# Base Load Power Hub (BLPH)

## DAVIT CRANE

## SPARE PART INDEX REGISTER (COMMISSIONING AND 2 YEAR OPERATION)

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# 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.

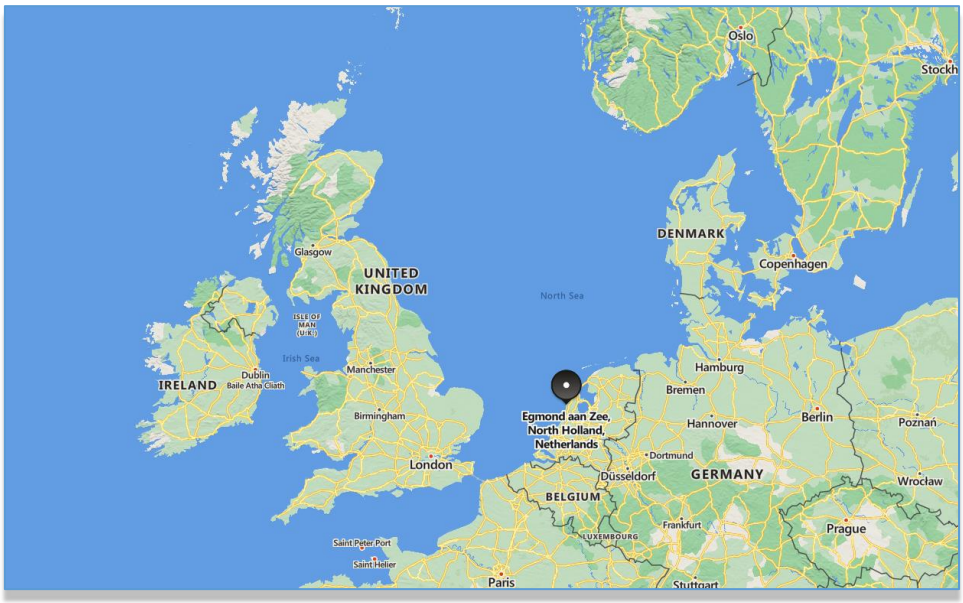



*Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map*

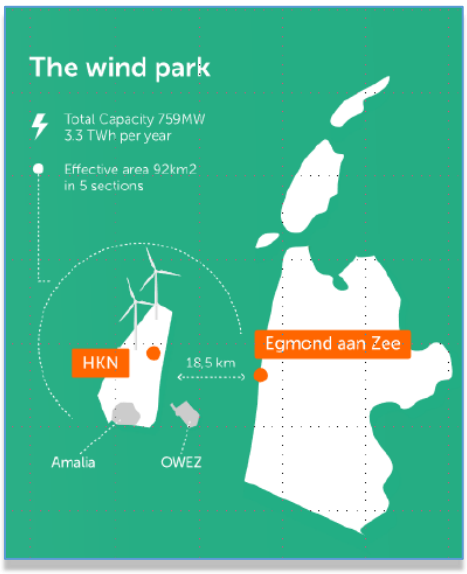



*Figure 2 - Wind Park Details*

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.

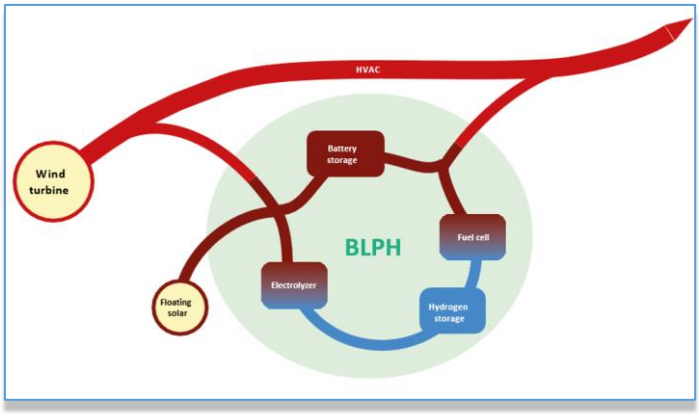


*Figure 3 – BLPH Concept*

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

The purpose of the document is to provide a list of replacement parts for the davit crane. The parts list will be divided between components needed for commissioning and those for the two-year

## 2.1 REFERENCES

| Doc. No. | Description |
|---|---|
| 1724001010 123A90A | Purchase order |
| | |
| | |

*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 SPARE PARTS INDEX REGISTER

## 3.1 SPARE PARTS FOR COMMISSIONING/START UP

## 3.2 SPARE PARTS 2Y OPERATION

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| SPARE PARTS FOR COMMISSIONING/START UP | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Number** | **Q.ty** | **Units** | **Item Description** | **Description Additional** | **Wiring Diagram** |
| 1 | 011-0014-C1311 | 2 | Each | Fuse | 10,3x38 CH10 1A gG | 50Q2 |
| 2 | 011-0014-C1315 | 6 | Each | Fuse | 10,3x38 CH10 2A gG | 32Q1 |
| 3 | 011-0014-C0643 | 1 | Each | Fuse | 10,3x38 CH10 6A gG | 40Q2 |
| 4 | 011-0014-C0641 | 1 | Each | Fuse | 10,3x38 CH10 10A gG | 34Q1 |
| 5 | 011-0014-C2598 | 2 | Each | Fuse | 22x58, CH22, 50A, aM | 50Q1 |
| 6 | 011-0014-C1527 | 1 | Each | Contactor | Contactor TeSys LC1D - 3 poles - AC3 440V 9 A - 24 V CC | 50KM1 |
| 7 | 011-0014-C2604 | 1 | Each | Contactor | Contactor TeSys LC1D - 4 poles - AC1 440V 32 A- 24 V CC | KM11 |
| 8 | 011-0014-C2605 | 1 | Each | Contactor | Contactor aux TeSys CA3SK - 10 A - 24 V CC | 74KM1 |
| 9 | 011-0014-C1828 | 1 | Each | Contactor | Contactor TeSys LC1D - 3 poles - AC3 440V 9 A - 230 V AC | 84KM1 |
| 10 | 006-0003-C0210 | 1 | Each | Cylindrical roller bearing | Wheel roller bearing NNF 5008 ADA-2LSV (40x68x38) | N.A. |
| 11 | 006-0003-C0849 | 1 | Each | Cylindrical roller bearing | Pulley roller bearingNNF 5012 ADB-2LSV (60x95x46) | N.A. |

| SPARE PARTS 2Y OPERATION | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Number** | **Q.ty** | **Units** | **Item Description** | **Description Additional** | **Wiring Diagram** |
| 1 | 011-0014-C2599 | 2 | Each | Relay | PLC-INTERFACE, with PLC-BPT.../21 with connection Push-in and relay, mounting on NS 35/7,5, 1 contact, input voltage 24 V DC | 32KA1 |
| 2 | 011-0015-C0034 | 1 | Each | Load cell amplifier | Load cell amplifier, output 4-20mA | 80E1 |
| 3 | 011-0008-C2442 | 1 | Each | Load cell | PSPRX pin load cell - model PRX, rated capacity 500 kg to 4000 kg, double shear, Stainless steel, IP65 | WT-0014 |
| 4 | 007-0003-C0579 | 1 | m | Cable chain | Dim. 100mm, pitch: 75, curvature radius: 75mm, pitch n°: 72 | N.A. |
| 5 | 011-0008-C2429 | 1 | Each | Limit switch | Proximity switch, M12, 4 mm, DC, 3 wires, PNP NA, IO-Link COM3, cable 5 m | LS0024-0025 |
| 6 | 011-0008-C2430 | 1 | Each | Limit switch | Proximity switch, M12, 4 mm, DC, 3 wires, PNP NA, IO-Link COM3, cable 15 m | LS0034-0035 |
| 7 | 011-0008-C2436 | 1 | Each | Hoisting limit switch | hoisting down limit switch for payout prevention | SW-0016 |
| 8 | 006-0003-C0210 | 2 | Each | Cylindrical roller bearing | Wheel roller bearing NNF 5008 ADA-2LSV (40x68x38) | N.A. |
| 9 | 006-0003-C0849 | 2 | Each | Cylindrical roller bearing | Pulley roller bearingNNF 5012 ADB-2LSV (60x95x46) | N.A. |
| 10 | 007-0006-C1220 | 1 | Each | Electric motor | Slewing motor MGM BAHK2 100 LB4 Enhanced Power (E.P.) | M2 |
| 11 | 007-0006-C1221 | 1 | Each | Electric motor | Hoisting motor MGM BAHK2 132 MC4 Enhanced Power (E.P.) | M1 |
| 12 | 007-0006-C1222 | 1 | Each | Electric motor | Traversing motor MGM BAHK2 90 SA4 Enhanced Power (E.P.) | M3 |

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