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Logistic Efficiencies And Naval architecture for Wind Installations with Novel Developments

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Document Information

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V0		VGSC	Sonia Abella	Mar Rodríguez	Mar Rodríguez
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Author(s) information (alphabetical):

Name	Organisation	Email
Isabel Otero	VGSC	iotero@kaleidologistics.com
Mar Rodríguez	VGSC	marrodriguez@kaleidologistics.com
Sonia Abella	VGSC	sabella@kaleidologistics.com

Acknowledgements/Contributions

Name	Organisation
Christophe Poels	OWA
Jan Goormachtigh	OWA
Chandra Irawan	UOPHEC
Dylan Jones	UOPHEC
Athanasios Pappas	NTUA

Definitions

OWT	Offshore Wind Turbines
H&S	Health and Safety
AIL	Abnormal Indivisible Load
GIS	Geographic Information System
WT	Wind Turbine
OWT	Offshore Wind Turbine
WF	Wind Farm
SPMT	Self-Propelled Modular Transporter
LCOE	Levelised Cost of Energy

Executive Summary

This document is included in the LEANWIND project Work Package related to Integrated Logistics, which main objective is to reduce the cost of offshore wind energy by increasing the efficiency of the entire supply chain including installation, operation and maintenance, and decommissioning.

This report is specifically focused on the on-land transport phase of components from manufacturing sites to marshalling or installation, as part of the transport and distribution segment of the Offshore Wind Power Supply Chain.

This report focuses *primarily* on European road transportation system. Road transport this is the current on-land dominant mode being used by the industry as a complement for port site assembly or manufacturing strategies, as well as waterborne transportation options.

The key areas analysed in the document are:

- State of the art of the on-land heavy and oversized transportation segment, with a description of the general solution equipment, as well as the ad-hoc solutions for wind turbine components currently available in the market.
- Limitations for the main phases of on-land transport of heavy and oversized wind parts:
 - o Transportation from manufacturing facilities to port or near port assembly sites
 - o Transportation of components within the coastal facilities.

Following this classification, the main limitations identified for the cross border road transportation of OWT components are:

- Lack of harmonization of road transport regulation aspects even inside Europe. There is a significance variance between and within different countries concerning aspects such as the limits in weight and dimensions for a cargo to be considered as an abnormal load, type and procedures for permit granting, and type or configuration of escorts. This lack of uniformity and common rules within Europe hinders cross border transport of this kind of cargo.
- Calendar limitations. Fixed date restrictions as well as non-fixed calendar limitations due to unpredictable reasons.
- Physical limitations due to point or linear infrastructure capacity or physical obstacles.
- Lack of suitable number or capacity of transport equipment.
- Restrictions imposed by manufacturers Handling Manuals.
- Equipment or infrastructure associated costs.

On the other hand, the main restrictions for the on-land transportation within coastal sites are related to the site access, the availability of sufficient area for transport routing and the availability of handling and transport equipment.

Furthermore, the study proposes opportunities to overcome some of these limitations for on-land transportation. Some of them could be solved due to new component and

equipment design, others could be mitigate by supply chain stakeholders collaboration or with new transport policies being deployed at a European level, while some others could only be overcome by new procurement/assembly strategies, reducing the dependence of on-land transport within the supply chain.