

Discriminatory Auctions for Renewable Energy Support Instruments, Effects and Political Conflicts

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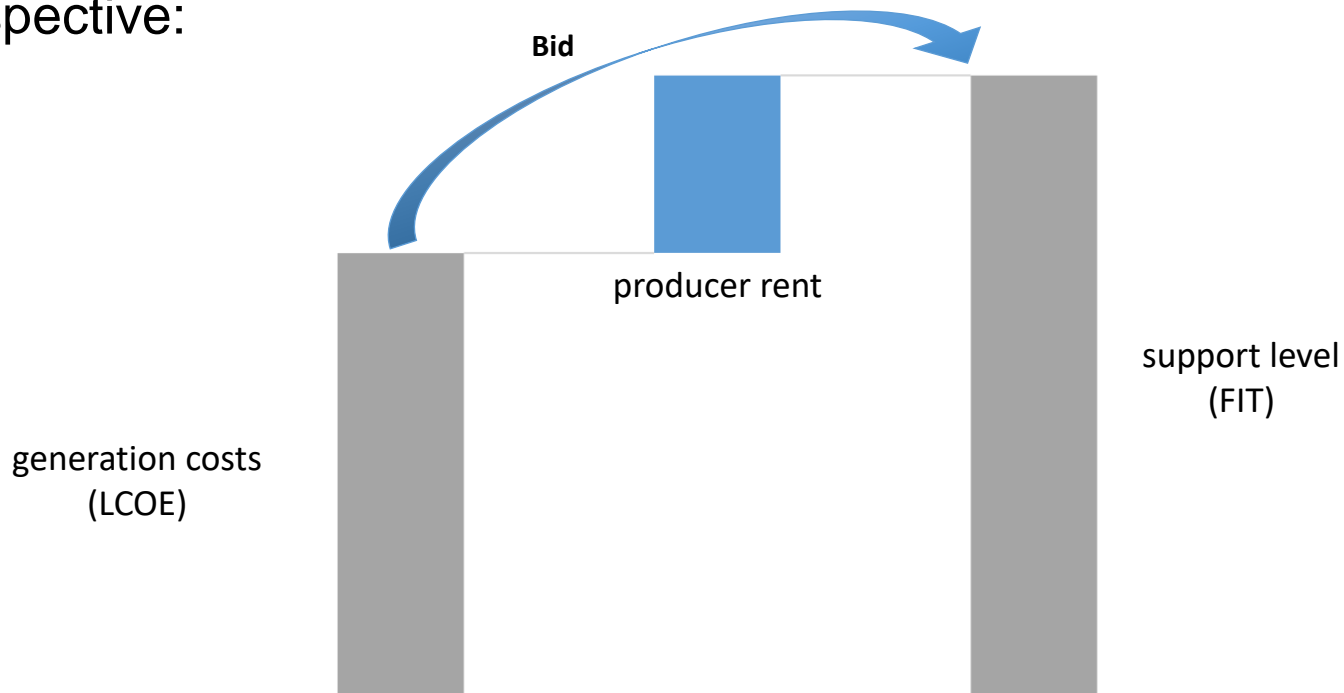
Agenda

1. Cost definition
2. Political targets
3. Value-based discrimination
4. Cost-based discrimination
5. Summary

1. Cost definition

1. Cost definition (1/2)¹

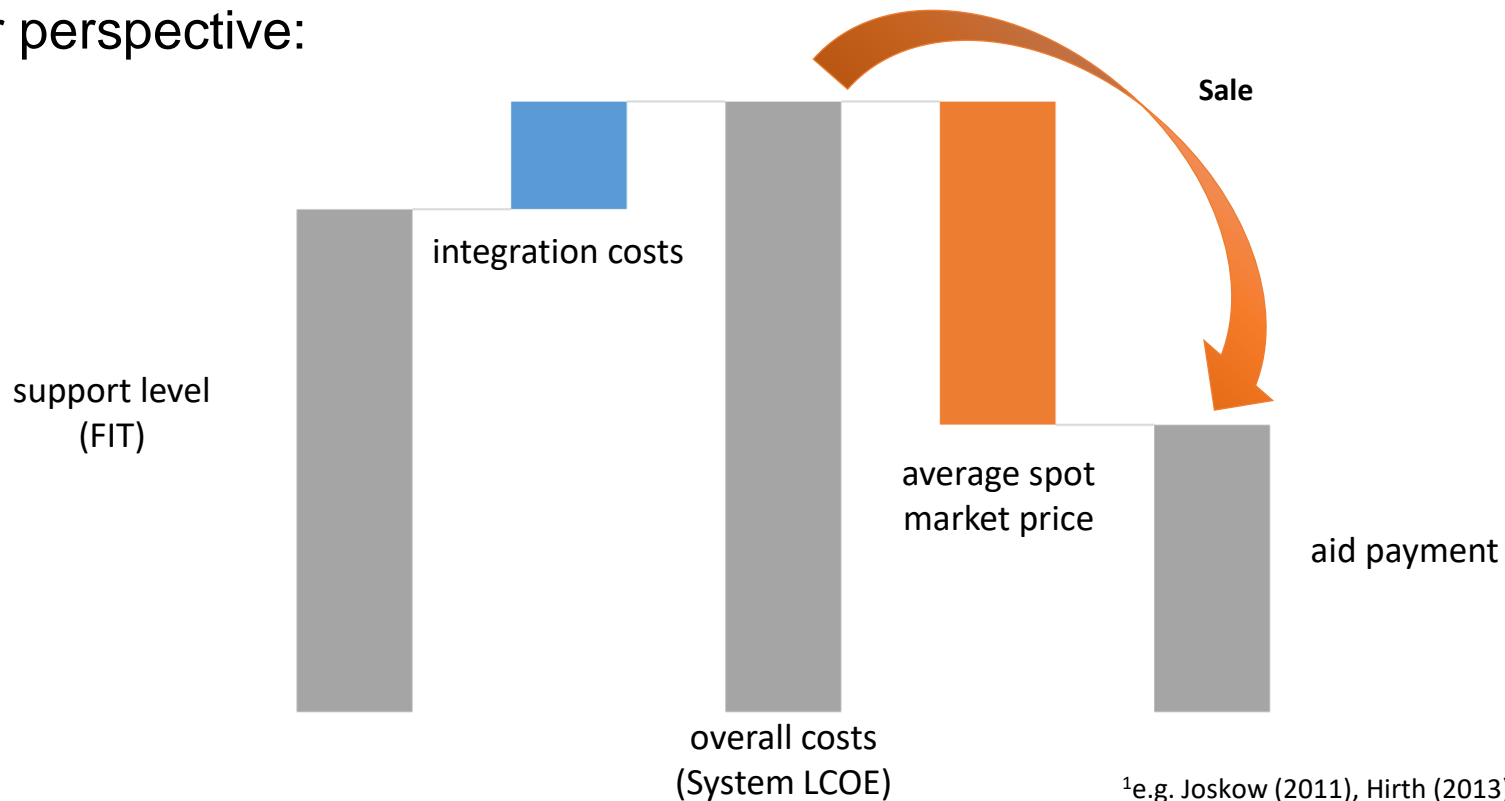
Bidder perspective:



¹e.g. Joskow (2011), Hirth (2013)

1. Cost definition (2/2) ¹

Auctioneer perspective:



¹e.g. Joskow (2011), Hirth (2013)

2. Political targets

2. Political targets (1/2)

- **EU State Aid Guidelines:**

3.2.5. Proportionality of the aid

3.2.5.1. General conditions

(69) Environmental and energy aid is considered to be proportionate if the aid amount per beneficiary is limited to the minimum needed to achieve the environmental protection or energy objective aimed for.

3.3.2. Operating aid granted to energy from renewable sources

3.3.2.1. Aid for electricity from renewable energy sources

(126) [...] If such competitive bidding processes are open to all generators producing electricity from renewable energy sources on a non-discriminatory basis, the Commission will presume that the aid is proportionate and does not distort competition to an extent contrary to the internal market. [...]

Minimum aid and non-discriminatory

2. Political Targets (2/2)

- **Germany: EEG (2017) § 39i**

Cost efficiency and system integration and non-discriminatory

- **However, in California and The Netherlands**

Discriminatory auctions to reduce costs and increase value?

2. Political Targets (2/2)

- **Germany: EEG (2017) § 39i**

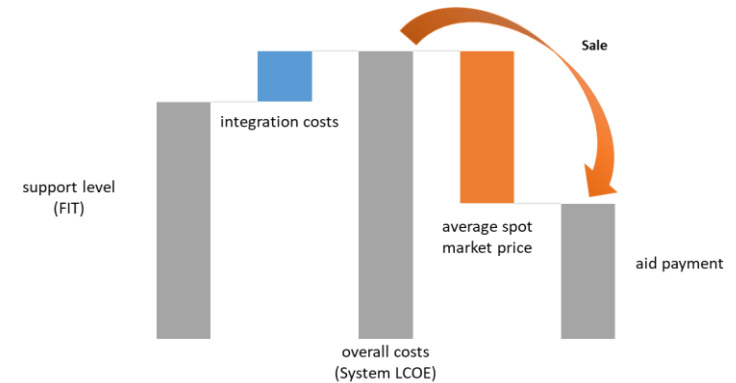
Cost efficiency and system integration and non-discriminatory

- **However, in California and The Netherlands**

Discriminatory auctions to reduce costs and increase value?

Common overall goal: Market integration

3. Value-based discrimination



3. Value-based discrimination (1/2)²

- Bidders submit bids of type (price, quality) = (p, q) .
- Price p represents the support level.
- Quality q represents location, technology and alignment of the RES of the bidder.
- Bidders have different costs $c_i(q)$ (LCOE) to provide quality.

²Che (1993)

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- Price p represents the support level.
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- Bidders have different costs $c_i(q)$ (LCOE) to provide quality.
- Auctioneer valuation for each quality $v(q)$ represents integration costs.
- Auctioneer calculates score $S(p, q) = v(q) + p$ which represents the overall costs of the electricity generation.
- Bidders with the highest scores (lowest overall costs / aid payment) are awarded in the auction.

²Che (1993)

3. Value-based discrimination (2/2)

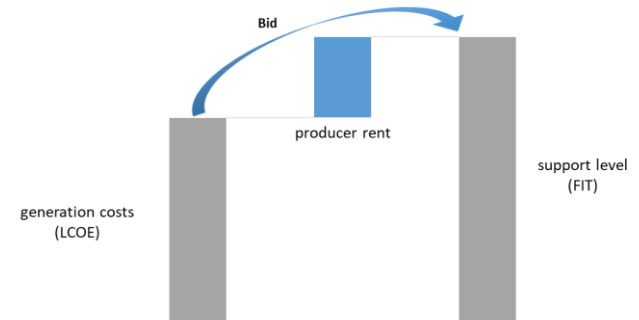
Discriminatory auctions enable the auctioneer to include all relevant costs of RES-electricity in the auction.

Minimization of the overall costs of RES-electricity minimizes the required aid payment.

Discriminatory auctions set incentives for bidders to consider market environment.

Fixed feed-in-premiums are better suited regarding market integration compared to sliding FIPs.

4. Cost-based discrimination

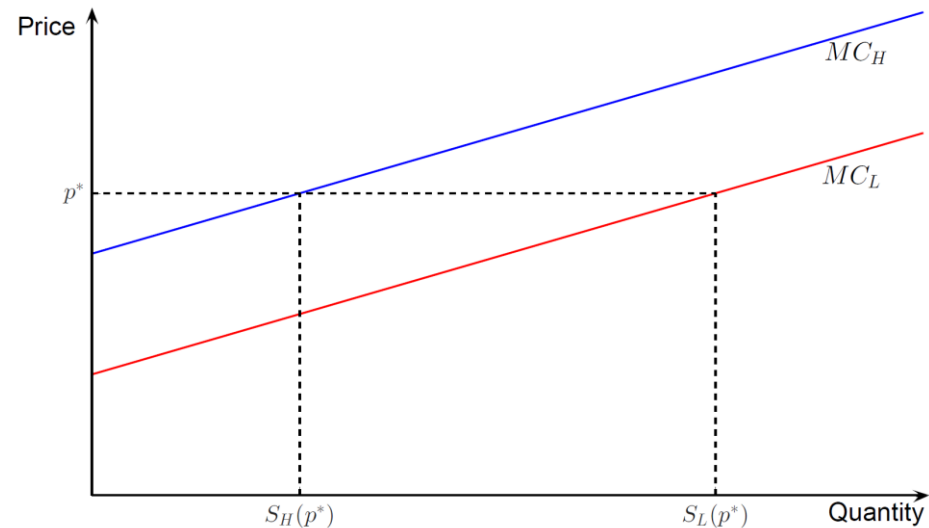


4. Cost-based discrimination (1/3)³

- Idealized model (no discrimination)
 - 2 asymmetric groups of bidders, strong L and weak H , characterized by their marginal cost functions
 - Auction volume Q
 - Uniform pricing
 - Single-unit supply

Overall costs:

$$\begin{aligned} C(Q) &= S_H(p^*)p^* + S_L(p^*)p^* \\ &= Qp^* \end{aligned}$$



³e.g. Schmalensee (1981), Varian (1989)

4. Cost-based discrimination (2/3)

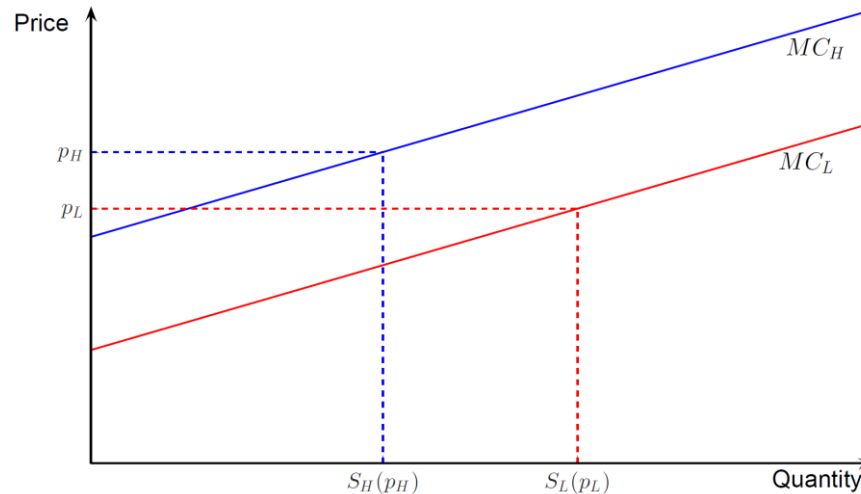
- Cost-based discrimination through quota, bonus or maximum price for the strong bidder class.

Example: Introduction of a quota: $\hat{Q} = S_H(p_H) > S_H(p^*)$

- Two different award prices: $p_L < p^* < p_H$

Overall costs:

$$\begin{aligned} C_d(Q) &= S_H(p_H)p_H \\ &+ S_L(p_L)p_L \end{aligned}$$



4. Cost-based discrimination (3/3)

- Cost minimizing quota $\hat{Q}^* = S_H(p_H)$

$$p_H - p_L = \frac{S_L(p_L)}{S'_L(p_L)} - \frac{S_H(p_H)}{S'_H(p_H)} = \Delta p^*$$

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- A bonus $b^* = \Delta p^*$ for the weak bidder group and
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A quota \hat{Q}^* , a bonus b^* and a maximum price r are equivalent regarding the auction outcome if they satisfy the given conditions.

5. Summary

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Political conflict: Minimum aid and non-discriminatory

Auctioneer can reduce aid payment for RES-Electricity (and hence overall costs) through discriminatory auctions.

Auctioneer can reduce support level (and hence overall costs) through discriminatory auctions.

A quota, a bonus and a maximum price can be equivalent regarding the auction outcome if certain conditions are satisfied.

Thank you for your attention.



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