Cadmium Telluride Photovoltaics Accelerator Consortium Solicitation

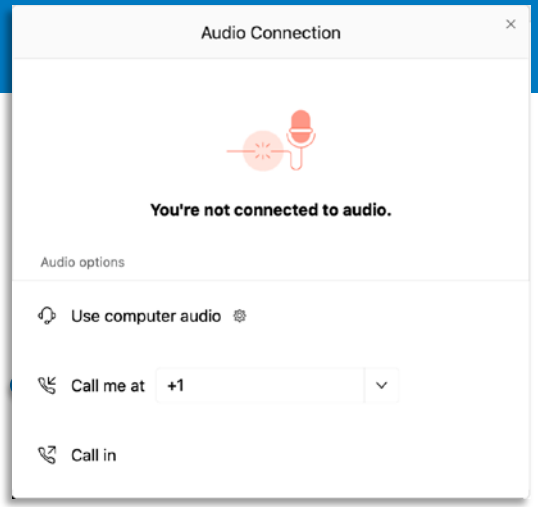
Request for Proposals Information

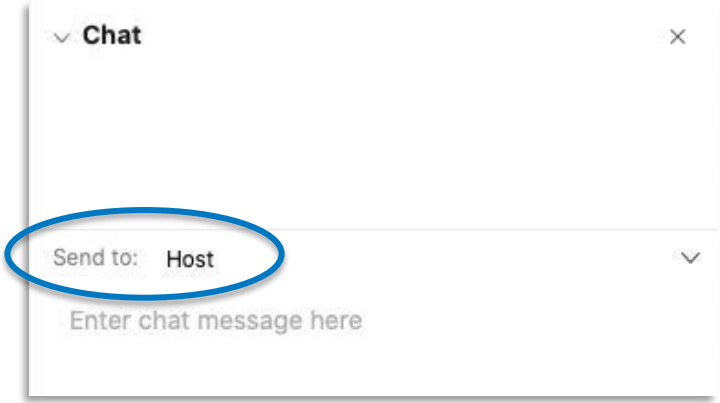
Webinar
June 14, 2021

NREL/PR-5K00-80274

Webex Housekeeping

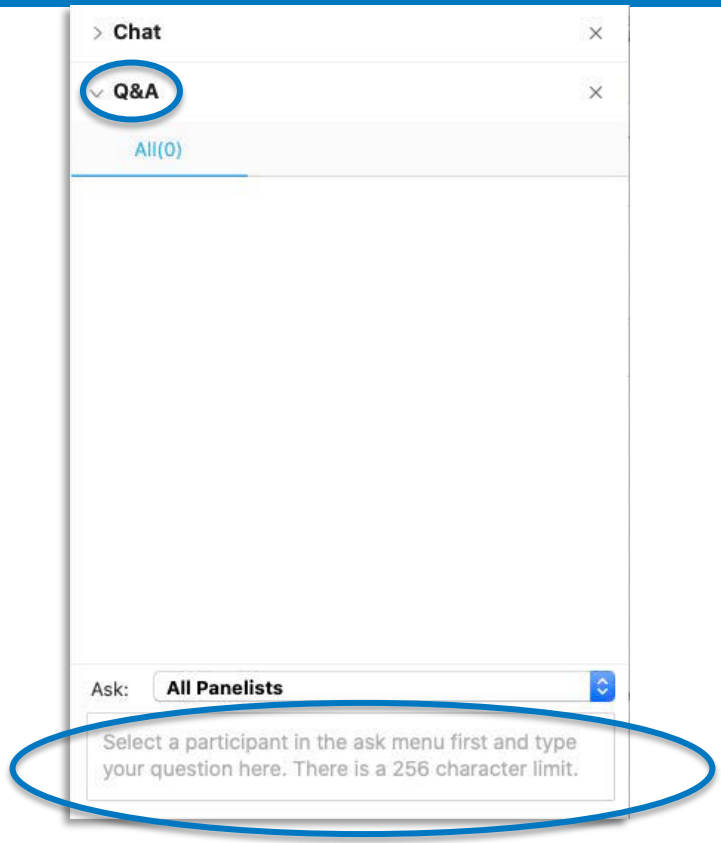
- **All attendees are muted.**
- **Audio issues?**
  - Try switching from computer to phone audio by having Webex call you or by calling in.
  - If that doesn't work, use the Chat window to message the Host.





Housekeeping

- **Will the presentation be available?**
  - A recording will be posted on Monday at nrel.gov/pv/cadmium-telluride-photovoltaics-accelerator-consortium-solicitation.html.
- **Q&A**
  - We will NOT be conducting live Q&A.
  - We WILL respond by RFP Amendment to all questions submitted to the Q&A tab during the webinar.
  - The RFP Amendment with Questions and Answers will be posted to our website and Sam.gov



Agenda

- Introduction to Webinar
- Program Overview and Goals
- Due dates for RFP
- Who is eligible to propose
- How to propose and what submittals are required
- Best Value Procurement Process
- Evaluation Criteria

Introduction to Webinar

Lorelle Mansfield

Introduction to Webinar

- Thank you for attending live or by recording
- Supported by the U.S. Department of Energy Solar Energy Technologies Office
- Find more information on our website
  - Search Cadmium Telluride on www.nrel.gov
- The purpose of today's webinar is to highlight information in the RFP

Program Overview and Goals

Lorelle Mansfield

Background

Cadmium telluride photovoltaics (CdTe PV) is a leading PV technology built on U.S. innovations that currently holds significant market share within domestic utility scale PV systems. In order to keep pace with a highly competitive and innovative global PV module market, CdTe manufacturing needs readily adaptable advances at the cell and module levels that simultaneously enable higher conversion efficiencies and manufacturing cost reductions without risking long-term module durability. In pursuit of this goal, the Department of Energy (DOE) Solar Energy Technologies Office (SETO) has asked the National Renewable Energy Laboratory (NREL) to launch and support a Consortium to accelerate domestic CdTe technology development through a competitive solicitation process.

NREL will competitively select a CdTe Consortium with the goals of enhancing U.S. competitiveness and expanding domestic CdTe PV material and module production through 2030. NREL will provide coordination and oversight through development of technical scopes, review of technical proposals, subcontract support, and review of deliverables along with research support to the Consortium. The new Consortium is expected to include major U.S. companies and universities that possess strong technology development, transfer, and validation capabilities. The research and analysis output of the CdTe Consortium will inform purchasing, design, deployment, and operations decisions of companies in the domestic CdTe PV supply chain, leading to increased material and module production in the U.S.

After the new Consortium is formed, NREL's role will include acting as a resource, support network, and technical analysis center with the goal of expanding the size of the U.S. CdTe supply chain. NREL is expected to support the Consortium in the following ways:

- Support Consortium efforts to develop a technology roadmap
- Assist with stakeholder engagement for Consortium meetings and events
- Support as needed via applied research efforts including measurement and characterization support
- Support Consortium in launching additional research efforts in order to meet the various targets set by the Consortium's technology roadmap
- Administer solicitations, review, and award subcontracts for the selected technology development and demonstration projects
    - The Consortium Lead will provide guidance on which projects it believes hold the most promise, and NREL will recommend selections to DOE SETO for final approval.

The CdTe Consortium will bring together the national lab and university research infrastructure and the CdTe photovoltaic supply-chain to discover, develop, de-risk, and enable the commercialization of new materials and designs for CdTe PV modules—with the intent to decrease the levelized cost of electricity toward SETO's 2030 goals.

Objectives

- The main goal of this RFP is to:
  Select the CdTe Consortium Lead that provides the best proposal to enable U.S. competitiveness and increase domestic CdTe PV material and module production through 2030 while decreasing the levelized cost of electricity toward SETO's 2030 goals.

- A Cadmium Telluride (CdTe) Consortium will bring together companies who are members of the CdTe supply chain along with research centers to work on the most important challenges in U.S. CdTe production.

- The goals of the Consortium are to:
  A. Develop a technology roadmap that will enable the long-term competitiveness of CdTe PV in the U.S.
  B. Enhance U.S. technology leadership and competitiveness in CdTe photovoltaics (PV) by:
     1. Enabling cell efficiencies above 24% and sustainable module prices below 20 ¢/W for domestic CdTe modules by 2025;
     2. Enabling cell efficiencies above 26% and sustainable module prices below 15 ¢/W for domestic CdTe modules by 2030; and
     3. Progressing towards the goals set by the consortium's CdTe technology roadmap.
  C. Expand domestic CdTe PV material and module production and continue to drive down the cost of CdTe PV systems through 2030.

Expected Consortium Activities

Expected Activity	Details
Develop a CdTe Technology Roadmap	• Update the roadmap annually to maintain U.S. technology leadership in CdTe PV. • Include input from stakeholders through engagement activities. • Include technology performance targets and high-priority research areas to help achieve them.
Assess the Domestic CdTe Supply Chain	• Update the assessment regularly to identify any critical material or capacity constraints. • Compile input from stakeholders including investors. • Identify technology transfer opportunities and conduct feasibility analysis of new technologies. Facilitate the transfer of promising technologies to U.S. manufacturers. • Determine whether opportunities exist to expand and enhance the U.S. manufacturing base or to increase the domestic content of CdTe PV systems.
Conduct Core Research Projects	• Develop and launch research projects within Consortium Institutions (Consortium Lead, Consortium Partners) and in collaboration with other institutions such as NREL to meet the targets set within the technology road map. • Projects are led by the Consortium Lead, Consortium Partner institutions, or NREL.

Advise NREL on Launching Additional Projects to Meet CdTe Technology Roadmap Targets	Additional proposals are expected to be solicited on a rolling basis in the following two categories:
	• External research projects
	  • Monitored by a representative from a company.
	  • Led by entities other than for-profit companies.
	  • Engage a high-priority area that will support U.S. manufacturing.
	• External development projects
	  • Led by for-profit companies and their partners.
	  • Can include product development, technology validation, feasibility analysis, and demonstration.
	Selections will be made by NREL with guidance from the Consortium Lead/Partners and approval from SETO.

Identify new members and capabilities for the Consortium	• Search for opportunities to grow and diversify the market, supply chain, and research community. • Identify opportunities for staff exchange and strategic partnerships between U.S. companies.

Relevant Technical Areas

- *Cell Improvements*
  - Increase photovoltage by overcoming fundamental material issues such as recombination and low carrier concentration.
  - Absorber modifications for improving CdTe hole density, such as group V doping.
  - Reduce interface recombination through passivation, reflectors, and/or fields.
  - Create new cell architectures to increase module efficiency.
  - Improve transparent back contacts to enable tandem and bi-facial modules.
  - Conduct surveys of potential new cell technologies to ensure long term reliability.
- *Module Improvements*
  - Components that increase performance (i.e., energy output over the module lifetime), durability, and/or safety.
  - Components that reduce manufacturing costs while maintaining or improving durability and performance.
  - Module architecture suitable for residential and commercial rooftop applications.
  - Processes, components, or module designs that improve the ability and/or decrease the cost to recycle PV modules.
- *Characterization*
  - Combine theory and experiments to describe material interactions.
  - Methods that improve the understanding of active versus inactive dopants in CdTe.
  - Develop methods suitable for high-throughput manufacturing.
  - Techniques for measuring band alignment and electron density in finished devices.
- *Manufacturing*
  - Equipment or synthesis innovations that increase factory throughput.
  - Advances in synthesis methods that reduce manufacturing costs.
- *Supply Chain*
  - Define gaps in the domestic supply chain and work to improve its efficiency and quality.
  - Understand the competitiveness of U.S. facilities including quantifying the materials, labor, and CapEx.
  - Analyze materials shipping costs and any applicable duties, sales taxes, and/or tariffs across borders.

Expected Funding Breakdown

Expected Funding for this Solicitation - Phase I		
Entity	**Description**	**Funding Amount**
Consortium Lead and Partners	36-month scope of work that will be funded under this Solicitation. This work will be conducted directly by the Consortium Lead and Partners.	$9,000,000
Phase II Funding for Consortium Lead and Partners - NO ACTION REQUIRED AT THIS TIME (Pending available fiscal Appropriations, Successful Completion of Phase I and successful bilateral Negotiation)		
Consortium Lead and Partners	In Phase II, project work will expand upon and enhance the work started in Phase I. Project objectives for Phase II will be identified in the CdTe Technology Road Map that is created and updated in Phase I. **Note:** Upon completion of Phase I, NREL will make a go/no go decision, based upon its sole judgement, whether or not to authorize a Phase II. The go/no go decision will depend on the availability of Federal Funds and the successful outcome of Phase I. *(See RFP for more details on this Phase)*	TBD
NREL Funding for Consortium Projects as defined in the RFP		
NREL	Research and analysis in support of the Consortium as defined in this RFP. This work will be conducted by NREL at the direction of the Consortium.	$1,500,000
Potential Funding for Future Solicitations to Other External Partners (Pending Appropriations)		
External Partners	External projects launched in order to gain access to new expertise or capabilities. This work will take place at institutions outside of the Consortium and Consortium Partners. These projects will be suggested by the consortium and solicited by NREL under a competitive process separate from this RFP.	$3,000,000

Details of Request for Proposals

Bill Peters

Important Dates

Issue Date	June 7, 2021	
Solicitation Webinar	June 14, 2021	10:00 am MDT
Deadline for Questions	June 21, 2021	4:00 pm MDT
Response Due Date	July 19, 2021	4:00 pm MDT
Award Selection Anticipated	September 2021	

Definitions

- **CdTe Consortium (The Consortium):** An association of two or more companies, universities, or organizations with the objective of participating in common activities and pooling their resources to enable U.S. competitiveness in CdTe PV and increase domestic CdTe PV material and module production while decreasing the levelized cost of electricity.
- **Consortium Lead (The Offeror):** Responsible for submitting the proposal on behalf of their organization and the Consortium Partners. In addition to participating as a technical partner on consortium research projects, the Consortium Lead may be asked to act in a facilitating capacity on behalf of the Consortium. This would include organizing meetings, reviewing results and reports with consortium partners, and working closely with NREL to coordinate consortium activities.
- **Consortium Partners:** Co-Leaders or Partners teaming with the Consortium Lead. The Consortium Lead will submit the information required for the Consortium Partner's in the proposal. NREL will make awards to the successful Consortium Lead and each Consortium Partner. NREL will also review and approve deliverables for the Consortium Lead and each Consortium Partner.

Potential Subcontract Award

- It is the intent of NREL to award to one Consortium under this Solicitation.
- This Consortium may be composed of multiple funded Consortium Partners including, but not limited to, industry, universities, and non-profit organizations.
- NREL will be responsible for awarding all subcontracts under this Solicitation including to the Consortium Lead, and any other Consortium Partners. In addition, NREL will obligate funding for all work efforts under each subcontract and payments will be sent directly from NREL to the corresponding Consortium Partners.
- It is anticipated that the initial NREL funding available for this Solicitation will not exceed $9,000,000 for the anticipated 36-month duration of the Phase I work effort.
- Additional funding and scope may be authorized in additional phases which may be negotiated between the parties.
- NREL will be responsible for awarding all subcontracts under this Solicitation including to the Consortium Lead, and any other Consortium Partners. In addition, NREL will obligate funding for all work efforts under each subcontract and payments will be sent directly from NREL to the corresponding Consortium Partners.

Who is Eligible to Propose

- Project teams may be led by a Consortium Lead that is a for-profit business, educational institution, or non-profit. The Consortium Lead and Consortium Partners must be incorporated (or otherwise formed) under the laws of a State or territory of the United States. Project teams are strongly encouraged to have significant participation from industrial partners. Consortia will be evaluated based on the degree to which they include non-federal resources.
- RFP submissions are limited to one per Consortium Lead organization.
- State, local, and tribal government entities are only eligible to propose as a Consortium Partner.
- Foreign entities, whether for-profit or otherwise, are eligible to participate within a project team as a lower tier subcontractor but are not eligible to apply as a Consortium Lead nor are they eligible to receive funding as a Consortium Partner under this RFP.

How to Propose

- RFP found here
- See Table 12.1 in RFP for more detail on the following sections:
  - Cover Page
  - High Level Summary
  - Team Composition, Capabilities, and Work Plan
  - Initial Technology Roadmap
  - Overview of Supply Chain Analysis and Business Support
  - References and Bibliography
  - Resumes/CV's
  - List of Government Contracts
  - Price Summary Sheet
  - Proposed Deliverables/Milestone Payment Schedule
  - Representations and Certifications for Subcontracts/Purchase Orders
  - Organizational Conflicts of Interest Form
  - Proposal Cover Letter

Best Value Procurement Process

- This Solicitation shall be conducted using Best Value Selection that results in the selection of submitted proposals for potential subcontract award that is most advantageous to NREL based on the best value combination of (a) evaluated qualitative merit and (b) evaluated price of the proposals submitted.
- Best Value Selection is based on the premise that, if all proposals are of approximately equal qualitative merit, the award will be made to those with the lowest evaluated price. However, NREL will consider selecting proposals with a higher evaluated price if the offer demonstrates the difference in price is commensurate with the higher qualitative merit. Conversely, NREL will consider selecting proposals with a lower evaluated qualitative merit if the price differential between it and other proposals warrants doing so.

Evaluation Criteria

- **Criterion 1:** Impact of the Proposal Relative to State of the Art, Technical Merit, and the Objectives as stated in No. 5 above (50%)
- **Criterion 2:** Team Composition, Capabilities, and Work Plan (50%)


Thank You