Carnegie kicks off Phase 2 European Wave Energy Contract

- CETO Wave Energy Ireland has signed the contract to deliver Phase 2 of the EuropeWave PCP Programme
- The ACHIEVE Project (CETO Wave Energy Ireland's Project) has commenced Phase 2 activities
- The €600k (A$890k) Phase 2 contract undertakes engineering that will advance the CETO prototype design for European sites and delivers power take-off (PTO) and tank testing
- Winning Phase 2 provides expert validation of CETO's technical and commercial potential

Carnegie Clean Energy (ASX: CCE) ("Carnegie" or the "Company") provides an update that its wholly owned subsidiary, CETO Wave Energy Ireland Limited (the "Contractor"), has now signed the contract for Phase 2 of the EuropeWave Pre-Commercial Procurement (PCP) programme. This follows the competitive selection of CETO in Phase 2 of the programme, previously announced to the ASX on 23 September 2022 Carnegie wins Phase 2 European Wave Contract.

CETO Wave Energy Ireland's EuropeWave project, called the ACHIEVE Project, formally commenced Phase 2 activities on 26 September and will run until June 2023. Phase 2 includes Front End Engineering Design (FEED), wave tank testing, power take off component testing and related certification and commercialisation activities. The European team will continue growing with recruitment for another engineer already underway.

What is EuropeWave

EuropeWave PCP is an innovative and competitive stage-gate programme designed to advance promising wave energy converter systems to a point from which they can be developed for commercial exploitation through other national/regional programmes and/or private investment.

CETO Wave Energy Ireland Limited was selected to deliver Phase 2 alongside four other companies, out of the initial seven that delivered Phase 1. Following the completion of Phase 2, three of the five companies will be selected on competitive basis to continue to the final Phase 3, which includes deployment in open sea conditions at the Biscay Marine Energy Platform (BiMEP) in the Basque Country or the European Marine Energy Centre (EMEC) in Scotland. The final phase is expected to start in September 2023 and conclude in May 2026.

Key terms of the Phase 2 Contract

CETO Wave Energy Ireland will deliver Phase 2 of the EuropeWave PCP with the support of an impressive team including its consortium partner SAITEC Offshore Technologies and subcontractors Hewlett Packard Enterprise, Hutchinson, DNV (including support from Yavin Four Consultants), IHCantabria and Julia F. Chozas Consulting Engineer. All the Phase 1 partners will continue to be involved and are being joined by new project partners, Hewlett Packard Enterprise who will be involved in the reinforcement learning based control and Hutchinson, who will be involved in the design and testing of the belt component of the power take-off system.

Under the Phase 2 contract, the team will complete various development and testing activities which progress CETO towards a potential European prototype deployment in Phase 3. This includes activities

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such as: Front End Engineering Design (FEED), Numerical Modelling, PTO Testing, Tank Testing, Operational Planning, Commercial Analysis and progressing the Certification Pathway with DNV.

A wave tank testing campaign will be undertaken at the Cantabria Coastal and Ocean Basin (CCOB) in Spain in early 2023. The tests will build on previous tank testing undertaken during Phase 1 and will validate the performance of CETO's advanced controllers and confirm a novel survival strategy, key advantages of the CETO technology.

A Power Take-Off (PTO) bench testing campaign will occur in early 2023 and will validate the fatigue life of the belt and characterise the efficiency and reliability of the PTO drive train, controller and electrical system. This work will be done in collaboration with the IMPACT project, which is developing test rigs that will be utilised by the team.

Carnegie will retain ownership of the intellectual property rights (IPRs) generated during the PCP Programme and will be able to use the IP to exploit the full market potential of the developed solutions.

This announcement has been authorised by the Chairman and CEO.

For more information

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ABOUT EUROPEWAVE PRE-COMMERCIAL PROCUREMENT PROGRAMME

EUROPEWAVE

EuropeWave PCP is an innovative R&D programme for wave energy technology, which runs from 2022 to 2026. It will combine over €22.5m of national, regional and EU funding to drive a competitive Pre-Commercial Procurement (PCP) programme for wave energy.

Originally pioneered by the Wave Energy Scotland programme, the PCP model provides a structured approach, fostering greater openness, collaboration and sharing of risk between the public sector and technology developers. The programme will focus on the design, development, and demonstration of cost-effective wave energy converter (WEC) systems for electrical power production that can survive in the harsh ocean environment.

Match-funded by the EU's Horizon 2020 programme, it is a collaboration between Wave Energy Scotland (WES), the Basque Energy Agency (EVE) and Ocean Energy Europe (OEE). This collaboration is closely aligned with the decarbonisation, industrial and competitiveness objectives of the European Green Deal, and is part of a range of actions being taken to meet the European Commission's targets of 100MW of ocean energy by 2025 and at least 1GW by 2030.

The main technical challenges to be addressed in EuropeWave PCP may be expressed in terms of:

- Performance – obtain quantitative evidence of appropriate power capture and conversion. capability and increase confidence in yield predictions from numerical model simulations.
- Survivability – demonstrate effective strategies for survival in survival events.
- Availability – demonstrate levels of availability through reliable prototype operation.
- Affordability – increase confidence in the estimation of the technology costs (capital and operational) and determine a route to cost reduction to achieve a competitive LCOE.

The 3 Phases of the Europe Wave PCP:

			Number of Contracts		Contract Maximum Value	
	Start date	End Date	Minimum	Anticipated	ex. VAT	inc. VAT
Phase 1 Concept Development	03 Jan 2022	29 July 2022	5	7	£ 291,667	£ 350,000
Phase 2 FEED and Modelling	26 Sept 2022	30 June 2023	4	5	£ 608,333	£ 730,000
Phase 3 Open- water deployment]	11 Sept 2023	29 May 2026	3	3	£ 3,750,000	£ 4,500,000
				Totals	£ 4,650,000	£ 5,580,000

This is part of the EuropeWave project that has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 883751.

https://www.europewave.eu/

ABOUT CARNEGIE & CETO WAVE ENERGY IRELAND

Carnegie Clean Energy (ASX: CCE) is a technology developer focused on delivering ocean energy technologies to make the world more sustainable. CETO Wave Energy Ireland is a wholly owned subsidiary of Carnegie Clean Energy. Carnegie is the owner and developer of the CETO® and MoorPower™ technologies, which capture energy from ocean waves and convert it into electricity. Using the latest advances in artificial intelligence and electric machines, Carnegie can optimally control our technologies and generate electricity in the most efficient way possible. The Wave Predictor technology developed by Carnegie uses a proprietary machine learning algorithm to improve the performance of our wave technologies and has additional applications beyond the wave energy industry. The company has a long history in ocean energy with a track record of world leading developments.

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