

Puget Sound Pilot Tidal Energy Project

> State/Federal Marine Energy Technology Advancement Partnership

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Energy Challenge



Service Region Growth

- Our region is growing rapidly several thousand new connections/year
- Load growth of 15 to 20 aMW/year

Renewable Portfolio Standard

 Requires the addition of ~140 aMW of new renewable resources by 2020.





Tidal Energy Characteristics



- Renewable
 - Meets Washington RPS requirements
- Clean
 - Zero emissions
- Predictable
 - Easier to integrate
- Close to load
 - Ease transmission constraints
 - Fewer energy loses

Tidal Energy Exploration Approach



Develop and evaluate a two-turbine, grid connected tidal energy array in Admiralty Inlet, Puget Sound, Washington

Objective is to generate data to better evaluate the feasibility of tidal energy from technical, economic, social, and environmental standpoints.



Project proposes the installation of two 10-meter, grid connected OpenHydro turbines.





Challenges

Regulatory



- Permitting processes are in their infancy...new marine energy efforts don't fit into traditional hydro licensing processes
- Renewable energy facilitation not part of the "mission" of key agencies
- Lack of clarity as to what information regulatory agencies need

Environmental

- Difficulty translating current knowledge of fish and marine mammal behavior to potential marine energy device effects
- Maintaining size/scope of study efforts commensurate with small, temporary pilot projects
- Identifying, developing and implementing the best tools and approaches to conduct monitoring studies

Multi Use

- Great breadth of stakeholder interests to balance and satisfy.
 - Environmental, recreational, commercial/navigational, tribal, military, etc.
- "An inland sea...completely surrounded by committees..."

Funding

- Working in the water is expensive.
- Must keep environmental study needs/costs rational.
- Dilution of available resources/funding across too many efforts may prevent any significant efforts from moving forward.
- Must leverage funds/resources from multiple sources



Site Studies

ADMIRALTY INLET PILOT TIDAL PROJECT MARINE MAMMAL PRE-INSTALLATION STUDY PLAN



Proposed study primarily focused on Southern Resident Killer Whales

- Migratory movements historical information
- Historical habitat use
- Current seasonal presence
- Current Transit patterns
- Current habitat use
- Vertical depth distribution

Studies will include:

- Passive acoustic monitoring (Loggerhead and C-Pod hydrophones)
 Beam Reach Port Townsend hydrophone
 Land-based observations
 Boat-based surveys
- Vertical hydrophone deployment



The Whale Museum

Promoting stewardship of whales and the Salish Sea ecosystem for 30 years through education and research.





BEAM REACH Marine Science & Sustainability School



Site Studies



BOTHELL SEATTLE TACOMA

 Coordinating closely with the efforts of the Northwest National Marine Renewable Energy Center

Several survey cruises conducted to date (April 2009 – May 2010)

•Study areas include ADCP, background acoustics, water quality (salinity, conductivity, dissolved oxygen, etc.), fish and marine mammal presence, and benthic characterization via grab samples and ROV video.

fiberglass frame)

http://depts.washington.edu/ nnmrec/



ROV_highlights.m4v

Instrumentation Platform



Mini-CTD (salinity and temperature)

Fish Tag Receiver (species identification)

T-Pod (echolocation hydrophone)

Lead Weight (600 lbs)

