AURES II: EU funded research project on auctions for renewable energy support

Funded by the European Union’s Horizon 2020 Framework Programme for research and innovation (2018 – 2021)
AURES II – objectives

1. Generate and communicate new insights on the applicability, performance, and effects of specific auction designs

2. Provide tailor-made policy support for different types of auction applications

3. Facilitate knowledge exchange between stakeholders
Focus today

Effects of remuneration schemes in combination with auctions
In the past renewable generation costs always above market values/revenues.

Support requirements

development of market values

Euro/MWh

years

LCOE
Now LCOE at least partly below market value/revenues

Development of market values

Revenue < costs

Revenue > cost

LCOE

years

Euro/MWh
Auctions shall identify plants with lowest support requirement

- Low support requirements if
  - gap between costs of electricity generation (€/MWh) and electricity market revenues (€/MWh) is minimized.
  - If LCOE > market values
    - minimize LCOE!
  - If market value partly > LCOE
    - current case: Selection of „optimal“ plants depends on future market value development
  - If market value > LCOE
    - no support necessary, market-based expansion (or auctions for land rights as in Montenegro)
Expected market values and risk get more important.
Expected market values and risk get more important

- LCOE are known
- Uncertain market price development influences support requirements and bids (depending on support regime)
Fixed premium (FP) vs. sliding premium (GP)

Disclaimer:

- A sliding premium corresponds to a one-sided CfD
- Two-sided CfD not considered here, but implies lowest risk and easiest determination of bid value as market values do not play a role and plants can bid LCOE
Bids for fixed premium consider long term development of market values

- Payment of fixed premium independent of market values
- Overall revenues depend on market price developments
Bids for sliding premium impacted by market price expectations only if LCOE low.

- Payment of sliding premium depends on market price development
- Overall revenue depends on market prices only if these are high
Bids for fixed premium if market values partly > LCOE

- Long term market values are considered in bid
- Bid value: LCOE – average expected market value

![Diagram showing the relationship between electricity price development and market values over years. The LCOE is represented as a horizontal line, and the average market value is shown as a dashed line. The bid for fixed premium is indicated by a red line.]
Bids for sliding premium if market values partly > LCOE

- Long term market values considered as well

![Diagram showing Electricity price development, Development of market values, average market value, LCOE, and Bid sliding premium: LCOE with expected additional revenues if MV > LCOE and losses as bid below LCOE (when MV < LCOE).]
Assumption: 3 bidders with different expectations regarding market values
If LCOE are equal, expected MV influences the bid values

- Assumptions: LCOE = 55€/MWh, real average market value 49€/MWh
- different MV assumptions (high, low, realistic)

**Sliding premium (SP):**
Bid for reference value (in blue)

**Fixed premium (FP):**
Bid for fixed premium (in orange)
Realistic MV expectation: support costs equal under FP and SP

- Same support costs under perfect foresight (correct expectation about MV)
- Too high and too low support more pronounced under fixed premium
FP implies higher profits or losses for plants with differing MV expectations.
Efficiency of FP and SP similar regarding the selection of plants with low LCOE

- Bidders with high expected MV (risk loving) are selected preferentially
- Effect is slightly more pronounced under fixed premium
Fixed premium increases financing costs and thus LCOE

<table>
<thead>
<tr>
<th></th>
<th>Share of certain revenues</th>
<th>WACC</th>
<th>LCOE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>80%</td>
<td>3.0%</td>
<td>51.4 €/MWh</td>
</tr>
<tr>
<td>FP (considering MV)</td>
<td>50%</td>
<td>4.5%</td>
<td>56.9 €/MWh</td>
</tr>
<tr>
<td>FP (not considering MV)</td>
<td>10%</td>
<td>6.5%</td>
<td>64.6 €/MWh</td>
</tr>
</tbody>
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- Assumptions: debt interest rate: 2%, equity interest rate: 7%
- Share of stable revenues determines debt ratio
- Under sliding premium bid value corresponds to stable revenues
- Under fixed premium, only premium is totally stable (FP not considering MV)
- FP considering MV acknowledges 40% of expected market value as stable
If financing costs are considered support costs higher under fixed premium.
Summary sliding vs. fixed premium under auctions

- LCOE currently partly below MV → Expected MV also relevant for bids under SP
- Impact of differing MV expectations important for efficient plants selection as well as support costs, profits and losses
- Higher danger of losses and profits under fixed premium
- Fixed premium implies lower share of stable revenues, implying higher financing costs or worse financing conditions and higher LCOE
New and upcoming reports of AURES II

• “Effects of auctions on financing conditions for renewable energy”
• Case studies: available for Poland and UK, upcoming: CSP, Offshore wind, Denmark, Chile, Mexico, Argentina, Canada, Portugal, Saudi Arabia, Greece, Germany
• Design Options for Cross-Border Auctions”
• “Auction-Theoretic Aspects of Cross-Border Auctions”
• Auction database and quantitative evaluations
• Research paper on multi-technology auctions
• Policy brief Ukraine
Next events

22 November 2019 in Vienna
2nd Regional Workshop
Community Energy

29 November 2019 in Copenhagen
3rd Regional Workshop
Offshore Energy hub in the North Sea

May/June 2020 in Berlin
4th Regional Workshop
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