



Cert No. 11460

## Annual Report 2023

Project name – Phase	Thornton Bank Wind Farm - Operational Phase
Document code	CPO-OPS-PA-BMM-GEN-RPT-ANNUAL-0001 – NON CONFIDENTIAL
Document revision	0
Status	Released
Issued to	Begeleidingscomité

	Function	Name	Date	Signature
Author	Chief Executive Officer	Dirk Magnus	27/3/2024   09:11:09 CET	<i>Dirk Magnus</i>
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Review	HSE Manager	Dave Demeyer	26/3/2024   16:01:57 CET	<i>Dave Demeyer</i>
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REVISION RECORD SHEET			
Revision	Date	Description changes	Changed by
0	27/03/2024	First issue	MGN



# TABLE OF CONTENTS

- 1 GENERAL PROJECT INFORMATION ..... 4**
- 2 MAIN ACTIVITIES IN 2023..... 5**
  - 2.1 Maintenance ..... 5
  - 2.2 Infield Cable Exchange ..... 5
  - 2.3 Turbine Major component replacements ..... 6
  - 2.4 Leading edge protection exchange ..... 6
- 3 CONSTRUCTION & OPERATION PERMIT CONDITIONS ..... 7**
- 4 ENVIRONMENTAL MONITORING ACTIVITIES..... 9**
- 5 HEALTH, SAFETY AND ENVIRONMENT (HSE)..... 9**
- 6 ANNEXES ..... 10**
  - 6.1 Availability per phase on monthly base .....10
  - 6.2 Production – Low wind – Stops – Maintenance hours.....10
  - 6.3 Production per month per phase .....10
  - 6.4 Production per year per turbine.....10
  - 6.5 Windrose .....10



# 1 GENERAL PROJECT INFORMATION

C-Power’s wind farm is located on the Thornton Bank, approximately 30 km off the coast of Zeebrugge. The project was constructed in three phases.

Phase 1 (2007-2009), the pilot phase, consisted of six 5M (5 MW) wind turbine generators (WTG) on gravity base foundations (GBF).

The 30 MW installed capacity is fully operational since end of June 2009.

Phase 2 (2011-2012) consisted of:

- the construction of 49 jacket foundations (JF);
- the installation of 30 WTGs of 6,15MW: 24 WTGs in sub area B and 6 WTGs in sub area A, mutually connected with 33/36 kV infield cables;
- the laying and connection of infield cables;
- the crossing of the 33/36kV infield cables with the Interconnector gas pipeline and the Concerto South telecom cable;
- the construction and installation of the offshore transformer station (OTS);
- disconnection works of 150/170kV cable A from D1 and connection to transformer station and the connection of a 33kV infield cable between OTS and D1;
- the installation of 2 subsoil 150kV onshore connections between the 150 kV offshore cables and the high voltage station “Sas Slijkens”;
- the laying of the second 150kV offshore export cable B.

Phase 3 (2012-2013) consisted of:

- the installation of 18 WTGs (6,15MW) and the necessary connections with the offshore transformer station

The complete project comprises 54 WTGs with a total rated power of 325 MW plus the supporting infrastructure. Full operation was accomplished by end of September 2013.

The figure below shows the layout of the C-Power wind farm.

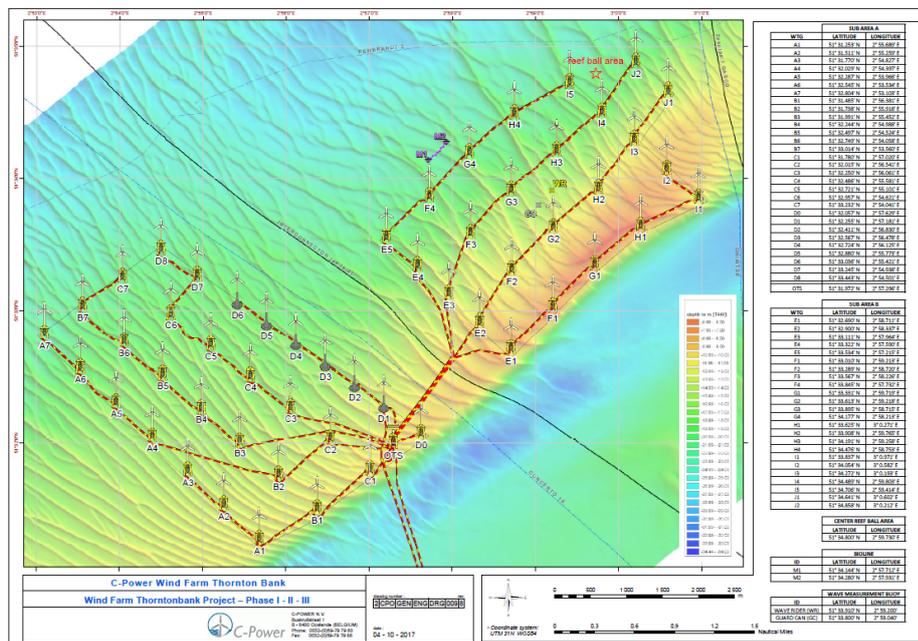


Figure 1: Layout of C-Power’s wind farm



## 2 MAIN ACTIVITIES IN 2023

In 2023, C-Power continued the “in house” organisation of its turbine maintenance activities, meaning without reliance on an “all in” service contract, to the satisfaction of its shareholders and financing institutions. The C-Power subsidiary Thornton Bank Maintenance Services and the Belgian maintenance company John Cockerill (formerly CMI) continued to perform the major maintenance works on the wind farm (refer to the Annual reports of previous years). For specific maintenance activities, requiring specialised knowledge, long-term agreements were concluded with a range of contractors, both from Belgium as abroad. C-Power took over the full responsibility for logistics, warehousing, and sourcing of spare parts.

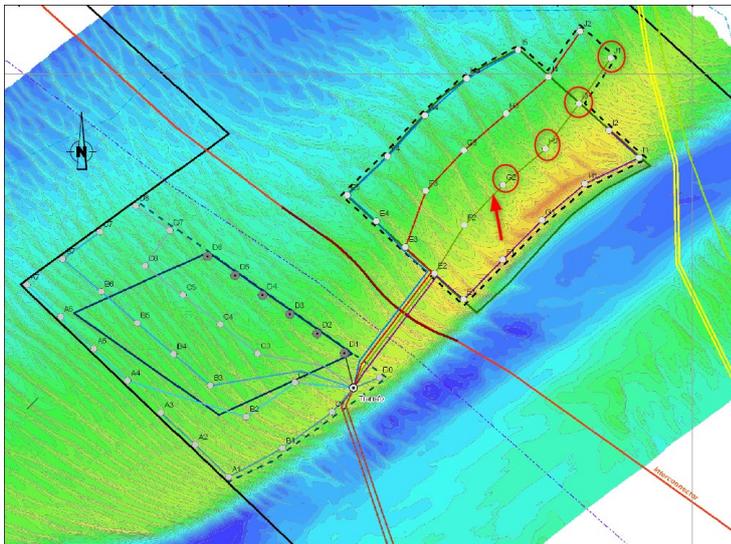
These changes had no impact on the safety and environmental policy and management of C-Power.

### 2.1 MAINTENANCE

All scheduled maintenance activities were performed in accordance with the maintenance manuals. Turbine maintenance activities were hindered by weather conditions being less favourable than in the past years. Offshore workability in 2023 was more than 20% lower than the long-term average. This resulted in some repair or retrofit activities, and semi-annual maintenance work being postponed.

### 2.2 INFIELD CABLE EXCHANGE

On 30 June a defect occurred on the infield cable F2 – G2. 4 turbines (G2, H2, I3, J1) were shutdown and remained out of service. We had a spare cable available in our cable warehouse and were able to mobilise a suitable vessel very quickly. This resulted in a fast exchange of the infield cable (between 11 and 15 August). After connection and re-commissioning works, the 4 turbines were back in operation on 27 August.



The part of the defective cable, where the fault was located, was sent for investigation to a laboratory but the cause of the defect could not be established.



## 2.3 TURBINE MAJOR COMPONENT REPLACEMENTS

In 2023, following major component exchanges were performed on the wind farm:

- Gearbox exchanges on 4 turbines (B6, D8, E6, G3)
- Generator exchange on C2

The exchanges were carried out in 2 campaigns: one in February and one in June with the Jack-Up Vessels Neptune (owner Deme) and Resolution (owner MPI).

At the end of 2023, 2 turbines were standing due to defective major components: A4 with a transformer fault and I3 with a generator fault. These components have been exchanged in February 2024.



## 2.4 LEADING EDGE PROTECTION EXCHANGE

In 2023, C-Power exchanged the leading edge protection (LEP) foil of the blades of in total 10 wind turbines. This marked the completion of the LEP exchange project, which started in 2020 and was spread out over 4 seasons (only possible to perform the works in Summer season). The LEP protects the leading edge of the blades against erosion from rain, airborne particles, etc.



### 3 CONSTRUCTION & OPERATION PERMIT CONDITIONS

All permit obligations are integrated and implemented in the daily management of the activities offshore by C-Power and its contractors.

The annual institutionalised Follow-up Committee ("*Begeleidingscomité*") took place on 29/02/2024. During this Follow-up Committee, the progress of the project is discussed as well as the compliance of the operation and maintenance activities with the permit conditions. C-Power also provides the Committee with 3-monthly reports.

Next to this regular and official reporting to the authorities, C-Power informs the federal and nautical authorities about important events on a frequent, voluntary, and transparent basis, including a regular dialogue with the relevant authorities.

An overview of the main permit conditions is given below.

#### **Drifting or sunken objects**

A detailed track record of the drifted and sunken objects is kept by C-Power. 1 incident with object lost at sea was reported:

- 17/10/2023: screwdriver fallen in the water

This number equals the number of lost objects in 2022 (1).

We are also still actively taking part in the 'Fishing for litter' campaign. Through this campaign we encourage the masters of our CTV to take onboard any litter they see drifting. We then collect this in big bags and deliver it to VVC who is a partner of the project. We have already collected pieces of wood, fisherman's buoys, ropes, ...

#### **Cables**

Infield and export cable surveys were performed in Winter 2023, mainly to serve as an input for the remediation campaign tender.

C-Power has commissioned a specific cable risk analysis in order to identify and quantify the risks associated with the burial depth of the export cables. A specific meeting with the *Begeleidingscomité* on this topic was organised on 19 October, where the proposed way forward was approved. Following a risk based approach, C-Power will rebury +-2200m of the Export Cable A and +-1225m of the Export Cable B trajectories. Timing for the remedial campaign will depend on vessel availability.

Status February 2024: request for quotation has been launched early January; C-Power will review the quotations as soon as received.

#### **Monitoring**

##### *Monitoring activities BMM*

Seabird surveys, monitoring of sea mammals with C-pods, hard substrate and sediment sampling, sampling of fish track, water sampling and various maintenance works on buoys, sensors and measuring instruments were performed by BMM in the course of the year 2023.

##### *Meteorological parameters*

Meteorological data (wind speed, wind direction, wave height, wave period, tide, pressure, temperature, visibility) measured in real time on C-Power's offshore transformer platform are available on "<https://meteo.c-power.be>".



The measurement buoy in Area B of the C-Power wind farm (see also Figure 1) installed by Vlaamse Hydrografie in August 2017 is still in operation; data of this wave buoy are visible in "Meetnet Vlaamse Banken".

## **Risks & Safety**

### *Internal emergency plan*

Was initially released May 2014. Latest revisions of the ERP are available on the C-Power management platform. No updates performed in 2023; this will be scheduled for 2024.

### *Emergency response exercises:*

27/06/2023: Porex (see below)

07/09/2023: ERP on WTG; with involvement MRCC

16/11/2023: ERP on WTG; with involvement MRCC

There was no involvement of the 40<sup>th</sup> squadron.

Next to the overall ERP exercises, 33 smaller drills were performed, both off- and onshore, such as Man Overboard trainings, First Aid training, evacuation exercises using the Sked and Milan, ERP drills without MRCC. The objective of these smaller drills is to train as many technicians as possible in rescue techniques.

One Porex (pollution exercise) was performed on 26 & 27 June 2023, with involvement of all relevant authorities and the windfarms of C-Power and Norther (common exercise).

For 2024, 4 ERP drills are planned together with MRCC and we plan 30 smaller exercises in this year.

### *Medevac*

1 medevac from a turbine was needed in 2023 (on 30/06/23). The casualty injured his knee and was not longer able to stand; C-Power management decided to bring the person onshore to the hospital with the NH90.

### *Overnight stay on the turbine*

On 25/12/23 a team performing troubleshoot works could not be transferred in the evening due to rapidly changing weather conditions (too high sea state; too low visibility). The team stayed on the turbine and was safely brought onshore the next morning.

## **Spills**

In 2023, we had no spills in the water.

## **Harmful substances**

Register updated with new substances and existing substances replaced by others or no longer used.

## **Permit compliance procedures**

Where relevant, an overview of permit conditions and a full copy of all permits have been integrated in the contracts with third parties operating offshore. All contractors are consequently fully informed on the mandatory permit conditions. C-Power coordinates and supervises the permit conditions' compliance of the respective contractors.



All incident reports are registered and kept on C-Power's internal server; lessons learnt, and actions are shared with C-Power's staff and with the main contractors.

### **Wind Turbine data; Energy Production; Wind Turbine Availability: Confidential information**

Data regarding energy production, availability, and number of stop and maintenance hours can be found in Attachments 6.1 to 6.5. **These data are to be treated as confidential.**

## **4 ENVIRONMENTAL MONITORING ACTIVITIES**

### **Bathymetric surveys**

Bathymetric surveys of all foundations, infield cables and export cables were executed in Winter 2023 in order to monitor the burial depth of the cables, and the evolution of the morphology of the seabed around the foundations.

## **5 HEALTH, SAFETY AND ENVIRONMENT (HSE)**

Over the year, we had +/- 190 full offshore workdays (meaning full occupancy of the crew vessels); +- 183 000 person hours were performed by C-Power and all its contractors (the majority being local, Belgian companies) on maintenance, servicing, and repair (excluding major component replacements) representing over 100 FTEs. These figures are lower than the figures of 2022, mainly due to less favourable weather conditions and hence lower volume of service works performed. Nevertheless the overall number of work hours remains high and indicates the labour-intensive nature of C-Power's maintenance and operations.

In the framework of C-Power's SCHIC program (Safety Culture and Health Improvement Campaign) we organised 2 safety days, in March and in October. This program will continue in 2024 to further stimulate the safety behaviour of all personnel and all (sub)contractors active in the wind farm. This will take the form of common toolboxes, newsletters, 2 safety days (real life with mandatory attendance) and a number of workgroups with service technicians to develop specific topics.

In 2023 we had 1 LTI on the wind farm:

- On 24/08/23: during manual handling of tools and parts, a technician injured a finger.

Corrective actions were identified (investigate the use of another type of lifting bag; workshop on ergonomics on next safety day).

### **Remote Monitoring system**

C-Power has a 24-hour SCADA (Supervisory Control and Data Acquisition) surveillance system in operation. The SCADA system enables the operational management of C-Power to have a complete overview of all turbines. The SCADA data are sent to an external control room, staffed on a 24/7 basis. On each wind turbine, 2 cameras are installed at the height of the boat landings. The camera images are sent through in real time to the operational centre in Ostend and are stored for 30 days. The Offshore transformer Station is equipped with 4 HD cameras covering the whole wind farm.



## **6 ANNEXES**

### **6.1 AVAILABILITY PER PHASE ON MONTHLY BASE**

### **6.2 PRODUCTION – LOW WIND – STOPS – MAINTENANCE HOURS**

### **6.3 PRODUCTION PER MONTH PER PHASE**

### **6.4 PRODUCTION PER YEAR PER TURBINE**

### **6.5 WINDROSE**