

U.S. DEPARTMENT OF
ENERGY

Office of
**ENERGY EFFICIENCY &
RENEWABLE ENERGY**

water

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& RENEWABLE ENERGY**

WATER POWER TECHNOLOGIES OFFICE

Semiannual Stakeholder Webinar
July 2021

welcome

- All listeners have been muted as this webinar will be recorded, transcribed, and shared on our website and in a future edition of the Water Wire.
- If you have issues with the webinar, please send us a note using the chat box on the righthand side of your screen.
- The webinar will conclude with a Q&A session. Please send questions by 4:00PM ET to WaterPowerTechnologiesOffice@EE.DOE.GOV or use the chat box in WebEx.
 - *Names of individuals submitting questions will remain anonymous to our listeners.*
 - *If we do not get to your question, we will follow up via email.*

speakers

Maxine Hillman
Communications
Analyst



Jenn Garson
Acting Director



Tim Welch
Hydropower
Program Manager



Sam Bockenauer
HydroWIRES Lead



Allison Johnson
Engagement and
Outreach Lead



Tim Ramsey
Marine Energy
Program Manager



Yana Shinger
Technical Project
Officer



Jennifer Garson

Acting Director, Water Power Technologies Office

For the last three years, Jennifer Garson has led some of the Water Power Technologies Office's key activities and initiatives—like the Powering the Blue Economy initiative—and a portfolio of prizes and interagency grants, among other programs. She has worked across the office to increase the impact of federal funding for supporting innovation, including leveraging nontraditional financial mechanisms, increasing the utilization of prizes, creative lab-directed funding, SBIR/STTRs, and other competitive solicitations.





Our main priorities in the FY22 Budget Request are to strengthen hydro's role on the grid, advance and fully fund innovative marine energy R&D, build on work to provide technical assistance to climate-impacted communities, ensure programs across the portfolio increase equity and diversity, and expand our STEM efforts to support the next-generation water power workforce.

- Increase Funding for Hydro Flexibility & Storage Expansion (\$26M)
- Enhancing Understanding of Hydrologic and Climate for Hydropower (\$18M)
- Investing to Modernize the Existing Hydro Fleet (\$8M)
- Expanding Hydro by Powering Nonpowered Dams and Infrastructure (\$26M)
- STEM/Workforce (\$1.1M)
- Energy Transitions Initiative Partnership Project Expansion (Crosscutting Hydro/Marine) (\$10M)
- Demonstration and In Water Deployment of Marine Energy Systems (\$45M)
- Foundational R&D, Resource Assessment, Alternative Markets, and Prototyping for Marine (\$29M)
- Testing and Infrastructure for Marine (\$18M)
- STEM/Workforce (\$2.1M)



The U.S. Department of Energy (DOE) released a request for information (RFI) to **understand the current barriers and actions needed** to make its funding opportunities and innovation and entrepreneurship activities more inclusive, just, and equitable, in line with the Administration's climate goals.

This RFI includes **five** categories:

- **Category 1:** Increasing Access to and Awareness of DOE Funding through Effective Outreach, Engagement, and Application Support
- **Category 2:** Barriers to Applying for and Receiving Funding from DOE
- **Category 3:** Support for an Innovation Ecosystem and Place Based Innovation
- **Category 4:** Regional and Local Barriers to DOE Funding
- **Category 5:** Barriers to Performing within the DOE Funding System

Responses are due August 6, 2021 by 5:00 p.m. ET.

View the full RFI [here](#).





updates from **hydropower**

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Hydropower MOU Action Plan

- DOE's Office of Energy Efficiency and Renewable Energy, Department of the Interior Bureau of Reclamation, and the Department of the Army through the U.S. Army Corps of Engineers signed a new [Memorandum of Understanding \(MOU\)](#).
- An [Action Plan](#) has been developed that provides the framework for in five topic areas:
 1. Asset Management
 2. Value of Hydropower
 3. Workforce
 4. Water Supply Reliability
 5. Environmental Outcomes
- Find MOU Action Plan Information by [Clicking Here.](#)



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— BUREAU OF —
RECLAMATION

242 RFI

On July 8th, DOE's Office of Energy Efficiency and Renewable Energy and WPTO released a Request for Information (RFI) to seek stakeholder input on factors to consider in relation to defining "an area where there is inadequate electric service", which will inform future eligibility criteria for the [Hydroelectric Production Incentive Program](#).



Defining this term will allow the Section 242 Hydroelectric Production Incentive Program to be executed, and increase access to clean, hydroelectric power to U.S. citizens in communities with inadequate electric services. This may include rural, remote, and underserved communities.

Responses are due September 7. See the [full announcement](#) for more information on this RFI.

NOTA Selectees

Just yesterday, WPTO announced three selectees for a Notice of Opportunity for Technical Assistance (NOTA) for Improving Hydropower's Value Through Informed Decision Making:

- [Great River Hydro](#), *Inflow Forecasting on New England's Great River*
- [Idaho Power Company](#), *Idaho Power hydrogen production integration project*
- [Energy Exemplar](#), *Enhance the representation of conventional hydropower data in production cost models (PCMs)*



Updates from Hydropower

Future HydroWIRES Funding Opportunity

Yesterday WPTO also announced its notice of intent to release a future funding opportunity for HydroWIRES which will seek next-generation technologies from manufacturers, equipment vendors, and research organizations to improve the operational flexibility of the U.S. hydropower fleet. Innovations submitted may range from the concept stage to prototype testing, preferably in partnership with a hydropower owner or operator. **Technology innovations of interest include those that can actively expand the operational flexibility of the hydropower unit to provide grid services, as well as capabilities to reduce negative impacts of more flexible plant operation.**

Hydro+Storage

Idaho Falls Power, a municipally owned utility, and researchers from INL, NREL, and ANL demonstrated black start capabilities from the city's hydropower plants and how they can be made more stable and responsive during emergencies. The tests involved integrating energy storage and modifying the control systems to help them balance changes in electricity quickly.



Updates from Hydropower

North American Renewable Integration Study (NARIS)

DOE and the National Renewable Energy Laboratory NREL have [released a report](#)—and Natural Resources Canada had produced a companion report—looking at different ways of modernizing and decarbonizing the North American power system through integrated planning and operation.

- The future low-carbon system can balance supply and demand in a wide range of future conditions, with all technologies contributing to resource adequacy.
- Operational flexibility comes from transmission, electricity storage, and flexible operation of all generator types, including hydropower, wind, solar, and thermal generation.



NARIS Visualization via [NREL](#)



2050

Regional and international cooperation can provide significant net system benefits through 2050

80%

Possible power sector carbon reduction continent wide by 2050

PSH Forum

Kelly Speakes Backman, DOE's Assistant Secretary for EERE, was named the co chair of the International Forum on Pumped Storage Hydropower. The IFPSH is a government led multi stakeholder platform to shape and enhance the role of the 'world's water batteries' in future power systems.

Norway MOU

The U.S. Department of Energy (DOE) and Norway's [Royal Ministry of Petroleum and Energy](#) (OED) made a commitment to collaborate on hydropower research and development by signing an Annex to a previously signed memorandum of understanding (MOU). Recent workshops have scoped out additional collaboration opportunities.





updates from **marine energy**

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The 2021 International Conference on Ocean Energy (ICOE)

- Occurred virtually April 28-30, 2021
- Hosted by the National Hydropower Association (NHA) and sponsored by WPTO.
- The theme was “Energizing a Powerful Blue Economy”.
- Nearly 700 people attended.
- The event included speakers from across the globe, including high level U.S. speakers like Senator Lisa Murkowski and Deputy Secretary of Energy David Turk.
- WPTO’s Marine Energy Collegiate Competition was a side event.

The screenshot shows the homepage of the 2021 International Conference on Ocean Energy (ICOE). The header features the ICOE 2021 logo, the theme "ENERGIZING A POWERFUL BLUE ECONOMY", the hashtag #ICOE2021, the website URL ICOE2021.ORG, and a "VIRTUAL CONFERENCE 28-30 April 2021" badge. A navigation menu on the left includes links for Login, About ICOE, Schedule at a Glance, My Schedule, Educational Sessions, Posters, Virtual Exhibit Hall, Sponsors, Who's Here, Help Center/Tech Support, FAQs, ICOE Planning Committee List, Affiliate Events, NHA's Marine Energy Council, IMEJ, Commercialization Strategy, Conduct and Guidelines, and Test - Browse by Field. The main content area is organized into a grid of event categories: Wednesday (28 April) with Full Research Recordings (On-Demand), Thursday (29 April) with Plenary Sessions, and Friday (30 April) with Live Presentations. Below this is a large yellow "Poster Gallery" button, followed by "Industry & Markets Track Sessions" and "Technical & Research Track Sessions". Further down are buttons for "Virtual Expo Hall", "On-Demand Sponsored Content", "BROWSE ATTENDEES", and "BROWSE SPEAKERS". A banner at the bottom promotes a "Be a part of all-new, official waterpower tradeshow + conference of the National Hydropower Association" alongside the "CLEAN CURRENTS 2021" logo. The footer contains a "HELP CENTER" button and a "Conduct a System Check" button. On the right side, there are sections for "CONFERENCE SPONSOR" (Office of Energy Efficiency & Renewable Energy) and "CONTENT SPONSORS" (ES, OceanBased, Interreg North-West Europe Ocean DEMO).

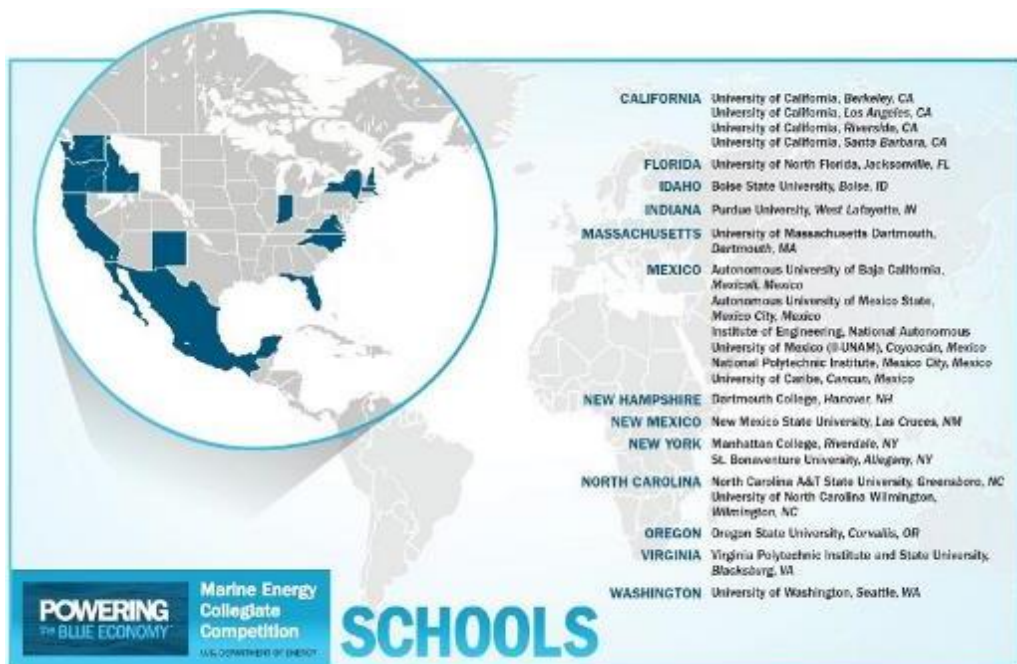
Marine Energy Collegiate Competition

Interdisciplinary teams are challenged to design a cost-effective, optimized marine energy device and supporting business plan. Competitors explore a range of ideas with a singular common goal: to power the blue economy.

2021 Competition

Overall winners:

- First-place winner: Purdue University
- Second-place winner: University of Washington
- Third-place winner: Virginia Polytechnic Institute and State University with University of California, Los Angeles



2022 Competition

17 participating teams representing 26 universities across four continents.

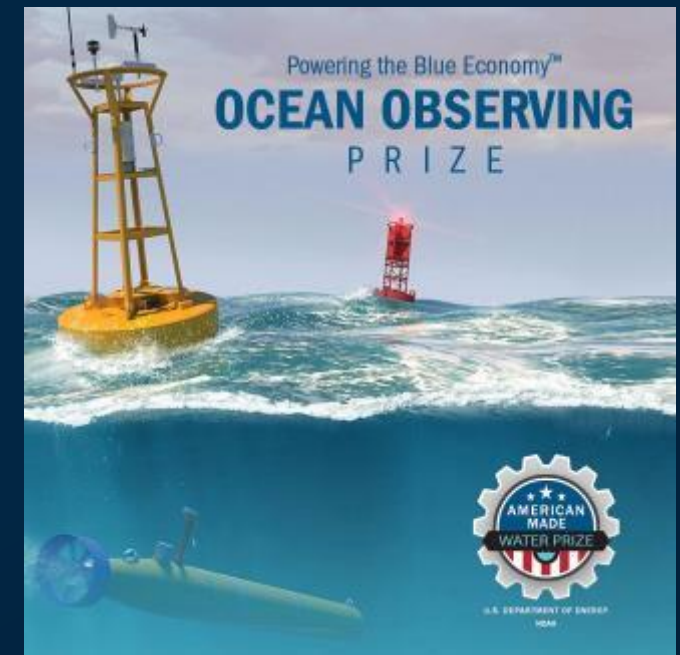


Regional representation of MECC 2022 participants, created by the team from Federal University of Rio de Janeiro

Recent Marine Energy Awardees, Prize Winners, and Technical Support Recipients

On April 19, DOE and the National Oceanic and Atmospheric Administration (NOAA) announced 7 winners of the DESIGN Contest, the first of three contests in the [Powering the Blue Economy™: Ocean Observing Prize](#) DEVELOP Competition, awarding \$400,000 to be split between:

- EEL Drone (Los Angeles, CA)
- Autonomous Marine Power System (Sacramento, CA)
- Halona WEC Based Mobile AUV Docking Station (Honolulu, HI)
- Maiden Wave Energy Rover (Philadelphia, PA)
- Platypus Prowler (West Palm Beach, FL)
- Thaumias - God of the Wonders of the Sea (Menlo Park, CA)
- Wave Powered Oceanographic Gliders (Tallahassee, FL)



The competition will culminate in autumn 2022 with finalists testing their devices.

Recent Marine Energy Awardees, Prize Winners, and Technical Support Recipients

SBIR/STTR Awardees

On June 10, EERE announced funding for Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) projects. \$2.4 million was allotted to WPTO for 12 marine energy R&D projects that will receive up to \$200,000 each of Phase 1 Awards.

Topics:

- Co Development of Marine Energy Technologies at Smaller Scales
- Low Cost, User Friendly Monitoring Tools for Marine and Hydrokinetic Sites

Awardees:

Ocean Renewable Power Company Aegis Technology Inc
AQUAHARMONICS Inc Triton Systems, Inc Ocean
Power Technologies, Inc Oscilla Power, Inc Excipio
Energy, Inc SubSeaSail LLC MarineSitu, Inc Emrgy,
Inc Integral Consulting Inc Hydronalix

Seedlings Awardees

Over the past two years, have funded over 70 short term, small scale projects at the National Labs. Will be featured in an August event.

Project Examples:

Ocean Observation Aquaculture Microgrids
Seawater Mineral Extraction New, Small Scale
Energy Harvesting Devices



Recent Marine Energy Current/Tidal In-Water Demonstrations

The Igiugig Village Council and ORPC in Alaska

- Longest operating current energy converter in the U.S. Currently monitoring adult salmon migration for potential interactions
- Second device funded by Office of Indian Energy is in transit to AK now.



Verdant Power in New York's East River

In May, Verdant successfully completed Retrieve & Replace operations replacing one turbine with a rotor housing three thermoplastic blades manufactured by NREL. New record for U.S. marine energy generation of 294.5MWh in 253 days with a 36-hour turbine retrieve and replace operation.



Triton Field Trials (TFIT) Field Work

PNNL's Triton in Field Trials (TFIT) safely conducted *nine* field tests in FY21 to assess environmental monitoring technology and methods

- Electromagnetic Field Test @MCRL (July, 2020 and May, 2021)
- Changes in Habitat @MCRL (three field tests in 2021)
- Underwater Noise @ MCRL (May, 2021)
- Collision Risk @ MCRL (two field tests in 2021)
- Collision Risk @ University of New Hampshire Living Bridge (one test May, 2021)
- Collision Risk @ Uni of Alaska Fairbanks, Tanana River Test site (one test June, 2021)

Upcoming Field Work:

July, 2021 - Underwater noise measurement technologies test at the University of New Hampshire Living Bridge

September, 2021- Underwater noise and changes in habitat technologies tests at Scripps Institution of Oceanography around the CalWave wave energy converter.

Results and recommendations from TFIT will be featured in an upcoming special issue of the Journal of Marine Science and Engineering.

(Link to the special issue:

https://www.mdpi.com/journal/jmse/special_issues/bz_environmental_monitoring_marine_renewable_energy)



Upcoming In-Water Demonstrations in August 2021

Submerged wave energy converter open water testing at Scripps, CA August 2021 – April 2022



Integral's newly patented NoiseSpotter® acoustic monitoring system will be co-deployed with CalWave offshore of the Scripps Pier in California.

The NoiseSpotter® will characterize and localize operational sounds from the CalWave wave energy converter (WEC) over a 10-day period. The characterization of sound from the CalWave WEC will enable streamlined future permitting of the wave energy technology with respect to underwater noise.



Upcoming In-Water Demonstrations in September 2021



C Power's SeaRAY autonomous offshore power system which will power a Saab autonomous underwater vehicle (AUV):

- CPower is currently working with NREL to test drivetrain and electrical system components for the SeaRay Autonomous Offshore Power System (AOPS) and to integrate the latest version of NREL's MODAQ system.
- Upon completion of testing at NREL, the SeaRay AOPS will be transported to the Navy's WETS in Oahu, HI for final component assembly and open water testing with various payloads.

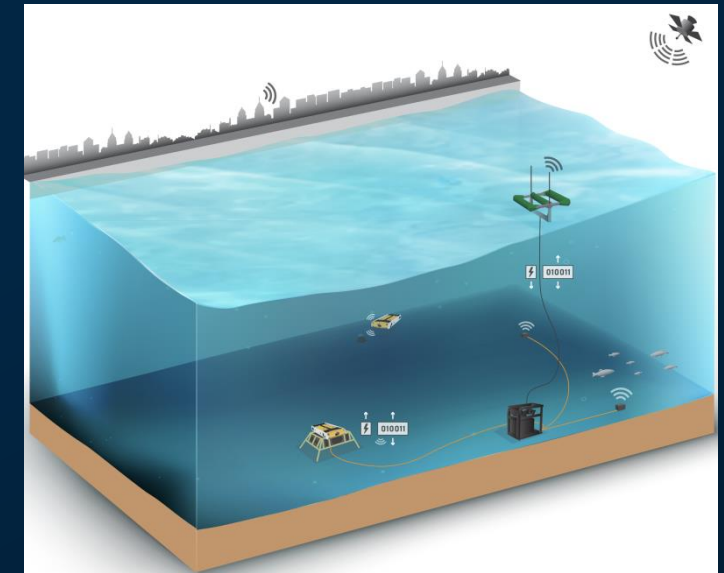


Long-Range Target Detection and Classification System for Environmental Monitoring at WETS



6 month deployment adjacent to C Power SeaRAY WEC to monitor:

- marine mammal behavior out to hundreds of meters in all directions
- fine scale marine life behavior around SeaRAY and SAAB seafloor components



Upcoming In-Water Demonstrations in September 2021

Oscilla's Triton C



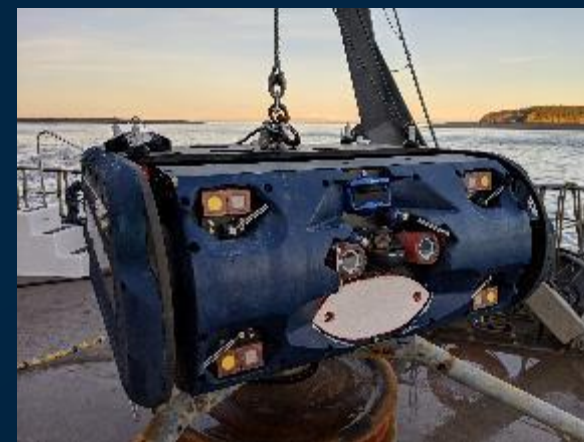
- *Oscilla's Triton C will be shipped to Hawaii, assembled, and deployed at the WETS 30m site pending weather window.*



3rd Generation Adaptable Monitoring Package

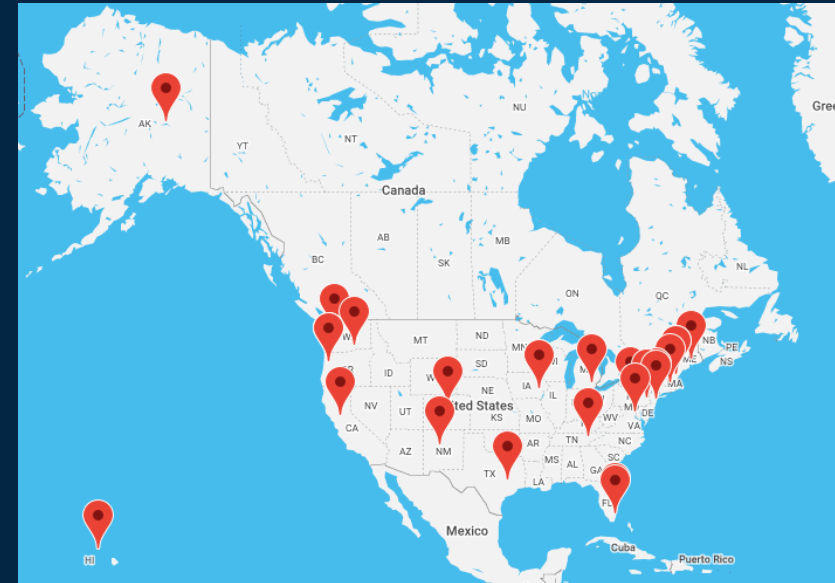


- *Sensors include acoustic camera, multibeam sonar, echosounder, hydrophones, acoustic doppler current profiler, optical backscatter sensor, and cameras with strobe illumination.*
- *Observe the marine environment and any interactions between marine animals and the WEC in real time.*



TEAMER – RFTS3 SELECTIONS Just Announced!

- BlueTec Energy, LLC, Torpedo Wave Powered Generator
Facility: Oregon State University O.H. Hinsdale Wave Research Laboratory
- CalWave Power Technologies Inc., xWave New Technology Qualification and Path to Certification
Facility: American Bureau of Shipping
- CalWave, xWave Real Time IMU Optimization for Advanced Controls
Facility: Evergreen Innovations
- E Wave Technologies LLC, Ocean Survivability Analysis of a Wave Energy Converter that Powers Marine Aquaculture
Facility: American Bureau of Shipping
- Hydrokinetic Energy Corporation
Facility: American Bureau of Shipping
- IProTech, Wave Tank Testing W2W Device
Facility: University of Maine Advanced Structures & Composites Center
- M. J. Plackett & Associates (MJP&A, Rapidly Installed Breakwater & Wave Amplifier (RIB&WA)
Facility: Oregon State University O.H. Hinsdale Wave Research Laboratory
- MaREI, University College Cork, Uncertainty analysis and performance comparison in tank testing of a floating OWC
Facility: Ohmsett The National Oil Spill Response Research & Renewable Energy Test Facility
- Orbital Marine Power, San Juan Islands Tidal Energy Characterization
Facility: University of Washington and Pacific Northwest National Laboratory
- Oscilla Power, Wave Energy Power Smoothing Via Supercapacitors Design Comparison
Facility: Oregon State University Wallace Energy System and Renewables Facility (WESRF)
- Pterofin, Inc., The Skimmer
Facility: Pennsylvania State University Applied Research Laboratory
- Pyro E, Flume Testing of Full scale EEL Marine Energy System
Facility: Stevens Institute Davidson Laboratory
- Triton Systems Inc., Biofouling Analysis for Wave Energy Piston Design
Facility: Pacific Northwest National Laboratory Marine and Coastal Research Laboratory
- University of Wisconsin Madison, Experimental validation of cross flow turbine flow dynamics
Facility: University of Washington Harris Hydraulics Lab: Alice C. Tyler Flume



TEAMER Facility Network details can be found: teamer-us.org/teamer-facility-network/



Marine Energy Infrastructure Upgrades at the National Labs

On March 22, WPTO announced \$7.1M to 7 projects supporting marine energy testing infrastructure across 5 DOE national labs: ANL, NREL, ORNL, PNNL, and SNL.

- Goals: Invest in lab infrastructure in support of advancing technologies under the Powering the Blue Economy Initiative (PBE) and develop a roadmap on long term infrastructure needs for marine energy.
- Projects were awarded under two topics: (1) Powering the Blue Economy Infrastructure Upgrades and Modernization; (2) Roadmap & Analysis of Long Term Laboratory Wide Infrastructure Upgrades for Marine Energy.

Project Examples



Sandia will develop a facility for testing belts and ropes for marine energy applications, leveraging the instrumentation and testing systems of the mobile Sandia Wave Energy Power Take Off (SWEPT) lab pictured above.



PNNL's Marine and Coastal Research Laboratory in Sequim Bay (pictured above) will soon have a new hybrid electric/diesel research vessel for use during in water research.

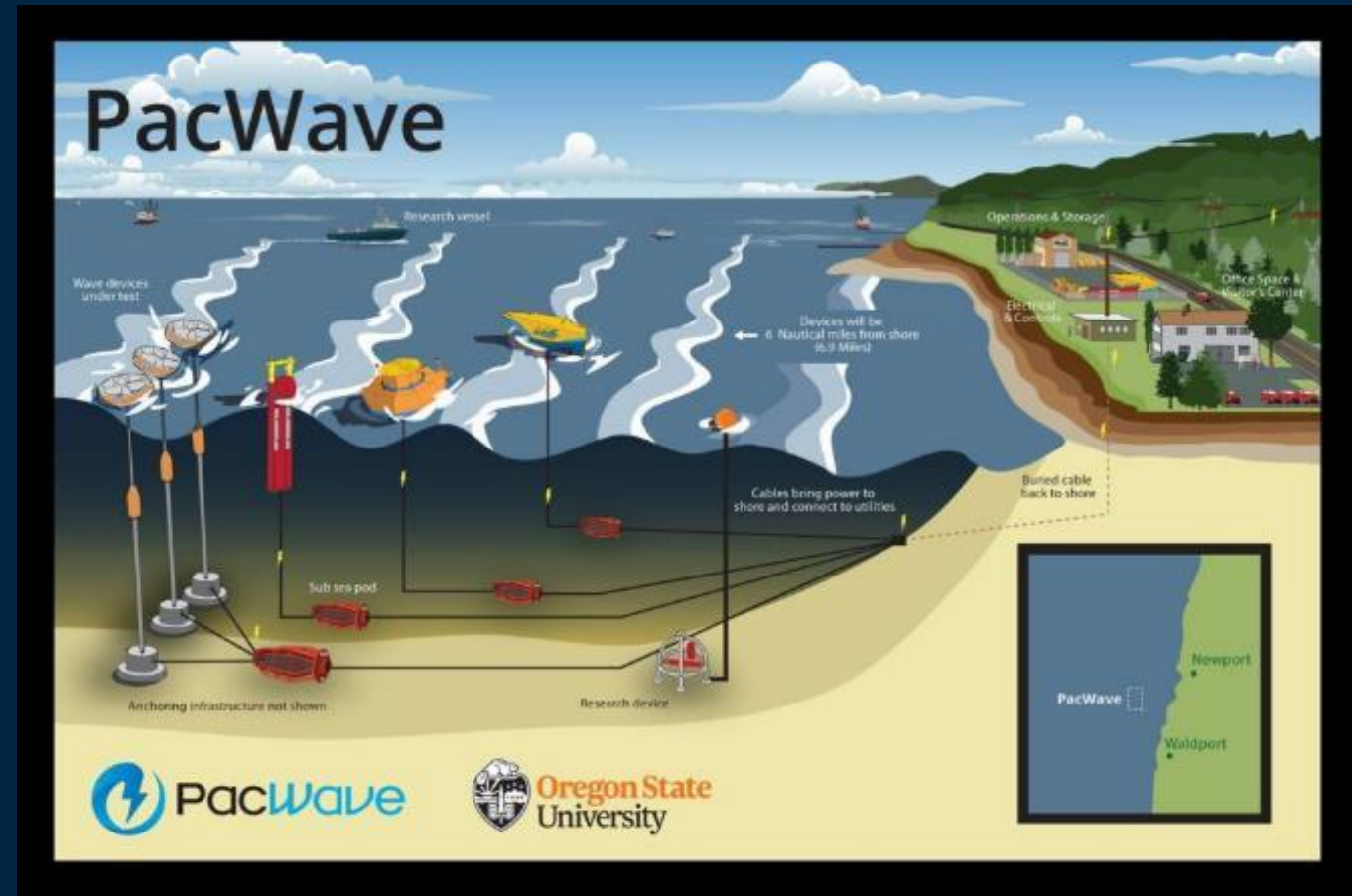
TA 1 Projects

NREL	Large-Amplitude Motion Platform for Wave Motion Simulation
NREL	Fast Iteration, Research and Evaluation (FIRE) Wave Tank
SNL	Preliminary analysis to leverage SNLs deep-water MHK shakedown tank
SNL	Power Take-Off and Mooring Lines Reliability Testing Facility
PNNL	Hybrid Research Vessel to Serve and Represent the Next Generation of Blue Economy Technology
PNNL	A Cabled Research Array for the Blue Economy and Energy (CRABEE)

PacWave has Broken Ground

PacWave has officially broken ground, and will be the first grid-connected, pre-permitted, and accredited wave energy test facility in the U.S.

Once complete, the facility will provide new infrastructure that companies and innovators need to test and deploy technologies to generate electricity in the open waters of the Pacific Ocean.



Open Funding Opportunity: \$27M for Advancing Wave Energy

FOA 0002415: Advancing Wave Energy Technologies through Open Water Testing at PacWave will support projects focusing on:

- **Testing Wave Energy Converter (WEC) Technologies at PacWave (up to \$15 million in federal funding):** This topic area focuses on testing of WEC system designs intended for remote and microgrid applications, as well as open source WEC systems that aim to generate publicly available data and knowledge to benefit the entire WEC industry.
- **Advancing WEC Designs for PacWave (up to \$5 million in federal funding):** This topic area will support the development of designs of robust WEC systems to generate offgrid or grid connected power. By the end of the award period, the systems designed would be ready for fabrication, deployment, and prototype testing at PacWave South.
- **Open Topic: Wave Energy R&D at PacWave (up to \$7 million in federal funding):** This topic area will directly leverage the PacWave test facility to perform impactful wave energy R&D that will advance the marine energy industry as a whole. This topic area will support projects that advance WEC systems, system components, environmental monitoring technologies, instrumentation and prognostic health monitoring systems, wave measurement systems, and other supporting technologies.

Questions about this FOA?

Email: MarineEnergyFOA@ee.doe.gov

Important Dates:

July 22: A pre recorded, informational webinar will be made available.

August 13: Concept papers are due.

October 5: Full applications are due.

Funding Opportunities

- HydroWIRES Notice of Intent released yesterday – full funding opportunity announcement coming soon!
- PacWave Funding Opportunity Announcement (closes 10/5)

Requests for Information(RFIs)

- Inclusive Innovation and Entrepreneurship (closes 8/6)
- 242 Hydroelectric Production Incentive Program (closes 9/7)

To receive news from WPTO as new opportunities are announced, please follow our [Water Wire newsletter](#). For the most up-to-date information on these solicitations, the official source for funding information is [EERE Exchange](#).

- **Seeding Water Power Innovation: An R&D Showcase | Webinar**
August 11, 2021, 1 PM – 5 PM EDT
 - An afternoon showcase of the projects and philosophy behind the Seedlings Program
- **NHA Alaska Regional Meeting | In-Person Event/Virtual Presence**
August 16, 2021, 10 AM – 10:40 AM AKST
 - A virtual presentation to Alaskan stakeholders about updates on Alaskan projects and ways in which they can get involved
- **R&D Deep Dive Series | Webinars**
Ongoing
 - Visit the [WPTO website](#) for the most up-to-date calendar of the R&D Deep Dive Series.
- **Peer Review 2022 | In-Person (Program Review & Conference)**
Summer 2022 (Date TBD)

Q&A Session and Closing

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