

Internationale Stiftung für Seerecht

Maritime Talks 2008

Offshore Wind Energy -Good for our climate, bad for our seas?-

March 14th, 2008

International Tribunal for the Law of the Sea (ITLOS), Hamburg

The fifth annual Maritime Talks of the International Foundation for the Law of the Sea (IFLOS) took place at the International Tribunal for the Law of the Sea (ITLOS). The subject of the talks was “Offshore Wind Energy – Good for our climate, bad for our seas?” Several speakers from political institutions, industry and environmental groups focused their presentations on the various facets of offshore wind technology and participated in controversial discussions following the presentations.

Background

The constantly increasing consumption of worldwide energy is supposedly responsible for various natural disasters. These natural disasters are probably caused by anthropogenic CO₂ emissions mainly originating from the energy sector.¹ Hence, new technologies are required to prevent CO₂ emissions while providing a reliable and secure energy supply for the future.

Offshore wind energy is such a technology; it is capable of reducing greenhouse gas emissions significantly. Therefore, Germany has decided to increase its proportion of wind power up to 25% of the overall energy generation by 2030.² This target requires 20,000-25,000 MW of new offshore energy, which leads to investments of 40 billion Euros nationwide³ and 650 billion Euros within Europe.⁴

¹ *European Wind Energy Association*, Delivering Offshore Wind Power in Europe, Brussels 2007, p. 5, http://www.ewea.org/fileadmin/ewea_documents/images/publications/offshore_report/ewea-offshore_report.pdf (as of April 4th, 2008).

² The 40 GW installed wind energy capacity, that was installed in Europe in 2007, saves i.e. 105 Mt CO₂ (*Federal Ministry for the Environment*, Entwicklung der Offshore-Windenergienutzung in Deutschland, Berlin 2007, p. 4 seq., source: http://www.erneuerbare-energien.de/files/pdfs/allgemein/application/pdf/offshore_wind_deployment_de_en.pdf (as of April 4th, 2008).

³ *Federal Ministry for the Environment*, BMU-Themenpapier: Windenergie, Berlin 2006, p. 11, source: http://www.bmu.de/files/pdfs/allgemein/application/pdf/themenpapier_wind.pdf (as of April 4th, 2008).

⁴ Studie: EU-Klimaziele nur mit viel Wind erreichbar, Neue Energien, 2007, issue 12, p. 11.

Nevertheless, this promising technology suffers from logistic problems, like the lack of available wind turbines or suitable construction ships,⁵ as well as ecological concerns. In this regard, adverse effects to the marine flora and fauna are to be expected. The wind power plants might reduce the natural habitat of seabirds and might cause bird deaths due to impacts with the blades. Furthermore, the sounds generated during the operation of the wind turbines and the electromagnetic fields emanating from the grid structure supposedly disturb fish and highly sensitive marine mammals. Finally, the whole installation process might adversely affect the seabed and its benthos.

This dilemma was the topic of the fifth Maritime Talks with the renowned experts *Christian Dahlke*, from the Federal Maritime and Hydrographic Agency, *Nicole Schäfer*, national expert at the European Commissions' DG Fisheries and Maritime Affairs, *Klaus Rave*, member of the executive board of the European Wind Energy Association (EWEA), *Ursula Prall*, from the Offshore Forum Windenergie, *Hans-Ulrich Rösner*, from the World Wide Fund for Nature, *Kai Schlegelmilch*, Federal Ministry for the Environment, and *Henning von Nordheim*, from the Federal Agency for Nature Conservation.

Reception and Introduction

Prof. Dr. Rüdiger Wolfrum, President of ITLOS, opened the Maritime Talks by introducing the Court's competences and its relation to offshore technology.

Afterwards, *Prof. Dr. Doris König*, from the Bucerius Law School, Hamburg, and chair of IFLOS welcomed the guests. She mentioned that the European Union, as well as various other states, plan to increase their proportion of renewable energies within their energy generation. Offshore wind energy can, on the one hand, contribute to the realization of these targets. But on the other hand, it raises doubts concerning its environmental compatibility in the marine surroundings. Thus, it is necessary to find a balance of interests. In this regard, *Prof. Dr. Doris König* pointed out that the Maritime Talks provide an ideal forum for interdisciplinary discussions.

⁵ *Arzt, Ingo; Weinhold, Nicole, Wer zuerst kommt, Neue Energien, 2007, issue 12, p. 48.*

Approval Procedure for the Construction and Operation of Installations and Research in the Field of Offshore Wind Power

The first speaker, *Christian Dahlke* from the Federal Maritime and Hydrographic Agency, concentrated on the legal and economic aspects of the German approval procedure for the installation of offshore wind turbines.

The legal basis for the erection of wind farms in the German EEZ is Art. 55 et seq. of the United Nations Convention on the Law of the Sea (UNCLOS) and the German Federal Maritime Responsibilities Act (Seeaufgabengesetz), which is implemented by the German Marine Facilities Ordinance (Seeanlagenverordnung).⁶ According to § 2 of the German Marine Facilities Ordinance, a wind farm project has to be approved unless it impairs the safety and efficiency of navigation or is hazardous to the marine environment.

Concerning the economic framework conditions, the German Government and the German Bundestag have implemented legislative reforms aimed at promoting the cost-effective use of offshore wind power in Germany. For example, the Renewable Energy Sources Act, as amended in 2004, guarantees a feed-in-tariff of currently 9.1 Eurocents/kWh. The Infrastructure Planning Acceleration Act, which came into effect in 2006, obligates network operators to provide necessary grid connections from the sea side substations to the most energy-efficient grid connection point.

The National Approval Procedure

The Federal Maritime and Hydrographic Agency is the competent authority, which decides on offshore wind farm projects in the German North and Baltic Sea regions and carries out the application procedure for wind farms in the German EEZ.

The approval procedure, according to the Marine Facilities Ordinance, consists inter alia of several consultation rounds,⁷ which include the participation of competent national authorities (the regional Waterways and Shipping Directories, the Federal Environmental Agency and the Federal Agency for Nature Conservation) and other stakeholders. During these consultation rounds, conflicting interests and uses are discussed. On the basis of environmental studies, the applicant prepares an Environmental Impact Assessment (EIA).

⁶ In the area of the territorial sea, responsibility for the approval of wind farms rests with the German coastal states.

⁷ Source: http://www.bsh.de/en/Marine_uses/Industry/Wind_farms/Approval_Procedure.jsp (as of April 4th, 2008).

After receiving the documentation from the applicant, the Federal Maritime and Hydrographic Agency verifies whether the application complies with the requirements for granting approval. Additionally, the competent regional Waterways and Shipping Directorate investigates whether a licence can be granted with regard to the safety and efficiency of navigation.

To-date the Federal and Maritime Hydrographic Agency has permitted the construction of 20 offshore projects.⁸

Offshore Test Field “alpha ventus”

Christian Dahlke then presented the construction plans for the first German offshore project, the test field “alpha ventus”, which consists of a dozen 5 MW wind turbines (6 Multibrid M5000 and 6 REpower 5M plants) suitable for rough offshore conditions. This project is funded by the Federal Ministry for the Environment with 50 million Euros and will focus on the research of adverse effects on marine mammals, fish, seabirds, bird migration and the benthos.⁹ The venture was enabled by the Offshore Wind Energy Foundation that leased its licence to a consortium consisting of EWE, E.ON and Vattenfall.¹⁰

Offshore Wind Energy from a European Perspective

Nicole Schäfer, national expert of the European Commission’s DG Fisheries and Maritime Affairs, continued by presenting European targets and instruments to promote renewable energies and afterwards touched on plans for an integrated European maritime policy.

Recent European politics are based upon the Commission’s Energy and Climate Package that was adopted in January 2007. It provides first for a 20% reduction of greenhouse gas emissions, secondly for a 20% improvement of energy efficiency and finally for a binding target of a 20% share of renewable energies in the total energy consumption until the year 2020. Up to now, 8.5% of the total energy consumption in Europe is generated from green power. For the remaining 11.5%, the

⁸ Source: http://www.bsh.de/en/Marine_uses/Industry/Wind_farms/Approval_Procedure.jsp (as of April 4th, 2008).

⁹ *Arzt, Ingo; Weinhold, Nicole, Wer zuerst kommt, Neue Energie, 2007, issue 12, p. 40.*

¹⁰ *Federal Ministry for the Environment, Entwicklung der Offshore-Windenergienutzung in Deutschland, Berlin 2007, p. 12, source: http://www.erneuerbare-energien.de/files/pdfs/allgemein/application/pdf/offshore_wind_deployment_de_en.pdf (as of April 4th, 2008).*

Commission set up a plan allocating half of the necessary efforts equally between the member states and the other half shared accordingly to the GDP per capita.¹¹

Furthermore, member states have to cooperate closely with the energy industry to promote the necessary technical innovations.¹² This shall be achieved through various European promotion programmes, for example; the European Union Research Funding,¹³ the European Structural and Cohesion Funds and the “Intelligent Energy Europe” programme,¹⁴ which offers 45 million Euros of funding in 2008.¹⁵

Referring to German efforts for an all-embracing maritime spatial planning, *Nicole Schäfer* explained the current existence of various disconnected, and hence less efficient, maritime policies in Europe. Thus, she advocated for the coordination and integration of the different maritime policies to promote the sustainable use of the sea and to intensify the cooperation between the stakeholders.

Challenges for the Offshore Wind Energy Industry in Europe

Klaus Rave, vice president of the EWEA, presented the technological progress and the economic perspectives of the offshore wind energy industry from the European point of view.

Technological and Economic Improvements

Klaus Rave demonstrated the rapid developments in technology regarding the capacity and power of wind turbines during the last several decades. The latest state-of-the-art technology is the recently invented 6 MW Enercon E-126 wind turbine with a rotor diameter of 127 m.¹⁶ In 1982 the worldwide installed wind power amounted to 100 MW, today it has increased up to 94,112 MW. In 2007 alone, 20,073 MW of new wind power have been installed worldwide; thereof 5,244 MW in the United States, 3,522 MW in Spain, 3,449 MW in China, 1,730 MW in India and 1,667 MW in

¹¹ COM 2008 (30) final.

¹² COM 2006 (847) final.

¹³ Source: <http://cordis.europa.eu> (as of April 4th, 2008).

¹⁴ Source: http://ec.europa.eu/energy/intelligent/index_en.html (as of April 4th, 2008).

¹⁵ The precise requirements for a financial funding can be found in the leaflet “Call for proposals 2008” under: http://ec.europa.eu/energy/intelligent/call_for_proposals/doc/call_2008_en.pdf (as of April 4th, 2008).

¹⁶ *Enercon GmbH*, Leistungsstärkste Windturbine der Welt bei Emden errichtet, *Windblatt Enercon Magazin für Wind und Energie*, 2008, issue 1, p. 6 seq., source: [http://www.enercon.de/www/de/windblatt.nsf/vwAnzeige/5E4606B6DF14DCE4C12573B400460FB7/\\$FILE/WB-0108-dt.pdf](http://www.enercon.de/www/de/windblatt.nsf/vwAnzeige/5E4606B6DF14DCE4C12573B400460FB7/$FILE/WB-0108-dt.pdf) (as of April 4th, 2008).

Germany.¹⁷ The wind energy's share of the power supply has risen from 0.001% up to 3% in the last 25 years in Europe alone.¹⁸

Grid Integration

The growing share of renewable energies generated by the European member states, the increasing energy trade within Europe and the limited grid capacity all require a projected development of the European grid to guarantee a safe and secure supply of energy for the future.¹⁹ Important aspects of integration in European networks and markets are currently being examined in the European Wind Integration Study (EWIS²⁰) and Trade Wind²¹. In particular, the feed-in of large quantities of electricity from offshore wind farms will have a major influence on power flows in the UCTE²² interconnected grid.

This does not only call for improvements on the European level but also on the national level. The German power grid, for example, has to be expanded with 850 km extra high voltage traces (corresponding to 5% of the German electricity grid) to transmit electricity from offshore wind farms from the coastal regions to the metropolitan areas.²³

In summary, offshore wind energy has yet to have a significant impact on today's energy supply. Hence, it is necessary to integrate offshore wind power into existing European and trans-national power systems.

Panel Discussion

The panel discussion was opened by a round of statements in which the advantages and disadvantages of offshore wind energy were emphasized again. The large number of offshore projects approved compared with the lack of knowledge about

¹⁷ Source: http://www.ewea.org/fileadmin/ewea_documents/documents/press_releases/2008/gwec-table-2008.pdf (as of April 4th, 2008).

¹⁸ Source: <http://www.ewea.org/index.php?id=615> (as of April 4th, 2008).

¹⁹ *Federal Ministry for the Environment*, *Entwicklung der Offshore-Windenergienutzung in Deutschland*, Berlin 2007, p. 23, see http://www.erneuerbare-energien.de/files/pdfs/allgemein/application/pdf/offshore_wind_deployment_de_en.pdf (as of April 4th, 2008).

²⁰ Source: <http://www.ucte.org> (as of April 4th, 2008).

²¹ Source: <http://www.trade-wind.eu> (as of April 4th, 2008).

²² UCTE= Union for the Co-ordination of Transmission of Electricity.

²³ *Deutsche Energie-Agentur GmbH*, *Zusammenfassung der wesentlichen Ergebnisse der Studie „Energiewirtschaftliche Planung für die Netzintegration für Windenergie in Deutschland an Land und Offshore bis zum Jahr 2020“*, Köln 2005, p. 8, source: http://www.dena.de/fileadmin/user_upload/Download/Dokumente/Projekte/kraftwerke_netze/netzstudie1/dena-netzstudie_1_zusammenfassung.pdf (as of April 4th, 2008).

cumulative impacts on the marine environment was of particular concern to the panellists. However, the experts also emphasized that offshore technology will play an important role in the reduction of CO₂ emissions and must hence be further developed.

After these statements, the discussion mainly focussed on the economic relevance of offshore technology, its compliance with the law of the nations and spatial planning aspects.

Anthony Lucky, judge at ITLOS, expressed his concerns about fossil energies possibly being crowded out by offshore technology and asked whether renewable energies will be able to meet the requirements of the industry.

Klaus Rave and *Nicole Schäfer* stressed the importance of replacing exhaustible raw materials in power generation with renewable energies, because oil and gas must be saved for the future demand of the chemical industry. Furthermore, recent projects have shown that offshore wind technology combined with other renewable energy sources are capable of providing a stable and secure energy supply.

Considering the lack of knowledge about the cumulative impacts of offshore wind technology, *Prof. Dr. Doris König* asked the panellists about the compatibility of offshore technology with the precautionary principle. In this regard, she also inquired about the possibility of restricting the construction of wind energy plants to specially designated areas.

Addressing the first question, *Henning von Nordheim*, from the Federal Agency for Nature Conservation, criticized the fact that current approvals for new projects can hardly fulfil the precautionary principle, because of the lack of knowledge regarding cumulative adverse effects on the marine environment. Recalling the advantages of offshore wind energy, he called for a balance of interests that can only be achieved when possible impacts are assessed properly.

To avoid such conflicts with the marine environment *Ursula Prall*, from the Offshore Forum Windenergie, supported the idea of restricting the construction of wind power plants to acknowledged exclusive zones. *Klaus Rave* confirmed that such a concept was recently brought into the legislative process for a federal marine spatial planning system.

In summary, on the one hand, offshore wind energy is a highly promising technology, but on the other hand, it also might have adverse effects on the sea. Thus, further research and an intense dialogue between the stakeholders is necessary to make the most of this chance and to be able to respond to the question “Offshore Wind Energy: Good for our climate, bad for our seas?”

Report by Andreas Haas and Theresa Ilgner, Bucerius Law School, Hamburg