ENGIE response to the public consultation pursuant to Art. 12 of Commission Regulation (EU) 1222/2015 (hereinafter CACM) on amendments to the Algorithm Methodology for the price coupling algorithm and the intraday auction algorithm due to Co-optimisation, organized by All NEMO Committee.

General remarks

ENGIE would like to thank NEMOs for the organization of the consultation on "proposed amendments to account for co-optimization in the algorithm methodology of the price coupling algorithm".

ENGIE supports the remarks on the proposal as expressed by eurelectric and EFET. In general, **ENGIE has serious doubts on the efficiency and feasibility of the co-optimisation process.** Further research must be done to determine how and whether the process can be implemented in a way that does not deteriorate the market functioning of both the SDAC and the balancing capacity markets. ENGIE therefore also considers that the introduction of a deadline for implementation is premature and inopportune.

ENGIE would also like to take the opportunity of this consultation to express its deep concerns on the current implementation path of co-optimization. Those are acknowledged in the explanatory notes accompanying the consultation (cf. the list of concerns provided in p.6-7). ENGIE would like nevertheless to stress the followings:

- ***Any prioritization of one market over another***, as foreseen in the *"unilateral bid linking"* options (both one-step or two-steps), ***will not offer any gains compared to the current situation and most likely lead to welfare deteriorating reduction of cross-zonal capacity for the clearing of energy***.
    - As intrinsic characteristic of a coupling algorithm, the clearing of balancing capacity will hit the limits of offered cross-zonal capacities in the vast majority of MTUs. This automatically results in strong capacity reduction/welfare losses to the subsequent clearing of energy. As the initial clearing of balancing capacity does not account for those welfare losses, this will most likely strongly deteriorate the overall welfare.
    - As the clearing of energy and balancing capacity is not done jointly, the price formation will not deliver consistent prices, leaving market participants with the task of forming expectations on the subsequent energy clearing.
- For the "multilateral bid linking", ***the heuristic of "inscribed boxes" fails to correctly integrate the welfare tradeoffs of allocating cross-zonal capacities between balancing capacity and energy, and unduly favors exchanges of balancing capacity.***
    - Cuts are added iteratively outside the welfare maximization optimization problem, meaning that the heuristic do not consider the subsequent reduction of overall cross-zonal capacities (i.e., the subsequent cuts) when deciding on its allocation between energy and balancing capacities. The heuristic therefore favors the exchange of balancing capacity in a sub-optimal manner.

This questions whether the current co-optimization implementation path can really bring any benefits. It also raises questions whether it should not re-focus primarily on the joint clearing of energy and balancing capacities, as international comparison suggests, and implement the sharing of cross-zonal balancing capacities in a second phase.

ENGIE would also like to express its strong conviction that continuous trading should be the main solution and the target model for intraday market. The benefits of auctions in the

intraday timeframe have not been shown, and it risks deteriorating the functioning of the intraday market.

Remarks on proposed amendments to the algorithm methodology, due to co-optimization and scalable complex orders

Title 3/Art. 7: "Indicators on SDAC algorithm's ability to maximize economic surplus"

The overall visibility on SDAC algorithm's solution quality is currently poor for market participants. The current indicators (i.e., economic surplus gain with respect to the first solution and the economic surplus gain after increasing the calculation time by T minutes) fail to provide fully convincing evidence as their values rely on the heuristics used. To correct this situation, ENGIE strongly advocates that ***the list includes the optimality gap***, i.e., an indicator measuring the difference between the solution found and a proven upper bound, which is the standard metric in the optimization field.

Based on NEMOs communication ("Scalable Complex Orders is a new order to increase scalability (…) [improving] high indicators relevance, especially on the calculation of the gap".), ENGIE understood that complex orders were the main obstacles for not communicating the optimality gap

With the replacement of complex orders to scalable complex orders, the development of the optimality gap metric should not pose any major challenge, e.g. by elaborating on the existing scientific literature on optimisation and notably on the papers published by authors strongly involved in the development of EUPHEMIA (e.g. "M. Madani and M. Van Vyve (2018), '*Revisiting minimum profit conditions in uniform price day-ahead electricity auctions'*, European Journal of Operational Research,Volume 266, Issue 3").

Title 5 /Art. 13: "Indicators to describe the output of maximization of economic surplus"

Following the inclusion of the optimality gap in Article 7, **"the economic surplus of a proven upper bound"** should also be published as indicator.

Title 6 /Art. 16 and Art. 19: "Monitoring the operations and reporting" and "Research and Development assessment"

The two articles (16 and 19) refer to Article 7 and its indicators to ensure the capabilities of co-optimisation algorithm. ***This reinforces the needs to include the optimality gap as indicators for monitoring the evolution of the co-optimization algorithm***. Indeed, as stated above, the current indicators fully rely on the heuristics used and fails to provide convincing evidence for external parties that the economic surplus is well maximized.

Given that the current proposals further rely on heuristics (i.e., the "inscribed boxes" to satisfy the deterministic requirement) or on subsequent clearings (i.e., the unilateral linking approaches), the current indicators will fail to provide a good assessment on the ability for the co-optimization algorithm to maximize economic surplus.

Title 7 /Art. 20: "Indicators on Co-optimisation algorithm's ability to maximise economic surplus"

First, for all the important reasons listed above***, the list shall also integrate the optimality gap as indicator***.

Secondly, ***ENGIE is puzzled by the ambiguous concept of "market side of the co-optimisation".*** As such, ENGIE interprets this term as the part related to energy clearing, but it certainly deserves definition. In the definition, it shall be clear that the term does not refer to a co-optimization based on "unilateral linking".

Finally, ENGIE confirms the relevance to disentangle the metrics along the various components of the economic surplus (energy clearing, balancing capacities, …). However, ENGIE would find even more useful if the breakdown of the economic surplus is done for all "commodities" that are co-optimized (e.g., not aggregating all balancing products in a single metric).

Title 7 /Art. 21: "Indicators on Co-optimisation algorithm's repeatability"

ENGIE would like to express the same remark regarding the lack of clarity of the term "the market side of the co-optimisation."

Title 8 /Art. 23: "Indicators to describe the usage of co-optimization products"

As stressed in the explanatory note, in the context of co-optimization, the bids should "allow market participants to better express their technical and economic characteristics while being able to bid in both markets". ***Specifying those characteristics via bid linking is already a restriction that might not be suitable*** (or it would require to exponentially increase the possibilities of block orders - in exclusive group or linked). As such, ***ENGIE would suggest to not include the term "definition of link"*** in the amendment as hybrid products linked to technology characteristics might be better suited.

ENGIE understands that "NEMOs and TSOs need to know what the right bidding structure from the MPs' point of view is" but the necessary consultations (and following numerical experiments) on this matter have not yet started, and the implementation path has mainly focused so-far on the TSO concerns (and how to implement the deterministic requirement).

ENGIE would like to express the same remarks regarding the lack of clarity of the term "the market side of the co-optimisation"

Title 8 /Art. 25: "Indicators to describe the network domain"

The list should include that indicators to describe the modification of the initial flow-based domain, if any, should also be reported.

For example, in the context of the "*inscribed box*" heuristic, the list of flow-based PTDF constraints that have been rewritten due to the heuristic (as in the former intuitive patch) should be published.

Title 9 /Art. 26: "Indicators to describe the output of maximization of the surplus "

Similarly to the comments on Article 20, ENGIE confirms the relevance to disentangle the metrics along the various components of the economic surplus (energy clearing, balancing capacities, …). However, ENGIE would find even more useful if the breakdown is done for all "commodities" that are co-optimized (e.g., not aggregating all balancing products in a single metric).

ENGIE has the same remarks regarding the lack of clarity of the term "the market side of the co-optimisation"

Title 9 /Art. 27: "Indicators to describe the status of orders "

The paragraph 3 and 4 are ambiguously written and should be clarified and improved.

Similarly to the comments on Article 23, the article does not integrate the possibility to define hybrid products that go beyond the linking.

Remarks on proposed amendments to the requirements for continuous single intraday coupling algorithm

Title 1: "Requirements for continuous intraday coupling algorithm"

The proposals deserve to be better explained, as the explanatory note does not tackle all the changes proposed.

For example, ENGIE has doubts on the rationale behind the following functionalities for the continuous trading matching algorithm:
[1.1.c.ii] "Support non-standard product": What are the non-standard products that algorithm should integrate? For continuous trading, it is important to have simple product that can easily be "matched". As such, we don't see the benefit of imposing non-standard product also in continuous trading.
[1.3.f] "Support switchover to auction mode": why making the switchover/switchback to auction mode a requirement? The algorithm to organize auction clearing is necessarily different than one for continuous matching.

ENGIE would also like to highlight that the proposal includes many requirements linked to cross-zonal capacities (related to capacity calculation or allocation constraints). It is difficult to judge on the relevance of all those requirements. ENGIE nevertheless must insist that it is key to well monitor and publish in real-time the constraints that are restraining the cross-zonal exchanges, (being constraints linked to the flow-based constraint of a critical network element, scheduled exchanges in case of net transmission capacity, allocation constraint, …).

Title 2: "Requirements for intraday auctions"

ENGIE notes several discrepancies between the requirement for the intraday auction compared to continuous trading (e.g., change of bidding zone should be implemented no later than 4 weeks in case of continuous trading, while this requirement is absent for auction).

As for the SDAC, the optimality gap shall also be included in algorithm output.

In general, ENGIE would like to point to the occurrence of several typos in the text and inconsistent/inadequate wording (e.g. [6.1.e] “social welfare” instead of economic surplus).