

Environmental Studies Program: Completed Study

Title	Alaska Wave Energy Converter Impact Assessment (AK-17-02)
Administered by	Alaska Regional Office
BOEM Contact(s)	Dr. Heather Crowley (heather.crowley@boem.gov)
Procurement Type(s)	Cooperative Agreement
Conducting Organizations(s)	University of Alaska Fairbanks
Total BOEM Cost	\$780,000
Performance Period	FY 2017–2021
Final Report Due	August 2021
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PICOC Summary	
<i><u>Problem</u></i>	Alaska holds vast potential for tidal and wave energy development, which can be harnessed to supply a cost-effective source of energy to Alaska’s remote communities.
<i><u>Intervention</u></i>	This study will assess the feasibility of a wave energy conversion demonstration project already underway off the coast of Yakutat, Alaska, through collection of environmental data to support required environmental analyses.
<i><u>Comparison</u></i>	Researchers will work with UAF Alaska Center for Energy and Power, Alaska Energy Authority, DOE, FERC, NOAA, and USFWS to integrate and extend offshore environmental feasibility studies sufficient to fully assess the viability of wave energy projects in Yakutat and other areas of coastal Alaska.
<i><u>Outcome</u></i>	The project will provide a firm scientific understanding of seabed dynamics, ambient underwater noise, and fish and marine mammal presence and habitat requirements in the project area offshore of Yakutat and evaluate the implications for feasibility studies in other areas of Alaska.
<i><u>Context</u></i>	The study is focused on the Gulf of Alaska Planning Area, but will provide insight that is applicable to other areas of Alaska, particularly Cook Inlet. Results may also inform wave energy projects in other OCS areas.

BOEM Information Need(s): The Energy Policy Act of 2005 delegated regulatory authority to BOEM over renewable energy resources on the OCS. For hydrokinetic energy development, FERC manages permit authority for licensing while BOEM retains regulatory responsibilities for leasing and compliance requirements. To achieve complete assessment of the feasibility of a wave energy conversion demonstration project already underway off the coast of Yakutat, Alaska, additional environmental data is needed, including: subsea hazards, seabed sediment dynamics, ambient noise, and local distribution of marine mammals and fish. BOEM and other regulatory authorities will use this newly acquired information to make immediate decisions about the viability and planning of commercial interests in offshore renewable energy projects in Yakutat and other promising locations, including on the OCS.

Background: Alaska holds vast potential for tidal and wave energy development. With emerging technologies, these energy resources are becoming more attractive to coastal communities as a

potential energy source to diminish reliance on costly diesel fuel. Yakutat is a remote community located along the northeastern Gulf of Alaska. Their current power generation is 100% from diesel fuel, which must be barged in, resulting in a high cost of electricity that averages \$.60 per kilowatt hour. The City and Borough of Yakutat, along with tribal leaders, have identified other options to meet their energy needs, including wave energy. Their interest led to an effort in 2009 to launch initial research intended to assess both available wave energy and local environmental factors that would establish the feasibility of advancing a development project using emergent “wave energy converter” (WEC) technology available from the Boston-based company, Resolute Marine Energy. FERC approved a preliminary permit for the project in January 2013 to initiate such feasibility studies. The preliminary project design envisions an array of nine wave converters positioned beyond the surf zone on the seabed in State waters running parallel to shore.

Study results from this assessment indicate that Yakutat wave resources provide “excellent” energy source potential in both deep and shallow water. However, additional data on environmental factors is necessary to assess the viability of undertaking the development. In particular, comprehensive assessments are still needed in three specific topical areas: subsea hazards, seabed dynamics, and marine mammals. In 2016, bathymetry and seabed depth work will be funded by the Department of Energy. But information needs are still pressing to characterize seabed dynamics, including areas prone to sediment movement and their implications for benthic habitat. Information needs are also still pressing to characterize ambient underwater noise, as well as presence and habitat implications for local fish and marine mammals. Without BOEM engagement, this demonstration project will remain incomplete and inconclusive, inhibiting renewable energy momentum in Alaska.

Objectives:

- Collect scientific and technical data sufficient to complete assessment of the feasibility of the Yakutat Wave Energy Project.
- Establish firm scientific understanding of seabed dynamics, ambient underwater noise, and fish and marine mammal presence and habitat requirements in the project area offshore of Yakutat.
- Evaluate implications of findings from the Yakutat Wave Energy Project for feasibility studies in other coastal regions of Alaska, including extensions onto the OCS.

Methods: Researchers will work with UAF Alaska Center for Energy and Power, Alaska Energy Authority, DOE, FERC, NOAA, and USFWS to integrate and extend offshore environmental feasibility studies sufficient to fully assess the viability of wave energy projects in Yakutat and other areas of coastal Alaska.

Specific Research Question(s):

1. What physical and biological parameters may be affected by a wave energy conversion facility off Yakutat, Alaska?
2. How can lessons learned from the Yakutat Wave Energy Project inform similar projects in other areas?

Current Status: Completed.

Publications Completed:

Kasper J, Castellote M, Seitz A, Stafford K, Courtney M, Brown E, 2021. Yakutat Wave Energy Converter Impact Assessment. Anchorage (AK): US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2021-055. 221 p.

Affiliated WWW Sites:

<http://www.boem.gov/akstudies/>

<https://marinecadastre.gov/espis/#/search/study/100214>