



Carnegie shores-up investment in 2013

The year is only half way through, and yet Carnegie Wave Energy has already seen a number of exciting developments. Carnegie Chief Executive Officer and Managing Director Dr Michael Ottaviano updates *EcoGeneration* on what's been happening for the ocean energy company in 2013.

What government support has Carnegie received in Australia?

Carnegie is fortunate to have the support of both the Federal Government and the Western Australian State Government to a total of approximately \$20 million.

The Western Australian State Government is supporting Carnegie's Perth Wave Energy Project through its *Low Emission Energy Deployment* program and the Federal Government's support comes from both the Australian Renewable Energy Agency's *Emerging Renewables Program* and the Department of Industry and Innovation's *Clean Technology Commercialisation Program*.

This combined support has greatly assisted the development of the Perth Wave Energy Project (PWEF) and allowed this innovative project to take place in Western Australia.

Can you update *EcoGeneration* on Carnegie's overseas ventures?

The potential wave energy market is a large, global one and while Carnegie is an Australian-based company, we have global ambitions. To that end, we assess international opportunities on a regular basis for their potential to become demonstration or commercial projects.

Carnegie Wave Energy United Kingdom (CWE UK) was established earlier this year to take advantage of the raft of incentives that exist there for wave energy. In March 2013, Carnegie officially opened CWE UK and also appointed Mr Allan MacAskill to the Board of Directors. CWE UK operates out of headquarters in Edinburgh, Scotland and is the platform for running all Carnegie's activities in the United Kingdom (UK).

The UK is generally considered to be the hub of wave activities globally and brings together co-ordinated commercialisation support including feed-in tariffs, capital grant support, offshore testing infrastructure, legislative and regulatory support and offshore wave project leasing rounds. This support in turn has led to significant industrial activity from power utilities, equipment suppliers and players

activities which are centred around a potential project site off the coast of County Clare. Through our licensee, French power company EDF, we are also active on the French Island of Reunion in the Indian Ocean. EDF has combined with French marine contractor DCNS to manufacture and install our CETO 4 system ahead of a commercial CETO project.

What has been the UK's clean energy industry's response to Carnegie's recent launch in the region?

It has been very positive. Carnegie was recently represented at the All-Energy Conference and Exhibition in Aberdeen by CWE UK, where there was a great deal of interest in our sector from the government, utilities, original equipment manufacturers and other developers. Their awareness of Carnegie's development and the PWEF at Garden Island in particular is reassuringly high and there are real opportunities for Carnegie in the UK on the back of a successful PWEF.

The ocean energy sector in the UK is seeing huge success and progress at the moment, what can both Australian companies and policy makers learn from the UK?

The UK is continuing to succeed due to a comprehensive view of Government as to the requirements of a developing sector like wave energy.

It's the combination of capital and revenue support, along with dedicated marine planning and access and provision of testing facilities, which has allowed a whole of industry approach. This has resulted in the UK leading the world in this sector despite having a wave resource significantly smaller than Australia's.

What has 2013 seen for Carnegie's PWEF?

Carnegie has been progressing its PWEF for approximately three years and activities to date include significant surveying work



Dr Michael Ottaviano, Chief Executive Officer and Managing Director, Carnegie Wave Energy.

stakeholders and landowners including the Western Australian State Government and the Australian Department of Defence, and the design, manufacture, installation and operation of the CETO 3 prototype unit at the offshore PWEF site.

Carnegie recently completed a number of key milestones which directly led to a ramp-up in local activities again at the site. These milestones include the securing of all environmental permits and approvals, the signing of a power offtake agreement with the Australian Department of Defence, the completion of detailed design for the PWEF and the securing of the required Government and private sector funding for the project.

The achievement of these milestones has now allowed the procurement of key components, systems and work packages to be awarded, including the manufacture and supply of the buoys, pumps, foundation attachments, onshore power plant, valving and hydraulic accumulation.

Construction is scheduled to complete early in 2014 and commissioning to follow thereafter.

How is Carnegie working to use its CETO units to produce desalinated water?

One of the advantages of Carnegie's CETO wave technology is that it is capable of



Carnegie had planned to use the PWEF as a demonstration site for both power and water production.

In February 2013, Carnegie was awarded an additional \$1.25 million in funding from the Federal Government's *Clean Technology Commercialisation Program* to fund 50 per cent of the design and construction of a desalination pilot plant.

The pilot plant will be co-located at Garden Island with the onshore power station and will allow the energy captured by the CETO units to be used for either the production of electricity or fresh water.

Are there plans to develop larger CETO units?

Carnegie is in a commercialisation pathway, which involves the design and operation of progressively larger capacity and more efficient CETO units. The goal is for CETO to be cost-competitive with more mature renewable energy technologies such as wind and solar with additional benefits such as no visual impact and the co-production of fresh water.

We have successfully moved through subsequent prototype generations and for the PWEF will be operating the CETO 5 generation. In parallel, work has commenced on the next generation design, which can only be finalised once results from the CETO 5 system are collated and analysed.

How far away is commercialisation of Carnegie's CETO technology? Have there been any setbacks? What are the major next steps that need to be taken to get the technology to the next level?

Carnegie's CETO will be commercial in different markets at different time horizons. Where the technology can displace expensive, remote diesel operations in areas of good wave resource such as some island nations, this will happen quite soon. For countries with cheaper power prices like Australia, it will require a further iteration in the development of CETO to achieve this.

The most significant setback we've encountered was the impact of the global financial crisis in 2008 and 2009 and its ongoing effect in greatly diminishing the availability of risk capital to fund the commercialisation of a technology like CETO. We have worked very hard to continue to fund the development of a capital intensive, power technology, but it has not been easy.

What are some of the key reasons for Carnegie's success in the Australian clean energy industry and what tips can it offer to others?

Like any technology developer, we've made our share of mistakes through the development

of CETO but we continue to make excellent progress, largely due to having built a small but capable team that is committed to developing the best wave technology in the world, combined with a loyal base of shareholders who are likewise committed to seeing us develop CETO to its full potential.

What are Carnegie's tips for securing funding for clean energy projects?

Don't apply for funding until you're ready and then make sure you hit your milestones. Mistakes are expensive when you are operating in a high energy, offshore environment. And when you do hit your milestones, make sure everyone knows about it.

As Chief Executive Officer of Carnegie Wave Energy, Michael Ottaviano has raised over \$45 million in equity, overseen an increase in market capitalisation from \$8 million to over \$40 million, and secured a total of \$20 million in government funding support for Carnegie's wave technology from Australian, Canadian and French governments. Michael has a Bachelor of Engineering, a Masters of Science and a Doctorate in Business Administration.