



Agentur für Wirtschaftsförderung Cuxhaven

Analysis and evaluation of the seaport of Cuxhaven as base port for the dismantling of offshore wind farms

Business Essential

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Timon Querfeld

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1 Introduction

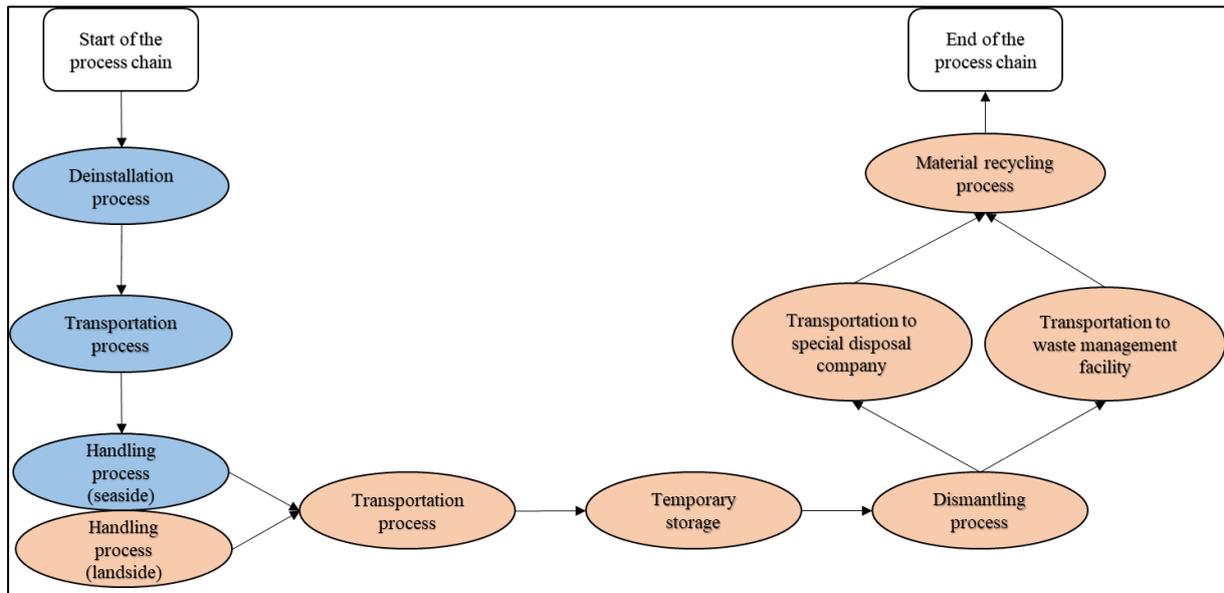
Germany is attempting energy transformation. In its climate protection goal, the Federal Government counterplan to degrade greenhouse gases by 80 to 95 percent by 2050 (see BMU 2016). The decision to phase out nuclear power in 2022 (see Federal Government 2011) and also the decision to phase out coal-fired power in 2038 (see Federal Government 2020) provides an assumption in this regard. These are required steps, particularly with regard to the German climate protection policy. The "Climate Protection 2020" action programme line up to enlarge renewable energies. One of the Federal Government's major ambition is to reduce the greenhouse gases caused by Germany and to nourish the supply of electricity from renewable energies. According to the Federal Ministry of Economics and Energy, wind energy presently has the potential to be a crucial building block in the expansion of renewable energy architecture (cf. BMWI). Consequently, the German government is having in view to balloon the total capacity of offshore wind farms (OWF) from 15 gigawatts (GW) to 20 GW (cf. Bundesregierung - Drucksache 2020: 1). One thing has to take into account: offshore wind turbines are not manufactured to last forever. Weather influences and technical senescence of the components breed wear and tear of the offshore wind turbines. This complex process will have to be pulled off in parallel with the installation of new offshore wind turbines. That is meant to say, as the service life of the offshore wind turbines pump up, there will be an interplay between erection and decommissioning in order to amplify rather than disrate the number of WTGs at sea. How is this necessary dismantling to be implemented once the offshore wind turbine has reached the end of its service life?

Ports impersonate a major function in this area. Harbours not only play the role of a base port when OWFs are erected, but also when they are dismantled. As in the construction of OWFs, the dismantling process involves the same heavy components. Those components are mostly oversized and not easy to handle with. Depending on the operational implementation of the dismantling phase and the substance of the components, the dismantling of OWFs places demands on base ports. On this tribune, which primarily only knows dimensions of over-width and thousands of tons, suitable port areas are a meaningful indication for the realization of the dismantling, but also an expressive answer of the respective port, which wants to act as a base port of dismantling OWFs.

2 Dismantling processes

First and foremost, a process chain illustrates the decommissioning processes of OWFs in figure 1. This process chain adopt that the dismantled components are recycled and not resold as a whole. The blue background of the circles shows the sea-side processes and orange the land-side processes.

Figure 1: Sea- and landside decommissioning process chain of offshore wind farms

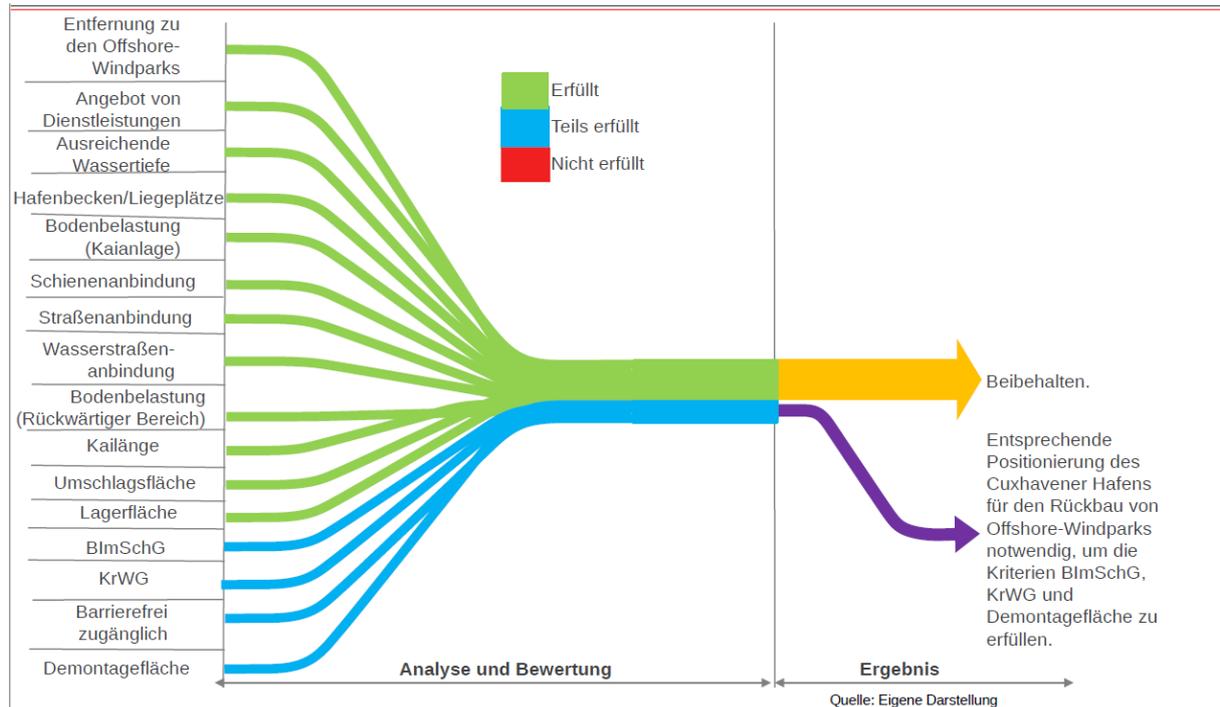


The process chain starts with the uninstallation process. That is to say, that the offshore wind turbine is dismantled. The uninstallation process has diverse scenarios. Whatever the case may be, it can be assumed that the offshore wind turbine is dismantled from above, starting with the rotor blades, down to the foundation structure. Afterwards, the uninstalled components must be carried to a harbour by vessel or pontoon. When the seaward transport unit arrives the respective port, handling is performed either by the vessel itself, which has own on-board cranes, or by capable port cranes. The transferred components must then be transported away from the quay to the rear port area. Furthermore, it may well be required to store the dismantled components temporarily before they are dismantled or shredded for further transport. The further transport to the waste management companies or to the special waste management companies can be execute using different modes of transport: by inland waterway, rail or truck. Nevertheless, the choice of the specific mode of transport depends on the accessibility and barrier-free access to the respective port and the waste management company. Material recycling marks the last process within the process chain. Decisive processes affecting the port are: the handling process, the transport process, the intermediate storage and the dismantling process. However, these mentioned processes can be performed in a matching port, but do not have to be done there. For example, the dismantled components can also be transhipped away in one piece. This depends on the planning of the decommissioning processes, but also on certain criteria that a port can or cannot meet.

3 Analysis and evaluation of the seaport of Cuxhaven

With regard to the dismantling of OWFs, the Cuxhaven seaport was analysed and evaluated according to specific criteria. These criteria involve legal, infrastructural, nautical and existing services. The result can be seen in the following figure 2.

Figure 2: Analysis and evaluation of the seaport of Cuxhaven



Of these 16 criteria, 12 are fulfilled. Four of these criteria are partially fulfilled. Overall, the seaport of Cuxhaven thus fulfilled most of the criteria. Three of the four criteria, which have been classified as partially met, can be fulfilled, by positioning the seaport of Cuxhaven as a baseport of decommissioning of OWFs. Especially the satisfactory location, large areas in the port area and the existing “Deutsches Offshore-Industrie-Zentrum” (DOIZ) offer excellent conditions, which are important for a base port that would like to offer itself for the dismantling of OWFs. The seaport of Cuxhaven demonstrated that it can be harness for the handling of offshore wind turbines, because of the function of a baseport of the installation of offshore wind turbines. However, dismantling is not the same as the installation of offshore wind turbines. Nevertheless, the seaport Cuxhaven is a port with suitable conditions for the dismantling of OWFs as a base port if it presents itself with an appropriate positioning.

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