

Industry Report 2011

Offshore wind power market Germany

June 2011

Wind Energy Agency WAB

All competencies on board

The Wind Energy Agency - WAB is the leading corporate network for wind energy in the northwest region and nationwide point of contact for the Offshore Wind Energy sector in Germany.

The members of the association counts more than 300 companies and institutions of all areas in the wind energy, the maritime area as well as research institutions.

Main targets of the WAB are the networking and the strengthening of the members network, the extension of the wind energy offshore and onshore and the development of the offshore wind industry in Germany as well as the support for Repowering in the own region.

WAB supports their members in searching appropriate business partners and offers various services and activities like international fair representation, special events, studies, market analysis, lobby and public relations, initiation and accompany research and educational projects as well as study trips.

The WAB organises the biggest international Offshore Conference Germany „WINDFORCE“ annually, regular network meetings, company visits and international delegation welcomes. The WAB is a multiplier for actual wind industry topics and discusses these on regional and federal political level.

www.wab.net



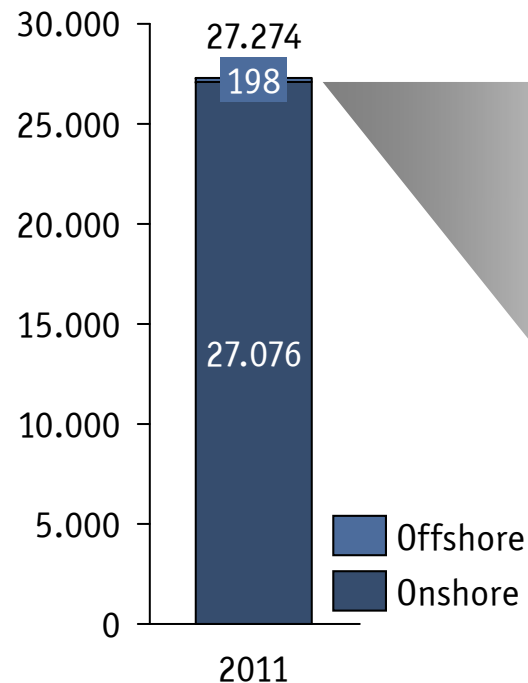


Currently less than 1% of the installed power in Germany is offshore wind energy

About 27.000 MW wind energy in 2011 only
200 MW is offshore

Currently two Offshore Wind Parks are in
operation in Germany

Installed capacity [MW]

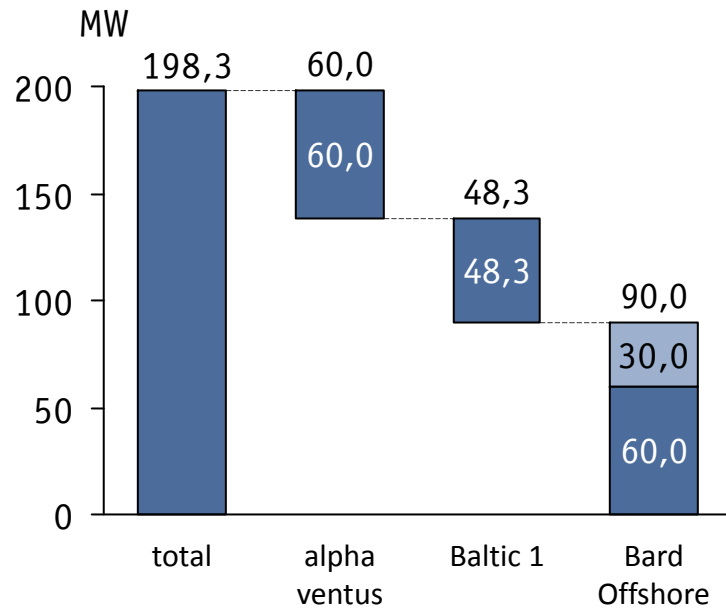


- 1** Wind farm: alpha ventus
Size: 60MW (12 x 5 MW)
Turbines: Repower, AREVA M5000
Operators: DOTI (E.ON, EWE, Vattenfall)
- 2** Wind farm: Baltic 1
Size: 48,3 MW
Turbines: Siemens
Operator: EnBW
- 3** Wind farm: Bard Offshore
Size: 90 MW (18 x 6 MW)
Turbines: Bard
Operator: Bard

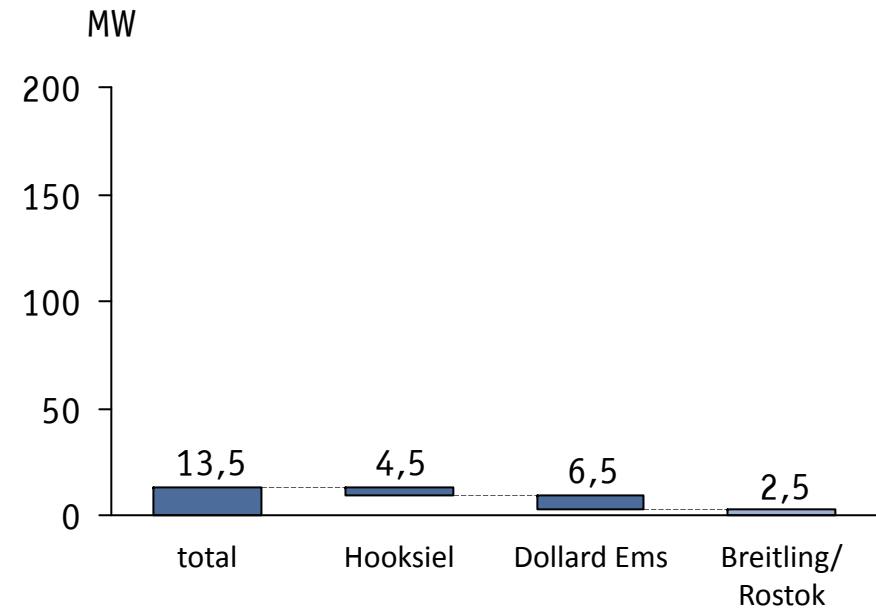


About 200 MW offshore wind energy is installed in Germany

198 MW installed offshore wind power in Germany



App. 14 MW near-shore- or test fields

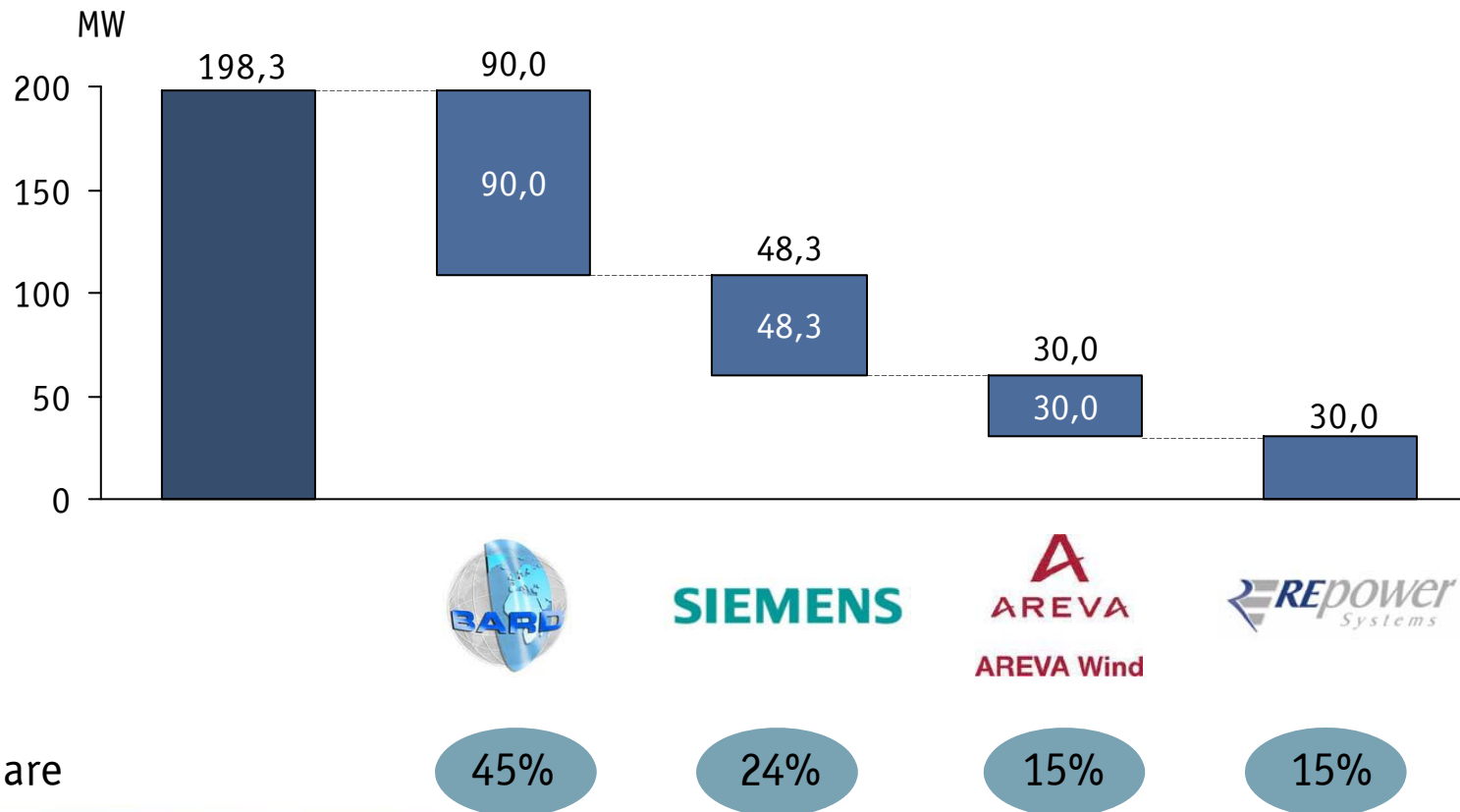


installed turbines	51	12	21	18
turbines on grid	45	12	21	12



BARD turbines with biggest portion (45%) of installed Offshore wind turbines in Germany

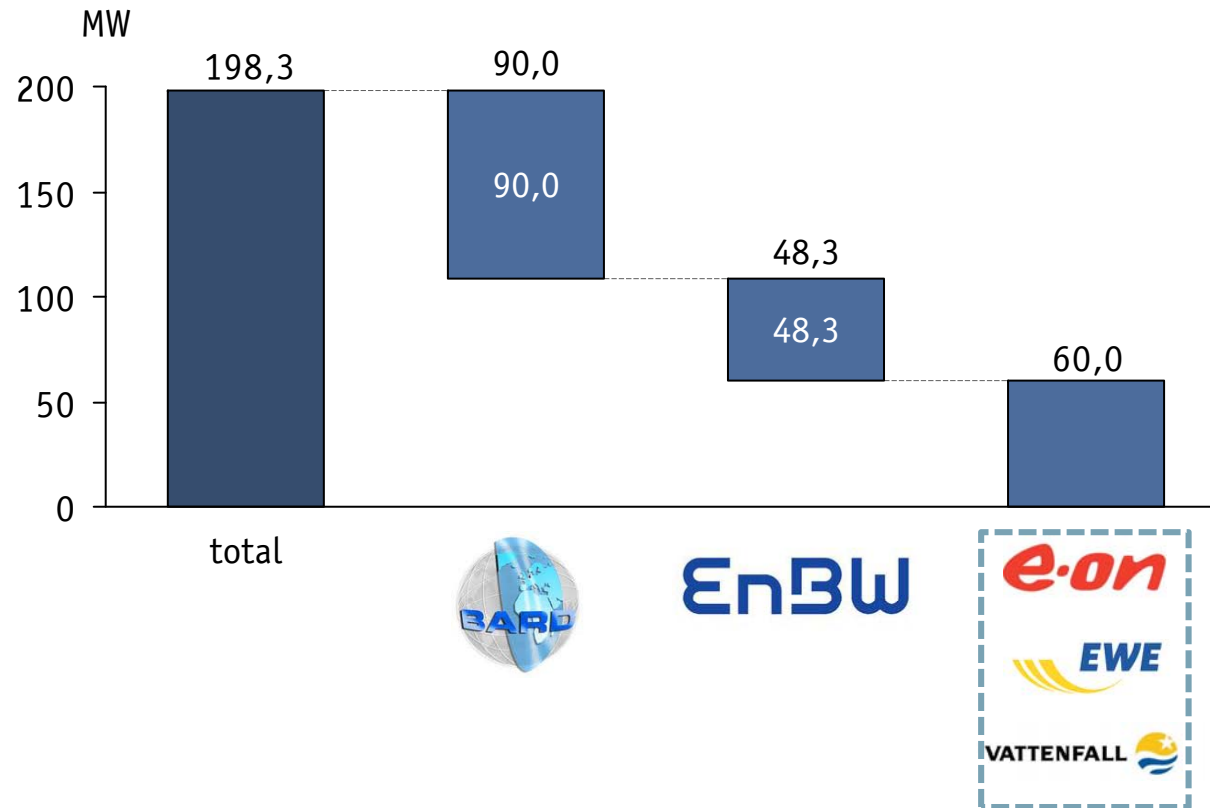
Installed power distributed by turbine manufacturer cumulated market share until 2010 (Germany)





At present BARD is also leading as operator

Installed power distributed by operators

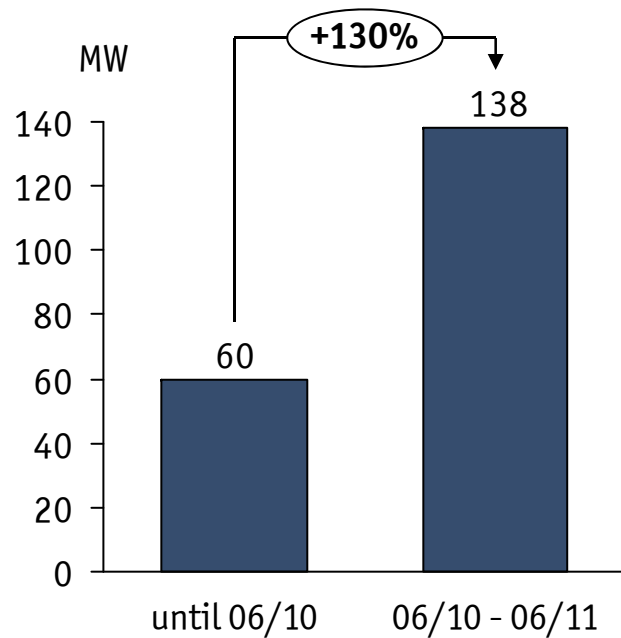




German offshore wind market grows in 2010/11

One offshore wind park with grid connection

Last year around 140 MW new installed...

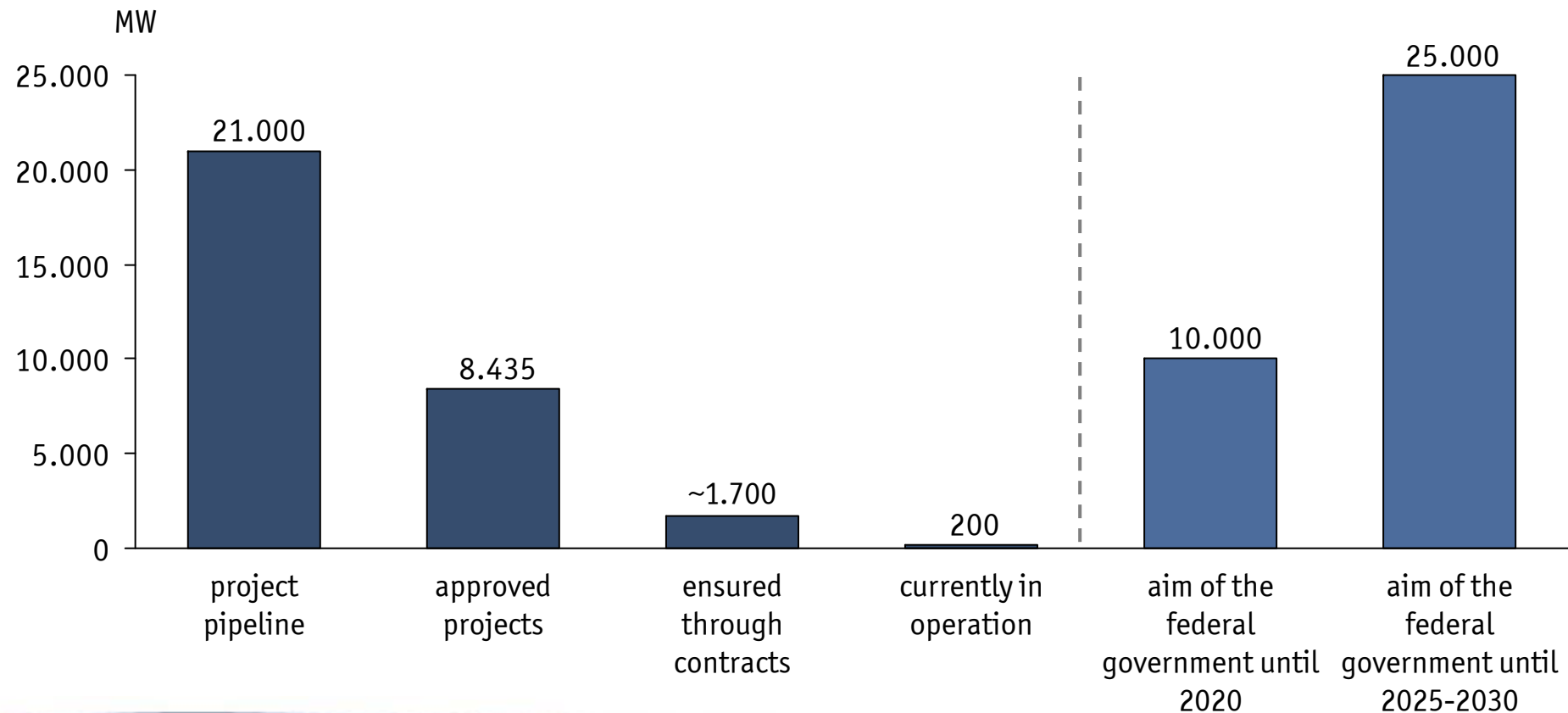


... in two new offshore parks

- 1 Baltic 1 (EnBW):**
21 SIEMENS 2,3 MW turbines erected and grid connected
- 2 BARD Offshore 1 (BARD):**
eighteen BARD 5 MW turbines
12 grid connected








Offshore wind energy its on the way to industrialisation: German offshore industry is born

21.000 MW project pipeline in Germany – already around 8.500 MW consented and about 1.700 MW secured through contracts





The next offshore wind parks to be grid connected

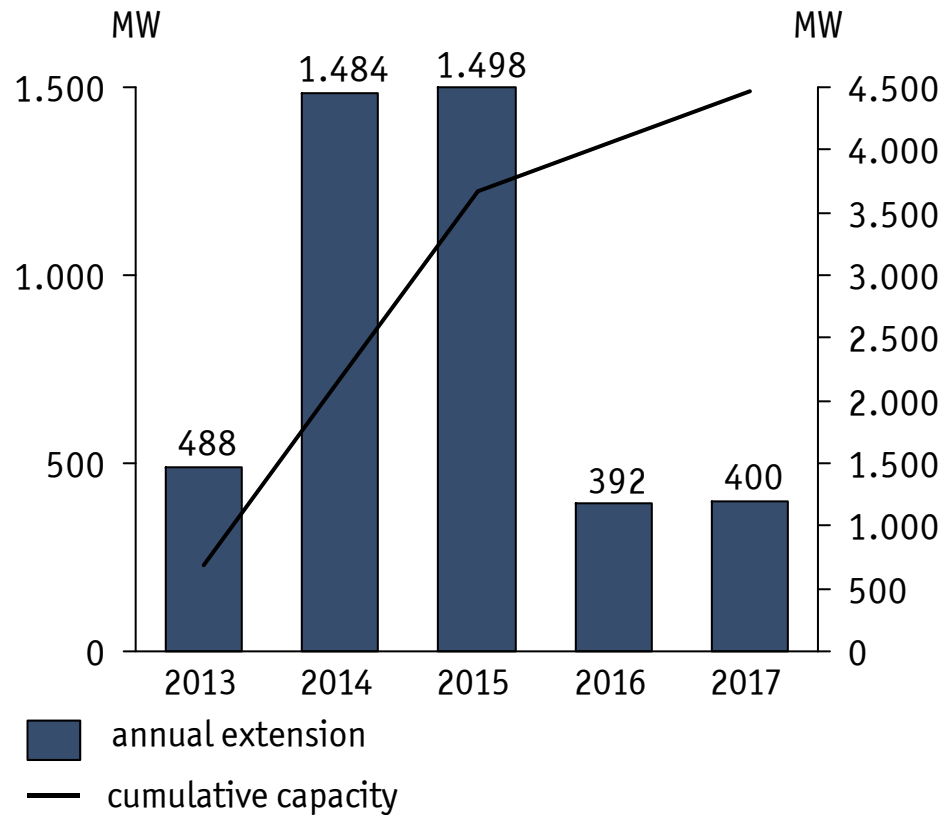
Name of wind park	Number of Turbines	Turbine manufacturer	MW	Project developer	Owner	Commissioning
Baltic 2	80		288	wpd	EnBW	2013
Borkum West II	40		200	n.prior	Trianel	2013
MEG Offshore	80		400	Windreich	Windreich	2014
Global Tech 1	80		400	Global Tech 1	Global Tech 1	2014
Dan Tysk	90		288	Vattenfall	Dong Energy	2014
He dreiht	80		400	wpd	EnBW	2015
EnBW Hohe See	80		400	wpd	EnBW	2015
Borkum Riffgat	30		108	Enova	EWE	2014
Nordsee Ost	48		288	RWE Innogy	RWE	2014
Nordergründe	18		90	Energiekontor	Energiekontor	2015
Delta Nordsee 1	48		288	Enova	E.ON	2015
He dreiht II	28		140	wpd	EnBW	2016
Nördlicher Grund	64		320	renergys	renergys	2015
Gode Wind II	84		252	PNE	PNE	2016
Veja Mate	80		400	BARD	BARD	2017



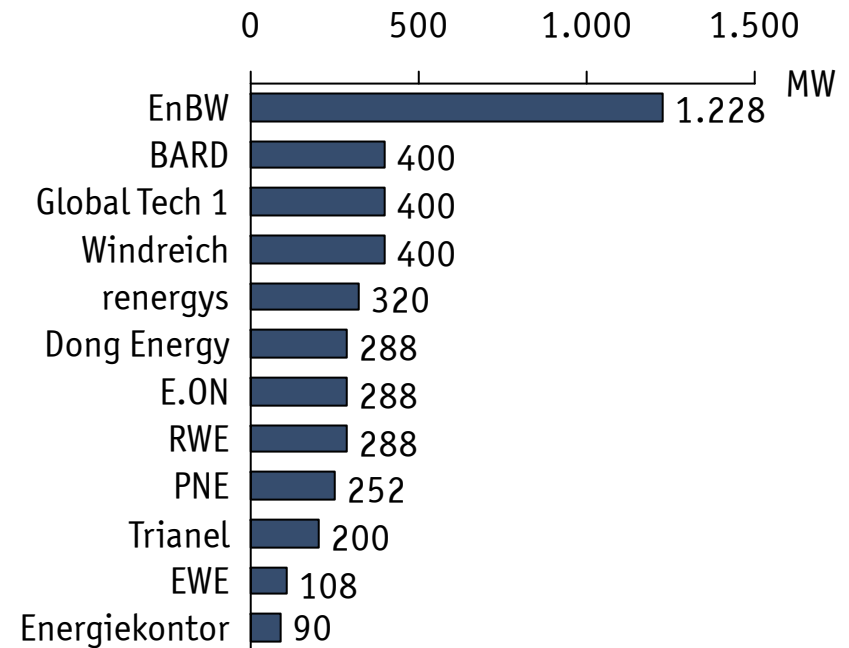
Until 2017 up to 4.500 MW installed power is expected

estimation

Projected extension until 2017



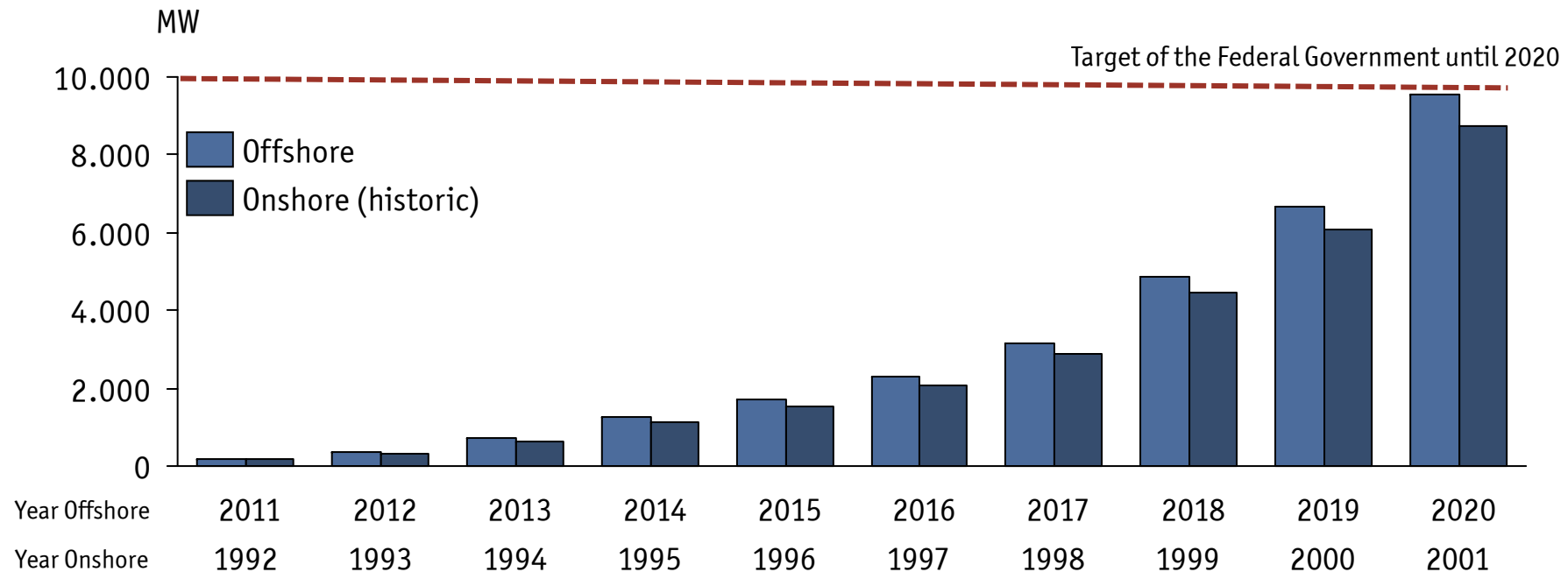
EnBW leading in projects





Historically wind onshore growth rates show:
Offshore target of 10.000 MW to 2020 ambitious but achievable....

**Comparison historical (1992-2001) onshore wind extension to
prognosticated offshore extension (2011-2020)**

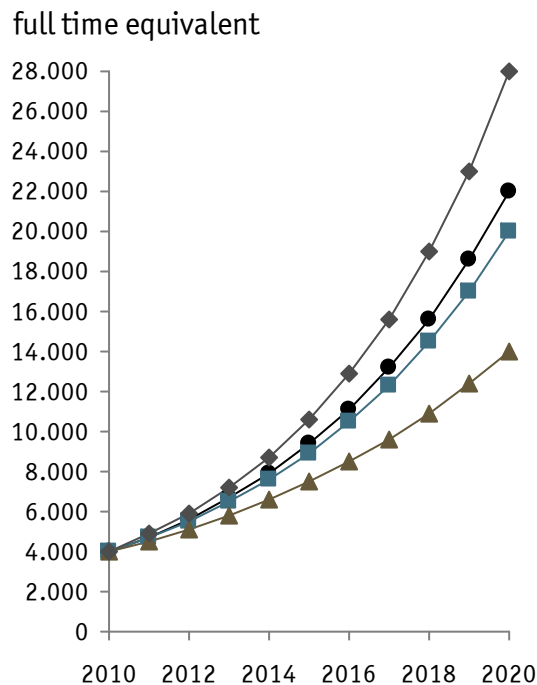


... only if political circumstances fit



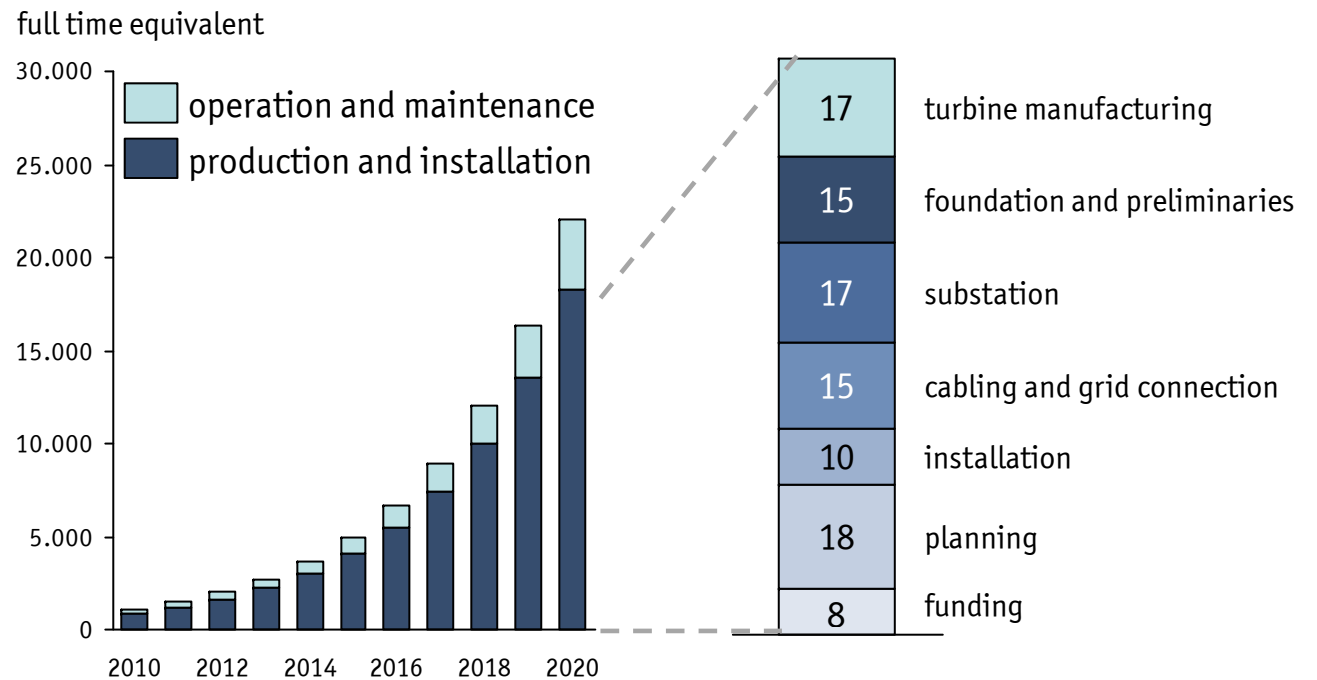
Up to 28.000 jobs until 2020 in the German offshore wind industry expected

Until 2020 up to 28.000 jobs in offshore wind



- estimation based on data
- UK Carbon Trust¹
 - Greenpeace¹
 - ▲ NordLB/VDEVDI
 - ◆ EWEA²

Majority of jobs until 2020 within manufacturing and installation



Approximately same %-distribution on field of activity

Notes: expectation about extension of offshore wind in Germany: 10 GW in 2020
 1. Estimations basis on figures for UK adjusted to Germany. 2. Estimations basis on figures for Europe, adjusted to Germany.
 Resource: Carbon Trust; Greenpeace; NordLB; EWEA

Political regulations and conditions

With the current renewable energy law (EEG 2009)
projects are not economical viable after 2015

**Regulations for projects grid connected before
2015**

Feed in compensation:

- 15 cent/kWh for the first 12 years (initial compensation)
- 3,5 cent/kWh for the last 8 years (hurdle rate)

Grid connection

The grid connection is financed by the transmission grid operator and by the grid charges.

**Regulations for projects grid connected in or
after 2015**

Feed in compensation:

- 13 cent/kWh for the first 12 years (initial compensation)
- 3,5 cent/kWh for the last 8 years (hurdle rate)

Grid connection

The grid connection is not financed by the transmission grid operator



Better conditions for offshore wind in UK as in Germany – Expected competition from 2015 onwards regarding financing

**Chance of EEG revision in 2011 must be considered,
otherwise the German offshore wind industry impends to lose the competitive edge**

„... besteht weiterhin das Risiko, dass die deutsche Offshore-Windindustrie in der Entwicklung gegenüber europäischen Wettbewerbern zunehmend zurückfällt. ... Großbritannien hat derzeit die besten Bedingungen“

„... further the risk exist, German offshore wind industry relapse in the development compared to European competitors... UK has currently the best conditions“

KPMG 2010

With regard to great efforts in the European neighbouring countries, especially in UK, the crucial course for the offshore wind energy location Germany has to be set as soon as possible.

Solely in Germany the offshore wind energy market comprises more than 30 billion Euro until 2020.



Four significant changes in the EEG are necessary for the success of the German offshore wind energy

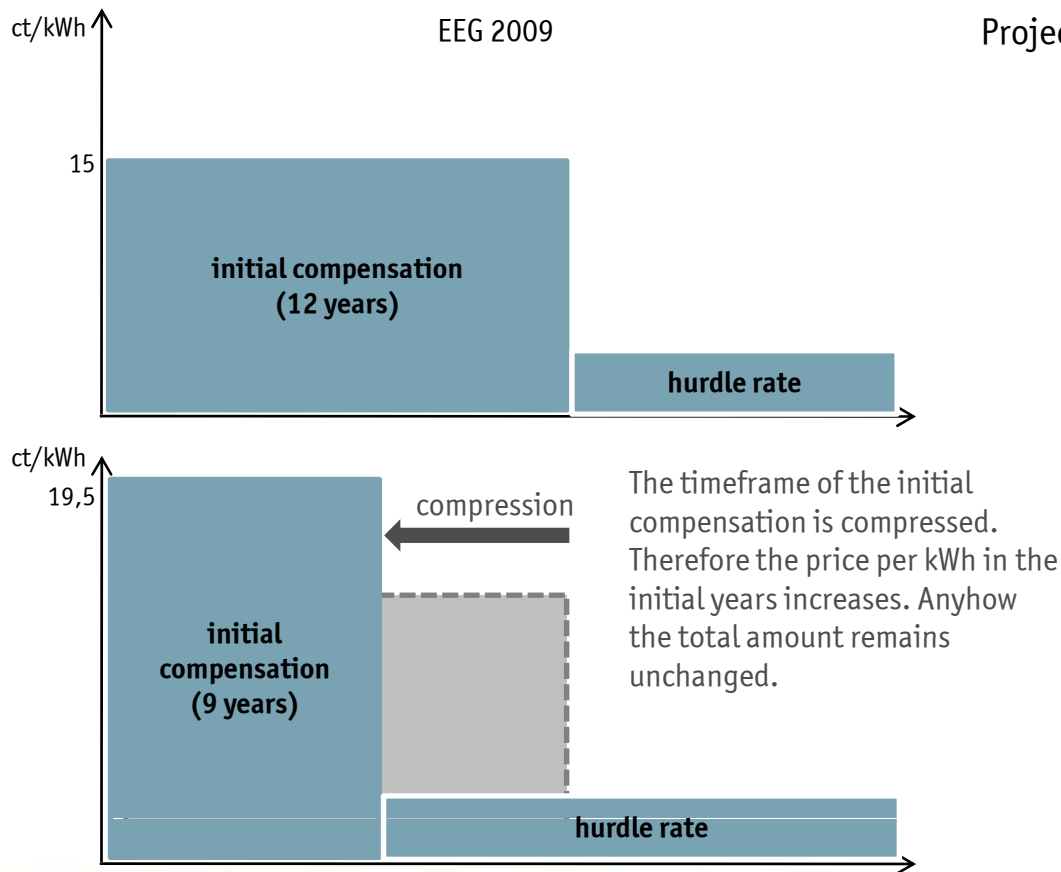
- 1 **Extension of sprint bonus** by 2ct/kWh with involvement of initial compensation. Potential decrease of initial compensation of 15 ct/kWh should be discussed in the context of future EEG-adjustments.
- 2 **Shift in point of time**, within a 5% scheduled degression regulation for offshore wind turbine generators from 01.01.2015 to 01.01.2018.
- 3 Amendment of the modified offshore wind energy compensation system by a **compression model** which enables optionally a concentration on compensation of at least two third of the timeframe for the initial compensation. Therefore the project rate of return increases.
- 4 **Loss of limitation for grid connection claim** for OWP regarding § 118 section 3 EnWG

Without these adjustments many projects won't be profitable after
2015

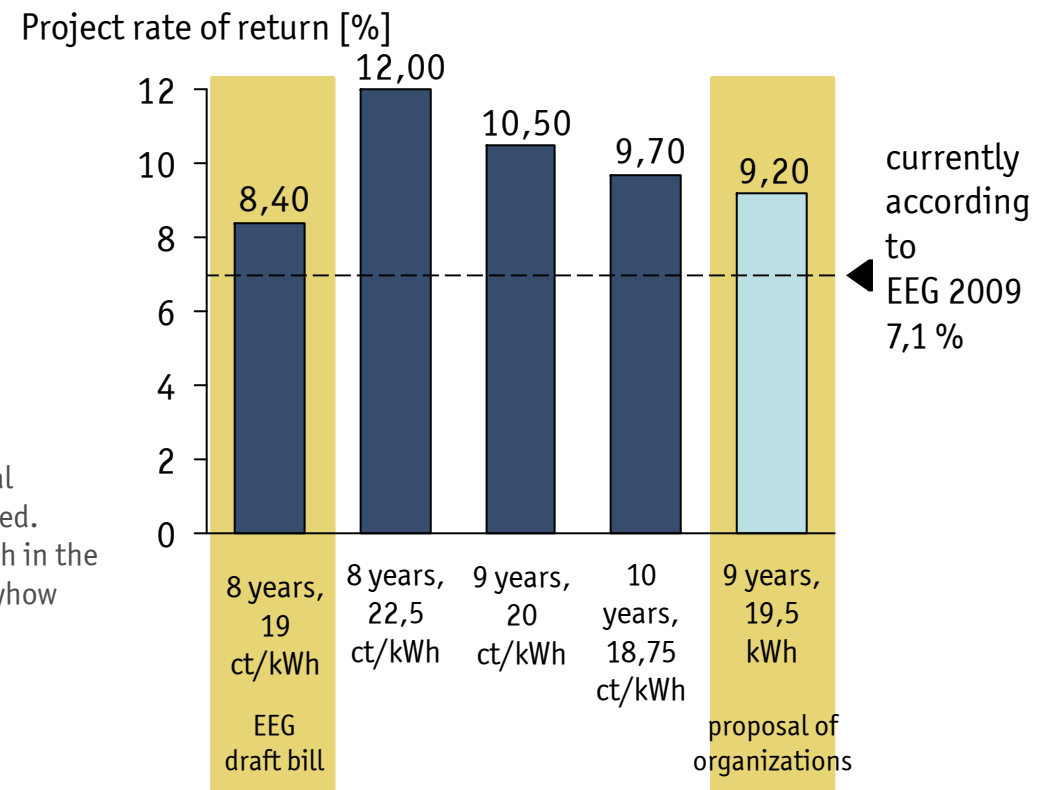


3 Compression model: compression to 9 years and 19,5 ct/kWh leads to adequate project profitability.

Principle of the compression model



Project rate of return with different compensation



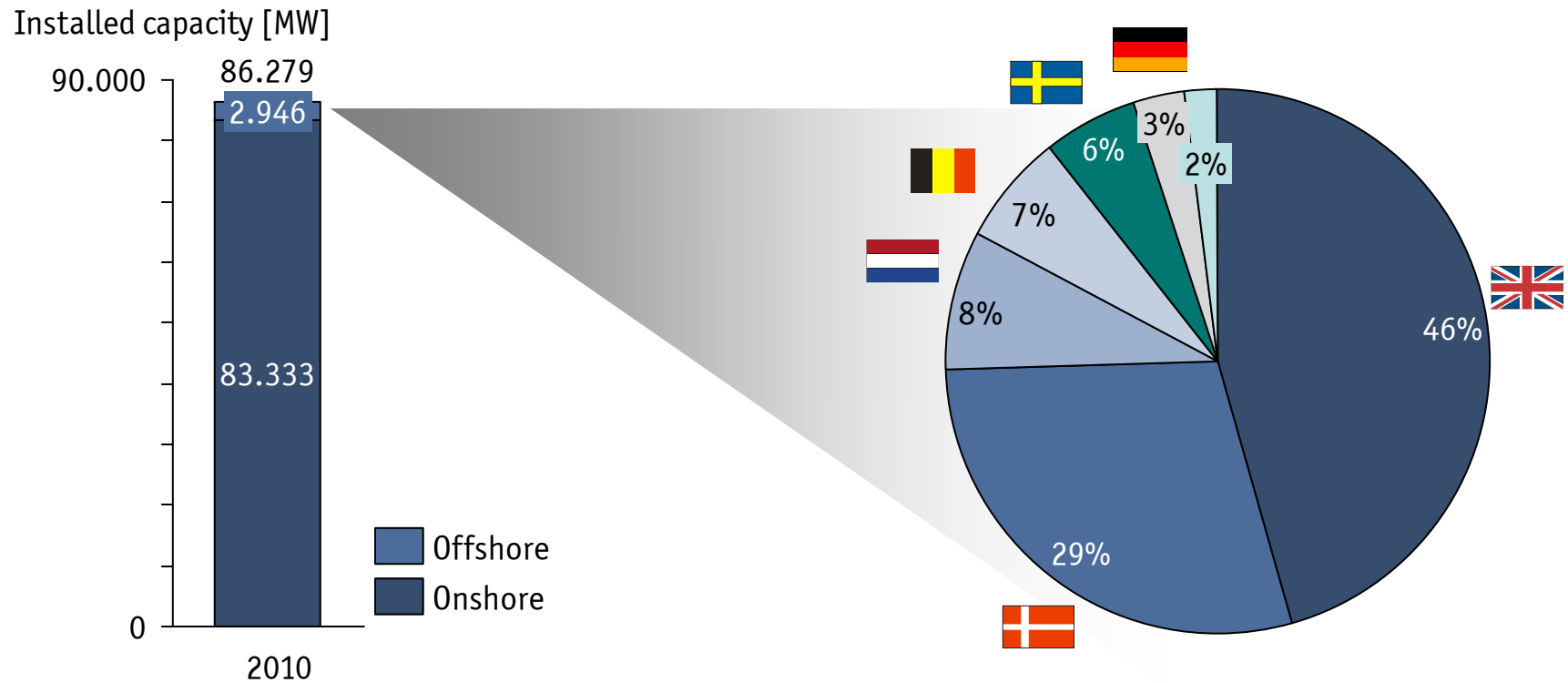
EU market



About 3.000 MW offshore wind energy already installed in Europe UK and Denmark leading

About 3.5% of the installed European wind capacity is offshore wind

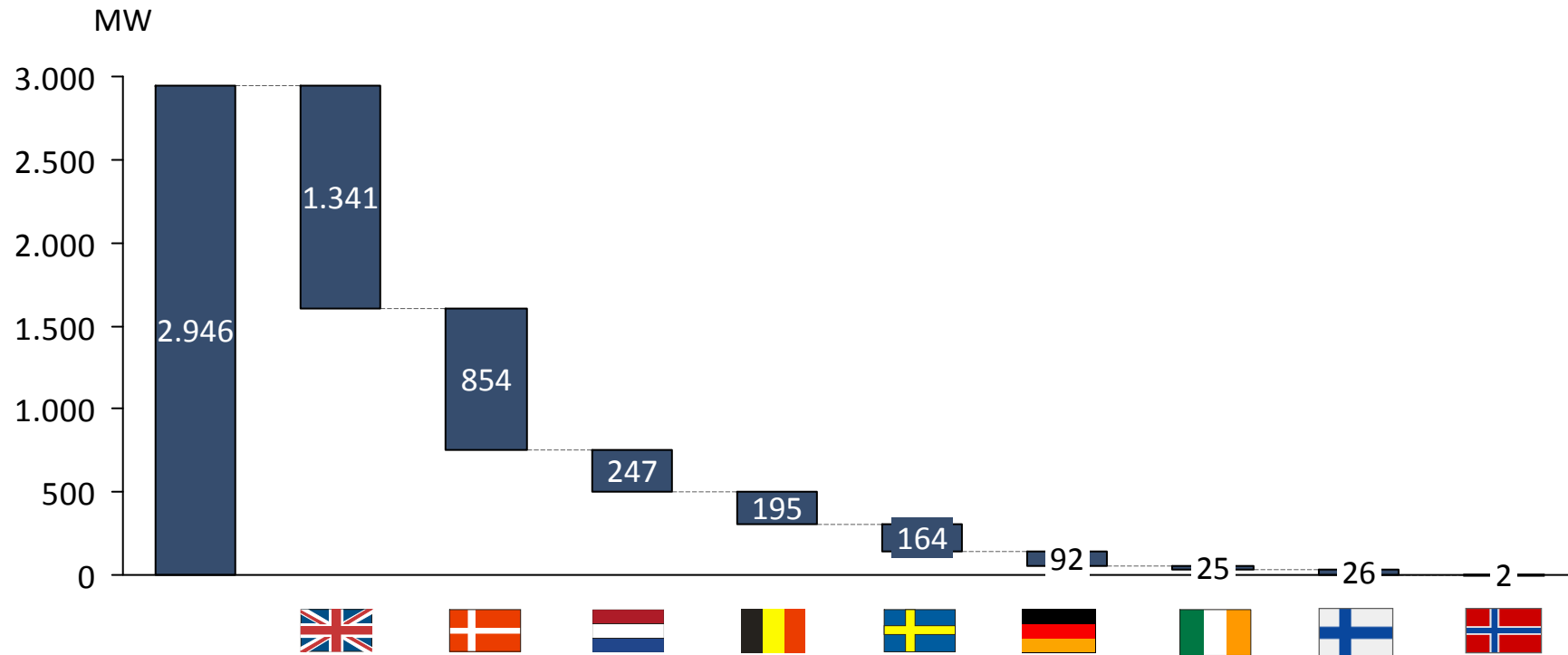
UK and Denmark as leading countries





About 3.000 MW installed wind power in Europe

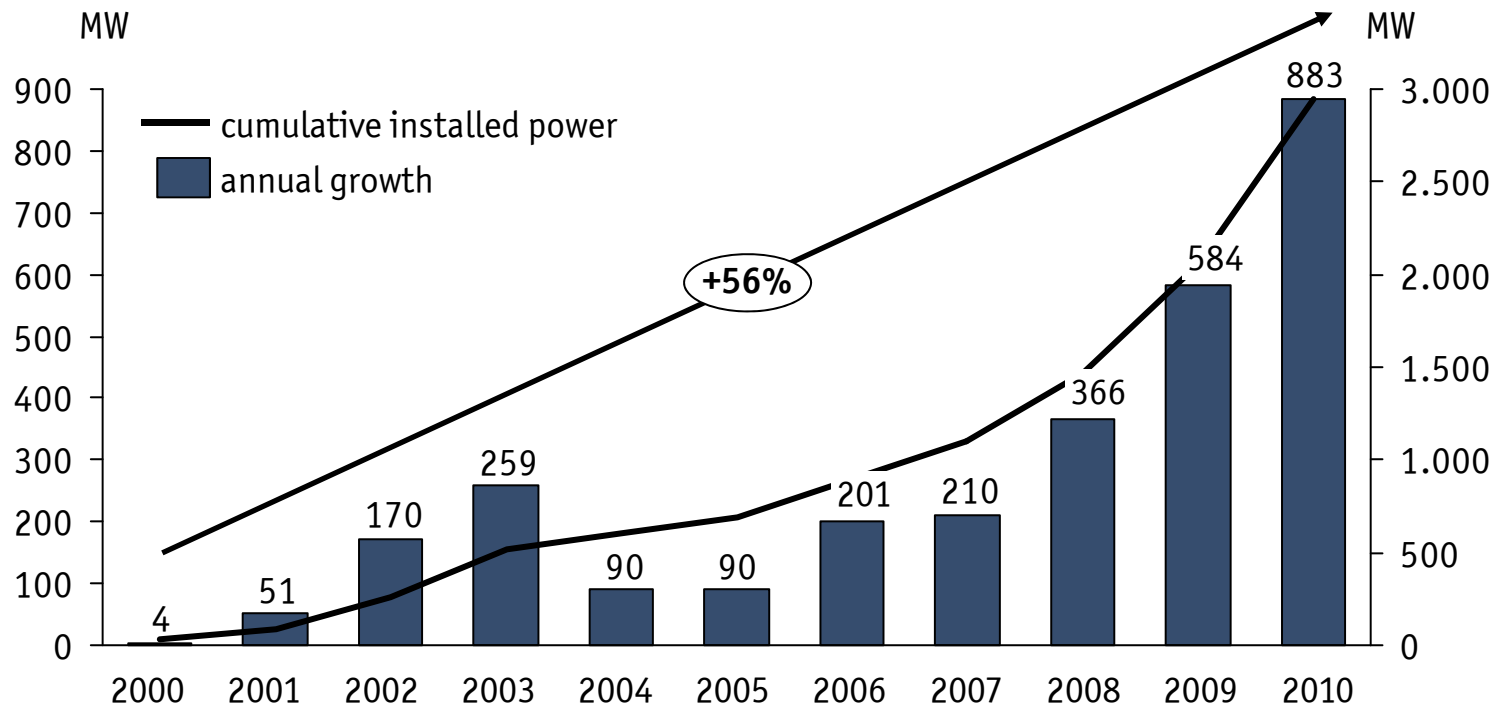
Installed European offshore wind energy by countries





Offshore wind energy on the way to industrialisation

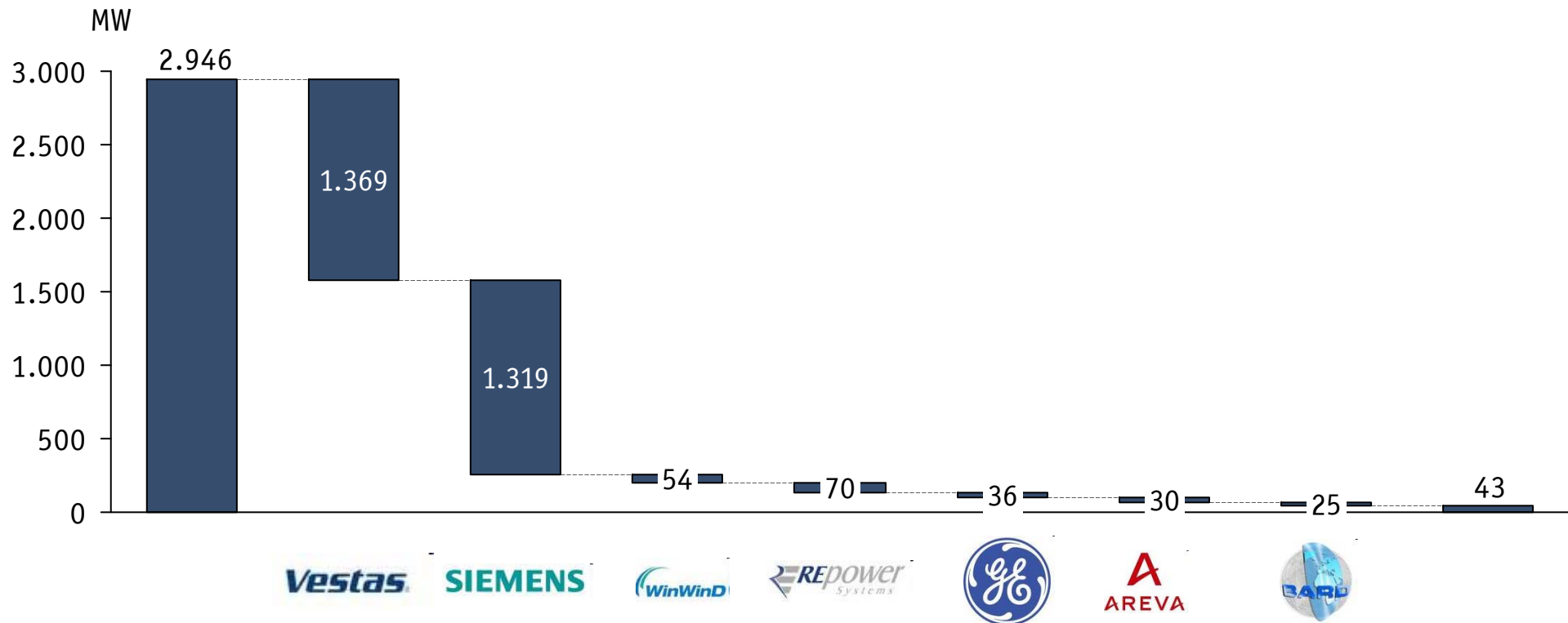
Impressing growth (+56% CAGR) in the last ten years in Europe





Vestas and Siemens with the biggest shares of the installed offshore wind energy in Europe

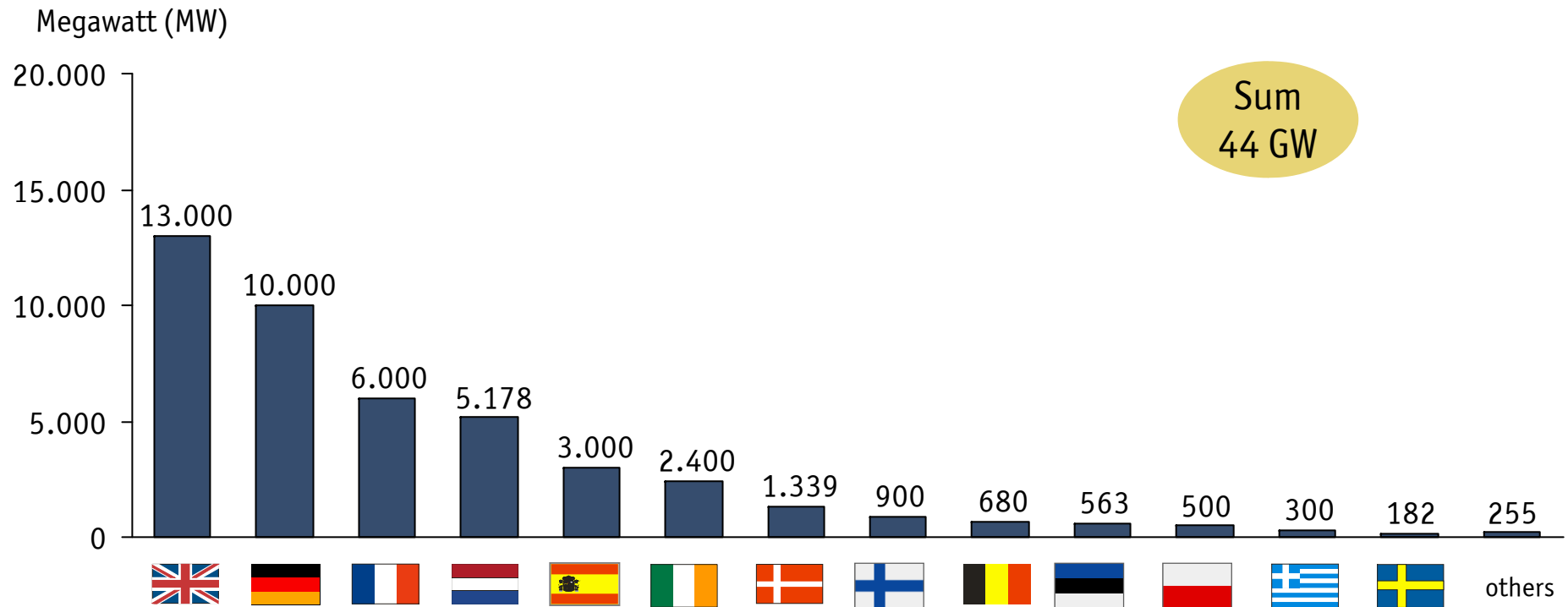
Cumulative market share 1991-2010 (Europe)





Most of the European countries with own targets for offshore wind energy

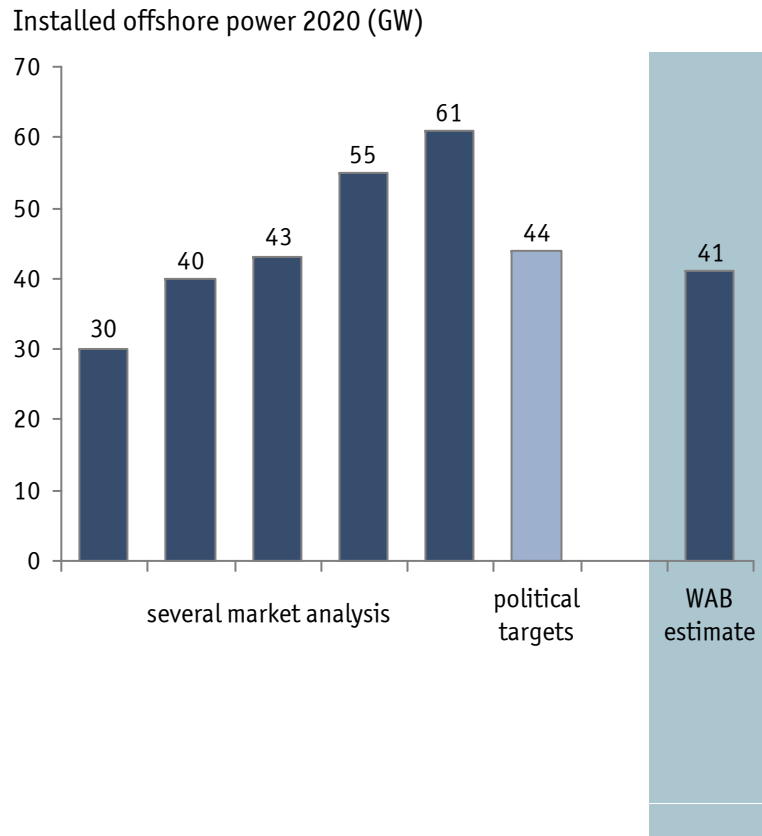
Political targets for offshore wind in Europe until 2020



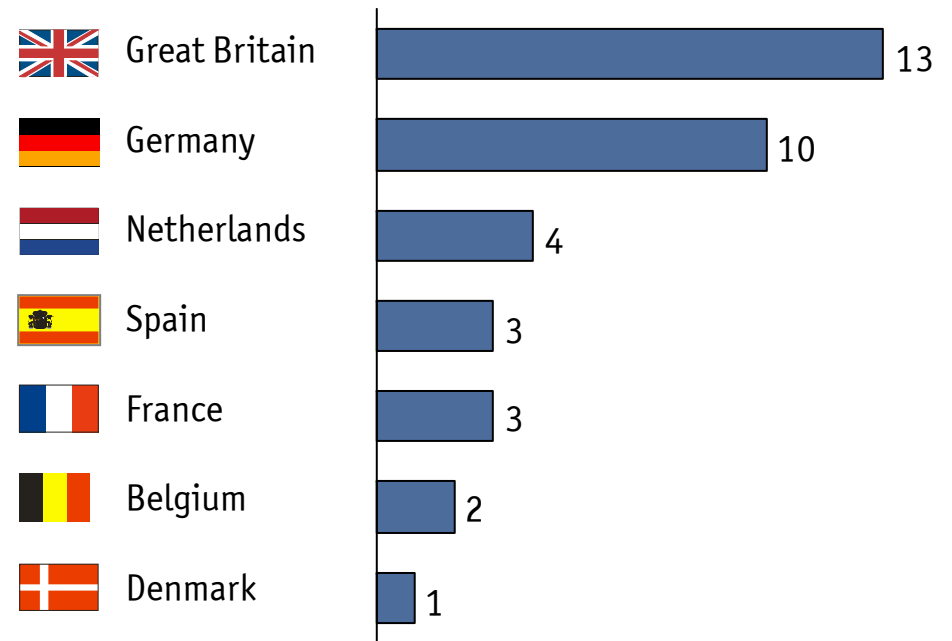


Until 2020 around 41.000 MW offshore wind power will be installed in Europe – market size app. 100 bn. EUR

Until 2020 about 41.000 MW offshore wind energy



Leading markets until 2020 (GW)

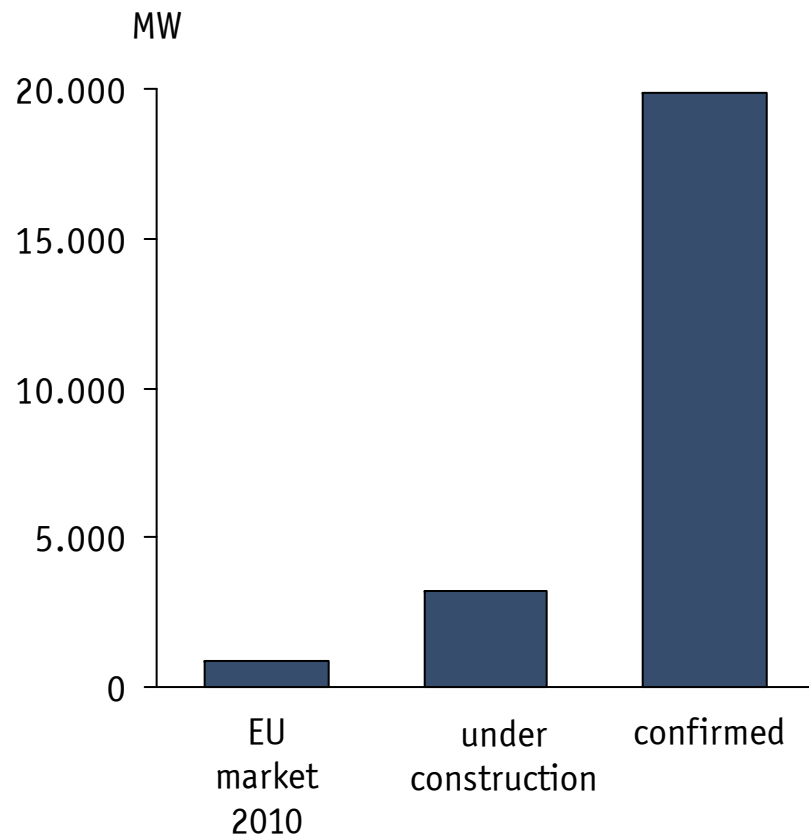


**assumed market size:
about 100 bn. EUR**

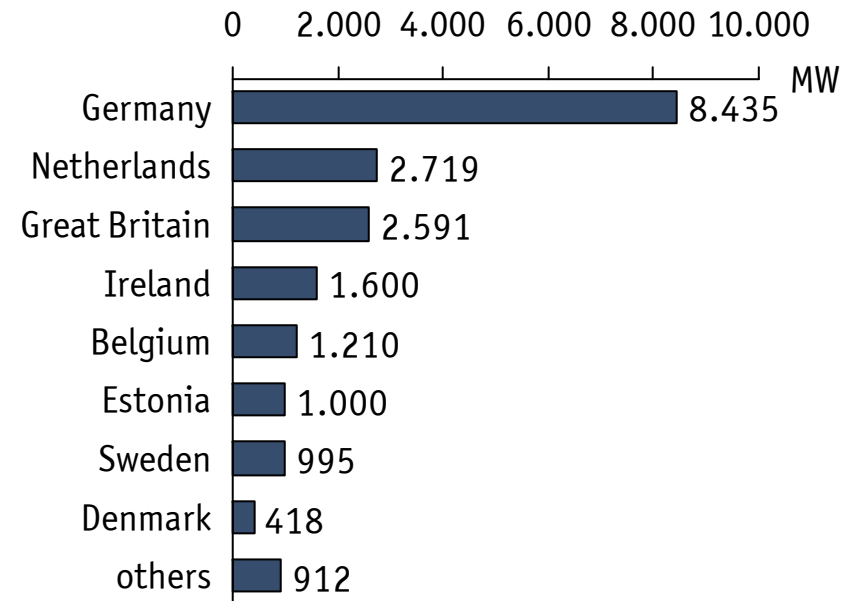


Germany leads with consented megawatts in Europe

around 20.000 MW approved projects in EU



Germany leading in approved projects with app. 8.500 MW



Ronny Meyer
Windenergie-Agentur WAB
Barkhausenstraße 2
27568 Bremerhaven
Germany
info@wab.net

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