



Concentrating Solar Power: Advanced Projects Offering Low LCOE Opportunities

Informational Webinar
Introduction & Concept papers
Oct. 10, 2014

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-0001186. Any content within this presentation that appears discrepant from the Funding Opportunity Announcement (FOA) language is superseded by the FOA language.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.

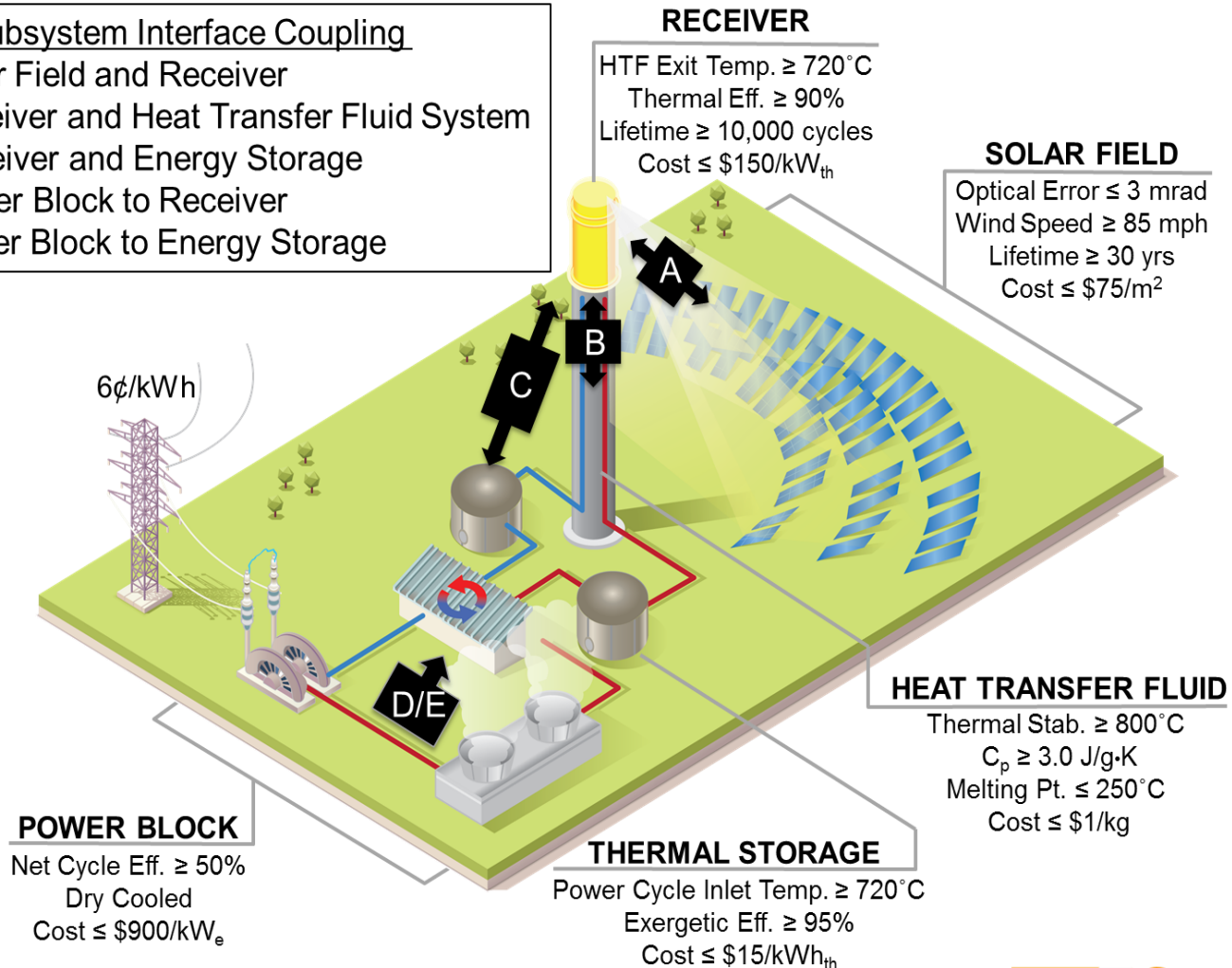
Agenda

- CSP: APOLLO introduction and overview
- Concept Paper
- Application and Review Timeline
- Questions

CSP: APOLLO Overview

CSP Subsystem Interface Coupling

- A: Solar Field and Receiver
- B: Receiver and Heat Transfer Fluid System
- C: Receiver and Energy Storage
- D: Power Block to Receiver
- E: Power Block to Energy Storage



Examples of topics

- **Topics of interest include, but are not limited to:**
 - Thermal Energy Storage (TES) with operating temperature ranges compatible with high efficiency power cycles.
 - Flexible, scaled system below 50 MW, which are high efficiency, have integrated TES and low operating costs, deliver dispatchable power and grid stability services, and are cost competitive with competing power generating solutions.
 - Collection systems that deliver concentrated solar flux with fewer, or no, moving parts or that enable greater accuracy or reduce the need for high-precision drives.
 - Selective receiver coating with high absorptivity ($\geq 95\%$), and are stable for operating service cycles and lifetimes at temperatures above 800 °C.
 - Thermal power cycle heat sink systems that consume no water and provide a heat sink below ambient temperature.
 - Systems to transport photonic or thermal energy at high energy densities cost-effectively and efficiently.
 - Extreme automation to drastically reduce solar field manufacturing, installation and overall CSP construction costs and time, by 50–75% from current state of the art.
 - Novel techniques for low-cost, reliable and predictive operations and maintenance.
 - Advanced designs and materials for hardware (e.g. pumps, valves/packing, piping).
- **Topics not of interest:**
 - Applications that fall outside the technical parameters specified in Section I.B of the FOA, including but not limited to incremental improvements to, or combinations of, existing products and technologies, wherein no significant advances in understanding or reductions in technical uncertainty are achieved.
 - Applications for proposed technologies that are not based on sound scientific principles (e.g., violates the law of thermodynamics).

Technology Readiness Level (TRL)

TRL	Description
1	Basic principles observed and reported.
2	Technology concept and/or application formulated.
3	Analytical and experimental critical function and/or characteristic proof of concept.
4	Component and/or breadboard validation in laboratory environment.
5	Component and/or breadboard validation in relevant environment.
6	System/subsystem model or prototype demonstration in a relevant environment.
7	System prototype demonstration in an operational environment.
8	Actual system completed and qualified through test and demonstration.
9	Actual system proven through successful mission operations.

Applications must begin at **TRL 3 or greater** and propose to advance the technology at least **2 levels**

Awards Overview

- Total federal funds available: \$25,000,000
- Max award amount: \$5,000,000
- Project period: 1 to 3 years
- Number of expected awards: 10-15
- Cost-share:
 - 20% of R&D activities performed by non-profit recipients and non-profit subrecipients
 - 50% of demonstration and commercial activities performed by non-profit recipients and non-profit subrecipients
 - 50% of all activities performed by for-profit recipients and for-profit subrecipients

Cost-Share

Total Task Cost = Non-federal Share + Federal Share

$$\text{Cost Share} = \frac{\text{Non-federal Share}}{\text{Total Task Cost}} \times 100\%$$

Type of Task and Type of Recipient or Sub-recipient	Minimum cost-share	Requested Federal Funds (example)	Cost-share (min)	Total Budget for Task
R&D Task performed by non-profit	20%	\$1,000,000	\$250,000	\$1,250,000
Demonstration or Commercialization Task performed by non-profit	50%	\$300,000	\$300,000	\$600,000
Any Task performed by for-profit	50%	\$800,000	\$800,000	\$1,600,000

Eligible Applicants (full details in FOA Section III.A)

- Individuals
 - U.S. citizens and lawful permanent residents
- Domestic entities
 - For- & not-for-profit, universities, national labs/FFRDCs
 - Can be held by foreign entity, but Applicant must be incorporated in U.S.
- Foreign entities
 - Waiver must be submitted for DOE approval
 - Can receive a minority of funding as sub-recipient
- Consortia
 - Can be a mix of domestic/foreign entities
 - Incorporated can apply as prime recipient
 - Unincorporated must designate a member as prime recipient
- **Applicants can submit more than one concept paper**
 - Each submission must be unique and distinct from the other(s)

Concept paper overview

- Provides early indicator of proposal relevance to FOA
 - Technical review criteria in FOA Section V.A.1
- For fairness, must conform to content requirements
 - Refer to FOA Section IV.C
- Encourage/Discourage notification sent to applicant
 - Notification will be sent approximately 3 weeks after concept paper due date
 - Applicants may submit a Full Application even if discouraged
- ***Concept papers are mandatory***
 - ***Only Applicants that submit a compliant Concept Paper are eligible to submit a Full Application.***

Concept Paper Content

- **Technology Description (3 pages max)**

- The proposed technology, including its basic operating principles and how it is unique and innovative;
- The proposed technology's target level of performance (Applicants should provide technical data or other support to show how the proposed target could be met);
- The current state-of-the-art in the relevant field and application, including key shortcomings, limitations, and challenges;
- How the proposed technology will overcome the shortcomings, limitations, and challenges in the relevant field and application;
- The potential impact that the proposed project would have on the relevant field and application;
- The key technical risks/issues associated with the proposed technology development plan; and
- The impact that EERE funding would have on the proposed project.
- Applicants may provide graphs, charts, or other data to supplement their Technology Description.

- **Team Description (2 pages max)**

- What skills and expertise the Principal Investigator (PI) and Project Team have that will allow them to successfully execute the project plan;
- Applicant's prior experience which demonstrates an ability to perform tasks of similar risk and complexity;
- Previous project and program collaborations between PI and team members; and
- Equipment and facilities necessary to accomplish the effort to which applicant has access and/or how applicant intends to obtain access to the necessary equipment and facilities.

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

Concept papers due November 26, 2014 at 5pm ET

Concept papers are mandatory

Submit Concept Paper in EERE-Exchange by

November 26, 2014 5:00 PM ET

<https://eere-exchange.energy.gov/>

Only applicants that have submitted a compliant Concept Paper are eligible to submit a Full Application

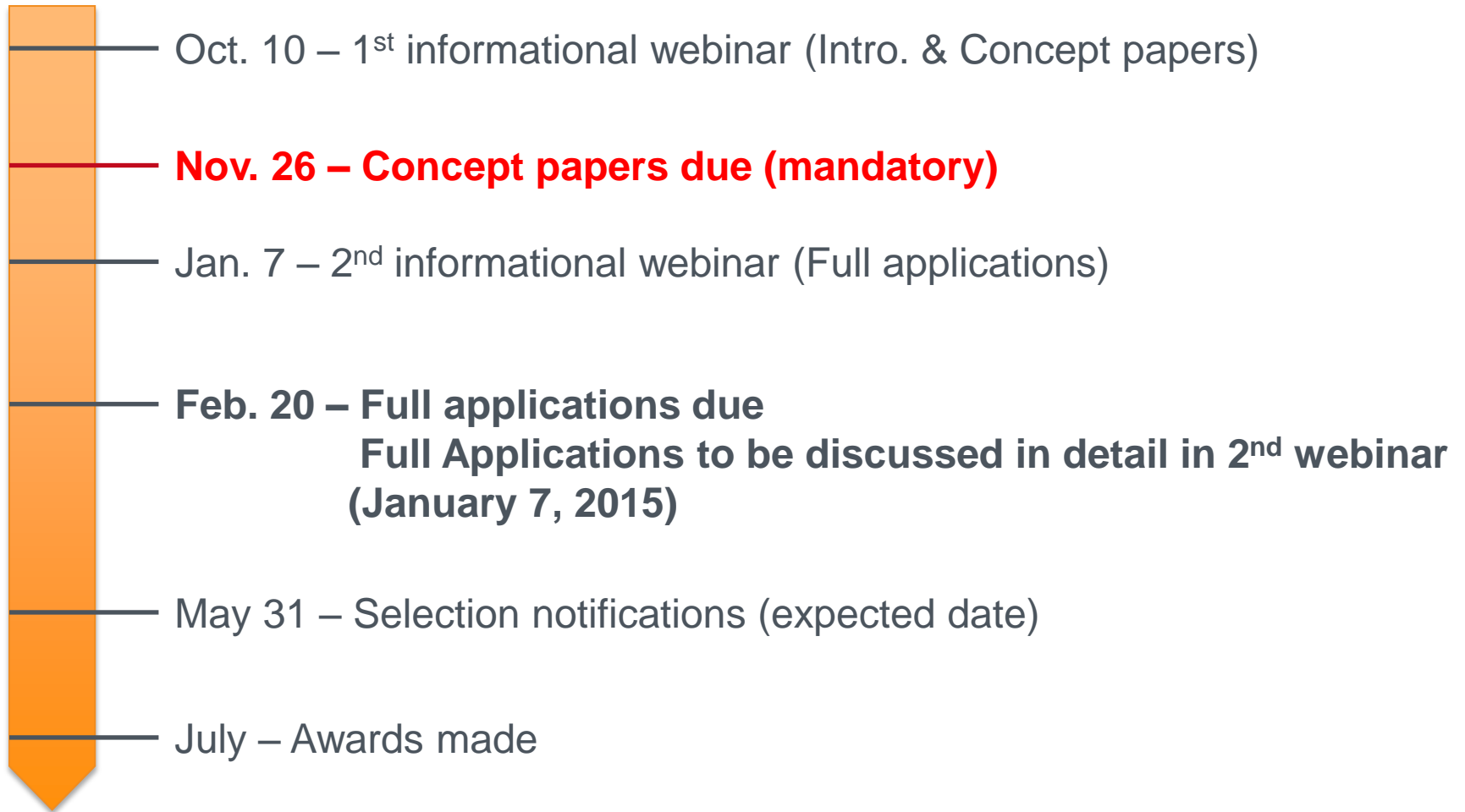
Concept Paper Review Criteria

- **Criterion 1: Impact of the Proposed Technology Relative to State of the Art (50%)**
 - This criterion involves consideration of the following factors:
 - Quality and accuracy of the description of the current state of the art technology;
 - If technical success is achieved, the ability of the proposed idea to significantly improve technical and economic performance relative to the state of the art; and
 - Quality of the rationale for how the proposed technology will address the Areas of Interest defined in Section I.B of this FOA.
- **Criterion 2: Overall Scientific and Technical Merit (50%)**
 - This criterion involves consideration of the following factors:
 - The proposed technology is unique and innovative; and
 - The proposed technical approach is justified and without major flaws.

Concept Paper Review Process

- Applicants will be provided review comments on their Concept Paper as well as an Encourage/Discourage decision
- It is **expected** that Encourage/Discourage notifications will be released on December 19, 2014
- Applicants will be provided approximately 2 months to prepare a Full Application.

Timeline





Questions can be emailed to
CSPAPOLLO@ee.doe.gov

Answers will be posted, along with this webinar and script at
<https://eere-exchange.energy.gov>