



EUROPEWAVE

Blue Horizon 250

Andrea Caio

Business Development Manager

Mocean Energy



mocean
energy



This project has received funding from the European Union's Horizon 2020 research and Innovation programme under grant agreement 883751.



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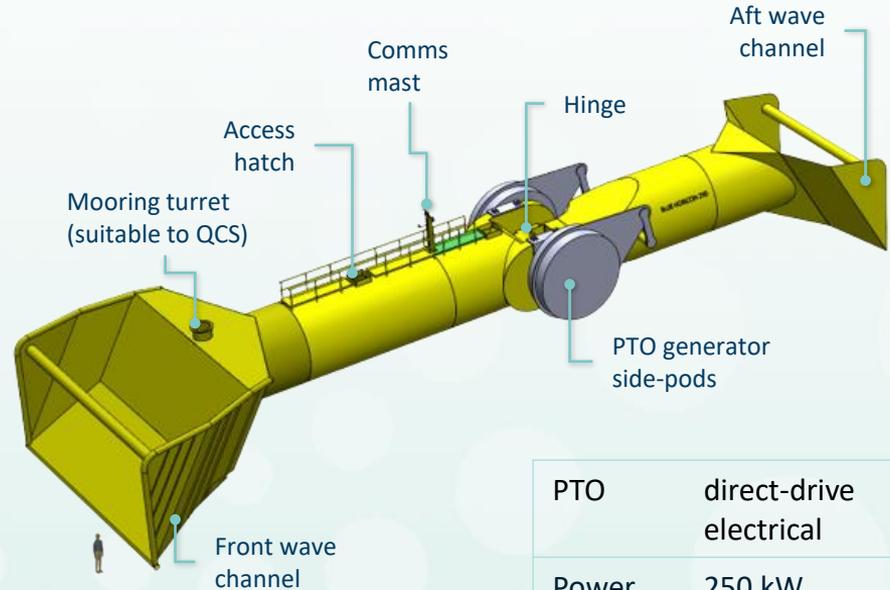


info@europewave.eu

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Key features & innovations

- AI-based design for optimised geometry
- Asymmetry enhances cross-coupling between modes of motion, increasing bandwidth
- Wave channels add resonances, bandwidth, increase power absorption, and enable steep wave diving
- Self-referencing – hulls react against one another, wave contouring
- VHM generator ideally adapted to HT-LS reciprocating wave excitation



PTO	direct-drive electrical
Power	250 kW
Mass	450 tonne
Length	48 m

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Target applications

- 3 main markets identified:
 - Small islands & remote communities
 - Off-grid assets (e.g. O&G platforms, CCS)
 - Early grid projects (UK)
- Mid element in our “small-mid-grid” technology roadmap
- Longer term: further scale by size and by number



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Why EuropeWave?

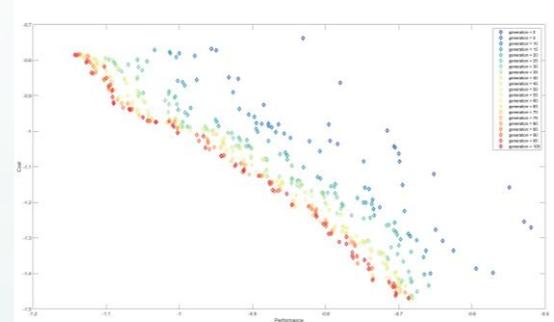
- Wave resource is Europe-wide and ultimately global, as is the market
- WEC production will require industrial resources and collaboration across Europe
- Opportunity to innovate & learn-by-doing, as per previous PCP involvement via WES NWECC program
- Mocean is ready to scale – EuropeWave provides a path and support
- Opportunity to undergo objective competitive assessment



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Phase 1: Learning and achievements

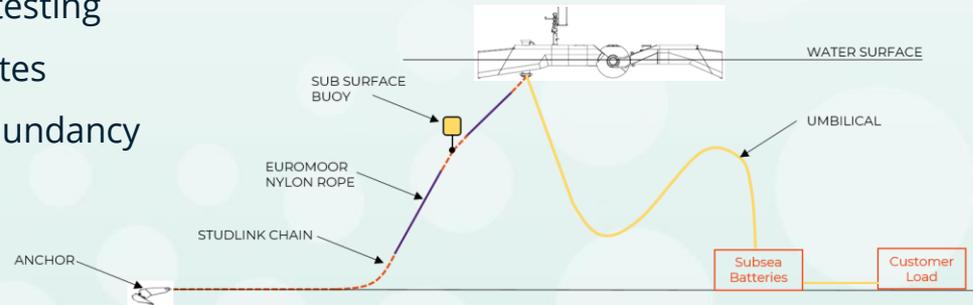
- Upgrade of numerical model: more elaborate shapes, higher fidelity, overcoming computational burden
- Reinforcement learning (RL) – accommodate goals beyond power performance, such as reliability via loading control
- Vernier Hybrid Machine (VHM): hybrid of PM and VR generators, smooths rotation and provides gearing
- Mooring concept established for station-keeping, anchoring and power export; storyboarding of mooring hook-up
- Implementation of lessons learned register
- 12 initial customer case studies conducted, informed by market analysis & customer discovery interviews



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Phase 1: Learning and achievements

- Tank tests @ two scales – validation & survival; very good agreement between measured & modelled power predictions in irregular waves
- Basis of Design (BoD) established
- TPV of tank testing and of structural design
- Survivability: hinge design and survival testing
- Manufacturability: visited 7 fabricator sites
- Reliability: modularity & sub-system redundancy
- Technical & project risk registers



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Phase 2: Activities and Team

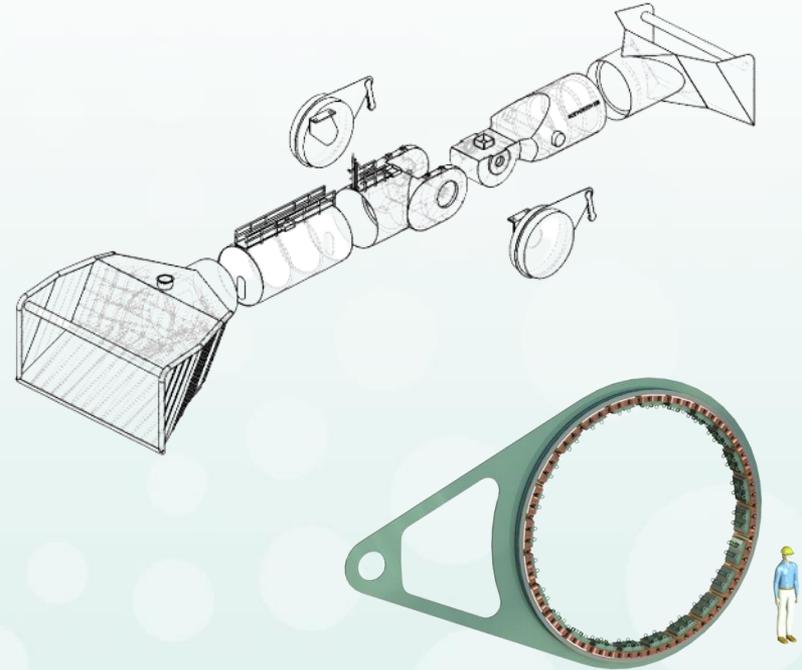
- Activities are spread across 10 work packages; aim to refine technical & commercial proposition
- From 6 partners in Phase 1 to 12 in Phase 2
- Optimisation – hydrodynamic, structural, RL
- Improve fidelity and traceability of LCOE, particularly O&M modelling
- Optioneering of QCS for moorings & selection of appropriate wet-mate connector
- Technology Qualification process
- RFQs already issued to potential fabricators



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Phase 2: Objectives and milestones

- Modularity & materials: internal stage-gate
- “Freeze” prime mover geometry
- VHM – scale up & dedicated rig build
- Assessment of local facilities & storyboarding of wider operations
- Continue to improve across IEA-OES evaluation areas
- Target early project LCOE to be within viable commercial range (2-3 case studies focus)
- Industrial advisory panel



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Phase 3: Ambitions

- Build & deploy full-scale WEC – product vs prototype
- Achieve Stage 4 of IEA development: commercial-scale single device demonstration (TRL 7)
- Demonstrate power performance and O&M over a period of 12 months at sea; de-risk manufacturability; gather more learning
- Establish commercialisation strategy
- Meet IEA-OES metrics – exceed cost of energy targets identified via case studies





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