

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



RECIPIENT: University of New Hampshire

STATE: NH

PROJECT TITLE : An Atlantic Marine Energy Center (AMEC) for Advancing the Marine Renewable Energy Industry and Powering the Blue Economy

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|--|--------------------------------------|----------------------------|-------------------|
| Funding Opportunity Announcement Number | Procurement Instrument Number | NEPA Control Number | CID Number |
| DE-FOA-0002234 | DE-EE0009450 | GFO-0009450-002 | |

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.)

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.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to the University of New Hampshire (UNH) to lead a university-led consortium which would include UNH, Stony Brook University (SBU), Lehigh University (LU), and the Coastal Studies Institute (CSI; administered by East Carolina University) to establish the Atlantic Marine Energy Center (AMEC). In addition to establishing AMEC organizational structure, participants, and research capabilities, award activities would include laboratory and field research.

DOE previously completed one NEPA Determination (ND) (GFO-0009450-001; A9, A11, B3.6, B5.15; 8/20/2021) which did not apply to Task 4, Subtask 9.4, Subtask 9.5, and all Budget Period (BP) 2 tasks. Additional information has been submitted for review since that time. This NEPA review is only for Subtasks 4.1, 4.3, 4.4, 4.5, 4.6, 4.7, and 4.8.

Task 4 activities include laboratory research activities and upgrades to preexisting facilities. Subtasks that are not part of this review and are still restricted at this time. Additional information and NEPA review is still required for restricted tasks and subtasks.

Subtasks 4.3 and 4.8 would include activities of an intellectual, academic, and analytical nature, including literature reviews, information gathering, data analysis, and computer modeling. Subtask 4.3 would involve enhancing a preexisting virtual flow simulator (VFS) model. Subtask 4.8 would involve reviewing existing microgrid platforms within the AMEC consortium.

Subtask 4.1 would involve the design, fabrication, and installation of an axial-flow turbine (AFT) testbed capable of testing AFTs up to 1m in diameter at UNH's Towing Tank (12 ft x 120 ft x 8 ft deep) at the Chase Ocean Engineering Laboratory (Durham, NH). Components of the testbed would include of steel, aluminum, acrylic, fiberglass, plastics, sealants, lubricants, epoxy, electronic components, and instrumentation. Components of the testbed would be fabricated by UNH, XFlow Energy (Seattle, WA), and Sensing Systems Corporation (Dartmouth, MA). Final

assembly of the testbed would occur at UNH. The testbed would be mounted under a preexisting tow carriage prior to use. There is a preexisting testbed mounted to the carriage but it is not designed for AFT technology (e.g. cross-flow turbines). The testbeds could be swapped as needed, depending on the needs of the user(s). The towing pool would not require modifications to install or operate the fabricated testbed.

Subtask 4.4 would involve development of smart mobile grids and power converter platforms. Activities would include installation of computer hardware components, software development and validation, and investigation and development of power conversion hardware. All activities would occur within SBU laboratory facilities (Stony Brook, NY) while using computers and electronic components.

Subtask 4.5 would involve upgrading the water tunnel at the Tidal Turbulence Test Facility at LU (Bethlehem, PA). The most significant upgrade would involve removal of the preexisting pump and installation of a larger (20 inch diameter) pump in its place. The larger pump and supporting fiberglass components would be fabricated by Engineering Laboratory Design, Inc. at their manufacturing facilities (Lake City, MN). The pump and supporting components would be transported to LU and would be assembled on-site. The upgraded pump would increase the maximum water flow speed within the test section of the tunnel to approximately 2m/s. Additional upgrades would include replacing fiberglass components to accommodate the larger pump, modification to the tunnel framework to accommodate the increased height of the pump assembly, adding a heat exchanger (to maintain water temperature during testing), and adding a flowmeter (to measure water flow rate through the tunnel). Additional fabrication activities for components may be completed by vendors who regularly complete such activities at purpose-built facilities.

Subtask 4.6 would involve the design and fabrication of a fatigue test rig at LU's Advanced Technology for Large Structural Systems (ATLSS) Engineering Research Center. The test rig would be fabricated to test single-blade test articles using a shaft restraint fixture (holds the test article in place) and hydraulic actuators (applies pressure to test article) attached to load fixtures (connects the hydraulic actuators to the test article). The reaction frame of the test rig would measure approximately 25 ft x 20 ft x 20 ft tall. Fabrication activities would be completed by experienced ATLSS personnel and preexisting, independent vendors who regularly complete similar activities. Each test article that would be tested with the rig would have its own testing protocol and would be consistent with the existing ATLSS safety plan. Although unlikely, if an explosive failure (e.g. shattering) of the test article during fatigue testing would be possible, additional protective barriers would be utilized during testing.

Subtask 4.7 would involve the modification of a preexisting conventional direct shear test (DST) device to allow users to simulate marine energy turbine conditions by applying cyclic loading (i.e. force) to soil samples. Modifications would include a modified shear box, stepper motor, and control system. A commercially available data acquisition system and sensors would be used when the modified device is operated. Some components (e.g. shear box) would be fabricated at LU purpose-built facilities. Assembly of the modified device would occur at ATLSS (LU).

All facilities involved with these activities are preexisting purpose-built facilities for the type of work to be conducted for this award. All activities would be completed by qualified personnel. Award activities would involve the handling and use of hazardous materials, including tools, machinery, metals, very large and heavy materials, and electronic components. All such handling and use would occur within controlled settings and would follow existing policies and procedures for handling and disposal of these materials. Activities at the UNH site would occur around test pools that present a drowning hazard. Existing university, corporate, and government health, safety, and environmental policies and procedures would be followed at all facilities, including: personnel training, proper personal protective equipment (PPE), engineering controls, monitoring, and internal assessments.

Any work proposed to be conducted at a federal facility may be subject to additional NEPA review by the cognizant federal official and must meet the applicable health and safety requirements of the facility.

NEPA PROVISION

DOE has made a conditional NEPA determination.

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

- Subtask 4.1
- Subtask 4.3
- Subtask 4.4
- Subtask 4.5

- Subtask 4.6
- Subtask 4.7
- Subtask 4.8

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

- Subtask 4.2
- Subtask 4.9
- Subtask 9.4
- Subtask 9.5
- Budget Period 2 (all tasks)

Notes:

Water Power Technologies Office (WPTO)
 NEPA review completed by Dan Cahill, 3/3/2022.

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:  Kristin Kerwin Date: 3/14/2022
 NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

- 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