Standards for Offshore Wind Farms in the German Exclusive Economic Zone (EEZ)

Nico Nolte, Sigulda, 29 May 2008
Offshore Wind Farm Projects

Boundaries
- Territorial Waters
- Continental Shelf/EEZ
- International Border

Offshore Windfarms
- planned
- approved
- in operation

Grid Connections
- Approved
- Planned

Geodetic Datum: WGS 84
Map Projection: Mercator (54° N)

BSH / M25 - 30.08.2007
BSH developed in co-operation with experts from agencies, universities and the private sector the following Standards:

**BSH - Standard for Environmental Impact Assessments** (February 2007)
Impacts of Offshore Wind Turbines on the Marine Environment

**BSH - Standard for Geotechnical Site and Route Surveys** (August 2003)
Minimum Requirements for the Foundation of Offshore Wind Turbines

**BSH - Standard Design of Offshore Wind Turbines** (June 2007)
Certification process from development to decommissioning

These Standards are guidelines for applicants and participating institutions and are intending to provide legal, planning and investment security.
Standard for Environmental Impact Assessments; development

2001

Standarduntersuchungskonzept
für Genehmigungsverfahren nach Seeanlagenverordnung

2002

Standarduntersuchungskonzept
Auszirkungen von Offshore-Windenergieanlagen auf die Meeresumwelt

2007

Standard
Untersuchung der Auswirkungen von Offshore-Windenergieanlagen auf die Meeresumwelt (STUK 5)
Standards  (available on english at www.bsh.de)
BSH - Standard for Environmental Impact Assessments (February 2007)
Impacts of Offshore Wind Turbines on the Marine Environment

• Potential adverse impacts of the turbines on the marine environment must be assessed; EIA mandatory for most projects (20 and more turbines)
• Standard provides detailed information on the scope of required investigations:
  • pre-construction phase: baseline survey to determine the spatial distribution and temporal variability of benthos, fish, birds and marine mammals
    - duration: two successive years before construction (one year before licence) in the project area and reference area
  • construction phase: assess impacts of the construction work in the project area and reference area
  • operation phase: monitoring and assessing impacts for least three years in the project area and reference area
**BSH - Standard for Environmental Impact Assessments** (February 2007)

Technical instructions for surveys of features of conservation interest

- **Benthos**: investigations and monitoring comprise i.a.:
  - sediment, habitat structure and their dynamics using side scan sonar and sediment sampling
  - epifauna using video equipment and beam trawl/dredge
  - infauna by means of grab sampling

- **Fish**: fish surveys and monitoring involve use of bottom and/or beam trawls

- **Avifauna (foraging, moulting and resting) birds**:
  - baseline: large-scale survey of distribution and density by means of ship and aircraft transect survey
  - construction and operation: recording of effects on birds and adaptive behaviour by means of ship and aircraft transect survey

- **Avifauna (migrating)**:
  - baseline, construction and operation: radar surveys in main migration periods
BSH - Standard for Environmental Impact Assessments (February 2007)
Technical instructions for surveys of features of conservation interest

• Marine mammals: investigations and monitoring comprise:
  - surveys of abundance and distribution
    baseline: stock-inventory in order to assess the area´s ecological importance
    construction: monitoring of the impacts of construction work
    operation: monitoring of the impacts on abundance and habitat use
    means: aircraft transect and ship transect surveys

  - surveys of habitat use in all phases with click detectors (TPODs)

  - surveys of noise emission and immission
Standard for Geotechnical Site and Route Surveys

BSH - Standard for Geotechnical Site and Route Surveys (August 2003)
Minimum Requirements for the Foundation of Offshore Wind Turbines
• site investigations on the seabed are a technical prerequisite to the construction of the foundations of turbines
• guidelines for geophysical (sonar, seismics, echosounding) and geotechnical (drilling, penetration tests) methods in different phases of the project
• requirements for laboratory tests
• aim: Constructional intrinsic safety and stability of the foundation
• update in summer 2008
Standard Design (Standard Konstruktion)

BSH - Standard Design of Offshore Wind Turbines (June 2007)
Certification process from development to decommissioning

Part 1: Introduction, general explanations

Part 2: Component-related certificates and confirmations, marine operations and inspections

Part 3: Project phase-related activities ("timetable")
Definition of the components of an offshore wind farms:

- Offshore wind turbine
- Support structure (tower and substructure incl. foundations)
- Internal and grid connecting power cables
- Electric power transformation station incl. platform
- Other special installations
Introduction of project phases:

• Development phase
• Design phase
• Implementation phase:
  Manufacturing
  Transport
  Installation
  Commissioning
• Operational phase
• Decommissioning phase
Important elements of the Standard Design:

• External certification/assay on behalf of the project developer

• Done by
  Classification companies and/or
  Inspection engineers ("Prüfsachverständige")

• Component-related certificates and confirmations

• Mixture of different codes and regulations is not allowed
Important elements of the Standard Design (cont'd):

• Conformity assessment of the turbine and the substructure

• Requirements for marine operations and inspections during the different project phases

• Sequence of the project phase-related requirements (Table 2)
Important elements of the Standard Design (cont'd):

• BSH will accept only documents which have been successfully undergone an external certification and/or assay procedure

• these certified/assayed documents may be subject to an assay on behalf of BSH

• Before clearance ("Freigabe") of the next project step according to Table 2
Developing phase:

• Project Developer:

  Design Basis incl. all relevant environmental parameters and loads (oceanographic data, geotechnical site survey, ...)
  Preliminary Draft ("Vorentwurf") of the complete installation

• External certification/assay on behalf of the Project Developer:

  Note: classification company/inspection engineer(s) should to be involved very early
Developing phase:

• BSH:

   Review of the certified/assayed Design Basis and Preliminary Draft ("Vorentwurf")

   Assay by experts of BAW, BAM and - if necessary - other experts on behalf of BSH

   1st clearance ("Freigabe"): start of tender ("Ausschreibung")
Standard Design (Standard Konstruktion)

Design phase (Part 1):

• Project Developer:

  Basic Design ("grundlegender Entwurf") of the complete installation

• External certification/assay on behalf of the Project Developer

• BSH:

  ... 2nd clearance ("Freigabe"): at least 1 year before installation!
Standard Design (Standard Konstruktion)

Design phase (Part 2):

- Project Developer:
  
  Implementation Design ("Ausführungsentwurf") of the complete installation

- External certification/assay on behalf of the Project Developer

- BSH:

  ... 
  3nd clearance ("Freigabe"): start of manufacturing
Important to note:

1. Change in the approval procedure:
   Applications must include
   - a Design Basis and a Preliminary Draft
   - which are the basis for an Environmental Impact Study
     (if an EIA is required)

2. Dynamic character of the Standard Design

3. Updating of the Standard Design
Thank you for your attention!

nico.nolte@bsh.de