

## ASX Announcement

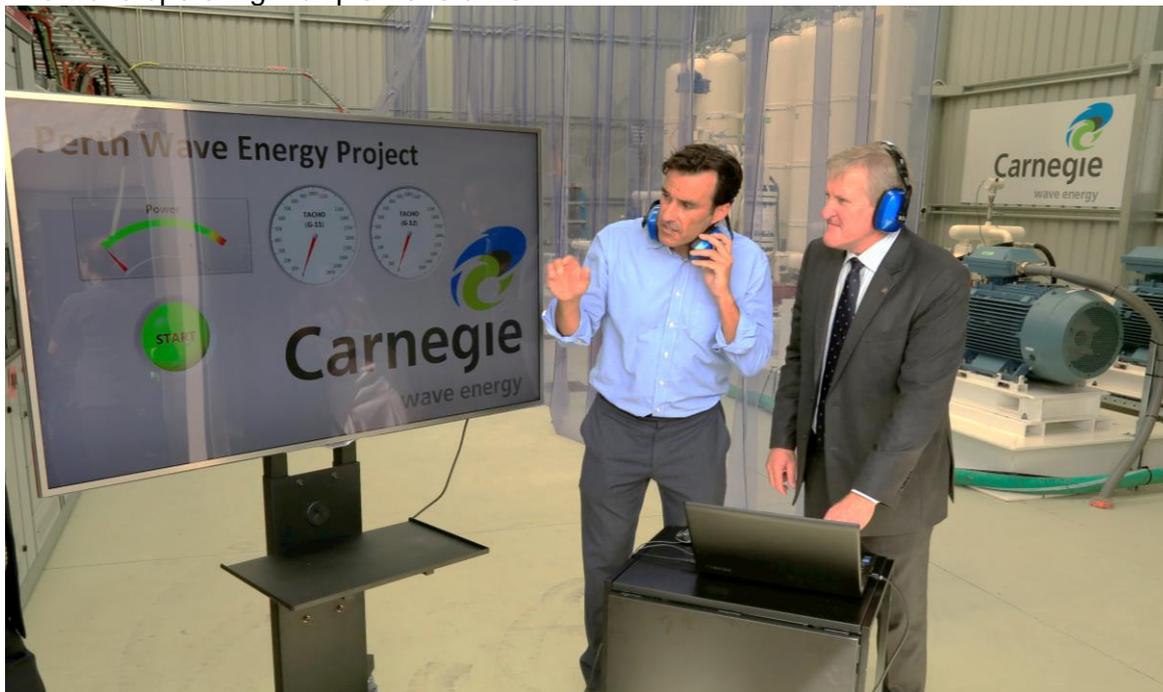
Wednesday, 18<sup>th</sup> February 2015

### Perth Project Grid Connected

- Australian Minister for Industry and Science opens Perth Wave Energy Project
- First electricity exported into state electricity grid at HMAS Stirling
- World's first grid connected wave energy array

Wave energy developer Carnegie Wave Energy Limited (ASX: CWE) is pleased to announce that the Perth Wave Energy Project was formally opened today by the Federal Minister for Industry and Science, the Hon Ian Macfarlane, and is now exporting electricity into the WA power grid.

The Perth Project was officially “switched-on” today by Federal Minister for Industry and Science, the Hon Ian Macfarlane MP and the Commanding Officer of HMAS Stirling, Captain Angela Bond. The Australian Department of Defence is the purchaser of all of the Project's power for use on Garden Island by HMAS Stirling, Australia's largest naval base. The Project is the first grid connected CETO wave power plant and the only wave power plant anywhere in the world operating multiple wave units.



**Federal Minister for Industry & Science, the Hon Ian Macfarlane MP and Carnegie CEO, Dr Michael Ottaviano switching on the world's first grid connected wave energy array power plant**

During his launch address, Minister Macfarlane referred to the Project as “great evidence of a commercial success in renewable energy. This type of practical application will guide future development of Australia’s renewable energy sector.”

ARENA CEO, Ivor Frischknecht said the Australian Renewable Energy Agency (ARENA) was pleased to be providing \$13 million funding support for the Project: “This is the first array of wave power generators to be connected to an electricity grid in Australian and worldwide. The innovative CETO technology moves with the waves to drive tethered seabed pumps and operates under water, providing protection from storms and corrosion.

Mr Frischknecht said “Carnegie is already taking the next steps to move their technology towards competitiveness with other sources of renewable power generation. Planning and design work has begun on Carnegie’s next generation CETO 6 technology, supported by \$11 million of ARENA funding. These larger units are aiming to deliver around four times the capacity of CETO 5 units, improving efficiency and reducing energy generation costs.

This progress is a clear example that given time, and with the right government support, emerging renewable energy technologies can progress along the innovation chain towards commercialisation.”

Carnegie’s CETO technology has been under development for approximately 10 years and has had some \$100 million invested in its commercialisation over this period. The wave resource that Carnegie’s CETO technology harnesses is an abundant and consistent source of clean energy. For example the CETO 6 Garden Island site records waves above 1m for 93% of the time and Albany, exposed to the Southern Ocean in the South West of Western Australia, for 100% of the time. The CSIRO also estimate that wave energy is at least three times more predictable than wind.

State Energy Minister Mike Nahan said that “the predictability of wave energy days in advance was helpful to grid operators working to balance supply and demand on the electricity network.”

Carnegie CEO, Dr Michael Ottaviano said: “The Perth Wave Energy Project is the culmination of many years’ work by the Carnegie team. The fact that this is the only wave power station operating anywhere in the world is a testament to the innovation and diligence of the Carnegie team. I’d like to thank all our staff, both past and present, along with our shareholders, the Western Australian and Federal Governments, the Department of Defence and the many other important project stakeholders”.



**The Hon Ian Macfarlane MP and Dr Michael Ottaviano overlooking the Perth Project offshore site**

The Project will soon also become the first wave power station in the world to produce both power and freshwater, when Carnegie's newly commissioned desalination plant on Garden Island is integrated into the Perth Wave Energy Project. This will allow zero-emission freshwater to be produced from the ocean's waves at the same time as clean electricity.

State Environment Minister Albert Jacob said "the ocean is an excellent source of reliable and plentiful energy. The fact that wave energy is not tied to the daily cycles of sun and wind energy makes it a particularly valuable energy resource. The success of this project has led to Carnegie beginning work on a commercial scale project with larger buoys and a new generation of the technology. This new CETO 6 project will also be located on Garden Island."

Carnegie's CETO 6 project is currently in the design phase and will feature the largest CETO units yet with a targeted capacity of some four times CETO 5 buoys. It is supported by some \$11m in Federal Government ARENA funding and by a \$20m debt facility from the Australian Government's Clean Energy Finance Corporation. An update on CETO 6 project activities will occur shortly.

### **About Carnegie**

[Carnegie Wave Energy Limited](#) is an Australian, ASX-listed (ASX:CWE) wave energy technology developer. Carnegie is the 100% owner and developer of the CETO Wave Energy Technology intellectual property.

### About ARENA

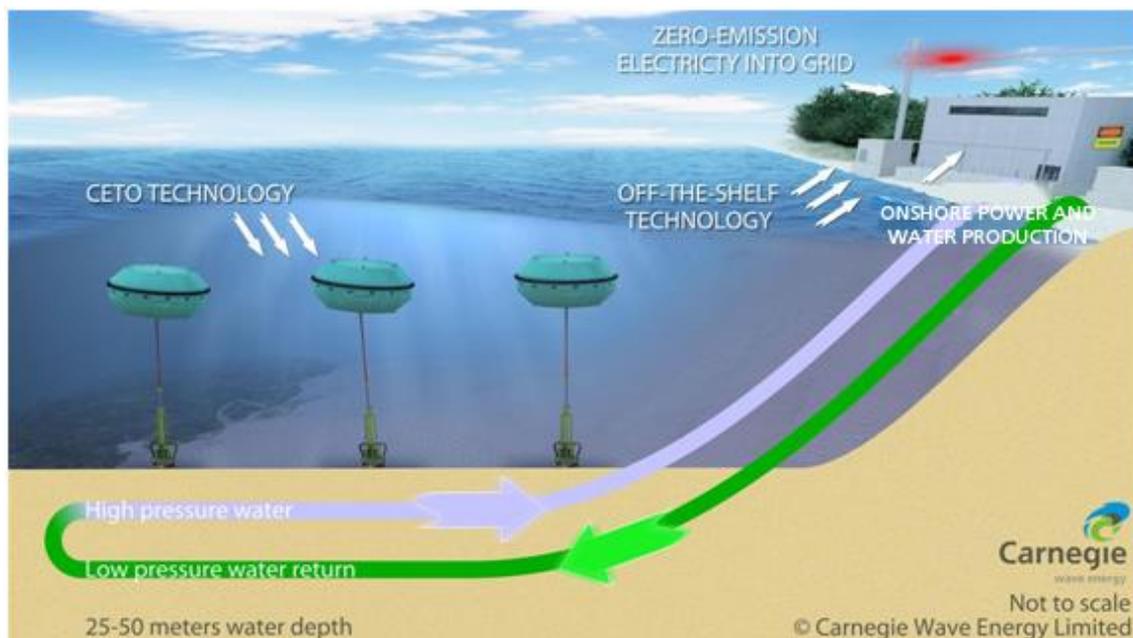
The Australian Renewable Energy Agency (ARENA) was established by the Australian Government as an independent agency on 1 July 2012 to make renewable energy technologies more affordable and increase the amount of renewable energy used in Australia. ARENA invests in renewable energy projects, supports research and development activities, boosts job creation and industry development, and increases knowledge about renewable energy.

### About CETO

The CETO system is different from other wave energy devices as it operates under water where it is safer from large storms and invisible from the shore. Fully submerged buoys are tethered to seabed pump units. These buoys move with the motion of the passing waves and drive the pumps. The pumps pressurise fluid which is then used to drive hydro turbines and generators to produce electricity.

CETO technology characteristics include:

- Converts ocean wave energy into zero-emission electricity and desalinated water.
- Environmentally friendly, has minimal visual impact and attracts marine life.
- Fully-submerged in deep water, away from breaking waves and beachgoers, and unaffected by storms.



CETO Power & Water

### Perth Wave Energy Project ('PWE') Fact File

- Upon completion, PWE will be the first commercial-scale CETO grid and desalinated water connected wave energy project.
- The Perth Wave Energy Project is supported by \$13.1m in Australian Government funding through the Australian Renewable Energy Agency's Emerging Renewables Program.
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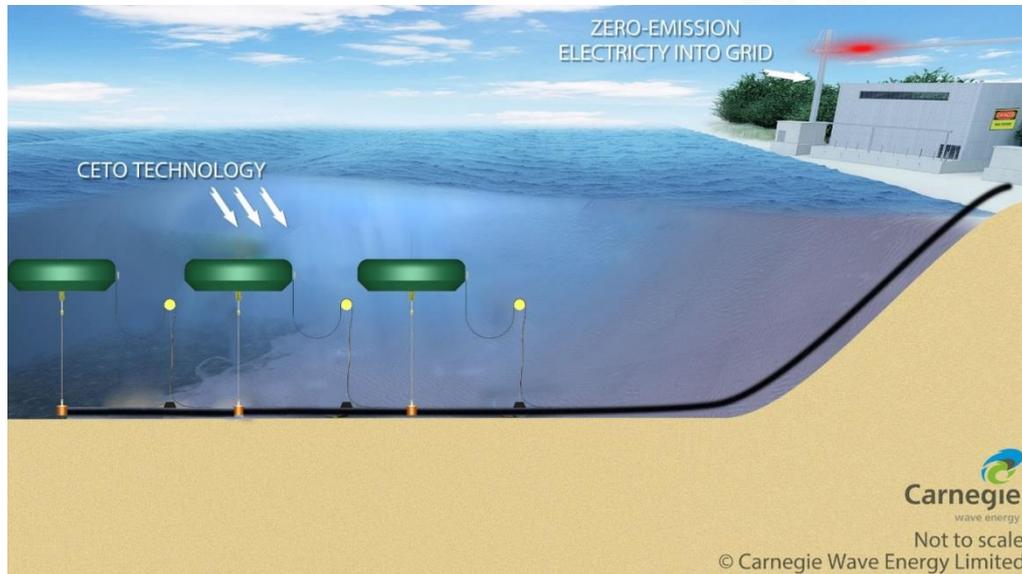
- PWEP is supported by \$7.3 million from the Government of Western Australia's Low Emissions Energy Development (LEED) Fund. This is part of a larger \$10 million LEED grant, awarded to Carnegie by the Western Australian Government, to support the development of the CETO technology from concept through to completion of PWEP.
- The Desalination Pilot is supported by a \$1.27m AusIndustry grant from the Clean Technology Innovation Program.
- Providing clean, renewable energy and potable desalinated water to Australia's largest naval base, HMAS Stirling, on Garden Island in Western Australia.

The CETO 5 technology being utilised in the Perth Wave Energy Project (PWEP) is configured to utilise the CETO pumps to pressurise water and deliver it onshore via an underwater pipe. Then, onshore, high-pressure water is used to drive hydroelectric turbines, generating zero-emission electricity. The high-pressure water can also be used to supply a reverse osmosis desalination plant, replacing or reducing reliance on greenhouse gas-emitting, electrically-driven pumps usually required for such plants.

### **CETO 6 Project Fact File**

The CETO 6 unit will have a targeted 1MW (1000kW) power capacity, some four times of the current CETO 5 generation being used in the Perth Project. It will also have superior efficiency, lower capital cost and reduced maintenance costs for sites where the array is located far from shore or in deeper water. CETO 6 will also incorporate the configuration option for the power generation system to be moved offshore and subsea rather than solely onshore as with the current CETO 5 generation. This option allows CETO to take advantage of deeper, more distant to shore wave resources which can significantly increase the size of the commercial market for CETO.

- The Project comprises the design, construction, deployment and demonstration of three CETO 6 units in a grid-connected, up to 3MW peak installed capacity wave energy project at Garden Island, Western Australia.
- The CETO 6 Project is supported by \$11m in Australian Government funding through the Australian Renewable Energy Agency's Emerging Renewables Program.
- The CETO 6 Project is supported by a five year \$20 million loan facility from the Australian Clean Energy Finance Corporation.
- Utilises Carnegie's fully submerged and commercially proven CETO wave energy device.
- The clean, renewable energy generated by the Project will be sold to the Australian Department of Defence at Australia's largest naval base, HMAS Stirling, on Garden Island in Western Australia.



**CETO 6 Project Power Schematic**

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