Tidal Energy for SE Alaska

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Presentation Overview

- Why is tidal energy important to SE Alaska?
- Tidal energy development timeline
- Statewide tidal energy resources
- Current Alaskan projects- Knik Arm and Eagle
- SE tidal energy resources
- Project financing options
Why is ocean energy important to Southeast Alaska?

- The region has a significant tidal energy resource at numerous sites.
- High fuel costs and small isolated grids make alternatives to diesel generation more economic.
- Potential for renewable power export from SE Alaska through Canada to Pacific Northwest.
- State agencies can assist with project development and financing:
  - Alaska Energy Authority (AEA)
  - Alaska Industrial Development and Export Authority (AIDEA)
Alaska Ocean Energy Development Timeline

- Fall 2005- began Knik Arm tidal energy study (EPRI, AEA, Chugach Electric, ML&P)
- Summer 2006- Knik Arm study completed and first FERC applications filed
- 2007- first Alaska Ocean Energy Conference, SE Alaska tidal energy study completed, EPRI hydrokinetic study started, AP&T Eagle project funded by the Denali Commission
- 2008- pilot projects in the water at Knik Arm (tidal) and Eagle on the Yukon (hydrokinetic)
AK Ocean Energy Resources

Tidal Electric Generation Potential
MW
- 13 - 25
- 25 - 50
- 50 - 75
- 75 - 100
- 100 - 200

Wave Power Resource
kWh
- 50 - 60
- 40 - 50
- 30 - 40
- 20 - 30

DRAFT
# Tidal Energy FERC Permits Issued In Alaska

<table>
<thead>
<tr>
<th>Licensee</th>
<th>Waterway</th>
<th>Proposed Capacity (KW)</th>
<th>Issuance Date</th>
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Why Knik Arm?

- Extensive tidal current data is already being collected for Knik Arm Bridge studies
- Close to Alaska’s largest electric load and electric distribution infrastructure
- Close to the energy, industrial, engineering, and university resources of the city of Anchorage
Knik Arm Snapshot

- Average width: 2,531 m
- Average depth: 29 m
- Cross-sectional area: 7,300 m²
- Required navigation clearance for boats and barges measured from LAT (lowest astronomical tide): 2 m
- Seabed composition: mud over dense sand and hard clay
- Grid interconnect: 5kV and 115kV for 1MW and 50MW peak plants
Figure 26. Bridge centerline east-to-west (looking south) transect during 2 August 2004 spring ebb tide flow. Elmendorf Air Force Base is on the left and the Matanuska-Susitna Borough is on the right. Currents are flowing into the paper, as illustrated here.

Figure 27. Bridge centerline east-to-west (looking south) transect during the spring flood tide of 2 August 2004. Currents are flowing out of the paper, as illustrated here.
Eagle Hydrokinetic Turbine Project
Eagle Hydrokinetic Turbine Project

Turbine
UEK® System

Photos courtesy of UEK Corporation
## SE Alaska Site Resource Summary

<table>
<thead>
<tr>
<th>Site</th>
<th>Cross Section (m²)</th>
<th>Average Depth (m)</th>
<th>Power Density (kW/m²)</th>
<th>Channel Power (MW)</th>
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Icy Strait and Cross Sound

![Map of Icy Strait and Cross Sound](image)

Figure 3 – Cross Sound and Icy Strait (Source: Google Maps)

3.1 South Inian Pass
Energy Project Financing

Denali Commission / Alaska Energy Authority

  } Rural Power System Upgrades
  } Energy Cost Reduction RFP
    _ Project selection based on life-cycle analysis
    _ Utilities, IPPs with utility support

AIDEA / Alaska Energy Authority

  } Power Project Loan Fund
    _ 10-30 year term, 0-5% interest
  } Loan Participation Program
    _ Up to 25 year term, originated through existing lender
    _ AIDEA purchases up to 75% of loan from bank
  } Loan Guarantee Program
    _ Up to 20 year term, $1 million

Legislature considering a Renewable Energy Fund
Ketchikan Shipyards Development Plan

Ketchikan Shipyards Completion Improvements
Looking North

Ketchikan Shipyards Completion Improvements
Looking South
Sustainable Ocean Energy Development—
we owe it to our kids!