



# WIND-projekt

Ingenieur- und Projektentwicklungsgesellschaft mbH



## Demonstration and Innovation Project RH<sub>2</sub>-WKA

*Connecting wind and hydrogen to make wind energy a steady power source*



Brussels, 2014-04-03

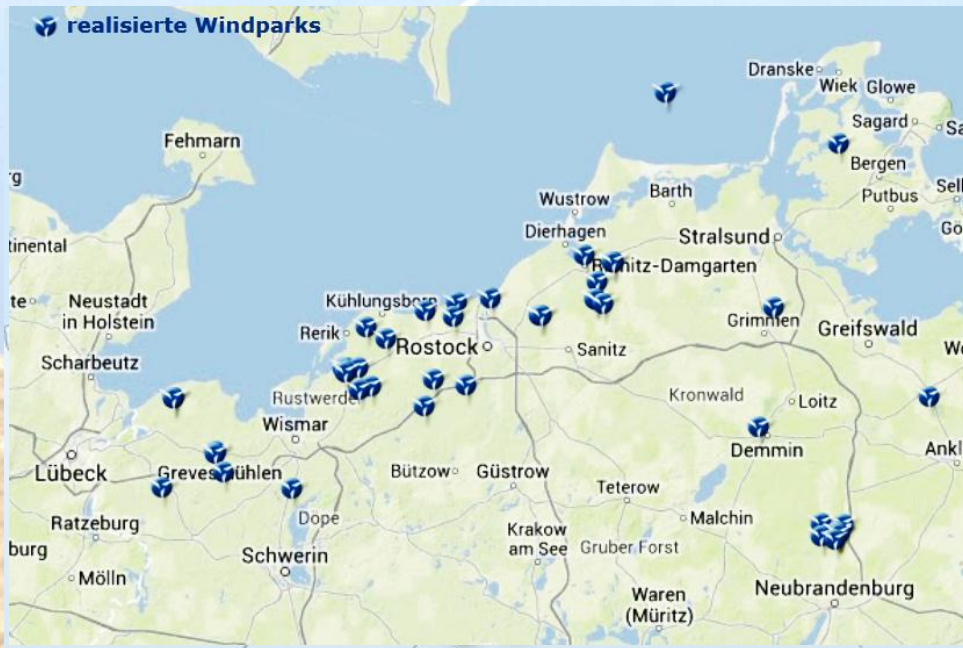


## WIND-projekt in brief

- founded in 1994 by the owner and CEO Mr. Carlo Schmidt
- independent project planning company (onshore+offshore wind)
- located in Börgerende (Federal State of Mecklenburg-Western Pomerania)
- Portfolio: planning, realization and operation of on- and offshore-wind turbines (WTG) and additive energy systems (e.g. energy storage)



CEO Dipl.-Ing.  
Carlo Schmidt



## Company vision:

„affordable energy“ based on  
renewable energies

## Key figures for project planning:

Onshore:  
approx. 200 WTG (ca 375 MW)

Offshore:  
approx. 230 WTG (ca 1,050 MW)  
(Breitling + Baltic I in operation)

## Planning activities in the german baltic sea



### Offshore WEA Breitling

location: port of Rostock  
distance to shore: ca. 0.3 km  
water depth: ca. 2.5 m  
power: 2.5 MW  
electrical energy for approx. 2,000 households  
Jan. 2006: WTG in operation



## Planning activities in the german baltic sea



### Offshore Wind farm Baltic I

location: within the 12-nautical mile zone  
 distance to shore: approx. 16 km  
 21 WTG with 2.3 MW each  
 total power: 48.3 MW  
 status: in operation

### Offshore Wind farm Kriegers Flak („Baltic II“)

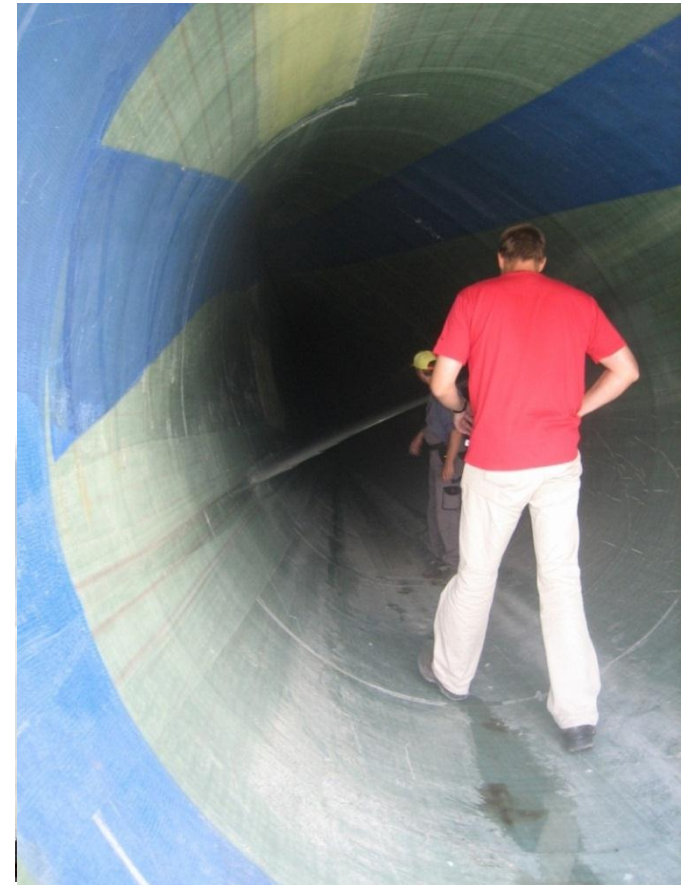
location: within the German exclusive economic zone  
 distance to shore: approx. 32-35 km  
 80 WTG with 3.6 MW each  
 total power : 288 MW  
 status: under construction since spring 2013

**The planning and permission procedures of the offshore-projects were conducted by WIND-projekt.**

The realization & operation is conducted by ENBW.



## Prototype sites and settlement consulting for manufacturers





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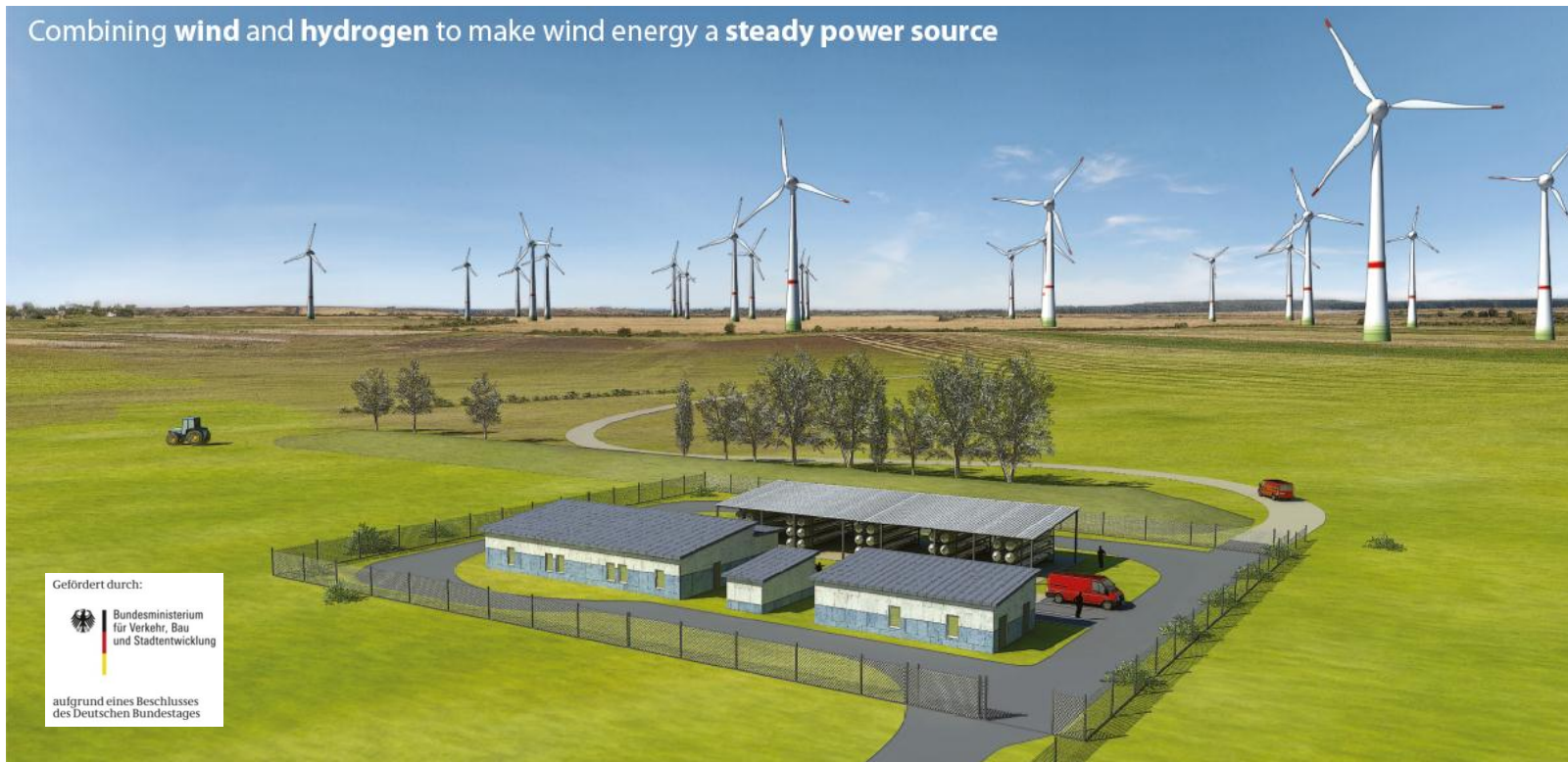
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Demonstration and innovation project  
RH<sub>2</sub>® - WKA

## Demonstration and Innovation Project RH<sub>2</sub>®-Werder/Kessin/Altentreptow (RH<sub>2</sub>-WKA)

Combining **wind** and **hydrogen** to make wind energy a **steady power source**



RH<sub>2</sub>-renewable hydrogen

[www.rh2-wka.de](http://www.rh2-wka.de)

## Key figures of the demonstration and innovation project RH<sub>2</sub>-WKA



Dimension:	28 WTG (up to 7.5 MW/WTG)
Total farm capacity:	approx. 140 MW
Hydrogen system:	1,000 kW electrolyses (1. step); pressure storage, 650 kW H <sub>2</sub> -CHP-unit
Grid connection:	380 kV and 110 kV grid access (SDL-compatible)
Job effects:	> 50 in region
Settling:	manufacturing/service base at project site
Infrastructure:	direct connection to the motorway A20
Output:	electrical energy for about 125,000 households (15% of M-V)
CO <sub>2</sub> -savings:	ca. 250,000 t CO <sub>2</sub> /a
Subsidies:	government funding of about 4.5M EUR for R&D
Status:	in operation

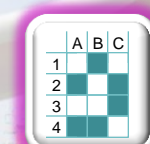


## Key figures of the demonstration and innovation project RH<sub>2</sub>-WKA



project approach:

- power demand of turbines
- network integration
- losses caused by grid management
- timeline for grid expansion
- new business cases





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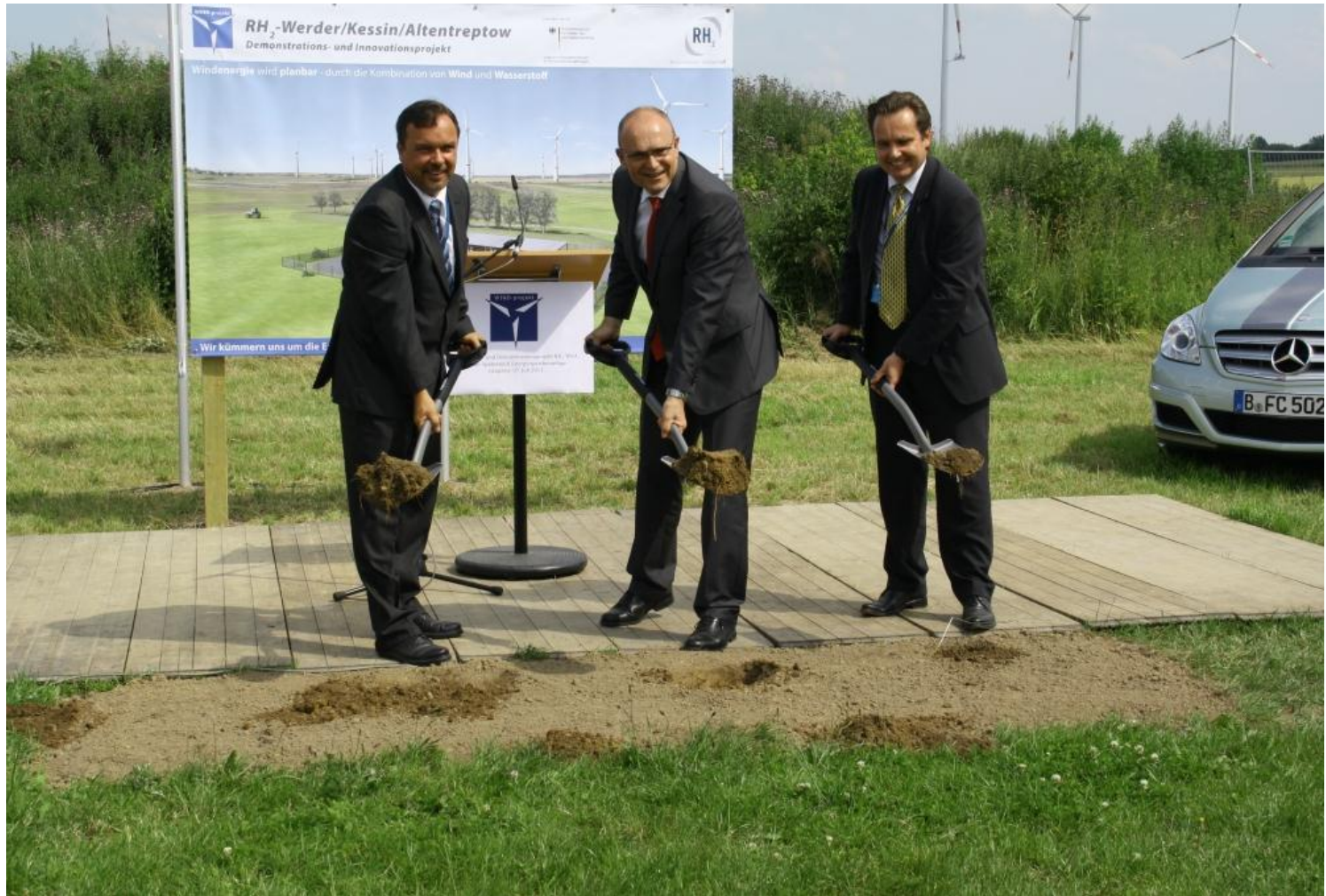
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realisation of the energy storage system





f. left: C. Schmidt (WIND-projekt), E. Selling (Prime Minister M-V), Dr. O. Ehret (NOW GmbH)

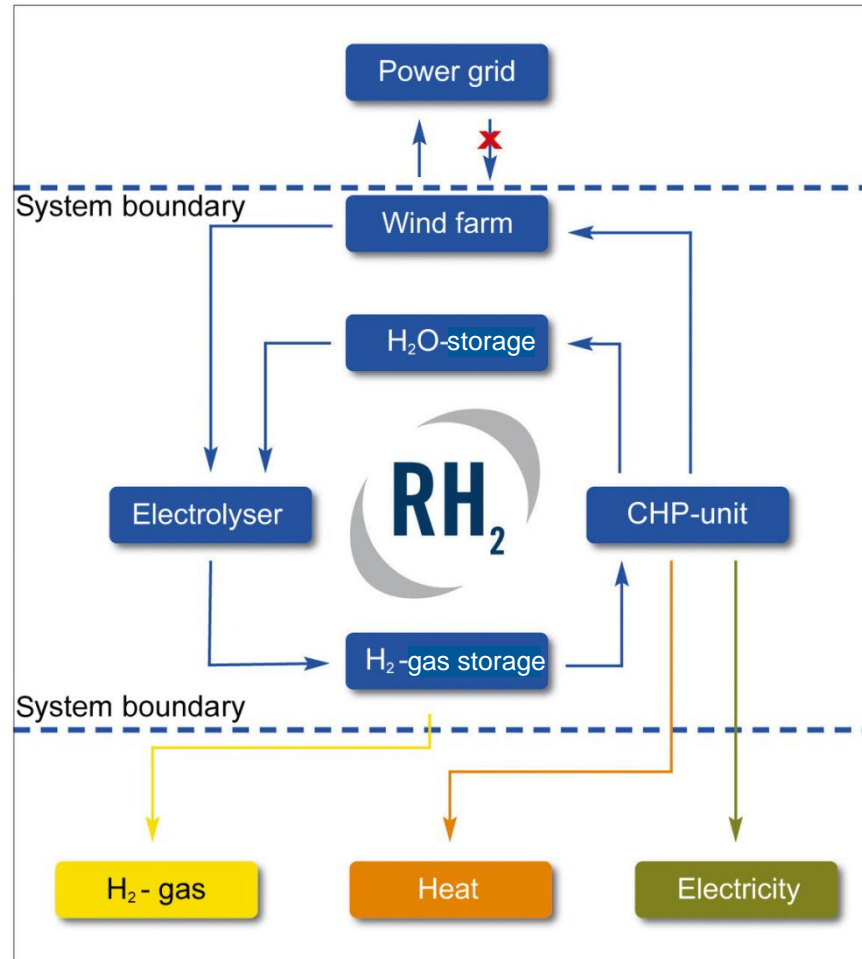
ground-breaking ceremony in 2011





realisation of the energy storage system

## Principle of the RH<sub>2</sub>- wind-hydrogen-system



## Principle of the RH<sub>2</sub>- wind-hydrogen-system





## Key data of the RH<sub>2</sub>- wind-hydrogen-system

electrolysis:	210 Nm <sup>3</sup> /h (alkaline electrolysis)
efficiency:	51.3 %
reconversion:	250 kWel;
efficiency:	33.2 % (MPP)
overall el. efficiency:	15.4 % (approx.)
test period:	since 1.Q/2013 (complete circle)
storage input:	357,000 kWh (via al. elec., only for test purposes, 2013)
storage output:	48,000 kWh (via ICE, only for test purposes, 2013)
permission process:	according to Federal Emission Protection Law (2010 + 2 years)
construction period:	about 12 month

subsidies:



partners:



## Main objectives/conclusions

Phase I:	component test (completed)
Phase II:	production according to the hydrogen gas demand (completed)
Phase III:	production according to the heat demand (in simulation)
Phase IV:	production in line with the power demand of the windfarm (completed)
Phase V:	production in line with phase IV + external parameters (completed) (e.g. wind forecast, grid management acc. to Renewable Energy Act)
Phase VI:	power-to-gas, injection of hydrogen into cng grid (permission process)
Phase VII:	plant extension for the supply of balancing energy (planning process)

### conclusions

- each application causes special needs in dimension, control system, technology
- still high demand of on-going development for the components
- need for public financial support for realization still significant
- demand of specific legal conditions for storing and green balance power plants



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## Contact

Thank you for your  
attention!



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**[www.RH2-WKA.de](http://www.RH2-WKA.de)**