



German coal closure auctions: bidding behaviour and design questions

September 2019

The Coal Commission proposes auctions to close hard coal plants – lots of questions need to be clarified

Statements in the final report of the Coal Commission

*"In the field of hard coal-fired power plants, the Federal Government should pursue a **steady reduction of capacities in the market as far as possible**. This should be based on the currently foreseeable reduction of hard coal-fired power plant capacities via the CHP Act [KWKG] as well as **security of supply**. For the remaining capacity, a **voluntary decommissioning premium** is to be offered in the form of a tender. [...]*

*If the tender for the voluntary decommissioning premium is **oversubscribed**, the award is made on the basis of a **criterion that reflects the emission savings**. A necessary prerequisite in a tender is the **exclusion of redundancies** for operational reasons and unfair social and economic disadvantages for the affected employees. If the **reduction of hard coal capacities is market-driven** along the reduction path anyway, **no tenders will be necessary** in these years or the decommissioning premium put out to tender will be zero".*

Key proposals

- **Reverse auctions to be held to close hard coal plants**
- **Hard coal plant operators participate voluntarily**
- **Auction timeline should account for closures due to CHP Act and lack of profitability**
- **If auctions are oversubscribed, bids are to be selected based on emission savings criterion**
- **No redundancies due to plant closures**

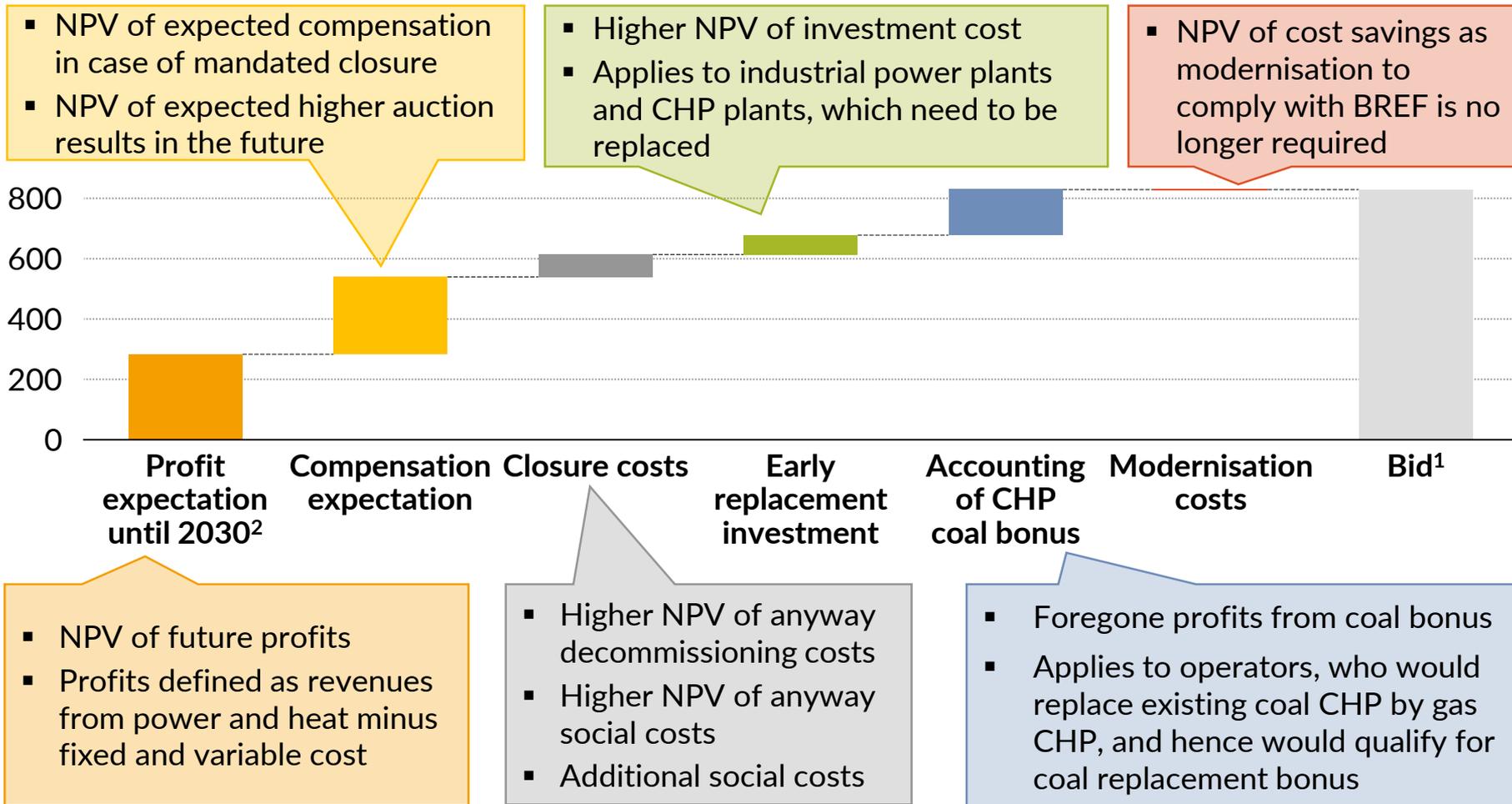
- **8 July 2019: key implementation principles published** in stakeholder consultation workshops
- **4 September 2019: working version of Hard Coal Exit Act leaked**

The proposed auction design is tough on plant operators, with forced closures if auctions are undersubscribed

Key design parameters		Current design proposal
Closure timeline	When should hard coal plants close? Evenly or in turn with lignite?	<ul style="list-style-type: none"> ▪ Hard coal plants close in turn with lignite
Auction timeline	How frequently should auctions be held? How far before closure?	<ul style="list-style-type: none"> ▪ Several auctions for closure (details not determined yet)
Clearing mechanism	Should auctions be pay-as-clear or pay-as-bid?	<ul style="list-style-type: none"> ▪ Pay-as-bid (leads to strategic bidding)
CHP subsidies	Should compensated coal plants lose CHP subsidies?	<ul style="list-style-type: none"> ▪ Accounting of CHP coal bonus
Restriction of past-2030 compensation	Should compensation be paid after 2030? Can it still be set by auctions?	<ul style="list-style-type: none"> ▪ Compensation after 2030 only for plants younger than 25 years
Maximum bid	Should a maximum bid be set?	<ul style="list-style-type: none"> ▪ Maximum bid decreasing over time (not set yet)
Mechanism to address undersubscription	Should undersubscribed auctions be complemented by mandated closures?	<ul style="list-style-type: none"> ▪ Mandated closures if auctions undersubscribed
Selection in case of oversubscription	Should past emissions be considered when selecting plants to be closed?	<ul style="list-style-type: none"> ▪ Bids are rescaled based on historical emissions
Grid constraints	Should grid constraints be taken into account?	<ul style="list-style-type: none"> ▪ Penalising capacities in grid-constrained areas

Expectations about plant value and replacement cost drive closure bids; tactical bidding is to be expected

Components of bids for closure in 2022 (discounted),
kEUR/MW

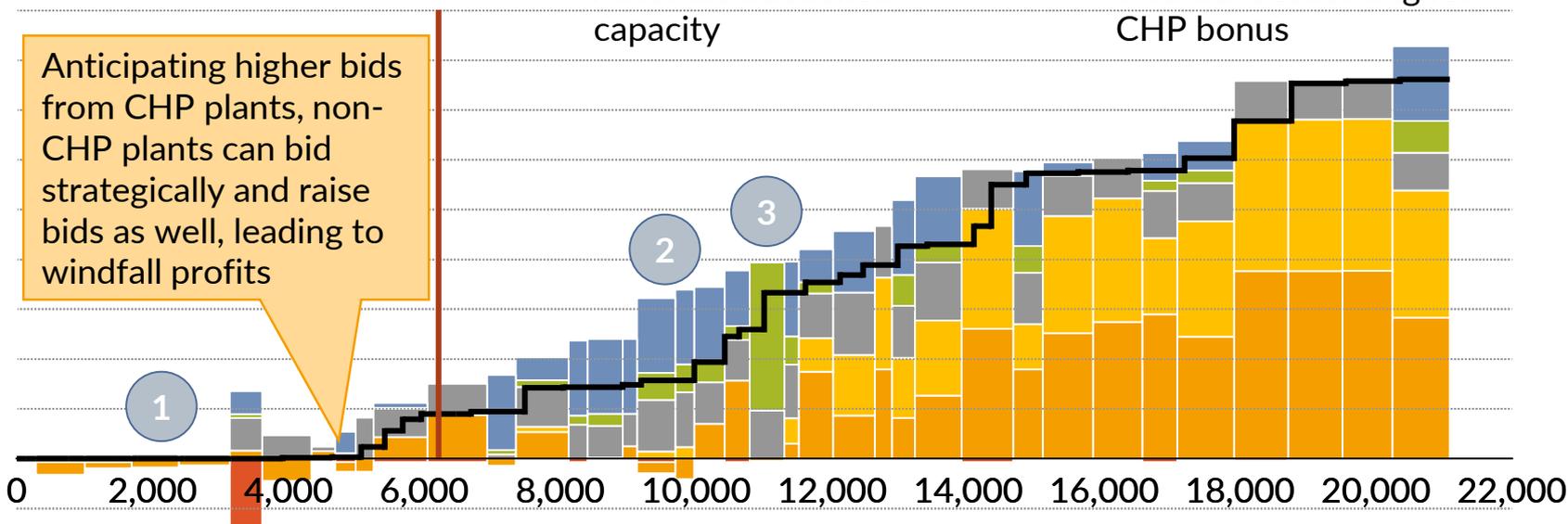


1) Bids show fundamental values without strategic considerations

Excluding CHP plants from receiving the coal replacement bonus increases their bids, raising overall costs

Bid ladder for closure in 2022, kEUR/MW

- Profit expectation until 2030
- Early replacement investment
- Compensation expectation
- Accounting of CHP coal bonus
- Closure costs
- Modernisation costs
- Assumed auctioned capacity
- Without accounting for CHP bonus



Anticipating higher bids from CHP plants, non-CHP plants can bid strategically and raise bids as well, leading to windfall profits

1 The **fundamental bids** from many power plants in the first few years are likely to be **close to zero**

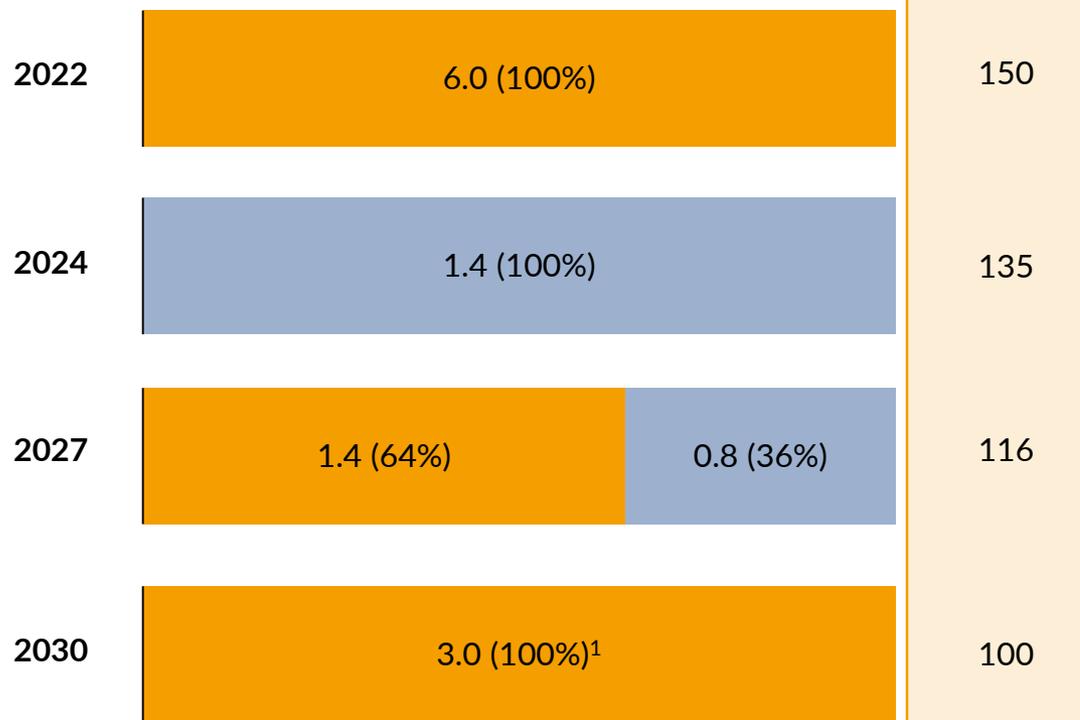
2 Bids turn positive, driven by **profit expectations, costs of closing early** and **pulling forward replacement investments**

3 **Excluding CHPs** from receiving the **coal replacement bonus raises their bids**, as they require a higher closure payment to become equivalent between closing and staying open

Under an assumed, degressive maximum bid starting at 150 kEUR/MW, some auctions would be undersubscribed

Hard coal capacity selected for closure by auction, GW

■ Auctions
 ■ Mandated closures



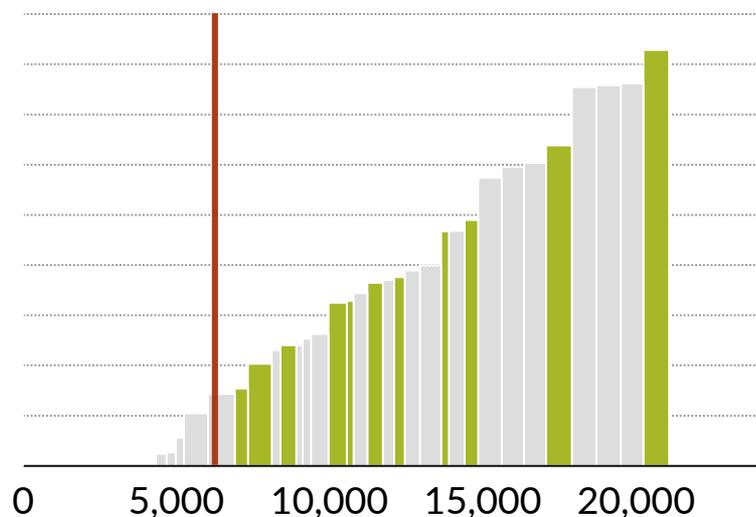
- The BMWi draft legislation does not specify the levels of maximum bids yet; we hence assume a maximum bid starting at 150 kEUR/MW, decreasing to 100 kEUR/MW
- As the first auction round for closure in 2022 is oversubscribed, no mandated closures are required
- The second auction round for closure in 2024 does not see any eligible bids, hence the entire capacity needs to be selected by the regulator based on plant age; the third round also sees significant mandated closures
- This creates an implementation risk, potentially delaying the coal exit
- From 2030, current draft legislation only foresees compensation to be paid to plants <25 years old, driving the bids of older plants down

1) Assuming no compensation is paid post-2030.

Even without discriminating against plants based in the South, we expect >75% of closures to be in the North

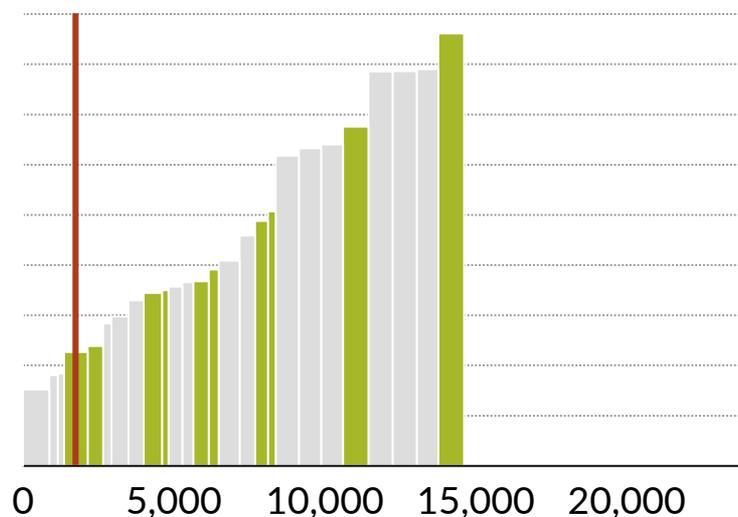
Bid ladder for closure in 2022, kEUR/MW

North
South



Bid ladder for closure in 2024, kEUR/MW

North
South



Closed hard coal capacity before 2025, GW

North

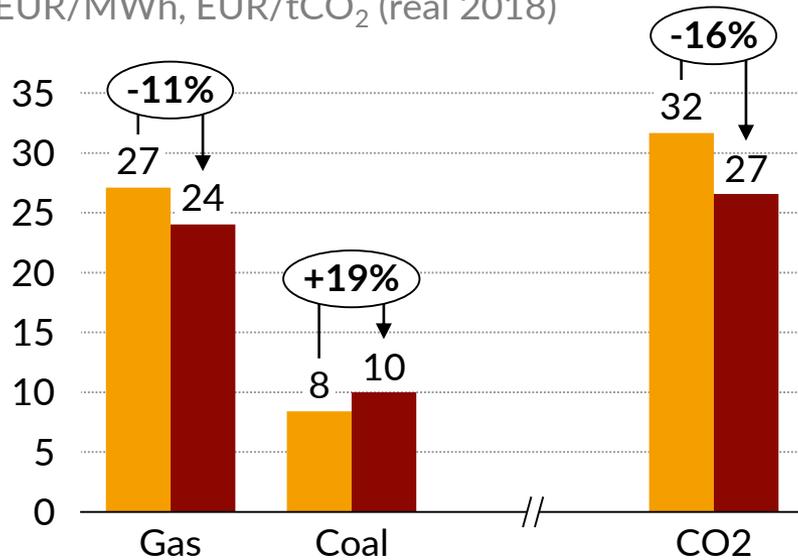
South



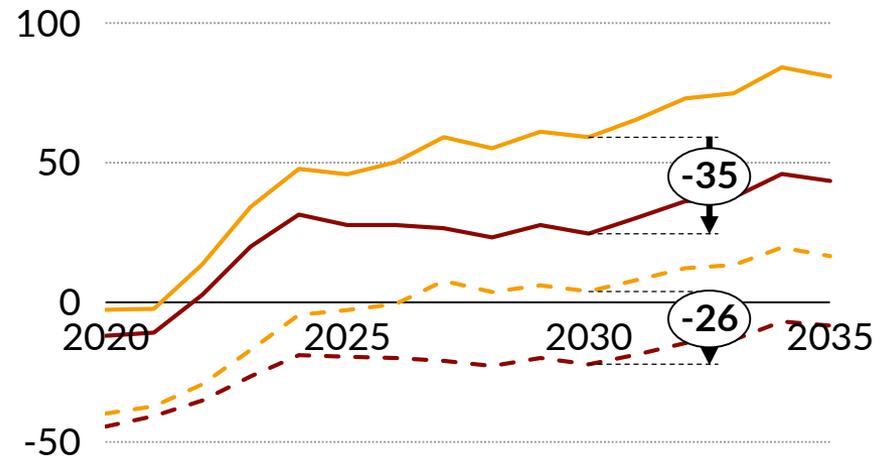
- Introducing a malus for Southern plants enables Northern plants to bid higher, increasing overall cost

Development of commodity prices according to IEA New Policies scenario would lower margins for coal power plants

Average prices in 2030, EUR/MWh, EUR/tCO₂ (real 2018)



Profitability of example coal power plants¹, kEUR/MW



■ Aurora Central
 ■ IEA New Policies
 — New plant
 - - Old plant

- In addition to Aurora Central, the IEA New Policies scenario was used, as it most closely corresponds to a consensus market view.
- In the IEA New Policies scenario, gas and EUA prices are 10-15% lower in 2030, and coal is 20% more expensive.

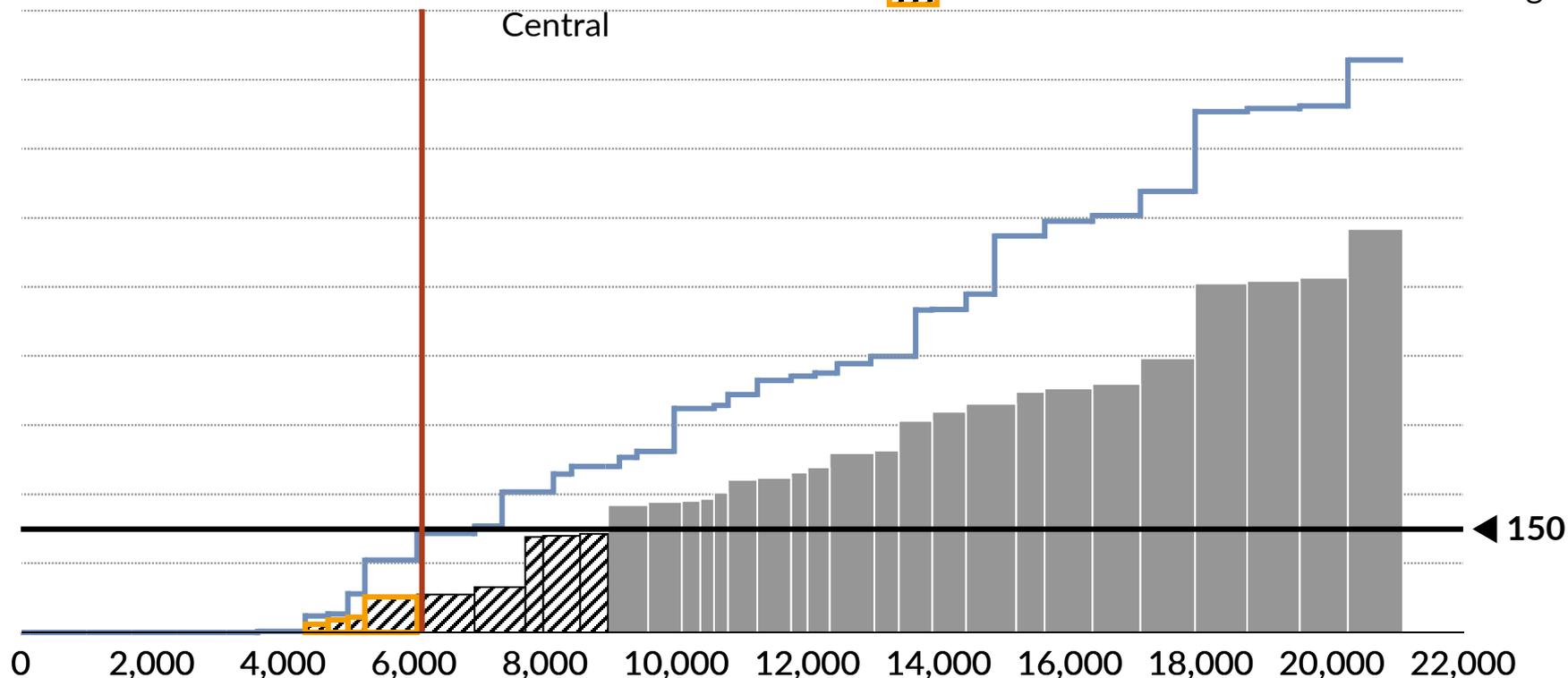
- Different commodity prices in the IEA New Policies scenario lead to lower market prices and lower margins for coal-fired power plants.
- Profits decrease by about 25-35 kEUR/MW and old power plants cannot cover their fixed costs even in late years.

1) Profits = Revenues on the spot market - variable and fixed costs

Market participants following IEA New Policies scenario assumptions leads to lower bids than Aurora Central

Bid ladder for closure in 2022, kEUR/MW

- Auctioned capacity
- Maximum price
- Bids under Aurora Central
- Bid under IEA New Policies
- Eligible bid (bid < max. price)
- Bid selected based on emission rescaling



- Expectations about commodity prices are a key driver of bidding behaviour
- If bidders believe in the IEA New Policies Scenario, they bid lower than under Aurora Central

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