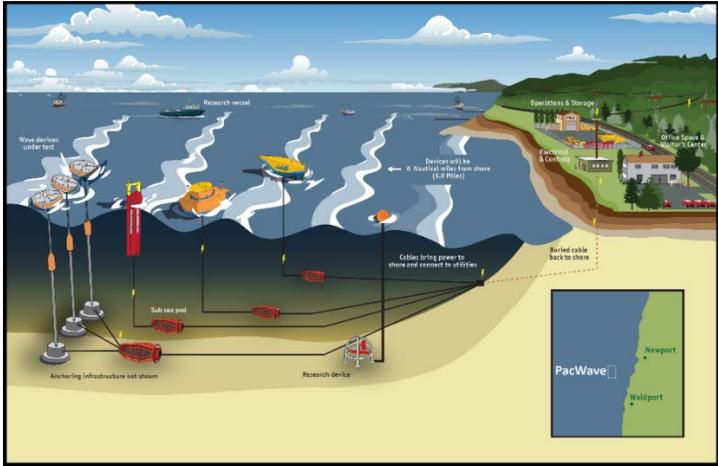


Capital Project Stage Gate II: PacWave Energy Test Facility

BACKGROUND

The PacWave Energy Test Facility project is included in the Ten-Year Capital Forecast. At its October 2019 meeting, the Finance & Administration Committee advanced the project to the design development phase, which the university has now completed. The following information is provided to the committee as it considers advancing this project to construction phase pursuant to the [Approval of Capital Projects policy](#).

PROJECT SUMMARY

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|  <p style="text-align: center;"><i>Architect's rendering of PacWave Test Facility</i></p> | Project budget | \$82,500,000 |
| | DOE Grants | \$61,000,000 |
| | Non-Federal matching | \$12,500,000 |
| | Future Operational Phase | \$9,000,000 |
| | Estimated project completion | Spring 2022 |
| Location | Newport, OR (Test Bed) North of Waldport, OR (Monitoring Station) | |

In partnership with the U.S. Department of Energy (DOE), the state of Oregon and other stakeholders, the university is developing PacWave, a grid-connected, wave energy test facility to evaluate utility-scale wave energy converter (WEC) performance, environmental interactions, and survivability. PacWave will support the development and testing of innovative wave energy systems that have the potential to be cost-competitive with other forms of electricity generation.

The PacWave open ocean test site will be approximately seven miles off the coast to the south of Newport, Oregon, in a location selected by the Newport community together with the Fishermen Involved in Natural Energy (FINE) committee. The test site will consist of four individual test berths over two square nautical miles, each with a separate five-megawatt (MW) subsea cable back to shore. Each berth will be able to accommodate multiple devices for array testing. The total project capacity is 20 megawatts, with up to 20 devices under test at any one time. PacWave will be licensed by the Federal Energy Regulatory Commission (FERC) for all currently known device types, with an option to amend the license in the future if a new device type is developed.

Power generated at the test site will be transmitted to a cable landing site at Driftwood Beach State Recreation Site in Seal Rock, Oregon. From there, the power will run to a Utility Connection and Monitoring Facility (UCMF) located on an OSU-owned property on NW Wenger Lane, east of Highway 101 in Seal Rock. At the UCMF, the power will be monitored, conditioned and fed onto the Central Lincoln People's Utility District distribution system, through which it will power local homes and businesses. Data from the test site will be monitored, analyzed and disseminated to stakeholders. The UCMF will function as the PacWave data, communications and control center.

The construction and operations of PacWave will be managed by the College of Earth, Ocean, and Atmospheric Sciences (CEOAS). CEOAS has a strong reputation for launching and supporting large infrastructure projects, including the Ocean Observatories Initiative (OOI) and the Regional Class Research Vessel (RCRV) project. CEOAS will build upon its existing collaborations with coastal communities to support the mission of the test facility and advance carbon-free energy technology.

ESTIMATED TOTAL PROJECT BUDGET, FUNDING AND TIMELINE

In 2017, OSU was awarded \$35M in federal funds from the DOE for design, construction, and operational testing of a full-scale PacWave project. Since that time, the project has raised over \$9M in matching funds from the state of Oregon, gifts and grants. Additional funds of \$26M were allocated to OSU by the DOE for PacWave in November 2019 and have been delivered to OSU. The PacWave team currently estimates the total project costs to be approximately \$82.5M.

DOE received the PacWave Final Technical Design Review and cost projection in September 2019, and informally approved that proposed design in December 2019. The university received official DOE approval to begin construction activities and authority to spend construction funds (the 'GO' determination) in April 2020.

FERC issued its final Environmental Assessment (EA) in April 2020, largely concurring with the recommendations made in the Final License Application prepared by OSU and submitted in July 2019. Remaining comment periods and attainment of all federal and state permits is expected to be complete summer 2020.

Design of the terrestrial components of PacWave including the Monitoring Station (a small complex of metal buildings) and the boring for the cable conduit from the beach to the station are complete and construction will begin in 2020. The university has received proposals for underground drilling work (Horizontal Directional Drilling). Engineering work will commence in the next several weeks, with site preparation and terrestrial drilling occurring in late 2020 and 2021. Proposals have been solicited for site preparation for the UCMF, and work may start as soon as late summer or early fall 2020. Work has begun on the subsea cable request for proposals, anticipating that the installation of the subsea cables (the final phase of construction) will occur in early spring of 2022. The PacWave Energy Test Facility is currently expected to be operational in summer 2022.

ADVANCING OSU'S STRATEGIC GOALS

| Goal 1 Preeminence in Research, Scholarship and Innovation | Goal 2 Transformative Education That is Accessible to All Learners | Goal 3 Significant and Visible Impact in Oregon and Beyond | Goal 4 A Culture of Belonging, Collaboration and Innovation |
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| PacWave will play an integral role in advancing wave energy from early-stage ocean testing through final demonstration for commercialization. | PacWave will serve as an integrated research center, as well as a training ground for future jobs in the ocean energy industry. | PacWave will become the nation's first pre-permitted, grid-connected facility for utility-scale WEC and array testing. | Data from PacWave will be analyzed and disseminated and become a focus of collaboration and innovation. |

IDENTIFICATION OF RISKS AND PROPOSED CONTINGENCY

The following risks have been identified for the project. In consideration of these risk, the contingencies for design, construction, and owner are 9%, 5%, and 10%, respectively, which are in the PacWave Budget.

| Risks | Consequences | Mitigation Strategy |
|--------------------------------|---|--|
| <i>Funding</i> | The PacWave team has estimated that the cost of the project will be substantially higher than the current \$47.5M of federal + matching funding. | An additional \$26M in funding was approved for PacWave in the recently passed federal budget. This provides sufficient funding for completion of construction of the PacWave test facility. However, funds required for the initial two-year operation phase following construction are currently unspecified. If DOE and Congress do not or are unable to provide the additional funds to support operations, the following options have been provided to DOE: <ul style="list-style-type: none"> • Delay operations until funding is secured • Share operations with outside partners such as the National Renewable Energy Laboratory (NREL) |
| <i>Undiscovered conditions</i> | Site work, directional boring and undersea work carry an inherent risk of the actual construction or conditions being different from archived documents or even | The PacWave team has utilized geotechnical investigative boring and sea floor mapping to anticipate actual conditions as best as possible. |

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| | explorative inspection and testing. Unexpected conditions could present a risk to final cost, schedule, and/or the quality and scope of the project. | The contingencies noted above will be in place to cover unexpected costs. |
| <i>Labor and materials availability</i> | Availability of resources presents risk to cost, schedule, and possible scope. | This risk is mitigated by the contingencies stated above. |
| <i>Higher than expected construction market escalation</i> | This risk is based on national/regional economics more than labor availability (above), but these risks are similar and interconnected. | This risk is mitigated by an annual escalation factor of 7%. |
| <i>Project delay</i> | Funding, land use permitting, FERC licensing, logistical, contractual, or any reason for substantial delays in construction present not only schedule vulnerability, but also subject the project to further escalation in materials and labor costs. Stretching the construction period would likely increase the cost for the contractors to manage the project and pay for general logistics (general conditions). | This risk is mitigated by having a team in place that considers critical activities, appropriate timelines, and measures to avoid and accommodate delays. Enhancing support for project management during this phase will also mitigate this risk. |

TOTAL COST OF OWNERSHIP

The contract with the Department of Energy is through Budget Period (BP) 3, which includes the initial two years of operations. Costs to design, construct and operate the test facility is included in the budgets of the three BPs. The disposition of ownership and operations of the test facility at the completion of BP3 is not yet established, though it is expected that operations will continue through the 25-year expected lifespan of the facilities.

In any case, whether OSU operates the facility with an extended contract from DOE, in a partnership with a national laboratory or through other arrangements, the operations, maintenance, and renewal costs is intended to be self-sustaining from test facility revenues sponsored by the DOE.

RECOMMENDATION

Staff recommend that the Finance & Administration Committee recommend to the Board approval of a total capital project budget of \$73,500,000 for the PacWave Energy Test Facility project and advancing of the project to the final construction phase.