

**U.S. Department of Energy (DOE)  
Office of Energy Efficiency and Renewable Energy (EERE)**

**Marine Energy University Foundational R&D**

**Funding Opportunity Announcement (FOA) Number: DE-FOA-0003097**

**FOA Type: Mod 0002**

**Assistance Listing Number: 81.087**

<b>FOA Issue Date:</b>	1/16/2024
<b>Informational Webinar:</b>	1/24/2024, 3:00 p.m. ET
<b>Submission Deadline for Concept Papers:</b>	2/20/2024, 5:00 p.m. ET
<b>Submission Deadline for Full Applications:</b>	5/6/2024, 5:00 p.m. ET
<b>Expected Submission Deadline for Replies to Reviewer Comments:</b>	7/17/2024, 5:00 p.m. ET
<b>Expected Date for EERE Selection Notifications:</b>	Sept 2024
<b>Expected (Start) Timeframe for Award Negotiations:</b>	Oct 2024

- **Proposed prime recipients are restricted to domestic institutions of higher education, including minority serving institutions.**
- Applicants must submit a Concept Paper by 5:00 p.m. ET on the due date listed above to be eligible to submit a Full Application.
- To apply to this FOA, applicants must register with and submit application materials through EERE eXCHANGE at <https://eere-eXCHANGE.energy.gov>, EERE's online application portal.
- Applicants must designate primary and backup points-of-contact in EERE eXCHANGE with whom EERE will communicate to conduct award negotiations. If an application is selected for award negotiations, it is not a commitment to issue an award. It is imperative that the applicant/selectee be responsive during award negotiations and meet negotiation deadlines. Failure to do so may result in cancelation of further award negotiations and rescission of the selection.
- **Unique Entity Identifier (UEI) and System for Award Management (SAM)** - Each applicant (unless the applicant is excepted from those requirements under 2 CFR

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25.110) is required to: (1) register in the SAM at <https://www.sam.gov> before submitting an application; (2) provide a valid UEI number in the application; and (3) maintain an active SAM registration with current information when the applicant has an active federal award or an application or plan under consideration by a federal awarding agency. DOE may not make a federal award to an applicant until the applicant has complied with all applicable UEI and SAM requirements and, if an applicant has not fully complied with the requirements by the time DOE is ready to make a federal award, DOE will determine that the applicant is not qualified to receive a federal award and use that determination as a basis for making a federal award to another applicant.

**NOTE:** Due to the high number of UEI requests and SAM registrations, entity legal business name and address validations are taking longer than expected to process. Entities should start the UEI and SAM registration process as soon as possible. If entities have technical difficulties with the UEI validation or SAM registration process they should use the [HELP](#) feature on [SAM.gov](https://www.sam.gov). SAM.gov will address service tickets in the order in which they are received and asks that entities not create multiple service tickets for the same request or technical issue. Additional entity validation resources can be found here: [GSAFSD Tier 0 Knowledge Base - Validating your Entity](#).

## Modifications

All modifications to the FOA are [HIGHLIGHTED] in the body of the FOA.

Mod. No.	Date	Description of Modification
0002	4/11/24	1. Updated the Estimated Funding Table for Topic Area 2a
0001	3/28/24	2. Updated Full Application deadline from 4/22/2024 to 5/6/2024. 3. Updated Expected Submission deadline for Replies to Reviewer Comments from 6/24/24 to 7/17/24. 4. SF-424: Application for Federal Assistance file naming convention is corrected from "ControlNumber_LeadOrganization_424" to "ControlNumber_LeadOrganization_App424" on page 43.

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## I. Funding Opportunity Description

### A. Background and Context

The Office of Energy Efficiency and Renewable Energy (EERE) is issuing, on behalf of the Water Power Technologies Office (WPTO) and Wind Energy Technologies Office (WETO), this Funding Opportunity Announcement (FOA) “Marine Energy University Foundational R&D.”

#### i. Background and Purpose

WPTO’s program supports research, development, demonstration, and the commercial application of marine renewable energy technologies that expand and diversify the nation’s clean energy portfolio by delivering power from ocean and river resources. WPTO supports tidal and river current energy, wave energy, ocean thermal energy conversion, and salinity and pressure gradient technology Research and Development (R&D) from early Technology Readiness Levels (TRLs) to certified marine energy prototypes ready for commercialization at project sites. Ultimately, a commercially successful marine energy industry in the U.S. will promote local economic security through good jobs and enhance resilience and reduce carbon emissions of microgrids in coastal, remote, and islanded communities in the near term and provide clean and reliable power to the grid in the long-term.

WETO’s program supports, plans, and executes a diversified portfolio of early-stage research and development to advance technologies for offshore, land-based, and distributed wind energy, and its integration with the electric grid. As part of its broad R&D portfolio, WETO invests in research to inform solutions to lower wind energy costs, increase capacity, accelerate reliable and safe energy production, and address environmental impacts.

This FOA supports foundational research at domestic institutions of higher education, including Minority Serving Institutions (MSI), to address challenges faced by marine energy industries and spur innovation and development. Universities offer an array of exceptional capabilities and resources that create a rich ecosystem for high-level research combining intellectual capital, advanced infrastructure, a commitment to knowledge creation and dissemination, and a training ground for the next generation of scientists and scholars. Funding research opportunities at institutions of higher education allows for interdisciplinary collaboration and the exploration of complex research questions from multiple angles. Moreover, universities are often uniquely situated to take advantage of partnership opportunities with other institutions, communities, and industries.

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Building a clean and equitable energy economy and addressing the climate crisis is a top priority of the Biden Administration. This FOA will advance the Biden Administration’s goals to achieve carbon pollution-free electricity by 2035 and to “deliver an equitable, clean energy future, and put the United States on a path to achieve net-zero emissions, economy-wide, by no later than 2050”<sup>1</sup> to the benefit of all Americans. The Department of Energy is committed to pushing the frontiers of science and engineering, catalyzing clean energy jobs through research, development, demonstration, and deployment (RDD&D), and ensuring environmental justice and inclusion of underserved communities.

The R&D activities to be funded under this FOA will support the government-wide approach to the climate crisis by driving innovation that can lead to the deployment of clean energy technologies, critical for climate protection. Specifically, this FOA will provide funding for foundational R&D activities to advance marine energy and offshore wind technologies, enabling broader utilization of ocean renewable energy sources. Projects funded under this FOA will support the goals of carbon pollution-free electricity by 2035 and net zero Greenhouse Gas emissions by 2050 by reducing carbon emissions of offshore aquaculture, and microgrids in coastal, remote, and islanded communities in the near term and provide clean and reliable power to the grid in the years following.

## **ii. Technology Space and Strategic Goals**

This FOA seeks applications to address challenges faced by marine renewable energy industries and spur innovation and development through foundational research at domestic institutions of higher education.

To become cost-competitive with other energy resources, the marine energy industry needs to achieve dramatic cost reductions over the next 10-20 years and develop a robust workforce to support this new industry. As detailed in WPTO’s Multi Year Program Plan (MYPP), the Marine Energy Program supports workforce development efforts and foundational R&D to drive cost reductions, both through improving the device performance and reducing costs of existing device designs and by developing new capabilities that can allow for entirely new designs and approaches to harnessing the energy in natural water bodies. These early-stage R&D efforts are typically applicable to a wide range of device archetypes and, in some cases, cut across multiple technology types (e.g., wave, tidal, ocean current).

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<sup>1</sup> Executive Order 14008, “Tackling the Climate Crisis at Home and Abroad,” January 27, 2021.

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**Applications to this funding opportunity should address one or more of WPTO's strategic goals and research priorities, including:**

- Evaluate applicability and performance of composite and other novel materials for marine energy converter systems and subsystems, such as wave energy converter hulls and tidal energy converter blades.
- Develop power take-off (PTO)/control system co-design methodologies and partner with technology developers to pilot the use in marine energy converter device design processes.
- Validate foundational modeling tools with data from ongoing water testing projects.
- Disseminate high fidelity data sets and models.
- Complete resource measurements and assessments in support of marine energy projects to enhance the resilience of specific remote communities.
- Test new and important component technologies that support significantly improved Installation, Operations & Maintenance (IO&M) (e.g., wet-mate connectors and distributed energy conversion technologies).
- Advance power electronics technologies that support integration of marine energy devices for power at sea and coastal community microgrid system applications.
- Conduct targeted outreach for workforce development programs, which could include outreach to universities, student associations, and professional societies across the nation to improve awareness of workforce development opportunities such as graduate student research fellowships and Marine Energy Collegiate Competitions.

WETO collaborated to develop Topic Area 2, recognizing the opportunities and challenges associated with responsible and sustainable use of U.S. ocean spaces and its contribution to the implementation of the U.S. Department of Energy Offshore Wind Energy Strategy. Specifically, this effort aligns with the FORWARD initiative<sup>2</sup> aiming to inform just, sustainable, and timely development of floating offshore wind energy in deep waters by exploring possible marine co-use scenarios with a focus on the unique impacts and geographies of floating offshore wind energy development.

Detailed technical descriptions of the specific topic areas are provided in [Section B](#).

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<sup>2</sup> The Floating Offshore Wind Advanced Research and Development (FORWARD) initiative establishes U.S. leadership in floating offshore wind design, manufacturing, and deployment by addressing the most urgent RD&D, supply chain, and siting needs.

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**iii. Teaming Partner List**

DOE is compiling a Teaming Partner List to facilitate the formation of project teams for this FOA. The Teaming Partner List allows organizations that may wish to participate on a project to express their interest to other applicants and to explore potential partnerships.

The Teaming Partner List will be available on EERE eXCHANGE and will be regularly updated to reflect new teaming partners who provide their organization's information.

**SUBMISSION INSTRUCTIONS:** View the Teaming Partner List by visiting the EERE eXCHANGE homepage and clicking on "Teaming Partners" within the left-hand navigation pane. This page allows users to view published Teaming Partner Lists. To join the Teaming Partner List, submit a request within eXCHANGE. Select the appropriate Teaming Partner List from the drop-down menu 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.

**iv. Coordination with University Marine Energy Research Community (UMERC)**

Recipients in Topic Areas 1, 2b, 3 and 4 will be required to work collaboratively with DOE's [University Marine Energy Research Community \(UMERC\)](#) including joining the UMERC portal, attending periodic in-person or virtual meetings hosted by the UMERC, and responding to occasional requests for information from the UMERC.

The UMERC's role is to help maximize the impact of marine energy-focused foundational and crosscutting research performed at domestic universities by improving transparency and awareness of ongoing research activities; evaluating and recommending ways to enhance future research activities for the greatest impact and alignment with industry needs; and encouraging research Recipient coordination and collaboration by strengthening university, national laboratory

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and industry ties and expanding the network of institutions involved in marine energy research.

## **B. Topic Areas**

This FOA includes four topic areas. Specific areas of research in this FOA include utilizing publicly available Marine Energy (ME) test platforms to produce publicly available data, investigating ways to help advance sustainable and scalable collaborations among offshore wind, marine energy and aquaculture, integrating marine energy content into undergraduate senior design or research projects, and an open topic area to address additional challenges not covered by the other topic areas. Funds will go toward the development of marine energy and offshore wind technologies, enabling the broader utilization of ocean renewable resources and the provision of clean and reliable power to the grid.

### **i. Topic Area 1: Publicly Available Marine Energy Data Analysis & Test Platform(s) to Produce Publicly Available Data**

When the Marine Energy (ME) program was initiated as part of the WPTO, Congress requested a report documenting the design and cost evaluation of a variety of ME designs to understand the current state of the industry to determine the best path toward commercialization. The publicly available information produced through the 2012 reference model project has been one of the most widely downloaded and used products to date by industry stakeholders. The 2012 reference model effort included design and techno-economic assessment of six different device types.

Despite the challenges of operating in harsh environments, the marine energy industry has made measurable progress in the decade since the reference model publication. However, to build on previous successes and create a viable commercial ME industry competitive with other forms of renewable power generation, R&D efforts must generate significant levelized cost of energy (LCOE) reductions through two pathways: performance improvements and cost reductions. To accomplish this goal, the WPTO seeks assistance to identify, prioritize, and evaluate cost-reduction and performance improvement pathways (hereafter LCOE reductions) based on quantitative information. Prioritization should be based on both pathways as well as the publication of publicly available ME designs accompanied by associated test data and test platforms.

Topic Area 1 (TA1) will fund projects that not only analyze LCOE reduction pathways to provide improvement opportunities, but also provide publicly available data and information detailing improvement opportunities, along with new, publicly available test platforms for use by the marine energy industry and other stakeholders to study LCOE reduction pathways. With these new

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resources, stakeholders will be able to make more informed technical and business decisions regarding future R&D initiatives and improvements to individual ME designs, accelerating the commercialization of the broader marine energy industry. There are three subtopics in TA1:

**1) Subtopic 1a: LCOE Reduction Pathway Analysis**

The purpose of Subtopic Area 1a is threefold. First, identify potential LCOE reductions pathways using existing information. Second, organize the identified pathways in a user-friendly, searchable, updatable format or database. Third, identify and prioritize the most promising pathways based on feasibility and impact. Subtopic Area 1a focuses on technologies designed for utility market applications and, to a lesser extent, on technologies designed for Powering the Blue Economy markets to the degree that the technologies are used for electrical power generation. In addition, the focus of Subtopic Area 1a should be wave and tidal energy resources, and less on other forms of marine energy given the limited budget.

To address purpose one, applications should clearly outline a methodology to identify existing or known LCOE reduction pathways for marine energy through information already publicly available. This may include, among other efforts, literature searches, surveys, workshops, and targeted interviews with current and previous marine energy technology developers, capturing a broad and deep knowledge base on potential LCOE reduction pathways. All data collected during project execution should be aggregated into a comprehensive report of research results and include a description of the full spectrum of LCOE reduction pathways that were identified.

To address purpose two, applications should describe in detail how the identified LCOE reduction pathways will be arranged in a useful format so users (industry stakeholders) can easily access and search the most up-to-date data for their needs.

This effort could include, but is not limited to, the evaluation of existing marine energy data schema and data schema from adjacent industries including industry standards (ISO, IEC, IEEE, ASTM, etc.) to determine the most appropriate format. At a minimum, the schema should include the ability to sort by different device archetypes, as some LCOE reduction pathways are unique to device type. Additionally, each pathway should be assigned into a CapEx or OpEx category, as defined in the [Marine Energy Systems Cost Breakdown Structure](#) and relevant [Marine Energy sub activity area level in the WPTO Multiyear Program Plan](#). Once the most appropriate data schema is determined, the database will be created and populated with the identified LCOE reduction pathways. Applications should also describe

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how the data will be made readily available to the public and how the database can be updated as new information is obtained after the project conclusion. The Recipient might consult, along with other possibilities, the DOE National Lab PRIMRE team on the potential to host the database on PRIMRE.org. A comprehensive report shall be submitted during the project detailing, at a minimum, the data schema utilized, location of/access to the database, a database management and maintenance plan, a database user guide and training materials and a quality assurance report for the fully populated database.

Finally, to address purpose three, applications should outline how the research data will be analyzed and synthesized to identify and prioritize the most promising LCOE reduction pathways (e.g., fastest path to significant cost reductions, lowest risk, lowest investment, most likely to leverage outside industries, etc.). Applications should also include a discussion on how the research data will be analyzed to determine the greatest barriers to LCOE reductions and prioritize the barriers in relation to the [highest-return, lowest-risk innovation pathways](#). By the end of the project, a comprehensive report shall be submitted by the recipient detailing the analysis and synthesis methodology, and LCOE reduction pathways prioritization with justifications. A data gaps and opportunity analysis to determine which additional data could improve the pathways analysis is encouraged.

Applicants are encouraged, but not required, to include or leverage partnerships, collaborations, or existing tools that could enhance the application and final outcomes.

Areas for which LCOE reduction pathways are needed include, but are not limited to, the following:

- Component level pathways including support systems. Examples of support systems are included in the CapEx Tab of the [Marine Energy Systems Cost Breakdown Structure](#).
- Soft costs, e.g. permitting, insurance.
- Costs associated with meeting International Electrotechnical Commission (IEC) and Institute of Electrical and Electronics Engineers (IEEE) requirements.
- Novel designs, e.g., Lift WECs, distributive embedded WECs.
- Leveraging existing infrastructure, e.g., piers, break waters, offshore wind farms.
- Manufacturing and materials R&D to include materials that resist biofouling, corrosion, and other potential materials improvements.

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- Improved standard design principals that facilitate maintenance of various subsystems.
  - Improved IO&M systems and processes, e.g., improved anchor and removal capabilities, use of robotics for maintenance activities.
  - System integration, e.g., multiple devices sharing common electrical generators and/or DC to AC conversion subsystems, sharing of anchoring and mooring components between multiple devices in an array.

Please consult [Appendix G](#) for a list of additional references relevant to Subtopic 1a.

## 2) **Subtopic 1b: Leveraging Existing Marine Energy Test Platform(s) to Produce Publicly Available Data**

A result of the substantial investment in and advancement of the marine energy industry over the past decade, there are several scaled device prototypes and/or marine energy test platforms that are no longer being utilized or are underutilized. The purpose of this subtopic is to leverage existing marine energy (ME) test platforms and repurpose them to objectively quantify potential LCOE reductions. For purposes of this subtopic, a ME test platform is a wave, current, or tidal energy device or subsystem that can be utilized as is, or modified to test various components, materials, health monitoring systems, subsystems, infrastructure support systems and/or control strategies. This topic is not intended to optimize performance of the specific ME test platform. Rather, the resulting ME test platform should allow testing of components, materials, subsystems and/or control systems that have applicability across a broad spectrum of ME technologies.

An ME test platform may have been developed with prior WPTO or other funding for use in bench top experiments, flume or basin testing, or open water testing. Additionally, the testing capabilities of the proposed ME test platform may be different than the original purpose. For example, a test platform originally built for studying wave body interactions in a wave basin, could be modified to test and study a broad range of mooring loads.

To facilitate future use of the ME test platform, **all design and test data must be made available to the public prior to any independent researcher using the test device.** The design data must include all design information including fabrication drawings and material requirements. Information related to the basis of different design attributes must also be provided. At the conclusion of the award, the modified ME test platform must be made publicly accessible.

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Additionally, all test data generated by the ME test platform for this subtopic, both during and post-award period, should be made publicly available for use by independent researchers to validate and improve existing numerical modeling tools as well as improve general understanding of LCOE reduction pathways.

Refer to Topic Area 1 Technical Volume Content Requirements ([Section IV.D.iii](#)) for detailed application requirements.

The publicly available ME test platform will contribute to broad marine energy knowledge generation in several ways. One way is the potential opportunities for data collection to validate numerical models and address cost reduction pathways including, but are not limited to:

- Characterization of internal energy losses through each step in the energy conversion from waves/currents to wire to include impacts of reflected inertia, friction, stiction on energy transfer/conversion, hydrodynamic coefficients and added mass.
- Characterization of stresses and strains for composite materials.
- Safety factors and design margins and their impact on other design parameters.
- Full characterization, in both the frequency and time domains, of the complete system, including:
  - Dampening factors and characterization of second order systems.
  - Broad band vs. narrow band frequency responses.
- Estimation of peak to average power ratios for different forcing functions (including non-linear).

Please consult [Appendix G](#) for a list of additional references relevant to Subtopic 1b.

*The Subtopic will have two budget periods with multiple decision reviews to allow for an iterative approach and an opportunity to validate and refine proposed methodologies. An overview of the anticipated project schedule and decision reviews is provided below.*

### **Budget Period 1**

In Budget Period 1, three decision reviews will be conducted. High level objectives for each review are detailed below. During these reviews the Recipient will be encouraged to refine the project tasks to best de-risk (cost, performance, schedule) future project tasks.



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**Decision Review 1 (DR1): Literature Search**

The Recipient will conduct a literature search to substantiate the chosen LCOE reduction pathway(s) and, if necessary, evaluate the proposed systems engineering processes to modify the proposed ME test platform. Targeted cost reduction pathway(s) and systems engineering processes should be refined as needed.

**Decision Review 2 (DR2): Concept Design Review**

A concept design review will be conducted in accordance with identified systems engineering design processes. The concepts discussed should be appropriate to inform a detailed design including, but not limited to:

- How the test platform can inform LCOE reduction pathway(s), including software and numerical tools that would be impacted by better understanding of device performance.
- Modifications, if necessary, to be made to the test platform to study a range of conditions.
- Data acquisition, data cataloging, and data sharing concepts.
- How the marine energy community will be engaged to communicate capabilities of the test platform.
- Potential technical risks in the form of a risk matrix.
- Maintenance, operations, and access plans after the period of performance has ended.

After Decision Review 2, the Recipient will test the existing platform, prior to modifications (if any), to collect baseline performance data and compare the data to anticipated results from the software or numerical model of interest.

**Decision Review 3 (DR3): Detail Design Review**

A detailed design review will be conducted in accordance with identified systems engineering design processes. The results of DR3 will be used to modify the existing test platform if needed. Discussion should include, but is not limited to:

- Existing test platform baseline results including comparison to software or model predictions, if applicable.
- How the test platform can be used to study the LCOE reduction pathway(s).
- How software and numerical tools would be improved by better understanding of device performance.
- Modifications, if any, to be made to the test platform to study a range of conditions.

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- Data acquisition, data cataloging, and data sharing details.
  - Refined maintenance, operations, and access plans after the period of performance has ended.
  - How the marine energy community will be engaged to communicate capabilities of the test platform. Public engagement plans will be implemented in Budget Period 2.
  - Updated estimates for all anticipated Budget Period 2 tasks considering the results of Decision Reviews 1 and 2. Detailed quotes are required where applicable.
  - Updated estimate for anticipated costs after the period of performance ends including but not limited to transportation, storage, insurance, IO&M including device installation, any repairs/refurbishments required to the existing device, periodic maintenance requirements, permitting costs, anchoring and mooring systems, etc.

**Go/No-Go (GNG) Decision Point:**

The purpose for the GNG meeting is to determine if the risks (cost, schedule, performance) of proceeding to Budget Period 2 are acceptable. To progress to Budget Period 2, Decision Reviews 1,2, and 3 must be completed.

Additional specific GNG criteria may be negotiated. The GNG meeting can be combined with Decision Review 3.

**Budget Period 2:**

In Budget Period 2, the test platform will be modified, if necessary, according to plans detailed in Decision Review 3. The Recipient will be required to make all necessary measurements to quantify the test platform device performance and to validate design methods and numerical models that were used to modify the test platform.

The Recipient will engage the marine energy community to communicate the capabilities of the test platform and encourage public use of the platform.

Two decision reviews will be held in Budget Period 2. High level objectives for each review are detailed below. During these reviews the Recipient will be encouraged to refine the project tasks and deliverables to best de-risk (cost, performance) continued utilization of the test platform after the period of performance ends.

**Decision Review 4 (DR4): IO&M Review**

The Recipient will conduct an installation, operations, and maintenance (IO&M) review in accordance with identified systems engineering design processes. The IO&M plan will be appropriate for long term use of the

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test asset after the project ends. DR4 will include a review of following deliverables, at a minimum:

- Finalized IO&M plan.
- IO&M user manual and training materials.
- Finalized data acquisition, data cataloging, and data sharing plan.
- Budget estimates for IO&M after the period of performance ends.
- How the test data can be utilized to elicit general lessons learned for the broader ME industry such as improvements to existing ME modeling software and/or improvements to the IEC TC 114 62600 series.

#### **Decision Review (DR5): Public Engagement Review**

A review of the public engagement to increase awareness and promote usage of the test asset by the marine energy community will be conducted. DR5 should discuss the public engagement efforts utilized, and any issues, challenges, or lessons learned during the public engagement process.

### **3) Subtopic 1c: Design and Fabricate Wave Energy Test Platform(s) to Produce Publicly Available Data**

The purpose of this subtopic is to design, fabricate, and test a new wave energy test platform and make it publicly accessible for testing to objectively quantify potential LCOE reductions. For purposes of this subtopic, a test platform is a wave energy device or subsystem that can be easily modified to test various components, materials, health monitoring systems, subsystems, infrastructure support systems, and/or control strategies.

Applications should propose a wave energy test platform that can generate high quality data for numerical model validation, quantify system power performance, quantify operational loads, quantify extreme loads, and measure other relevant data that will advance the state of Wave Energy Converter (WEC) technologies and drive LCOE reductions. Modular systems that can be easily modified or used to test various WEC components or control strategies as part of future testing campaigns are encouraged.

To facilitate future use of the wave energy test platform, **all design and test data must be made available to the public prior to any independent researcher using the test device.** The wave energy test platform design data must include all design information including fabrication drawings and material requirements. Information related to why specific design attributes were chosen for the basis of the design must also be provided. At the

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conclusion of the award, the wave energy test platform must be made publicly accessible.

Additionally, all test data generated by the wave energy test platform for this subtopic, both during and post-award period, should be publicly available for use by independent researchers to validate and improve existing numerical modeling tools as well as improve general understanding of LCOE reduction pathways.

Refer to Topic Area 1 Technical Volume Content Requirements ([Section IV.D.iii](#)) for detailed application requirements.

The publicly available wave energy test platform will contribute to broad marine energy knowledge generation in several ways. One way is the potential opportunities for data collection to validate numerical models and address cost reduction pathways including, but not limited to:

- Characterization of internal energy losses through each step in the energy conversion from waves to wire to include impacts of reflected inertia, friction, stiction on energy transfer/conversion, hydrodynamic coefficients and added mass.
- Characterization of stresses and strains for composite materials.
- Safety factors and design margins and their impact on other design parameters.
- Full characterization, in both the frequency and time domains, of the complete system, including:
  - Dampening factors and characterization of second order systems.
  - Broad band vs. narrow band frequency responses.
- Estimation of peak to average power ratios for different forcing functions (including non-linear).

Please consult [Appendix G](#) for a list of additional references relevant to Subtopic 1c.

*The subtopic will have two budget periods with multiple decision reviews to allow for an iterative approach and an opportunity to validate and refine proposed methodologies. An overview of the anticipated project schedule and decision reviews is provided below.*

### **Budget Period 1**

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In Budget Period 1, three decision reviews will be conducted. High level objectives for each review are detailed below. During these reviews the Recipient will be encouraged to refine the project tasks to best de-risk (cost, performance, schedule) future project tasks.

**Decision Review 1 (DR1): Literature Search**

The Recipient shall conduct a literature search to substantiate the chosen LCOE reduction pathway(s) and evaluate the proposed systems engineering processes for design and fabrication of the new test platform. Targeted cost reduction pathway(s) and systems engineering processes should be refined as needed.

**Decision Review 2 (DR2): Concept Design Review**

A concept design review will be conducted in accordance with identified systems engineering design processes. The concepts discussed should be appropriate to inform a detailed design, including but not limited to:

- How the test platform can inform LCOE reduction pathway(s) including software and numerical tools that would be impacted by better understanding of device performance.
- Design of the test platform to study a range of conditions.
- Data acquisition, data cataloging, and data sharing concepts.
- How the marine energy community will be engaged to communicate capabilities of the test platform.
- Potential technical risks in the form of a risk matrix.
- Maintenance, operations, and access plans after the period of performance has ended.

**Decision Review 3 (DR3): Detail Design Review**

A detailed design review will be conducted in accordance with identified systems engineering design processes. The details discussed will be appropriate to use for fabrication of the new wave energy test platform, including, but not limited to:

- How the wave energy test platform can be used to study the identified LCOE reduction pathway(s).
- How software and numerical tools would be improved by better understanding of device performance.
- Data acquisition, data cataloging, and data sharing details.
- Refined maintenance, operations, and access plans after the period of performance has ended.

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- How the marine energy community will be engaged to communicate capabilities of the test platform. Public engagement plans will be implemented in Budget Period 2.
  - Updated estimates for all anticipated Budget Period 2 tasks considering the results of Decision Reviews 1 and 2. Detailed quotes are required where applicable.
  - Updated estimates for anticipated costs after the period of performance ends including, but not limited to transportation, storage, insurance, IO&M including device installation, any repairs/refurbishments required to the existing device, periodic maintenance requirements, permitting costs, anchoring and mooring systems, etc.

**Go/No-Go (GNG) Decision Point:**

The purpose of the GNG meeting is to determine if the risks (cost, schedule, performance) of proceeding to Budget Period 2 are acceptable. To progress to Budget Period 2, Decision Reviews 1, 2, and 3 must be completed. Additional specific GNG criteria may be negotiated. The GNG meeting can be combined with Decision Review 3.

**Budget Period 2:**

In Budget Period 2, the test platform will be fabricated according to the outcome of Decision Review 3. The Recipient will be required to make all necessary measurements to quantify the test platform device performance and to validate design methods and numerical models that were used to modify the test platform.

The Recipient will engage the marine energy community to communicate the capabilities of the test platform and encourage public use of the platform.

Two decision reviews will be held in Budget Period 2. High level objectives for each review are detailed below. During these reviews, the Recipient will be encouraged to refine the project tasks and deliverable to best de-risk (cost, performance) continued utilization of the wave energy test platform after the period of performance ends.

**Decision Review 4 (DR4): IO&M Review**

An installation, operations, and maintenance (IO&M) review will be conducted in accordance with identified systems engineering design processes. The IO&M plan will be appropriate for long term use of the test asset after the project ends. DR4 should discuss the following, at a minimum:

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- Finalized IO&M plan.
- IO&M user manual and training materials.
- Finalized data acquisition, data cataloging, and data sharing plan.
- Budget estimates for IO&M after the period of performance ends.
- How the test data can be utilized to elicit general lessons learned for the broader ME industry such as: improvements to existing ME modeling software and/or improvements to the IEC TC 114 62600 series.

#### **Decision Review (DR5): Public Engagement Review**

A review of the public engagement results will be conducted. DR5 should discuss the public engagement efforts utilized, and any issues, challenges, or lessons learned during the public engagement process.

## **ii. Topic Area 2: Sustainable & Scalable Offshore Wind, Marine Energy, and Aquaculture**

The research activities funded under this topic area seek to understand how sustainable and scalable aquaculture production can pair with ocean renewable energy technologies, like offshore wind and marine energy, and to identify synergies that can advance the development of both the ocean renewable energy and aquaculture sectors.

Offshore wind (OSW) and marine energy (ME) are at different stages and scales of commercial development, and therefore offer different potential opportunities for aquaculture co-development and co-location. The U.S. offshore wind industry is expanding rapidly. Driven by state-level commitments and federal action such as the Bureau of Ocean Energy Management's (BOEM's) California lease auction and the passage of the Inflation Reduction Act, the U.S. offshore wind project pipeline grew to 52,687 Megawatt (MW) in various stages of development (including two fully operational projects totaling 42 MW). States have set offshore wind energy procurement mandates totaling 42,730 MW by 2040.<sup>3</sup> Realizing this level of deployment would create a new industry, revitalize U.S. waterfronts, create good-paying U.S. jobs, and help address the climate emergency.

Marine energy is an emerging industry and efforts have primarily focused on research, design, development, testing, and demonstration of new technologies. These technologies have vast potential to play a role in addressing U.S. energy needs and are particularly suited to meeting energy needs of the blue economy.<sup>4</sup> Marine energy resources—ocean waves, tides, currents, and salinity, thermal,

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<sup>3</sup> [Offshore Wind Market Report: 2023 Edition \(energy.gov\)](#)

<sup>4</sup> [Powering the Blue Economy Report | Department of Energy](#)

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and pressure gradients—are abundant, geographically diverse, energy dense, predictable, and have near-term potential to provide clean, renewable electricity to coastal communities and blue economy markets, such as aquaculture.

The Aquaculture industry, a potentially pivotal component in climate resilience efforts, continues to rapidly grow worldwide. In the U.S., the National Oceanic and Atmospheric Administration (NOAA) Office of Aquaculture<sup>5</sup> has advanced efforts to expand sustainable aquaculture production in both state and federal waters as evidenced by ongoing efforts to identify Aquaculture Opportunity Areas (AOA) and the “Guide to Permitting Marine Aquaculture in the United States”<sup>6</sup> released in February of 2022. To identify AOAs, the U.S. federal government is conducting spatial and environmental analyses and public engagement to determine areas that are environmentally, socially, and economically appropriate for commercial aquaculture. Globally, marine aquaculture is projected to double and reach near-equal productivity as traditional marine capture fishing as a source of fish protein by 2050.<sup>7</sup>

Pairing aquaculture systems and ocean renewable energy systems through co-location and co-development efforts has potential to benefit both industries. Ocean renewable energy technologies could provide clean power to aquaculture operations. Co-locating aquaculture and ocean renewable energy development could provide additive benefits to coastal communities such as good-paying jobs and working waterfront infrastructure that support both industries. Co-development or co-location could also create efficiencies in shared needs between the two industries, such as spatial analyses, environmental surveying, maintenance, long-term monitoring, and federal environmental reviews for permitting, while decreasing competition for ocean space.

To address this opportunity, Congress directed WETO and WPTO to support: *“University-led research projects related to resource characterization, site planning, aquaculture assessments, community outreach, and planning for long term environmental monitoring for applications of marine energy and floating offshore wind technologies to support sustainable, scalable aquaculture production.”*<sup>8</sup>

In response to this Congressional direction, WETO and WPTO conducted an Offshore Renewable Energy and Aquaculture Synergies Request for Information (RFI) ([DE-FOA-0002943](#)) in February 2023 to elicit stakeholder views and inform

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<sup>5</sup> [Office of Aquaculture](#) | NOAA Fisheries

<sup>6</sup> [Guide to Permitting Marine Aquaculture in the United States \(2022\) | NOAA Fisheries](#)

<sup>7</sup> [DNV Marine Aquaculture Forecast: Oceans' future to 2050 - DNV](#)

<sup>8</sup> See Fiscal Year 2023 Conference Agreement Report Explanatory Statement, Congressional Record, Dec. 20, 2022, p. S8350

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future investments. The RFI requested information on opportunities, feasibility, and key challenges relating to the co-location and co-development of aquaculture with ocean renewable energy. The RFI specifically sought input on ways in which aquaculture could support offshore wind deployment, as well as the potential for using marine energy to power aquaculture operations. Key takeaways from RFI responses for both OSW and ME are summarized in [Appendix H](#) for additional detail supporting Topic Area 2.

**Informed by WETO and WPTO priorities and the RFI results, Topic Area 2 will support work in two subtopics:**

1. Feasibility of Floating Offshore Wind Energy and Aquaculture Co-Location;  
and
2. Integration and Co-location of Marine Energy and Aquaculture

For the purposes of these subtopics:

- *Floating offshore wind* refers to commercial, utility-scale deployment of floating offshore wind arrays in U.S. waters.
- *Marine energy* is defined as renewable power harnessed from the movement of ocean waves, tides, and river and ocean currents, as well as power harnessed from ocean thermal, pressure, and salinity gradients. Marine energy technologies are inclusive of devices that convert marine energy to mechanical energy (e.g., seawater pumping) or electrical energy.
- *Aquaculture* refers to, but is not limited to, coastal and offshore shellfish, finfish, macroalgae, and multi-trophic farms or hatcheries of all sizes which can include wild harvest from offshore renewable energy projects. Activities can also include monitoring, environmental surveying of potential locations, and other activities related to farm or cultivation siting. Land-based aquaculture facilities located near the shoreline such as hatcheries, recirculating farms, processing facilities, and others are also applicable.

**1) Subtopic 2a: Feasibility of Floating Offshore Wind Energy and Aquaculture Co-Location**

This subtopic was developed by WETO with the intention of seeking applications that provide strategic feasibility assessments of potential co-location scenarios of sustainable and scalable aquaculture production and commercial scale floating offshore wind. With recognition of the opportunities and challenges associated with responsible and sustainable use of U.S. ocean spaces, this FOA will contribute to the implementation of the

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U.S. Department of Energy Offshore Wind Energy Strategy. Specifically, this effort aligns with the FORWARD initiative<sup>9</sup> aiming to inform just, sustainable, and timely development of floating offshore wind energy in deep waters by exploring possible marine co-use scenarios with a focus on the unique impacts and geographies of floating offshore wind energy development.

Offshore aquaculture production —defined as more than three miles offshore—is virtually non-existent in the U.S. due to the economic, engineering, and operational challenges in the exposed offshore environments that may host floating offshore wind developments. Currently, there is a scarcity of research on the feasibility and practicality of merging U.S. aquaculture and offshore wind energy industry efforts. To pursue the goal of efficient marine co-use, it is important to understand the barriers and benefits of potential co-location of offshore energy production and aquaculture.

WETO is seeking applications for feasibility analyses that analyze the challenges and opportunities associated with co-location of aquaculture and commercial scale floating offshore wind. WETO recommends applicants select a region of interest, specifically either the West coast (Central California through Northern Oregon) or the Gulf of Maine. WETO encourages applicants to provide a comprehensive analysis of the range of potential floating offshore wind and aquaculture co-location scenarios within their identified geography, such as through a tiered assessment approach that begins broadly and winnows down to specific scenarios.

WETO seeks applications that produce insights on key challenges, barriers, risks, and potential opportunities, with the intent of identifying the circumstances and scenarios in which co-location may be more or less realistic. Particular areas of interest include (but are not limited to): 1) economic feasibility (including potential sharing of upfront capital costs or ongoing operational costs between floating offshore wind and aquaculture); 2) scalability; 3) technological requirements; 4) regulatory considerations (including permitting obstacles and pathways); 5) environmental effects and climate resilience; 6) co-use impacts (e.g. with fisheries); 7) ability for onshore infrastructure to support offshore operations; 8) safety (e.g. navigational and food safety); 9) workforce requirements; 10) community benefits; and 11) social acceptance. Applicants are also encouraged to provide recommendations on future research and development needed to capitalize on identified opportunities.

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<sup>9</sup> The Floating Offshore Wind Advanced Research and Development (FORWARD) initiative:  
<https://www.energy.gov/sites/default/files/2023-03/advancing-offshore-wind-energy-highlights.pdf>

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It is anticipated that up to two applications may be funded under this subtopic. To align with regions expected for floating offshore wind development, WETO expects to fund one application focused on the Gulf of Maine and one application focused on the West Coast (Central California through Northern Oregon).

The subtopic will have one budget period.

## **2) Subtopic 2b: Integration and Co-location of Marine Energy and Aquaculture**

This subtopic was developed by WPTO with the intention of seeking applications that advance our understanding of: (1) how marine energy could provide a renewable power source for the aquaculture industry, as existing options for power at sea are mostly non-renewable (e.g., diesel generators), and (2) how co-location of these two industries could create efficiencies in shared research and development needs. With proper R&D, marine energy could become an integral part of marine aquaculture's renewable energy portfolio and help decarbonize the industry. To date, WPTO has supported R&D for the co-location of marine energy and aquaculture through investments in feasibility, market analysis, and spatial planning studies. While these studies have broadened the understanding of opportunities for marine energy and aquaculture co-location, many knowledge gaps and challenges still exist, as highlighted in responses to the Offshore Renewable Energy and Aquaculture Synergies RFI<sup>10</sup>. Research priorities for Topic Area 2b were informed by key takeaways from the RFI (see [Appendix H](#) for details) as well as by relevant research studies, communications and collaborations with other relevant federal agencies, and interviews with community engagement professionals in the aquaculture sector.

### **Research Priorities**

For Subtopic Area 2b, WPTO aims to support university-led research to advance the sustainable and environmentally responsible development of marine energy devices suited to powering aquaculture operations, increasing the likelihood of marine energy adoption by the aquaculture industry. Applications that consider either mechanical or electrical uses of marine energy are eligible for submission given there is a clear innovative and/or technological component to the application. Applications that incorporate previous and/or proposed aquaculture end-user and/or community engagement and that address one or more of the following research priorities are requested:

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<sup>10</sup> [EERE eXCHANGE: Funding Opportunity \(energy.gov\)](#)

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- 1) Design, development, optimization, and/or testing of marine energy technology intended to integrate and/or co-locate with aquaculture operations based on end-user needs.
- 2) Identification and evaluation of the needs, goals, concerns, and/or challenges of ocean farmers, marine energy technology developers, and/or surrounding communities regarding the integration and/or co-location of marine energy technologies and aquaculture.
- 3) Measurement and/or gathering of data on energy needs across ocean farm sizes, types, and/or temporal scales; incorporation of gathered data into a co-location framework, domestic market analysis, and/or model that can be used for co-location studies with marine energy.
- 4) Assessment of the possible interferences and interactions between co-located marine energy technologies and aquaculture (e.g., cumulative environmental impacts, farm productivity, energy generation) and the resulting implications, if any, for developing and/or permitting marine energy co-location projects.
- 5) Analysis of the economic feasibility and operating costs for ocean farmers to use marine energy as compared to existing energy sources.
- 6) Open research: any of the priorities above, or other research areas not listed, that integrate marine energy with aquaculture or that integrate other renewable energy technologies (e.g., solar energy, fixed-bottom or floating wind energy), marine energy, and aquaculture in a hybrid energy approach.

Participation of and collaboration between aquaculture practitioners; marine energy technology developers; impacted community representatives; regional research hubs; federal, state, and local agencies or regulators; and/or other stakeholders is highly encouraged. Proposed partnerships do not need to be finalized by the concept paper deadline, but concept papers should specify how these partnerships would be formed, if applicable. Applicants are responsible for obtaining all necessary permits for any proposed in-water activities.

See Section [IV.C](#) and [IV.D](#) for specific required components of the Concept Paper and Full Application, respectively.

The subtopic will have one budget period.

### **iii. Topic Area 3: Undergraduate Senior Design and/or Research Project**

WPTO acknowledges that the future of marine energy is dependent on the availability of a skilled workforce. Recognizing the marine energy community needs professionals contributing to a diverse set of jobs spanning research,

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policy, environmental science, ecology, engineering, communication, outreach, and more, WPTO's goal is to cultivate a skilled student population with an abundant source of new knowledge before entering the next phase of education and/or a career in marine energy. Topic Area 3 seeks to support the development of a skilled workforce by ensuring undergraduate students have access to a wide range of resources (research, methodology, technical support and/or network development) needed to be successful in completing their senior design and/or research projects, expanding students' ability to tackle some of the most critical challenges that cut across the entire marine energy industry.

Topic Area 3 will fund universities to support undergraduate senior design and/or research projects in marine energy. Topic Area 3 objective is to enable universities to increase undergraduate students' access to the resources and tools needed to strengthen, advance, and ultimately complete their senior design and/or research projects. The work under this topic area could include professional network growth and industry exposure as an added benefit to the student's research and understanding of the marine energy sector, its stakeholders, and the communities where marine energy technologies are located.

The resources needed will vary by project, at the discretion of each university and student, as applicable to the research. Resources could include, but are not limited to, project supplies, funding for travel to conduct fieldwork, datasets, technical assistance, mentorship, trainings, and/or access to research and testing facilities. Projects can be carried out at the student's home institution, in partnership with another educational institution (for example, if another institution offers complementary coursework on the topic of interest to a student), and/or with partnering communities (such as a local government, tribal nation, or state), nonprofit organizations, electric utilities, technology development companies, and/or other industry organizations that are working in marine energy. Any partnering or host organizations must offer opportunities for the students to cultivate skills and experiences that will help them successfully complete their senior project.

Senior projects can include a range of disciplines, such as engineering, environmental science, or the social sciences, and include, but are not limited to, the following areas of study:

- Community adoption of marine energy.
- Social acceptance of marine energy.
- Environmental concerns surrounding marine energy.
- Research and design of emerging marine energy technologies.

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WPTO encourages applications from universities that have not received DOE funding in the past to support marine energy research as well as universities just beginning to develop marine energy curricula and/or research programs. WPTO also welcomes applications involving multiple partnering universities or from a university partnering with a technology development company, community, or other organization.

**iv. Topic Area 4: Open Topic Area**

WPTO recognizes that there may be many other novel and impactful research avenues that could benefit the entire marine energy industry. This open topic area allows researchers to propose project ideas that do not fit within the parameters of the other topic areas. Projects funded through this topic area will support the Marine Energy program objectives of driving cost reductions both through improving device performance and reducing costs of existing device designs or testing and deployment requirements. Projects may also develop new capabilities that can allow for entirely new designs and approaches.

The objective of Topic Area 4 is to develop innovative technologies that have the potential to significantly advance Marine Energy technologies and the state of the Marine Energy industry. The Marine Energy industry has a broad range of concepts for components and systems with varying levels of maturity. This topic area allows applicants to propose activities that address the needs of the marine energy industry not covered by other topic areas of this FOA. WPTO will consider applications in the areas of wave energy, tidal energy, ocean thermal energy or current and pressure gradients. Proposed research should advance the state of the industry and address a challenge or opportunity in the foundational R&D area. The onus will be on the applicant to clearly articulate the impact of the proposed research on the Marine Energy industry.

Potential areas of interest include, but are not limited to, the following areas: supply chain analyses; materials development, advancement, or testing; advanced manufacturing for prototyping or production devices; Powering the Blue Economy (PBE) applications; marine energy integration for blue economy applications (non-aquaculture); marine energy-powered product generation (e.g. desalination, hydrogen, ammonia, etc.); marine energy-powered carbon dioxide removal, including marine energy-powered monitoring, reporting, and verification; microscale marine energy converters; wave remote sensing, including forecasting and wave-to-wave tuning; and high-bandwidth high-efficiency power electronics (specific to wave energy converters at both utility and PBE scales).

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Any software products proposed under this topic area must be made publicly available. See [Appendix D](#). All work for projects selected under this FOA must be performed in the United States. See Section [IV.J.iii.](#) and [Appendix B](#).

### **C. Applications Specifically Not of Interest**

The following types of applications will be deemed nonresponsive and will not be reviewed or considered (See [Section III.D.](#) of the FOA):

- Applications that fall outside the technical parameters specified in Sections [I.A.](#) and [I.B.](#) of the FOA.
- Applications for proposed technologies that are not based on sound scientific principles (e.g., violates the laws of thermodynamics).
- Topic Area 1/ Subtopic 1b: Applications that seek only to optimize the performance of the specific ME test platform and do not have applicability to a broader range of ME technologies.
- Topic Area 2/ Subtopic 2a: Applications for feasibility studies focused on aquaculture co-location within specific offshore wind energy lease areas and feasibility studies considering co-location of aquaculture with fixed bottom offshore wind.
- Topic Area 2/Subtopic 2b: Applications that do not include marine energy-relevant R&D. Marine Energy is defined as energy harnessed from the natural movement of water, including waves, tides, and river and ocean currents. Marine energy can also be harnessed from thermal, salinity or pressure gradients. Offshore wind energy is excluded from this definition.

### **D. Diversity, Equity, and Inclusion**

It is the policy of the Biden Administration that:

The Federal Government should pursue a comprehensive approach to advancing equity<sup>11</sup> for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality. Affirmatively advancing equity, civil rights, racial justice, and equal opportunity is the responsibility of the whole of our government. Because advancing equity requires a systematic approach to embedding fairness in decision-making processes, executive departments, and agencies (agencies) must recognize and work

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<sup>11</sup> The term “equity” means the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment, such as Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality.

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to redress inequities in their policies and programs that serve as barriers to equal opportunity.

By advancing equity across the Federal Government, we can create opportunities for the improvement of communities that have been historically underserved, which benefits everyone.<sup>12</sup>

As part of this whole of government approach, this FOA seeks to encourage the participation of underserved communities<sup>13</sup> and underrepresented groups. Applicants are highly encouraged to include individuals from groups historically underrepresented<sup>14,15</sup> in STEM on their project teams. As part of the application, applicants are required to describe how diversity, equity, and inclusion objectives will be incorporated in the project. Specifically, applicants are required to submit a Diversity, Equity, and Inclusion Plan that describes the actions the applicant will take to foster a welcoming and inclusive environment, support people from underrepresented groups in STEM, advance equity, and encourage the inclusion of individuals from these groups in the project; and the extent the project activities will

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<sup>12</sup> Executive Order 13985, “Advancing Racial Equity and Support for Underserved Communities Through the Federal Government” (Jan. 20, 2021).

<sup>13</sup> The term “underserved communities” refers to populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life, as exemplified by the list of in the definition of “equity.” E.O. 13985. For purposes of this FOA, as applicable to geographic communities, applicants can refer to economically distressed communities identified by the Internal Revenue Service as Qualified Opportunity Zones; communities identified as disadvantaged or underserved communities by their respective States; communities identified on the Index of Deep Disadvantage referenced at <https://news.umich.edu/new-index-ranks-americas-100-most-disadvantaged-communities/>, and communities that otherwise meet the definition of “underserved communities” stated above.

<sup>14</sup> According to the National Science Foundation’s 2019 report titled, “Women, Minorities and Persons with Disabilities in Science and Engineering”, women, persons with disabilities, and underrepresented minority groups—blacks or African Americans, Hispanics or Latinos, and American Indians or Alaska Natives—are vastly underrepresented in the STEM (science, technology, engineering and math) fields that drive the energy sector. That is, their representation in STEM education and STEM employment is smaller than their representation in the U.S. population. <https://nces.nsf.gov/pubs/nsf19304/digest/about-this-report> For example, in the U.S., Hispanics, African Americans and American Indians or Alaska Natives make up 24 percent of the overall workforce, yet only account for 9 percent of the country’s science and engineering workforce. DOE seeks to inspire underrepresented Americans to pursue careers in energy and support their advancement into leadership positions. <https://www.energy.gov/articles/introducing-minorities-energy-initiative>

<sup>15</sup> See also. Note that Congress recognized in section 305 of the American Innovation and Competitiveness Act of 2017, Public Law 114-329:

(1) [I]t is critical to our Nation’s economic leadership and global competitiveness that the United States educate, train, and retain more scientists, engineers, and computer scientists; (2) there is currently a disconnect between the availability of and growing demand for STEM-skilled workers; (3) historically, underrepresented populations are the largest untapped STEM talent pools in the United States; and (4) given the shifting demographic landscape, the United States should encourage full participation of individuals from underrepresented populations in STEM fields.

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be located in or benefit underserved communities (See Section IV.D.vii). The plan should include at least one SMART (Specific, Measurable, Assignable, Realistic and Time-Related) milestone per budget period supported by metrics to measure the success of the proposed actions. This plan will be evaluated as part of the technical review process and incorporated into the award if selected.

Further, Minority Serving Institutions<sup>16</sup>, Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses, Veteran Owned Businesses, or entities located in an underserved community that meet the eligibility requirements (See Section III.) are encouraged to apply as the prime applicant or participate on an application as a proposed partner to the prime applicant. The Selection Official may consider the inclusion of these types of entities as part of the selection decision (See Section V.C.i).

## E. Authorizing Statutes

The programmatic authorizing statutes are:

- **WPTO**: Energy Independence and Security Act (EISA) of 2007, P.L. 110-140, Section 635 as added by Energy Act of 2020, P.L. 116-260, Div. Z, Title III, Section 3001(a) (Dec. 27, 2020). Codified at 42 U.S.C. § 17214, Marine energy research, development and demonstration.
- **WETO**: Energy Act of 2020, P.L. 116-260, Div. Z, Title III, Section 3003(b) (Dec. 27, 2020). Codified at 42 U.S.C. § 16237, Wind energy research and development.

Awards made under this announcement will fall under the purview of 2 CFR Part 200 as amended by 2 CFR Part 910.

## II. Award Information

### A. Award Overview

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<sup>16</sup> Minority Serving Institutions (MSIs), including Historically Black Colleges and Universities/Other Minority Institutions as educational entities recognized by the Office of Civil Rights (OCR), U.S. Department of Education, and identified on the OCR's Department of Education U.S. accredited postsecondary minorities' institution list. See <https://www2.ed.gov/about/offices/list/ocr/edlite-minorityinst.html>.

**i. Estimated Funding**

EERE expects to make a total of approximately \$14,500,000 of federal funding available for new awards under this FOA, subject to the availability of appropriated funds. EERE anticipates making up to 33 awards under this FOA.

EERE may issue one, multiple, or no awards. Individual awards may vary between \$200,000 and \$1,000,000.

EERE may issue awards in one, multiple, or none of the following topic areas:

Topic Area Number	Topic Area Title	Anticipated Number of Awards	Anticipated Minimum Award Size for Any One Individual Award (Fed Share)	Anticipated Maximum Award Size for Any One Individual Award (Fed Share)	Approximate Total Federal Funding Available for All Awards	Anticipated Period of Performance (months)	Budget Periods
1	<b>Publicly Available Marine Energy Data Analysis &amp; Test Platforms to Produce Publicly Available Data</b>						
1a	LCOE Reduction Pathway Analysis	1	\$500K	\$500K	\$500K	Up to 12	1
1b	Leveraging Existing Publicly available ME Test Platforms to Produce Publicly Available Data	Up to 5	\$200K	\$500K	\$1.5M	Up to 36	2
1c	Design and Fabricate Wave Energy Test Platform(s) to Produce Publicly Available Data	Up to 5	\$250K	\$1.0M	\$3M	Up to 48	2
2	<b>Sustainable &amp; Scalable Offshore Wind, Marine Energy, and Aquaculture</b>						
2a	Feasibility of Floating Offshore Wind Energy and Aquaculture Co-Location	Up to 2	\$375K	\$375K	\$750K	Up to 24	1
2b	Integration and Co-Location of Marine Energy and Aquaculture	Up to 3	\$250K	\$750K	\$750K	Up to 36	1
3	Undergraduate Senior Design and/or Research Project	Up to 4	\$500K	\$500K	\$2M	Up to 48	1
4	Open Topic	Up to 12	\$500K	\$1.0M	\$6M	Up to 48	2

EERE may establish more than one budget period for each award and fund only the initial budget period(s). Funding for all budget periods, including the initial budget period, is not guaranteed.

## ii. Period of Performance

EERE anticipates making awards that will run from twelve months (Topic Area 1a) up to four years in length, comprised of one or more budget periods. Project

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continuation will be contingent upon several elements, including satisfactory performance and [Go/No-Go](#) (GNG) decision. For a complete list and more information on the GNG review, see [Section VI.B.xiv](#).

**iii. New Applications Only**

EERE will accept only new applications under this FOA. EERE will not consider applications for renewals of existing EERE-funded awards through this FOA.

**B. EERE Funding Agreements**

Through cooperative agreements and other similar agreements, EERE provides financial and other support to projects that have the potential to realize the FOA objectives. EERE does not use such agreements to acquire property or services for the direct benefit or use of the U.S. government.

**i. Cooperative Agreements**

EERE generally uses cooperative agreements to provide financial and other support to prime recipients.

Through cooperative agreements, EERE provides financial or other support to accomplish a public purpose of support or stimulation authorized by federal statute. Under cooperative agreements, the government and prime recipients share responsibility for the direction of projects.

EERE has substantial involvement in all projects funded via cooperative agreement. See [Section VI.B.x](#) of the FOA for more information on what substantial involvement may involve.

**ii. Funding Agreements with Federally Funded Research and Development Center (FFRDCs)<sup>17</sup>**

In most cases, FFRDCs are funded independently of the remainder of the project team. The FFRDC then executes an agreement with any non-FFRDC project team members to arrange work structure, project execution, and any other matters. Regardless of these arrangements, the entity that applied as the prime recipient for the project will remain the prime recipient for the project. See Section III.E.i.

**III. Eligibility Information**

To be considered for substantive evaluation, an applicant's submission must meet the criteria set forth below. If the application does not meet these eligibility requirements, it will be considered ineligible and removed from further evaluation.

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<sup>17</sup> Federally Funded Research and Development Centers (FFRDC) - FFRDCs are public-private partnerships that conduct research for the U.S. government. A listing of FFRDCs can be found at <http://www.nsf.gov/statistics/ffrdclist/>.

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## A. Eligible Applicants

### i. Domestic Entities

The proposed prime recipient and subrecipient(s) must be domestic entities.

Prime Recipients for this Funding Opportunity Announcement are restricted to domestic institutions of higher education, including minority serving institutions.

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.

The following types of domestic entities are eligible to participate as a subrecipient of this FOA:

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

DOE/NNSA FFRDCs are eligible to apply for funding as a subrecipient but are not eligible to apply as a prime recipient.

Non-DOE/NNSA FFRDCs are eligible to participate as a subrecipient but are not eligible to apply as a prime recipient.

Federal agencies and instrumentalities (other than DOE) are eligible to participate 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.

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**ii. Foreign Entities**

In limited circumstances, EERE may approve a waiver to allow a foreign entity to participate as a prime recipient or subrecipient. A foreign entity may submit a Full Application to this FOA, but the Full Application must be accompanied by an explicit written waiver request. Likewise, if the applicant seeks to include a foreign entity as a subrecipient, the applicant must submit a separate explicit written waiver request in the Full Application for each proposed foreign subrecipient.

[Appendix B](#) lists the information that must be included in a foreign entity waiver request. The applicant does not have the right to appeal EERE's decision concerning a waiver request.

**B. Cost Sharing**

Applicants are bound by the cost share proposed in their Full Applications if selected for award negotiations.

Cost sharing is accepted, but not required under this FOA.

If an applicant elects to include cost share in their application, refer to sections III.B.i to III.B.vi below.

To help applicants calculate proper cost share amounts, EERE has included a cost share information sheet and sample cost share calculation as [Appendix A](#) to this FOA.

**i. Legal Responsibility**

Although the cost share requirement applies to the project, including work performed by members of the project team other than the prime recipient, the prime recipient is legally responsible for paying the entire cost share. If the funding agreement is terminated prior to the end of the project period, the prime recipient is required to contribute at least the cost share percentage of total expenditures incurred through the date of termination.

The prime recipient is solely responsible for managing cost share contributions by the project team and enforcing cost share obligation assumed by project team members in subawards or related agreements.

**ii. Cost Share Allocation**

Each project team is free to determine how best to allocate the cost share requirement among the team members. The amount contributed by individual

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project team members may vary, as long as the cost share requirement for the entire project is met.

### **iii. Cost Share Types and Allowability**

Every cost share contribution must be allowable under the applicable federal cost principles, as described in Section IV.J.i. of the FOA. In addition, cost share must be verifiable upon submission of the Full Application. Cost share may be provided in the form of cash or cash equivalents, or in-kind contributions. Cost share must come from non-federal sources (unless otherwise allowed by law), such as project participants, state or local governments, or other third-party financing. Federal financing, such as DOE Loan Guarantee, cannot be leveraged by applicants to provide the required cost share or otherwise support the same scope that is proposed under a project.

Cost share may be provided by the prime recipient, subrecipients, or third parties (entities that do not have a role in performing the scope of work). Vendors/contractors may not provide cost share. Any partial donation of goods or services is considered a discount and is not allowable.

Cash contributions include but are not limited to personnel costs, fringe costs, supply and equipment costs, indirect costs and other direct costs.

In-kind contributions are those where a value of the contribution can be readily determined, verified, and justified but where no actual cash is transacted in securing the good or service comprising the contribution. Allowable in-kind contributions include but are not limited to the donation of volunteer time or the donation of space or use of equipment.

Project teams may use funding or property received from state or local governments to meet the cost share requirement, so long as the federal government did not provide the funding to the state or local government.

The recipient may not use any of the following sources to meet its cost share obligations:

- Revenues or royalties from the prospective operation of an activity beyond the project period;
- Proceeds from the prospective sale of an asset of an activity;
- Federal funding or property (e.g., federal grants, equipment owned by the federal government); or
- Expenditures that were reimbursed under a separate federal program.

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Project teams may not use the same cash or in-kind contributions to meet cost share requirements for more than one project or program.

Cost share contributions must be specified in the project budget, verifiable from the prime recipient's records, and necessary and reasonable for proper and efficient accomplishment of the project. As all sources of cost share are considered part of total project cost, the cost share dollars will be scrutinized under the same federal regulations as federal dollars to the project. 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.

Applicants are encouraged to refer to 2 CFR 200.306 as amended by 2 CFR 910.130 for additional cost sharing requirements.

**iv. Cost Share Contributions by FFRDCs**

Because FFRDCs are funded by the federal government, costs incurred by FFRDCs generally may not be used to meet the cost share requirement. FFRDCs may contribute cost share only if the contributions are paid directly from the contractor's Management Fee or another non-federal source.

**v. Cost Share Verification**

Applicants are required to provide written assurance of their proposed cost share contributions in their Full Applications.

Upon selection for award negotiations, applicants are required to provide additional information and documentation regarding their cost share contributions. Please refer to [Appendix A](#) of the FOA.

**vi. Cost Share Payment**

DOE requires prime recipients to contribute the cost share amount incrementally over the life of the award. Specifically, the prime recipient's cost share for each billing period must always reflect the overall cost share ratio negotiated by the parties (i.e., the total amount of cost sharing on each invoice when considered cumulatively with previous invoices must reflect, at a minimum, the cost sharing percentage negotiated). As FFRDC funding will be provided directly to the FFRDC(s) by DOE, prime recipients will be required to provide project cost share at a percentage commensurate with the FFRDC costs, on a budget period basis, resulting in a higher interim invoicing cost share ratio than the total award ratio.

In limited circumstances, and where it is in the government's interest, the Contracting Officer may approve a request by the prime recipient to meet its

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cost share requirements on a less frequent basis, such as monthly or quarterly. Regardless of the interval requested, the prime recipient must be up-to-date on cost share at each interval. Such requests must be sent to the Contracting Officer during award negotiations and include the following information: (1) a detailed justification for the request; (2) a proposed schedule of payments, including amounts and dates; (3) a written commitment to meet that schedule; and (4) such evidence as necessary to demonstrate that the prime recipient has complied with its cost share obligations to date. The Contracting Officer must approve all such requests before they go into effect.

### C. Compliance Criteria

All applicant submissions must:

- Comply with the applicable content and form requirements listed in [Section IV.](#) of the FOA;
- Include all required documents;
- Be uploaded and submitted to EERE eXCHANGE <https://eere-eXCHANGE.energy.gov>; and
- Be submitted by the deadline stated in the FOA.

EERE will not review or consider submissions submitted through means other than EERE eXCHANGE, submissions submitted after the applicable deadline, or incomplete submissions.

**Applicants are strongly encouraged to submit their Concept Papers, Full Applications, and Replies to Reviewer Comments at least 48 hours in advance of the submission deadline.** Under normal conditions (i.e., at least 48 hours before the submission deadline), applicants should allow at least one hour to submit a Concept Paper, Full Application, or Reply to Reviewer Comments. Once the Concept Paper, Full Application, or Reply to Reviewer Comments is submitted in EERE eXCHANGE, applicants may revise or update that submission until the expiration of the applicable deadline. If changes are made to any of these documents, the applicant must resubmit the Concept Paper, Full Application, or Reply to Reviewer Comments before the applicable deadline. EERE will not extend the submission deadline for applicants that fail to submit required information by the applicable deadline due to server/connection congestion.

### D. Responsiveness Criteria

All Applications Specifically Not of Interest as described in [Section I.C.](#) of the FOA, are deemed nonresponsive and are not reviewed or considered.

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## E. Other Eligibility Requirements

### i. Requirements for DOE/NNSA and Non-DOE/NNSA FFRDCs Included as a Subrecipient

DOE/NNSA and non-DOE/NNSA FFRDCs may be proposed as a subrecipient on another entity's application subject to the following guidelines:

- a. Authorization for non-DOE/NNSA FFRDCs  
The federal agency sponsoring the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The use of a FFRDC must be consistent with its authority under its award.
- b. Authorization for DOE/NNSA FFRDCs  
The cognizant Contracting Officer for the FFRDC must authorize in writing the use of the FFRDC 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 Laboratory to participate in the proposed project. The work proposed for the Laboratory is consistent with or complementary to the missions of the Laboratory and will not adversely impact execution of the DOE assigned programs at the Laboratory.

- c. Funding, Cost Share, and Subaward with FFRDCs  
The value of and funding for the FFRDC portion of the work will not normally be included in the award. DOE/NNSA FFRDCs participating as a subrecipient on a project will be funded directly through the DOE field work proposal (WP) process. Non-DOE/NNSA FFRDCs participating as a subrecipient will be funded through an interagency agreement with the sponsoring agency. Although the FFRDC portion of the work is excluded from the award, the applicant's cost share requirement will be based on the total cost of the project, including the applicant's, the subrecipient's, and the FFRDC's portions of the project.

Unless instructed otherwise by the DOE Contracting Officer for the DOE award, all FFRDCs are required to enter into a Cooperative Research and Development Agreement<sup>18</sup> (CRADA) or, if the role of the DOE/NNSA FFRDC

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<sup>18</sup> A cooperative research and development agreement is a contractual agreement between a national laboratory contractor and a private company or university to work together on research and development. For more information, see <https://www.energy.gov/gc/downloads/doe-cooperative-research-and-development-agreements>

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is limited to technical assistance and intellectual property is not anticipated to be generated from the DOE/NNSA FFRDC's work, a Technical Assistance Agreement (TAA), with at least the prime recipient before any project work begins. Any questions regarding the use of a CRADA or TAA should be directed to the cognizant DOE field intellectual property (IP) counsel.

The CRADA or TAA is used to ensure accountability for project work and provide the appropriate management of IP, e.g., data protection and background IP. The CRADA or TAA must be agreed upon by all parties and submitted to DOE or other sponsoring agency, when applicable, for approval, or submitted to DOE for notice under the Master Scope of Work process, when applicable, using any DOE or other sponsoring agency approved CRADA or TAA template without substantive changes by the time the award is made to the prime recipient.

d. Responsibility

The prime recipient 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 prime recipient and the FFRDC.

e. Limit on FFRDC Effort

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

## **F. Limitation on Number of Concept Papers and Full Applications Eligible for Review**

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.

## **G. Questions Regarding Eligibility**

DOE will not make eligibility determinations for potential applicants prior to the date on which applications to this FOA must be submitted. The decision whether to apply in response to this FOA lies solely with the applicant.

# **IV. Application and Submission Information**

*Questions about this FOA? Email [MarineEnergyFOA@ee.doe.gov](mailto:MarineEnergyFOA@ee.doe.gov).*

*Problems with EERE eXCHANGE? Email [EERE-eXCHANGESupport@hq.doe.gov](mailto:EERE-eXCHANGESupport@hq.doe.gov) Include FOA name and number in subject line.*

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## A. Application Process

The application process includes multiple submission phases: Concept Paper, and Full Application. **Only applicants who have submitted an eligible Concept Paper will be eligible to submit a Full Application.**

All submissions must conform to the form and content requirements described below, including maximum page lengths.

- Each must be submitted in Adobe PDF format unless stated otherwise;
- Each must be written in English;
- All pages must be formatted to fit on 8.5" x 11" paper with margins not less than one inch on every side. Use Calibri typeface, a black font color, and a font size of 12-point or larger (except in figures or tables, which may be 10-point font). A symbol font may be used to insert Greek letters or special characters, but the font size requirement still applies. References must be included as footnotes or endnotes in a font size of 10 or larger. Footnotes and endnotes are counted toward the maximum page requirement;
- A **control number** will be issued when an applicant begins the EERE eXCHANGE application process. The control number must be included with all application documents. Specifically, the control number must be prominently displayed on the upper right corner of the header of every page and included in the file name (i.e., *Control Number\_Applicant Name\_Full Application*);
- Page numbers must be included in the footer of every page; and
- 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, EERE will review only the authorized number of pages and disregard any additional pages.

### i. Additional Information on EERE eXCHANGE

EERE eXCHANGE is designed to enforce the deadlines specified in this FOA. The "Apply" and "Submit" buttons will automatically disable at the defined submission deadlines.

Applicants who experience technical difficulties with submission PRIOR to the FOA deadline should contact the EERE eXCHANGE helpdesk for assistance ([EERE-eXCHANGESupport@hq.doe.gov](mailto:EERE-eXCHANGESupport@hq.doe.gov)).

## B. Application Forms

The application forms and instructions are available at [EERE Funding Application and Management Forms](#) and on EERE eXCHANGE. To access these materials on EERE eXCHANGE, go to <https://eere-eXCHANGE.energy.gov> and select the appropriate funding opportunity number.

Note: The maximum file size that can be uploaded to the EERE eXCHANGE website is 50MB. Files larger than 50MB cannot be uploaded, and hence cannot be submitted for review. If a file is larger than 50MB but is still within the maximum page limit specified in the FOA, it must be broken into parts and denoted to that effect. For example:

TechnicalVolume\_Part\_1  
TechnicalVolume\_Part\_2

**EERE will not accept late submissions that resulted from technical difficulties due to uploading files that exceed 50MB.**

## C. Content and Form of the Concept Paper

Each Concept Paper must be limited to a single concept or technology. The Concept Paper must conform to the requirements listed below, including the stated page limits.

Section	Page Limit	Description
<b>Cover Page</b>	1 page maximum	<b>All Topic Areas</b> The cover page should include the project title, the specific announcement Topic Area and subtopic area being addressed, both the technical and business points of contact, names of all team member organizations, the project location(s), and any statements regarding confidentiality.
<b>Technology or Research Description</b>	3 pages maximum	Applicants are required to describe succinctly:  <b>Topic Area 1 (all subtopics) and Topic Area 4</b> <ul style="list-style-type: none"> <li>• The proposed technology, including its basic operating principles, and how it is unique and innovative;</li> <li>• The proposed technology’s target level of performance (applicants should provide technical data or other support to show how the proposed target could be met);</li> <li>• The current state of the art in the relevant field and application, including key shortcomings, limitations, and challenges;</li> </ul>

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		<ul style="list-style-type: none"> <li>• How the proposed technology will overcome the shortcomings, limitations, and challenges in the relevant field and application;</li> <li>• The potential impact that the proposed project would have on the relevant field and application;</li> <li>• How the proposed location of the proposed project will support technology development and long-term success;</li> <li>• The key technical risks/issues associated with the proposed technology development plan; and</li> <li>• The impact that EERE funding would have on the proposed project.</li> </ul> <p><b>Topic Area 2 (Subtopic 2a):</b></p> <ul style="list-style-type: none"> <li>• The proposed research, including the region of interest, a detailed description of chosen methodology, and how it is valuable to the goals outlined in the Topic Area;</li> <li>• The proposed research’s desired outcomes (applicants should explain how proposed research outcomes could be met by utilizing proposed methodologies);</li> <li>• Overview of current state of the literature in the relevant fields and applications, including key shortcomings, limitations, and challenges;</li> <li>• The potential impact that the proposed project would have on the relevant field of application;</li> <li>• The key technical risks/issues associated with the proposed research plan; and</li> <li>• The impact that EERE funding would have on the proposed project.</li> </ul> <p><b>Topic Area 2 (Subtopic 2b):</b></p> <ul style="list-style-type: none"> <li>• Which of the six stated Subtopic 2b research priorities this application is addressing;</li> <li>• The proposed research, including description of methods and how it is unique and innovative;</li> <li>• The current state of knowledge in the relevant field and application, including key shortcomings, limitations, and challenges;</li> <li>• How the proposed research will overcome the shortcomings, limitations, and challenges in the relevant field and application;</li> <li>• How the project will be informed by previous engagement with aquaculture stakeholders, and/or how it will incorporate aquaculture stakeholder engagement to inform the research;</li> </ul>
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		<ul style="list-style-type: none"> <li>• Whether the application focuses solely on marine energy as a renewable power source, or incorporates other renewable energy technologies;</li> <li>• The potential impact that the proposed project would have on the relevant field and application;</li> <li>• The key technical risks/issues associated with the proposed research plan and potential mitigation strategies; and</li> <li>• The impact that EERE funding would have on the proposed project.</li> </ul> <p><b>Topic Area 3</b></p> <ul style="list-style-type: none"> <li>• A clear and concise description of at least three proposed activities;</li> <li>• A description of how the proposed activities would address the topic area objective;</li> <li>• The proposed metrics and how the applicant will define and measure success;</li> <li>• A description of the potential replicability or scalability of the proposed activities;</li> <li>• The proposed project management approach;</li> <li>• The key skillsets and partnerships the applicant will draw upon to advance the project’s goals and impact;</li> <li>• The key resources, such as facilities or programs, the applicant will draw upon to ensure students are adequately supported and resourced;</li> <li>• An explanation of how EERE funding for undergraduate senior research design and/or research development projects will maximize research impacts; and</li> <li>• A description of how the project will promote diversity, equity, inclusion, and accessibility, including how the project will identify and select student research projects to support.</li> </ul>
<b>Addendum</b>	2 pages maximum	<p><b>All Topic Areas</b></p> <p>Applicants are required to succinctly describe the qualifications, experience, and capabilities of the proposed project team, including:</p> <ul style="list-style-type: none"> <li>• Whether the Principal Investigator (PI) and project team have the skill and expertise needed to successfully execute the project plan;</li> <li>• Whether the applicant has prior experience which demonstrates an ability to perform tasks of similar risk and complexity;</li> <li>• Whether the applicant has worked together with its teaming partners on prior projects or programs, if applicable;</li> </ul>

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		<ul style="list-style-type: none"> <li>• Whether the applicant has adequate access to equipment and facilities necessary to accomplish the effort and/or clearly explain how it intends to obtain access to the necessary equipment and facilities; and</li> <li>• Applicants may provide graphs, charts, or other data to supplement their Technology or Research Description.</li> </ul>
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EERE makes an independent assessment of each Concept Paper based on the criteria in [Section V.A.i.](#) of the FOA. EERE will encourage a subset of applicants to submit Full Applications. Other applicants will be discouraged from submitting a Full Application. See [Section VI.A.](#)

## D. Content and Form of the Full Application

Applicants must complete the following application forms found at [EERE Funding Application and Management Forms](#) and on the EERE eXCHANGE website at <https://eere-eXCHANGE.energy.gov/>.

Applicants will have approximately 30 days from receipt of the Concept Paper Encourage/Discourage notification on EERE eXCHANGE to prepare and submit a Full Application. Regardless of the date the applicant receives the Encourage/Discourage notification, the submission deadline for the Full Application remains the date and time stated on the FOA cover page.

All Full Application documents must be marked with the control number issued to the applicant.

### i. Full Application Content Requirements

Each Full Application must be limited to a single concept. Full Applications must conform to the following requirements and must not exceed the stated page limits.

Component	File Format	Page Limit	File Name
SF-424: Application for Federal Assistance	PDF	n/a	ControlNumber_LeadOrganization_App424
Technical Volume	PDF	20	ControlNumber_LeadOrganization_TechnicalVolume
Resumes	PDF	3 pages each	ControlNumber_LeadOrganization_Resumes
Letters of Commitment	PDF	1 page each	ControlNumber_LeadOrganization_LOCs
Statement of Project Objectives	MS Word	10	ControlNumber_LeadOrganization_SOPO

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Diversity, Equity, and Inclusion Plan	PDF	5	ControlNumber_LeadOrganization_DEIP
Budget Justification Workbook	MS Excel	n/a	ControlNumber_LeadOrganization_Budget_Justification
Summary/Abstract for Public Release	PDF	1	ControlNumber_LeadOrganization_Summary
Summary Slide	MS PowerPoint	1	ControlNumber_LeadOrganization_Slide
Subrecipient Budget Justification	MS Excel	n/a	ControlNumber_LeadOrganization_Subrecipient_Budget_Justification
DOE Work Proposal for FFRDC, if applicable (see DOE O 412.1A, Attachment 2)	PDF	n/a	ControlNumber_LeadOrganization_WP
Authorization from cognizant Contracting Officer for FFRDC	PDF	n/a	ControlNumber_LeadOrganization_FFRDCAuth
SF-LLL Disclosure of Lobbying Activities	PDF	n/a	ControlNumber_LeadOrganization_SF-LLL
Waiver Requests	PDF	n/a	ControlNumber_LeadOrganization_Waiver
Current and Pending Support	PDF	n/a	ControlNumber_LeadOrganization_CPS
Locations of Work	MS Excel	n/a	ControlNumber_LeadOrganization_LOW
Transparency of Foreign Connections	PDF	n/a	ControlNumber_LeadOrganization_TFP
Potentially Duplicative Funding Notice	PDF	n/a	ControlNumber_LeadOrganization_PDFN

**Note:** The maximum file size that can be uploaded to the EERE eXCHANGE website is 50MB. See [Section IV.B](#).

EERE provides detailed guidance on the content and form of each component below.

**ii. SF-424: Application for Federal Assistance (required)**

Applicants must complete the SF-424 Application for Federal Assistance, which is available on [EERE Funding Application and Management Forms](#).

Effective January 1, 2020, the System for Award Management (SAM) is the central repository for common government-wide certifications and representations required of Federal grants recipients. As registration in SAM is required for eligibility for a federal award and registration must be updated annually, Federal agencies use SAM information to comply with award requirements and avoid increased burden and costs of separate requests for

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such information, unless the recipient fails to meet a federal award requirement, or there is a need to make updates to their SAM registration for other purposes.

Note: The dates and dollar amounts on the SF-424 are for the complete project period and not just the first project year, first phase, or other subset of the project period.

Save the SF-424 in a single PDF file using the following convention for the title “ControlNumber\_LeadOrganization\_App424”.

**iii. Technical Volume (required)**

The Technical Volume must conform to the following content and form requirements. This volume must address the technical review criteria as discussed in [Section V.](#) of the FOA.

Save the Technical Volume in a single PDF file using the following convention for the title “ControlNumber\_LeadOrganization\_TechnicalVolume”.

Applicants must provide sufficient citations and references to the primary research literature to justify the claims and approaches made in the Technical Volume. However, EERE and reviewers are under no obligation to review cited sources.

The Technical Volume to the Full Application may not be more than 20 pages, including the cover page, table of contents, and all citations, charts, graphs, maps, photos, or other graphics, and must include all information in the table below. The applicant should consider the weighting of each of the technical review criteria (see [Section V.A.ii.](#) of the FOA) when preparing the Technical Volume.

The Technical Volume should clearly describe and expand upon information provided in the Concept Paper.

<b>Topic Area 1 Technical Volume Content Requirements</b>	
<b>SECTION/PAGE LIMIT</b>	<b>DESCRIPTION</b>
<b>Cover Page</b>	The cover page should include the project title, the specific FOA Topic Area and subtopic being addressed, both the technical and business points of contact, names of all team member organizations, names of the PI, Senior/Key Personnel and their organizations, the project location(s), and any statements regarding confidentiality.

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<p><b>Project Overview</b> (Approximately 10% of the Technical Volume)</p>	<p>The Project Overview should contain the following information:</p> <ul style="list-style-type: none"> <li>• <b>Background:</b> The applicant should discuss the background of its organization, including the history, successes, and current research and development status (i.e., the technical baseline) relevant to the technical topic being addressed in the Full Application.</li> <li>• <b>Project Goal:</b> The applicant should explicitly identify the targeted improvements to the baseline technology or research and the critical success factors in achieving that goal.</li> <li>• <b>DOE Impact:</b> The applicant should discuss the impact that DOE funding would have on the proposed project. Applicants should specifically explain how DOE funding, relative to prior, current, or anticipated funding from other public and private sources, is necessary to achieve the project objectives.</li> </ul>
<p><b>Technical Description, Innovation, and Impact</b> (Approximately 30% of the Technical Volume)</p>	<p>The Technical Description should contain the following information:</p> <ul style="list-style-type: none"> <li>• <b>Relevance and Outcomes:</b> The applicant should provide a detailed description of the technology or focus area, including the scientific and other principles and objectives that will be pursued during the project. This section should describe the relevance of the proposed project to the goals and objectives of the FOA, including the potential to meet specific DOE technical targets or other relevant performance targets. The applicant should clearly specify the expected outcomes of the project.</li> <li>• <b>Feasibility:</b> The applicant should demonstrate the technical feasibility of the proposed technology and capability of achieving the anticipated performance targets, including a description of previous work done and prior results. This section should also address the project’s access to necessary infrastructure (e.g., transportation, water, electricity transmission), including any use of existing infrastructure, as well as to a skilled workforce.</li> <li>• <b>Innovation and Impacts:</b> The applicant should describe the current state-of-the-art in the applicable field, the specific innovation of the proposed technology or focus area, the advantages of proposed technology over current and emerging technologies, and the overall impact on advancing the state-of-the-art/technical baseline if the project is successful.</li> </ul> <p>Additional Subtopic area specific information should include:</p> <p><b><u>Subtopic Area 1b:</u></b></p> <ul style="list-style-type: none"> <li>• The specific ME test platform to be leveraged. Partnerships between universities and Marine Energy industry members are strongly encouraged.</li> <li>• Specific LCOE reduction pathways targeted by the ME test platform.</li> <li>• Specific modifications, if necessary, that would be made to the platform to enable testing and validation of the LCOE reduction pathways.</li> <li>• How the ME test platform will be used to test the identified LCOE reductions.</li> <li>• How capabilities of the ME test platform will be communicated to potential end users.</li> </ul>

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	<ul style="list-style-type: none"> <li>• How continued access to the ME test platform will be ensured after the period of performance.</li> <li>• How all test data generated by the ME test platform, both during and post award period, will be made publicly available.</li> </ul> <p><b>Subtopic Area 1c:</b></p> <ul style="list-style-type: none"> <li>• The general concept of the proposed wave energy test platform.</li> <li>• Specific LCOE reduction pathway(s) to be targeted by the new wave energy test platform.</li> <li>• Specific attributes of the proposed wave energy test platform that enable testing and validation of the LCOE reduction pathway(s).</li> <li>• How the wave energy test platform will be used to test the identified LCOE reductions.</li> <li>• How capabilities of the wave energy test platform will be communicated to potential end users.</li> <li>• How continued access to the wave energy test platform will be ensured after the period of performance.</li> <li>• How all test data generated by the wave energy test platform, both during and post award period, will be made publicly available.</li> </ul>
<p><b>Workplan</b> (Approximately 40% of the Technical Volume)</p>	<p>The Workplan should include a summary of the Project Objectives, Technical Scope, Work Breakdown Structure (WBS), Milestones, <a href="#">Go/No-Go</a> decision points, and Project Schedule. A detailed SOPO is separately requested. The Workplan should contain the following information:</p> <ul style="list-style-type: none"> <li>• <b>Project Objectives:</b> The applicant should provide a clear and concise (high-level) statement of the goals and objectives of the project as well as the expected outcomes.</li> <li>• <b>Technical Scope Summary:</b> The applicant should provide a summary description of the overall work scope and approach to achieve the objective(s). The overall work scope is to be divided by performance periods that are separated by discrete, approximately annual decision points (see below for more information on <a href="#">Go/No-Go</a> decision points). The applicant should describe the specific expected end result of each performance period, including milestones in the Diversity, Equity, and Inclusion Plan.</li> <li>• <b>WBS and Task Description Summary:</b> The Workplan should describe the work to be accomplished and how the applicant will achieve the milestones, will accomplish the final project goal(s), and will produce all deliverables. The Workplan is to be structured with a hierarchy of performance period (approximately annual), task and subtasks, which is typical of a standard WBS for any project. The Workplan shall contain a concise description of the specific activities to be conducted over the life of the project. The description shall be a full explanation and disclosure of the project being proposed (i.e., a statement such as “we will then complete a proprietary process” is unacceptable). It is the applicant’s responsibility to prepare an adequately detailed task plan to describe the proposed project and the plan for addressing the objectives of this FOA. The summary provided should be consistent with the SOPO. The SOPO will contain a more detailed description of the WBS and tasks.</li> </ul>

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	<ul style="list-style-type: none"> <li>• <b>Milestone Summary:</b> The applicant should provide a summary of appropriate milestones throughout the project to demonstrate success. A milestone may be either a progress measure (which can be activity based) or a Specific, Measurable, Attainable, Realistic, and Timely (SMART) technical milestone. SMART milestones should be Specific, Measurable, Achievable, Relevant, and Timely, and must demonstrate a technical achievement rather than simply completing a task. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one milestone per quarter for the duration of the project with at least one SMART technical milestone per year (depending on the project, more milestones may be necessary to comprehensively demonstrate progress). The applicant should also provide the means by which the milestone will be verified. The summary provided should be consistent with the Milestone Summary Table in the SOPO.</li> <li>• <b>Go/No-Go Decision Points</b> (See <a href="#">Section VI.B.xiv</a> for more information on the Go/No-Go Review): The applicant should provide a summary of project-wide Go/No-Go decision points at appropriate points in the Workplan. At a minimum, each project must have at least one project-wide Go/No-Go decision point for each budget period (12 to 18-month period) of the project. See <a href="#">Section VI.B.xiv</a>. The applicant should also provide the specific technical and Diversity, Equity, and Inclusion Plan criteria to be used to evaluate the project at the Go/No-Go decision point. The summary provided should be consistent with the SOPO. Go/No-Go decision points are considered “SMART” and can fulfill the requirement for an annual SMART milestone.</li> <li>• <b>End of Project Goal:</b> The applicant should provide a summary of the end of project goal(s). At a minimum, each project must have one SMART end of project goal. The summary provided should be consistent with the SOPO.</li> <li>• <b>Project Schedule (Gantt Chart or similar):</b> The applicant should provide a schedule for the entire project, including task and subtask durations, milestones, and Go/No-Go decision points.</li> <li>• <b>Buy America Requirements for Infrastructure Projects:</b> Within the first two pages of the Workplan, include a short statement on whether the project will involve the construction, alteration, and/or repair of infrastructure in the United States. See <a href="#">Appendix C</a> for applicable definitions and other information to inform this statement.</li> <li>• <b>Project Management:</b> The applicant should discuss the team’s proposed management plan, including the following:             <ul style="list-style-type: none"> <li>○ The overall approach to and organization for managing the work;</li> <li>○ The roles of each project team member;</li> <li>○ Any critical handoffs/interdependencies among project team members;</li> <li>○ The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices;</li> <li>○ The approach to project risk management, including a plan for securing a qualified workforce and mitigating risks to project performance including but not limited to community or labor disputes;</li> </ul> </li> </ul>
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	<ul style="list-style-type: none"> <li>○ A description of how project changes will be handled;</li> <li>○ If applicable, the approach to Quality Assurance/Control; and</li> <li>○ How communications will be maintained among project team members.</li> </ul>
<p><b>Technical Qualifications and Resources</b> (Approximately 20% of the Technical Volume)</p>	<p>The Technical Qualifications and Resources should contain the following information:</p> <ul style="list-style-type: none"> <li>● A description of the project team’s unique qualifications and expertise, including those of key subrecipients;</li> <li>● A description of the project team’s existing equipment and facilities, or equipment or facilities already in place on the proposed project site, that will facilitate the successful completion of the proposed project; include a justification of any new equipment or facilities requested as part of the project;</li> <li>● Relevant, previous work efforts, demonstrated innovations, and how these enable the applicant to achieve the project objectives;</li> <li>● The time commitment of the key team members to support the project;</li> <li>● A description of the technical services to be provided by DOE/NNSA FFRDCs, if applicable;</li> <li>● The skills, certifications, or other credentials of the construction and ongoing operations workforce;</li> <li>● For multi-organizational projects, describe succinctly:             <ul style="list-style-type: none"> <li>○ The roles and the work to be performed by the PI and Senior/Key Personnel at the prime and sub levels;</li> <li>○ Business agreements between the applicant and sub;</li> <li>○ How the various efforts will be integrated and managed;</li> <li>○ Process for making decisions on technical direction;</li> <li>○ Publication arrangements;</li> <li>○ Intellectual property issues; and</li> <li>○ Communication plans</li> </ul> </li> </ul>

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<b>Topic Area 2 Technical Volume Content Requirements</b>	
<b>SECTION/PAGE LIMIT</b>	<b>DESCRIPTION</b>
<b>Cover Page</b>	The cover page should include the project title, the specific FOA Topic Area and subtopic being addressed, both the technical and business points of contact, names of all team member organizations, names of the PI, Senior/Key Personnel and their organizations, the project location(s) if applicable, and any statements regarding confidentiality.
<b>Project Overview</b> (Approximately 10% of the Technical Volume)	<p>The Project Overview should contain the following information:</p> <ul style="list-style-type: none"> <li>• <b>Background:</b> The applicant should discuss the background of its organization, including the history, successes, and current research and development status (i.e., the technical baseline) relevant to the technical topic being addressed in the Full Application.</li> <li>• <b>Project Goal:</b> The applicant should explicitly identify the targeted improvements to the baseline technology or research and the critical success factors in achieving that goal.</li> <li>• <b>DOE Impact:</b> The applicant should discuss the impact that DOE funding would have on the proposed project. Applicants should specifically explain how DOE funding, relative to prior, current, or anticipated funding from other public and private sources, is necessary to achieve the project objectives.</li> </ul>
<b>Technical Description, Innovation, and Impact</b> (Approximately 30% of the Technical Volume)	<p>The Technical Description should contain the following information:</p> <p><b>Topic Area 2 (Subtopic 2a):</b></p> <ul style="list-style-type: none"> <li>• <b>Relevance and Outcomes:</b> This section should describe the relevance of the proposed project to the goals and objectives of the FOA, including the potential to meet specific DOE technical targets or other relevant performance targets. The applicant should clearly specify the expected outcomes of the project. The applicant should provide a detailed description of the proposed research, including: <ul style="list-style-type: none"> <li>○ A description of the applicable aquaculture industries in the region (ex. shellfish, finfish, macroalgae, polyculture, or others)</li> <li>○ Possible co-location scenarios of aquaculture with floating offshore wind the research might explore including, but not limited to, commercial scale production, using aquaculture for nature inclusive design/habitat enhancement, wild harvest from floating offshore wind infrastructure, etc.</li> <li>○ A description of a methodology or methodologies for the feasibility analysis that can analyze co-location scenarios from multiple fields and perspectives</li> <li>○ Applications should include plans for gathering input and receiving oversight from offshore wind developers, aquaculture</li> </ul> </li> </ul>

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	<p>industry stakeholders, relevant federal agencies, and impacted communities to better understand their needs, views, and potential points of conflict (WETO will facilitate coordination with federal agencies)</p> <ul style="list-style-type: none"> <li>• <b>Feasibility:</b> The applicant should demonstrate the feasibility of the proposed methodologies and capability of applicants to achieving the anticipated performance targets, including a description of previous work done and prior results.</li> <li>• <b>Innovation and Impacts:</b> The applicant should describe the current state of the literature in the applicable field, the specific advancements offered by the proposed research, and the overall impact on advancing the state-of-the-art/technical baseline if the project is successful. The applicant should specify how they plan to disseminate project findings to stakeholders and/or the public in an accessible form.</li> </ul> <p><b>Topic Area 2 (Subtopic 2b):</b></p> <ul style="list-style-type: none"> <li>• <b>Relevance and Outcomes:</b> The applicant should provide a detailed description of the proposed research, including the research methods and objectives that will be pursued during the project. This section should explicitly state which of the six Topic Area 2b research priorities the project is addressing, and whether the project incorporates marine energy or a combination of marine energy with other renewable energy technologies. Applications that take a hybrid energy approach should describe why a hybrid approach is more impactful to advancing marine energy for aquaculture co-location than if marine energy were the sole energy source considered in the research approach. The applicant should specify how the research is justified by previous end-user and/or stakeholder engagement and/or specify how end-user and/or stakeholder engagement will enable incorporation of end-user needs into the research. The applicant should clearly specify the expected outcomes of the project.</li> <li>• <b>Feasibility:</b> The applicant should demonstrate the technical feasibility of the proposed research and capability of achieving the anticipated performance targets, including a description of previous work done and prior results if applicable. If applicable, this section should also address the project’s access to necessary infrastructure (e.g., transportation, water, electricity transmission), including any use of existing infrastructure, as well as to a skilled workforce.</li> <li>• <b>Innovation and Impacts:</b> The applicant should describe the current state-of-the-art in the applicable field, the specific innovation of the proposed research, and the overall impact on advancing marine energy technology development if the project is successful. The applicant should specify if they anticipate this project would conclude at the end</li> </ul>
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	<p>of the FOA project period or if they plan to position themselves for additional public or private funding opportunities to continue the research. The applicant should specify how they plan to disseminate project findings to stakeholders and/or the public in an accessible form.</p>
<p><b>Workplan</b> (Approximately 40% of the Technical Volume)</p>	<p>The Workplan should include a summary of the Project Objectives, Technical Scope, Work Breakdown Structure (WBS), Milestones, <a href="#">Go/No-Go</a> decision points, and Project Schedule. A detailed SOPO is separately requested. The Workplan should contain the following information:</p> <ul style="list-style-type: none"> <li>• <b>Project Objectives:</b> The applicant should provide a clear and concise (high-level) statement of the goals and objectives of the project as well as the expected outcomes.</li> <li>• <b>Technical Scope Summary:</b> The applicant should provide a summary description of the overall work scope and approach to achieve the objective(s). The overall work scope is to be divided by performance periods that are separated by discrete, approximately annual decision points (see below for more information on <a href="#">Go/No-Go</a> decision points). The applicant should describe the specific expected end result of each performance period, including milestones in the Diversity, Equity, and Inclusion Plan.</li> <li>• <b>WBS and Task Description Summary:</b> The Workplan should describe the work to be accomplished and how the applicant will achieve the milestones, will accomplish the final project goal(s), and will produce all deliverables. The Workplan is to be structured with a hierarchy of performance period (approximately annual), task and subtasks, which is typical of a standard WBS for any project. The Workplan shall contain a concise description of the specific activities to be conducted over the life of the project. The description shall be a full explanation and disclosure of the project being proposed (i.e., a statement such as “we will then complete a proprietary process” is unacceptable). It is the applicant’s responsibility to prepare an adequately detailed task plan to describe the proposed project and the plan for addressing the objectives of this FOA. The summary provided should be consistent with the SOPO. The SOPO will contain a more detailed description of the WBS and tasks. If applications include in-water activities, applicants should incorporate permitting tasks into their project timeline, Work Breakdown Structure, <a href="#">Go/No-Go</a> decision points, budget, and any other affected areas of the proposed work.</li> <li>• <b>Milestone Summary:</b> The applicant should provide a summary of appropriate milestones throughout the project to demonstrate success. A milestone may be either a progress measure (which can be activity based) or a Specific, Measurable, Attainable, Realistic, and Timely (SMART) technical milestone. SMART milestones should be Specific, Measurable, Achievable, Relevant, and Timely, and must</li> </ul>

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	<p>demonstrate a technical achievement rather than simply completing a task. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one milestone per quarter for the duration of the project with at least one SMART technical milestone per year (depending on the project, more milestones may be necessary to comprehensively demonstrate progress). The applicant should also provide the means by which the milestone will be verified. The summary provided should be consistent with the Milestone Summary Table in the SOPO.</p> <ul style="list-style-type: none"> <li>● Go/No-Go Decision Points (See <a href="#">Section VI.B.xiv.</a> for more information on the Go/No-Go Review): The applicant should provide a summary of project-wide Go/No-Go decision points at appropriate points in the Workplan. At a minimum, each project must have at least one project-wide Go/No-Go decision point for each budget period (12 to 18-month period) of the project. See Section VI.B.xiv. The applicant should also provide the specific technical and Diversity, Equity, and Inclusion Plan criteria to be used to evaluate the project at the Go/No-Go decision point. The summary provided should be consistent with the SOPO. Go/No-Go decision points are considered “SMART” and can fulfill the requirement for an annual SMART milestone. criteria to be used to evaluate the project at the Go/No-Go decision point.</li> <li>● End of Project Goal: The applicant should provide a summary of the end of project goal(s). At a minimum, each project must have one SMART end of project goal. The summary provided should be consistent with the SOPO.</li> <li>● Project Schedule (Gantt Chart or similar): The applicant should provide a schedule for the entire project, including task and subtask durations, milestones, and <a href="#">Go/No-Go</a> decision points.</li> <li>● Buy America Requirements for Infrastructure Projects: If applicable, within the first two pages of the Workplan, include a short statement on whether the project will involve the construction, alteration, and/or repair of infrastructure in the United States. See <a href="#">Appendix C</a> for applicable definitions and other information to inform this statement.</li> <li>● Project Management: The applicant should discuss the team’s proposed management plan, including the following:             <ul style="list-style-type: none"> <li>○ The overall approach to and organization for managing the work;</li> <li>○ The roles of each project team member;</li> <li>○ Any critical handoffs/interdependencies among project team members;</li> <li>○ The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices;</li> </ul> </li> </ul>
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	<ul style="list-style-type: none"> <li>○ The approach to project risk management, including a plan for securing a qualified workforce and mitigating risks to project performance including but not limited to community or labor disputes, if applicable;</li> <li>○ A description of how project changes will be handled;</li> <li>○ If applicable, the approach to Quality Assurance/Control; and</li> <li>○ How communications will be maintained among project team members.</li> </ul> <ul style="list-style-type: none"> <li>● Market Transformation Plan: If not applicable, a short explanation of why this section was omitted should be included. If applicable, the applicant should provide a market transformation plan, including the following:             <ul style="list-style-type: none"> <li>○ Identification of target market, competitors, and distribution channels for proposed technology or research findings along with known or perceived barriers to market penetration, including a mitigation plan;</li> <li>○ Identification of a product development and/or service plan, commercialization timeline, financing, product marketing, legal/regulatory considerations including intellectual property, infrastructure requirements, data dissemination, and product distribution.</li> </ul> </li> </ul>
<p><b>Technical Qualifications and Resources</b> (Approximately 20% of the Technical Volume)</p>	<p>The Technical Qualifications and Resources should contain the following information:</p> <ul style="list-style-type: none"> <li>● A description of the project team’s unique qualifications and expertise, including those of key subrecipients;</li> <li>● A description of the project team’s existing equipment and facilities, or equipment or facilities already in place on the proposed project site, that will facilitate the successful completion of the proposed project; include a justification of any new equipment or facilities requested as part of the project;</li> <li>● Relevant, previous work efforts, demonstrated innovations, and how these enable the applicant to achieve the project objectives;</li> <li>● The time commitment of the key team members to support the project;</li> <li>● A description of the technical services to be provided by DOE/NNSA FFRDCs, if applicable;</li> <li>● The skills, certifications, or other credentials of the construction and ongoing operations workforce, if applicable;</li> <li>● For multi-organizational projects, describe succinctly:             <ul style="list-style-type: none"> <li>○ The roles and the work to be performed by the PI and Senior/Key Personnel at the prime and sub levels;</li> <li>○ Business agreements between the applicant and sub;</li> <li>○ How the various efforts will be integrated and managed;</li> <li>○ Process for making decisions on technical direction;</li> <li>○ Publication arrangements;</li> </ul> </li> </ul>

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	<ul style="list-style-type: none"> <li>○ Intellectual property issues; and</li> <li>○ Communication plans</li> </ul>
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<b>Topic Area 3 Technical Volume Content Requirements</b>	
<b>SECTION/PAGE LIMIT</b>	<b>DESCRIPTION</b>
<b>Cover Page</b>	The cover page should include the project title, the specific FOA Topic Area being addressed (if applicable), both the technical and business points of contact, names of all team member organizations, names of project managers, senior/key personnel and their organizations, the project location(s), and any statements regarding confidentiality.
<b>Project Overview</b> (Approximately 10% of the Technical Volume)	<p>The Project Overview should contain the following information:</p> <ul style="list-style-type: none"> <li>● <b>Background:</b> The applicant should discuss the background of their university, including the history, successes, and current support available including state of the process, relevant to the technical topic being addressed in the Full Application.</li> <li>● <b>Project Goal:</b> The applicant should describe at least three proposed activities, including how the proposed activities would address the objective identified in the topic area, and the critical success factors in achieving these goals.</li> <li>● <b>DOE Impact:</b> The applicant should discuss the impact that DOE funding would have on the proposed project. Applicants should specifically explain how EERE funding for undergraduate senior research design and/or research development projects will maximize research impacts.</li> </ul>
<b>Technical Description, Innovation, and Impact</b> (Approximately 30% of the Technical Volume)	<p>The Technical Description should contain the following information:</p> <ul style="list-style-type: none"> <li>● <b>Relevance and Outcomes:</b> This section should describe the relevance of the proposed project to the goals and objectives of the topic area. The applicant should provide a detailed description of the focus area, including the principles and objectives that will be pursued during the project. The applicant should clearly specify the expected outcomes of the project, including proposed metrics and how the applicant will define and measure success.</li> <li>● <b>Feasibility:</b> The applicant should demonstrate the feasibility of the proposed capability in achieving the anticipated performance targets, including a description of previous work done and prior results. The applicant should address the appropriateness and the value of the environment that intends to support the research and professional development experience for the student participants, including a plan that describes how the applicant intends to identify promising student research projects and determine the type of support needed at the outset.</li> </ul>

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	<ul style="list-style-type: none"> <li>• Innovation and Impacts: The applicant should describe the current state-of-the-art in the applicable field, the specific innovation of the focus area, and the overall impact on advancing the state-of-the-art/technical baseline if the project is successful.</li> </ul>
<p><b>Workplan</b> (Approximately 40% of the Technical Volume)</p>	<p>The Workplan should include a summary of the Project Objectives, Technical Scope, Work Breakdown Structure (WBS), Milestones, and Project Schedule. A detailed SOPO is separately requested. The Workplan should contain the following information:</p> <ul style="list-style-type: none"> <li>• Project Objectives:             <ul style="list-style-type: none"> <li>○ The applicant should provide a clear and concise (high-level) statement of the goals and objectives of the project as well as the expected outcomes.</li> <li>○ Technical Scope Summary:</li> <li>○ The applicant should provide a summary description of the overall work scope and approach to achieve the objective(s).</li> </ul> </li> <li>• WBS and Task Description Summary:             <ul style="list-style-type: none"> <li>○ The Workplan should describe the work to be accomplished and how the applicant will achieve the milestones, will accomplish the final project goal(s), and will produce all deliverables. The Workplan is to be structured with a hierarchy of performance period (approximately annual), task and subtasks, which is typical of a standard WBS for any project. The Workplan shall contain a concise description of the specific activities to be conducted over the life of the project. The description shall be a full explanation and disclosure of the project being proposed (i.e., a statement such as “we will then complete a proprietary process” is unacceptable). It is the applicant’s responsibility to prepare an adequately detailed task plan to describe the proposed project and the plan for addressing the objectives of this FOA. The summary provided should be consistent with the SOPO. The SOPO will contain a more detailed description of the WBS and tasks.</li> </ul> </li> <li>• Milestone Summary:             <ul style="list-style-type: none"> <li>○ The applicant should provide a summary of appropriate milestones throughout the project to demonstrate success. A milestone may be either a progress measure (which can be activity based) or a SMART technical milestone. SMART milestones should be Specific, Measurable, Achievable, Relevant, and Timely, and must demonstrate a technical achievement rather than simply completing a task.</li> <li>○ The applicant should include at least one milestone per quarter for the duration of the project with at least one SMART milestone per year (depending on the project, more milestones may be necessary to comprehensively demonstrate progress).</li> <li>○ The applicant should also provide the means by which the milestone will be verified. The summary provided should be consistent with the Milestone Summary Table in the SOPO.</li> </ul> </li> <li>• End of Project Goal:             <ul style="list-style-type: none"> <li>○ The applicant should provide a summary of the end of project goal(s) that supports students' preparation and promotes the continuation of student's interest and involvement in research. The summary provided should be consistent with the SOPO.</li> </ul> </li> </ul>

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	<ul style="list-style-type: none"> <li>○ The applicant should include a description of potential replicability or scalability of the proposed activities.</li> <li>● Project Schedule (Gantt Chart or similar):             <ul style="list-style-type: none"> <li>○ The applicant should provide a schedule for the entire project, including task and subtask durations, and milestones.</li> </ul> </li> <li>● Project Management: The applicant should discuss the team’s proposed management plan, including the following:             <ul style="list-style-type: none"> <li>○ The overall approach to and organization for managing the work.</li> <li>○ The roles of each project team member, including any stakeholders or partners</li> <li>○ Any critical handoffs/interdependencies among project team members.</li> <li>○ A description of how project changes will be handled.</li> <li>○ How communications will be maintained among project team members.</li> </ul> </li> </ul>
<b>Technical Qualifications and Resources</b> (Approximately 20% of the Technical Volume)	<p>The Technical Qualifications and Resources should contain the following information:</p> <ul style="list-style-type: none"> <li>● Describe the project team’s unique qualifications and expertise</li> <li>● Describe the time commitment of the key team members to support the project.</li> <li>● Describe the key resources, including stakeholders, partners, or programs, the applicant will draw upon to ensure students are adequately supported and resourced.</li> <li>● For multi-organizational projects, describe succinctly:             <ul style="list-style-type: none"> <li>○ The roles and the work to be performed by the Project Manager and senior/key personnel at the prime and sub levels;</li> <li>○ Business agreements between the applicant and sub;</li> <li>○ How the various efforts will be integrated and managed;</li> <li>○ Process for making decisions on technical direction;</li> <li>○ Publication arrangements;</li> <li>○ Intellectual Property issues; and</li> <li>○ Communication plans.</li> </ul> </li> </ul>

<b>Topic Area 4 Technical Volume Content Requirements</b>	
<b>SECTION/PAGE LIMIT</b>	<b>DESCRIPTION</b>
<b>Cover Page</b>	The cover page should include the project title, the specific FOA Topic Area being addressed , both the technical and business points of contact, names of all team member organizations, names of the PI, Senior/Key Personnel and their organizations, the project location(s), and any statements regarding confidentiality.

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<p><b>Project Overview</b> (Approximately 10% of the Technical Volume)</p>	<p>The Project Overview should contain the following information:</p> <ul style="list-style-type: none"> <li>• <b>Background:</b> The applicant should discuss the background of its organization, including the history, successes, and current research and development status (i.e., the technical baseline) relevant to the technical topic being addressed in the Full Application. The applicant should also clearly articulate how the proposed research will address a need of the marine energy industry.</li> <li>• <b>Project Goal:</b> The applicant should explicitly identify the targeted improvements to the baseline technology or research and the critical success factors in achieving that goal.</li> <li>• <b>DOE Impact:</b> The applicant should discuss the impact that DOE funding would have on the proposed project. Applicants should specifically explain how DOE funding, relative to prior, current, or anticipated funding from other public and private sources, is necessary to achieve the project objectives.</li> </ul>
<p><b>Technical Description, Innovation, and Impact</b> (Approximately 30% of the Technical Volume)</p>	<p>The Technical Description should contain the following information:</p> <ul style="list-style-type: none"> <li>• <b>Relevance and Outcomes:</b> The applicant should provide a detailed description of the technology or focus area, including the scientific and other principles and objectives that will be pursued during the project. This section should describe the relevance of the proposed project to the goals and objectives of the FOA, including the potential to meet specific DOE technical targets or other relevant performance targets. The applicant should clearly specify the expected outcomes of the project.</li> <li>• <b>Feasibility:</b> The applicant should demonstrate the technical feasibility of the proposed technology or research and capability of achieving the anticipated performance targets, including a description of previous work done and prior results. This section should also address the project’s access to necessary infrastructure (e.g., transportation, water, electricity transmission), including any use of existing infrastructure, as well as to a skilled workforce.</li> <li>• <b>Innovation and Impacts:</b> The applicant should describe the current state-of-the-art in the applicable field, the specific innovation of the proposed technology or focus area, the advantages of proposed technology over current and emerging technologies, and the overall impact on advancing the state-of-the-art/technical baseline if the project is successful.</li> </ul>
<p><b>Workplan</b> (Approximately 40% of the Technical Volume)</p>	<p>The Workplan should include a summary of the Project Objectives, Technical Scope, Work Breakdown Structure (WBS), Milestones, <a href="#">Go/No-Go</a> decision points, and Project Schedule. A detailed SOPO is separately requested. The Workplan should contain the following information:</p> <ul style="list-style-type: none"> <li>• <b>Project Objectives:</b> The applicant should provide a clear and concise (high-level) statement of the goals and objectives of the project as well as the expected outcomes.</li> <li>• <b>Technical Scope Summary:</b> The applicant should provide a summary description of the overall work scope and approach to achieve the objective(s). The overall work scope is to be divided by performance periods that are separated by discrete, approximately annual decision points (see below for more information on <a href="#">Go/No-Go</a> decision points). The applicant should describe the specific</li> </ul>

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	<p>expected end result of each performance period, including milestones in the Diversity, Equity, and Inclusion Plan.</p> <ul style="list-style-type: none"> <li>• <b>WBS and Task Description Summary:</b> The Workplan should describe the work to be accomplished and how the applicant will achieve the milestones, will accomplish the final project goal(s), and will produce all deliverables. The Workplan is to be structured with a hierarchy of performance period (approximately annual), task and subtasks, which is typical of a standard WBS for any project. The Workplan shall contain a concise description of the specific activities to be conducted over the life of the project. The description shall be a full explanation and disclosure of the project being proposed (i.e., a statement such as “we will then complete a proprietary process” is unacceptable). It is the applicant’s responsibility to prepare an adequately detailed task plan to describe the proposed project and the plan for addressing the objectives of this FOA. The summary provided should be consistent with the SOPO. The SOPO will contain a more detailed description of the WBS and tasks.</li> <li>• <b>Milestone Summary:</b> The applicant should provide a summary of appropriate milestones throughout the project to demonstrate success. A milestone may be either a progress measure (which can be activity based) or a Specific, Measurable, Attainable, Realistic, and Timely (SMART) technical milestone. SMART milestones should be Specific, Measurable, Achievable, Relevant, and Timely, and must demonstrate a technical achievement rather than simply completing a task. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one milestone per quarter for the duration of the project with at least one SMART technical milestone per year (depending on the project, more milestones may be necessary to comprehensively demonstrate progress). The applicant should also provide the means by which the milestone will be verified. The summary provided should be consistent with the Milestone Summary Table in the SOPO.</li> <li>• <b>Go/No-Go Decision Points</b> (See <a href="#">Section VI.B.xiv.</a> for more information on the Go/No-Go Review): The applicant should provide a summary of project-wide Go/No-Go decision points at appropriate points in the Workplan. At a minimum, each project must have at least one project-wide Go/No-Go decision point for each budget period (12 to 18-month period) of the project. See <a href="#">Section VI.B.xiv.</a> The applicant should also provide the specific technical and Diversity, Equity, and Inclusion Plan criteria to be used to evaluate the project at the Go/No-Go decision point. The summary provided should be consistent with the SOPO. Go/No-Go decision points are considered “SMART” and can fulfill the requirement for an annual SMART milestone.</li> <li>• <b>End of Project Goal:</b> The applicant should provide a summary of the end of project goal(s). At a minimum, each project must have one SMART end of project goal. The summary provided should be consistent with the SOPO.</li> <li>• <b>Project Schedule (Gantt Chart or similar):</b> The applicant should provide a schedule for the entire project, including task and subtask durations, milestones, and Go/No-Go decision points.</li> <li>• <b>Buy America Requirements for Infrastructure Projects:</b> If applicable, within the first two pages of the Workplan, include a short statement on whether the</li> </ul>
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	<p>project will involve the construction, alteration, and/or repair of infrastructure in the United States. See Appendix C for applicable definitions and other information to inform this statement.</p> <ul style="list-style-type: none"> <li>• Project Management: The applicant should discuss the team’s proposed management plan, including the following: <ul style="list-style-type: none"> <li>○ The overall approach to and organization for managing the work;</li> <li>○ The roles of each project team member;</li> <li>○ Any critical handoffs/interdependencies among project team members;</li> <li>○ The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices;</li> <li>○ The approach to project risk management, including a plan for securing a qualified workforce and mitigating risks to project performance including but not limited to community or labor disputes;</li> <li>○ A description of how project changes will be handled;</li> <li>○ If applicable, the approach to Quality Assurance/Control; and</li> <li>○ How communications will be maintained among project team members.</li> </ul> </li> <li>• Market Transformation Plan: If not applicable, a short explanation of why this section was omitted should be included. If applicable, the applicant should provide a market transformation plan, including the following: <ul style="list-style-type: none"> <li>○ Identification of target market, competitors, and distribution channels for proposed technology along with known or perceived barriers to market penetration, including a mitigation plan; and</li> <li>○ Identification of a product development and/or service plan, commercialization timeline, financing, product marketing, legal/regulatory considerations including intellectual property, infrastructure requirements, data dissemination, and product distribution.</li> </ul> </li> </ul>
<p><b>Technical Qualifications and Resources</b> (Approximately 20% of the Technical Volume)</p>	<p>The Technical Qualifications and Resources should contain the following information:</p> <ul style="list-style-type: none"> <li>• A description of the project team’s unique qualifications and expertise, including those of key subrecipients;</li> <li>• A description of the project team’s existing equipment and facilities, or equipment or facilities already in place on the proposed project site, that will facilitate the successful completion of the proposed project; include a justification of any new equipment or facilities requested as part of the project;</li> <li>• Relevant, previous work efforts, demonstrated innovations, and how these enable the applicant to achieve the project objectives;</li> <li>• The time commitment of the key team members to support the project;</li> <li>• A description of the technical services to be provided by DOE/NNSA FFRDCs, if applicable;</li> </ul>

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	<ul style="list-style-type: none"> <li>• The skills, certifications, or other credentials of the construction and ongoing operations workforce;</li> <li>• For multi-organizational projects, describe succinctly:             <ul style="list-style-type: none"> <li>○ The roles and the work to be performed by the PI and Senior/Key Personnel at the prime and sub levels;</li> <li>○ Business agreements between the applicant and sub;</li> <li>○ How the various efforts will be integrated and managed;</li> <li>○ Process for making decisions on technical direction;</li> <li>○ Publication arrangements;</li> <li>○ Intellectual property issues; and</li> <li>○ Communication plans</li> </ul> </li> </ul>
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**iv. Resumes (required)**

A resume provides information reviewers can use to evaluate an individual’s skills, experience, and potential for leadership within the scientific community. Applicants must submit a resume (limited to three pages) for each Principal Investigator and Senior/Key Personnel that includes the following:

1. Contact information;
2. Education and training: Provide name of institution, major/area, degree, and year for undergraduate, graduate, and postdoctoral training;
3. Research and professional experience: Beginning with the current position, list professional/academic positions in chronological order with a brief description. List all current academic, professional, or institutional appointments, foreign or domestic, at the applicant institution or elsewhere, whether or not remuneration is received, and, whether full-time, part-time, or voluntary;
4. Awards and honors;
5. 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. An abbreviated style such as the Physical Review Letters (PRL) convention for citations (list only the first author) may be used for publications with more than 10 authors;
6. Synergistic activities: List up to five professional and scholarly activities related to the proposed effort; and

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7. There should be no lapses in time over the past 10 years or since age 18, whichever period is shorter.

As an alternative to a resume, it is acceptable to use the biographical sketch format approved by the National Science Foundation (NSF). The biographical sketch format may be generated by the Science Experts Network Curriculum Vita (SciENcv), a cooperative venture maintained at <https://www.ncbi.nlm.nih.gov/sciencv/>, also available at [https://www.nsf.gov/bfa/dias/policy/researchprotection/commonform\\_biographicalsketch.pdf](https://www.nsf.gov/bfa/dias/policy/researchprotection/commonform_biographicalsketch.pdf). The use of a format required by another agency is intended to reduce the administrative burden to researchers by promoting the use of common formats.

Save the resumes in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_Resumes".

**v. Letters of Commitment (if applicable)**

Submit letters of commitment from all subrecipients and third-party cost share providers. If applicable, the letter must state that the third party is committed to providing a specific minimum dollar amount or value of in-kind contributions allocated to cost sharing. The following information for each third party contributing to cost sharing should be identified: (1) the name of the organization; (2) the proposed dollar amount to be provided; and (3) the proposed cost sharing type (cash-or in-kind contributions). Each letter must not exceed one page.

Save the letters of commitment in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_LOCs".

Letters of support or endorsement for the project from entities that do not have a substantive role in the project will not be accepted.

**vi. Statement of Project Objectives (SOPO) (required)**

Applicants must complete a SOPO. A SOPO template is available at: [EERE Funding Application and Management Forms](#). The SOPO, including the Milestone Table, must not exceed 10 pages when printed using standard 8.5" x 11" paper with 1" margins (top, bottom, left, and right) with font not smaller than 12-point (except in figures or tables, which may be 10-point font).

Save the SOPO in a single Microsoft Word file using the following convention for the title "ControlNumber\_LeadOrganization\_SOPO".

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**vii. Diversity, Equity, and Inclusion Plan (required)**

As part of the application, applicants are required to describe how diversity, equity, and inclusion objectives will be incorporated in the project. Specifically, applicants are required to submit a Diversity, Equity, and Inclusion Plan that describes the actions the applicant will take to foster a welcoming and inclusive environment, support people from groups underrepresented in STEM, advance equity, and encourage the inclusion of individuals from these groups in the project; and the extent the project activities will be located in or benefit underserved communities (also see Section I.A.iii.). The plan should include at least one SMART milestone per Budget Period supported by metrics to measure the success of the proposed actions and will be incorporated into the award if selected. The Diversity, Equity, and Inclusion Plan should contain the following information:

- Equity Impacts: the impacts of the proposed project on underserved communities, including social and environmental impacts.
- Benefits: The overall benefits of the proposed project, if funded, to underserved communities; and
- How diversity, equity, and inclusion objectives will be incorporated in the project.

The following is a non-exhaustive list of actions that can serve as examples of ways the proposed project could incorporate diversity, equity, and inclusion elements. These examples should not be considered either comprehensive or prescriptive. Applicants may include appropriate actions not covered by these examples.

- a. Include persons from groups underrepresented in STEM as PI, co-PI, and/or other senior personnel;
- b. Include persons from groups underrepresented in STEM as student researchers or post-doctoral researchers;
- c. Include faculty or students from Minority Serving Institutions as PI/co-PI, senior personnel, and/or student researchers, as applicable;
- d. Enhance or collaborate with existing diversity programs at your home organization and/or nearby organizations;
- e. Collaborate with students, researchers, and staff in Minority Serving Institutions;
- f. Disseminate results of research and development in Minority Serving Institutions or other appropriate institutions serving underserved communities;
- g. Implement evidence-based, diversity-focused education programs (such as implicit bias training for staff) in your organization;
- h. Identify Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses and Veteran Owned Businesses to solicit as

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vendors and sub-contractors for bids on supplies, services and equipment.

The Diversity, Equity, and Inclusion Plan must not exceed 5 pages. Save the Diversity, Equity and Inclusion Plan in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_DEIP".

**viii. Budget Justification Workbook (required)**

Applicants must complete the Budget Justification Workbook, available at: [EERE Funding Application and Management Forms](#). Applicants must complete each tab of the Budget Justification Workbook for the project, including all work to be performed by the prime recipient and its subrecipients and contractors. Applicants should include costs associated with required annual audits and incurred cost applications in their proposed budget documents. The "Instructions and Summary" included with the Budget Justification Workbook will auto-populate as the applicant enters information into the Workbook. Applicants must carefully read the "Instructions and Summary" tab provided within the Budget Justification Workbook.

Save the Budget Justification Workbook in a single Microsoft Excel file using the following convention for the title "ControlNumber\_LeadOrganization\_Budget\_Justification".

**ix. Summary for Public Release (required)**

Applicants must submit a one-page summary of their project that is suitable for dissemination to the public. It should be a self-contained document that identifies the name of the applicant, the lead project manager/principal investigator(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 (e.g., benefits, outcomes), major participants (for collaborative projects), and the project's commitments and goals described in the Diversity, Equity, and Inclusion Plan. This document must not include any proprietary or business-sensitive information as DOE may make it available to the public after selections are made. The summary must not exceed one page when printed using standard 8.5" x 11" paper with 1" margins (top, bottom, left, and right) with font not smaller than 12-point.

Save the Summary for Public Release in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_Summary".

**x. Summary Slide (required)**

Applicants must provide a single slide summarizing the proposed project. The Summary Slide template is available on EERE eXCHANGE at <https://eere-eXCHANGE.energy.gov/> and must include the following information:

- A technology or research summary;
- A description of the technology's or research's impact;
- Proposed project goals;
- Any key graphics (illustrations, charts and/or tables);
- The project's key idea/takeaway;
- Topline community benefits
- Project title, prime recipient, PI, and Senior/Key Personnel information; and
- Requested EERE funds and proposed applicant cost share.

Save the Summary Slide in a single Microsoft PowerPoint file using the following convention for the title "ControlNumber\_LeadOrganization\_Slide".

**xi. Subrecipient Budget Justification (if applicable)**

Applicants must provide a separate budget justification for each subrecipient that is expected to perform work estimated to be more than \$250,000 or 25% of the total work effort, whichever is less. The budget justification must include the same justification information described in the "Budget Justification" section above.

Save each subrecipient budget justification in a Microsoft Excel file using the following convention for the title "ControlNumber\_LeadOrganization\_Subrecipient\_Budget\_Justification".

**xii. Budget for DOE/NNSA FFRDC (if applicable)**

If a DOE/NNSA FFRDC is to perform a portion of the work, the applicant must provide a DOE work proposal (WP) in accordance with the requirements in DOE Order 412.1A, Work Authorization System, Attachment 2, available at: <https://www.directives.doe.gov/directives-documents/400-series/0412.1-BOrder-a-chg1-AdmChg>.

Save the WP in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_WP".

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**xiii. Authorization for Non-DOE/NNSA or DOE/NNSA FFRDCs (if applicable)**

The federal agency sponsoring the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The use of a FFRDC must be consistent with the contractor's authority under its award.

Save the Authorization in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_FFRDCAuth".

**xiv. SF-LLL: Disclosure of Lobbying Activities (required)**

Recipients and subrecipients may not use any federal funds to influence or attempt to influence, directly or indirectly, congressional action on any legislative or appropriation matters.

Recipients and subrecipients are required to complete and submit SF-LLL, "Disclosure of Lobbying Activities"

(<https://www.grants.gov/web/grants/forms/sf-424-individual-family.html>) to ensure that non-federal funds have not been paid and will not be paid to any person for influencing or attempting to influence any of the following in connection with the application:

- An officer or employee of any federal agency;
- A member of Congress;
- An officer or employee of Congress; or
- An employee of a member of Congress.

Save the SF-LLL in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_SF-LLL".

**xv. Waiver Requests (if applicable)****Foreign Entity Participation**

For projects selected under this FOA, all recipients and subrecipients must qualify as domestic entities. See [Section III.A](#). To request a waiver of this requirement, the applicant must submit an explicit waiver request in the Full Application. Appendix [B](#) lists the information that must be included in a waiver request.

**Performance of Work in the United States (Foreign Work Waiver Request)**

As set forth in Section IV.J.iii., all work for projects selected under this FOA must be performed in the United States. To request a waiver of this requirement, the applicant must submit an explicit waiver request in the Full Application.

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Appendix B lists the information that must be included in a foreign work waiver request.

Save the Waivers in a single PDF file using the following convention for the title “ControlNumber\_LeadOrganization\_Waiver”.

**xvi. Current and Pending Support (required)**

Current and pending support is intended to allow the identification of potential duplication, overcommitment, potential conflicts of interest or commitment, and all other sources of support. As part of the application, the principal investigator and all senior/key personnel at the applicant and subrecipient level must provide a list of all sponsored activities, awards, and appointments, whether paid or unpaid; provided as a gift with terms or conditions or provided as a gift without terms or conditions; full-time, part-time, or voluntary; faculty, visiting, adjunct, or honorary; cash or in-kind; foreign or domestic; governmental or private-sector; directly supporting the individual’s research or indirectly supporting the individual by supporting students, research staff, space, equipment, or other research expenses. All connections with foreign government-sponsored talent recruitment programs must be identified in current and pending support.

For every activity, list the following items:

- The sponsor of the activity or the source of funding;
- The award or other identifying number;
- The title of the award or activity. If the title of the award or activity is not descriptive, add a brief description of the research being performed that would identify any overlaps or synergies with the proposed research;
- The total cost or value of the award or activity, including direct and indirect costs and cost share. For pending applications, provide the total amount of requested funding;
- The award period (start date through end date); and
- The person-months of effort per year dedicated to the award or activity.

To identify overlap, duplication of effort, or synergistic efforts, append a description of the other award or activity to the current and pending support.

Details of any obligations, contractual or otherwise, to any program, entity, or organization sponsored by a foreign government must be provided on request to either the applicant institution or DOE. Supporting documents of any identified source of support must be provided to DOE on request, including certified translations of any document.



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PIs and senior/key personnel must provide a separate disclosure statement listing the required information above regarding current and pending support. Each individual must sign and date their respective disclosure statement and include the following certification statement:

I, [Full Name and Title], certify to the best of my knowledge and belief that the information contained in this Current and Pending Support Disclosure Statement is true, complete, and accurate. I understand that any false, fictitious, or fraudulent information, misrepresentations, half-truths, or omissions of any material fact, may subject me to criminal, civil or administrative penalties for fraud, false statements, false claims or otherwise. (18 U.S.C. §§ 1001 and 287, and 31 U.S.C. §§ 3729-3733 and 3801-3812). I further understand and agree that (1) the statements and representations made herein are material to DOE's funding decision, and (2) I have a responsibility to update the disclosures during the period of performance of the award should circumstances change which impact the responses provided above.

The information may be provided in the approved common disclosure format available at Common Form for Current and Pending (Other) Support (nsf.gov).

Save the Current and Pending Support in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_CPS".

#### **Definitions:**

**Current and pending support** – (a) All resources made available, or expected to be made available, to an individual in support of the individual's RD&D efforts, regardless of (i) whether the source is foreign or domestic; (ii) whether the resource is made available through the entity applying for an award or directly to the individual; or (iii) whether the resource has monetary value; and (b) includes in-kind contributions requiring a commitment of time and directly supporting the individual's RD&D efforts, such as the provision of office or laboratory space, equipment, supplies, employees, or students. This term has the same meaning as the term Other Support as applied to researchers in NSPM-33: For researchers, Other Support includes all resources made available to a researcher in support of and/or related to all of their professional RD&D efforts, including resources provided directly to the individual or through the organization, and regardless of whether or not they have monetary value (e.g., even if the support received is only in-kind, such as office/laboratory space, equipment, supplies, or employees). This includes resource and/or financial support from all foreign and

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domestic entities, including but not limited to gifts provided with terms or conditions, financial support for laboratory personnel, and participation of student and visiting researchers supported by other sources of funding.

**Foreign Government-Sponsored Talent Recruitment Program** – An effort directly or indirectly organized, managed, or funded by a foreign government, or a foreign government instrumentality or entity, to recruit science and technology professionals or students (regardless of citizenship or national origin, or whether having a full-time or part-time position). Some foreign government-sponsored talent recruitment programs operate with the intent to import or otherwise acquire from abroad, sometimes through illicit means, proprietary technology or software, unpublished data and methods, and intellectual property to further the military modernization goals and/or economic goals of a foreign government. Many, but not all, programs aim to incentivize the targeted individual to physically relocate to the foreign state for the above purpose. Some programs allow for or encourage continued employment at United States research facilities or receipt of federal research funds while concurrently working at and/or receiving compensation from a foreign institution, and some direct participants not to disclose their participation to United States entities. Compensation could take many forms including cash, research funding, complimentary foreign travel, honorific titles, career advancement opportunities, promised future compensation, or other types of remuneration or consideration, including in-kind compensation.

**Senior/key personnel** – An individual who contributes in a substantive, meaningful way to the scientific development or execution of a research, development and demonstration (RD&D) project proposed to be carried out with a DOE award.<sup>19</sup>

**xvii. Locations of Work (required)**

The applicant must provide a list of locations where project work will be performed by the prime recipient or subrecipient(s) including the following information for each location:

- Location Type
- Location Type Category
- Is this a Principal Place of Performance?
- Prime or Subrecipient Location?
- If Subrecipient, Subrecipient/Community Name
- Facility Name (if applicable)

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<sup>19</sup> Typically, these individuals have doctoral or other professional degrees, although individuals at the masters or baccalaureate level may be considered Senior/Key Personnel if their involvement meets this definition. Consultants, graduate students, and those with a postdoctoral role also may be considered Senior/Key Personnel if they meet this definition.

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- Is location in a foreign country?
  - Street Address, City, State, 5-Digit Zip Code - +4
  - Briefly describe the primary activity at this location or with this population. For example, management headquarters; construction, operations, production; raw materials extraction, etc.
  - Latitude/Longitude
  - Does the location or community qualify as a disadvantaged community (DAC) according to the Climate and Economic Justice Screening Tool (CEJST)?
  - If DAC, add the census tract number or describe the distributed disadvantaged community served (e.g., migrant workers)
  - % of work performed at this location

For your convenience, a Locations of Work template is available on EERE eXCHANGE at <https://eere-eXCHANGE.energy.gov/>. Applicants are strongly encouraged to use the template. If the template is not used, the submission must include all of the elements described above, and as outlined in the template.

Applicants must provide the Locations of Work Documentation as a Microsoft Excel file using the following convention for the title: "Control Number\_LeadOrganization\_LOW."

#### **xviii. Transparency of Foreign Connections (required)**

Applicants must provide the following as it relates to the proposed recipient and subrecipients. Include a separate disclosure for the applicant and each proposed subrecipient. U.S. National Laboratories, domestic government entities, and institutions of higher education are only required to respond to items 1, 2 and 9, and if applying as to serve as the prime recipient, must provide complete responses for project team members that are not U.S. National Laboratories, domestic government entities, or institutions of higher education.

1. Entity name, website address and mailing address;
2. The identity of all owners, principal investigators, project managers, and senior/key personnel who are a party to any *Foreign Government-Sponsored Talent Recruitment Program* of a foreign country of risk (i.e., China, Iran, North Korea, and Russia);
3. The existence of any joint venture or subsidiary that is based in, funded by, or has a foreign affiliation with any foreign country of risk;
4. Any current or pending contractual or financial obligation or other agreement specific to a business arrangement, or joint venture-like arrangement with an enterprise owned by a foreign state or any foreign entity;

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5. Percentage, if any, that the proposed recipient or subrecipient has foreign ownership or control;
6. Percentage, if any, that the proposed recipient or subrecipient is wholly or partially owned by an entity in a foreign country of risk;
7. Percentage, if any, of venture capital or institutional investment by an entity that has a general partner or individual holding a leadership role in such entity who has a foreign affiliation with any foreign country of risk;
8. Any technology licensing or intellectual property sales to a foreign country of risk, during the 5-year period preceding submission of the application;
9. Any foreign business entity, offshore entity, or entity outside the United States related to the proposed recipient or subrecipient;
10. Complete list of all directors (and board observers), including their full name, citizenship and shareholder affiliation, date of appointment, duration of term, as well as a description of observer rights as applicable;
11. Complete capitalization table for your entity, including all equity interests (including LLC and partnership interests, as well as derivative securities). Include both the number of shares issued to each equity holder, as well as the percentage of that series and all equity on a fully diluted basis. Identify the principal place of incorporation (or organization) for each equity holder. If the equity holder is a natural person, identify the citizenship(s). If the recipient or subrecipient is a publicly traded company, provide the above information for shareholders with an interest greater than 5%;
12. A summary table identifying all rounds of financing, the purchase dates, the investors for each round, and all the associated governance and information rights obtained by investors during each round of financing; and
13. An organization chart to illustrate the relationship between your entity and the immediate parent, ultimate parent, and any intermediate parent, as well as any subsidiary or affiliates. Identify where each entity is incorporated.

DOE reserves the right to request additional or clarifying information based on the information submitted.

Save the Transparency of Foreign Connections information in a single PDF file using the following convention for the title  
"ControlNumber\_LeadOrganization\_TFC."

**xix. Potentially Duplicative Funding Notice (required)**

If the applicant or project team member has other active awards of federal funds, the applicant must determine whether the activities of those awards

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potentially overlap with the activities set forth in its application to this FOA. If there is a potential overlap, the applicant must notify DOE in writing of the potential overlap and state how it will ensure any project funds (i.e., recipient cost share and federal funds) will not be used for identical cost items under multiple awards. Likewise, for projects that receive funding under this FOA, if a recipient or project team member receives any other award of federal funds for activities that potentially overlap with the activities funded under the DOE award, the recipient must promptly notify DOE in writing of the potential overlap and state whether project funds from any of those other federal awards have been, are being, or are to be used (in whole or in part) for one or more of the identical cost items under the DOE award. If there are identical cost items, the recipient must promptly notify the Contracting Officer in writing of the potential duplication and eliminate any inappropriate duplication of funding.

Save the Potentially Duplicative Funding Notice in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_PDFN."

## **E. Content and Form of Replies to Reviewer Comments**

EERE will provide applicants with reviewer comments following the evaluation of all eligible Full Applications. Applicants have a brief opportunity to prepare a short Reply to Reviewer Comments (Reply). The Reply must not exceed three pages. If a Reply is more than three pages in length, EERE 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.

EERE will post the reviewer comments in EERE eXCHANGE. The expected submission deadline is on the cover page of the FOA; however, it is the applicant's responsibility to monitor EERE eXCHANGE if the expected date changes. The deadline will not be extended for applicants who are unable to timely submit their Reply due to failure to check EERE eXCHANGE or relying on the expected date alone. Applicants should anticipate having approximately three (3) business days to submit a Reply.

Applicants are not required to submit a Reply to Reviewer Comments. EERE will review and consider each eligible Full Application, even if no Reply is submitted or if the Reply is found to be ineligible.

## **F. Post Selection Information Requests**

If selected for award negotiations, EERE reserves the right to require that selected applicants provide additional or clarifying information regarding the application submissions, the project, the project team, the award requirements, and any other

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matters related to anticipated award. The following is a list of examples of information that may be required:

- Personnel proposed to work on the project and collaborating organizations (See [Section VI.B.xix](#). Participants and Collaborating Organizations);
- Current and Pending Support (See Sections [IV.D.xvi](#). and [VI.B.xx](#). Current and Pending Support);
- A Data Management Plan (if applicable) describing how all research data displayed in publications resulting from the proposed work will be digitally accessible at the time of publications, in accordance with [Section VI.B.xxiii](#).;
- Indirect cost information;
- Other budget information;
- Letters of Commitment from third parties contributing to cost share, if applicable;
- Name and phone number of the Designated Responsible Employee for complying with national policies prohibiting discrimination (See 10 CFR 1040.5);
- Information for the DOE Office of Civil Rights to process assurance reviews under 10 CFR 1040;
- Representation of Limited Rights Data and Restricted Software, if applicable; and
- Environmental Questionnaire.

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## **G. Unique Entity Identifier (UEI) and System for Award Management (SAM)**

Each applicant (unless the applicant is an individual or federal awarding agency that is excepted from those requirements under 2 CFR 25.110(b) or (c), or has an exception approved by the federal awarding agency under 2 CFR 25.110(d)) is required to: (1) Register in the SAM at <https://www.sam.gov> before submitting an application; (2) provide a valid UEI in the application; and (3) maintain an active SAM registration with current information when the applicant has an active federal award or an application or plan under consideration by a federal awarding agency. DOE may not make a federal award to an applicant until the applicant has complied with all applicable UEI and SAM requirements. If an applicant has not fully complied with the requirements by the time DOE is ready to make a federal award, DOE will determine that the applicant is not qualified to receive a federal award and use that determination as a basis for making a federal award to another applicant.

**NOTE:** Due to the high demand of UEI requests and SAM registrations, entity legal business name and address validations are taking longer than expected to process. Entities should start the UEI and SAM registration process as soon as possible. If entities have technical difficulties with the UEI validation or SAM registration process they should use the [HELP](#) feature on [SAM.gov](#). SAM.gov will work entity service tickets in the order in which they are received and asks that entities not create multiple service tickets for the same request or technical issue. Additional entity validation resources can be found here: [GSAFSD Tier 0 Knowledge Base - Validating your Entity](#).

## **H. Submission Dates and Times**

All required submissions must be submitted in EERE eXCHANGE no later than 5 p.m. ET on the dates provided on the cover page of this FOA.

## **I. Intergovernmental Review**

This FOA is not subject to Executive Order 12372 – Intergovernmental Review of Federal Programs.

## **J. Funding Restrictions**

### **i. Allowable Costs**

All expenditures must be allowable, allocable, and reasonable in accordance with the applicable federal cost principles. Pursuant to 2 CFR 910.352, the cost principles in the Federal Acquisition Regulations (48 CFR 31.2) apply to for-profit entities. The cost principles contained in 2 CFR Part 200, Subpart E apply to all entities other than for-profits.

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**ii. Pre-Award Costs**

Applicants selected for award negotiations (selectees) must request prior written approval to charge pre-award costs. Pre-award costs are those incurred prior to the effective date of the federal award directly pursuant to the negotiation and in anticipation of the federal award where such costs are necessary for efficient and timely performance of the scope of work. Such costs are allowable only to the extent that they would have been allowable if incurred after the date of the federal award and **only** with the written approval of the federal awarding agency, through the Contracting Officer.

Pre-award costs cannot be incurred prior to the Selection Official signing the Selection Statement and Analysis.

Pre-award expenditures are made at the selectee's risk. EERE is not obligated to reimburse costs: (1) in the absence of appropriations; (2) if an award is not made; or (3) if an award is made for a lesser amount than the selectee anticipated.

**1. National Environmental Policy Act (NEPA) Requirements Related to Pre-Award Costs**

EERE's decision whether and how to distribute federal funds under this FOA is subject to NEPA. Applicants should carefully consider and should seek legal counsel or other expert advice before taking any action related to the proposed project that would have an adverse effect on the environment or limit the choice of reasonable alternatives prior to EERE completing the NEPA review process.

EERE does not guarantee or assume any obligation to reimburse pre-award costs incurred prior to receiving written authorization from the Contracting Officer. If the applicant elects to undertake activities that DOE determines may have an adverse effect on the environment or limit the choice of reasonable alternatives prior to receiving such written authorization from the Contracting Officer, the applicant is doing so at risk of not receiving federal funding for its project and such costs may not be recognized as allowable cost share. Nothing contained in the pre-award cost reimbursement regulations or any pre-award costs approval letter from the Contracting Officer overrides the requirement to obtain the written authorization from the Contracting Officer prior to taking any action that may have an adverse effect on the environment or limit the choice of reasonable alternatives. Likewise, if an application is selected for negotiation of award, and the prime recipient elects to undertake activities that are not authorized for federal funding by the Contracting Officer in advance of EERE completing a NEPA

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review, the prime recipient is doing so at risk of not receiving federal funding and such costs may not be recognized as allowable cost share.

### **iii. Performance of Work in the United States (Foreign Work Waiver)**

#### **1. Requirement**

All work performed under awards issued under this FOA must be performed in the United States. The prime recipient must flow down this requirement to its subrecipients.

#### **2. Failure to Comply**

If the prime recipient fails to comply with the Performance of Work in the United States requirement, EERE may deny reimbursement for the work conducted outside the United States and such costs may not be recognized as allowable recipient cost share. The prime recipient is responsible should any work under this award be performed outside the United States, absent a waiver, regardless of whether the work is performed by the prime recipient, subrecipients, contractors or other project partners.

#### **3. Waiver**

To seek a foreign work waiver, the applicant must submit a written waiver request to EERE. [Appendix B](#) lists the information that must be included in a request for a foreign work waiver.

Save the waiver request(s) in a single PDF file. The applicant does not have the right to appeal EERE's decision concerning a waiver request.

### **iv. Construction**

Recipients are required to obtain written authorization from the Contracting Officer before incurring any major construction costs.

### **v. Foreign Travel**

If international travel is proposed for your project, please note that your organization must comply with the International Air Transportation Fair Competitive Practices Act of 1974 (49 U.S.C. § 40118), commonly referred to as the "Fly America Act," and implementing regulations at 41 CFR 301-10.131 through 301-10.143. The law and regulations require air transport of people or property to, from, between, or within a country other than the United States, the cost of which is supported under this award, to be performed by or under a cost-sharing arrangement with a United States flag carrier, if service is available. Foreign travel costs are allowable only with the written prior approval of the Contracting Officer assigned to the award.

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**vi. Equipment and Supplies**

Property disposition may be required at the end of a project if the current fair market value of property exceeds \$5,000. For-profit entity disposition requirements are set forth at 2 CFR 910.360. Property disposition requirements for other non-federal entities are set forth in 2 CFR 200.310 – 200.316.

**vii. Build America Buy America Requirements for Infrastructure Projects**

Pursuant to the Build America Buy America Act, subtitle IX of BIL (Buy America, or BABA), federally assisted projects that involve infrastructure work, undertaken by applicable recipient types, require that:

- All iron, steel, and manufactured products used in the infrastructure work are produced in the United States; and
- All construction materials used in the infrastructure work are manufactured in the United States.

Whether a given project must apply this requirement is project-specific and dependent on several factors, such as the recipient's entity type, whether the work involves "infrastructure," as defined in Section 70914 of the BIL, and whether the infrastructure in question is publicly owned or serves a public function.

Applicants are strongly encouraged to consult [Appendix C](#) of this FOA to determine whether their project may have to apply this requirement, both to make an early determination as to the need of a waiver, as well as to determine what impact, if any, this requirement may have on the proposed project's budget.

Please note that, based on implementation guidance from the Office of Management and Budget issued on April 18, 2022, the Buy America requirements of the BIL do not apply to DOE projects in which the prime recipient is a for-profit entity; the requirements only apply to projects whose prime recipient is a "non-Federal entity," e.g., a State, local government, Indian tribe, Institution of Higher Education, or nonprofit organization. Subawards should conform to the terms of the prime award from which they flow; in other words, for-profit prime recipients are not required to flow down these Buy America requirements to subrecipients, even if those subrecipients are non-Federal entities as defined above. Conversely, prime recipients which are non-Federal entities must flow the Buy America requirements down to all subrecipients, even if those subrecipients are for-profit entities. Finally, for all

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applicants—both non-Federal entities and for-profit entities—DOE is including a Program Policy Factor that the Selection Official may consider in determining which Full Applications to select for award negotiations that considers whether the applicant has made a commitment to procure U.S. iron, steel, manufactured products, and construction materials in its project.

The DOE financial assistance agreement will require each recipient to: (1) fulfill the commitments made in its application regarding the procurement of U.S.-produced products and (2) fulfill the commitments made in its application regarding the procurement of other key component metals and domestically manufactured products that are deemed available in sufficient and reasonably available quantities or of a satisfactory quality at the time of award negotiation. Applicants may seek waivers of these requirements in very limited circumstances and for good cause shown. Further details on requesting a waiver can be found in [Appendix C](#) and the terms and conditions of an award.

Applicants are strongly encouraged to consult [Appendix C](#) for more information.

#### **viii. Lobbying**

Recipients and subrecipients may not use any federal funds to influence or attempt to influence, directly or indirectly, congressional action on any legislative or appropriation matters.

Recipients and subrecipients are required to complete and submit SF-LLL, “Disclosure of Lobbying Activities” (<https://www.grants.gov/web/grants/forms/sf-424-individual-family.html>) to ensure that non-federal funds have not been paid and will not be paid to any person for influencing or attempting to influence any of the following in connection with the application:

- An officer or employee of any federal agency;
- A Member of Congress;
- An officer or employee of Congress; or
- An employee of a Member of Congress.

#### **ix. Risk Assessment**

Pursuant to 2 CFR 200.206, DOE will conduct an additional review of the risk posed by applications submitted under this FOA. Such risk assessment will consider:

1. Financial stability;
2. Quality of management systems and ability to meet the management standards prescribed in 2 CFR 200 as amended and adopted by 2 CFR 910;
3. History of performance;
4. Audit reports and findings; and
5. The applicant's ability to effectively implement statutory, regulatory, or other requirements imposed on non-federal entities.

DOE may make use of other publicly available information and the history of an applicant's performance under DOE or other federal agency awards.

Depending on the severity of the findings and whether the findings were resolved, DOE may elect not to fund the applicant.

In addition to this review, DOE must comply with the guidelines on government-wide suspension and debarment in 2 CFR 180, and must require non-federal entities to comply with these provisions. These provisions restrict federal awards, subawards and contracts with certain parties that are debarred, suspended or otherwise excluded from or ineligible for participation in federal programs or activities.

Further, as DOE invests in critical infrastructure and funds critical and emerging technology areas, DOE also considers possible threats to United States research, technology, and economic security from undue foreign government influence when evaluating risk. If high risks are identified and cannot be sufficiently mitigated, DOE may elect to not fund the applicant. As part of the research, technology, and economic security risk review, DOE may contact the applicant and/or proposed project team members for additional information to inform the review.

#### **x. Invoice Review and Approval**

DOE employs a risk-based approach to determine the level of supporting documentation required for approving invoice payments. Recipients may be required to provide some or all of the following items with their requests for reimbursement:

- Summary of costs by cost categories;
- Timesheets or personnel hours report;
- Invoices/receipts for all travel, equipment, supplies, contractual, and other costs;
- UCC filing proof for equipment acquired with project funds by for-profit recipients and subrecipients;

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- Explanation of cost share for invoicing period;
  - Analogous information for some subrecipients; and
  - Other items as required by DOE.

## **xi. Prohibition Related to Foreign Government-Sponsored Talent Recruitment Programs**

### **a. Prohibition**

Persons participating in a *Foreign Government-Sponsored Talent Recruitment Program of a Foreign Country of Risk* are prohibited from participating in projects selected for federal funding under this FOA. Should an award result from this FOA, the recipient must exercise ongoing due diligence to reasonably ensure that no individuals participating on the DOE-funded project are participating in a *Foreign Government-Sponsored Talent Recruitment Program of a Foreign Country of Risk*. Consequences for violations of this prohibition will be determined according to applicable law, regulations, and policy. Further, the recipient must notify DOE within five (5) business days upon learning that an individual on the project team is or is believed to be participating in a foreign government talent recruitment program of a foreign country of risk. DOE may modify and add requirements related to this prohibition to the extent required by law.

### **b. Definitions**

- 1. Foreign Government-Sponsored Talent Recruitment Program.** An effort directly or indirectly organized, managed, or funded by a foreign government, or a foreign government instrumentality or entity, to recruit science and technology professionals or students (regardless of citizenship or national origin, or whether having a full-time or part-time position). Some foreign government-sponsored talent recruitment programs operate with the intent to import or otherwise acquire from abroad, sometimes through illicit means, proprietary technology or software, unpublished data and methods, and intellectual property to further the military modernization goals and/or economic goals of a foreign government. Many, but not all, programs aim to incentivize the targeted individual to relocate physically to the foreign state for the above purpose. Some programs allow for or encourage continued employment at United States research facilities or receipt of federal research funds while concurrently working at and/or receiving compensation from a foreign institution, and some direct participants not to disclose their participation to U.S. entities. Compensation could take many forms including cash, research funding, complimentary foreign

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travel, honorific titles, career advancement opportunities, promised future compensation, or other types of remuneration or consideration, including in-kind compensation.

2. **Foreign Country of Risk.** DOE has designated the following countries as foreign countries of risk: Iran, North Korea, Russia, and China. This list is subject to change.

## xii. **Affirmative Action and Pay Transparency Requirements**

All applicants must comply with all applicable federal labor and employment laws, including but not limited to Title VII of the Civil Rights Act of 1964, the Fair Labor Standards Act, the Occupational Safety and Health Act, and the National Labor Relations Act, which protects employees' right to bargain collectively and engage in concerted activities for the purpose of workers' mutual aid or protection.

All federally assisted construction contracts exceeding \$10,000 annually will be subject to the requirements of Executive Order 11246:

- (1) Recipients, subrecipients, contractors, and subcontractors are prohibited from discriminating in employment decisions on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin.
- (2) Recipients and contractors are required to take affirmative action to ensure that equal opportunity is provided in all aspects of their employment. This includes flowing down the appropriate language to all subrecipients, contractors, and subcontractors.
- (3) Recipients, subrecipients, contractors, and subcontractors are prohibited from taking adverse employment actions against applicants and employees for asking about, discussing, or sharing information about their pay or, under certain circumstances, the pay of their co-workers.

DOL's Office of Federal Contractor Compliance Programs (OFCCP) uses a neutral process to schedule compliance evaluations. Consult OFCCP's Technical Assistance Guide<sup>20</sup> to gain an understanding of the requirements and possible actions the recipients, subrecipients, contractors, and subcontractors must take. Additional guidance may also be found in the National Policy Assurances, produced by DOE.

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<sup>20</sup> See OFCCP's Technical Assistance Guide at:

<https://www.dol.gov/sites/dolgov/files/ofccp/Construction/files/ConstructionTAG.pdf?msclkid=9e397d68c4b111ec9d8e6fecb6c710ec> Also see the National Policy Assurances <http://www.nsf.gov/awards/managing/rtc.jsp>

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**xiii. Foreign Collaboration Considerations**

- a. Consideration of new collaborations with foreign entities, organizations, and governments. The recipient will be required to provide DOE with advanced written notification of any potential collaboration with foreign entities, organizations, or governments in connection with its DOE-funded award scope. The recipient will then be required to await further guidance from DOE prior to contacting the proposed foreign entity, organization, or government regarding the potential collaboration or negotiating the terms of any potential agreement.
- b. Existing collaborations with foreign entities, organizations, and governments. The recipient will be required to provide DOE with a written list of all existing foreign collaborations in which has entered in connection with its DOE-funded award scope.
- c. Description of collaborations that should be reported. In general, a collaboration will involve some provision of a thing of value to, or from, the recipient. A thing of value includes but may not be limited to all resources made available to, or from, the recipient in support of and/or related to the DOE award, regardless of whether or not they have monetary value. Things of value also may include in-kind contributions (such as office/laboratory space, data, equipment, supplies, employees, students). In-kind contributions not intended for direct use on the DOE award but resulting in provision of a thing of value from or to the DOE award must also be reported. Collaborations do not include routine workshops, conferences, use of the recipient's services and facilities by foreign investigators resulting from its standard published process for evaluating requests for access, or the routine use of foreign facilities by recipient staff in accordance with the recipient's standard policies and procedures.

## V. Application Review Information

### A. Technical Review Criteria

#### i. Concept Papers

Concept Papers are evaluated based on consideration the following factors. All sub-criteria are of equal weight.

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

This criterion involves consideration of the following factors:

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**Topic Areas 1, 4 & Topic Area 2 Subtopic a (TA2a)**

- The applicant clearly describes the proposed technology or research approach, how the technology or research approach is unique and innovative, and how the technology or research approach will advance the current state of the art;
- The applicant has identified risks and challenges of the technology or research approach, regulatory and financial aspects of the application 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 the qualifications, experience, capabilities and other resources necessary to complete the proposed project; and
- The proposed work, if successfully accomplished, would clearly meet the objectives as stated in the FOA.

**Topic Area 2 Subtopic b (TA2b)**

- The applicant clearly describes the proposed research, describes how the research is unique and innovative, and how the research will advance the current state of knowledge;
- The proposed research is relevant to one or more of the six Topic Area 2 Subtopic B research priorities;
- The proposed research is informed by aquaculture end user needs and/or plans to engage aquaculture stakeholders as part of the project to incorporate end user needs;
- The applicant has identified risks and challenges, including possible mitigation strategies;
- The proposed work, if successfully accomplished, would clearly meet the objectives as stated in the FOA;
- The applicant has the qualifications, experience, capabilities and other resources necessary to complete the proposed project.

**Topic Area 3**

- The applicant clearly describes the various activities to be undertaken to achieve the objective of the Topic Area.
- The applicant provides descriptions of at least three potential impactful activities (the duration of activity can vary but must be completed by the end of the period of performance) that will support undergraduate senior student's design and/or research project development and completion.
- The applicant clearly describes how the university will identify viable projects and how they will determine the type of support needed.
- The applicant has articulated how the university and or project manager's skillset: 1) enables achievement of the project objectives; 2) enables the

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achievement of the identified high impact projects, and 3) will be maintained over the period of performance and adapted as needed.

## ii. **Full Applications**

Applications will be evaluated against the technical review criteria shown below. All sub-criteria are of equal weight.

### Topic Area 1

#### **Criterion 1: Technical Merit, Innovation, and Impact (50%)**

This criterion involves consideration of the following factors:

##### Technical Merit and Innovation

- Potential of work plan to identify innovative and impactful LCOE reduction pathways;
- Extent to which the application specifically and convincingly demonstrates how the applicant will generate impactful data and information that enables the broader Marine Energy industry to decrease LCOE;
- For topics 1(b) and 1(c), the degree to which the proposed design could be used innovatively test multiple ME device subsystems in a impactful manner that will enable the broader Marine Energy industry to decrease LCOE;
- Sufficiency of technical detail in the application to assess whether the proposed work is scientifically meritorious and revolutionary, including relevant data, calculations, and discussion of prior work, with analyses that support the viability of the proposed work;
- Degree to which design details and data products produced through testing will be publicly available and have significant impact for industry.

##### Project Management

- Adequacy of proposed project management systems including the ability to track scope, cost, and schedule progress and changes;
- Reasonableness of budget and spend plan as detailed in the budget justification workbook for proposed project and objectives;
- Adequacy of contingency funding based on quality of cost estimate and identified risks;
- Adequacy, reasonableness, and soundness of the project schedule, as well as periodic Go/No-Go decisions prior to further funds disbursement, interim milestones, and metrics to track process;
- Adequacy, reasonableness, and soundness of the project schedule, as well as annual Go/No-Go decisions prior to a budget period

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continuation application, interim milestones, and metrics to track process;

- Adequacy of the identification of risks, including labor and community opposition or disputes, and “timely” and appropriate strategies for mitigation and resolution; and
- Soundness of a plan to expeditiously address environmental, siting, and other regulatory requirements for the project, including evaluation of resilience to climate change.

### **Criterion 2: Project Research Plan (25%)**

This criterion involves consideration of the following factors:

#### Research Approach, Workplan and SOPO

- Degree to which the task descriptions are clear, detailed, timely, and reasonable, resulting in a high likelihood that the proposed Workplan and SOPO will succeed in meeting the project goals;
- Likelihood that the proposed work plan will meet FOA objectives and
- Quality and feasibility of the operations and maintenance plan.

#### Identification of Technical Risks

- Discussion and demonstrated understanding of the key technical risk areas involved in the proposed work and the quality of the mitigation strategies to address them.

#### Baseline, Metrics, and Deliverables

- Level of clarity in the definition of the baseline, metrics, and milestones; and
- Relative to a clearly defined project baseline, the strength of the quantifiable metrics, milestones, and mid-point deliverables defined in the application, such that meaningful interim progress will be made.

### **Criterion 3: Team and Resources (15%)**

This criterion involves consideration of the following factors:

- The capability of the Principal Investigator(s) and the proposed team to address all aspects of the proposed work with a high probability of success. The qualifications, relevant expertise, and time commitment of the individuals on the team;
- Diversity of expertise and perspectives of the team and the inclusion of industry partners that will amplify impact;
- The sufficiency of the facilities to support the work;

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- Level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the Workplan;
  - The level of interest in the application as evidenced by letters of endorsement from ME industry and
  - The reasonableness of the budget and spend plan to achieve the proposed project objectives.

**Criterion 4: Diversity, Equity, and Inclusion (10%)**

This criterion involves consideration of the following factors:

- The quality and manner in which the measures incorporate diversity, equity and inclusion goals in the project; and
- Extent to which the project benefits underserved communities.

**Topic Area 2a****Criterion 1: Technical Merit, Innovation, and Impact (50%)**

This criterion involves consideration of the following factors:

**Technical Merit and Innovation**

- Extent to which the proposed project is innovative or replicable;
- Extent to which the application specifically and convincingly demonstrates how the applicant will contribute to improving state of the art understanding of the topic; Sufficiency of technical detail in the application to assess whether the proposed work is scientifically meritorious and revolutionary, including relevant data, calculations, and discussion of prior work, with analyses that support the viability of the proposed work;
- Extent to which project has a plan to integrate participation from needed stakeholders, including those from aquaculture industry, offshore wind developers, and regulatory bodies; and
- Extent to which the proposed work, if successfully accomplished, would assess a variety of factors in analyzing co-location feasibility and clearly meet the objectives as stated in the FOA.

**Project Management**

- Adequacy of proposed project management systems including the ability to track scope, cost, and schedule progress and changes;
- Reasonableness of budget and spend plan as detailed in the budget justification workbook for proposed project and objectives;
- Adequacy of contingency funding based on quality of cost estimate and identified risks;
- Adequacy, reasonableness, and soundness of the project schedule, as well as periodic Go/No-Go decisions prior to further funds

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- Adequacy, reasonableness, and soundness of the project schedule, as well as annual Go/No-Go decisions prior to a budget period continuation application, interim milestones, and metrics to track process.

**Criterion 2: Project Research (25%)**

This criterion involves consideration of the following factors:

**Research Approach, Workplan and SOPO**

- Degree to which the approach and critical path have been clearly described and thoughtfully considered; and
- Degree to which the task descriptions are clear, detailed, timely, and reasonable, resulting in a high likelihood that the proposed Workplan and SOPO will succeed in meeting the project goals.

**Identification of Risks**

- Discussion and demonstrated understanding of the key risk areas involved in the proposed work and the quality of the mitigation strategies to address them.

**Baseline, Metrics, and Deliverables**

- Level of clarity in the definition of the baseline, metrics, and milestones; and
- Relative to a clearly defined project baseline, the strength of the quantifiable metrics, milestones, and mid-point deliverables defined in the application, such that meaningful interim progress will be made.

**Criterion 3: Team and Resources (15%)**

This criterion involves consideration of the following factors:

- Capability of the Principal Investigator(s) and the proposed team to address all aspects of the proposed work with a high probability of success. The qualifications, relevant expertise, and time commitment of the individuals on the team;
- Diversity of expertise and perspectives of the team and the inclusion of industry partners;
- Level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the Workplan; and
- Reasonableness of the budget and spend plan for the proposed project and objectives.

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**Criterion 4: Diversity, Equity, and Inclusion Plan (10%)**

This criterion involves consideration of the following factors:

- The quality and manner in which the measures incorporate diversity, equity and inclusion goals in the project; and
- Extent to which the project benefits underserved communities.

**Topic Area 2b****Criterion 1: Technical Merit, Innovation, and Impact (45%)**

This criterion involves consideration of the following factors:

**Technical Merit and Innovation**

- Extent to which the proposed research is innovative and/or replicable;
- Degree to which the current state of knowledge and the proposed advancement are clearly described;
- Extent to which the proposed research is informed by aquaculture end user needs or includes plans for stakeholder engagement to include end user needs; and
- Sufficiency of technical detail in the application to assess whether the proposed work is scientifically meritorious, including relevant data, calculations and discussion of prior work in the literature with analyses that support the viability of the proposed work.

**Impact of Research**

- Extent to which the application specifically and convincingly demonstrates how the applicant will address one of more the six Topic Area 2 Subtopic B research priorities;
- Ability of the project to contribute to the responsible advancement of marine energy technologies and their adoption while considering potential benefits and adverse impacts to ocean users, impacted communities, and the surrounding environment;
- Extent to which the project facilitates stakeholder relationships across new or existing stakeholders to gain technical buy-in and increase potential for future marine energy deployments while considering the historical, cultural, and socioeconomic context of the work; and
- Potential for the applicant to either close out the proposed project with an impactful deliverable or to position themselves as a promising candidate for private or public funding opportunities to continue the research and maintain relationships with stakeholders after the conclusion of this FOA.

**Project Management**

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- Adequacy of proposed project management systems including the ability to track scope, cost, and schedule progress and changes;
  - Reasonableness of budget and spend plan as detailed in the budget justification workbook for proposed project and objectives;
  - Adequacy of contingency funding based on quality of cost estimate and identified risks;
  - Adequacy, reasonableness, and soundness of the project schedule, as well as periodic Go/No-Go decisions prior to further funds disbursement, interim milestones, and metrics to track process; and
  - Soundness of a plan to expeditiously address environmental, siting, and other regulatory requirements for the project, including evaluation of resilience to climate change.

### **Criterion 2: Project Research Plan and if applicable, Market Transformation Plan (25%)**

This criterion involves consideration of the following factors:

#### Research Approach, Workplan and SOPO

- Degree to which the approach has been clearly described and thoughtfully considered;
- Degree to which the task descriptions are clear, detailed, timely, and reasonable, resulting in a high likelihood that the proposed Workplan and SOPO will succeed in meeting the project goals.

#### Identification of Technical Risks

- Discussion and demonstrated understanding of the key technical risk areas involved in the proposed work and the quality of the mitigation strategies to address them.

#### Metrics and Deliverables

- Level of clarity in the definition of the metrics and milestones; and
- Strength of the quantifiable metrics, milestones, and a mid-point deliverables defined in the application, such that meaningful interim progress will be made.

#### Market Transformation Plan (if applicable)

- Identification of target market, competitors, and distribution channels for proposed technology along with known or perceived barriers to market penetration, including mitigation plan; and
- Comprehensiveness of market transformation plan including but not limited to product development and/or service plan, commercialization timeline, financing, product marketing, legal/regulatory considerations including intellectual property,

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infrastructure requirements, Publicly Available Software Distribution Plan (if applicable), etc., and product distribution.

- If not applicable: adequacy of the brief justification of why this section was not relevant to the application.

### **Criterion 3: Team and Resources (15%)**

This criterion involves consideration of the following factors:

- Capability of the Principal Investigator(s) and the proposed team to address all aspects of the proposed work with a high probability of success. The qualifications, relevant expertise, and time commitment of the individuals on the team;
- Diversity of expertise and perspectives of the team;
- Sufficiency of the facilities to support the work;
- Degree to which the proposed consortia/team demonstrates the ability to facilitate and expedite further development of marine energy technologies;
- Level of participation from the aquaculture sector and marine energy sector, as well as from other applicable stakeholders;
- Level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the Workplan; and
- Clarity, adequacy, and completeness of roles and contributions of each team member in development of the project, including financial support of partners, and subrecipients.

### **Criterion 4: Diversity, Equity, and Inclusion Plan (15%)**

This criterion involves consideration of the following factors:

- The quality and manner in which the measures incorporate diversity, equity and inclusion goals in the project; and
- Extent to which the project benefits underserved communities.

## **Topic Area 3**

### **Criterion 1: Technical Merit, Innovation, and Impact (30%)**

This criterion involves consideration of the following factors:

#### **Technical Merit and Innovation**

- Extent to which the proposed process, or project is innovative, replicable, and/or scalable;
- Degree to which the current state of the process, or project, and the proposed advancement are clearly described;

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- Extent to which the application specifically and convincingly demonstrates how the applicant will facilitate partnerships to address workforce development challenges in the marine energy industry;
  - Extent to which project has buy-in from key stakeholders to ensure success, and the extent to which the project facilitates these stakeholder relationships across new or existing stakeholders;
  - Appropriateness and value of the environment that supports the research and professional development experience for the student participants.

#### Project Management

- Adequacy of proposed project management systems including the ability to track scope, cost, and schedule progress and changes;
- Reasonableness of budget and spend plan as detailed in the budget justification workbook for proposed project and objectives;
- Adequacy, reasonableness, and soundness of the project schedule, interim milestones, and metrics to track process; and
- Adequacy of the identification of risks, including labor and community opposition or disputes, and “timely” and appropriate strategies for mitigation and resolution

#### **Criterion 2: Project Plan (20%)**

This criterion involves consideration of the following factors:

#### Approach, Workplan and SOPO

- Degree to which the proposed approach and activities have been clearly described and thoughtfully considered;
- Quality of plan to identify promising student research projects and determine the type of support needed at the outset of a student research project;
- Quality of plans for student preparation and for follow-through designed to promote continuation of student interest and involvement in research; and
- Degree to which the task descriptions are clear, detailed, timely, and reasonable, resulting in a high likelihood that the proposed Workplan and SOPO will succeed in meeting the project goals.

#### Identification of Technical Risks

- Discussion and demonstrated understanding of the key risk areas involved in the proposed work and the quality of the mitigation strategies to address them.

#### Baseline, Metrics, and Deliverables

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- 
- Level of clarity in the definition of the baseline, metrics, and milestones; and
  - Relative to a clearly defined project baseline, the strength of the quantifiable metrics, milestones, and mid-point deliverables defined in the application, such that meaningful interim progress will be made.

**Criterion 3: Team and Resources (30%)**

This criterion involves consideration of the following factors:

- Capability of the Principal Investigator(s) and the proposed team to address all aspects of the proposed work with a high probability of success, including the qualifications, relevant expertise, and time commitment of the individuals on the team;
- Diversity of expertise and perspectives of the team and the inclusion of stakeholders, and/or partners, that will enhance impact;
- Quality of the research environment, including the facilities, the preparedness of the research mentor(s) to guide undergraduate research, and the professional development opportunities for the students;
- Level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the Workplan; and
- Reasonableness of the budget and spend plan for the proposed project and objectives.

**Criterion 4: Diversity, Equity, and Inclusion Plan (20%)**

This criterion involves consideration of the following factors:

- The quality and manner in which the measures incorporate diversity, equity and inclusion goals in the project; and
- Extent to which the project benefits underserved communities.

**Topic Area 4****Criterion 1: Technical Merit, Innovation, and Impact (50%)**

This criterion involves consideration of the following factors:

**Technical Merit and Innovation**

- Extent to which the proposed technology, process, or project is innovative or replicable;
- Degree to which the current state of the technology and the proposed advancement are clearly described;

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- Extent to which the application specifically and convincingly demonstrates how the applicant will move the state of the art to the proposed advancement;
  - Sufficiency of technical detail in the application to assess whether the proposed work is scientifically meritorious and revolutionary, including relevant data, calculations, and discussion of prior work, with analyses that support the viability of the proposed work;
  - Extent to which project has buy-in from needed stakeholders to ensure success;
  - Degree to which key manufacturing and supply chain challenges are considered, as applicable, for viable scale-up in this and future demonstrations;
  - Degree to which siting and environmental constraints are considered for deployment;
  - Sufficiency of existing infrastructure to support addition of proposed demonstration.

#### Impact of Technology Advancement

- Ability of the project to advance industry adoption;
- Extent to which the project supports the topic area objectives and target specifications and metrics;
- Potential impact of the project on advancing the state-of-the-art;
- Extent to which demonstration/deployment is replicable and may lead to future demonstrations; and
- Extent to which the project facilitates stakeholder relationships across new or existing stakeholders to gain technical buy-in and increase potential for future deployments.

#### Project Management

- Adequacy of proposed project management systems including the ability to track scope, cost, and schedule progress and changes;
- Reasonableness of budget and spend plan as detailed in the budget justification workbook for proposed project and objectives;
- Adequacy of contingency funding based on quality of cost estimate and identified risks;
- Adequacy, reasonableness, and soundness of the project schedule, as well as periodic Go/No-Go decisions prior to further funds disbursement, interim milestones, and metrics to track process;
- Adequacy, reasonableness, and soundness of the project schedule, as well as annual Go/No-Go decisions prior to a budget period continuation application, interim milestones, and metrics to track process;

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- Adequacy of the identification of risks, including labor and community opposition or disputes, and “timely” and appropriate strategies for mitigation and resolution; and
  - Soundness of a plan to expeditiously address environmental, siting, and other regulatory requirements for the project, including evaluation of resilience to climate change.

**Criterion 2: Project Research and Market Transformation Plan (25%)**

This criterion involves consideration of the following factors:

**Research Approach, Workplan and SOPO**

- Degree to which the approach and critical path have been clearly described and thoughtfully considered; and
- Degree to which the task descriptions are clear, detailed, timely, and reasonable, resulting in a high likelihood that the proposed Workplan and SOPO will succeed in meeting the project goals.

**Identification of Technical Risks**

- Discussion and demonstrated understanding of the key technical risk areas involved in the proposed work and the quality of the mitigation strategies to address them.

**Baseline, Metrics, and Deliverables**

- Level of clarity in the definition of the baseline, metrics, and milestones; and
- Relative to a clearly defined project baseline, the strength of the quantifiable metrics, milestones, and mid-point deliverables defined in the application, such that meaningful interim progress will be made.

**Market Transformation Plan (if applicable)**

- Identification of target market, competitors, and distribution channels for proposed technology along with known or perceived barriers to market penetration, including mitigation plan; and
- Comprehensiveness of market transformation plan including but not limited to product development and/or service plan, commercialization timeline, financing, product marketing, legal/regulatory considerations including intellectual property, infrastructure requirements, Publicly Available Software Distribution Plan, etc., and product distribution.

**Industry Adoption Plan**

- Identification of the interest and extent of industry adoption of the technology/process.

**Criterion 3: Team and Resources (15%)**

This criterion involves consideration of the following factors:

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- Capability of the Principal Investigator(s) and the proposed team to address all aspects of the proposed work with a high probability of success. The qualifications, relevant expertise, and time commitment of the individuals on the team;
- Diversity of expertise and perspectives of the team and the inclusion of industry partners that will amplify impact;
- Sufficiency of the facilities to support the work;
- Degree to which the proposed consortia/team demonstrates the ability to facilitate and expedite further demonstration, development and commercial deployment of the proposed technologies;
- Clarity, adequacy, and completeness of roles and contributions of each team member in development of the project, including financial support of partners, and subrecipients.
- Level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the Workplan; and
- Reasonableness of the budget and spend plan for the proposed project and objectives.

**Criterion 4: Diversity, Equity, and Inclusion Plan (10%)**

This criterion involves consideration of the following factors:

- The quality and manner in which the measures incorporate diversity, equity and inclusion goals in the project; and
- Extent to which the project benefits underserved communities.

**iii. Criteria for Replies to Reviewer Comments**

DOE has not established separate criteria to evaluate Replies to Reviewer Comments. Instead, Replies to Reviewer Comments are attached to the original applications and evaluated as an extension of the Full Application.

**B. Standards for Application Evaluation**

Applications that are determined to be eligible will be evaluated in accordance with this FOA, by the standards set forth in EERE's Notice of Objective Merit Review Procedure (76 Fed. Reg. 17846, March 31, 2011) and the guidance provided in the "DOE Merit Review Guide for Financial Assistance," effective September 2020, which is available at: <https://energy.gov/management/downloads/merit-review-guide-financial-assistance-and-unsolicited-proposals-current>.

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## **C. Other Selection Factors**

### **i. Program Policy Factors**

In addition to the above criteria, 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 EERE 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 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 (OMIs)); 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 will employ procurement of U.S. iron, steel, manufactured products, and construction materials;
- The degree to which the proposed project contributes to the diversity of organizations and organization types and sizes selected from the subject FOA when compared to the existing DOE project portfolio.

## **D. Evaluation and Selection Process**

### **i. Overview**

The evaluation process consists of multiple phases; each includes an initial eligibility review and a thorough technical review. Rigorous technical reviews of eligible submissions 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 and risk reviews, in determining which applications to select.

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**ii. Pre-Selection Interviews**

As part of the evaluation and selection process, EERE may invite one or more applicants to participate in pre-selection interviews. Pre-selection interviews are distinct from and more formal than pre-selection clarifications (See [Section V.D.iii.](#) of the FOA). The invited applicant(s) will meet with EERE representatives to provide clarification on the contents of the Full Applications and to provide EERE an opportunity to ask questions regarding the proposed project. The information provided by applicants to EERE through pre-selection interviews contributes to EERE's selection decisions.

EERE will arrange to meet with the invited applicants in person at EERE's offices or a mutually agreed upon location. EERE may also arrange site visits at certain applicants' facilities. In the alternative, EERE may invite certain applicants to participate in a one-on-one conference with EERE via webinar, videoconference, or conference call.

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.

**iii. Pre-Selection Clarification**

EERE may determine that pre-selection clarifications are necessary from one or more applicants. Pre-selection clarifications are distinct from and less formal than pre-selection interviews. These pre-selection clarifications will solely be for the purposes of clarifying the application. The pre-selection clarifications may occur before, during or after the merit review evaluation process. Information provided by an applicant that is not necessary to address the pre-selection clarification question will not be reviewed or considered. Typically, a pre-selection clarification will be carried out through either written responses to EERE's written clarification questions or video or conference calls with EERE representatives.

The information provided by applicants to EERE through pre-selection clarifications is incorporated in their applications and contributes to the merit review evaluation and EERE's selection decisions. If EERE contacts an applicant for pre-selection clarification purposes, it does not signify that the applicant has been selected for negotiation of award or that the applicant is among the top ranked applications.

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EERE will not reimburse applicants for expenses relating to the pre-selection clarifications, nor will these costs be eligible for reimbursement as pre-award costs.

**iv. Recipient Responsibility and Qualifications**

DOE, prior to making a federal award with a total amount of federal share greater than the simplified acquisition threshold, is required to review and consider any responsibility and qualification information about the applicant that is in the entity information domain in [SAM.gov](https://sam.gov) (see 41 U.S.C. § 2313).

The applicant, at its option, may review information in the entity information domain in [SAM.gov](https://sam.gov) and comment on any information about itself that a federal awarding agency previously entered and is currently in the entity information domain in [SAM.gov](https://sam.gov).

DOE will consider any written comments by the applicant, in addition to the other information in the entity information domain in [SAM.gov](https://sam.gov), in making a judgment about the applicant's integrity, business ethics, and record of performance under federal awards when completing the review of risk posed by applicants as described in 2 CFR 200.206.

**v. Selection**

The Selection Official may consider the technical merit, the Federal Consensus Board's recommendations, program policy factors, risk reviews, and the amount of funds available in arriving at selections for this FOA.

**E. Anticipated Notice of Selection and Award Negotiation Dates**

EERE anticipates notifying applicants selected for negotiation of award and negotiating awards by the dates provided on the cover page of this FOA.

## **VI. Award Administration Information**

### **A. Award Notices**

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**i. Ineligible Submissions**

Ineligible Concept Papers and Full Applications will not be further reviewed or considered for award. The Contracting Officer will send a notification letter by email to the technical and administrative points of contact designated by the applicant in EERE eXCHANGE. The notification letter will state the basis upon which the Concept Paper or the Full Application is ineligible and not considered for further review.

**ii. Concept Paper Notifications**

EERE will notify applicants of its determination to encourage or discourage the submission of a Full Application. EERE will post these notifications to EERE eXCHANGE. EERE may include general comments provided from reviewers on an applicant's Concept Paper in the encourage/discourage notifications.

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, EERE 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.

A notification encouraging the submission of a Full Application does not authorize the applicant to commence performance of the project.

**iii. Full Application Notifications**

EERE will notify applicants of its determination via a notification letter by email to the technical and administrative points of contact designated by the applicant in EERE eXCHANGE. The notification letter will inform the applicant whether or not its Full Application was selected for award negotiations. Alternatively, EERE may notify one or more applicants that a final selection determination on particular Full Applications will be made at a later date, subject to the availability of funds or other factors.

**iv. Applicants Selected for Award Negotiations**

Successful applicants will receive written notification that they have been selected for award negotiations. Receipt of a notification letter selecting a Full Application for award negotiations does not authorize the applicant to commence performance of the project. If an application is selected for award negotiations, it is not a commitment by EERE to issue an award nor is it a guarantee of federal government funding. Applicants do not receive an award unless and until award negotiations are complete and the Contracting Officer

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executes the funding agreement, accessible by the prime recipient in FedConnect.

The award negotiation process takes approximately 60 days. Applicants must designate a primary and a backup point-of-contact in EERE eXCHANGE with whom EERE will communicate to conduct award negotiations. The applicant must be responsive during award negotiations (i.e., provide requested documentation) and meet the negotiation deadlines. If the applicant fails to do so or if award negotiations are otherwise unsuccessful, EERE will cancel the award negotiations and rescind the selection. EERE reserves the right to terminate award negotiations at any time for any reason.

Please refer to [Section IV.J.ii.](#) of the FOA for guidance on pre-award costs.

**v. Alternate Selection Determinations**

In some instances, an applicant may receive a notification that its application was not selected for award and EERE designated the application to be an alternate, which means EERE may consider the Full Application for federal funding in the future. A notification letter stating the Full Application is designated as an alternate does not authorize the applicant to commence performance of the project. EERE may ultimately determine to select or not select the Full Application for award negotiations.

**vi. Unsuccessful Applicants**

EERE shall promptly notify in writing each applicant whose application has not been selected for award or whose application cannot be funded because of the unavailability of appropriated funds.

**B. Administrative and National Policy Requirements**

**i. Registration Requirements**

There are several required one-time actions applicants must take before applying to this FOA. Some of these actions may take several weeks, so it is vital applicants build in enough time to complete them. Failure to complete these actions could interfere with application or negotiation deadlines or the ability to receive an award if selected. These requirements are as follows:

**1. EERE Funding Opportunity Exchange (eXCHANGE)**

Register and create an account on EERE eXCHANGE at <https://eere-eXCHANGE.energy.gov>. This account will allow the user to apply to any open EERE FOAs in EERE eXCHANGE.

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To access [EERE eXCHANGE](#), potential applicants must have a [Login.gov](#) account. As part of the eXCHANGE registration process, new users will be directed to create an account in Login.gov. Please note that the email address associated with Login.gov must match the email address associated with the eXCHANGE account. For more information, refer to the eXCHANGE Multi-Factor Authentication (MFA) Quick Guide in the [Manuals section](#) of eXCHANGE.

Each organization or business unit, whether acting as a team or a single entity, should use only one account as the contact point for each submission. Applicants must also designate backup points of contact. **This step is required to apply to this FOA.** The eXCHANGE registration does not have a delay; however, **the remaining registration requirements below could take several weeks to process and are necessary for a potential applicant to receive an award under this FOA.**

## **2. System for Award Management**

Register in SAM (<https://www.sam.gov>). Designating an Electronic Business Point of Contact (EBiz POC) and obtaining a special password called a Marketing Partner ID Number (MPIN) are important steps in SAM registration. Please update your SAM registration annually.

## **3. FedConnect**

Register in FedConnect (<https://www.fedconnect.net>). To create an organization account, your organization's SAM MPIN is required. For more information about the SAM MPIN or other registration requirements, review the FedConnect Ready, Set, Go! Guide at <https://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect Ready Set Go.pdf>.

## **4. Grants.gov**

Register in Grants.gov (<http://www.grants.gov>) to receive automatic updates when Amendments to this FOA are posted. Please note that Concept Papers, and Full Applications will not be accepted through Grants.gov.

### **Electronic Authorization of Applications and Award Documents**

Submission of an application and supplemental information under this FOA through electronic systems used by the DOE, including EERE eXCHANGE and FedConnect, constitutes the authorized representative's approval and electronic signature.

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**ii. Award 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.

**iii. Foreign National Participation**

All applicants selected for an award under this FOA and project participants (including subrecipients and contractors) who anticipate involving foreign nationals in the performance of an award, may be required to provide DOE with specific information about each foreign national to satisfy requirements for foreign national participation. A “foreign national” is defined as any person who is not a United States citizen by birth or naturalization. The volume and type of information collected may depend on various factors associated with the award. DOE concurrence may be required before a foreign national can participate in the performance of any work under an award.

DOE may elect to deny a foreign national’s participation in the award. Likewise, DOE may elect to deny a foreign national’s access to a DOE site, information, technologies, equipment, programs, or personnel.

**iv. Subaward and Executive Reporting**

Additional administrative requirements necessary for DOE grants and cooperative agreements to comply with the Federal Funding and Transparency Act of 2006 (FFATA) are contained in 2 CFR Part 170. Prime recipients must register with the new FFATA Subaward Reporting System database and report the required data on their first tier subrecipients. Prime recipients must report the executive compensation for their own executives as part of their registration profile in SAM.

**v. National Policy Requirements**

The National Policy Assurances that are incorporated as a term and condition of award are located at: <http://www.nsf.gov/awards/managing/rtc.jsp>.

**vi. Environmental Review in Accordance with National Environmental Policy Act (NEPA)**

EERE’s decision whether and how to distribute federal funds under this FOA is subject to NEPA (42 U.S.C. § 4321, *et seq.*). NEPA requires federal agencies to integrate environmental values into their decision-making processes by considering the potential environmental impacts of their proposed actions. For additional background on NEPA, please see DOE’s NEPA website, at <https://www.energy.gov/nepa>.

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While NEPA compliance is a federal agency responsibility and the ultimate decisions remain with the federal agency, all recipients selected for an award will be required to assist in the timely and effective completion of the NEPA process in the manner most pertinent to their proposed project. If DOE determines certain records must be prepared to complete the NEPA review process (e.g., biological evaluations or environmental assessments), the recipient may be required to prepare the records and the costs to prepare the necessary records may be included as part of the project costs.

## **vii. Flood Resilience**

Applications should indicate whether the proposed project location(s) is within a floodplain, how the floodplain was defined, and how flooding will factor into the project's design. The base floodplain long used for planning has been the 100-year floodplain, which has a 1% chance of flooding in any given year. As directed by Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input (2015), federal agencies, including DOE, must continue to avoid development in a floodplain to the extent possible. When doing so is not possible, federal agencies are directed to "expand management from the current base flood level to a higher vertical elevation and corresponding horizontal floodplain to address current and future flood risk and ensure that projects funded with taxpayer dollars last as long as intended." The higher flood elevation is based on one of three approaches: climate-informed science (preferred), freeboard value, or 0.2% annual flood change (500-year floodplain). EO 13690 and related information is available at: <https://www.energy.gov/nepa/articles/eo-13690-establishing-federal-flood-risk-management-standard-and-process-further>.

## **viii. Applicant Representations and Certifications**

### **1. Lobbying Restrictions**

By accepting funds under this award, the prime recipient agrees 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.

### **2. Corporate Felony Conviction and Federal Tax Liability Representations**

In submitting an application to this FOA, the applicant represents that:

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

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- b. 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.

For purposes of these representations, a corporation is any for-profit or nonprofit 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].

### 3. Nondisclosure and Confidentiality Agreements Representations

In submitting an application to this FOA the applicant represents that:

- a. It **does not and will not** require its employees or contractors to sign internal nondisclosure or confidentiality agreements or statements prohibiting or otherwise restricting its employees or contractors from lawfully reporting waste, fraud, or abuse to a designated investigative or law enforcement representative of a federal department or agency authorized to receive such information.
- b. It **does not and will not** use any federal funds to implement or enforce any nondisclosure and/or confidentiality policy, form, or agreement it uses unless it contains the following provisions:
- (1) *“These provisions are consistent with and do not supersede, conflict with, or otherwise alter the employee obligations, rights, or liabilities created by existing statute or Executive Order relating to (1) classified information, (2) communications to Congress, (3) the reporting to an Inspector General of a violation of any law, rule, or regulation, or mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or safety, or (4) any other whistleblower protection. The definitions, requirements, obligations, rights, sanctions, and liabilities created by controlling Executive Orders and statutory provisions are incorporated into this agreement and are controlling.”*
- (2) The limitation above shall not contravene requirements applicable to Standard Form 312 Classified Information Nondisclosure Agreement (<https://fas.org/sgp/othergov/sf312.pdf>), Form 4414 Sensitive Compartmented Information Disclosure Agreement (<https://fas.org/sgp/othergov/intel/sf4414.pdf>),

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or any other form issued by a federal department or agency governing the nondisclosure of classified information.

- (3) Notwithstanding the provision listed in paragraph (a), a nondisclosure or confidentiality policy form or agreement that is to be executed by a person connected with the conduct of an intelligence or intelligence-related activity, other than an employee or officer of the U.S. government, may contain provisions appropriate to the activity for which such document is to be used. Such form or agreement shall, at a minimum, require that the person will not disclose any classified information received during such activity unless specifically authorized to do so by the U.S. government. Such nondisclosure or confidentiality forms shall also make it clear that they do not bar disclosures to Congress, or to an authorized official of an executive agency or the U.S. Department of Justice, that are essential to reporting a substantial violation of law.

**ix. Statement of Federal Stewardship**

EERE will exercise normal federal stewardship in overseeing the project activities performed under EERE awards. Stewardship activities include, but are not limited to, conducting site visits; reviewing performance and financial reports; providing assistance and/or temporary intervention in unusual circumstances to correct deficiencies that develop during the project; assuring compliance with terms and conditions; and reviewing technical performance after project completion to ensure that the project objectives have been accomplished.

**x. Statement of Substantial Involvement**

EERE has substantial involvement in work performed under awards made as a result of 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. Substantial involvement includes, but is not limited to, the following:

1. EERE shares responsibility with the recipient for the management, control, direction, and performance of the project.
2. 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.
3. 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(s).

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4. EERE participates in major project decision-making processes.

**xi. Subject Invention Utilization Reporting**

To ensure that prime recipients and subrecipients holding title to subject inventions are taking the appropriate steps to commercialize subject inventions, EERE may require that each prime recipient holding title to a subject invention submit annual reports for ten (10) years from the date the subject invention was disclosed to EERE on the utilization of the subject invention and efforts made by prime recipient or its licensees or assignees to stimulate such utilization. The reports must include information regarding the status of development, date of first commercial sale or use, gross royalties received by the prime recipient, and such other data and information as EERE may specify.

**xii. Intellectual Property Provisions**

The standard DOE financial assistance intellectual property provisions applicable to the various types of recipients are located at <http://energy.gov/gc/standard-intellectual-property-ip-provisions-financial-assistance-awards>.

**xiii. Reporting**

Reporting requirements are identified on the Federal Assistance Reporting Checklist, attached to the award agreement.

In addition, all marine energy information and products created through these projects (e.g., reports, journal articles, conference papers, datasets, code, videos, webinars) will be uploaded to the Portal and Repository for Information on Marine Renewable Energy (PRIMRE) (more information on PRIMRE is provided below). Data and products should be uploaded as they are generated, but no later than the end of each reporting quarter in which the data and products are generated. The data will be made publicly available once it has been submitted, standardized, curated, and accepted into the appropriate system. Protected Data will be treated according to the Intellectual Property Provisions of the Award. Data, project-related information, and products resulting from WPTO financial assistance should be uploaded to the appropriate PRIMRE Knowledge Hub, especially:

•MHKDR

o Data, including any tabular data, time series data, code, software, or APIs suitable for public release should be uploaded to the DOE Marine and Hydrokinetic Data Repository. For more information, see the MHK Data Repository Training Video or access tutorials and frequently asked questions (FAQs) under “Help” at <https://mhkdr.openei.org>. Data submitted to PRIMRE’s MHKDR that have been identified as protected, or

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subject to a moratorium, will not be made publicly available until the period of protection is over or the moratorium has expired, and will be held in a secure section of the system.

- Tethys and Tethys Engineering
  - o Publications (such as journal articles, technical reports, conference papers, white papers, and other public documents) focused on aspects of marine energy will be contributed to Tethys (which is focused on environmental effects of marine energy) or Tethys Engineering (which is focused on technical and engineering information about marine energy). You can contribute by emailing your paper to [tethys@pnnl.gov](mailto:tethys@pnnl.gov).
- Events for the PRIMRE Calendar
  - o Information about public marine energy events funded by WPTO financial assistance should be submitted to the PRIMRE events calendar. Events can be added by completing this form.

PRIMRE supports the marine energy community by overcoming data and information barriers to research, development, and deployment. This is accomplished through the integration of marine energy data and information on the centralized PRIMRE platform, assuring project-related information and products are available to the public at no cost. For more information about how and where to submit your materials to PRIMRE, see contributing to PRIMRE. In addition, you can reach out to the PRIMRE helpline ([primrehelp@groups.nrel.gov](mailto:primrehelp@groups.nrel.gov)) to discuss any questions or specific dissemination needs you might have.

#### **xiv. Go/No-Go Review**

Each project with more than one budget period selected under this FOA will be subject to a periodic project evaluation referred to as a Go/No-Go Review. A Go/No-Go Review is a risk management tool and a project management best practice to ensure that, for the current phase or period of performance, technical success is definitively achieved and potential for success in future phases or periods of performance is evaluated, prior to beginning the execution of future phases. At the Go/No-Go decision points, DOE will evaluate project performance, project schedule adherence, the extent milestone objectives are met, compliance with reporting requirements, and overall contribution to the program goals and objectives. Federal funding beyond the Go/No-Go decision point (continuation funding) is contingent upon (1) availability of federal funds appropriated by Congress for the purpose of this program; (2) the availability of future-year budget authority; (3) recipient's technical progress compared to the Milestone Summary Table stated in Attachment 1 of the award; (4) recipient's submittal of required reports; (5) recipient's compliance with the terms and conditions of the award; (6) DOE's Go/No-Go decision; (7) the recipient's

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submission of a continuation application;<sup>21</sup> and (8) written approval of the continuation application by the Contracting Officer.

As a result of the Go/No-Go Review, DOE may, at its discretion, authorize the following actions: (1) continue to fund the project, contingent upon the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority; (2) recommend redirection of work under the project; (3) place a hold on federal funding for the project, pending further supporting data or funding; or (4) discontinue funding the project because of insufficient progress, change in strategic direction, or lack of funding.

The Go/No-Go decision is distinct from a non-compliance determination. In the event a recipient fails to comply with the requirements of an award, DOE may take appropriate action, including but not limited to, redirecting, suspending or terminating the award.

**xv. Conference Spending**

The recipient shall not expend any funds on a conference not directly and programmatically related to the purpose for which the grant or cooperative agreement was awarded that would defray the cost to the U.S. government of a conference held by any Executive branch department, agency, board, commission, or office for which the cost to the U.S. government would otherwise exceed \$20,000, thereby 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.

**xvi. Uniform Commercial Code (UCC) Financing Statements**

Per 2 CFR 910.360 (Real Property and Equipment) when a piece of equipment is purchased by a for-profit recipient or subrecipient with federal funds, and when

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<sup>21</sup> A continuation application is a non-competitive application for an additional budget period within a previously approved project period. At least ninety (90) days before the end of each budget period, the recipient must submit its continuation application, which includes the following information:

- i. A progress report on the project objectives, including significant findings, conclusions, or developments, and an estimate of any unobligated balances remaining at the end of the budget period. If the remaining unobligated balance is estimated to exceed 20 percent of the funds available for the budget period, explain why the excess funds have not been obligated and how they will be used in the next budget period.
- ii. A detailed budget and supporting justification if there are changes to the negotiated budget, or a budget for the upcoming budget period was not approved at the time of award.
- iii. A description of any planned changes from the SOPO and/or Milestone Summary Table.

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the federal share of the financial assistance agreement is more than \$1 million, the recipient or subrecipient must:

Properly record, and consent to the Department's ability to properly record if the recipient fails to do so, UCC financing statement(s) for all equipment in excess of \$5,000 purchased with project funds. These financing statement(s) must be approved in writing by the Contracting Officer prior to the recording, and they shall provide notice that the recipient's title to all equipment (not real property) purchased with federal funds under the financial assistance agreement is conditional pursuant to the terms of this section, and that the government retains an undivided reversionary interest in the equipment. The UCC financing statement(s) must be filed before the Contracting Officer may reimburse the recipient for the federal share of the equipment unless otherwise provided for in the relevant financial assistance agreement. The recipient shall further make any amendments to the financing statements or additional recordings, including appropriate continuation statements, as necessary or as the Contracting Officer may direct.

**xvii. Real Property and Equipment**

Real property and equipment purchased with project funds (federal share and recipient cost share) are subject to the requirements at 2 CFR 200.310, 200.311, 200.313, and 200.316 (non-federal entities, except for-profit entities) and 2 CFR 910.360 (for-profit entities).

For projects selected for awards under this FOA, the recipients may (1) take disposition action on the real property and equipment; or (2) continue to use the real property and equipment after the conclusion of the award period of performance with Contracting Officer approval. The recipient's written request for Continued Use must identify the property and include: a summary of how the property will be used (must align with the authorized project purposes); a proposed use period, (e.g., perpetuity, until fully depreciated, or a calendar date when the recipient expects to submit disposition instructions); acknowledgement that the recipient shall not sell or encumber the property or permit any encumbrance without prior written DOE approval; current fair market value of the property; and an estimated useful life or depreciation schedule for equipment.

When the property is no longer needed for authorized project purposes, the recipient must request disposition instructions from DOE. For-profit entity disposition requirements are set forth in 2 CFR 910.360. Property disposition requirements for other non-federal entities are set forth in 2 CFR 200.310 – 200.316.

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**xviii. Implementation of Executive Order 13798, Promoting Free Speech and Religious Liberty**

States, local governments, and other public entities may not condition subawards in a manner that would discriminate against or otherwise disadvantage subrecipients based on their religious character.

**xix. Participants and Collaborating Organizations**

If selected for award negotiations, the selected applicant must submit a list of personnel who are proposed to work on the project, both at the recipient and subrecipient level and a list of collaborating organizations prior to award. Recipients will have an ongoing responsibility to notify DOE of changes to the personnel and collaborating organizations and submit updated information during the life of the award.

**xx. Current and Pending Support**

If selected for award negotiations, within 30 days of the selection notice, the selectee must submit: 1) current and pending support disclosures and resumes for any new PIs or senior/key personnel, and 2) updated disclosures if there have been any changes to the current and pending support submitted with the application. Throughout the life of the award, the recipient has an ongoing responsibility to submit: 1) current and pending support disclosure statements and resumes for any new PI and senior/key personnel, and 2) updated disclosures if there are changes to the current and pending support previously submitted to DOE. Also see Section IV.E.xvii.

**xxi. U.S. Manufacturing Commitments**

A primary objective of DOE's multi-billion-dollar research, development, and demonstration investments is to cultivate new research and development ecosystems, manufacturing capabilities, and supply chains for and by United States industry and labor. Therefore, in exchange for receiving taxpayer dollars to support an applicant's project, the applicant must agree to a U.S. Competitiveness provision requiring that any products embodying any subject invention or produced through the use of any subject invention will be manufactured substantially in the United States unless the recipient can show to the satisfaction of DOE that it is not commercially feasible. Award terms, including the specific U.S. Competitiveness Provision applicable to the various types of recipients and projects, are available at:  
<https://www.energy.gov/gc/standard-intellectual-property-ip-provisions-financial-assistance-awards>.

Please note that a subject invention is any invention conceived or first actually reduced to practice in performance of work under an award. An invention is

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any invention or discovery which is or may be patentable. The recipient includes any recipient, recipient, sub-Recipient, or sub-recipient.

As noted in the U.S. Competitiveness Provision, if an entity cannot meet the requirements of the U.S. Competitiveness Provision, the entity may request a modification or waiver of the U.S. Competitiveness Provision. For example, the entity may propose modifying the language of the U.S. Competitiveness Provision in order to change the scope of the requirements or to provide more specifics on the application of the requirements for a particular technology. As another example, the entity may request that the U.S. Competitiveness Provision be waived in lieu of a net benefits statement or United States manufacturing plan. The statement or plan would contain specific and enforceable commitments that would be beneficial to the United States economy and competitiveness. Examples of such commitments could include manufacturing specific products in the United States, making a specific investment in a new or existing United States manufacturing facility, keeping certain activities based in the United States or supporting a certain number of jobs in the United States related to the technology. DOE may, in its sole discretion, determine that the proposed modification or waiver promotes commercialization and provides substantial United States economic benefits, and grant the request. If granted, DOE will modify the award terms and conditions for the requesting entity accordingly.

More information and guidance on the waiver and modification request process can be found in the DOE Financial Assistance Letter on this topic, available at <https://www.energy.gov/management/pf-2022-09-fal-2022-01-implementation-doe-determination-exceptional-circumstances-under>. Additional information on DOE's Commitment to Domestic Manufacturing for DOE-funded R&D is available at <https://www.energy.gov/gc/us-manufacturing>.

The U.S. Competitiveness Provision is implemented by DOE pursuant to a Determination of Exceptional Circumstances (DEC) under the Bayh-Dole Act and DOE Patent Waivers. See [Section VIII.J](#). Title to Subject Inventions of this FOA for more information on the DEC and DOE Patent Waivers.

## **xxii. Interim Conflict of Interest Policy for Financial Assistance**

The DOE interim Conflict of Interest Policy for Financial Assistance (COI Policy)<sup>22</sup> is applicable to all non-Federal entities applying for, or that receive, DOE funding by means of a financial assistance award (e.g., a grant, cooperative agreement, or technology investment agreement) and, through the implementation of this

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<sup>22</sup> DOE's interim COI Policy can be found at [PF 2022-17 FAL 2022-02 Department of Energy Interim Conflict of Interest Policy Requirements for Financial Assistance](#).

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policy by the entity, to each Investigator who is planning to participate in, or is participating in, the project funded wholly or in part under the DOE financial assistance award. The term “Investigator” means the PI and any other person, regardless of title or position, who is responsible for the purpose, design, conduct, or reporting of a project funded by DOE or proposed for funding by DOE. Recipients must flow down the requirements of the interim COI Policy to any subrecipient non-federal entities. Further, for DOE funded projects, the recipient must include all financial conflicts of interest (FCOI) (i.e., managed and unmanaged/ unmanageable) in its initial and ongoing FCOI reports.

It is understood that non-federal entities and individuals receiving DOE financial assistance awards will need sufficient time to come into full compliance with DOE’s interim COI Policy. To provide some flexibility, DOE allows for a staggered implementation. Specifically, prior to award, applicants selected for award negotiations must: ensure all Investigators complete their significant financial disclosures; review the disclosures; determine whether a FCOI exists; develop and implement a management plan for FCOIs; and provide DOE with an initial FCOI report that includes all FCOIs (i.e., managed and unmanaged/ unmanageable). Recipients will have 180 days from the date of the award to come into full compliance with the other requirements set forth in DOE’s interim COI Policy. Prior to award, the applicant must certify that it is, or will be within 180 days of the award, compliant with all requirements in the COI Policy.

**xxiii. Data Management Plan**

Each applicant whose Full Application is selected for award negotiations will be required to submit a Data Management Plan (DMP) during the award negotiations phase. A DMP explains how, when appropriate, data generated in the course of the work performed under an EERE award will be shared and preserved to validate the results of the proposed work or how the results could be validated if the data is not shared or preserved. The DMP must provide a plan for making all research data displayed in publications resulting from the proposed work digitally accessible at the time of publications.

**xxiv. Fraud, Waste, and Abuse**

The mission of the DOE Office of Inspector General (OIG) is to strengthen the integrity, economy, and efficiency of the Department’s programs and operations including deterring and detecting fraud, waste, abuse, and mismanagement. The OIG accomplishes this mission primarily through investigations, audits, and inspections of DOE activities to include grants, cooperative agreements, loans, and contracts.

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The OIG maintains a hotline for reporting allegations of fraud, waste, abuse, or mismanagement. To report such allegations, please visit <https://www.energy.gov/ig/ig-hotline>.

Additionally, recipients of DOE awards must be cognizant of the requirements of [2 CFR 200.113 Mandatory disclosures](#), which states:

The non-Federal entity or applicant for a Federal award must disclose, in a timely manner, in writing to the Federal awarding agency or pass-through entity all violations of Federal criminal law involving fraud, bribery, or gratuity violations potentially affecting the Federal award. Non-Federal entities that have received a Federal award including the term and condition outlined in appendix XII of 2 CFR Part 200 are required to report certain civil, criminal, or administrative proceedings to SAM.gov. Failure to make required disclosures can result in any of the remedies described in [2 CFR 200.339](#). (See also [2 CFR part 180](#), [31 U.S.C. § 3321](#), and [41 U.S.C. § 2313](#).) [[85 FR 49539](#), Aug. 13, 2020]

Applicants and subrecipients (if applicable) are encouraged to allocate sufficient costs in the project budget to cover the costs associated for personnel and data infrastructure needs to support performance management and program evaluation needs, including but not limited to independent program and project audits to mitigate risks for fraud, waste, and abuse.

**xxv. Human Subjects Research**

Research involving human subjects, biospecimens, or identifiable private information conducted with DOE funding is subject to the requirements of DOE Order 443.1C, Protection of Human Research Subjects, 45 CFR Part 46, Protection of Human Subjects (subpart A which is referred to as the “Common Rule”), and 10 CFR Part 745, Protection of Human Subjects. Additional information on the DOE Human Subjects Research Program can be found at: [HUMAN SUBJECTS Human Subjects Pr... | U.S. DOE Office of Science \(SC\) \(osti.gov\)](#).

## VII. Questions/Agency Contacts

Upon the issuance of a FOA, EERE personnel are prohibited from communicating (in writing or otherwise) with applicants regarding the FOA except through the established question and answer process described below. Questions regarding this FOA must be submitted to [MarineEnergyFOA@ee.doe.gov](mailto:MarineEnergyFOA@ee.doe.gov) no later than three (3)

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business days prior to the application due date and time. Please note, feedback on individual concepts will not be provided through Q&A.

All questions and answers related to this FOA will be posted on EERE eXCHANGE at: <https://eere-eXCHANGE.energy.gov>. **You must first select the FOA Number to view the questions and answers specific to this FOA.** EERE will attempt to respond to a question within three (3) business days, unless a similar question and answer has already been posted on the website.

Questions related to the registration process and use of the EERE eXCHANGE website should be submitted to [EERE-eXCHANGESupport@hq.doe.gov](mailto:EERE-eXCHANGESupport@hq.doe.gov).

## VIII. Other Information

### A. FOA Modifications

Amendments to this FOA will be posted on EERE eXCHANGE and the Grants.gov system. However, you will only receive an email when an amendment or a FOA is posted on these sites if you register for email notifications for this FOA in Grants.gov. EERE recommends that you register as soon after the release of the FOA as possible to ensure you receive timely notice of any amendments or other FOAs.

### B. Government Right to Reject or Negotiate

EERE reserves the right, without qualification, to reject any or all applications received in response to this FOA and to select any application, in whole or in part, as a basis for negotiation and/or award.

### C. Commitment of Public Funds

The Contracting Officer is the only individual who can make awards or commit the government to the expenditure of public funds. A commitment by anyone other than the Contracting Officer, either express or implied, is invalid.

### D. Treatment of Application Information

Applicants should not include trade secrets or business-sensitive, proprietary, or otherwise confidential information in their application unless such information is necessary to convey an understanding of the proposed project or to comply with a requirement in the FOA. Applicants are advised to not include any critically sensitive proprietary detail.

If an application includes trade secrets or business-sensitive, proprietary, or otherwise confidential information, it is furnished to the federal government in confidence with the understanding that the information shall be used or disclosed

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only for evaluation of the application. Such information will be withheld from public disclosure to the extent permitted by law, including the Freedom of Information Act. Without assuming any liability for inadvertent disclosure, EERE will seek to limit disclosure of such information to its employees and to outside reviewers when necessary for merit review of the application or as otherwise authorized by law. This restriction does not limit the federal government's right to use the information if it is obtained from another source.

If an applicant chooses to submit trade secrets or business-sensitive, proprietary, or otherwise confidential information, the applicant must provide **two copies** of the submission (e.g., Concept Paper, Full Application). The first copy should be marked "non-confidential," with the information believed to be confidential deleted. The second copy should be marked "confidential" and must clearly and conspicuously identify the trade secrets or business-sensitive, proprietary, or otherwise confidential information and must be marked as described below. Failure to comply with these marking requirements may result in the disclosure of the unmarked information under the Freedom of Information Act or otherwise. The federal government is not liable for the disclosure or use of unmarked information and may use or disclose such information for any purpose as authorized by law.

The cover sheet of the Full Application, and other applicant submission must be marked as follows and identify the specific pages containing trade secrets or business-sensitive, proprietary, or otherwise confidential information:

**Notice of Restriction on Disclosure and Use of Data:**

Pages [list applicable pages] of this document may contain trade secrets or business-sensitive, proprietary, or otherwise confidential information that is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes or in accordance with a financial assistance agreement between the submitter and the government. The government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source. [End of Notice]

In addition, (1) the header and footer of every page that contains trade secrets or business-sensitive, proprietary, or otherwise confidential information must be marked as follows: "Contains Trade Secrets or Business-Sensitive, Proprietary, or Otherwise Confidential Information Exempt from Public Disclosure," and (2) every line or paragraph containing such information must be clearly marked with double brackets or highlighting. DOE will make its own determination about the confidential status of the information and treat it according to its determination.



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## **E. Evaluation and Administration by Non-Federal Personnel**

In conducting the merit review evaluation, the Go/No-Go Reviews and Peer Reviews, 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, including EERE contractors. The applicant, by submitting its application, consents to the use of non-federal reviewers/administrators. Non-federal reviewers must sign conflict of interest (COI) and non-disclosure acknowledgements (NDA) prior to reviewing an application. Non-federal personnel conducting administrative activities must sign an NDA.

## **F. Notice Regarding Eligible/Ineligible Activities**

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

## **G. Notice of Right to Conduct a Review of Financial Capability**

EERE reserves the right to conduct an independent third-party review of financial capability for applicants that are selected for negotiation of award (including personal credit information of principal(s) of a small business if there is insufficient information to determine financial capability of the organization).

## **H. Requirement for Full and Complete Disclosure**

Applicants are required to make a full and complete disclosure of all information requested. Any failure to make a full and complete disclosure of the requested information may result in:

- The termination of award negotiations;
- The modification, suspension, and/or termination of a funding agreement;
- The initiation of debarment proceedings, debarment, and/or a declaration of ineligibility for receipt of federal contracts, subcontracts, and financial assistance and benefits; and
- Civil and/or criminal penalties.

## **I. Retention of Submissions**

EERE expects to retain copies of all Full Applications and other submissions. No submissions will be returned. By applying to EERE for funding, applicants consent to EERE's retention of their submissions.

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## J. Title to Subject Inventions

Ownership of subject inventions is governed pursuant to the authorities listed below:

- Domestic Small Businesses, Educational Institutions, and Nonprofits: Under the Bayh-Dole Act (35 U.S.C. § 200 et seq.), domestic small businesses, educational institutions, and nonprofits may elect to retain title to their subject inventions;
- All other parties: The Federal Non-Nuclear Energy Act of 1974, 42. U.S.C. § 5908, provides that the government obtains title to new inventions unless a waiver is granted (see below);
- Class Patent Waiver: DOE has issued a class waiver that applies to this FOA. Under this class waiver, domestic large businesses may elect title to their subject inventions similar to the right provided to the domestic small businesses, educational institutions, and nonprofits by law. To avail itself of the class waiver, a domestic large business must agree that any products embodying or produced through the use of a subject invention first created or reduced to practice under this program will be substantially manufactured in the United States.
- Advance and Identified Waivers: Applicants not covered by a Class Patent Waiver or the Bayh-Dole Act may request a patent waiver that will cover subject inventions that may be invented under the award, in advance of or within 30 days after the effective date of the award. Even if an advance waiver is not requested or the request is denied, the recipient will have a continuing right under the award to request a waiver for identified inventions, i.e., individual subject inventions that are disclosed to EERE within the timeframes set forth in the award's intellectual property data terms and conditions. Any patent waiver that may be granted is subject to certain terms and conditions in 10 CFR 784.
- DEC: On June 07, 2021, DOE approved a Determination of Exceptional Circumstances (DEC) under the Bayh-Dole Act to further promote domestic manufacture of DOE science and energy technologies. In accordance with this DEC, all awards, including subawards, under this FOA shall include the U.S. Competitiveness Provision in accordance with [Section VI.B.xx](#). U.S. Manufacturing Commitments of this FOA. A copy of the DEC can be found at <https://www.energy.gov/gc/determination-exceptional-circumstances-decs>. Pursuant to 37 CFR 401.4, any nonprofit organization or small business firm as defined by 35 U.S.C. § 201 affected by any DEC has the right to appeal it by providing written notice to DOE within 30 working days from the time it receives a copy of the determination.

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- DOE may issue and publish further DEC's on the website above prior to the issuance of awards under this FOA. DOE may require additional submissions or requirements as authorized by any applicable DEC.

## **K. Government Rights in Subject Inventions**

Where prime recipients and subrecipients retain title to subject inventions, the U.S. government retains certain rights.

### **Government Use License**

The U.S. government retains a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States any subject invention throughout the world. This license extends to contractors doing work on behalf of the government.

### **March-In Rights**

The U.S. government retains march-in rights with respect to all subject inventions. Through "march-in rights," the government may require a prime recipient or subrecipient who has elected to retain title to a subject invention (or their assignees or exclusive licensees), to grant a license for use of the invention to a third party. In addition, the government may grant licenses for use of the subject invention when a prime recipient, subrecipient, or their assignees and exclusive licensees refuse to do so.

DOE may exercise its march-in rights only if it determines that such action is necessary under any of the four following conditions:

- The owner or licensee has not taken or is not expected to take effective steps to achieve practical application of the invention within a reasonable time;
- The owner or licensee has not taken action to alleviate health or safety needs in a reasonably satisfied manner;
- The owner has not met public use requirements specified by federal statutes in a reasonably satisfied manner; or
- The United States manufacturing requirement has not been met.

Any determination that march-in rights are warranted must follow a fact-finding process in which the recipient has certain rights to present evidence and witnesses, confront witnesses and appear with counsel and appeal any adverse decision. To date, DOE has never exercised its march-in rights to any subject inventions.

## **L. Rights in Technical Data**

Data rights differ based on whether data is first produced under an award or instead was developed at private expense outside the award.

“Limited Rights Data”: The U.S. government will not normally require delivery of confidential or trade secret-type technical data developed solely at private expense prior to issuance of an award, except as necessary to monitor technical progress and evaluate the potential of proposed technologies to reach specific technical and cost metrics.

Government Rights in Technical Data Produced Under Awards: The U.S. government normally retains unlimited rights in technical data produced under government financial assistance awards, including the right to distribute to the public. However, for Topic Areas 2, 3 and 4 only, pursuant to special statutory authority, certain categories of data generated under EERE awards may be protected from public disclosure for up to five years after the data is generated (“Protected Data”). For awards permitting Protected Data, the protected data must be marked as set forth in the award’s intellectual property terms and conditions and a listing of unlimited rights data (i.e., non-protected data) must be inserted into the data clause in the award. In addition, invention disclosures may be protected from public disclosure for a reasonable time in order to allow for filing a patent application.

## **M. Copyright**

The prime recipient and subrecipients may assert copyright in copyrightable works, such as software, first produced under the award without EERE approval. When copyright is asserted, the government retains a paid-up nonexclusive, irrevocable worldwide license to reproduce, prepare derivative works, distribute copies to the public, and to perform publicly and display publicly the copyrighted work. This license extends to contractors and others doing work on behalf of the government.

## **N. Export Control**

The United States government regulates the transfer of information, commodities, technology, and software considered to be strategically important to the United States to protect national security, foreign policy, and economic interests without imposing undue regulatory burdens on legitimate international trade. There is a network of federal agencies and regulations that govern exports that are collectively referred to as “Export Controls.” All recipients and subrecipients are responsible for ensuring compliance with all applicable United States Export Control laws and regulations relating to any work performed under a resulting award.

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The recipient must immediately report to DOE any export control violations related to the project funded under the DOE award, at the recipient or subrecipient level, and provide the corrective action(s) to prevent future violations.

## **O. Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment**

As set forth in 2 CFR 200.216, recipients and subrecipients are prohibited from obligating or expending project funds (federal funds and recipient cost share) to procure or obtain; extend or renew a contract to procure or obtain; or enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that use *covered telecommunications equipment or services* as a substantial or essential component of any system, or as critical technology as part of any system. As described in Section 889 of Public Law 115-232, *covered telecommunications equipment* is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).

See Public Law 115-232, Section 889, 2 CFR 200.216, and 2 CFR 200.471 for additional information.

## **P. Personally Identifiable Information (PII)**

All information provided by the applicant must to the greatest extent possible exclude PII. "PII" refers to information that can be used to distinguish or trace an individual's identity, such as their name, Social Security Number, or biometric records, alone or combined with other personal or identifying information linked or linkable to a specific individual, such as date and place of birth or mother's maiden name. (See OMB Memorandum M-17-12 dated January 3, 2017.)

By way of example, applicants must screen resumes to ensure that they do not contain PII such as personal addresses, personal landline/cell phone numbers, and personal emails. **Under no circumstances should Social Security Numbers (SSNs) be included in the application.** Federal agencies are prohibited from the collecting, using, and displaying unnecessary SSNs. (See the Federal Information Security Modernization Act of 2014 (Pub. L. No. 113-283, Dec 18, 2014; 44 U.S.C. § 3551).

## **Q. Annual Independent Audits**

If a for-profit entity is a prime recipient and has expended \$750,000 or more of DOE awards during the entity's fiscal year, an annual compliance audit performed by an independent auditor is required. For additional information, please refer to 2 CFR 910.501 and Subpart F.

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If an educational institution, nonprofit organization, or state/local government is a prime recipient or subrecipient and has expended \$750,000 or more of federal awards during the non-federal entity's fiscal year, a Single or Program-Specific Audit is required. For additional information, please refer to 2 CFR 200.501 and Subpart F.

Applicants and subrecipients (if applicable) should propose sufficient costs in the project budget to cover the costs associated with the audit. EERE will share in the cost of the audit at its applicable cost share ratio.

## **R. Informational Webinar**

EERE will conduct one informational webinar during the FOA process. It will be held after the initial FOA release but before the due date for Concept Papers.

Attendance is not mandatory and will not positively or negatively impact the overall review of any applicant submissions. The webinar will be open to all applicants who wish to participate. Applicants should refrain from asking questions or communicating information that would reveal confidential and/or proprietary information specific to their project. The webinar date is listed on the cover page of the FOA.

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## APPENDIX A – COST SHARE INFORMATION

### Cost Sharing or Cost Matching

The terms “cost sharing” and “cost matching” are often used synonymously. Even the DOE Financial Assistance Regulations, 2 CFR 200.306, use both terms in the titles specific to regulations applicable to cost sharing. EERE almost always uses “cost sharing,” as it conveys the concept that non-federal share is calculated as a percentage of the Total Project Cost. An exception is the State Energy Program Regulation, 10 CFR 420.12, State Matching Contribution. Here “cost matching” for the non-federal share is calculated as a percentage of the federal funds only, rather than the Total Project Cost.

### How Cost Sharing Is Calculated

As stated above, cost sharing is calculated as a percentage of the Total Project Cost. FFRDC costs must be included in Total Project Costs. The following is an example of how to calculate cost sharing amounts for a project with \$1 million in federal funds with a minimum 20% non-federal cost sharing requirement:

- Formula: Federal share (\$) divided by federal share (%) = Total Project Cost  
Example: \$1,000,000 divided by 80% = \$1,250,000
- Formula: Total Project Cost (\$) minus federal share (\$) = Non-federal share (\$)  
Example: \$1,250,000 minus \$1,000,000 = \$250,000
- Formula: Non-federal share (\$) divided by Total Project Cost (\$) = Non-federal share (%)  
Example: \$250,000 divided by \$1,250,000 = 20%

### What Qualifies for Cost Sharing

While it is not possible to explain what specifically qualifies for cost sharing in one or two sentences, in general, if a cost is allowable under the cost principles applicable to the organization incurring the cost and is eligible for reimbursement under an EERE grant or cooperative agreement, it is allowable as cost share. Conversely, if the cost is not allowable under the cost principles and not eligible for reimbursement, it is not allowable as cost share. In addition, costs may not be counted as cost share if they are paid by the federal government under another award unless authorized by federal statute to be used for cost sharing.

The rules associated with what is allowable as cost share are specific to the type of organization that is receiving funds under the grant or cooperative agreement, though they are generally the same for all types of entities. The specific rules applicable to:

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- FAR Part 31 for For-Profit entities, (48 CFR Part 31); and
- 2 CFR Part 200 Subpart E - Cost Principles for all other non-federal entities.

In addition to the above regulations, other factors may come into play such as timing of donations and length of the project period. For example, the value of 10 years of donated maintenance on a project that has a project period of five years would not be fully allowable as cost share. Only the value for the five years of donated maintenance that corresponds to the project period is allowable and may be counted as cost share.

Additionally, EERE generally does not allow pre-award costs for either cost share or reimbursement when these costs precede the signing of the appropriation bill that funds the award. In the case of a competitive award, EERE generally does not allow pre-award costs prior to the signing of the Selection Statement by the EERE Selection Official.

### **General Cost Sharing Rules on a DOE Award**

- 1. Cash Cost Share** encompasses all contributions to the project made by the recipient or subrecipient(s) for costs incurred and paid for during the project. This includes when an organization pays for personnel, supplies, or equipment for their company with organizational resources. If the cost of the item or service is reimbursed, it is cash cost share. All cost share items must be necessary to the performance of the project.
- 2. In-Kind Cost Share** encompasses all contributions to the project made by the recipient or subrecipient(s) that do not involve a payment or reimbursement and represent donated items or services. In-Kind cost share items include volunteer personnel hours, donated existing equipment, and donated existing supplies. The cash value and calculations thereof for all In-Kind cost share items must be justified and explained in the Cost Share section of the project Budget Justification. All cost share items must be necessary to the performance of the project. Consult your DOE contact if you have questions before filling out the In-Kind cost share section of the Budget Justification.
- 3. Funds from other federal sources** may **not** be counted as cost share. This prohibition includes FFRDC subrecipients. Non-federal sources include any source not originally derived from federal funds. Cost sharing commitment letters from subrecipients must be provided with the original application.
- 4. Fee or profit**, including foregone fee or profit, are not allowable as project costs (including cost share) under any resulting award. The project may incur only those costs that are allowable and allocable to the project (including cost share) as determined in accordance with the applicable cost principles prescribed in FAR Part 31 for For-Profit entities and 2 CFR Part 200 Subpart E - Cost Principles for all other non-federal entities.



## DOE Financial Assistance Rules 2 CFR Part 200 as amended by 2 CFR Part 910

As stated above, the rules associated with what is allowable cost share are generally the same for all types of organizations. Following are the rules found to be common, but again, the specifics are contained in the regulations and cost principles specific to the type of entity:

**(A) Acceptable contributions.** All contributions, including cash contributions and third-party in-kind contributions, must be accepted as part of the prime recipient's cost sharing if such contributions meet all of the following criteria:

- (1)** They are verifiable from the recipient's records.
- (2)** They are not included as contributions for any other federally-assisted project or program.
- (3)** They are necessary and reasonable for the proper and efficient accomplishment of project or program objectives.
- (4)** They are allowable under the cost principles applicable to the type of entity incurring the cost as follows:
  - a.** For-profit organizations. Allowability of costs incurred by for-profit organizations and those nonprofit organizations listed in Attachment C to OMB Circular A-122 is determined in accordance with the for-profit cost principles in 48 CFR Part 31 in the FAR, except that patent prosecution costs are not allowable unless specifically authorized in the award document. (v) Commercial Organizations. FAR Subpart 31.2—Contracts with Commercial Organizations; and
  - b.** Other types of organizations. For all other non-federal entities, allowability of costs is determined in accordance with 2 CFR Part 200 Subpart E.
- (5)** They are not paid by the federal government under another award unless authorized by federal statute to be used for cost sharing or matching.
- (6)** They are provided for in the approved budget.

**(B) Valuing and documenting contributions**

- (1)** Valuing recipient's property or services of recipient's employees. Values are established in accordance with the applicable cost principles, which mean that amounts chargeable to the project are determined on the basis of costs incurred. For real property or equipment used on the project, the cost principles authorize

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depreciation or use charges. The full value of the item may be applied when the item will be consumed in the performance of the award or fully depreciated by the end of the award. In cases where the full value of a donated capital asset is to be applied as cost sharing or matching, that full value must be the lesser or the following:

- a. The certified value of the remaining life of the property recorded in the recipient's accounting records at the time of donation; or
  - b. The current fair market value. If there is sufficient justification, the Contracting Officer may approve the use of the current fair market value of the donated property, even if it exceeds the certified value at the time of donation to the project. The Contracting Officer may accept the use of any reasonable basis for determining the fair market value of the property.
- (2) Valuing services of others' employees. If an employer other than the recipient furnishes the services of an employee, those services are valued at the employee's regular rate of pay, provided these services are for the same skill level for which the employee is normally paid.
- (3) Valuing volunteer services. Volunteer services furnished by professional and technical personnel, consultants, and other skilled and unskilled labor may be counted as cost sharing or matching if the service is an integral and necessary part of an approved project or program. Rates for volunteer services must be consistent with those paid for similar work in the recipient's organization. In those markets in which the required skills are not found in the recipient organization, rates must be consistent with those paid for similar work in the labor market in which the recipient competes for the kind of services involved. In either case, paid fringe benefits that are reasonable, allowable, and allocable may be included in the valuation.
- (4) Valuing property donated by third parties.
- a. Donated supplies may include such items as office supplies or laboratory supplies. Value assessed to donated supplies included in the cost sharing or matching share must be reasonable and must not exceed the fair market value of the property at the time of the donation.
  - b. Normally only depreciation or use charges for equipment and buildings may be applied. However, the fair rental charges for land and the full value of equipment or other capital assets may be allowed, when they will be consumed in the performance of the award or fully depreciated by the end of the award, provided that the Contracting Officer has approved the charges. When use charges are applied, values must be determined in accordance with the usual accounting policies of the recipient, with the following qualifications:

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- i. The value of donated space must not exceed the fair rental value of comparable space as established by an independent appraisal of comparable space and facilities in a privately-owned building in the same locality.
  - ii. The value of loaned equipment must not exceed its fair rental value.
- (5) Documentation. The following requirements pertain to the recipient's supporting records for in-kind contributions from third parties:
  - a. Volunteer services must be documented and, to the extent feasible, supported by the same methods used by the recipient for its own employees.
  - b. The basis for determining the valuation for personal services and property must be documented.

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## **APPENDIX B – WAIVER REQUESTS FOR: 1. FOREIGN ENTITY PARTICIPATION; AND 2. FOREIGN WORK**

### **1. Waiver for Foreign Entity Participation**

Many of the technology areas DOE funds fall in the category of critical and emerging technologies (CETs). CETs are a subset of advanced technologies that are potentially significant to United States national and economic security.<sup>23</sup> For projects selected under this FOA, all recipients and subrecipients must be organized, chartered or incorporated (or otherwise formed) under the laws of a state or territory of the United States; have majority domestic ownership and control; and have a physical location for business operations in the United States. To request a waiver of this requirement, an applicant must submit an explicit waiver request in the Full Application.

#### **Waiver Criteria**

Foreign entities seeking to participate in a project funded under this FOA must demonstrate to the satisfaction of DOE that:

- a. Its participation is in the best interest of the United States industry and United States economic development;
- b. The project team has appropriate measures in place to control sensitive information and protect against unauthorized transfer of scientific and technical information;
- c. Adequate protocols exist between the United States subsidiary and its foreign parent organization to comply with export control laws and any obligations to protect proprietary information from the foreign parent organization;
- d. The work is conducted within the United States and the entity acknowledges and demonstrates that it has the intent and ability to comply with the United States Competitiveness Provision (see [Section VI.B.xxi.](#)); and
- e. The foreign entity will satisfy other conditions that may be deemed necessary by DOE to protect United States government interests.

#### **Content for Waiver Request**

A Foreign Entity waiver request must include the following:

- a. Information about the entity: name, point of contact, and proposed type of involvement in the project;
- b. Country of incorporation, the extent of the ownership/level control by foreign entities, whether the entity is state owned or controlled, a summary of the ownership breakdown of the foreign entity, and the percentage of

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<sup>23</sup> See [Critical and Emerging Technologies List Update \(whitehouse.gov\)](#).

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- ownership/control by foreign entities, foreign shareholders, foreign state or foreign individuals;
- c. The rationale for proposing a foreign entity participate (must address criteria above);
  - d. A description of the project's anticipated contributions to the United States economy;
    - How the project will benefit the United States, including manufacturing, contributions to employment in the United States and growth in new markets and jobs in the United States;
    - How the project will promote manufacturing of products and/or services in the United States;
  - e. A description of how the foreign entity's participation is essential to the project;
  - f. A description of the likelihood of Intellectual Property (IP) being created from the work and the treatment of any such IP; and
  - g. Countries where the work will be performed (Note: if any work is proposed to be conducted outside the United States, the applicant must also complete a separate request foreign work waiver.)

DOE may also require:

- A risk assessment with respect to IP and data protection protocols that includes the export control risk based on the data protection protocols, the technology being developed, and the foreign entity and country. These submissions could be prepared by the project lead (if not the prime recipient), but the prime recipient must make a representation to DOE as to whether it believes the data protection protocols are adequate and make a representation of the risk assessment – high, medium, or low risk of data leakage to a foreign entity.
- Additional language be added to any agreement or sub agreement to protect IP, mitigate risk, or other related purposes.

DOE may require additional information before considering the waiver request.

DOE's decision concerning a waiver request is not appealable.

## 2. **Performance of Work in the United States (Foreign Work Waiver Request)**

As set forth in [Section IV.J.iii.](#), all work funded under this FOA must be performed in 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 Full Application. A separate waiver request must be submitted for each entity proposing performance of work outside of the United States.

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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 for a foreign work waiver must include the following:

1. The rationale for performing the work outside the United States (“foreign work”);
2. A description of the work proposed to be performed outside the United States;
3. An explanation as to how the foreign work is essential to the project;
4. A description of the anticipated benefits to be realized by the proposed foreign work and the anticipated contributions to the U.S. economy;
5. The associated benefits to be realized and the contribution to the project from the foreign work;
6. How the foreign work will benefit the United States, including manufacturing, contributions to employment in the United States and growth in new markets and jobs in the United States;
7. How the foreign work will promote manufacturing of products and/or services in the United States;
8. A description of the likelihood of IP being created from the foreign work and the treatment of any such IP;
9. The total estimated cost (DOE and recipient cost share) of the proposed foreign work;
10. The countries in which the foreign work is proposed to be performed; and
11. The name of the entity that would perform the foreign work.

DOE may require additional information before considering the waiver request.

DOE’s decision concerning a waiver request is not appealable.

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## APPENDIX C – REQUIRED USE OF AMERICAN IRON, STEEL, MANUFACTURED PRODUCTS, AND CONSTRUCTION MATERIALS BUY AMERICA REQUIREMENTS FOR INFRASTRUCTURE PROJECTS

### A. Definitions

For purposes of the Buy America requirements, based both on the statute and OMB Guidance Document dated April 18, 2022, the following definitions apply:

**Construction materials** includes an article, material, or supply—other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives<sup>24</sup>—that is or consists primarily of:

- Non-ferrous metals;
- Plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
- Glass (including optic glass);
- Lumber; or
- Drywall.

**Infrastructure** includes, at a minimum, the structures, facilities, and equipment for, in the United States, roads, highways, and bridges; public transportation; dams, ports, harbors, and other maritime facilities; intercity passenger and freight railroads; freight and intermodal facilities; airports; water systems, including drinking water and wastewater systems; electrical transmission facilities and systems; utilities; broadband infrastructure; and buildings and real property. Infrastructure includes facilities that generate, transport, and distribute energy.

Moreover, according to the OMB guidance document:

When determining if a program has infrastructure expenditures, Federal agencies should interpret the term “infrastructure” broadly and consider the definition provided above as illustrative and not exhaustive. When determining if a particular construction project of a type not listed in the definition above constitutes “infrastructure,” agencies should consider whether the project will serve a public function, including whether the project is publicly owned and operated, privately operated on behalf of the public, or is a place of public accommodation, as opposed to a project that is privately owned and not open to the public. Projects with the former qualities have greater indicia of infrastructure, while projects with the latter quality have fewer. Projects consisting solely of the

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<sup>24</sup> BIL, § 70917(c)(1).

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purchase, construction, or improvement of a private home for personal use, for example, would not constitute an infrastructure project.

The Agency, not the applicant, will have the final say as to whether a given project includes infrastructure, as defined herein. Accordingly, in cases where the “public” nature of the infrastructure is unclear but the other relevant criteria are met, DOE strongly recommends that applicants complete their full application with the assumption that Buy America requirements will apply to the proposed project.

**Project** means the construction, alteration, maintenance, or repair of infrastructure in the United States.

### **B. Buy America Requirements for Infrastructure Projects (“Buy America” requirements)**

In accordance with Section 70914 of the BIL, none of the project funds (includes federal share and recipient cost share) may be used for a project for infrastructure unless:

(1) all iron and steel used in the project are produced in the United States--this means all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States;

(2) all manufactured products used in the project are produced in the United States—this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard for determining the minimum amount of domestic content of the manufactured product has been established under applicable law or regulation; and

(3) all construction materials<sup>25</sup> are produced in the United States—this means that all manufacturing processes for the construction material occurred in the United States.

The Buy America requirements only apply to articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project. As such, it does not apply to tools, equipment, and supplies, such as temporary scaffolding, brought to the construction site and removed at or before the completion of the infrastructure project. Nor does the Buy America requirements apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished infrastructure project, but are not an integral part of the structure or permanently affixed to the infrastructure project.

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<sup>25</sup> Excludes cement and cementitious materials, aggregates such as stone, sand, or gravel, or aggregate binding agents or additives.

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These requirements must flow down to all sub-awards, all contracts, subcontracts and purchase orders for work performed under the proposed project, except where the prime recipient is a for-profit entity. Based on guidance from the Office of Management and Budget (OMB), the Buy America requirements of the BIL do not apply to DOE projects in which the prime recipient is a for-profit entity; the requirements only apply to projects whose prime recipient is a State, local government, Indian tribe, Institution of Higher Education, or non-profit organization.

For additional information related to the application and implementation of these Buy America requirements, please see OMB Memorandum M-22-11, issued April 18, 2022:

Note that for all applicants—both non-Federal entities and for-profit entities—DOE is including a Program Policy Factor that the Selection Official may consider in determining which Full Applications to select for award negotiations that considers whether the applicant has made a commitment to procure U.S. iron, steel, manufactured products, and construction materials in its project.

### **C. Waivers**

The DOE financial assistance agreement will require each recipient: (1) to fulfill the commitments made in its application regarding the procurement of U.S.-produced products and (2) to fulfill the commitments made in its application regarding the procurement of other key component metals and domestically manufactured products that are deemed available in sufficient and reasonably available quantities or of a satisfactory quality at the time of award negotiation.

In limited circumstances, DOE may waive the application of the Buy America requirements where DOE determines that:

- (1) Applying the Buy America requirements would be inconsistent with the public interest;
- (2) The types of iron, steel, manufactured products, or construction materials are not produced in the United States in sufficient and reasonably available quantities or of a satisfactory quality; or
- (3) The inclusion of iron, steel, manufactured products, or construction materials produced in the United States will increase the cost of the overall project by more than 25%.

If an applicant or recipient is seeking a waiver of the Buy America requirements, it may submit a waiver request after it has been notified of its selection for award negotiations. A waiver request must include:

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- A detailed justification for the use of “non-domestic” iron, steel, manufactured products, or construction materials to include an explanation as to how the non-domestic item(s) is essential to the project;
- A certification that the applicant or recipient made a good faith effort to solicit bids for domestic products supported by terms included in requests for applications, contracts, and nonproprietary communications with potential suppliers;
- Applicant/Recipient name and Unique Entity Identifier (UEI)
- Total estimated project cost, DOE and cost-share amounts;
- Project description and location (to the extent known);
- List and description of iron or steel item(s), manufactured goods, and construction material(s) the applicant or recipient seeks to waive from Domestic Content Procurement Preference requirement, including name, cost, country(ies) of origin (if known), and relevant PSC and NAICS code for each;
- Waiver justification including due diligence performed (e.g., market research, industry outreach) by the applicant or recipient; and
- Anticipated impact if no waiver is issued.

DOE may require additional information before considering the waiver request.

Waiver requests are subject to public comment periods of no less than 15 days and must be reviewed by the Made in America Office. There may be instances where an award qualifies, in whole or in part, for an existing waiver described at [DOE Buy America Requirement Waiver Requests](#).

DOE’s decision concerning a waiver request is not appealable.

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## APPENDIX D – OPEN-SOURCE SOFTWARE

### Publicly available Software Distribution Plan

If required by DOE during award negotiations, recipients will submit an open-source software distribution plan describing how software produced under this FOA will be distributed. For a DOE National Laboratory or a FFRDC, the data rights clause (including rights and requirements pertaining to computer software) in its M&O contract shall apply and take precedence over any requirement set forth in this Appendix. The plan must include the following elements:

1. A complete description of any existing software that will be modified or incorporated into software produced under this FOA, including a description of the license rights. The license rights must allow the modified or incorporated software to be distributed as publicly available.
2. A discussion of the publicly available license that the applicant plans to use for the software it intends to produce under the FOA, and how that choice furthers the goals of this FOA. The discussion must also address how the license conforms to the conditions listed below.
3. A method for depositing the software in a source code repository.
4. A method for sharing and disseminating the software and other information to team members or others when multiple parties will contribute to the development of the software or the FOA requires that the software or other information be shared or disseminated to others.

Publicly available Definition: Publicly available licenses must conform to all of the following conditions:

#### **Free Redistribution**

The license shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several sources. The license shall not require a royalty or other fee for such sale. The rights attached to the software must apply to all to whom the software is redistributed without the need for execution of an additional license by those parties.

#### **Source Code**

The program must include source code and allow distribution in source code as well as compiled form. Where some form of a product is not distributed with source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable

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reproduction cost preferably, i.e., downloading via the Internet without charge. The source code must be the preferred form in which a programmer would modify the program. Deliberately obfuscated source code and intermediate forms, such as the output of a preprocessor or translator, are not allowed.

### **Derived Works**

The license must allow modifications and derived works, and permit the option of distributing the modifications and derived works under the same terms as the license of the original software.

### **Integrity of the Author's Source Code**

The license may restrict source-code from being distributed in modified form only if the license allows the distribution of "patch files" with the source code for the purpose of modifying the program at build time. The license must explicitly permit distribution of software built from modified source code. The license may require derived works to carry a different name or version number from the original software.

### **No Restriction Against Fields of Endeavor**

The license must not restrict anyone from using the program in a specific field of endeavor. For example, it may not restrict the program from being used in a business or for genetic research.

### **License Must Not Be Specific to a Product or Technology**

The rights attached to the program must not depend on the program's being part of a particular software distribution. If the program is extracted from that distribution and used or distributed within the terms of the program's license, all parties to whom the program is redistributed should have the same rights as those that are granted in conjunction with the original software distribution. No provision of the license may be predicated on any individual technology or style of interface.

### **License Must Not Restrict Other Software**

The license must not place restrictions on other software that is distributed along with the licensed software. For example, the license must not insist that all other programs distributed on the same medium be publicly available software.

#### Examples of Acceptable Licenses

Apache License, 2.0

<http://www.apache.org/licenses>

The 2.0 version of the Apache License was approved by the Apache Software Foundation (ASF) in 2004. The goals of this license revision were to reduce the number of frequently asked questions, to allow the license to be reusable without modification by any project (including non-ASF projects), to allow the license to be included by reference instead of listed in every file,

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to clarify the license on submission of contributions, to require a patent license on contributions that necessarily infringe the contributor's own patents, and to move comments regarding Apache and other inherited attribution notices to a location outside the license terms.

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The LGPL places copyleft restrictions on the program governed under it but does not apply these restrictions to other software that merely link with the program. There are, however, certain other restrictions on this software.

The LGPL is primarily used for software libraries, although it is also used by some stand-alone applications, most notably Mozilla and OpenOffice.org.

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## APPENDIX E – LIST OF ACRONYMS

AC	Alternating Current
AOA	Aquaculture Opportunity Area
BOEM	Bureau of Ocean Energy Management
CETs	Critical and Emerging Technologies
COI	Conflict of Interest
CRADA	Cooperative Research and Development Agreement
DC	Direct Current
DEC	Determination of Exceptional Circumstances
DEI	Diversity, Equity, Inclusion
DMP	Data Management Plan
DOE	Department of Energy
DOI	Digital Object Identifier
DOL	Department of Labor
DR	Decision Review
EERE	Energy Efficiency and Renewable Energy
FAR	Federal Acquisition Regulation
FCOI	Financial Conflicts of Interest
FFATA	Federal Funding and Transparency Act of 2006
FOA	Funding Opportunity Announcement
FOIA	Freedom of Information Act
FORWARD	Floating Offshore Wind Advanced Research and Development
FFRDC	Federally Funded Research and Development Center
GAAP	Generally Accepted Accounting Principles
GHG	Greenhouse Gas
GNG	Go/No-Go
HBCUs	Historically Black Colleges and Universities
IO&M	Installation, Operations and Maintenance
IRB	Institutional Review Board
LCOE	Levelized Cost of Energy
M&O	Management and Operating
ME	Marine Energy
MEC	Marine Energy Converter
MFA	Multi-Factor Authentication
MPIN	Marketing Partner ID Number
MSI	Minority-Serving institution
MW	Megawatt
MYPP	Multi-Year Program Plan
NDA	Non-Disclosure Acknowledgement
NEPA	National Environmental Policy Act
NOAA	National Atmospheric and Oceanic Administration
NNSA	National Nuclear Security Agency

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NSF	National Science Foundation
OFCCP	Office of Federal Contractor Compliance Programs
OIG	Office of Inspector General
OMB	Office of Management and Budget
OSTI	Office of Scientific and Technical Information
OSW	Offshore Wind
OTA	Other Transactions Authority
PBE	Powering the Blue Economy
PII	Personal Identifiable Information
PTO	Power Take Off
R&D	Research and Development
RD&D	Research, Development, and Demonstration
RFI	Request for Information
RFP	Request for Proposal
SAM	System for Award Management
SciENcv	Science Experts Network Curriculum Vita
SMART	Specific, Measurable, Attainable, Realistic, and Timely
SOPO	Statement of Project Objectives
SPOC	Single Point of Contact
STEM	Science, Technology, Engineering, and Mathematics
TAA	Technical Assistance Agreement
TIA	Technology Investment Agreement
TRL	Technology Readiness Level
UCC	Uniform Commercial Code
UEI	Unique Entity Identifier
UMERC	University Marine Energy Research Community
WBS	Work Breakdown Structure
WEC	Wave Energy Converter
WETO	Wind Energy Technologies Office
WP	Work Proposal
WPTO	Water Power Technologies Office

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## APPENDIX F – DEFINITION OF TECHNOLOGY READINESS LEVELS

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

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## APPENDIX G – RELEVANT REFERENCES FOR TOPIC AREA 1

The following list, while not comprehensive, includes references relevant to Topic area 1 (all subtopics):

- [Tethys Engineering – Levelized Cost of Energy](#)
- [Telesto – Levelized Cost of Energy Guidance](#)
- [Technological Cost-Reduction Pathways for Point Absorber Wave Energy Converters in the Marine Hydrokinetic Environment](#)
- [Technological Cost-Reduction Pathways for Oscillating Water Column Wave Energy Converters in the Marine Hydrokinetic Environment](#)
- [Technological cost-reduction pathways for attenuator wave energy converters in the marine hydrokinetic environment](#)
- [Technological Cost-Reduction Pathways for Axial-Flow Turbines in the Marine Hydrokinetic Environment](#)
- [WPTO Multi-Year Program Plan](#)
- Another resource to consider is the [Next Generation Software Needs Assessment](#) for potential software cost reduction and performance improvement pathway opportunities.
- [MHKDR: MHK Levelized Cost of Energy \(LCOE\) Guidance and Techo Economic Analysis Materials \(openei.org\)](#)
- [Marine Energy Systems Cost Breakdown Structure](#)
- [Marine Energy Software](#)

## **APPENDIX H – OFFSHORE RENEWABLE ENERGY AND AQUACULTURE SYNERGIES REQUEST FOR INFORMATION (RFI) (DE-FOA-0002943)**

Differences in required infrastructure, spatial scale, the magnitude of required investment, and power output between offshore wind (OSW) and marine energy (ME) create different potential synergies between aquaculture and these renewable energy technologies. Key takeaways from RFI responses for both OSW and ME are therefore summarized separately below.

### *Offshore Wind RFI Responses*

Stakeholders identified several potential opportunities and challenges for co-location of offshore wind development and aquaculture, including:

- Regulatory challenges – particularly interactions between the permitting processes associated with aquaculture and offshore wind – were commonly identified as one of the largest hurdles facing co-location of wind and aquaculture.
- Other risks include negative public perception; co-use conflicts between ocean users; and potential for magnified industry risks with co-located infrastructure (including increased exposure to storms for offshore aquaculture operations and the potential for increased wildlife interaction, such as marine mammal entanglement or avian attraction).
- Potential benefits to co-location included fisheries enhancement; ecosystem restoration; opportunity for marine carbon dioxide removal (mCDR) and carbon sequestration; and eco-tourism.
- Monitoring technologies represent a critical investment pathway to meet the demands of both environmental observation on leases, and the operations and maintenance requirements of mixed-industry offshore developments.

Based on these opportunities and challenges, stakeholders recommended that:

- Feasibility studies are needed to assess the benefits and challenges of co-locating offshore wind energy and aquaculture.
- Focus areas mentioned included economic feasibility; scalability; regulatory considerations (including permitting obstacles and pathways); environmental effects; and co-use impacts and interactions (e.g. with fisheries); ability for onshore infrastructure to support offshore operations; workforce requirements; and social acceptance.
- Many partners were suggested for inclusion in this type of research: aquaculture companies, offshore wind energy developers, government agencies, academia, key local communities (fishery sector, indigenous groups, other community groups), insurance and legal entities and

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technology developers. Federal interagency coordination and clear articulation of lead agency authorities in this space is critical.

### *Marine Energy RFI Responses*

Stakeholders provided guidance and identified potential opportunities and challenges for co-location of marine energy and aquaculture, which were used to inform Subtopic 2b research priorities including:

- Energy usage varies greatly by farm, as well as within farms on a seasonal and hourly basis.
- Funding mechanisms should incentivize collaboration between aquaculture and marine energy industries, researchers, and stakeholders.
- Data sharing is needed to ensure transparency, promote collaborative research and equitable access, and develop best practices, guidelines, and adaptive management strategies.
- Community needs and stakeholder input are important to take into consideration and incorporate into co-location projects. Early engagement and transparent communication with relevant community members and stakeholders is critical to identify these needs. Forming partnerships with trusted community organizations can help facilitate these interactions.
- Near-term opportunities for marine energy to power aquaculture operations exist and include, but are not limited to, environmental monitoring, data collection, feeding, lighting, harvesting, and transportation.
- Demonstrated reliability of marine energy devices and availability of electric technologies will likely influence interest from the aquaculture community.

Challenges to address included:

- More comprehensive aquaculture energy demand data are needed at a finer temporal scale to better evaluate the ability of renewable energy resources to meet aquaculture energy needs.
- Interactions between marine energy and aquaculture are uncertain and data are needed to understand how co-location influences cumulative environmental impacts, farm productivity, and energy harvesting, among other types of interactions.
- A regulatory framework and permitting guidance are needed. (Note: DOE is not a regulatory agency).
- Reducing operational costs is a major interest for aquaculture farmers and needs to be considered in assessments and co-development.
- Environmental and social impacts are a concern for co-location and robust evaluations of these impacts are needed.

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