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Wave of the Future

The clean energy future is taking shape in Clackamas

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Taller than a seven story building, it will float more than 90 percent submerged beneath the chilly waters off Oregon’s coast. Its mission: coax electricity from the ceaseless motion of the wide, blue Pacific Ocean – eventually.

Finavera Renewables, a leading developer of wind turbines, has charged Oregon Iron Works in Clackamas County with the construction of a prototype ocean buoy capable of harnessing the waves for power.

“We have incredible experience in the marine fabrication environment, so this is a natural extension of a talent and a skill that we already possess,” said Chandra Brown, the company’s vice president. “We know how to build for the salt water environment: it’s such a harsh environment, you need some expertise to build a good product.”

In this case, that good product is a one-half scale buoy that will be anchored off shore this summer to test the feasibility of one idea for harnessing wave energy. The largest single component of the design is an 80 foot tall “acceleration tunnel,” which will be entirely submerged when the unit is in place.

A piston will be suspended in the middle of the tunnel, which is about 10 feet in diameter and open at both ends. The piston will be neutrally buoyant, so that when a wave passes

underneath the float on the ocean's surface, the distance between the piston and the float will increase.

This action will stretch and constrict a heavy-duty rubber hose manufactured by Dunlop in the United Kingdom, forcing the water inside it through a turbine. When the float above drops into the trough between waves, an identical hose on the bottom of the piston will do likewise – creating a steady flow of water through the turbine to generate electricity.

The system is, in short, a wave-powered pump. The prototype under construction in OIW's workshop will not actually include a turbine. Instead, it will carry instruments to measure how much water it pumps, and how fast, in order to determine if such a system could efficiently generate electricity.

"You put the test device in the water to collect data," said David Gibson, the company's renewable energy program manager. "The whole idea behind all this is to get the cost down."

The company also has a contract with Ocean Power Technology, which is pursuing an alternative approach.

"We consider ourselves to be device neutral," said Brown. "There are many different devices under development right now."

To facilitate the development of wave energy, Brown and Gibson joined OWET – the Ocean Wave Energy Trust.

"It's a new nonprofit that has just been formed in the last few months to be a clearinghouse for information related to the field," said Brown.

OWET may soon see an infusion of cash from the state government – \$4.2 million, part of a broader \$28 million fund meant to foster innovation in Oregon, which is under debate in the closing weeks of the state legislature.

"Wave energy will have to be part of the renewable energy mix. I believe it's an important piece of the pie" Brown said. "It's not going to take over from wind, but it does have certain advantages. Waves are continuous; wind stops. Waves are predictable; wind isn't. Water is much denser than air, so the amount of energy you can generate is potentially much greater.

"It's a great resource, but we're in the beginning stages right now. It's where wind was 20 years ago."