

ASX Announcement

Wednesday 10th September 2014

Perth Wave Energy Project Update

- Onshore plant construction and power generation equipment installation complete.
- Offshore preparations complete in advance of CETO unit deployment and Project commissioning.
- Onshore integration testing of CETO units nearing completion.
- Process Control System implementation nearing completion

Wave energy developer Carnegie Wave Energy Limited (ASX: CWE) is pleased to provide an update on the recent progress of the Perth Wave Energy Project.

Carnegie has made significant progress on the assembly and testing stage of the Perth Wave Energy Project in advance of the Project's final commissioning and operation phase. Noteworthy recent progress includes the completion of the offshore preparations in advance of the deployment of the CETO unit, completion of construction of the onshore plant including installation of all power generation and conditioning equipment on Garden Island and nearing completion of the testing of the CETO units.



In-ocean testing of the CETO 5 Unit 1 Buoyant Actuator

Unit assembly and integration testing program progress

Over the past months, Carnegie has been working through a rigorous program of integration testing of the CETO units in advance of offshore installation and commissioning. This testing program has been designed to test and verify that individual components meet specification, component interfaces conform and component subsystems are integrated and tested. This allows Carnegie the opportunity to identify and remedy problems before deploying the CETO units offshore. The time spent on integration testing provides significant benefit to the Perth Project as well as valuable input into the design of future CETO projects. The testing program has included testing of the buoyant actuators, pumps, connectors, onshore and offshore pods, hoses, instrumentation and control system.



Onshore integration testing of the Pump, Hoses and Foundation Connector



In-ocean testing of the CETO Unit 1 Buoyant Actuator



Subsea pods undergoing onshore testing at Carnegie's Fremantle test facility

Offshore preparations

Carnegie recently took advantage of some suitable weather windows to complete a number of final offshore preparations ahead of the deployment of the CETO units. These activities included the installation of the lower foundation connector which connects the CETO unit to the offshore foundation previously installed. In addition, Carnegie has installed the offshore mudmat which will provide the base for the subsea hydraulic pod that helps regulate the flow from the CETO unit through the pipeline to the onshore plant. The short interconnection pipelines that connect the subsea pods to the rest of the pipeline system have also now been installed in preparation for the deployment of the CETO units and subsea pods.



Installation of a Foundation Connector (left) and in place on an offshore foundation (right)



Installation of Pod mudmat (left) and Unit interconnection pipelines (right)

Onshore plant construction completed

Final construction of the onshore plant, located on Garden Island, Western Australia, has been completed with the site and building works complete and the onshore hydraulic pod, motors, generators, process control system and grid connection also installed.



Onshore plant site exterior (top left), motors, generators and onshore hydraulic pod (right), interior of onshore plant (bottom left).



Onshore plant transformer (left), cable installation between the onshore plant and the grid connection point (right)

Unit Installation and Project Commissioning

Carnegie expects to complete its onshore system integration tests shortly before commencing offshore installation of the CETO units and final commissioning the Project. Carnegie will implement a conservative staged deployment strategy that brings on capacity of the plant in a controlled and gradual manner minimising installation and operational risk. Project commissioning involves the installation of CETO Unit 1 and an initial fault finding and operational optimisation period to identify, improve and/or correct any “infant” operating issues.

The integration testing program, currently nearing completion, is carried out to reduce the likely extent of in-ocean fault finding however it is anticipated that an initial unit will require some level of intervention and/or rectification either offshore or onshore. Where relevant the same corrective actions are carried out on Units 2 and 3 prior to their deployment.

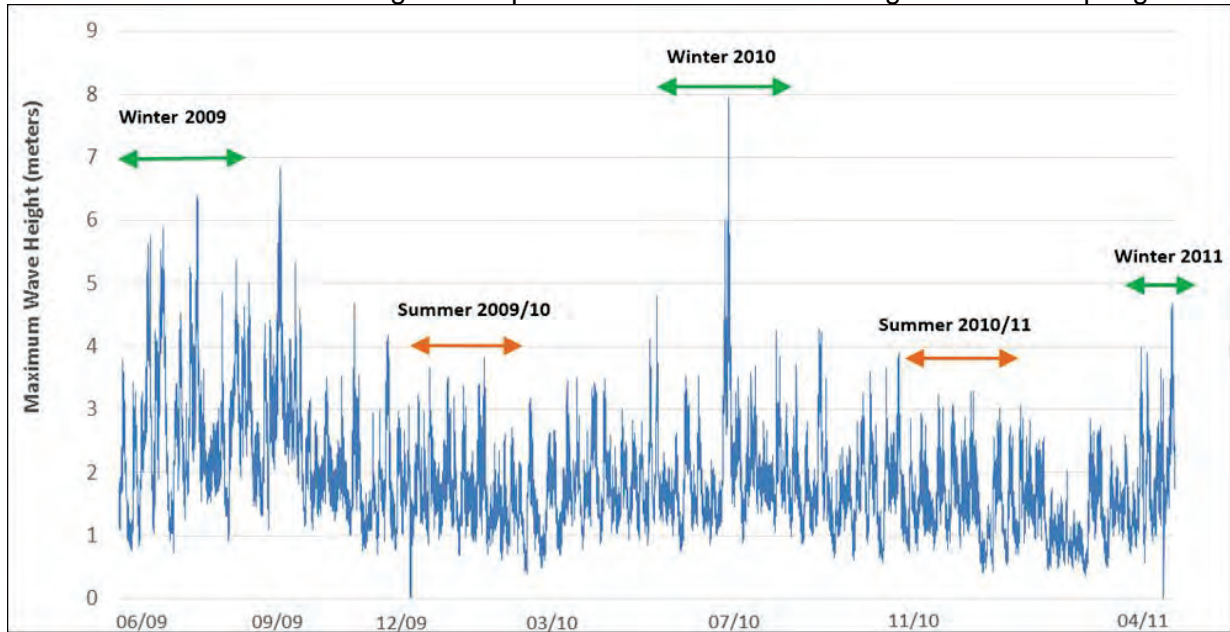
Once CETO Unit 1 is operational, CETO Unit 2 will be installed and a new fault finding and optimisation period undergone, and importantly the interaction of multiple wave units analysed. This is then followed by the installation and optimisation of the final CETO unit.

Offshore Activities Planning

A weather window is a period of wind and wave conditions that allows a planned marine operation to be performed safely and effectively. Weather windows are a critical consideration in planning any offshore activities but particularly for a demonstration project like the Perth Project, and especially for the installation of the first CETO 5 unit. For initial Unit deployments, both the period of installation, as well the initial operational period requires a low to moderate sea state to minimise the risk of component or system damage, and to maximise the ability to intervene should it be required.

The vessels being used and components being deployed are typically susceptible to the maximum wave height during installation. Historical maximum wave height off Garden Island (in 2009 – 2011) can be seen in the graph below. As would be expected, it shows that the maximum wave height is higher in the winter months than in the summer months and highlights that avoiding the winter months is the lowest risk approach to the planning of offshore construction

and installation activities. In recent weeks, the Perth Project site has seen a maximum wave heights in excess of 5m. While this is within the normal operational range for a CETO unit, it is well beyond the conditions required by the vessels involved in the installation activities. As evidenced from Carnegie's recent offshore installation preparation, the incidents of suitable weather windows has now begun to improve and will continue through the rest of Spring.



Historical Maximum Wave Height (meters) off Garden Island

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 the Australian Renewable Energy Agency

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. Power can be generated either offshore or onshore. The fully submerged buoys can drive seabed pump units deliver high pressure fluid onshore via a subsea pipe to standard 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. Alternatively, the movement of the buoys can drive pumps and generators offshore that are contained within the buoy itself with power delivered back to shore through subsea cables.

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.

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.
- PWE 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 PWE.
- 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.

For more information:

Dr Michael Ottaviano

CEO & Managing Director

Carnegie Wave Energy Limited

+61 8 9486 4466

enquiries@carnegiewave.com

Website: www.carnegiewave.com