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(1.08.09.13)

U.S. DEPARTMENT OF ENERGY
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY
NEPA DETERMINATION

RECIPIENT: University of Washington **STATE:** WA

PROJECT TITLE: National Marine Renewable Energy Center Infrastructure Upgrades

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
	DE-EE0008955	GFO-0008955-001	GO8955

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Policy 451.1), I have made the following determination:

CX, EA, EIS APPENDIX AND NUMBER:
Description:

A9 Information gathering, analysis, and dissemination	Information gathering (including, but not limited to, literature surveys, inventories, site visits, and audits), data analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to, conceptual design, feasibility studies, and analytical energy supply and demand studies), and information dissemination (including, but not limited to, document publication and distribution, and classroom training and informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)
B1.31 Installation or relocation of machinery and equipment	Installation or relocation and operation of machinery and equipment (including, but not limited to, laboratory equipment, electronic hardware, manufacturing machinery, maintenance equipment, and health and safety equipment), provided that uses of the installed or relocated items are consistent with the general missions of the receiving structure. Covered actions include modifications to an existing building, within or contiguous to a previously disturbed or developed area, that are necessary for equipment installation and relocation. Such modifications would not appreciably increase the footprint or height of the existing building or have the potential to cause significant changes to the type and magnitude of environmental impacts.
B2.3 Personnel safety and health equipment	Installation of, or improvements to, equipment for personnel safety and health (including, but not limited to, eye washes, safety showers, radiation monitoring devices, fumehoods, and associated collection and exhaust systems), provided that the covered actions would not have the potential to cause a significant increase in emissions.
B3.6 Small-scale research and development, laboratory operations, and pilot projects	Siting, construction, modification, operation, and decommissioning of facilities for smallscale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment.
B5.15 Small-scale renewable energy research and development and pilot projects	Small-scale renewable energy research and development projects and small-scale pilot projects, provided that the projects are located within a previously disturbed or developed area. Covered actions would be in accordance with applicable requirements (such as local land use and zoning requirements) in the proposed project area and would incorporate appropriate control technologies and best management practices.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to the University of Washington to support the upgrade of existing marine renewable energy testing and research infrastructure located at National Marine Renewable Energy Centers (NMRECs).

The proposed project is divided into five tasks, with one task for each of five universities where NMREC research and testing is performed: University of Washington; Oregon State University; University of Alaska, Fairbanks; Florida Atlantic University; and, University of Hawaii.

In Task 1 University of Washington (UW) would upgrade their existing marine renewable energy testing and research infrastructure.

Proposed work would include upgrades to a number of UW facilities and equipment.

Work would include upgrades to UW's Alice C. Tyler Flume. The Alice C. Tyler Flume is a preexisting indoor laboratory scale flume with a test section that is 4.8 meters long and 0.9 meters wide. Water depths are up to 0.65 meters. The flume is located within the Harris Hydraulics Laboratory. Upgrades would include replacing an existing Acoustic Doppler Velocimeter with Laser Doppler Velocimeter. The laser containment system within the Harris Hydraulics Laboratory would be improved through installation of aluminum framing and fabric laser curtains.

UW would also upgrade to the Washington Air-Sea Interaction Research Facility (WASIRF). The WASIRF is a preexisting laboratory flume that is 12 meters long, 1.2 meters high and 0.9 meters wide. Water depths are up to 0.76 meters. The flume is located within the Harris Hydraulics Laboratory. Upgrades would include modification of a wave maker, instrumentation with additional gauges, and replacement of a bottom panel from aluminum to glass.

UW would also install a deck crane on UW's research vessel, the R/V Russel Davis Light (RDL), to increase load and handling capacities. As well, UW would upgrade field instrumentation on the RDL.

In addition, UW would fabricate a small scale oscillating-surge wave energy converter (OSWEC) for use in the WASIRF. The OSWEC would be a laboratory scale wave energy converter with power take off emulation. The OSWEC would be fabricated at the UW machine shop in Henderson Hall. The OSWEC would be a flap and hinge assembly on a base that would be placed in the laboratory flume and tested for movements. The OSWEC would be approximately 1 meter wide and 0.5 meters high.

Lastly, UW would upgrade computer and computer software systems for processing data and enabling three-dimensional high-resolution simulations.

All work under this task would be completed at UW facilities. Work would include light construction as well as fabrication and installation. Work would primarily occur within existing University buildings, though some work would occur on the RDL. All work would be conducted by trained personnel in accordance with existing Environmental, Health and Safety standards and University policies, including wearing of appropriate personal protective equipment. No new permits would be required for any activities.

In Task 2 Oregon State University (OSU) would upgrade their existing marine renewable energy testing and research infrastructure.

Proposed work would include upgrades to two facilities.

Upgrades to the O.H. Hinsdale Wave Research Laboratory's wave tank testing facility would include replacing the existing wave maker with an elevated hinge design to allow testing at greater depths, and installing a new motion tracking system to measure water motions. The Hinsdale facility is a pre-existing indoor wave tank testing facility.

Upgrades would be made to the test bed at the Wallace Energy Systems and Renewables Facility (WESRF). Specifically, WESRF has a 300 HP motor-generator testbed. This test-bed is straight grid connect and does not allow for any specific control of the generator being tested. OSU would purchase and install an electric drive between the grid and the generator, enabling full torque or speed control of the generator, and of synchronizing the electrical conversion to the grid.

OSU would also procure parts for and assemble a laboratory scale point absorber wave energy converter. This device would be approximately 2 meters in diameter and 4 meters in height. OSU would validate this equipment at Hinsdale. In addition, OSU would procure two small scale (under 1 meter round) wave measurement buoys.

Finally, OSU would conduct an assessment of some of the upgrades completed.

All work under this task would be completed at OSU facilities. Work would include light assembly and installation. Work would occur within existing University laboratory or office facilities. All work would be conducted by trained personnel in accordance with existing Environmental, Health and Safety standards and University policies, including wearing of appropriate personal protective equipment. No new permits would be required for any activities.

In Task 3 University of Alaska, Fairbanks (UAF) would upgrade their existing marine renewable energy testing and research infrastructure.

Proposed work would include upgrades to the Tanana River Test Site (TRTS). TRTS is UAF's seasonal field site for testing and demonstrating river energy converters and related technologies. TRTS is preexisting permitted field test site located on the Tanana River near Nenana, AK. Proposed work would include upgrades to the barge (water based) testing systems including upgrading the existing net system (a net system is required by the Alaska Department of

Fish and Game), upgrading the debris diverter on the TRTS barge to be an aluminum version, upgrading the barge anchor, and updating the data acquisition system. UAF would also procure a mobile job trailer that could be left on site and which would provide a workspace as well as hold equipment and tools. UAF would also upgrade the existing boat launch.

UAF also proposes to make upgrades to, and test, an existing New Energy 5kW vertical-axis cross-flow turbine. The turbine would be instrumented to measure water pressure variations, and would coordinate with upgrades to the TRTS upgraded data acquisition system to conduct higher quality current and voltage measurements. Once upgraded UAF would test the system in the Tanana River at the TRTS.

Finally, UAF would make upgrades to their Power Systems Integration (PSI) Lab, located at UAF in Fairbanks, AK. The PSI Lab is a preexisting indoor lab, with outdoor generators and load banks, which mimics a 500-kW hybrid-diesel microgrid. The lab is powered b y a 320 kW Caterpillar diesel gen-set as well as programmable 100 kW wind and solar PV emulators. The lab also includes a 270 kWh/600 kW valve-regulated lead acid battery, an 11 kWh/33 kW lithium-ion battery and a 313 kVA ABB PCS100 Energy Storage Inverter. Proposed work would include upgrades to the existing cooling system to enable testing of unbalanced loads, and incorporation of a generator test stand to help standardize testing of marine energy converters. Once installed, a test stand would be commissioned to demonstrate it works with various configurations.
Work at TRTS would involve active boating. Potential hazards are boating or floating platform failures, line failure, and floating river debris. To mitigate these, all personnel will wear PPE when on the water and all boats have secondary motors in the case of engine failure. All lines, gear and other equipment associated with the floating platform will be inspected prior to use and inspected weekly for signs of wear and tear along with being cleared of any debris daily. All University health and safety procedures would be followed. Work at PSI would include electrical and test equipment upgrades. All work will be conducted only by trained personnel in accordance with all health and safety regulations.

Work would also include testing the New Energy 5 kW turbine in the Tanana River, placing a work trailer at the site, as well as grading the pre-existing dirt boat ramp. The river and terrestrial area surrounding Tanana River Test Site contains no Endangered Species Act (ESA) listed species. As such, DOE has determined that these activities will have No Effect on ESA listed species.

In Task 4 Florida Atlantic University (FAU) would upgrade their existing marine renewable energy testing and research infrastructure.

Proposed work would include upgrading FAU's winch system. The existing system contains a winch approximately 8 foot wide by 8 foot long by 6 foot tall in size, mounted on a 20 foot by 8 foot base. The winch can be mounted onto the deck of a ship when in use at sea, and is stored indoors when not in use. Upgrades would include replacing the winch electrical cable from a 1.25 inch diameter cable to a larger 2.5 to 3 inch fiber optic cable which would be able to handle larger loads. In addition a new drum shell would be installed to simplify winding of the cable.

FAU would also perform upgrades to their turbine testing platform system. The platform is a preexisting test stand that attaches to a vessel and that allows for testing of generic rotors in an ocean environment. Upgrades would include attaching an acoustic Doppler current profiler and a 5 kW generator to the test stand. FAU would also develop a rotor mechanical performance suite to measure rotor blade health. To facilitate installation and removal of rotors from the test stand while the stand is on the vessel, FAU would install a pedestal crane at the FAU small boats marina. The crane would be installed at an existing boat yard which is contained by sea walls. The crane would be placed in a previously disturbed adjacent to the sea wall so that it could access boats in the marina.

Finally, FAU would upgrade their 20 kW and 3 kW dynamometers. Both dynamometers are currently in the FAU laboratory building at the Dania Beach campus. Upgrades would include upgrades to the instrumentation and control systems, battery banks, electronics, generators, and sensors.

All work would be completed at FAU facilities. Work would include use of fabrication and machining tools and heavy and medium lift equipment. All FAU facilities and activities are governed by FAU Environmental Health & Safety department. Protocols, training, and oversight are in place, including laboratory, chemical, occupational, and electrical safety.

In Task 5 University of Hawaii (UH) would upgrade their existing marine renewable energy testing and research infrastructure.

Proposed work would include completing a site management plan for the Kilo Nalu Observatory (KNO) site. This work would be limited to planning.

Work would also include procurement of additional equipment to enhance wave and wave energy converter (WEC) measurement capabilities. This would include the purchase of wave measurement buoys, acoustic Doppler current profilers, and an inspection class remote operated vehicle.

UH would also gather data from previously existing mooring floats located at the Wave Energy Test Site (WETS) in Kaneohe Bay. No new floats would be deployed for this action. UH would then develop a motion reference unit (with a software license for OrcaFlex system) to help assess mooring loads on WECs. This would include procurement of the OrcaFlex system, inputting the collected data, and adjusting models to refine predictions. This task is limited to information gathering and data analysis.

Finally, UH would design and or procure equipment and then test that equipment in specific deployments at KNO or WETS. This would include: the procurement of a digital marine radar (DMR), with proposed installation at WETS or KNO; the procurement and installation of ancillary measurement equipment at KNO; the procurement and fabrication of a docking station, with proposed installation at KNO; and the design and procurement of instrumentation for an existing laboratory scale Oscillating Water Column WEC, with proposed deployment for testing at WETS or KNO.

Deployment or installation of these devices could have impacts upon Endangered Species Act listed species. There is not enough information at this time to determine the potential impacts. As such, all tasks involving deployment or installation are restricted until UH provides additional information regarding those potential impacts, including the production of a Biological Evaluation. Restricted tasks include Task 5.1.5 (Installation of DMR), Task 5.2.2 (Install Ancillary Kilo Nalu Equipment), Task 5.2.4 (Installation of Docking Station at KNO), and Task 5.4.2 (Installation and Testing of Field-scale OWC Instrumentation Package).

All project work would occur at UH. Planning, data analysis, and procurement would occur at the UH POST building, and at the Hawaii Institute of Geophysics building. Fabrication and assembly would occur at the Hawaii Institute of Geophysics building and Homes Hall. All facilities are preexisting, purpose built facilities located in Honolulu, HI. Fabrication and assembly work will take place in labs specifically designed for that type of work. All work conducted in those facilities would adhere to UH Safety and Health guidelines including training, protective gear, and safety assessments.

NEPA PROVISION

DOE has made a conditional NEPA determination.

The NEPA Determination applies to the following Topic Areas, Budget Periods, and/or tasks:

Task 1 All Subtasks
Task 2 All Subtasks
Task 3 All Subtasks
Task 4 All Subtasks
Task 5.1.1: Wave Measurement Buoys
Task 5.1.2: Procurement of Acoustic Doppler Current Profilers (ADCPs)
Task 5.1.3: Inspection-class ROV Procurement
Task 5.1.4: Design, Procurement, and Fabrication of Digital Marine Radar (DMR) System
Task 5.1.6: Determine relevant regulatory/NEPA considerations
Task 5.2.1: KNO Site Management Plan
Task 5.2.3: Fabrication and Integration of Docking Station
Task 5.2.5: Determine relevant regulatory/NEPA considerations
Task 5.3.1: Development of Motion Reference Unit (MRU)/OrcaFlex Mooring Analysis Methodology
Task 5.3.2: Collect MRU Data at WETS and Compare with Modeling
Task 5.3.3: Determine relevant regulatory/NEPA considerations
Task 5.4.1: Design and Procurement of Field-scale OWC Instrumentation
Task 5.4.3: Determine relevant regulatory/NEPA considerations

The NEPA Determination does not apply to the following Topic Area, Budget Periods, and/or tasks:

Task 5.1.5 Installation of DMR
Task 5.2.2 Install Ancillary Kilo Nalu Equipment
Task 5.2.4 Installation of Docking Station at KNO
Task 5.4.2 Installation and Testing of Field-scale OWC Instrumentation Package

Notes:

Water Power Technologies Office
This NEPA determination DOES require a tailored NEPA provision.
Review completed by Roak Parker, 4/8/2020

FOR CATEGORICAL EXCLUSION DETERMINATIONS

The proposed action (or the part of the proposal defined in the Rationale above) fits within a class of actions that is listed in Appendix A or B to 10 CFR Part 1021, Subpart D. To fit within the classes of actions listed in 10 CFR Part 1021, Subpart D, Appendix B, a proposal must be one that would not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, or similar requirements of DOE or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities; (3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited to, those listed in paragraph B(4) of 10 CFR Part 1021, Subpart D, Appendix B; (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those listed in paragraph B(5) of 10 CFR Part 1021, Subpart D, Appendix B.

There are no extraordinary circumstances related to the proposed action that may affect the significance of the environmental effects of the proposal.

The proposed action has not been segmented to meet the definition of a categorical exclusion. This proposal is not connected to other actions with potentially significant impacts (40 CFR 1508.25(a)(1)), is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1508.27(b)(7)), and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211 concerning limitations on actions during preparation of an environmental impact statement.

A portion of the proposed action is categorically excluded from further NEPA review. The NEPA Provision identifies Topic Areas, Budget Periods, tasks, and/or subtasks that are subject to additional NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Roak Parker Date: 4/9/2020

NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

- [x] Field Office Manager review not required
- [ ] Field Office Manager review required

BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :

Field Office Manager's Signature: _____ Date: _____

Field Office Manager