American Tidal Energy Project

February 13, 2025

ORPC

Patented Technology, Proven Through 18 Successful Deployments Since 2007

Who we are

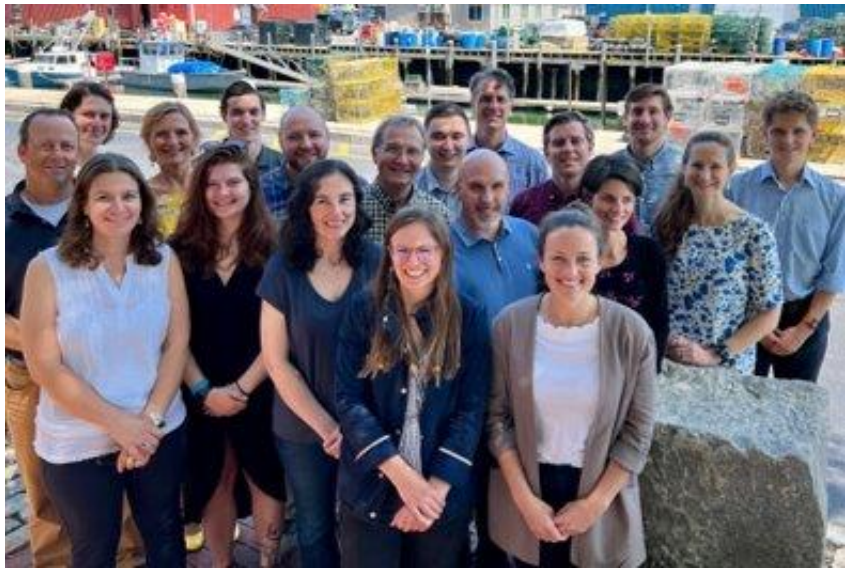
- Founded 20 years ago. Headquartered in Portland, Maine, USA
- 50 employees in 4 countries (USA, Canada, Ireland, Chile)
- In Alaska since 2006

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

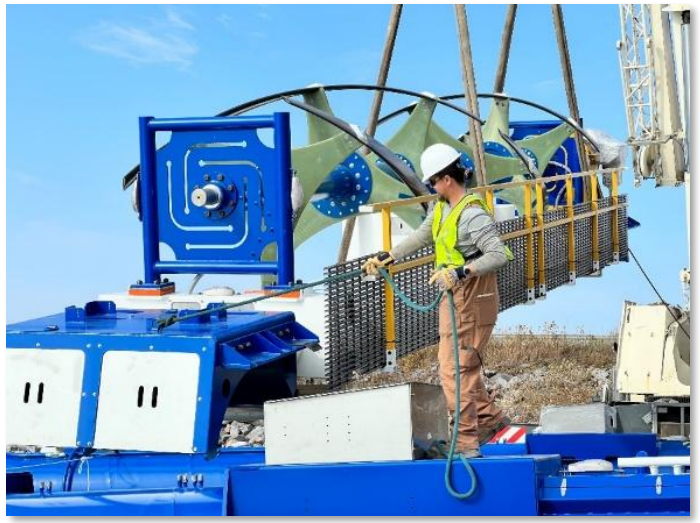
ALASKA ENERGY AUTHORITY

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

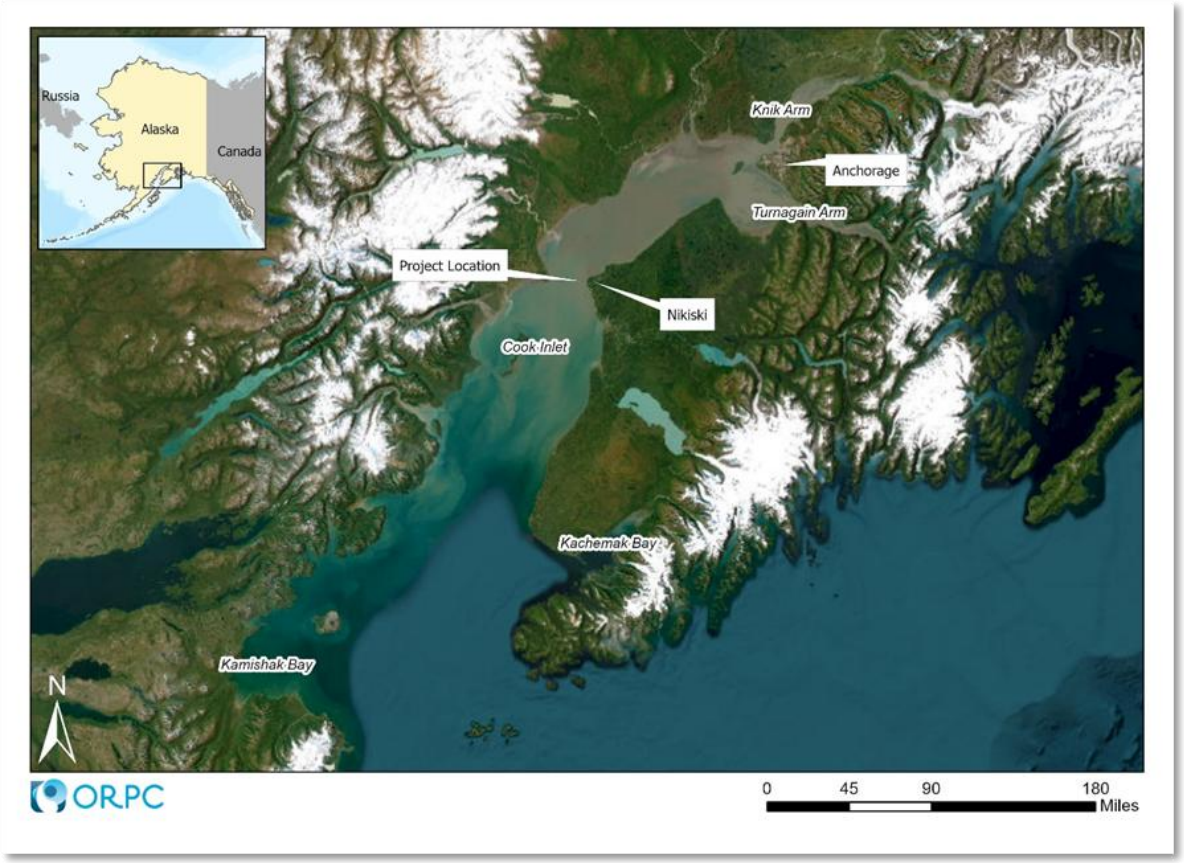
ORPC Team Accomplishments

- 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 - Iguiugig)
- 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

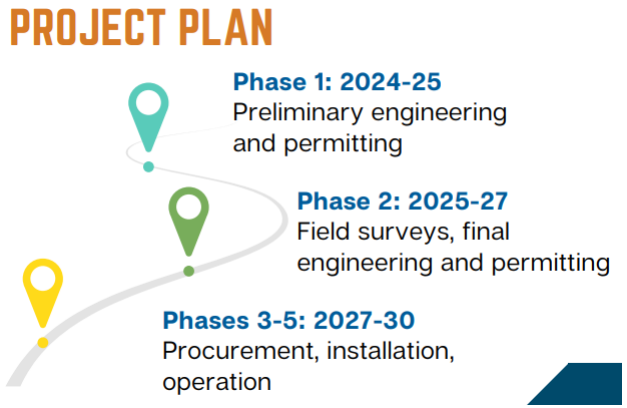
$3M - OPALCO
Puget Sound,
Washington
Project

Down Select
(Starting April 2025)

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

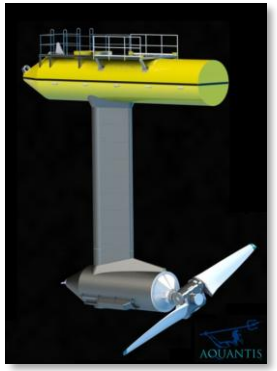
Phases 2 – 5
(2025-2030)

- 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



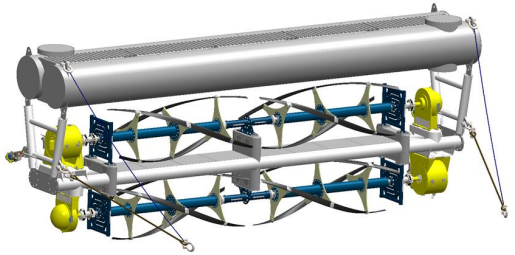
Funding level of the grant program can significantly advance the U.S. tidal industry

Technology Selection Process Results



Aquantis

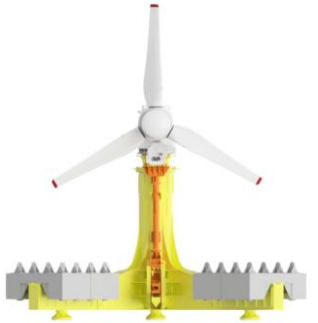
Proteus

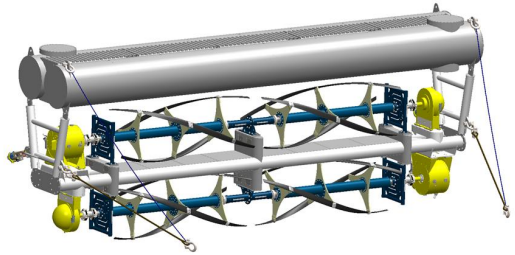


ORPC

EMEC (European Marine Energy Centre), Tidal Energy Corporation

Proteus





ORPC

Moving onto Phase 2

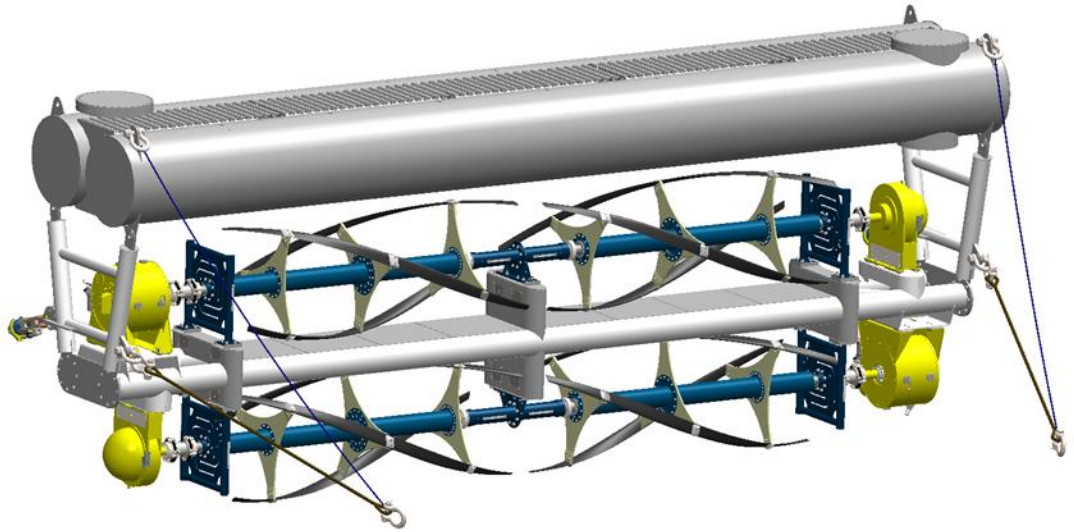
*Aquantis still involved in an advisory role

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

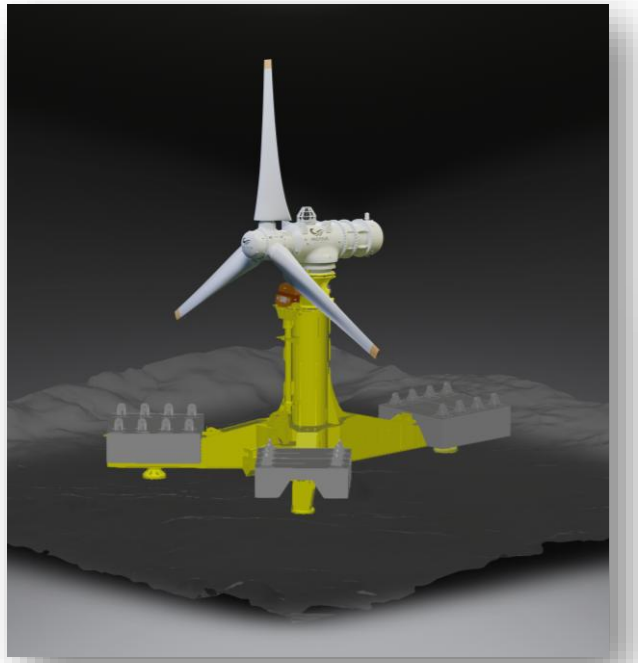
- 22 years' experience
- 25 deployments in six countries
- Technologies generated over 20GWh

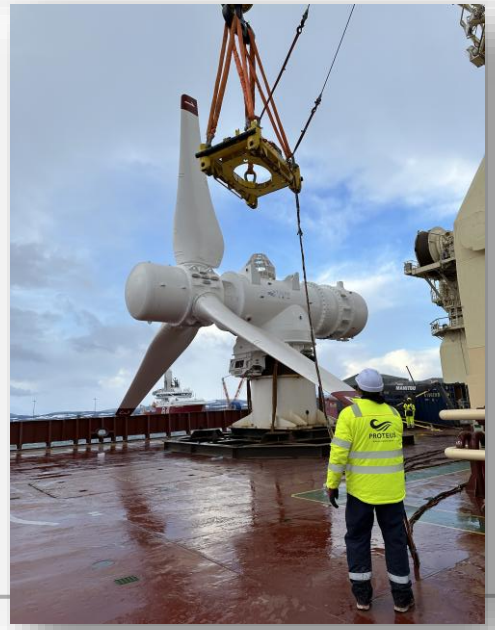
System Highlights

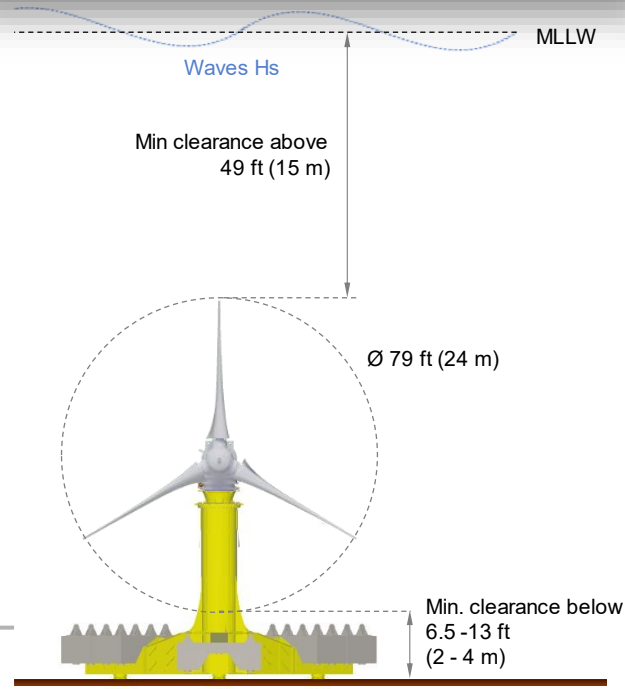
- Horizontal axis, single rotor turbine
- 3 advanced composite quick fit foils
- Reliable, modular architecture
- Seabed mounted foundations, no visual pollution
- No navigation or surface impact risk

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

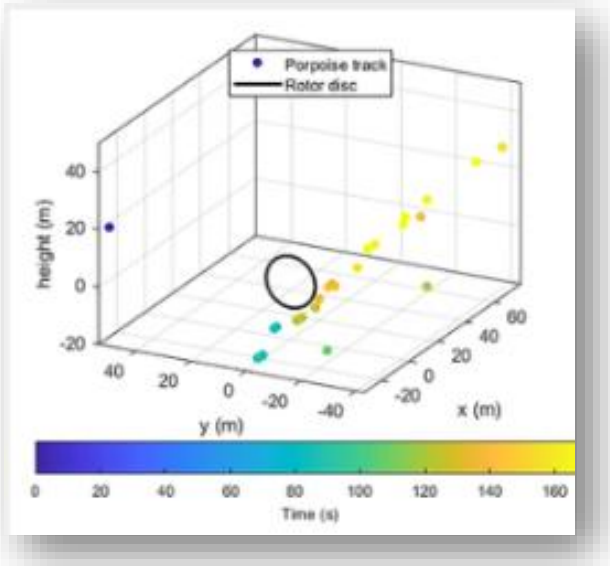
ORPC

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

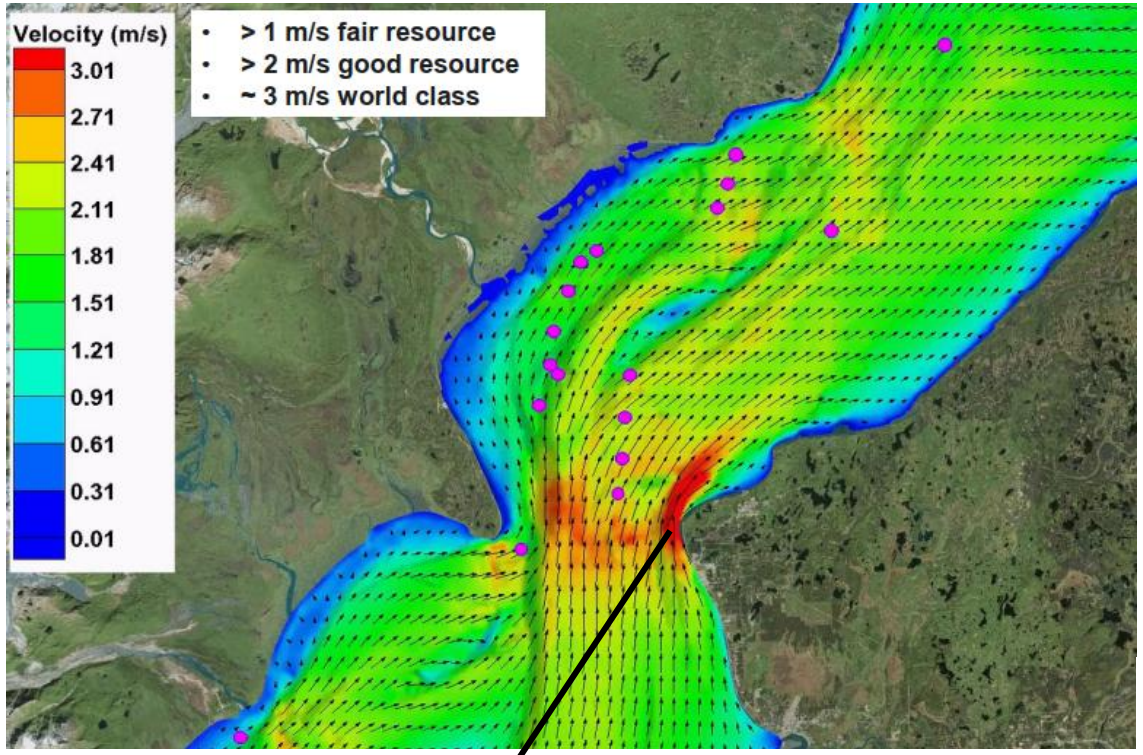
ADCP Deployment
(East Foreland in 2021)

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

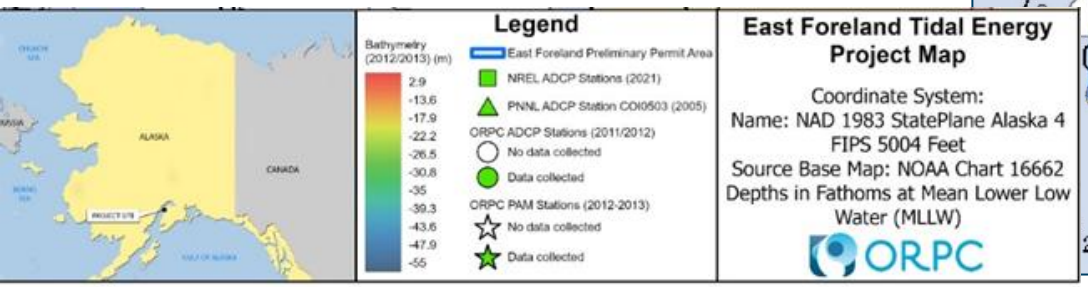


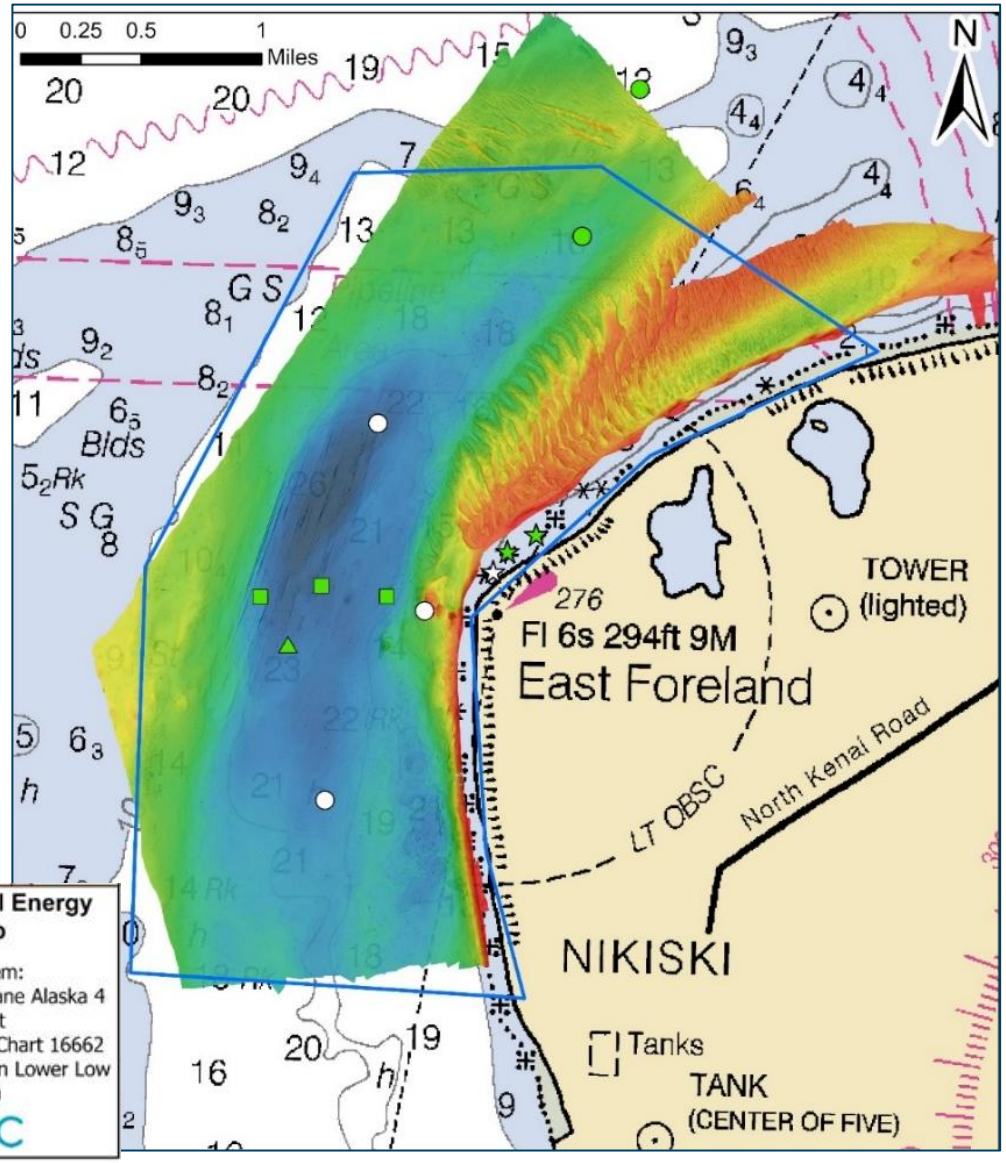
- East Foreland = Premier tidal energy development site in the U.S.
- Measured velocity can reach up to 4 m/s at the East Foreland
- Resource ~ 18 GWs[1]
- Tidal energy could play an important role in decarbonizing Alaska's railbelt[2]

[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.*

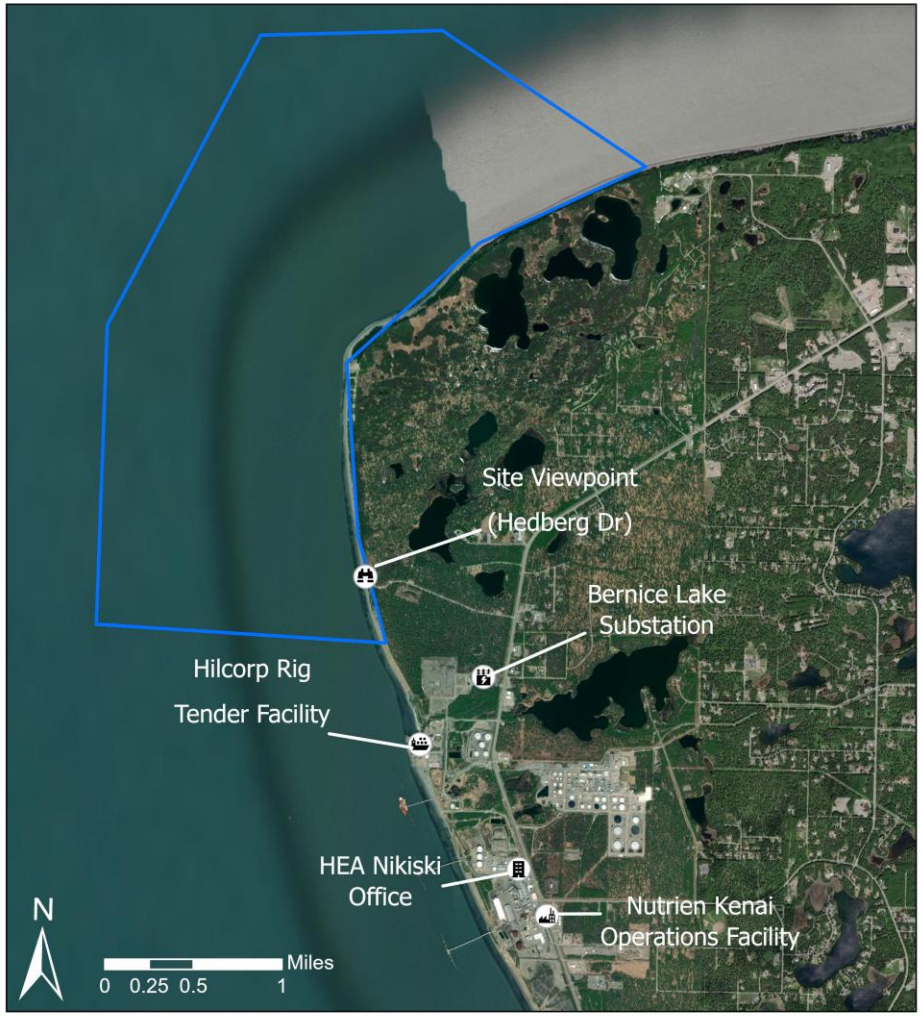
Project Area of Interest





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

This work is funded in part by the U.S. Department of Energy's Water Power Technologies Office under Award Number DE-EE0011265.