Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE U-64000
MANUFACTURERS RECORD BOOK (FINAL DOSSIER) - INDEX

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None

1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

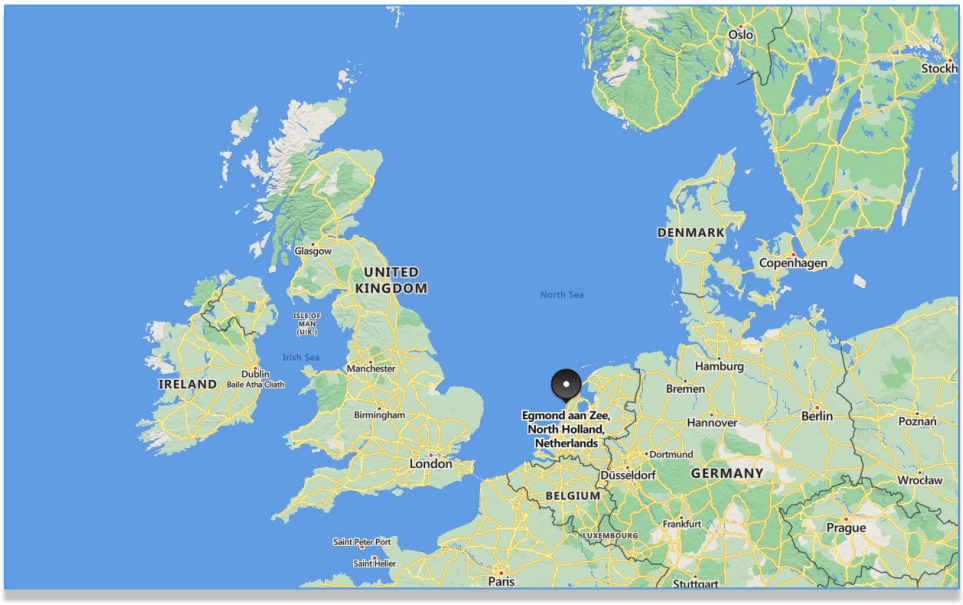


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

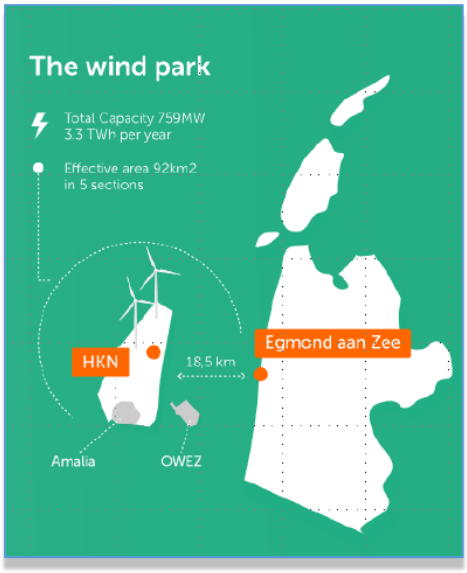


Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

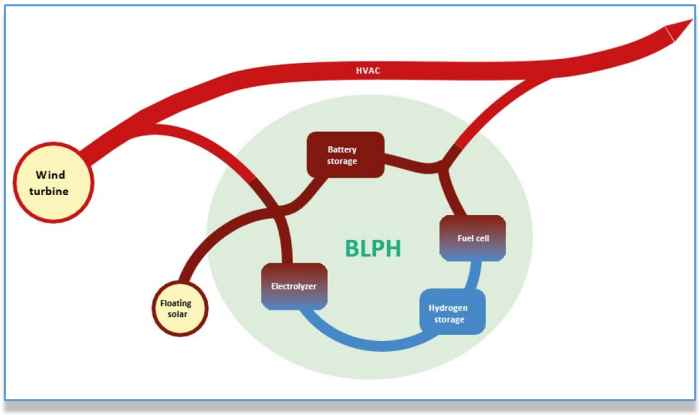


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document identifies any electrical equipment to be fed with its main characteristics.

2.1 REFERENCES

Doc. No.	Description
1724000437-MD-LIS-00001	SMIR - SUPPLIER MASTER INFORMATION REGISTER

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

3 INDEX

3.1 DESIGN DOSSIER

3.1.1 Lists

- 1724000437-MD-LIS-00001: SMIR - SUPPLIER MASTER INFORMATION REGISTER
- 1724000437-EL-LIS-00014: ELECTRICAL LOAD LIST
- 1724000437-IN-LIS-00015: I/O LIST
- 1724000437-IN-LIS-00016: INSTRUMENT LIST WITH SET POINTS/CONTROL/ALARM/SHUTDOWN
- 1724000437-EL-LIS-00017: CABLES LIST
- 1724000437-MAC-LIS-00026: ATEX REGISTER
- 1724000437-MAC-LIS-00027: ATEX DOCUMENTATION

3.1.2 Diagrams

- 1724000437-PR-PID-00018: PACKAGE P&ID

3.1.3 Drawings

- 1724000437-MAC-DA-00005: CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)
- 1724000437-MAC-DD-00006: EQUIPMENT SECTIONAL DRAWING WITH BILL OF MATERIAL
- 1724000437-MAC-DD-00008: PACKAGE PIPING SCHEMATICS AND BILL OF MATERIALS
- 1724000437-MAC-DG-00009: PACKAGE WIRING DIAGRAM INCLUDING LAYOUT OF PACKAGE CONTROL PANEL
- 1724000437-MAC-CE-00004: PACKAGE CAUSE EFFECT MATRIX /LOGIC DIAGRAMS

3.1.4 Calculation notes

- 1724000437-ST-RE-00010: PACKAGE STRUCTURAL CALCULATION REPORT INCLUDING FIXING POINTS and LIFTING POINTS
- 1724000437-MAC-CA-00031: NITROGEN RECEIVER CALCULATION

3.1.5 Data sheets

- 1724000437-MAC-DS-00011: EQUIPMENT DATA SHEETS INCLUDING PSA, ETC.
- 1724000437-MAC-DS-00012: PACKAGE EQUIPMENT NOISE DATA SHEETS INCLUDING PSA, ETC.
- 1724000437-MAC-DS-00013: INSTRUMENT DATA SHEETS

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3.2 CERTIFICATION DOSSIER

3.2.1 Manufacturing procedures

- 1724000437-QC-ITP-00002: INSPECTION TEST PLAN (ITP)
- 1724000437-WEL-LIS-00020: WELDING BOOK (WPS, PQR, WELDERS QUALIFICATIONS, WELDING MAPS, ETC.)
- 1724000437-NDT-PRO-00019: NDT PROCEDURES INCLUDING PERSONNEL QUALIFICATIONS
- 1724000437-MAT-PRO-00021: PAINTING PROCEDURE
- 1724000437-QC-PRO-00022: HYDROSTATIC AND OR PNEUMATIC TEST PROCEDURE
- 1724000437-QC-PRO-00023: FAT (FACTORY ACCEPTANCE TEST) PROCEDURE
- 1724000437-QC-PRO-00030: HANDLING, PRESERVATION AND PACKAGING PROCEDURE

3.2.2 Manufacturing records

- NDT RECORDS
- PAINTING RECORDS
- HYDROSTATIC TEST RECORDS
- FAT REPORT

3.3 FIELD OPERATIONS & MAINTENANCE

3.3.1 General documents

- 1724000437-MAC-SP-00003: SYSTEM/PACKAGE FUNCTIONAL DESCRIPTION
- 1724000437-COM-LIS-00028: SPARE PARTS LIST (2 YEARS AND COMMISSIONING & START-UP)
- 1724000437-MAC-MAN-00029: INSTALLATION, OPERATING AND MAINTENANCE MANUAL (INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)

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