Company Overview

- Ocean Renewable Power Company (ORPC) is a developer of hydrokinetic power systems and commercial projects for tidal, river and ocean current power generation.
- ORPC Alaska is a wholly owned subsidiary of Ocean Renewable Power Company.
- Business development activities are focused on the Bay of Fundy (Maine and Nova Scotia) and Alaska.
- Lead project is the Maine Tidal Energy Project through which ORPC is developing power system technology and project sites. This expertise is being transferred to develop projects in Alaska.
- Founded 2004 - now 28 employees in Maine and Alaska.
Tidal Energy - the Resource

The Tidal Cycle - driven by the gravity of the Moon and Sun

Spring tides
Neap tides

Spring tides
Neap tides
Tidally generated currents

- Tidal currents vary predictably through the lunar cycle
Velocity to Power

- Power = $\frac{1}{2}$ density x velocity$^3$
- Water is 832 times as dense as air

Graph courtesy of Mirko Previsic, EPRI
Tidal Energy - in Alaska ...

Tidal resources in Alaska represent over 90% of the total potential in the entire United States.

ORPC Alaska’s Cook Inlet project sites

Why Cook Inlet?

- 4th largest tidal range in the world up to 12 meters (40 feet)
- Current velocities up to 10 knots
- Tidal resource is in the vicinity of electrical infrastructure - the Railbelt Grid
Cook Inlet Tidal Current Phases
Hydrokinetic Turbines

5-10 years ago ...
Today!
Cook Inlet Environmental Studies

- Pre and post deployment fish studies
- Pre and post deployment Beluga monitoring
  - Visual monitoring
  - Passive Acoustic Monitoring
- Sediment transport modeling
  - Working with UAA researchers to develop modeling and study plan
- $800,000+ invested in studies
Passive Hydroacoustic Monitoring

- ORPC Project, DOE funded
  - Directional Autonomous Seafloor Acoustic Recorders (DASARs) - localize beluga vocalizations

- Team CIBA collaboration (ADF&G, NMML, UAF, UH)
  - Ecological Acoustic Recorder (EAR) and C-POD
  - used by Team Cook Inlet Beluga Acoustics

Whale photo credit: NMFS, AK regional office
East Foreland Cook Inlet Tidal Energy Pilot Project Site - Project Development
Economic Benefits

- High quality, sustainable Jobs
- Money to local economies
- Out of state investment
- Exportable expertise
- New materials & fabrication techniques
Economic Impact

Central Alaska Partners, Contractors, Vendors and Consultants

MatSu Borough
TerraSond

Fairbanks Region
Jon’s Machine Shop
University of Alaska Fairbanks

Municipality of Anchorage
ORPC Alaska Office
Alaska Serigraphics
Arctic Office Products
GCI
HDR/DTA
Holloway Associates, LLC
Kinetic Laboratories Inc
LGL Limited
Marsh Creek, LLC
Northwest Arctic Aviation
PND Engineers, Inc.
Restoration Science & Engineering
The UPS Store

Kenai Peninsula Borough
Aquacoustics, Inc.
Specialty Electric Supply
Scott Dickerson Photography
ORPC Alaska is already bringing R&D funding to AK

- $600,000 (DOE): beluga monitoring
- $240,000 (DOE): state-of-the-art flume at UAA to understand effects of silt bearings and seals
- $830,325 (Denali Commission EETF): Phase 1 of the Nenana Project
Southeast Alaska Tidal Energy Resources

Source Google Maps
## Southeast Alaska Tidal Energy Potential

<table>
<thead>
<tr>
<th>Site</th>
<th>Cross Section(^1) m(^2)</th>
<th>Average Depth(^2) m</th>
<th>Power Density(^3) kW/m(^2)</th>
<th>Channel Power(^4) MW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cross Sound and Icy Strait</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Passage (Icy Strait)</td>
<td>380,000</td>
<td>87</td>
<td>1.3</td>
<td>480</td>
</tr>
<tr>
<td>North Passage (Icy Strait)</td>
<td>490,000</td>
<td>110</td>
<td>0.9</td>
<td>420</td>
</tr>
<tr>
<td>South Inian Pass</td>
<td>34,000</td>
<td>46</td>
<td>4.3</td>
<td>150</td>
</tr>
<tr>
<td>North Inian Pass</td>
<td>660,000</td>
<td>230</td>
<td>2.5</td>
<td>1600</td>
</tr>
<tr>
<td><strong>Wrangell Narrows</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turn Point</td>
<td>4700</td>
<td>6.8</td>
<td>1.8</td>
<td>9</td>
</tr>
<tr>
<td>South Ledge</td>
<td>4800</td>
<td>5.5</td>
<td>2.6</td>
<td>12</td>
</tr>
<tr>
<td>Spike Rock</td>
<td>3500</td>
<td>4.8</td>
<td>2.6</td>
<td>9</td>
</tr>
<tr>
<td><strong>Chatham Strait</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kootznahoo Inlet(^5)</td>
<td>3100</td>
<td>12</td>
<td>7.4</td>
<td>23</td>
</tr>
<tr>
<td><strong>Peril Strait</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sergius Narrows</td>
<td>5600</td>
<td>11</td>
<td>4.5</td>
<td>25</td>
</tr>
<tr>
<td><strong>Prince of Wales Island</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tlevak Narrows</td>
<td>12,000</td>
<td>18</td>
<td>1.5</td>
<td>18</td>
</tr>
<tr>
<td>Tonowek Narrows</td>
<td>15,000</td>
<td>18</td>
<td>0.7</td>
<td>11</td>
</tr>
</tbody>
</table>

Source EPRI 2006

---

\(^1\) Cross Section
\(^2\) Average Depth
\(^3\) Power Density
\(^4\) Channel Power
\(^5\) Kootznahoo Inlet
ORPC is committed to bringing the economic, environmental and energy diversity benefits of tidal and river hydrokinetic energy projects to Alaska...

You can help in make it a reality!