

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



RECIPIENT: University of Minnesota

STATE: MN

PROJECT TITLE : Hydraulic Switch-mode Power Transformer Power-Take Off for Wave-Powered Reverse Osmosis Desalination

Notice of Funding Opportunity Number
DE-FOA-0002793

Procurement Instrument Number
DE-EE0011961

NEPA Control Number
GFO-0011961-001

CID Number
GO11961

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:

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 federal funding to the University of Minnesota (UMN) to design, evaluate, fabricate, and test wave energy converter (WEC) power take-off (PTO) systems under a variety of conditions.

Award activities carried out at UMN (Minneapolis, MN) would include the development and testing of PTO architecture for wave-powered desalination. The devices would use a switch-mode power transformer (SMPT) to elevate the pressure at the WEC pump, eliminate components with a common-shaft power distribution system, and maximize power capture through a feedback control system that intelligently adapts to changing sea states. Testing would occur in a hardware-in-the-loop system in an existing UMN laboratory. UMN would also create a database, collect data, work with stakeholders, disseminate knowledge, and coordinate with the University Marine Energy Research Community. The University of Michigan (Ann Arbor, MI) would assist in the conceptualization of the PTOs.

Award activities would be completed in existing, purpose-built facilities. No building modifications, ground disturbance, new permits, or licenses would be needed to perform project activities.

Potential hazards include working with testing equipment, high energy systems, and electrical equipment. Mitigation activities would include following institutional health and safety policies, mandatory employee training, the use of personal protective equipment, adherence to safety protocols, regular safety audits, and risk assessments. Additionally, all applicable federal, state, and local health, safety, and environmental regulations would be adhered to.

DOE has considered the scale, duration, and nature of proposed activities to determine potential impacts on resources, including those of an ecological, historical, cultural, and socioeconomic nature. DOE does not anticipate impacts on these resources which would be considered significant or require DOE to consult with other agencies or stakeholders.

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.

For Categorical Exclusion Determinations:

- The proposal fits within a class of actions that is listed in Appendix B to 10 CFR Part 1021 or Appendix B and C of DOE's NEPA Implementing Procedures (June 30, 2025). To fit within the classes of actions listed in Appendix B to 10 CFR Part 1021, or Appendix B of DOE's NEPA Implementing Procedures, a proposal must satisfy the conditions that are integral elements of the classes of actions in Appendix B of both 10 CFR Part 1021 and DOE's NEPA Implementing Procedures.

- 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.
- The proposed action is categorically excluded from further NEPA review.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Water Power Technologies Office
NEPA review completed by Emma Luther, 8/20/2025

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____

 Electronically
Signed By: **Nicole Serio**

NEPA Compliance Officer

Date: **8/20/2025**

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: _____

Field Office Manager

Date: _____