leanwind

Logistic Efficiencies And Naval architecture for Wind Installations with Novel Developments

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Document Information

Version	Date	Description			
			Prepared by	**Reviewed by**	**Approved by**
V1	25/10/2017	**Name/ Organisation**	F. Judge (UCC), K. Lynch (UCC)	L. M. Nonås (SINTEF Ocean) J. Giebhardt (IWES)	
V2	23/11/2017		F. Judge (UCC), K. Lynch (UCC)		Jan Arthur Norbeck (SINTEF Ocean)

Author(s) information (alphabetical):	
Name	**Organisation**
Iver Bakken Sperstad	SINTEF
Fiona Devoy McAuliffe	University College Cork
Elin Espeland Halvorsen-Weare	SINTEF Ocean
Brian Flannery	University College Cork
Chandra Irawan	University of Portsmouth
Dylan Jones	University of Portsmouth
Frances Judge	University College Cork
Katie Lynch	University College Cork

Acknowledgements/Contributions:	
Name	**Organisation**
Negar Akbari	University of Portsmouth
Graham Wall	University of Portsmouth

Definitions

CAPEX	Capital Expenditure
CPU	Computation Time
CTV	Crew Transfer Vessel
DCM	Decommissioning
DECEX	Decommissioning Expenditure
DSS	Decision Support System
EIS	Environmental Impact Statement
FEED	Front End Engineering Design
GIS-T	Geographical Information System for Transport
HLV	Heavy Lift Vessel
IntDis	Decommissioning recycling and landfill centres
IRR	Internal Rate of Return
KPI	Key Performance Indicator
LB	Lower Bound
LCA	Life Cycle Analysis
LCOE	Levelised Cost of Energy
LIVO	LEANWIND Installation Vessel Optimiser
NPV	Net Present Value
O&M	Operation and Maintenance
OPEX	Operational Expenditure
OWF	Offshore Wind Farm
PIns	Port Installation Logistics Model
PortDis	Decommissioning Port Selection
PortLay	Port Installation Layout model
PortOM	O&M Port & Base Selection
PTPIns	Component transport installation phase model
SES	Surface Effect Ship
SOV	Service Offshore Vessel
UB	Upper Bound
VMINS	Installation Vessel Mix Installation Model
VMOM	O&M Vessels & helicopters
WP	Work Package
WTG	Wind Turbine Generator

Executive Summary

The following report summarises the validation activities carried out on the two sets of analysis models developed in LEANWIND i.e. the logistics models and the financial models. The models have been developed as complementary models to be used by various stakeholders as decision support tools in offshore wind farm project planning and design. The combined use of these sets of models are described in LEANWIND Deliverable 8.3: Integrated Financial and Logistics Model.

The logistics models provide optimised solutions for supply chain and logistics in each of the three primary project phases (installation, O&M and decommissioning) and in each of the three primary supply chain phases (transport to port, at port and transport from port to site). The models provide the best solution for a given set of options for an offshore wind farm project e.g. the best O&M port, vessel fleet, transport routes etc. for given turbine, foundations and project location. Due to the nature of these models, validation in the more traditional sense is challenging, as the optimum solution is not easily 'proven'. The models scope and assumptions were developed with input from industry including through feedback at specific LEANWIND events. After system testing and "de-bugging" on an individual level, a sample LEANWIND case study was used to run through the full suite of models in order to sense check the logic and results from the use of the combined models. This was thoroughly described in LEANWIND Deliverable 5.7: Holistic Supply Chain Optimisation Model.

In contrast, the financial model comprises of three simulation-based modules, which can more readily be validated through the application of theoretical and real case studies; through comparison with other financial models; and through sensitivity analysis of specific parameters allowing given output parameters to be used as KPIs for comparative purposes. The three modules address the installation, O&M and decommissioning phases and as such, each module was validated independently as well as the financial model as a whole.

The models were all validated successfully with reasonable comparison to case study data and other models and with significant input from industry on the model input data, assumptions and output data checks.