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## GPDs public consultation answer on Co-optimization study #307675

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### Question 1.1

The consultancy study shows significant welfare gains for co-optimisation under a design where market participants are not required to forecast the day-ahead energy market outcome when bidding for balancing capacity. As shown in Appendix G1, introducing an explicit price for balancing capacity, based on opportunity costs, leads to a deterioration of benefits of about 15%. In light of these findings, do you agree to further assess the bid design without an explicit price for balancing capacity in the upcoming R&D activities to be carried out by NEMOs and TSOs for the implementation of co-optimisation in the SDAC algorithm?

Reply to question 1.1:

Yes.

Green Power Denmark submitted a response to the public consultation on amending the electricity price coupling algorithm methodology in February this year, where it was stated that the preferred bid design would be separate bids for day-ahead and balancing capacity market(s). This answer was provided based on a concern from Danish market participants related to the complexity of submission of bids from the production of electricity on thermal power plants. Another reason for this answer is also because Green Power Denmark find that the freedom of pricing is an important part of the liberalized European electricity markets.

However, regardless of this answer Green Power Denmark agrees to further assess the bid design without an explicit price for balancing capacity in the upcoming R&D activities to be carried out by NEMOs and TSOs for the implementation of co-optimisation in the SDAC algorithm.

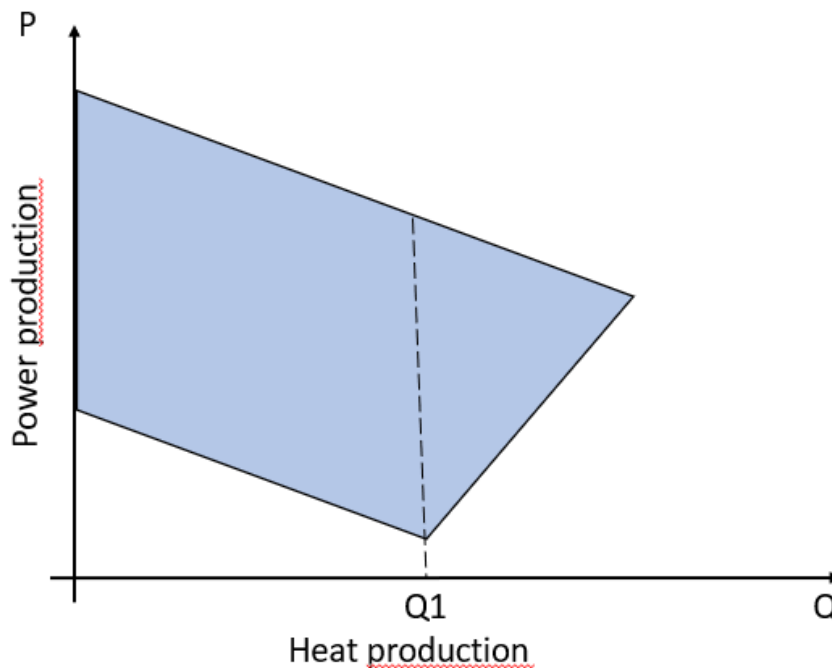
The reason being that Green Power Denmark understands the need to further investigate the co-optimisation design with the highest benefits. Going forward with these R&D activities please also include concerns on the ability to express the necessary complexity in the algorithm, as these concerns have been expressed by both NEMOs, TSOs and market participants. Pricing BC bids may integrate numerous parameters including technical capabilities of assets, BE prices and probability of activation.

In relation to abovementioned Green Power Denmark is concerned that the involvement of Market participants assured in the changes applied to the [algorithm methodology](#): “(...) This research and development shall include the collection of market participants input for a Bidding Guide with linking options of SBCPs, DA products and Order types fit for the co-optimisation.” is not sufficiently ensured.

Green Power Denmark is not aware of any Danish market participants directly involved in the development of the bidding guide and the deadline 1 January 2025 mentioned in article 16 of the [algorithm methodology](#), does not provide sufficient time for input from market participants on bidding structures and order types.

Market participants with insight in the technical capabilities of different types of underlying assets shall be interviewed separately to avoid the disclosure of confidential information to competitors. Green Power Denmark especially highlights the importance of including producers of electricity based on combined heat and power production from thermal power plants, in this work.

One of the points we would like to bring forward is that if Euphemia’s calculation time is increased with co-optimisation, it is important that the gate closure time for submission of bids to Euphemia is not moved forward in time (earlier). Combined heat and power producers must first know the outcome of the heat-market (11.00am) before they can submit bids to Euphemia. The certainty of the level of heat production reduces the options (see “Q1” in the figure) of different combinations of heat-power production represented in a simple PQ-diagram.



If the gate closure time for submission of bids to Euphemia is not moved forward in time, it is theoretically possible to design a Bidding Guide with linking options of SBCPs, DA products and Order types fit for the co-optimisation, without an explicit price for balancing capacity, that could encounter the necessary complexity to cover choices on where on the y-axis on the PQ-diagram the power production is optimal (this requires 50+ conditions in the bidding) and then following also encounter the choice of whether to activate boilers based on e.g. gas, coal, straw or biomass which all have different outcomes with regards to the ability to deliver the 6 different ancillary

services currently in place in DK1 and DK2, which further increases the need for conditions in the bid design.

The Co-optimisation benefits study is far from reflecting the complexity necessary to represent the reality, and the benefit of co-optimization lies with the ability to reflect the market participants reality directly in the bid design. If this is not possible and/or the algorithm cannot handle the full complexity, then the benefits of co-optimization will not materialize.

Green Power Denmark therefore urges that the market participants are closely involved in the bid design.

Question

1.2

Please list advantages and disadvantages of a co-optimisation design where bids for balancing capacity are based on the price of the linked day-ahead energy bid and the day-ahead energy price calculated by the SDAC algorithm.

Reply to question 1.2:

It is an advantage if it enables a more efficient use of cross border capacity and thereby ensures a maximization of the sum of economic surplus for SDAC and the economic surplus from the exchange of balancing capacity or sharing of reserves per trading day.

However, the model used the Co-optimisation benefits study assumes perfect foresight and with the increase in RES in the production mix prognose errors are to be expected and a co-optimization process simply cannot ensure the "perfect" allocation of capacity.

It is also a disadvantage that the capacity reserved for the exchange of balancing energy decreases the capacity which can be provided to the day ahead market, which further decreases the capacity left for the intraday market, and as a result this reduces the chances for the market participants to perform self-balancing prior to the activation of ancillary services.

As already mentioned, the increase of RES in the production mix, increases the inability to predict the production of electricity day ahead which further increases the importance of the intraday market. The volumes traded in the intraday market have drastically increased year after year, since the introduction of cross border intraday trading in 2018. The decrease in capacity provided to intraday is not accounted for in the Co-optimisation benefits study.

Also, it is not clear whether there are any limitations to the percentage of capacity that can be allocated to the exchange of balancing energy using co-optimization. Upholding the 70% or above cross-zonal capacity allocated to Day ahead and intraday must at least be ensured. This comment was also provided in Green Power Denmark's consultation response to ENTSO-Es proposed amendments to the Cross-Zonal Capacity Allocation Harmonized Methodology which was submitted in May 2024.

Another disadvantage is the complexity in products necessary to enable co-optimization as this reduces the transparency in price formation.

Question 2.

Please provide any other comments on the consultancy study.

Euphemia is already under a lot of pressure and the calculation time will increase with the introduction of 15 min MTU. Green Power Denmark finds that it is too early to implement co-optimisation in the algorithm in 2030. The computation speed and capacity must be further increased before co-optimisation can be successfully implemented.

Best regards

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