
# Intraday cross-zonal capacity pricing

Julia Bellenbaum, Michael Bucksteeg, Thomas Kallabis, Christoph Weber
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UNIVERSITÄT DUISBURG ESSEN

*Offen im Denken*

# Agenda

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# Motivation

- Development of European electricity markets progressed in recent years
  - Increase of international trading activities
  - Integration of European power exchanges
  - Establishment of Market coupling of Regions
  - Move from bilateral market coupling to flow-based market coupling
- Development of international intraday trading is lacking behind
- For integration of RES → cross-zonal intraday trading of major importance
- Objective of the study
  - Options to use and price intraday cross-zonal capacity efficiently
  - Considering requirements of
    - European Target Model
    - Network code

# Problem identification: legal requirements

| Article CACM | Objectives / requirements |
| --- | --- |
| Article 3.1 (a) | Promoting effective competition in the generation, trading, and supply of electricity |
| Article 3.1 (b) | Ensuring optimal use of the transmission infrastructure |
| Article 3.1 (h) | Respecting the need for fair and orderly market and price formation |
| Article 3.1 (j) | Providing a non-discriminatory access to cross-zonal capacity |
| Article 51.1 (a) | maximising economic surplus for the single intraday coupling per trade |
| Article 51.1 (e) | Intraday cross-zonal capacity pricing should be repeatable and scalable |
| Article 55.1 | Intraday cross-zonal capacity shall be priced in a manner which reflects Market Congestion and is based on actual orders |
| clause (13) of the preamble | Capacity traded in the day-ahead and intra-day time frames should be allocated implicitly |

# Problem identification: key problems

- Scarcity of transmission capacity in continuous markets
  - Transmission capacity not scarce until congested
  - No natural price of cross-border capacity
- Explicit and implicit capacity allocation
  - Explicit: separate markets for energy and transmission capacity
  - Implicit: capacity is traded along with energy, e.g. by market coupling
- Trade-off btw information efficiency and simultaneous pricing efficiency
  - Information efficiency: immediate use of new information and translation into transactions
  - Simultaneous pricing efficiency: capability of the mechanism to reflect the coupling of energy prices with scarce transmission capacities demand
- Implicit allocation + continuous trading + scarcity pricing

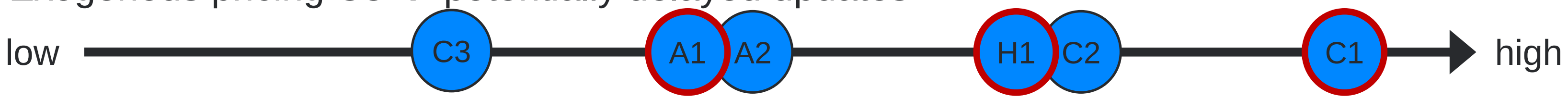
# Possible options

| solution | description | auction-based or continuous trading | implicit or explicit trading | congestion pricing | CACM compatibility |
|---|---|---|---|---|---|
| Continuous 1 (C1) | no congestion prices, fully implicit | continuous | implicit | no | yes |
| Continuous 2 (C2) | explicit congestion prices through separate capacity pricing mechanisms | continuous | explicit | yes | no |
| Continuous 3 (C3) | explicit congestion prices through exogenous specification | continuous | Implicit | indirectly | yes |
| Auction 1 (A1) | auction-based solution | auction-based | implicit | indirectly | uncertain |
| Auction 2 (A2) | hybrid implicit-explicit allocation | auction-based | both | yes | uncertain |
| Hybrid 1 (H1) | hybrid model | both | implicit | indirectly | yes |

# Assessment

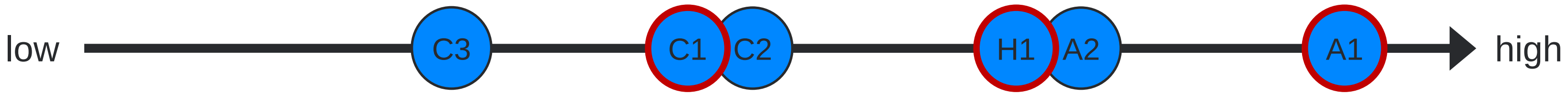
### Information efficiency

- High information efficiency: market prices update instantaneously on new information
  - Very limited time of inconsistent prices
- Execution speed paramount
  - Continuous trading better suited than auctions
- Exogenous pricing C3 → potentially delayed updates




### Simultaneous pricing efficiency

- Simultaneous pricing efficiency: consistency between energy and capacity prices
- Continuous mechanisms fit orders successively
  - May not fully reflect the interdependencies between scarcity in capacities and energy prices
- Auction-based mechanisms clear all orders simultaneously
  - Results in consistent prices for both energy and capacity



# Assessment

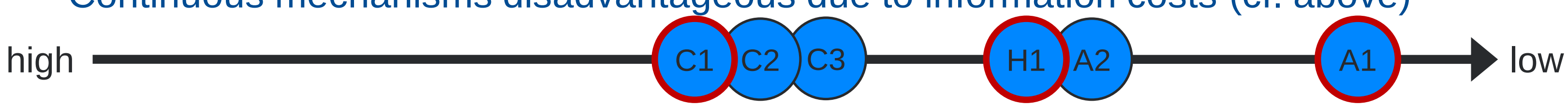


## Liquidity

- High liquidity supports the overall market efficiency
- Auctions aggregate orders → increased liquidity
- Continuous trading → increased information costs
  - Could act as entry barrier to small actors


## Sensitivity to exercise of market power

- Market power may be used to block capacity
  - Explicit trading of capacity particularly at risk
- Vulnerable when market concentration is high
  - Continuous mechanisms disadvantageous due to information costs (cf. above)



# Conclusion

- High degree of **pricing efficiency** and competition → auction-based solutions (A1 and A2) and solution H1
  - Pricing efficiency → inextricably linked with liquidity
  - Auction-based mechanisms increase liquidity and reduce information asymmetry
  - Auction-based solutions only compliant in a broader sense
- High degree of **information efficiency** → continuous pricing mechanisms (C1 and C2)
  - Immediate execution of orders upon reception by market participants
  - Difficult implementation → Increase of complexity through FBMC and intraday capacity pricing
- Frequency of **information arrival** could potentially have an impact on efficiency
  - Capability to cope with frequent information updates
- Solution C3 comes close to achieving continuous, implicit congestion pricing
  - External pricing mechanism → Not equivalent to a market-determined price
  - Potential divergence of prices → Compromise of efficiency
- Mechanism H1 seems to provide an attractive combination of the advantages of both the auction-based and the continuous trading approaches
  - Closing auction → Increase of simultaneous pricing efficiency at the continuous trading stage
  - Key challenge → Ensure utilization of latest available information → Final auction sufficiently close to real time

# Thank you for your attention

**Julia Bellenbaum**

Julia.bellenbaum@uni-due.de
+49 201/183-7383