FINANCIAL ASSISTANCE
FUNDING OPPORTUNITY ANNOUNCEMENT (FOA)

U. S. Department of Energy

Idaho Operations Office

Silicon Carbide Cladding Development

Funding Opportunity Number: DE-FOA-0002662

Announcement Type: Initial

CFDA Number: 81.121

FOA Issue Date: December 17, 2021

Letter of Intent Due Date: January 7, 2022

Questions Due Date: January 27, 2022

Application Due Date: February 11, 2022

Registration Requirements

There are several one-time actions you must complete in order to submit an application in response to this funding opportunity announcement (FOA) (e.g., obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number, register with the System for Award Management (SAM)). Applicants, who must obtain a DUNS number and/or who are not registered with SAM should allow at least 30 days to complete these requirements. It is suggested that the process be started as soon as possible.

NOTE: There a few requirements each applicant must accomplish before submitting their application package is sent to DOE:

- Applicants must obtain a DUNS number. DUNS website: https://www.dnb.com/duns-number/get-a-duns.html/
- Applicants must register with the SAM. SAM website: http://www.sam.gov. If you had an active registration in the Central Contractor Registration (CCR) system, you should have an active registration in SAM. More information about SAM registration for applicants is found at: https://www.sam.gov/SAM/pages/public/loginFAQ.jsf
- Applicants must disclose foreign government ownership interests. This disclosure shall include foreign government ownership at any level in the corporate structure. Applicants with no foreign (non-U.S.) government ownership at any level in the corporate structure shall affirmatively indicate the same.

FOA Questions

Prospective Offerors are requested to submit written questions concerning the solicitation via the applicant's FedConnect account (www.fedconnect.net). Since application packages are due within 60 days of FOA issuance, all proposal questions are due no later than 30 days after date of FOA issuance. Answers will be posted through the FedConnect portal within a few days after question submittal. Offerors are encouraged to periodically check FedConnect to ascertain the status of any answers to questions. Telephonic questions shall not be answered. Questions must clearly specify the FOA areas (section, page, etc.) to which they refer.

The Government will furnish responses to all questions from interested Offerors via their FedConnect account.

Any required FOA changes resulting from submitted questions will be incorporated into the FOA via written addendum. No changes to the solicitation are to be assumed; they must be incorporated by written amendment to the solicitation to be applicable.

Application Preparation and Submission

Instructions are provided in Section IV of this FOA.

Review of Risk Posed and Responsibility Determination

Applicants selected for negotiation will be subject to a review of risk posed and responsibility determination in accordance with 2 CFR Part 200.205 and DOE's Guide to Financial Assistance located at: https://www.energy.gov/management/downloads/department-energy-guide-financial-assistance

This process may involve a review of the applicant's and sub-recipient's business management systems (i.e., accounting, financial, procurement, property, etc.) and a review of financial statements. Other information may be requested to support this review and determination based on the amount of previous experience the applicant and sub-recipient have in successfully performing other Federal awards.

Section I - FUNDING OPPORTUNITY DESCRIPTION

DESCRIPTION

The U.S. Department of Energy (DOE) Office of Nuclear Energy (NE) sponsors a program focused on supporting commercialization activities of U.S. nuclear fuels to enhance the accident tolerance of light water reactor (LWR) fuel in severe accident situations. A goal of the program, named Accident Tolerant Fuel (ATF) program, is to assist U.S. commercial implementation of advanced LWR fuel concepts in the mid-2020s time-period, and for which several concepts, identified as Coated Cladding concept, are already being pursued.

Applications are invited to provide a proposed five-year project that supports the objective of achieving a continuation of the silicon carbide ceramic matrix composite fuel cladding development concept for use in commercial U.S. LWR reactors.

Funding for the cooperative agreement awarded under this FOA is subject to Congressional appropriations. The cooperative agreement will be awarded in accordance with Title 2 of the Code of Federal Regulations, Chapter II Subchapter H, Part 200 (2 CFR Part 200) and Title 2 of the Code of Federal Regulations, Chapter II Subchapter H, Part 910 (2 CFR Part 910).

BACKGROUND

In the 2012 Consolidated Appropriations Act, Congress appropriated funds to DOE for the research and development of advanced ATF in response to the incident that occurred at the Fukushima Daiichi Nuclear Power Plant in Japan following the March 2011 earthquake and tsunami. The Fukushima Daiichi incident, along with progress in the development of advanced materials, provided the impetus to improve nuclear fuel performance and safety, thereby mitigating the effects of a severe accident. To support the research and development of advanced ATF, NE, under 2012 guidance, initiated an industry-oriented program to accelerate improvements to LWR fuel performance and safety.

The goal of this ATF development effort is to have one or more LWR advanced fuel concepts in commercial implementation in the late 2020's time period. Toward that end several concepts are being pursued that involve either coating on existing LWR clad material or a new non-metallic type of cladding. The silicon carbide ceramic matrix clad concept is an example of the latter.

The operational constraint on all ATF concepts is that they fit geometrically into existing LWRs, and, in comparison with standard LWR fuel, should be able to tolerate loss of active cooling in a severe accident for a considerably longer time period, and maintain or improve fuel performance during normal operations. Because of its non-metallic nature, silicon carbide ceramic matrix composite fuel cladding has a potential to tolerate higher accident transient temperatures with lower hydrogen production in the severe accident situation and thereby meet desired ATF safety enhancements. However, silicon carbide ceramic matrix composite fuel cladding has significant manufacturing development hurdles that must also be addressed.

The result of the ATF development activities, if successful, will be one or more commercial products that is utilized in existing and future nuclear power plants. While the end user of the new technology will be the nuclear industry, the Government has a major role in facilitating the initial research, development, and deployment (RD&D) to support the effort, because the effort is primarily focused on continued use of clean energy technology with enhanced safety that is in the public's interest.

STATEMENT OF OBJECTIVES

This solicitation provides further support for the development of silicon carbide ceramic matrix composite fuel cladding for LWRs that will support the ATF Program effort of deploying advanced fuel concepts in the U.S to improve nuclear fuel performance and safety, thereby mitigating the effects of a severe accident.

Critical Objectives for this five-year award are:

- For each budget period, describe the progress and results of R&D as compared to the Project Management Plan, what conclusions could be reached, and the remaining steps necessary to complete the development and qualification for silicon carbide ceramic matrix composite fuel cladding. Include any updates to go/no go decisions. Also include any significant changes in approach resulting from research and testing results.

- Generation of sufficient scientific, technical, and economic data proving that the proposed silicon carbide ceramic matrix composite fuel cladding concept is feasible. Data generated must make a compelling case that the silicon carbide ceramic matrix composite fuel cladding concept shows promise of improving the performance of nuclear fuel in accidents and has both regulatory and commercial viability.

- Fabrication of silicon carbide ceramic matrix composite fuel cladding fueled rodlets for irradiation testing. Fabrication of test rodlets is critical to assessing the maturity of the technology. It will also ensure that the silicon carbide ceramic matrix composite fuel cladding is ready for materials testing in a LWR environment.

PROJECT DELIVERABLES AND MEETINGS

As the first task in the Statement of Objectives, the successful applicant will revise the version of the Project Management Plan that is submitted with their applications by including any new details, if necessary, from the negotiation process. All deliverables will be described in this plan. This Project Management Plan will be updated each budget period by the Recipient as the project progresses.

The recipient shall attend semi-annual program review meetings to report progress. Each meeting can be held in person or via webinar. A presentation should be prepared by the recipient to support the project review and should include a high-level summary on the current status of the project.

Section II - AWARD INFORMATION

A. TYPE OF AWARD INSTRUMENT

DOE will award one cooperative agreement under this FOA. The prime recipient may partner with DOE National Laboratories, universities, non-profit organizations, and for-profit organizations.

B. ESTIMATED FUNDING

Contingent upon the availability of funds appropriated by Congress, DOE expects to make available up to $45,000,000 of federal funding over a period of five years for a new single award under this FOA. Therefore, should further congressional guidance occur with the same development goal, DOE may add such additional funding to this multiyear award as directed.

C. MAXIMUM AND MINIMUM AWARD SIZE

The maximum total amount of government funds for an award made under this announcement is $45,000,000. The maximum amount of government funds for the first year is $15,000,000. After the first year, funding will be contingent on future Congressional appropriation. The award will also require a minimum of 20% cost share from the recipient. Cost share requirements are described further in Section III of this FOA.

Floor (i.e., the minimum amount for an individual award made under this announcement): None

D. EXPECTED NUMBER OF AWARDS

DOE anticipates making one award under this FOA.

E. PERIOD OF PERFORMANCE

DOE anticipates making an award for an estimated project period up to five years, consisting of five one-year budget periods, with an anticipated start date in May, 2022. Applicants may propose project periods less than five years. Performance beyond the award base year is contingent on future appropriation, an evaluation of satisfactory progress during the base year, and DOE's approval of the yearly continuation application.

F. TYPE OF APPLICATION

DOE will accept only new applications under this announcement. Only one award will be made to the winning applicant.

Section III - ELIGIBILITY INFORMATION

A. ELIGIBLE APPLICANTS

All U.S. entities are eligible for award with the exception of Federally Funded Research and Development Centers (FFRDCs). This financial assistance award is a “covered program” (as defined in 2 CFR 910.124(b)) and must be accomplished in the economic interest of the United States as stated in 2 CFR 910.124. Eligible entities include, but are not limited to, teams, consortia, or other partnership arrangements.

FFRDCs are not eligible to participate as a prime applicant. This restriction does not apply to these entities to become sub-recipients, sub-awardees, vendors, or team members of the prime/lead applicant.

B. OTHER ELIGIBILITY REQUIREMENTS

FFRDC/National Laboratories

FFRDC contractors may be proposed as a team member subject to the following guidelines:

- Authorization for non-DOE/NNSA FFRDCs. 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 authority under its award and must not place the FFRDC contractor in direct competition with the private sector.

- Authorization for DOE/NNSA FFRDCs. The cognizant contracting officer for the FFRDC must authorize in writing the use of a DOE/NNSA FFRDC contractor on the proposed project and this authorization must be submitted with the application. The following wording is acceptable for this authorization.

  "Authorization is granted for the [Name] Laboratory to participate in the proposed project. The work proposed for the laboratory is consistent with or complimentary to the missions of the laboratory, will not adversely impact execution of the DOE/NNSA assigned programs at the laboratory, and will not place the laboratory in direct competition with the domestic private sector."

- Value/Funding. The value of, and funding for, the FFRDC contractor portion of the work will not be included in the award amount to a successful applicant. DOE/NNSA will fund a DOE/NNSA FFRDC contractor through the DOE field work proposal system and other FFRDC contractors through an interagency agreement with the sponsoring agency.

- Cost-share. The applicant's cost-share requirement will be based on the total cost of

the project, this includes the applicant's and the FFRDC contractor's portions of the effort.

- Scope of Work. The scope of work to be performed by the FFRDC contractor should not be more significant than the scope of work to be performed by the applicant.

- 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.

C. COST SHARING

The cost share must be at least 20% of the total allowable costs for research and development projects and must come from non-Federal sources unless otherwise allowed by law. See 2 CFR part 200 and 2 CFR part 910 [DOE Financial Assistance Regulations] for the applicable cost sharing requirements. See also Part VIII.F of this FOA, 2 CFR 200.306, and 2 CFR 910.130 for specific information on cost sharing requirements.

DOE will not reimburse an applicant at a higher cost share portion in the beginning budget periods of the project with the condition that the applicant catches up its proposed cost share contribution in later budget periods. Also, applicants shall provide the minimum, or higher if proposed, cost share amount throughout the term of the award. For each invoice submitted to DOE for payment the awardee will be required to pay at least 20% of the total invoice cost.

D. QUESTIONS REGARDING ELIGIBILITY

Questions **regarding eligibility** should be directed to the Agency contact identified in Section VII.B.

Section IV - APPLICATION AND SUBMISSION INFORMATION

A. CONTENT AND APPLICATION FORMS

Application forms and instructions are available at grants.gov. To access these materials, go to http://www.grants.gov, select "FORMS" and then select "R&R Family." The approved OPM forms for submitting application packages are provided on this web page within the grants.gov website. All forms listed in the below table can be found on the grants.gov website.

B. LETTER OF INTENT

Applicants are required to submit a letter of intent by January 7, 2022. This letter should include the name of the applicant, the title of the project, the name of the Project Director/Principal Investigator(s), estimated project cost, and a one-page abstract. The required letters of intent will be used by DOE to organize and expedite the merit review selection process. The letter of intent should be sent by email to silicon-carbide-project@id.doe.gov. In the subject line type: Letter of Intent for DE-FOA-0002662.

C. APPLICATION PROCESS

DOE performs an initial eligibility review of applicant submissions to determine whether they meet the eligibility requirements of Section III of the FOA. **DOE will not review or consider submissions that do not meet the eligibility requirements of Section III.**

Document Format Requirements

All submissions must conform to the following form and content requirements, including maximum page lengths (described below) and must be submitted as specifically stated. DOE will not review or consider submissions submitted through means other than specifically stated in the FOA and will not review or consider any incomplete submissions.

Applications must conform to the following requirements:

- Each document must be submitted in Adobe PDF format, except for spreadsheets.
- All spreadsheets are to be created in a Microsoft Excel file format. Do **NOT** lock any cells in the spreadsheet.
- Each document must be written in English.
- All non-budget documentation (use templates where provided) is to be prepared using standard 8.5" by 11" paper with 1" margins (top, bottom, left, right), using a font size no smaller than Times New Roman 11 point. Each submission must not exceed the specified maximum page limit, including cover page, charts, graphs, maps, and photographs when printed using the formatting requirements set forth above and single spaced. If applicants exceed the maximum page lengths indicated below, **DOE will review only the authorized number of pages and disregard any additional pages.**

Applicants must submit an application to be considered for funding under this FOA. Applicants must complete all mandatory forms and any applicable optional forms (e.g., SF-LLL- Disclosure

of Lobbying Activities) in accordance with the instructions on the forms and the additional instructions below. Files must be in Adobe Portable Document Format (PDF) unless otherwise specified in this announcement.

DOE will not review or consider incomplete or noncompliant applications. Additionally, evaluators will not review pages above the specified page limit.

Each application shall be limited to a single technology, specifically silicon carbide ceramic matrix composite fuel cladding for use in existing commercial U.S. LWRs. Unrelated concepts and technologies shall not be consolidated in the application. Applications that propose other concepts in addition to silicon carbide ceramic matrix composite fuel cladding may be deemed ineligible and eliminated from full merit review.

Applications must conform to the following requirements:

	Name of Document	**Format**	**Required From**
1	SF 424 (R&R) (Application)	Form	Lead Applicant
2	Research and Related Other Project Information	Form	Lead Applicant
2a	Project Summary/Abstract **(1 page limit)**	PDF	Lead Applicant
2b	Project Narrative File **(30 page limit)**	PDF	Lead Applicant
2c	Other Attachments	PDF	Lead Applicant
3	Project Management Plan **(20 page limit)**	PDF	Lead Applicant
4	Resume / Vitae – Technical Expertise and Qualifications (**2 page limit each**)	PDF	All leads and collaborators
5	Benefit of Collaborations (**4 page limit**)	PDF	Lead Applicant
6	Capabilities (**5 page limit**)	PDF	Lead Applicant
7	Research & Related Budget (total Fed + Non-Fed	Form	Lead Applicant and Sub-recipient
7a	R&R Subaward (Total Fed + Non-Fed) Attachment Form	Form	Lead Applicant and Sub-Recipients
8	Budget Justification	PDF	Lead Applicants and Collaborators
9	Current and Pending Support (**5-page limit**)	PDF	Lead Applicants and Collaborators
10	Project/Performance Site Location(s)	PDF	All sites performing work
11	SF-LLL Disclosure of Lobbying Activities (if applicable)	PDF	Lead Applicant
12	Conflict of Interest Acknowledgement	PDF	Affirmed by Lead Applicant for all Participants
13	Waiver Requests: Performance of Work in the United States (if applicable)	PDF	Lead Applicant

	Name of Document	Format	Required From
14	Past Performance	PDF	Lead Applicant and Collaborators
15	Foreign Government Ownership Disclosure (if applicable)	PDF	Lead Applicant and Collaborators
16	Certifications and Assurances	PDF	Lead Applicant
17	Budget for DOE/NNSA FFRDC Contractor (if applicable)	Form	Collaborators

Note: Documents listed with a "Form" format must be downloaded from the Grants.gov website. All PDF documents are created in a Word Format and saved as a PDF document.

Note: The maximum file size that can be sent through the @id.doe.gov web server is 45MB. This is the largest email with all attachments that can pass through the web server. This includes any attached zip files. The server will count the compressed and un-compressed zip file sizes as part of the 45MB limit. If required, send more than one email with attachments in order to submit your application package through the web server. Webservers have restrictions on file names. In order to email zip files, name the file "*file_name*.doe.zip".

DOE will not accept late submissions that resulted from technical difficulties due to exceeding the 45MB e-mail limitation.

Detailed guidance on the content and form of each application component is listed below.

1. **SF 424 (R&R)**

   This is the cover page for application for Federal Assistance. Complete this form first to populate data in other forms. Complete all the required fields in accordance with the pop-up instructions on the form.

2. **RESEARCH AND RELATED OTHER PROJECT INFORMATION FORM**

   Complete questions 1 through 6 and then attach files as described below. The files must comply with the following instructions:

   a. Project Summary/Abstract (Field 7 on the Form)

      The project summary/abstract must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained document that identifies the name of the applicant, the project manager(s), the project title, the objectives of the project, a description of the project, including methods to be employed, the potential impact of the project (i.e., benefits, outcomes), and major participants (for collaborative projects). This document must not include any proprietary or sensitive business information as DOE may make it available to the public. The project summary must not exceed one (1) page when printed using

standard 8.5” by 11” paper with 1” margins (top, bottom, left and right) single-spaced with font no smaller than 11 point. Save this information in a file named “Summary.pdf,” and click on “Add Optional Other Attachment” to attach.

b. Project Narrative File (Field 8 on the Form)

The project narrative must include:

1) Narrative Cover Page which must indicate:

   a) The name and type of organization;
   b) The FOA number;
   c) The project title;
   d) The technical and business points of contact for the applicant, denoting the names, titles, addresses, telephone and facsimile numbers, and electronic mail addresses (see Attachment C: Point of Contact Sheet);
   e) Project Manager’s name, telephone number, facsimile number, e-mail address, and organization name/unit; and
   f) Names of team/partnership/consortium members and funding split;

2) Project Objectives. This section should provide a clear, concise statement of the specific objectives/aims of the proposed project and a concise description on the proposed project.

3) Merit Review Criterion and Program Policy Selection Factors Discussion: This section should be formatted to address each of the merit review criterion and sub-criterion listed in Section V.A, as well as each Program Policy Selection Factors. In addressing the merit review criterion and sub-criterion, applicants are encouraged to reference any correlation between the responses provided under this item and the responses provided for other information requests, including Technical Concept Descriptions (item 4 below) and applicable elements of the technical description as discussed below. Applicants shall provide enough information so that reviewers will be able to evaluate the application in accordance with these merit review criteria and program policy factors. DOE WILL EVALUATE AND CONSIDER ONLY THOSE APPLICATIONS THAT ADDRESS SEPARATELY EACH OF THE MERIT REVIEW CRITERION AND SUB-CRITERION AND PROGRAM POLICY FACTORS.

4) Technical Concept Description: After the 2011 Fukushima accident, in response to Congressional guidance, the U.S. Department of Energy's Office of Nuclear Energy has an active Accident Tolerant Fuel (ATF) program supporting development and commercialization of advanced LWR fuel. The goal of this ATF development effort is to have one or more LWR advanced fuel concepts in commercial implementation. Toward that end several concepts are being pursued that involve either coating on existing LWR clad material or a new non-metallic

type of cladding. The silicon carbide ceramic matrix composite fuel cladding concept is an example of the latter.

The operational constraint on all ATF concepts is that they fit geometrically into existing LWRs, and, in comparison with standard LWR fuel, should be able to tolerate loss of active cooling in a severe accident for a considerably longer time period than existing LWR clad concepts, and maintain or improve fuel performance during normal operations. Because of its non-metallic nature silicon carbide ceramic matrix composite fuel cladding concept has a potential to tolerate higher accident transient temperatures with lower hydrogen production and thereby meet desired ATF safety enhancements. However, silicon carbide ceramic matrix composite fuel cladding has significant manufacturing and development hurdles that must also be addressed.

The objective of the ensuing award from this FOA is enhancement of the chances for this concept to be successful toward meeting the ATF program goal. The successful proposal to this FOA will contribute to affecting an earlier near-term fueled irradiation test of their silicon carbide ceramic matrix composite fuel cladding concept in an existing reactor than would be possible under existing program funding and plans. This fueled pin test objective is anticipated to be within the five-year project period.

The application should provide a clear description of how the proposed technical concept meets the ATF program goals.

5) Relevance and Outcomes/Impacts: Should explain the relevance of the project and expected outcomes and/or impacts. The justification for the proposed project should include a clear statement of the importance of the project in terms of the utility of the outcomes. The degree to which this R&D project would further the commercialization of silicon carbide ceramic matrix composite fuel cladding should also be described.

6) Roles of Participants and Key Personnel: Describe the roles and the work to be performed by each organization (including estimates of percentages of total project effort to be accomplished by each participant), business agreements between the applicant and participants, and how the various efforts will be integrated and managed. This will include identification of work to be accomplished by National Laboratories and indication of which National Laboratories will be used, if applicable.

7) If applicable, Multiple Principal Investigators (PI): The applicant, whether a single organization or team/partnership/consortium, must indicate if the project will include multiple PIs. While the Department of Energy's preference is to have only one PI specified, this decision is solely the responsibility of the applicant; having multiple PIs specified will not affect the selection for award of applications submitted in response to this FOA.

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, at a minimum, will include:

a. process for making decisions on scientific/technical direction;
b. publications;
c. intellectual property issues;
d. communication plans;
e. procedures for resolving conflicts; and
f. PIs' roles and administrative, technical, and scientific responsibilities for the project.

8) Facilities and Other Resources: Identify the facilities and resources (e.g., office, laboratory, computer, testing, etc.) to be used at each performance site listed and, if appropriate, indicate capacities, pertinent capabilities, relative proximity, and extent of availability to the project. Describe only those resources that are directly applicable to the proposed work.

9) Equipment: List critical items of equipment (e.g., items involved in key test programs or important long-lead procurements) required for successful completion of this project and identify whether the item of equipment is already available or proposed for acquisition, the pertinent capabilities of each, the location of available equipment and the estimated acquisition cost of equipment proposed for acquisition.

10) Biographical Sketch Appendix: Provide a biographical sketch for the project director/principal investigator (PD/PI) and each senior/key person listed in Section A on the R&R Budget form. Provide the biographical sketch information as an appendix to your project narrative. Do not attach a separate file. The biographical sketch appendix will not count in the project narrative page limitation. The biographical information for each person must not exceed 2 pages when printed on 8.5" by 11" paper with 1-inch margins (top, bottom, left, and right) with font not smaller than 11 point and must include:

a) Education and Training: Undergraduate, graduate, and postdoctoral training as applicable. Provide institution, major/area, degree, and year of graduation.
b) Research and Professional Experience: Beginning with the current position list, in chronological order, professional/academic positions with a brief description.
c) Publications: If applicable, provide a list of up to 10 publications 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. Patents, copyrights, and software systems developed may be provided in addition to or substituted for publications.

d) Synergistic Activities: List no more than five professional and scholarly activities related to the effort proposed.

11) Statement of Project Objectives: The project narrative must contain a single, detailed Statement of Project Objectives (SOPO) that addresses how the near-term, short-term, and project objectives will be met. The SOPO must contain a clear, concise description of all activities to be completed during project performance and follow the structure discussed below. The SOPO may be released to the public by DOE in whole or in part at any time. It is therefore required that it shall not contain proprietary or confidential business information.

Applicants shall prepare the SOPO in the following format:

TITLE OF WORK TO BE PERFORMED
(Insert the title of work to be performed. Be concise and descriptive.)

A. OBJECTIVES
Include one paragraph on the overall objective(s) of the work.

B. SCOPE OF WORK
This section should not exceed one-half page and should summarize the effort and approach to achieve the objective(s) of the work.

C. TASKS TO BE PERFORMED
Tasks, concisely written, should be provided in a logical sequence and should be divided into the project phases, as appropriate. This section should provide a brief summary of the planned approach to this project.

D. DELIVERABLES
The periodic, topical, and final reports shall be submitted in accordance with the attached Appendix A, "Federal Assistance Reporting Checklist," and the instructions accompanying the checklist.

[Note: The Recipient shall provide a list of deliverables other than those identified on the "Federal Assistance Reporting Checklist" that will be delivered, including the expected delivery dates. These reports shall also be identified within the text of the Statement of Project Objectives.] See the following examples:

1. Task 1.1 - (Report Description)
2. Task 2.2 - (Report Description)

c. Other Attachments (Field 12 on the Research and Related Other Project Information

Form)

1) Should you need to elaborate on your responses to question 1-6 on the "Other Project Information" document, attach the additional document(s) to Field 12.

2) Conflict of Interest Statement (Required for National Laboratories, DOE and NON-DOE FFRDCS Applicants and Sub-Applicants).

Conflicts of interest may exist due to previous efforts performed by the Labs or assistance provided in program direction and other mission related activities. Accordingly, for each applicant or (or sub-applicant) that is a National Laboratory or DOE and/or Non-DOE FFRDCs, identify any potential conflicts of interest, fully explain the conflict, whether you feel it is significant or not, along with your rationale, and if significant, how you will avoid, neutralize, or mitigate the potential conflict. If applicable attach the conflict-of-interest document to Field 12.

3. PROJECT MANAGEMENT PLAN:

This plan should be formatted to include the following sections with each section to include the information as described below:

a. Executive Summary: Provide a description of the project that includes the objective, project goals, and expected results. For purposes of the application, this information is included in the Project Narrative (Field 8) and should be copied to this document for completeness, so that the Project Management Plan is a stand-alone document.

b. Risk Management: Provide a summary description of the proposed approach to identify, analyze, and respond to perceived risks associated with the proposed project. Project risk events are uncertain future events that, if realized, impact the success of the project. As a minimum, include the initial identification of significant technical, resource, and management issues that have the potential to impede project progress and strategies to minimize impacts from those issues.

c. Milestone Log: Provide milestones for each budget period (or phase) of the project. Each milestone should include a title and planned completion date. Milestones should be quantitative and show progress toward budget period and/or project goals.

   [Note: During project performance, the Recipient will report the Milestone Status as part of the required quarterly Progress Report as prescribed under Attachment 4, Reporting Requirements Checklist. The Milestone Status will present actual performance in comparison with Milestone Log, and include:

   (1) the actual status and progress of the project,
   (2) specific progress made toward achieving the project's milestones, and,
   (3) any proposed changes in the project's schedule required to complete milestones.

d. Funding and Costing Profile: Provide a table (the Project Funding Profile) that shows,

by budget period, the amount of government funding going to each project team member. Also provide a table (the Project Costing Profile) that projects, by month, the expenditure of government funds for the first budget period, at a minimum.

e. Project Timeline: Provide a timeline of the project (similar to a Gantt chart) broken down by each task and subtask, as described in the Statement of Project Objectives. The timeline should include for each task, a start date, and end date. The timeline should show interdependencies between tasks and include the milestones that are identified in the Milestone Log (Section C).

f. Success Criteria at Decision Points: Provide success criteria for each decision point in the project, including go/no-go decision points and the conclusions of budget periods and the entire project. The success criteria should be objective and stated in terms of specific, measurable, and repeatable data. Usually, the success criteria pertain to desirable outcomes, results, and observations from the project.

   [**Note:** As the first task in the Statement of Project Objectives, successful applicants will revise the version of the Project Management Plan that is submitted with their applications by including details from the negotiation process. This Project Management Plan will be updated by the Recipient as the project progresses, and the Recipient must use this plan to report schedule and budget variances.]

   Save this plan in a single file named "pmp.pdf" and click on "Add Attachments" in Field 12 to attach.

4. RESUME / VITAE-TECHNICAL EXPERTISE AND QUALIFICATIONS

Applicant shall name all teaming partners by name and organization, as well as their proposed roles and responsibilities. For collaborators (including senior key person) who will contribute in a substantial, measurable way to the project (including for subrecipients and consultants), the applicant shall provide a brief vita that lists the following:

- Contact information.
- Education and Training: Provide institution, major/area, degree, and year for any undergraduate, graduate, and postdoctoral training.
- Research and Professional Experience: Beginning with the current position list, in chronological order, professional/academic positions with a brief description.
- Publications: Provide a list of up to 10 publications 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.
- Patents, copyrights, and software systems developed may be provided in addition to or substituted for publications.
- Synergistic Activities: List no more than five professional and scholarly activities related to the effort proposed.

Technical expertise and qualifications are to be provided for individual participants, whether the participant is receiving funding or not (including consultants or national laboratory personnel). All participants making a defined, material contribution that is critical to the success of the project must be listed on the online application. A separate resume/ vita for each individual collaborator must be uploaded to the application website.

5. BENEFIT OF COLLABORATORS

The applicant shall provide a narrative that includes an explanation of the contribution that will be made by the collaborating organizations and/or facilities to be utilized. Please indicate within this section if the application has benefit or influence on other ongoing or proposed NE R&D projects.

6. CAPABILITIES

Infrastructure Requirements: The applicant shall identify the infrastructure (e.g., facilities, equipment, instrumentation, and other resources) required to execute the proposed scope of work, including its location, availability, capabilities, and how it will be used in the project. Describe the non-labor (e.g., facilities, equipment, and instrumentation) resources that are available and accessible to the applicant and are required to execute the scope of work. Describe any unique equipment and facilities that are needed, are accessible, and will be used to execute the scope of work. Discuss the adequacy of these resources and identify any gaps and how these will be addressed.

This FOA allows the applicant to propose the purchase of any needed equipment to conduct the proposed work. If equipment purchases are proposed, describe comparable equipment, if any, already available and explain why it cannot be used.

Facilities & Other Resources: Describe the capability of the organizational resources, including subrecipient resources, available to perform the effort proposed. Identify the facilities to be used (Laboratory, Animal, Computer, Office, Clinical, and Other). If appropriate, indicate capacities, pertinent capabilities, relative proximity, and extent of availability to the project. Describe only those resources that are directly applicable to the proposed work. Describe other resources available to the project (e.g., machine shop, electronic shop) and the extent to which it would be available to the project.

Equipment Appendix: If applicable provide a list of major items or equipment already available for this project and, if appropriate, identify location and pertinent capabilities.

7. RESEARCH AND RELATED BUDGET (TOTAL FED + NONFED) FORM

The name of the form on Grants.gov is Research and Related Budget (Total Fed + Non-Fed). Complete the form in accordance with the instructions on the form (Activate Help Mode to see instructions) and the following instructions. You must complete a separate budget for

each year of support requested. The form will generate a cumulative budget for the total project period. You must complete all the mandatory information on the form before the NEXT PERIOD button is activated. You may request funds under any of the categories listed 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.H).

a. R&R SUBAWARD (Total Fed + non-Fed) ATTTACHMENT(s) FORM

Provide a separate cumulative R&R budget for each sub-recipient, other than a DOE National Laboratory or FFRDC contractors, expected to perform work estimated to be more than $250,000 or 50 percent of the total work effort (whichever is less). Use the same R&R budget (total Fed + Non-Fed) form (the same form the prime applicant uses) and e-mail the form to each subrecipient that is required to submit a separate budget. After the Sub-recipient has e-mailed its completed budget back, attach it to one of the blocks provided on the form. Use up to 10 letters of the sub-awardee's name as the file name.

8. BUDGET JUSTIFICATION DOCUMENT

Provide the required supporting information for the following costs: equipment; domestic and foreign travel; participant/trainees; material and supplies; publication; consultant services; ADP/computer services; subaward/consortium/contractual; equipment or facility rental/user fees; alterations and renovations; and indirect cost type. Provide any other information you wish to submit to justify your budget request. Attach a single budget justification document file for the entire project period in Field L. The file automatically carries over to each budget year. Therefore, only attach one budget justification document to cover all the award budget periods.

The budget is the financial plan for the proposed project. Following selection of applications for award consideration, but prior to award being made, DOE will perform a budget review to determine whether the proposed activities are supported by adequate resources in this plan, as well as to verify cost data, including that specific elements of the proposed budget are allowable, allocable, reasonable, and are consistently treated in accordance with generally accepted accounting principles and applicable cost principles. Both the applicant's budget, as well as all sub-recipient's budgets (over $250,000), will be reviewed from both a technical and cost perspective. This evaluation will provide a comparison between the budget and the project narrative. Sub-recipient budget justifications must also be submitted for sub-recipient proposed budgets over $250,000.

A budget review of sub-contractor costs will not be accomplished by DOE. However, prime award recipients will be required to explain how they determined sub-contractor costs to be fair and reasonable. The technical review will also include reviewing sub-contractor proposals and scope-of-works to determine if the proposed scope to be performed by the sub-contractor supports the award's overall project scope. All award amounts for sub-contracts will have a technical review of the proposed scope of work.

Please ensure the scope-of-work to be performed by sub-contractors is discussed in the project narrative.

In order to permit DOE to accomplish this budget review, and to ensure that the issuance of the award will not be delayed, the applicant must provide a budget justification, including supporting information. Provide the following for the budget justification:

1) General
   a) Applicant assessment of how the total project cost is reasonable for the effort.
   b) Applicant assurance that all costs proposed are:
      i) In accordance with any limitations, exclusions, or special conditions set forth in the FOA.
      ii) In accordance with generally accepted accounting principles and the applicable costs principles, as well as being allocable and allowable.
   c) Specify whether your proposed indirect rates have been audited and approved; include a copy of the audit or information on where the audit can be obtained by DOE.
   d) If the applicant is in a partnership or consortium, describe the relationships among each member and specify how this is included in the budget.

2) Personnel
   a) Identify individuals or positions, describe the different levels of personnel required (experience/skill/education, etc.), and state time commitment percentages for individuals and/or positions working on the forthcoming DOE award.
   b) State rates/compensation to be paid to individuals or positions. In the budget justification document explain how each labor rate(s) are established. Also explain how the labor rates were determined to be fair and reasonable.

3) Other Direct Costs.
   a) Travel. If travel is proposed, provide the following data on a Microsoft Excel spreadsheet:
      i. Identify the proposed trips; specify the purpose of the trip, as well as the number of people traveling on each trip, the number of days per trip, and an explanation of why the specified number of travelers is required for each trip.
      ii. Specify whether the travel costs proposed are consistent with the applicant's established travel policy; include a copy of the relevant portions of the travel policy or specify where DOE can access the travel policy.
      iii. Estimated airline cost and an explanation on how airline ticket cost was estimated for each trip. If business or first-class airfares are included, provide a complete justification for the additional cost.
      iv. Identify city pairs to include cities leaving from and destination cities.
      v. Federal travel regulation daily approved per diem rates for each destination city (travel day costs can't be higher than 75% of the destination city per diem rate)
      vi. Federal travel regulation daily incidental rates for each destination city
      vii. Federal travel regulation maximum hotel rates for each destination city

viii. If applicable, estimated car rental costs, estimated car fuel costs for each trip, estimated parking fees or other costs such as tolls
ix. If applicable, estimated train, taxi, or other transportation costs.

b) Equipment. For proposed equipment, provide the following:
   i. Explain the need for the equipment and clearly indicate the unit cost for each item to be purchased.
   ii. Explain how the cost estimates for equipment purchases are established and how the cost estimates were determined to be fair and reasonable.

c) Other direct costs. If any other direct costs are proposed, identify such costs and provide an explanation/justification for each cost, like what is required in paragraphs 3a and 3b above.

d) Sub-recipients. See section IV number 5 above for a discussion of sub-recipient budget justifications.

e) Sub-contractors. Describe the goods or services to be acquired and justify how the costs were determined fair and reasonable in accordance with the awardee's 2 CFR 200 Procurement Standards. Prime awardees must have a DOE approved procurement standard as outlined in 2CFR.200.317 thru 200.326. If the prime awardee does not possess an approved procurement standards document at time of award selection, the prime award recipient will be given time before the award is approved to create the procurement standard document. Award selection cannot be completed until the prime recipient's procurement standard document is submitted to DOE (the award administrator) and then reviewed and approved by DOE.

9. CURRENT AND PENDING SUPPORT

Provide a list of all current and pending support (both federal and non-federal) for the Project Director/Project Manager (PD/PM) and senior/key persons, including sub-recipients, for ongoing projects and pending applications. For each organization providing support, show the total award amount for the entire award period (including indirect costs) and the number of person-months per year to be devoted to the project by the senior/key person. Concurrent submission of an application to other organizations for simultaneous consideration will not prejudice its review.

10. PROJECT/PERFORMANCE SITE LOCATION(S)

Indicate the primary site where the work will be performed. If a portion of the project will be performed at any other site(s), identify the site location(s) in the blocks provided.

Note that the Project/Performance Site Congressional District is entered in the format of the 2-digit state code followed by a dash and a 3-digit Congressional district code, for example VA-001. Hover over this field for additional instructions.

Use the Next Site button to expand the form to add additional Project/Performance Site Locations.

11. DISCLOSURE OF LOBBYING ACTIVITIES (SF-LLL) FORM

If applicable, complete 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 cooperative agreement, you must complete and submit Standard Form - LLL, "Disclosure Form to Report Lobbying."

12. CONFLICT OF INTEREST ACKNOWLEDGEMENT

(Required for National Laboratories, DOE and NON-DOE FFRDC Applicants and Sub-Applicants).

Conflicts of interest may exist due to previous efforts performed by the Labs or assistance provided in program direction and other mission related activities. Accordingly, for each applicant or (or sub-applicant) that is a National Laboratory or DOE and/or Non-DOE FFRDCs, identify any potential conflicts of interest, fully explain the conflict, whether you feel it is significant or not, along with your rationale, and how you will avoid, neutralize, or mitigate the potential conflict.

13. WAIVER REQUEST: PERFORMANCE OF WORK IN THE UNITED STATES

All work under DOE funding agreements must be performed in the United States. This requirement does not apply to the purchase of supplies and equipment, so a waiver is not required for foreign purchases of these items. However, the Prime Recipient should make every effort to purchase supplies and equipment within the United States. There may be limited circumstances where it is in the interest of the project to perform a portion of the work outside the United States. To seek a waiver of the Performance of Work in the United States requirement, the applicant must submit an explicit waiver request in the Application. A separate waiver request must be submitted for each entity proposing performance of work outside of the United States.

Overall, a waiver request must demonstrate to the satisfaction of DOE that it would further the purposes of this FOA and is otherwise in the economic interests of the United States to perform work outside of the United States. A request to waive the *Performance of Work in the United States* requirement must include the following:

- The rationale for performing the work outside the U.S. (“foreign work”);
- A description of the work proposed to be performed outside the U.S.;
- An explanation as to how the foreign work is essential to the project;

- A description of the anticipated benefits to be realized by the proposed foreign work and the anticipated contributions to the US economy;
- The associated benefits to be realized and the contribution to the project from the foreign work;
- How the foreign work will benefit U.S. research, development and manufacturing, including contributions to employment in the U.S. and growth in new markets and jobs in the U.S.;
- How the foreign work will promote domestic American manufacturing of products and/or services;
- A description of the likelihood of Intellectual Property (IP) being created from the foreign work and the treatment of any such IP;
- The total estimated cost (DOE and recipient cost share) of the proposed foreign work;
- The countries in which the foreign work is proposed to be performed; and
- The name of the entity that would perform the foreign work.

DOE may require additional information before considering the waiver request. The applicant does not have the right to appeal DOE's decision concerning a waiver request.

14. PAST PERFORMANCE

Applicants must submit data on past performance that demonstrates the applicant team (not required for FFRDC/NL) has demonstrated successful experience/past performance, knowledge and understanding of the business and regulatory requirements for projects of similar size, scope and complexity in achieving project technical success within budget and on time with no significant safety and quality issues.

15. FOREIGN GOVERNMENT OWNERSHIP DISCLOSURE

Applicants must disclose to the DOE all foreign interest in applicant's company or corporation, as defined in this FOA. In this FOA, foreign interest is defined as: all *foreign government ownership, investment, interest, and/or influence*, as well as *foreign nongovernment public, private ownership, interest, and/or investment* in an applicant's company or corporation. Foreign interest applies at all levels of the corporate structure, including the executive and board levels, from parent (e.g., trust, holding company, corporation, etc.) to subsidiary, as well as ancillary levels, regardless of the applicant entity's place of incorporation and operation. Moreover, foreign interest includes, but is not limited to, political influence and participation in foreign talent recruitment programs. A foreign government is defined as a non-U.S. government. Applicants with no foreign interest, as defined in this FOA, shall certify to the DOE in writing that they have none.

16. CERTIFICATIONS AND ASSURANCES

Certifications and Assurances can be found on the DOE Financial Assistance Forms Page at https://www.energy.gov/management/downloads/certifications-and-assurances-use-sf-424

17. BUDGET FOR DOE/NNSA FFRDC CONTRACTOR

If a DOE/NNSA FFRDC/National Laboratory (NL) contractor is applying as a collaborator, it must provide a DOE Field Work Proposal (FWP), in accordance with the requirements in DOE Order 412.1A, Administrative (Admin) Change 1, Work Authorization System, dated May 21, 2014. Include an FFRDC budget justification, to include a breakdown of the cost categories and rationale regarding the necessity of the expenditures, as well as the basis of estimate for each of the budget cost categories (e.g. labor, travel, materials, etc.). Note that normally no justification is required for FFRDC rates (directs, indirects, and fee) as these are already pre-established on the FFRDC contract.

FWPs will be provided by the respective National Laboratory financial administrators. FFRDC/NL are permitted to propose costs in accordance with their established DOE contracts (e.g., overhead, fees, etc.).

D. SUBMISSIONS FROM SUCCESSFUL APPLICANTS

If selected for award, DOE/NNSA 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
- 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
- Commitment Letter from Third Parties Contributing to Cost Sharing, if applicable

E. SUBMISSION DATES AND TIMES

Applications must be received by February 11, 2022 no later than 8:00 PM Eastern Daylight Time in accordance with Section IV, paragraph I instructions. Applicants are encouraged to transmit applications well before the deadline. APPLICATIONS RECEIVED AFTER THE DEADLINE WILL NOT BE REVIEWED OR CONSIDERED FOR AWARD.

F. INTERGOVERNMENTAL REVIEW

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

G. 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.

Cost Principles. Costs must be allowable, allocable, and reasonable in accordance with the applicable Federal cost principles referenced in 2 CFR part 200 as amended by 2 CFR part 910 [DOE Financial Assistance Regulation]. The cost principles for commercial organization are set forth in FAR Part 31.

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, if the costs are allowable in accordance with the applicable Federal cost principles referenced in 2 CFR part 200 as amended by 2 CFR part 910 [DOE Financial Assistance Regulation]. Recipients must obtain the prior approval of the grants 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, the award is made for a lesser amount than the applicant expected, or if the DOE decides to cancel the award.

H. OTHER SUBMISSION AND REGISTRATION REQUIREMENTS

1. WHERE TO SUBMIT

APPLICATIONS MUST BE EMAILED TO THE DOE GRANTS SPECIALIST AT silicon-carbide-project@id.doe.gov on or before the application due date of February 11, 2022. See the second note in Section IV c for the MB size limit for submitting the application package as an email with attachments.

2. APPLICATION VALIDITY TIMEFRAME

Upon submitting an application in response to this FOA, applicants agree that their applications are valid for at least two years from the date set forth for receipt of applications to this FOA.

Section V - APPLICATION REVIEW INFORMATION

A. APPLICATION REVIEW CRITERIA

1. Initial Review Criteria

Prior to a comprehensive merit evaluation, DOE will perform an initial review to determine that (1) the applicant is eligible for an award; (2) the information required by the announcement has been submitted; (3) all mandatory requirements are satisfied; and (4) the proposed project is responsive to the objectives and stated goals of the FOA. If the application fails to meet these requirements, it may be deemed ineligible and eliminated from full merit review.

2. Merit Review Criteria

A merit review will be conducted in accordance with the following criteria. All applications that pass the initial review will be evaluated using an adjectival rating.

Criterion 1 – Technical approach and feasibility for silicon carbide ceramic matrix composite fuel cladding

DOE will evaluate the technical merit of the application that includes the potential for commercialization. This criterion will consider evaluation of the following:

a) The extent to which the application describes and plans for the technical and regulatory obstacles to be overcome for a successful commercial deployment of silicon carbide ceramic matrix composite fuel cladding.

b) DOE will also evaluate the technical approach for overcoming the obstacles to commercialization.

Criterion 2 – Proposed Project Management Plan

DOE will evaluate the planned approach in the application as described in the Project Management Plan.

Specifically, DOE will consider the following:

a) The degree to which the planned approach is logical, well planned, and likely to lead to eventual commercialization.

b) The degree to which risks are described, and how risks and contingency plans will be managed as the project proceeds.

Criterion 3 - Applicant Team Capabilities and Experience

DOE will evaluate the applicant's team capabilities and experience, including sub-recipients, vendors, subcontractors, and any other team members necessary to complete the scope of the project.

Specifically, DOE will consider the following:

a) The relevance and depth of the team's experience and capabilities, together with that of key personnel, will be evaluated as it relates to the likely successful completion of the project activities.
b) The availability of facilities, equipment, and other infrastructure in the U.S. necessary for completion of planned project activities.
c) The knowledge and experience of the team with the fabrication, testing, and requirements necessary for commercialization of silicon carbide ceramic matrix composite fuel cladding.

3. The selection official may also consider the following program policy factors in the selection process:

a) Extent of industry cost-share (i.e., proposed contributions greater than 20%) may be given preferential consideration.
b) Extent to which the applicant is, or has been, a member of one of the existing Advanced Fuel Cycle program's industrial teams.
c) Extent to which proposed scope builds on and extends existing silicon carbide ceramic matrix composite fuel cladding development efforts.
d) Applications that include team members located in an urban and economically distressed area including a Qualified Opportunity Zone (QOZ) or the proposed project will occur in a QOZ or otherwise advance the goals of QOZ may be given preferential consideration.
e) Applications that have significant involvement with U.S. Nuclear Utilities or groups representing the U.S. Nuclear Power Utilities may be given preferential consideration.
f) Applications that provide collaboration with Minority Serving Institutions (as described in U.S. Department of Education NCES 2008-156) may be given preferential consideration.
g) The degree to which the budget evaluation of the application results in a logical and reasonable approach to meeting program goals.

4 The above program policy factors may be used by the Selection Official to assist in determining which application shall receive DOE funding support. These factors, while not indicators of the Application's merit, e.g., technical excellence, applicant's ability, etc., may be essential to the process of selecting the application that, individually or collectively, will best achieve the program objectives. Such factors are often beyond the control of the Applicant. Each Applicant should recognize that some very good applications might not receive an award because they do not fit within a mix of projects

that maximizes the probability of achieving the DOE's overall research and development objectives.

B. REVIEW AND SELECTION PROCESS

1. Merit Review

   Applications that pass the initial 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 and Unsolicited Proposals." This guide is available at http://energy.gov/management/financial-assistance under Financial Assistance Policy and Guidance.

2. Selection Official Consideration

   The Selection Official will consider the merit review recommendation, program policy factors, and the amount of funds available.

3. Discussions and Award

   The Government may enter into discussions with a selected applicant for any reason deemed necessary, including but not limited to: (1) the budget is not appropriate or reasonable for the requirement; (2) only a portion of the application is selected for award; (3) the Government needs additional information to determine that the recipient is capable of complying with the requirements in 2 CFR Part 200 and 2 CFR Part 910; and/or (4) special terms and conditions are required. Failure to resolve satisfactorily the issues identified by the Government will preclude award to the applicant.

C. ANTICIPATED NOTICE OF SELECTION AND AWARD DATES

DOE anticipates notifying applicants selected for award in March 2022 and making award in May 2022. DOE reserves the right to make additional award selections using applications submitted in response to this FOA for up to two years after the initial award selection date, if agreed to by the applicant(s) selected for additional award(s). Award(s) for this project are subject to the availability of Federal funding.

Section VI - AWARD ADMINISTRATION INFORMATION

A. AWARD NOTICES

1. Notice of Selection

DOE will notify the applicant selected for award. This notice of selection is not an authorization to begin performance.

Organizations whose applications have not been selected will be advised as promptly as possible. The notice will explain why the application was not selected.

2. Notice of Award

An Assistance Agreement issued by the Grants 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) certain sections of 2 CFR part 200 and 2 CFR part 910 [DOE Financial Assistance Regulations]; (5) National Policy Assurances to be incorporated as award terms; (6) Budget Summary; and (7) Federal Assistance Reporting Checklist, which identifies the reporting requirements.

For grants and cooperative agreements made to universities, non-profits and other entities subject to Title 2 CFR, awards made under this funding opportunity should include the government-wide Research Terms and Conditions. A new version of the Terms and Conditions based on the changes to 2 CFR 200 is available. The Terms and Conditions will be located at http://www.nsf.gov/bfa/dias/policy/rtc/index.jsp.

3. Nondisclosure and Confidentiality Agreement Representations

In submitting an application in response to this FOA the Applicant represents that it will not require its employees or contractors seeking to report fraud, waste, or abuse to sign internal nondisclosure or confidentiality agreements or statements prohibiting or otherwise restricting such employees or contactors from lawfully reporting such waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information.

B. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS

1. Administrative Requirements

The administrative requirements for DOE grants and cooperative agreements are contained in 2 CFR part 200 as amended by 2 CFR part 910 [DOE Financial Assistance Regulation].

2. DUNS and SAM Requirements

Additional administrative requirements for DOE grants and cooperative agreements are contained in 2 CFR, Part 25 (See: http://www.eCFR.gov). Prime awardees must keep their

data at the System for Award Management (SAM) current. The website is located at http://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. Sub-awardees at all tiers must obtain a DUNS number and provide this number to the prime awardee before the subaward can be issued.

3. Subaward and Executive Reporting

   Additional administrative requirements necessary for DOE grants and cooperative agreements to comply with the Federal Funding Accountability and Transparency Act of 2006 (FFATA) are contained in 2 CFR, Part 170. (See: http://www.eCFR.gov). Prime awardees must also register with the new Federal Funding Accountability and Transparency Act Subaward Reporting System (FSRS) database and report the required data on their first-tier sub-awardees. The FSRS web site is located at https://www.fsrs.gov. Prime awardees must report the executive compensation for their own executives as part of their registration profile in the System for Award Management (SAM).

4. Special Terms and Conditions and National Policy Requirements

   - The DOE Special Terms and Conditions for use in most Grants and Cooperative Agreements are located at: https://www.energy.gov/management/downloads/special-terms-and-conditions-use-most-grants-and-cooperative-agreements

   - The National Policy Assurances to be incorporated as award terms are located at http://www.nsf.gov/bfa/dias/policy/rtc/appc.pdf.

   - Intellectual Property Provisions. The standard DOE financial assistance intellectual property provisions applicable to the various types of recipients are located at the following website: https://www.energy.gov/gc/standard-intellectual-property-ip-provisions-financial-assistance-awards. The appropriate IP provision will be determined by the DOE and will be part of the award documents.

5. 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.

6. Corporate Felony Conviction and Federal Tax Liability Representations

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

   i. It is not a corporation that has been convicted of a felony criminal violation under any Federal law within the preceding 24 months; and

   ii. 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.

Note: For purposes of these representations, the following definition applies: 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.

7. Statement of Substantial Involvement

DOE anticipates having substantial involvement during the project period, through technical assistance, advice, intervention, integration with other awardees performing related activities, and technical transfer activities. The Statement of Substantial Involvement may be negotiated with the recipient prior to award. It will be something similar to the following:

The recipient's responsibilities are listed in paragraph "a" below and DOE's responsibilities are listed in paragraph "b".

a. Recipient Responsibilities: The recipient is responsible for:

1. Performing the activities supported by this award, including providing the required personnel, facilities, equipment, supplies, and services;
2. Defining approaches and plans, submitting the plans to DOE for review, and incorporating DOE's comments;
3. Managing and conducting the project activities, including coordinating with a DOE management and operating (M&O) contractor on activities performed under the M&O contract that are related to the project;
4. Attending annual program review meetings and reporting project status;
5. Providing DOE appropriate levels of proprietary and non-proprietary information on an as-needed basis to assist in response to external and internal private inquiry. DOE will protect information in accordance with the agreements set forth in the CA language.
6. Submitting technical reports as stated in the Federal Assistance Reporting Checklist, and incorporating DOE comments; and
7. Presenting the project results at appropriate technical conferences or meetings as directed by the DOE Project Officer (it is anticipated that the number of conferences/meetings will not exceed two per year, not counting program review meetings).

b. DOE Responsibilities: DOE's involvement will consist of the following normal Federal stewardship responsibilities (see Section 1) below, as well as Substantial Involvement activities (see Section 2 below).

1. <u>Normal Federal Stewardship Activities</u>:

a) Approving recipient plans prior to award.
b) Providing technical assistance prior to the start of the activity, if requested

by the recipient and agreed to by DOE.

c) Providing technical assistance to correct deficiencies in project or financial performance when reports or monitoring indicates some sort of problem.
d) Performing site visits.
e) Reviewing financial, performance, and audit reports.
f) Performing technical reviews to determine whether to continue funding the next budget period.
g) Reviewing performance to ensure that the objectives, terms, and conditions of the award are accomplished.
h) Providing general administrative requirements, such as prior approvals required by the financial assistance regulations and/or OMB Circulars.
i) Reviewing performance after completion.

2. Substantial Involvement Activities:

a) Reviewing project plans and redirecting the work effort if the plans do not address critical programmatic issues.
b) Conducting program review meetings (annually or more often if needed) to ensure adequate progress and that the work accomplishes the program and project activities. Redirecting work or shifting work emphasis, if needed. Recommending continued funding.
c) Promoting and facilitating technology awareness activities, including disseminating program results through presentations and publications.
d) Serving as scientific/technical liaison between awardees and other project stakeholders.
e) Reviewing and approving of one stage before work can begin on a subsequent stage.
f) Additional monitoring to permit specified kinds of direction or redirection of the work because of interrelationships with other projects.
g) The power to immediately halt an activity if detailed performance specifications are not met.

c. There are limitations on recipient and DOE responsibilities and authorities in the performance of the project activities. Performance of the project activities must be within the scope of the Statement of Objectives, the terms and conditions of the cooperative agreement, and the funding and schedule constraints.

C. REPORTING REQUIREMENTS

Reporting requirements will be identified on the Federal Assistance Reporting Checklist, DOE F 4600.2, attached to the award agreement. An example of the checklist is available at https://www.energy.gov/sites/prod/files/FA_RepReqChecklist_RDD_031711_final_2.pdf

Section VII - QUESTIONS/AGENCY CONTACTS

A. SOLICITATION QUESTIONS

Telephonic questions shall not be answered. Questions regarding the content of this FOA must be submitted through the FedConnect portal. Questions must clearly specify the FOA areas (section, page, etc.) to which they refer. Applicants must register with FedConnect to respond as an interested party to submit questions and to review responses to questions. It is recommended applicants register as soon as possible after release of the FOA in order to have the benefit of all FOA question responses. DOE will try to respond to a question within five (5) business days, unless a similar question and answer has already been posted on the website. Questions and comments concerning this FOA shall be submitted not later than January 27, 2022. Questions submitted after that date may not allow the Government and other applicant's enough time to respond.

Any required changes to the FOA resulting from questions submitted will be incorporated into the FOA via written amendment. No changes to the FOA are to be assumed; changes must be incorporated by written amendment to the FOA to be applicable.

B. DOE AGENCY CONTACT

PRIMARY CONTACT:

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SECONDARY CONTACT:

Mark Payne
Grants Officer
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Section VIII - OTHER INFORMATION

A. MODIFICATIONS

Notices of any modifications to this announcement will be posted on the FedConnect portal. Applicants can receive an email when a modification or an announcement message is posted by registering with FedConnect as an interested party for this FOA. It is recommended that applicants register as soon after release of the FOA as possible to ensure applicants receive timely notice of any modifications 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 Grants Officer is the only individual who can make awards or commit the Government to the expenditure of public funds. A commitment by other than the Grants Officer, either explicit or implied, is invalid.

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.

D. PROPRIETARY APPLICATION INFORMATION

Patentable ideas, trade secrets, proprietary or confidential commercial or financial information, disclosure of which may harm the applicant, should be included in an application only when such information is necessary to convey an understanding of the proposed project. The use and disclosure of such data may be restricted, provided the applicant includes the following legend on the first page of the project narrative and specifies the pages of the application which are to be restricted:

> "The data contained in pages [*Insert pages*] of this application have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this applicant receives an award as a result of or in connection with the submission of this application, DOE shall have the right to use or disclose the data herein to the extent provided in the award. This restriction does not limit the government's right to use or disclose data obtained without restriction from any source, including the applicant."

To protect such data, each line or paragraph on the pages containing such data must be specifically identified and marked with a legend similar to the following:

"The following contains proprietary information that (name of applicant) requests not be released to persons outside the Government, except for purposes of review and evaluation."

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 will required to sign a non-disclosure agreement.

F. UNDERSTANDING COST SHARING REQUIREMENTS

Department-wide cost sharing requirements are established by Section 988 of the Energy Policy Act (EPAct) of 2005. The DOE Financial Assistance Rules at 2 CFR 200 and 2 CFR 910 implement cost sharing requirements (see §§ 200.32, 200.306, 910.130). This FOA requires a minimum of 20% cost sharing for research and development projects by awardees.

In accordance with EPAct 2005, section 988 (d), Calculation of Amount, when calculating the amount of the non-Federal cost share contribution, the Government:

1) May include the following costs as allowable in accordance with the applicable cost principles:
    a) Cash;
    b) Personnel costs;
    c) The value of a service, other resource, or third-party in-kind contribution determined in accordance with the applicable circular of the Office of Management and Budget. [Note: In-kind contributions, like any other cost, need to be incurred during the award project period, e.g., cannot give credit for costs incurred prior to the award, including prior development costs, unless otherwise authorized by the applicable cost principles];
    d) Indirect costs or facilities and administrative costs; or
    e) Any funds received under the power program of the Tennessee Valley Authority (except to the extent that such funds are made available under an annual appropriation Act).

2) Shall not include:
    a) Revenues or royalties from the prospective operation of an activity beyond the time considered in the award;
    b) Proceeds from the prospective sale of an asset of an activity; or
    c) Other appropriated Federal funds.

The terms and conditions of the cooperative agreement will include appropriate provisions on cost allowability.

The Federal share shall not be required to be repaid as a condition of award. Royalties should not be used to repay or recover the Federal share but may be used as a reward for technology transfer activities.

Cost share is often confused with some form of cost matching. The key to understanding how cost share works is to understand the base from which the cost share percentage is calculated. Cost share percentage is a percentage of the Total Allowable Costs of the project. Note that it is NOT a percentage of the DOE funds, but rather a percentage of the entire project that includes all awardee funds, DOE funds, and all FFRDC requirements.

When determining the cost share requirement in dollars, it is first necessary to determine the entire project cost. Initially, no consideration would be given as to where the funds would come from. An applicant would determine that a certain cost (e.g., hours, travel, supplies, etc.) would be needed to complete the project as proposed in the application. Once the project cost is determined, an applicant can then calculate the cost share requirement by multiplying the cost share percentage by the project cost. The resulting dollar figure would be the dollar requirement that the applicant must provide as cost share.

Below are two examples of how the cost share amount would be calculated:

Example 1

The applicant determines that the following budget requirements are needed to carry out the work described in its proposal to DOE:

Direct Labor	$100,000
Travel	3,000
Equipment	17,000
Supplies	10,000
Subcontract	20,000
l Project Cost	**$150,000**

A cost share requirement of 20% was specified in the funding announcement.

Cost Share = (cost share percentage) x (***total project cost***) Cost Share = (20%) x ($150,000)
Cost Share = $30,000

The applicant must now identify $30,000 of $150,000 as “Cost Share.” The applicant would then request DOE funding in the amount of $120,000.

DOE Share = $120,000 Awardee Share = $30,000

Example 2

The applicant determines that the following budget requirements are needed to carry out the work described in its proposal to DOE:

Direct labor	$200,000
Travel	10,000
Equipment	17,000
Supplies	10,000
FFRD	60,000
Subcontract	3,000
Total Project Cost	**$300,000**

A cost share requirement of 20% was specified in the funding announcement. Cost

Share = (cost share percentage) x (total project cost)
Cost Share = (20%) x ($300,000)
Cost Share = $60,000

The applicant must now identify $60,000 of $300,000 as "Cost Share". Applicant will be required to establish agreement with the FFRDC for $60,000. The applicant would then request DOE funding in the amount of $180,000.

DOE Share = $180,000 (funds to Awardee) + $60,000 (FFRDC) = $240,000 Awardee

Share = $60,000

Note: FFRDC funds are paid directly to the FFRDC by DOE. The work provided by the FFRDC is still considered part of the Total Project Cost; therefore, it is included in the base from which the Awardee cost share is calculated.

In all cases, the applicant must specify the individual costs that make up each part of the total project cost and indicate whether DOE or Non-DOE funds will be used to cover the cost.

The budget from **Example 1** might look something like the following:

		DOE	**Non-Federal**
Direct Labor	$100,000	$70,000	$30,000
Travel	3,000	3,000	0
Equipment	17,000	17,000	0
Supplies	10,000	10,000	0
Subcontract	20,000	20,000	0
Total Project Cost	**$150,000**	**$120,000**	**$30,000**

The application forms in this FOA will facilitate the identification of funding sources.

G. INTELLECTUAL PROPERTY DEVELOPED UNDER THIS PROGRAM

Patent Rights. The government will have certain statutory rights in an invention that is conceived or first actually reduced to practice under a DOE award. 42 U.S.C. 5908 provides that title to such inventions vests in the United States, except where 35 U.S.C. 202 provides otherwise for nonprofit organizations or small business firms. However, the Secretary of Energy may waive all or any part of the rights of the United States subject to certain conditions. (See "Notice of Right to Request Patent Waiver" in paragraph H below.)

Rights in Technical Data. Normally, the government has unlimited rights in technical data created under a DOE agreement. 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 ensure the commercialization of technology developed under a DOE agreement.

Special Protected Data Statutes. This program is covered by a special protected data statute. The provisions of the statute provide for the protection from public disclosure, for a period of up to five years from the development of the information, of 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. Generally, the provision entitled, Rights in Data Programs Covered Under Special Protected Data Statutes (Item 4 under 2 CFR 910 Appendix A to Subpart D), would apply to an award made under this announcement. This provision will identify data or categories of data first produced in the performance of the award that will be made available to the public, notwithstanding the statutory authority to withhold data from public dissemination, and will also identify data that will be recognized by the parties as protected data.

H. 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. The DOE website where further information can be found about submitting a patent rights waiver can be found at https://www.energy.gov/eere/funding/downloads/petition-advance-waiver-patent-rights-under-10-cfr-part-784

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.

I. CONFERENCE SPENDING

The recipient shall not expend funds for the purpose of: 1) defraying the cost to the Government of a conference held by any Executive Branch department, agency, board, commission, or office for which the cost to the Government was more than $20,000; or 2) circumventing the required notification by the head of any such Executive Branch department, agency, board, commission, or office to the Inspector General or senior ethics official for any entity without an Inspector General, of the date, location, and number of employees attending such conference that is not directly and programmatically related to the purpose for which the grant or cooperative agreement was awarded.

J. NOTICE REGARDING ELIGIBLE/INELIGIBLE ACTIVITIES

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