

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



RECIPIENT: NREL

STATE: CO

PROJECT TITLE: NREL-25-004 SURF-WEC Deployment-Waimanalo, HI

Notice of Funding Opportunity Number

Procurement Instrument Number

NEPA Control Number

CID Number

DE-AC36-08GO28308

GFO-NREL-25-004

GO28308

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:

- B3.16 Research activities in aquatic environments** Small-scale, temporary surveying, site characterization, and research activities in aquatic environments, limited to: (a) Acquisition of rights-of-way, easements, and temporary use permits; (b) Installation, operation, and removal of passive scientific measurement devices, including, but not limited to, antennae, tide gauges, flow testing equipment for existing wells, weighted hydrophones, salinity measurement devices, and water quality measurement devices; (c) Natural resource inventories, data and sample collection, environmental monitoring, and basic and applied research, excluding (1) large-scale vibratory coring techniques and (2) seismic activities other than passive techniques; and (d) Surveying and mapping. These activities would be conducted in accordance with, where applicable, an approved spill prevention, control, and response plan and would incorporate appropriate control technologies and best management practices. None of the activities listed above would occur within the boundary of an established marine sanctuary or wildlife refuge, a governmentally proposed marine sanctuary or wildlife refuge, or a governmentally recognized area of high biological sensitivity, unless authorized by the agency responsible for such refuge, sanctuary, or area (or after consultation with the responsible agency, if no authorization is required). If the proposed activities would occur outside such refuge, sanctuary, or area and if the activities would have the potential to cause impacts within such refuge, sanctuary, or area, then the responsible agency shall be consulted in order to determine whether authorization is required and whether such activities would have the potential to cause significant impacts on such refuge, sanctuary, or area. Areas of high biological sensitivity include, but are not limited to, areas of known ecological importance, whale and marine mammal mating and calving/pupping areas, and fish and invertebrate spawning and nursery areas recognized as being limited or unique and vulnerable to perturbation; these areas can occur in bays, estuaries, near shore, and far offshore, and may vary seasonally. No permanent facilities or devices would be constructed or installed. Covered actions do not include drilling of resource exploration or extraction wells.
- 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.)
- A11 Technical advice and assistance to organizations** Technical advice and planning assistance to international, national, state, and local organizations.

## Rationale for determination:

The U.S. Department of Energy's (DOE) National Renewable Energy Laboratory (NREL) is proposing to subcontract with the University of Hawaii and Manoa (U of H) to deploy, maintain, monitor, and recover the Small Underwater Research Flap Wave Energy Converter (SURF-WEC) at Makai Research Pier in Waimanalo, Hawaii. The Makai Research Pier, owned by U of H, is an established site that is used to test temporary installations of small-scale wave energy devices.

The project proposes to deploy three spotter buoys and one SURF-WEC off the Makai Research Pier, and the data collected would increase the marine energy communities' understanding of installation and operations and maintenance issues by deploying a WEC in a different environment compared to previous at-sea deployments.

**SURF-WEC AND SUPPORTING EQUIPMENT**

The SURF-WEC consists of a prime mover and a hydraulic power take-off (PTO). The prime mover (flap) is the physical object moving from the force of water waves, while the PTO converts the movement of the flap into electric

energy. Oil is pressurized by the wave induced oscillations of the flap. The pressurized oil is then used to turn a hydraulic motor connected to an electric generator located onshore. The hydraulic oil is routed through hydraulic energy storage (accumulator), a hydraulic to electric energy converter (hydraulic motor, generator), oil storage and sensors. The hydraulic fluid within the PTO would be vegetable oil based, non-toxic, and biodegradable. Less than 35 gallons would be used in the circuit. The SURF-WEC system would have a footprint of approximately 3-meter by 5-meters on the seafloor.

The spotter buoys are solar powered measuring approximately 16-inches by 12-inches and weighing approximately 16 pounds. The buoys would have a flashing navigation light on them that emits 1 flash every 2.5 seconds with 1-mile visibility. The data collected from the 3 spotter buoys would help the team understand the relationship between the wave conditions at the existing Mokapu buoy (located north of the Makai Research Pier) and the proposed deployment locations. The spotter buoys would have a footprint of approximately 1-meter by 1-meter on the seafloor.

## DEPLOYMENT

The deployment of equipment for the project would occur in phases. During the first phase, a total of three spotter buoys would be deployed within the proposed project area. The buoys would be deployed for approximately one year before the second phase commences. The second phase would be the deployment of the SURF-WEC and PTO assemblies. Once the SURF-WEC is ready for deployment, it would be deployed in a designated location and the spotter buoy from this location would be moved to a new position within the project area. The spotter buoys may be deployed anywhere within the proposed project area depending on the needs of the project at the time of deployment. Deployment, installation, maintenance, and monitoring of the SURF-WEC system would occur from the Makai Research Pier using a forklift. The WEC and PTO would be deployed for up to two years.

The proposed deployment locations for both the buoys and SURF-WEC consist of a sandy bottom with pier or beach access and would avoid hard bottom areas (e.g. rock or coral) and areas frequented by the public. The anchor system for the buoys would be assembled onshore and then deployed from a small boat or inflatable. Each buoy would be anchored to the seafloor with a gravity anchor shackled to a 20-inch long by 3/8-inch diameter 316 stainless steel chain. The chain will be shackled to a 3/8-inch spectra fiber line to the bottom with a gravity weight weighing up to 97-pounds in water. The footprint on the seafloor would be less than 1-meter by 1-meter.

The SURF-WEC would be deployed in about 2-meters of water depth in a location situated approximately 54-feet from the Makai Pier. Personnel would assemble the system on the pier. A forklift would be used to place the device in the water. Two proposed deployment methods for the WEC have been identified. One deployment method would see more assembly completed on the pier while the other would see more assembly done in the water. Divers would connect hydraulic and electrical cable from the WEC to the cables coming from the pier. All cables would be secured with stakes to the seafloor every 2-meters. The stakes would be galvanized steel 10-inches long by 0.5-inches in diameter. The cables would be run through an 8-inch diameter PVC conduit at the base of the pier, secured to the 12-inch by 12-inch concrete pier piling. The platform would be anchored to the seafloor with gravity weights. The total area for placement would be about 5-meters by 3-meters. The SURF-WEC would be deployed for at least two years starting approximately one year after the spotter buoys are deployed.

## MAINTENANCE

Project personnel would perform maintenance during daylight hours for the spotter buoys about once every 2 months. Maintenance inspections for the WEC would be performed twice per week for the first month. Inspections would be expected to be reduced to once per week in the second month, and bi-weekly thereafter, once the device's performance is stable. Maintenance would include wiping down the spotter buoys and WEC with a non-metallic chemical free scour pad to reduce accumulation of microorganisms or algae.

## RETRIEVAL

At the conclusion of testing, project personnel would haul up the anchor weight with the help of the spotter buoy lines. Project personnel would remove the SURF-WEC system using a forklift. Two retrieval and removal methods have been identified. One retrieval method would see more disassembly in the water while the other method would have more disassembly on the pier.

## SCHEDULE

Proposed project activities include the deployment of the spotter buoys for up to three years and the deployment of the SURF-WEC for up to two years. The SURF-WEC would be placed approximately one year after the spotter buoys have been deployed. The total deployment duration of this project would be approximately three years. The SURF-WEC would deploy as soon as summer 2025.

## PERMITS AND AUTHORIZATIONS

All required permits and authorizations shall be obtained before project activities commence. Permitting agencies could include: the U.S. Army Corps of Engineers (for activities in navigable waters); U.S. Coast Guard (USCG) (Private Aids to Navigation application/Notice to Mariners); U.S. Bureau of Ocean Energy Management - Coastal Zone Management Authority; and Hawaii Department of Land and Natural Resources.

## FWS CONSULTATION

There is multiple federally listed threatened or endangered species under FWS's jurisdiction that could occur in the Project area. DOE determined there would be no effect to the following federally listed seabird species under FWS jurisdiction that may be present in the action area: band-rumped storm-petrel; Hawaiian petrel; Newell's shearwater; and short-tailed albatross. While project equipment would include a light on the buoys, they are not particularly bright (approximately 47 lumens) and are similar to those used on other moored devices in the area. Because of this, impacts to seabird species are not anticipated. There is no designated critical habitat for any FWS species in the project area.

GFO communicated its determination to FWS on June 12, 2024. The FWS concurred with this determination on June 17, 2024.

## NMFS CONSULTATION

NREL completed a biological assessment for the proposed project in preparation for informal Section 7 Endangered Species Act (ESA) consultation with NMFS. There are 5 federally listed endangered species under NMFS's jurisdiction that could occur in the proposed project area. DOE determined that the proposed project would have no effect on federally listed whale species and the Oceanic Whitetip Shark because the proposed action area is close to shore, and they are not expected to be present.

The proposed project location includes designated critical habitat for one species, the Hawaiian Monk Seal, and proposed critical habitat for one species, the Central North Pacific Green Sea Turtle. Additionally, the proposed project also falls within the boundaries of Essential Fish Habitat (EFH).

The proposed project has the potential to impact ESA species, designated critical habitat, and EFH. As such, DOE requested expedited informal Section 7 ESA consultation with the National Marine Fisheries Service (NMFS) on November 6, 2024.

Physical effects to species could include collisions with the vessel or project equipment during deployment and retrieval and entanglement with cables or lines. Other impacts to species could include disturbance from human activity, noise, electromagnetic fields, and increased turbidity within the marine habitat. The likelihood adverse impacts is anticipated to be very low due to: the deployment of anchors in a slow and controlled manner to avoid marine mammal strikes; adherence to NMFS-recommended BMPs and conservation measures for species, critical habitat, and EFH; the presence of divers and marine mammal observers to alert to the team to the presence of marine life; avoidance of sea turtle nesting season (which begins in mid-May); using reduced speeds while piloting vessels when entering marine wildlife habitat within the project area; and the spacing of devices and anchors to allow marine animals safe and unrestricted access through the area. Additionally, project activities would be small in scale and temporary in nature and would not permanently alter or degrade any critical habitat or EFH.

NMFS concurred with DOE's determination that the proposed project is not likely to adversely affect the NMFS ESA-listed species and/or designated critical habitat. DOE also determined that the proposed project would not result in destruction or adverse modification to EFH.

Two letters of concurrence from NMFS were received by DOE. The first letter concurred with DOE's findings for EFH and was received on December 5, 2024. The second letter concurred with DOE's findings for threatened and endangered species and designated critical habitat and was received on December 17, 2024.

## ADDITIONAL IMPACTS

The proposed project would occur at an established test site that is used for research and all land-based activities would occur at existing facilities (i.e. the Pier and its parking lots); as such, the project would not affect the use of the area by marine life or the public. The discharge of brine and fresh water produced by the devices and the operation of vessels would not affect the use, availability, or quality of water resources, or planned or ongoing land uses.

The proposed project would not effect cultural resources.

Vessel and vehicle use would result in de minimus air emissions. Project activities may temporarily elevate noise levels and would likely be masked by the existing background noise in the area from waves, existing recreational and commercial vessel activity, and other activities that regularly occur in the project area.

Individuals working on this project could be exposed to various hazards during equipment and device assembly, deployment, testing, and retrieval. Existing corporate health and safety policies and procedures would be followed, including employee training, proper protective equipment, and engineering controls; additional policies and procedures would be implemented as new health and safety risks are identified.

## NEPA PROVISION

DOE has made a final NEPA determination.

Include the following condition in the financial assistance agreement:

All required permits, permissions, notifications, and approvals shall be received prior to commencing project activities.

All work performed to execute the project shall abide by all mitigation measures outlined in DOE’s consultation with NMFS and FWS.

Notes:

NREL  
Brandon Bammel, 01/07/2025

**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: Nicole Serio** Date: **1/7/2025**  
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