

A setback for wave power technology

By Patrick Blum

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LISBON: Projects for wind and wave energy beset by technical snags and dwindling investment

In July, a Pelamis wave power generator, an articulated steel machine like a giant semi-submerged sausage, was towed into the deep Atlantic, off the coast of Aguçadoura in northern Portugal, and attached to a floating mooring.

By September, two more Pelamis units, each capable of generating 750 kilowatts of electricity, had joined the first, about three miles, or five kilometers, off shore, and the Portuguese power utility Energias de Portugal was able to announce proudly that "the world's first commercial wave power project," was transmitting electricity to the national grid.

Costing about 9 million, or \$11.5 million, the three machines were the first phase of a plan intended ultimately to be expanded to 28 units, with a total generating capacity of 21 megawatts enough to power more than 15,000 homes and save more than 60,000 tons a year of carbon dioxide from being spewed into the skies by conventional power plants.

In mid-November all three were disconnected and towed back to land, where they now lie in Leixões harbor, near the city of Porto, with no date set for their return to operation.

So what went wrong?

First, there was a buoyancy problem, said Max Carcas, a spokesman for Pelamis Wave Power, the British company that designed and built the units and retained a 23 percent stake in the project. According to a report on ocean energy systems published by the International Energy Agency, foam-filled buoyancy tanks for the mooring installation leaked and needed to be replaced, delaying startup.

The buoyancy problem was resolved, Mr. Carcas said during a telephone interview this month, but other technical issues emerged, as could be expected in a prototype project. "Like all things new, you have niggles to work through, and we continue to do that."

Then, the financial crisis kicked in.

The Aguçadoura wave farm was announced in September as a joint venture between Pelamis and a group of three promoters including EDP, the Portuguese electrical engineering company Efacec, and the asset manager Babcock & Brown, an Australia-based specialist in power and other infrastructure investments.

But, by November, as the global credit crunch and falling share markets took a deepening toll of highly leveraged investors, Babcock & Brown announced a major program of asset sales to pay down its debt: and the Portuguese partners pulled back from the venture.

"Babcock & Brown are in process of winding down and we're looking at offers for all our assets," Anthony Kennaway, a Babcock & Brown spokesman, said from London. "Pelamis is part of that. All our assets are for sale. We are not putting any more money into the project."

Against that background, Mr. Carcas, of Pelamis, said that there was no timetable for returning the generators to sea.

"As soon as things are resolved," he said. "Could be next week. Could be anything."

Harnessing ocean power for energy seemed an ideal option for Portugal, a small country with no

oil and limited resources, and a long Atlantic coastline south of the Bay of Biscay, famed for its fierce waves and storms.

Portugal now imports more than 80 percent of its energy supplies, far above the European Union average. Domestic power generation is heavily dependent on hydroelectric projects, which are vulnerable to big fluctuations in output, depending on seasonal weather conditions.

Ambitious government plans still aim for a radical transformation of Portugal's energy profile, with as much as 60 percent of the country's electricity to be generated from renewable sources by 2020. That compares with an EU target of 20 percent for the union as a whole.

But the Aguçadoura project points up the risks of a strategy relying on cutting-edge, and potentially costly, technology. Whether or not the target is achievable, particularly in current economic conditions, is a subject of debate among the country's renewable energy specialists.

"We assumed there would be no critical technical issues," to hinder deployment of offshore generators, said Antonio Sarmento, director of the Wave Energy Center, WavEC, a Portuguese nonprofit organization that promotes ocean wave power generation.

"Also we assumed there would be no environmental impact and that the energy would be relatively cheap. So we were optimistic," Mr. Sarmento said. "It's an educated guess. We are still guessing. When you pick up a new technology and look at the future it's difficult to say what will be."

On the cost side, investments in ocean-based technologies "are very high and operating costs are not entirely negligible because you have the problem of corrosion from salt water," said Colette Lewiner, head of the global energy and utilities sector at the French consultancy and services company Capgemini.

While the Aguçadoura partners put the cost of the first phase at a relatively modest 9 million, the true cost of such developments is difficult to calculate, said Hugo Chandler, a renewable energy analyst at the International Energy Agency in Paris.

"Part of the problem is the absence of data," he said. "Countries are still at an early stage and don't want to reveal real costs."

It's a very young technology, Mr. Chandler said, but "the indications are that it is considerably more expensive than other technologies."

Still, the Aguçadoura experience has not discouraged EDP from pursuing other high-tech ocean solutions. Last month it signed an agreement with Principle Power of the United States to develop and install a floating offshore wind farm off the Portuguese coast, one of the first projects of its kind in Europe.

The project would use proprietary Principle Power technology designed to allow wind turbines to be set in high-wind but previously inaccessible ocean locations where water depth exceeds 50 meters, or 164 feet. The agreement foresees commercial deployment in three phases, but sets no timetable.

Offshore wind power generation currently costs 50 percent to 100 percent more than equivalent onshore wind farms, according to a recent Capgemini report on clean technologies in Europe. But Portugal is eager to press ahead with the new technology. "Offshore wind is one of our key innovation priorities," said the chief executive of EDP, António Mexia.

"The development of floating foundations for wind turbines is a prerequisite to the development of offshore wind farms world-wide, as areas in which the sea bed is less than 50 meters deep are scarce and fixed structures in deeper waters are economically not feasible," he said.

Still, he noted, the agreement with Principle Power "is not a binding contract; there are a number of prerequisites, technical and financial, that need to be met."

A 30 million first phase, covering development and infrastructure construction, could see a small, five megawatt floating generator in operation by the second half of 2012. But for that to happen, full funding would need to be in place "by the end of this semester," Mr. Mexia said.

WavEC, meanwhile, has several wave power projects in the pipeline, including tests of prototype systems from three companies WaveRoller, of Finland; Ocean Power Technologies of the United States; and Wavebob, of Ireland.

For sure, the economic recession and financial crisis are adding to the challenges facing such projects, as investors pull back. "There will be a pause, a slowdown, in renewable energy investment until we see the recovery," said Ms. Lewiner, of Capgemini. But "these investments take time and you can't sleep through the recession. These plants are needed."

Correction:

Notes:

