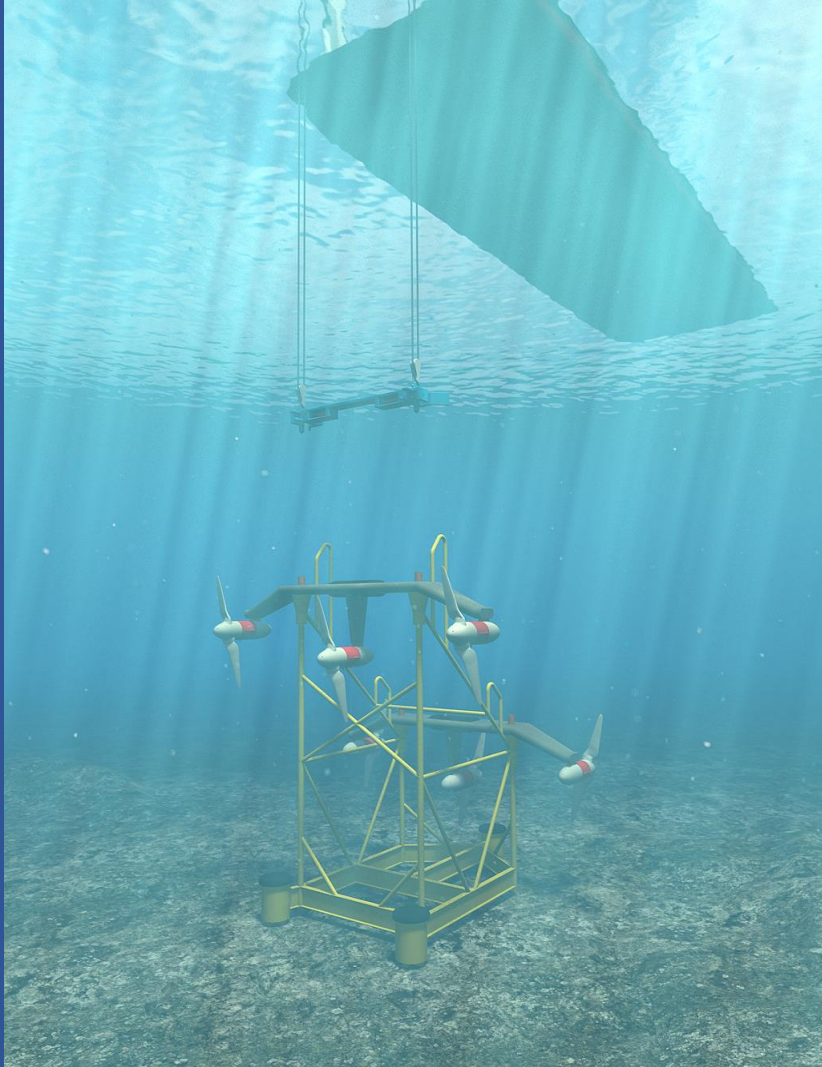


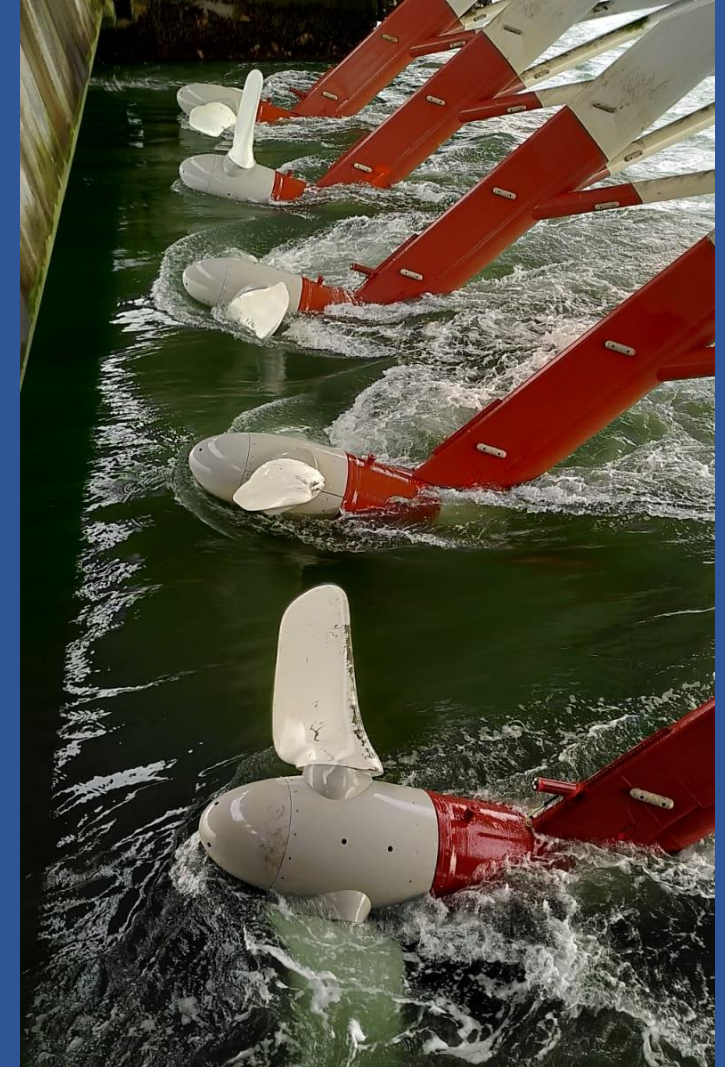
Offshore Operations and Logistics- Tidal Energy



HYDR**WING**

INYANGA
marine projects

**Installation Tips for
Tidal Energy**



al Installation Challenges

- Key challenges:
 - Adverse environment causing low site accessibility
 - Costs of mobilizing suitable assets for installation and O&M
 - Volatility in Spot Market rates for larger Offshore Construction Vessels
 - Capability of vessels and ROV for operating in adverse environment
 - Current projects at low scale

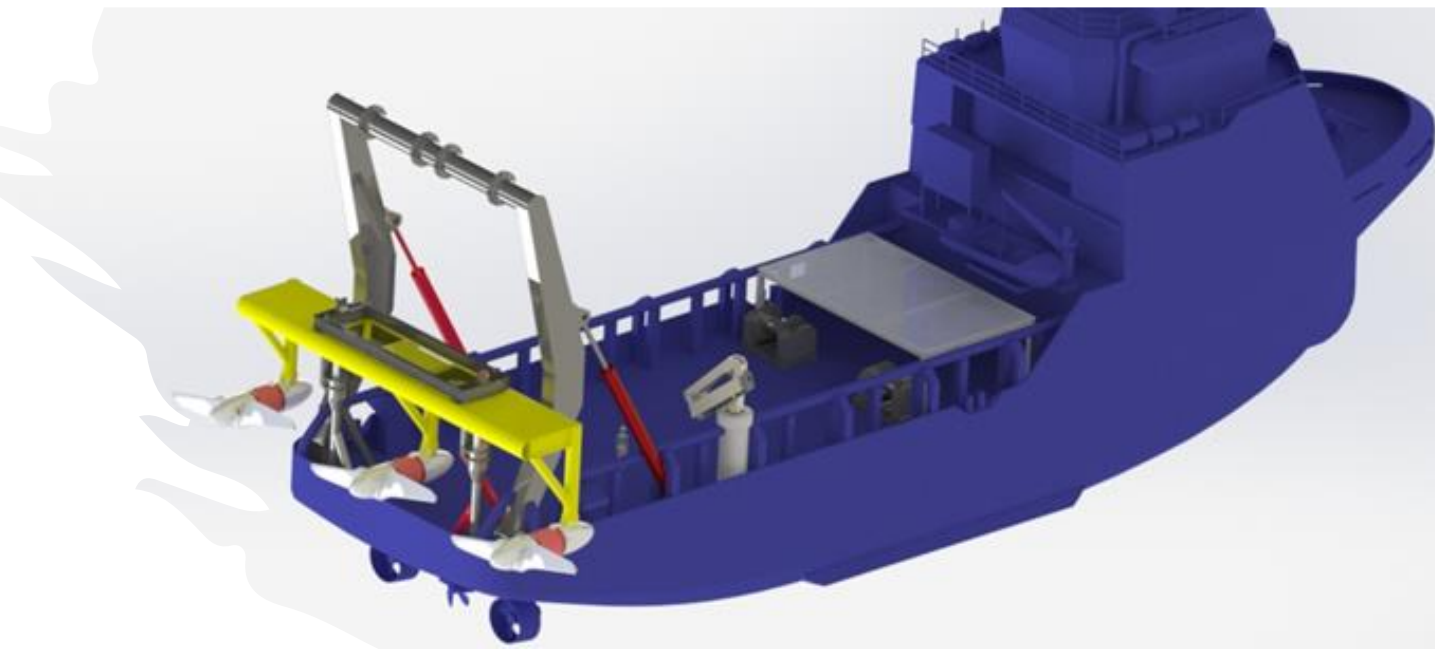


HYDRWING

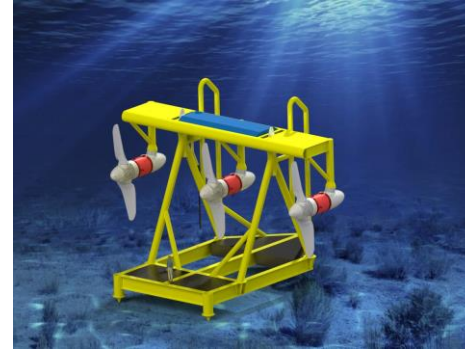
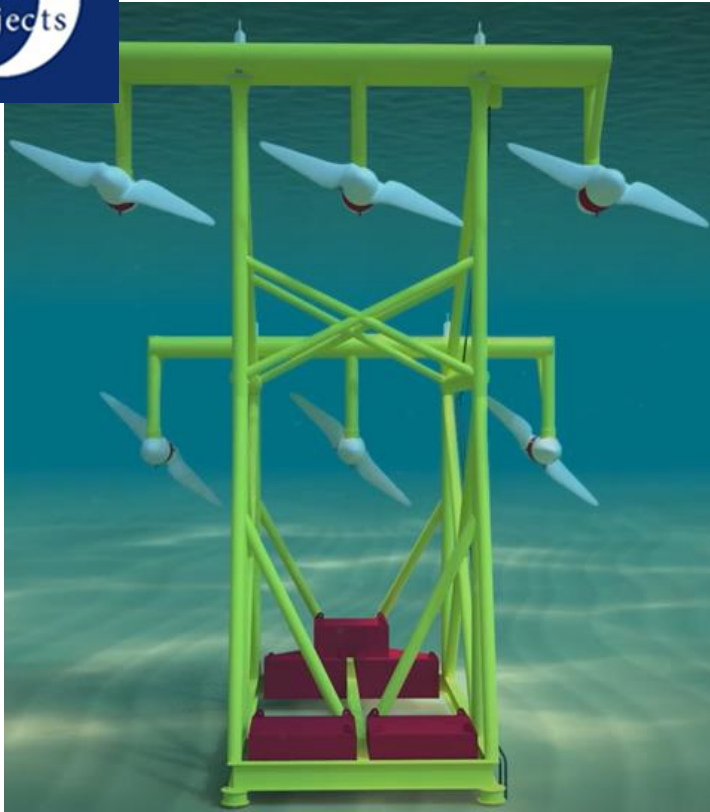
Scalable Tidal Power through Cost-effective Marine Operations

Marine Operations- HydroWing

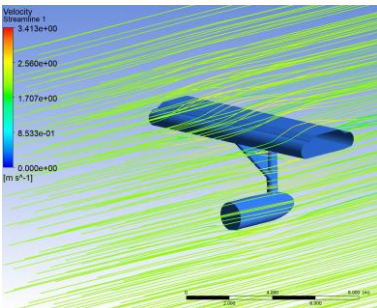
- Marine operations core to the design of HydroWing
- Intelligent LARS => no need of ROV, saving 12-20 kUSD/day
- Wet mate connection = reliable and efficient marine operations
- => Very rapid launch and recovery, in spring or neap tides
- Installation using 4-point mooring barge or small low-cost DP assets
- Long term strategy: develop a low-cost DP concept vessel
- Project clustering and shared marine assets highly beneficial
- => Cheaper marine operations



HydroWing O&M



- Multiple turbines for increased redundancy and improved availability
- Components with high MTBF > 2.5-5 years. Predictive condition monitoring => planned maintenance schedule
- Spare turbines - be changed within 12 hours, easily transported in standard container / truck at short notice
- Spare blades – can be changed in hours
- Spare electrical components – can be changed offshore in hours



- Project Clustering - planned and unplanned maintenance interventions can be clustered with other projects in region
- Installation costs at scale should be lower than offshore wind
- Large scale projects or project clusters - 100MW+ justify a dedicated marine asset, spare turbines, wings, PPMS Monitoring
- Condition monitoring and digitalization can dramatically reduce O&M costs increasing planned interventions and reducing unplanned interventions

Scale	HW 10MW	HW 100MW	Offshore Wind 1000MW
Installation Cost GBP/MW	£500K	£350K	£650K
O&M LCOE Impact GBP/MWh	£30	£20	£17
O&M Cost GBP/MW/yr	£95K	£50K	£76K

**Sources: ORE Catapult,
<https://guidetoanoffshorewindfarm.com/wind-farm-costs>*

Conclusion

- Decoupling from volatile vessel spot markets and using dedicated purpose marine asset is key
- Installation and O&M costs strategy reduces costs at scale
- Eliminating ROV and using intelligent LARS yields huge benefits
- Robust Installation O&M strategy can reduce CAPEX as well
- Project clustering and collaboration with other developers is highly beneficial
- Tidal energy LCOE costs can be comparable with offshore wind at scale of 100MW +



Thank you for your time



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