

Day Ahead and Intra Day Algorithm Requirements

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Background

In accordance with article 37 of Commission Regulation (EU) 2015/1222 establishing a guideline on capacity allocation and congestion management, all TSOs have provided a proposal for a common set of requirements for efficient capacity allocation to enable the development of the price coupling algorithm and the continuous trading matching algorithm

Definitions

Cross Zonal Flows:

Scheduled flows between adjacent scheduling areas (where applicable scheduling area is equal to a bidding zone).

NEMO HUB:

Defined in the Scheduled Exchanges Methodology : 'NEMO Trading hub' shall be defined as 'the set of orders submitted by the market participants to a specific NEMO within a geographic area such as bidding zone and / or scheduling area'.

A map of Europe with a dense network of white lines overlaid, representing cross-zonal capacities. The lines are most concentrated in Western and Central Europe, with a few lines extending into Eastern Europe and the Mediterranean. The background is a solid dark blue.

**Related to cross
zonal capacities**

Related to cross zonal capacities

- The algorithm shall be configurable: for each Market time Unit:

- Allow setting constant cross zonal capacity value
- Constraint cross zonal flows to a value
- Allow setting default value for cross zonal capacities
- Allow to define bounds for each bidding zone

This will allow the TSOs some flexibility in the capacity setting.

The most common approach will be to deliver NTC or flow based parameters on a daily basis

- constrain, where appropriate, an aggregated set of cross-zonal interconnectors with one global cross-zonal transmission capacity limit
- The algorithm shall support flow based parameters

A map of Europe with a complex network of white lines overlaid, representing a network structure. The background is a solid blue color. A yellow horizontal bar is at the top of the slide.

Related to allocation constraints

Related to allocation constraints

The algorithm shall be able to:

- for direct current (“DC”) interconnectors constrain increase/decrease of flows over one interconnector from a MTU to the following MTU
- constrain increase/decrease of net positions of a single bidding zone from a MTU to the following MTU
- incorporate losses functionality on interconnector(s) between bidding zones during capacity allocation

Allocation constraints are needed for several reasons:

- System security requires a limit in changes of flow over some interconnectors or for the net position from one MTU to the next one (ramping constraint)
- Increase the social welfare: By including losses there will be no flow on the interconnectors if the price difference is less than the losses of flowing electricity on the interconnector

Related to allocation constraints

- For the DC interconnectors the flow shall not be below the minimum stable flow (“MSF”), other than at zero.
- The algorithm shall allow to set a minimum price difference between adjacent bidding zones when DC interconnector is used for power exchange
- The algorithm shall allow for adverse flows
- ID: The algorithm shall aim to minimize the number of bidding zone borders on the path between matched orders

The main reason for these constraints are

- 1) Increase the welfare of the solution
- 2) Necessary requirements to make sure to have a unique solution for allocated flows

A map of Europe with a complex network of white lines overlaid, representing a network structure. The background is dark blue, and the network lines are white. A yellow bar is at the top of the slide.

Related to balance constraints

DA Related to balance constraints

The algorithm shall ensure that the balance constraints are taken into account

- For overall balance of a defined area, the algorithm shall ensure that the unrounded net positions and transmission losses, where applicable, over all bidding zones within a defined area shall be zero for each MTU.
- For overall balance of all bidding zones, the algorithm shall ensure that the sum of unrounded net positions and transmission losses, where applicable, of all bidding zones shall be zero for each MTU.
- For overall balance of a bidding zone, the algorithm shall ensure for each bidding zone the sum of unrounded net position and transmission losses, where applicable, shall be equal to the sum of import and export of this bidding zone resulting from the day ahead capacity allocation for each MTU.

The background of the slide is a dark blue map of Europe. Overlaid on the map is a complex, dense network of thin white lines, representing a graph or a network structure. The network is most concentrated in the central and eastern parts of Europe, with many lines connecting various points across the continent. The lines vary in thickness and density, creating a web-like pattern. The overall aesthetic is technical and data-driven.

Algorithm output and deadlines for the results

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The output of the algorithm shall be, for each Market Time Unit :

price

- Prices in Euros for each bidding zones
- Shadow prices Different prices of critical branches as needed for Flow-Based (FB) capacity allocation
- DA: regional reference prices (i.e PUN Italy, System Price Nordics)
- DA: TSOs can require one price per bidding zone in case of decoupling and use of fallback solutions

quantities

- Rounded and unrounded net position for each geographic area
- Allocated capacities, in the form of allocated flows on relevant bidding zone borders and on relevant scheduling area borders
- DA: remaining available margin (RAM) or the remaining allowable power flow (AMF) on the network element under FB capacity allocation

Algorithm output and deadlines for the results

Scheduled
exchanges

The output of the algorithm shall be:

- For each relevant MTU, Bilateral and Multilateral Scheduled Exchanges between Scheduling areas, bidding zones and NEMOs trading Hubs
- overall economic surplus and economic surplus for each bidding zone
- output necessary for monitoring in accordance with Article 82(2) and (4) of CACM Regulation
- information necessary to comply with monitoring of REMIT regulation where the algorithm is the only feasible source.
- the volume of matched orders and not matched orders of each NEMO for the bidding zones of the control area if requested by TSOs

Algorithm output and deadlines for the results

Deadlines:

- The algorithm shall be able to implement a change of bidding zone configurations no later than 4 weeks after a TSO notifies a change
- The DA algorithm shall be capable of finding results normally within 10 minutes.
- The ID algorithm shall be capable of providing results in order for all post-coupling processes to be initiated in 5 minutes after Gate Closure Time of particular MTU