications must be submitted under this announcement though EERE Exchange at https://eere-exchange.energy.gov/ to be considered for award.

Applicants cannot submit a Letter of Intent or a Full Application through EERE Exchange unless they are registered. Please read the registration requirements below carefully and start the process immediately.

In case of 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.

In the event that an application is untimely (i.e., late) and deemed ineligible for consideration, the Contracting Officer will promptly notify the applicant in writing that the application cannot be considered for award. An application is late if the date and time stamp for submission to EERE Exchange is after the stated closing date and time. A late application may be reviewed if the applicant provides sufficient evidence of technical issues that the EERE Exchange Help Desk failed to resolve prior to the receipt date and time.

APPLICATIONS RECEIVED AFTER THE NOTED DEADLINES OR BY ANY OTHER MEANS WILL NOT BE REVIEWED OR CONSIDERED FOR AWARD.

2. Registration Process Requirements

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

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

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

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

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

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

- Register in Grants.gov to receive automatic updates when Amendments to this FOA

are posted. However, please note that applications will not be accepted through Grants.gov. http://www.grants.gov/

Besides the EERE Exchange registration system, which does not have a delay, these registration requirements could take several weeks to process and are required in order for a potential applicant to receive an award under this announcement. Therefore, although not required in order to submit a preliminary or full application, all potential applicants lacking a DUNS number must complete the registrations as soon as possible.

Once registered, all Application submissions are to be made via the EERE Exchange at https://eere-exchange.energy.gov. This account will then allow the user to register for any open EERE FOAs that are currently in EERE Exchange. It is recommended that each organization or business unit, whether acting as a team or a single PI, utilize one account as the appropriate contact information for each submission.

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 (https://eere-exchange.energy.gov) and FedConnect, 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 Compliance Review Criteria

Application Award Eligibility

Prior to the comprehensive merit evaluation, DOE will perform an Initial Compliance Review to determine that:

1. The applicant is eligible for an award.
2. The applicant submitted a Letter of intent (LOI) before the stated deadline.
3. The information required by the announcement has been submitted by the applicable deadlines.
4. All mandatory requirements are satisfied, including:
    i. A minimum of two institutions are represented on the project team;
    ii. The project team consists of at least 3 key team members;
    iii. The project team is clearly stated and is similar with that previously submitted as part of the Letter of Intent application process;
    iv. The Principle Investigator (PI) is only listed as the PI on one application and is not listed as a team member on more than one additional application; and
5. The proposed project is responsive to the objectives of the funding opportunity announcement.
6. The application materials adhere to all page limits stated in Section IV. Applications which exceed these page limits will have the substance beyond the limits redacted prior to review. Redactions will be conducted at the sole discretion of DOE and reviewers will not review content that is in excess of the stipulated page limits.

If an application fails to meet these requirements, it may be deemed noncompliant and/or nonresponsive and eliminated from further review.

2. Merit Review Criteria

Applications that pass the Initial Compliance Review will be eligible for comprehensive merit review. As described in more detail in Section V.B, the comprehensive merit review will be a thorough, consistent, and objective examination of applications based on the merit review criteria outlined below.

The following merit review evaluation criteria will be used in the comprehensive evaluation of Full Applications. For each criterion, the weighting (out of 100%) is indicated to show the relative importance. No single bullet or sub-criterion below is given any specific weight.

Criterion and Description	**Weight (%)**
Criterion 1: Overall Scientific and Technical Merit • Degree to which proposed research provides opportunity for technical innovation based on a critical evaluation of existing knowledge • Degree to which the model system concept demonstrates a synergistic and fundamental approach using theoretical / computational modeling and device design fabrication to achieve an efficiency approaching SQ limits • Degree to which the proposed concept and approach to the model system brings a significant improvement over the state-of-the-art technology, as judged by the efficiency improvement relative to the state of the art for the proposed technology • Degree to which the proposed concept has the potential to reach SQ limits • Likelihood that the proposed research methods can deliver a proof of concept device with the targeted cell efficiency • Demonstration of a sound technical approach to accomplish the proposed tasks and objectives • Adequacy of the discussion of the risks and challenges the proposed research will face, and the ability of the proposed application to overcome the scientific and technical obstacles / risks to achieve the research objectives	35%
Criterion 2: Team Experience, Qualifications, and Capabilities • Quality of the proposed interaction among team members including the plan for communication and collaboration • Capability of the proposed organizations to conduct integrated research and adequacy of the proposed research facilities and resources to support the achievement of the proposed project objectives. • Degree to which the Applicant team demonstrates expertise in the field through preliminary studies, research, demonstrated innovations, and strong publication or IP development in the relevant field of study that may be pertinent to the proposed research, including any other information that will help to establish the experience and competence of the team members to pursue the proposed project • Diversity and the ability of the planned collaborations to form a synergistic effort • Degree to which the team contains key personnel / members from the following areas: materials growth, materials measurements and characterization, analytical calculations and/or numerical simulation, and device integration, as evidenced by experience working in these areas and relevant publications or advanced degrees	35%

• Involvement of one team member in producing a PV cell within 3% (absolute) of the current world record for the proposed absorber. Involvement can be proven through authorship on academic publications or a letter from an institution or company stating nature of the involvement. • The ability to integrate and balance the technical strengths of each participant to produce a cohesive research program • Degree to which the Applicant team's resources are appropriately allocated to successfully complete the proposed work • Extent to which the Principal Investigator has demonstrated capabilities in managing multi-disciplinary teams for supporting a high likelihood of the project's success • Adequacy of the computational and laboratory facilities that will be used for the project and their adequacy towards the computing and testing needs of the proposed research • Adequacy of the equipment already available for this project, the location, and pertinent capabilities of each	
Criterion 3: Statement of Project Objectives and Project Management Plan • Technical relevance and importance of the proposed milestones and of the plan to reach them as described in the Statement of Project Objectives (SOPO) and Project Management Plan (PMP) • The ability of the proposed milestones and go / no-go criteria to track the progression of the tasks using quantified metrics • Quality and completeness of the description of each activity necessary to complete the scope of work • Degree to which the proposed milestones represent a systematic approach to achieving the ultimate goals • Likelihood that the proposed short-, medium- and long-term goals will accomplish the FOA objectives • Degree to which the proposed work schedule is sufficiently stated, timely, and achievable	15%
Criterion 4: Publications, Intellectual Property, and Impact • Degree of commitment of the Applicant to publish results • Likelihood that the Applicant will commercialize the results in the near term (i.e., within five years of the award period) based on an explanation of how the product will be transitioned to a commercial product and subsequently introduced to the market • Degree to which the likely results of the collaboration and the proposed Intellectual Property Plan will result in domestic commercialization and/or positively impact the U.S. PV industry • Degree to which the likely results of the collaboration will support the goals of the SunShot Initiative	15%

Criteria for Replies to Reviewer Comments

DOE has not established separate criteria to evaluate Replies to Reviewer Comments. Instead, Replies to Reviewer Comments are evaluated as an extension of the Full Application.

Criteria for Pre-Selection Clarifications

As part of the Merit Review process, the DOE reserves the right to ask the Applicant for an in-person presentation or audio-video conference call. DOE representatives and the reviewers assigned to evaluate the respective Application may meet or facilitate a conference call with the Project team member, or members, to pose questions regarding the proposed project. The meeting will be structured to uncover more information in areas relevant to the Full Application review criteria. These questions allow DOE and/or the merit reviewers to further assess the proposed project and provide the Applicant with the opportunity to respond to programmatic issues and concerns. Applicant costs incurred to participate in the merit review process (such as travel or other presentation costs) are application costs and are only allowable to awardees as indirect expenses to Federally sponsored projects to the extent that those costs are allowable, allocable and reasonable. *The applicants should be aware that they may not receive notification about the review meetings until two days prior to the meeting.*

Clarifications provided by the Applicant to the Merit Review Panel will contribute to the merit review evaluation and selection decision. Selection for participation for an in-person or conference with the Merit Review Panel does not signify that Applicants have been selected for negotiation of award.

DOE has not established separate criteria to evaluate Pre-Selection Clarifications.

4. Other Selection Factors

Program Policy Factors

In addition to the above mentioned criteria, the selection official may consider the following program policy factors in the selection process. Unlike the Merit Review Criteria, these factors are not weighted.

1) Diversity and geographic distribution of technologies, approaches, methods, facilities, institutions, and organizations.
2) Advancement of the national knowledge base & broader impact.
3) Optimization of the DOE investment and maximized commitment as demonstrated by the cost share.

4) The extent that the proposed work complements or fills existing gaps in expertise, facilities, technologies, or techniques that are funded within in the SunShot portfolio
5) The degree of leveraging DOE and Federal resources.

B. Review and Selection Process

1. Merit Review Process

Applications that pass the initial compliance 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.

The preliminary reviewers' comments for the Full Application (but not the scoring) will be made available to the Applicant. Only the Applicant will be able to view the comments provided to their application. Applicants have a brief opportunity (4-5 days) to review these comments and prepare a short Reply to Reviewer Comments. DOE has not established separate criteria to evaluate the Replies to Reviewer Comments, and are evaluated as a supplement to the Full Application.

A Merit Review Panel composed of the designated reviewers will be held to discuss the merits of the various applications.

2. Pre- Selection Clarifications

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

Applicants should be aware that they may not receive notification about a Pre-Selection Clarification until two days prior to the meeting.

3. Selection Official Consideration

The Selection Official may consider the Merit Review Panel recommendation, program policy factors, and the amount of funds available when making selections.

4. Discussions and Award

The Government may enter into discussions with a selected Applicant for any reason deemed necessary, including, but not limited to:

i. the budget is not appropriate or reasonable for the requirement
ii. only a portion of the application is selected for award
iii. the Government needs additional information to determine that the recipient is capable of complying with the requirements in 10 CFR part 600, and/or
iv. Special terms and conditions are required.

The Applicant must complete submission of all required documents and response to negotiations within 30 days.

Failure to resolve satisfactorily the issues identified by the Government will preclude award to the applicant.

5. Anticipated Notice of Selection and Award Dates

DOE anticipates notifying Applicants selected for negotiation of an award under this FOA by July 2013 and making awards by August 2013.

SECTION VI - AWARD ADMINISTRATION INFORMATION

A. Notice of Selection

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.

Selected Applicants Notification

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

B. 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) Intellectual Property Provisions; (7) Statement of Project Objectives; (8) Federal Assistance Reporting Checklist, which identifies the reporting requirements; and (9) Budget Summary.

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.

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

1. Administrative Requirements

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

DUNS and SAM Requirements

Additional administrative requirements for DOE grants and cooperative agreements are contained in 2 CFR, Part 25 (See: http://ecfr.gpoaccess.gov). Prime awardees must keep their data at the System for Award Management (SAM) current at https://www.sam.gov.

SAM is the government-wide system that replaced the CCR. If you had an active registration in the CCR, you have an active registration in SAM. Subawardees at all tiers must obtain DUNS numbers and provide the DUNS to the prime awardee before the subaward can be issued.

Subaward and Executive Reporting

Additional administrative requirements necessary for DOE grants and cooperative agreements to comply with the Federal Funding and Transparency Act of 2006 (FFATA) are contained in 2 CFR, Part 170. (See: http://ecfr.gpoaccess.gov). Prime awardees must register with the new FSRS database and report the required data on their first tier subawardees. Prime awardees must report the executive compensation for their own executives as part of their registration profile in the System for Award Management (SAM).

2. Special Terms and Conditions, National Policy Requirements, and Applicant Representations and Certifications (Required)

The DOE Special Terms and Conditions for Use in Most Grants and Cooperative Agreements are located at: http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms.

The National Policy Assurances To Be Incorporated as Award Terms are located at http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms

Applicant Representations and Certifications

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

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

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

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

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

For purposes of these representations the following definitions apply:

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

Applicant Lighting Efficiency Certification (April 2012)

In submitting an application in response to this FOA the Applicant certifies that if chosen for a **grant** award and the award is in excess of $1,000,000 it will, by the end of the Federal Government's fiscal year, upgrade the efficiency of its facilities by replacing any incandescent lighting of the type for which section 325 of the Energy Policy and Conservation Act (42 USC 6295) establishes a standard that does not meet or exceed the energy efficiency standard for incandescent light bulbs set forth in that section with a lamp that meets or exceeds the standards for lamps established in or pursuant to that section.

Incandescent reflector lamps shall meet or exceed the lamp efficacy standards shown in the table:

Rated lamp wattage	Lamp spectrum	Lamp diameter (inches)	Rated voltage	Minimum average lamp efficacy (lm/W)
40–205	Standard Spectrum	>2.5	≥125V	$6.8*P^{0.27}$
			<125V	$5.9*P^{0.27}$
		≤2.5	≥125V	$5.7*P^{0.27}$
			<125V	$5.0*P^{0.27}$
40–205	Modified Spectrum	>2.5	≤125V	$5.8*P^{0.27}$
			<125V	$5.0*P^{0.27}$
		≤2.5	≥125V	$4.9*P^{0.27}$
			<125V	$4.2*P^{0.27}$

Note 1: P is equal to the rated lamp wattage, in watts.

Note 2: Standard Spectrum means any incandescent reflector lamp that does not meet the definition of modified spectrum in 10 CFR 430.2.

Subject to the exemption below, the standards specified in this section shall apply to ER incandescent reflector lamps, BR incandescent reflector lamps, BPAR incandescent reflector lamps, and similar bulb shapes.

Subject to the exemption below, the standards specified in this section shall apply to incandescent reflector lamps with a diameter of more than 2.25 inches, but not more than 2.75 inches.

Exemption: The standards specified in this section shall not apply to the following types of incandescent reflector lamps:

(A) Lamps rated at 50 watts or less that are ER30, BR30, BR40, or ER40 lamps;

(B) Lamps rated at 65 watts that are BR30, BR40, or ER40 lamps; or

(C) R20 incandescent reflector lamps rated 45 watts or less.

For purposes of this Certification, the following definitions apply:

(A) Facilities mean the room(s), area(s), or building(s) that are used to complete a majority of the work under the project.

(B) In excess of $1,000,000 means the total value of the grant including all budget periods funded with Federal funds and recipient cost share is greater than $1,000,000.

(C) Federal Government's fiscal year begins October 1st and ends September 30th.

(D) Except as provided in subparagraph (4) below, the term "incandescent lamp" means a lamp in which light is produced by a filament heated to incandescence by an electric current, including only the following:

(1) Any lamp (commonly referred to as lower wattage nonreflector general service lamps, including any tungsten-halogen lamp) that has a rated wattage between 30 and 199 watts, has an E26 medium screw base, has a rated voltage or voltage range that lies at least partially within 115 and 130 volts, and is not a reflector lamp.

(2) Any lamp (commonly referred to as a reflector lamp) which is not colored or designed for rough or vibration service applications, that contains an inner reflective coating on the outer bulb to direct the light, an R, PAR, ER, BR, BPAR, or similar bulb shapes with E26 medium screw bases, a rated voltage or voltage range that lies at least partially within 115 and 130 volts, a diameter which exceeds 2.25 inches, and has a rated wattage that is 40 watts or higher.

(3) Any general service incandescent lamp (commonly referred to as a high- or higher-wattage lamp) that has a rated wattage above 199 watts (above 205 watts for a high wattage reflector lamp).

(4) The term "incandescent lamp" does not include any lamp excluded by the Secretary, by rule, as a result of a determination that standards for such lamp would not result in significant energy savings because such lamp is designed for special applications or has special characteristics not available in reasonably substitutable lamp types.

(E) The term ‘‘base’’ means the portion of the lamp which connects with the socket as described in ANSI C81.61–1990.

(F) The term ‘‘bulb shape’’ means the shape of lamp, especially the glass bulb with designations for bulb shapes found in ANSI C79.1–1980 (R1984).

(G) The term ‘‘lamp efficacy’’ means the lumen output of a lamp divided by its wattage, expressed in lumens per watt (LPW).

(H) The term “lamp wattage” means the total electrical power consumed by a lamp in watts, after the initial seasoning period referenced in the appropriate IES standard test procedure and including, for fluorescent, arc watts plus cathode.

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 Specialist and DOE Project Officer will negotiate a Statement of Substantial Involvement prior to award.

Please refer to 10 CFR 600.5 (b) for additional information describing substantial involvement.

D. Reporting

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

SECTION VII – QUESTIONS AND AGENCY CONTACTS

A. Questions

Questions regarding the content of this announcement must be submitted to: FPACE2ModelSystems@go.doe.gov not later than 5 business days prior to the application due date.

All questions and answers related to this FOA will be posted on EERE Exchange at: https://eere-exchange.energy.gov/. **Please note that you must first select this specific FOA Number in order to view the questions and answers specific to this FOA**. DOE will attempt to respond to a question within 3 business days, unless a similar question and answer has already been posted on the website.

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

DOE will not accept or respond to communications received by other means (e.g., telephone calls, faxes). Emails sent to other email addresses will be disregarded.

An informational Webinar will be held on February 22, 2013 to address questions from interested applicants. Please see Appendix C for more information.

SECTION VIII - OTHER INFORMATION

A. Amendments

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

B. Government Right to Reject or Negotiate

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

C. Commitment of Public Funds

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

D. Proprietary Application Information

DOE will use data and other information contained in Letter of Intent and Full 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 Letter of Intent or Full 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 [___] 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. Unless the applicant requests and DOE agrees to a TIA, the statutes and policies governing disposition of title to inventions conceived or first actually reduced to practice under Government agreements ("subject inventions") will be as follows:

i. The Bayh-Dole Act, 35 U.S.C. 200 et seq., requires that universities, nonprofits and small businesses who are participating under a funding agreement will have the option to retain title to their own employees' subject inventions.

ii. The Federal Non Nuclear Energy Act of 1974, 42 U.S.C. 5908, will govern disposition of title for all other parties, regardless of whether they receive Government funding and requires that the Government obtains title to new inventions unless a waiver is granted. (See "Notice of Rights to Request Patent Waiver" in paragraph G below)

iii. Subject inventions made by employees of an FFRDC will be subject to the M&O contract terms and conditions with respect to ownership of inventions made by lab employees.

Determination of Exceptional Circumstances. DOE may issue a Determination of Exceptional Circumstances (DEC) (under 35 U.S.C. 202) that would apply to all awards, including sub-awards, under this FOA. The DEC, if issued, may specify requirements to support or encourage U.S. manufacturing activities.

Subject Invention Utilization Reporting. To ensure that Recipients (both Prime Recipients and Subrecipients) holding title to subject inventions are taking the appropriate steps to commercialize subject inventions, DOE may require Prime Recipients to submit annual reports for the life of the subject invention on the utilization of subject inventions and efforts made by Prime Recipients or their licensees or assignees to stimulate such utilization.

Rights in Technical Data: Normally, the government has unlimited rights in (including, but not limited to, the right to publish) technical data created under a DOE agreement.

Awardees will be expected to publish the results of their funded research in high-visibility, high-impact-factor, peer-reviewed journals. In cases where significant intellectual property has been developed, publishing can be postponed until after the initiation of any desired patent documentation and applications. All publications resulting from the funded research will be required to include an acknowledgement that the work was supported by the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Solar Energy Technologies Program, under the specific award number.

Notwithstanding the foregoing, DOE may approve protection of certain research results from public disclosure, for a period of up to period of up to five (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 under the authority of a special protected statute. Such protection will be negotiated at the time of the award provided that the awardee demonstrates that the protection would support its plan to commercialize the likely research results in the near-term (i.e., up to five (5) years after the beyond of the award). If the protection is approved then the provision entitled, Rights in Data – Programs Covered Under Special Protected Data Statutes, (10 CFR 600 Appendix A to Subpart D), will apply to the award. This provision will identify data or categories of data first produced in the performance of the award that will be subject to the protection.

Delivery or third party licensing of proprietary software or data developed solely at private expense will not normally be required except as specifically negotiated in a particular agreement to satisfy DOE's own needs or to insure the commercialization of technology developed under a DOE agreement.

G. Notice of Right to Request Patent Waiver

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

A waiver shall only be granted if it is determined that the waiver would best serve the United States and the general public. This determination shall be made according to the considerations set forth at 10 CFR 784.4 including a commitment by the recipient to agree to U.S. manufacturing or other activities that would benefit the U.S. economy.

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

H. Notice Regarding Eligible/Ineligible Activities

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

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

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

J. Notice of Potential Disclosure under Freedom of Information Act

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

K. Lobbying Restrictions

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

SECTION IX- APPENDICES

Appendix A – Definitions

"**Amendment**" means a revision to a Funding Opportunity Announcement

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

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

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

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

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

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

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

"**Cooperative Agreement**" means a Financial Assistance instrument used by DOE to transfer money or property when the principal purpose of the transaction is to accomplish a public purpose of support or stimulation authorized by Federal statute, and Substantial Involvement (see definition below) is anticipated between DOE and the Applicant during the performance of the contemplated activity.

"**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.

"**Collaborative Research Team (CRT)**" means a team of researchers who share coherent scientific goals and complementary theoretical, computational and/or experimental approaches.

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

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

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

"**EERE Exchange**" is the Department of Energy, Energy Efficiency and Renewable Energy's web system for posting Federal Funding Opportunity Announcements and receiving applications.
https://eere-exchange.energy.gov/FileContent.aspx?FileID=e10b8886-1826-447d-b1bf-8d9f0bf06f8e

"**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 award information available via the web. https://www.fedconnect.net/FedConnect/

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

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

"**Grant**" means a Financial Assistance instrument used by DOE to transfer money or property when the principal purpose of the transaction is to accomplish a public purpose of support or stimulation authorized by Federal statute, and no Substantial Involvement is anticipated between DOE and the Applicant during the performance of the contemplated activity.

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

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

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

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

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

"**Principal Investigator (PI)**" 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.

"**System for Award Management (SAM)**" is the primary database which collects, validates, stores and disseminates data in support of agency missions.

"**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 – 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 (2 CFR Part 220) -- Cost Principles for Educational Institutions

(ii) *Other nonprofit organizations.* Allowability is determined in accordance with OMB Circular A-122 (2 CFR Part 230),, 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 (2 CFR Part 225), 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.

Appendix C – Webinar Schedule for SunShot Initiative: FPACE II- Model Systems

Webinars for Potential Applicants

Webinars are intended to help potential applicants understand the scope and purpose of this FOA, in order to increase the quality of applications received. The summary slides that are presented at the webinar will be provided through EERE Exchange. Selected questions and answers that are general in nature, which arise during the webinar will be provided on the FOA Frequently asked questions that are posted on EERE Exchange.

Overview Webinar
SunShot Initiative FPACE II- Model Systems
Friday, February 22, 2013; 3:00pm – 5:00pm Eastern Time
Please check EERE Exchange (https://eere-exchange.energy.gov/Default.aspx) for registration information.