



Analysing Offshore Wind Auction Results in Germany

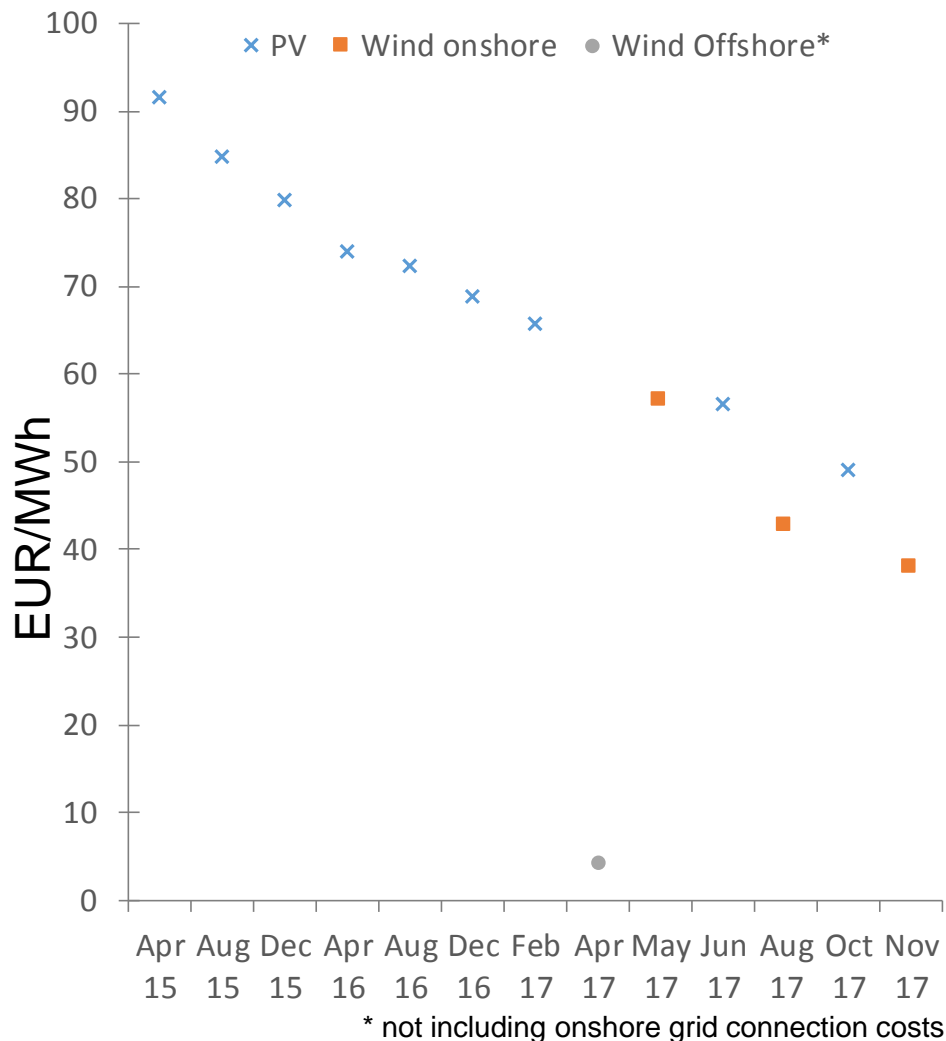
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Recent Trends in German RES Auctions: Auction Dates and Results (average payment for winning bids)



- ◆ Generally declining trend
- ◆ Winning bids receive wholesale electricity price plus difference between bid and technology's average wholesale price
- ◆ Onshore wind and PV on similar levels
- ◆ RES seem to be closing the gap to conventionals fast...
- ◆ ... – but details matter.

Auction Results and Research Question: Offshore Wind

- ◆ Auctions for German offshore wind projects going online between 2021 and 2025 (“transition period”)
 - 31 approved projects with a total planned capacity of 8,654 MW
 - 1. auction: 1,550 MW April 1st, 2017
 - 2. auction: 1,550 MW April 1st, 2018
- ◆ Results of 2017 auction: Three out of four winning projects bid zero
 - Dong/Ørsted OWP West (240 MW)
 - Dong/Ørsted Borkum Riffgrund West 2 (240 MW)
 - EnBW He Dreiht (900 MW)
- ◆ *Research question: Why?*

Hypotheses

- a) *Bids are (expected to be) profitable*: Rising wholesale prices and lower LCOEs increase profitability of projects
- b) *“Option bidding”*: Investors have not yet decided on investment. If projects become profitable, they invest. If not, they do not invest and lose bid bond (which can thus be interpreted as an option premium).
- c) *Securing grid access*: Not all planned projects can be connected. Winning auction guarantees grid connection.
- d) *Other reasons*

Hypothesis a): Bids are (expected to be) profitable

- ◆ All zero bid projects expected to start operation (based on finishing grid connection) at the end of transition period:
 - OWP West and Borkum Riffgrund West 2: NOR 1-1 (converter DoIWin 5) planned for 2024
 - He Dreiht: NOR 7-1 (converter BorWin 5) planned for 2025
- ◆ Possible cost reductions (Dong: FID 2021)
 - Next generation wind turbines, 13-15 MW capacity
 - Other cost reductions
- ◆ Possible wholesale price increase:
 - Net capacity reductions (nuclear phase-out, coal, ...)
 - Increasing costs for CO₂-emissions
- ◆ Not all fixed costs are included: costs of grid connection are paid by consumers
 - Costs for DoIWin5 (BR West 2 / OWP West, DONG): 1,300 €/kW and for BorWin5 (He Dreiht, EnBW): 1,550 €/kW (own estimates based on O-NEP 2025)
- ◆ “Winners’ curse” may be present

Thank you for your attention!

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<https://www.tu-cottbus.de/fakultaet3/de/energiewirtschaft/lehrstuhl/profil.html>

Hypothesis b): “Option bidding”

- ◆ Bidders hope that their projects will be profitable at time of FID
- ◆ Downside (project not profitable at FID): restricted to loss of bid bond (plus other sunk costs for investment before FID)
 - Bid bond: € 100 per kW in case of total non-compliance (around 3 % of total investment costs)
- ◆ Upside (project profitable): unrestricted profit
 - Subsidy from winning the auction, for “zero” bids:
 - Grid connection subsidy
 - Right to be connected
 - Revenues on wholesale market

Hypothesis c): Securing grid access

Constrained general setting

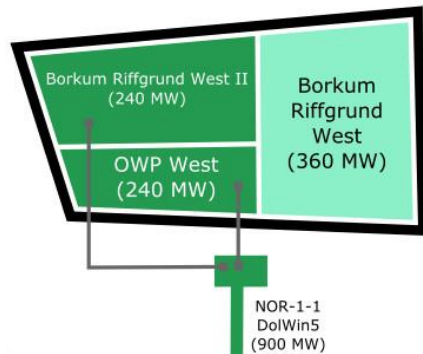
- ◆ Total amount allocated for period 2021 to 2025: 2 x 1,550 MW in two auctions, i.e. 3,100 MW
- ◆ Capacities of 31 approved projects (own calculation based on BSH): 8,654 MW
- ◆ Roughly 36 % of all approved projects can be realized before 2025

Hypothesis c): Securing grid access Constrained clusters (i)

- ◆ Winning bids receive the right to get connected to the grid
- ◆ Offshore wind farms are grouped in clusters, i.e. zones with physical connection points
- ◆ Not all projects within a cluster can be connected
- ◆ Example: EnBW He Dreiht blocks grid access for Vattenfall Global Tech 2. The latter project was cancelled after EnBW winning the auction.

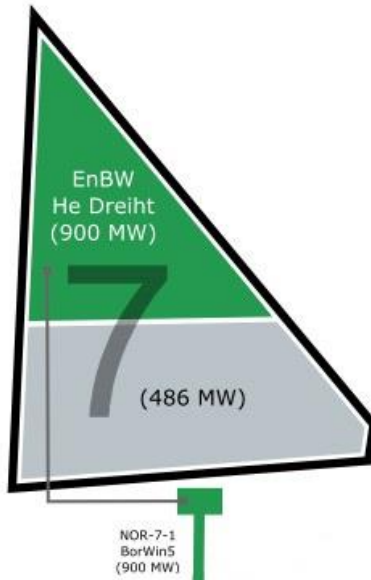
Hypothesis c): Securing grid access

Constrained clusters (ii)



OWP West (240 MW) and Borkum Riffgrund West 2 (240 MW)

- In cluster 1 with one other competing project (Borkum Riffgrund West 1, 360 MW) – which is also from Dong!
- Cluster capacity not scarce: $240+240+360=840$, Anbindung: NOR 1-1 (DolWin 5), 900 MW
- **Conclusion: no constraint**



He Dreiht (900 MW):

- In cluster 7 with one other project (Vattenfall Global Tech 2, 486 MW)
- 900 MW capacity in NOR 7-1 (BorWin 5), additional capacity in NOR 7-2 (BorWin 6) planned for 2030 (source: WindGuard)
- **Conclusion: constraint**
EnBW He Dreiht blocking access for (at least) Vattenfall Global Tech 2, project was cancelled in April 2017

Hypothesis d): Other reasons

- ◆ Improve reputation for wind offshore projects in general
 - They used to be seen as the next cost driver in the German Energiewende
 - Now, they could be perceived as on the verge of competitiveness (at least in the same league as wind onshore and photovoltaic)
- ◆ Signaling (very) strong competitiveness to competitors
- ◆ EnBW is owned by the German state of Baden-Württemberg, which has a green party government that has set ambitious RE targets as share in EnBW production portfolio