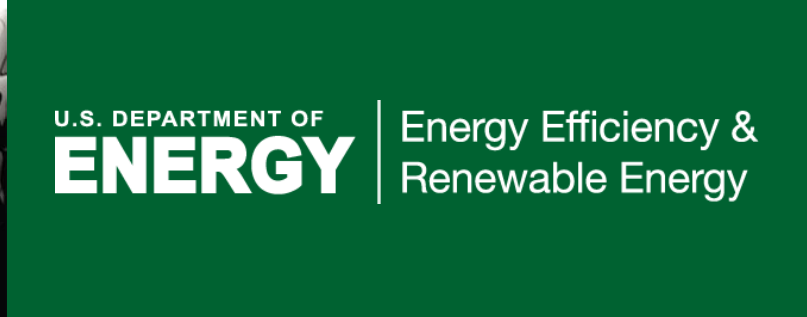


Welcome

This webinar is being recorded and will be published on the EERE EXCHANGE website as a link in the FOA description.

This Teams call is being recorded and may be posted on DOE's website or used internally. If you do not wish to have your voice recorded, please do not speak during the call. If you do not wish to have your image recorded, please turn off your camera or participate by phone. If you speak during the call or use a video connection, you are presumed consent to recording and use of your voice or image.



Fiscal Year 2023

Materials, Operation, and Recycling of Photovoltaics (MORE PV)

Funded in part by Bipartisan Infrastructure Law

Email questions to:
PVRD@ee.doe.gov

FOA Webinar
DE-FOA-0002985
July 26, 2023

Notice

- NO NEW INFORMATION OTHER THAN THAT PROVIDED IN THE FOA WILL BE DISCUSSED IN THE WEBINAR.
- There are no particular advantages or disadvantages to the application evaluation process with respect to participating on the webinar today.
- Your participation is completely voluntary.

Notice

- All applicants are strongly encouraged to carefully read the Funding Opportunity Announcement DE-FOA-0002985 (“FOA”) and adhere to the stated submission requirements.
- This presentation summarizes the contents of FOA. If there are any inconsistencies between the FOA and this presentation or statements from DOE personnel, the FOA is the controlling document and applicants should rely on the FOA language and seek clarification by submitting a question to PVRD@ee.doe.gov .

Materials, Operation, and Recycling of Photovoltaics (MORE PV)

Anticipated Schedule:

| | |
|--|----------------|
| FOA Issue Date: | 07/21/2023 |
| Submission Deadline for Letter of Intent: | 09/06/2023 |
| Submission Deadline for Concept Papers: | 09/13/2023 |
| Submission Deadline for Full Applications: | 11/28/2023 |
| Submission Deadline for Replies to Reviewer Comments: | 01/16/2024 |
| Expected Date for EERE Selection Notifications: | April 2024 |
| Expected Timeframe for Award Negotiations: | April-Aug 2024 |

Agenda

- 1) FOA Description
- 2) Topic Areas/Technical Areas of Interest
- 3) Award Information
- 4) Statement of Substantial Involvement
- 5) Cost Sharing
- 6) FOA Timeline
- 7) Letters of Intent
- 8) Concept Papers
- 9) Full Applications
- 10) Merit Review and Selection Process
- 11) Pre-selection Interviews
- 12) Registration Requirements

FOA Description

The U.S. Department of Energy's (DOE) Solar Energy Technologies Office is issuing the Materials, Operation, and Recycling of Photovoltaics (MORE PV) Funding Opportunity Announcement.

Through this Funding Opportunity Announcement (FOA), the Solar Energy Technologies Office (SETO) will provide funding for research and development to reduce material usage, improve installation quality and resilience of photovoltaic (PV) systems, and address handling of PV systems at the end of life.

Awards made under this FOA will be funded, in whole or in part, with funds appropriated by the Infrastructure Investment and Jobs Act, more commonly known as the Bipartisan Infrastructure Law. BIL is a once-in-a-generation investment in modernizing and upgrading American infrastructure to enhance U.S. competitiveness, drive the creation of good-paying union jobs, tackle the climate crisis, and ensure strong access to economic, environmental, and other benefits for disadvantaged communities.

FOA Description

This FOA will support multi-stakeholder collaborations to reduce material usage, improve installation quality and resilience of PV systems, and address handling of PV systems at the end of life. This FOA calls for diverse teams to assess **impact of the developed technologies on all the life stages** of PV systems **in terms of energy use, cost, and environmental impact**. The holistic technological solutions developed in the projects funded by this FOA will facilitate rapid growth of PV deployment in the U.S. in the next decade.

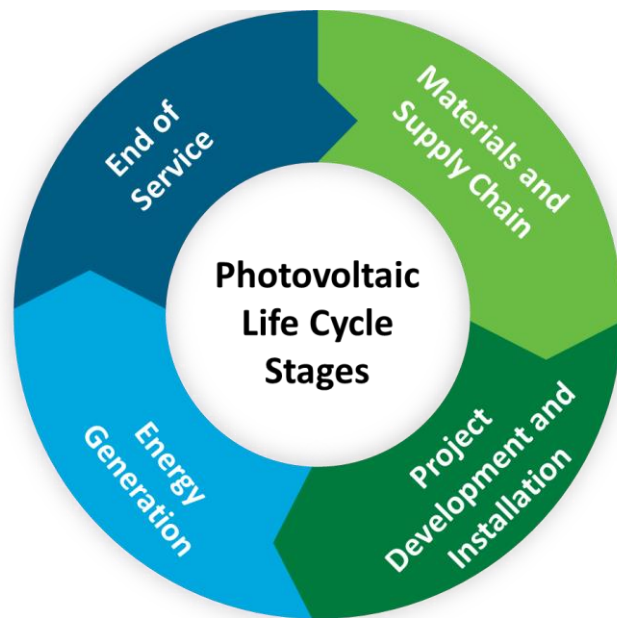


Figure 2. Lifecycle stages of a PV power plant. All of these stages need to be considered in projects supported by this FOA.

Table 1. Energy, economic, and environmental metrics useful for joint cost and lifecycle analyses.

| Type of metric | Primary metrics | Components of primary metric | Compound metrics relating input and output |
|------------------------------|---|--|--|
| Energy (output) | Solar energy output (kWh) | Capacity factor, Efficiency, Performance ratio, Availability, Degradation rate, O&M response and resolution time ⁴¹ | |
| Energy (input) | Embodied Energy (MJ/m ²), or Cumulative Energy Demand (CED) ⁴³ | Energy to produce panel and BOS materials for PV system Energy to manufacture PV system components Energy to transport materials and components Energy to install the system Energy for EOL management | Energy Payback Time ⁴² Energy Return on Investment (EROI) ⁴⁵ , |
| Economic (input) | Total Life Cycle Cost | Material and component cost EPC cost O&M cost Recycling cost Cost priority number of O&M | Levelized cost of energy (LCOE), Value-adjusted levelized cost of energy (VALCOE) ⁴⁹ Levelized cost of solar plus storage (LCOSS) |
| Environmental (input) | Embodied GHG (kg CO ₂ -eq) ⁴³ | GHG due to producing materials for PV GHG due to manufacturing PV system GHG due to transporting materials GHG due to installing the system GHG due to O&M GHG due to end-of-life management | Environmental impact mitigation potential |

Composition of a Successful Application

Successful applications will include these elements:

- Technological solutions
- Data
- Analysis
- Baselines
- Teaming, e.g., working groups in Topic 2
- Adoption and Outreach

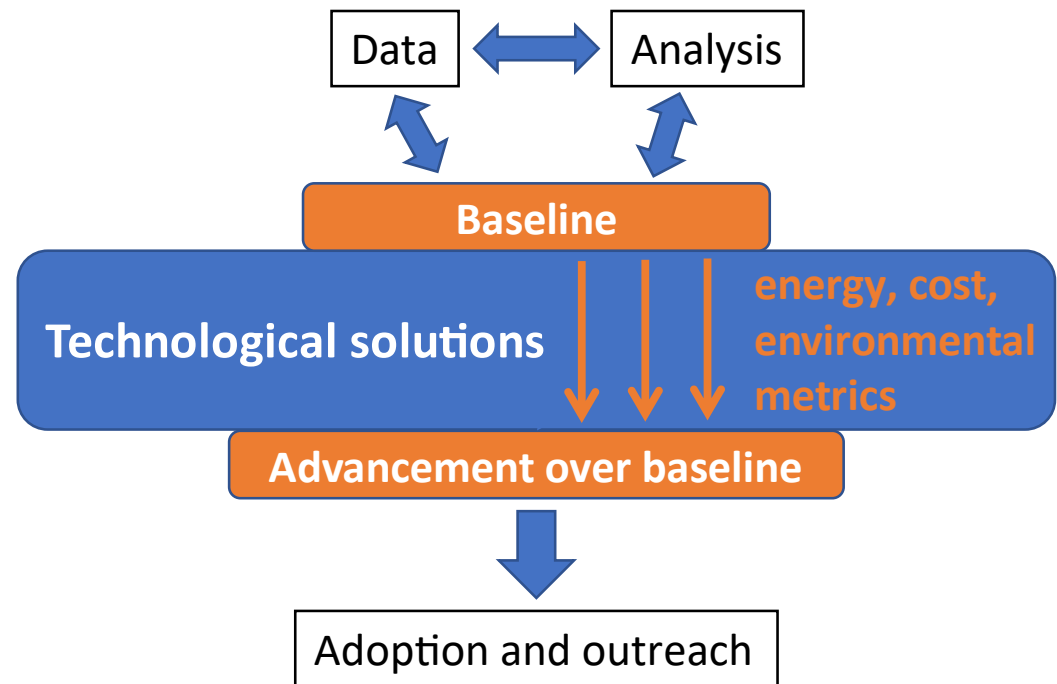


Figure 3. Potential structure of a responsive project.

Topic Area 1. MORE Connection: Connecting PV Materials, Design, Installation, Performance, and End of Life

This Topic Area will use \$12 million of non- Bipartisan Infrastructure Law (BIL) funding to fund **collaborations of diverse stakeholders** who can bring expertise from **all life stages of the PV system lifecycle to reduce cost and lifecycle impacts** of a PV system and its components, including co-located storage. Projects funded in this topic area will develop technology and design solutions to optimize the interconnected energy, economic, and environmental impact metrics in pursuit of rapid and sustainable scale-up of PV technologies.

Specific areas of interest include:

- Design of PV systems and PV system components that minimizes the use of materials, especially critical materials.
- Development of characterization and non-destructive testing of bill of materials (BOM) of PV system components throughout their life.
- Development and implementation of holistic design for engineering, procurement, and construction (EPC) of PV systems that can simultaneously optimize energy, economic, and environmental metrics during the system's useful life under relevant operating conditions, in a high deployment environment.
- Scalable hardware and software solutions for robust, error-free, low-maintenance tools, components, and methods for installation, quality management, and maintenance.

Topic Area 2. Solar Partnership to Advance Recycling and Circularity (Solar PARC)

This topic area **uses funds designated by the BIL and seeks to fund one research partnership** at a maximum of \$8 million dedicated to improving materials recovery efficiency and developing safe end-of-life (EOL) practices for PV system components, including modules, inverters, and other balance-of-system (BOS) components.

The partnership will **focus on technologies and methods to enable low-cost reuse, refurbishing, repair, and recycling of photovoltaic materials**, and best practices for safe disposal of these materials, and will include data collection, analysis, and working groups to enable effective collaborations and technology transfer.

Non-Responsive Applications

The following types of applications will be deemed nonresponsive and will not be reviewed or considered for an award:

- Applications that fall outside the technical parameters specified in Section II.A or II.B of the FOA
- Applications for proposed technologies that are not based on sound scientific principles (e.g., violates the law of thermodynamics).
- Standalone theoretical modeling and analysis efforts.
- Solutions with no clear financial or supply chain path to implementation.
- Applications that develop markets for redeployment of decommissioned PV system components (rather than recycling).
- Development of installation standards, which is the scope of separate efforts.
- Pilot-scale testing or demonstrations of Si PV manufacturing technologies or supply chain innovations beyond TRL of 6, which is the scope of DE-FOA-0003057: Bipartisan Infrastructure Law: Silicon Solar Manufacturing, and Dual-use Photovoltaics Incubator.

Teaming Partner List

- To facilitate the formation of new project teams for this FOA, a Teaming Partner List is available at EERE eXCHANGE:
[TPL-0000021: TEAMING PARTNER LIST FOR DE-FOA-0002985 MATERIALS, OPERATION, AND RECYCLING OF PHOTOVOLTAICS \(MORE PV\).](#)
- **SUBMISSION INSTRUCTIONS:** Select the Teaming Partner List from the drop-down menu in EERE Exchange or use the link in the EERE Exchange FOA posting, and fill in the following information:
 - Investigator Name, Organization Name, Organization Type, Topic Area, Background and Capabilities, Website, Contact Address, Contact Email, and Contact Phone.
- **DISCLAIMER:** By submitting a request to be included on the Teaming Partner List, the requesting organization consents to the publication of the above-referenced information. By facilitating the Teaming Partner List, DOE is not endorsing, sponsoring, or otherwise evaluating the qualifications of the individuals and organizations that are identifying themselves for placement on this Teaming Partner List. DOE will not pay for the provision of any information, nor will it compensate any applicants or requesting organizations for the development of such information.

Award Information

| | |
|------------------------------------|--|
| Total Amount to be Awarded | Topic 1: Approximately \$12M* Topic 2: Approximately \$8M* |
| Average Award Amount | EERE anticipates making 3 to 6 awards that range from \$2M to \$4M for Topic 1 and one award for \$8M for Topic 2. |
| Types of Funding Agreements | Cooperative Agreements |
| Period of Performance | Topic 1: 36 to 48 months Topic 2: 48 to 60 months |
| Cost Share Requirement | 0-20% of Total Project Costs |

*Subject to the availability of appropriated funds

Statement of Substantial Involvement

EERE has substantial involvement in work performed under awards made following this FOA. EERE does not limit its involvement to the administrative requirements of the award. Instead, EERE has substantial involvement in the direction and redirection of the technical aspects of the project as a whole. Substantial involvement includes, but is not limited to, the following:

- EERE shares responsibility with the Recipient for the management, control, direction, and performance of the Project.
- EERE may intervene in the conduct or performance of work under this award for programmatic reasons. Intervention includes the interruption or modification of the conduct or performance of project activities.
- EERE may redirect or discontinue funding the Project based on the outcome of EERE's evaluation of the Project at the Go/No Go decision point.
- EERE participates in major project decision-making processes.

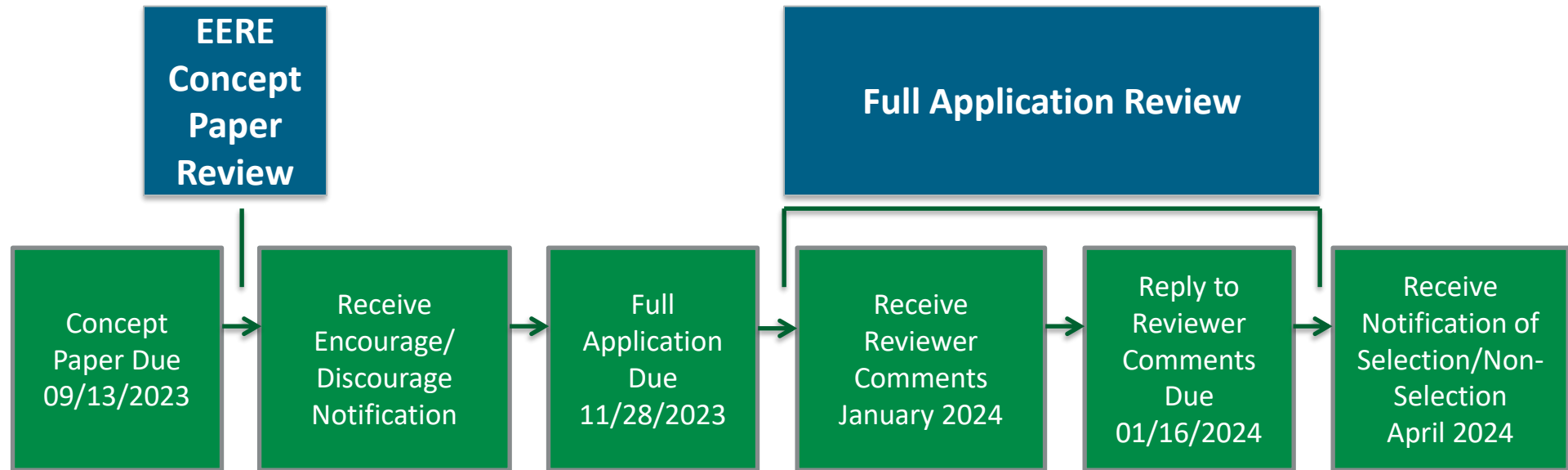
Cost Sharing Requirements

- For Topic Area 1, the cost share must be at least 20% of the total project costs for research and development projects.
- Topic Area 2 allows blended cost share: 0% cost share is required for outreach activities and a minimum 20% cost share is required for all research and development activities. Please refer to **Appendix B** of the FOA for guidance on the cost share calculations.
- Cost sharing is not required for institutions of higher education and nonprofit organizations. This waiver is granted per Section 10725 of the Research and Development, Competition, and Innovation Act. For details, see **Section IV.B of the FOA**.

Cost Share Contributions

- Cost share contributions must be:
 - Allowable
 - Specified in the project budget
 - Verifiable from the Prime Recipient's records
 - Necessary and reasonable for proper and efficient accomplishment of the project
- For details and more information on cost share contributions, including what is allowable and unallowable, please see **Section IV.B and Appendix A of the FOA.**
- If you are selected for award negotiations, every cost share contribution must be reviewed and approved in advance by the Contracting Officer and incorporated into the project budget before the expenditures are incurred.

FOA Timeline



EERE anticipates making awards by August 2024.

Who is Eligible to Apply?

The proposed prime recipient and subrecipient(s) must be domestic entities. The following types of domestic entities are **eligible** to participate as a prime recipient or subrecipient of this FOA:

1. Institutions of higher education;
2. For-profit entities;
3. Nonprofit entities; and
4. State and local governmental entities and Indian Tribes.

To qualify as a domestic entity, the entity must be organized, chartered, or incorporated (or otherwise formed) under the laws of a particular state or territory of the United States; have majority domestic ownership and control; and have a physical place of business in the United States.

- DOE/NNSA FFRDCs, non-DOE/NNSA FFRDCs, 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.**
- Entities banned from doing business with the U.S. government, such as entities debarred, suspended, or otherwise excluded from or ineligible for participating in federal programs, are **not eligible.**
- 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.

Are Multiple Applications Allowed?

An entity may submit more than one Concept Paper and Full Application to this FOA, provided that each application describes a unique, scientifically distinct project and an eligible Concept Paper was submitted for each Full Application.

Letters of Intent Required by 09/06/2023 5PM ET

- Letters of Intent (“LOIs”) are REQUIRED in order to be eligible to submit a Concept Paper and Full Application
- The LOI must comply with the content and form requirements of **Section V.C of the FOA.**
- The applicant must enter all required information and click the “Create Submission” button in EERE eXCHANGE by the deadline stated in the FOA.
- The LOIs should not contain any proprietary or sensitive business information.
- DOE will use Letters of Intent to plan for the merit review process. The letter will not be used for down-selection purposes and does not commit an applicant to submit an application.

Content and Form of the Letter of Intent

- Project Title;
- Lead Organization;
- Organization Type (business < 500 employees; business > 1,000 employees; business = 500-1,000 Employees; FFRDC; government-owned, government-operated; nonprofit; university);
- Whether the application has been previously submitted to DOE;
- % of effort contributed by the Lead Organization;
- The Project Team, including:
 - o The Principal Investigator (PI) for the prime recipient;
 - o Team members (i.e., subrecipients); and
 - o Senior/Key Personnel (i.e., individuals who contribute in a substantive, measurable way to the execution of the proposed project);
- Technical Topic or Area; and
- Abstract no longer than 200 words providing a truncated explanation of the proposed project.

Concept Papers

- Concept Papers must be submitted by 09/13/2023 5:00PM ET, through EERE eXCHANGE
- Each Concept Paper must be limited to a single concept or technology
- **Section V.D of the FOA** states what information a Concept Paper should include and the page limits.
- EERE provides applicants with: (1) an “encouraged” or “discouraged” notification, and (2) the reviewer comments
- Applicants may submit a Full Application even if they receive a notification discouraging them from doing so. By discouraging the submission of a Full Application, DOE intends to convey its lack of programmatic interest in the proposed project. Such assessments do not necessarily reflect judgments on the merits of the proposed project. The purpose of the Concept Paper phase is to save applicants the considerable time and expense of preparing a Full Application that is unlikely to be selected for award negotiations.

Content and Form of the Concept Paper

- Cover page – 1 page max
- Technology Description – 4 pages max
- R&D Community Benefits Plan – 1 page max
- Addendum – 2 pages max
 - to succinctly describe the qualifications, experience, and capabilities of the proposed project team
- Summary Slide – 1 page max

- Optional templates for Concept Paper and Summary Slide are provided in EERE eXCHANGE.

Concept Paper Review

Concept Papers are evaluated based on consideration the following factors.

Concept Paper Criterion: Overall FOA Responsiveness and Viability of the Project (Weight: 100%)

This criterion involves consideration of the following factors:

- The applicant clearly describes the proposed technology, how the technology is unique and innovative, and how the technology will advance the current state-of-the-art;
- The applicant has identified risks and challenges of the technology, regulatory and financial aspects of the proposal including possible mitigation strategies, and has shown the impact that EERE funding and the proposed project would have on the relevant field and application;
- The applicant has built a team with the qualifications, experience, capabilities, access to relevant data and other resources necessary to complete the proposed project and address the specific FOA Topic Area requirements; and
- The proposed work, if successfully accomplished, would clearly meet the objectives as stated in the FOA.

Full Applications

The Full Application includes:

- **Technical Volume:** The key technical submission - info relating to the technical content, project team members, etc.
- **SF-424 Application for Federal Assistance:** The formal application signed by the authorized representative of the applicant.
- **Budget Justification workbook:** a detailed budget and spend plan for the project, including a subrecipient budget if applicable.
- **Summary Slide**
- **Summary for Public Release**
- **Letters of Commitment**
- **R&D Community Benefits Plan and Budget Justification**
- **Resumes**
- **Administrative Documents:** FFRDC Work Proposal and Authorization (if applicable), Disclosure of Lobbying Activities, Foreign Waiver(s) (if applicable), Transparency of Foreign Connections, Current and Pending Support, Potentially Duplicative Funding Notice, Locations of Work

Full Applications: Technical Volume Content

This is the key technical component of the Full Application

- Topic 1: 15 pages maximum
- Topic 2: 20 pages maximum

| Content of Technical Volume | Suggested % of Technical Volume |
|---|--|
| Cover Page | |
| Project Overview | 10% |
| Technical Description, Innovation and Impact | 30% |
| Workplan (A detailed SOPO will be requested separately at the negotiation stage.) | 40% |
| Technical Qualifications and Resources | 20% |

Optional template for the Technical Volume is available on EERE Exchange.

Full Application Eligibility Requirements

- Applicants must submit a Full Application by 11/28/2023
- Full Applications are eligible for review if:
 - The Applicant submitted an eligible Concept Paper;
 - The Applicant is an eligible entity **Section IV.A of FOA**;
 - The Cost Share requirement is satisfied **Section IV.B of FOA**;
 - The Full Application is compliant **Section IV.C of FOA**;
 - The proposed project is responsive to the **Section IV.D** of FOA; and
 - The Full Application meets any other eligibility requirements listed in **Section IV of the FOA**.

Merit Review and Selection Process (Full Applications)

- The Merit Review process consists of multiple phases that each include an eligibility review and a thorough technical review
- Rigorous technical reviews are conducted by reviewers that are experts in the subject matter of the FOA
- Ultimately, the Selection Official considers the recommendations of the reviewers, along with other considerations such as program policy factors, to make the selection decisions

Technical Merit Review Criteria – FOA Section VI.A.ii

| Criteria | Weighting |
|--|-----------|
| <p>Criterion 1: Technical Merit, Innovation, and Impact</p> <ul style="list-style-type: none"> • Technical Merit and Innovation • Impact of Technology Advancement | 35% |
| <p>Criterion 2: Workplan Quality and Likelihood of Completion of Stated Goals</p> <ul style="list-style-type: none"> • Research Approach and Workplan • Identification of Technical Risks • Baseline, Metrics, and Deliverables • Market Impact Plan • Project Management | 35% |
| <p>Criterion 3: Team and Resources</p> | 15% |
| <p>Criterion 4: R&D Community Benefits Plan</p> <ul style="list-style-type: none"> • Diversity, Equity, Inclusion, and Accessibility • Energy Equity • Workforce Implications | 15% |

Replies to Reviewer Comments

- EERE provides applicants with reviewer comments
- Applicants have a brief opportunity to prepare a short Reply to Reviewer Comments (Reply).
- Applicants are not required to submit a Reply - it is optional
- To be considered by EERE, a Reply must be submitted by 01/16/2024 and submitted through EERE eXCHANGE
- Content and Form of the Reply:
 - The Reply must not exceed three pages. If a Reply is more than three pages in length, DOE will review only the first three pages and disregard additional pages.
 - Applicants may use the Reply to respond to one or more comments or to supplement their Full Application.
 - The Reply may include text, graphs, charts, or data.

Please see **Sections V.F. and VI.A.iii** for information on Replies to Reviewer Comments

Pre-Selection Interviews

- EERE may invite one or more applicants to participate in Pre-Selection Interviews
- All interviews will be conducted in the same format
- EERE will not reimburse applicants for travel and other expenses relating to the Pre-Selection Interviews, nor will these costs be eligible for reimbursement as pre-award costs
- Participation in Pre-Selection Interviews with EERE does not signify that applicants have been selected for award negotiations

Selection Factors

The Selection Official may consider the merit review recommendation, program policy factors, and the amount of funds available in arriving at selections for this FOA

Program Policy Factors – FOA Section VI.D.i

The Selection Official may consider the following program policy factors in determining which Full Applications to select for award negotiations:

- The degree to which the proposed project exhibits technological diversity when compared to the existing DOE project portfolio and other projects selected from the subject FOA;
- The degree to which the proposed project, including proposed cost share, optimizes the use of available DOE funding to achieve programmatic objectives;
- The level of industry involvement and demonstrated ability to accelerate demonstration and commercialization and overcome key market barriers;
- The degree to which the proposed project is likely to lead to increased high-quality employment and manufacturing in the United States ;
- The degree to which the proposed project will accelerate transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty;
- The degree to which the proposed project, or group of projects, represent a desired geographic distribution (considering past awards and current applications);
- The degree to which the proposed project incorporates applicant or team members from Minority Serving Institutions (e.g., Historically Black Colleges and Universities (HBCUs)/Other Minority Institutions); and partnerships with Minority Business Enterprises, minority-owned businesses, woman-owned businesses, veteran-owned businesses, or Indian tribes;
- The degree to which the proposed project, when compared to the existing DOE project portfolio and other projects to be selected from the subject FOA, contributes to the total portfolio meeting the goals reflected in the R&D Community Benefits Plan criteria;
- The degree to which the proposed project will employ procurement of U.S. iron, steel, manufactured products, and construction materials;
- The degree to which the proposed project enables recovery and/or reduced use of critical materials;
- The degree to which the project’s solution or strategy will maximize deployment or replication.

Registration Requirements

- To apply to this FOA, Applicants must submit application materials through EERE eXCHANGE: <https://eere-Exchange.energy.gov/>
- Obtain a “control number” at least 24 hours before the first submission deadline.
- Although not required to submit an Application, the following registrations must be complete to received an award under this FOA:

| Registration Requirement | Website |
|--------------------------|---|
| SAM | https://www.sam.gov |
| FedConnect | https://www.fedconnect.net |
| Grants.gov | http://www.grants.gov |

Means of Submission

- Letters of Intent, Concept Papers, Full Applications, and Replies to Reviewer Comments must be submitted through EERE eXCHANGE at <https://eere-eXCHANGE.energy.gov>
 - EERE will not review or consider applications submitted through other means
- The Users' Guide for Applying to the Department of Energy EERE Funding Opportunity Announcements can be found at <https://eere-eXCHANGE.energy.gov/Manuals.aspx>

Applicant Points-of-Contact

- Applicants must designate primary and backup points-of-contact in EERE eXCHANGE with whom EERE will communicate to conduct award negotiations
- It is imperative that the Applicant/Selectee be responsive during award negotiations and meet negotiation deadlines
 - Failure to do so may result in cancellation of further award negotiations and rescission of the Selection

Key Submission Points

- EERE strongly encourages Applicants to submit 1-2 days prior to the deadline to allow for full upload of application documents and to avoid any potential technical glitches with EERE eXCHANGE
- Check entries in EERE eXCHANGE
 - Submissions could be deemed ineligible due to an incorrect entry
- 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
- For your records, print out the EERE eXCHANGE page at each step, which contains the application's Control Number

Questions

- Questions about this FOA? Email PVRD@ee.doe.gov
 - All Q&As related to this FOA will be posted on EERE eXCHANGE
 - You must select this specific FOA Number in order to view the Q&As
 - EERE will attempt to respond to a question within 3 business days, unless a similar Q&A has already been posted on the website
- Problems logging into EERE eXCHANGE or uploading and submitting application documents with EERE eXCHANGE? Email EERE-eXCHANGESupport@hq.doe.gov.
 - Include FOA name and number in subject line