LLŶR FLOATING OFFSHORE WIND PROJECT

Llŷr 1 Floating Offshore Wind Farm

Environmental Statement

Volume 6: Appendix 15-B - Noise Modelling

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FLOVENTIS ENERGY

Document Status

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Acronyms and abbreviations

Acronym or Abbreviation	Definition	Acronym or Abbreviation	Definition
DB	Decibels	MLT	Marine Licensing Team
HDD	Horizontal Directional Drilling	NRW	Natural Resources Wales
OfECC	Offshore Export Cable Corridor	TJB	Transition Joint Bays
OnECC	Onshore Export Cable Corridor	WTG	Wind Turbine Generator

Glossary of project terms

Term	Definition
The Applicant	The developer of the Project, Llŷr Floating Wind Ltd.
Array	All wind turbine generators, inter array cables, mooring lines, floating sub-structures and supporting subsea infrastructure within the Array Area, as defined, when considered collectively, excluding the offshore export cable(s).
Array Area	The area within which the wind turbine generators, inter array cables, mooring lines, floating sub-structures and supporting subsea infrastructure will be located
Floventis Energy	A joint venture company between Cierco Ltd and SBM Offshore Ltd of which Llŷr Floating Wind Limited is a wholly owned subsidiary.
Landfall	The location where the offshore export cable(s) from the Array Area, as defined, are brought onshore and connected to the onshore export cables (as defined) via the transition joint bays (TJB).
Llŷr 1	The proposed Project, for which the Applicant is applying for Section 36 and Marine Licence consents. Including all offshore and onshore infrastructure and activities, and all project phases.
Marine Licence	A licence required under the Marine and Coastal Access Act 2009 for marine works which is administered by Natural Resources Wales (NRW) Marine Licensing Team (MLT) on behalf of the Welsh Ministers.
Offshore Development Area	The footprint of the offshore infrastructure and associated temporary works, comprised of the Array Area and the Offshore Export Cable Corridor, as defined, that forms the offshore boundary for the S36 Consent and Marine Licence application
Offshore Export Cable	The cable(s) that transmit electricity produced by the WTGs to landfall.
Offshore Export Cable Corridor (OfECC)	The area within which the offshore export cable circuit(s) will be located, from the Array Area to the Landfall.
Onshore Development Area	The footprint of the onshore infrastructure and associated temporary works, comprised of the Onshore Export Cable Corridor and the Onshore Substation, as defined, and including new access routes and visibility splays, that forms the onshore boundary for the planning application.
Onshore Export Cable(s)	The cable(s) that transmit electricity from the landfall to the onshore substation
Onshore Export Cable Corridor (OnECC)	The area within which the onshore export cable circuit(s) will be located.

Term	Definition
proposed Project	All aspects of the Llŷr 1 development (i.e. the onshore and offshore components).
Onshore Substation	Located within the Onshore Development Area, converts high voltage generated electricity into low voltage electricity that can be used for the grid and domestic consumption.
Section 36 consent	Consent to construct and operate an offshore generating station, under Section 36 (S.36) of the Electricity Act 1989. This includes deemed planning permission for onshore works.

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15-B. Noise Model Settings

1. To determine potential operational noise emissions from the development, noise prediction models have been prepared using the CadnaA® v2022 MR2 software package. The following settings were applied in noise models:

    - The ground acoustic absorption has been set to 0.8 (i.e. assumed soft ground conditions which is considered appropriate for predominantly open grass field and farmland);
    - The maximum order of reflections was 1;
    - Air temperature was assumed to be 9 degrees and humidity 80%;
    - Land topography has been sourced from Ordnance Survey Open Map data; and
    - No boundary fences/walls have been included in the noise model.

15.1 Construction Noise Modelling

2. CadnaA noise mapping software was used to predict construction noise levels at the selected receptors. The construction noise model followed the procedures for prediction of demolition and construction noise set out in BS 5228-1. Sound power levels for each of the following construction activities have been calculated:

    - Open trench construction;
    - HDD works; and
    - Substation construction.

3. Noise source data for construction plant are presented in **Table 15B-1**. Construction noise predictions were carried out to represent a worst-case scenario where all plant is operational on-site. Consequently, construction noise predictions may overestimate construction noise levels so can be considered as worst case.

Table 15B-1. Construction plant

Activity	Plant	Reference	Sound Power Level Lw dB(A)	Quantity	% on-time
HDD works	Excavator	BS_5228_2009_C2_3	106	1	60
	Generators	BS_5228_2009_C4_84	101.7	3	100
	HDD Rig	Measured[1]	86	1	95
	Drill fluid recycling	Measured[1]	114	1	95
	system"	Measured[1]	88	2	90
	Mud Pump	Measured[1]	88	1	95
	Power Pack	Measured[1]	88	1	95
	Bulldozer	BS_5228_2009_C2_11	107	1	75

[1] Data provided in TECHNICAL NOTE PROJECT EREBUS HDD LANDFALL INPUTS FOR THE ENVIRONMENTAL IMPACT STATEMENT, reference ERE-CAB-OWC-TNT-ENV-0001 Rev A01, OWC 2021.

Activity	Plant	Reference	Sound Power Level Lw dB(A)	Quantity	% on-time
Open Trench Construction	Dump Truck	BS_5228_2009_C1_11	108	1	75
	Tracked Excavator	BS_5228_2009_C2_3	106	1	75
	Generator	BS5228:2009 C4_84	101.7	1	100
	Wheeled Loader	BS_5228_2009_C2_28	104	1	75
Substation Construction	Tracked Excavator	BS_5228_2009_C2_3	106	2	75
	Wheeled Loader	BS_5228_2009_C2_28	104	2	75
	Bulldozer	BS_5228_2009_C2_11	107	2	75
	Dump Truck	BS_5228_2009_C1_11	108	2	75
	Mobile Crane	BS_5228_2009_C4_39	105	2	75
	Truck Mounted Concrete Pump and Boom Arm	BS_5228_2009_C4_32	108	1	50

15.2 Operational Noise Modelling

4. Operational noise was modelled in CadnaA, which employs the noise prediction routines commonly used in the UK (e.g. ISO 9613 Acoustics – Attenuation of Sound during Propagation Outdoors – Part 1: Calculation of the absorption of sound by the atmosphere (1993) and Part 2: General Method of Calculation (1996). The substation plant listed in **Table 15B-2** were modelled.

Table 15B-2. Substation noise sources

Plant	Sound Power Level Lw dB(A)	Source height (m)
Grid Transformer main tank	80	3.3
Grid Transformer coolers	97	3.3
Auxiliary Transformer	65	1.5
Harmonic Filter	95	3.0
Shunt reactor main tank	80	2.0
Shunt reactor coolers	97	2.0
STATCOM / SVC switched reactor	80	2.0
STATCOM heat exchanger cooling	90	1.0
STATCOM cooling plant pumps	90	1.0