STIFTUNG OFFSHORE WINDENERGIE

Offshore Wind Energy and Maritime Spatial Planning

Workshop on regional cooperation on energy and maritime spatial planning in the North Sea. 29 January 2015, Edinburgh

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CEO German Offshore Wind Energy Foundation

The German Offshore Wind Energy Foundation

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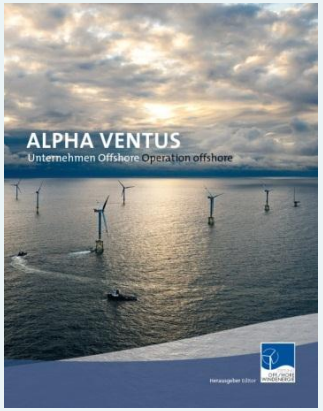
- Founded in 2005 as an independent, non-profit organisation to promote the utilization and research of offshore wind
- Acquisition of ownership rights (permit) of **test site alpha ventus** (Sep. 2005) – moderated/accompanied development process
- Platform for the **offshore wind/maritime industry**, incl. **trade associations, policy-makers and research**
- Offices in Varel and Berlin (since Q4/2011)
- **Initiator** of studies/initiatives
  - *Cost reduction* study (Prognos-Fichtner, 2013)
  - *Energy system benefits* study (Fraunhofer IWES, 2013)
- *Involved in various projects, e.g.* **OffWEA** – consultation, support and moderation



OFFSHORE-WINDENERGIE.NET

On behalf of Federal Ministry for Economic Affairs and Energy

- Collaborative WG between maritime industry and offshore wind sector

NMMT Nationaler Masterplan Maritime Technologien

- Offshore Test Site Project

OFT OFFSHORE TESTFELD-FORSCHUNG

- PR and public acceptance work

FASZINATION OFFSHORE WIND vom MEER für NEUE ENERGIE in Stadt und Land

- **International (EU) Projects**

windspeed SUPPORTING DECISIONS

Seanergy 2020

European Union European Regional Development Fund

INTERREG IVC

4POWER

SOUTH BALTIC OFF.E.R

The Evolution of a Strategy for OWE in Germany

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Background

- Jan. 2002 - Government Strategy Paper on Offshore Wind Energy (OWE): 500 MW by 2006; 2-3 GW by 2010; 20-25 GW by 2025-30
- Dec. 2006 - Energy Law Revision– grid connection obligation for TSOs
- IEKP (Integrated Energy and Climate Programme of 2007): 25 GW target for offshore wind energy by 2030 confirmed
- EEG (RE Act) revision of 2008: higher FIT for OWE, 30 % of German electricity supply from RES by 2020
- Energy Strategy Paper of 2010 –25 GW target by 2030 confirmed, 80 % RE target by 2050
- April 2010: first OWF in German waters operational (alpha ventus)
- June 2011 - revised Energy Legislation of 2011 (post-Fukushima), nuclear phase-out by 2022, incl. EEG revision: min. 35 % from RE by 2020 (25 % in 2012); National Grid Planning (onshore)
- Nov./Dec. 2012 - Energy Law revision, ‘system change’ for offshore grid, incl. liability regime and a new offshore-grid development plan, i.e. synchronised development of OWF with offshore grids
- August 2014 – EEG revision with new RES targets, 6.5 GW target by 2020 for offshore wind energy, 15 GW by 2030

→ Long-term process

Offshore Wind Permits & Installation in Germany **(Q1/2013)** - Work in Progress

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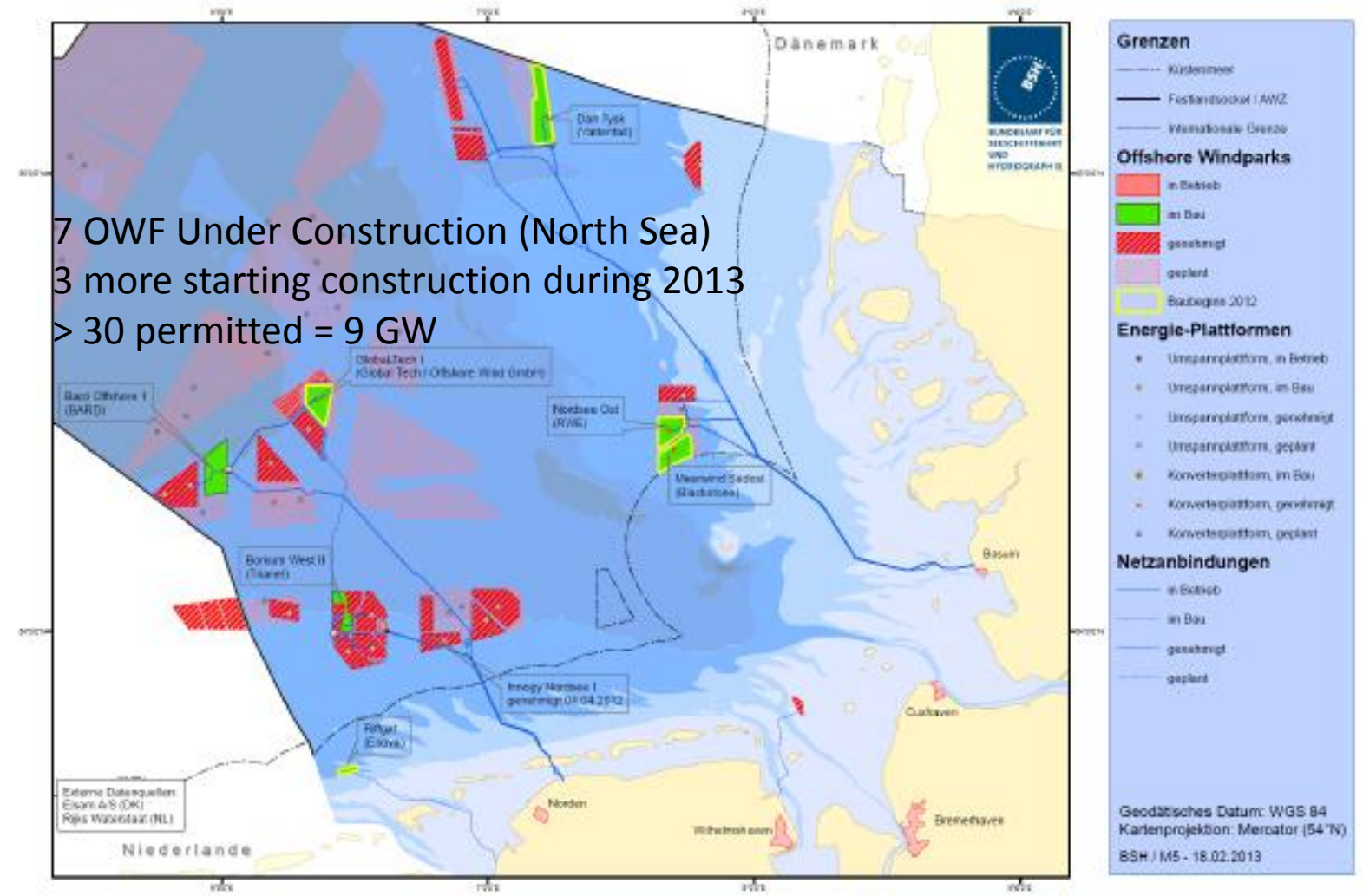

7 OWF Under Construction (North Sea)
3 more starting construction during 2013
> 30 permitted = 9 GW

Status of German Offshore Wind Development (7/2014)

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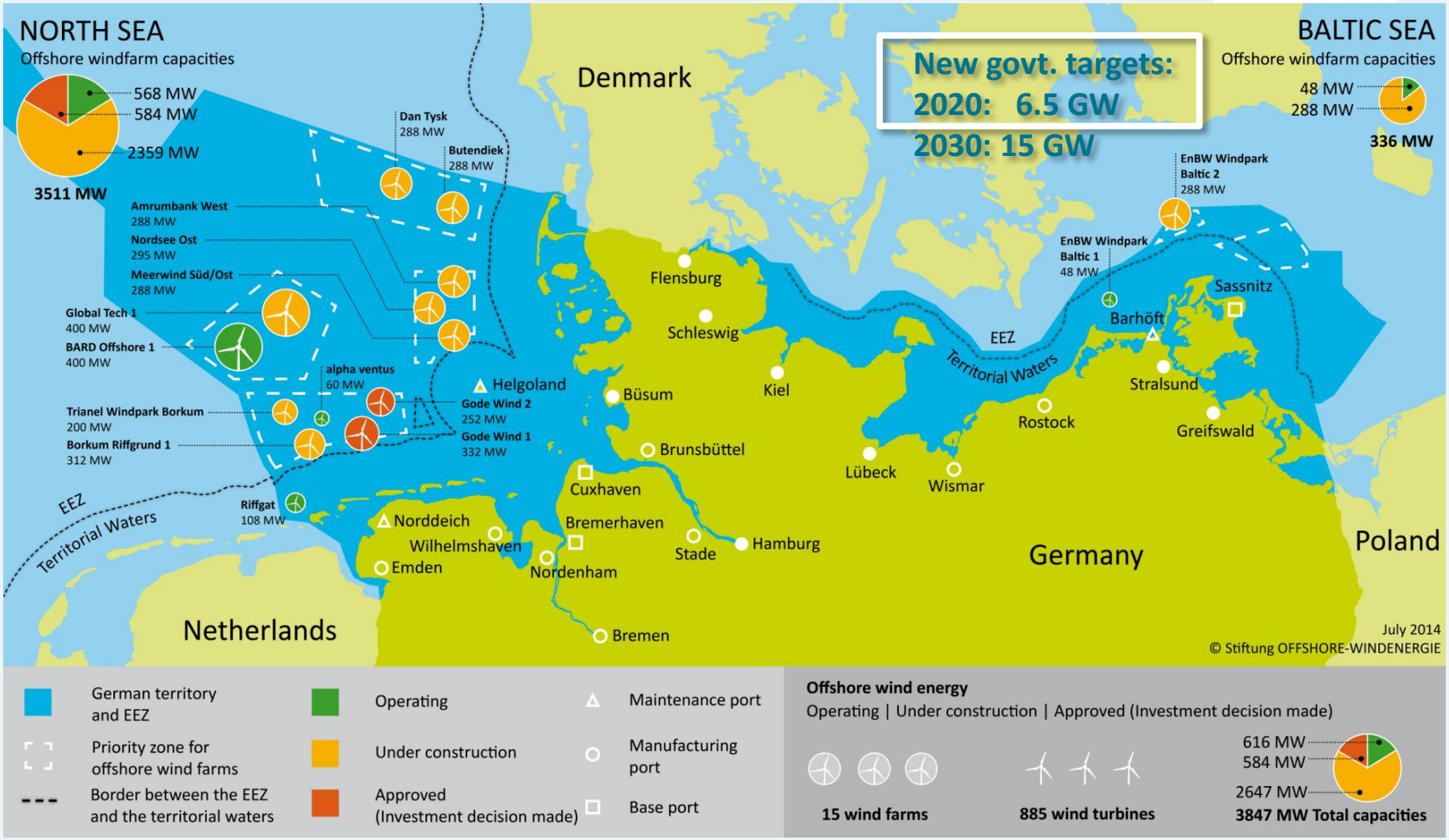


> 1 GW online by 2014, > 3 GW by 2015

In a nutshell: MSP in Germany

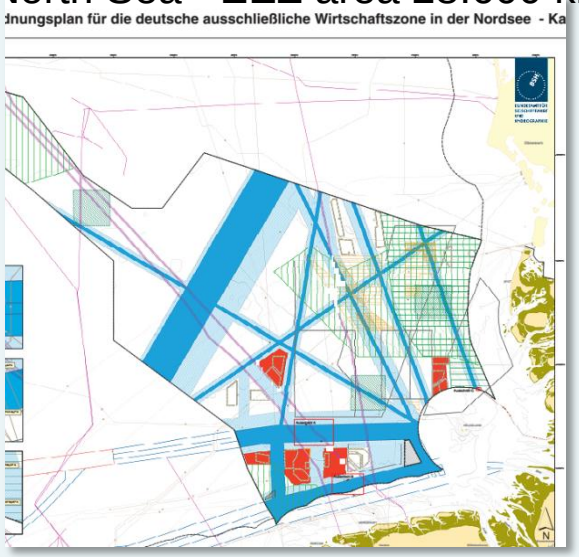
In 2009, spatial plans for EEZ in the North Sea and in the Baltic Sea entered into force (BSH responsible, coastal states in charge of MSP for territorial waters)

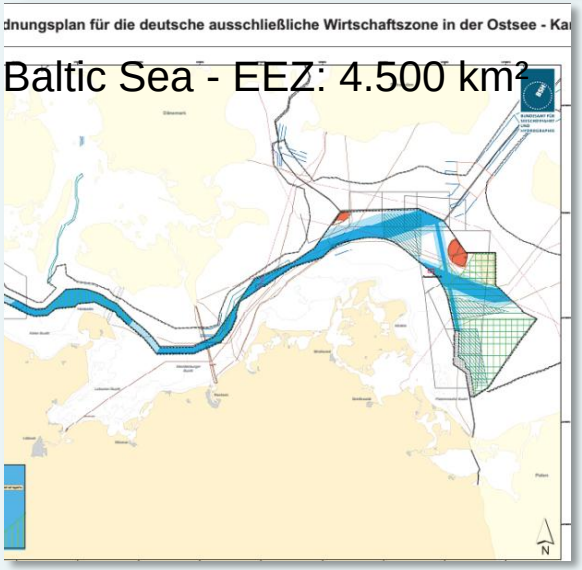
- Priority areas defined for …
  - shipping (blue)
  - wind energy (red)
- Gates for electricity cables
- White areas open for any use/development
- No wind farms allowed in Natura 2000 areas (green grid) – 47 % of total maritime space protected (70 % in coastal waters)

- § 6 SeeAnlV: OWF have a legal claim for **approval**, unless project is
  - A threat to safety of shipping traffic,
  - A threat to the marine environment,
  - Not in compliance with aims of MSP or
  - Overriding military, public or private interests.

➢ Offshore wind as a newcomer

North Sea - EEZ area 28.600 km²





Baltic Sea - EEZ: 4.500 km²

MSP in Germany -Objectives and Principles

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Categories

- Priority Areas (Vorranggebiete) - exclusivity for specific (sea) use functions granted (excl. other sea uses)
- Reserved Areas (Vorbehaltsgebiete) - special importance to specific (sea) use functions
- Designated Areas (Eignungsgebiete)
- Special purpose areas which are consequently forbidden in other areas

BMVI (Federal Ministry of Transport and Infrastructure), via its agency BSH (Federal Maritime and Hydrographic Agency), structured MSP along Key Objectives (legally binding) and

- Principles and Guidelines - need to be particularly considered:
  - Ensure safety and efficiency of maritime traffic
  - Strengthen economic capacity through orderly spatial development
  - Promotion of offshore wind energy use
  - Long-term sustainable use of the sea,
  - Protection of the marine environment – comprehensive SEA (part of MSP)

Application Process for Offshore Wind

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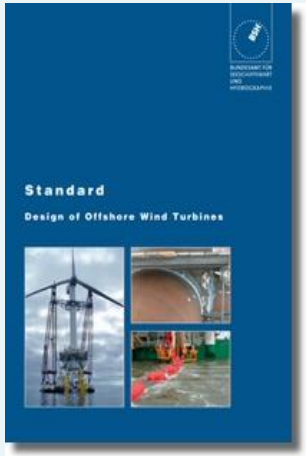
BSH Standards and required documents for permits

- **Environmental Impact Study** (covering two seasons) - **‚Standard Investigation Concept** of the impacts of Offshore Wind Turbines on the Marine Environment‘ **(StUK**, 3rd edition publ. in 2007**)**
- **Technical Risk Analysis** about the likelihood of ship collision risk , incl. assessment on hull-retaining configuration of substructures (foundations)
- **Design Basis** and Preliminary Draft of installation structures - **Standard Konstruktion** (‚Design of OWT‘, publ. in 2007, revision process underway, incl. transformer and converter platforms)
- Geotechnical assessments - **Standard ‚Ground Investigation for Offshore Wind Farms‘** (publ. in 2003)



German MSP as a role model for the EU?

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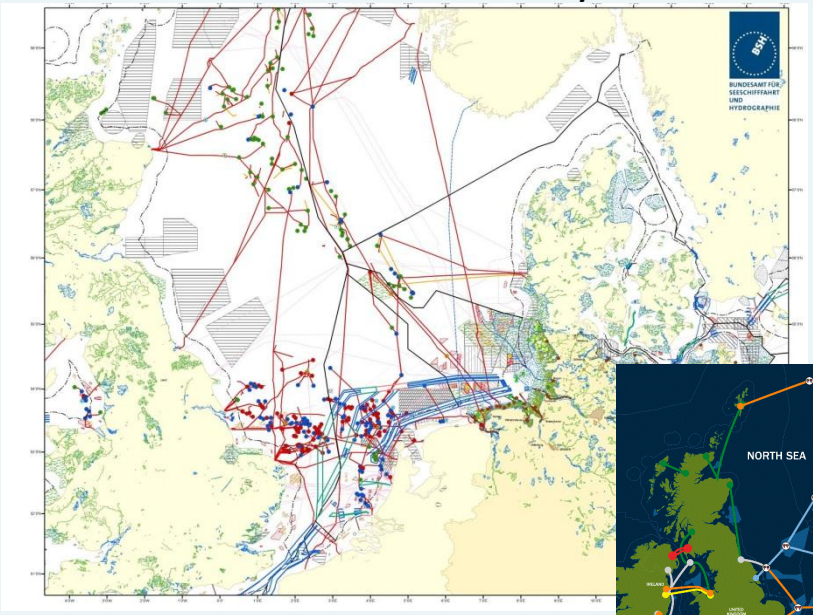
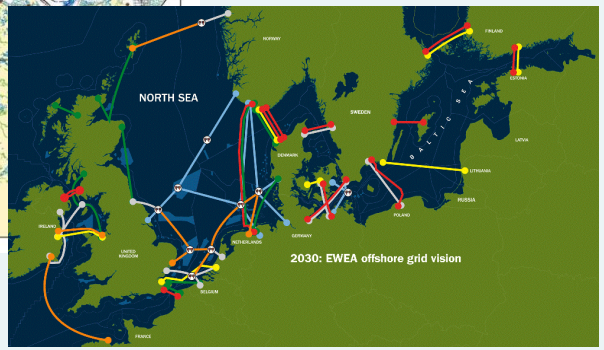
Need to organise, moderate and balance multiple sea use interests

Well-established (traditional) Interests -

- Shipping,
- Marine environment/ nature conservation,
- Military,
- Fisheries,
- Resource extraction,
- Cables, pipelines
- Tourism

vs. Newcomers e.g. Offshore Wind
Potentially: CO2 storage, other marine RES





- Organise space to allow proper exploitation for different sea use functions – promoting synergies through muktiple use
- Cross-border cooperation and strategic (grid) planning
- Common standards and procedures

WINDSPEED (IEE-Project) - brief overview

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Project objectives

- 2030 Roadmap to offshore wind deployment in the Central & Southern North Sea
  - Ambitious but realistic target(s) for offshore wind for 2020-2030
- Decision Support System (spatial planning tool)
  - Spatial representation of wind energy potential and cost in relation to non-wind sea functions and environmental aspects
- Scenario analysis – addressing OWE potentials
  - Opportunities for additional space for offshore wind deployment in light of other sea use functions
  - Possible grid configurations to accompany future offshore wind deployment

Project partners

we@sea

ECN Energy research Centre of the Netherlands

GL Garrad Hassan

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DLR

SINTEF

S.P.O.K

WAGENINGEN UR For quality of life

Coventry University Enterprises Limited

WINDSPEED approach and spatial inputs

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Cables & Pipelines

Military

Sand Extraction

Shipping Density

Shipping Routes

Oil & Gas Platforms

Fisheries

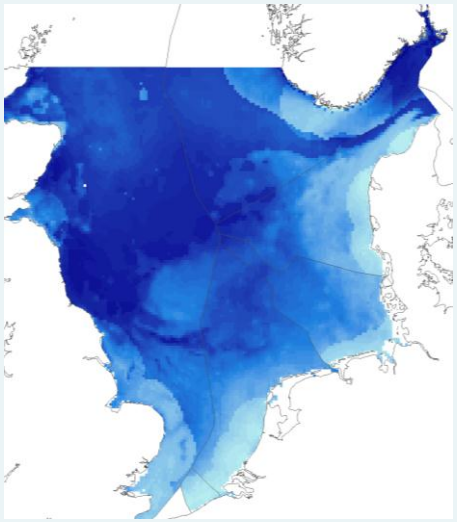
Nature Conservations Zones

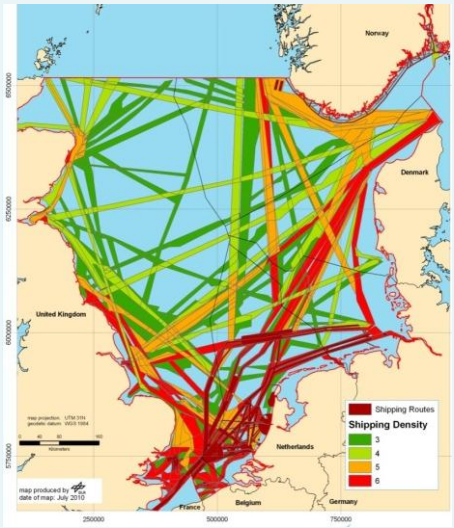
Fish species richness

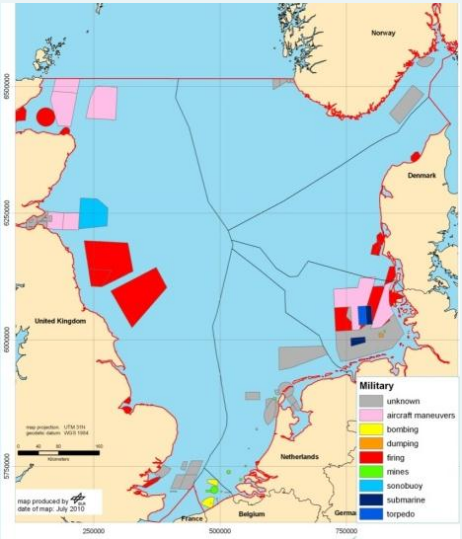
Benthic value

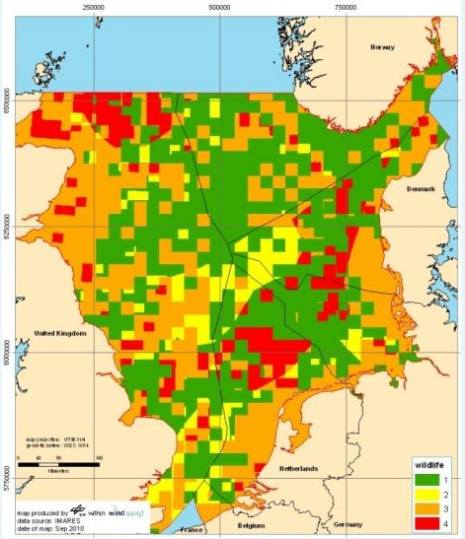
Bird Sensitivity

Existing and Planned OWP





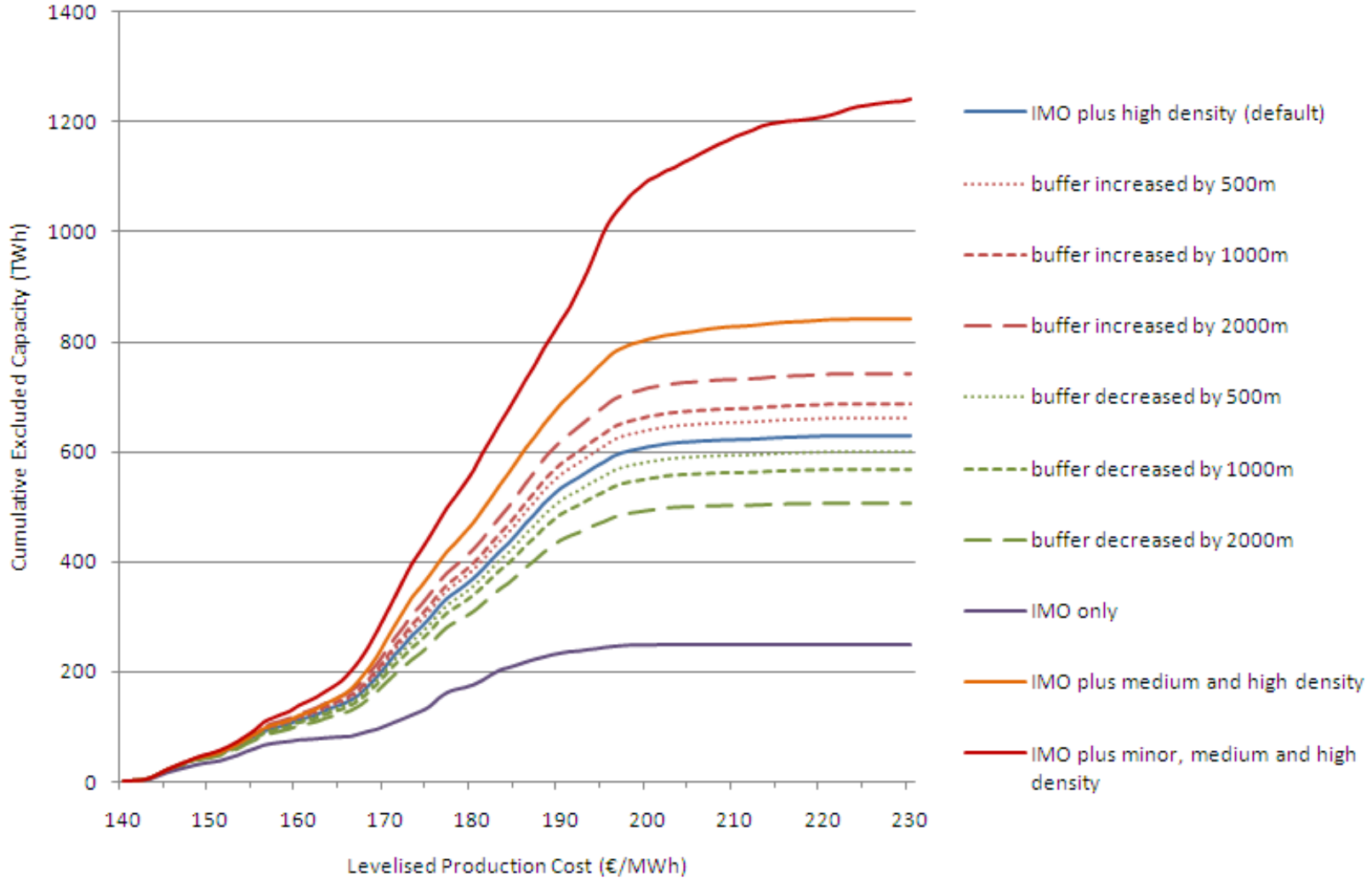




Key spatial drivers – sensitivity calculations

Overlap of sea use functions,

Example: Effect of shipping lane variations on OWE resource potential



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WINDSPEED Sensitivity conclusions for different sea uses

- Shipping: relatively hard constraint and dominant in areas with low cost OWE. Buffer modification has limited effect. VSS widths match closely to anticipated OWE park spacing
- Oil & gas: hard regulatory constraint – but a changing one (decreasing resource) - important to scale for decommissioning
- Fisheries: largest constraint but relatively soft. Large opportunity to integrate with OWE and have co-use
- Military: firm constraint via negotiation, with low OWE costs – challenge is to set a practical level of exclusion
- Cables/pipelines: hard regulatory constraint that is growing – need to scale up
- Sand extraction: small constraint – Dutch law will restrict this to near shore
- Natura 2000: firm regulatory constraint with limited potential for OWE – countries have different conservation philosophies.
- Marine wildlife: soft constraint – currently doubles Natura 2000 areas
- Planned (and permitted) OWP: hard constraint – little opportunity for obvious reasons

WINDSPEED scenarios

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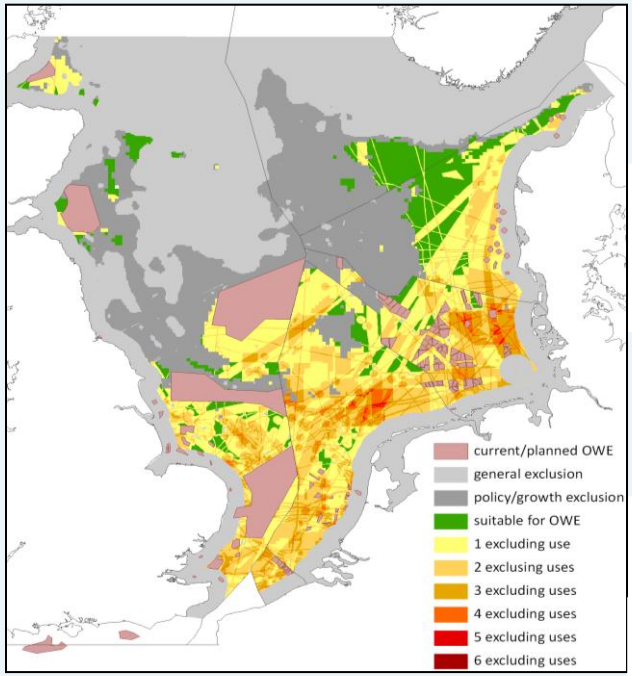
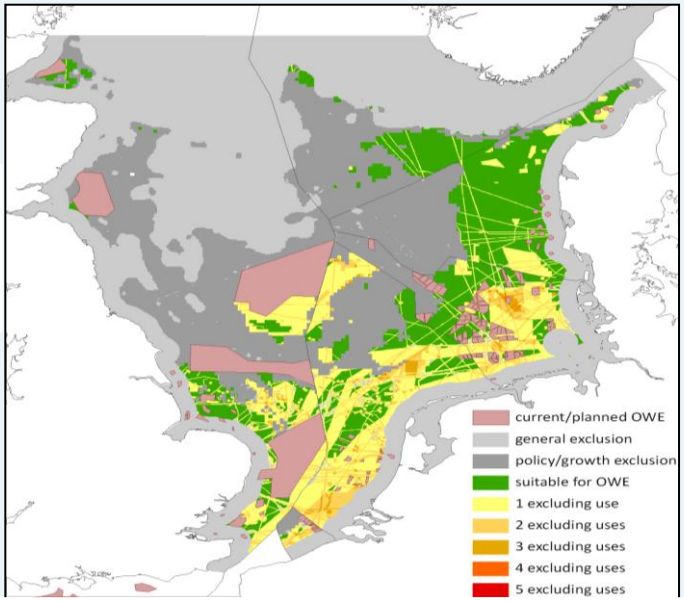
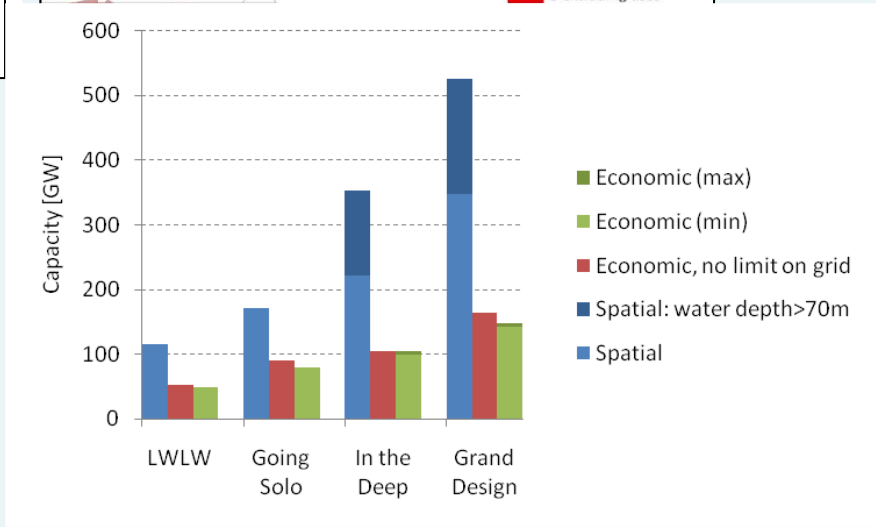
‚In the Deep‘



Grand Design



Overview of potentials for WINDSPEED countries in 2030



WINDSPEED Roadmap for 2030: Policy recommendations

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- Post 2020 RES targets urgently needed
- Establish cooperation mechanisms that
  a) are appropriate for considerable OWE transfers between neighbouring countries,
  b) provide adequate incentives for additional OWE capacity to be exported/shared
  c) are compatible with the development of an offshore grid
- Revisit MSP priorities to find low cost wind energy opportunities
- Give explicit attention to wind recovery between parks and potential for co-existence with other sea users through MSP
- Support for non-RES generation that has value for balancing, which otherwise could be negatively impacted by increasing offshore wind generation
- Develop well-defined responsibilities for developing post 2020 offshore grid (legal, regulatory challenges)
- Continued R&D efforts to develop deeper water offshore wind potential

WINDSPEED – Key conclusions and findings

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- **Central and Southern North Sea could deliver more than a third of the electricity production the six countries in 2030** if offshore grid develops and appropriate steps are taken to integrate this level of variable generation into the market
- Limited opportunities for near shore OWP after 2020 without prioritisation. **Spatial prioritisation could double economic potential** in both radial and meshed grid scenarios compared to non-prioritised counterpart scenarios
- **Opportunities for co-use/integration** from low density assumed in clustered parks
- Policy cost, growth and transmission constraints lead to only a fraction of the indicated suitable areas being used
- Scenarios with an offshore meshed grid have approximately twice the spatial potential compared to scenarios with radial connections
- Realising floating technologies doubles total spatial offshore wind potential, mainly in UK and NO
- Significant differences in the OWE costs and potentials between countries increase the value of an offshore grid
- WINDSPEED results show similar offshore grid configuration to other studies

Outlook & Challenges

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- Sea-basin approach for MSP
- Coordination and co-operation among countries and different sea users
- Offshore grid connection issues need to be addressed, incl. technology solutions, cost & financing, regulations, security of supply, cross-border offshore grid development
- Onshore electricity transport to load centers (South & Central Germany), incl. restructuring and extension of existing onshore grid)
- Financing support, incl. onshore infrastructure development (ports, vessels, suppliers)
- Development of common technical standards and regulations needed, incl. HSE
- Common understanding of environmental questions (noise mitigation, birds, etc.)
- Creation of a comprehensive Maritime Safety Partnership

A Vision for the North Sea Countries – The Powerhouse of Europe

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What's needed

An ambitious, stable and reliable regulatoryand financial framework for offshore wind, including MSP and offshore grid development

→ Political leadership and commitment required to create sustainable development with new jobs and economic prospects around the North Sea region (and other sea basins)

Thank you!!

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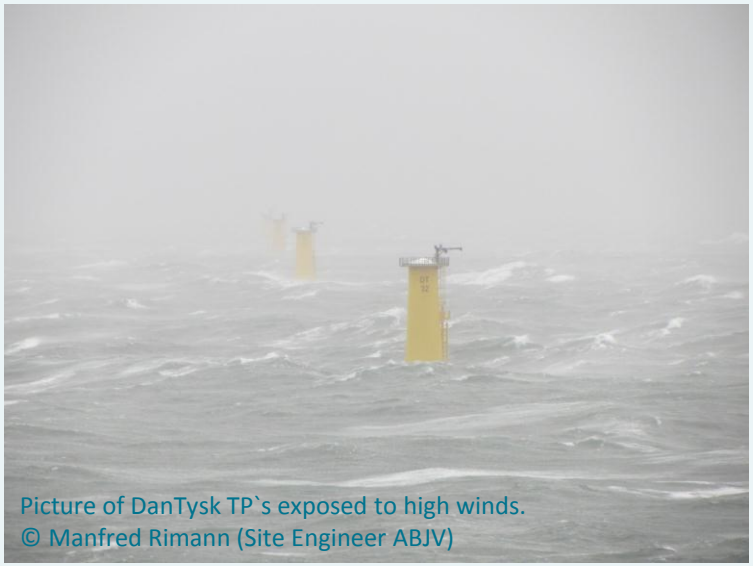

Picture of DanTysk TP`s exposed to high winds.
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