American Tidal Energy Project

February 13, 2025

ORPC

Patented Technology, Proven Through 18 Successful Deployments Since 2007

Who we are

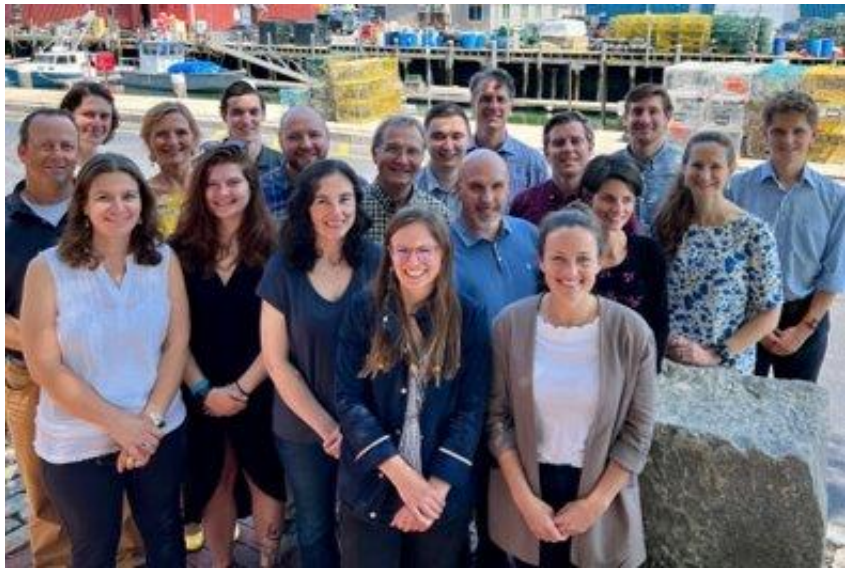
- Founded 20 years ago. Headquartered in Portland, Maine, USA
- 50 employees in 4 countries (USA, Canada, Ireland, Chile)
- In Alaska since 2006

What we do

- Convert kinetic energy from moving water into clean, predictable, affordable sources of renewable electricity

ORPC's objectives

- Develop clean energy solutions for remote communities and critical infrastructure
- Create local jobs for installing and maintaining equipment



U.S. DEPARTMENT OF ENERGY

EU Horizon 2020

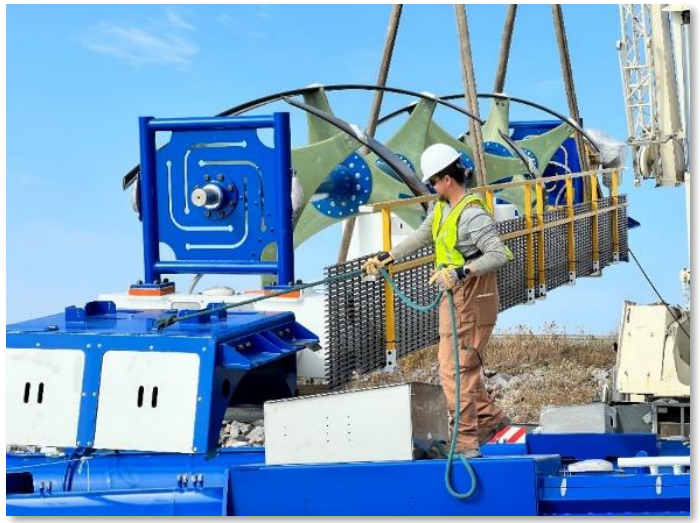
ALASKA ENERGY AUTHORITY

seai SUSTAINABLE ENERGY AUTHORITY OF IRELAND

Natural Resources Canada

ORPC Deployments – 6/18 in Alaska

RivGen devices,
Igiugig, Alaska



RivGen device
Winnipeg, Manitoba

Modular RivGen
devices,
Millinocket, Maine

TidGen device
Eastport, Maine

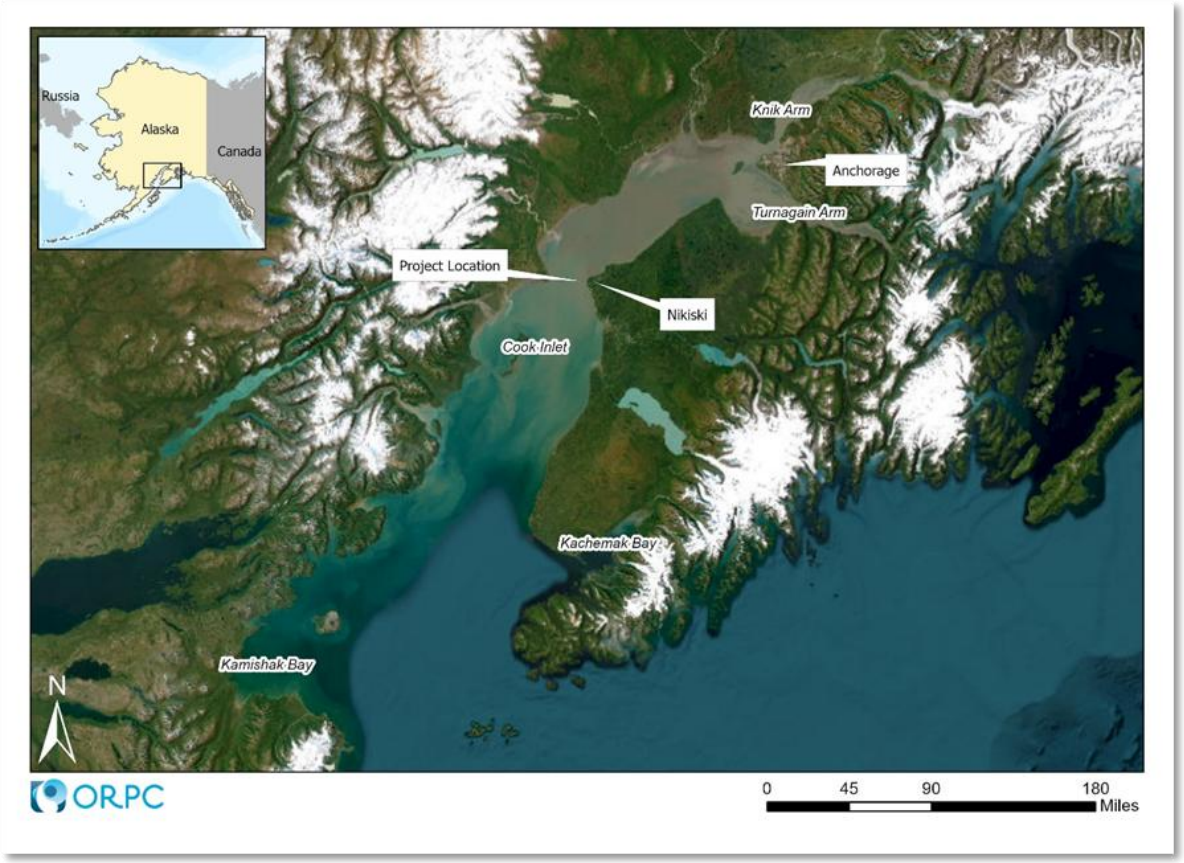
ORPC Team Accomplishments

- First federally licensed ocean energy project in the Americas to deliver power to a regional grid under a power purchase agreement
  - Cobscook Bay Tidal Energy Project (P-12711)
- Only company to secure a FERC license for both tidal and river hydrokinetic projects (on behalf of Native Alaskan community - Igiugig)
- Numerous deployments, operations and retrievals in both tidal and river environments

Project Overview

The Big Picture

- Develop a commercially viable, standalone tidal energy market in Cook Inlet supplying clean, reliable, predictable, and affordable power to the Railbelt grid



The First Step: the American Tidal Energy Project

The American Tidal Energy Project's objective is to develop an Alaska-based 1 MW to 5 MW tidal site that integrates the best available tidal technologies to provide power to the grid and/or alternative end users, while involving community and environmental stakeholders in the vision for, and implementation of, a commercial tidal energy project beyond the funding period.

U.S. Department of Energy Water Power Technologies Office Funding Opportunity

- Funding Opportunity Announcement = May 2023
  - Funded by the Bipartisan Infastructure Law
  - First large-scale investment in U.S. tidal and/or current energy
- Two projects selected for initial Phase I award in February 2024
- Project kickoff = June 1, 2024

Project Funding Broken Down into Five Phases

Down Select Scheduled for April/May 2025

Phase 1 – 2024/2025
(Two Awardees)

$3M - ORPC
East Foreland,
Alaska Project

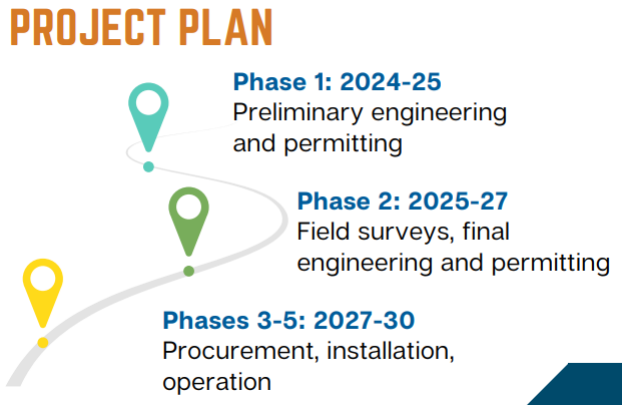
$3M - OPALCO
Puget Sound,
Washington
Project

Down Select
(Starting April 2025)

$29M to be **awarded** to one project

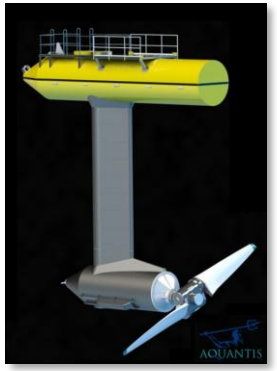
Phases 2 – 5
(2025-2030)

- Develop site for commercial use
- Deploy and operate 1 – 5 MW
- Establish local-based supply chain and prepare for scale-up
- Develop a local workforce
- Establish environmental monitoring pathway for marine life



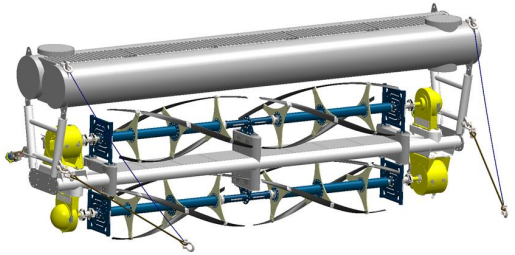
Funding level of the grant program can significantly advance the U.S. tidal industry

Technology Selection Process Results



Aquantis

Proteus



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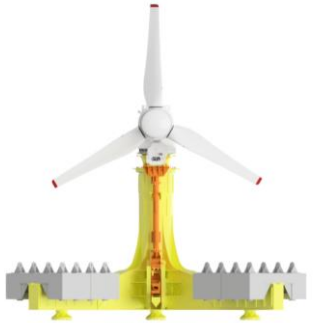
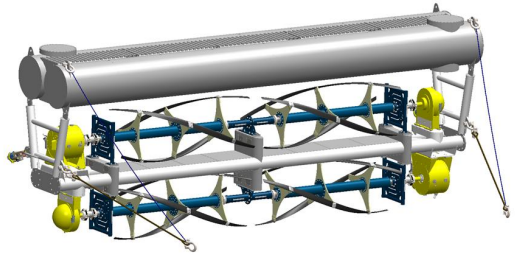
EMEC (European Marine Energy Centre), Tidal Energy Corporation

Proteus





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Moving onto Phase 2

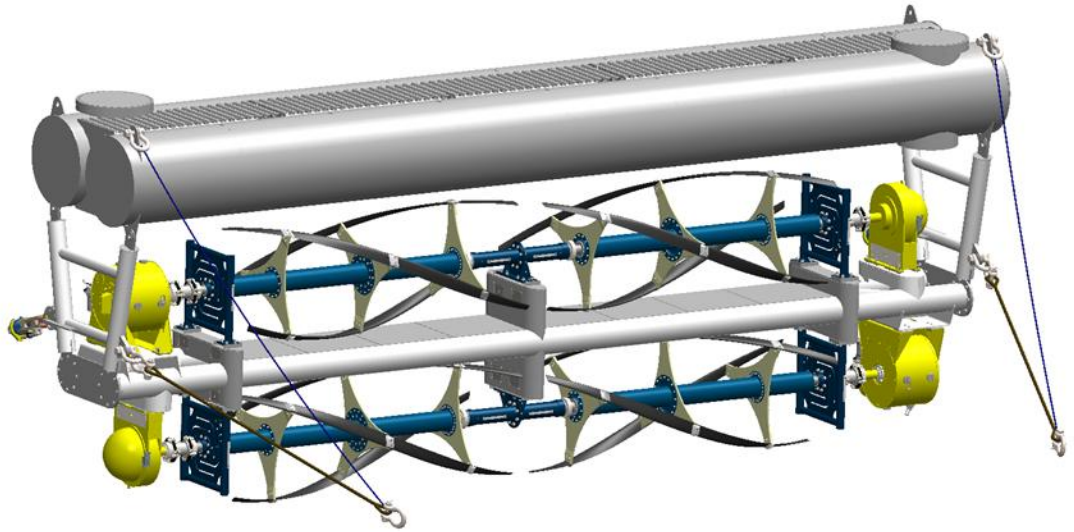
*Aquantis still involved in an advisory role

ORPC TidGen80®

- Submerged cross flow turbine
  - Multiple rows of counter rotating turbines
- The turbines are supported in the water column by a buoyancy system and moored to the seafloor with a mooring spread
- Same turbine system as used in Igiugig, AK & Cobscook Bay, ME
- Length: 23 ft (7 m); Width: 58 ft (17.6 m); Height: 20 ft (6m)

Power Rating

- Generates power between 0.8-3.5 m/s
- 80 kW at 2.25 m/s
- 230 kW at 3.5 m/s



ORPC TidGen Prior Environmental Study & Monitoring Work

Cobscook Bay Tidal Energy Project (P-12711) 2012-2013

- Marine Mammal Presence & Interaction Monitoring
- Fisheries & Marine Life Presence & Interaction Monitoring
- Bird Presence & Behavoir Monitoring
- Benthic & Biofouling Monitoring
- Acoustic Monitoring
  - Recorded noise below NOAA Level B Harassment Threshold
- Hydraulic Monitoring

No negative effects identified

Proteus AR-Series

Company Intro

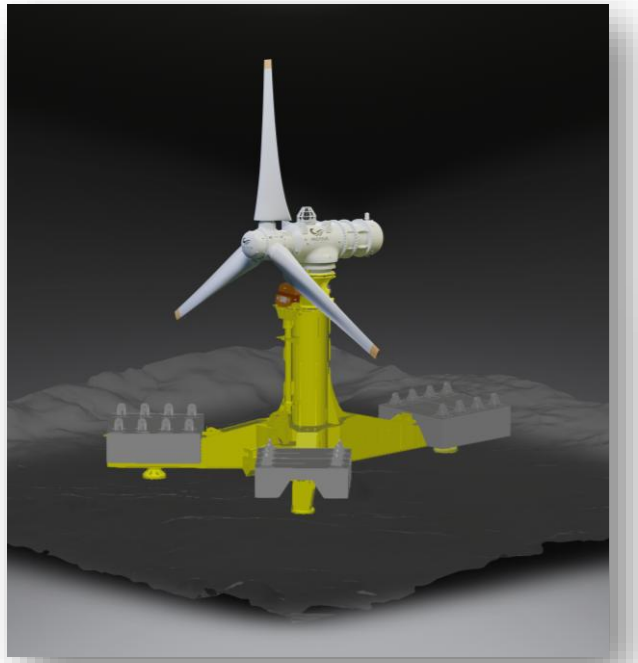
- 22 years' experience
- 25 deployments in six countries
- Technologies generated over 20GWh

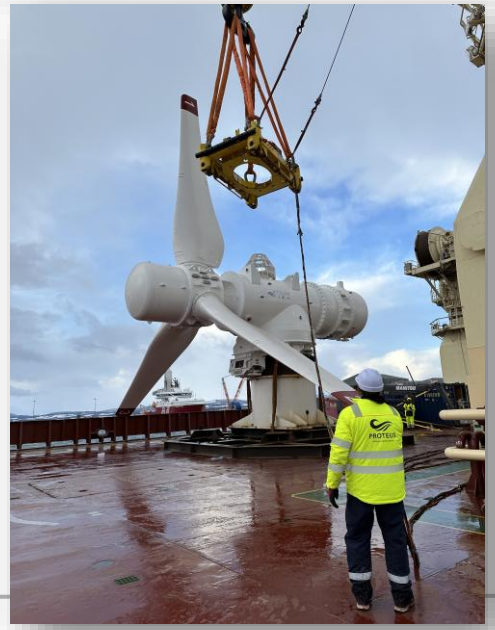
System Highlights

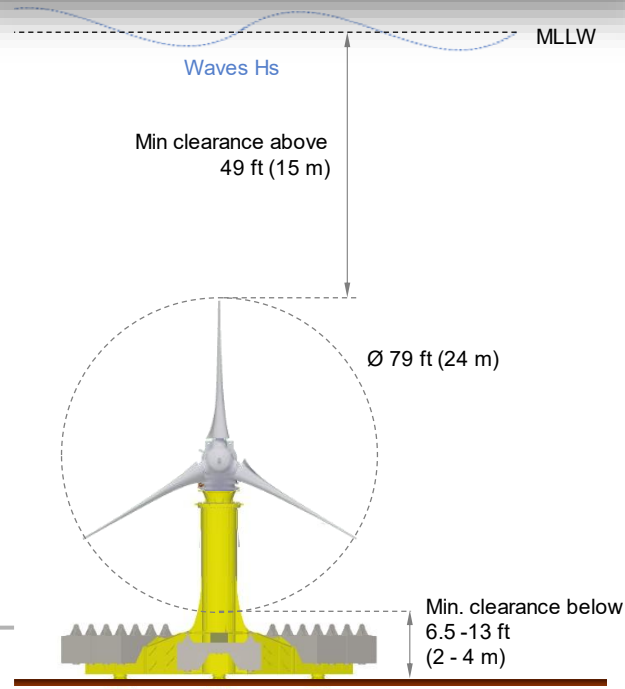
- Horizontal axis, single rotor turbine
- 3 advanced composite quick fit foils
- Reliable, modular architecture
- Seabed mounted foundations, no visual pollution
- No navigation or surface impact risk

Tech Specs

- Production flow speed: 0.7 – 5 m/s
- Power output: 1.75 MW (at 2.6 m/s)
- Rotor speed: 12rpm (5 seconds per rotation)
- Turbine mass: 170 tonnes







Celebrating 20 years of innovating sustainable river and tidal energy solutions

Proteus AR Series Prior Environmental Study & Monitoring Work

PROTEUS MARINE RENEWABLES

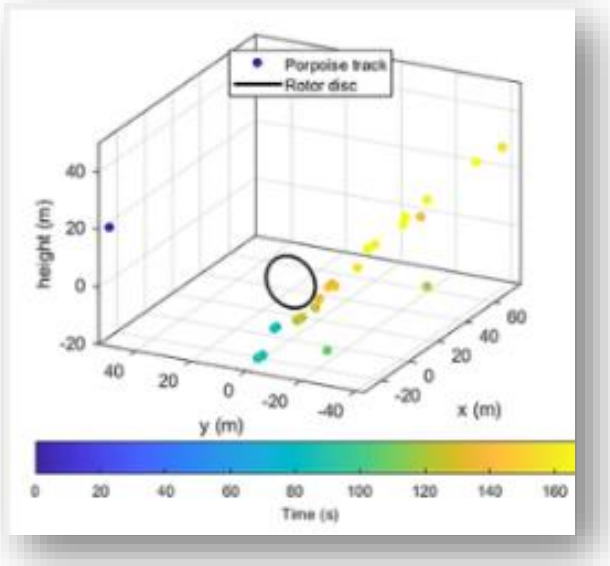
ORPC

SeaGen (Strangford Lough, Northern Ireland), 2008-2012:

- No major impacts on marine mammals detected
- No significant change to the flow

MeyGen (Pentland Firth, Scotland), 2018 to present:

- Subsea sonar and hydrophone live data recorded
- Porpoise evasion observed during turbine operation
- Results show that the risk of collision is low
- Acoustic data recording used in modelling concluded low risk of impact on marine life behavior



Japan (Naru Straight) 2021:

- Visual observations of tropical fish around the rotor

No negative effects identified over the operating periods

Planned Project Environmental Studies & Monitoring

Phase 2: Fieldwork 2025/2026

- Site characterization surveys
  - Velocity measurements
  - Baseline acoustics
  - Geophysical measurements
  - Geotechnical measurements
- Seasonal beluga visual monitoring
- Cultural resources assessment
- Terrestrial habitat assessment

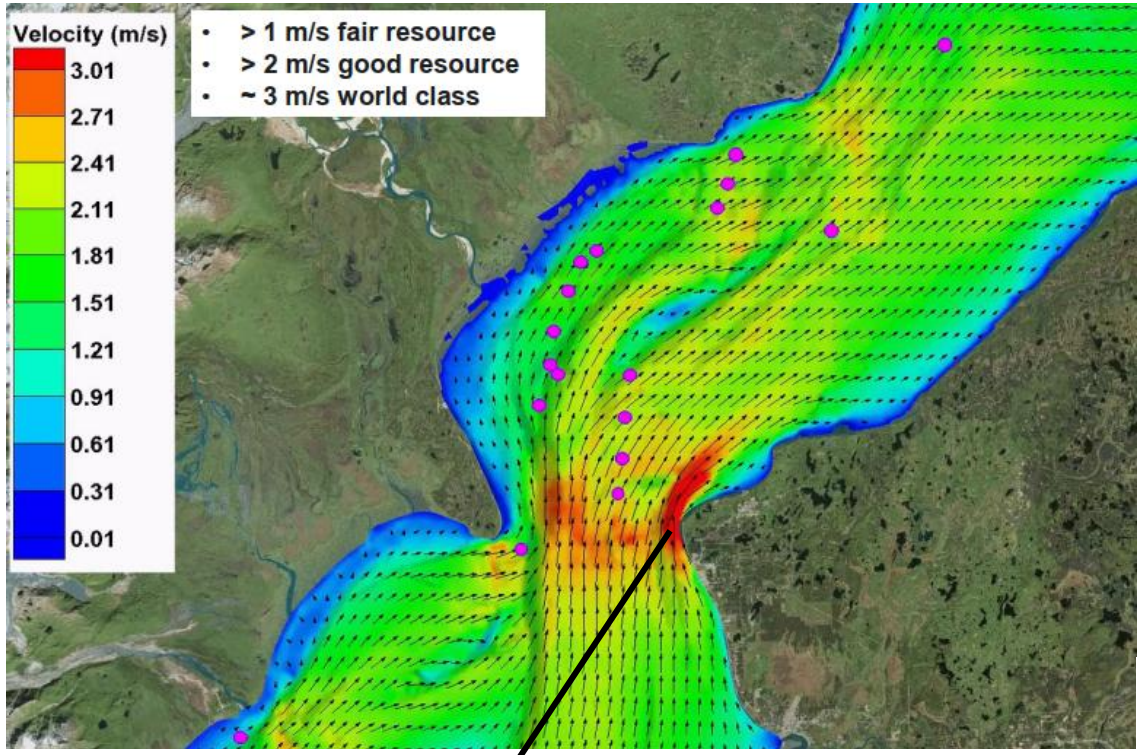
ADCP Deployment
(East Foreland in 2021)

Phases 3-5: Installation and Operation

- Protected Species Monitoring and Mitigation Plan (PSMMP)
  - Cook Inlet Beluga Whale, Steller Sea Lion, Harbor Seal, Harbor Porpoise, Gray Whale, Humpback Whale, Northern Sea Otter, Short-Tailed Albatross, Steller's Eider, Sunflower Sea Star (proposed threatened species)
  - To be implemented during construction and project operations
  - Combination of acoustic monitoring and visual monitoring anticipated
  - ORPC is working with resource agencies (NOAA & USFWS) to develop an appropriate PSMMP for the Project

Why East Foreland, Cook Inlet?

Tidal power in Alaska, and Cook Inlet specifically, can provide >100% of the region's energy needs enabling the potential to power significant future economic growth

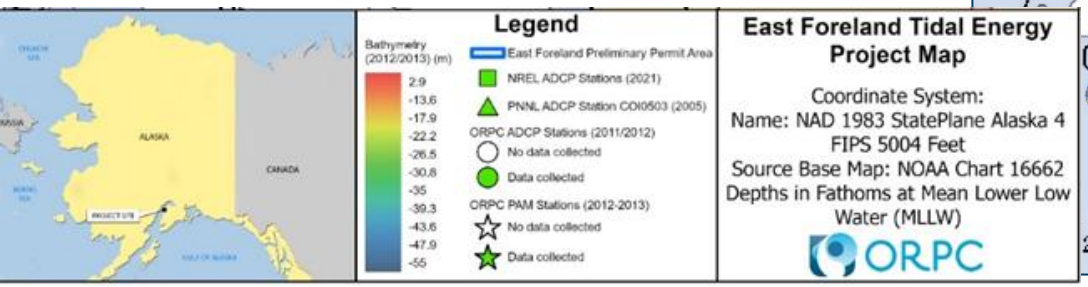


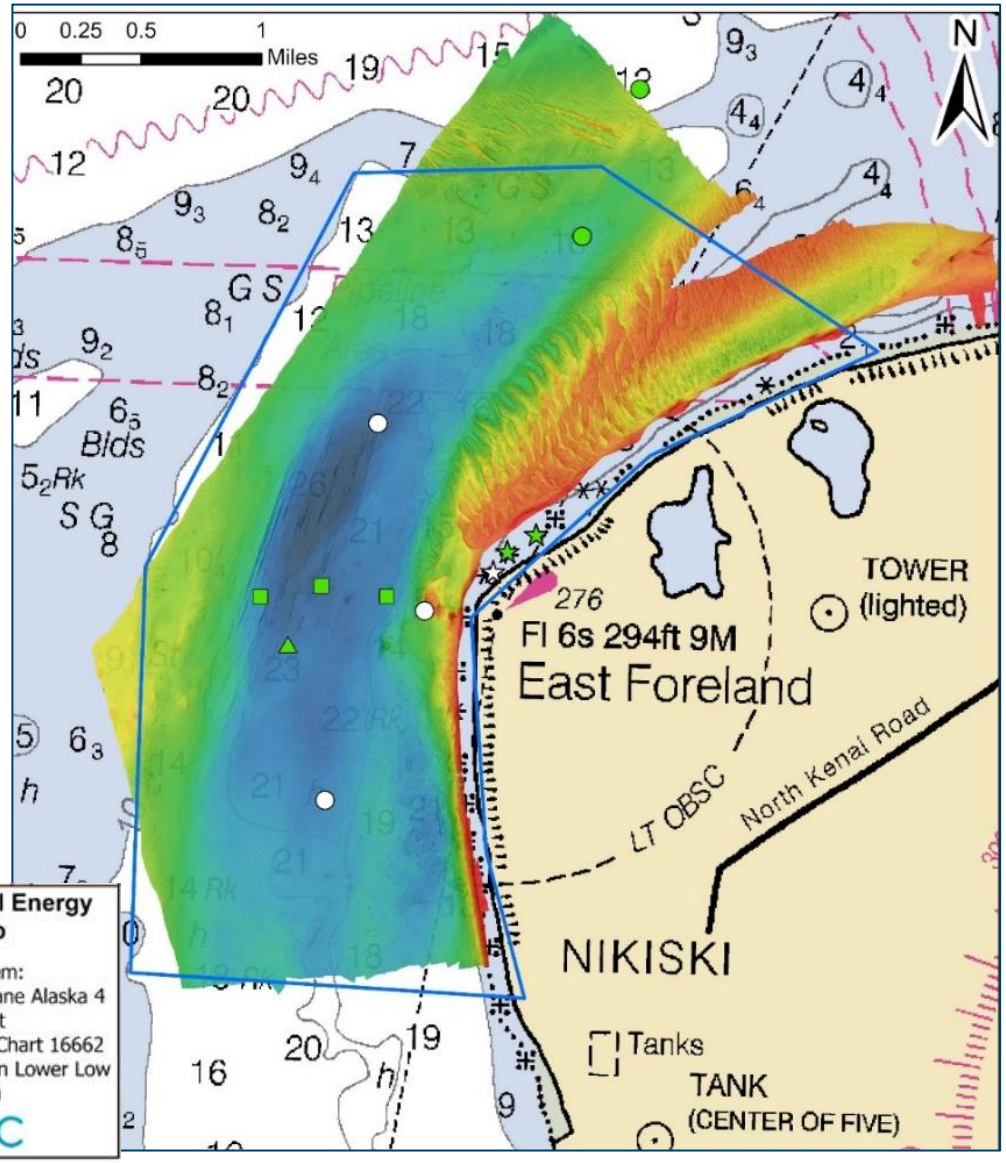
- East Foreland = Premier tidal energy development site in the U.S.
- Measured velocity can reach up to 4 m/s at the East Foreland
- Resource ~ 18 GWs[1]
- Tidal energy could play an important role in decarbonizing Alaska's railbelt[2]

[1] *Wang, T. and Z. Yang, 2020. A Tidal Hydrodynamic Model for Cook Inlet, Alaska, to Support Tidal Energy Resource Characterization. J. Mar. Sci. Eng. 2020, 8(4), 254; https://doi.org/10.3390/jmse8040254*

[2] *National Renewable Energy Laboratory. 2024. Evaluating the Impact of Tidal Energy in the Cook Inlet on Alaska's Railbelt Electrical Grid. April 2024. Technical Report: NREL/TP-5700-85943. https://www.nrel.gov/docs/fy24osti/85943.pdf.*

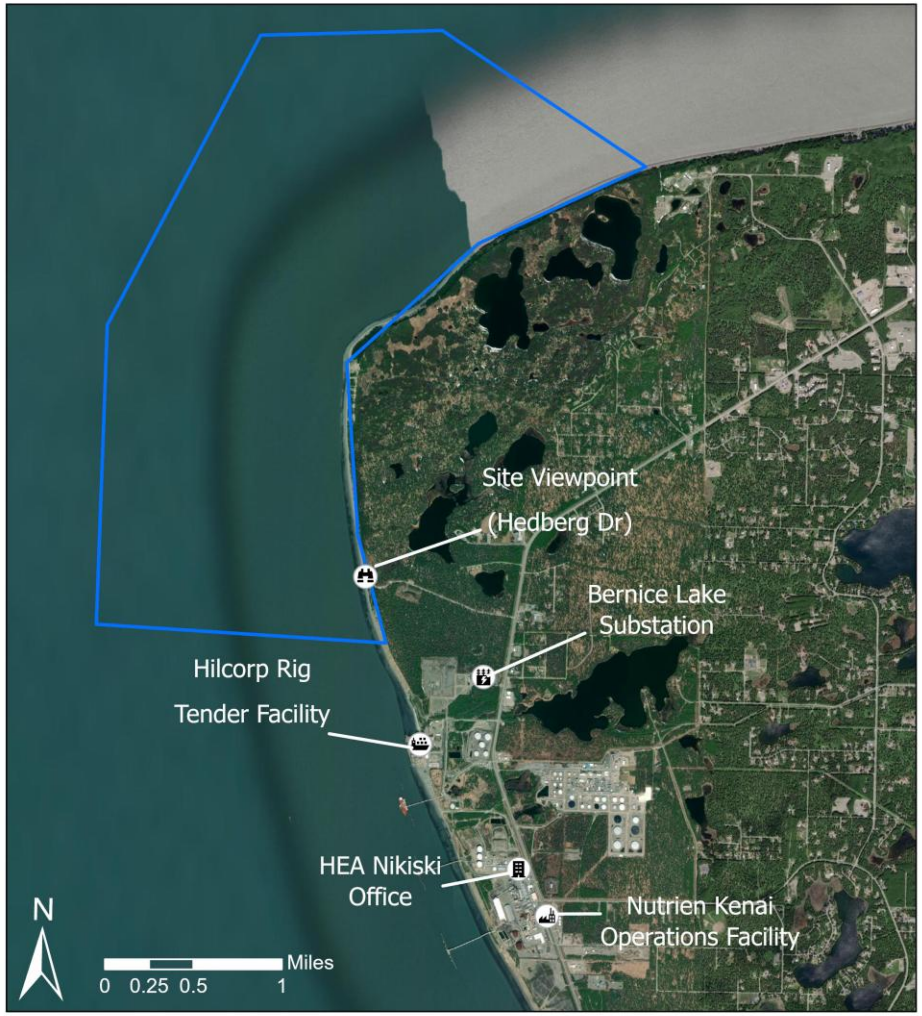
Project Area of Interest





Area of assessment as approved within ORPC's FERC Preliminary Permit for the East Foreland Project (P-15116)

Available Infrastructure In Place & In Close Proximity



Points of Interest

- Bernice Lake Substation
- HEA Nikiski Office
- HEA Soldotna BESS
- Hilcorp Rig Tender Facility
- Nutrien Kenai Operations Facility
- Site Viewpoint (Hedberg Dr)
- Kenai Peninsula Economic Development District (KPEDD)
- East Foreland Preliminary Permit Area

Regulatory Requirements

FERC Pilot License

- Federal Power Act
- National Environmental Policy Act
- Clean Water Act
  - AK DEC waived all water quality certifications for FERC jurisdictional projects in 1999
- Coastal Zone Management Act
  - Not applicable to AK
- Magnuson-Stevens Fishery Conservation and Management Act
- Marine Mammal Protection Act
- Endangered Species Act
- Bald and Golden Eagle Protection Act
- Migratory Bird Treaty Act
- National Historic Preservation Act
- Tribal Consultation
- Fish and Wildlife Coordination Act
- Rivers and Harbors Act
- Marine Protection, Research, and Sanctuaries Act
- Wild and Scenic Rivers Act
- Federal Land Management Policy Act

Project Partners & Supporters

- KPEDD
- HEA
- UAF
- Tidal Energy Corp.
- Hilcorp
- AEA
- Hatch
- Proteus MR
- Aquantis
- Terrasond (Acteon Geo-services)
- HDR
- EMEC
- Integral Consulting
- HT Harvey
- Shell
- Northern Economics

Technical support from:

- Pacific Northwest National Laboratory
- Sandia National Laboratory

Next Steps?

- Between April and June, we will learn if we are receiving an additional $29M from the U.S. DOE to execute phases 2-5 of the project.
- Contingent on funding and permitting, we are planning a 2025 and 2026 summer field season to take additional measurements in Cook Inlet that will inform our FERC licensing, state and local permitting, and project development processes.
- Continued community stakeholder engagement activities – individual meetings with local stakeholders, regulatory agencies, nonprofits, government, legislative organizations, and community organizations of all kind.

Thank You!

Questions? Please contact Eva White at ewhite@orpc.co

Project website: americantidalenergy.com

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