Storage Orders – Audience Q&A

16/06/2026

SDAC

1. Background

This Q&A document accompanies the webinar on storage orders and the questionnaire for feedback on the storage orders design.

The recording of the webinar is available online on the ENTSO-E and NEMO committee websites.

The questionnaire for feedback is available online, until 14/07/2026.

Detailed information on the public consultation for Storage Orders is available on the ENTSO-E and NEMO committee websites.

2. Submitted Questions

The questions below were submitted by participants during the webinar and are grouped by theme. They are numbered consecutively across themes.

2.1 Storage Order Concept, Scope and Coupling with SDAC

1. Will you include storage orders in the DA products methodology you are consulting? (ACER)
Answer: At a later stage we shall include storage order as an optional product into the DA product methodology. It was not considered for the current review of this methodology, since the possible Go-Live of storage orders is expected only in Q4/2027.
2. Aren't storage orders inferior to exclusive links product by EPEX Spot?
Answer: SDAC MSD cannot comment on individual NEMO product offerings.
3. Are there any plans to improve one-sided block orders (e.g. only buy or only sell) to be more suitable for storages. For example, "Sell maximum 50 MWh, with maximum 10 MWh per MTU, during hours 18:00 - 22:00". This would solve a lot of storage bidding problems, but is probably easier to implement.
Answer: No such change is being considered at the moment. If participants see value in it, they are encouraged to raise it through the questionnaire, so it can be taken into account. If enough market participants ask for it, it can be assessed whether there is value in implementing it.
4. It looks like there are still many doubts on the mechanism of the storage order and how it couples with the DAM. Could you provide some practical examples in the next days?
Answer: The mechanism is clear, but the final configuration options are still to be finalized. Key part of the finalization is the feedback from market participants. Several simple examples showing the impact of particular parameters are part of this Q&A.

2.2 Order Parameters and Definitions

5. Some parameters are defined as "One per period"… do you mean "One per MTU"?
Answer: Given that there will be the possibility to submit storage orders with 15', 30' and 60' granularity (depending on the BZ and individual NEMO offering), we define that the parameter can be defined per period by which we mean that such parameter can be defined for each 15', 30' or 60' interval (depending on the granularity of the given storage order).
6. The definition of the parameters "cycling costs" and "end-of-day-value" are not quite clear to me. How would they impact the coupling process?
Answer: ***Cycling cost:***

The cycling cost covers the market participant's cost of cycling the asset, and must be included in the price delta between buying and selling so that completing a cycle yields a profit at least covering that cost.

The cycling cost is fixed in €/MWh. If the order is buying at 10€/MWh and selling at 50€/MWh, with a cycling cost of 10€/MWh (and 100% efficiency), it will only stop charging/discharging before its physical limit if the price difference between the two periods gets below 10€/MWh.

Please see additional details on cycling cost parameter in chapter 2.5 of this Q&A document.

End-of-day-value:

The end-of-day-value reflects the value [€/MWh] that a participant assigns to the remaining energy in their storage system at end of the day (in the last period – last 15/30/60-min. depending on the granularity of the storage order). It can limit the number of buy/sell cycles and may affect selling or buying towards the end of the day, ensuring the required end state of the system is respected — so it constrains the freedom to optimise the storage system. The end-of-day value is incorporated into the objective function by multiplying it with the volume in the last period, resulting in a monetary value that is directly added to the objective function. If the price in the last period is lower than the end-of-day value (multiplied by the efficiency), the order will want to buy electricity during the last period. If the price in the last period is higher than the end-of-day value + the cycling cost, the order will want to sell electricity during the last period. Please see the examples below.

Example 1: Price Last period: 10€/MWh. End-of-day value: 20€/MWh. Efficiency 80%. The battery will want to buy power (as much as possible). Buying 12.5 MWh means that 10MWh are going to be stored, at a cost of 125€. These 10MWh are valued at 200€, so this is beneficial for the storage order.

Example 2: Price Last period: 50€/MWh. End-of-day value: 20€/MWh, cycling cost 10€/MWh. The battery will want to sell power (as much as possible). Selling 10MWh will cost the battery 100€ and be paid 500€, leaving the asset owner with 400€ which is more than the 200€ value of not selling anything.

7. To what specific end will the values, collected as input parameters in questions from 15 to 22, be employed?

Answer: The collected values show which exact numbers the market participants are likely to use and will help define the data for further simulations, enabling an assessment of the expected market impact — particularly the impact on algorithm performance. Initial simulations were conducted somewhat "blind" with respect to participants' actual choices, so input from market participants is essential for performing further simulations in the R&D process. Please note that responses remain anonymous, and the values submitted in the public consultation will not be presented individually (if presented, then only in an aggregated form).

8. I'm confused by your explanation that availabilities per MTU will not be supported, while in the presentation max in-/output power are described to be per period.

Answer: There may be a misunderstanding. The maximum input and output power are entered per period. Please refer to question number 15 for a full answer.

2.3 Energy and Power Limits

9. Are storage orders using single max injection and withdrawal for the full day, or these can vary from one MTU to another MTU, while respecting global energy reservoir?

Answer: Euphemia optimises the inject / withdrawal separately for every MTU, while respecting the overall limitations.

10. How do I control the minimum energy that I would like to stay in the asset and the maximum power in the asset? As in, create a range of energy where the optimal volume allocation would not be outside this range.

Answer: The parameters Maximum energy stored and Minimum energy stored, both defined for each period, reflect the max and min energy (MWh) that can be stored in the asset. Once you enter these parameters, the algorithm treats them as constraints and will not exceed the minimum and maximum energy stored limits you have defined. However, in the case of the baskets (aggregation option B) the parameter Minimum energy stored is omitted due to simplicity (but you can still control it indirectly by reducing the Max energy stored value by the value of the Min energy stored).

Similarly, the parameters Maximum input and output power (MW) are available, reflecting the maximum charging/discharging rate. Again, the algorithm takes the parameters as constraints and will not exceed the defined values. In the case of the baskets (aggregation option B) the input and output power is assumed to be the same and is expressed as a single parameter.

11. Is there a way to tweak a storage order s.t. a minimum energy within storage after delivery period is guaranteed?

Answer: There is the parameter Minimum energy stored which can be defined for each period (please see the detailed elaboration on this parameter in the previous question nr. 10). With regards to the energy that will be stored in the asset at the end of the delivery day, market participants can influence it by assigning the value to the energy at the end of the day (please see the detailed elaboration on the end-of-day parameter in the question nr. 6)

12. Would it be possible to lower the minimum aggregated power to 1 MW?

Answer: Current simulations show a need for some level of aggregation. During the simulations, the two options were assessed: 5 and 25 MW. Whether the threshold will be set to 25 MW, 5 MW or lower (e.g. 4 or 3 MW) remains still an open point and will be defined at a later stage after evaluating the feedback from market participants in this public consultation and after further simulations. Indicating your preference on this threshold is also one of the questions in the public consultation, market participants' input on this is highly appreciated.

13. In case Option B is implemented, will it be possible that market participants submit storage orders without using baskets in case they reach the minimum power (5 or 25 MW)?

Answer: Yes. If an order exceeds the minimum size threshold, it can be submitted unaggregated, using the full set of required and optional parameters. Only orders below the minimum size threshold need the aggregation. So, for larger-scale storage systems market participants will have the possibility to submit a single, unaggregated storage order regardless which option for the aggregation will be chosen.

14. Will the aggregation threshold (in MW) be applied to the average power during the day? Sometimes part of the asset is not available for part of the day.

Answer: The aggregation threshold (MW) would be the average power (MW) over periods with non-zero power. It will be determined at a later stage whether input or output power (MW) will be used to assess whether the storage order can be submitted as an unaggregated order.

15. Is it possible to block some hours from the bid?

Answer: Power (input and output) in MW will be defined per period (15/30/60-min.), meaning that market participants can define also 0 MW for some of the periods, meaning that for such periods the storage order will not be activated (will not be buying/selling any energy).

2.4 Asset Characteristics (Efficiency, Asymmetry, Cycling Depth, Technology)

16. Can the input power and output power be different in one asset (asymmetric batteries)?

Answer: The maximum input and output power shall be defined separately by the market participant. Both parameters can be found among the input parameters of a Storage order. However, in the case of option B – NEMO aggregation, the power is defined as a single parameter, assuming that input and output power is equal (this is the simplification that would be needed for the NEMO aggregation option, if such option would be chosen).

18. Could efficiency be greater than 100%?

Answer: Values from 0 to 100% have been considered, since charging and discharging will typically lose some energy. Please note that for storage order the efficiency is applied during charging only (refer to answer to question nr. 25).

19. Can deep DoD (Depth of Discharge) have different cycle cost than less deep discharge or less full charges?

Answer: The cycling costs are independent of the depth of the discharge.

20. Can the initial state of pump-storage unit (Spinning: Yes/No) be included as an attribute?

Answer: At the moment that is not supported and currently we have no plans to implement it.

21. Can ancillary services be taken into account in the storage order? Could Max power (MW) be a time series for example?

Answer: Storage Order is planned to be included into regulated design for the co-optimised day-ahead energy and balancing capacity market in future, for which the research and development is currently ongoing. No other plans exist for ancillary services support.

The maximum input and output power (MW) are to be defined for each period (i.e. each 15/30/60-min).

2.5 Cycles and Cycle Costs

22. Can you detail what a cycle cost represents? How can a market participant limit the number of cycles in a session? Are the cycling costs part of the primal problem objective?

Answer: The cycle cost represents the market participant's cost [€/MWh] of cycling the system and must be reflected in the price delta between buying and selling so that each cycle at least covers that cost (see an example in Question nr. 6).

The number of cycles cannot be directly limited according to the current design (there is no such parameter considered). However, market participants can influence the number of cycles indirectly by changing the cycle costs (and partly also with the end-of-day value, examples provided in question 6). That way, the battery degradation and other operational costs are taken into account.

And yes, cycling costs are part of the primal problem objective.

23. How many cycles per day might the result include? Is it possible to limit the number of cycles, or is it only possible through adjusting the cycle cost?

Answer: The number of cycles can differ per day and is also largely dependent on the defined values of the input parameters as well as the market situation itself.

According to the current design, the number of cycles cannot be limited directly (there is no such parameter considered). However, market participants can influence the number of cycles indirectly by changing the cycle costs (and partly also with the end-of-day value). That way, the battery degradation and other operational costs are taken into account.

24. How does the algo calculate the minimum cycle cost per order? For example, if the asset cycles multiple times a day, does the algo ensure that the income is at a minimum at this cost level per cycle or is it the income per MW for the entire day?

Answer: The cycle cost is provided as an input parameter by the market participant [€/MWh]. Cycle cost will then impact the price delta between charging and discharging the energy to ensure that the cycle will be profitable for the asset owner.

25. Will the cycling cost be attributed to charged energy or discharged energy?

Answer: The cycling cost are applied to discharging energy only. This is not only important due to output and input power being different, but also due to losses (i.e. efficiency), since the efficiency parameter is applied only in charging.

An example is a battery for which in one cycle it charges 10 MWh and discharges 9MWh. If the costs for this full cycle estimated by a market participant are 90 €, then the market participant should use cycling costs as (90/9=) 10 €/MWh or in other words, if in one cycle it charges 10 MWh and discharges 9MWh and the cycling cost is 10 €/MWh, then the cost of the full cycle from a storage order point of view is 90 €.

Since the efficiency parameter was mentioned as part of this question, please see an example on how the efficiency parameter is considered. An order with 50% efficiency and a storage capacity of 50 MWh, starting empty from 0 MWh and defined on an hourly basis, can purchase 100 MW of power in the first period. This corresponds to consuming 100 MWh, of which only 50 MWh is actually stored due to losses.

Conversely, if the same order starts fully charged (50MWh), it can sell 50 MW of power in the first period, discharging all stored energy. This is because losses are applied during charging, not during discharging.

2.6 Optimisation, Allocation and Dispatch (Euphemia)

26. Suppose 2 batteries A with 30 MW 60 MWh and B with 25 MW 50 MWh and identical efficiency and other parameters. Then suppose the market provided only 20 MW in tradable capacity for these batteries. How is the allocation among the batteries decided?

Answer: The allocation will be based on the ratio of the respective capacities. So in this case the total capacity of the market is 55 MW, and the tradable capacity is 20 MW. So, they both get 20/55 = 36% of their capacity offered. Battery A gets 10.9 MW and Battery B gets 9.1 MW.

27. If two batteries bid with similar parameters? Which one is preferred by Euphemia?

Answer: Note that "similar" does not mean identical. If two orders are similar, they will be accepted and cleared by Euphemia based on the constraints presented. If the parameters are exactly the same (identical) and are submitted to the same bidding zone, they will be accepted proportionally to their capacity ratios (please see the example in the previous question nr. 26).

28. Do storage orders permit that two equally bidding storages are dispatched with unequal profits?

Answer: No. If two storage orders are bidding equally, with all details the same, they will provide equal profits.

29. How will the profit be distributed among the battery owners when some batteries will be distributed to different profitability periods?

Answer: This question is not fully clear to us. If the market participant would like to clarify it further via e-mail, SDAC MSD is happy to answer in detail. In that case, please send us an e-mail on info@mcsc-communication.eu.

30. Will the storage order ensure that I capture the highest and lowest prices in the day?

Answer: Conceptually, since the storage order is optimised to maximise its surplus, it would capture the highest and lowest prices if it would respect the constraints given, especially the limits set by the cycling cost and the end-of-day value. If an asset has the end-of-day value very close to the price caps, it might not make sense for it to sell, even at the price cap. Also, if the price is not variable enough, the storage asset might not benefit from trading at all, and thereby never do so. As an example, if an asset has a cycling cost of 100€/MWh, and the price remains between 50 and 75€/MWh, it never makes sense for the asset to trade.

31. Will the new order type change the Euphemia calculation time? Will the DA results be published later?

Answer: Day-ahead results will be published as they are today. Maintaining the market coupling session timings is precisely one reason for aggregating the orders, so result publication is not expected to become later.

32. What is your view on possible problems with the price calculation in the future with possible massive usage of this block order with new BESS installations?

Answer: BESS (battery energy storage system) forecasts for the SDAC domain up to 2030 and 2034 have been examined. With aggregation, we expect the calculation process to remain under control, and the current 30-minute calculation time will be maintained in the future, extending the calculation time is not considered. Without aggregation it could be rather challenging in the long run; aggregation keeps the number of storage orders limited.

33. In slides from MCCG there was a limitation on max MW per bid (400 MW) in simulations. Why?

Answer: The 400 MW was not a maximum threshold for the storage order. It was the largest storage system the team identified as plausible to bid in a single day-ahead session — not a limit being introduced for the product.

34. Does there always exist a solution so that changing buy/sell profile would not increase MPs` income?

Answer: The solution identified by Euphemia is optimal for the market participants, considering the constrains given.

35. How will Storage Order change prices on DAM?

Answer: The impact is highly dependent on how widespread the usage of storage orders is and also on other market conditions, but storage orders could contribute to less extreme price minimums and maximums.

2.7 Granularity and Product Horizon

36. I note that the storage orders are discussed at 15-minute granularity. Will market participants be able to bid at 30-minute or 60-minute granularity where that is available in their bidding zone?

Answer: Technically yes — you can bid at 30- or 60-minute granularity where that is available in the bidding zone. As discussed before the introduction of the 15-minute MTU for curve orders, there is a similar (rather very low) possibility that 30- or 60-minute orders are partially "paradoxically rejected".

37. I understand that this is a product with a daily horizon. Are other horizons (weekly, monthly) being considered?

Answer: No. The order is under development within the SDAC project (Single Day-Ahead Coupling), meaning to be introduced on the day-ahead market only.

2.8 Aggregation, Submission and NEMO Implementation

38. What does aggregation do from NEMOs side?

Answer: Aggregation combines the storage systems with same parameters / configurations into a single order. NEMOs maintain the relevant information during the market coupling session and once the results are available, the aggregated storage order will be split among the market participants. More information about the NEMO aggregation method is available in the PDF document on the ENTSO-E and NEMO committee websites.

39. Did you consider both options going live? Bigger orders submitted by MPs and smaller orders aggregated by NEMO?

Answer: Yes, we considered several options, including the ones listed in the question.

40. Will the storage orders be made available by all NEMOs?

Answer: That is up to each individual NEMO to decide — whether or not they want to provide the storage order to their market participants.

41. Will each NEMO implement the orders in their own systems? As in, for bidding zones where the currency is not EUR, are MPs able to submit orders in their local currency?

Answer: Please consult your respective NEMO for details on both questions. It will be up to each NEMO to decide whether they want to provide this product to their market participants. Regarding the currency, you can expect the same approach as for currently available products of the respective NEMO. SDAC MSD cannot speak for all NEMOs, but assumes NEMOs will allow trading in the local currency. Euphemia performs the calculation in euros: the local currency is converted to euros using the exchange rate for the calculation and converted back when the results are available — exactly as it happens today in areas where the currency is not the euro.

2.9 Implementation Timeline and Interaction with Other Initiatives

42. Some of these proposals are meant to be coming to ISEM soon. SDAC presumably takes precedence over this. Will these products likely delay that?

Answer: ISEM (Single Electricity Market in Ireland) is part of the SDAC and therefore the storage order will be available for the NEMOs operational also in the ISEM market. It is up to the individual NEMOs to provide the service, SDAC MSD cannot comment on individual NEMO product offerings.

43. If storage order is already implemented, is it not possible to finish this faster than late 2027 (which is likely to be delayed)? What are the biggest bottlenecks for faster implementation?

Answer: The technical implementation exists, but fine-tuning the parameters discussed today will take time. There are about two Euphemia releases per year: the release coming next winter is already fixed, and the spring/early-summer 2027 release already contains changes considered more urgent. To avoid additional delays or risk, the storage order was placed in the later release, with a go-live target towards the end of 2027.

2.10 Process, Consultation and Materials

44. Will the slides be shared?

Answer: The slides are available online on ENTSO-E and NEMO committee websites. These links will also be shared via e-mail with all participants of the webinar and attendants of the most recent Market Coupling Consultative Group (MCCG) meeting.

45. Would it be possible to get a copy of the recording please?

Answer: Yes. The recording of the webinar is available online on the respective YouTube channels: [ENTSO-E], [NEMO committee].

46. Would it be possible to get the aggregated results of the questionnaire, once results are final?

Answer: Yes. The outcomes of the questionnaire and the impact on the final design can be provided as part of a Market Coupling Consultative Group (MCCG) webinar — not the one on 8 July, but most likely the one in autumn.

47. Could you please send us the answers to these questions as well?

Answer: Answers to all questions raised during the webinar are included in this Q&A document.

48. Is there a source to further understand the technical details of storage orders?

Answer: You can find some specific detailed examples in this Q&A document. Additionally, the presentation from the webinar was based on a more detailed PDF available on the NEMO Committee and ENTSO-E websites - please consult also that PDF. If questions remain, there is also an email address where questions can be submitted: info@mcsc-communication.eu.

49. I suggest having the Q&A before the end of the consultation. You have the choice to extend the deadline.

*Answer: We have decided to extend the consultation deadline to **July 14th**, end of day, for two additional weeks. However, we will not arrange another webinar / Q&A session before the end of consultation period.*