

# Strategies in renewable auctions – experience from Germany

**DFBEW Konferenz: Ausschreibungen für Windenergie an Land:  
Zwischen Wettbewerbsfähigkeit und Kosteneffizienz  
September 15, 2020**

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# DNV GL – Energy, an energy technology powerhouse



**Largest**

independent technical advisor on renewable energy and 2,500 energy experts

**>25**

standards and guidelines published as a leading certification body

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in high power and high voltage testing with 10 laboratories incl. our leading lab in Arnhem

**90**

years experience in the power industry, including 30 years in energy efficiency and wind energy

# DNV GL Energy Advisory - Global service portfolio



## Policy development:

- Energy policy & regulation
- Market design
- Competitive retail market structure and support
- Strategic planning
- Technology planning
- Supply chain optimization
- Risk & change management

## Power Generation:

- Alternative business model development
  - Dynamic microgrids
  - Thermal generation
  - Distributed generation
  - Renewables
- Trading**
- Trading & risk management
  - Power purchase agreements
  - Benchmarking performance

## T&D:

- Power systems planning & design
- Operational excellence
- Grid hardening & resiliency
- Asset management
- Renewables integration

## Efficient use of energy:

- Energy efficiency
- Demand side management
- Data analytics
- Energy economics
- Behind the meter generation
- Building automation

# Energy Market & Technology

Unique insights into market design and the development of energy markets, providing defensible and sustainable business strategies.

- Markets policy, design, and regulatory support services
- Renewables market analysis and business impact advisory services
- Strategic market planning and due diligence services



## Key Services:

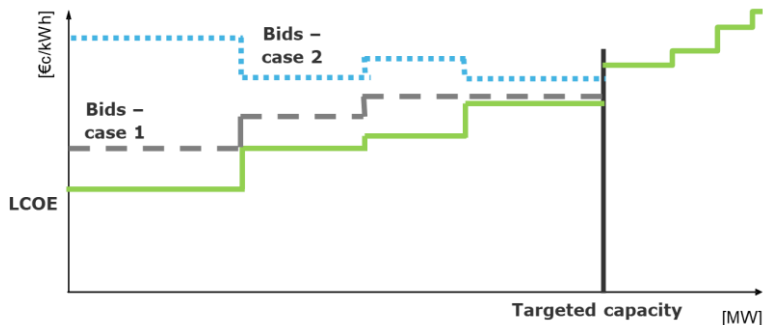
- Future market design and modelling analysis for electric and gas markets focused on bulk energy and retail markets
- Regulation, policy, advisory services assess business impact of current and future policy in regulated and deregulated markets
- Business & technology strategy developing sustainable revenues in new markets based on competitive analysis, benchmarking and risk assessed scenarios.

# RE auction price rules & bidder strategy

Pay-as-bid and pay-as-clear are most common price rules in RE auctions; bidder strategies vary considerably under the two price rules

## Pay-as-bid

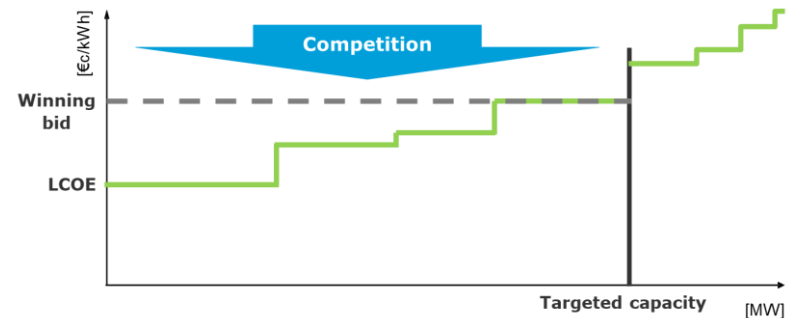
- Policy makers' target: reduce support levels & cost (case 1);
- Speculation among bidders about the highest winning bid level can distort the merit order and increase support cost (case 2)



Best strategy: Estimate level of highest winning bid and bid just below

## Pay-as-clear

- Policy makers' target: incentivise bidders to bid their true cost (valuation)
- Prerequisite: private information & no collusion of bidders

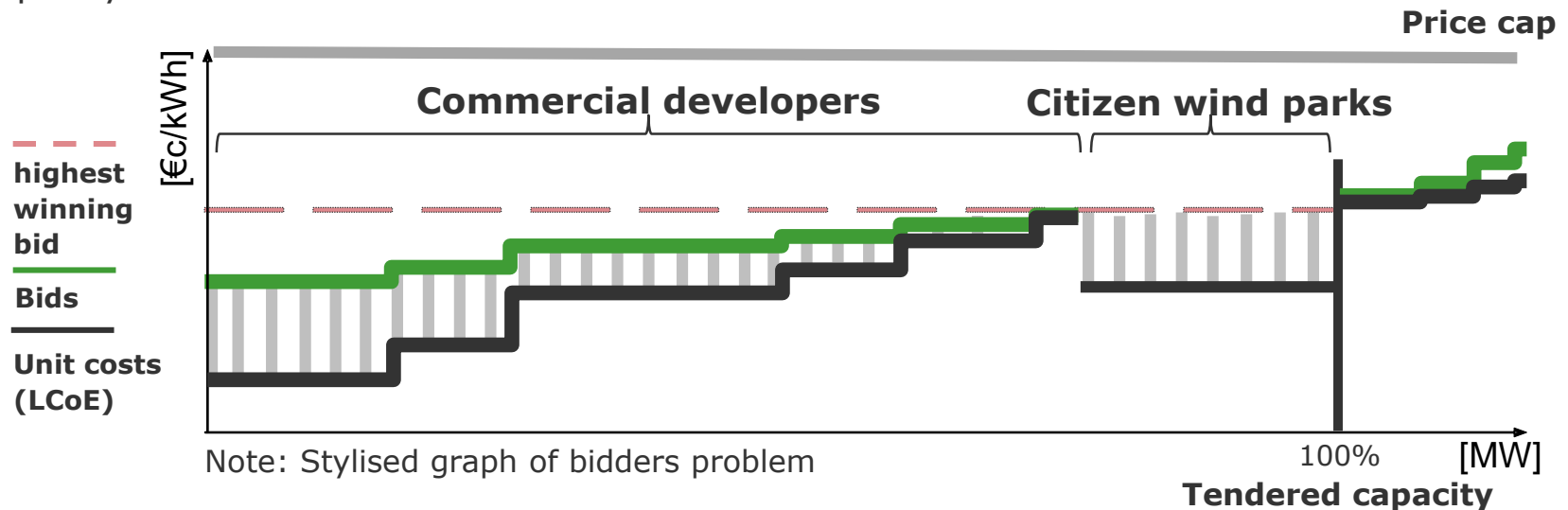


Dominant Strategy: Bid the at the project's cost+ rate (LCOE)

# Onshore wind Auction design

In Germany, policy makers have combined a pay-as-bid and pay-as-clear auction to distinguish between commercial and citizen investors

- The auction is a **pay-as-bid multi unit auction** in which bids consist of an energy price [€/kWh] and a planned capacity. Bids are accepted in the **merit order** until the tendered capacity is reached:



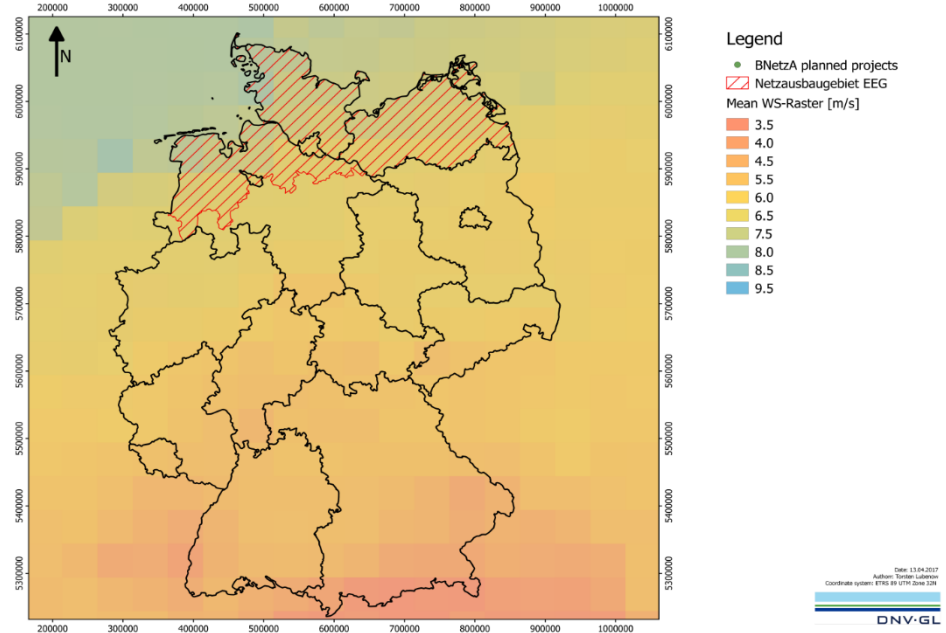
- The pay-as-bid rule does not apply to **citizen wind parks** (Bürgerenergiegesellschaften). They receive the highest winning bid if their own bid is among the successful ones (**uniform price rule**).

Sources: RES Legal, Bundesnetzagentur, Aures

# Regionalization in onshore wind auction

## Regionalization of the bids has a strong influence on the auction outcomes

- Renewable Energy Law enshrines division of Germany into two regions
  - Cap on new installations due to network congestion problems in the North of Germany
- Correction factor for each wind farm project mitigates quality differences in location (w.r.t. wind speed) – „Referenzertragsmodell“:
  - Developers commission an official site quality assessment (referring to wind speed)
  - Support level is corrected by quality factor

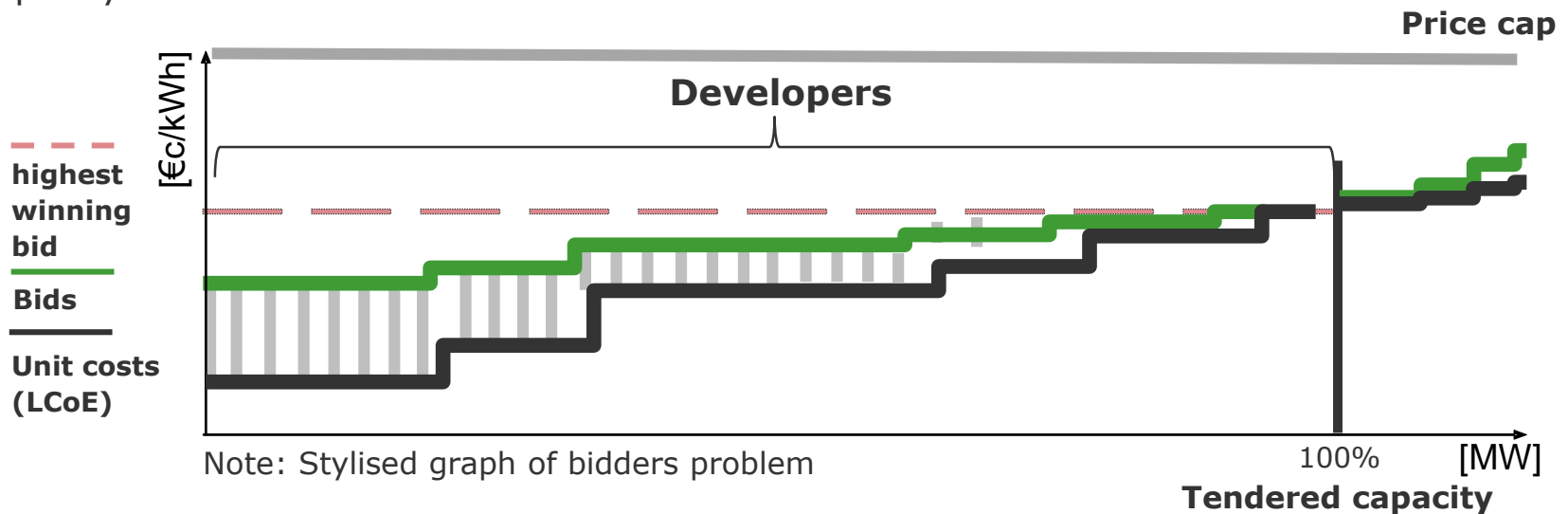


Quality factor	Gütefaktor	70 Prozent	80 Prozent	90 Prozent	100 Prozent	110 Prozent	120 Prozent	130 Prozent	140 Prozent	150 Prozent
Correction factor	Korrekturfaktor	1,29	1,16	1,07	1,00	0,94	0,89	0,85	0,81	0,79

# Solar PV Auction design

In Germany, policy makers have chosen a bid-as-bid auction design for solar PV auctions

- The auction is a **pay-as-bid multi unit auction** in which bids consist of an energy price [€/kWh] and a planned capacity. Bids are accepted in the **merit order** until the tendered capacity is reached:

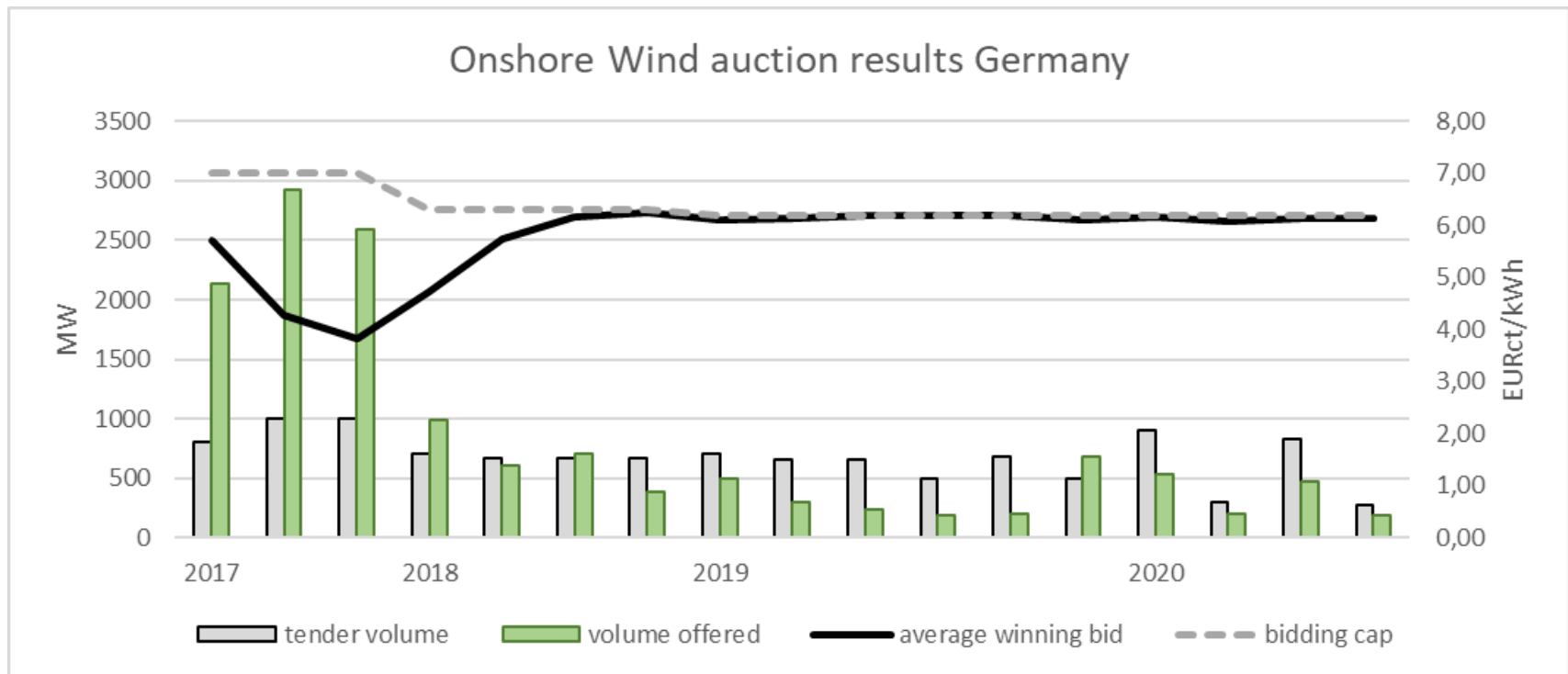


Sources: RES Legal, Bundesnetzagentur, Aures



# Onshore wind Auction results 2017-2020 (1)

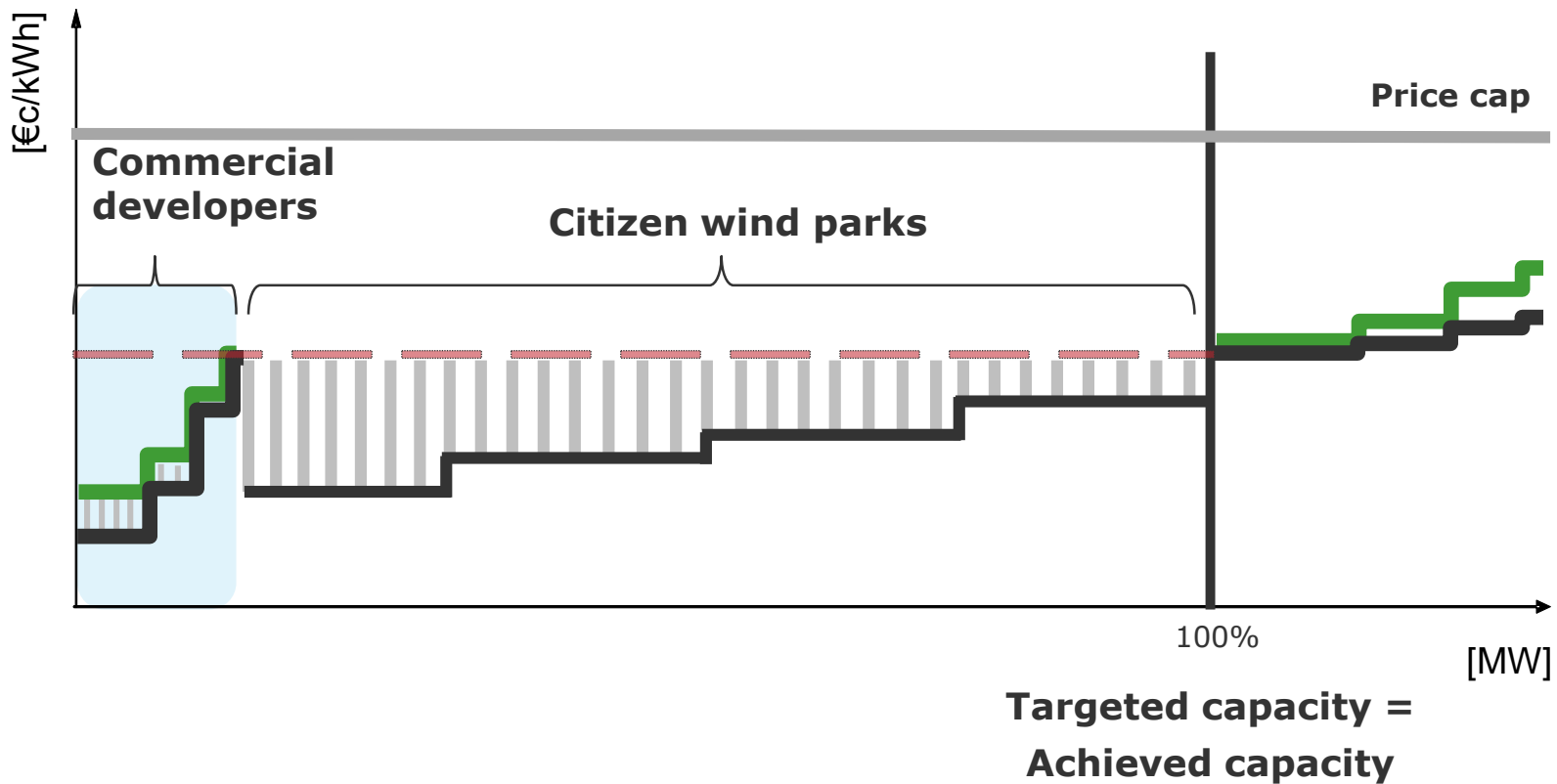
Wind auction participation went from high to low over the 2017 – 2020 period; after an initial drop in winning bid levels, they are now at the cap value



# Onshore wind

## Stylized auction results 2017

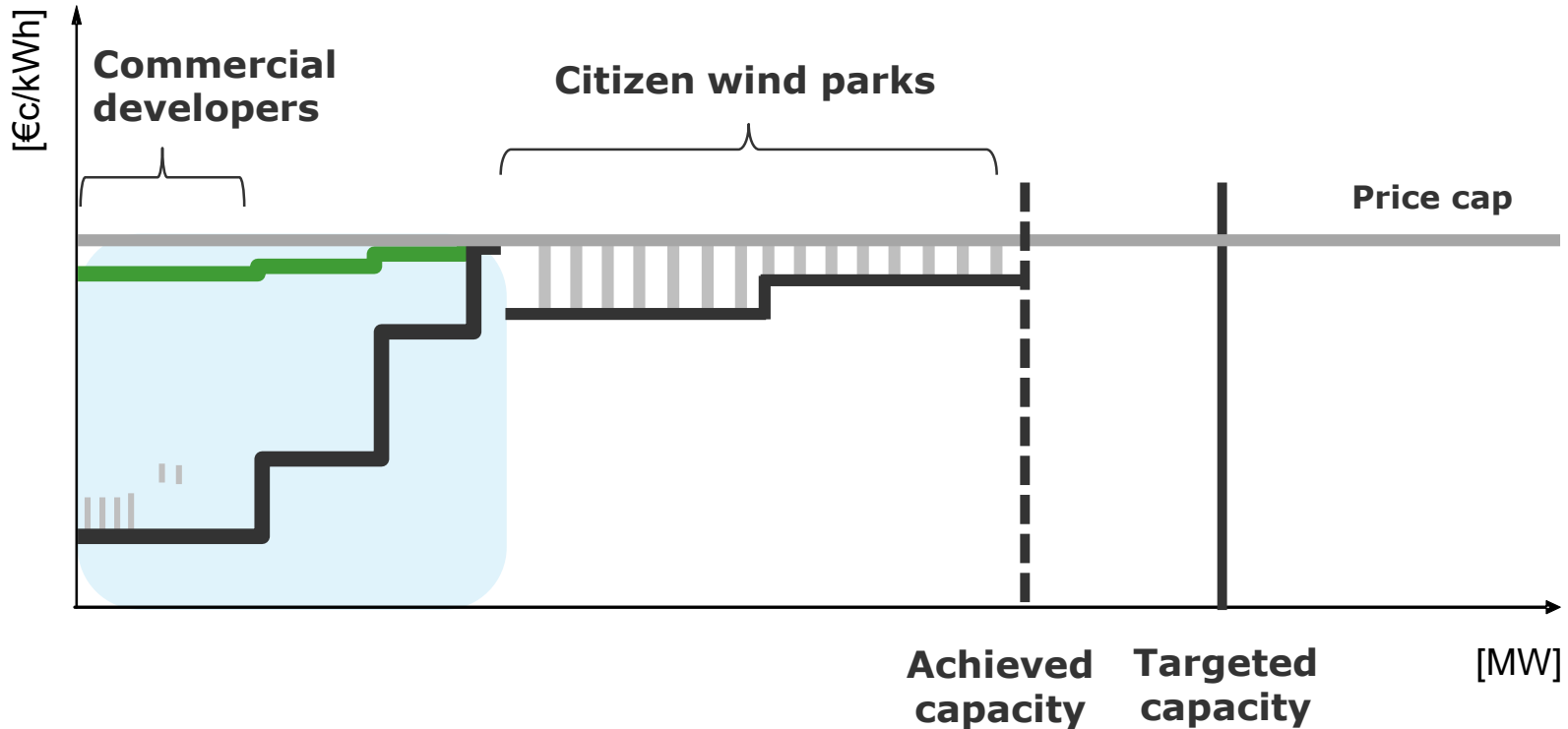
In 2017, citizen wind parks dominated the winner field of the auction, depressing the results to low support levels



# Onshore wind

## Stylized auction results 2019ff & conclusions for bidding strategy

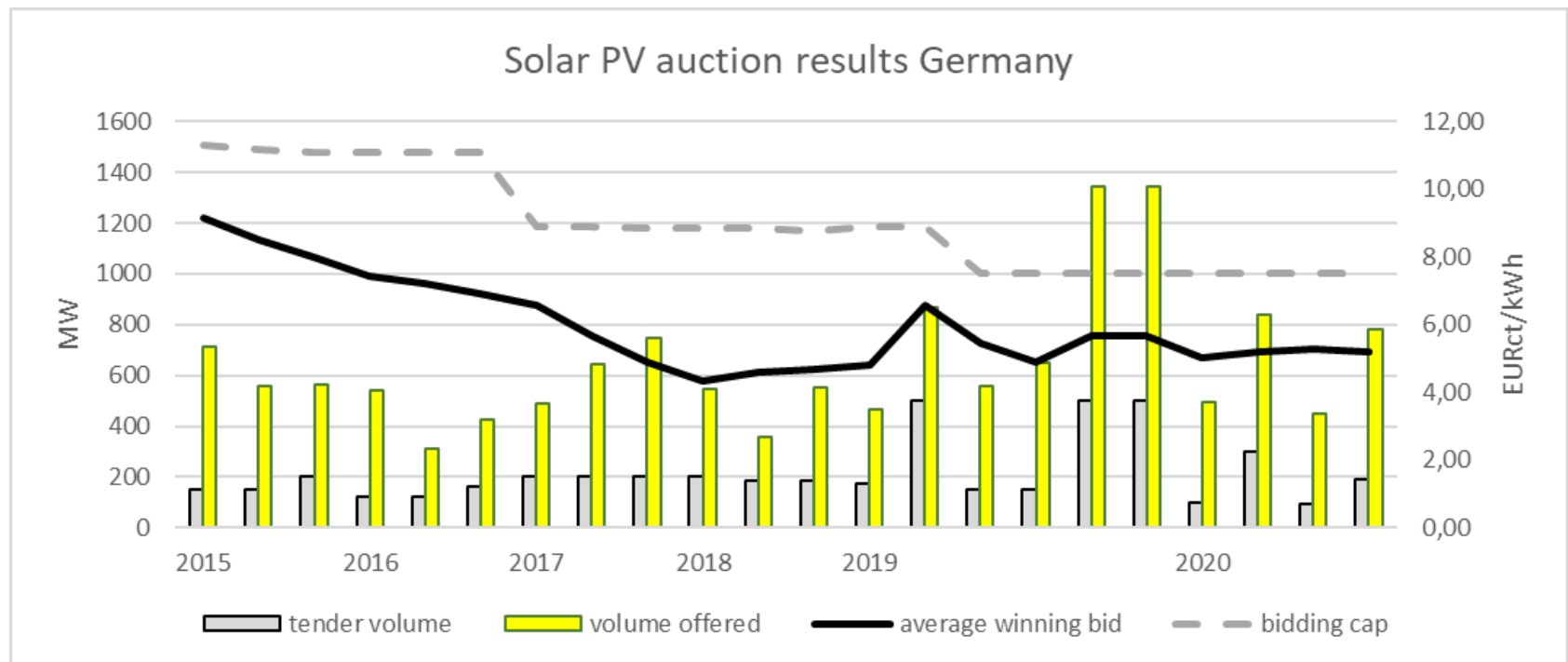
In 2019, participation in the wind onshore auction was low, and so the bidding went up just below the price cap



**Dominant Strategy: Bid the upper price cap**

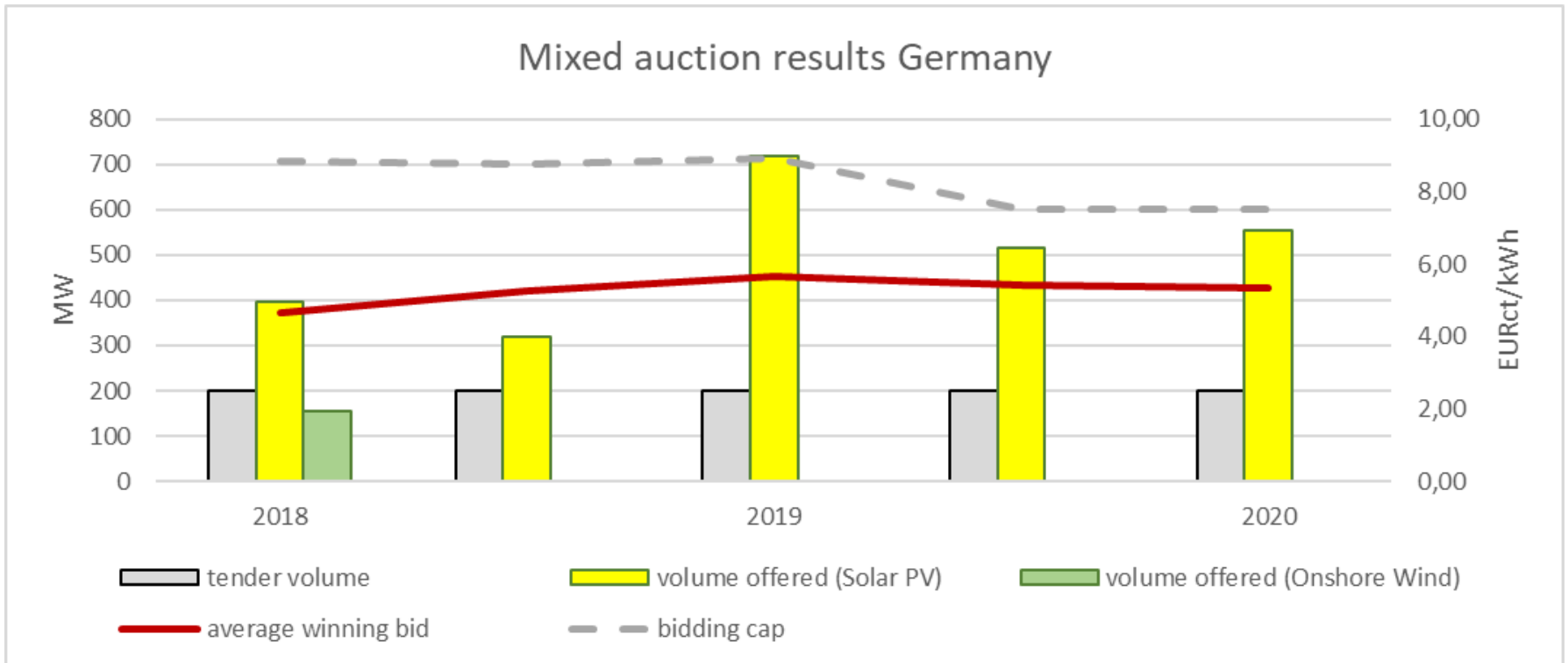
# Solar PV auction Results 2015-2020

From 2015 to 2020, participation in solar PV auctions has been high; winning bid levels have been falling until 2018, and increased since then



# Mixed auctions Results 2018-2020

Participation in mixed auctions has been high since 2018, but by solar PV; winning bid levels have been in line with solar PV auctions



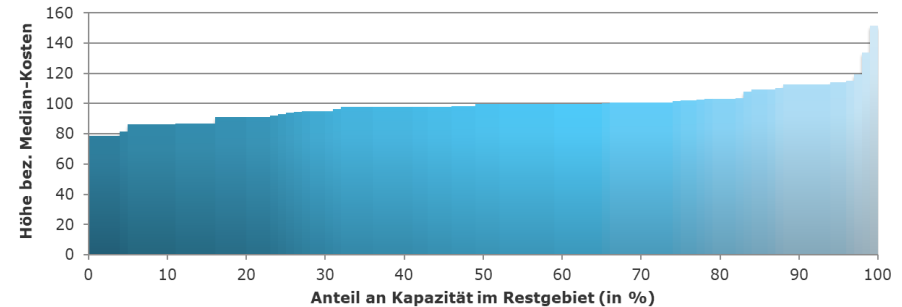
# Solar PV

## Conclusion for bidding strategy

As sufficiently many solar PV projects remain in the pipeline for now, the best strategy for bidders is to estimate the LCOE field of competition

- Estimation of LCOE allows for understanding of competitive position of bidder in the auction (bids below LCOE are irrational)
- Estimation of field of competition
  - Collect a set of plausible projects participating in the project (or similar ones) – possible source is EEG register
  - Estimate CAPEX based on estimation of construction & financing cost
  - Estimate OPEX – essentially O&M
  - Estimate electricity yield based on radiation data
  - Derive LCOE

### Example: merit order of normalized LCOE (onshore wind, 2017)



**Bid below highest winning bid (given target capacity)**

# Thanks for your attention

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# Onshore wind Auction results 2017-2020 (2)

Citizen wind parks dominated the winner field in the beginning, after 2017 their role was greatly diminished.

Onshore Wind auction Germany: Citizen vs. Commercial

