

**Baltic InteGrid  
on the WindEnergy Hamburg 2018**



26. September 2018

---

# **Iberdrola in the Baltic Sea**

## Content

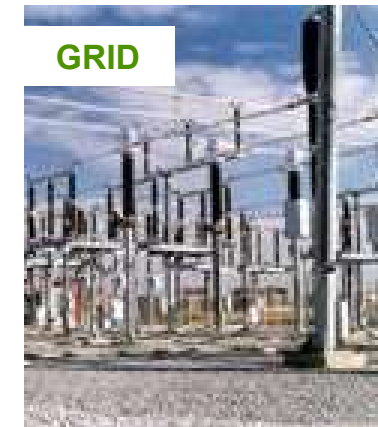
- 1. Iberdrola – An international energy leader**
- 2. Wikinger offshore windfarm**
- 3. Iberdrola's future projects in Baltic Sea**
- 4. Grid connection concepts**

1

**Iberdrola**

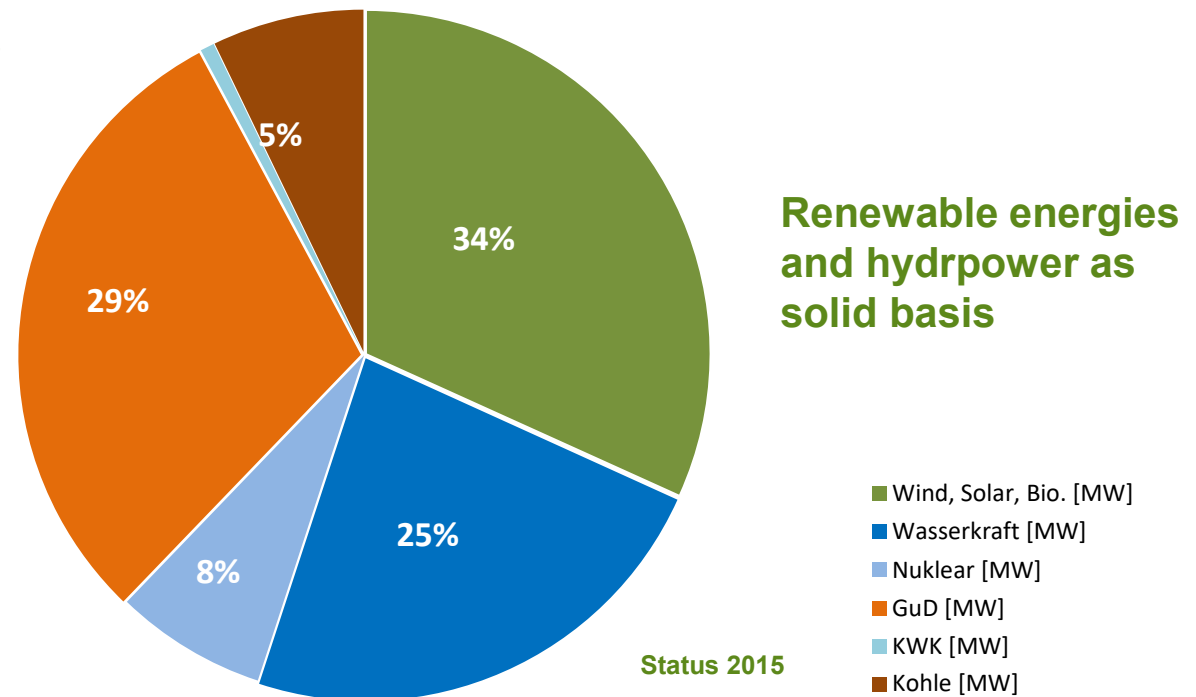
**An international energy  
leader**

## Focus – Renewable Energy and Grid

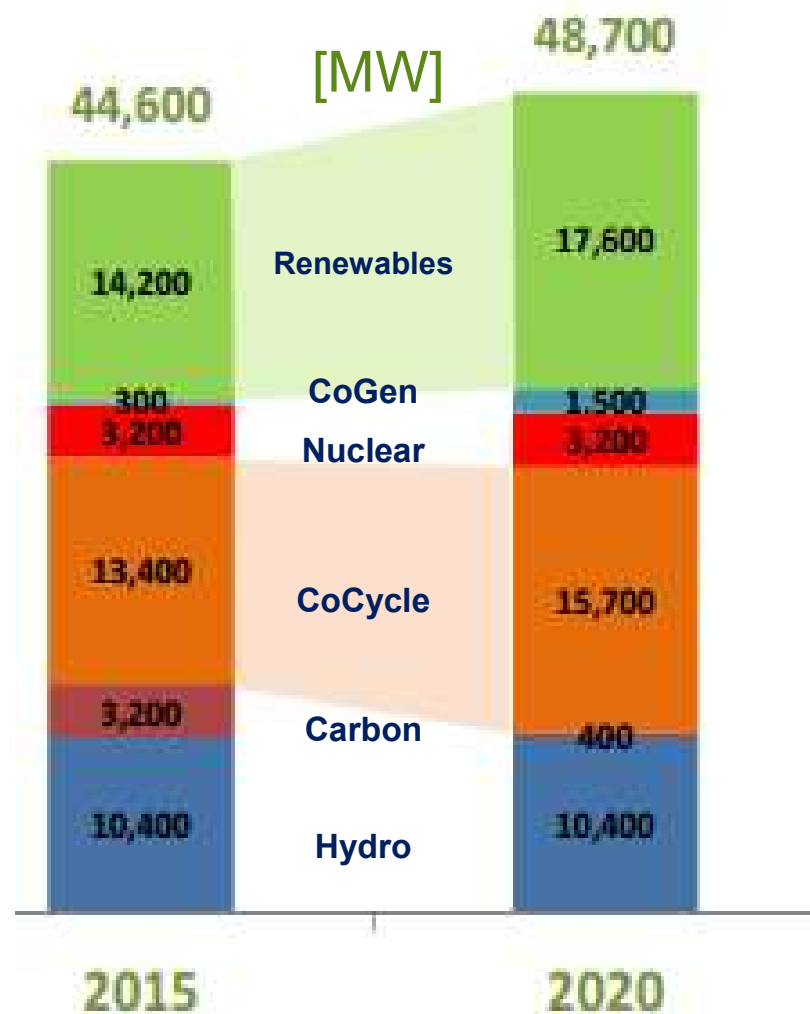


## The utility of the future

Portfolio correspond to the mix aimed for in the „Energiewende“



More than 50% of the installed capacity are renewable energies and hydropower



+ 6,9 GW for clean energy  
(carbon will be only 1%)

# Iberdrola - An international energy leader

- Global player in energy business, huge investments in renewables energy since years
- Main markets:
  - Spain  IBERDROLA
  - UK  SCOTTISHPOWER
  - USA  AVANGRID
  - Brasil  NEOENERGIA
  - Mexico  IBERDROLA MÉXICO
- Revenue 2017: 31.2 Mrd EUR
- No. 1 wind energy producer in Europe
- Capacity renewable energy: approx. 16.6 GW; mainly onshore wind

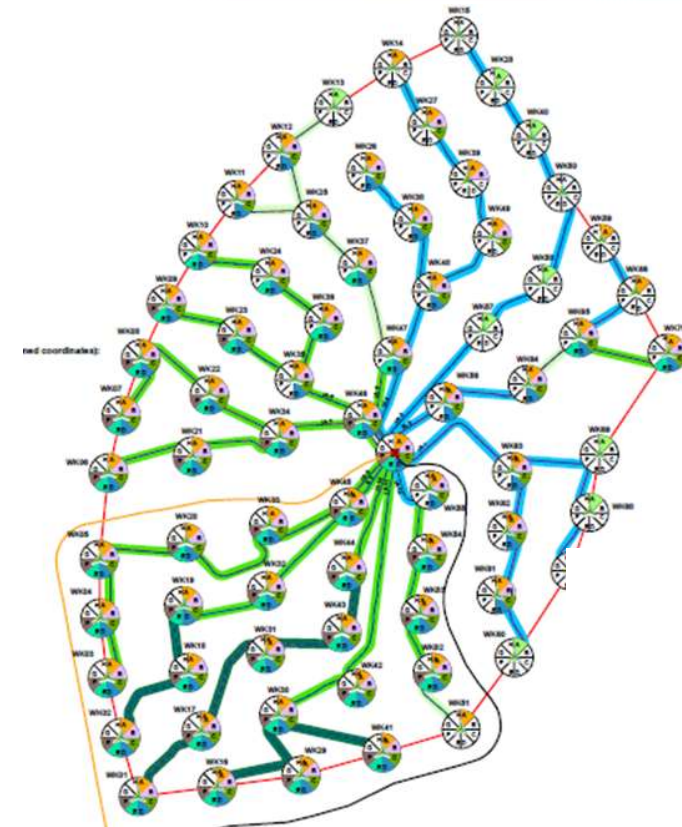
- Over 7,5 GW Pipeline until year 2022
- Baltic Sea – 900 MW pipeline
  - Wikinger, DE in operation since end 2017
  - Baltic Eagle, DE awarded in auction 2018
  - Wikinger Süd, DE awarded in auction 2018
  - Windanker part of auction 2021
- North Sea (UK) – 2,800 GW pipeline
  - West of Duddon Sands, UK in operation since 2015
  - East Anglia ONE, UK in construction, completion 2020
  - Saint-Brieux, F planned for 2023
  - East Anglia 2 -4, UK
- US East Coast – 4,000 GW pipeline
  - Kitty Hawk
  - Vineyard



2

# Wikinger Offshore Windfarm

- Owner and operator Iberdrola
- Investment approx. 1.4 Bil. EUR
- Projektteam in Berlin, London, Madrid, Saßnitz
- Baseport: Sassnitz/Mukran (Island Rügen)



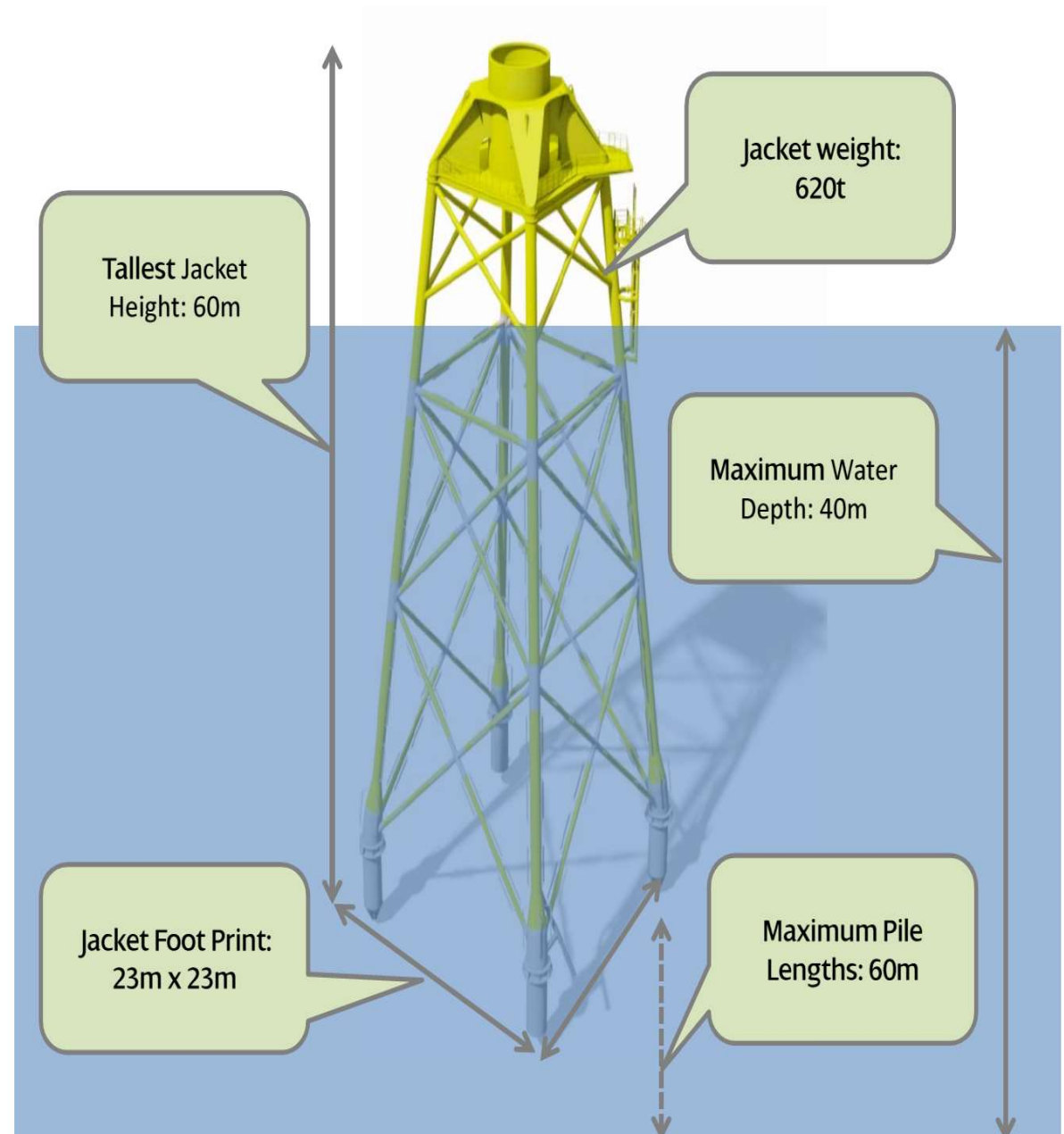
- Capacity 350 MW
- 70 Windturbines (Adwen AD5-135)
- Start Installation March 2016
- Commissioning 2017
- Handed over to operation team

- 70 Windturbines (WTG): Adwen M 5000-135
  - Nacelle (Bremerhaven)
  - Blades (Stade)
- Substation (OSS)
  - Shared with TSO (50hertz)
  - Manufacturing Navantia
  - Transport and Installation SHL
- Foundations:
  - Manufacturing (Navantia-Windar and Bladt)
  - Transport and Installation (OWFJV)
- Internal array cables Prysmian



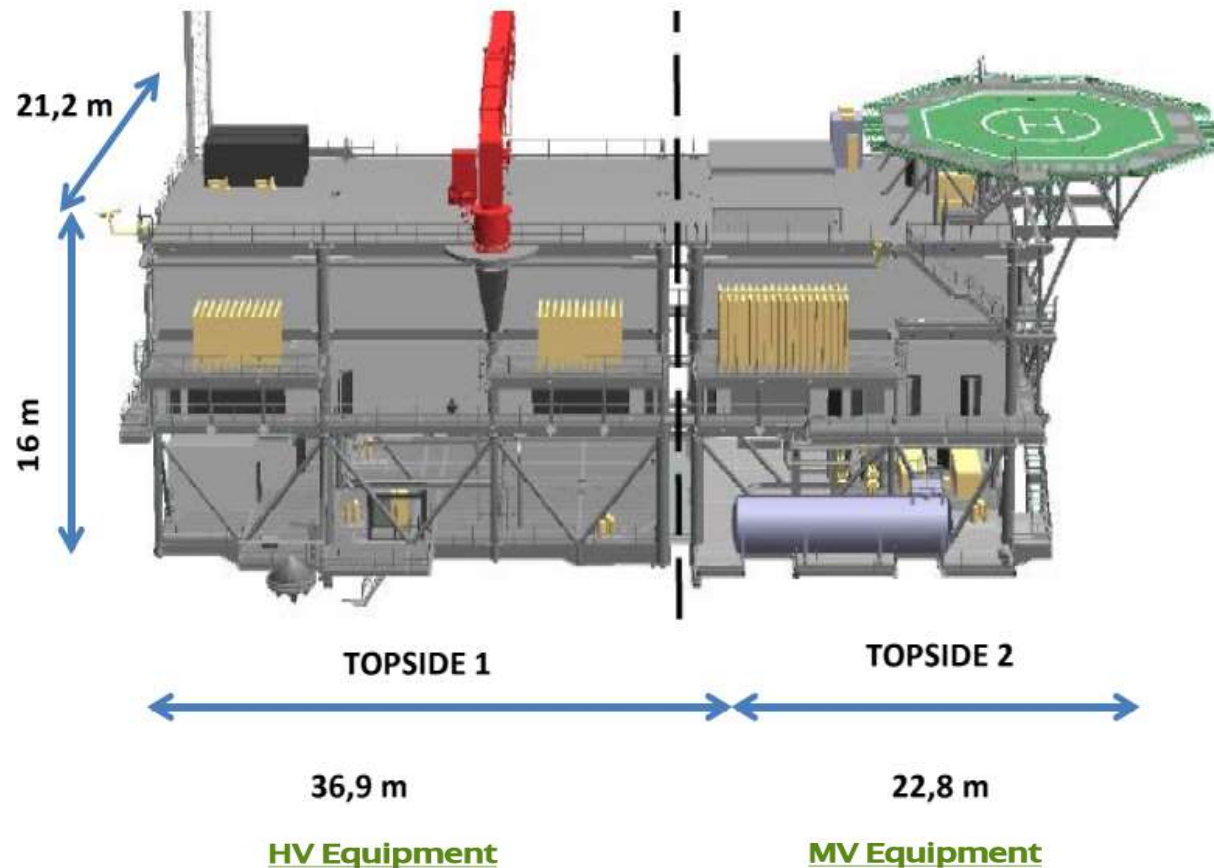


- Typ Adwen M-5000-135
- Nennleistung 5 MW
- Nabenhöhe 97,5 m
- Rotordurchmesser 135 m
- Anlagenanzahl 70





## Topside



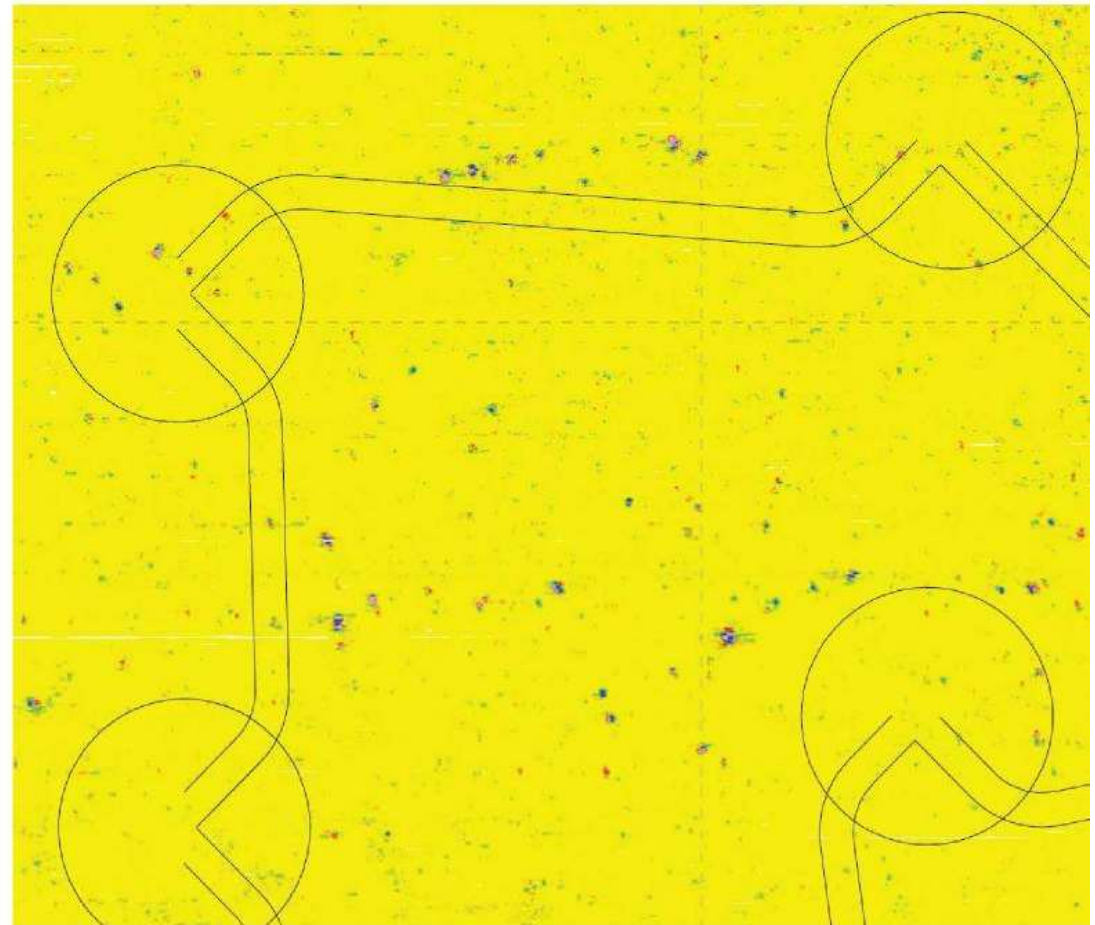
### Elevations:

- Cable Deck → + 13,5 m
- Main Deck → + 20,5 m
- Utility Deck → + 25 m
- Roof Deck → + 29,5 m

### Weights:

- Topside 1 → 2.646 tn
- Topside 2 → 2.202 tn

- UXO & Obstacle Investigation 2015 / 2016





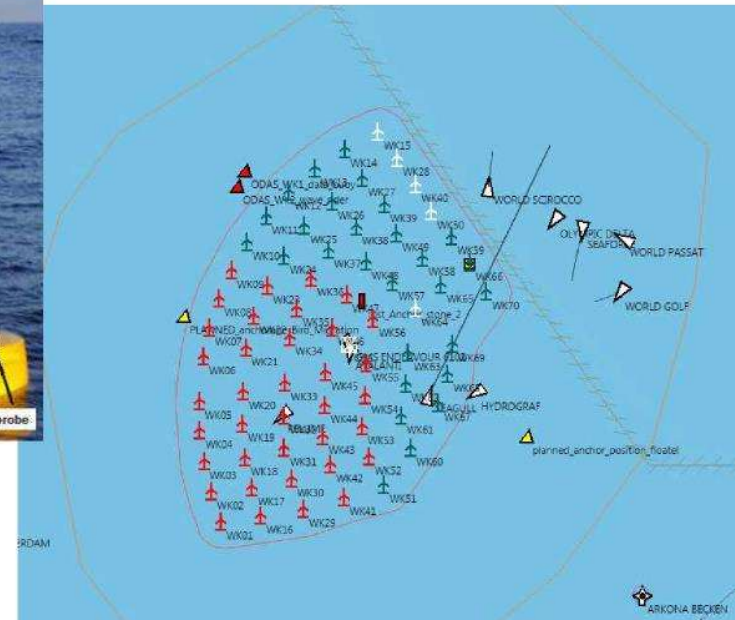
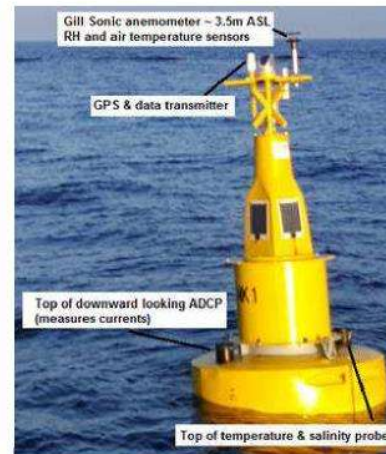
# Wikinger Preparations Works

- UXO removal





- Cardinal buoy
- Weather buoy
- Weather forecasts
- Guard vessel
- Crew Transfer Vessels (CTV)
- Marine coordination



Wikinger : Forecast graphs  
0600 forecast issued at 0537 CET



Baseport and  
Stagging port  
Saßnitz / Mukran





## Installation vessel piles: Giant 7

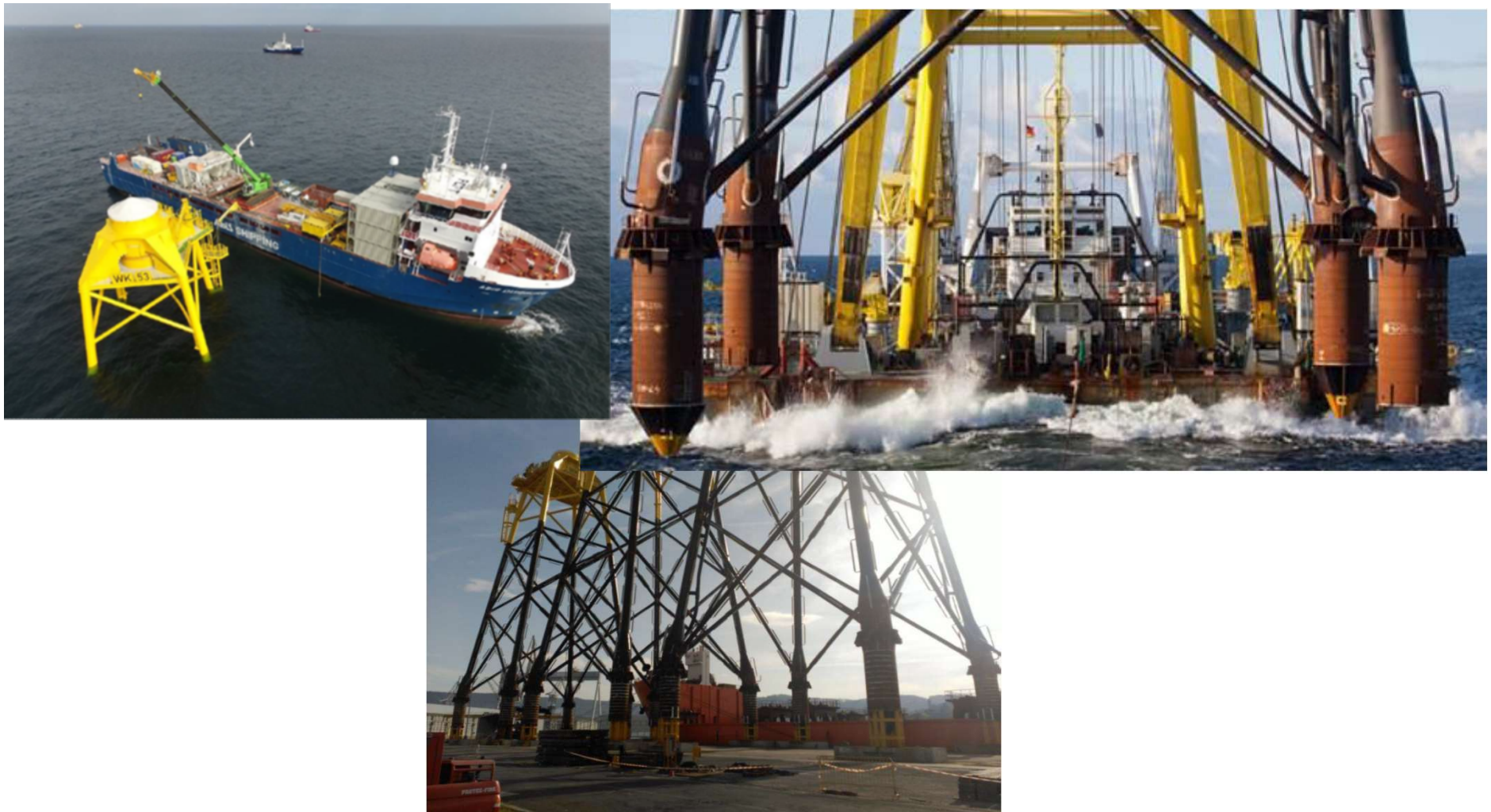






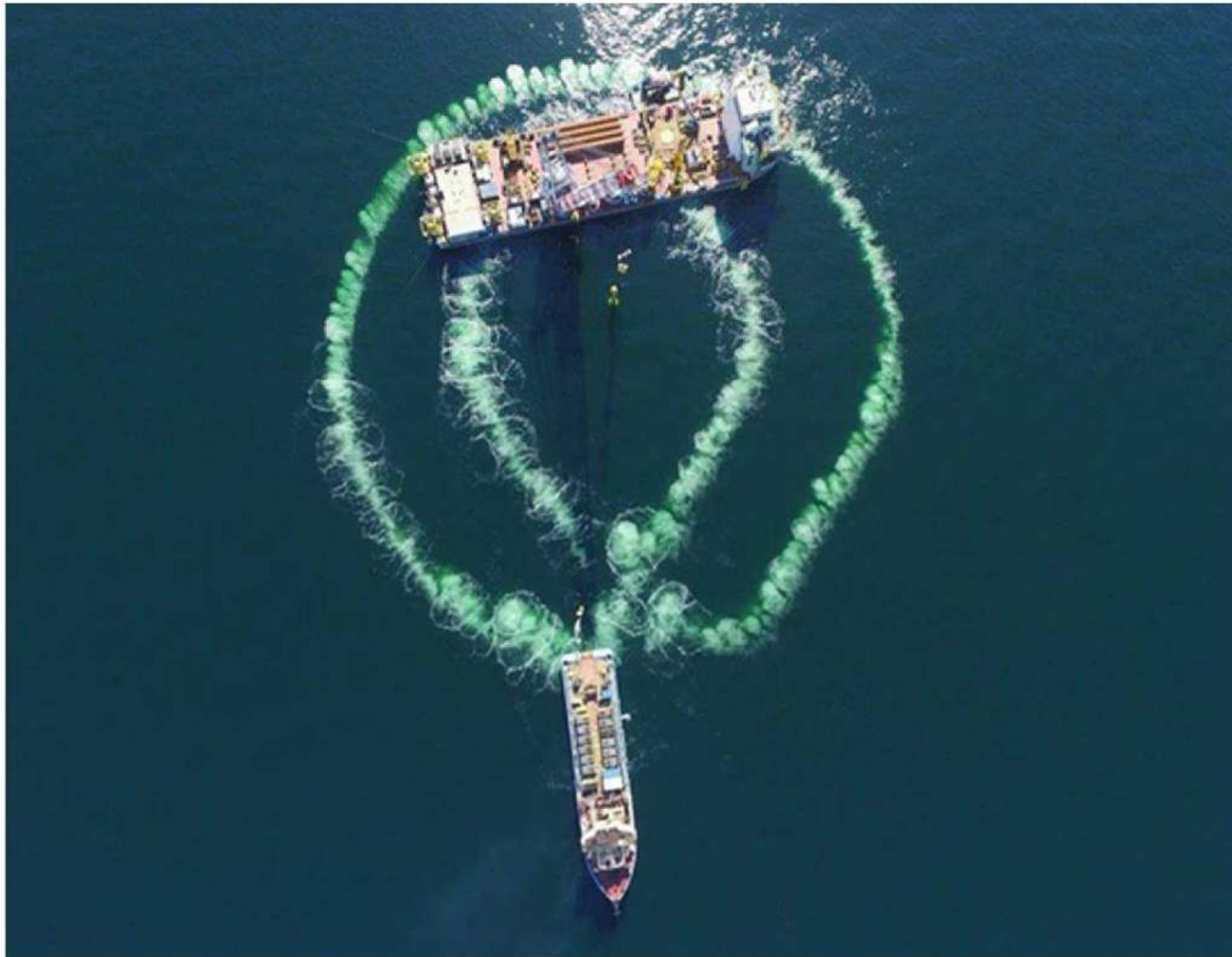
Foundation installation incl. grouting

03/2016 – 01/2017





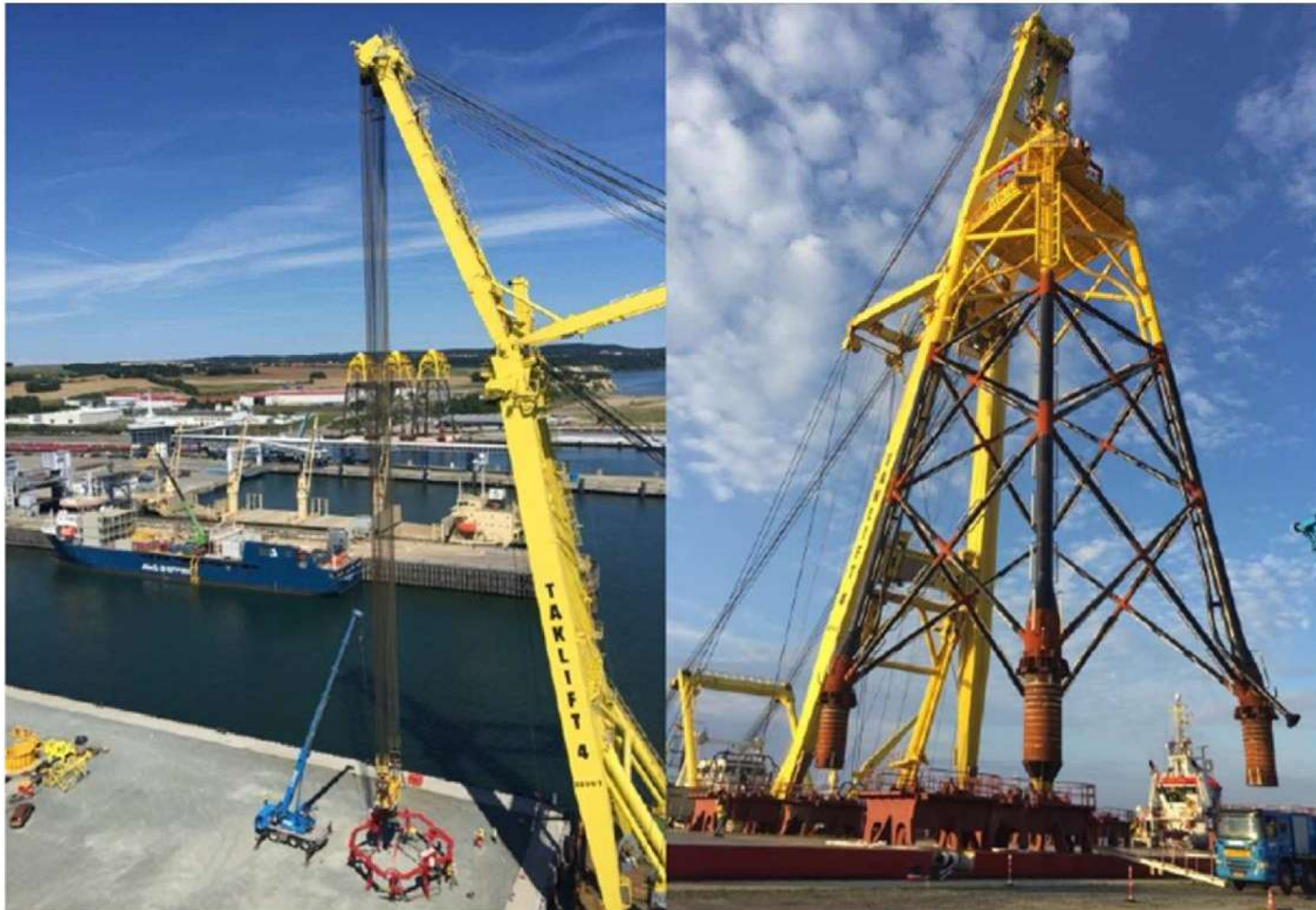














# Wikinger Installation



# Wikinger Installation



## Offshore Substation (OSS):

Offshore installation OSS (foundation and topside)

08/2016









# Wikinger Installation























## Internal cables:

Cable laying completed

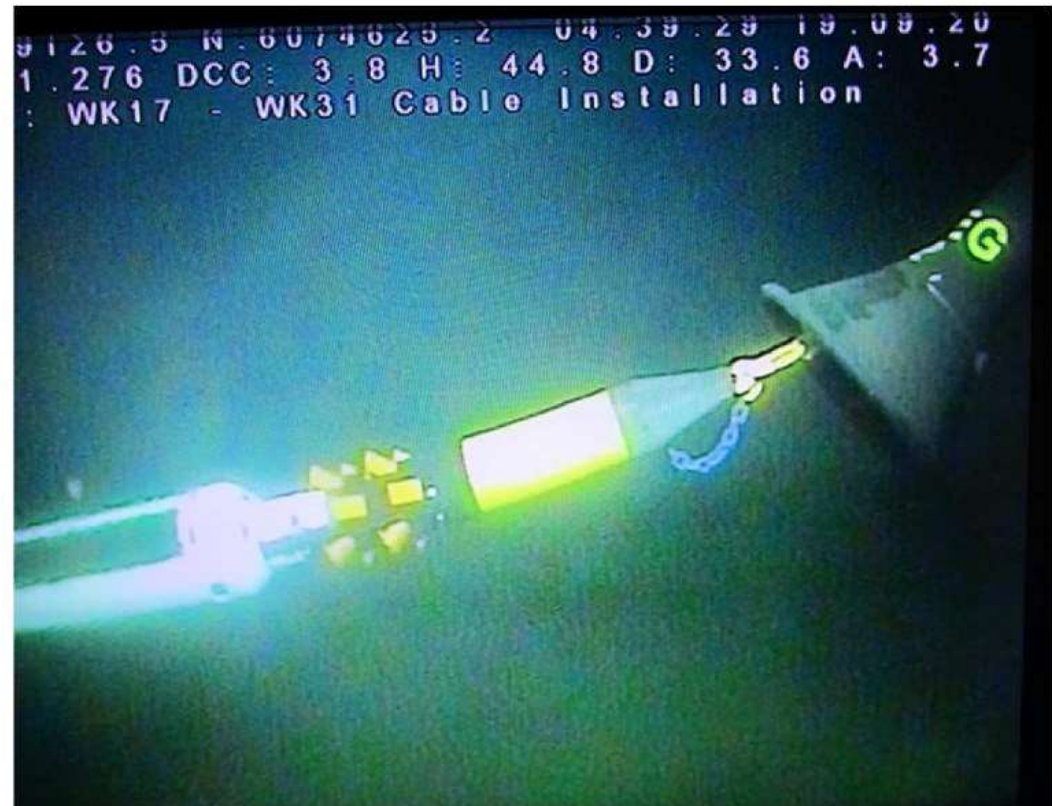
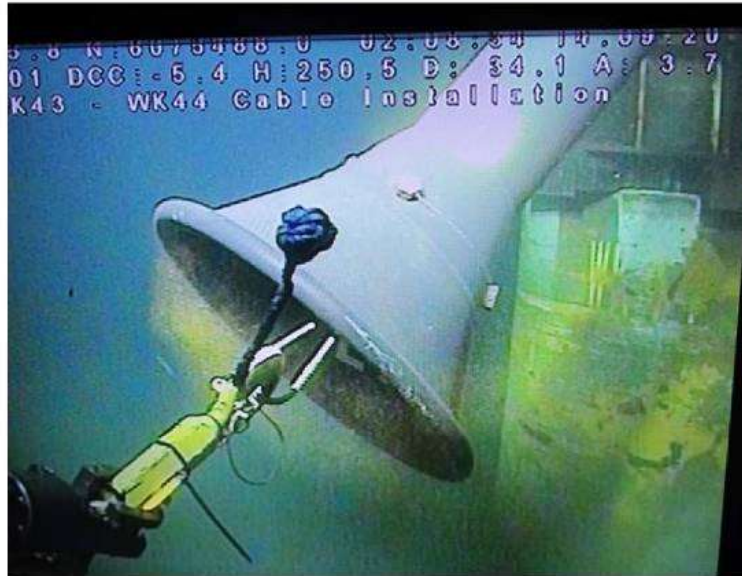
01/2017







# Wikinger Installation



## Windturbine installation:

Installation

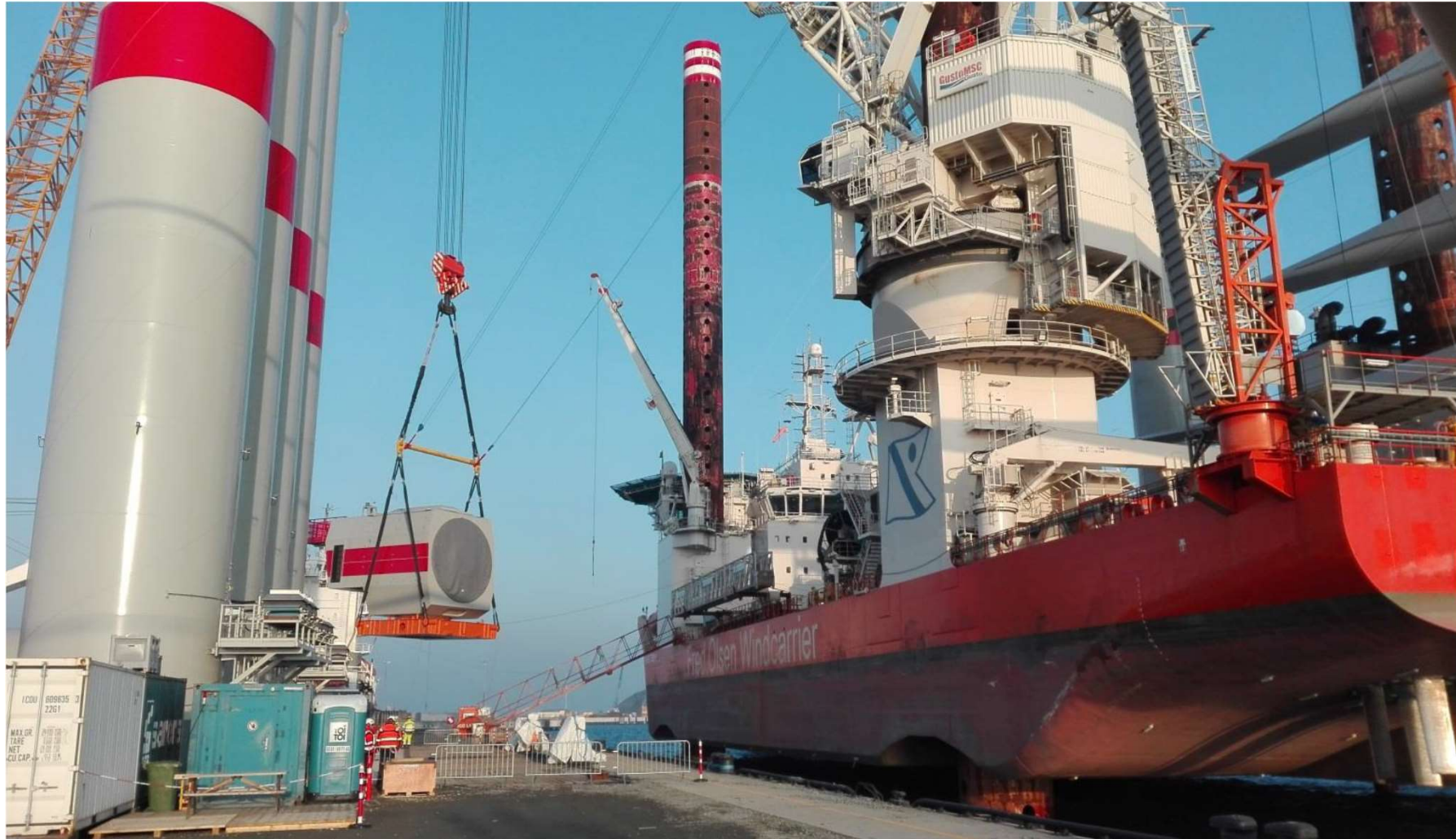
01/2017 – 10/2017

























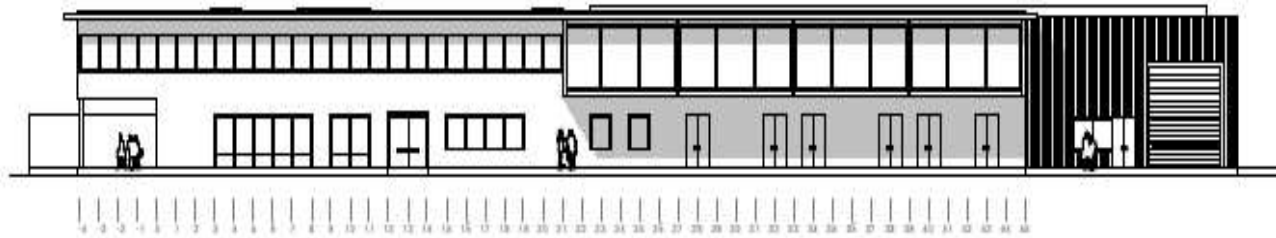








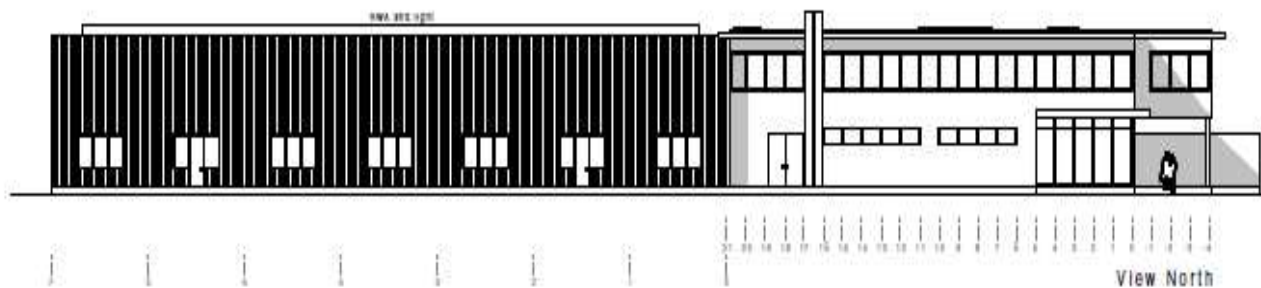




View South



View West



View North



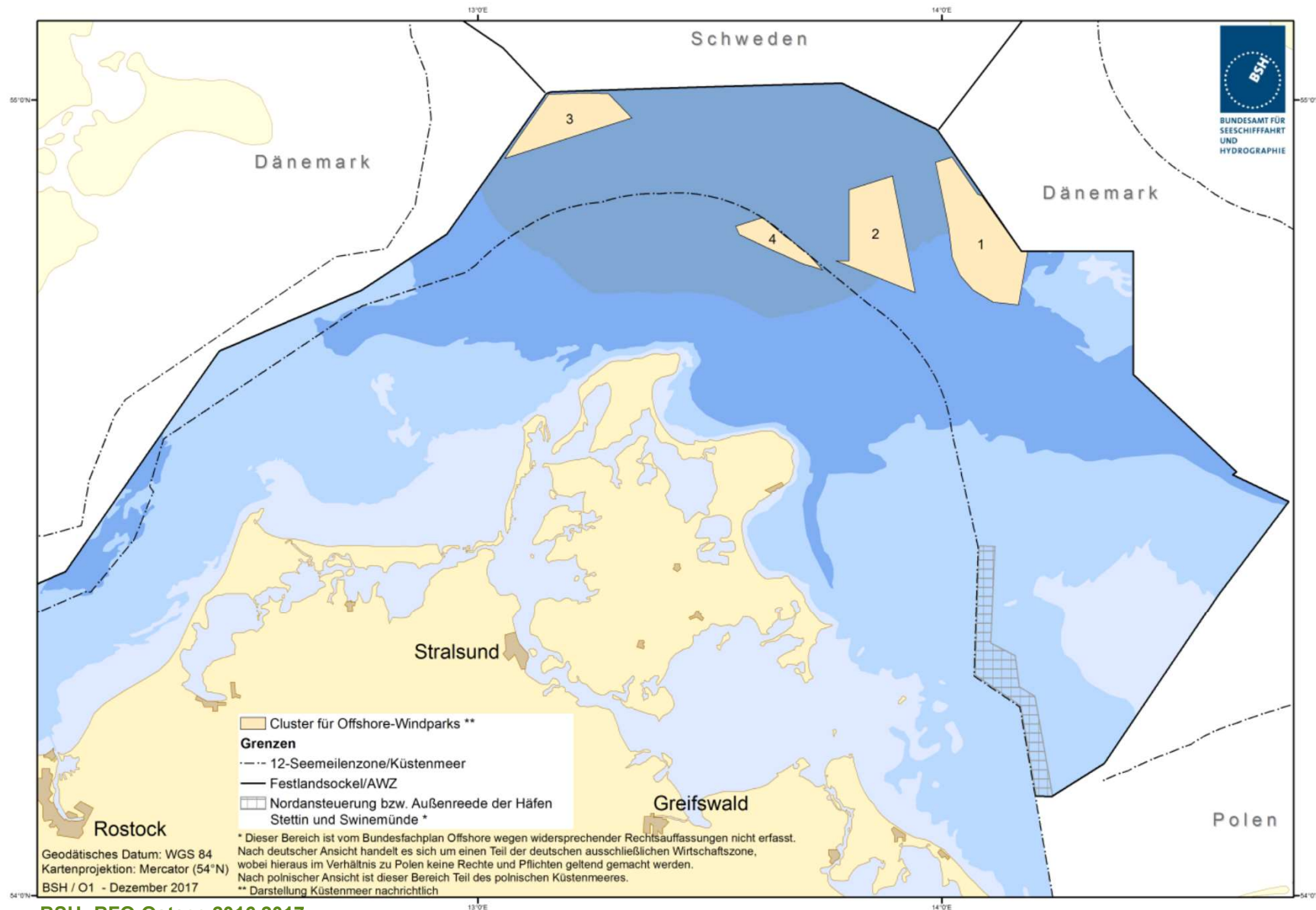




# 3

## Iberdrola's future projects in Baltic Sea

## Overview projects: German Baltic Sea





# Iberdrola in Baltic Sea – future projects

## Overview projects German Baltic Sea

Area O-1 in German EEZ acc. to Pre-Draft of Area Development Plan (FEP)



BSH: FEP\_Vorentwurf\_2019

## Iberdrola in Baltic Sea – future projects

### Baltic Eagle and Wikinger Süd

- Iberdrola was awarded in 2nd interrim auction acc. to §26 WindSeeG
- Awarded capacity 486 MW
- Area approx. 35 km<sup>2</sup> + 5 km<sup>2</sup>
- Windturbine 8 – 10 MW class
- Investment approx. 1.1 Bil. EUR
- Project set-up comparable to Wikinger
- TSO 50hertz - shared platform in planning
- Grid connection scheduled acc. to BFO
- Grid connection Baltic Eagle with system OST-2-2 and OST-2-3
- Wikinger Süd will be connected to the Wikinger OSS (system OST 1-3)



## Iberdrola in Baltic Sea – future projects

### Windanker

- Windanker area is considered in pre-draft Area Development Plan (FEP) – O-1.3
- Iberdrola expects consideration of Windanker area in next auction
- Area size approx. 18 km<sup>2</sup>





# 4

## Grid connection concepts

# Iberdrola in Baltic Sea - Grid concepts

---

## Possible alternatives for Grid connection in Baltic Sea

- Short-term solution in Germany:
  - Higher utilization of installed grid connection cables
  - Buffers identified within ongoing discussion of 2K-criteria
- International solution (example UK):
  - Grid connection build by windfarm operator
  - After completion handed over to TSO in a tender (OFTO)
  - Higher investment costs but project is in control of timing (coordination in one hand)

# Vielen Dank

