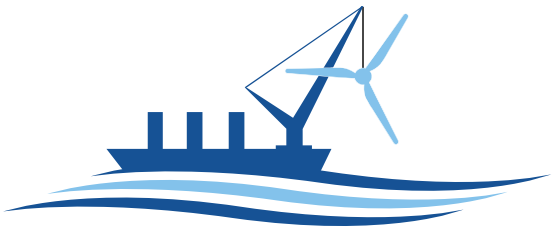

leanwind

Logistic Efficiencies And Naval architecture for Wind Installations with Novel Developments

Project acronym: **LEANWIND**
Grant agreement nº 614020
Collaborative project
Start date: 01st December 2013
Duration: 4 years

WP Framework/Industry Challenges Report – construction, deployment and installation

Work Package 2 - Deliverable 2.1 – Executive Summary

Lead Beneficiary: 3
Due date: 31st March 2014
Delivery date: 31st March 2014
Dissemination level: PU (Public)

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No. 614020.

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Document Information

Version	Date	Description			
			Prepared by	**Reviewed by**	**Approved by**
0	30/03/2014	**Name**	GDG	LR/MRTK/ UCC_HMRC	MRTK – subject to revision and updates

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Executive Summary

Project Background: The Levelised Cost Of Energy (LCOE) produced by the offshore wind power in the end of 2013 has been estimated to be between 0.119 to 0.194 Euro/kWh. The cost of offshore wind power is significantly higher than that produced onshore, which in large part is due to the more expensive installation procedure, and the higher associated operation and maintenance costs. However, offshore wind power has great potentials for cost reduction, and LEANWIND is targeting reductions of less than 10 cents/ kWh by 2030. This cannot be achieved without the implementation of novel innovations in the areas of **Construction, Deployment and Installation**, which is the subject of Work Package 2. This deliverable, D2.1, is aimed at setting the background for the WP2 scope of work, highlighting the state of the art, identifying the relevant challenges and constraints and most importantly establishing a design basis for the future technical studies.

Scope of Work: The scope of work for Work Package 2 is to identify the relevant substructure concepts, and associated fabrication methods and installation strategies that will offer the most potential for cost reductions over the next 10 years. The substructure concepts considered for future technical studies include both fixed and floating solutions. For fixed foundations, the technical work has been broken down into gravity based concepts and steel structures, which will be investigated independently using a variety of numerical tools, combined with some physical model testing. Gravity Based Concepts will be considered from a generic standpoint to determine the relative merits of buoyant structures that can initially be floated into position before ballasting versus the more conventional structures installed using heavy lift vessels. This study will include conceptual engineering, detailed analysis, supply-chain studies and economic modelling. The initial study on steel structures will investigate innovations for both jacket structures and also for XL monopiles to determine how the design, construction and deployment can be achieved in a more efficient and leaner manner. The outcome of this work will be to identify key technical modifications that will enable cost reductions. For example, standardising jacket geometries for entire sites by using different pile stick-up lengths will be considered as one possible innovation. For floating concepts, it is recognised that the associated installation strategies (including the turbine erection) are not as technologically mature; therefore the initial aspect of this work will be a conceptual study to identify the concepts that are closest to market. This preliminary investigation will then allow innovations to be applied to one specific form of floating solution, either a TLP, Semi-submersible of Spar concept.

Design Basis: In order to complete the scope of works described above a series of uniform relevant design cases were identified. The design cases relevant to WP2 are outlined in the table below and cover most of the parameter space for consented and planned wind farms in European waters.

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Site conditions			Ground conditions	
Design case	Water Depth (m)	Distance to Port (km)	Shallow bedrock	Medium dense sand
1	40	30	Gravity bases	XL Monopiles Gravity Bases
2	60	100	Lattice Structures Gravity Bases	Lattice structures Gravity Bases
3	100	30	×	Floating foundations

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