

POWER Offshore Wind Supply Chain Study for Germany

Executive Summary



A Report to the German partners in the POWER project: The Senator for Construction, Environment and Transport of Bremen; Wirtschaftsförderungsgesellschaft Nordfriesland mbH; Investitions und Förderbank Niedersachsen GmbH – NBank; WAB e.V.

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EXECUTIVE SUMMARY & CONCLUSIONS

In its offshore wind power strategy the German Federal Government targets the installation of offshore wind farms with a capacity of 3.000 MW until 2010. Until 2030 25.000 MW offshore wind power plants (WEA) could be installed which could supply 15% of the current German electricity demand. This results in an expected total investment volume of about 45 billion Euro for the German economy. Wind farm developers (as a driving force) and potential investors pursue the offshore planning and approval procedures.

German offshore development differs significantly from the progress in other countries. The German development demands installing large offshore turbines and farms at a depth of 20 – 40 meters and far away from the coast. Due to the offshore grid connection and installation as well as due to complex foundation structures at the larger water depths, the economic efficiency of these farms can only be assured with turbines of the 3-5 Megawatt (MW) class.

29 farms in the Exclusive Economic Zone (EEZ) and further projects in the 12 nautical mile zone are planned mainly by medium-sized companies. 10 wind farms with a total of 560 3-5 MW turbines have been licensed by Federal Authority for Shipping and Hydrography (BSH) thus far.

	Number of turbines <4 MW	Number of turbines >4MW
Pilot Phase	292	1,193
Expansion Phases	618	4,399

Table 1: Number of planned turbines in pilot and expansion phases

292 turbines (<4 MW) and 1,193 (>4 MW) turbines are planned to be installed in already approved wind farms, a total of 1,485 turbines within the pilot phase, 618 (<4 MW) and 4,399 (>4 MW) turbines during the later stages.

1. Capabilities of local business

Scenario II (>4 MW) is a challenge to the German offshore development. The regional turbine manufacturers are world-wide technology leaders in development of the 5 MW-class wind turbines as well as the developers of the foundations for such foundations. The regional scope of this study is limited to the federal states of Bremen, Lower-Saxony and Schleswig-Holstein.

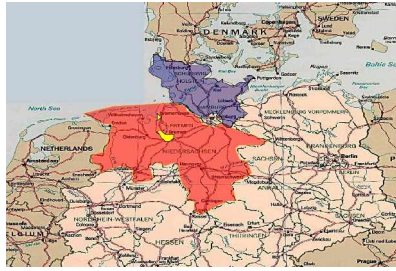


Figure 1: Regional scope of study: Lower-Saxony, Bremen, Schleswig-Holstein

506 companies have been identified with own activities and/or capabilities in the offshore wind energy supply chain. 125 of them located in Bremen/Bremerhaven, 177 in Lower Saxony, 115 in Schleswig Holstein and 81 in Hamburg

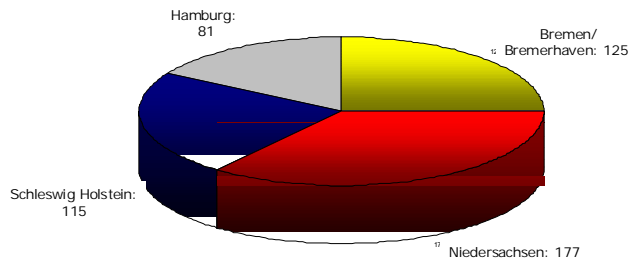


Figure 2: Number of categorized companies in each federal state

The companies were analysed according to a business category system and have shown a total of 1,200 fields of business activities related to the wind energy industry. Also more than 300 enterprises develop over 1,000 business fields related to the offshore industry.

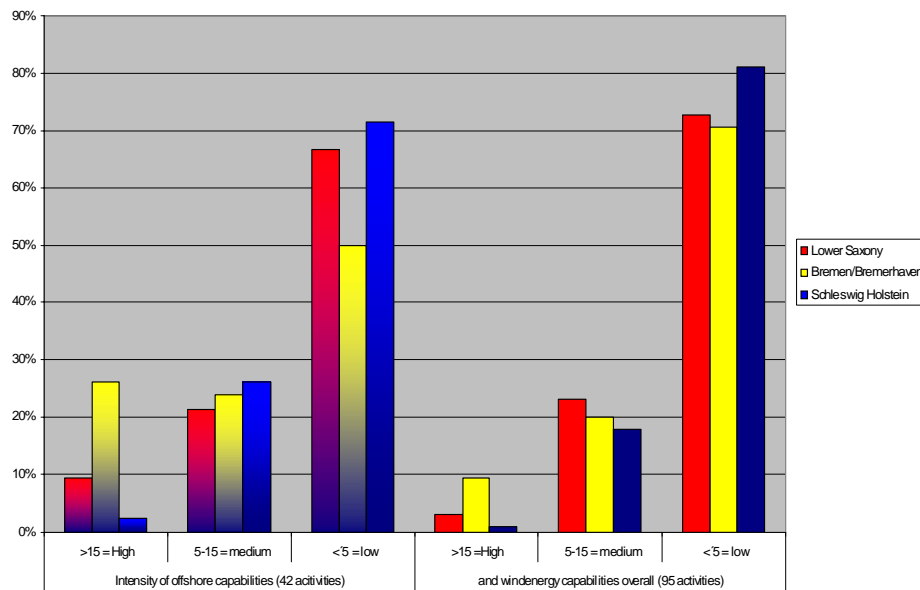


Figure 3: Number of capabilities in relevant offshore wind business fields

In the Federal State of Bremen 50 % of the relevant business fields for offshore wind development are present with a medium to high capability available in the local industry. In Schleswig-Holstein a medium to high capability is available in 28 % of the relevant fields. In Lower-Saxony this is valid for 30% of all relevant fields.

Furthermore the maritime economy - such as shipyard industry, steel industry, harbour and logistic service providers, offshore and water engineering - could develop an integral part of the wind energy industry by developing their business profile for offshore wind power.

2. Bottlenecks and Challenges

The implementation of a first offshore project is an essential precondition for the further development of added value in the regions concerned - and respectively in Germany as a whole.

Substantial bottleneck factors have been analysed in interviews that were conducted in the course of this study with 30 companies:

- financing and insurability
- cable licenses
- securing the large quantity of steel. Approx. 650,000 t. steel must be supplied in order to build 642 turbines within 3-4 years
- on-time availability of submarine cable

Furthermore, a successful market development demands concerted efforts to reduce market barriers such as:

- lengthy and cost-intensive licensing procedures
- planning risks, e.g. development of the grid infrastructure
- lack of onshore and nearshore sites for prototype testing of 5 MW wind turbines
- permit procedures for the cable routes for the first pilot projects
- current lack of traffic and port infrastructure regarding the scenario with turbines larger than 4 MW

To realize the potentially large regional creation of added value and employment the support through a coordinated national action plan is needed.

3. Economic relevance

Very different future developments of the regional wind energy supply chains are possible, depending on the local success in further establishment of the wind energy supply chains. Investigations have been carried out according to three scenarios:

Best case	<ul style="list-style-type: none"> •1 high added value in the region •2 production and installation of the main modules in the region •3 production and shipping by a harbour from the region •4 supply from a harbour in the region •5 procurement from at least C-parts from the region.
Business as usual	expected added value in the region
Worst case	supply and maintenance of the construction site coming from abroad

The analysis differentiates between two basic scenarios, which consider the implementation of wind turbines sizes up to 3.9 MW (scenario I) and above 4 MW (scenario II).

Bremen and Lower-Saxony

A substantial volume of annual gross value added can be realized only during the first few years of pilot installations in Bremen and Lower Saxony in Scenario I (<4 MW turbines). This volume would peak at 29.5 Million Euro in 2010. Due to the rising share of O&M activities the volume would again increase between 2016 and 2030. In Scenario II (>4 MW turbines) very substantial volumes of gross value added can be realised in "best case-" and "business as usual"-Scenario. This volume could reach up to 490 million Euro in 2030. In the worst case scenario, when large part of the value creation chain would lie elsewhere, only a very small volume of gross value added can be realized regionally. In Scenario I a significant volume of jobs, peaking at 670 person years per year in 2010, can be realized. A very substantial number of jobs can be realized in the "Best case" with up to 11,500 person years in 2030

It is quite clear that it is very important for Lower Saxony and Bremen to further strengthen the current wind turbine production capacity. In such case almost 40% of the total value added of the entire German production could be attracted to the two federal states.

Schleswig-Holstein

In Schleswig-Holstein, similar to Bremen and Lower-Saxony, a substantial volume of gross value added can be reached only during the first few years of pilot installations in scenario I (<4MW). This volume could peak at 26.3 Million Euro in 2010. The volume would again increase from 2016 to 2030 due to the rising share of O&M activities. In Scenario II (>4MW) very substantial volumes of gross value added can be realised. The volume could reach up to 285 million Euro in 2030. In Scenario I a substantial volume of jobs, with a maximum of 616 person years per year in 2010, can be expected. A very substantial number of jobs can be realized in sub scenario "best case" and "business as usual", with up to 6,900 person years in 2030.

For the state of Schleswig-Holstein it is absolutely necessary to hold all its wind turbine manufacturing in the state. Additionally the federal state should target to attract major component manufacturers presently not located in the state. A strategy to develop the offshore wind energy value chain can lead to a substantial share of almost 35% of the entire German gross value added through the offshore development in the German part of the North Sea.

4. Conclusions and Recommendations

1. The scenario with turbines larger than 4 MW is the crucial market for the German offshore development and for the creation of substantial added value in the region.
2. Concrete efforts should be made to secure the continued existence and further development of companies and to maintain the added value in these regions and in Germany.
3. Supportive political promotion and acquisition strategies have positively affected the development of the value chain in Bremen and Bremerhaven.
4. A nationally coordinated and coherent political action plan is needed for the successful offshore market development. Otherwise a substantial opportunity to create regional value added and employment could be missed.
5. The development of a concerted political action plan for the already planned and licensed offshore projects, could be an important support for the installation of the first offshore wind farms. Such a political action plan should take into account the relevant public institutions and private enterprises.
6. The political action plan should define the necessary procedures, milestones, time-schedule and responsibilities, to ensure that a substantial value creation in the regions can be secured.