

INFINITY

Instant Force & Model Predictive Control for Ocean Energy Power take-off with high Fidelity

*Lifetime-aware MPC to be developed and tested
with InfinityWEC power take-off in HIL test rig
with next-generation testing approach*

Problems being addressed

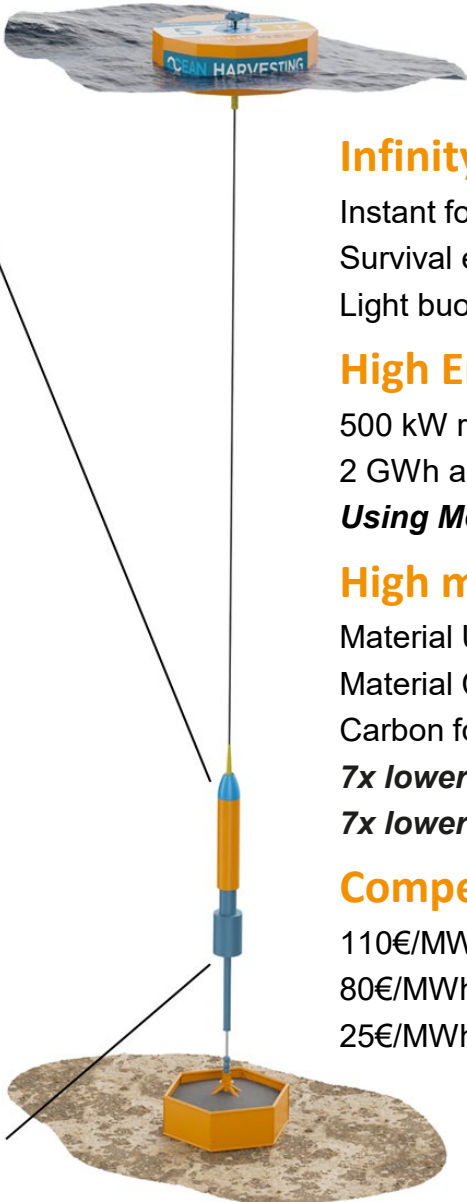
EFFICIENT CONTROL SYSTEMS FOR WAVE ENERGY CONVERTERS

MPC has shown superior energy production in numerous studies but have been difficult to implement on real-time control systems and also reduces lifetime if only energy maximization is considered in the control objectives, increasing CAPEX/OPEX and failing to achieve the lowest Levelized Cost of Energy.

GENERIC TEST PLATFORM AND TESTING METHODS

Dry-testing is needed before sea trials to debug the power take-off and reduce the risk of failures at sea. But it is very demanding and costly for technology developers to develop their own bespoke test rigs and also challenging to design the testing campaigns to meet the necessary standards.

Next Generation Power Take-Off



InfinityWEC

Instant force control with hydrostatic pre-tension and ball screws
Survival ensured with novel end stop spring in the buoy
Light buoy made of ultra high-performance concrete

High Energy Output

500 kW rated power
2 GWh annual energy production

Using Model Predictive Control

High material efficiency

Material Use 350 ton/MW
Material Cost 0,5 MEUR/MW
Carbon footprint 200 tonCO₂eq/MW
7x lower material cost than floating wind power
7x lower CO₂ footprint from used materials

Competitive LCOE

110€/MWh by 2030
80€/MWh by 2035
25€/MWh by 2050



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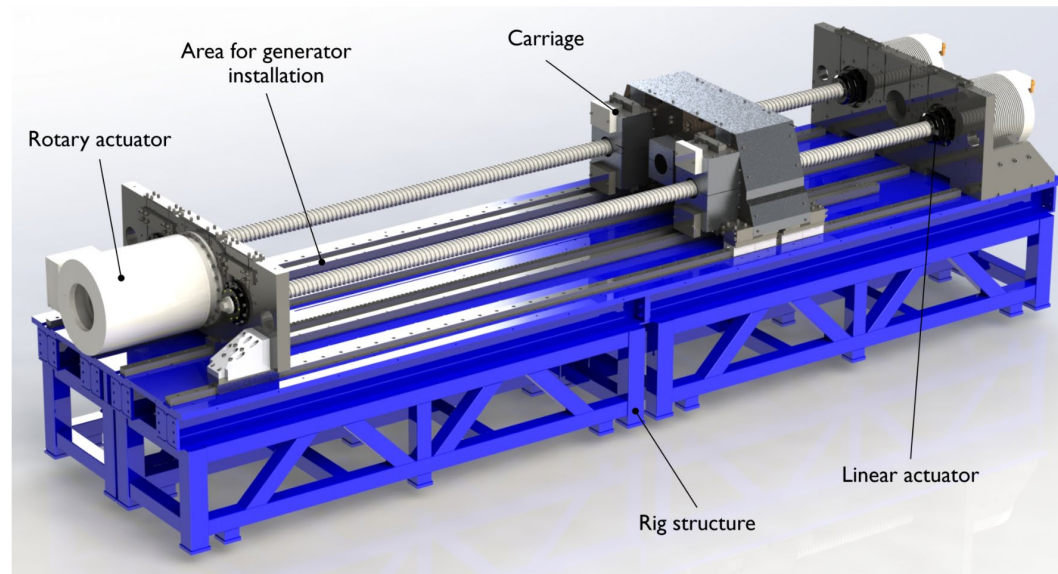


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Next generation testing approach and Hardware-In-the-Loop test-rig (IMAGINE)

Drivetrain test rig



consortium

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