

**FINANCIAL ASSISTANCE
FUNDING OPPORTUNITY ANNOUNCEMENT**



**U.S. Department of Energy
Golden Field Office**

Marine and Hydrokinetic Technology Readiness Advancement Initiative

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REGISTRATION AND APPLICATION SUBMISSION REQUIREMENTS

Registration Requirements: Allow at least 21 days to complete registrations.

To submit an application under this announcement, complete the following registrations:

1. Obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number, at <http://fedgov.dnb.com/webform>.
2. Register in the Central Contractor Registration (CCR) system, at <https://www.ccr.gov/>. Designating an E-Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in CCR registration. These items are needed to submit applications in Grants.gov. Update your CCR registration annually.
3. Register in Grants.gov at <http://www.grants.gov/>. See the Organization Registration User Guide at <http://www.grants.gov/assets/OrgRegUserGuide.pdf>. The Applicant User Guide is at <http://www07.grants.gov/assets/ApplicantUserGuide.pdf>.
4. Register in FedConnect at <https://www.fedconnect.net/>; use “Register as a Vendor” link. To create an organization account, your organization’s CCR MPIN is required.

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Where to Submit the Application Package:

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Where to Submit Questions About the Registrations or Systems:

DUNS & Bradstreet: govt@dnb.com

Central Contractor Registration (CCR) system: <https://www.bpn.gov/ccr/contactccr.aspx>
By phone: 866-606-8220 or 334-206-7828 (8:00 a.m. to 8:00 p.m., Eastern Time)

Grants.gov: support@grants.gov
By phone: 1-800-518-4726 (7:00 a.m. to 9:00 p.m., Eastern)

FedConnect: support@FedConnect.net
By phone: 1-800-899-6665 (8:00 a.m. to 8:00 p.m., Eastern)

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SECTION I – FUNDING OPPORTUNITY DESCRIPTION (ALL TOPIC AREAS)

A. DESCRIPTION

The Department of Energy's (DOE) Wind and Hydropower Technologies Program (WHTP) works to maximize renewable energy utilization in the United States by leading the Nation's research and development efforts that improve wind and water power generation technology and address barriers to the use of renewable energy. Goals of the WHTP include increasing the maturity of wind and water power technology in a socially and environmentally responsible manner. To do so, DOE is investing in marine and hydrokinetic (MHK) technologies. The opportunity to harness energy from waves, tides, currents, and ocean thermal gradients represents a promising, largely untapped resource that can produce predictable baseload renewable energy that is within close proximity to loads.

The mission of DOE's Water Power Program is to perform and sponsor the necessary research, development, test, evaluation, and demonstration of innovative water power technologies, in order to effectively generate renewable, environmentally responsible, and cost-effective electricity from MHK resources. Considering the early-stage of development of the industry and most MHK technologies, the Program will employ Technology Readiness Levels, or TRLs, as a means to assess the technical maturity of various types of marine and hydrokinetic water power technologies, in a consistent and uniform manner. It is the intent of this Funding Opportunity Announcement (FOA) to advance the technical and operational readiness of marine and hydrokinetic systems and components across a range of TRLs, with the unified goal of accelerating the development and deployment of these technologies to provide a domestic source of clean, affordable energy that is both economical and ecologically responsible.

Technology readiness, and associated Technology Readiness Levels (TRLs), are used by numerous federal agencies (including the Department of Defense (DoD) and National Aeronautics and Space Administration (NASA)) and many private sector companies, as a measure (or metric) to assess the maturity of evolving technologies. According to DoD's *Defense Acquisition Guidebook* (2006), the use of TRLs enables consistent and uniform discussions of validated performance comparisons across different types of technologies. Furthermore, the DoD's adoption of this metric to evaluate the readiness levels of new technologies guides their development efforts so they may designate systems and technologies as "Operationally Ready".

DoD TRLs utilize a scale of one (TRL 1) to nine (TRL 9). The lowest TRL (TRL 1) starts with paper studies of the basic concept, proceeding with laboratory demonstrations at higher TRLs, and ending with a technology that has proven itself. DOE intends to use a condensed version of the DoD approach. The Air Force Research Laboratory considers TRL 7 an acceptable risk for starting the engineering and manufacturing development phase of systems and technologies. Their readiness level definitions state that for a technology to be rated at TRL 7, "it must be demonstrated using prototype hardware that is the same size, weight, and configuration as that called for in the final design and that prototype has to be demonstrated to work in an environment similar to the planned operational system."

The Government Accounting Office (GAO) has previously reviewed the impact of incorporating technologies into new product and weapon system designs.¹ The results showed that programs met product objectives when the technologies were matured to higher levels and conversely showed that cost and schedule problems arose when programs started when technologies were at low readiness levels. DOD agreed that TRLs are important and necessary to guide decision makers in determining when and where to insert new technologies into weapons system programs and that “it is desirable to mature technologies to TRL 7 prior to entering the engineering and manufacturing development phase of a weapon system program.”² Since that time, DOD has adopted the technology readiness levels as a means of assessing the technological maturity of new major programs.

When considering the successful past history of TRL applications, it is a reasonable extension to apply TRLs to the research, development, and demonstration (RD&D) needs of MHK technologies. However, DOD and NASA’s implementation of TRLs is typically for highly complex, mission critical weapons and space systems, where failure can be catastrophic. For the purposes of this FOA, DOE is employing a simplified “banded” TRL definition to strategically incorporate a structured technology progression, but with an accelerated development schedule that will better support industry’s efforts at demonstrating innovative MHK systems and components.

Federal funding for the Marine and Hydrokinetic (MHK) Technology Readiness Advancement Initiative for fiscal year 2010 is expected to be up to \$15.36 million, with the possibility of continued funding at, or near, fiscal year 2010 levels for up to an additional two years. This FOA seeks applications in the following Topic Areas:

- Topic Area 1: MHK Technologies Concept Development (TRLs 1-3)
- Topic Area 2: MHK Technology Readiness Level Advancement (TRLs 4-9)

Funding will be made available in each Topic Area for the advancement of both MHK “systems” and “components” as defined below. For the purposes of this announcement, “device” will refer to the technology in question and can be either a system or component.

- MHK Systems: For the purposes of this announcement, a system is defined as a complete device that is capable of capturing and converting hydrokinetic energy (wave, current, or tidal) with the purpose of generating electricity for the grid, either via a single unit or configured in an array. Integrated ocean thermal systems will not be funded under this announcement. All necessary components should be conceptualized, designed, and integrated. These components may include, but not limited, to: nacelle, hydrodynamic, buoys, power-train, power take-off, mooring, and foundation.
- MHK Component: For the purposes of this announcement, a component is defined as a sub-system of an MHK system that is optimized for an existing MHK system, or has the potential for cross-cutting multiple MHK systems. DOE is also interested in components

¹ (*Best Practices: Successful Application to Weapon Acquisitions Requires Changes in DOD’s Environment* (GAO/NSIAD-98-56, Feb. 24, 1998) and *Best Practices: Better Management of Technology Development Can Improve Weapon System Outcomes*).

² (GAO/NSIAD-99-162, July 30, 1999).

that maximize commonality across existing and/or future MHK systems. Components may address marine and hydrokinetic energy (wave, current, tidal, and ocean thermal). Examples include optimized rotors, generators, drive-trains, power take-off devices.

The Department of Energy has organized and grouped the DoD TRLs into four discrete funding categories. Each category has prescribed funding levels and project performance periods (duration of project) as shown below in Tables 1-3. Each application is required to (1) describe, and provide evidence of, the current stage of readiness of their device (self categorize) per the DOE guidelines, and (2) define the proposed research, development, and demonstration (RD&D) that will be performed in order to advance their technology to a higher TRL category.

The DOE guidelines are outlined later in the FOA under each funding category discussion and a TRL summary matrix can be found in Appendix D. While DOE does not precisely prescribe the specific requirements for qualification of any TRL designation, guidelines are provided for the type of testing and data that is expected for each TRL category. In this regard, the best applications will provide a logical and thorough RD&D plan that addresses DOE's definitions of TRLs.

Applicants must first self categorize their technology at the appropriate TRL level in which they fully meet DOE's established definitions and guidelines. The definitions and guidelines are outlined later in the FOA under each funding category discussion. Also, a TRL summary matrix can be found in Appendix D and examples of self categorization can be found in Appendix E.

As part of the self-categorization process, applicants must justify their initial TRL category designation, and provide evidence of the specific RD&D efforts previously undertaken that support this claim. The best applications will have performed the necessary RD&D, and have test and performance data available (as applicable) that supports and validates these claims.

It is important to note that applications that do not appropriately self-categorize the subject component or system will be rejected. The banding of TRLs, as proposed by DOE, should simplify the self categorization requirement.

Federally Funded Research and Development Center (FFRDC) contractors, including DOE National Labs, may not be proposed as team members or subcontractors on another entity's application, however, DOE may facilitate technical assistance partnerships with applicants selected for award and an FFRDC to ensure that the objectives and task requirements of the targeted funding group are met. This assistance may include activities such as test plan refinement, testing observation, and data and results analysis.

The proposed scope of work needs to be executable without FFRDC support, as it is expected that the application's merits must stand alone without potential FFRDC participation. Any proposed FFRDC roles or tasks must include an explanation as to how the additional work supplements the project. The program will evaluate the FFRDC participation request and make determinations as a function of resources and project needs.

The applicant must also identify the TRL level to which they intend to advance their technology. In support of this identification, the applicant is required to define an appropriate RD&D strategy that should successfully advance their technology to a higher TRL category designation. This RD&D strategy can advance the technology to the next higher TRL stage, or it can progress

through multiple stages. It is envisioned that multiple stage advancements may be feasible for developers that only fully qualify for a lower TRL designation but have made progress through, but not fully accomplished, all the requirements for a higher TRL designation (i.e. currently fall in the middle of a TRL category). The best applications will account for possible design evolutions that must be incorporated to correct design deficiencies, and/or maximize technology performance.

It is important to note that applicants will only be eligible for the funding category associated with the higher TRL advancement, and not for the combined funding associated with more than one TRL advancement. Two representative examples are shown below.

- If an applicant has completed Early Stage Development, Design and Engineering (TRL 1-3), and initiated, but not completed, Proof of Concept RD&D (TRL 4), the applicant should self-categorize as TRL 1-3, and request funding to complete Proof of Concept RD&D (TRL 4). While the applicant may apply for the maximum amount allowed as shown in Tables 1-3 under TRL 4, it is expected that only the funding necessary to complete the stage will be requested. At the conclusion of the applicant's TRL 4 effort, the technology would then be categorized as TRL 4, and be eligible for TRL 5/6 funding in possible future announcements.
- If a developer has accomplished most but not all of DOE's expectations for TRL 5/6, the applicant should self-categorize as a TRL 4 (assuming that a convincing argument is made that the technology does indeed meet TRL 4 guidelines). The application could then define an RD&D strategy that completes the missing requirements for TRL 5/6, and also fully completes the requirements for TRL 7/8. However, the application must identify a plan that accomplishes the complete RD&D strategy within the Period of Performance prescribed for TRL 7/8, and only request funding associated with TRL 7/8, not the combined amounts for 5/6 and 7/8.
- Please see Appendix E for additional examples.

The four discrete funding categories are shown below. Further detail is outlined in Tables 1 – 3. Please note that DOE is not funding TRL 9, as those technologies are deemed commercially ready and should not require federal funding. Also, in order to maximize federal funds, the DOE will only fund systems (not components) in the TRL 7/8 category, as it is DOE's position that components must be effectively integrated into a larger system after they have completed TRL 5/6.

Topic Area 1: MHK Technologies Concept Development (TRLs 1-3)

- **DOE TRL 1-3**
Discovery / Concept Definition / Early Stage Development, Design and Engineering
DOE anticipates making awards that will run for up to 12 months over one budget period, and will include only FY 2010 funds. The project budget will be obligated over the first budget period and will cover a period of 12 months.

Topic Area 2: MHK Technology Readiness Level Advancement (TRLs 4-9)

- **DOE TRL 4**

Proof of Concept

DOE anticipates making awards that will run for up to 18 months over one budget period and will include FY 2010 and FY 2012 funds. The project budget will be obligated over the 18 month period of performance.

- **DOE TRL 5/6**

System Integration and Technology Laboratory Demonstration

DOE anticipates making awards that will run for up to 18 months for components and up to 24 months for systems and will include FY 2010 and FY 2012 funds. Component projects will be one budget period with half the funding obligated in FY 2010 and the remaining budget obligated in FY 2012. System projects will consist of two budget periods with the first being 12 months and include the FY 2010 funding. The second budget period will be an additional 12 months and include the FY 2012 funding. Continuation funding is contingent on (1) availability of funds; (2) substantial progress towards meeting the objectives of the project; (3) submittal of required reports; (4) compliance with the terms and conditions of the award; and/or (5) a go/no-go decision on funding for budget period two, which will occur upon the completion of the first budget period of the award and a review by DOE of the project progress. DOE reserves the right to not extend the award period into the second budget period based on this progress review and the go/no-go determination. Applications should address the entire project period (18 months for components, 24 months for systems).

- **DOE TRL 7/8**

Open Water System Testing, Demonstration, and Operation

DOE anticipates making awards that will run for up to 36 months over two budget periods and will include FY 2010, FY 2012, and FY 2013 funds. The first budget period will be 24 months and include the FY 2010 and FY 2012 funding. The second budget period will be 12 months and include the FY 2013 funding. Continuation funding is contingent on (1) availability of funds; (2) substantial progress towards meeting the objectives of the project; (3) submittal of required reports; (4) compliance with the terms and conditions of the award; and/or (5) a go/no-go decision on funding for budget period two, which will occur upon the completion of the first budget period of the award and a review by DOE of the project progress. DOE reserves the right to not extend the award period into the second budget period based on this progress review and the go/no-go determination. Applications should address the entire project period (36 months).

In order to be eligible, the applicant must first “self categorize” their technology in the appropriate TRL Category. Applicants that do not provide sufficient justification for the TRL in which they self categorize, or self categorize their technology in an inappropriately high TRL, will be rejected. “Sufficient justification” is viewed as an applicant’s ability to provide substantial and substantiated detail regarding research, development, and demonstration (RD&D) efforts that (a) have already been undertaken (and thus support the self-categorized TRL Category), and (b) will be undertaken to advance the technology along the TRL Category scale. Furthermore, the applicant should provide a defined

commercialization pathway that shows the next steps to be undertaken that will lead to successful commercialization.

The statutory authority for this program is the Energy Policy Act of 2005, section 931(a)(2)(E)(i) and the Energy Independence and Security Act of 2007, section 633.

Table 1 - Topic Area Summary

Topic Area	Period of Performance	Expected Number of Awards	Total Estimated Federal Funding*	Estimated FY10 Federal Funding*	Estimated 1st Year Federal Funding per Award	Estimated Range per Award (Total Federal Funding)*	Required Cost Share
1. MHK Technologies Concept Development (TRLs 1-3)	12 months	8 (4 Systems, 4 Components)	\$1.6 M	\$1.6 M	\$240k for Systems \$160k for Components	\$240k for Systems \$160k for Components	20%
2. MHK Technology Readiness Level Advancement (TRLs 4-9)	18-36 months See Tables 2-3 Below	18 (11 Systems, 7 Components)	\$36.72 M	\$13.76 M	See Tables 2-3 Below	See Tables 2-3 Below	See Tables 2-3 Below

***Federal funding is subject to annual appropriations. All figures above should be treated as estimates.**

Table 2 – TRL Funding Breakdown Structure (SYSTEMS)**

<u>SYSTEMS</u>	<u>TRL 1-3</u>	<u>TRL 4</u>	<u>TRL 5/6</u>	<u>TRL 7/8</u>	<u>TRL 9</u>
Topic Area	Topic Area 1	Topic Area 2			NA
Estimated Project Period of Awards	12 months	18 months	24 months	36 months	NA
Funding:					
Anticipated Level of Required Cost Share:	80% DOE 20% Recipient	80% DOE 20% Recipient	60% DOE 40% Recipient	50% DOE 50% Recipient	NA
Total Estimated Cost of the TRL Level:	\$1.20 M	\$2.00 M	\$20.00 M	\$40.00 M	NA
Total DOE Estimated Cost of the TRL Level:	\$0.96 M	\$1.60 M	\$12.00 M	\$20.00 M	NA
FY10 DOE Funding Anticipated per Award***:	\$240k	\$200k	\$1.20 M	\$2.70 M	NA
Total DOE Funding Anticipated per Award***:	\$240k	\$400k	\$2.40 M	\$10.00 M	NA
Estimated number of Selections anticipated:	4	4	5	2	NA

Table 3 – TRL Funding Breakdown Structure (COMPONENTS)**

<u>COMPONENTS</u>	<u>TRL 1-3</u>	<u>TRL 4</u>	<u>TRL 5/6</u>	<u>TRL 7/8</u>	<u>TRL 9</u>
Topic Area	Topic Area 1	Topic Area 2		NA	NA
Estimated Project Period of Awards	12 months	18 months	18 months	NA	NA
Funding:					
Anticipated Level of Required Cost Share:	80% DOE 20% Recipient	80% DOE 20% Recipient	60% DOE 40% Recipient	NA	NA
Total Estimated Cost of the TRL Level:	\$0.80 M	\$0.90 M	\$4.00 M	NA	NA
Total DOE Estimated Cost of the TRL Level:	\$0.64 M	\$0.72 M	\$2.40 M	NA	NA
FY10 DOE Funding Anticipated per Award***:	\$160k	\$120k	\$300k	NA	NA
Total DOE Funding Anticipated per Award***:	\$160k	\$240k	\$600k	NA	NA
Estimated number of Selections anticipated:	4	3	4	NA	NA

****Federal funding is subject to annual appropriations. All figures above should be treated as estimates. DOE also reserves the right to adjust the number of awards (and funding levels) within/between categories to meet program goals and objectives.**

*****The initial funding is the amount of DOE funds obligated at the time of award. The remaining DOE funds (Total DOE funding less the Initial DOE funding) will be obligated over the period of performance, subject to appropriations and applicable performance reviews.**

Topic Area 1: MHK Technologies Concept Development (TRLs 1-3)

SECTION II – AWARD INFORMATION (TOPIC AREA 1)

The objective of this topic area is to stimulate and support technological innovation for the investigation and advancement of innovative water power technologies at both the component and system level, with a focus on funding projects advancing within the TRL 1-3 range. DOE will fund analytical studies of innovative concepts or projects that propose a sound but novel approach to a potentially important water power technology, science, or engineering breakthrough that can be applied to, or add to the portfolio of, innovative water power technologies. This can be a solution or an improvement to an existing component or system, or the pursuit of a new technology or system, with the principal focus on systems capable of producing utility-scale electricity.

Applications must provide sufficient information to convince DOE, and members of the research community who review the grant application, that the proposed work represents a sound approach to the investigation of an important scientific or engineering question, and that it is worthy of support by detailing the potential application and opportunities associated therewith. The application should describe self-contained research that will contribute to proving scientific or technical feasibility of the approach or concept.

Technical reviewers will base their conclusions only on information contained in the application. Applicants should assume that technical reviewers are familiar with general principles and benefits of MHK technologies, the general concerns about our environment, global climate change, and fossil-based fuels, and the benefits of renewable energy. Applicants should not assume that reviewers are acquainted with the applicant's business, key individuals, or any unique theory or experiments referred to, but not described. (This includes material in referred professional journals--those in which the articles have been subjected to peer review, and material referenced on the internet). Relevant journal articles should be summarized in the application. Information provided via internet links will not be reviewed.

Specifically excluded for consideration under this announcement are applications principally for literature surveys, for compilations of the work of others, for technical assessments, or for technical status surveys. If any of these types of tasks are included in the work plan, the grant (if awarded) may be reduced in proportion to that effort. In addition, applications primarily for the development of already proven concepts will be declined.

Requirements and Guidelines:

DOE TRL 1-3: Discovery / Concept Definition / Early Stage Development, Design and Engineering

DOE TRL 1-2: These are the lowest levels of technology readiness. Scientific research begins to be translated into applied research and development where basic principles are observed and reported. Technology concept and application are formulated and investigated through analytic

studies and in-depth investigations of principal design considerations. This stage is characterized by paper studies, concept exploration, and planning.

DOE TRL 3: In this stage, active research is initiated, including engineering studies and laboratory studies to physically validate analytical predictions of separate elements of the technology.

Entry Level Criteria:

No specific entry level criteria are applied in terms of technology development. Concepts with the greatest technical feasibility and commercial potential as characterized by first order estimates of cost of energy, cost per installed kW, conversion efficiency, annual energy production, and operating and maintenance costs will be prioritized for funding. These estimates must be supported with commonly accepted analyses, calculations, and experimental methods. Furthermore, environmental impacts of proposed systems and/or devices must be considered and discussed. The need for greater renewable energy deployment will be considered in context with the need for environmentally conscientious and sustainable systems.

Funding Category Overview

The objective of this funding category (DOE TRL 1-3) is to stimulate and support early stage development of promising marine and hydrokinetic technologies that may provide breakthrough/enabling capabilities and have convincing commercial potential. DOE intends to fund studies and early stage development of both components (subsystems) and full systems that provide a solution or an improvement to existing state-of-the-art technology or pursue a new innovative device concept. Concepts must be grounded in sound and defensible scientific and engineering principles and should demonstrate promise for competitive cost of energy, long term reliability, manufacturability and application in the United States, in an environmentally conscientious manner.

Projects funded in this category will aim to determine the scientific or technical merit of an idea, concept, or technology, advance it completely through the DOE TRL 1-3 category. DOE recognizes the importance of early stage project planning, management, engineering and concept validation to risk reduction, shortened timelines and lower costs of commercialization and ultimate project success. DOE therefore encourages applicants to adopt, at this early stage, industry accepted systems engineering, project management and engineering practices, coupled with necessary due diligence.

Funding Category Tasks/Stage-Gate Criteria

The following reference list includes elements that are typical in DOE TRL 1 - 3 efforts and should be considered for inclusion in work plans. DOE recognizes that technologies may be at different stages within this funding category and applicants should therefore clearly delineate which of the following tasks have been completed and for which tasks funding is being requested. Some tasks may or may not be applicable to certain technologies/efforts and with sufficient justification, may be omitted, on a project-by-project basis. These tasks are representative of the Stage-Gate criteria to be completed before moving to DOE TRL 4.

- (a) A feasibility study that describes the basic properties and operational characteristics of the technology, and identifies the technical and economic merits of the concept (TRL 1-2)
- (b) Preliminary design and engineering (TRL 1-2)
- (c) A systems engineering analysis that may include a needs analysis, requirements flowdown to define R&D pathways, work breakdown structure, concept definition, management plan, and risk assessment (TRL 1-2)
- (d) Consider and identify potential deployment sites and the associated potential resource
- (e) Identification of the intended marine resource application, with potential extractable energy estimates
- (f) Engineering and design focused on advancing the device/component for proof of concept modeling, developing solutions to technology hurdles, determining all components/subsystems, developing high fidelity estimates of such values as device/component size, weight, layout, interfacing and performance (TRL 3)
- (g) Small scale prototyping and testing of components to reduce uncertainty provide input into numeric models and validate high level assumptions (TRL 3)
- (h) Assess Commercial Of The Shelf (COTS) equipment that can be employed within the system
- (i) Develop specifications for a proof-of-concept model and fabrication plan/costing
- (j) Test and integration plan
- (k) Numerical model(s) and simulation(s)
- (l) Assessment of risks and barriers - resource, environmental, ecological, stakeholder, etc. Define a proposed follow-on RD&D effort that seeks to prove out the concept
- (m) Conduct stage transition design reviews
- (n) Consider and discuss Permitting and NEPA requirements where needed to meet future testing and deployment plans.

A. Type of Award Instrument

- DOE anticipates awarding project grants under this Topic Area.

B. Estimated Funding

- Approximately \$ 1.6 M is expected to be available for new awards under this Topic Area.

C. Estimated Maximum and Minimum Award Size

- Ceiling (i.e., the maximum amount for an individual award made under this Topic Area): \$240k for systems; \$160k for components.
- Floor (i.e., the minimum amount for an individual award made under this Topic Area): None

D. Expected Number of Awards

- DOE anticipates making up to 8 awards under Topic Area 1 (4 for systems, 4 for components).

E. Anticipated Award Size

- DOE anticipates that awards will be in the \$ 240k range for the total project period for systems.
- DOE anticipates that awards will be in the \$ 160k range for the total project period for

components.

F. Period of Performance

- DOE anticipates making awards that will run for 12 months.

G. Type of Application

- DOE will accept only new applications under this Topic Area (i.e., applications for renewals of existing DOE funded projects will not be considered).

SECTION III - ELIGIBILITY INFORMATION (TOPIC AREA 1)

A. Eligible Applicants

The following entities are eligible to apply for this announcement: (1) institutions of higher education; (2) nonprofit and for-profit entities; (3) State and local governments; and (4) consortia of entities (1) through (3). All types of entities are eligible to apply, except other Federal agencies, Federally Funded Research and Development Center (FFRDC) Contractors, and nonprofit organizations described in section 501(c)(4) of the Internal Revenue Code of 1986 that engaged in lobbying activities after December 31, 1995.

B. Cost Sharing

The cost share must be at least 20% of the total allowable costs of the project (i.e., the sum of the Government share and the recipient share of allowable costs equals the total allowable cost of the project) and must come from non-Federal sources unless otherwise allowed by law. (See 10 CFR Part 600 for the applicable cost sharing requirements.)

C. Other Eligibility Requirements

Federally Funded Research and Development Center (FFRDC) Contractors

FFRDC contractors are not eligible for an award under this announcement. FFRDC contractors may not be proposed as a team member or subcontractor on another entity's application. A list of FFRDCs can be found at <http://www.nsf.gov/statistics/nsf05306/>. Applicants shall not contact FFRDCs and shall not seek to obtain or submit letters of support or commitment from FFRDCs. Following selection, DOE can facilitate technical assistance partnerships with an FFRDC. Technical Assistance may be provided between DOE, the organization selected to receive the Technical Assistance, and the team members providing the Technical Assistance.

The proposed scope of work needs to be executable without FFRDC support, as it is expected that the application's merits must stand alone without potential FFRDC participation. Any proposed FFRDC roles or tasks must include an explanation as to how the additional work supplements the project. The program will evaluate the FFRDC participation request and make determinations as a function of resources and project needs.

D. MULTIPLE PRINCIPAL INVESTIGATORS

The assignment and use of multiple Principal Investigators (PIs) in projects awarded under this FOA is allowed. The applicant, whether a single organization or team/partnership/consortium, must however indicate in the application if the project will

include multiple PIs (See Part III). The decision to use multiple PIs for a project is the sole responsibility of the applicant. If multiple PIs will be designated, the application must identify in the application the Contact PI/Project Coordinator and provide a “Coordination and Management Plan” that describes the organization structure of the project as it pertains to the designation of multiple PIs. This plan should, at a minimum, include:

- Process for making decisions on scientific/technical direction
- Publications
- Intellectual property issues
- Communication plans
- Procedures for resolving conflicts
- PIs’ roles and administrative, technical and scientific responsibilities for the project

SECTION IV - APPLICATION REVIEW INFORMATION (TOPIC AREA 1)

A. REVIEW CRITERIA

1. Initial Review Criteria

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

To be eligible, the applicant must first “self categorize” their technology in the appropriate TRL Category. Applicants that do not provide sufficient justification for the TRL Category in which they self categorize, or self categorize their technology in an inappropriately high TRL Category, will be rejected. Successful applications will provide substantial detail regarding research, development, and demonstration (RD&D) efforts that (a) have already been undertaken and thus support the self-categorized TRL Category, and (b) will be undertaken to advance the technology along the TRL scale. Furthermore, the applicant should provide a defined commercialization pathway that shows the next steps to be undertaken that will lead to successful commercialization.

2. Merit Review Criteria

The following criteria will be used to evaluate Applications within Topic Area 1: **MHK Technologies Concept Development (TRLs 1-3)**

Criterion 1: Strength of the Scientific / Technical Approach Weight: [40%]

- Degree to which application is based on sound principles and defensible assumptions, including how well the application demonstrates a clear understanding of the current state of the science.

- Degree to which proposed plan is clearly stated, organized, achievable and technically feasible, including the adequacy and completeness of proposed tasks and the resources identified to successfully address all elements of the technical plan.
- Viability and completeness of project plan.
- Credibility of approach to predict cost of energy, cost per installed kW, conversion efficiency, annual energy production, and operating and maintenance costs.

Criterion 2: Potential Market Impact / Advancement **Weight: [20%]**

- Identification of potential markets and applications for the proposed technology, based on a cogent assessment of the resource potential.
- Likelihood that proposed technology will result in broadly applicable deployment – application should contain a clear explanation of intended market impact by 2020.
- Potential to rapidly accelerate MHK technology deployment and achieve competitive cost of electricity (COE).

Criterion 3: Team Member Qualifications / Available Resources **Weight: [20%]**

- Capabilities, experience, qualifications, and credentials of team members, including the applicant’s team experience and record of success in technical innovation and performance.
- Availability of required equipment, laboratory and demonstration facilities, analytic support, and other necessary resources for performing the proposed project.
- Demonstrated support of each team member’s participation.

Criterion 4: Innovation **Weight: [20%]**

- Degree to which application presents a novel approach or novel technological solution to enhance and/or advance MHK technologies and/or the deployment of MHK systems.
- Degree to which the proposed innovation could improve upon the current state of the art, including but not limited to increased efficiency, improved reliability, or lower costs.
- Likelihood that the critical enabling technologies needed to achieve success can be developed.

3. Other Selection Factors

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

1. Technological diversity of projects (includes TRL level, resource, component vs systems, etc.)
2. Cost share offered above the minimum amount required
3. Significance of environmental considerations
4. Alignment with the mission and goals of the Wind and Hydropower Technologies Program

B. Review and Selection Process

1. Merit Review

Applications that pass the initial review will be subjected to a merit review in accordance with the guidance provided in the “Department of Energy Merit Review Guide for Financial Assistance”. This guide is available at:

<http://www.management.energy.gov/documents/meritrev.pdf>.

It is very important that the Project Abstract and Project Narrative file, that will be used during the Merit Review Process, do not contain any Personally Identifiable Information as described in Appendix B.

2. Selection

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

3. Discussions and Award

The Government may enter into discussions with a selected applicant for any reason deemed necessary, including, but not limited to: (1) the budget is not appropriate or reasonable for the requirement; (2) only a portion of the application is selected for award; (3) the Government needs additional information to determine that the recipient is capable of complying with the requirements in 10 CFR part 600; and/or (4) special terms and conditions are required. Failure to resolve satisfactorily the issues identified by the Government will preclude award to the applicant.

C. Anticipated Notice of Selection and Award Dates

DOE anticipates notifying applicants selected for award by the end of August 2010 and making awards by the end of September 2010.

Topic Area 2 - Technology Readiness Advancement Initiative (TRL 4-9)

SECTION II – AWARD INFORMATION (TOPIC AREA 2)

Topic Area 2 will address technologies ranging from prototype development (TRL 4) through commercial deployment (TRL 9). This MHK Technology Readiness Level Advancement Initiative will advance the technological and operational readiness of marine and hydrokinetic water power technologies for both systems and components (TRL matrix can be found in Appendix D). Through this initiative, the Program will use TRLs to make decisions concerning the following:

1. the appropriate TRL designation (e.g., the current development status) of water power technologies and systems;
2. the effective transitioning of technologies along the TRL scale towards operational readiness and commercialization; and
3. the selection of, and funding amounts for, water power projects in various TRLs.

To be eligible, the applicant must first self-categorize their technology in the appropriate TRL Category. Applicants that do not provide sufficient justification for the TRL Category in which they self categorize, or self categorize their technology in an inappropriately high TRL Category, will be rejected. Successful applications will provide substantial detail regarding research, development, and demonstration (RD&D) efforts that (a) have already been undertaken and thus support the self-categorized TRL Category, and (b) will be undertaken to advance the technology along the TRL scale. Furthermore, the applicant should provide a defined commercialization pathway that shows the next steps to be undertaken that will lead to successful commercialization.

Funding will be made available for the advancement of both MHK “systems” and “components” as defined below. For the purposes of this announcement, “device” will refer to the technology in question, which can be either a system or component.

- **MHK Systems:** For the purposes of this announcement, a system is defined as a complete device that is capable of capturing and converting hydrokinetic energy (wave, current, or tidal) with the purpose of generating and transmitting electricity to and for the grid, either via a single unit or configured in an array. Applications that seek to demonstrate a complete, integrated ocean thermal system will not be funded under this announcement. All necessary components should be conceptualized, designed, and integrated, including, but not limited to: nacelle, hydrodynamic, buoys, power-train, power take-off, mooring, and foundation.
- **MHK Component:** For the purposes of this announcement, a component is defined as a sub-system of an MHK system that is optimized for an existing MHK system, or has the potential for cross-cutting multiple MHK systems. Ideally these components should identify/maximize commonality for application within existing and/or future MHK systems. Components may address marine and hydrokinetic energy (wave, current, tidal, and ocean thermal). Examples include optimized rotors, generators, drive-trains, power take-off devices.

Requirements and Guidelines:

DOE TRL 4: Proof of Concept

DOE TRL 4: Basic technological components of a sub-scale model are integrated to validate design predictions and system level functionality. The models, or critical subsystems, are tested in a laboratory environment.

Entry Level Criteria:

To be considered for funding in this category (DOE TRL 4), applicants must demonstrate that their system has achieved the Stage-Gates of DOE TRL 1-3 and performed the due diligence required to mitigate risk and maximize success at DOE TRL 4. Devices and components with the greatest technical feasibility and commercial potential as characterized by refined estimates of cost of energy, cost per installed kW, conversion efficiency, annual energy production, operating and maintenance costs will be prioritized for funding. These estimates must be supported with commonly accepted analyses, calculations, and experimental methods. Furthermore, environmental impacts of proposed systems and/or devices must be considered and discussed. The need for greater renewable energy deployment will not override the need for environmentally conscientious and sustainable systems. Proposed technologies should also have convincing commercial potential/application.

Funding Category Overview

The objective of this funding category is to promote early stage proof of concept system/component development, testing and concept validation. In this stage, critical technology elements are developed and tested in a laboratory environment (suggested 1:10 scale or smaller). It may not be necessary or feasible at this level to test a fully operational model. For example, it may be essential to validate the hydrodynamic sub-system and a simulated PTO would be sufficient to achieve this. Additionally, DOE recognizes that certain devices may not effectively scale to meet this limit and achieve their testing goals. Thus, larger scales will be considered with sufficient supporting justification. Proposed models should have the necessary functionality to enable bench-scale tests to validate/confirm hydrodynamic fidelity, piece-part assembly, manufacturability, performance, cost effectiveness, and basic operating principles of the device. Scale should be judiciously chosen so the model reproduces the physical, functional, and performance characteristics of the proposed device. Scale models will validate form, fit and function (F3), demonstrate that basic technological components can be effectively integrated, validate design assumptions/predictions, identify and correct unforeseen design and performance issues at an early stage, and reduce risk of follow-on efforts including the same issues at higher level TRLs.

Funding Category Tasks/Stage-Gate Criteria

The following reference list includes elements that are typical in DOE TRL 4 efforts and should be considered for inclusion in work plans. This should not be considered a comprehensive list, and the best applications will identify an appropriately robust RD&D plan that meets developer needs while also addressing DOE guidelines. Some tasks identified below may or may not be applicable to certain technologies/efforts and with sufficient justification, may be omitted, on a

project-by-project basis. These tasks are representative of the Stage-Gate criteria to be completed before moving to DOE TRL 5/6.

- (a) A sub-scale model of the proposed device is developed and tested to validate critical technology elements and/or novel components at the system level. Some sub-systems may be simulated if appropriate
- (b) Data sets must be collected that are sufficient and accurately measure system performance to compare with engineering estimates, numerical models, and other previous studies. Testing and validation reports with sufficient documentation, data and analysis to:
 - i. validate basic operating principles, functionality and assumptions
 - ii. provide a first order estimate of the system performance
 - iii. verify piece-part assembly, interface and interactions
 - iv. provide a first order validation of numerical models
 - v. demonstrate repeatability of results
- (c) Documentation of design revisions including approach for resolving technology hurdles
- (d) Preliminary fabrication plans for TRL 5/ 6 where the scale is larger (1:1- 1:5)
- (e) Preliminary component/subsystem/system monitoring and test plan for DOE TRL 5/ 6.
- (f) Draft manufacturing plan
- (g) Permitting application(s) and NEPA documentation as needed to meet future testing and deployment plans

Guidelines:

- Model size is expected to be 1:10 or smaller.
- Testing such as 2D flume, 3D basin, tow tank.
- Foundation concepts should be incorporated into model testing.

DOE TRL 5/6: System Integration, and Technology Laboratory Demonstration

DOE TRL 5: Basic technological components are fabricated at a scale relevant to full scale and integrated to establish and verify subsystem and system level functionality and preparation for testing in a simulated environment.

DOE TRL 6: Representative model or prototype system at a scale relevant to full scale, which is beyond that of TRL 5, is tested in a relevant environment. This stage represents a major step up in a technology's demonstrated readiness and risk mitigation and is the stage leading to open water testing.

Entry Level Criteria:

In order to qualify for funding under TRL 5/6, the applicant must have completed and demonstrated, to DOE's satisfaction, the relevant milestones identified in the previous funding category for DOE TRL 4. All successful applicants must have

- (a) constructed an appropriately scaled, representative model
- (b) conducted high fidelity testing and
- (c) demonstrated the technical and economic viability of the system or component

Devices and components with the greatest technical feasibility and commercial potential, as characterized by plausible predictions of such metrics as cost of energy, cost per installed kW, conversion efficiency, annual energy production, and operating and maintenance costs will be prioritized for funding. These estimates must be supported with commonly accepted analyses, calculations, and experimental methods. Furthermore, environmental impacts of proposed systems and/or devices must be considered and discussed. The need for greater renewable energy deployment will not override the need for environmentally conscientious and sustainable systems. Naturally, proposed technologies should also have convincing commercial potential/application.

Funding Category Overview

The objective of this funding category is to support development and interfacing/integration of a representative model/prototype system that is well beyond that of DOE TRL 4, and testing and demonstration of that model/prototype in a relevant environment. DOE strongly encourages the use of instrumented and accredited test facilities. A list of testing facilities can be found on DOE's Water Power Program's Test Facility Database:

<http://www1.eere.energy.gov/windandhydro/hydrokinetic/default.aspx>.

It is anticipated that a relevant environment for TRL 5/6 would be a simulated operational environment, however we recognize that there may be cases where it is more appropriate to test in a controlled open water location such as a lake or bay. Applicant should provide sufficient justification for using open water test sites including a monitoring/test plan.

Funding may also be applied to project development activities such as siting, environmental studies, and permitting, provided the application demonstrates that these activities will facilitate deployment.

Models must be at a relevant scale (1:1 – 1:5) to reflect the challenges and realities of the full scale (1:1) system and so that knowledge and advances gained from this stage can be directly applied to future TRLs. DOE recognizes that certain devices may not scale to meet this limit and achieve their tests goals, thus, larger or smaller scales will be considered with sufficient justification and supporting documentation.

Component performance and component interfacing is a leading mode of failure in multi-component systems such as ocean energy harvesting devices; hence device, subsystem, and system level interfacing/integration testing are important and represent a vital stage in technology development. DOE encourages all applications to include the necessary due diligence to maximize the probability for device reliability and risk mitigation prior to moving to model testing in a simulated operational environment.

Funding Category Tasks/Stage-Gate Criteria

For a device to complete the TRL 5/6 requirements, the device must be tested in water in a simulated environment and DOE strongly encourages the use of instrumented and accredited test facilities. A list of testing facilities can be found on DOE's Water Power Program's Test Facility Database: <http://www1.eere.energy.gov/windandhydro/hydrokinetic/default.aspx>.

The following reference list includes elements that are typical in DOE TRL 5/6 efforts and should be considered for inclusion in work plans. This should not be considered a comprehensive list, and the best applications will identify an appropriately robust RD&D plan that meets developer needs while also addressing DOE guidelines in this regard. It is further noted that some tasks may or may not be applicable to certain technologies/efforts and with sufficient justification, may be omitted, on a project-by-project basis. These tasks are representative of the Stage-Gate criteria to be completed before moving to DOE TRL 7/8.

- a) Development/construction of a well-evolved scale-model system, appropriately incorporating necessary design evolutions as determined by lower TRL level testing. This scale-model or prototype system is to be fully operational, capable of producing electricity and measuring performance/output. The system must also be at a scale sufficient to fully validate the component or system
- b) Component, subsystem, and system level integration and interfacing testing that incrementally verifies and validates operation and performance
- c) Testing and demonstration in a test facility capable of simulating the operational environment to:
 - i. validate operational scale functionality and design assumptions
 - ii. provide a high fidelity estimate of the system performance, including demonstrating the repeatability of the results
 - iii. verify piece-part assembly, interface and interactions
 - iv. validation of numerical models
- d) Documentation of design revisions and final design report
- e) Preliminary fabrication and testing plans relevant to TRL 7 and 8
- f) Preliminary commercial level manufacturing plan
- g) Necessary permits, licenses and testing agreements for TRL 7 and 8
- h) Accurate measurements and estimates of cost of energy, cost per installed kW, conversion efficiency, annual energy production, and operating and maintenance costs
- i) Preliminary business plan with anticipated market impact

Guidelines:

- Model size is expected to be 1:1 - 1:5 where feasible, as mentioned above.
- Testing is to be performed in a test facility capable of producing simulated waves/currents and other operational conditions while monitoring device response and performance.
- Foundation concept shall be incorporated and demonstrated.

DOE TRL 7/8: Open Water System Testing, Demonstration, and Operation

DOE TRL 7: Prototype scale components and subsystems are fabricated and integrated to establish and verify subsystem and system level functionality and preparation for testing in an open water operational environment to verify expected operation and fine tune the design prior to deployment in an operational demonstration project.

DOE TRL 8: The prototype in its final form (at or near full scale) is to be tested, and qualified in an open water environment under all expected operating conditions to demonstrate readiness for commercial deployment in a demonstration project. Testing should include extreme conditions.

Entry Level Criteria:

In order to qualify for funding in TRL 7/8, the applicant must have completed and demonstrated, with the necessary rigor and success, the relevant milestones identified in the previous funding categories, DOE TRL 5/6. All successful applicants must have

- (a) a well-evolved design, appropriately incorporating necessary design evolutions as determined by lower TRL level testing,
- (b) constructed an appropriately scaled, representative fully operational model (1:1 – 1:5) capable of producing electricity and measuring performance/output,
- (c) conducted high fidelity testing in a test facility capable of simulating the operational environment, and
- (d) demonstrated the technical and economic viability of the system or component.

Accurate test data that verifies previous performance studies and models must be available for review. Devices with the greatest technical feasibility and commercial potential as characterized by accurate estimates of (backed up by commonly accepted analyses, calculations and experimental methods) cost of energy, cost per installed kW, conversion efficiency, annual energy production, and operating and maintenance costs, will be prioritized for funding.

Funding Category Overview

The objective of this funding category is to support the testing/demonstration/quantification of the device in open water conditions near, or at full scale. (1:1 is the preferred scale, but smaller scales will be considered on a device by device basis with sufficient justification and documentation.) Funding is provided for the development, construction and operation of a fully operational prototype that is representative of the envisioned commercial system. Funding may also be applied to project development activities such as siting, environmental studies, and permitting, provided the application demonstrates that these activities will facilitate deployment.

That is, the device must include all components at (or near) full scale assembled and operating as ultimately intended. Proposed activities must reflect the incremental nature of the DOE TRL 7 and 8 stages to ensure the due rigor is followed to minimize risk and maximize chances for success in moving the device to final demonstration and qualification. Testing must therefore be incremental and start with simple “wet” tests in benign environments and move toward open water testing in maximum expected conditions. At each stage, the device must quantitatively demonstrate the device is able to meet pre defined criteria that demonstrates either a pass or failure. Device modification and refinement is expected at this stage and should be considered in funding requests and timelines. At the conclusion of this phase, the technology will have been proven to work under expected conditions and the system will be ready to move toward commercial-level qualification and deployment. Ideally, this testing will take place at one of the National Marine Renewable Energy Centers, when these Centers have fully operational test berths with established testing methodologies, protocol and data measurement equipment installed and operational.

Funding Category Tasks/Stage-Gate Criteria

The following reference list includes elements that are typical in DOE TRL 7/8 efforts and should be considered for inclusion in work plans. This should not be considered a comprehensive list, and the best applications will identify an appropriately robust RD&D plan that meets developer needs while also addressing DOE guidelines. It is further noted that some tasks may or may not be applicable to certain technologies/efforts and with sufficient justification, may be omitted, on a project-by-project basis. These tasks are representative of the Stage-Gate criteria to be completed before moving to DOE TRL 9.

- a) Development/construction of a fully operational full scale (or near full scale) prototype system that includes all components as envisioned in the commercial system. The device must incorporate necessary design evolutions as determined by lower TRL level testing. This system must be capable of producing electricity and include onboard sensors to measure performance, health and output.
- b) Open water testing, demonstration and qualification to:
 - i. validate component, subsystem, and system level integration and interfacing testing
 - ii. validate operation, performance and design assumptions
 - iii. assess and verify all operation and maintenance procedures
 - iv. monitor and analyze electrical quality and power take-off performance
 - v. measure and quantify environmental/ecological interactions and impacts
 - vi. assess reliability and survivability - MTBF, corrosion, cavitation, etc
 - vii. final validation of numerical models

Data sets must be collected that are sufficient and accurately measure system performance to compare with engineering estimates, numerical models, and other previous studies. Tests must also include both typical and extreme conditions to fully demonstrate device operation.

- c) Grid connection design and testing as facilities and infrastructure become available
- d) Design and planning for deployment of multiple devices
- e) Documentation of design revisions and final design report
- f) Refined commercial level manufacturing plan and economic model
- g) Final measurements and estimates of cost of energy, cost per installed kW, conversion efficiency, annual energy production, and operating and maintenance costs
- h) Database of in-situ engineering/performance/reliability data and environmental measurements including documentation of environmental effect and mitigation for potential negative impact

Guidelines:

- Model scale is expected to be at or near full scale (1:1 – 1:2).
- Testing to be initially performed in water at relatively benign location and then moved to the open water in fully exposed and representative operating environments.
- Final foundation/mooring design shall be incorporated into model testing.

A. Type of Award Instrument

- DOE anticipates awarding grants under this Topic Area.

B. Estimated Funding

- Approximately \$ 36.72 M is expected to be available for new awards under this Topic Area (See Tables 1-3).

C. Maximum and Minimum Award Size

- Ceiling (i.e., the maximum amount for an individual award made under this Topic Area): \$10.0 M for systems; \$600k for components (See Tables 1-3).
- Floor (i.e., the minimum amount for an individual award made under this Topic Area): None

D. Expected Number of Awards

- DOE anticipates making up to 18 awards under Topic Area 2 (11 for systems, 7 for components).

E. Anticipated Award Size

- DOE anticipates that awards will be in the \$ 400k - \$10M range for the total project period for systems (See Tables 1-3).
- DOE anticipates that awards will be in the \$ 240k - \$600k range for the total project period for components (See Tables 1-3).

F. Period of Performance

- **TRL 4** - DOE anticipates making awards that will run for up to 18 months.
- **TRL 5/6** - DOE anticipates making awards that will run for up to 18 months for components and up to 24 months for systems and will include FY 2010 and FY 2012 funds. Component projects will be one budget period with half the funding obligated in FY 2010 and the remaining budget obligated in FY 2012. System projects will consist of two budget periods with the first being 12 months and include the FY 2010 funding. The second budget period will be an additional 12 months and include the FY 2012 funding. Continuation funding is contingent on (1) availability of funds; (2) substantial progress towards meeting the objectives of the project; (3) submittal of required reports; (4) compliance with the terms and conditions of the award; and/or (5) a go/no-go decision on funding for budget period two, which will occur upon the completion of the first budget period of the award and a review by DOE of the project progress. DOE reserves the right to not extend the award period into the second budget period based on this progress review and the go/no-go determination. Applications should address the entire project period (18 months for components, 24 months for systems).
- **TRL 7/8** - DOE anticipates making awards that will run for up to 36 months over two budget periods and will include FY 2010, FY 2012, and FY 2013 funds. The first budget period will be 24 months and include the FY 2010 and FY 2012 funding. The second budget period will be 12 months and include the FY 2013 funding. The second budget period will be an additional 12 months and include the FY 2012 funding. Continuation funding is contingent on (1) availability of funds; (2) substantial progress towards meeting the objectives of the project; (3) submittal of required reports; (4) compliance with the terms and conditions of the award; and/or (5) a go/no-go decision on funding for budget period two, which will occur upon the completion of the first budget period of the award and a review by DOE of the

project progress. DOE reserves the right to not extend the award period into the second budget period based on this progress review and the go/no-go determination. Applications should address the entire project period (36 months).

G. Type of Application

- DOE will accept only new applications under this announcement (i.e., applications for renewals of existing DOE funded projects will not be considered).

SECTION III - ELIGIBILITY INFORMATION (TOPIC AREA 2)

A. Eligible Applicants

Eligibility for Topic Area 2 is restricted to industry members or industry-led partnerships. The industry member or industry lead can be a technology developer, project developer, private utility, public municipal or cooperative utility, privately-funded research organization, or services company. Only one application should be submitted by the lead member on behalf of the partnership.

A technology developer is defined as a company engaged in the research, development and/or deployment of a MHK technology.

Federal and State entities will not be considered for an award under this Funding Opportunity. National Labs will not be considered for an award, nor will they be allowed to partner.

B. Cost Sharing

TRL 4

The cost share must be at least 20% of the total allowable costs of the project (i.e., the sum of the Government share and the recipient share of allowable costs equals the total allowable cost of the project) and must come from non-Federal sources unless otherwise allowed by law. (See 10 CFR Part 600 for the applicable cost sharing requirements.)

TRL 5/6

The cost share must be at least 40% of the total allowable costs of the project (i.e., the sum of the Government share and the recipient share of allowable costs equals the total allowable cost of the project) and must come from non-Federal sources unless otherwise allowed by law. (See 10 CFR Part 600 for the applicable cost sharing requirements.)

TRL 7/8

The cost share must be at least 50% of the total allowable costs of the project (i.e., the sum of the Government share and the recipient share of allowable costs equals the total allowable cost of the project) and must come from non-Federal sources unless otherwise allowed by law. (See 10 CFR Part 600 for the applicable cost sharing requirements.)

C. Other Eligibility Requirements

Federally Funded Research and Development Center (FFRDC) Contractors

FFRDC contractors are not eligible for an award under this announcement. FFRDC contractors may not be proposed as a team member or subcontractor on another entity's

application. Applicants shall not contact FFRDCs and shall not seek to obtain or submit letters of support or commitment from FFRDCs. Following selection, DOE can facilitate technical assistance partnerships with an FFRDC. Technical Assistance may be provided between DOE, the organization selected to receive the Technical Assistance, and the team members providing the Technical Assistance.

The proposed scope of work needs to be executable without FFRDC support, as it is expected that the application's merits must stand alone without potential FFRDC participation. Any proposed FFRDC roles or tasks must include an explanation as to how the additional work supplements the project. The program will evaluate the FFRDC participation request and make determinations as a function of resources and project needs.

D. MULTIPLE PRINCIPAL INVESTIGATORS

The assignment and use of multiple Principal Investigators (PIs) in projects awarded under this FOA is allowed. The applicant, whether a single organization or team/partnership/consortium, must however indicate in the application if the project will include multiple PIs (See Part III). The decision to use multiple PIs for a project is the sole responsibility of the applicant. If multiple PIs will be designated, the application must identify in the application the Contact PI/Project Coordinator and provide a "Coordination and Management Plan" that describes the organization structure of the project as it pertains to the designation of multiple PIs. This plan should, at a minimum, include:

- Process for making decisions on scientific/technical direction
- Publications
- Intellectual property issues
- Communication plans
- Procedures for resolving conflicts
- PIs' roles and administrative, technical and scientific responsibilities for the project

SECTION IV - APPLICATION REVIEW INFORMATION (TOPIC AREA 2)

A. REVIEW CRITERIA

1. Initial Review Criteria

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

To be eligible, the applicant must first self-categorize their technology in the appropriate TRL Category. Applicants that do not provide sufficient justification for the TRL Category in which they self categorize, or self categorize their technology in an inappropriately high TRL Category, will be rejected. Successful applications will provide substantial detail regarding research, development, test and evaluation (RD&D) efforts that (a) have already been undertaken and thus

support the self-categorized TRL Category, and (b) will be undertaken to advance the technology along the TRL scale. Furthermore, the applicant should provide a defined commercialization pathway that shows the next steps to be undertaken that will lead to successful commercialization.

2. Merit Review Criteria

The following criteria will be used to evaluate Applications within Topic Area 2:
Technology Readiness Advancement Initiative (TRLs 4-9)

Criterion 1: Potential Market Impact / Advancement **Weight: [30%]**

- Identification of potential markets and applications for the proposed technology.
- Likelihood that proposed technology will result in broadly applicable deployment – application should contain a clear explanation of intended market impact by 2020.
- Potential to rapidly accelerate MHK technology deployment and achieve competitive COE.
- Comprehensiveness of plan to disseminate results of research to others in the water power industry (may include conferences, papers, workshops, and web-based information sharing) in a timely manner (i.e. publications, technical presentations, and patent filings).

Criterion 2: Technical Approach **Weight: [30%]**

- Soundness of the technical approach to advance technology readiness.
- Comprehensiveness of plan to produce appropriate data (test plan and analysis) to demonstrate technology advancement to higher TRL designation. Plan should consider DOE recommended guidelines as applicable (see Appendix D for matrix).
- Adequacy of the identification and assessment of critical success factors, risks and barriers, as well as plans for mitigation (to include both technical and environmental risk mitigation). Degree to which plans include timely compliance with all applicable regulatory requirements, including licensing or other development permits.
- Credibility of approach to predict cost of energy, cost per installed kW, conversion efficiency, annual energy production, and operating and maintenance costs.

Criterion 3: Qualifications and Resources **Weight: [30%]**

- Capabilities, experience, qualifications, and credentials of team members, including the credibility of applicant's team experience and record of success in technical innovation and performance.
- Plan to leverage appropriate equipment, laboratory and demonstration facilities, analytic support, and other necessary resources for performing the proposed project.
- Demonstrated level of the involvement of private industry to ensure rapid introduction of technologies to the marketplace.
- Demonstrated support of each team member's participation.

Criterion 4: Project Management Plan **Weight: [10%]**

- The degree to which the plan is clear and well-organized in responding to the FOA objectives, including key elements such as a work breakdown structure, a viable and achievable resource-loaded schedule, appropriately defined objectives, and well defined tasks.
- The viability, completeness and adequacy of the proposed project lifecycle budgeted resources and the cost profile. This includes the adequacy, appropriateness, and reasonableness of the proposed resources (budget under various categories), and resource distribution to the team members to complete the proposed project and accomplish the stated objectives.
- The extent to which the proposed management controls demonstrate adequate ability to mitigate potential project issues and risks. This includes the viability of the process for monitoring and evaluating the project's progress and performance against the proposed objectives.
- The reasonableness of the schedule and the technical quality of critical path planning. This includes the adequacy and value of proposed milestones, and performance metrics.

3. Other Selection Factors

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

1. Technological diversity of projects (includes TRL level, resource, component vs systems, etc.)
2. Cost share offered above the minimum amount required
3. Significance of environmental considerations
4. Alignment with the mission and goals of the Wind and Hydropower Technologies Program

B. Review and Selection Process

1. Merit Review

Applications that pass the initial review will be subjected to a merit review in accordance with the guidance provided in the "Department of Energy Merit Review Guide for Financial Assistance". This guide is available at: <http://www.management.energy.gov/documents/meritrev.pdf>.

It is very important that the Project Abstract and Project Narrative file, that will be used during the Merit Review Process, do not contain any Personally Identifiable Information as described in Appendix B.

2. Selection

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

3. Discussions and Award

The Government may enter into discussions with a selected applicant for any reason deemed necessary, including, but not limited to: (1) the budget is not appropriate or reasonable for the requirement; (2) only a portion of the application is selected for award; (3) the Government needs additional information to determine that the recipient is capable of complying with the requirements in 10 CFR part 600; and/or (4) special terms and conditions are required. Failure to resolve satisfactorily the issues identified by the Government will preclude award to the applicant.

C. Anticipated Notice of Selection and Award Dates

DOE anticipates notifying applicants selected for award by the end of August 2010 and making awards by the end of September 2010.

SECTION V – APPLICATION AND SUBMISSION INFORMATION (ALL TOPICS)

A. Address to Request Application Forms

Application forms and instructions are available at Grants.gov. To access these materials, go to <http://www.grants.gov>, select “Apply for Grants,” and then select “Download Application Package.” Enter the CFDA and/or the funding opportunity number located on the cover of this announcement and then follow the prompts to download the application package. (Also see Section H of this Part below.)

B. Letter of Intent and Pre-Application

1. Letter of Intent

- Letters of Intent are not required.

2. Pre-application

- A pre-application is not required.

C. Content and Form of Application

You must complete the mandatory forms and any applicable optional forms, in accordance with the instructions on the forms and the additional instructions below, as required by this FOA. **Files that are attached to the forms must be in Adobe Portable Document Format (PDF) unless otherwise specified in this announcement.**

Once the forms below have been completed, save the Application Package in a single file, using up to 10 letters of the Applicant’s Organization Name as the file name (e.g., Company). If your organization is submitting more than one Application, you must identify an application number at the end of each file name (e.g., Company-1). **If your organization is submitting Applications to more than one topic areas, you must identify an application number and the Topic Area Number at the end of each file name (e.g., Company-1-Topic1).**

1. SF 424 - Application for Federal Assistance

Complete this form first to populate data in other forms. Complete all required fields in accordance with the instructions on the form. The list of certifications and assurances referenced in Field 21 can be found at http://management.energy.gov/business_doe/business_forms.htm, under Certifications and Assurances.

2. Project/Performance Site Location(s)

Indicate the primary site where the work will be performed. If a portion of the project will be performed at any other site(s), identify the site location(s) in the blocks provided. **Note that the Project/Performance Site Congressional District is entered in the format of the 2 digit state code followed by a dash and a 3 digit Congressional district code; for example, VA-001.** In the electronic form, hover the pointer over this field for additional instructions.

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

3. Other Attachments Form

Submit the following files with your application and attach them to the Other Attachments Form. Click on “Add Mandatory Other Attachment” to attach the Project Narrative. Click on “Add Optional Other Attachment,” to attach the other files.

a. Project Summary Sheet

The project summary/abstract must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained document that identifies the name of the applicant, the project director/principal investigator(s), the project title, the objectives of the project, a description of the project, including methods to be employed, the potential impact of the project (i.e., benefits, outcomes), and major participants (for collaborative projects). This document must not include any proprietary or sensitive business information, as the Department may make it available to the public. The project summary must not exceed 2 pages when printed using standard 8.5” by 11” paper, single spaced, with font not smaller than 11 point. **Applicants must use the PROJECT SUMMARY SHEET TEMPLATE, which can be found in Appendix F.** Save this information in a file named “Summary.pdf,” and click on “Add Optional Other Attachment” to attach.

b. Project Narrative File - Mandatory Other Attachment

The project narrative must not exceed 20 pages, including cover page, table of contents, charts, graphs, maps, photographs, and other pictorial presentations, when printed using standard 8.5” by 11” paper with 1 inch margins (top, bottom, left, and right), single spaced. EVALUATORS WILL REVIEW ONLY THE NUMBER OF PAGES SPECIFIED IN THE PRECEDING SENTENCE. The font must not be smaller than 11 point. Do not include any Internet addresses (URLs) that provide information necessary to review the application. See Section VIII.D for instructions on how to mark proprietary application information. Save the information in a single file named “Project.pdf,” and click on “Add Mandatory Other Attachment” to attach.

The project narrative must include:

- Project Objectives.
This section should provide a clear, concise statement of the specific objectives/aims of the proposed project.
- Merit Review Criteria Discussion.
The section should be formatted to address each of the merit review criterion and sub-criterion listed in Part V. A. below. Provide sufficient information so that reviewers will be able to evaluate the application in accordance with these merit review criteria. **DOE WILL EVALUATE AND CONSIDER ONLY THOSE APPLICATIONS THAT ADDRESS SEPARATELY EACH OF THE MERIT REVIEW CRITERION AND SUB-CRITERION.**
- Project Timetable:
This section should outline as a function of time, year by year, all the important activities or phases of the project, including any activities planned beyond the project period. Successful applicants must use this project timetable to report progress.
- Relevance and Outcomes/Impacts:
This section should explain the relevance of the effort to the objectives in the program announcement and the expected outcomes and/or impacts. The justification for the proposed project should include a clear statement of the importance of the project in terms of the utility of the outcomes and the target community of beneficiaries.
- Roles of Participants:
For multi-organizational or multi-investigator projects, describe the roles and the work to be performed by each participant/investigator, business agreements between the applicant and participants, and how the various efforts will be integrated and managed.
- Facilities and Other Resources:
Identify the facilities (e.g., office, laboratory, computer, etc.) to be used at each performance site listed, and, if appropriate, indicate their capacities pertinent capabilities, relative proximity, and extent of availability to the project. Describe only those resources that are directly applicable to the proposed work. Provide any information describing the other resources available to the project, such as machine and electronics shops.
- Equipment:
List important items of equipment already available for this project, and if appropriate, note the location and pertinent capabilities of each. If you are proposing to acquire equipment, describe comparable equipment, if any, already at your organization and explain why it cannot be used.
- Bibliography and References, if applicable:
Provide a bibliography for any references cited in the Project Narrative section. This section must include only bibliographic citations.

All the components of your Project Narrative (listed above) must be within the Narrative page limit specified in paragraph b. above. Documents listed below may be included as clearly marked appendices to your Narrative and will not count towards the Project Narrative page limit. Please note that some of the required documents listed below may have their own page limits to which you must adhere.

c. Resume File

Provide a resume for each key person proposed, including subawardees and consultants if they meet the definition of key person. A key person is any individual who contributes in a substantive, measurable way to the execution of the project. Save all resumes in a single file named “resume.pdf” and click on “Add Optional Other Attachment” to attach. The biographical information for each resume must not exceed 2 pages when printed on 8.5” by 11” paper with 1 inch margins (top, bottom, left, and right), single spaced, with font not smaller than 11 point and should include the following information, if applicable:

Education and Training. Undergraduate, graduate and postdoctoral training; provide institution, major/area, degree and year.

Professional Experience.: Beginning with the current position list, in chronological order, professional/academic positions with a brief description.

Publications. Provide a list of up to 10 publications most closely related to the proposed project. For each publication, identify the names of all authors (in the same sequence in which they appear in the publication), the article title, book or journal title, volume number, page numbers, year of publication, and website address, if available electronically.

Patents, copyrights and software systems developed may be provided in addition to, or substituted for, publications.

Synergistic Activities. List no more than 5 professional and scholarly activities related to the effort proposed.

- Of the key personnel identified in this file, indicate the Principal Investigator(s) (PI).
- For Multiple Principal Investigators:
The applicant, whether a single organization or team/partnership/consortium, must indicate if the project will include multiple PIs. The decision to use multiple PIs for a project is the sole responsibility of the applicant. If multiple PIs will be designated, the application must identify the Contact PI/Project Coordinator and provide a “Coordination and Management Plan” that describes the organization structure of the project as it pertains to the designation of multiple PIs. This plan should, at a minimum, include:
 - Process for making decisions on scientific/technical direction;
 - Publications;
 - Intellectual property issues;
 - Communication plans;
 - Procedures for resolving conflicts; and
 - PIs’ roles and administrative, technical and scientific responsibilities for the project.

The resume file does not have a page limitation.

d. Budget File

SF 424 A Excel, Budget Information – Non-Construction Programs File

You must provide a separate budget for each year of support requested and a cumulative budget for the total project period. Use the SF 424 A Excel, “Budget Information – Non Construction Programs” form on the DOE Financial Assistance Forms Page at http://management.energy.gov/business_doe/business_forms.htm. You may request funds under any of the Object Class Categories as long as the item and amount are necessary to perform the proposed work, meet all the criteria for allowability under the applicable Federal cost principles, and are not prohibited by the funding restrictions in this announcement (see Section IV, G). Save the information in a single file named “SF424A.xls,” and click on “Add Optional Other Attachment” to attach.

- e. Budget Justification File** You must justify the costs proposed in each Object Class Category/Cost Classification category (e.g., identify key persons and personnel categories and the estimated costs for each person or category; provide a list of equipment and cost of each item; identify proposed subaward/consultant work and cost of each subaward/consultant; describe purpose of proposed travel, number of travelers and number of travel days; list general categories of supplies and amount for each category; and provide any other information you wish to support your budget). Provide the name of your cognizant/oversight agency, if you have one, and the name and phone number of the individual responsible for negotiating your indirect rates. If cost share is required, you must have a letter from each third party contributing cost share (i.e., a party other than the organization submitting the application) stating that the third party is committed to providing a specific minimum dollar amount of cost share. In the budget justification, identify the following information for each third party contributing cost share: (1) the name of the organization; (2) the proposed dollar amount to be provided; (3) the amount as a percentage of the total project cost; and (4) the proposed type of cost share – cash, services, or property. By submitting your application, you are providing assurance that you have signed letters of commitment. Successful applicants will be required to submit these signed letters of commitment. Provide budget justification for SF 424A Budget. A budget justification form can be found at <https://www.eere-pmc.energy.gov/Forms.aspx>. Save the budget justification information in a single file named “Budget.xls,” and click on “Add Optional Other Attachment” to attach.

f. Letters of Commitment

If cost share is required, you must have a letter from each third party contributing cost share (i.e., a party other than the organization submitting the application) stating that the third party is committed to providing a specific minimum dollar amount of cost share. **All Letters of Commitment must be attached as an Appendix to the Project Narrative File.** Identify the following information for each third party contributing cost share: (1) the name of the organization; (2) the proposed dollar amount to be provided; (3) the amount as a percentage of the total project cost; and (4) the proposed type of cost share – cash, services, or property. Letters of Commitment from parties participating in the project, exclusive of vendors, who will not be contributing cost share, but will be integral to the success of the project must be included as part of this Appendix to the Narrative. By submitting your application, you are providing assurance that you have signed letters of commitment. Successful

applicants will be required to submit these signed letters of commitment. Letters of Commitment will not count towards the Project Narrative page limit.

g. Previous Performance Test Data

Applications should include accurate test data that verifies previous performance studies and models. Test data should show the technical feasibility and commercial potential as characterized by accurate estimates (backed up by commonly accepted analyses, calculations and experimental methods) cost of energy, cost per installed kW, conversion efficiency, annual energy production, and operating and maintenance costs. **Past Performance Test Data must be attached as an Appendix to the Project Narrative File and must not exceed 20 pages when printed using standard 8.5” by 11” paper with 1 inch margins (top, bottom, left, and right), single spaced.** Past performance Test Data will not count towards the Project Narrative page limit.

h. Subaward Budget File(s)

You must provide a separate budget (i.e., budget for each budget year and a cumulative budget) for each subawardee that is expected to perform work estimated to be more than \$100,000 or 50 percent of the total work effort (whichever is less). Use the SF 424 A Excel for Non Construction Programs or the SF 424 C Excel for Construction Programs. These forms are found on the DOE Financial Assistance Forms Page at http://management.energy.gov/business_doe/business_forms.htm. Save each Subaward budget in a separate file. Use up to 10 letters of the subawardee’s name (plus 424.xls) as the file name (e.g., company424.xls or energyres424.xls). Click on “Add Optional Other Attachment” to attach each file.

A budget justification for the subaward budget is also required. The budget justification must include the same justification information described in paragraph e. above.

i. Environmental Questionnaire

For TRL 7/8, you must complete the environmental questionnaire at <https://www.eere-pmc.energy.gov/NEPA.asp>. Save the questionnaire in a single file named “Env.pdf” and click on “Add Attachments” in Field 11 to attach.

For TRL 1-6, the environmental questionnaire will be required from selected applicants only.

j. SF-LLL Disclosure of Lobbying Activities

If applicable, complete SF- LLL. Applicability: If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the grant/cooperative agreement, you must complete and submit Standard Form - LLL, "Disclosure Form to Report Lobbying." The form is available in the optional document box on the Adobe Application Package attached to this FOA.

Summary of Required Forms/Files

Your application must include the following documents:

Name of Document	Format	File Name
SF 424 - Application for Federal Assistance	Part of Adobe Application Package	SF424Application.pdf
Project/Performance Site Location(s)	Part of Adobe Application Package	See Instructions
Other Attachments Form: Attach the following files to this form:	Part of Adobe Application Package	See Instructions
Project Summary Sheet	PDF	Summary.pdf
Project Narrative File, including required appendices (e.g. Letters of Commitment, Past Performance Test Data)	PDF	Project.pdf
Resume File	PDF	Resume.pdf
SF 424A Excel – Budget Information for Non-Construction Programs File	Excel	SF424A.xls
Budget Justification File	Excel	See Instructions
Subaward Budget File(s), if applicable Budget Justification(s), if applicable	Excel for Budget PDF for Justification	See Instructions
Environmental Questionnaire, if applicable	PDF	See Instructions
SF-LLL Disclosure of Lobbying Activities	PDF	SF-LLL.pdf

D. Submissions from Successful Applicants

If selected for award, DOE reserves the right to request additional or clarifying information for any reason deemed necessary, including but not limited to:

- Indirect cost information
- Other budget information
- Commitment Letter from Third Parties Contributing to Cost Share, if applicable
- Environmental Questionnaire

E. Submission Dates and Times

1. Pre-application Due Date

- Pre-applications Are Not Required

2. Application Due Date

June 7th, 2010, 11:59 PM

- Applications must be received by 6/07/2010 not later than 11:59 PM Eastern Time. You are encouraged to transmit your application well before the deadline.

APPLICATIONS RECEIVED AFTER THE DEADLINE WILL NOT BE REVIEWED OR CONSIDERED FOR AWARD.

F. Intergovernmental Review

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

G. Funding Restrictions

Cost Principles. Costs must be allowable in accordance with the applicable Federal cost principles referenced in 10 CFR Part 600. The cost principles for commercial organization are in FAR Part 31.

Pre-award Costs. Recipients may charge to an award resulting from this announcement pre-award costs that were incurred within the ninety (90) calendar day period immediately preceding the effective date of the award, if the costs are allowable in accordance with the applicable Federal cost principles referenced in 10 CFR part 600. Recipients must obtain the prior approval of the contracting officer for any pre-award costs that are for periods greater than this 90 day calendar period.

Pre-award costs are incurred at the applicant's risk. DOE is under no obligation to reimburse such costs if for any reason the applicant does not receive an award or if the award is made for a lesser amount than the applicant expected.

H. Submission and Registration Requirements

1. Where to Submit

APPLICATIONS MUST BE SUBMITTED THROUGH GRANTS.GOV TO BE CONSIDERED FOR AWARD UNDER THIS ANNOUNCEMENT. You cannot submit an application through Grants.gov unless you are registered. Please read the registration requirements below carefully and start the process immediately. Submit electronic applications through the “Apply for Grants” function at www.Grants.gov.

If you have problems completing the registration process or submitting your application, call Grants.gov at 1-800-518-4726 (7:00 a.m. to 9:00 p.m., Eastern) or send an email to support@grants.gov. It is the responsibility of the applicant to verify successful transmission, prior to the Application due date and time.

2. Registration Process Requirements

To submit an application in response to this FOA, Applicants must be registered with Grants.gov. Register in Grants.gov at <http://www.grants.gov/>. See the Organization Registration User Guide at <http://www.grants.gov/assets/OrgRegUserGuide.pdf>. The Applicant User Guide is at <http://www07.grants.gov/assets/ApplicantUserGuide.pdf>.

Allow at least 21 days to complete all registration requirements.

Before you can register with Grants.gov, you will need the following:

- a. Your organization's Dun and Bradstreet Data Universal Numbering System (DUNS) (including plus 4 extension if applicable). To check whether your organization has a DUNS or if your organization requires a DUNS, search for the number or request one at <http://fedgov.dnb.com/webform/displayHomePage.do>.
- b. A federal Central Contractor Registration (CCR) account. If your organization is not currently registered with CCR, please register at www.ccr.gov before continuing with your Grants.gov registration. Designating an Electronic Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in CCR registration. These items are needed to submit applications in Grants.gov. CCR registration must be updated annually.
- c. Registration in FedConnect at <https://www.fedconnect.net/>; use "Register as a Vendor" link. To create an organization account, your organization's CCR MPIN is required; obtain the MPIN from your organization's Electronic Business Point of Contact. Refer to the FedConnect Quick Start guide at the website.

3. Electronic Authorization of Applications and Award Documents

Submission of an application and supplemental information under this announcement through electronic systems used by the Department of Energy, including Grants.gov and FedConnect, constitutes the authorized representative's approval and electronic signature.

Submission of award documents, including modifications, through electronic systems used by the Department of Energy, including FedConnect, constitutes the authorized representative's approval and acceptance of the terms and conditions of the award. Award acknowledgement via FedConnect constitutes the authorized representative's electronic signature.

SECTION VI - AWARD ADMINISTRATION INFORMATION (ALL TOPIC AREAS)

A. Award Notices

1. Notice of Selection

DOE will notify applicants selected for award. The notice of selection is not an authorization to begin performance. (See Section IV.G with respect to the allowability of pre-award costs.)

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

2. Notice of Award

A Financial Assistance Award or Assistance Agreement issued by the Contracting Officer is the authorizing award document. It normally includes, either as an attachment or by reference: (1) Special Terms and Conditions; (2) Applicable program regulations, if any; (3) Application as approved by DOE; (4) DOE assistance regulations at 10 CFR part 600; (5) National Policy Assurances To Be Incorporated As Award Terms; (6)

Budget Summary; (7) Federal Assistance Reporting Checklist, which identifies the reporting requirements; and (8) Statement of Project Objectives.

For grants and cooperative agreements made to universities, non-profits and other entities subject to OMB Circular A-110, the Award also includes the Research Terms and Conditions and the DOE Agency Specific Requirements located at:

<http://www.nsf.gov/bfa/dias/policy/rtc/index.jsp>.

B. Administrative and National Policy Requirements

1. Administrative Requirements

The administrative requirements for DOE grants and cooperative agreements are contained in 10 CFR part 600 (See: <http://ecfr.gpoaccess.gov>). Grants and cooperative agreements made to universities, non-profits and other entities subject to OMB Circular A-110 are subject to the Research Terms and Conditions located on the National Science Foundation web site at: <http://www.nsf.gov/bfa/dias/policy/rtc/index.jsp>.

2. Special Terms and Conditions and National Policy Requirements

The DOE Special Terms and Conditions for Use in Most Grants and Cooperative Agreements are located at

http://management.energy.gov/business_doe/business_forms.htm

<http://www.management.energy.gov/documents/specialtermsandcondition308.pdf>.

The National Policy Assurances To Be Incorporated As Award Terms are located at

http://management.energy.gov/business_doe/business_forms.htm

http://management.energy.gov/business_doe/1374.htm.

3. Intellectual Property Provisions

The standard DOE financial assistance intellectual property provisions applicable to the various types of recipients are located at

http://www.gc.doe.gov/financial_assistance_awards.htm.

C. Reporting

Reporting requirements are identified on the Federal Assistance Reporting Checklist, DOE F 4600.2, attached to the award agreement. For a sample Checklist, see

<http://management.energy.gov/documents/DOEF46002PolicyVersion.pdf>.

SECTION VII - QUESTIONS (ALL TOPIC AREAS)

A. Questions

Questions regarding the content of the announcement must be submitted through the FedConnect system. You must register with FedConnect to respond as an interested party to submit questions, and to review responses to questions. It is recommended that you register as soon after release of the FOA as possible to have the benefit of all responses. More information is available at

https://www.fedconnect.net/Fedconnect/PublicPages/FedConnect_Ready_Set_Go.pdf.

DOE will try to respond to a question within 3 business days, unless a similar question and

answer have already been posted on the website.

Questions pertaining to the **submission of applications through Grants.gov** should be directed by e-mail to support@grants.gov or by phone to 1-800-518-4726. The Grants.gov Helpdesk is available 7:00 a.m. to 9:00 p.m. Eastern Time.

SECTION VIII - OTHER INFORMATION (ALL TOPIC AREAS)

A. Modifications

Notices of any modifications to this announcement will be posted on Grants.gov. When you download the application at Grants.gov, you can register to receive notifications of changes through Grants.gov.

Notices of any modifications to this announcement will also be available in the FedConnect system. You can receive an email when a modification or an announcement message is posted by registering with FedConnect as an interested party for this FOA. It is recommended that you register as soon after the release of the FOA as possible to ensure you receive timely notice of any modifications or other announcements. More information is available at <http://www.fedconnect.net> and https://www.fedconnect.net/Fedconnect/PublicPages/FedConnect_Ready_Set_Go.pdf

B. Government Right to Reject or Negotiate

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

C. Commitment of Public Funds

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

D. Proprietary Application Information

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

“The data contained in pages _____ of this application have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this applicant receives an award as a result of or in connection with the submission of this application, DOE shall have the right to use or disclose the data herein to the extent provided in the award. This restriction does not limit

the government’s right to use or disclose data obtained without restriction from any source, including the applicant.”

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

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

E. Evaluation and Administration by Non-Federal Personnel

In conducting the merit review evaluation, the Government may seek the advice of qualified non-Federal personnel as reviewers. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The applicant, by submitting its application, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign conflict of interest and non-disclosure agreements prior to reviewing an application. Non-Federal personnel conducting administrative activities must sign a non-disclosure agreement.

F. Intellectual Property Developed under this Program

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

Rights in Technical Data. Normally, the government has unlimited rights in technical data created under a DOE agreement. Delivery or third party licensing of proprietary software or data developed solely at private expense will not normally be required except as specifically negotiated in a particular agreement to satisfy DOE’s own needs or to ensure the commercialization of technology developed under a DOE agreement.

Special Protected Data Statutes. This program is covered by a special protected data statute. The provisions of the statute provide for the protection from public disclosure, for a period of up to five years from the date of its development, of first-produced data that would be trade secret, or commercial or financial information that is privileged or confidential, if the information had been obtained from a non-Federal party. Generally, the provision entitled, Rights in Data – Programs Covered Under Special Protected Data Statutes, (10 CFR 600 Appendix A to Subpart D), will apply to an award made under this announcement. This provision will identify data or categories of data first produced in the performance of the award that will be made available to the public, notwithstanding the statutory authority to withhold data from public dissemination, and may also identify data that will be recognized by the parties as protected data.

DOE will work with the selected applicants during negotiation of the award to define data that DOE may request to distribute among DOE and DOE National Labs and the data DOE

may want to disseminate to the public. For example, performance data may be requested to better inform National Lab development of performance models. Please see Appendix G for example data produced under an award which DOE may request.

G. Notice of Right to Request Patent Waiver

Applicants may request a waiver of all or any part of the rights of the United States in inventions conceived or first actually reduced to practice in performance of an agreement as a result of this announcement, in advance of or within 30 days after the effective date of the award. Even if such advance waiver is not requested or the request is denied, the recipient will have a continuing right under the award to request a waiver of the rights of the United States in identified inventions, i.e., individual inventions conceived or first actually reduced to practice in performance of the award. Any patent waiver that may be granted is subject to certain terms and conditions in 10 CFR 784. See http://gc.doe.gov/documents/gc62_advance.pdf and <http://www.gc.doe.gov/documents/patwaivclau.pdf>.

Domestic small businesses and domestic nonprofit organizations will receive the patent rights clause at 37 CFR 401.14, i.e., the implementation of the Bayh-Dole Act. This clause permits domestic small business and domestic nonprofit organizations to retain title to subject inventions. Therefore, small businesses and nonprofit organizations do not need to request a waiver.

H. Notice Regarding Eligible/Ineligible Activities

Eligible activities under this program include those which 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.

I. Notice of Right to Conduct a Review of Financial Capability

DOE 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).

J. Notice of Potential Disclosure under Freedom of Information Act

Applicants should be advised that identifying information regarding all applicants, including applicant names and/or points of contact, may be subject to public disclosure under the Freedom of Information Act, whether or not such applicants are selected for negotiation of award.

REFERENCE MATERIAL

Appendix A – Definitions

“**Amendment**” means a revision to a Funding Opportunity Announcement

"**Applicant**" means the legal entity or individual signing the Application. This entity or individual may be one organization or a single entity representing a group of organizations (such as a Consortium) that has chosen to submit a single Application in response to a Funding Opportunity Announcement.

"**Application**" means the documentation submitted in response to a Funding Opportunity Announcement.

“**Authorized Organization Representative (AOR)**” is the person with assigned privileges who is authorized to submit grant applications through Grants.gov on behalf of an organization. The privileges are assigned by the organization’s E-Business Point of Contact designated in the CCR.

"**Award**" means the written documentation executed by a DOE Contracting Officer, after an Applicant is selected, which contains the negotiated terms and conditions for providing Financial Assistance to the Applicant. A Financial Assistance Award may be either a Grant or a Cooperative Agreement.

"**Budget**" means the cost expenditure plan submitted in the Application, including both the DOE contribution and the Applicant Cost Share.

“**Central Contractor Registration (CCR)**” is the primary database which collects, validates, stores and disseminates data in support of agency missions. Funding Opportunity Announcements which require application submission through FedConnect or Grants.gov require that the organization first be registered in the CCR at <http://www.grants.gov/CCRRegister>.

"**Consortium (plural consortia)**" means the group of organizations or individuals that have chosen to submit a single Application in response to a Funding Opportunity Announcement.

"**Contracting Officer**" means the DOE official authorized to execute Awards on behalf of DOE and who is responsible for the business management and non-program aspects of the Financial Assistance process.

"**Cooperative Agreement**" means a Financial Assistance instrument used by DOE to transfer money or property when the principal purpose of the transaction is to accomplish a public purpose of support or stimulation authorized by Federal statute, and Substantial Involvement (see definition below) is anticipated between DOE and the Applicant during the performance of the contemplated activity.

"**Cost Sharing**" means the respective share of Total Project Costs to be contributed by the Applicant and by DOE. The percentage of Applicant Cost Share is to be applied to the Total Project Cost (i.e., the sum of Applicant plus DOE Cost Shares) rather than to the DOE contribution alone.

“Credential Provider” is an organization that validates the electronic identity of an individual through electronic credentials, PINS, and passwords for Grants.gov and FedConnect. Funding Opportunity Announcements which require application submission through Grants.gov require that the individual applying on behalf of an organization first be registered with the Credential Provider at <https://apply.grants.gov/OrcRegister>.

“Data Universal Numbering System (DUNS) Number” is a unique nine-character identification number issued by Dun and Bradstreet (D&B). Organizations must have a DUNS number prior to registering in the CCR. Call 1-866-705-5711 to receive one free of charge. http://www.grants.gov/applicants/request_duns_number.jsp

“E-Business Point of Contact (POC)” is the individual who is designated as the Electronic Business Point of Contact in the CCR registration. This person is the sole authority of the organization with the capability of designating or revoking an individual’s ability to conduct CCR transactions.

“E-Find” is a Grants.gov webpage where you can search for Federal Funding Opportunities in FedGrants. <http://www.grants.gov/search/searchHome.do>

"Financial Assistance" means the transfer of money or property to an Applicant or Participant to accomplish a public purpose of support authorized by Federal statute through Grants or Cooperative Agreements and sub-awards. For DOE, it does not include direct loans, loan guarantees, price guarantees, purchase agreements, Cooperative Research and Development Agreements (CRADAs), or any other type of financial incentive instrument.

“FedConnect” is where federal agencies post opportunities and make awards via the web. Any Applicant can view public postings without registering. However, registered users have numerous added benefits including the ability to electronically submit Applications / Responses to the government directly through this site. <https://www.fedconnect.net/FedConnect/>

“Federally Funded Research and Development Center (FFRDC)” means a research laboratory as defined by Federal Acquisition Regulation 35.017.

“Funding Opportunity Announcement (FOA)” is a publicly available document by which a Federal agency makes known its intentions to award discretionary grants or cooperative agreements, usually as a result of competition for funds. Funding opportunity announcements may be known as program announcements, notices of funding availability, announcements, or other names depending on the agency and type of program.

"Grant" means a Financial Assistance instrument used by DOE to transfer money or property when the principal purpose of the transaction is to accomplish a public purpose of support or stimulation authorized by Federal statute, and no Substantial Involvement is anticipated between DOE and the Applicant during the performance of the contemplated activity.

“Grants.gov” is the “storefront” web portal which allows organizations to electronically find grant opportunities from all Federal grant-making agencies. Grants.gov is THE single access

point for over 900 grant programs offered by the 26 Federal grant-making agencies.
<http://www.grants.gov>

“Indian Tribe” means any Indian tribe, band, nation, or other organized group or community, including Alaska Native village or regional or village corporation, as defined in or established pursuant to the Alaska Native Claims Settlement Act (85 Stat. 688)[43 U.S.C. § 1601 et seq.], which are recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians.

"Key Personnel" mean the individuals who will have significant roles in planning and implementing the proposed Project on the part of the Applicant and Participants, including FFRDCs.

“Marketing Partner Identification Number (MPIN)” is a very important password designated by your organization when registering in CCR. The E-Business Point of Contact will need the MPIN to assign privileges to the individual(s) authorized to perform CCR transactions on behalf of your organization. The MPIN must have 9 digits containing at least one alpha character (must be in capital letters) and one number (no spaces or special characters permitted).

"Participant" for purposes of this Funding Opportunity Announcement only, means any entity, except the Applicant substantially involved in a Consortium, or other business arrangement (including all parties to the Application at any tier), responding to the Funding Opportunity Announcement.

“Principal Investigator” refers to the technical point of contact/Project Manager for a specific project award.

"Project" means the set of activities described in an Application, State plan, or other document that is approved by DOE for Financial Assistance (whether such Financial Assistance represents all or only a portion of the support necessary to carry out those activities).

“Proposal” is the term used to describe the documentation submitted in response to a Funding Opportunity Announcement. Also see Application.

“Recipient” means the organization, individual, or other entity that receives a Financial Assistance Award from DOE, is financially accountable for the use of any DOE funds or property provided for the performance of the Project, and is legally responsible for carrying out the terms and condition of the award.

"Selection" means the determination by the DOE Selection Official that negotiations take place for certain Projects with the intent of awarding a Financial Assistance instrument.

"Selection Official" means the DOE official designated to select Applications for negotiation toward Award under a subject Funding Opportunity Announcement.

"Substantial Involvement" means involvement on the part of the Government. DOE's involvement may include shared responsibility for the performance of the Project; providing technical assistance or guidance which the Applicant is to follow; and the right to intervene in

the conduct or performance of the Project. Such involvement will be negotiated with each Applicant prior to signing any agreement.

“Technology Investment Agreement (TIA)” is a type of assistance instrument used to support or stimulate research projects involving for-profit firms, especially commercial firms that do business primarily in the commercial marketplace. TIAs are different from grants and cooperative agreements in that the award terms may vary from the Government-wide standard terms (See DOE TIA regulations at 10 CFR Part 603). The primary purposes for including a TIA in the type of available award instruments are to encourage non-traditional Government contractors to participate in an R&D program and to facilitate new relationships and business practices. A TIA can be particularly useful for awards to consortia (See 10 CFR 603.225(b) and 603.515, Qualification of a consortium).

"Total Project Cost" means all the funds to complete the effort proposed by the Applicant, including DOE funds (including direct funding of any FFRDC) plus all other funds that will be committed by the Applicant as Cost Sharing.

“Tribal Energy Resource Development Organization or Group” means an “organization” of two or more entities, at least one of which is an Indian Tribe (see “Indian Tribe” above) that has the written consent of the governing bodies of all Indian Tribes participating in the organization to apply for a grant or loan, or other assistance under 25 U.S.C. § 3503.

Appendix B – Personally Identifiable Information

In responding to this Announcement, Applicants must ensure that Protected Personally Identifiable Information (PII) is not included in the following documents: Project Abstract, Project Narrative, Biographical Sketches, Budget or Budget Justification. These documents will be used by the Merit Review Committee in the review process to evaluate each application. PII is defined by the Office of Management and Budget (OMB) and DOE as:

Any information about an individual maintained by an agency, including but not limited to, education, financial transactions, medical history, and criminal or employment history and information that can be used to distinguish or trace an individual's identity, such as their name, social security number, date and place of birth, mother's maiden name, biometric records, etc., including any other personal information that is linked or linkable to an individual.

This definition of PII can be further defined as: (1) Public PII and (2) Protected PII.

- a. **Public PII:** PII found in public sources such as telephone books, public websites, business cards, university listing, etc. Public PII includes first and last name, address, work telephone number, email address, home telephone number, and general education credentials.
- b. **Protected PII:** PII that requires enhanced protection. This information includes data that if compromised could cause harm to an individual such as identity theft.

Listed below are examples of Protected PII that Applicants must not include in the files listed above to be evaluated by the Merit Review Committee.

- Social Security Numbers in any form
- Place of Birth associated with an individual
- Date of Birth associated with an individual
- Mother's maiden name associated with an individual
- Biometric record associated with an individual
- Fingerprint
- Iris scan
- DNA
- Medical history information associated with an individual
- Medical conditions, including history of disease
- Metric information, e.g. weight, height, blood pressure
- Criminal history associated with an individual
- Employment history and other employment information associated with an individual
- Ratings
- Disciplinary actions
- Performance elements and standards (or work expectations) are PII when they are so intertwined with performance appraisals that their disclosure would reveal an individual's performance appraisal

- Financial information associated with an individual
- Credit card numbers
- Bank account numbers
- Security clearance history or related information (not including actual clearances held)

Listed below are examples of Public PII that Applicants may include in the files listed above to be evaluated by the Merit Review Committee:

- Phone numbers (work, home, cell)
- Street addresses (work and personal)
- Email addresses (work and personal)
- Digital pictures
- Medical information included in a health or safety report
- Employment information that is not PII even when associated with a name
- Resumes, unless they include a Social Security Number
- Present and past position titles and occupational series
- Present and past grades
- Present and past annual salary rates (including performance awards or bonuses, incentive awards, merit pay amount, Meritorious or Distinguished Executive Ranks, and allowances and differentials)
- Present and past duty stations and organization of assignment (includes room and phone numbers, organization designations, work email address, or other identifying information regarding buildings, room numbers, or places of employment)
- Position descriptions, identification of job elements, and those performance standards (but not actual performance appraisals) that the release of which would not interfere with law enforcement programs or severely inhibit agency effectiveness
- Security clearances held
- Written biographies (e.g. to be used in a program describing a speaker)
- Academic credentials
- Schools attended
- Major or area of study
- Personal information stored by individuals about themselves on their assigned workstation or laptop unless it contains a Social Security Number

Appendix C – 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, 10 CFR Part 600, use both of the terms in the titles specific to regulations applicable to cost sharing. DOE almost always uses the term “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 Part 420.12, State Matching Contribution. There “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. Following is an example of how to calculate cost sharing amounts for a project with \$1,000,000 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%

See the sample cost share calculation for a blended cost share percentage below. **Keep in mind that FFRDC funding is DOE funding.**

What Qualifies For Cost Sharing

While it is not possible to explain what specifically qualifies for cost sharing in one or even a couple of 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 a DOE grant or cooperative agreement, then it is allowable as cost share. Conversely, if the cost is not allowable under the cost principles and not eligible for reimbursement, then 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:

- Institutions of Higher Education, Hospitals, and Other Nonprofit Organizations are found at

10 CFR.600.123;

- State and Local Governments are found at 10 CFR600.224;
- For-profit Organizations are found at 10 CFR600.313.

In addition to the regulations referenced above, other factors may also come into play such as timing of donations and length of the project period. For example, the value of ten 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, DOE 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, DOE generally does not allow pre-award costs prior to the signing of the Selection Statement by the DOE Selection Official.

Following is a link to the DOE Financial Assistance Regulations. You can click on the specific section for each Code of Federal Regulations reference mentioned above.

DOE Financial Assistance Regulations:

<http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=98a996164312e8dcf0df9c22912852b0&rgn=div5&view=text&node=10:4.0.1.3.9&idno=10>

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 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 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 costs principles in 48 CFR Part 31 in the Federal Acquisition Regulation, except that patent prosecution costs are not allowable unless specifically authorized in the award document.

(b) *Other types of organizations.* Allowability of costs incurred by other types of organizations that may be subrecipients under a prime award is determined as follows:

(i) *Institutions of higher education.* Allowability is determined in accordance with OMB Circular No. A-21 -- Cost Principles for Educational Institutions

(ii) *Other nonprofit organizations.* Allowability is determined in accordance with OMB Circular A-122, Cost Principles for Non-Profit Organizations

(iii) *Hospitals.* Allowability is determined in accordance with the provisions of 45 CFR Part 74, Appendix E, Principles for Determining Costs Applicable to Research and Development Under Grants and Contracts with Hospitals

(iv) *Governmental organizations.* Allowability for State, local, or federally recognized Indian tribal government is determined in accordance with OMB Circular No. A-87, Cost Principles for State, Local, and Indian Tribal Governments

(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 contracting officer may approve the use of the current fair market value of the donated property, even if it exceeds the certified value at the time of donation to the project. The contracting officer may accept the use of any reasonable basis for determining the fair market value of the property.

(2) *Valuing services of others' employees.* If an employer other than the recipient furnishes the services of an employee, those services are valued at the employee's regular rate of pay, provided these services are for the same skill level for which the employee is normally paid.

(3) *Valuing volunteer services.* Volunteer services furnished by professional and technical personnel, consultants, and other skilled and unskilled labor may be counted as cost sharing or matching if the service is an integral and necessary part of an approved project or program. Rates for volunteer services must be consistent with those paid for similar work in the recipient's organization. In those markets in which the required skills are not found in the recipient organization, rates must be consistent with those paid for similar work in the labor market in which the recipient competes for the kind of services involved. In either case, paid fringe benefits that are reasonable, allowable, and allocable may be included in the valuation.

(4) *Valuing property donated by third parties.*

(a) Donated supplies may include such items as office supplies or laboratory supplies. Value assessed to donated supplies included in the cost sharing or matching share must be reasonable and must not exceed the fair market value of the property at the time of the donation.

(b) Normally only depreciation or use charges for equipment and buildings may be applied. However, the fair rental charges for land and the full value of equipment or other capital assets may be allowed, when they will be consumed in the performance of the award or fully depreciated by the end of the award, provided that the contracting officer has approved the charges. When use charges are applied, values must be determined in accordance with the usual accounting policies of the recipient, with the following qualifications:

(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 D – Technology Readiness Level (TRL) Matrix

TRL Area	TRL		TRL Description		TRL Examples		TRL Goals		Enabling New Capabilities		General Signposts	
	1	2	3	4	5	6	7	8	9	10	11	12
1	Analysis, Proof of Concept and Small Scale Experiments	Technical analysis and/or application of the technology to a specific problem or concept.	Active research and development is underway. This includes experimental technical analysis and/or application of the technology to a specific problem or concept.	Basic technology test components are integrated at a smaller scale than in a laboratory environment.	Basic technology test components are integrated at a smaller scale than in a laboratory environment.	Development of an operational prototype model for scale and performance of "wet" or "in-wet" testing under fully monitored laboratory conditions.	System mock-up at a scale model level, including form, fit and function (FFI), developed. This model defines the characteristics or specifications that uniquely identify the component or system.	Design space defined with sufficient analysis to justify detailed design and basic experimental hardware. Engineering design is sufficient to justify hardware mock-up and scaled up by basic scale test facility.	Design space defined with sufficient analysis to justify detailed design and basic experimental hardware. Engineering design is sufficient to justify hardware mock-up and scaled up by basic scale test facility.	Design space defined with sufficient analysis to justify detailed design and basic experimental hardware. Engineering design is sufficient to justify hardware mock-up and scaled up by basic scale test facility.	Design space defined with sufficient analysis to justify detailed design and basic experimental hardware. Engineering design is sufficient to justify hardware mock-up and scaled up by basic scale test facility.	Design space defined with sufficient analysis to justify detailed design and basic experimental hardware. Engineering design is sufficient to justify hardware mock-up and scaled up by basic scale test facility.
	Discovery, Concept Demonstration and Feasibility	Feasibility study and/or application of the technology to a specific problem or concept.	Investigation begins. One or two primary objectives are observed. Applications are possible and there may be a proof of concept analysis to support the investigation.	Investigation begins. One or two primary objectives are observed. Applications are possible and there may be a proof of concept analysis to support the investigation.	Investigation begins. One or two primary objectives are observed. Applications are possible and there may be a proof of concept analysis to support the investigation.	Investigation begins. One or two primary objectives are observed. Applications are possible and there may be a proof of concept analysis to support the investigation.	Investigation begins. One or two primary objectives are observed. Applications are possible and there may be a proof of concept analysis to support the investigation.	Investigation begins. One or two primary objectives are observed. Applications are possible and there may be a proof of concept analysis to support the investigation.	Investigation begins. One or two primary objectives are observed. Applications are possible and there may be a proof of concept analysis to support the investigation.	Investigation begins. One or two primary objectives are observed. Applications are possible and there may be a proof of concept analysis to support the investigation.	Investigation begins. One or two primary objectives are observed. Applications are possible and there may be a proof of concept analysis to support the investigation.	Investigation begins. One or two primary objectives are observed. Applications are possible and there may be a proof of concept analysis to support the investigation.
2	Component level or sub-system level integration, testing and validation	Component level or sub-system level integration, testing and validation.	Component level or sub-system level integration, testing and validation.	Component level or sub-system level integration, testing and validation.	Component level or sub-system level integration, testing and validation.	Component level or sub-system level integration, testing and validation.	Component level or sub-system level integration, testing and validation.	Component level or sub-system level integration, testing and validation.	Component level or sub-system level integration, testing and validation.	Component level or sub-system level integration, testing and validation.	Component level or sub-system level integration, testing and validation.	Component level or sub-system level integration, testing and validation.
	Prototype Model Test Facility Validation	System level or system model demonstration in a relevant environment.	System level or system model demonstration in a relevant environment.	System level or system model demonstration in a relevant environment.	System level or system model demonstration in a relevant environment.	System level or system model demonstration in a relevant environment.	System level or system model demonstration in a relevant environment.	System level or system model demonstration in a relevant environment.	System level or system model demonstration in a relevant environment.	System level or system model demonstration in a relevant environment.	System level or system model demonstration in a relevant environment.	System level or system model demonstration in a relevant environment.
3	Open Water System Test and Validation	System prototype demonstration in an open water environment (e.g., for initial operational testing).	System prototype demonstration in an open water environment (e.g., for initial operational testing).	System prototype demonstration in an open water environment (e.g., for initial operational testing).	System prototype demonstration in an open water environment (e.g., for initial operational testing).	System prototype demonstration in an open water environment (e.g., for initial operational testing).	System prototype demonstration in an open water environment (e.g., for initial operational testing).	System prototype demonstration in an open water environment (e.g., for initial operational testing).	System prototype demonstration in an open water environment (e.g., for initial operational testing).	System prototype demonstration in an open water environment (e.g., for initial operational testing).	System prototype demonstration in an open water environment (e.g., for initial operational testing).	System prototype demonstration in an open water environment (e.g., for initial operational testing).
	Final Demonstration Level	Final demonstration level.	Final demonstration level.	Final demonstration level.	Final demonstration level.	Final demonstration level.	Final demonstration level.	Final demonstration level.	Final demonstration level.	Final demonstration level.	Final demonstration level.	Final demonstration level.

*Table may be resized and adjusted as necessary to view.

Appendix E – TRL Self-Categorization Examples

- A MHK developer has completed all stage-gate criteria for DOE TRL 4 utilizing a smaller scale model that demonstrates a proof of concept by verifying overall performance and validating all major assumptions; however, the device did not include one or more components of the full scale system. If the components that were not included in the smaller scale model were justifiably excluded and the applicant is able to convincingly prove these excluded components are considered low risk, they are well understood, and they are commonly utilized in the manner intended, then the device developer may classify the system as DOE TRL 4 and apply for DOE TRL 5/6 funding.
- An applicant has completed the stage-gates for DOE TRL 4 and thus can be self-categorized as DOE TRL 4. The applicant is applying for DOE TRL 5/6 funding but the proposed device is sufficiently large such that the physical model needed to advance the design and meet the goals of DOE TRL 5/6 is too large to fit into any laboratory test facility. With sufficient justification, the applicant may propose to perform open water testing at this early stage but the application must clearly demonstrate that (a) all the goals and stage-gates of DOE TRL 5/6 will be achieved, (b) data will be of comparable quality to that obtained in test facilities, (c) all permits are/will be granted and (d) risk has been minimized through an staged test plan to ensure device readiness for open water.
- If a developer has is justifiably self-categorized as a DOE TRL 5/6, and is requesting funding associated with DOE TRL 7/8 but wishes to deploy a prototype that is smaller than a 1:2 scale, the application must clearly demonstrate that (a) all the goals and stage-gates of DOE TRL 7/8 will be achieved, (b) data, knowledge and validations are directly applicable to the full scale system and (c) the follow-on device will be a commercial level demonstration prototype. If the proposed device does not meet these requirements, the applicant should request funding associated with DOE TRL 5/6 and clearly justify that a mid-scale device is needed to provide data, verify device performance, and bring risk to a sufficient level to substantiate a DOE TRL 7/8 effort with a larger model/prototype.
- A component developer has accomplished all the goals for DOE TRL 5/6 and is justifiably self-categorized as DOE TRL 5/6. The developer intends to deploy their component in open water testing. The developer does not qualify for DOE TRL 7/8 funding as a stand-alone component and therefore has teamed with a device developer to apply under category 7/8. Provided that the whole device, including the new component, meets all stage-gate criteria of DOE TRL 5/6, it is eligible for DOE TRL 7/8 funding to perform RD&D associated with DOE TRL 7/8. It is expected that the overall device be sufficiently novel to justify investment and that only the funding necessary to complete the stage is requested.

Appendix F – PROJECT SUMMARY SHEET TEMPLATE
Marine and Hydrokinetic Technology Readiness Advancement Initiative
 Funding Opportunity Announcement Number: DE-FOA-0000293
 CFDA Number: 81.087 Renewable Energy Research and Development

Applicant Information

Applicant Name:
 Project Title:
 Major Project Subcontractors:
 Major Project Vendors:
 Key Individuals:
 PI Contact Info:

Technology Readiness Level (TRL) Request for Funding

Applicants can submit multiple applications, though each application should address one, and only one, of the TRL funding categories for their technology. Select the type of technology (system vs component), the TRL category the technology is currently in (self categorization), and the TRL category the application intends to accomplish through the proposed work package. **SELECT ONLY ONE FROM EACH LINE BELOW.**

System or Component SELECT ONLY ONE	<input type="checkbox"/> System	<input type="checkbox"/> Component		
Current TRL Category SELECT ONLY ONE	<input type="checkbox"/> TRL 1 – 3	<input type="checkbox"/> TRL 4	<input type="checkbox"/> TRL 5/6	<input type="checkbox"/> TRL 7/8
Final TRL Category of Completion SELECT ONLY ONE	<input type="checkbox"/> TRL 1 – 3	<input type="checkbox"/> TRL 4	<input type="checkbox"/> TRL 5/6	<input type="checkbox"/> TRL 7/8

Project Financing Description

%	\$	\$	\$
Minimum required cost share (%) for the selected TRL Category.	Total Applicant's cost share (\$) of Project	Total DOE cost share (\$) of Project	Total Project Cost (Applicant Share plus DOE Share)

Technical Description

The technical description must contain a summary of the proposed activity suitable for dissemination to the public. It should include a clear and concise statement of the goals and objectives of the project as well as the expected outcomes (i.e. benefits, potential impact). Begin the Technical Description here (by deleting the text in italics) and continue onto a second page if needed. This PROJECT SUMMARY SHEET (including the Technical Description) must not exceed 2 pages when printed using standard 8.5" by 11" paper.

This document must not include any proprietary or sensitive business information, as the Department may make it available to the public.

Appendix G – Data Produced Under an Award

1. Example of project data that may be requested by DOE to share with FFRDCs, Test Centers, or other research partners:

DOE may request system performance data to be used by National Labs to develop performance models. DOE will work with recipients during negotiation to facilitate the development of non-disclosure agreements (NDAs), where appropriate, that will protect the interests of all parties. While DOE may require that certain data be shared with FFRDCs, Test Centers, or other research partners, the data will otherwise be protected from public disclosure for 5 years from the date the data were first produced, as set forth in Section VIII of this Funding Opportunity Announcement.

DOE may publish aggregated industry data but will not release detailed cost and performance data specific to any one project.

2. Example of project data that may be requested by DOE to make public:

DOE understands that some data is sensitive and making it public could put a technology developer at a competitive disadvantage. In most cases, it is not appropriate or desirable to publish detailed design and performance data. However, some higher level data that is more general in nature may be valuable to make public to help advance the MHK industry as a whole.

For example, DOE may request results of device / marine animal interaction to make public for the purpose of better informing siting methodology. In this case, DOE would work with the recipient to agree upon what type of information is needed and what level of detail is appropriate.

Please Note: DOE has the right to have delivered and to use for its purposes all data produced under an award, and has unlimited rights to first produced data after the five-year protected period has elapsed. This right applies to all data produced using project funds. Project funds include both DOE funds and recipient cost share.

The following list of data, while not comprehensive, is an example of the type of information that may be requested when appropriate. DOE may publish aggregated industry data but has no intention of releasing detailed cost and performance data specific to any one project. More detailed data may be requested for analysis by National Labs or research partners, but will not be made public.

DEPLOYMENT LOCATION

Bathymetry – Seabed Topology

- Bathymetry & topology of seabed (could have potential effect on performance of devices/mooring system, quality of tidal currents) Sub-bottom profiling (sediment type,)
- Sediment core samples with soil characteristics (geotechnical data for designing anchoring systems)

Water Quality

- Suspended sediment, turbidity
- Salinity
- Conductivity
- Transmissivity
- Temperature
- Dissolved oxygen
- Dissolved nutrients (nitrate, phosphate, silicate, etc.)

Biological Characteristics and Effects

- Baseline assessments of marine animals in area, particularly threatened or endangered species (i.e. marine mammals, seabirds, resident and migratory fish, commercially important invertebrates like crab)
- Monitoring data (post installation) of direct interactions of marine animals with devices
- Benthic substrate characteristics, before and after installation
- Measures of productivity of systems, such as chlorophyll
- Animals affected by acoustics (noise)
- Animals affected by EMF from devices or cables
- Near shore habitat that will be affected by cable crossings, grid connection
- ROV survey results
- Sediment grabs – grain size, total organic carbon (to help characterize benthic habitat)
- Type of monitoring equipment & methodology

Resource

- Tidal current speeds and directions over water column and spatial variations considerations
- Turbulent structure of currents
- Wave characteristics (shape, amplitude , period)
- Depth where measurements taken
- Wind measurements
- Extreme events (storms, floods, etc.)

Deployment Location

- Berth location
- Water depth and locations of the measurement devices and any nearby met station and standard tide gauge installations

TECHNOLOGY

- Description of energy capture technology, including cut-off levels, depth below surface (or above the seabed) of the energy capture axis
- Description of power take-off system and its rating – power, voltage, type of generator, etc.
- Normal range of operating parameters
- Extreme event operating parameters
- Standard dimensions
- Net electric power from WEC/TEC (via transducer or other methodology)

- COE
- Capture efficiency
- Availability

OPERATIONAL

Operation & Maintenance

- Deployment methodology
- Installation (ie. turbine, cable)
- Operations and maintenance approach and costs

GRID CONNECTION

- Voltage frequency and the permitted tolerances
- Prevailing grid conditions that may have limited the power output during the test period
- Cable frequency

SITING AND ACCEPTANCE

- Commercial/recreational/subsistence fishing and shell fishing
- Key recreational uses
- Navigation, commercial shipping, etc
- Other marine industries

Appendix H – Funding Matrix Summary

MHK Systems						
<u>DOE TRL</u>	DOE Cost Share	# Awards	Period of Performance	Initial DOE Investment Per Award (\$M)	Total DOE Investment Per Award (\$M)	Total DOE Funding Per TRL (\$M)
1 - 3	80%	4	12 months	\$ 0.240	\$ 0.240	\$ 0.960
4	80%	4	18 months	\$ 0.200	\$ 0.400	\$ 1.600
5 / 6	60%	5	24 months	\$ 1.200	\$ 2.400	\$ 12.000
7 / 8	50%	2	36 months	\$ 2.700	\$ 10.000	\$ 20.000
9						

MHK Components						
<u>DOE TRL</u>	DOE Cost Share	# Awards	Period of Performance	Initial DOE Investment Per Award (\$M)	Total DOE Investment Per Award (\$M)	Total DOE Funding Per TRL (\$M)
1 - 3	80%	4	12 months	\$ 0.160	\$ 0.160	\$ 0.640
4	80%	3	18 months	\$ 0.120	\$ 0.240	\$ 0.720
5 / 6	60%	4	18 months	\$ 0.300	\$ 0.600	\$ 2.400
7 / 8						
9						