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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: A Unified Multiphysics Approach for Modeling, Control, and Optimization of Wave Energy Converters

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002234	DE-EE0009446	GFO-0009446-001	GO9446

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 Washington to develop methods of multiphysics modeling of wave energy conversion (WEC) systems that would facilitate optimized design approaches. A suite of computer models for wave energy converters would be designed that represent true ocean conditions and other physical subsystems (e.g. mechanical, electrical, control) and that compute energy conversion. These would then be combined into a unified system model which would be used to design multi-WEC plants.

Models would be validated through simulations and experiments using existing or off-the-shelf motors, generators, and hydromechanical components in dedicated university laboratories. Results would be used to optimize the design of WEC systems and arrays and to analyze net power generation. A WEC simulation library would be created and shared with industry.

Proposed project activities, by location, are listed below:

University of Washington – Seattle, WA

Washington Air-Sea Interaction Research Facility, Harris Hydraulics Lab

• Investigate wind-wave-current interactions to validate formulated models.
• Submerge a flap-style wave energy converter in the test tank and generate waves to measure rotational speed, torque and force applied to the flap, and height of waves in the tank.

Johnson Power Electronics Laboratory

• Benchtop experiments with existing power electronics drives and electric machines to analyze electromechanical energy conversion.
• Program a dual machine system (1 ft x 3 ft x 1.5 ft mounted on top of a bench) to emulate the mechanical profile/response of a typical electrical generator as well as hydromechanical excitations. Measure currents and voltages in these systems.

Oregon State University - Corvallis, Oregon

Wallace Energy Systems and Renewables Facility

• Test industrial motor drives and electric motors under emulated hydrodynamic operational conditions to validate the generator and drive models.

O.H. Hinsdale Wave Research Laboratory

• Test Wave Energy Converter (WEC), a Self Reacting Point Absorber prototype, in either the large wave basin or flume to formulate accurate circuit equivalent models under a variety of wave-based excitations (simulating the action of tsunamis, waves, and/or storm surges) to observe response.

No changes in the use, mission, or operation of existing facilities would be required as part of this project and no additional permits would be required in order to conduct any of the work activities.

Project activities would involve work under high voltages, machinery with moving/rotating mechanical parts, and work near open water tanks. Any associated risks would be mitigated through adherence to established health and safety policies and procedures. Protocols would include controlled access to water tanks, the use of protective equipment, engineering controls, proper insulation of electrical components, and barriers surrounding moving mechanical parts. All waste products would be disposed of by licensed waste management service providers. University of Washington and Oregon State University would observe all applicable Federal, state, and local health, safety, and environmental regulations.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Water Power Technologies Office
This NEPA determination does not require a tailored NEPA provision.
Review completed by Shaina Aguilar on 6/24/21.

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.

The proposed action is categorically excluded from further NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Roak Parker Date: 6/24/2021

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