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

Oceans of Opportunity: U.S. Wave Energy Open Water Testing

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FOA Issue Date:	Sept 18, 2024
Informational Webinar:	Oct 9, 2024
Submission Deadline for Concept Papers:	Oct 25, 2024 5:00 p.m. ET
Submission Deadline for Full Applications:	January 30, 2025 5:00 p.m. ET
Expected Submission Deadline for Replies to Reviewer Comments:	April 1, 2025 5:00 p.m. ET
Expected Date for EERE Selection Notifications:	June 2025
Expected Timeframe for Award Negotiations:	June – Aug 2025

- Applicants must submit Concept Paper(s) by 5:00 p.m. ET on the due date listed above to be eligible to submit a Full Application.

- The U.S. Department of Energy, Office of Energy Efficiency (EERE) is launching a pilot program in its newly updated portal for funding opportunities — the EERE Program Information Center. This FOA is being published as part of EERE's pilot program. All other announcements will continue to be published in eXCHANGE.

- 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.

- To apply to this FOA, applicants must register with and submit application materials through the EERE Program Information Center at https://epicweb.ee.doe.gov/EPICWeb. To do so, applicants are advised to complete the following steps, which are **required** for application submission:

- **Unique Entity Identifier (UEI) and System for Award Management (SAM) -** Each applicant 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 at all times during which it has an active federal award or an application or plan under consideration by a federal awarding agency (unless the applicant is excepted from those requirements under 2 CFR 25.110). 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 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. 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.

- Register and create an account in the EERE Program Information Center at https://epicweb.ee.doe.gov/EPICWeb. This account will allow the user to apply to any open EERE FOAs that are currently in the EERE Program Information Center.

  To access the EERE Program Information Center, we recommend potential applicants have a Login.gov account. As part of the EERE Program Information Center registration process, new users have the option of creating an account in Login.gov. Please note that the email address associated with Login.gov must match the email address associated with the EERE Program Information Center account.

  NOTE: Your organization's Authorized Organizational Representative (AOR) must first create an account in the EERE Program Information Center before any applicant accounts can be approved. The AOR will then be responsible for approving/managing user accounts created for the organization or designating an Account Administrator to act on their behalf.

  If you need any assistance while using the EERE Program Information Center, please utilize the Help Center located at the top right corner of the home page, which provides several useful resources, including quick guides and training videos. You may also contact the EERE Program Information Center Helpdesk for assistance at eere-epichelpdesk@ee.doe.gov.

Table of Contents

I. Funding Opportunity Description

A. Background and Context

i. Background and Purpose

The Water Power Technologies Office (WPTO) is issuing this funding opportunity announcement (FOA), "Oceans of Opportunity: U.S. Wave Energy Open Water Testing", to significantly accelerate the design, fabrication, and testing of multiple wave energy converters (WECs). WPTO plans to open a stage-gated, five-year, up to $112.5 million funding opportunity to advance U.S. wave energy technology commercial adoption.

This opportunity focuses on three marine energy pathways: distributed energy applications, community energy solutions, and utility energy generation. Distributed wave energy efforts provide power for off-grid applications at sea that can include but are not limited to ocean observation, aquaculture, and marine carbon dioxide removal. Community energy efforts aim to support community wave energy projects and develop nearshore energy solutions for coastal communities and industries. Community-driven solutions could provide power or water delivery for coastal and island-invested users and may or may not be connected to an electric grid. Utility wave energy efforts seek to maximize energy generation, ensuring grid stability and reliability, and promote sustainability by supporting the deployment of grid-connected marine energy technologies.

Awards selected under this funding opportunity will be subject to stage-gate reviews—specifically, a down-select process at the end of the first Budget Period (BP) and Go/No-Go (GNG) reviews for subsequent BPs (see Section I.B for topic area (TA) stage information and Section VI.C for program down-select information). This stage-gated approach is intended to reduce risks for deployments, increase the potential for commercial adoption, and offer additional benefits to quickly advance WECs. This opportunity will support long-duration (e.g., up to two years), in-water testing of WECs, which is critical to industry and investors to demonstrate technology readiness.

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"[1] to the

[1] Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad," January 27, 2021.

benefit of all Americans. The Department of Energy (DOE) 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 research and development (R&D) activities to be funded under this FOA will support the government-wide approach to the climate crisis by driving the innovation that can lead to the deployment of clean energy technologies, which are critical for climate protection. Specifically, this FOA is intended to fund open water testing of WECs, which is critical to the development of wave energy technologies. Activities include validating current system performance, understanding durability and survivability, identifying and solving operational challenges, collecting robust data, and validating models. Ultimately, these activities are needed to fully develop technologies that can survive and perform in harsh ocean environments and provide carbon-free electricity and/or potable water using the power of ocean waves.

Water Power Technologies Office Priorities

The opportunities to harness marine energy are abundant. The total available marine energy resource in the United States is equivalent to approximately 57% of U.S. power generation. Even if only a small portion of this technical resource potential is captured, marine energy technologies would make significant contributions to the nation's energy needs. These resources are also highly predictable, making them promising contributors to a stable, reliable clean energy grid. For example, the daily and seasonal cycles of marine energy resources make them an excellent complement to other renewable energy sources like wind energy and solar power.

WPTO's Marine Energy Program conducts research, development, demonstration, and commercial activities that advance the development of reliable, cost-competitive wave energy technologies and reduce barriers to deployment.

Since 2008, WPTO has funded wave energy deployments. Key projects include the development and testing of various WECs at the U.S. Navy's Wave Energy Test Site (WETS) located at Marine Corps Base Hawaii, deployment tests at the Scripps Institution of Oceanography's pier in San Diego, California, and deployments of wave-powered desalination WECs at Jennette's Pier in Nags Head, North Carolina. These in-water projects tested new methodologies for marine installations and measurements to optimize wave energy capture effectively. All these projects were tested in challenging environments, including hurricane-level waves. The tests are usually short lived and, while they provide excellent data and lessons learned, a more prolonged testing program (multi-year) is necessary. This FOA is set up to address long duration, open water testing that contribute:

- Technological advancements: Safe and efficient open water deployments will contribute to technological progress by proving and improving reliability, durability, and wave energy conversion efficiency of these WEC systems at all scales under operational conditions.
- Data collection and analysis: New development risk tools and methodologies for assessing the impact of wave energy technologies on marine wildlife ensures that environmental considerations are integrated into the design and deployment of these systems, promoting environmentally sustainable development.
- Economic impact: Wave energy projects help capture capital expenditure (CAPEX) and operating expenditure (OPEX) data that identifies where industry needs to innovate to reduce overall costs.

U.S. Wave Energy Progression

WPTO's annual appropriations have increased over the years. As a result, WPTO has increased funding for U.S. WEC designs focused on multiple scales.

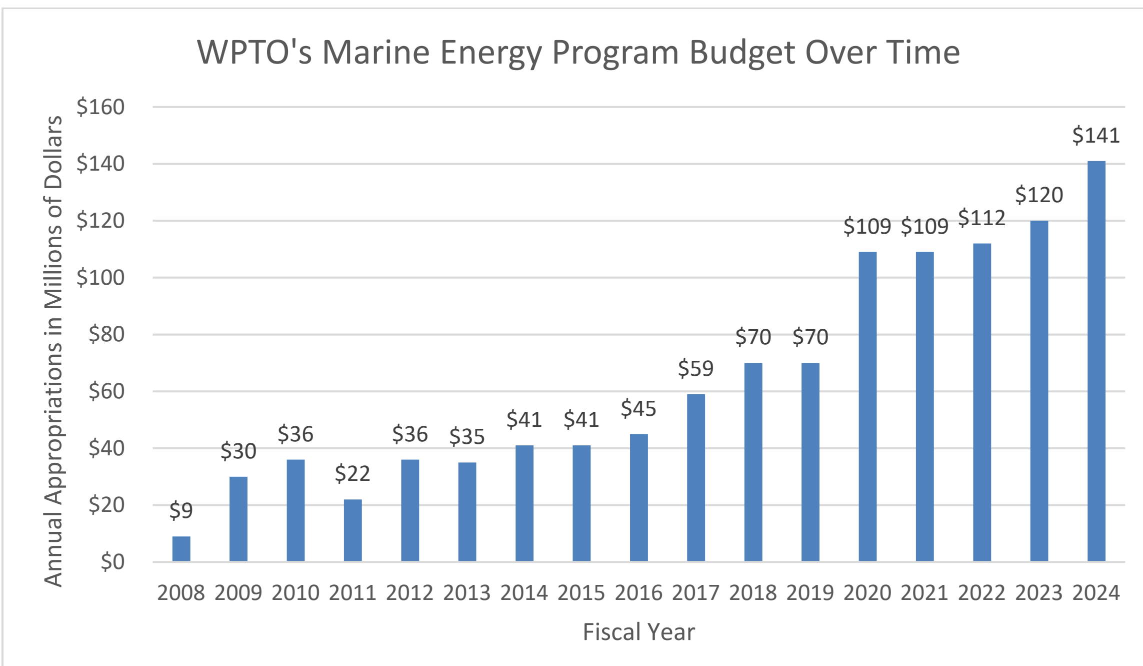

Figure 1 – ANNUAL APPROPRIATED FUNDING LEVELS

Significant funding opportunities to date include the Wave Energy Prize in 2016. This prize was a competition to identify and accelerate the development of wave energy devices and several innovative WECs emerged. In 2017, several WEC developers received funding to support device testing and validation at WETS in Hawaii. In 2019 and 2021, WPTO funded wave energy innovators to design devices that could potentially be tested at the PacWave South test site. WPTO also funded fit-for-purpose infrastructure to support advancements in WEC testing and operational performance. The PacWave South test site, located off the Oregon coast, will provide a comprehensive test ground for WECs. It is expected to be fully operational in 2025 and will be the largest state-of-the-art, pre-permitted, accredited wave energy grid-connected test site in the world. From 2020 to 2022, WPTO also supported multiple projects aimed at reducing the cost of wave energy and involved deploying and demonstrating WECs in real-world conditions to gather performance data and assess reliability.

Throughout all these projects, WPTO and the wave energy developer community identified a significant barrier to progressive technology development—a lack of consistent, long-term funding that supports long-term, in-water testing. The inherent inefficiencies for technology developers to stop development during periods between WPTO funding opportunities significantly impacts demonstration and testing lessons learned, long-term data collection, and the ability to attract sustained investment through the technology valley of death while retaining good engineering staff. This FOA is set to address these inefficiencies.

ii. Technology Space and Strategic Goals

The technology space for wave energy is diverse and evolving, with multiple innovative approaches aimed at harnessing the vast potential of the U.S. wave energy resource, which has an estimated technical potential of 1,400 terawatt hours per year.

This FOA seeks applications to address the design, fabrication, and field testing of WECs, targeting end-use applications covered in the FOA TAs. The primary goal for this FOA is to accelerate the commercialization of the U.S. wave energy industry through open water field testing of wave energy systems and sub-systems. The scope of this FOA includes WEC technologies across different sizes and markets, including grid-connected and non-grid-connected applications. This multi-year funding model should accelerate the wave energy sector's commercialization by demonstrating the device designs with the highest potential.

In the first year, TA awardees will undergo a technology, cost, permitting, and stakeholder assessment. These evaluations will inform a down-select on the most promising designs within each TA (see Section I.B for TA stage information and Section VI.C for program down-select information). Year two and beyond will progress the technologies through further design optimization and fabrication with long-term, open water testing likely occurring in years three through five. The projects will progress through stage gates, i.e., comprehensive reviews by subject-matter experts, before field testing begins to ensure that only the most viable projects advance.

The scope of this FOA also includes:

- Initial technology assessments in year one of up to 17 devices.
- Down-select of the most promising WEC designs to up to 10 devices.
- Progression through stage gates validating design decisions; cost efficiency; installation, operations, and maintenance (IO&M) plans; and fit to end use.

The overarching goals of this FOA include:

- Generating high quality public data sets, lessons learned, and best practices.
- Demonstrating the ability of wave energy systems to meet potential customer requirements.
- Validating cost efficiency and performance improvements proposed by developers.
- Validating and informing the direction of foundational wave energy R&D.
- Promoting U.S. wave energy supply chain.
- Improving management and mitigation of project risks.
- Improving health, safety, and environment (HS&E) WPTO marine energy programmatic requirements.

Strategic Goals Topic Area 1

Innovation of distributed marine energy technologies could allow marine energy to become an economically viable option to meet non-grid energy demands of the blue economy and/or enhance non-grid market capabilities at sea. Moreover, development of distributed marine energy technologies can generate benefits across the entire marine energy industry. Distributed marine energy typically faces shorter implementation times as it is subject to less complex regulatory structures than grid-connected devices. Additionally, distributed devices are often smaller, easier, and more affordable to deploy. Taken together, these factors allow for more deployment opportunities that can increase valuable data to fill knowledge gaps for offshore energy and environmental monitoring applications, helping to accelerate the advancement of marine energy technologies. Ultimately, by pursuing opportunities for marine energy to meet non-grid needs, a spillover effect is expected that leads to advances in marine energy readiness for more traditional utility-scale electrical grid markets and potentially other unforeseen opportunities.

Strategic Goals Topic Area 2

Coastal and island communities and blue economy end users are often located in challenging environments for delivering critical energy services and typically have high energy costs, minimal energy storage, and vulnerable energy systems. Facing immediate impacts of climate change and natural hazards, these communities and end users also have unique resiliency needs across their respective social and physical infrastructures. While these challenges to reliability and demonstration are formidable, they also present an opportunity for technology advancement and validation of WEC technologies. Smaller, decentralized community and blue economy end-user energy systems are a growing market globally, where it can be less costly to develop local power generation sources connected to off-grid or islanded microgrids. Communities can present opportunities to drive innovation faster for wave energy technologies. Successful demonstration via this opportunity could effectively establish the first representative and replicable WECs powering coastal and/or island microgrids in the United States, supporting optimization, high-performance, and safe operation to help rapidly advance devices toward commercialization. For the purposes of this opportunity, community can be defined broadly to include many facets of the ocean economy, such as electric cooperatives, community economic development, defense facilities, remote communities, local factories, industrial sites, resilient power systems, novel blue economy/ocean technology, ports, and harbors.

TA2 intends to focus on the development and testing of technologies to significantly accelerate the design, fabrication, and testing of multiple WECs at a range of scales and purposes. This TA aims to support small-scale wave energy projects and the development of nearshore energy solutions for coastal communities and blue economy end users. These wave-powered solutions could provide power or water delivery. The grid pathway for WECs has its own cost and design cycles based on levelized cost of energy (LCOE) and delivering power at scale, whereas the community-scale pathway has a unique opportunity for delivering reliable power near the shore at a smaller scale. The economics of wave energy are unknown, and this pathway may reduce uncertainties related to cost and reliability. Two key themes for the technology space are:

- Minimizing the risks and/or technical barriers of developing marine energy technologies by focusing on nearshore environments and shore-based infrastructure, which avoid the most challenging wave environments and associated costs.

- Testing will potentially provide an alternative path to de-risking community-scale solutions by developing strategies to extract energy from the resource without a focus on LCOE optimization. WECs aiming to optimize LCOE often overdesign structural components and power take-off (PTO) and mooring systems to squeeze every bit of power available from a resource, which likely increases costs and potentially decreases reliability.

Many of the technology strategies described in this TA build on the Powering the Blue Economy's Resilient Coastal Communities portfolio in WPTO by combining approaches to invest across a varied landscape, bridging smaller, distributed devices to strategic niche opportunities to develop utility-scale wave energy devices. A clear focus is on nearshore technologies as defined by the following three technology spaces: (1) small-scale power systems, (2) coastal structure integrated WECs, and (3) wave-powered desalination.

Small Power Systems	Coastal Structure Integrated WEC	Wave-Powered Desalination
Grid-connected via islanded microgrids Off-grid applications in remote coastal or island communities Maritime and shoreside facilities (e.g., ports, seafood processing, municipal water systems)	WEC installed along a coastal structure (e.g., breakwater) that protects an area against waves, storm surges, and coastal flooding	WEC that desalinates seawater using a hydraulic and/or electric power conversion system

WPTO's goals are to show how WEC technologies can support community and blue economy end-user transitions to a resilient and renewable energy system. A key goal of this TA is to find a balance between end-user priorities and the opportunity for WEC developers, which may drive longer-term value, expedite regulatory and permitting processes, and benefit developers by supporting and integrating many components of project development. In addition, technology demonstrations will provide critical feedback to central R&D questions, such as improving the siting and marinization of marine energy systems to understand how they can be deployed in an environmentally responsible way and survive in harsh, highly corrosive, and energetic environments.

Strategic Goals Topic Area 3

The WPTO programmatic focus for wave energy utility developments is based on several strategic goals that demonstrate the value of connecting wave energy to the U.S. electricity grid.

- Maximize energy generation from wave resources (greater than 500 kilowatts (kW) to the megawatt scale), which involves optimizing the design, deployment, and operation of wave energy devices to enhance efficiency and output. Goals include reducing downtime and improving predictability of energy generation to better match electric utility supply with consumer demand.
- Ensure grid stability and reliability with the key goal of ensuring that integration of wave energy to the grid does not compromise grid stability and reliability. This involves developing technologies and implementing strategies that manage the intermittent nature of marine energy sources and mitigate their impact on the grid. Improving forecasting techniques, enhancing grid flexibility through energy storage and/or demand response measures, and implementing grid-friendly control systems for wave energy devices to provide grid support services such as frequency regulation and voltage control are all vital goals for grid stability and reliability.
- Promote sustainability and demonstrate grid-connected wave energy technologies' value either as stand-alone systems or co-located with other renewable energy technologies to decarbonize the grid. Other sustainability goals focus on conducting environmental assessments to identify and mitigate potential adverse effects of wave energy projects on the marine ecosystems where they are deployed.
- Accelerate foundational and subsystem R&D areas of interest, including mechanical load data collection for structural health and monitoring systems, integration of energy storage systems, control methodologies for survivability in extreme sea states, and demonstrations of material R&D to improve capital and operational expenditure costs.

The resulting analytical results and data collected from these TA efforts should be made publicly available to the greatest extent possible without infringing on developers' intellectual property (IP) at the conclusion of the project in accordance with the data management plan. See Section I.B (Data Accessibility, Collection, and Transparency) for additional information.

Detailed technical descriptions of the specific TAs are provided in the sections that follow.

B. Topic Areas

This FOA will support projects across three (3) TAs focused on advancing wave energy research, development, and demonstration (RD&D) to move the wave energy industry toward commercialization for distributed, community, and utility applications. The table below illustrates strategic differences between technology applications (e.g., use cases, power generation), so applicants can select the TA that most closely aligns with their technology and application.

Distributed (TA1)	Community (TA2)	Utility (TA3)
• Not grid connected • When commercially deployed, would not be reconnected to shore (but may be connected to shore during testing) • Associated with a blue economy end use at sea (offshore) • Average power output likely milliwatts to 50 kW • Technology readiness level (TRL) 4–8	• Prefer non-grid connected • Associated with a coastal community or blue economy end user (usually connected to shore) • Deployed in a nearshore environment (generally defined as state waters according to the Submerged Lands Act and 0–100-meter depth range) • Range of 1–100 kW average power output • TRL 4–8	• Connected to electrical grid or major industrial process • Nearshore or offshore • Average power output (rated 500 kW or more aggregate, not necessarily per device) • TRL 5–9

TA1 (Open Water Testing and System Validation for Distributed Applications) will provide up to $16.875 million for wave device development and open water testing for dispersed (e.g., remote/offshore) use cases and power-at-sea applications.
TA2 (Open Water Testing and System Validation for Community Applications) will provide up to $45 million for wave device development in direct support of coastal community needs, which may include power and/or desalinated water applications.
TA3 (Open Water Testing and System Validation for Utility Applications) will provide up to $50.625 million for wave device development in support of utility power needs, utilizing offshore grid-connected testing facilities such as PacWave.

Information Applicable to all Topic Areas

Project Management Plan Requirements

Awards selected under this FOA will be required to create and use a project management plan throughout the award period of performance. The following items are to be addressed in the project management plan at a minimum:

- Developers must implement project management software to manage workflow, costs, and schedule, and monitor safety and environmental impacts. Developer must demonstrate how they will utilize the software to WPTO during initial phase of Stage 1.
- Project management plan shall provide comprehensive schedule for the entire project (i.e., design, procurement, fabrication, testing and decommissioning).
- Schedule shall include predecessor/successor relationships for tasks.
- Developer shall capture lessons learned, including all aspects of safety (personnel and environmental) throughout the project.
- If incidents occur during marine operations that lead to personnel injury, equipment damage, or loss/degradation of equipment function, developers shall submit incident summary reports to demonstrate health and safety risk mitigation.

Plans for Commercialization

Awards selected under this FOA will develop commercialization plans during the period of performance. The following items are to be addressed in the commercialization plan at a minimum:

- Market transformation plan and description of how the technology will be ready for non-WPTO follow-on funding at the conclusion of the award.
- Market transformation planning should consider WEC development as well as end-use application, which should be informed by end-user engagement (as applicable).
- Evidence of product viability and market demand for long-term commercial success.
- Description of competition landscape and security of IP.
- Description of finance and expected revenue model.

Data Collection, Accessibility, and Transparency

The Oceans of Opportunity funding opportunity is an opportunity to rapidly advance technology and understanding of WECs. Knowledge and experience from projects will be captured and conveyed primarily through data collected. These data can be used to boost the industry's maturation rate by, for example, validating design; capturing and sharing lessons learned; assessing design and testing approaches; developing and validating models; developing standards; establishing baseline timelines and protocols; measuring the impact of diversity, equity, inclusion, and accessibility; quantifying costs; and understanding, characterizing, and solving environmental and ecological challenges. WPTO expects a high level of transparency for these projects to provide value back to the taxpayer; thus, each project must have robust data collection and dissemination with strong security, quality control, transparency, and accessibility. All project data, including but not limited to technical, economic, cost, schedule, site characterization, and environmental, will be made public subject to the following data release requirements and data protection limitations:

- All project data will be made available to WPTO as it is produced in or near real time and should be specified in the statement of project objectives (SOPO). Special exceptions may be given when data cannot be accessed for self-contained WECs and instruments (e.g., data is only accessible by recovering the device).
- Protected data protection period is limited to one year from the end of the award period of performance.

Strong preference will be given to applicants where real-time data access and availability is implemented. Applicants are encouraged to address how data sharing is important to project success, end-user priorities, and the broad success of the wave energy industry. The use of the Modular Ocean Data Acquisition (MODAQ) system (or a proven third-party measurement system), the Marine and Hydrokinetic Toolkit (MHKiT), the Marine Energy Data Pipeline, and marine energy data standards is strongly encouraged.

A key endeavor of this funding opportunity is to improve the quality of R&D related to testing and validation of WECs in laboratory and open water environments. Understanding and validating processes for technology evaluation, along with supporting DOE and WPTO in evaluating R&D opportunities and future testing and validation needs, will be critical to delivering a pipeline of future projects. It is vital for government services to adequately analyze and synthesize project data to help drive innovation and commercialization of technology.

Projects will need to ensure technology system performance is comprehensively characterized during open water testing. Further, applicants will be required to make all necessary measurements to quantify device loads and performance and to validate design methods and numerical models that were used in system design. In their FOA applications, applicants should present a detailed testing, measurement, and data collection plan, including a description of the measurements, a schematic of the flow of data and quality control processes, a mapping of data to test objectives, and information on how these measurements will be used to further the technology development and measure interim progress. See Section IV.D.iii. for technical volume description, Section IV.D. xxi. for testing, measurement, and data collection plan description, and Appendix G for marine energy data repository plan description.

For all TAs, the following data types and sources for qualitative and measured and/or quantitative data should be discussed in the technical volume as well as the testing, measurement, and data collection plan. To ensure data quality and minimize time gaps in data streams, all channels should be automatically monitored to provide a basic level of data quality assurance and to verify that all instruments and the data acquisition system are functioning properly.

Qualitative data sources include but are not limited to:

- HS&E lessons learned.
- Permitting/regulatory lessons learned.
- Lessons learned concerning laboratory testing, open water testing, and marine operations.
- Internal and external presentations, reports, deliverables, and journal publications.

Measured/quantitative data sources include but are not limited to:

- Metadata that provides contextual information on the data so they can be fully understood and used by third parties (e.g., a data guide or annotation to provide context for full datasets).
- Ocean resource measurements, such as wave spectra or ocean current speed will be made public immediately.
- Environmental data collected.
- All test data collected through the application of the International Electrotechnical Commission (IEC) marine energy technical specification series: IEC Technical Specification 62600-3 for load measurements, IEC Technical Specification 62600-4 for technology qualification (or equivalent), and IEC

Technical Specification 62600-100 WEC power performance assessment (if applicable to the project).

- All data collected within specified evaluation areas as defined in the International Energy Agency-Ocean Energy Systems (IEA-OES) evaluation and guidance framework[2] (e.g., survivability and/or reliability data).
- Techno-economic data (e.g., prototype costs, installation costs, transportation costs, maintenance costs).
- Other measurements, including but not limited to measurements of device motions, mechanical loads, electrical loads, mooring and anchoring loads, environmental measurements, system reliability, loads during installation, loads during operational sea states, and loads during extreme sea states.

The testing, measurement, and data collection plan should include the ability to adequately measure system-level performance such as extracted power, system conversion efficiency, reliability, etc. At the completion of the project, these data must be submitted to the appropriate Portal and Repository for Information on Marine Renewable Energy (PRIMRE) knowledge hub (see Appendix G) as agreed to by the applicant during the DOE award negotiations.

Prior to deployment, all instrument and data acquisition systems that will be used in offshore testing must undergo commissioning and a readiness review by a project due diligence team by completing the following:

- Bench testing of all equipment.
- End-to-end characterization test.
- Long-term, end-to-end system verification test of at least three months.
- Operation readiness review.

A validated rule from naval architecture states that what would take one hour (dollar) to install in a shore/land facility will take three hours (dollars) in a dry dock and at least eight hours (dollars) in the field. Therefore, every effort should be made to attach all sensors and instrumentation on land prior to moving to a dry dock. Not only is installation in the field expensive, but it can also be unsafe and time consuming. Often, time is limited, and installation can only occur during calm conditions.

Awardees will be encouraged to work with national laboratories and the technical assistance team on data processing, quality assurance, quality control, and archiving. Awardees are also encouraged to work with national laboratories on leveraging community technical assistance as it relates to data and community energy

[2] IEA-OES evaluation and guidance framework

planning. See the National Laboratory Technical Assistance section immediately below for further information.

National Laboratory Technical Assistance

Collaboration with the National Renewable Energy Laboratory (NREL), Pacific Northwest National Laboratory (PNNL), and Sandia National Laboratories (Sandia) during the period of performance is encouraged. DOE has allocated initial funding outside of this FOA for NREL, PNNL, and Sandia to support FOA applicants. Accordingly, applicants do not need to budget to pay for this support out of their project budget. However, continued funding for this support is subject to the availability of appropriations and is limited.

Applicants are not permitted to communicate with NREL, PNNL, and Sandia staff about laboratory support on this FOA before FOA awards are made. Instead, applicants should identify the areas in which they would benefit from NREL, PNNL, and/or Sandia support in their applications. The types of support that are available is described below. For awarded projects, the details and scope of the support will be finalized during award negotiations between the applicant, DOE, and the institution(s) providing support.

Questions regarding NREL, PNNL, or Sandia should be submitted to the FOA mailbox (MarineEnergyFOA@ee.doe.gov) or through the EERE Program Information Center (EPIC). It is important to note that the institutions that will provide the requested support may be different from what applicants request depending on capabilities and staff and facility availability. Applicants are strongly encouraged to leverage the capabilities of NREL, PNNL, and/or Sandia in the following areas:

- **Measurement systems, instrumentation, data acquisition, and control systems:** NREL and Sandia can support deployments to ensure the instrumentation, data acquisition, and control systems will operate robustly and accurately during a deployment. This can include support on real-time control, data acquisition systems (e.g., MODAQ), instrumentation, mechanical load measurements (e.g., fiber optic strain, acceleration, pressure) and integration thereof.
- **Data quality assurance/quality control (QA/QC), analysis conforming to IEC technical specifications, and data format standardization for PRIMRE knowledge hubs:** Sandia, PNNL, and NREL can provide data QA/QC and metric analysis using MHKiT and custom code requests for data analysis, including analyses that follow the IEC technical specifications (e.g., -300, -301). PNNL, NREL, and Sandia can also process data to a standardized format using the Marine Energy Data Pipeline for upload to the appropriate PRIMRE knowledge hub.
- **Accredited measurements:** Applicants are encouraged to work with NREL to leverage its International Organization for Standardization (ISO)/IEC 17025

accreditation[3] to perform accredited testing to IEC Technical Committee (TC) 114 standards. Accredited test results can be used for device certification and to demonstrate system viability to project financiers and insurance companies. The ISO/IEC 17025 accreditation confirms that NREL has the quality assurance procedures in place and the expertise to provide high-quality testing more broadly. This is essential for the industry to attract private funding in the future.

- **Environmental monitoring:** PNNL's expertise in environmental monitoring around marine energy converters can be leveraged for technical assistance and monitoring support for measurements and assessment of several device interactions, including underwater noise to the IEC TC 114-40 technical specification, collision risk for marine fauna (including fish, seabirds, and marine mammals), electromagnetic fields, and changes in pelagic and benthic habitats defined in the OES-Environmental 2020 State of the Science Report.[4]
- **Community technical assistance:** Technical assistance can include direct advice on issues or goals, tools and maps, and training. This assistance can offer support for addressing strategic energy planning, policy, financing, data management, and technologies to help implement successful renewable energy projects.
- **In-water testing:** Technical assistance can be used to access lab-owned, in-water testing facilities.

In addition, applicants can request R&D support from NREL, PNNL, and/or Sandia in areas where each institution has expertise, as identified on the institutions' websites:

- NREL: https://www.nrel.gov/water/marine-energy.html, https://openei.org/wiki/PRIMRE/Telesto/National_Labs_Testing_Capabilities, https://www.nrel.gov/state-local-tribal/.
- PNNL: https://www.pnnl.gov/marine-energy, https://www.pnnl.gov/marine-and-coastal-research-laboratory.
- Sandia: https://energy.sandia.gov/programs/renewable-energy/water-power/.

NREL, PNNL, and Sandia support using award funds cannot be leveraged to procure or fabricate the WEC or system components (e.g., moorings and anchors) or to pay for installation, operations, maintenance and decommissioning (IOM&D) activities.

If applicants would like to request technical assistance from a different DOE lab, this request should be specified in their application(s) and may be accommodated during

[3] NREL is accredited by the American Association for Laboratory Accreditation to International Organization for Standardization (ISO) 17025 standards for power performance, power quality, and mechanical loads testing of wave and tidal technologies following International Electrotechnical Commission (IEC) standards for marine energy.

[4] Copping, A.E. and Hemery, L.G., editors. 2020. OES-Environmental 2020 State of the Science Report: Environmental Effects of Marine Renewable Energy Development Around the World. Report for Ocean Energy Systems (OES). DOI: 10.2172/1632878.

award negotiations depending on national laboratory capabilities and staff and facility availability.

Down-Select Process

All projects selected under this FOA will be subject to a down-select at the end of Stage 1. The aim for the down-select is to assess three deliverables per TA to down-select WEC technologies that demonstrate ability to achieve overall performance and ability to deliver reliable power and/or water to the intended end user. A primary objective is to only advance projects to the next stage that can clearly demonstrate the ability of the awardee project team to accomplish their SOPO objectives on budget and on schedule. TA down-select criteria is based on the following deliverables in Stage 1. The listing below is general in nature and will vary slightly by TA. For more information directly applicable to specific TAs, refer to the specific TA descriptions in subsequent sections.

- Techno-economic assessment based on a WEC design basis report.
- Full WEC system cost basis analysis.
- Project stakeholder and regulatory consultation as applicable per TA.

At the end of month 10 in Stage 1, awardees will submit final deliverables to WPTO. WPTO and identified third-party reviewers will use these reports to conduct an analysis and down-select against the criteria listed below. At the beginning of month 11, awardees present to WPTO.

Upon completion of the down-select process, WPTO will select which projects will receive federal funding beyond Stage 1. Projects will be selected on merit across all TAs and based on the intent and quality of projects to advance TA goals and deliver on specific TA scope and requirements. If proposals are not found to be meritorious, DOE reserves the right to not select any projects for funding beyond Stage 1.

Contingency Reserve

A contingency reserve of 10% of total project costs is required, and it is expected that this contingency reserve is demonstrated before the project advances to site commissioning and technology fabrication. The contingency reserve is in addition to total project costs and cannot count toward cost share until expended. If expended, the contingency will not result in reimbursement by DOE above the total federal share approved in the award. DOE discourages recipients from reducing scope to comply with the contingency reserve requirement.

Awardees must demonstrate that they can meet the financial needs of their project when submitting a GNG continuation application for Phase 4. The continuation application must include documentation showing that the recipient has access to this minimum 10% required contingency. Contingency funds must be (a) liquid, (b) immediately available, and (c) unrestricted funds dedicated exclusively to the project for the purpose of mitigating project performance baseline risk.

Topic Area 1: Open Water Testing and System Validation for Distributed Applications

TA1 addresses distributed marine energy, which includes fixed and mobile wave energy harvesting technologies that are not connected to the grid and, when in commercial operation, would not be connected to shore (though a shore connection is allowable during testing). Distributed marine energy technologies are well-suited to powering blue economy applications or end uses at sea, which include but are not limited to scientific and defense ocean observation, aquaculture, marine carbon dioxide removal, seawater mining, and synthetic fuels generation.

i. Key TA1 Objectives

- Accelerate the development of wave energy technologies via structured design and testing methods that focus on rapid iteration and knowledge generation, enabled by the smaller size and lower cost of distributed blue economy applications.
- Mature existing distributed wave energy harvesting technologies, leading to significant increases in performance and reliability.
- Produce data and information at all stages of design and testing that maximize value to the sector, including but not limited to design tool development and validation, lessons learned, standards development, and deployment experience.
- Demonstrate the ability of wave energy to provide reliable power for an identified distributed blue economy application(s) and establish sector credibility that marine energy is a cornerstone for growth.

ii. TA1 Scope

This TA is focused on the design, fabrication, and testing of distributed at-sea application(s). Applicants are expected to have an end use in mind and a plan to identify a customer. The applicant should work with the end-user customer to identify pathways for long-term commercial success.

Requirements that applicants should complete before applying to this funding opportunity include:

- End-use application should be identified, but the end user is not required to have committed to a partnership at time of application.
- Applicant's technology is approximately TRL 4 or higher.
- Modeling and bench/lab testing have occurred.
- Previous ocean testing would be beneficial but is not required.

iii. TA1 Technical Eligibility Information

To be eligible for this TA, the proposed technology should already be well developed with, at a minimum, the working principles demonstrated through computer modeling and scale testing with the following efforts already completed. Please include evidence of the following in the application:

- Design basis.
- Customer/end-use requirements and constraints.
- WEC design specifications.
- High-level system configuration and layout.
- Functional descriptions and primary operating principles.
- Basic dimensions.
- Estimates of device performance and costs.
- Lists of design innovations, challenges, technology barriers, and design assumptions.
- Risk register and mitigation plan.

Additionally, during the award period of performance, the criteria listed below must be addressed. The applicant should include any plans to address the following in the application:

- Have an identified customer and end-use requirements to which they are designing:
    - Applicant will conduct end-user outreach with the goal of finding a potential customer by end of year one.
    - Applicant will conduct community outreach as appropriate.
- Design and fabrication of prototype:
    - Finalize design, requirements, and constraints through an iterative process that is tailored to the needs of an end user.
    - Plans for fabrication and prototype testing.
- Plans for in-water testing and deployments:
    - The project plan must include at least one long-term deployment lasting two months or more that is defined by the

applicant in partnership with their customer and relevant to customer needs.
- If testing is planned at a site that is not pre-permitted, the applicant is expected to obtain all necessary permits and should demonstrate knowledge of necessary permitting requirements and timelines.

iv. TA1 Project Stages—Descriptions and Requirements

Stage 1—Design Phase

Stage 1 Objectives

Stage 1 combines both the preliminary and final design processes with a goal of completing the design and producing documentation, plans, and drawings that enable construction, testing, commissioning, and operation of the proposed WEC prototype. The stage should complete every aspect of the mechanical design, including specification of all welds, bolts, materials, coatings, wires, etc. The manufacturing drawings and parts lists should be sufficient so that an independent entity can carry out the build and assembly. It shall also produce full and detailed electrical schematics that include the power electronics, all sensors, wiring paths, and electrical safety equipment based on complete analysis that involve simulations to understand how the completed electrical system will perform and interact with ocean waves. Electrical systems should be prototyped with software and hardware to verify function and stability at this stage before full fabrication is started. As part of the detailed design, control and operations software should also be prototyped and tested with hardware when feasible. All measurement and data systems should also be prototyped and verified to help ensure that they can be integrated with confidence as a technology is built and to support incremental testing. When there is high novelty and/or uncertainty, every effort should be made to prototype components and subsystems to verify that they perform as intended. Verification testing is a key element of this stage that should provide data and feedback and guide the design to ensure requirements will be satisfied and risks are mitigated as early as possible and prior to fabrication.

Stage 1 Milestones (M) and Deliverables (D)

- D: Final design basis document (follow Appendix G—Design Basis Content List).

- D: Cost basis per the Marine and Hydrokinetic Data Repository cost breakdown structure to level 4.[5]
- D: Bill of materials for the proposed technology.
- D: HS&E and IO&M plans.
- D: End-use specification and functional requirements (see Powering the Blue Economy—Ocean Observing Use Cases Report as an example of defining end-user requirements).
- D: National Environmental Policy Act (NEPA) documentation and permit applications, as applicable, completed and submitted.
- D: Risk register and failure mode, effects, and criticality analysis (FMECA) matrix per NREL Marine Energy Risk Management Framework (revision to be published in late 2024) and/or PNNL Environmental Risk Register.
- M: End user/partner identified, if applicable, with letters of support, if applicable.

End of Stage 1 Down-Select (See Section VI.C. for additional information)

Stage 2—Design Phase

Stage 2 Objectives
The objective of this phase is to fabricate and assemble a working prototype for testing. This is typically an incremental process that starts with building and testing components, then separately assembling the subsystems and verifying their integration, sequentially assembling, and verifying until the system is complete and the operation of every component, subsystem, and system is verified, including all safety functions.

Stage 2 Milestones (M) and Deliverables (D)
- D: Completed test article.
- D: Final in-water test plan with schedules and budget.
- D: Updated risk register and mitigation plan.
- D: Documented build and assembly report.
- D: As-built mechanical and electrical drawings and parts lists.
- D: Updated safety and operations manual.
- D: Cost reports.
- M: NEPA findings and necessary permits.
- M: Verification testing completed.

[5] https://mhkdr.openei.org/files/361/MEC_CBS_2021.xlsx

- M: Confirmed end user (ideally as a subcontractor) has confirmed requirements.
- M: Data from any testing processed and shared.

GNG (See Section VI.B.xiii for additional information)

Stage 3—Installation and Initial Testing Phase

Stage 3 Objectives
The objective of this stage is to commission and incrementally verify the operation of the system prior to long-term unattended deployment. The technology is commissioned when the operation and conformity to test facility, as well as operational and safety requirements are confirmed. This is a sequence of tests that is required to incrementally bring the prototype into operation and, if applicable, connect it to test facility equipment or proposed load. Because wave energy systems are complex and operating in the ocean is challenging, it is recommended that this phase be incremental and include the following steps:

1. Onshore system verification.
2. Dockside splash test to verify integrity and in-water function.
3. Short-term deployment, operation, recovery, inspection, and repair, if needed. This should be an iterative process until confidence is gained in the operation and must be compliant with all permitting/regulatory requirements (e.g., NEPA).

At the end of this stage, safety and operating functions are verified to ensure the prototype is ready for use, essentially making sure the prototype operates as expected and control/safety systems respond appropriately. Developers should leave this phase with a high degree of confidence that their technology will operate as intended while unattended for the remainder of testing.

Stage 3 Milestones (M) and Deliverables (D)
- D: Test reports, including updates to design documents to reflect modifications.
- D: Lessons learned report.
- D: Updated test plan and risk register.
- D: Data and initial performance curves and metrics.
- D: Updated HS&E and IO&M plans/manuals.
- D: Cost reports.

- D: Information about mooring and anchoring, if applicable.
- D: HS&E lessons learned.
- M: IO&M procedures defined, as applicable.

GNG (See Section VI.B.xiii for additional information)

Stage 4—Operations and Maintenance Phase

Stage 4 Objectives

The operations and maintenance (O&M) stage is dedicated to a long deployment (two months or more but would depend on the identified end use) of the full system, as well as a description of the next steps to get to commercialization.

This stage is focused on testing the technology in the ocean for a long duration as defined by the end-user need. Testing must provide traceable data that can be used to validate system operation and to ensure the final product meets requirements and specifications, such as validating performance and design claims. Validation testing is often high fidelity and requires comprehensive test plans, instrumentation with traceable calibrations and uncertainty estimates, QA/QC processes and controls, verified analyses methods and software, and characterized test sites. Specific objectives include:

1. Validate features of the design such as performance, loads, acoustics, etc., referencing (as a best practice) appropriate use of IEC TC 114 standards, as applicable. Accreditation is not required under this TA.
2. Demonstrate technology and integrate the technology with the proposed application.
3. Practice and validate installation, operation, maintenance, and recovery strategies.

Testing duration needed should be calculated based on data collection needs to meet test criteria. For example, based on the number of data points needed to establish power capture performance with associated uncertainty at specific sea states, the project team uses the capture matrix and site-specific joint probability matrix (wave height and wave energy period) to estimate the testing duration needed to have sufficient occurrences of relevant operational data points. A similar approach could be taken based on fatigue cycles or other factors.

Stage 4 Milestones (M) and Deliverables (D)

- D: Lessons learned report.
- D: Updated risk register.
- M: Data uploaded to MHKDR and others as defined in the SOPO.

GNG (See Section VI.B.xiii for additional information)

Stage 5—Commercialization Phase

Finalize market transformation plan and requirements, generate data reports, upload to shared repositories, and focus on outreach and engagement.

Stage 5 Objective(s)

Completing a full and inclusive analysis of the design, build, and testing activities is crucial to verify design objectives, understand costs, and improve engineering of future technology generations. By examining test, cost, and engineering data, awardees should characterize performance benchmarks, reevaluate risks, and evaluate regulatory compliance and environmental impact. This work should include the development of a detailed market transformation plan and/or a detailed plan for the development of the next generation of the technology. These analyses facilitate technology improvement, knowledge retention, and innovation, ultimately enhancing project outcomes and providing a clear understanding of return on investment while the knowledge is still fresh.

Stage 5 Deliverables (D)

- D: Test and cost reports.
- D: Processed data products, performance curves, and metrics.
- D: Market transformation plan.
- D: Technology improvement plan.
- D: Lessons learned report.

Topic Area 2: Open Water Testing and System Validation for Community Applications

This TA aims to develop functional wave energy technologies for end users such as coastal and island communities as well as for blue economy[6] applications. The technology development focus ranges from small-scale, nearshore solutions that are not connected to the grid to early adoption of technologies suited for communities

[6] https://www.energy.gov/eere/water/goals-powering-blue-economy

that deliver critical power and/or water services. This TA emphasizes non-grid-connected projects to focus and deliver cost-effective testing and validation for community-scale WEC technology development.

Applicants will need to lay out a process for design, fabrication, prototype development and testing, validation, and longer-term open water testing. Open water testing is essential to mature technologies, validate performance against analytic models, demonstrate compliance with applicable design standards, and mitigate the technical and financial risk of developing commercial projects. Partnerships or collaborations with communities and blue economy end users to ensure the proposed project aligns with end-user priorities are highly encouraged.

i. Key TA2 Objectives

This FOA will fund projects that accelerate the design, fabrication, and testing of WECs at a range of scales and purposes, as well as work with state, local, Tribal, and project partners to solve engineering, regulatory, and innovation challenges associated with advancing nearshore WEC technologies in the United States. Through this funding, projects will address time and costs associated with applicable permitting and other regulatory requirements, pre- and post-deployment environmental characterization, and the monitoring needed to understand and minimize environmental impacts. Through these activities, awards under this FOA will directly support the WPTO programmatic objective of performing "complete at-sea, pre-commercial demonstrations of newly developed marine energy-powered desalination systems; and refine concept, design, and small-scale prototype testing of new wave energy system concepts," as identified in the Multi-Year Program Plan[7] published in 2022. The following list summarizes key objectives for TA2:

- Develop community-scale, nearshore energy solutions to unlock the value in the blue economy of resilient coastal communities and industries.
- Design and develop a WEC project in the United States that creates a template or replicable guide for other communities across the country and its territories.
- Scale-up from the Waves to Water Prize[8] and Marine Energy Systems Innovation at Sea[9] technologies to community-scale desalination opportunities.
- Develop simple, robust, and cost-effective WEC devices.

[7] https://www.energy.gov/eere/water/multi-year-program-plan
[8] One Year Later, Finalists Reflect On the Waves to Water Prize | Department of Energy
[9] WPTO Releases $10 Million Funding Opportunity to Advance Marine Energy Innovation | Department of Energy

- Accelerate foundational and subsystem R&D.
- Understand the economic constraints of using complex mooring systems for smaller-scale WECs and the associated potential burdens of expensive deployments.
- Develop advanced mooring and connection systems for nearshore WECs.
- Generate meaningful data that feeds into programmatic technical goals and answers key technical questions (e.g., detailed design documents for WEC and subsystems, quantitative reporting on validation of models/simulations through field testing, detailed reports of field-testing observations, etc.).
- Solve community energy systems and/or microgrid integration challenges, requirements, and needs.
- Understand the potential necessity of energy storage and its associated technical challenges.
- Baseline WEC reliability data through extended testing duration (two or more years).
- Accelerate faster design and testing cycles toward reliability and survivability.
- Collecting higher fidelity WEC CAPEX and OPEX costs, utilizing the LCOE work breakdown structure (WBS) and/or cost breakdown structure or defining alternative approaches with supporting justification.
- Improvement and demonstration of WEC PTOs and their control systems.

ii. TA2 Scope

TA2 projects must formulate a process for design, fabrication, prototype development and testing, validation, and longer-term open water testing ranging from 1–100 kW of average annual power production that meets current local, state, and federal regulatory requirements. These community or blue economy[10] end-user projects must incorporate WEC technologies, primarily identified as small power systems, desalination, and coastal structure integrated WECs with a TRL between 4 and 8 in a nearshore environment, 0–100 meters in depth, and in state waters according to the Submerged Lands Act, 43 U.S.C. §1301 et seq.[11]

WPTO prefers applicants to pursue projects that are not grid connected. This is especially relevant to permitting timelines and award budgets, where projects meet the following three conditions: (1) technology is experimental in design, (2) operated for a short period of time (typically less than 18 months), and (3) has no effect on interstate commerce (not connected to the

[10] Powering the Blue Economy | Department of Energy
[11] Submerged Lands Act (SLA) of 1953, 43 U.S.C. § 1301 et seq.

grid). When these three conditions are met, the project may be eligible for a FERC Declaratory Order, known as the "Verdant Exception."[12] The "Verdant Exception" allows for testing under a U.S. Army Corps of Engineers permit (general or nationwide permit, depending on the U.S. Army Corps of Engineers district) and other relevant state and local permits, significantly speeding project delivery to in-water testing and validation.

In addition to a strong community or blue economy end user and technology developer partnership, a WEC test will require resource data collection and site characterization, stakeholder and Tribal outreach and engagement (as appropriate), identification and leverage of local economies, community-informed technology development and fabrication, and WEC device installation. For any application that potentially impacts Tribes, refer to Section IV.B.vi for additional information on application requirements.

iii. TA2 Technical Eligibility Information

To be eligible for this TA, the proposed technology should already be well developed with, at a minimum, the working principles demonstrated through computer modeling and scale testing with the following already completed:

- Project design basis.
- Requirements and constraints identified.
- Design specifications.
- High-level layouts and basic dimensions.
- Functional descriptions and primary operating principles.
- Estimates of device performance and costs.
- Lists of design innovations, challenges, technology barriers, and design assumptions.
- TRL 4 proof of concept: This TRL represents an early-stage, proof-of-concept system or component development, testing, and concept validation. In this stage, critical technology elements are developed and tested in a laboratory environment. It is envisioned that scale models will be at a 1:10 scale or smaller. At this level, basic technological components of a subscale model are integrated to validate design predictions and system-level functionality. The models or critical subsystems are tested in a laboratory environment.

[12] Verdant Power, FERC Decision, 111 FERC ¶ 61,024, clarified at, 112 FERC ¶ 61,143 (2005). Maine Maritime Academy, FERC Declaratory Order, 130 FERC ¶ 62,234 (2010)

iv. TA2 Stage Information

Stage 1—Design Phase

Stage 1 Objectives

Stage 1 combines both the preliminary and final design processes with a goal of completing the design and producing documentation, plans, and drawings that enable construction, testing, commissioning, and operation of the next-generation prototype. The stage should complete every aspect of the mechanical design, including specification of all welds, bolts, materials, coatings, wire types and sizes, wire connectors, etc. The manufacturing drawings and parts lists should be sufficient so that an independent entity can carry out the build and assembly in absence of the design team. It shall also produce full and detailed electrical schematics that include the power electronics, all sensors, wiring paths, and electrical safety equipment based on complete analysis that involve simulations to understand how the completed electrical system will perform and interact. Electrical systems should be prototyped with software and hardware to verify function and stability at this stage before full fabrication is started. As part of the detailed design, control and operations software should also be prototyped and tested with hardware when feasible. All measurement and data systems should also be prototyped and verified to help ensure that they can be integrated with confidence as a technology is built and to support incremental testing. When there is high novelty and/or uncertainty, every effort should be made to prototype components and subsystems to verify that they perform as intended. Verification testing is a key element of this stage that should provide data and feedback and guide the design to ensure requirements will be satisfied and risks are mitigated as early as possible and prior to fabrication.

The following provides a list of additional activities beyond technology development that are critical to Stage 1:

- Desktop data collection and analysis in support of the milestones and deliverables listed below for Stage 1.
- Planning for resource and infrastructure requirements.
- Technology design vetting and selection process with integrated end-user role.
- Consultation with relevant regulatory agencies for a non-grid-connected test.

- Provide proof of consultation with FERC for either a jurisdictional determination or Declaratory Order,[13] also known as the "Verdant Exception."
- Show proof of meeting with FERC's Tribal liaison if the community is a sovereign Tribal Nation and the proposed site is on Tribal land.

Stage 1 Milestones (M) and Deliverables (D)

- D: Design basis report (see Appendix G—Design Basis Content List) including specific details on the following:
    - Detailed WEC design documents to the component level.
    - Power performance estimates with associated modeling and test data.
    - Testing plan to include pre-test inspections prior to deploying device.
    - Risk register and FMECA matrix per NREL Marine Energy Risk Management Framework (revision to be published in late 2024).
    - Design basis that reflects the guidance found in NREL Marine Energy Risk Management Framework (revision to be published in late 2024).
    - HS&E procedures for complete project to include manufacturing, IO&M, testing, and decommissioning.
    - Fabrication and assembly plan, budget, and schedule with QA oversight of device assembly aligned with ISO 9001 or similar.
    - Test plan with schedules and budget.
    - Third-party reports from certification bodies or engineering firms, including, at a minimum, a technology statement of feasibility or equivalent.
    - Revised SOPO and budget for remaining project.
- D: Cost basis report
    - CAPEX for the specific device (and any prototypes) to be tested under this award as defined in WPTO LCOE guidance with cost breakdown structure to level 4 as defined in the Marine Energy Performance Metrics (https://openei.org/wiki/PRIMRE/Telesto/Economics).
        - These cost estimates must be validated by a third party under contract with the developer to provide an independent estimate.
        - Recommend using the NREL System Advisor Model tool in developing LCOE cost breakdown structures.

[13] Verdant Power, FERC Decision, 111 FERC ¶ 61,024, clarified at, 112 FERC ¶ 61,143 (2005). Maine Maritime Academy, FERC Declaratory Order, 130 FERC ¶ 62,234 (2010)

    - OPEX cost estimate, which must be validated by a third party under contract with the developer to provide an independent estimate. OPEX estimates must consider all costs, including insurance with cost breakdown structure to level 3 as defined in the Marine Energy Performance Metrics.
    - Bill of materials with three quotes for WEC structure (hull) and anchoring and mooring subsystem.
- D: Project stakeholder and regulatory consultation report.
    - Accounting for depth of community/stakeholder engagement to inform design, testing, and long-term project development and regulatory consultation requirements as need for the testing site.
- D: Safety and operations manual.
- D: Fabrication and assembly plan, budget, and schedule.
- D: Test plan with schedules and budget.
- D: End-use description and market transformation plan.
- M: End user/partner, if applicable, with letters of support, if applicable.
- M: NEPA documentation and permit applications completed and submitted.
- D: Performance metrics document plus model-based (or other) baseline predictions at a minimum should include:
    - Annual energy production (AEP).
    - Power-to-weight ratio.
    - Peak-to-average power ratio.
    - Annual absorbed energy per characteristic mass.
    - Capacity factor.
    - LCOE and/or levelized avoided cost of energy.
    - Levelized cost of water (as applicable).
    - Water product targets (as applicable).
    - Availability.
    - Reliability metrics (system and component level).
        - Mean time to repair.
        - Mean time to failure.
    - Survivability (system and component level).
    - All prediction will be validated via the open water testing and reported in the final technical report.
- M: Interconnection or simulated connection (as applicable).
- D: IOM&D plan.
- D: Project management plan.
    - In-water testing and validation.
    - Monitoring and reporting.
    - Risk register.
    - Project schedule.

- D: Draft testing, measurement, and data collection plan
  - Marine energy technical data that pertains to proposed test sites and their environmental characteristics.
  - Data sharing.
- D: Draft test site characterization plan, which identifies publicly available data and data gaps for the following topics in the proposed project area:
  - Geology.
  - Water velocity.
  - Geomorphology.
  - Shipping routes.
  - Commercial vessel activity.
  - Critical habitat areas.
  - Rare, threatened, and endangered species.
  - Commercial fisheries.
  - Subsistence fishing.
  - Resource instrumentation.
  - Wave resource and joint probability distribution.
  - Extreme sea states.
  - Tidal and current measurements as necessary.

End of Stage 1 Down-Select (See Section VI.C. for additional information)

Stage 2—Fabrication and Detailed Site Characterization Phase

Stage 2 Objectives

The objective of this stage is to fabricate and assemble a working prototype for testing. This is typically an incremental process that starts with building and testing components, then assembling the subsystems and verifying their operation. Then, subsystems should be methodically integrated and verified until the system is complete and the operation of every component, subsystem, and system is verified, including all safety functions. Additionally, all required permits, site characterization, and other critical activities feeding into the deployment and testing phase should be completed by the end of the stage.

The following provides a list of additional activities beyond technology development that are critical to Stage 2:

- Full characterization of the WEC site and physical data collection.
- Site permitting and environmental monitoring data collection.
- Complete NEPA review.
- Fabricate a working prototype for testing after building and testing components.

Stage 2 Milestones (M) and Deliverables (D)

- M: Completed test article/prototype.
- D: NEPA findings and necessary permits.
- D: Final open-ocean test plan with schedules and budget.
- D: Updated risk register and mitigation plan.
- D: Documented build and assembly report.
- D: As-built mechanical and electrical drawings and parts lists.
- M: Verification testing reports.
- D: Cost reports.
- D: Updated safety and operations manual.
- M: Confirmed end user (ideally as a subcontractor) to confirm requirements.
- D: Data from any testing completed.
- D: Updated project and risk management plans.
- D: Updated testing, measurement, and data collection plan with updated marine energy technical data that pertains to proposed test sites and their environmental characteristics and how data will be shared.
- D: Final site characterization plan with desktop and in-water collected data.

GNG (See Section VI.B.xiii for additional information)

Stage 3—Installation and Initial Testing Phase

Stage 3 Objectives

The installation and initial testing phase involves transporting the WEC to the deployment site, completing pre-deployment checks, installing anchoring moorings, connecting the WEC to anchoring and moorings subsystem in its intended location, and performing a series of tests to ensure the WEC is functioning correctly.

To enable the objectives discussed above, the following list summarizes key activities to occur in Stage 3:

- Transportation to deployment site.
- Infrastructure siting and preparation, including laying cable, if applicable, and technology integration planning.
- Component and full system testing and validation.
- Preliminary dockside/nearshore testing.
- Commission and verify system operation.
- Completion of all necessary permits.
- Finalize IO&M plans.

- Development of safety protocols.
- Conduct full system WEC pre-deployment checks.

Stage 3 Milestones (M) and Deliverables (D)

- D: Marine operations plan with information about the following topics:
    - Introduction.
    - Abbreviations and definitions.
    - Roles and responsibilities.
    - Operational risk management.
    - Training, competency, manning, and relevant certifications (for staff).
    - Operational communications and meetings.
    - Operational best practices.
    - Collision risk management.
    - Logistics and cargo handling.
    - Anchor handling.
    - Project support operations.
    - Emergencies.
    - Change order management.
- D: Draft IOM&D standard operating procedures (SOPs), which should be completed for the site-specific requirements and include roles and responsibilities for implementation.
- D: Updated testing, measurement, and data collection plan with updated marine energy technical data that pertains to proposed test sites and their environmental characteristics.
- D: Test reports.
- D: Details about mooring and anchoring.
- D: Deployment plan.
    - Updated risk registers.

GNG (See Section VI.B.xiii for additional information)

Stage 4—Testing, Maintenance, and Power Generation

Stage 4 Objectives

The stage is focused on testing the technology in the ocean for a long duration, as defined by the end-user need, or to establish reliable technologies for communities. Testing must provide traceable data that can be used to validate system operation and to ensure the final product meets requirements and specifications, such as validating performance and design claims. Validation testing is often high fidelity that requires comprehensive test plans, instrumentation with traceable calibrations and uncertainty estimates, QA/QC processes and controls, verified analyses methods and software, and characterized test sites.

To enable the objectives discussed above, the following list summarizes key activities to occur in Stage 4:

- Validate features of the design such as performance, loads, acoustics, etc., referencing (as a best practice) appropriate IEC TC 114 standards as applicable. Accreditation is not required under this TA.
- Demonstrate technology and integrate the technology with the proposed application.
- Practice and validate installation, operation, maintenance, and recovery strategies with clear strategies toward resolving operational challenges and minimizing costs.
- Updates to IO&M procedures.
- Initial testing and commissioning.
- Practice and validate installation, operation, maintenance, and recovery strategies.

Testing duration needed should be calculated based on data collection needs to meet test criteria. For example, based on the number of data points needed to establish power capture performance with associated uncertainty at specific sea states, the project team uses the capture matrix and site-specific joint probability matrix (wave height and wave energy period) to estimate the testing duration needed to have sufficient occurrences of relevant operational data points. A similar approach could be taken based on fatigue cycles or other factors.

Stage 4 Milestones (M) and Deliverables (D)

- D: Lessons learned report.
- D: Updated risk register.
- D: Final IOM&D SOPs, which should be completed for the site-specific requirements and include roles and responsibilities for implementation.
- D: Updated testing, measurement, and data collection plan with marine energy technical data gathered to include formats, resolution, and accessibility that enables easy access and consumption by potential end users.
- M: Test data uploaded into MHKDR.

Stage 5—Power Performance and Decommissioning

Stage 5 Objectives

Decommissioning should be accounted for in the budgeting in BP4. If the developer would like to extend the period of in-water testing through the permit allowance, that is allowable and a no-cost time extension can be executed, but the budget needs to be accounted for in BP4 planning.

This stage also involves finalizing the market transformation plan and requirements, generating data reports, uploading to shared repositories, and focusing on outreach and engagement.

Completing a full and inclusive analysis of the design, build, and testing activities is crucial to verify design objectives, understanding costs, and improving engineering of future technology generations. By examining test, cost, and engineering data, awardees should characterize performance benchmarks, reevaluate risks, and evaluate regulatory compliance and environmental impact. This work should include the development of a detailed market transformation plan and/or a detailed plan for the development of the next generation of the technology. These analyses facilitate technology improvement, knowledge retention, and innovation, ultimately enhancing project outcomes and providing a clear understanding of return on investment while the knowledge is still fresh.

To enable the objectives discussed above, the following list summarizes key activities to occur in Stage 5:

- Power performance testing and environmental monitoring completed.
- Characterize performance benchmark.
- Development of a detailed market transformation plan and/or a detailed plan for the development of the next generation of the technology.
- Decommissioning activities commenced and completed in a safe and environmentally responsible way.

Stage 5 Milestones (M) and Deliverables (D)

- D: Final technical report to include:
    - Final testing, measurement, and data collection plan with marine energy technical data gathered to include formats, resolution, and accessibility that enables easy access and consumption by potential end users.
    - Final project synthesis workshop and written summary.
        - Host a project synthesis workshop aligned with the decommissioning phase of the in-water testing and validation to include the project team, technology developer, national laboratory staff that supported the project, and DOE technology managers.

- Develop a written report summarizing lessons learned and follow-on activities.
  - Data uploaded into MHKDR.
  - Market transformation plan.
  - Technology improvement plan.
  - Test and cost reports.
  - Processed data products, performance curves, and metrics.

Topic Area 3: Open Water Testing and System Validation for Utility Applications

This TA is designed to support the maturing of wave energy technologies designed to connect to the grid and demonstrate reliable power generation. The TA focuses on open water testing for power, survivability, and reliability. The developer can utilize PacWave as an open water test site or propose alternative grid-connected sites such as WETS in Hawaii.

i. TA3 Key Objectives

- Baselining WEC survivability and reliability data through extended testing durations.
- Baselining high fidelity CAPEX and OPEX cost data utilizing the LCOE cost breakdown structure using the NREL System Advisor Model tool.
- Increasing WPTO confidence in cost estimates prior to authorizing fabrication via third-party verification of estimates.
- Demonstrating the ability to grid connect and test single and/or multiple prototypes in parallel and improving grid integration requirements at PacWave or an alternative cable-ready, pre-permitted site.
- Applying foundational R&D to improve full system, subsystem, and component performance demonstrating reliable operations for a minimum two-year period of open water testing.
- Implementing best practices in safety protocols for marine energy open water testing, maintenance, and inspections.

ii. TA3 Test Site Requirements

TA3 projects are dependent on testing at the PacWave South test site or at an alternative grid-connected site. The following requirements should be included in applicants' proposals.

Unique requirements for the PacWave South test site include:[14]

- Developers must include PacWave berthing fees and any other fees required by PacWave in the budget documentation provided with the

[14] South Test Site – PacWave (pacwaveenergy.org)

proposal and follow-on submissions to WPTO. The amount of the fees will be dependent on project-specific information and should be obtained directly from PacWave.

- Developers must submit proposals that are aligned with the PacWave pre-permitted devices as described in PacWave's guidance to developers.[15]
- Developers must include in their budget PacWave requirements for insurance and bonding, as well as any other fees charged by PacWave for utilization of their berths or any other unique services that PacWave will provide the developer beyond their baseline services.
- Developers must include in their budget estimates required accredited testing per IEC 62600-3 (mechanical loads), 62600-30 (electrical power quality), and 62600-100 (WEC power performance).
- Developers must include costs for anchor procurement, installation, and removal in their budget estimates.
- Developers must meet all PacWave contractual requirements prior to site access.
- Developers must meet all requirements to obtain approval at PacWave and Central Lincoln Public Utility (CLPUD) for grid connection prior to the Stage 2 GNG.
- Developers must provide necessary information to complete PacWave/NREL CLPUD grid interconnection study when requested by PacWave.
- Proposals must reflect alignment with PacWave contractual requirements and SOPs, including PacWave requirements for third-party verifications/approvals.
- Developers must obtain PacWave and WPTO concurrence with developer's IO&M procedures prior to commencing WEC testing.

High-level requirements for testing at alternative (non-PacWave) test sites:

- Developers testing at a location other than PacWave must obtain all necessary permits and FERC license, as required, for grid-connected testing.
- Developers must demonstrate that they have formal approval from test site or utility, as applicable, for grid connection as part of materials presented at Stage 2 GNG after fabrication is complete.

[15] https://pacwaveenergy.org/for-clients/

- Prior to commencing WEC testing, developers must have all documentation that insurance, bonding, and contractual requirements have been met as required.
- Developers must obtain WPTO concurrence with IO&M procedures prior to commencing WEC testing.

iii. TA3 Scope and Stage Information

This TA scope includes five development stages. It is expected that applicants will describe tasks/subtasks and milestones associated with these phases, provide documented evidence for past progression, and clearly describe targeted progression within each phase.

The following section represents the period of performance over the first-year stage, describing progression from one stage to the next and the expected objectives, deliverables, and milestones in each stage.

Stage 1—Design Phase

Stage 1 Objectives

- Developers must contract with a third party to complete a technology qualification plan per IEC TC 114 TS 62600-4 or similar technical qualification during BP1 design stage and obtain a statement of feasibility or equivalent from a certification body to include in the design basis report.
- Completion of power performance baseline estimates with associated modeling, analysis, and test data for initial validation of AEP estimate.
- Development of detailed design and engineering specifications ensuring the WEC design has been finalized and reviewed for manufacturability and compliance with regulatory and industry standards. The developer must contract with an engineering firm with expertise in manufacturing to evaluate the feasibility and cost effectiveness of the developer's fabrication plans. This engineering firm shall also provide an independent cost estimate of total system CAPEX to include support systems (e.g., anchoring/mooring systems, umbilical cables).
- Development of procurement schedule including identification of long-lead items in budget and schedule.
- Development of high-fidelity cost estimates for the full system WEC, including electrical connectors and cables, moorings and anchoring, installation, operations, maintenance, recovery, and

decommissioning costs. The cost estimates should be based on weight estimates for the complete WEC device, as well as structure and anchoring subsystems included in the design basis report.

Stage 1 Milestones (M) and Deliverables (D)

- D: Design basis report (see Appendix G—Design Basis Content List), including specific details on the following:
    - Detailed WEC design documents to the component level.
    - Mass properties report.
    - Power performance estimates with associated modeling and test data.
    - Testing, measurement, and data collection plan to include pre-test inspections prior to deploying device.
    - Developers to include all technical verification and validation plans using, as applicable, the IEC System for Certification to Standards Relating to Equipment for Use in Renewable Energy Applications conformity assessment testing and certification to the relevant IEC TC 114 marine energy standards.
    - Risk register and FMECA matrix per NREL Marine Energy Risk Management Framework (revision to be published in late 2024).
    - Design basis that reflects the guidance found in NREL Marine Energy Risk Management Framework (revision to be published in late 2024).
    - HS&E procedures for complete project to include manufacturing, IO&M, testing, and decommissioning.
    - Fabrication and assembly plan, budget, and schedule with QA oversight of device assembly aligned with ISO 9001 or similar.
    - Test plan with schedules and budget.
    - Third-party reports from certification bodies or engineering firms including, at a minimum, statement of feasibility or equivalent.
    - Revised SOPO and budget for remaining project.
    - Metrics, as determined by the developer, that include as a minimum:
        - Rated power.
        - LCOE.
        - AEP for the scale of the device to be tested under this award.
        - Structural weight including breakdown by unballasted weight, ballasted weight, PTO weight, and anchoring and mooring weight.
        - Power-to-weight ratio.
        - Peak-to-average power ratio.

        - Note: the actual values of these metrics are also required in the final technical report based on accredited test data and final invoices.
- D: Systems engineering management plan, including but not limited to:
    - Cost basis report.
        - CAPEX for the specific device to be tested under this award as defined in WPTO LCOE guidance with cost breakdown structure to level 3 as defined in the Marine Energy Performance Metrics (https://openei.org/wiki/PRIMRE/Telesto/Economics).
            - These cost estimates must be validated by a third party under contract with the developer to provide an independent estimate.
        - OPEX cost estimate, which must be validated by a third party under contract with the developer to provide an independent estimate. OPEX estimates must consider all costs, including insurance with cost breakdown structure to level 3 as defined in the Marine Energy Performance Metrics.
    - Bill of materials with three quotes for WEC structure (hull) and anchoring and mooring subsystem.
    - Initial spare parts procurement plan.
    - Procurement schedule, including identification of long-lead items in budget and schedule. Procurement of long-lead items during BP1 requires specific WPTO approval at the line-item level.
- D: Project stakeholder and regulatory consultation report that thoroughly addresses stakeholder and regulatory consultation requirements, as needed, for deployments at PacWave and/or other grid-connected test sites.

End of Stage 1 Down-Select (See Section VI.C. for additional information)

Stage 2—Fabrication Phase

The fabrication stage for wave energy technologies involves the detailed process of manufacturing and assembling the WEC components and subsystems, as necessary, to build out the full system ready for deployment. This phase is crucial to ensure that devices are constructed to withstand the harsh marine environment and function efficiently.

Stage 2 Objectives

- Final design review (FDR) of the WEC to review all open issues identified during the Stage 1 down-select review is required prior to commencing fabrication. It is anticipated that developers will provide a document to WPTO that summarizes the resolution of all issues identified during the down-select near the start of Stage 2 and schedule this review at approximately month 2 of Stage 2.

- Procurement of materials and components to include material and component sourcing. Refine spare parts procurement plan with associated bills of materials.
- Implementation of manufacturing plan with QA oversight of component fabrication and device assembly aligned with ISO 9001 or similar.
- Preliminary statement of technology qualification or similar shall be provided at the end of Stage 2.
- Final assembly complete and device ready for tow/transport at the end of Stage 2.
- Review and acceptance of IO&M and HS&E procedures.

Stage 2 Milestones (M) and Deliverables (D)

- D: Final design and engineering specifications report.
- D: Detailed mass properties report.
- D: Updated testing, measurement, and data collection plan.
- D: All QA and test reports uploaded into MHKDR.
- D: Updated FMECA matrix and technical, environmental, and project risk registers.
- D: Testing plan (including accredited testing plans) complete.
- D: IO&M procedures to include transportation, loading/offloading of WEC at laydown area to the site, and installation at the test site.
- D: HS&E protocols to include any protocols associated with:
  - Boarding WEC while deployed.
  - Entering WEC while deployed.
  - Diving operation in vicinity of WEC.
  - Operations on deployed WEC during hours of darkness.
- D: Reports from certification bodies, including verification that preliminary statement of technology qualification or similar is complete.
- D: Documentation of approval of anchoring/mooring designs per PacWave requirements for third-party verifications if testing at PacWave.
- D: Documentation that all insurance and bonding requirements are met and fully funded.
- D: Documentation that all PacWave/WETS/other test site contractual requirements are complete, as applicable.
- D: HS&E lessons learned report.
- M: FDR completed.

- M: Cost control review of project budget.
- M: PacWave/WETS/WPTO concurrence with developer's IO&M detailed procedures, as applicable.
- M: Completion of any permits required, including permits for dockside/nearshore testing, as required.
- M: Completion of formal approval for grid interconnection from PacWave/CLPUD/Hawaiian Electric (HECO)/others, as applicable.
- M: Completed WEC assembly.

GNG (See Section VI.B.xiii for additional information)

Stage 3—Installation and Initial Testing

The installation and initial testing stage involves transporting the WEC to the deployment site, completing pre-deployment checks, installing anchoring moorings, connecting the WEC to anchoring and moorings subsystem in its intended location, and performing a series of tests to ensure the WEC is functioning correctly at the test site. Survivability testing then begins. The developer can begin grid-connected operations during this stage if they have met all prerequisites and have sufficient budget.

Stage 3 Objectives

The objective of this stage is to commission the in-water testing deployment, including installation and initial testing, to incrementally verify the operation of the system, correct operation of all safety systems when feasible, and begin long-term operation. The objectives and activities within this stage include:

- Final test readiness review (FTRR) to review all open issues identified during the Stage 2 GNG review is required prior to commencing WEC installation at the test site. It is anticipated that developers will provide a document to WPTO that summarizes the resolution of all issues identified during GNG near the start of the stage and schedule this review during approximately month 2 of the new stage.
- Developers must obtain approval of mooring and anchoring system design, including if deployments are scheduled at PacWave, per PacWave requirements for third-party verifications.
- Efficient transportation of WEC and associated equipment to deployment site.
- Preliminary testing to include pre-test inspections and dockside/nearshore testing prior to deploying the device at the test

site in accordance with approved test plans and any applicable permits.
- Conduct full system WEC pre-deployment checks (e.g., buoyancy testing).
- If deploying at PacWave, address any remaining PacWave requirements for third-party verification.
- Present testing, measurement, and data collection plan to collect WEC positioning and survivability test data, including how this data will be shared with test center personnel.

Stage 3 Milestones (M) and Deliverables (D)
- D: IO&M lessons learned report.
- D: Updated IO&M plans based on lessons learned, as appropriate; the WEC installation plans should be detailed, include input from professional offshore marine service provider, and reflect risk and FMECA analyses.
- D: HS&E lessons learned report.
- D: Updated HS&E plans based on lessons learned, as appropriate.
- D: Updated statement of technology qualification plan or similar by certification body or similar.
- D: Final testing, measurement, and data collection plan.
- D: Updated risk registers and FMECA matrix.
- D: Test reports, as applicable.
- M: FTRR complete.
- M: Pre-installation checks completed.
- M: Mooring and anchoring installed.
- M: WEC positioning, including mooring watch circle and anchor footprint determination, and test of any survivability subsystems.
- M: Grid connection, if part of approved project schedule.

GNG (See Section VI.B.xiii for additional information)

Stage 4—Connections, Testing, and O&M

This phase involves the electrical and mechanical connections between the WEC connector to the umbilical and the umbilical connection to the electrical cable. Installations at PacWave will have a clear connection/disconnection set of procedures to follow. This phase also includes the initial testing and commissioning of the WEC, performance testing, and troubleshooting and optimization during O&M.

Stage 4 Objectives

- Safe implementation of electrical and mechanical connections.
- Demonstration of updated FMECA and risk registers.
- IO&M procedures and associated lessons learned.
- Implementation of accredited testing per IEC 62600-3 (mechanical loads), 62600-30 (electrical power quality), and 62600-100 (WEC power performance) will be completed in parallel and shall be completed in stage 4 or 5 depending on the specific project and NREL schedules.
- Initial testing and commissioning to the grid through safety inspections and functional testing.
- Calibration and adjustment O&M interventions—sensors, other components checked to ensure accurate measurements and optimal performance of the WEC.

Stage 4 Milestones (M) and Deliverables (D)

- D: Submission of final decommissioning plan.
- D: Updated IO&M procedures and updated IO&M lessons learned report.
- D: Updated HS&E procedures and updated HS&E lessons learned.
- D: Updated statement of technology qualification plan by certification body or similar.
- D: Updated risk register and FMECA matrix.
- D: Test reports, as applicable, submitted to MHKDR.
- M: Completion of safety inspections.
- M: Completion of functional testing of mechanical systems, electrical systems, and control systems.
- M: Complete connection of WEC to export cable per PacWave procedures if not completed in previous stage.

GNG (See Section VI.B.xiii for additional information)

Stage 5—Power Performance and Decommissioning

For grid-connected devices, this phase is essential to evaluate the efficiency, reliability, and overall effectiveness of WECs in generating electricity. This phase involves preparing for testing, implementing the IEC TS 62600-100 WEC power performance assessment technical specification, and completing baseline data collection and measurements during the long-term power performance campaign and power output measurement and analysis, including developing the energy capture efficiency and power curve/matrix in a final performance report.

This phase also includes decommissioning the WEC device. Decommissioning involves the safe and environmentally responsible removal of WECs and associated infrastructure at the end of the period of performance. Subsea remotely operated vehicle (ROV) inspection is required after decommissioning at PacWave and must be included in the developer's budget. Other test sites may have similar requirements.

Stage 5 Objectives

- Completion of all required testing to include accredited testing; accredited testing per IEC 62600-3 (mechanical loads), 62600-30 (electrical power quality), and 62600-100 (WEC power performance) will be completed in parallel and shall be completed in stage 4 or 5 depending on the specific project and NREL schedules.
- Completion of all required decommissioning activities.
- Completion of market transformation plan.

Stage 5 Milestones (M) and Deliverables (D)

- D: Final technical report shall include at a minimum:
    - Results and conclusions from any foundational R&D included in the project to advance the broader marine energy industry.
    - Statement of feasibility from certification body complete and/or similar prototype certification.
    - Accredited test reports.
    - Final CAPEX and OPEX (final output from NREL System Advisor Model tool) based on actual expenditures as defined in WPTO LCOE guidance with cost breakdown structure to level 3.
    - Final metrics determinations to include AEP, power-to-weight ratio, and peak-to-average power.
    - Finalization of market transformation plan.
    - Final FMECA and risk registers.
    - All final reports required by test site (e.g., final ROV surveys).
    - Final IO&M procedures.
    - Developer's plan for how they propose to utilize or dispose of device after award.
    - Lessons learned regarding testing, measurements, and data collection campaign.
    - Lessons learned regarding FMECA and risk registers development and implementation.

- Lessons learned regarding IO&M procedures development and implementation.
- Lessons learned regarding all aspects of safety (personnel and environmental), considering all project phases (design, manufacturing, IO&M, testing).
- Lessons learned regarding implementation of IEC and other technical standards; these lessons learned should identify the specific paragraph/clause and any recommended changes to the technical standards.
- Lessons learned from design, manufacturing, procurement and testing that would be beneficial for the broader marine energy industry and that WPTO should consider in future funding opportunities.
- Lessons learned regarding implementation of SOPs that could be incorporated into future revisions.

- M: Test data (e.g., power and loads) uploaded into MHKDR.

All work for projects funded 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.C. and 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).

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[16] for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and

[16] 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.

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 must recognize and work 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.[17]

As part of this whole of government approach, this FOA seeks to encourage the participation of underserved communities[18] and underrepresented groups. Applicants are highly encouraged to include individuals from groups historically underrepresented[19,20] 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

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[17] Executive Order 13985, "Advancing Racial Equity and Support for Underserved Communities Through the Federal Government" (Jan. 20, 2021).

[18] 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.

[19] 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://ncses.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

[20] 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.

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 be located in or benefit underserved communities. See Section IV.D.ix. The plan should include at least one SMART (Specific, Measurable, Achievable, Relevant, and Timely) 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[21], businesses majority owned or controlled by underrepresented persons or groups of underrepresented persons, 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.).

E. Authorizing Statutes

The programmatic authorizing statute is Section 635 of the Energy Independence and Security Act of 2007, Public Law 110-140. Codified at 42 U.S.C 17214. Marine energy, research, development, and demonstration.

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

II. Award Information

A. Award Overview

i. Estimated Funding

EERE expects to make a total of approximately $112.5 million of federal funding available for new awards under this FOA, subject to the availability of appropriated funds. EERE anticipates making up to approximately 17 awards

[21] 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.

under this FOA. EERE may issue one, multiple, or no awards. Individual awards may vary between $2.410 million and $25.313 million.

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

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)
1	Open Water Testing and System Validation for Distributed Applications	Up to 7	$2.410M	$3.375M	$16.875M	60
2	Open Water Testing and System Validation for Community Applications	Up to 6	$7.5M	$15M	$45M	60
3	Open Water Testing and System Validation for Utility Applications	Up to 4	$12.656M	$25.313M	$50.625M	60

EERE may establish more than one budget period for each award and fund only the initial BP(s). Funding for all BPs, including the initial BP, is not guaranteed. Before the expiration of the initial BP(s), EERE may perform a down-select among different recipients and provide additional funding only to a subset of recipients.

In this funding opportunity, WPTO intends to use future year appropriations, subject to availability of funds. The table below shows potential future year appropriations across the TAs.

Fiscal Year	Topic Area 1	Topic Area 2	Topic Area 3
FY 2024	$1.875M	$5.00M	$5.625M
FY 2025	$3.750M	$10.0M	$11.25M
FY 2026	$3.750M	$10.0M	$11.25M
FY 2027	$3.750M	$10.0M	$11.25M
FY 2028	$3.750M	$10.0M	$11.25M
Total	**$16.875M**	**$45.0M**	**$50.625M**

ii. Period of Performance

EERE anticipates making awards that will run from one year up to five years, comprised of one or more BPs. Project continuation will be contingent upon several elements, including satisfactory performance and GNG decision. For a complete list, see Section VI.B.xiv.

The period of performance will include five BPs for cost control performance (BP1–BP5), which are aligned with five stage gates (SG1) for technical and operational performance. Toward the end of BP1/SG1, projects will be down-selected from an anticipated 17 projects to up to 10 projects. BP2–BP5/SG2–SG5 will incorporate GNGs as described in each TA description. The below table is an example for illustration:

BUDGET PERIOD 1, YEAR 1											
1	2	3	4	5	6	7	8	9	10	11	12
									DOWN-SELECT / STAGE GATE 1		
BUDGET PERIOD 2, YEAR 2											
13	14	15	16	17	18	19	20	21	22	23	24
									GO/NO-GO / STAGE GATE 2		
BUDGET PERIOD 3, YEAR 3											
25	26	27	28	29	30	31	32	33	34	35	36
									GO/NO-GO / STAGE GATE 3		
BUDGET PERIOD 4, YEAR 4											
37	38	39	40	41	42	43	44	45	46	47	48
									GO/NO-GO / STAGE GATE 4		
BUDGET PERIOD 5, YEAR 5											
49	50	51	52	53	54	55	56	57	58	59	60
									End of Performance		

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 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 agreements. See Section VI.B.ix of the FOA for more information on what substantial involvement may involve.

ii. Funding Agreements with Federally Funded Research and Development Center (FFRDCs)[22]

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.

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.

A. Eligible Applicants

i. Domestic Entities

For-profit entities and nonprofit entities that are organized, chartered, or incorporated (or otherwise formed) under the laws of the United States or a

[22] 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/.

particular state or territory of the United States and have a physical location for business operations in the United States are eligible to apply for funding as a prime recipient or subrecipient.

Institutions of higher education are eligible to participate as a subrecipient of this FOA but are not eligible to apply as a prime recipient.

State and local governmental entities and Indian Tribes are eligible to apply for funding as a prime recipient or subrecipient.

DOE/NNSA FFRDCs are eligible to apply for funding as described below: DOE/NNSA FFRDCs/National Laboratories (except NREL, Sandia, and PNNL) may apply as prime recipients or subrecipients.

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.

ii. Foreign Entities

A foreign entity is eligible to apply for funding as a prime recipient if it designates in the Full Application a subsidiary or affiliate incorporated (or otherwise formed) under the laws of a state or territory of the United States to be the prime recipient. The Full Application must state the nature of the corporate relationship between the foreign entity and domestic subsidiary or affiliate.

Foreign entities may request a waiver of the requirement to designate a subsidiary in the United States as the prime recipient in the Full Application (i.e., a foreign entity may request that it be the prime recipient). To do so, the applicant must submit an explicit written waiver request in the Full Application.

Appendix B lists the information that must be included in a request to waive this requirement. The applicant does not have the right to appeal DOE'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.

The cost share must be at least 10% of the total project costs[23] for R&D projects.[24] The cost share must come from non-federal sources unless otherwise allowed by law.

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 entire 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 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

[23] Total project costs is the sum of the government share, including FFRDC costs if applicable, and the recipient share of project costs.
[24] Energy Policy Act of 2005, Pub. L. 109-58, sec. 988. Also see 2 CFR 200.306 and 2 CFR 910.130 for additional cost sharing requirements.

financing. DOE Loan Guarantees 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 prime recipient and subrecipients may not use 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.

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 Grants Officer and incorporated into the project budget before the expenditures are incurred.

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 Grants Officer may approve a request by the prime recipient to meet its 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 Grants 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 Grants 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 Program Information Center https://epicweb.ee.doe.gov/EPICWeb; and
- Be submitted by the deadline stated in the FOA.

EERE will not review or consider submissions submitted through means other than the EERE Program Information Center, 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 the EERE Program Information Center, 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.

E. Other Eligibility Requirements

i. Requirements for DOE/NNSA FFRDCs Listed as the Applicant

A DOE/NNSA FFRDC (except NREL, PNNL, and Sandia as discussed in Section III.A.i) is eligible to apply for funding under this FOA if its cognizant Contracting Officer provides written authorization and this authorization is submitted with the application.

The following wording is acceptable for the 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.

If a DOE/NNSA FFRDC is selected for award negotiation, the proposed work will be authorized under the DOE work authorization process and performed under the laboratory's Management and Operating (M&O) contract.

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

DOE/NNSA FFRDCs (except NREL, PNNL, and Sandia) as discussed in Section III.A.i) 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 Work Authorization process in accordance with DOE O 412.2A. 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 Grants Officer for the DOE financial assistance award, all FFRDCs are required to enter into a Cooperative

Research and Development Agreement[25] (CRADA) or, if the role of the DOE/NNSA FFRDC is limited to technical assistance and IP is not anticipated to be generated from the DOE/NNSA FFRDC's work, a Technical Assistance Agreement (TAA), with at least the prime recipient.

The CRADA is used to ensure accountability for project work and provide the appropriate management of IP, e.g., data protection and background IP. A Data Management Plan is not suited for this purpose. If IP will not be generated from the DOE/NNSA FFRDC's work, a TAA is sufficient. The CRADA or TAA must be approved by the cognizant DOE/NNSA or other sponsoring agency Contracting Officer for the FFRDC or be compliant with a Master Scope of Work process prior to the FFRDC starting work directly allocable to the FA award. Any questions regarding the use of a CRADA or TAA should be directed to the cognizant DOE IP counsel.

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 and may submit more than one Concept Paper and Full Application to each TA, 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

EERE 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.

[25] 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

IV. Application and Submission Information

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 Program Information Center 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 the EERE Program Information Center

The EERE Program Information Center 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 Program Information Center helpdesk for assistance (eere-epichelpdesk@ee.doe.gov).

B. Application Forms

The application forms and instructions are available at EERE Funding Application and Management Forms and on the EERE Program Information Center. To access these materials on the EERE Program Information Center, go to https://epicweb.ee.doe.gov/EPICWeb and select the appropriate funding opportunity number.

Note: The maximum file size that can be uploaded to the EERE Program Information Center 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

DOE 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, scientifically distinct concept or technology and TA. The concept paper must conform to the requirements listed below, including the stated page limits.

Section	Page Limit	Description
Cover Page	1 page maximum	The cover page should include the project title, the specific announcement TA being addressed with a short (4–6 sentences) justification of why that TA is selected, both the technical and business points of contact (including the administrative officer, if applicable), names of all team member organizations, the project location(s), and any statements regarding confidentiality.

Open Water Testing and System Validation Description	3 pages maximum	Applicants are required to succinctly describe: • The proposed WEC technology and how it addresses the selected TA requirements and objectives, including its basic operating principles and how it is unique and innovative specific to the TA end-user requirements. • The proposed WEC technology's target level of performance for the proposed TA and how the technology will progress through the multi-year program. (Applicants should provide technical data or other support to show how the proposed target could be met.) • The current state of the art of the proposed WEC technology and its application in the TA, including key shortcomings, limitations, and challenges. • How the proposed WEC technology will overcome the shortcomings, limitations, and challenges in the proposed TA. • The potential impact that the proposed project would have in the TA. • How the proposed location of the proposed project will support WEC technology development and long-term success. • The key technical risks/issues associated with the proposed WEC technology development plan. • The impact that EERE funding would have on the proposed project. • Estimated target costs for full wave energy system, including WEC fabrication, anchoring/mooring system procurement, and installation (including TA3 grid connection costs when applicable). Cost estimates should specifically reference estimate for structural weight as this is the most significant CAPEX cost. • Device power rating and estimate for AEP for the planned test location. • Description of proposed technology and site, including how proposed technology defines and meets end-user requirements (e.g., offshore application, community, or grid requirements).
Addendum	2 pages maximum	Applicants are required to succinctly describe the qualifications, experience, and capabilities of the proposed project team, including: • Whether the principal investigator (PI) and project team have the skill and expertise needed to successfully execute the project plan. • Whether the applicant has prior experience that demonstrates an ability to perform tasks of similar risk and complexity. • Whether the applicant has worked together with its teaming partners on prior projects or programs and a description of the key results of those efforts. • 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. • Applicants may provide maps of the proposed site, graphs, charts, or other data to supplement their technology description.

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 Program Information Center website at https://epicweb.ee.doe.gov/EPICWeb, which is listed under New Opportunities under the Title: Notice of Intent to Issue Funding Opportunity (NOI).

Applicants will have approximately 30 calendar days from receipt of the Concept Paper Encourage/Discourage notification on the EERE Program Information Center 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 and TA. 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_424
Technical Volume	PDF	25	ControlNumber_LeadOrganization_TechnicalVolume
Resumes	PDF	3 pages each	ControlNumber_LeadOrganization_Resumes
Letters of Commitment	PDF	1 page each	ControlNumber_LeadOrganization_LOCs
Impacted Indian Tribes Documentation	PDF	n/a	ControlNumber_LeadOrganization_ImpactedTribes

Statement of Project Objectives	MS Word	10	ControlNumber_LeadOrganization_SOPO
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
Budget for DOE/NNSA FFRDC (if applicable)	PDF	n/a	ControlNumber_LeadOrganization_WP
Authorization for Non-DOE/NNSA or DOE/NNSA FFRDCs (if applicable)	PDF	n/a	ControlNumber_LeadOrganization_FFRDCAuth
SF-LLL Disclosure of Lobbying Activities	PDF	n/a	ControlNumber_LeadOrganization_SF-LLL
Foreign Entity Waiver Requests and Foreign Work Waiver Requests	PDF	n/a	ControlNumber_LeadOrganization_Waiver
Current and Pending Support	PDF	n/a	ControlNumber_LeadOrganization_CPS
Transparency of Foreign Connections	PDF	n/a	ControlNumber_LeadOrganization_TFC
Potentially Duplicative Funding Notice	PDF	n/a	ControlNumber_LeadOrganization_PDFN
Community Partnership Documentation (Optional)	PDF	n/a	ControlNumber_LeadOrganization_PartnerDoc
Testing, Measurement, and Data Collection Plan	PDF	5	ControlNumber_LeadOrganization_TMDCP

Note: The maximum file size that can be uploaded to the EERE Program Information Center 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 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 (Block 17) and dollar amounts (Block 18) 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_424".

iii. Technical Volume

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 25 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.

Technical Volume Content Requirements

SECTION/PAGE LIMIT	DESCRIPTION
Cover Page	• Project title, TA indication. • Both Technical and business points of contact. • Project team organizational chart. • Table that shows all project partners and key stakeholders (PI, Senior/Key Personnel and their organizations by name), including location indications of all project participants and RACI matrix, if available. • Graphic of WEC technology design. • Statements regarding confidentiality. • Identify proposed testing site.

Project Overview (Approximately 10% of the technical volume)	The project overview should contain the following information: • Background: The applicant should discuss the background of its organization, including the history, successes, and current R&D status (i.e., the technical baseline) relevant to the technical TA being addressed in the full application. • Project Goal: The applicant should explicitly identify the targeted improvements to the baseline technology as it relates to the TA project goals listed in Section B and clearly describe the WEC development pathway and the critical success factors in achieving that goal. • DOE Impact: The applicant should discuss the impact of the proposed project as it relates to the TA project goals listed in Section B and overall FOA objectives. • Applicants should identify their intended end user and any coordination/collaboration/partnership with the intended end user/end-user community/utility application. • If applicable, applicants are required to document any efforts taken to identify any potential impacts to Indian Tribes, Indian lands, Alaska Native regional and village land, traditional homelands, Tribal rights, or Tribal historic sites, or sacred sites. This includes any correspondence with Indian Tribes.
Technical Description, Innovation, and Impact (Approximately 40% of the technical volume)	The technical description should contain the following information: • Relevance and Outcomes: The applicant should provide a detailed description of the technology, including the scientific and other principles and objectives that will be pursued during the project, including a description of previous work done, in-water demonstrations, and prior results. 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 within the stage-gated process as described in Section B. The applicant should clearly specify the expected outcomes of the project. • Feasibility: The applicant should demonstrate the technical and cost feasibility of the proposed technology development, technology fabrication, and deployments with description of WEC design basis, IO&M plan, HS&E plan, and test plans. Describe the WEC technology's capability of achieving the anticipated performance targets within the stage-gated process as described in Section B. Applicant should outline the technical risks and mitigation strategies, including risks and mitigation actions associated with obtaining any necessary permits.

	• Data and Metrics: The applicant should provide a detailed discussion of the key metrics the applicant intends to use during the project to measure device performance and performance improvements as described in Section B. Further, the applicant should specify the methods used to collect the data needed to support/calculate the metrics (e.g., discussion of current and voltage measurements in support of calculating AEP for LCOE metric). • Innovation and Impacts: How the WEC is validated and capable of performing its intended functions in accordance with its performance requirements. Describe how the overall technical baseline is improved if the project is successful. • Impact to Broader Marine Energy Industry: The applicant should describe how it will collect and disseminate data and lessons learned, enabling learning for other researchers, supply chain partners, and other strategic interests, and to solve strategic challenges of the industry. • TA3: The applicant should describe the WEC technology design optimizations to date and how this FOA impacts WEC technology qualification and prototype certification.
Workplan and Market Transformation Plan (Approximately 40% of the technical volume)	The workplan should include a summary of the project objectives, technical scope, WBS, milestones, down-select, GNG decision points, and project schedule. A detailed SOPO is separately requested. Follow the stage-gated process as described in Section B for the proposed TA. The workplan should contain the following information: • Project Objectives: The applicant should provide a clear and concise (high-level) statement of the goals and objectives of the technology for the proposed TA as well as the expected outcomes. • Technical Scope Summary: 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 five performance periods that are separated by discrete, approximately annual decision points (see below for more information on down-select and GNG decision points). The applicant should describe the specific expected end result of each performance period. (See TA scope descriptions and objectives in Section B.) • WBS and Task Description Summary: The workplan should describe clearly and concisely the work to be accomplished within each stage and technology development phase and how the applicant will achieve the milestones, accomplish the final project goal(s), and produce all deliverables. (See TA stage-gate requirements, milestones, and deliverables in Section B.) The summary provided should be consistent with the SOPO. The SOPO will contain a more detailed description of the WBS and tasks.

	• Milestone Summary: 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, achievable, relevant, and timely (SMART) technical milestone. SMART milestones 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.
	• Down-Select Stage Gate: Applicant should include the down-select period at a minimum of three months prior to the end of BP1.
	• GNG Stage-Gate Decision Points (See Section VI.B.xiii. for more information on the GNG review): The applicant should provide a summary of GNG decision points at the end of stage gates 2–4 as described in the workplan. See Section VI.B.xiv. The applicant should include the specific technical criteria to be evaluated in the project at the GNG decision point. The summary provided should be consistent with the SOPO. GNG decision points are considered "SMART" and can fulfill the requirement for an annual SMART milestone.
	• End of Project Goal: The applicant should provide a summary of the end of project goal(s). (See TA description of expected end goals Section I.B.) At a minimum, each project must have one SMART end-of-project goal per budget period. The summary provided should be consistent with the SOPO.
	• Project Schedule (e.g., Gantt chart or similar): The applicant should provide a schedule for the entire project, including task and subtask durations, milestones, and GNG decision points.
	• Build America, Buy America Requirements (BABA) for Infrastructure Projects: 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 Appendix D for applicable definitions and other information to inform this statement.
	• Project Management: The applicant should discuss the team's proposed management plan that includes the following:
	    o The overall approach to and organization for managing the work.
	    o The roles of each project team member.
	    o Any critical handoffs/interdependencies among project team members.

	◦ The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices. ◦ The approach to project risk management, including identification of project technical/financial/other risks and discussion of proposed mitigation strategies. ◦ A description of how project changes will be handled. ◦ If applicable, the approach to QA/QC. ◦ How communications will be maintained among project team members. • Market Transformation Plan: The applicant should provide a market transformation plan that includes the following: ◦ Technology company vision, mission, and its contribution to national and international deployment targets. ◦ Technology company commercialization team, consultants, advisors, and investors. ◦ Identification of target market opportunity and size, end-user requirements, competitors, proposed technology differentiation, and distribution channels, along with known or perceived barriers to market penetration including a mitigation plan. ◦ Identification of a product development and/or service plan including targeted equipment sales, maintenance services, pre-construction and installation services, a commercialization timeline, financing and revenue model, product marketing, legal/regulatory considerations including IP, infrastructure requirements, data dissemination, and product distribution. ◦ If applicable, any agreements (informal or formal) with the identified end user and/or end-user community, and/or community partner. ◦ Plans or strategy to attract follow-on funding from non-federal sources. ◦ Contingency Reserve: A contingency reserve is required for 10%. Awardees must demonstrate that they can meet the financial needs of their project when submitting a continuation application.
Technical Qualifications and Resources (Approximately 10% of the technical volume)	The technical qualifications and resources should contain the following information: • A description of the project team's unique qualifications and expertise, including those of key subrecipients and/or end users. • 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. • Relevant, previous work efforts, demonstrated innovations, and how these enable the applicant to achieve the project objectives. • The time commitment of the key team members to support the project identified in letters of commitment. • A description of the technical services to be provided by DOE/NNSA FFRDCs, if applicable. • The skills, certifications, or other credentials of the construction and ongoing operations workforce. • For multi-organizational projects, describe succinctly: o The roles and the work to be performed by the site lead project manager and senior/key personnel at the prime and sub levels. o Business agreements between the applicant and sub. o How the various efforts will be integrated and managed. o Process for making decisions on technical direction. o Publication arrangements. o IP issues. o Communication plans.

iv. Resumes

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 PI 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 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 over the past 5 years;
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
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. 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

Submit letters of commitment, support, and intent from all entities substantially contributing to the proposed project, all subrecipients, and all third-party cost share providers. An entity is considered substantial if its involvement is critical for project success. For TA1 and TA2, end users are not required to be committed partners at the time of application.

If contributing cost share, the letter must state that the 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 1 page.

If not contributing cost share, the letter must state that the organization is committed to perform the work as outlined in the application.

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 are not accepted.

Topic Area 3 Specific Requirements
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. Impacted Indian Tribes Documentation

For any application that potentially impacts Indian Tribes or is on Tribal land[26], including when the potentially impacted Indian Tribe is the applicant, applicants are required to submit additional documentation at the time of application, and possibly during negotiation and prior to award. For any project that potentially impacts Indian Tribes, applicants are required to submit documentation demonstrating that an authorized representative[27] of each potentially impacted Indian Tribe is, at a minimum, aware of the nature of the application and its potential impacts to the relevant Indian Tribes. The notified authorized representative must be holding their position while the award is open for applications, and documentation must demonstrate affirmative awareness of

[26] Tribal land is as defined in 25 U.S.C. §§ 3501(2), (3), (4)(A) and (13)

[27] An authorized representative must be an elected official or designated leader according to the traditions, constitution, or charter of the Indian Tribe, or someone with relevant delegated authority within the Tribal government. Examples include: Chief, Chairman, Chairwoman, Governor, Nation Representative, President, Chief Executive Officer, Chief Financial Officer, Speaker of the Council, Speaker of the Congress, Tribal administrator

the application (e.g., a delivery record from certified mail, a reply by the authorized representative).

For any project intended to be sited on Tribal land(s) or intersecting with Tribal subsurface rights, applicants are required to submit documentation demonstrating support from the relevant Indian Tribes at the time of application.

Documentation of support submitted at the time of application will be considered to also demonstrate awareness of an Indian Tribe (specified above). Documentation may include either:

- A letter of support from Tribal leadership. The letter must be signed by an authorized representative of the Indian Tribe. The signer(s) must be holding their position while the award is open for applications or negotiations.
- A Tribal Council Resolution, Board resolution (including the Board of Directors of an Alaska Native Corporation (ANC)), or similar act passed by the legislative body of the Tribal government or Board of Directors of an ANC, expressing support for the project.

Applicants are encouraged to reference or include any applicable community benefits agreements in the Tribal support documentation, and to integrate any Tribal support documentation in the community benefits plan as appropriate. For projects not intended to be sited on Tribal land(s) or intersecting with Tribal subsurface rights, but that may have other potential impacts on Tribal resources or reserved rights, letters of support or resolutions of support are strongly encouraged and, depending on the nature of the impact, may be required if selected for negotiation of an agreement. Applicants are encouraged to reach out to Indian Tribes as early as possible in the application process to give Indian Tribes ample time to evaluate and respond.

The following resources may be useful to help determine if a project may impact an Indian Tribe(s) resources or reserved rights and the appropriate contacts. These resources are not exhaustive, and many Indian Tribes have resources or reserved rights which extend beyond their Tribal lands, or are covered within treaties, statutes, or case-law. Applicants are encouraged to do additional research:

- Map of Indian Lands: Indian Lands (geoplatform.gov)
- Tribal Treaties Database: Home (okstate.edu)
- Directory of federally recognized Tribes and Tribal leaders: Tribal Leaders Directory | Indian Affairs (bia.gov)
- Best Practices for Identifying and Protecting Tribal Treaty Rights, Reserved Rights, and other similar rights in federal regulatory actions: Best Practices Guide (bia.gov)

To help determine if an Indian Tribe's resources or reserved rights may be impacted by the project, applicants must address the following elements. If the applicant is an Indian Tribe, these elements should be addressed to ascertain impacts to Indian Tribes other than the applicant. Applicants do not need to reveal specific details about sacred sites such as specific location or specific ceremonies:

- Identify any specific resources which will be quantified and/or modeled (e.g., wave spectra) on or near Tribal land, traditional homelands, Tribal historic sites, sacred sites, or in areas where an Indian Tribe maintains rights to [specific resources]. Identify which Indian Tribe(s) may be impacted? Explain any instances of uncertainty or confidentiality."
- Identify any Tribal resources or reserved rights (e.g., water, fishing, or other treaty rights) which could be impacted by the proposed project. Identify any Tribal historic sites, sacred sites, or Tribally relevant vistas, which could be impacted by the project. Identify the potentially impacted Indian Tribe(s) and explain any sources of uncertainty or confidentiality.
- Identify any [other] proposed actions which may impact an Indian Tribe(s) resources or reserved rights. Tribal resources and reserved rights include, and are not limited to, an Indian Reservation or Land (as defined in 25 U.S.C. § 3501) [or intersecting Tribal sub-surface rights], historic homelands from which they were removed, cultural sites, sacred sites, water rights, mineral and other subsurface rights, fishing rights, and hunting rights. Identify the Tribe(s) potentially impacted and any sources of uncertainty or confidentiality.
- Explain any actions taken by the applicant to mitigate or address any potential impacts identified above, including engaging with the potentially impacted Indian Tribe(s), in the application.

Applicants are required to document any efforts taken to identify any potential impacts to Indian Tribes, Indian lands, Alaska Native regional and village land, traditional homelands, Tribal rights, or Tribal historic sites, or sacred sites. This includes any correspondence with Indian Tribes. These documents should be available on request to DOE. An applicant's failure to submit documentation of an Indian Tribe's awareness, or a letter of support, when required as described above, may constitute grounds for determining an application ineligible, non-responsive to the FOA/OT solicitation, not subject to further review and/or not otherwise subject to selection or award.

Any application that may potentially impact Indian Tribe(s) may be shared with the potentially impacted Indian Tribe(s). Applicants should include a Notice of Restriction on Disclosure and Use of Data identifying any business sensitive, trade secrets, proprietary, or otherwise confidential information. Such information shall be used or disclosed only for evaluation of the application or to determine whether the proposed project affects an Indian Tribe(s). If an applicant determines an Indian Tribe(s) will be impacted, the applicant must provide information on the project location, potential impacts and how the applicant will engage with Indian Tribe(s), during the period of performance of the agreement, and, if necessary, after the end of the agreement. Approval by DOE must be obtained before any activities take place that could impact Tribal resources or reserved rights, including but not limited to lands, cultural sites, sacred sites, water rights, mineral rights, fishing rights, and hunting rights. DOE will determine if formal government-to-government consultation is needed, and DOE will conduct that consultation accordingly, in addition to any engagement by applicant.

Save the Impacted Indian Tribes Documentation in a single PDF using the following convention for the title “ControlNumber_LeadOrganization_ ImpactedTribes”.

vii. Statement of Project Objectives (SOPO)

Applicants must complete a SOPO. A SOPO template is available on [EERE Funding Application and Management Forms and](https://www.energy.gov/eere/funding/eere-funding-application-and-management-forms) on the EERE Program Information Center at https://epicweb.ee.doe.gov/EPICWeb. 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”.

viii. Diversity, Equity, and Inclusion Plan

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 R&D 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 businesses majority owned or controlled by underrepresented persons or groups of underrepresented persons, Woman Owned Businesses and Veteran Owned Businesses to solicit as vendors and subcontractors 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". Guidance for Project Teams on Diversity, Equity, Inclusion, and Accessibility Plans can be found here: Guidance for Project Teams on Diversity, Equity, Inclusion, and Accessibility Plans_8.2.22.pdf (energy.gov)

ix. Budget Justification Workbook

Applicants must complete the Budget Justification Workbook, which is available on EERE Funding Application and Management Forms and on the EERE Program Information Center at https://epicweb.ee.doe.gov/EPICWeb. 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 proposals 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".

x. Summary for Public Release

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 project director/PI(s), the project title, the objectives of the project, project locations(s), a description of the project, including methods to be employed, the potential impact of the project (e.g., benefits, outcomes), and major participants (for collaborative projects). 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".

xi. Summary Slide

Applicants must provide a single slide summarizing the proposed project. The Summary Slide template is available on the EERE Program Information Center at https://epicweb.ee.doe.gov/EPICWeb and must include the following information:

- A technology summary.
- Project location (location of work) including if sited on Tribal land(s) or intersecting with Tribal subsurface rights.
- A description of the technology's impact for relevant TA.
- Proposed project goals.
- Any other technology key performance graphics (illustrations, charts and/or tables).
- Topline community benefits (if applicable).
- Project title, prime recipient, PI, and senior/key personnel information.
- 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".

xii. 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 Workbook" section above.

Save each subrecipient budget justification in a Microsoft Excel file using the following convention for the title: "ControlNumber_LeadOrganization_Subrecipient_Budget_Justification".

xiii. 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.](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".

xiv. 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".

xv. SF-LLL: Disclosure of Lobbying Activities

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" (grants.gov/forms/forms-repository/sf-424-

individual-family) 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(s) in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_SF-LLL".

xvi. 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 C 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. Appendix C 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".

xvii. Current and Pending Support

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 PI 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 proposals, 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.

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 https://www.nsf.gov/bfa/dias/policy/researchprotection/commonform_cps.pdf. Regardless of the format used, the individual must include a signature, date, and a certification statement using the language included in the paragraph above.

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 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 IP 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.[28]

xviii. Transparency of Foreign Connections

Applicants must provide the following information as it relates to the proposed recipient and subrecipient(s). 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 physical address;
2. The identity of all owners, PIs, 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, including the People's Republic of China;
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;
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, directly or indirectly, by an entity in a foreign country of risk;

[28] 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.

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 IP sales to a foreign country of risk, during the 5-year period preceding submission of the proposal;
9. Any of the following foreign equipment proposed for use on the project:
    a. Unmanned aircraft, control, and communication components originally made or manufactured in a foreign country of risk (including relabeled or rebranded equipment).
    b. Coded equipment where the source code is written in a foreign country of risk.
    c. Equipment from a foreign country of risk that will be connected to the internet or other remote communication system.
    d. Any companies from a foreign country of risk that will have physical or remote access to any part of the equipment used on the project after delivery.
10. Any foreign business entity, offshore entity, or entity outside the United States related to the proposed recipient or subrecipient;
11. 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;
12. 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%;
13. 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
14. 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

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

xx. Community Partnership Documentation (Optional)

Applicants may submit documentation to demonstrate existing or planned partnerships with community entities, such as organizations that work with local invested users most vulnerable to or affected by the project, organizations that carry out workforce development programs, labor unions, Tribal organizations, and community-based organizations that work with disadvantaged communities. The partnership documentation could be in the form of a letter on the partner's letterhead outlining the planned partnership signed by an officer of the entity, a memorandum of understanding, or other similar agreement. Such letters must state the specific nature of the partnership and must not be general letters of support. If the applicant intends to enter into workforce and community agreements, please include letters from proposed partners, as appropriate. Each letter must not exceed one page. In total, the partnership documentation must not exceed 10 pages. Save the partnership documentation in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_PartnerDoc".

xxi. Testing, Measurement, and Data Collection Plan

Applicants must submit a testing, measurement, and data collection plan. The plan must not exceed five pages when printed using standard 8.5" x 11" paper with 1" margins (top, bottom, left, and right) with font not smaller than 11-point (except in figures or tables, which may be 10-point font). The plan should include:

- A discussion of all necessary/planned measurements to quantify device loads, device performance, and validate design methods and/or numerical models.
- A description of the measurements to be taken during the project (e.g., types of measurements, such as voltage current and force, discussion of sensor locations, purpose/objectives of testing and measurements).
- A discussion and schematic illustrating the flow of data and quality control processes from measuring instrument to data publication.
- Mapping data collected to specific test objectives.
- How these measurements will be used to further the technology development and measure interim progress.
- A discussion of the relevant platforms (e.g., MHKDR) on which the data will be made available to EERE and/or the public and how/when such dissemination will occur.

A template testing, measurement, and data collection plan is available on the EERE Program Information Center for applicants to use for their application if desired. Applicants must save the plan as a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_TMDCP".

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 the EERE Program Information Center. The expected submission deadline is on the cover page of the FOA; however, it is the applicant's responsibility to monitor the EERE Program Information Center 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 the EERE Program**

Information Center 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 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.xx. Participants and Collaborating Organizations);
- Current and Pending Support (See Sections IV.E.xx. and VI.B.xxi. Current and Pending Support);
- An IP Management Plan (if applicable) describing how the project team/consortia members will handle IP rights and issues between themselves while ensuring compliance with federal IP laws, regulations, and policies;
- 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.xxii;
- 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.

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

Each applicant 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 at all times during which it has an active federal award or an application or plan under consideration by a federal awarding agency (unless the applicant is an individual or federal awarding agency that is excepted from those requirements under 2 CFR 25.110). 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 the EERE Program Information Center 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.

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 DOE Grants 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 Grants 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 Grants 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 Grants Officer overrides the requirement to obtain the written authorization from the Grants 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 Grants Officer in advance of EERE completing a NEPA 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 EERE 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 Grants 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 Grants Officer assigned to the award.

vi. Equipment and Supplies

To the greatest extent practicable, all equipment and products purchased with funds made available under this FOA should be American-made. This requirement does not apply to used or leased equipment.

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) and in accordance with 2 CFR Part 184,, no funds for federal financial assistance which is subject to BABA requirements may be used for a project unless:

- All iron and steel used in the infrastructure work are produced in the United States;
- All manufactured products used in the project 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 D 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.

BABA requirements apply to DOE prime recipients that are "non-Federal entities." In accordance with OMB Memorandum M-24-02 and 2 CFR 200.1, the term "non-Federal entity" includes states, local governments, territories, Indian Tribes, Institutes of Higher Education or non-profit organizations. DOE does not apply BABA requirements to for-profit entities. A Program Policy Factor that the Selection Official may consider in determining which Full Applications to select for award negotiations that by for-profit entities may be applied pursuant to Section V.C.i., Program Policy Factors. The relevant Program Policy Factor considers the degree to which the proposed project will employ procurement of U.S. iron, steel, manufactured products, and construction materials in its project.

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.

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 and 2 CFR Part 184 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" (grants.gov/forms/forms-repository/sf-424-individual-family) 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 Part 200 as adopted and supplemented by 2 CFR Part 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 Part 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. This risk review is conducted separately from the technical merit 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;
- 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 IP 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 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, Equal Employment Opportunity:

(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[29] 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.

[29] 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

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, organizations, or government regarding the potential collaboration or negotiating the terms of any potential agreement.

b. Existing collaborations with foreign entities and governments. The recipient will be required to provide DOE with a written list of all existing foreign collaborations in which it 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 awardee 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 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:

- The applicant clearly describes the proposed technology, the state of the art of the technology, how the proposed technology is unique and innovative, and how the technology will advance in the proposed TA.
- The applicant has identified risks and challenges of the technology and regulatory and financial aspects of the proposal including possible mitigation strategies, has shown the impact that EERE funding and the proposed project would have in the relevant TA and application, and identified an end user (if applicable).
- The applicant has the qualifications, experience, capabilities, and other resources necessary to complete the proposed project.
- The proposed work, if successfully accomplished, would clearly meet the overall objectives as stated in the FOA, including TA objectives.

ii. Full Applications

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

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 open water testing is innovative and replicable.
- Degree to which the current state of the technology and the proposed advancement to in-water demonstration are clearly described.
- Degree to which the project will generate and deliver readily available high quality data sets, lessons learned, and best practices for industry.
- Extent to which the application specifically and convincingly demonstrates how the applicant will advance the state of the art.
- 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 end-user requirements are understood and incorporated into final design, testing, data collection, and reporting.
- 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.
- Extent to which the project demonstrates a good approach to the project HS&E risks.

- Extent to which project has the potential to provide clean energy acceleration benefits for an end user group, community and/or region; and
- Sufficiency of existing infrastructure to support proposed project.

Impact of Technology Advancement

- Ability of the project to advance industry adoption and/or benefit end users;
- Extent to which the project supports the topic area objectives and target specifications and metrics.
- Extent to which the project demonstrates cost efficiency and WEC performance improvements.
- Extent to which demonstration advances the commercial readiness of the technology and informs future demonstrations and/or R&D needs.
- Extent to which the project improves stakeholder relationships with new or existing invested users, gaining technical buy-in and increasing the 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 GNG decisions prior to further funds disbursement, interim milestones, and metrics to track progress.
- 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:

Project Approach, Workplan, and SOPO

- Degree to which the project approach and critical path have been clearly and concisely described.
- 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.
- Completeness of cost data and mitigation strategies for cost controls.
- Completeness of project schedule and identification of risks against the schedule.

Baseline, Metrics, and Deliverables

- Level of clarity in the definition of the baseline, metrics, and milestones.
- 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

- Identification of target market, competitors, and distribution channels for the proposed technology, along with known or perceived barriers to market penetration including mitigation plan.
- Comprehensiveness of market transformation plan including but not limited to product development and/or service plan, commercialization timeline, financing and revenue model, product marketing, legal/regulatory considerations including IP, infrastructure requirements, and product distribution.
- Identification of the interest and extent of industry adoption of the technology.
- Extent to which project has buy-in from needed invested users to ensure success.

Criterion 3: Team and Resources (15%)

This criterion involves consideration of the following factors:

- Capability of the PI(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.
- Extent of team's (including key personnel's) experience and success in industry and/or in similar projects.
- 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;

- Level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the workplan.

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.
- Extent to which the project benefits underserved communities.

iii. Criteria for Replies to Reviewer Comments

EERE 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 October 1, 2020, which is available at:https://energy.gov/management/downloads/merit-review-guide-financial-assistance-and-unsolicited-proposals-current.

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 is likely to lead to increased high-quality employment and manufacturing in the United States;

- The degree to which the proposed project will accelerate transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty;
- The degree to which the proposed project, or group of projects, represent a desired geographic distribution (considering past awards and current applications); and
- The degree to which the proposed project incorporates applicant or team members from Minority Serving Institutions, partnerships with businesses majority owned or controlled by underrepresented persons or groups of underrepresented persons, 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 avoids duplication/overlap with other publicly or privately funded work;
- The degree to which the proposed project supports complementary efforts or projects, which, when taken together, will best achieve the research goals and objectives;
- The degree to which the proposed project has broad public support from the communities most directly impacted by the project;
- The degree to which the proposed project enables new and expanding market segments; and
- The degree to which the project promotes increased coordination with nongovernmental entities for demonstration of technologies and research applications to facilitate technology transfer.

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.

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.

EERE may obtain additional information through pre-selection interviews that will be used to make a final selection determination. EERE may select applications for funding and make awards without pre-selection interviews.

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.

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 (see 41 U.S.C. § 2313).

The applicant, at its option, may review information in the entity information domain in 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.

DOE will consider any written comments by the applicant, in addition to the other information in the entity information domain in 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

i. Ineligible Submissions

Ineligible Concept Papers and Full Applications will not be further reviewed or considered for award. The Grants Officer will send a notification letter by email to the technical and administrative points of contact designated by the applicant in the EERE Program Information Center. 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 the EERE Program Information Center. 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 the EERE Program Information Center. 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

DOE may stagger its selection determinations. As a result, some applicants may receive their notification letter in advance of other Applicants. 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 Grants Officer 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 the EERE Program

Information Center 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. As an alternate, 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 one-time actions applicants must take before applying to this FOA. Some of these 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 Program Information Center (EPIC)**
   Register and create an account on the EERE Program Information Center at https://epicweb.ee.doe.gov/EPICWeb. This account will allow the user to apply to any open EERE FOAs in the EERE Program Information Center.

   To access the EERE Program Information Center, potential applicants must have a Login.gov account. As part of the EERE Program Information Center 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 EERE Program Information Center account.

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, a Business Point of Contact and a Technical Point of Contact. **This step is required to apply to this FOA.** The EERE Program Information Center 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). Please update your SAM registration annually.

3. **FedConnect**
   Register in FedConnect (https://www.fedconnect.net).

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 Letters of Intent, 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 the EERE Program Information Center and FedConnect, constitutes the authorized representative's approval and electronic signature.

ii. Award Administrative Requirements

The administrative requirements for DOE grants and cooperative agreements are contained in 2 CFR Part 200 as adopted and supplemented by 2 CFR Part 910.

iii. Foreign National Participation

All applicants selected for award negotiations and recipients of an award under this FOA as well as 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 without U.S. citizenship or nationality (may include a stateless person). 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.

While NEPA compliance is a federal agency responsibility and the ultimate decisions remain with the federal agency, all applicants selected for an award negotiations and recipients of 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 documents must be prepared to complete the NEPA review process, the recipient may be required to prepare the documents and the costs to prepare the necessary documents may be included as part of the project costs. DOE will independently evaluate the environmental document and will take responsibility for the contents, including ensuring the professional integrity of the discussion and analysis, as required by NEPA.

vii. 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

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 contactors 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:

''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.''

(1) The limitation above shall not contravene requirements applicable to Standard Form 312 Classified Information Nondisclosure Agreement (https://fas.org/sgp/othergov/intel/sf4414.pdf), Form 4414 Sensitive Compartmented Information Disclosure Agreement (https://fas.org/sgp/othergov/intel/sf4414.pdf), or any other form issued by a federal department or agency governing the nondisclosure of classified information.

(2) 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 United States 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 United States 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.

viii. 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.

ix. 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 Down-Select and/or GNG decision point(s).

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

5. EERE may request cost control reviews during the project period of performance.

x. Subject Invention Utilization Reporting

To ensure that prime recipients, subrecipients, and contractors 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 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.

xi. Intellectual Property Provisions

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

xii. Reporting

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

xiii. Go/No-Go Review

Each project 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, EERE 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) EERE's Go/No-Go decision; (7) the recipient's submission of a continuation application;[30] and (8) written approval of the continuation application by the Grants 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, EERE may

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[30] 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.

take appropriate action, including but not limited to, redirecting, suspending, or terminating the award.

xiv. 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 United States 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.

xv. 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 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 Grants 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 Grants 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 Grants Officer may direct.

xvi. 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 Grants 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. In addition, pursuant to the FY23 Consolidated Appropriations Act (Pub. L. No. 117-328), Division D, Title III, Section 309, at the end of the award period the Secretary or a designee of the Secretary, at their discretion, may vest unconditional title or other property interests acquired under this project regardless of the fair market value of the property.

xvii. 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.

xviii. 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 proposed 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.

xix. 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.D.xviii.

xx. 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/recipient and any subrecipient and contractor 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 applicant/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 any invention or discovery which is or may be patentable. The recipient includes any awardee, recipient, subawardee, or subrecipient.

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.

xxi. Interim Conflict of Interest Policy for Financial Assistance

The DOE interim Conflict of Interest Policy for Financial Assistance (COI Policy)[31] 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 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

[31] 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.

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.

xxii. Data Management Plan

Each applicant selected for award negotiations will be required to select a Data Management Plan (DMP) option 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. Depending on factors such as whether protected data is desired by the recipient, the DMP option must provide a plan for making all research data displayed in publications resulting from the proposed work digitally accessible at the time of publications.

xxiii. 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.

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/recipients 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.

xxiv. 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).

C. Program Down-Select

In addition to the GNG reviews required for each project, EERE intends to conduct a competitive project review (down-selection process) upon the completion of BP1. Recipients will present their projects to EERE individually (not to other recipients). Subject-matter experts from academia, national laboratories, and industry may be used as reviewers, subject to conflict of interest and non-disclosure considerations. Projects will be evaluated based on the following criteria:

The aim for the down-select is to assess three deliverables per TA to down-select WEC technologies that demonstrate the ability to achieve overall performance and to deliver reliable power and/or water to the intended end user. A primary objective is to only advance projects to the next stage that can clearly demonstrate the ability of the awardee project team to accomplish their SOPO objectives on budget and on schedule. TA down-select criteria is based on the following deliverables in BP1:

- Techno-economic assessment based on a WEC design basis report.
- Full WEC system cost basis analysis.
- Project stakeholder and regulatory consultation as applicable per TA.

The listing above is general in nature and will vary slightly by TA. For more information directly applicable to specific TAs, refer to the specific TA descriptions in subsequent sections.

Down-Select Criteria Applicable to All Topic Areas:

- Cost control. Demonstrated ability to control/forecast project costs, level of certainty around project costs.
    - Examples: Costs estimates for parts (bill of materials), fabrication, assemble, deployment, operation, and recovery.
- Sufficiency of project technical and administrative detail in the down-select application to assess all project risks and risk mitigations, clearly understand the costs, evaluate the social and environmental impacts, and ultimately be confident in site developer business model and organization to deliver a WEC demonstration.
- Discussion and demonstrated understanding of the project risks (e.g., technical, financial, commercial) and the quality of the mitigation strategies to address them.
- Predicted/estimated performance metrics from models for power matrix, capture width, and capture width ratio.
    - These performance metrics can be modeled and/or tank tested.
    - The metrics must be aligned with end-use requirements; more energy is not necessarily always better if it comes at too high a cost, so end-user input is critical.
- Demonstrated understanding of permitting requirements for technology deployment and demonstration of adequate plans in place to meet permitting requirements (as applicable for applicants not deploying at a pre-permitted facility).

Down-Select Criteria Specific to Topic Areas:

- TA1 specific
    - End-user engagement and requirements defined, ideal to have committed end user as partner but not required at time of application; include letters of support/commitment from any informal and formal partners/collaborations.
    - Fit to mission and demonstrated understanding of end-user requirements and evidence device can meet those requirements.
    - Extent to which the recipient demonstrates a thorough analysis of avoided/reduced costs (compared to a defined baseline) and/or capabilities enabled by the proposed technology.

- TA2 specific
    - Extent to which a community and/or blue economy end user has been engaged and degree to which design and functional requirements have been determined. Potentially have a formal partner established (evidenced by letters of support).

- Degree to which project advances TA goals to advance and develop technologies fit for purpose for community-scale applications and the nearshore environment.
- Extent to which project advances energy system and/or water system integration challenges, such as microgrid integration and energy storage requirements.
- Extent to which project effectively shares technical and cost data, including raw datasets, curation of data, and data suited for test evaluation. Project must ensure programmatic learning to maximize the impact of the FOA and should ideally demonstrate performance target or provide critical lessons and perspectives for future testing R&D.

- TA3 specific
  - Demonstrate metrics against a well-defined baseline including, at a minimum:
    - Rated power.
    - LCOE.
    - AEP for the scale of the device to be tested under this award.
    - Power-to-weight ratio.
    - Peak-to-Average-power ratio.

Upon completion of the competitive project review (down-selection process), EERE will select which projects will receive federal funding beyond Stage 1. Due to the availability of funding and program considerations, only a portion of the recipients will be selected to receive funding for project continuation. As a result of this down-select process, <u>certain projects will not receive federal funding beyond Stage 1 even if the project is meeting the predefined metrics</u>.

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 no later than three (3) 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 the EERE Program Information Center at: https://epicweb.ee.doe.gov/EPICWeb. **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 Program Information Center website should be submitted to: EERE-EPICHelpDesk@ee.doe.gov.

VIII. Other Information

A. FOA Modifications

Amendments to this FOA will be posted on the EERE Program Information Center 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 Grants 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 Grants 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 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 any document of the submission (e.g., Concept Paper, Full Application) that contains such information. 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, 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.

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 cancellation 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.

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 IP 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.xxi. 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.
- DOE may issue and publish further DECs 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, subrecipients, and contractors retain title to subject inventions, the U.S. government retains certain rights.

1. 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 government contractors.

2. **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, pursuant to special statutory authority, certain categories of data generated under

EERE awards under this FOA may be protected from public disclosure for up to one (1) year 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 IP 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.

In addition to the requirements discussed above, for awardees under this FOA, WPTO requires the following data release procedures for awardees:

- All project data will be made available to WPTO as it is produced at or on a near real-time basis and should be specified in the SOPO. Special exceptions may be given when data cannot be accessed for self-contained WECs and Instruments (e.g., data is only accessible by recovering the device).

M. Copyright

The prime recipient and subrecipient(s) 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.

The recipient must immediately report to DOE any export control investigations, indictments, charges, convictions, and violations, 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; exercise an option to procure, 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 $1,000,000 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.

If an educational institution, nonprofit organization, or state/local government is a prime recipient or subrecipient and has expended $1,000,000 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.

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 are generally the same for all types of entities. The specific rules applicable to:

- 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 adopted and supplemented 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 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 Grants 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 Grants 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 Grants 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:

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.

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

1. Waiver for Foreign Entity Participation as the Prime Recipient

As set forth in Section III.A., all prime recipients receiving funding under this FOA must be incorporated (or otherwise formed) under the laws of a state or territory of the United States 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 U.S. Competitiveness Provision (see Section VI.B.xx.); and
e. The foreign entity will satisfy other conditions that DOE may deem necessary to protect U.S. government interests.

Content for Waiver Request

A Foreign Entity waiver request must include the following:

a. Information about the entity(ies) involved in the proposed work to be conducted outside the United States (i.e., the entity seeking a waiver and the entity(ies) that will conduct the work): 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 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 United States R&D and manufacturing, including contributions to employment in the United States and growth in new markets and jobs in the United States;
   - How the project will promote domestic American manufacturing of products and/or services;
e. A description of how the foreign entity's participation is essential to the project;
f. A description of the likelihood of 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 subagreement 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. Waiver for 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.

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.

Appendix C – Buy America Requirements for Infrastructure Projects Required Use of American Iron, Steel, Manufactured Products, and Construction Materials

A. Definitions
For purposes of the Buy America Requirement, the following definitions apply:

Components See 2 CFR 184.3 Definitions

Construction Materials See 2 CFR 184.3 Definitions

"Buy America Preference," "Buy America Requirement," or "domestic content procurement preference" means the requirements set forth in section 70914 of the Build America, Buy America Act, which requires the head of each Federal agency to ensure that none of the funds subject to the requirements are made available for a Federal award for an infrastructure project may be obligated unless all of the iron, steel, manufactured products, and construction materials incorporated into the project are produced in the United States.

Infrastructure See 2 CFR 184.4(c) and (d).

Manufactured Products See 2 CFR 184.3 Definitions

Predominantly of iron or steel See 2 CFR 184.3 Definitions.

Infrastructure project See 2 CFR 184.3 Definitions

B. Buy America Requirement for Infrastructure Projects (Buy America Requirement)
None of the award 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 is 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. See 2 CFR 184.5 for determining the cost of components for manufactured products; and

(3) all construction materials[32] are manufactured in the United States—this means that all manufacturing processes for the construction material occurred in the United States. See 2 CFR 184.6 for construction material standards.

The Buy America Requirement only applies to those articles, materials, and supplies that are consumed in, incorporated into, or affixed to the infrastructure in the 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 Requirement 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.

The Buy America Requirement only applies to an article, material, or supply classified into one of the following categories* based on its status at the time it is brought to the work site for incorporation into an infrastructure project:

(i) Iron or steel products;
(ii) Manufactured products; or
(iii) Construction materials;

The Buy America Requirement only applies to the iron or steel products, manufactured products, and construction materials used for the construction, alteration, maintenance, or repair of public infrastructure in the United States when those items are consumed in, incorporated into, or permanently affixed to the infrastructure. An article, material, or supply incorporated into an infrastructure project should not be considered to fall into multiple categories, but rather must meet the Buy America Preference Requirement for only the single category in which it is classified.

The Buy America Requirement applies to public infrastructure projects in the United States. For purposes of this guidance, applicants should consider whether the infrastructure project will serve a public function. Infrastructure projects should generally be considered "public" if the infrastructure is: publicly owned, privately owned but operated on behalf of the public, or is a place of public accommodation. Review the implementation guidance in OMB Memorandum OMB Memorandum M-24-02 and consult with DOE if you are unsure if your project is subject to Buy America requirements.

[32] Excludes cement and cementitious materials, aggregates such as stone, sand, or gravel, or aggregate binding agents or additives.

All iron and steel, manufactured products, and construction materials used in the infrastructure project must be produced in the United States.

** Section 70917(c) Materials* are cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives as provided in section 70917(c) of BABA. Section 70917 (c) materials are excluded from Construction materials. Asphalt concrete pavement mixes are typically composed of asphalt cement (a binding agent) and aggregates such as stone, sand, and gravel. Accordingly, asphalt is also excluded from the definition of Construction materials.

Section 70917(c) materials, on their own, are not manufactured products. Further, Section 70917(c) materials should not be considered manufactured products when they are used at or combined proximate to the work site—such as is the case with wet concrete or hot mix asphalt brought to the work site for incorporation. However, certain Section 70917(c) materials (such as stone, sand, and gravel) may be used to produce a manufactured product, such as is precast concrete. Precast concrete is made of components, is processed into a specific shape or form, and is in such state when brought to the work site. Furthermore, wet concrete should not be considered a manufactured product if not dried or set prior to reaching the work site.

Further clarification is provided in 2 CFR Part 184 on the circumstances under which a determination is made that Section 70917(c) materials should be treated as components of a manufactured product. That determination is based on consideration of: (i) the revised definition of the "manufactured products" at 2 CFR 184.3; (ii) a new definition of "section 70917(c) materials" at 2 CFR 184.3; (iii) new instructions at 2 CFR 184.4(e) on how and when to categorize articles, materials, and supplies; and (iv) new instructions at 2 CFR 184.4(f) on how to apply the Buy America preference by category.

The recipient is responsible for flowing the Buy America Requirement down to all subawards, contracts, subcontracts, and purchase orders for work performed under the proposed infrastructure project, including to For-Profit Entities when the for-profit entity is a subrecipient or subawardee.

Recipients must certify or provide equivalent documentation for proof of compliance that a good faith effort was made to solicit bids for domestic products used in the infrastructure project under this award.

Recipients must also maintain certifications or equivalent documentation for proof of compliance that those articles, materials, and supplies that are consumed in, incorporated into, affixed to, or otherwise used in the infrastructure project, not covered by an approved waiver or an exemption provided in 2 CFR 184.8, are produced in the United States. The certification or proof of compliance must be provided by the suppliers or manufacturers of the iron, steel, manufactured products and construction materials and flow up from all subawardees, contractors and vendors to the recipient. Recipients must keep these certifications with the award/project files and be able to produce them upon request from DOE, auditors or Office of Inspector General.

C. DOE Submission Requirements for Full Application

Within the first two pages of the workplan or project description, applicants must provide a short statement on whether the project will involve the construction, alteration, maintenance and/or repair of infrastructure in the United States. The ultimate determination about whether a project includes infrastructure remains with DOE, but the applicant's statement will assist project planning and integration of the Buy America Requirement, which may impact the project's proposed budget and/or schedule.

D. Waivers

In limited circumstances, DOE may waive the application of the Buy America Requirement in an award where DOE determines that:

(1) applying the Buy America requirements would be inconsistent with the public interest (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 (Non-Availability); 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% (Unreasonable Cost).

DOE will only process waiver requests after an award has been made but prior to any purchase of items the recipient is seeking to waive, and for which the requests have been submitted in accordance with the term and conditions of the award. Waiver requests must be reviewed by DOE and the Office of Management and Budget's Made in America Office and are subject to a public comment period of no less than 15 calendar days.

DOE or OMB may request additional information for consideration of the wavier. DOE may reject or grant waivers in whole or in part depending on its review, analysis, and/or feedback from OMB or the public. DOEs final determination regarding approval or rejection of the waiver request may not be appealed by a recipient.

Requests to waive the Buy America Requirement must include the following:

- Waiver type (Public Interest, Non-Availability, or Unreasonable Cost);
- Recipient name and Unique Entity Identifier (UEI);
- Award information (Federal Award Identification Number, Assistance Listing number);

- A brief description of the project, its location, and the specific infrastructure involved;
- Total estimated project cost, with estimated federal share and recipient cost share breakdowns;
- Total estimated infrastructure costs, with estimated federal share and recipient cost share breakdowns;
- List and description of iron or steel item(s), manufactured goods, and/or construction material(s) the recipient seeks to waive from the Buy America Requirement, including name, cost, quantity(ies), country(ies) of origin, and relevant Product Service Codes (PSC) and North American Industry Classification System (NAICS) codes for each;
- A detailed justification as to how the non-domestic item(s) is/are essential the project;
- A certification that the recipient made a good faith effort to solicit bids for domestic products supported by terms included in requests for proposals, contracts, and non-proprietary communications with potential suppliers;
- A justification statement—based on one of the applicable justifications outlined above—as to why the listed items cannot be procured domestically, including the due diligence performed (e.g., market research, industry outreach, cost analysis, cost-benefit analysis) by the recipient to attempt to avoid the need for a waiver. This justification may cite, if applicable, the absence of any Buy America-compliant bids received for domestic products in response to a solicitation;
- A description of the market research conducted that includes who conducted the market research, when it was conducted, sources that were used, and the methods used to conduct the research; and Anticipated impact to the project if no waiver is issued.

APPENDIX D – 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

APPENDIX E – LIST OF ACRONYMS

AEP	Annual Energy Production
CAPEX	Capital Expenditure
CLPUD	Central Lincoln Public Utility
COI	Conflict of Interest
CRADA	Cooperative Research and Development Agreement
DEC	Determination of Exceptional Circumstances
DEI	Diversity, Equity, and Inclusion
DMP	Data Management Plan
DOE	Department of Energy
DOI	Digital Object Identifier
EERE	Energy Efficiency and Renewable Energy
FAR	Federal Acquisition Regulation
FCOI	Financial Conflicts of Interest
FDR	Final Design Review
FFATA	Federal Funding and Transparency Act of 2006
FFRDC	Federally Funded Research and Development Center
FMECA	Failure Mode, Effects, and Criticality Analysis
FOA	Funding Opportunity Announcement
FOIA	Freedom of Information Act
FTRR	Final Test Readiness Review
GAAP	Generally Accepted Accounting Principles
GNG	Go/No-Go
HS&E	Health, Safety, and Environment
IEA-OES	International Energy Agency-Ocean Energy Systems
IEC	International Electrotechnical Commission
IO&M	Installation, Operations, and Maintenance
IOM&D	Installation, Operations, and Maintenance and Decommissioning
IP	Intellectual Property
IPMP	Intellectual Property Management Plan
IRB	Institutional Review Board
ISO	International Organization for Standardization
JPD	Joint Probability Distribution
LCOE	Levelized Cost of Energy
M&O	Management and Operating
MFA	Multi-Factor Authentication
MHKDR	Marine and Hydrokinetic Data Repository
MHKiT	Marine and Hydrokinetic Toolkit
MODAQ	Modular Ocean Data Acquisition
MPIN	Marketing Partner ID Number
MSI	Minority-Serving institution
MYPP	Multi-Year Program Plan

NDA	Non-Disclosure Acknowledgement
NEPA	National Environmental Policy Act
NNSA	National Nuclear Security Agency
NREL	National Renewable Energy Laboratory
NSF	National Science Foundation
O&M	Operations and Maintenance
OIG	Office of Inspector General
OMB	Office of Management and Budget
OPEX	Operating Expenditure
OSTI	Office of Scientific and Technical Information
OTA	Other Transactions Authority
PI	Principal Investigator
PII	Personal Identifiable Information
PMP	Project Management Plan
PNNL	Pacific Northwest National Laboratory
PRIMRE	Portal and Repository for Information on Marine Renewable Energy
PTO	Power Take-Off
QA/QC	Quality Assurance/Quality Control
R&D	Research and Development
RDD&D	Research, Development, Demonstration, and Deployment
RFI	Request for Information
RFP	Request for Proposal
RMP	Risk Management Plan
ROV	Remotely Operated Vehicle
SAM	System for Award Management
Sandia	Sandia National Laboratories
SciENcv	Science Experts Network Curriculum Vita
SMART	Specific, Measurable, Attainable, Realistic, and Timely
SOP	Standard Operating Procedure
SOPO	Statement of Project Objectives
SPOC	Single Point of Contact
STEM	Science, Technology, Engineering, and Mathematics
TA	Topic Area
TAA	Technical Assistance Agreement
TC	Technical Committee
TIA	Technology Investment Agreement
TRL	Technology Readiness Level
UCC	Uniform Commercial Code
UEI	Unique Entity Identifier
WBS	Work Breakdown Structure
WEC	Wave Energy Converter
WETS	Wave Energy Test Site
WP	Work Proposal
WPTO	Water Power Technologies Office

APPENDIX F – DESIGN BASIS CONTENT LISTING

This structured content listing ensures comprehensive coverage of all aspects involved in the design, deployment, and operation of a WEC.

1. Executive Summary

- Overview of the report's purpose and scope
- Key findings and recommendations
- Summary of design criteria and objectives

2. Introduction

- Background and context of the WEC project
- Objectives of the design basis report
- Outline of the report structure

3. Site Conditions

- Description of the project site
- Location
- Bathymetry and topography
- Environmental conditions
- Wave climate (wave height, period, direction)
- Tidal and current data
- Wind conditions
- Geological and geotechnical data
- Soil and seabed characteristics
- Subsurface conditions
- Environmental and ecological considerations
- Marine life
- Protected areas and species

4. Design Criteria and Standards

- Applicable codes and standards
- Safety and reliability requirements
- Performance targets
- Design life and maintenance considerations
- Environmental and regulatory compliance

5. WEC Technology

- Description of WEC technology selected
- Operational principles
- Key components and their functions
- Historical performance and case studies

6. Structural Design

- Structural configuration

- Hull design
- Mooring and anchoring systems
- Load considerations
- Wave loads
- Wind loads
- Mooring and operational loads
- Material selection
- Corrosion resistance
- Fatigue life
- Design analysis
- Structural analysis methods
- Simulation and modeling techniques

7. Mechanical and Electrical Systems

- PTO system
- Generators and converters
- Energy storage options
- Control systems
- Operational control strategies
- Monitoring and diagnostics
- Electrical systems
- Cabling and connectors
- Grid integration and power conditioning

8. Installation and Commissioning

- Installation methodologies
- Transportation and logistics
- Installation techniques
- Commissioning procedures
- Testing and validation
- Initial operational assessments

9. Operation and Maintenance

- Operational strategies
- Monitoring and control
- Performance optimization
- Maintenance planning
- Scheduled maintenance
- Predictive maintenance techniques
- Spare parts management
- Safety protocols

10. Risk Assessment and Mitigation

- Identification of risks

- Environmental risks
- Technical and operational risks
- Risk analysis methods
- Qualitative and quantitative assessments
- Mitigation strategies
- Design modifications
- Operational adjustments
- Emergency response plans

11. Economic Analysis

- CAPEX estimates
- OPEX estimates
- Financial models
- Cost-benefit analysis
- Return on investment (ROI)
- Sensitivity analysis

12. Environmental and Regulatory Compliance

- Potential impacts and mitigation measures
- Regulatory requirements
- Permitting process
- Compliance with local regulations

13. Data Collection and Monitoring

- Testing, Measurement, and Data Collection Plan including data collection strategies
- Instrumentation and sensors
- Data acquisition systems
- Monitoring plan
- Key performance indicators (KPIs)
- Data analysis and reporting

14. Conclusion and Recommendations

- Summary of key findings
- Design validation and verification
- Recommendations for future work

15. Appendices

- Supporting documentation
- Technical drawings and schematics
- Detailed calculations and simulations
- Test results and validation data
- Glossary of terms
- References and bibliography

APPENDIX G – DOE MARINE ENERGY DATA REPOSITORY PLAN

All data collected, as well as key deliverables, should be delivered in accordance with the Federal Assistance Reporting Checklist. Data will be uploaded either to the EERE Project Management Center (PMC), DOE CODE, Interagency Edison (iEdison), USDOE Scientific and Technical Information management system (OSTI elink), to the relevant WPTO-funded PRIMRE Knowledge Hubs (MHKDR, Tethys, Tethys Engineering, and MRE Software). Data should be uploaded as it is generated, but no later than the end of each reporting quarter in which the data is generated. The data will be made publicly available once it has been submitted, curated, and accepted into the appropriate system. Data submitted to MHKDR that have been identified as protected, or 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. Protected Data will be treated according to the Intellectual Property Provisions of the Award.

Products resulting from WPTO financial assistance should be uploaded to the appropriate PRIMRE Knowledge Hub:

- MHKDR
  - Data: including any modeling outputs, visualizations, schematics, videos, code, software, raw data or other digital assets suitable for public release should be uploaded to DOE Marine and Hydrokinetic Data Repository (https://mhkdr.openei.org). Additionally, the Marine Energy Data pipeline and MHKiT should be leveraged to convert data to a standardized format and can be used to automate the upload to the MHKDR. Data submitted to PRIMRE's MHKDR that have been identified as protected, or 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.
  - For more information, see the MHK Data Repository Training Video online at https://youtube.com/openei or access tutorials and frequently asked questions (FAQs) under "Help" at https://mhkdr.openei.org.
- Tethys
  - Publications (such as journal articles, technical reports, conference papers, white papers, or as well as other public documents) focused on research, monitoring results, or technology development to assess and mitigate environmental effects of marine energy will be contributed to Tethys. (https://tethys.pnnl.gov/contributing-tethys). All uploads are carried out by the Tethys team at PNNL.
- Tethys Engineering
  - Publications (such as journal articles, technical reports, conference papers, white papers, or as well as other public documents) focused on technical and engineering information about marine energy will be contributed to Tethys

Engineering (https://tethys-engineering.pnnl.gov/contribute-tethys-engineering). All uploads are carried out by the Tethys Engineering team at PNNL.

- MRE Software
  - Software developed for marine energy applications should be hosted on the PRIMRE Code Catalog (https://openei.org/wiki/PRIMRE/Code_Catalog). Submit software through the MRE Code Submission Form. Open-source software hosted on a public repository will automatically be forked into the GitHub MRE Code Hub (https://github.com/MRE-Code-Hub).