Foundational Program to Advance Cell Efficiency II (FPACE II)

SunShot
U.S. Department of Energy

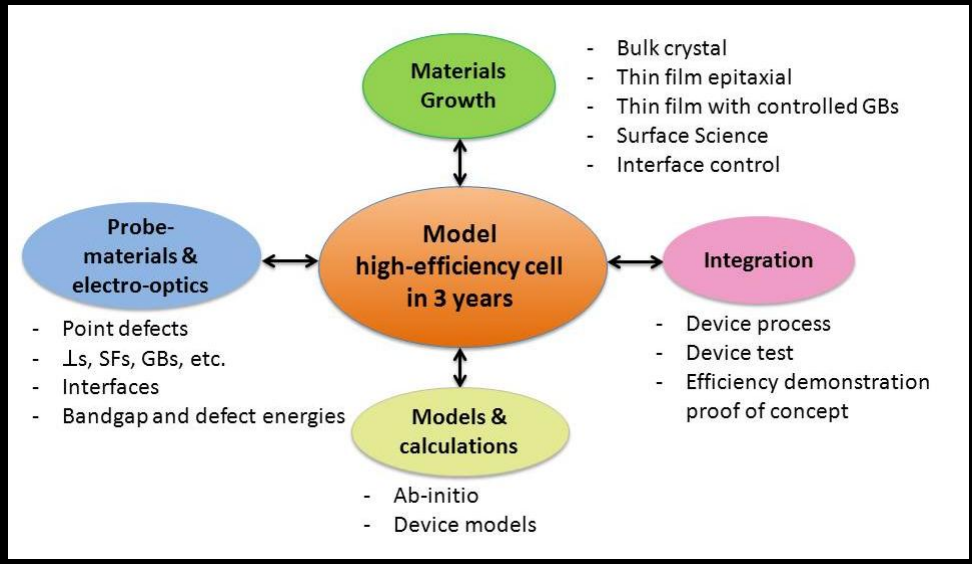
None of the information presented here is legally binding. The content included in this presentation is intended only to summarize the contents of funding opportunity DE-FOA-0000806. Any content within this presentation that appears discrepant from the FOA language is superseded by the FOA language. All Applicants are strongly encouraged to carefully read the FOA guidelines and adhere to them. Neither the U.S. Department of Energy (DOE) nor the employees associated with DOE working on this presentation shall be held liable for errors committed by applicants based on potentially incorrect or inaccurate information presented herein.

Agenda

1) FPACE II Introduction
2) Mandatory Letters of Intent
3) Full Application
4) Review Process
5) Frequently asked Questions

FPACE II: Diverse Teams and Ambitious Goals

- Synergistic teams from universities, national laboratories, and/or companies to conduct integrated research
- Goal should be a single-junction device that approaches the theoretical limits for power conversion efficiency
- Minimum 3 key members from at least 2 institutions, but more are expected to form a comprehensive team



Program Structure and Cost Share

- Federal awards up to $1.6M / year from DOE ($4.8M / 3 years)
- All projects must include a 20% non-Federal cost share

$$\text{Total Project Costs} = \text{Nonfederal Share} + \text{Federal Share}$$

$$\text{Cost Share} = \frac{\text{Nonfederal Share}}{\text{Total Project Costs}} \text{X } 100\%$$

Mandatory Letters of Intent to Apply (LOI)

LOI Deadline

Applicants must submit an LOI in EERE Exchange by

5 PM ET, March 7, 2013

We strongly encourage you to submit

1-2 days prior to avoid any potential technical glitches with EERE Exchange

Purpose

The Letter of Intent to Apply phase facilitates the timely review of applications by providing preliminary application information to SunShot

Letter of Intent to Apply Overview

- LOIs are not for downselection purposes, no commitment to apply
- Only applicants that submitted a compliant LOI are eligible to submit a Full Application
- Applications may include team members who have not submitted an individual LOIs, but these members may not act as the lead recipient or PI
- The LOI must contain a list of Potential Reviewer Conflicts of Interest

Full Application

Application Deadline

Submit Application in EERE Exchange by

5 PM ET, April 8, 2013

We strongly encourage you to submit

1-2 days prior to avoid any potential technical glitches with EERE Exchange

Key Points

- Follow the formatting criteria and page lengths stated in the FOA
- Triple check entries in Exchange
  - Submissions could be deemed non-compliant due to an incorrect entry and cannot be reviewed
- Make sure you hit the submit button
  - Any changes made after you hit submit will un-submit your application and you will need to hit the submit button again

Format and Page Limits

Extra material will be REDACTED OR REMOVED and will NOT be provided to reviewers

Section	Notes
Project Narrative	PDF, 20 pages max for all sections combined
Title Page Project Objectives Milestones & Timeline Technical Qualifications & Resources (7 pages max) Bibliography and References	
Project Narrative Appendices	PDF
1) Intellectual Property (IP) Management Plan 2) Demonstrated Capacity Within 3% (Absolute) of World Record PV Power Conversion Efficiency (1 page) 3) Individual Letters of Commitment 4) Current and Pending Support	
Project Summary	1 page max
Statement of Project Objectives	8 pages max
Project Management Plan	Excel Sheet
Resume Files	Each resume is limited to 2 pages max
Summary Slide	PowerPoint, 1 page max
SF424	SF-LLL, if applicable
SF424A	Excel, necessary for all sub recipients performing > $100,000 or 50% of the total work effort
Budget Justification, PMC 123.1	Necessary for all sub recipients
Waiver Request	Foreign entities and/or work if applicable

Milestones Go/ No-Go Criteria

- 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)
- Milestones and Go / No-Go Criteria will be carefully evaluated by the Reviewers
- Milestone should be quantifiable
- ***Reports are NOT acceptable milestones***

Criteria Weighting for Full Applications

Overall Scientific and Technical Merit	35%
Team Experience, Qualifications, and Capabilities	35%
Statement of Project Objectives and Project Management Plan	15%
Publications, Intellectual Property, and Impact	15%

Selection Criteria – Part I

***Overall Scientific and Technical Merit* (35%)**

- 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

Selection Criteria – Part II

Team Experience, Qualifications, and Capabilities (35%)

- 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
- …

Selection Criteria – Part II cotd.

Team Experience, Qualifications, and Capabilities (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

Selection Criteria – Part III

Statement of Project Objectives and Project Management Plan (15%)

- 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

Selection Criteria – Part IV

***Publication, Intellectual Property, and Impact* (15%)**

- 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

Review Process

- At least 3 reviewers will review each application
- Expected release of reviewer comments to applicants
  5 pm ET, May 9, 2013
- Expected optional submission deadline for reviewer comment replies: 5 pm ET, May 14, 2013
  - Single PDF Document, 2 pages of text max, 1 page of images max
- Reviewers and DOE discuss applications
- Expected dates of pre-selection conference calls and presentations: June 3-7, 2013

Replies to Reviewer Comments

- Applicants will have the option to have a brief opportunity (4-5 days) to review these comments and prepare a short Reply to Reviewer Comments

- 2 pages of text max, 1 page of images max

- Expected release of reviewer comments to applicants:
  May 9, 2013

- 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.

Frequently Asked Questions

All questions must be submitted to FPACE2ModelSystems@go.doe.gov

and answers will be provided on EERE Exchange at:

https://eere-exchange.energy.gov/FAQ.aspx?FoaId=9e8defc6-c525-4f17-87d8-0f4083a01eef

Answers posted on EERE Exchange

Question: Will the FOA consider multijunction concepts as well?

Answer: The DOE SunShot Initiative is soliciting collaborative research teams to define and fabricate model single junction structures that can approach SQ limits with this FOA. Multijunction concepts are not being solicited with this funding announcement.

Question: Can Federally Funded Research and Development Centers (FFRDCs) apply to this FOA?

Answer: As described in Section III.A, non-DOE/NNSA FFRDCs and non-DOE Government-Operated Government-Owned laboratories GOGOs are eligible to apply for funding as a subrecipient, but are not eligible to apply as a prime recipient. DOE/NNSA FFRDCs and DOE GOGOs are eligible to apply for funding as a prime recipient or subrecipient.

Answers posted on EERE Exchange

Question: A team member is required who has worked on, or demonstrated a cell within 3% absolute of the technology in question. In the case of Si PV, does the world record mean singly a 25% PERL cell, or there is a separation between "thick" wafer Si and ultra-thin kerfless Si?

Answer: The reviewers will use the submitted application materials to determine if the applicant team contains at least one member that was part of a team that fabricated a cell within 3% of the world record for the technology addressed in the application. In the case of thin-film silicon, the record at the time the FOA was released was 20.1% as shown in Figure 3 on page 8.

Answers posted on EERE Exchange

Question: It appears that the PV materials DOE is looking for are limited to III-V, chalcogenide, or c-Si. However, we would like to make sure about this since we are thinking of creating team for advanced organic solar cells. Would you please clarify if this is appropriate?

Answer: As stated in Section I.D, PV technologies that have demonstrated device efficiencies of at least 11% are an area of programmatic interest for this FOA. As shown in Figure 3, OPV technologies have exceeded this threshold. The objective of the FOA is to create model PV systems that approach SQ limits and all applicants are encouraged to consider the merit review criteria when constructing their application.

FPACE2ModelSystems@go.doe.gov

energy.gov/sunshot

February 22, 2013

FPACE II Webinar Script – 2/22/13

Introduction:

Hello and thank you for attending the FPACE II – Model Systems Webinar. During this webinar, I will provide a brief overview this program and review process but please bear in mind that the content included in the webinar is only intended to summarize the contents of the funding opportunity announcement (FOA).

FOA Text Supersedes This Presentation:

Therefore, please note that any content within this presentation that appears discrepant from the FOA language is superseded by the funding opportunity language. All Applicants are strongly encouraged to carefully read the FOA guidelines and adhere to them. Neither the U.S. Department of Energy (DOE) nor the employees associated with DOE working on this presentation shall be held liable for errors committed by applicants based on potentially incorrect or inaccurate information presented herein.

Agenda:

OK, Now I'll move on to the Agenda for this presentation. To start things off, I will present a one-slide overview on the FPACE II program. Again, Applicants should read the funding announcement for more information on the objectives of this program. I will then briefly go over the application and review process; starting with the required Letters of Intent (LOIs), followed by the Full Application, the review process, and the optional Replies to Reviewer Comments. I will then close the webinar by reviewing several frequently asked questions that have been submitted to the FPACE II email address.

FPACE II:

So with that, let's briefly go over the goals of this funding announcement. Due to price reductions in the solar energy industry and the goals of the SunShot Initiative, we believe there is a need to increase the efficiency of the highest performing laboratory cells. As outlined in the SunShot Vision Study, module power conversion efficiencies of 25% may be required to achieve the SunShot price targets. Therefore, we aim to accelerate the advancement of record cell efficiencies so that such module efficiencies are obtainable.

Through this funding opportunity, FPACE II: Model Systems, SunShot seeks experimental demonstration near Shockley-Queisser efficiency limits through a fundamental approach of materials design; defect engineering; device simulations; and materials growth and characterization. We expect that achieving such advances in efficiency will require multidisciplinary teams, and therefore, each proposal must include at least 3 key members

from at least 2 institutions. Please see the funding announcement from more information on the FPACE II objectives and background information.

Program Structure:

While the FOA contains more information on the program structure, I thought I would briefly touch on a couple points now. Applicants are required to contribute at least a 20% cost share, and the maximum award size is $4.8M over 3 years. There is often a bit of confusion when people calculate cost share so I've put the equations here. The key point is that applicants must contribute at least 20% of the Total Project Costs. The Total Project Costs include the Federal and non-Federal contributions.

So with that, I will briefly go over the components of the application and the application process for this funding announcement.

Mandatory Letters of Intent (LOI):

LOI Deadline:

In order to apply to this funding announcement, Applicants must submit a letter intent (LOI) by March 7th as described in Section IV.B of the announcement. Applicants that submit a Full Application without submitting a Letter of Intent will be deemed non-compliant and will not be reviewed.

LOI Intent:

The Letter of Intent will not be used for downselection purposes and will be used to facilitate a timely review of the applications.

LOI Overview:

In the required Letter of Intent, applicants must submit a 2-3 page summary of the proposed project and team. This material will not be provided to the reviewers so please be sure that you repeat any necessary information in your Full Application.

Additionally, the LOI must contain an appendix to identify reviewers that may have a conflict of interest when reviewing your application. Once selected, reviewers must also verify that they are not conflicted when reviewing applications and the early identification of such conflicts facilitates a timely review process. Please list collaborators and coauthors in the past 4 years as well as coeditors over the last 2 years for published materials that are closely related to the proposed project. Finally, the names of graduate students and post-doctoral advisors over the last three years must be listed.

Full Application:

Now I will move on to the Full Application.

Full Application – Application Deadline:

After the mandatory Letter of Intent has been submitted, applicants must submit a Full Application to EERE Exchange in order to be considered for an award. Applications must be uploaded into Exchange and the applicant must click the "submit" button before 5pm on April 8th. Everyone is encouraged to submit their application 1-2 days before the deadline to avoid any issues that could result in an untimely application that would not be reviewed. I would like to stress this point; please do not wait until just before the application is due.

Key points:

When constructing an application please ensure that all the submitted materials adhere to the formatting criteria and page lengths stated in the FOA. All pages that are in excess of the stated limits will be redacted and not supplied to the reviewers.

Of course, triple check your entries in Exchange and make sure that you click the submit button.

If you make any changes to your application after it has been submitted, the application becomes un-submitted in Exchange and you must make sure that you resubmit the application again before 5pm on April 8th.

Format and Page Limits:

So now, I will briefly go over the required parts of the Full Application. This table outlines the required application documents and their respective page limits. The project narrative consists of a Title Page, and sections for the Project Objectives, Milestones & Timeline, Technical Qualifications & Resources (which is limited to 7 pages max), and References. Additionally, the required appendices to the project narrative are listed here which will also be reviewed according to the Merit Review Criteria in the FOA. Please see the actual funding announcement for information on constructing your application materials. Again, please adhere to all page limits and formatting requirements stated in the funding announcement. Any material that is in excess of the stated page limits will not be sent to the reviewers.

Milestones and Go / No-Go:

The Solar program requires applicants to identify key milestones and Go / No-Go criteria when constructing their applications. The proposed milestones should be quantifiable and include

metrics that are relevant to achieving the overall project objectives. The milestones and Go / No-Go criteria will be evaluated by the Reviewers and will be further negotiated if an applicant is selected for award negotiations. The milestones that you identify in the application will also be described in your Statement of Project Objectives and the Project Management Plan sections of the application. Please see the funding announcement and the instructions for the Statement of Project Objectives, which includes a sample template, for more information on selecting milestones.

Criteria Weighting for Full Applications:

All applicants should carefully consider the Merit Review Criteria stated in the funding announcement when constructing their application. Reviewers are asked to consider these criteria when evaluating applications. Therefore, I would like to briefly go over the 4 main criteria sections. After this slide, I have a couple slides that break out these criteria but I will not read through each sub-criterion.

Applications will be reviewed based on their overall scientific merit, the team quality, the quality of the Statement of Project Objectives and management plan, and the perceived impact of the project. The specific weights are shown here.

For each of these sections, we have listed specific criteria in the funding announcement.

Selection Criteria – Overall Scientific and Technical Merit:

For example, under the scientific and technical merit section you can see that there are specific criteria such as those relating to the contribution to existing knowledge, the formation a synergistic effort, and the ability of the project to improve the state of the art. I will not read through all of these but they are here and stated in the FOA for your reference.

Selection Criteria – Team Experience, Qualifications, and Capabilities:

Likewise, the team section contains criteria such as the quality of the interaction, the capability of the organization to conduct integrated research, and the diversity of the team.

Selection Criteria – Team Experience, Qualifications, and Capabilities: cotd

This section also contains a criterion on the involvement of at least one team member in fabricating a cell within 3% of the world record for solar power conversion for that technology. This “demonstrated capacity” as it is referred to in the funding announcement will facilitate the ability of the team to succeed in making a high-efficiency model system. Again, please see the funding announcement for more information.

Selection Criteria – Statement of Project Objectives and Project Management Plan:

Similarly, the Statement of Project Objectives and the proposed milestones will be evaluated based on criteria such as their technical relevance and their ability to track the progress of the project using quantifiable metrics.

Selection Criteria – Publication, Intellectual Property, and Impact:

Finally, the last section of criteria relate to the impact of the proposed project, the commitment to publish, and likelihood of commercialization.

Again, let me say this one more time I have only briefly gone through the merit criteria in this presentation. Please carefully consider all of the Merit Review Criteria stated in the funding announcement.

Review Process:

I will now quickly go over the review process for submitted applications. Submitted applications will be reviewed by at least 3 reviewers. The applicant will then have a short period of time (the funding announcement states at least 4 calendar days) to prepare a Reply to Reviewer Comments. The replies are then considered along with the applications when making selections.

A subset of Applicants may then be selected for pre-selection clarifications. Selection for clarification does not mean that the Applicant has been selected for an award and are for the purposes of clarifying the application. Applicants may only receive a couple days notice before such clarifications, which can take the form of written responses to questions, video or conference calls with DOE representatives and/or merit reviewers, in person-meetings, or presentations.

Replies to Reviewer Comments:

As I mentioned before, Applicants will have a brief opportunity to review the reviewer 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. There is a 2-page limit for text and a 1-page limit for any accompanying figures. We are expecting to release the comments on May 9th. This is only an expected date since we cannot be absolutely sure when the comments will be ready for release to the applicants. See Section IV.D of the funding announcement for more information.

Frequently Asked Questions:

Now I will briefly discuss a couple of the frequently asked question that we have received. Applicants must submit all questions to the FPACE II email address for this funding

announcement and answers are posted on EERE Exchange for everyone to review. The FPACE II email address and a link for viewing the answers are on this slide.

Answers Posted on EERE Exchange (1):

We have received a question about multijunction concepts and their applicability to this announcement. With this funding announcement, we are only looking for single junction model cells that can approach Shockley Queisser limits.

We also received a question about whether Federally Funded Research and Development Centers (FFRDCs) can apply to this announcement. Again, I will point to the actual announcement. Section III.A of the FOA outlines eligibility criteria; FFRDCs and Government-Operated Government-Owned laboratories can participate.

Answers Posted on EERE Exchange (2):

Finally, we have received several questions about specific technologies and their applicability to this announcement. Applicants are encouraged to read the FOA and consider the Merit Review Criteria when constructing their application. Concerning specific technology thresholds, please consult Figure 3 of the funding announcement.

Answers Posted on EERE Exchange (3):

You can see that we have received questions for silicon and organic photovoltaic technologies.

Closing Slide:

So with that, I will now wrap up. Thank you for attending and I hope this was useful.

Please send any questions to FPACE2ModelSystems@go.doe.gov and answers will be posted in FAQ section for this funding announcement in EERE exchange.

Thank you and have a nice day.