

Frequently Asked Questions about the Pacific Marine Energy Center (PMEC)

What is PMEC?

PMEC refers to the Northwest National Marine Renewable Energy Center's marine energy converter testing facilities. PMEC encompasses the range of test facilities available to the marine energy industry.

What facilities are included under PMEC?

PMEC includes scaled laboratory testing facilities for wave and current converters and intermediate and full-scale open water wave converter testing facilities in both Washington and Oregon. Over time, our vision is to add other wave and current test facilities to the PMEC portfolio to create a global hub for marine renewable energy research and testing.

- **Oregon State University Campus**

The Wallace Energy Systems and Renewable Facility provides research, testing and consulting services related to machines and drives, power electronics, hybrid electric vehicles, power systems and renewables. The two wave tanks at the O.H. Hinsdale Wave Research Laboratory- the Large Wave Flume and the directional Tsunami Wave Basin- allow for testing of scaled devices.

- **University of Washington Campus**

The Aeronautical Laboratory maintains a flume suitable for scale testing of current turbines. The Harris Hydraulics Laboratory is in the process of upgrading its combined wind/wave channel (available late-2014) suitable for scale testing of wave energy devices and mooring systems.

- **Washington Open Water Testing**

For intermediate scale wave energy devices, UW supports open water testing in Puget Sound and in Lake Washington.

- **Oregon Open Water Testing**

For a full-scale wave energy resource, the PMEC North Energy Test Site (NETS) can accommodate devices up to 100kW connected to the Ocean Sentinel, and larger devices if no grid emulation or connection is required. The PMEC South Energy Test Site (SETS) is a grid-connected site currently under development. SETS will serve as the utility-scale wave energy test facility for the US, and is expected to be available for device testing in 2016.

Why should we support marine renewable energy technologies in Oregon?

Marine renewable energy is located near our nation's coastlines and close to population centers, thereby reducing transmission costs. In addition, marine renewables provide a local emission free source of energy that will help wean our nation from dependence on fossil fuels. A robust marine renewables energy industry will help create jobs, revitalize shipyards and add to the economies of coastal communities.

Frequently Asked Questions about the P MEC South Energy Test Site (SETS)

What is SETS?

SETS will be the utility scale, grid-connected, open ocean test facility for prototype and commercial scale wave energy converters (WECs) in the US, expected to be available in 2016. SETS will offer four test berths connected by subsea cables to a substation onshore, each with the capacity to test full-scale devices or arrays. The site will also gather weather and wave data from each test berth.

What is a "test berth"?

A test berth is a location in the ocean where a WEC (or small array of WECs) will be moored for testing. At the berth, the WEC will be connected to buried subsea cable through which electricity will be transmitted to an onshore facility, and then to the electrical grid.

Where will SETS be located?

SETS will be located in Newport, Oregon. The exact ocean location for SETS will be finalized during the permitting process in a zone that has been selected in collaboration with ocean stakeholders – an area that will not impede shipping lanes and takes environmental impacts into consideration.

Why was Newport chosen?

The selection was ultimately based on ocean site characteristics, marine and on-shore cable routes, port and industry capabilities, impacts to existing ocean users, permitting challenges, stakeholder participation in the proposal process, and support of the local fishing communities.

Why a grid-connected site in Oregon?

The absence of standardized testing facilities has been identified as a key barrier to the development of the marine energy industry. Oregon is uniquely poised to fill the testing

needs of the industry with its tremendous ocean energy resource, available infrastructure, technical expertise, and political support.

What is the permitting process?

The sea- and land-based infrastructure associated with SETS will require local, state, and federal regulatory approvals. The Federal Energy Regulatory Commission (FERC) is the lead federal agency for the process and the Department of Interior's Bureau of Ocean Energy Management (BOEM) is a cooperating agency. Answers to other permitting process questions [here](#).

What are the potential benefits of SETS?

SETS's facilities will serve as an integrated test center for wave energy developers to evaluate performance and ecosystem impacts of a utility scale WEC or small array. At SETS, developers will have the opportunity to optimize their devices and arrays, learn about deployment, retrieval, operations and maintenance, while minimizing environmental impact and increasing reliability and survivability. Additionally, SETS will provide a training ground for future jobs in the ocean energy industry. The environmental clearance process and permitting for testing will be streamlined for developers testing WECs at SETS.

What onshore infrastructure is needed?

SETS will require a building near the location where the electrical cable comes onshore for equipment that will analyze and record data coming from the test berths. The electricity from the berths will then be transmitted to the electrical grid. Depending on the site and capacity, there may also be a need to upgrade the local electricity grid.

How long will SETS be in place?

Based on experiences of other renewable energy test facilities, such as the National Renewable Energy Laboratory in Colorado, we expect that SETS could be active for 20 to 30 years.

What are the potential environmental impacts?

Installing SETS might affect some existing users of the sea and its environment. Concerns exist with regard to interference with fish or marine mammal migration, reduction of wave height and release of lubricants used within wave energy devices. A primary role of SETS is to understand any effects so that sound decisions about marine energy development can be made.

- **Environmental Considerations:** Monitoring will be undertaken at SETS to ensure that there are only minimal effects upon the environment, and to help plan for future projects.
- **Pollutant-Free:** Wave devices produce no greenhouse gases unlike conventional fossil fuelled energy generation. The technologies under development have carefully designed moving parts and where lubricants and hydraulic fluids are needed, biodegradable and non-toxic liquids can be used in compliance with federal and international laws.
- **Visibility:** Marine renewable energy devices come in a variety of shapes and sizes. Some are very low to the surface or even underwater entirely; others may have a height above surface that would require lighting. The test site will be several miles from shore and therefore will most likely not impose any adverse visual impacts.
- **Wave Energy Displacement:** Wave devices take energy out of the sea. They will not noticeably reduce the size of the waves reaching the shore, and will not stop the waves. SETS will not affect surfing, swimming or other watersports.

Where does the SETS funding come from?

The first installment of funding for SETS was received in September, 2012, consisting of \$4 million from the U.S. Department of Energy, along with a non-federal cost match. NNMREC, the Northwest National Marine Renewable Energy Center, will be applying for additional federal and non-federal funding to complete the project.