London Research International

*LRI Newsletter #1*
*Date: 27th September 2010*
*Company: Dartmouth Wave Energy Ltd.*
*Interviewee: Mr. Alvin Smith (Inventor)*

"**A simple wave energy conversion technology could power Britain**"

*At LRI, we have launched an interview-based newsletter that features innovative energy technologies and businesses. In the first edition of the newsletter, LRI staff interviewed Mr. Alvin Smith, the inventor of the SEARASER, of Dartmouth Wave Energy Ltd.*

**The SEARASER by Dartmouth Wave Energy Ltd.**

(www.searaser.com)

Founded in May 2008 by the inventor Mr Alvin Smith and three business partners, Dartmouth Wave Energy Ltd. has successfully tested a simple and inexpensive wave energy converter that could power the entire nation.

Mr. Alvin Smith moved to Dartmouth in 1998, a coastal town in South West England, where he developed the idea for the "SEARASER", a simple wave energy converter using a high-pressure water-pump mechanism. Mr. Smith did not try to convert his idea into a working product until 2006, when he realized that global interest in renewable energy was increasing.

The SEARASER works as a simple high-pressure water-pump that is driven by the motion of the waves. It consists of a piston vertically attached between 2 floats. The lower float is chained to an anchor on the seabed, whilst the swell of the wave lifts the upper float; and gravity, with the help of the installed weights, pulls the float back down. This motion of the piston pumps sea-water through the attached pipe to the shore. Once the water is pumped, it can be stored in a reservoir located on a raised coastline. The water can then be used to generate electricity through a regular hydropower turbine fitted inside a pipe connecting the reservoir and the sea, using the flow of the water returning to the sea through gravity. Depending on the height of the swell, the prototype can push 112 cubic metres (or 112,800 litres) of water a day, and has a maximum output of 0.77 kW, generating 18.4 kWh.

The prototype SEARASER has a 1.8 m stroke, and a piston of 83 mm diameter. A full-sized product will have a stroke of 12 m and a piston with a 900 mm diameter, allowing a much larger pumping capacity. The full-sized prototype that will be built soon is expected to have a capacity of 53.34kW per metre of wave height, and a maximum output of 640 kW with a 12 m stroke. The increased pressure of the water-pump will also allow the full-sized prototype to push water up to 100 m above the sea level to the reservoir, making it serviceable in a wider coastal landscape.

Mr. Smith believes that the SEARASER has the potential to supply the whole of the existing and future domestic electricity demand in the UK. To do so would require 170,000 of the 900mmSEARASERs operating from 1.5m average waves to be installed across the coastline of

England. Up to 800 SEARASERs can be set up in a square kilometre of sea, and therefore 212.5 square kilometres of sea bed will be required. The small size of the area required for installation is one of the benefits of the SEARASER against major competitors such as the Pelamis and Anaconda. Pelamis is a *"semi submerged articulated structure composed of cylindrical sections linked by hinged joints"* which requires a space of 200 m radius for each installation, whilst Anaconda uses rubber tubes and require a space of 150 m radius for each installation. Other major competitors such as CETO and Oyster use a similar water-pump mechanism to the SEARASER. Mr. Smith believes that, although Oyster (developed by Aquamarine) may pump water at a higher pressure than the SEARASER, the volume of water pumped by the SEARASER is greater from the same catchment area of sea than it's competitors.
Furthermore, due to its simplicity, the SEARASER can be used on a wide range of coastal landscapes. Dartmouth Wave Energy is currently in talks with the authorities in Portland to install the full-sized prototypes. In Portland, water will be pumped 80 m above the sea level and stored in a quarry.

**Obstacles for growth:**

Mr. Smith said that securing funding presents the main challenge for the SEARASER. Another small start-up company similar to Dartmouth Wave Energy has been notably disadvantaged with regard to securing government support schemes and establishing a potential partnership with a British university. Bureaucracy can also cause particular barriers when competing with large universities that are more resourceful and with well-established connections.

Although there have been difficulties in securing governmental funding, Mr. Smith says that the Regional Development Agency's European Division helped to advertise his technological invention, which eventually led to attracting a potential European investor.

**The Next Step:**

Dartmouth Wave Energy Ltd. is currently in talks with two private investors (one British and one European company), and is looking to seal an exclusive contract by the end of September 2010.

Due to its simplicity, the SEARASER is a technology that is adaptable to any coastal landscape, providing that sufficient wave height is available. Dartmouth Wave Energy is keen to establish a partnership with a Japanese company for the SEARASER. Mr. Smith is particularly interested in installing the SEARASER in Okinawa, Japan, at the Yanbaru Seawater Pumped Storage Power Plant, which is currently driven by fossil fuel (Reference: Yanburu, Okinawa World's First Sea Water Pumped Storage Station: http://seawaterpower.com/mp-sps.html).