

Chapter 2. A brief introduction to offshore wind farms in the Belgian part of the North Sea

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Photo Jan Haelters / RBINS

2.1. Context

The European directive 2001/77/EG presently enforces each member state a target figure of the contribution of the production of electricity from renewable energy sources that should be achieved in 2010. For Belgium, this target figure is 6 % of the total energy consumption. Offshore wind farms in the Belgian part of the North Sea can contribute to achieve that goal.

With the Royal Decree of 17 May 2004 a zone in the Belgian part of the North Sea was assigned for the production of electricity. Since then two companies, C-Power and Belwind, were granted a permit to build and exploit a wind farm on the Thorntonbank and the Bligh Bank, respectively. C-Power will build a wind farm of 60 turbines with a total capacity of 300 MW. Belwind will start in 2009 with the construction of 110 turbines that have a total capacity of 330 MW. A third company, Eldepasco, started this year with the environmental permit procedure.

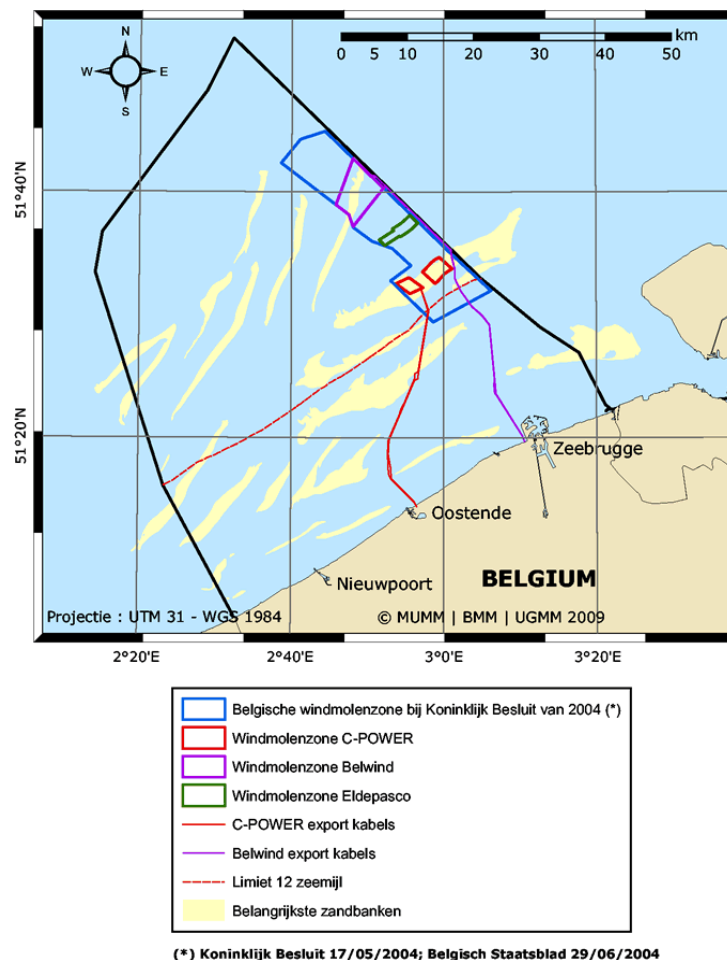


Figure 1. Zone assigned for the production of electricity by the Royal Decree of 17 May 2004.

The permit includes a monitoring programme to assess the impact of the project on the marine environment. The monitoring has two goals:

- the ability to mitigate or even halt the activities in case of extreme damage to the marine ecosystem;
- to understand the impact of offshore wind farms on the different aspects of the marine environment and consequently support the future policy regarding offshore wind farms.

2.2. Monitoring programme

The monitoring programme studies physical, biological and economical-social aspects of the marine environment. MUMM coordinates the monitoring and specifically covers underwater noise, hard substrate epifauna and fish (the latter in collaboration with Ghent University), radar detection of seabirds, marine mammals and hydrodynamics. MUMM further collaborates with different institutions to complete its expertise in the following domains: INBO (seabirds), ILVO (soft substrate epibenthos and fish), the Marine Biology Section of Ghent University (soft substrate macrobenthos), Renard Centre of Marine Geology of Ghent University (underwater noise). In some cases MUMM decided that the project developers are better placed to conduct some aspects of the monitoring.

For each of these ecosystem features, except for those related to hard substrates, the baseline situation of the Thorntonbank, alongside two reference sites, was described in 2005 (De Maersschalk *et al.*, 2006; Vanermen *et al.*, 2006; Henriet *et al.*, 2006). In 2008, the same was done for the Bligh Bank and the ecological impact assessment of the C-power project phase 1 (first six turbines) started. Furthermore, preliminary work for a landscape study and a study of flying birds with a specially designed radar system was executed.

In 2008 C-Power realized the phase I of its project, this means that 6 turbines were put in place. Because pile driving seemed to be impossible on the Thorntonbank, C-Power decided to build gravity based foundations (GBF). This is a hollow, concrete structure (Figure 2) that is filled with sand once it is placed on the seabed. Due to its weight, it remains stable. Before the GBF can be placed the seabed needs to be prepared. A foundation pit is dredged to remove the loose sand and to create a flat surface on dense sand. A foundation gravel layer (1 m) is placed in the foundation pit and then the GBF can be lowered on the exact location. The 6 GBF were set in place on the following dates: D1: 27/4; D2: 8/5; D3: 22/5; D4: 24/5; D5: 30/5 and D6: 29/5.



Figure 2. Transport of the first GBF from the port of Ostend to the Thorntonbank (Photo R. Brabant/RBINS).

After a GBF is put in place the foundation pit is backfilled with soft sediment and the GBF is filled with sand (infill). Finally, a scour protection is put around each GBF. This is a layer of stones that should prevent the erosion of the soft sediment.

In 2008, six turbines (RePower, 5MW) were placed on the GBF's. At the time of writing, all six of them are delivering power.

2.3. References

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