

PMC-ND

(1.08.09.13)

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

**RECIPIENT:** Stevens Institute of Technology**STATE:** NJ

**PROJECT TITLE:** Floating Oscillating Surge Wave Energy Converter Using Controllable Efficient Power Takeoff System

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0002080	DE-EE0008953	GFO-0008953-001	G08953

**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 Stevens Institute of Technology (SIT) to design, fabricate, and test a novel floating oscillating surge wave energy converter (F-OSWEC). Design specifications for a 1:2 scale prototype (100 kW annual averaged electrical power output) would be developed. A smaller, 1:20 scale model device would then be fabricated and used for performance testing at a wave energy testing facility over a two year period. A prototype power take-off (PTO) system and floating platform would also be developed in conjunction with the F-OSWEC.

Proposed project activities would include design work, computer modeling/simulations, follow-on planning efforts, pilot-scale component fabrication/assembly, and laboratory-based performance testing.

Design work and computer modeling/simulations would focus primarily on the 1:2 scale prototype. This would include modeling of structural elements of the prototype device, system dynamics, and component failure analysis. Power electronics for the PTO system would also be modeled. These design/modeling efforts would not entail any physical testing. All project partners would be involved with design work.

Follow-on planning efforts would comprise work activities performed to plan for potential future testing and commercialization efforts for the prototype device upon conclusion of the DOE-funded project. These would include the development of a manufacturing plan, an ocean testing plan, a commercialization plan, and planning efforts for adherence to regulatory standards. The ocean testing plan would be developed for potential future deployment of the 1:2 scale prototype device into coastal waters for field testing. However, no field testing would be performed as part of this project. Future field testing is not certain to occur, but rather, would be planned for as a possibility. Regarding regulatory planning, SIT and its project partners would develop plans to meet NEPA requirements, should field testing take place in the future, and to meet national regulatory standards when manufacturing the device (e.g. Institute of Electrical and Electronics Engineers standards). A qualified, third-party consulting firm may be contracted to assist with NEPA planning efforts. All project partners would participate in planning efforts.

Component fabrication and assembly would be limited to development of the 1:20 scale F-OSWEC model and development of a controllable PTO prototype device. The F-OSWEC model would measure approximately 2.5 m in length and 0.8 m in width, with a flap measuring 0.6 m x 0.45 m. The model would be fabricated from plastic and aluminum parts. Among the components to be integrated into the prototype would be mooring lines, platforms, and

flaps. Fabrication/assembly of the F-OSWEC model would be performed by SIT at its laboratory/testing facility in Hoboken, NJ. The PTO prototype device would be fabricated by project partner Virginia Polytechnic Institute and State University (VA Tech), at its facility in Blacksburg, VA.

Laboratory-based performance testing would consist of wave tank testing and validation of the prototype PTO device. The wave tank testing would be performed by SIT at its laboratory/testing facility in Hoboken, NJ, using an existing wave tank measuring 100 m x 5 m x 2.2 m. Wave tank testing would be used to inform the design of the 1:2 scale prototype. Validation of the prototype (e.g. component failure testing) PTO device would be performed by VA Tech and project partner, the National Renewable Energy Laboratory (NREL) at their laboratory facilities in Blacksburg, VA and Golden, CO, respectively. Control algorithm testing of the PTO device would be performed by project partner Sandia National Laboratory (SNL) at its facilities in Albuquerque, NM. Control algorithm testing would be fully computer-based and would not involve any physical testing.

Project work would be performed at existing, purpose-built laboratory facilities. SIT would coordinate all project activities with its project partners and lead development of the F-OSWEC and conduct performance testing of the device using an existing wave energy testing tank at its laboratory facility in Hoboken, NJ. This facility regularly performs hydrodynamic testing. VA Tech would design, fabricate and test a power takeoff unit at its campus in Blacksburg, VA. Resolute Marine Energy would perform office-based research and analysis activities from its headquarters in Boston, MA. SNL would assist with control algorithm development at its facilities in Albuquerque, NM. NREL would assist with hardware design and analysis/validation from its facilities in Golden, CO. No physical modifications to existing facilities, ground disturbing activities, or changes in the use, mission, or operation of existing facilities would be required for this project. Likewise, no additional permits or authorizations would need to be obtained.

Project work would involve the use and handling of high-powered machinery and wave tank testing. Potential risks associated with the performance of project activities would be mitigated through adherence to established health and safety policies and procedures. Fabrication/assembly activities would be performed by SIT and VA Tech by certified machine shop personnel. A mini crane would be operated at both facilities to lift/position heavy equipment. This machinery would only be operated by trained personnel. Emergency shut off procedures and equipment are in place at each laboratory facility. Wave tank testing would be performed by SIT at its facility in Hoboken, NJ. Safety devices, including life preservers would be used when performing wave testing. Physical component testing would also be performed at NREL's laboratory facilities in Golden, CO. All facilities where physical testing and/or fabrication activities would be performed are monitored by their respective Environmental, Health, and Safety Offices. SIT and its project partners would observe all applicable Federal, state, and local health, safety, and environmental regulations.

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 final NEPA determination.

Notes:

Water Power Technologies Office

This NEPA determination does not require a tailored NEPA provision.

Review completed by Jonathan Hartman, 04/02/2020

## 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.

The proposed action is categorically excluded from further NEPA review.

**SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.**

NEPA Compliance Officer Signature:  Roak Parker Date: 4/2/2020  
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