German WindEnergy Association (BWE)

Stall or boom? When is kick-off for the German offshore market?

Hermann Albers
BWE Vice President

Copenhagen Offshore Wind 2005
Thursday 27.10.2005

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Strategy of the Federal Government of Germany

- Gradual development of wind energy capacity up to **3.000 MW until 2010** and **25.000 MW until 2030**

Covering 15 % of German electricity consumption and large contribution to climate protection

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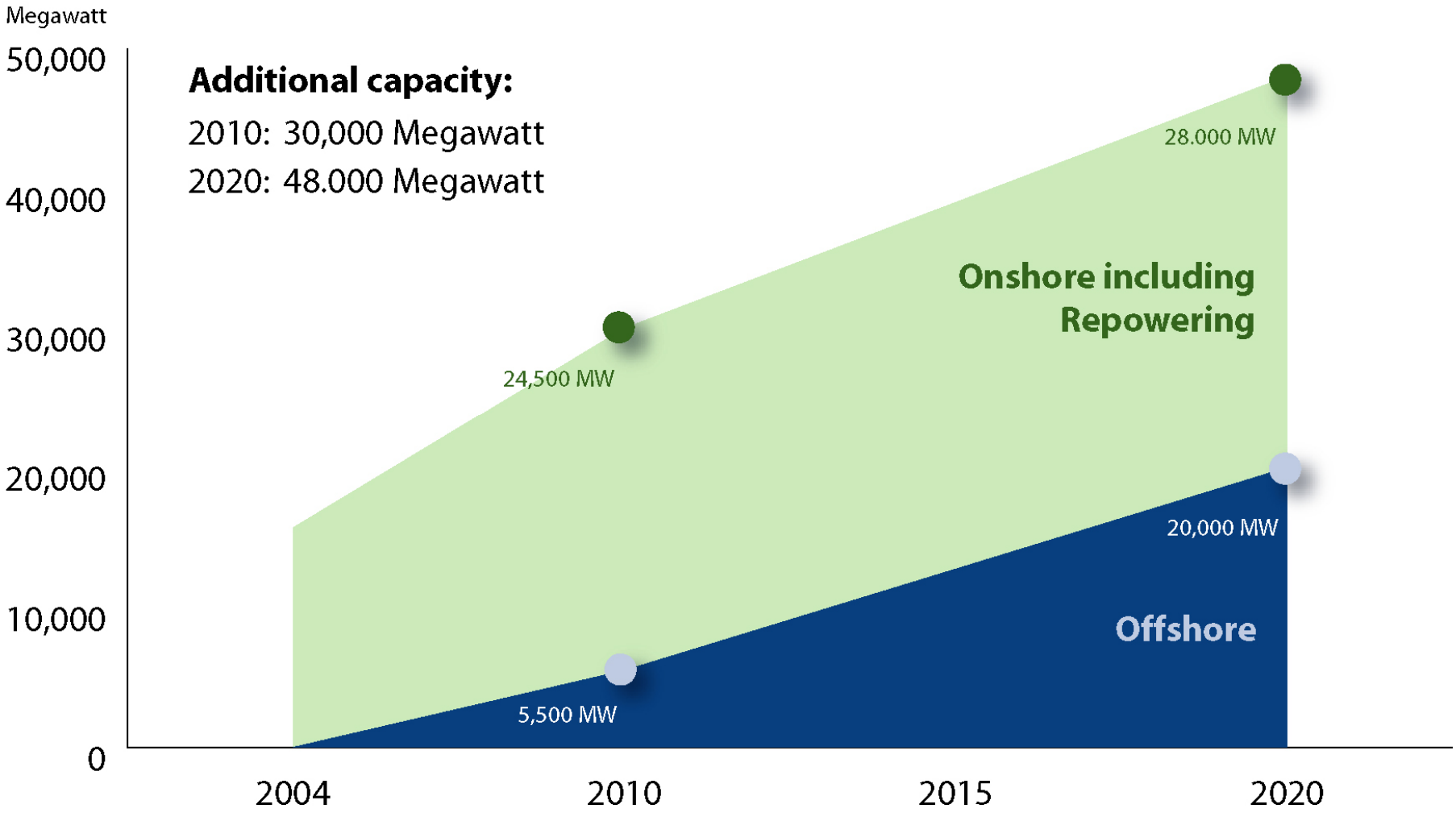
Development of Wind energy in Germany until 2030

Data from: DENA 2005



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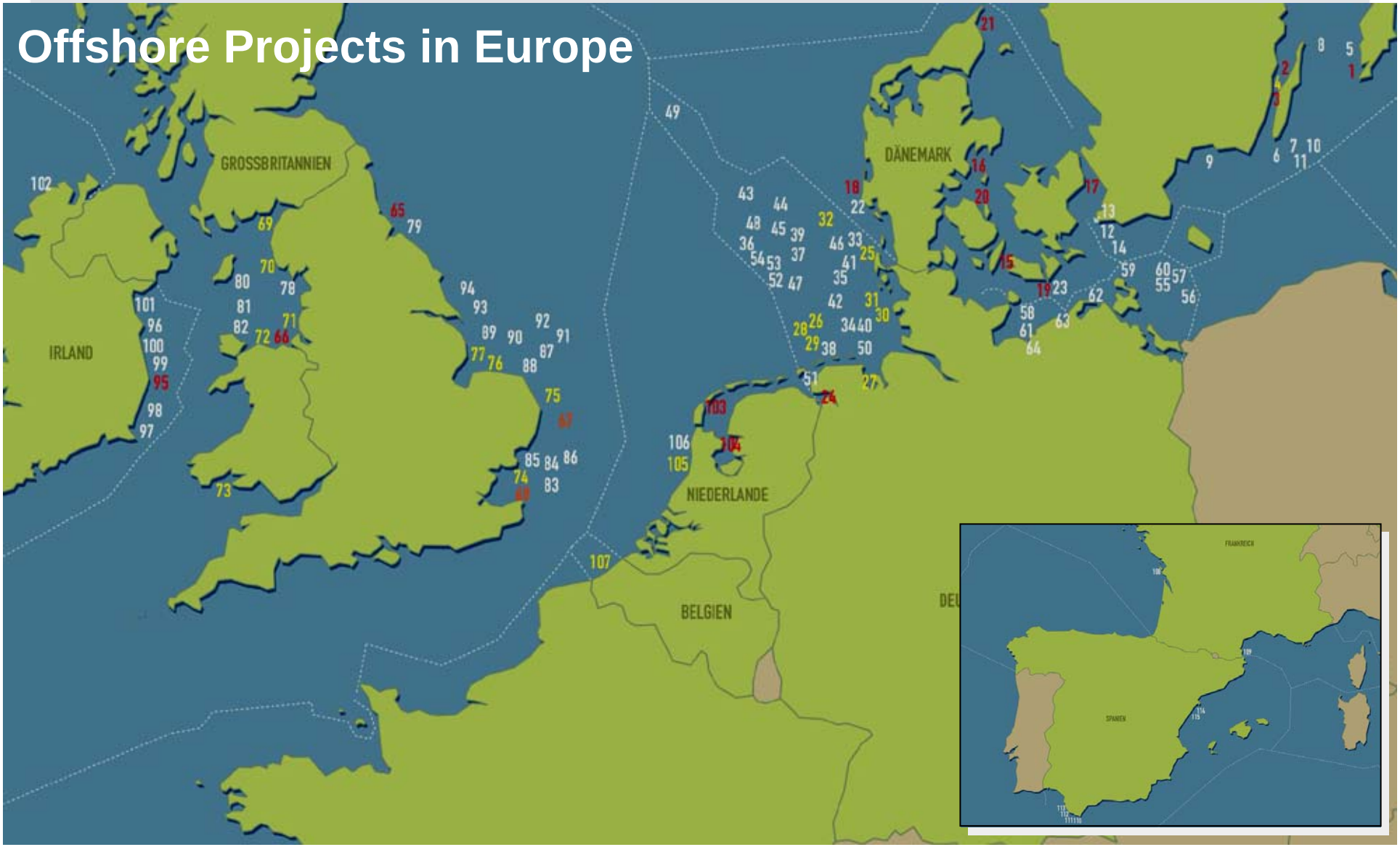
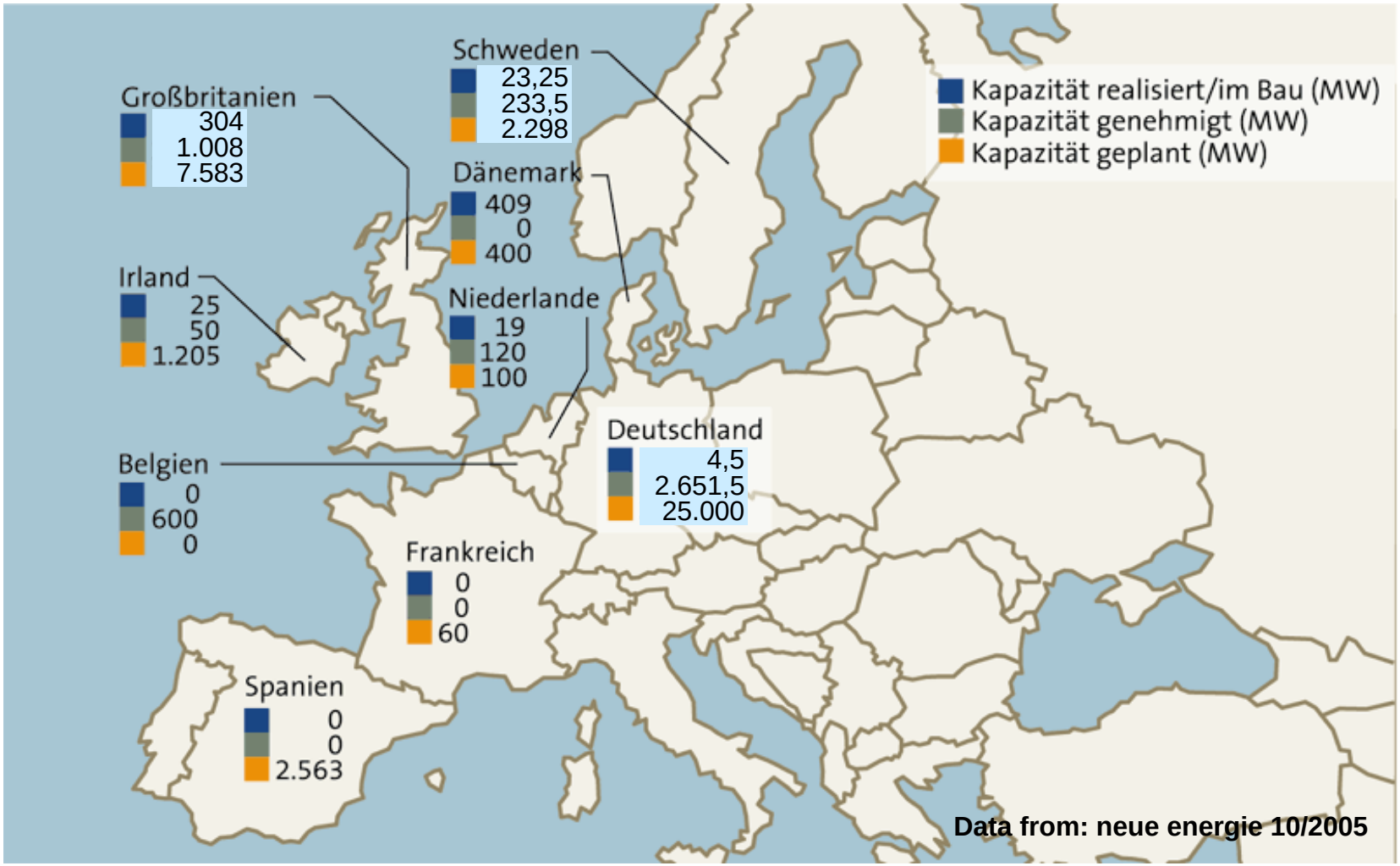
Offshore Projects in Europe



Status Offshore Wind Energy in Europe



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Offshore Projects in Europe

Country	total number of projects		implemented		licensed		planned	
	number	Megawatt	number	Megawatt	number	Megawatt	number	Megawatt
Denmark	9	809	7	409	--	--	2	400
United Kingdom	30	8.913	4	214	9	1.116	17	7.583
Sweden	14	2.521	3	23	2	134	9	2.364
The Netherlands	4	239	2	19	1	120	1	100
Ireland	8	1.280	1	25	1	50	6	1.205
Germany	41	70.682	1	4,5	8	2.036	37	68.642
for comparison	onshore share of almost 30 % in the world wind energy market, offshore 0,5 %.							
Belgium	1	600	--	--	1	600	--	--
Spain	6	2.563	--	--	--	--	6	2.563
France	2	60	--	--	--	--	2	60

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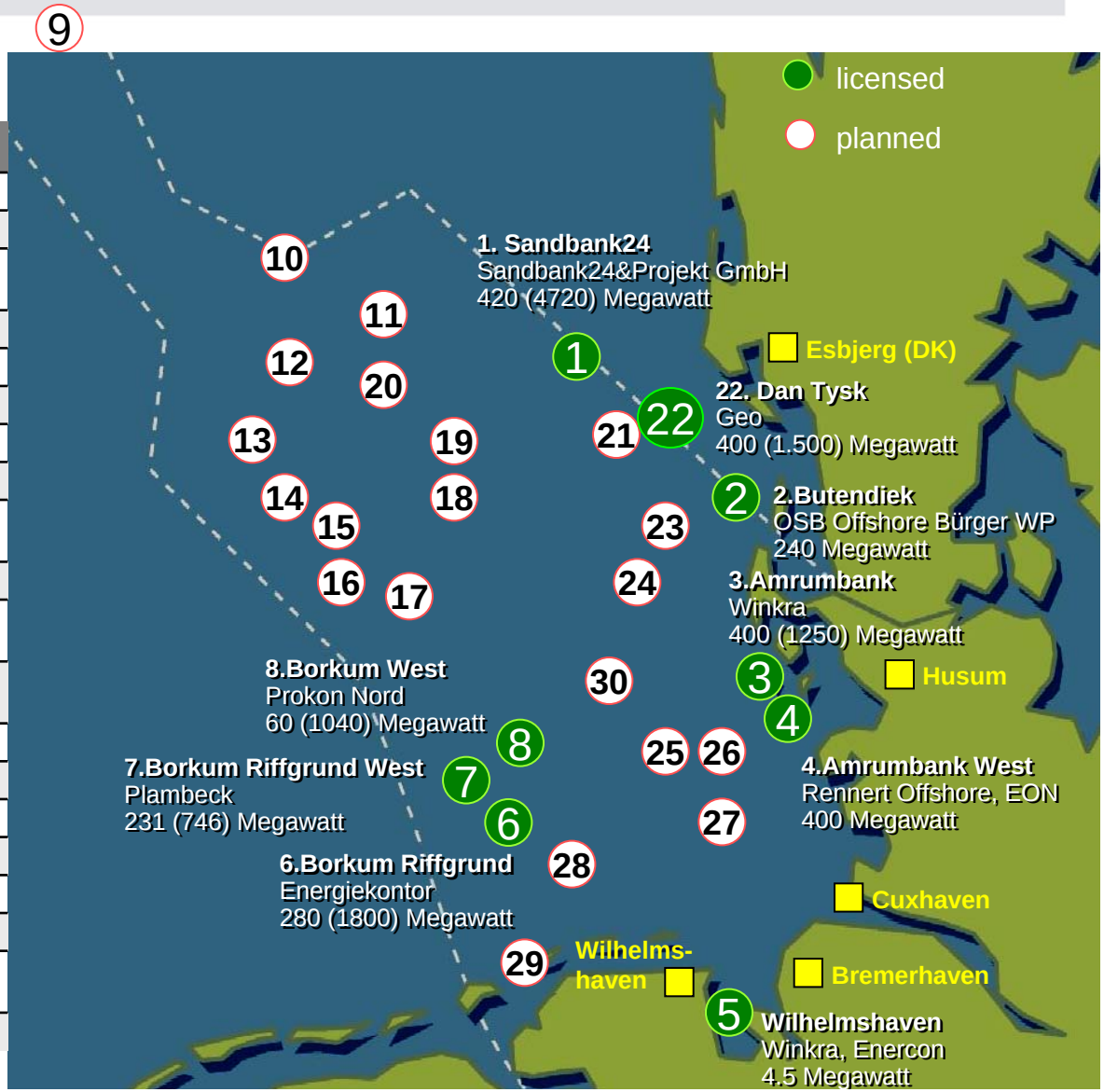
Offshore-Projects in Germany - North Sea

Nr	Project	Executing Organ.	Megawatt
9	H2-20	Geo	400 (4.000)
10	Jules Verne	Plambeck	13.500
11	Ventotec Nord 1	Arcadis (Dt. Bank, GHF, Vestas)	150 (600)
12	TGB Nord	Ep4 Offshore	1.005 (2.550)
13	Forseti	Prokon Nord	17.500
14	Deutsche Bucht	Rennert Offshore	400 (400)
15	Austergrund	Rennert Offshore	400 (400)
16	Bard Offshore 1	Bard Engeneering	400 (1.600)
17	Hochsee Windpark HE dreiht	EOS Offshore	536
18	Globaltech 1	Nordsee Windpower	360 (1.440)
19	Hochsee Windpark Nordsee	EOS Offshore	536 (2.286)
20	Ventotec Nord 2	Arcadis (Dt. Bank, GHF, Vestas)	150 (600)
21	Nördlicher Grund	GEO, ABB, GREP	360 (2.195)
23	Uthland	Geo	400
24	Weiße Bank 2010	OSB Butendiek	2.700
25	Meerwind	Windland	265 (819)
26	Godewind	Plambeck	320 (896)
27	Nordergründe	Energiekontor	125 (270)
28	Offshore North Sea Windpower	Enova	203 (1.255)
29	Riffgat	Enova	400 (1.600)



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Offshore-Projects in Germany - Baltic Sea

Nr	Project	Executing Organ.	Megawatt
1	Sky 2000	GEO, EON	10 (100)
2	Wismar	Arcadis (Dt. Bank, GHF, Vestas)	2
3	Breitling	Offshore Ostsee Wind AG	2,3
4	Baltic 1	Offshore Ostsee Wind AG	51
5	Arcona ,Becken Südost	AWE (EON, Brockmüller Energy consulting)	400 (1.005)
6	Ventotec Ost 2	Arcadis (Dt. Bank, GHF, Vestas)	150 (600)
7	Adlergrund	OWP	280 (720)
8	Pommersche Bucht	Winkra	350 (1.000)
9	Baltsee	Plambeck	75 (415)

Different conditions for German Offshore Wind Energy Projects

- For reasons of nature protection large distance to coast of 30 to 100 km, here water depth of 20-40 m

Technological development of new turbines

- Grid connection
- Offshore much more expensive than onshore

Total costs of offshore installation currently about 2.000 € / kW, (initial studies were estimating costs at about 1.400 € / kW)

Technical development – also for the Offshore market

The currently biggest wind turbines

	Enercon E-112	Repower 5M	Multibrid M5000
Capacity	4.5 MW	5 MW	5 MW
Hub hight	112 meters	120 meters	102,6 meters
Rotor diameter	114 meters	126 meters	116 meters
Currently installed	5 turbines (Emden, Wilhelmshaven, etc.)	1 turbine (Brunsbüttel)	1 turbine (Bremerhaven)

Question: Do bigger wind turbines lead to further degression of costs?

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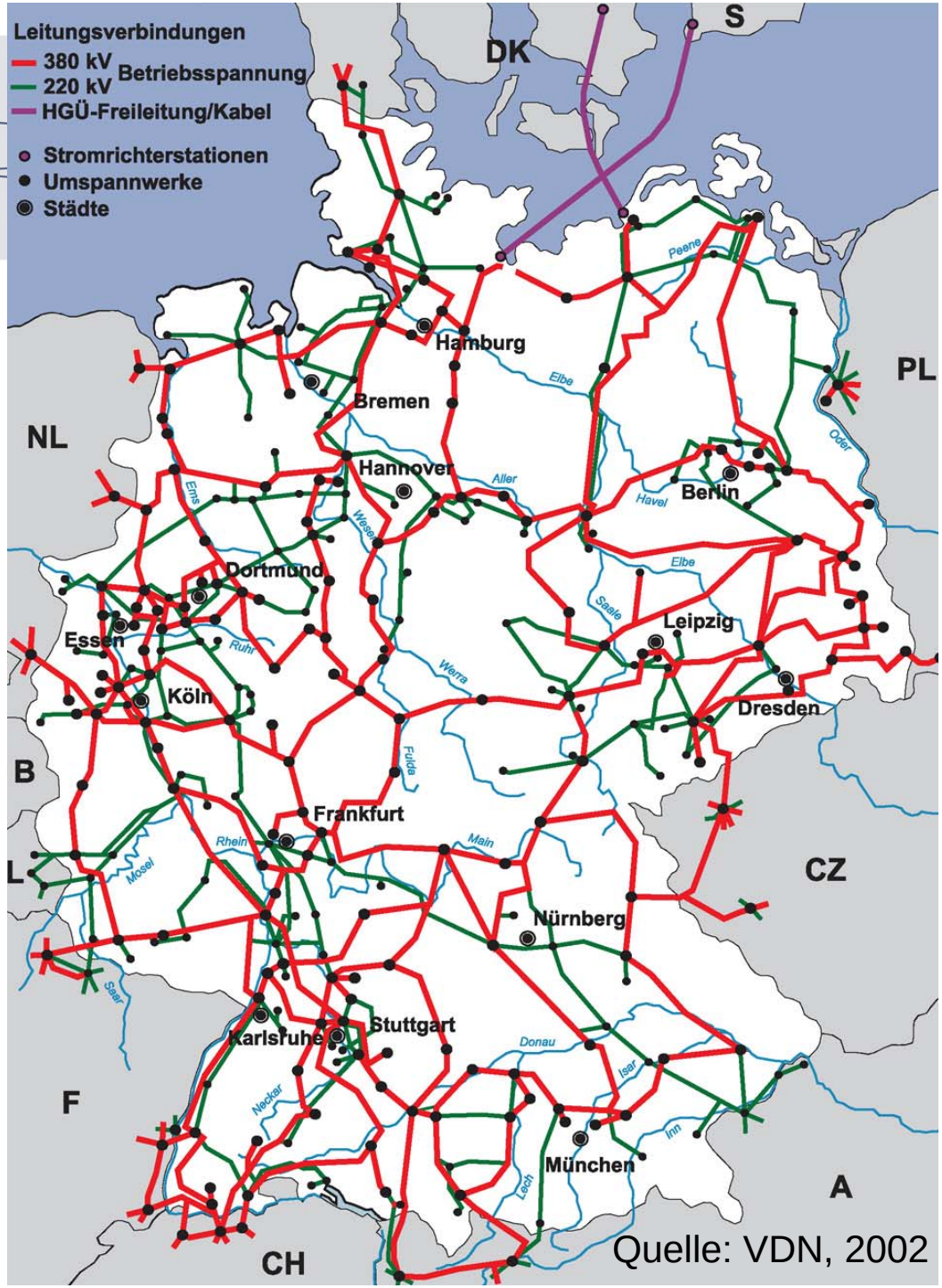
German power grid

Present power grid and points of transnational coupling.



Quelle: VDN, 2002

Limited grid capacity for wind energy

Methods of resolutions

- Optimal grid utilisation
- Grid extension
- Management of electricity production (ErzMan)

Criteria for assessment

- macroeconomic optimal costs
- As much compliant with landscape
- Efficient licensing process

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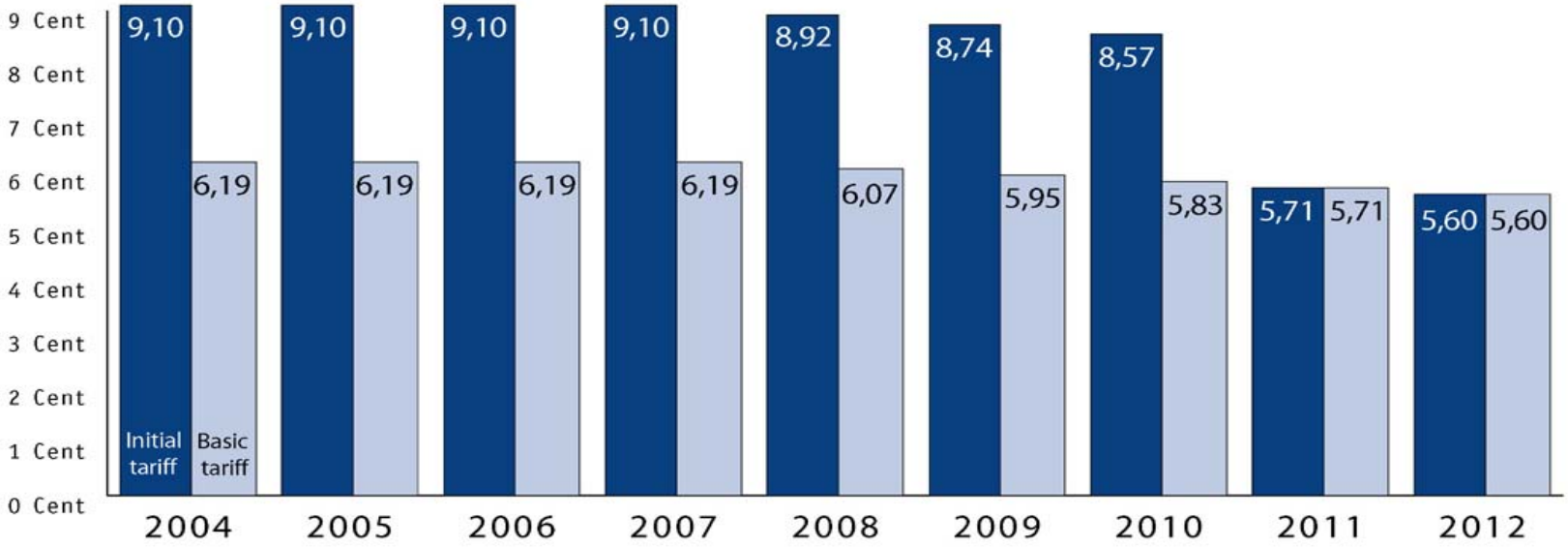
Renewable energy sources act (EEG) recompensation for wind electricity offshore

Development of recompensation of offshore wind energy.

New details:

- Plants that go into operation before 2010 get higher initial tariff for 12 years.
- Annual digression of 2% from 1.1.2008.
- Prolanged Initial tariff:
  per sea-mile - 0.5 months (starting from 12 miles)
  per meter water depth - 1.7 months (from 20m depth)



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Renewable energy sources act (EEG) recompensation for wind electricity offshore

Prolonged initial tariff in month:

- per sea-mile (sm) - 0.5 month (from 12 miles)
- per meter depth of water 1.7 month (from 20m depth)

	12 sm	13 sm	14 sm	15 sm	16 sm	17 sm	18 sm	19 sm	20 sm	21 sm	22 sm	23 sm	24 sm	25 sm	26 sm	27 sm	28 sm	29 sm
20 m	0,00	0,50	1,00	1,50	2,00	2,50	3,00	3,50	4,00	4,50	5,00	5,50	6,00	6,50	7,00	7,50	8,00	8,50
21 m	1,70	2,20	2,70	3,20	3,70	4,20	4,70	5,20	5,70	6,20	6,70	7,20	7,70	8,20	8,70	9,20	9,70	10,20
22 m	3,40	3,90	4,40	4,90	5,40	5,90	6,40	6,90	7,40	7,90	8,40	8,90	9,40	9,90	10,40	10,90	11,40	11,90
23 m	5,10	5,60	6,10	6,60	7,10	7,60	8,10	8,60	9,10	9,60	10,10	10,60	11,10	11,60	12,10	12,60	13,10	13,60
24 m	6,80	7,30	7,80	8,30	8,80	9,30	9,80	10,30	10,80	11,30	11,80	12,30	12,80	13,30	13,80	14,30	14,80	15,30
25 m	8,50	9,00	9,50	10,00	10,50	11,00	11,50	12,00	12,50	13,00	13,50	14,00	14,50	15,00	15,50	16,00	16,50	17,00
26 m	10,20	10,70	11,20	11,70	12,20	12,70	13,20	13,70	14,20	14,70	15,20	15,70	16,20	16,70	17,20	17,70	18,20	18,70
27 m	11,90	12,40	12,90	13,40	13,90	14,40	14,90	15,40	15,90	16,40	16,90	17,40	17,90	18,40	18,90	19,40	19,90	20,40
28 m	13,60	14,10	14,60	15,10	15,60	16,10	16,60	17,10	17,60	18,10	18,60	19,10	19,60	20,10	20,60	21,10	21,60	22,10
29 m	15,30	15,80	16,30	16,80	17,30	17,80	18,30	18,80	19,30	19,80	20,30	20,80	21,30	21,80	22,30	22,80	23,30	23,80
30 m	17,00	17,50	18,00	18,50	19,00	19,50	20,00	20,50	21,00	21,50	22,00	22,50	23,00	23,50	24,00	24,50	25,00	25,50
31 m	18,70	19,20	19,70	20,20	20,70	21,20	21,70	22,20	22,70	23,20	23,70	24,20	24,70	25,20	25,70	26,20	26,70	27,20
32 m	20,40	20,90	21,40	21,90	22,40	22,90	23,40	23,90	24,40	24,90	25,40	25,90	26,40	26,90	27,40	27,90	28,40	28,90
33 m	22,10	22,60	23,10	23,60	24,10	24,60	25,10	25,60	26,10	26,60	27,10	27,60	28,10	28,60	29,10	29,60	30,10	30,60
34 m	23,80	24,30	24,80	25,30	25,80	26,30	26,80	27,30	27,80	28,30	28,80	29,30	29,80	30,30	30,80	31,30	31,80	32,30
35 m	25,50	26,00	26,50	27,00	27,50	28,00	28,50	29,00	29,50	30,00	30,50	31,00	31,50	32,00	32,50	33,00	33,50	34,00
36 m	27,20	27,70	28,20	28,70	29,20	29,70	30,20	30,70	31,20	31,70	32,20	32,70	33,20	33,70	34,20	34,70	35,20	35,70

Offshore-Foundation and Offshore Testfarm

- Founded by: Federal Ministry of the Environment, Wind Energy Associations, Manufacturers, Banks, Insurance companies, Firms of Building Contractors, Electricity Companies
- Grid Connection / Operation / Testing Possibilities
- 2007: 42 km north of Borkum test field with twelve turbines of the 5 MW-class
- Technical tests of the turbines under offshore conditions
- More security for financing offshore projects
- Promotion of sustainable production and supply of energy
- Promotion of technological research, development and innovation

Conclusion: When is kick-off in Germany?

Status quo

- German Offshore Wind Energy governmental-initiated in the Offshore Testfarm
- Commercial implementation not yet visible, depends on cost structures and development of energy costs

The BWE recommends

- Efficient expansion of grids / where coupling of grids?
- More possibilities for testing offshore turbines
- Security for investment / governmental suretyships / GE-risks
- Cost of interests
- Accelerated licensing procedures
- Amount of EEG recompensation