ETIP Wind

EUROPEAN TECHNOLOGY & INNOVATION PLATFORM ON **WIND ENERGY**

Offshore balance of plant

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Offshore BoP - Sub-topics and timelines

Priority	Delivery by 2020-2025	Delivery by 2025-2030	Delivery post 2030
Industrialized transport and installation systems			
Innovative and industrialized offshore towers and foundations, including better understanding of seabed interaction			
Methodologies for analysis of turbine-substructure interaction on, and station keeping of floating wind turbines			
Innovative and industrialized offshore substations and cables			
Wind Farm level optimisation and modelling - Validation, Testing and demonstration of all areas			

Industrialised transport and installation systems

Topic	Description	Delivery by
Industrialised transport and installation systems	Installation and access in higher sea states – better vessels and systems	2.5m – 2025 3.0m– 2030
	Optimal installation of 10+ MW systems. Is the traditional assembly method with foundation, tower, nacelle and three blades optimal?	Short
	Requirements for modern installation vessels that can handle increasingly large turbines, foundations, offshore platforms and cables	Short
	Floating installation of bottom fixed foundations and turbines in higher sea states- Should include float and sink concepts (jackets)	
	Requirements and design for submarine cable installation tools -	
	CALCULATION of noise in connection with installation and development of noise mitigation systems - Heavily researched in DE, UK – less work required in certain areas - Cumulative effects are still important to be considered. - Other environmental effects are also important - Environmental considerations in decommissioning are also important. - An EU Noise program would be ideal –A study has been published by DG RTD as a reference point	
	Development of common HSE requirements in connection with all installation operations	
	Development and validation of Logistical models for planning , transportation and installation.	

Innovative and industrialised offshore towers and foundations, including better understanding of seabed interactions

Topic	Description	Delivery by
Innovative and industrialised offshore towers and foundations, including better understand-ding of seabed interactions	Development of improved and more efficient measurement and mapping of the soil and seabed properties with various technologies (sonar, CPT, etc.)	
	Development of improved theory and methods for probe taking and handling of soil samples Development of a Subsea ROV rock coring tool requires development – Shallow bed rock site sampling and piling is difficult at present. This is also relevant for floating too	
	Development of improved theory for calculation of soil/foundation interaction - PISA project and other existing bodies of work exist, more work is required	
	Development of improved theory for fatigue properties of steel under influence of corrosion	
	Improved theory for calculation and verification of wave loads on offshore structures	
	Development of better scour protection, coatings, cathodic methods, etc	
	Reduce design margins to reduce costs	
	Demonstration of immature foundation concepts – including onshore testing for foundation testing (welding, nodes etc)	
	Development of common HSE requirements for offshore structures	

Innovative and industrialised offshore substations and cables

Topic	Description	Delivery by
Innovative and industrialised offshore substations and cables	Development of industry standards and regulatory requirements for offshore wind farms with a view to increase value of offshore wind	
	Development of universal joints for subsea power cables	
	Improved understanding of offshore wind subsea array and export cables fatigue and lifetime, including transportation and installation, Increasing understanding of soil cable interaction, eg in relation to temperature dissipation, moving seabeds etc.	
	Development of floating substations for offshore wind farms	
	Development of best practices for power cable installation in intertidal areas and for sea defence crossing	
	Development of generic agreements and procedures for crossing (incl. oil & gas pipes, telecom and power cables etc.) and proximity (incl. proximity to structures) requirements for submarine cables • This is more regulatory, but could be solved with smart system of mapping? • Needs to be considered with growing importance of undersea mining	
	Development of HVDC technologies or suitable alternatives, Building on top of PROMOTION project	
	Standardisation of substation design and layouts	

Floating offshore wind farms

Topic	Description	Delivery by
Floating offshore wind farms	Methodologies for analysis of turbine substructure interaction on and station keeping of floating wind turbines	
	Scaling of substructure designs and weights with larger turbines for the three main concept types: Spar, Semi-sub, TLP, eg. for 6 MW, 10 MW, and 14 MW turbines	
	Development of Combined Load Cases (CLC's) in standards to handle floating systems	
	Development of controller strategies for floating systems	
	Transfer systems for floating substructures/WTG's	
	Development of efficient installation methods for each of the three main floating substructure concepts, e.g.: - Spar: Horizontal tow to site and upending and turbine installation on site in high sea states - Semi-sub: Installation of anchors, moorings and substructure - TLP: Stable float out and installation in high sea states	
	Strategies for replacement of larger parts (e.g. blades, gearbox, generator) on floating WTG's	
	Development of models for design and testing of anchors and mooring systems	
	Connection of inter array cables in floating arrays – the lifetime and optimisation of dynamic cables	

Wind farm level optimization and modelling

Topic	Description	Delivery by
Wind Farm level optimisation and modelling - **Validation, Testing and demonstration on all areas**	Development of early stage engineering models in planning phase	
	Development of cost models to feed into decision making models at planning phase	

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Thanks for your attention

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