

2007 SUMMARY OF CONFERENCE PROCEEDINGS

“Oregon’s Ocean: Resources and Opportunities ”

Panel III: “The Power of Ocean Waves ”

Robin Hartman, Chair, Wave Energy Working Group, Ocean Policy Advisory Council
Justin Klure, Interim Director, Oregon Wave Energy Trust
Kevin Bannister, Vice-President for Development, Finavera Renewables
Betsy Macmillan, Oceanlinx of Energetech America; read by Robin Sullivan, HHCC Board Member
Ron Yockim, Legal Counsel to Douglas County

Hartmann began by citing some of the criteria used by the Electric Power Research Institute in a 2004 study of potential offshore wave energy sites, which include: characteristics of deep water vs. close to shore; bottom characteristics; grid interconnection points, and minimal conflicts with existing uses.

To preserve fishing and crabbing, industry interests want to protect sandy bottoms which are best for crabs (25-30 fathoms), where gear is safer at those depths, and easier to get to where efficiency is important due to early season harvest.

Describing the permitting process, Hartmann said the Federal Energy Regulatory Commission (FERC) has the authority to site wave facilities. The role played by the state lies with the Department of State Lands which issues rules for leasing the seafloor, which addresses the compatibility of existing uses, biological and ecological effects, and the geological hazards.

Some counties have shown interest in siting, and Hartmann pointed to three counties. In the Lincoln County model, an application for a preliminary permit would be required, although FERC now exercises that role; their second approach to involve fishermen in proposing sites for test buoys under FERC jurisdiction. Douglas County wishes to use a "municipal preference" model and partner with a company. Tillamook county proposes to partner with the local PUD.

Some of the siting problems identified by Hartmann include the effect of mooring cables on marine mammals, structures which may result in new migration corridors, and the attraction of new predators.

In conclusion, among other considerations, Hartmann group is at work on several fronts: identifying and protecting sensitive sites from future development; developing a coastwide framework for wave energy, and conducting a cumulative effects study.

Speaking for the recently formed Oregon Wave Energy Trust, Klure began by citing the tremendous increase in world energy consumption, together with projections of even greater demands in the foreseeable future. In the U.S., while we diversify with coal, natural gas, hydro, oil and nuclear, only 1% is from renewables. And Oregon, in particular, depends mostly upon hydro and coal, with wind and geothermal power providing about 1%.

Klure then declared the ocean to be the largest, most concentrated source of renewable energy on earth. Furthermore, ocean energy has the potential to supply 10% of the world's electricity needs.

The intensive interest in developing wave energy off the West Coast is emphasized by twelve projects underway, seven of which are in Oregon, namely: Finavera Renewables has interest in Coos Bay and is

testing off Newport; Oceanlinx off Florence; Ocean Power Technologies at Newport, Reedsport, and Coos Bay; and intentions filed by Lincoln County and Douglas County.

Klure's Trust intends to demonstrate new wave energy technologies by assisting with funding to support activities at Oregon State University's Wave Energy Center. They also intend to site one 2-megawatt commercial project by 2009.

As one of the companies working with the Trust, Ocean Power Technologies was identified by Klure in the Federal Energy Regulatory Commission's licensing process which can take two to three years.

Bannister stated that Finavera's patented wave energy converters are based on proven, survivable buoy technology. Clusters of these small, modular devices called AquaBuOYs are moored several kilometers offshore where the wave resource is the greatest. The power plants are scalable from hundreds of kilowatts to hundreds of megawatts. Finavera power plants are designed to provide clean, renewable energy to large population centers. The offshore plants are suitable for distributing the generation and load balancing at coastal transmission points.

Energy transfer takes place by converting the vertical component of wave kinetic energy into pressurized seawater by means of two-stroke hose pumps. Pressurized seawater is directed into a conversion system consisting of a turbine driving an electrical generator. The power is transmitted to shore by means of a secure, undersea transmission line.

A cluster of AquaBuOYs would have a low silhouette in the water. Located several miles offshore, the power plant arrays would be visible to allow for safe navigation and no more noticeable than a small fleet of fishing boats.

Oceanlinx Technology converts wave vertical motion to air flow, pass through a turbo-generator to produce electrical energy, which is transmitted ashore by sub-sea cable. The technology was invented in 1990 and promoted by Energetech Australia with head offices in Sydney. This year, the company changed its name to Oceanlinx. A regional office in Connecticut works to establish partnerships in America.

Oceanlinx's unit is a floating steel frame structure that uses a patented technology to perform as an oscillating water column device. It converts wave energy into electricity with efficient variable-pitch blades on a turbine which allows it to spin at the optimum speed in one direction, despite the bi-directional air flow from the water column. Simplicity with very few moving parts, all above waterline, minimizes the likelihood of breakdown.

One Oceanlinx unit produces 1.5 mw-which can serve about 1500 homes. Advantages to the environment are: low visibility; positive impact on marine life; low noise (75 dBA); several kilometers offshore; and a natural reef.

Douglas County applied to FERC in August 2006 for a permit to site a wave energy installation on the jetty at the mouth of the Umpqua River. Yockim said a preliminary permit was issued in April 2007.

The technology is supplied by Wavegen, a Voith & Siemens Company located in Scotland. The oscillating water column technology provided by the stationary structure is different than the buoys proposed by other companies. Describing a structure to be fitted into the rock jetty, Yockim said wave action forces a surge into

the housing that causes turning a turbine to produce electricity.

Yockim explained that Douglas County already has experience in generating electricity with a coal-fired installation. Electricity produced by this venture would serve the Reedsport area, replacing power now produced by conventional means.

Douglas County is exploring one to three units having installed capacity of 1 - 3 mw. A measured approach to this venture is being taken with the expectation of seeing results in 2-3 years.