NOBELWIND

Offshore wind energy power plant

Annual work report 2024

NBW_MUMM_2024_Annual work report

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Modification history

Subject	Author	Reviewer	Approver	Date
Draft report	O&M	FSC	MBO	10/03/2025
Final Report	O&M	FSC	MBO	12/03/2025

1. Purpose of the document

The present report gives an overview of the main activities and relevant parameters of the Nobelwind offshore windfarm for the period as from 1 January 2024 up to 31 December 2024.

2. Introduction

The Nobelwind offshore wind farm is located on the Bligh Bank, part of the Belgian Continental Shelf within the Belgian Exclusive Economic zone (Figure 1). The distance from the wind farm to the nearest point at shore (Zeebrugge) is approximately 47 km. Other wind farm data can be found in Table 1.

Table 1: Wind Farm data

Quantity	50	#
Power wind turbine	3.3	MW
Wind farm power	165	MW
Offshore HV stations	1	#
Wind farm area	19,8	Km²
Minimum seabed level depth, approx.	26	m LAT
Maximum seabed level depth, approx.	38	m LAT
Distance to the coast, approx.	47	km

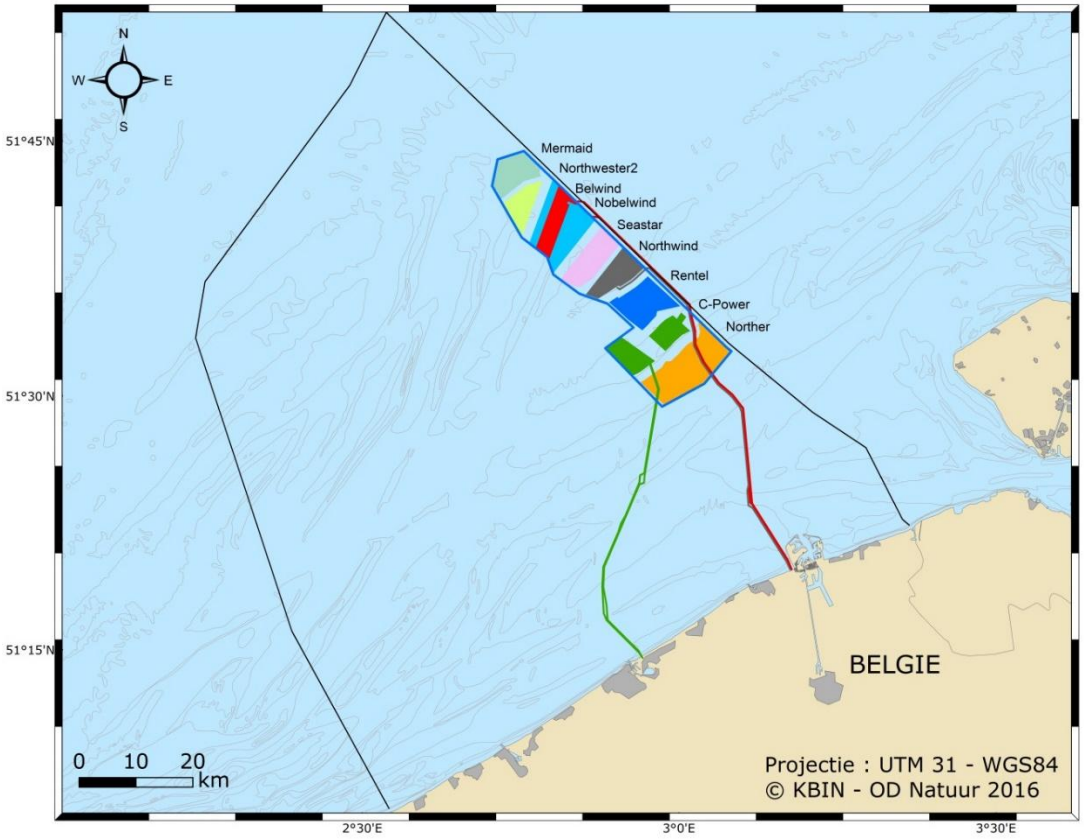

Figure 1: Location offshore wind farm Nobelwind

3. Project overview

The Bligh Bank offshore wind park zone is the initially Belwind concession zone, which has been split up into two separate concessions namely the Belwind and Nobelwind concession (Figure 2). In line with the Royal Decrees of 20 December 2000 (Domain concession), 12 March 2002 (Sea-cable permit) and 07 September 2003 (Marine environmental permit), the partial split of these initial permits has been applied for by Belwind and Nobelwind. Nobelwind obtained in 2015 the necessary authorization for its realization.

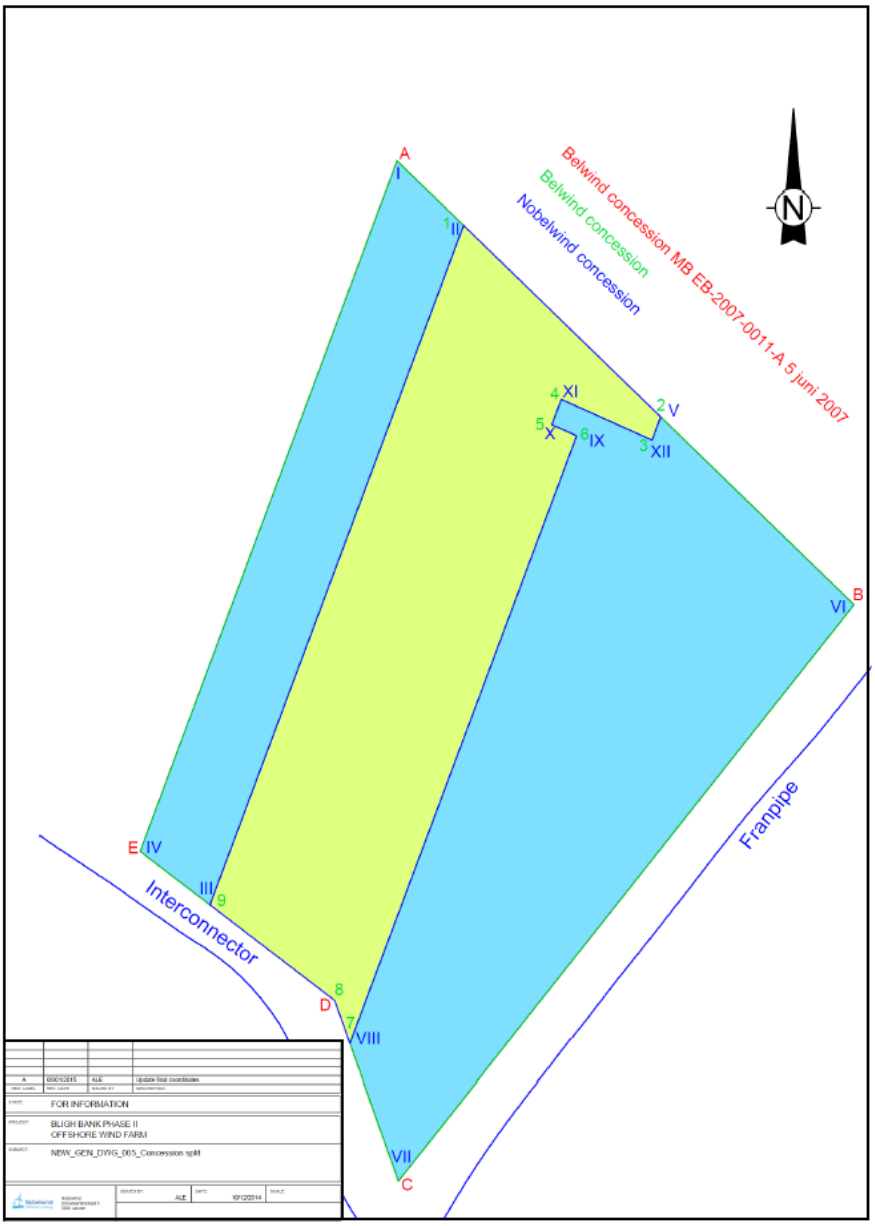

Figure 2: Domain concessions Belwind and Nobelwind

Nobelwind consists of 50 WTG's, type Vestas V112 3.3 MW, total of 165 MW and one Offshore High Voltage Station (OHVS) (Figure 3). Via a local grid (33kV) the wind turbines are connected to this OHVS. Further, a 220kV interconnector cable connects this OHVS with the Northwind OHVS. Energy is transported to land via the existing 220kV export cable, installed during the construction of the Northwind project, but the cable owner is now Cableco CVBA. Construction of the Nobelwind project started in 2016. The first energy has been produced since January 2017 and Nobelwind in full production as of May 2017.

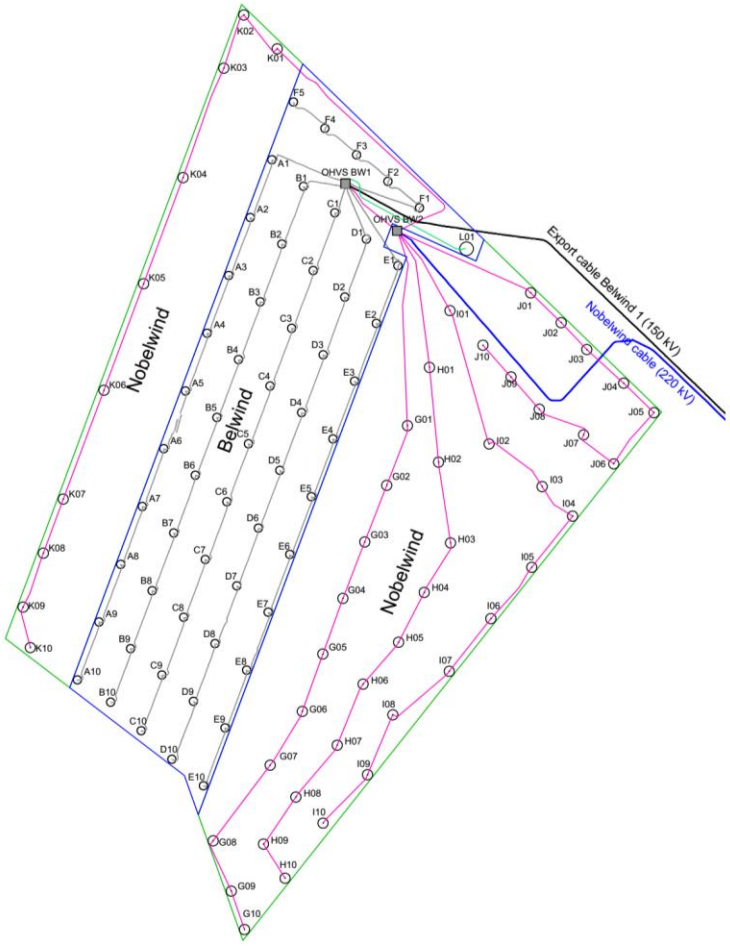

Figure 3: Locations of the Nobelwind and Belwind wind turbines and the grid connection

4. Wind farm annual operations information

4.1. Performance of the wind farm

The total energy produced for the Nobelwind wind farm in 2024 was 574,83 GWh.

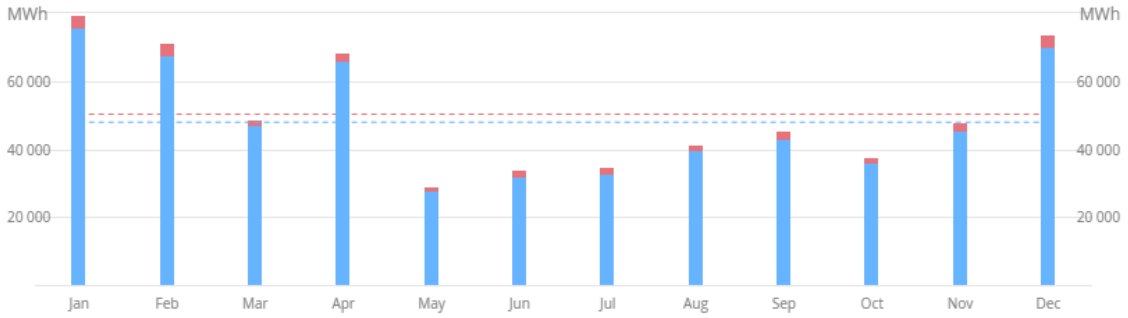

Figure 4: Monthly production V112 2024

4.2. Wind rose

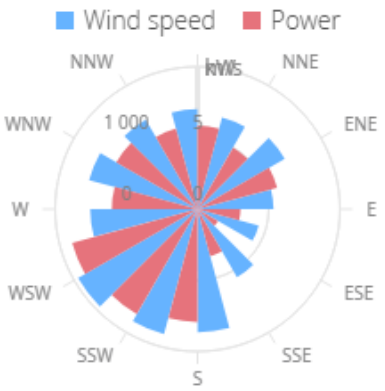

Figure 5: Wind Rose 2024

The displayed wind rose is a graphical representation of the wind speed and direction measured all over the wind park. The wind speed is calculated as an average for all turbines. For all wind speed categories, the wind direction WSW prevails.

4.3. Planned Maintenance

Vestas, the service contractor for the Nobelwind **WTG's**, performed the following planned maintenance and inspections in 2024:

- Vestas completed the 7-yearly service (May till May) on time and started the 8-yearly service as of September 2024. The counter end of December is on 14/50, which is on the planned target.
- Yearly Statutory inspections: 50/50 WTG's completed;
- HV inspections: all WTGs have been inspected;
- GPC inspections were performed on all WTGs along the HV inspections.
- Drone inspections performed in May and June and blade repairs executed during the summer period of 2024.

On the **electrical installation**, the following tasks have been performed for 2024 as part of the routine maintenance:

- Yearly mandatory statutory inspections of high voltage installation: this inspection was carried out by supplier according to legal criteria and no major observations were made;
- Yearly mandatory statutory inspections of all lifting equipment by supplier: all secondary equipment, cables, chains, slings, hooks and the cranes mechanisms are inspected to see if any aging or damage has occurred to the equipment. An exception has been successfully obtained since 2020 to go from a 3-monthly inspection to a yearly inspection as all lifting equipment is rarely used;
- Yearly maintenance of all equipment by Parkwind: the maintenance focuses on visual inspection, cleaning and functional testing of low voltage systems and components;
- Yearly inspection and maintenance of the fire detection system by supplier: this maintenance campaign focuses on testing of the fire detection equipment and fire control cabinet functions;
- Yearly inspection and maintenance of the firefighting by supplier: this maintenance campaign focuses on the firefighting equipment, e.g. pressure on the firefighting gas and portable fire bottles and test of the release valves and activation push buttons;
- Yearly inspection of First Aid kits;
- 3-monthly maintenances to all SCADA systems and IT infrastructure by Parkwind and supplier: during the SCADA and IT maintenance all equipment is tested and some performance and connectivity tests are performed;
- Yearly maintenance of HVAC installation by supplier: check of filters, functional tests of all valves & sensors, inspection of coolers and cleaning of the heat exchange condensers is performed;
- Yearly inspection of diesel fuel system by Parkwind: general inspection of the diesel generator, pumps and valves are focused during this yearly maintenance. Also, the diesel tank and its leak detection is checked;

- Generator maintenance and load test have been done on a 6-monthly basis to ensure the correct working;
- Yearly inspection of life saving equipment (life jackets and immersion suits) by supplier;
- Yearly inspection life raft by supplier;
- Regularly high and medium voltage equipment checks by Parkwind
- Small preventive maintenance has been done (e.g.: changing defect light bulbs, …);
- Preventive paint repairs have been performed to avoid excessive corrosion;
- Onshore: Yearly HVAC maintenance has been performed by supplier.

On the **foundations**, the following tasks have been performed in 2024 as part of the routine maintenance:

- Inspection, maintenance and recertification of the fall arrest systems: the complete fall arrest system is inspected and recertified by qualified technicians. If any system is non-compliant it gets replaced as soon as possible;
- Cathodic protection: the cathodic protection needs to prevent/limit the corrosion on the primary and secondary submerged steel. The protection level is continuously monitored through the ICCP SCADA system. The status of the system determines whether offshore interventions are required to control, repair or check the system;
- Survey of interconnector and inter-array cables: this multibeam survey takes a snapshot of the sea bottom condition and the results are used to determine the depth of burial of the cable assets;
- ROV inspection of outer submerged foundation to evaluate the marine growth and presence of ropes, fishing nets, rocks or other debris;
- Smart foundation monitoring: the WTG's K05, G08 and G10 are equipped with several sensors in order to monitor mainly acceleration, inclination and loads..
- MP-TP bolted connection: the bolted connection needs to be checked to assure the bolts are tightened to the correct tension, the flange is air-tight, and the bolts are not corroding;
- Frequency monitoring: this monitoring is performed on 20% of the foundations. During half an hour the natural frequencies are measured by accelerometers. These results are analyzed and compared against design frequencies and excitation frequencies caused by blades. This is to monitor that natural frequencies are in a safe zone where there is no chance of resonance.
- Nobelwind has stepped into a cable repair framework managed by Parkwind, called Safe Link project. The Safe Link project will ensure that in case of a cable failure, the repair works will be executed within reasonable time to minimize the loss of electricity production, reduce idle time of WTG's and reenergize the cable as soon as possible. To be able to cope with a quick repair, following actions are defined and active:
    - Carry out preparedness services = be prepared to mobilize personnel and marine spread + equipment within agreed response time and prepared to carry out the repair works.

- Carry out repair works on the Nobelwind export cable and Inter Array Cables.
- Carry out the spare parts management.

The Safe Link project framework agreement started in September ’21 and extends until April ’27.

5. Environmental Research

The MUMM coordinated all the foreseen standard environmental monitoring activities in the field. In collaboration with scientific organizations, some dedicated programs were also started-up and further executed by the MUMM whereby Nobelwind cooperates where relevant (e.g. fish track sampling).

6. Permit conditions

In compliance with the authorization for the construction and a license for the operation of a wind farm on the Bligh Bank in the Belgian sea areas article, we give an overview of the environmental permit conditions as mentioned in Schedule 1 of the authorization for the construction and a license for the operation of a wind farm (see Table 2).

Table 2: Permit conditions overview

Condition Number	Condition Summary	Current Status
2	Each planned modification must be reported to the Board and will be included in the annual work report.	No modifications to be reported in 2024.
4	The holder undertakes to find and recover all floating or sunken objects used for its activities which, for any reason, have ended up in the sea during the construction, operation or dismantling stages.	All dropped objects related to Nobelwind offshore activities are recorded in the online reporting tool, the SOS system, and reported on a quarter basis.
14	During construction, all foundations and structures already finished must have a temporary warning light (at the highest point) for shipping and aviation traffic.	No new foundations installed in 2024.
15	The holder must set up the necessary safety systems to assure the signalling of the wind farm and structures at all times.	Since 14 July 2017 all navigation and aviation signalisation are fully operational and monitored.
16	All WTG’s must be numbered individually at the base of the mast and at the top of the nacelle.	The foundation and the WTGs have been numbered in accordance with the requirements of this condition.
17	All WTGs and transformers must be provided with collection receptacles to prevent liquids from being released in the environment.	The design of the WTG is such that in case of leakage in the nacelle, all fluids are collected in the central part of the nacelle. From here, collection receptacles are installed under the oil pumps and hydraulic systems as standard.

Condition Number	Condition Summary	Current Status
20	During the operation stage, the availability must be facilitated of a specially equipped intervention vessel (or combination of vessels) for assignments concerning the prevention of shipping traffic accidents and cleaning up sea pollution around and in the wind farm	An agreement was signed with Federal authority responsible for the marine environment.
21	Once or twice a year, the holder must take part in simulated nautical accidents, emergency towing exercises and pollution combating exercises.	On a regular base Nobelwind MVOW execute internal emergency exercises (see 8.2.3 of this report).
24	Before laying protective mattresses or other artificial erosion protection on the seabed, the holder must verify and certify that all components chosen can be used without any danger of leaching into the marine environment. The composition of the erosion protection must be presented to the Board for approval. The use of monoliths and slag is hereby prohibited.	No new construction material to be approved in 2024.
29.1	The construction materials and rip-rap must be made of natural materials and must not contain any waste materials or a secondary raw material… the use of slag is prohibited.	No new construction material to be approved in 2024.
31.2	Pile driving activity between 1 January and 30 April will be subject to additional, special monitoring in the amount of EUR 50,000 at most, which is not included in the estimated budget and is completely at the expense of the holder	No piling activities have been performed in 2024.
33.1	The lighting of the turbines for the benefit of shipping and aviation traffic must comply with the conditions set by the competent authorities.	Lights are installed according to the Navigational Aids Plan and have been fully operational in the O&M reporting period. Since Nobelwind is built around Belwind, the Navigational Aids Plan of Belwind has been changed into a Navigational Aids Plan of the Bligh Bank, considering the whole zone of Belwind and Nobelwind as one zone.
33.2	Foghorns, which come into operation automatically in the event of a meteorological visibility of less than 2 sea miles, must be placed on the corner turbines.	Fog horns are installed according to the Navigational Aids plan and have been fully operational in the O&M reporting period.
34	The holder must maintain the farm on a regular basis.	All installations are maintained on a regular basis.
35.4	The covering of the cables must be assured at all times. If the annual monitoring shows that the cable is exposed, the necessary work must be done in the shortest possible time, three months at most, so that the cable can be placed at its original depth.	Annual cable burial depth surveys are executed during the operational phase. Based on the result of the cable risk analysis (Cable Risk Management), a reburial campaign will be set up.

Condition Number	Condition Summary	Current Status
48	A logbook must be kept in which the following is specified for each turbine: ➢ Date, time and all relevant data of incidents that occur which have an impact of the environment, stating the measures taken; and ➢ The recording of hazardous waste materials, the date of removal of the relevant batch of waste, the quantity and the name of the carrier and the recognised waste processor must also be recorded.	We confirm that logbooks have been kept for all turbines since start-up of the first WTG and this has continued during operation.

7. Health, Safety, Security and environment

7.1. Unwanted events over the reporting period

No unwanted events (with LTI) happened during the reporting period.

7.2. Proactive safety initiatives

In 2024, alongside the Parkwind ISO 9001 and ISO 27001 certifications, the Parkwind HSE Management System was awarded ISO 14001 and ISO 45001 certification, further demonstrating our commitment to excellence in environmental and occupational health and safety management.

In alignment with Parkwind's ISO 45001 and ISO 14001 certification commitments, relevant HSSE procedures and risk assessments were thoroughly reviewed, revised, and, where necessary, newly developed and implemented. All updated HSSE procedures and risk assessments have been integrated into the online Document Management System, ensuring efficient and timely revisions through established revision frequencies, along with defined review and approval workflows.

In line with our commitments to ISO 45001 and ISO 14001 certification, the RedOnline tool was introduced to facilitate the monitoring and documentation of legal compliance. This tool houses our legal registers, enabling comprehensive compliance assessments. Additionally, it provides timely notifications of legislative changes and allows for continuous evaluation of our compliance status.

In line with previous years' efforts to sustain the positive HSSE performance of our Operations & Maintenance (O&M) teams and to further establish and reinforce a genuine HSSE culture, the company has continued to implement a KPI across all O&M teams. In 2023, the HSSE department introduced a new tool for managing Safety Data Sheets (SDS), called EcoOnline, which provides quick and remote access to SDS, facilitates the creation of specific risk assessments, and more.

To populate the system with relevant chemical data and ensure proper employee training and awareness, in 2024 a KPI was established focused on the assessment and registration of all chemicals pertinent to the teams' work scope. Additionally, teams were required to develop risk assessments for each chemical, considering potential hazards and risks associated with their use. This process enables prompt identification of substitution needs, the implementation of necessary control measures, and other safety actions. The KPI was tracked and reported on a monthly basis to ensure consistent monitoring and follow-up.

In collaboration with our external prevention service provider, voluntary medical/vitality checks were organized for our office personnel. While not legally required, we recognize the importance of prioritizing employee health and intend to continue offering these voluntary health checks on a periodic basis.

In 2024, also in collaboration with our external prevention service provider, we introduced the Employee Assistance Program (EAP). Available 24/7, the EAP offers confidential, cost-free support to all employees and their residential family members, addressing both work-related and personal challenges. The program is designed to provide support in case of intense work or non-work-related experiences, assist with managing everyday life challenges, as well as providing support for individuals dealing with issues related to substance use.

7.2.1. Emergency exercises

Overview emergency exercises 2024	
OSS	19/02/2024: Parkwind emergency exercise: Fall from cable deck ladder
WTG	15/11/2024: Parkwind emergency exercise: Fall from TP platform 04/08/2024: Emergency exercise: Walking Casualty Nacelle to TP J08 04/08/2024: Emergency exercise: Walking Casualty Nacelle to TP G02 08/08/2024: Emergency exercise: Walking Casualty Nacelle to TP H10 28/08/2024: Emergency exercise: Nacelle to TP G02 28/08/2024: Emergency exercise: Nacelle to TP J09 28/08/2024: Spill Containment: G02 28/08/2024: Spill Containment: J09 25/09/2024: Emergency exercise: Nacelle to TP J01 04/10/2024: Emergency exercise: Nacelle to TP I07 30/10/2024: Emergency exercise: Nacelle to TP K05
Desktop drills	05/05/2024: Desktop Emergency Exercise: SOV 16/07/2024: Desktop Emergency Exercise 21/08/2024: ERP Desktop drill SOV Mercator 31/08/2024: ERP Desktop drill SOV Mercator 02/10/2024: ERP Desktop drill SOV Mercator 27/11/2024: ERP Desktop drill SOV Mercator
Vessel	24/04/2024: MOB Drill 15/06/2024: Fire Drill 15/06/2024: MOB Drill 23/07/2024: Report Fire drill Esvagt Mercator 01/08/2024: Report Man Overboard Drill Esvagt Mercator 20/08/2024: Report Fire drill Esvagt Mercator

Table 3: Emergy exercises

It has been agreed that, to ensure a higher level of safety, environmental protection and security, the knowledge and participation gained from exercises conducted within the larger area of offshore wind, shall be shared amongst the several Windfarm owners via the HSSE BOP.

7.2.2. Emergency actions (TIER2)

In 2024, no Tier 2 situations were reported.

7.2.3. Intrusions

In 2024, 2 third party / Tier-classified intrusions were reported in the Nobelwind concession:

As most of the intrusions were related to activities of neighbouring windfarms and only included small crossings of the safety zone (Proximity Agreement), these intrusions were managed between Nobelwind Marine Coordinator and the Marine Coordinators of the applicable neighbouring wind parks. Thus, these intrusions were not reported towards the Authorities, using the MRCC intrusion template.

All intrusions are logged in the SOS system and are during the periodic Supervisory Committee meetings communicated to the Authorities. In case of intrusions by civilians (e.g. fishing boats) the MRCC template is used to report towards the Authorities; considered a TIER situation.

7.3. Vessel & accessibility

For maintenance on the turbines the Esvagt Mercator is used as hotel/mother ship. Small crew transfer crafts, FRC's, are being used for transfer of personal, tools and equipment on the wind turbines, as well as for maintenance on the OHVS and the foundations, for delivery of parts and equipment to the wind farm and for carrying out surveys and measurement campaigns.

For the maintenance of the OHVS and the foundations secondary steel Parkwind uses CTV`s starting from shore per the vessel pooling agreement.

When required specific Work Vessels can be added to the logistics mix for specific tasks such as surveys, ROV works, Cable or scour repair actions or Major component exchange.

7.4. O&M office Parkwind

O&M team offices are located in the harbor of Ostend: Esplanadestraat 10B, 8400 Oostende.

8. Conclusion and outlook

No major HSSE incidents were recorded. All HSSE incidents and observations are well followed-up on and all tasks as mentioned under the operational permits are well managed.

We foresee a further rolling out of the HSSE master plan in 2024 supported by the Parkwind HSSE team.

Nobelwind, managed by the Parkwind organization, will keep striving for innovation in terms of maintenance procedures, preventive actions, O&M inspection tools, etc. as it has been doing in the

past. Next to the standard maintenance, we are confident that any concern can be tackled adequately and preferably in a proactive matter.