renewableUK, OFFSHORE WIND 2013

STIFTUNG OFFSHORE WINDENERGIE

The New Grid Connection Regime – Perspectives for Offshore Wind Farms in Gemany

Andreas Wagner

Managing Director
Stiftung OFFSHORE-WINDENERGIE
(German Offshore Wind Energy Foundation)

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Overview

1. **Stiftung OFFSHORE-WINDENERGIE**

2. Status of Offshore Wind Energy Development in Germany

3. New Regime for Offshore Grid Connection
   - EnWG
   - BFO
   - O-NEP

4. Conclusion

German Offshore Wind Energy Foundation

- Independent, non-partisan institution to support the development of offshore wind energy, founded in 2005
- **Platform for offshore wind** (and maritime) industry, policy and research-oriented stakeholders
- **Board of Trustees** - key industry & policy stakeholders
- PR and public acceptance activities,

- **Policy initiatives & studies**
  - OffWEA project
    Consulting and support for the federal government in realising and advancing the German offshore wind energy strategy
  - WINDSPEED
  - SEANERGY 2020
  - **Interreg Projects:**
    POWER Cluster, 4POWER, **South Baltic OFF.E.R.**

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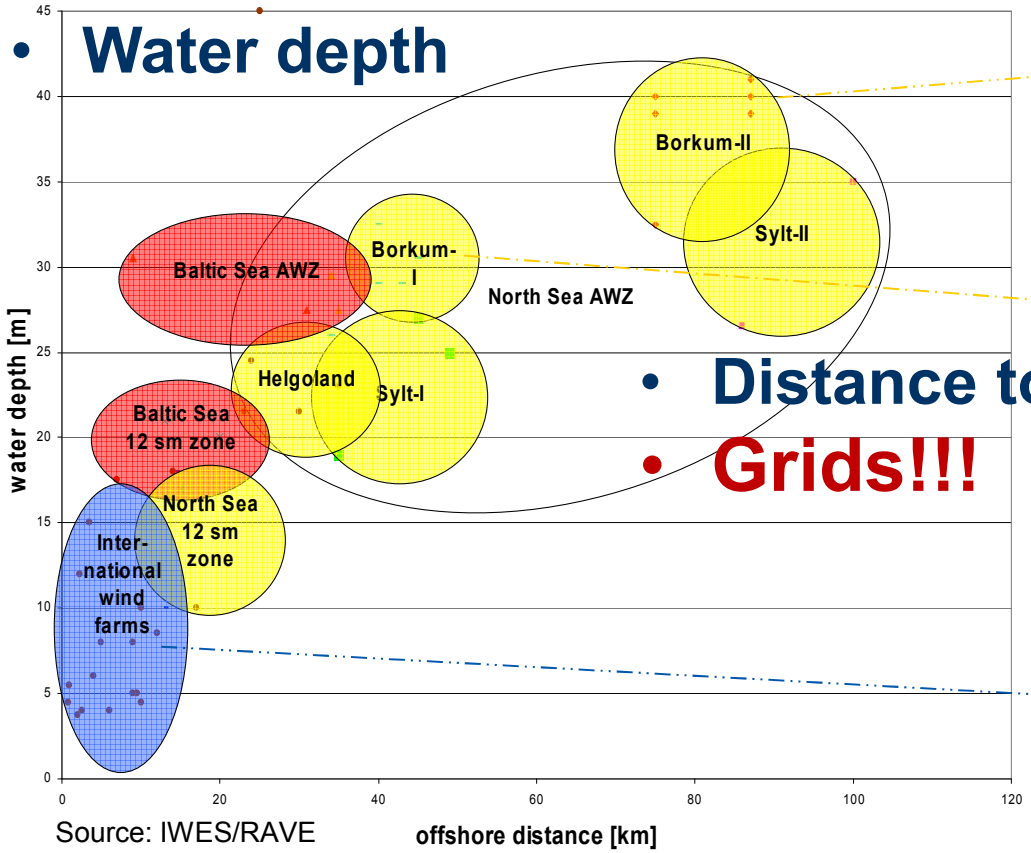
Offshore Wind Energy –

Challenges in German Waters

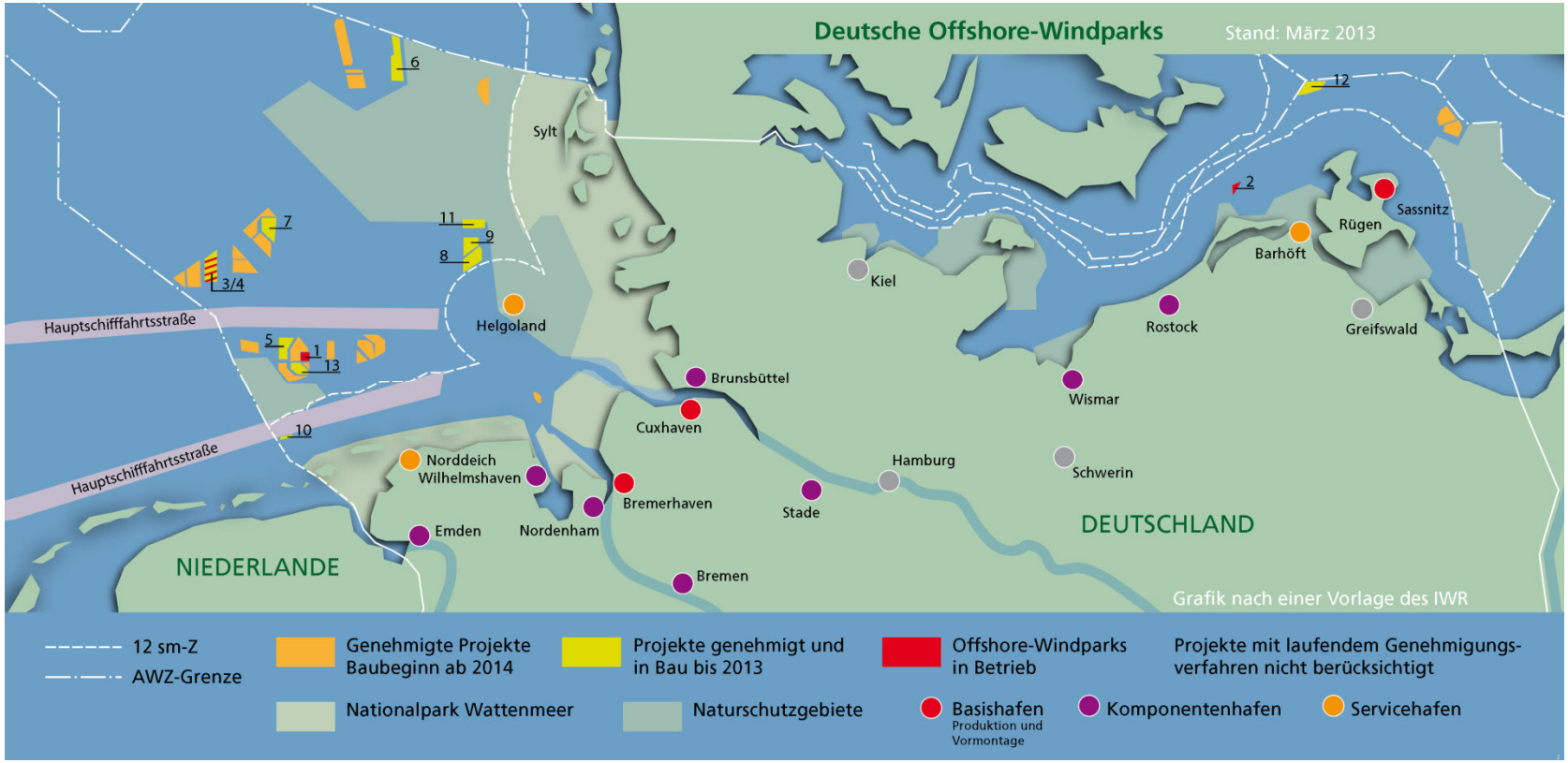
- **Water depth**



Source: IWES/RAVE

- **Distance to shore**
- **Grids!!!**

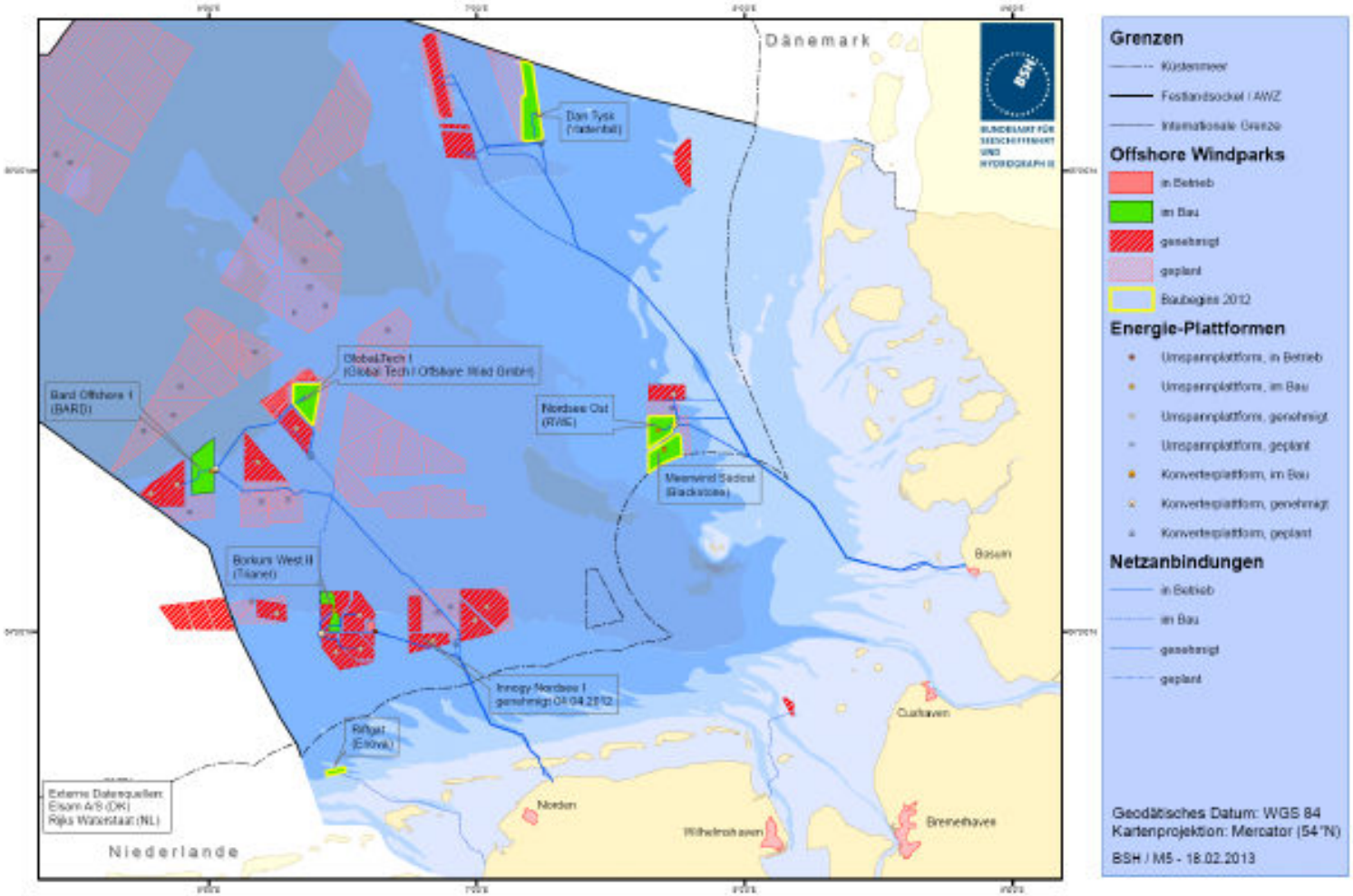
Status and Perspectives in Germany



Operational (as per 31.03.2013):	appr. 320 MW
Under construction (by late 2013):	appr. 2,7 GW
Additionally permitted projects:	appr. 6 GW

Offshore Wind in Germany (Q1/2013)
Work in Progress

7 **OWF** Under Construction (North Sea)
3 more starting construction during 2013



Prerequisite – A stable & reliable legal framework

- The **Renewable Energy Law „EEG 2012“**: a reliable framework for investors and for OWE development (modifications in feed-in-tariff structure accomodate requirements of offshore wind projects)
- **EEG, para 31: *two options*** for Offshore Feed-in tariff (OFIT) – **limited until 2017!**

  a) 0.15 €/kWh for at least 12 years (extension dependant on water depth and distance to shore), afterwards 0.035 €/kWh

  b) ‚**Compressed‘ OFIT** – 0.19 €/kWh for 8 years (extension of 0.15 €/kWh dependant on water depth and distance to shore), afterwards 0.035 €/kWh
- EEG designed to increase pressure on **cost reduction** and to enhance **system integration**

Challenge: Political Debate about cost of supporting RE since 2013

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Challenges in 2011/12 – Grid Connection

- Transmission system operator (TSO) has been legally required to provide grid connection in time with completion of wind farm

- **Baltic Sea:**
  Shorter distance to shore - standard AC-connections built/planned (so far); less technical challenges (except seabed condition, etc.) grid connections realised within 24-36 months

- **North Sea – Delays!**
  - Greater distance to shore, larger wind farms (clusters) require HVDC-connections (< 120 km sea cable so far);

  - **Supply Constraints** (grid connections take 60-72 months – instead of 30 months as expected by electricity regulator in 2009);

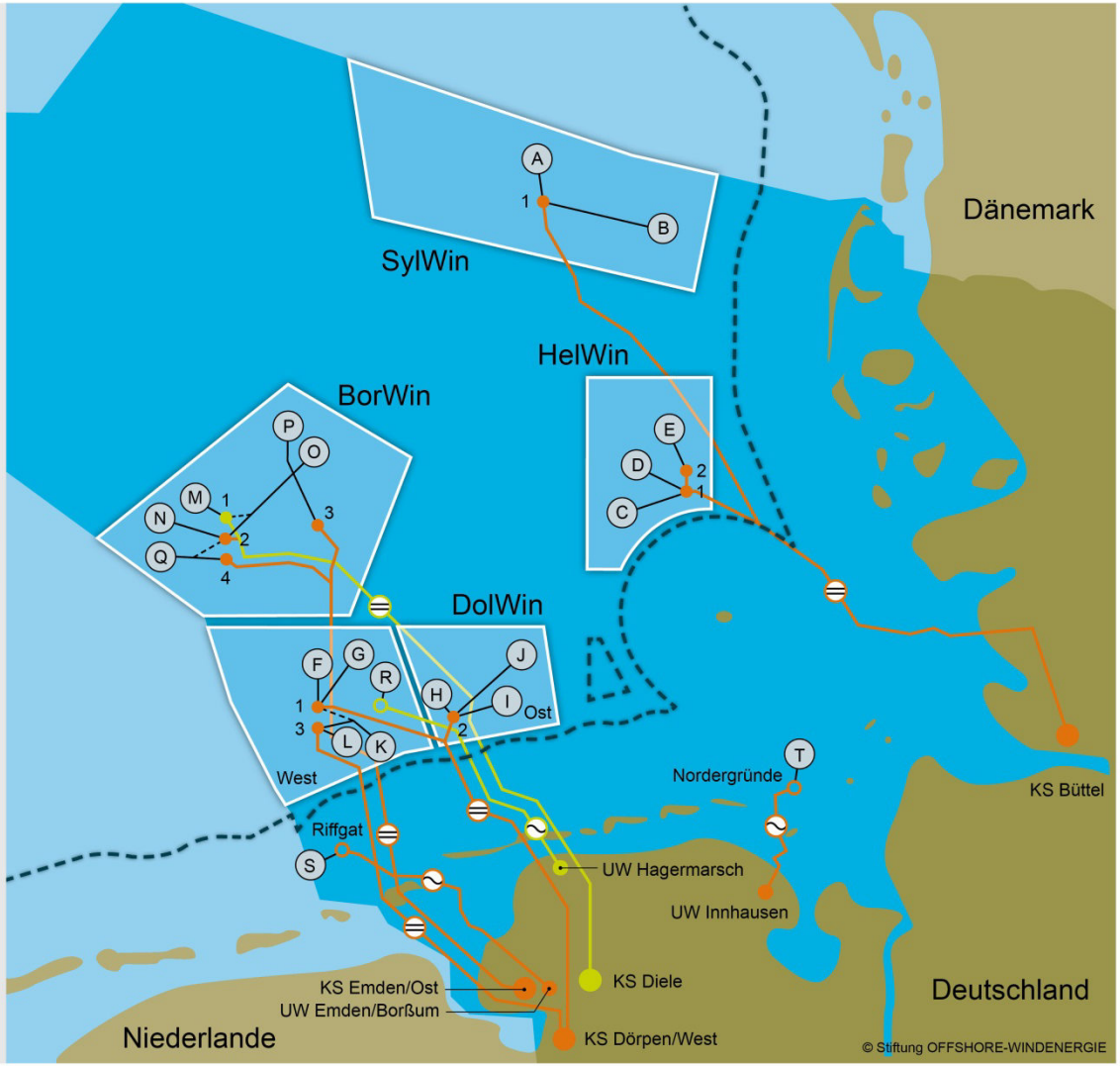
  - **TenneT** - TSO in charge of North Sea connections – difficulties to comply with legal requirements (**financing issues!)**

→ **Legal framework revised in late 2012** to address challenges **(liability issues)**

North Sea (Tennet) – DC cluster connections & OWF

Anschluss/OWP	Leistung	IBN
SylWin 1	864 MW	2014
A DanTysk	288 MW	2014
B Butendiek	288 MW	2015
HelWin 1	576 MW	2014
C Meerwind Süd/Ost	288 MW	2014
D Nordsee Ost	288 MW	2014
HelWin 2	690 MW	2015
E Amrumbank West	288 MW	k.A.
DolWin 1	800 MW	2014
F Borkum West II	200 MW	2013
G MEG Offshore I	400 MW	2015
DolWin 2	900 MW	2015
H Innogy Nordsee I	332 MW	k.A.
I Gode Wind I	332 MW	k.A.
J Gode Wind II	252 MW	k.A.
DolWin 3	900 MW	2017
K Borkum Riffgrund I	291 MW	2015
L Borkum Riffgrund II	349 MW	k.A.
BorWin 1	400 MW	2009
M BARD Offshore I	400 MW	2014
BorWin 2	800 MW	2015
N Veja Mate	400 MW	k.A.
O Global Tech I	400 MW	2014
BorWin 3	900 MW	2018
P Albatros I	50 MW	k.A.
BorWin 4	900 MW	2018
Q Deutsche Bucht	210 MW	k.A.
Einzelanbindungen		
R alpha ventus	62 MW	2009
S Riffgat	108 MW	2013
T Nordergründe	111 MW	2014

UW Umspannwerk
KS Konverterstation
Grenze 12-Seemeilenzone/AWZ
Parkanbindung
Interimsanschluss
Stromkabel in Betrieb
Stromkabel in Planung / im Bau
HGÜ-Cluster-Anbindung
Drehstrom-Einzelanbindung
A Offshore-Windpark



Offshore-Wind Projects & grid connections (Q1/2013)

Project	Capacity (MW)	Year of operation
In operation		
alpha ventus	60	2009
BorWin 1	400	2010
Under construction/ awarded		
BorWin2	800	2015
DolWin1	800	2014
DolWin2	900	2015
HelWin1	576	2014
HelWin2	690	2015
SylWin1	864	2014
Riffgat	108	2013
Nordergründe	111	2015
DolWin3	900	2018
Σ built / awarded	6.209	
In tender phase		
BorWin3, BorWin4	1.800	
To be tendered until 2023 according to O-NEP2013		
6 DC-connections	5.400	

Source: TenneT

OWP in the Baltic Sea

TSO: 50 Hertz

Baltic 1 (48,3 MW)

Baltic 2 (288 MW)

Wikinger (400 MW)

Arkonabecken Südost (320 MW)

GEOFReE (25 MW)

21 OWP haben Anträge für Netzanbindungen gestellt (ca. 5 GW).

1 Beta Baltic
2 Fairwind
3 Beltsee
4 EnBW Windpark Baltic 1
5 EnBW Windpark Baltic 2
6 Arcadis Ost 1
7 ArkonaSee West
8 ArkonaSee Süd
9 Baltic Eagle
10 Strom-Nord
11 ArconaSee Ost
12 Wikinger-Nord
13 Wikinger
14 Adlergrund Gap
15 Adlergrund 500
16 Arcona-Becken Südost
17 Ostseeperle (alternativ zu ArkonaSee West und ArkonaSee Süd)
18 Strom-Süd (alternativ zu Baltic Eagle)
19 Ostseeschatz (alternativ zu Strom-Nord)
20 Windanker (alternativ zu ArkonaSee Süd)
21 Wikinger-Süd (alternativ zu Adlergrund Gap)

System Change for Offshore Grid Connection (2012)

- **‚Old' System** (EnWG § 17 (2a) of **Dec. 2006**:
  TSO obligation to connect OWF ‚on time' → ‚Position Paper' (PP) on Offshore Grid Connection by the regulator (BNetzA) of **Oct. 2009**
- **Delays:** Construction time of DC connections (North Sea) doubled – up to 60 months, instead of 30 months (as envisaged by PP)
- **‚New System'** (EnWG, 3rd revision in autumn 2012 in force 1st Jan. 2013):
  → **BFO (Federal Plan Offshore)** – set up by BSH
  → **Offshore Grid Development Plan:** binding grid connection dates - OWPs will follow the grid of the future (2023/33) – drafted by TSOs – consultation rounds & reviews by regulator
  Prerequisite to develop an optimized (meshed?) Offshore-Grid
- Legal Framework for dealing with liability issues → risk mitigation measure and improved conditions to attract more (third party) investors for the grid

Standstill > 1 year - Adjustment of legal framework Chronology 2011/12

- 2006: § 17 (2a) EnWG (grid connection obligation, principle of timeliness)
- 2009: Grid connection regime established acc. PP BNetzA (criteria for TSO and OWF developer)

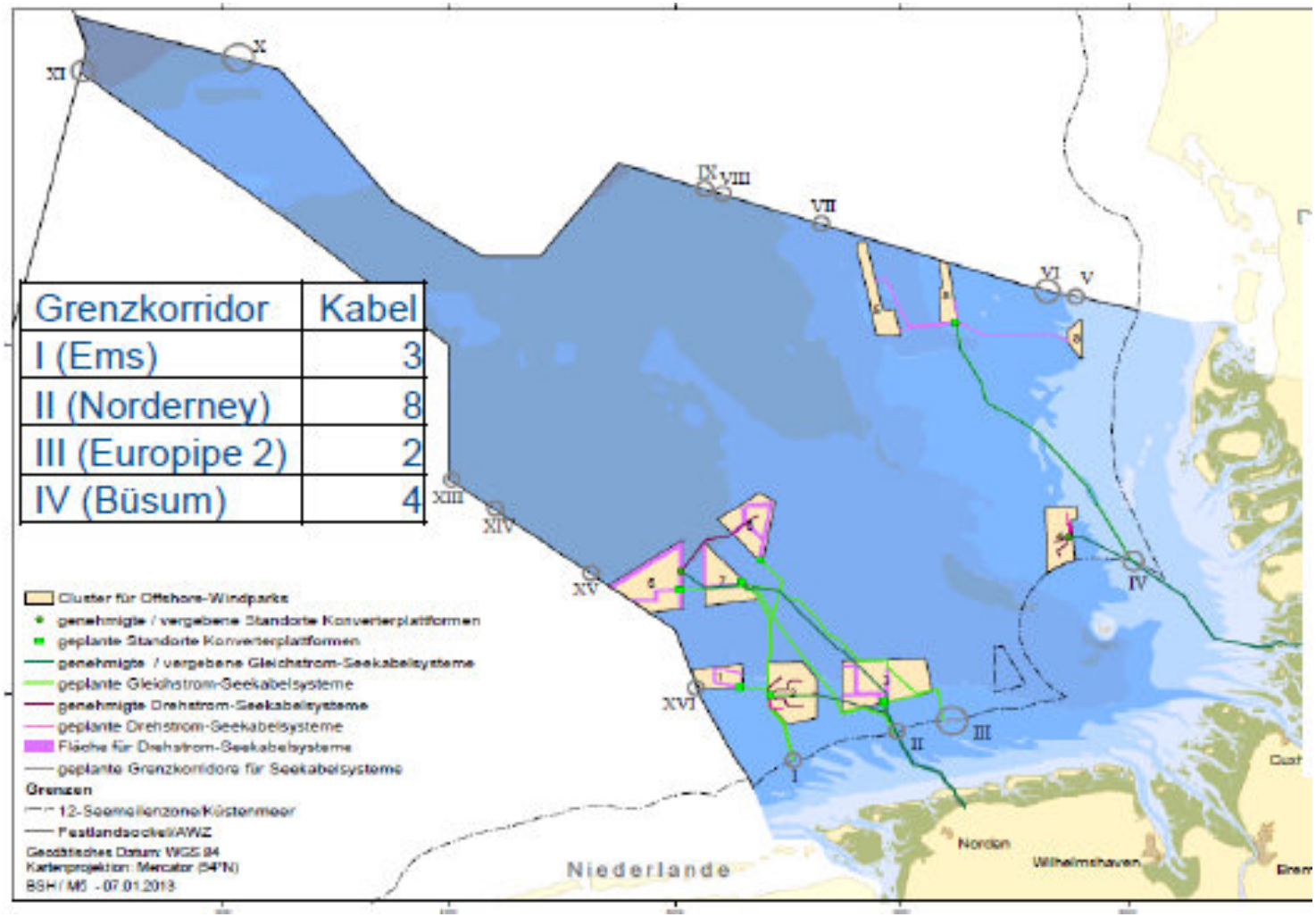
- Since 2010: grid connection delays > 30 months, up to 50(+) months
- Since 2011: Liability and Financing questions raised
- 7 Nov.2011: TenneT letter to the German government
- From late 2011 until Jan. 2013 no more grid connections awarded by TenneT – Since then no more FIDs (closings) on OWFs

- **Q1 2012 – WG Accelerating Offshore-Grid Connection (BMWi / BMU) –** Moderated by SOW
- **22 Mar. 2012 – WG submitted recommendations and proposals to government**

- 2 July 2012 – government launched principles on Liability/System Change
- 15 Aug.– draft bill EnWG-ÄndG, pre-consultation and internal govt. debate
- 29 Aug. - adopted by Federal Cabinet (government decisison)
  → start of parliamentary process
- 22 Oct. – Hearing by Committee on Economics (Bundestag)
- 29 Nov.– bill adopted by Bundestag (Lower House)
- 14 Dec – bill adopted by Bundesrat (Upper House – Länder)
- 20 Dec.– bill publised in Bundesgesetzblatt (Official Journal)
- 1 Jan.2013 – EnWG ÄndG enters into force

From Plan to Implementation – Federal Plan Offshore Grid Connection (**BFO**)

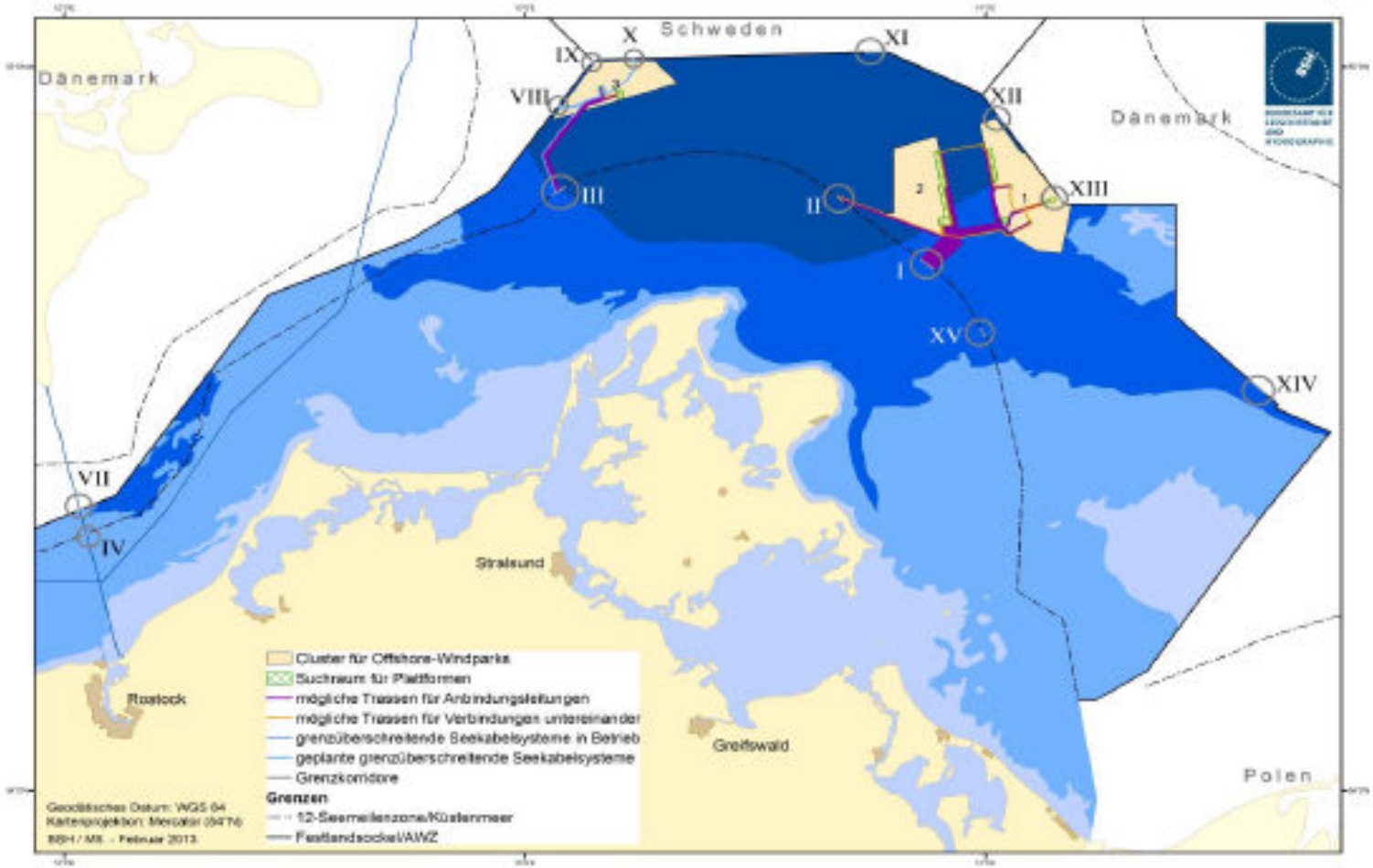
North Sea – MSP arrangements by BSH



Grenzkorridor	Kabel
I (Ems)	3
II (Norderney)	8
III (Europipe 2)	2
IV (Büsum)	4

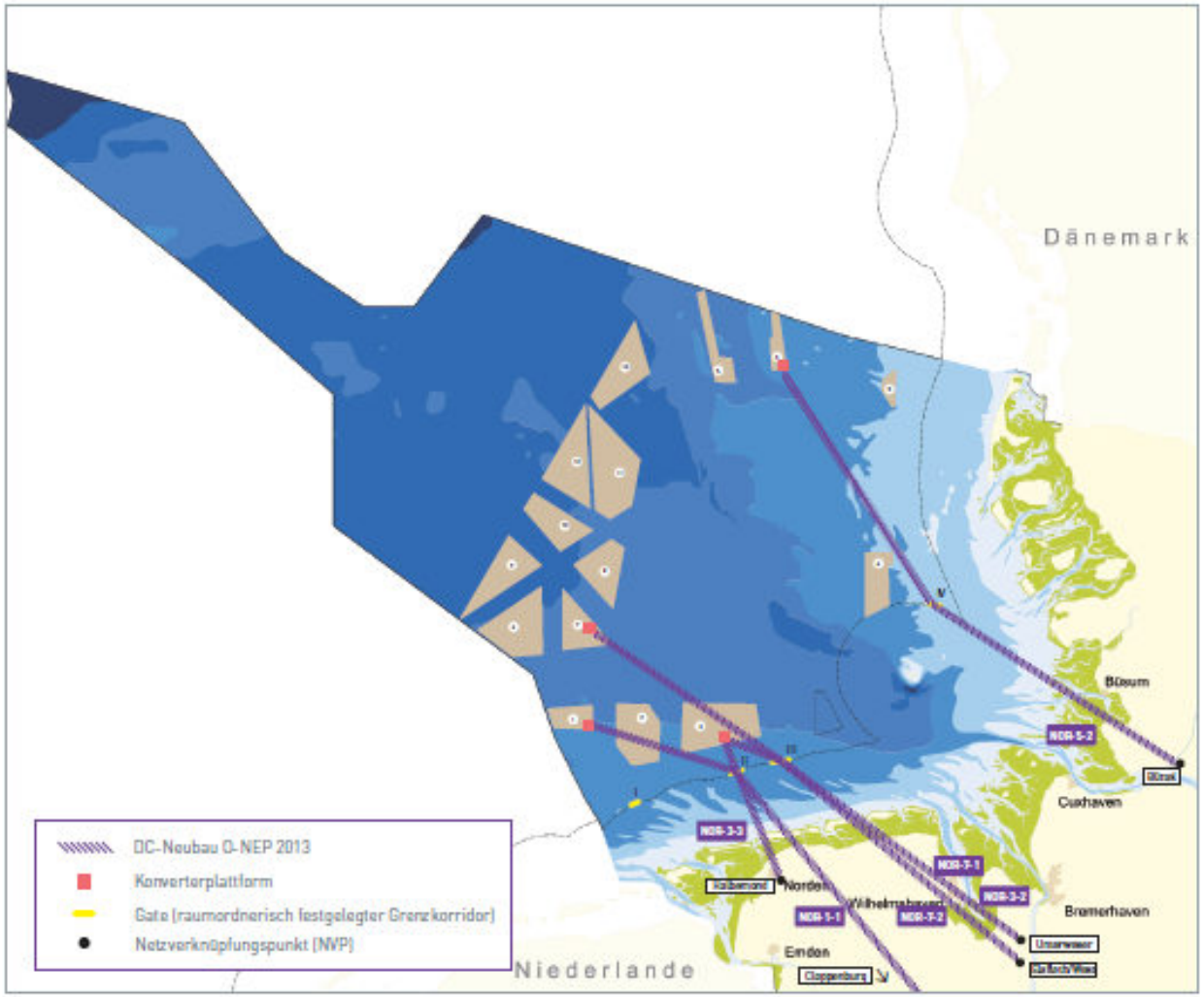
From Plan to Implementation – Federal Plan Offshore Grid Connection (**BFO**)

Baltic Sea - MSP arrangements by BSH



From Plan to Implementation – **O-NEP** (Offshore Grid Development Plan)

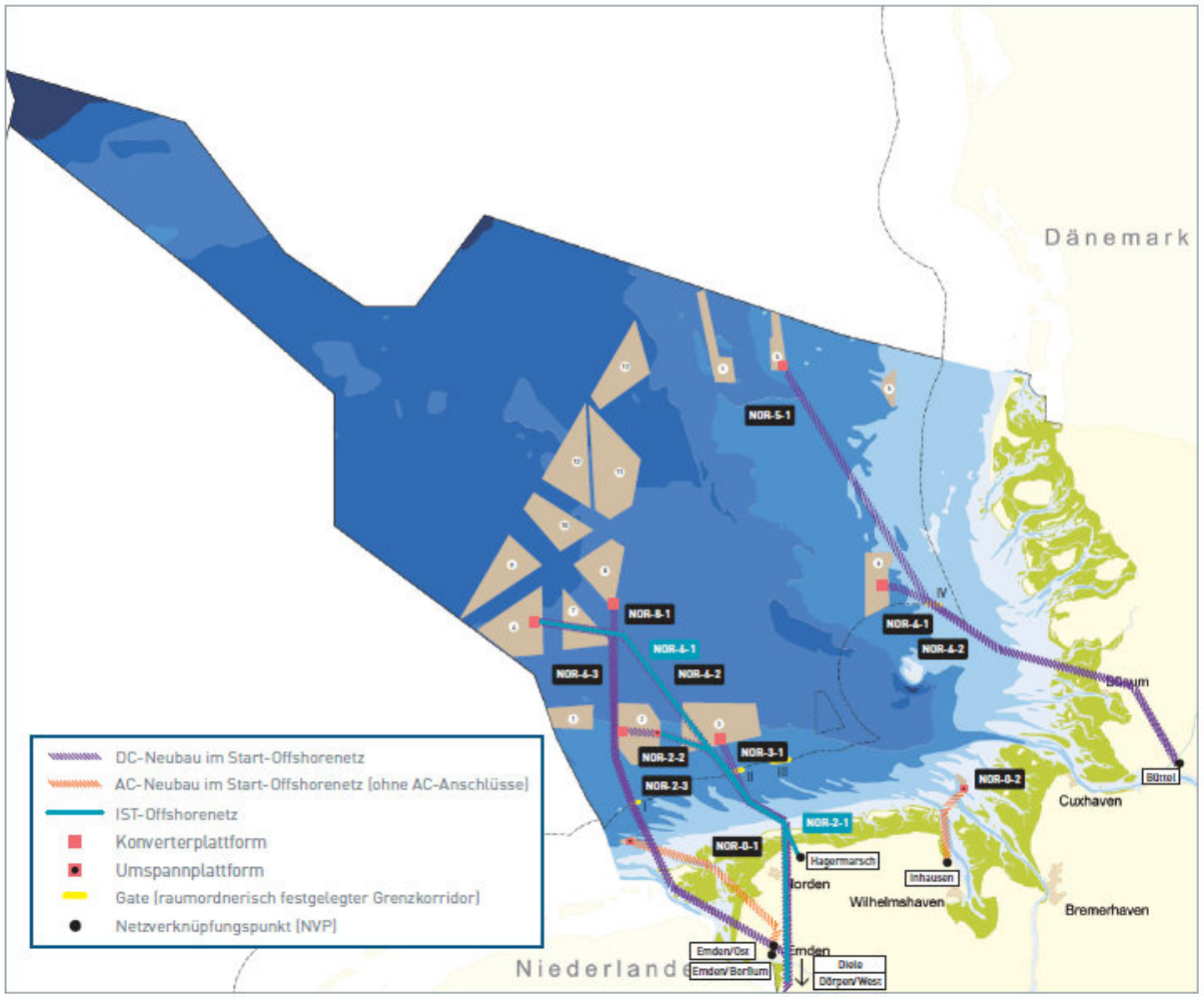
ABBILDUNG 26: SZENARIO B 2023 NORDSEE



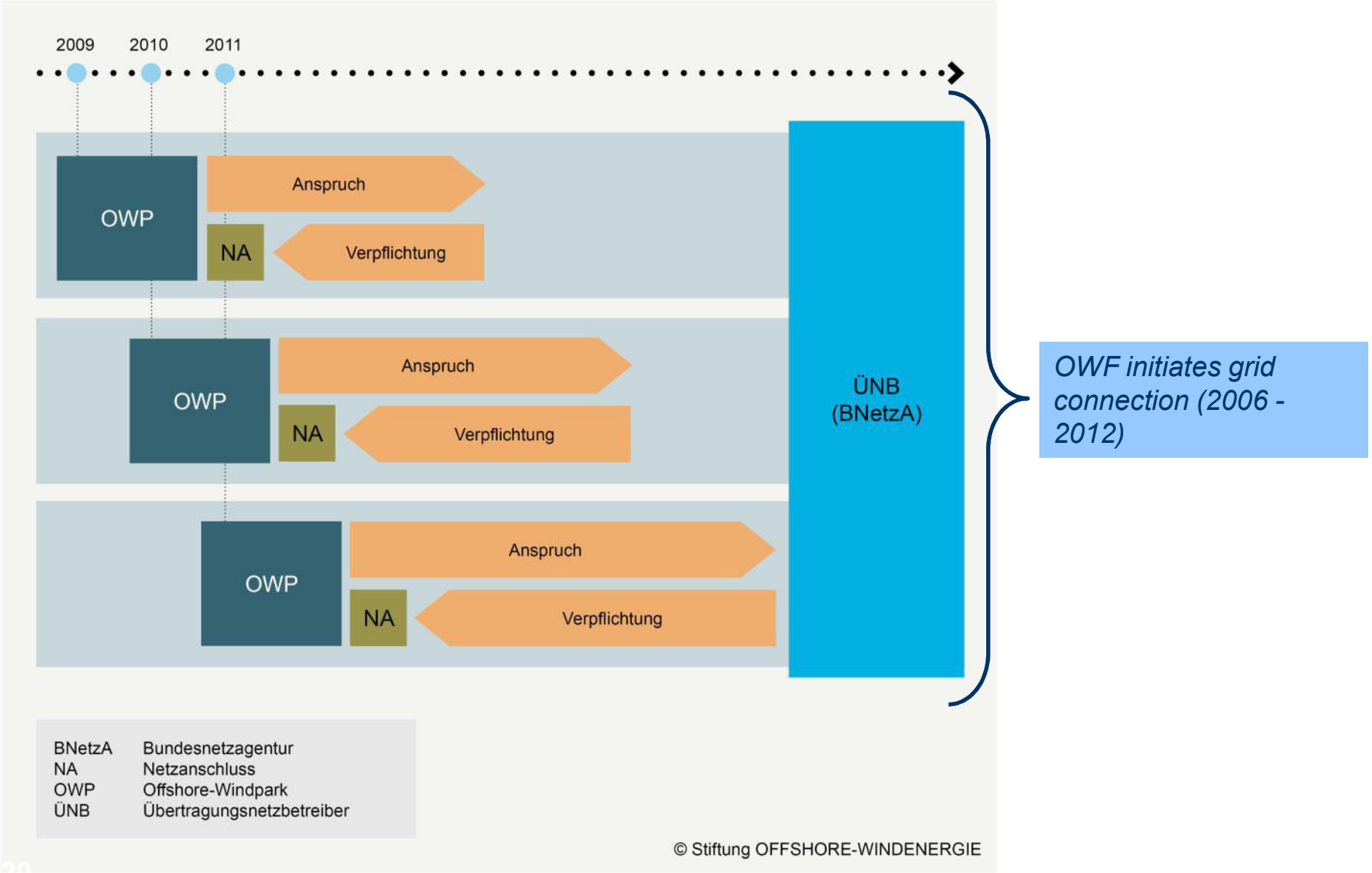
Quelle: Bundesamt für Seeschifffahrt und Hydrographie/Übertragungsnetzbetreiber

From Plan to Implementation – Startnetz (Status Grid)

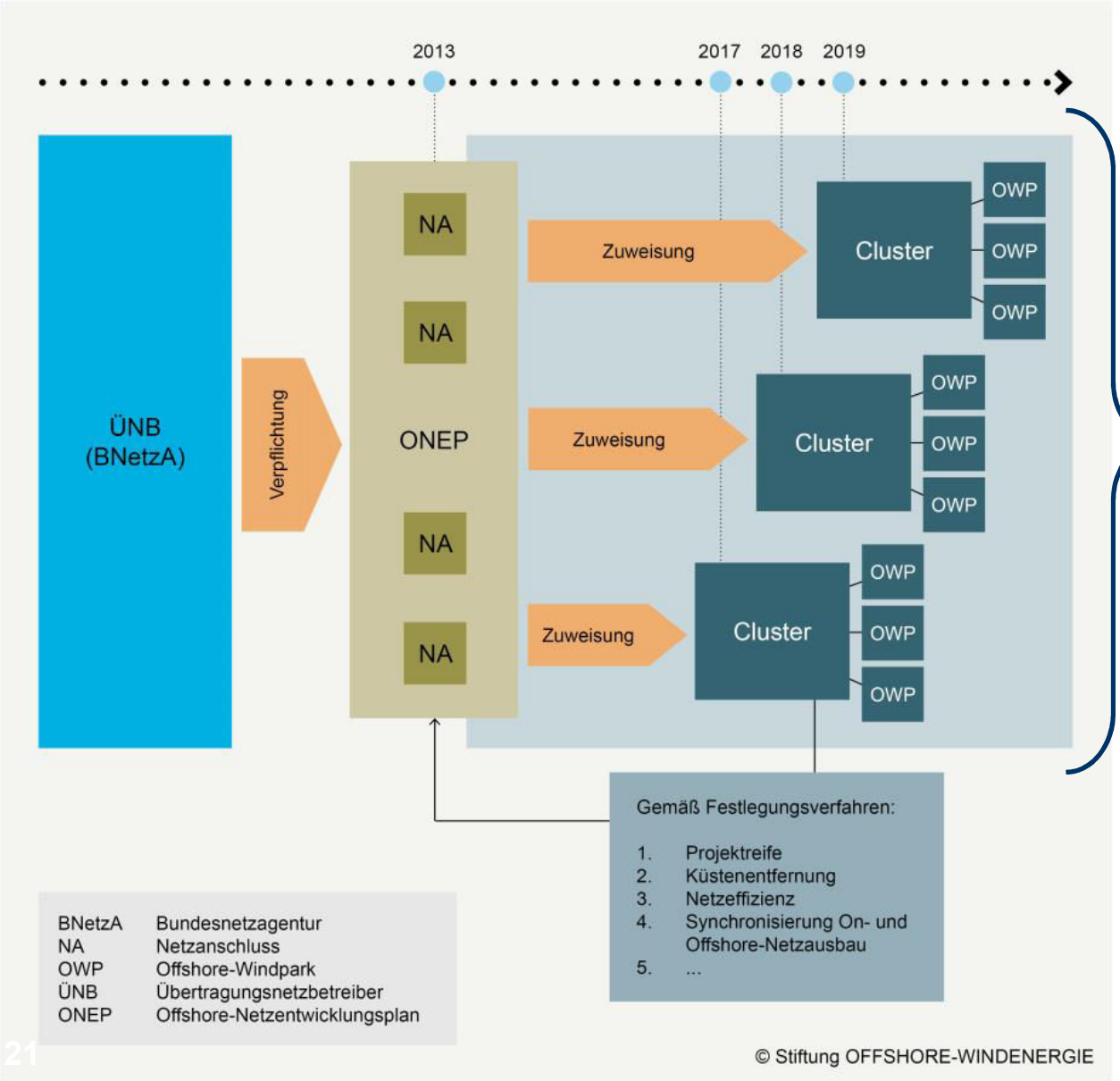
START-OFFSHORENETZ NORDSEE



‚Old' grid connection regime for offshore wind (in force until 2012) (acc. § 17 para 2a EnWG, supplemented by PP BNetzA)

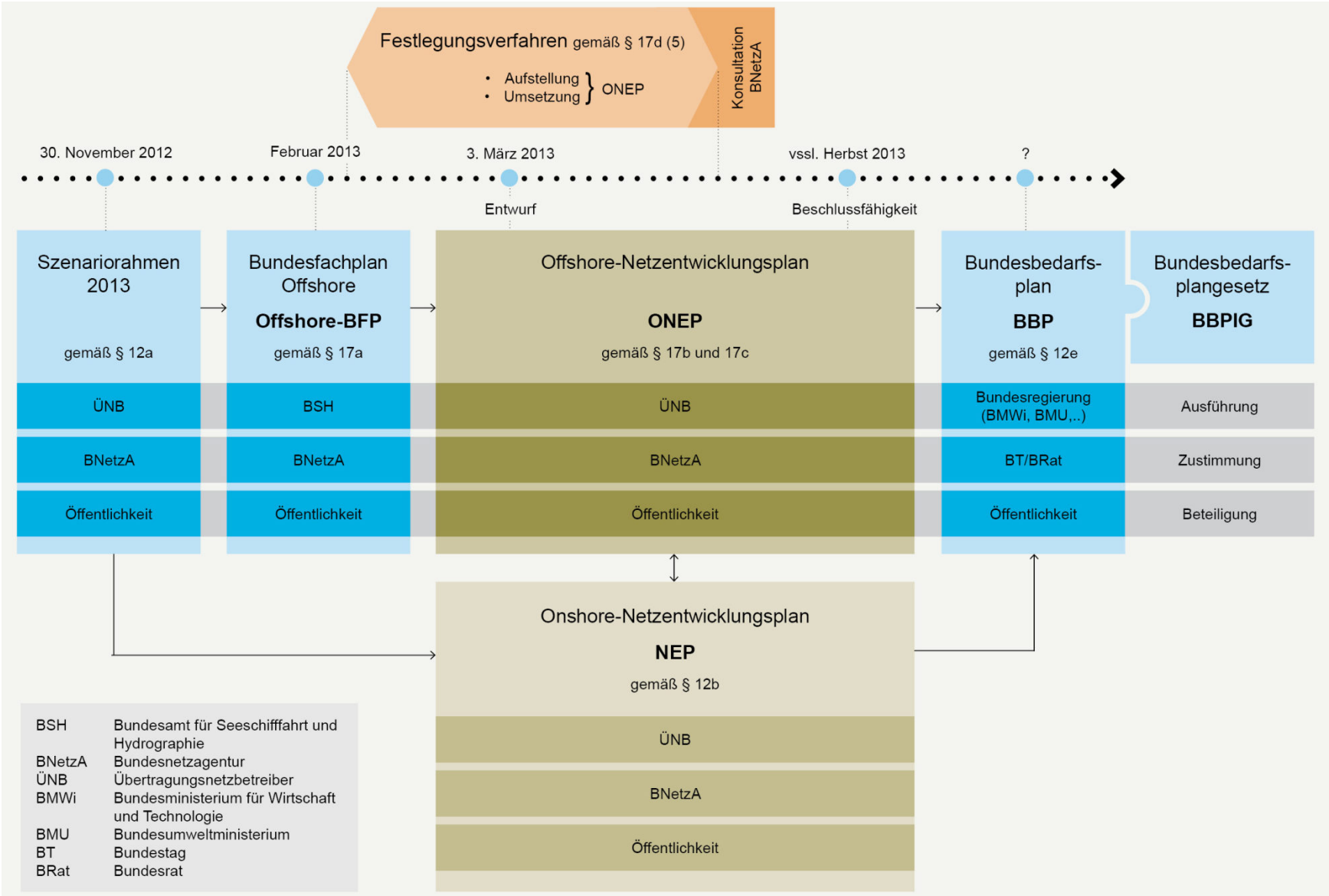


‚New' grid Connection Regime as of 2013, acc. to para 17a ff. EnWG



System Change:
Main Objective – *Creation of an efficient and demand-oriented grid infrastructure –*
prior to OWF connection, resp. as much as possible synchronised development

EnWG 2013 – Implementation System Change (process-oriented)



Risk mitigation strategies acc. to para 17f EnWG

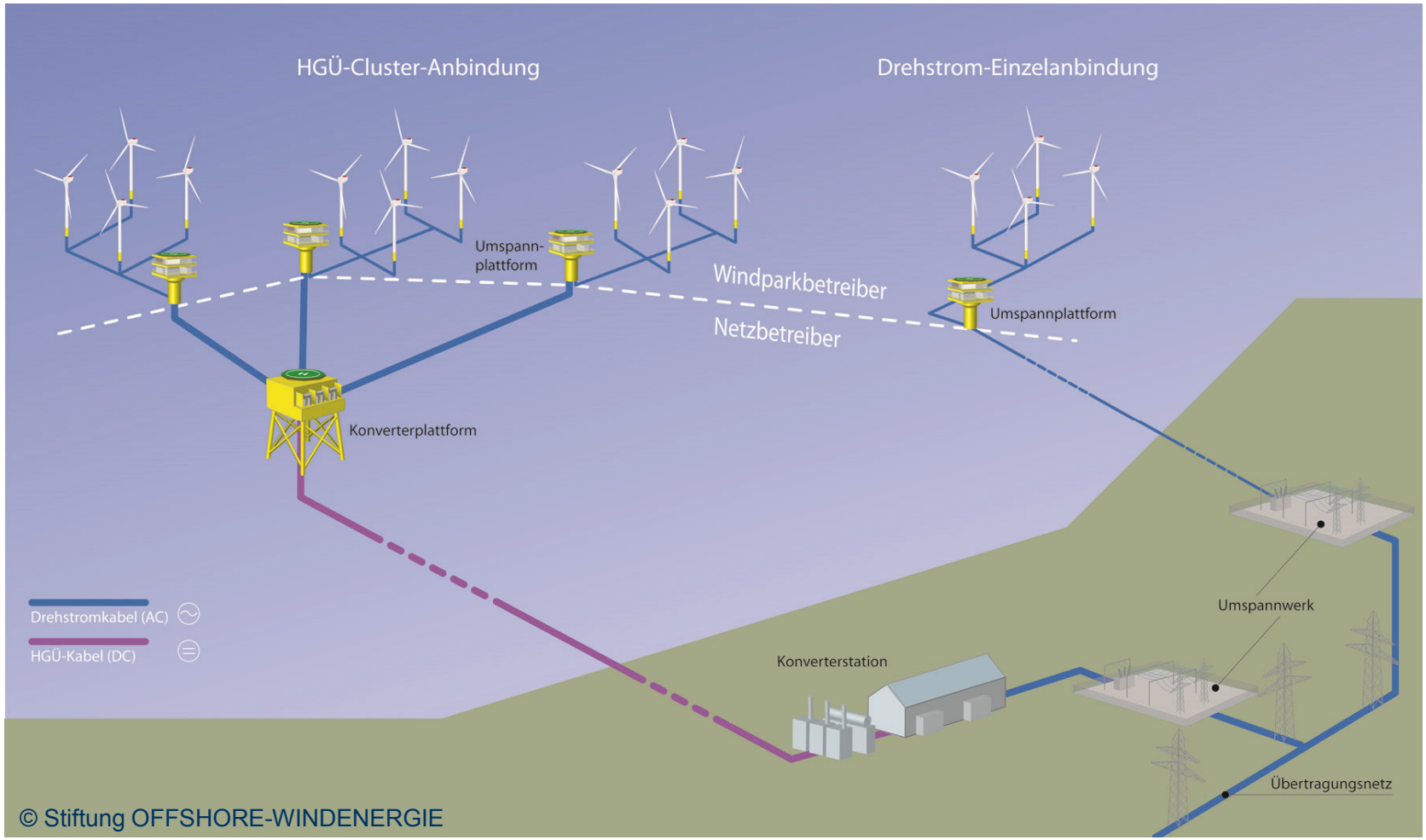
Risk mitigation strategies are available (acc. to state of the art) & need to be considered (part of O-NEP, details under consultation):

- ***Realisation Schedules*** (part of O-NEP acc. para 17d EnWG), incl. option to prioritise certain grid connections
- ***Grid connection management*** and temporary grid connection measures requ. technical implementation and cost allowance by the regulator
- ***Meshed grid*** (connection of clusters/converter stations) – ensures system stability in case of damage/failure of a single DC cable/platform

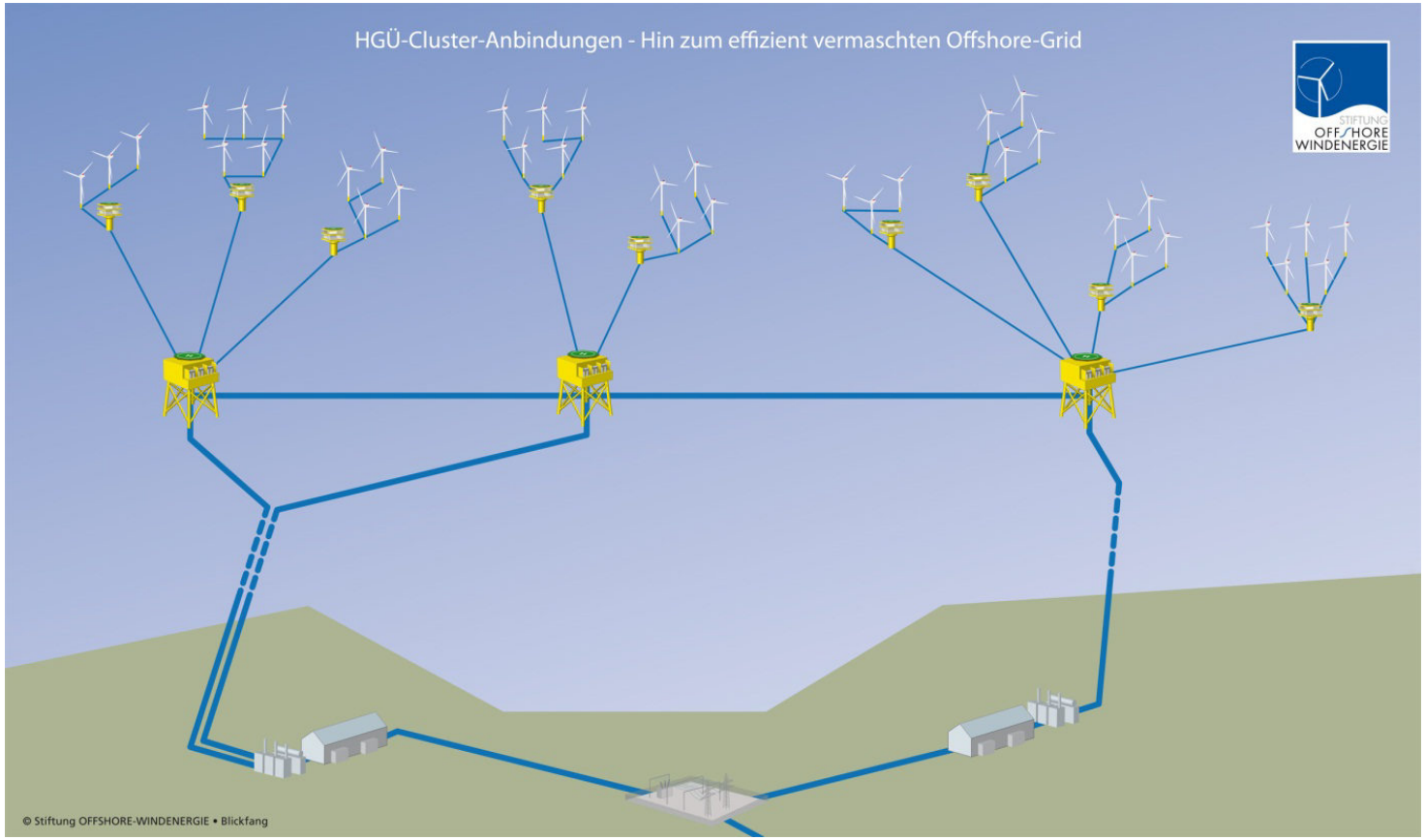
Risk mitigation strategies have been incorporated in the EnWG →
Aim: *Optimise system economic and technical solutions and reduce potential liability exposure.*

OWF cluster connection – today

Approach so far: singular (DC) grid (cluster) connections -
Contains substantial risk to energy system stability and economics



Future Perspective/SOW proposal: Meshed Offshore Grid



Aim:

Create a „flexible" offshore grid as an element of ‚applied consumer protection!'

- Minimising grid interruptons and delays in grid connection
- Continuously ensuring **system safety and stability**
- Risk mitigation

→ Can/should be implemented in the short/medium-term

Realisation (implementaton) Schedules

- Needed to improve and facilitate the information exchange/ dialogue between TSO and OWF developers by
  - Overcoming bilateral relationship,
  - Instead, bringing all stakeholders involved around the table (authorities, certifying bodies, insurance and finance service providers, maritime industry, supliers of components and cables, etc)

- Integral part of the new regime (EnWG para 17d)

- Even more important for the so-called ‚Startnetz‘ the government/regulator needs to make sure that DC capacities already contracted or under construction (6,2 GW) by TSO (TenneT) are sufficiently and timely filled with OWFs

- Realisation (implementation) schedules are needed both on macro and micro level

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Conclusion and open questions

- How can TSOs ensure a sustainable financing of the grid (both offshore, as well as onshore, e.g. overlay-grid)?

  → SOW suggested in 2012 as a short-term and temporary option *the involvement of KfW*

- In the mid-term, a strong and capable organisational structure is needed (open for third party investors) which ensures system stability and proper management of the ‚Energiewende', e.g. a National TSO?

- A **systematic approach**, incl. meshed (offshore) grid, standardisation and implementation schedules with all parties involved can lead to
  - drastically reduced risk exposure in case of grid failure/damage (BET study 2012)
  - delays can be overcome/mitigated
  - a more flexible and stable (offshore) grid by standardisation
  - spare parts management and downtime/repair times can be reduced drastically (studies by MARSH, Deutsche. WindGuard)

  → *Ultimately **improving conditions for financing/insurance** for (offshore) grid connection systems (DC) and OWFs.*

Open Questions & Demands from the sector

What's needed (in Germany, and elsewhere):

A strong, stable and reliable political and financial framework for OWE, including the grid → requires **political leadership** →
Creates **Sustainable development with jobs and new economic prospects !**

Anything else?

Thank you!!

Andreas Wagner,
German Offshore Wind Energy Foundation
Oldenburger Str. 65, 26316 Varel, Germany
Phone: +49-4451-9515-161, Fax: +49-4451-9515-249
info@offshore-stiftung.de

Berlin Office
Schiffbauerdamm 19, 10117 Berlin, Germany
Phone: +49-30-27595-141, Fax: +49-30-27595142
berlin@offshore-stiftung.de

www.offshore-stiftung.de www.offshore-windenergie.net