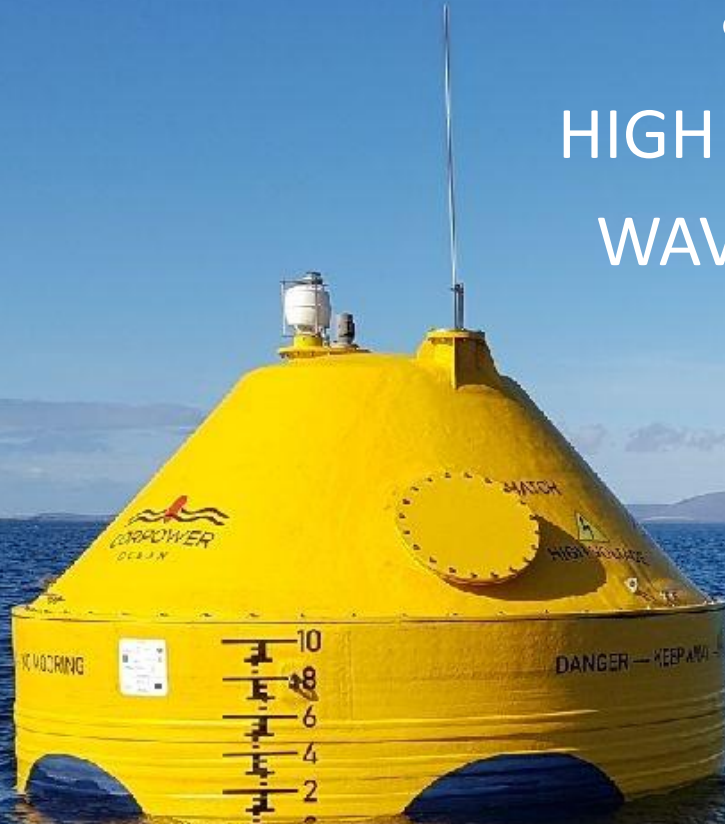




# HIGH EFFICIENCY WAVE ENERGY



ENABLING 100% RENEWABLES



# CORPOWER OCEAN IN SHORT



- Developer (OEM) of **New high-efficiency Wave Energy Converters**
- **Started in 2010.** Offices in Sweden, Norway, Scotland & expanding in Portugal.
- Physics providing **competitive LCOE**, verified through step-by-step approach.
- Major players engaging, including **EDP, Simply Blue Energy, ENEL**
- Broad backing across Europe. **50+ MEUR** funding secured to date.



# TEAM

**Patrik Möller**  
CEO & Co-founder



**Kevin Rebenius**  
Commercial Director



**Jonathan Meason**  
Engineering Manager



**Miguel Silva**  
MD CorPower Portugal



**Hanna Nordqvist**  
Head of People



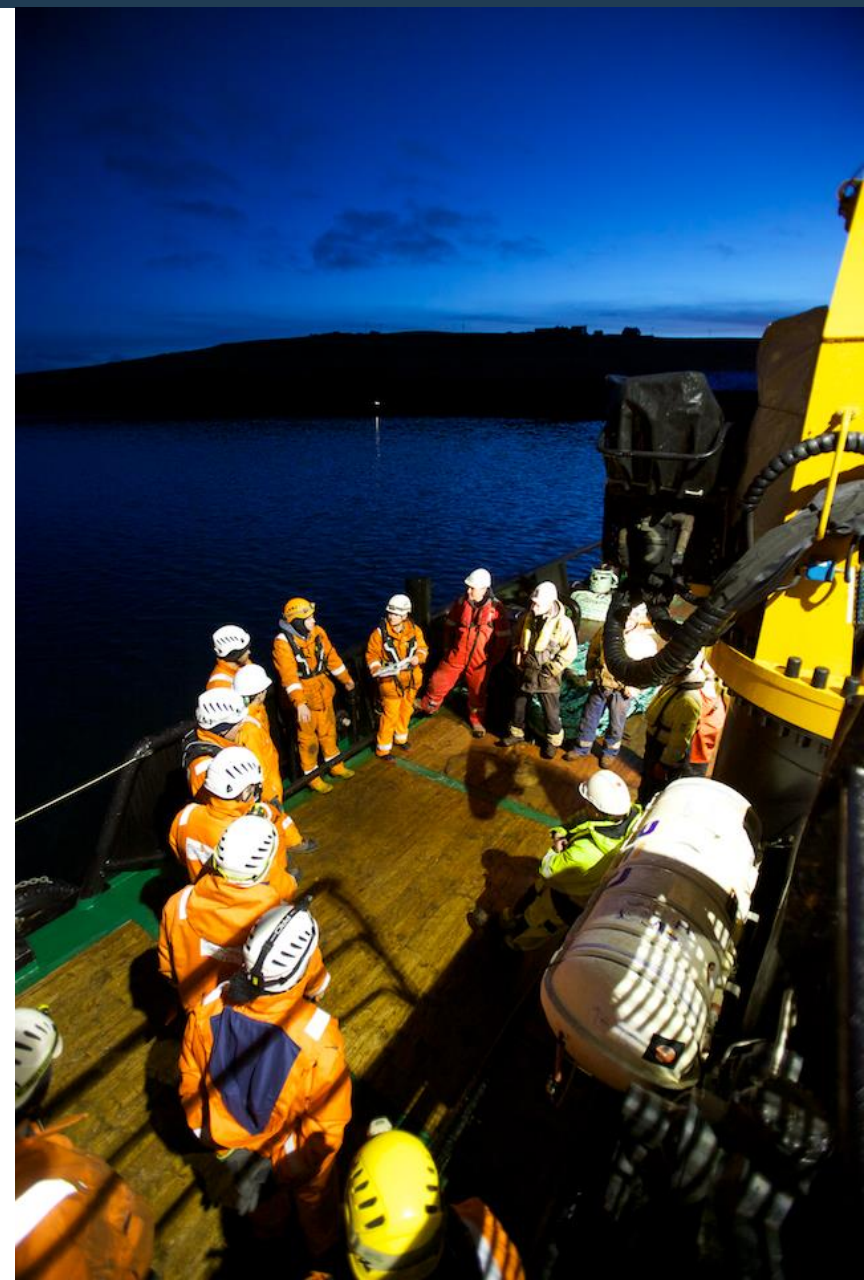
**Tord Jonsson**  
Supply Chain Manager



**Matt Dickson**  
Head of Projects



**Jean-Michel Chauvet**  
Integration Director

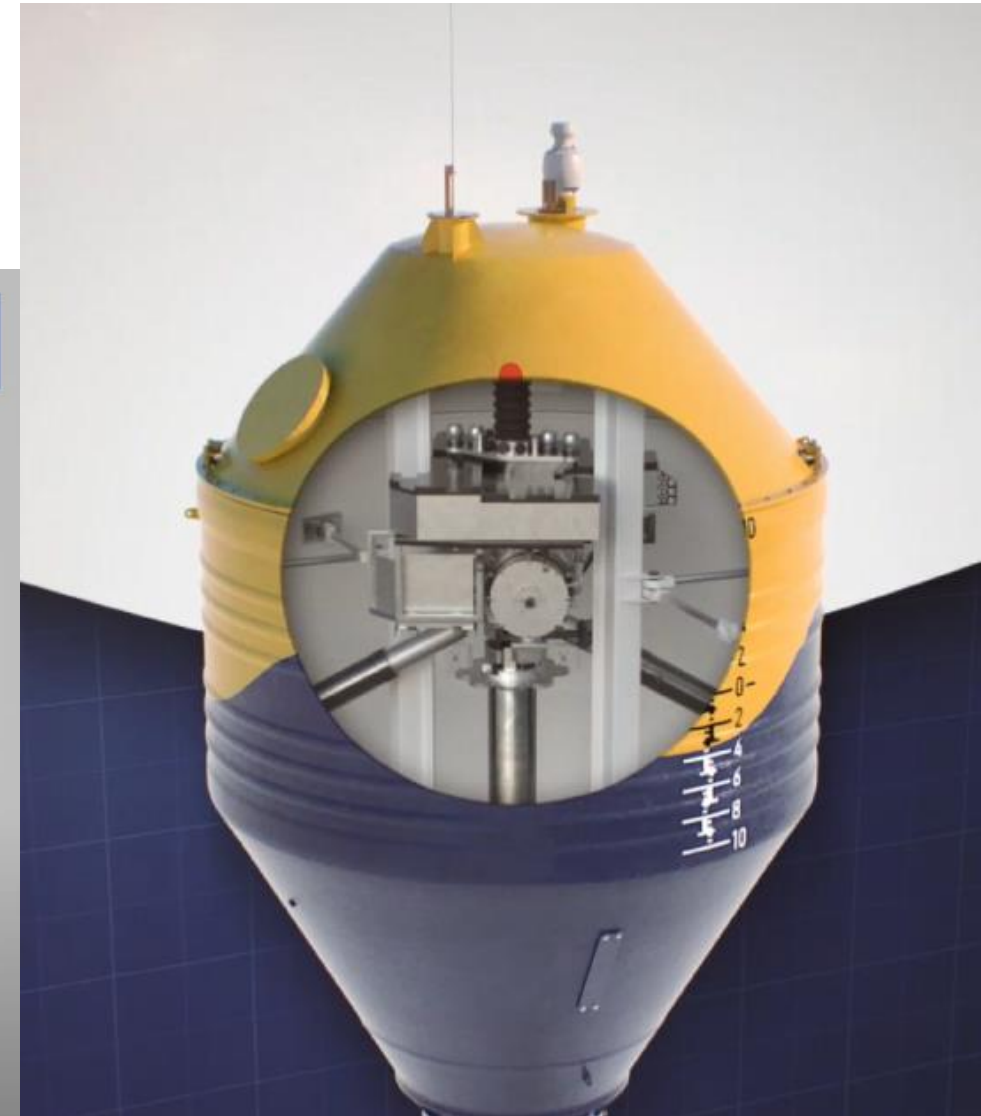


# CPO WAVE ENERGY CONVERTER (WEC)

## Point Absorber Type - WEC

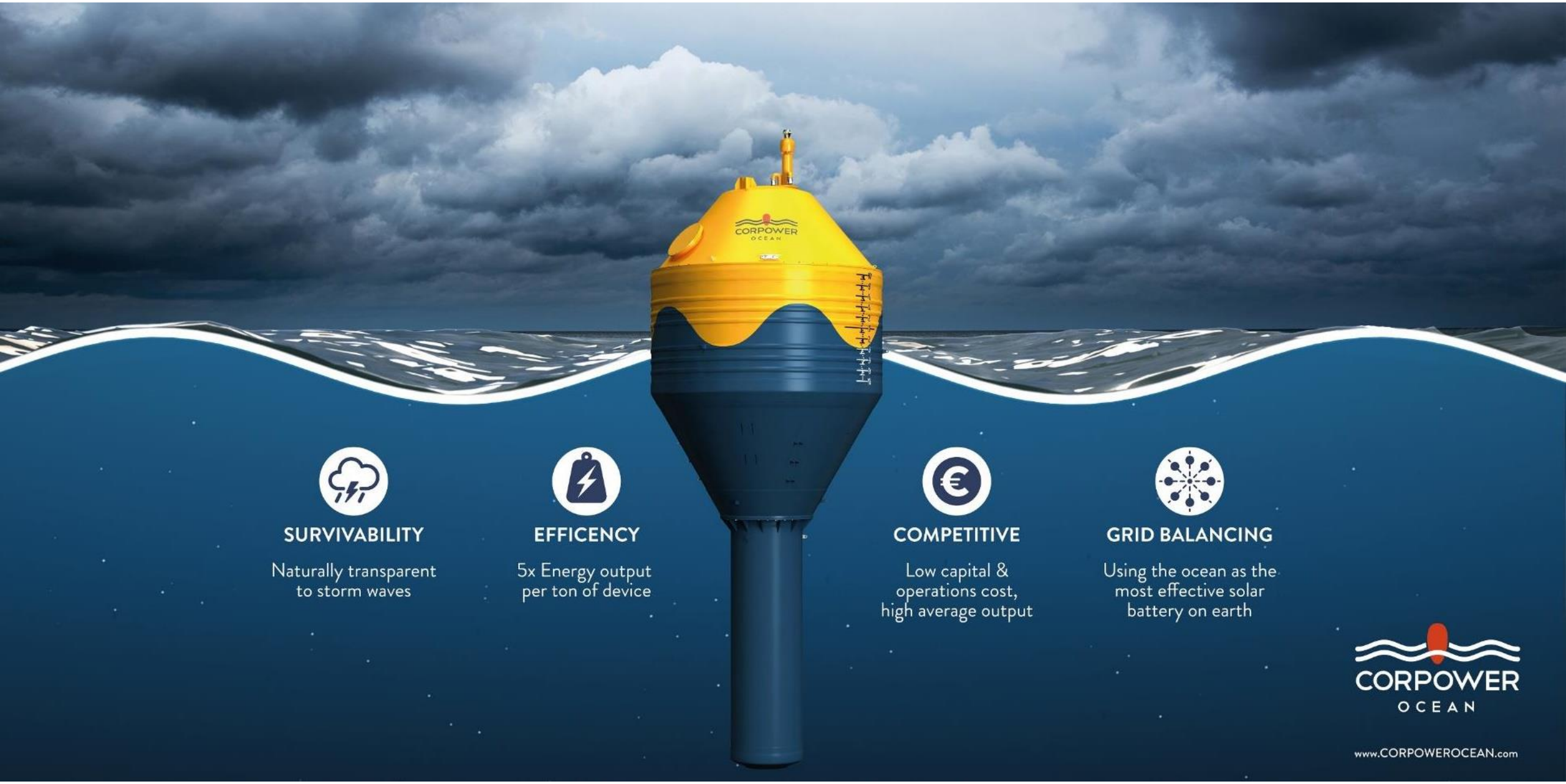
- Transparent in storms
- Amplified in normal operation

<https://www.youtube.com/watch?v=mM4qTAqgZYc>





# CLEAR PATH TOWARDS € 35 / MWH



## SURVIVABILITY

Naturally transparent  
to storm waves



## EFFICIENCY

5x Energy output  
per ton of device



## COMPETITIVE

Low capital &  
operations cost,  
high average output

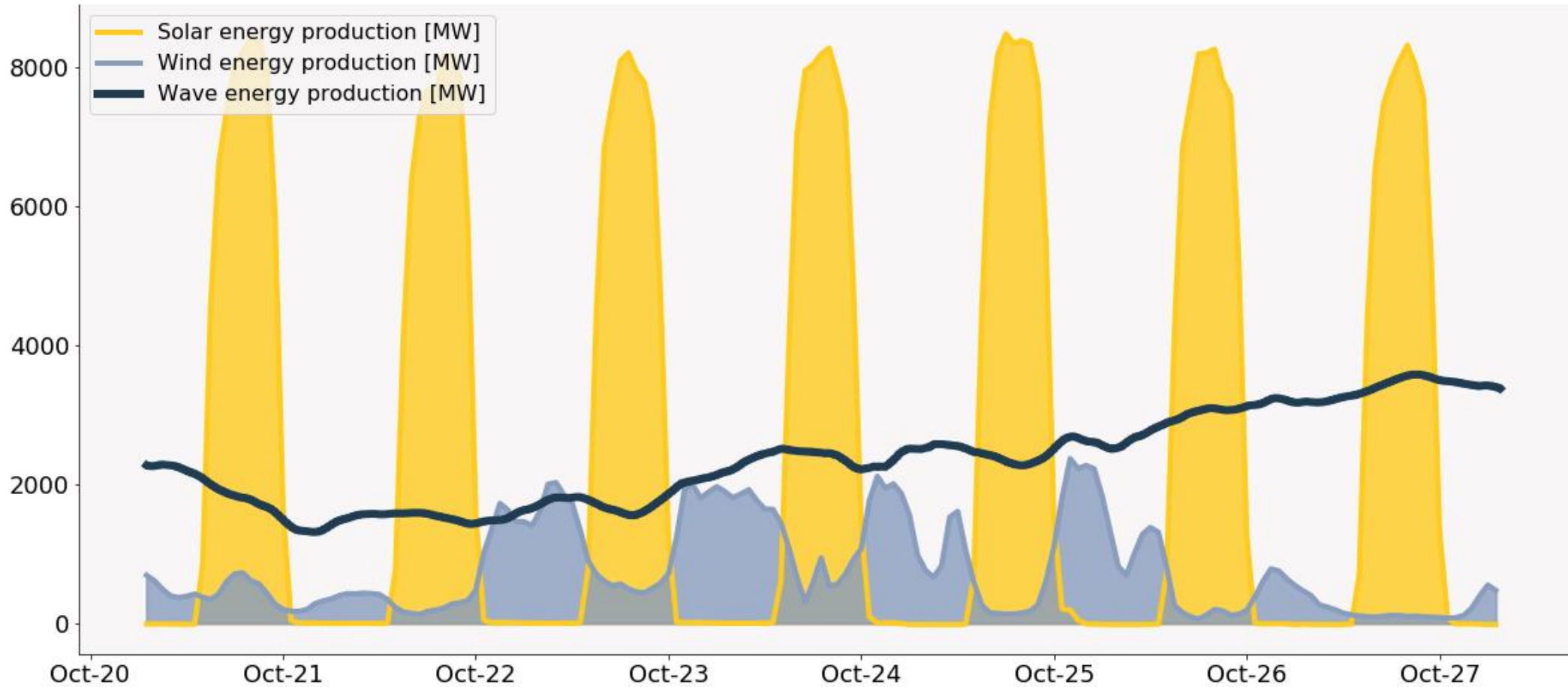


## GRID BALANCING

Using the ocean as the  
most effective solar  
battery on earth

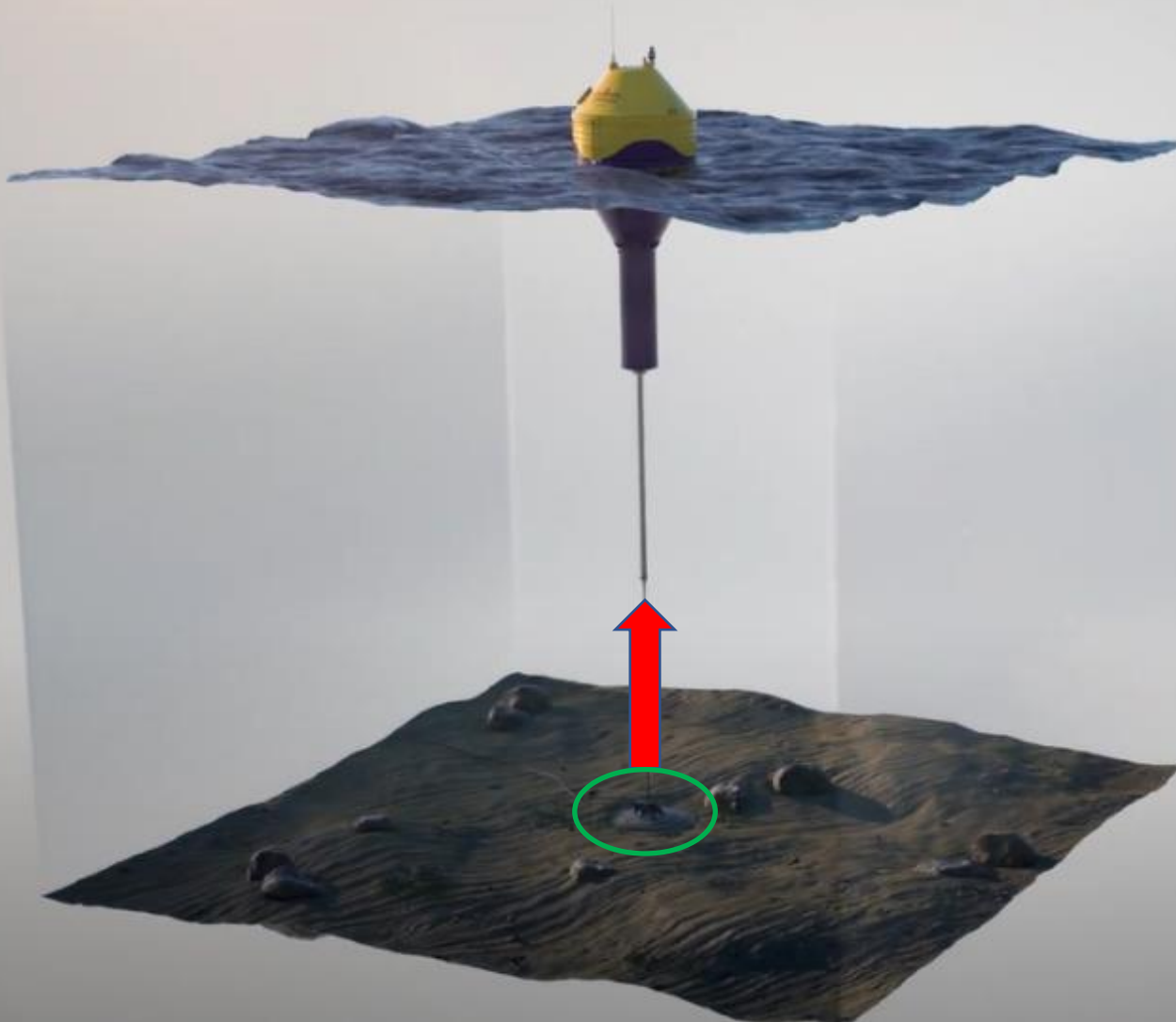


# CONSISTENT AND COMPLEMENTARY PRODUCTION PROFILE



Wind (6.5 GW) and solar (13.5GW) production: Actual time series of the period  
Wave production (6.0 GW): Estimate based on measured wave data and CorPower power matrix  
6 GW wave energy devices evenly distributed over four sites along the coast of California

# CHALLENGE: OCEAN ENERGY NEEDS A NEW ANCHORING SOLUTION



Ocean Energy Anchoring needs to:

- Resist WEC Loading profile with structurally efficient mooring and anchoring
- Move away from gravity base anchoring and towards more cost efficient solution

# THE SOLUTION: UMACK PROJECT



- **Develop and demonstrate a technical anchor** for multiple sea-bed types to **replace the generally used Gravity Based Anchors (GBAs)**.
- **Reduce deployment and retrieval time, complexity, improve LCOE and LCA.** Enabling deployment and retrieval operations within 30-minute windows and at sea states of up to 1 – 1.5 m Hs waves.
- **Demonstrate best practice within the ocean energy sector** by ocean demonstration of full-scale WEC device and UMACK solution.





# UMACK PROJECT PARTNERS + COLLABORATORS



## **Mooring systems experts**

Moorings package lead  
- specialists in the design, development, testing and qualification of station keeping solutions and mooring systems



## **LCA and LCoE Specialists**

The Policy and Innovation Group is composed by enthusiastic researchers dedicated to the analysis and promotion of ocean energy. The team is led by Mr Henry Jeffrey, Senior Lecturer at the University of Edinburgh.



## **Project Lead and OEM**



## **Rock Anchor Specialists**

Bring the rock anchoring option to the UMACK anchor



## **Geotechnical Specialists**

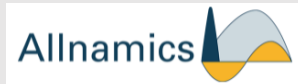
Sand/Clay Anchor work package leads  
- Experts in marine geophysics, geotechnics and foundation engineering



## **Certification Guidance**

Guidance on certification and testing  
World renowned ocean testing knowledge and facility  
TS-10 Standard Application

## **UMACK Collaborators**

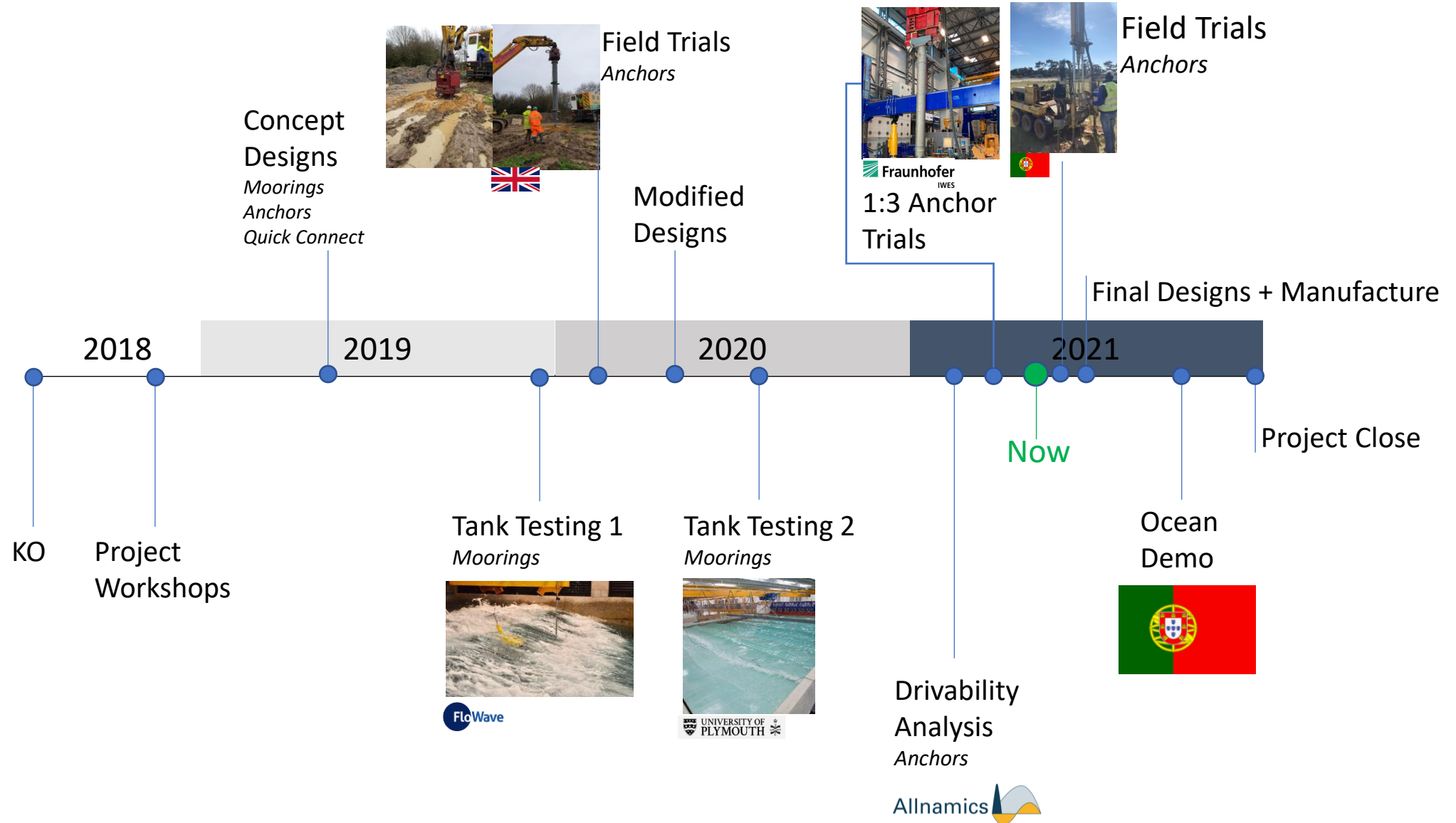


## UMACK project finance map

- Total costs: **3,773,639 €**
- 268 person months
- Duration: 42 Months



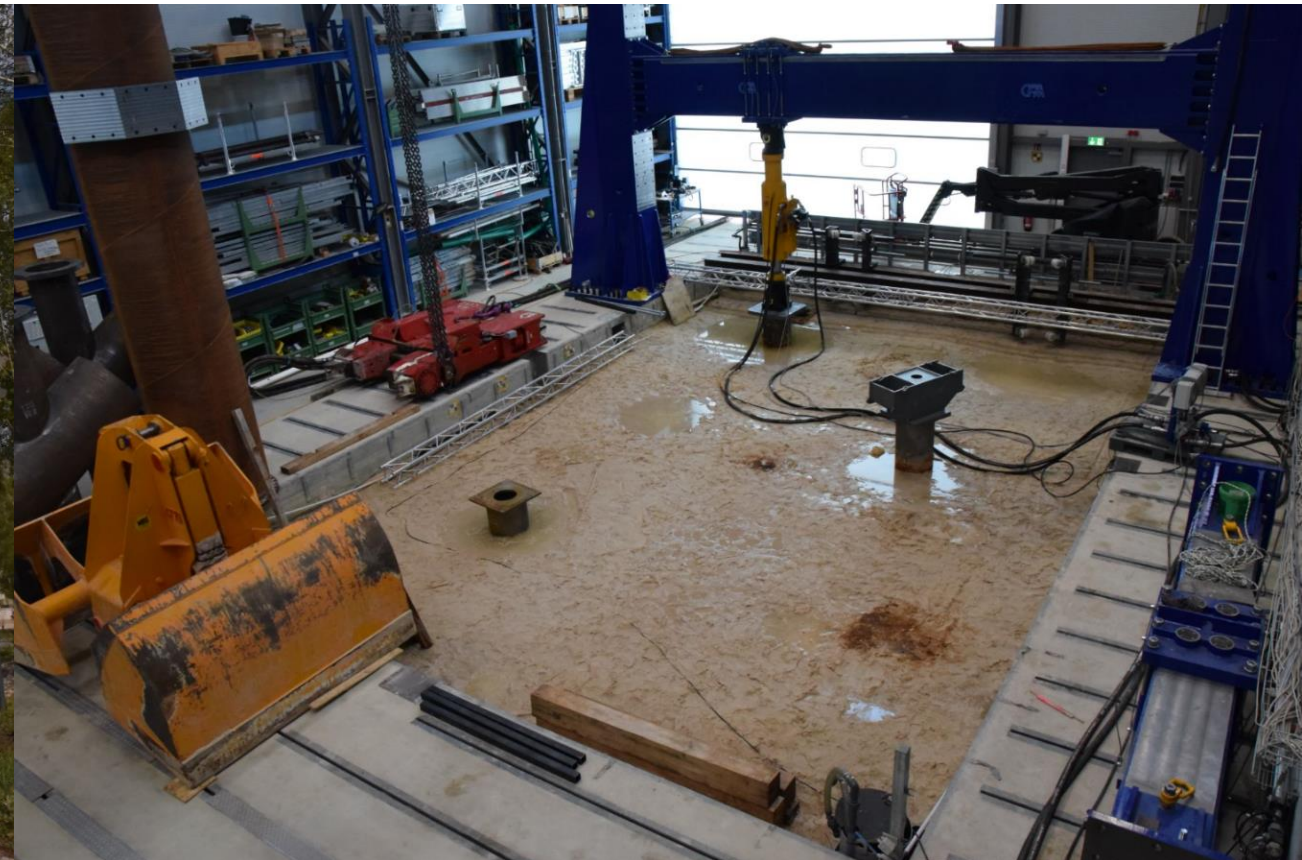
# UMACK – HIGH LEVEL PROJECT TIMELINE





# UMACK COLLABORATORS – IWES + TEST CENTRE FOR SUPPORT STRUCTURES

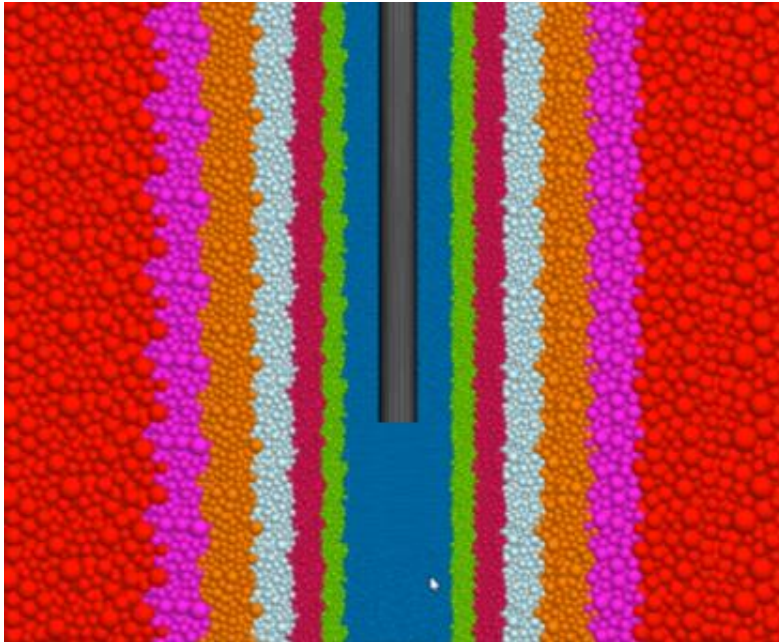
- **The Test Centre Support Structures (TTH)** in Hanover offers a unique infrastructure for testing all types of support structures.
- **The foundation test pit** and the span can be used to investigate fatigue and extreme load behaviour under multi-axial loading.





# UMACK COLLABORATORS – IWES + TEST CENTRE FOR SUPPORT STRUCTURES

- Since its installation in 1997, a wide range of actuators have been developed in-house and commissioned externally to address a wide variety of geotechnical and geo-environmental engineering problems in a high-g environment.



Discrete Element Modelling (DEM)  
Modelling  
*Anchors*



Centrifuge Testing 1:50  
*Anchors*



## DIESEKO

- Innovative and efficient equipment for the foundation industry
- Pile Handling and Installation Reviews with Dieseko Group and UMACK Project





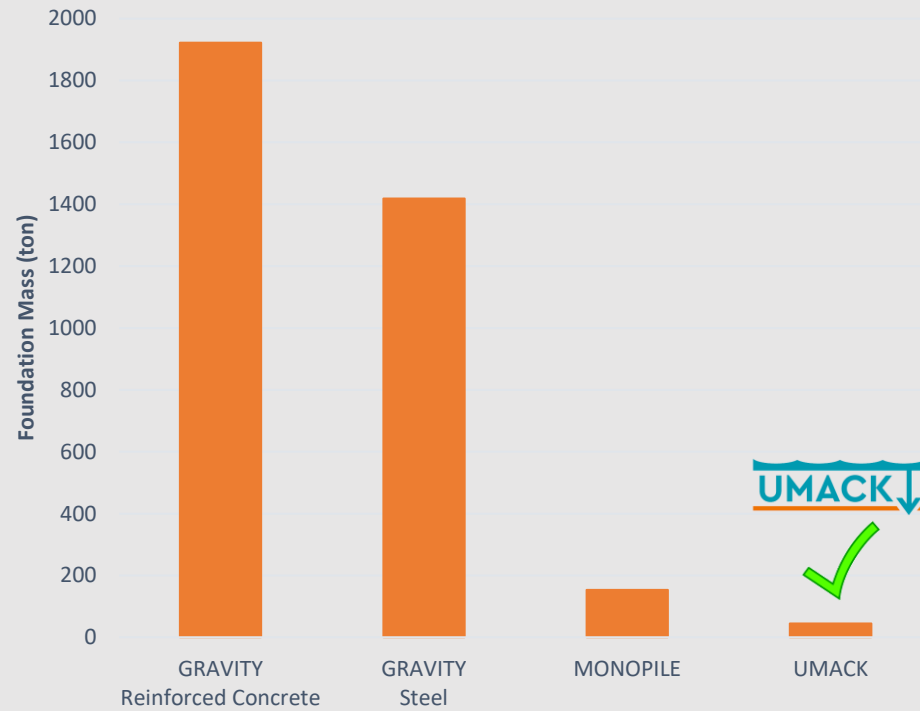
# Preliminary Results – Mass and LCA



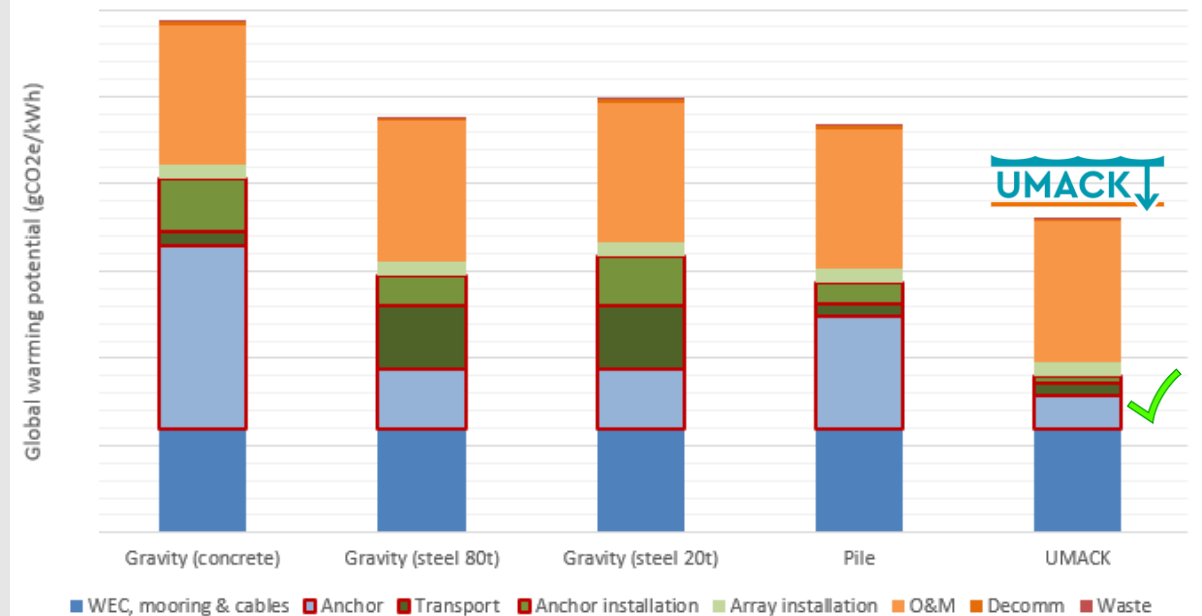
THE UNIVERSITY of EDINBURGH  
School of Engineering

Policy and Innovation Group

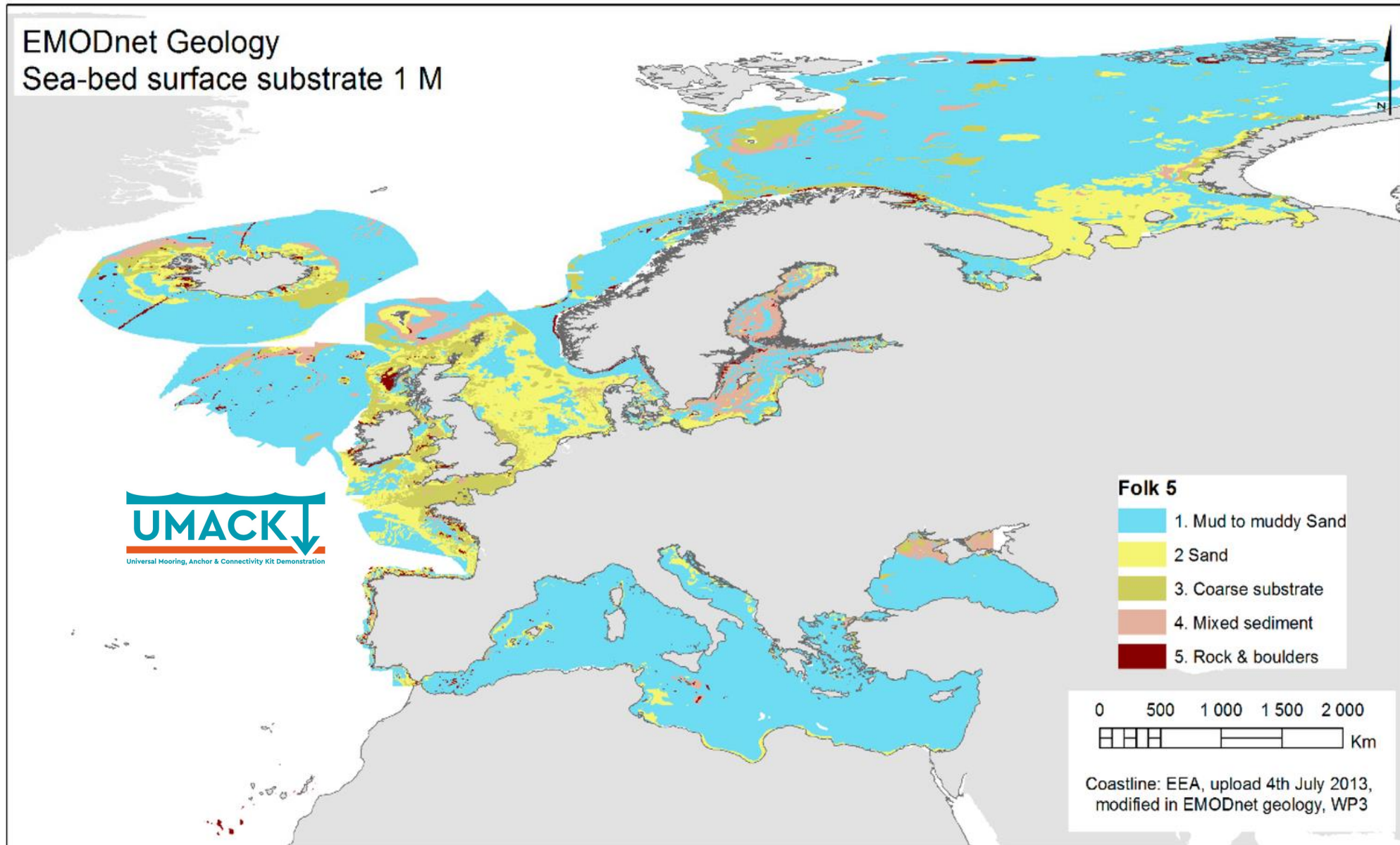
## Foundation Mass



## UMACK preliminary LCA results - anchors comparison



# SAND / CLAY SEABED COVERS MOST OF MARKET OPPORTUNITY



# WESTERN STAR – SIMPLY BLUE ENERGY



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[Floating Offshore Wind](#)

[Wave Energy Conversion](#)

[Community](#)

[FAQs](#)

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Simply Blue Energy's Western Star

# Creating a clean, sustainable future for everyone

[Scroll to Discover](#)



30 MW

Capacity phased  
demonstration development




4km

Coastal Distance



# COMBINED WAVE AND WIND FARMS

- 
- Natural time shift between wave and wind resource
  - Reduced variability, higher average value per MWh
  - Shared project development & consenting process
  - Shared electrical infrastructure & operations teams



# Ocean energy: The next big thing in energy



400,000 European jobs by 2050



Europe can dominate an estimated €53bn global annual market



Thanks to Europe's technological leadership, nearly all existing projects worldwide use European technology



Enables better balancing of electricity supply and demand



Ocean Energy  
Europe

100GW of ocean energy  
in Europe by 2050





THANK YOU



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