

The future of auctions in the energy system

Auctions beyond renewable electricity

AURES II webinar, 15 December 2021



Integrated auction approaches

What are integrated auctions?

Auctions that bring **different technological solutions and system services** into direct competition for remuneration to provide pre-defined goods or services, e.g., CO₂ savings, availability of capacity, reduced load at specific times.

Integrated auctions can help policymakers **discover the most cost-effective (combination of) options** that help achieve specific policy goals, including:

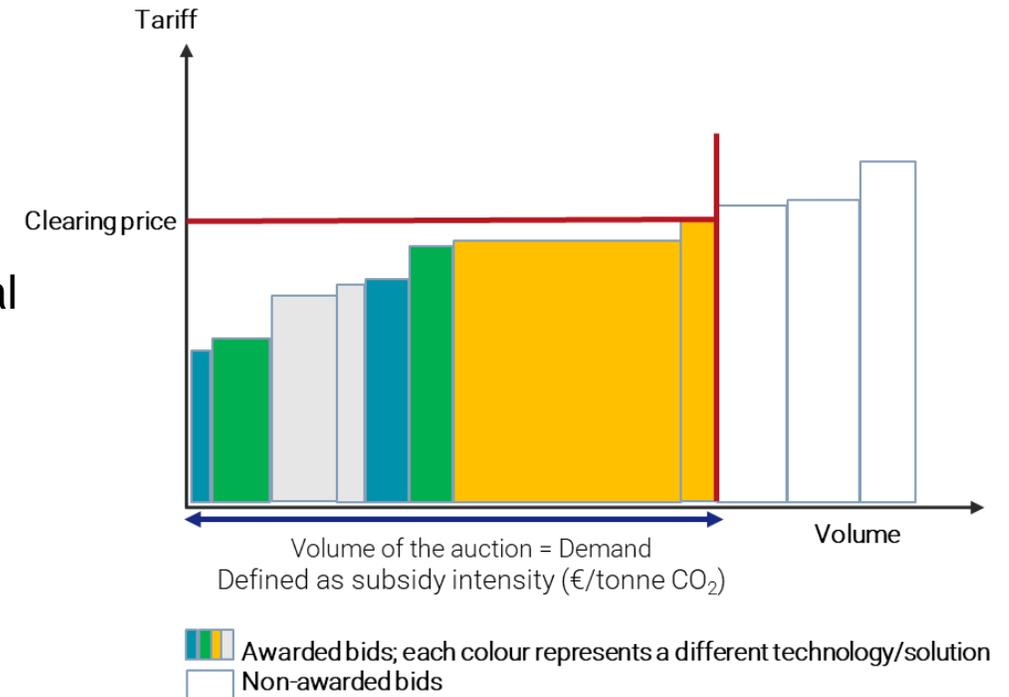
- ✓ Reducing carbon emissions in the most cost-efficient way possible,
- ✓ Reducing or shifting load peaks and thus avoiding the need for grid expansions,
- ✓ Optimizing the procurement of capacities in the electricity market.

Why can integrated auctions be useful?

Achieving [net-zero emissions by 2050](#) will require

- the continued expansion of RE deployment and thus solutions to integrate increasing capacities into the system, and
- dedicated planning and scale-up of other technological solutions beyond (variable) RE deployment, e.g., demand response & efficiency measures, flexible capacities, CCS.

Governments need to make use of a [mix of these technological options](#) to allow for a cost-efficient and system-friendly decarbonization and energy transition.



SDE++ (Netherlands)

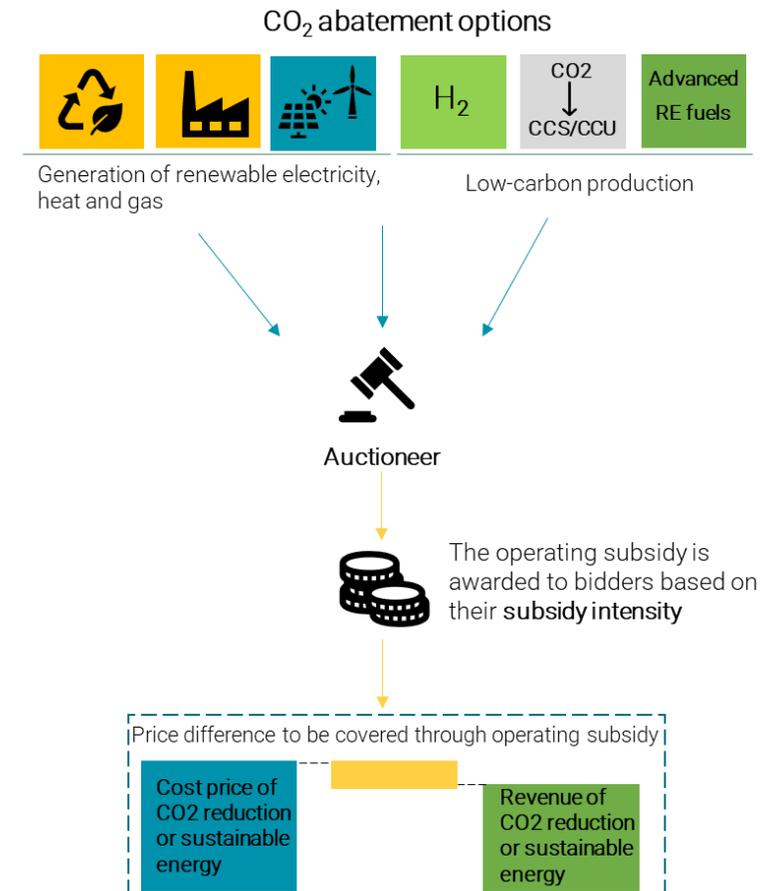
Main Goal: Achieve CO₂ savings in a cost-optimal manner through competition between GHG abatement options in terms of the achieved CO₂ reduction per Euro of support.

Approach:

- Bids are ranked and awarded based on the lowest bid price, which is defined as the subsidy requirement in € per tonne of CO₂ emissions avoided (sliding premium for 12 to 15 years)
- 5 technology categories (RES-E, RES-H&C (CHP), renewable gas, low-carbon heat, and low-carbon production)
- So far, two auction rounds have taken place in 2020 and 2021 (budget: € 5 billion each).

Outcome: In the SDE++ 2020 round, Solar PV and CCS received 87% of subsidies worth €4.7 billion.

Methodological challenges arise in the context of comparing CO₂ reductions (via emission factors) for very diverse measures and technologies over the whole support period of up to 15 years.



Brooklyn Queens Demand Management Program in the U.S. (Con Edison, NY)



Main Goal: Reduce or shift load peaks and thus defer grid investments through non-wire alternatives.

Approach: In 2016, a technology-neutral auction was launched, both demand- and supply- side measures & storage, could participate.

- descending clock format with uniform pricing
- two time windows (16:00-20:00 and 20:00-24:00 o'clock), to which a ceiling price was applied (= auction's opening price).
- bid price in USD per kW, plus call price of USD 5 per kWh

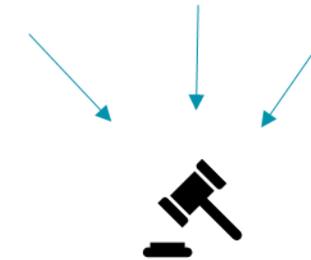
Outcome:

- 22.69 MW of load reduction were procured to cover peak load in 2018. More than half of awarded bidders came from demand-side measures.
- High non-realization rates among battery storage projects (lack of clarity on required permits), which was filled by demand-side measures.
- Relatively short lead times made participation for supply-side measures more difficult.

Non-wires alternatives (NWAs)



Diverse non-traditional measures to defer the need for traditional utility investments



Auctioneer



Payment based on the offered load relief in a specific capability period (USD/kW capability period)

PJM Base Residual Auction in the U.S.

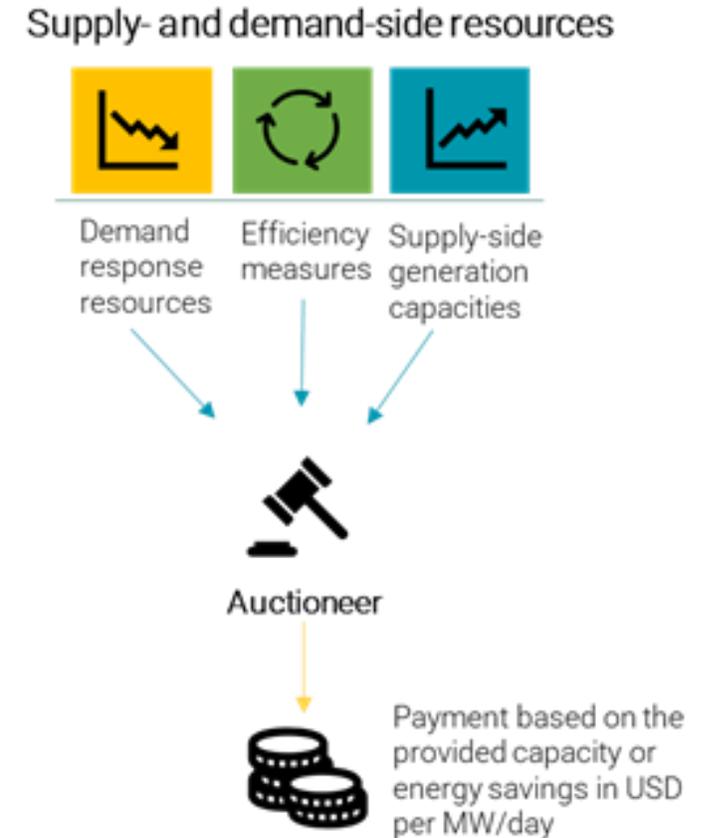
Main Goal: Optimize the procurement of supply- and demand-side resources in the capacity market of the regional transmission organization PJM

Approach: Since 2009, demand response and efficiency measures directly compete with supply-side generation capacities in PJM's BRA.

- Successful bidders need to supply electricity or reduce their load, if PJM determines that this is necessary to address load peaks
- Remuneration based on provided capacity (or through energy savings) in USD per MW/day as determined by the auction's clearing price
- Efficiency measure need to fulfill certain reliability & the measure needs to be evaluated, measured and verified regularly

Outcome: Clearing prices fluctuated significantly. Moreover, RPM has consistently procured more capacities than intended or needed.

Volumes procured from demand-side resources have increased over time (from 0.42% to 3.3% of the total procured capacity between delivery years 2012/13 and 2022/23), with most demand-side volumes being successful.



What to consider when designing integrated auctions?

Integrated auctions would typically include **resources with different characteristics** that should be considered in the auction design.

Design options should be thoroughly assessed against the aim to **avoid unintended outcomes**, e.g., windfall profits for lower-cost technologies, exploitation of market power.

This may require for example:

- differentiated and customised **prequalification requirements** matching the diverse features
- technology-specific **realisation periods** considering differing implementation times
- technology-specific **ceiling prices** to avoid windfall profits for lower-cost technologies
- appropriate **verification procedures and methodology** to ensure completion and compliance of the project (e.g. baseline required for efficiency measures)

When and (when not) to use integrated auctions?

Policymakers should **carefully assess** when to use integrated auctions and in which cases it would be more advisable to rely on separate auctions per technological solution.

Integrated auctions tend to be more advisable when:

- the technological solutions and services can **provide the same good**, for instance, peak shaving, CO2 savings, or energy system flexibility.
- competing options can **address the same (scale of) problem**, e.g., bottlenecks in distribution grid.
- awarding a certain type of technological solution is not required, e.g., adding RE electricity to meet other policy goals, RE quota to be achieved.



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AURES II has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 817619