



Open Sea Operating Experience to Reduce Wave Energy Cost



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Wave energy is forecast to have the potential to supply some 10% of European electricity needs; about half today's total renewable generation.

Due to its phasing, wave power complements solar and wind power and thus facilitates the practical integration of more renewables in the European grid.

Europe is currently the world leader in wave energy and thus there are significant opportunities for green jobs associated with its development and deployment.

Wave energy costs remain high compared to conventional forms of energy. There has been very limited open-sea experience to fully understand the challenges in device performance, survivability and reliability.

The limited operating data and experience that currently exists are rarely shared, since it is often partly private-sponsored. OPERA will remove this roadblock by delivering, for the first time, open access, high-quality open-sea operating data to the wave energy development community.

Led by TECNALIA, OPERA will collect, analyse and share open-sea operating data and experience to validate and de-risk the following industrial innovations for wave energy, taking them from TRL3-4⁽¹⁾ to TRL5⁽¹⁾ and opening the way to long term cost-reduction of over 50%

**Reducing
time-to-market
for wave energy**

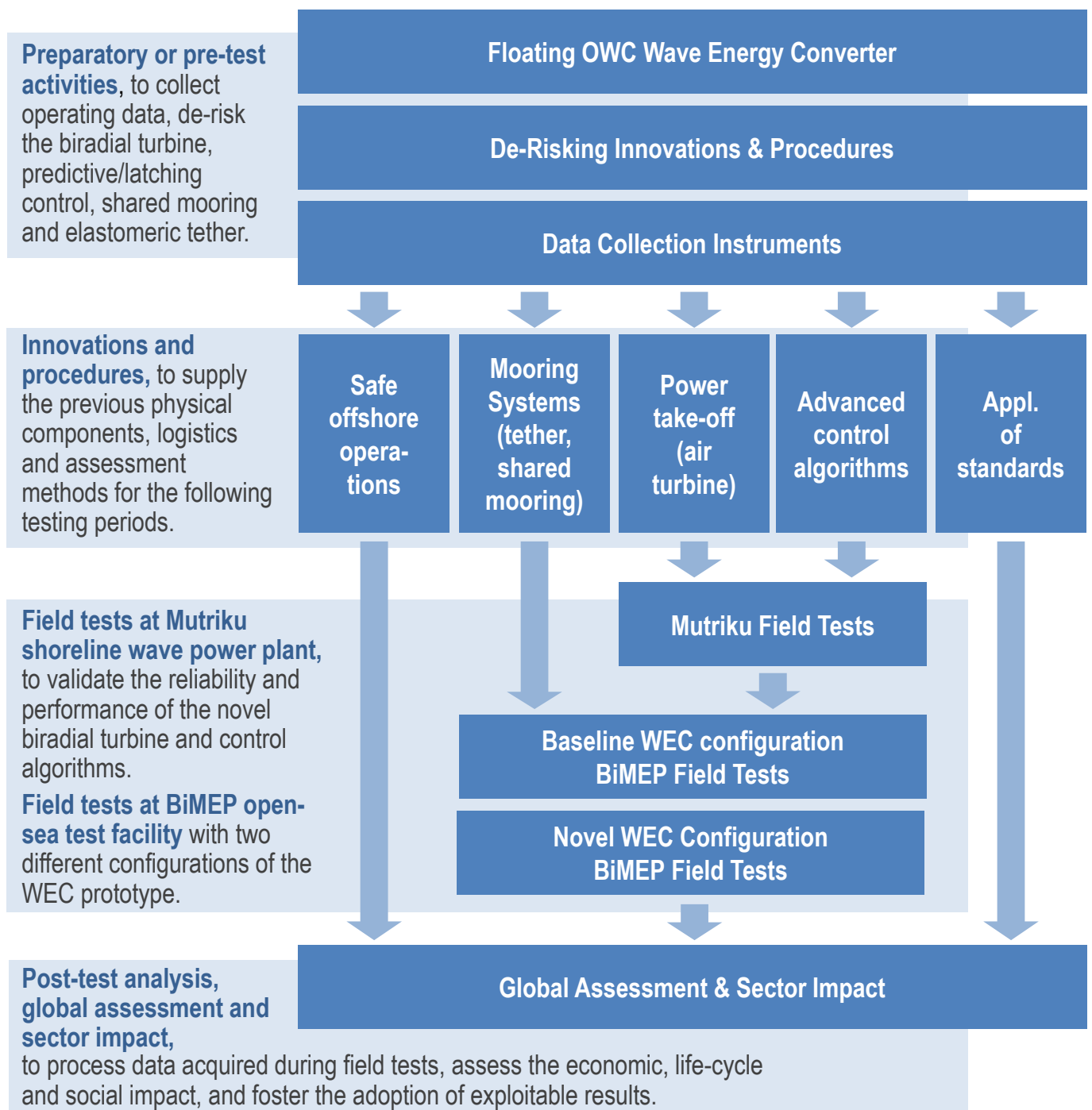
Challenges faced by wave energy	
Operating data needed to focus research and development	OPERA will collect, stream and publish two years of open-sea operating data of both a floating WEC ⁽²⁾ and a shoreline wave power plant
Costly mooring overdesign from lack of open-sea validated WEC ⁽²⁾ -specific method	OPERA will de-risk mooring innovations that lower cost by 50% and enhance survivability
High resource variability; unreliable power chain with low efficiency	OPERA will increase OWC ⁽³⁾ power production by 50% and improve reliability
Poor energy capture of WEC ⁽²⁾	OPERA will advance predictive and latching control to enable a 30% increase in power production
No established/applied sector-specific standards is costly business risk	OPERA will accelerate establishment of standards for wave energy
Costly, non-optimised offshore logistics of uncertain risk	OPERA will reduce uncertainty, frequency, risk and cost of offshore operations
Uncertainties on risks and costs hamper investment	OPERA will improve risk management and cost estimation with real data
Lack of strong value chain	OPERA will maximise impact on the entire value chain and on society

⁽¹⁾ TRL: Technology Readiness Levels • ⁽²⁾ WEC: Wave Energy Converter • ⁽³⁾ OWC: Oscillating Water Column

OPERA's first phase entails a nationally-funded open-sea testing of a baseline configuration of the OCEANTEC floating OWC device, **with shared mooring, conventional tether, Wells turbine and non-predictive control algorithms.**

OPERA's second phase integrates three cost-reducing innovations into the OWC: **biradial turbine, novel elastomeric tether, and predictive control.** These innovations will undergo thorough lab-testing and prior derisking in the Mutriku shoreline wave power plant.

Sensor integration of the OCEANTEC floating OWC will permit to compare its structural and power performance, as well as sub-system reliability and survivability.





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