Methodology for the price coupling algorithm ~~and~~, the continuous trading matching algorithm and the intraday auction algorithm

also incorporating a common set of requirements in accordance with Article 37(5) of the Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management

~~01 August 2019~~

~~16th July 2019~~

30 January 2020

Table of Contents

Annex 1 to the Algorithm methodology: Common set of requirements for the price coupling algorithm

Annex 2 to the Algorithm methodology: Common set of requirements for the continuous ~~single intraday couplingtrading~~ matching algorithm and the intraday auction ~~algorithmsalgorithm~~

Annex 3 to the Algorithm methodology: ~~Methodology for~~ Algorithm monitoring ~~the performance and usage of the price~~methodology for single day-ahead coupling ~~algorithm~~

Annex 4 to the Algorithm methodology: ~~Methodology for~~ Algorithm monitoring ~~the performance and usage of the continuous trading matching algorithm~~methodology for single intraday coupling

Whereas

(1)   This document (‘Algorithm methodology’) establishes the methodology for the price coupling algorithm ~~and for,~~ the continuous trading matching algorithm ~~(‘and~~ intraday auction algorithm ~~methodology’)~~ in accordance with Article 37(5) of Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a

guideline on capacity allocation and congestion management ('CACM Regulation'). It incorporates, as annexes, a common set of requirements for the day-ahead price coupling algorithm ('DA algorithm requirements') and for the intraday continuous trading matching algorithm and the intraday auction algorithm ('ID algorithm requirements') in accordance with ~~Article~~Articles 37 and 55 of the CACM Regulation, and ~~common set of~~ principles and indicators for their respective monitoring.

(2) This ~~document also establishes the~~ Algorithm methodology ~~for the algorithm applied in the Intra Day Auctions~~incorporates the intraday auctions (IDAs) ~~established compliant to ACER's decisions 01/2019~~ to comply with the requirement for ~~the~~ pricing ~~of~~cross-zonal capacity in ~~the Single Intra Day Coupling~~ single intraday coupling (SIDC) set forth in ~~CACM~~ Article 55~~. As a consequence, the common set~~ of the CACM Regulation and to comply with the provisions of ~~requirements for the IDAs are included in~~the Methodology for pricing intraday cross-zonal capacity. Consequently, the ID algorithm requirements ~~Annex. As a further consequence~~include the requirements for the continuous trading matching algorithm and the IDA algorithm. For the avoidance of doubt, while ~~by Single Day Ahead Coupling~~the single day-ahead coupling (SDAC) ~~it is meant~~means the day-ahead session of market coupling, ~~by Single Intra Day Coupling (SIDC) it is meant~~the SIDC means both the continuous trading session and the ~~Intraday Auction~~IDA session as set out in the aforementioned Methodology for pricing intraday cross-zonal capacity.

(3) In order to be able to support the same set of products and functionalities while assuring at the same time an efficient use of resources in terms of implementation costs and time to delivery of new functionalities, as well as benefit from ~~algorithm~~the SDAC algorithm's development ~~evolution~~evolution, the same ~~price coupling~~algorithm used for SDAC ~~shall~~should be used also for ~~Intra Day auctions. As a consequence, in~~ IDAs.

~~(3)~~(4) In this Algorithm methodology ~~whenever ID auction algorithm is referred~~, any reference to~~, it is meant to refer~~ the IDA algorithm directs to the same ~~price coupling~~algorithm solution used ~~for the~~in SDAC. The proposed timeline for the implementation of the IDAs is based on ~~the above~~this assumption.

~~(4)~~(5) This Algorithm methodology takes into account the general objectives of capacity allocation and congestion management described in Article 3 of the CACM Regulation as set out below in paragraphs ~~(3)~~(6) to (15).

~~(5)~~(6) ~~The~~This Algorithm methodology promotes effective competition in the generation, trading and supply of electricity (Article 3(a) of the CACM Regulation) as it establishes a level playing field for competition among all market participants through an objective function, which ~~maximises~~aims to maximise the economic surplus and sets transparent conditions to participate in the ~~price coupling~~SDAC and ~~continuous trading matching~~SIDC.

~~(6)~~(7) ~~The~~This Algorithm methodology ensures that the cross-zonal capacity is allocated in a way that ~~maximizes~~aims to maximise the economic surplus and thus contributes to ensuring optimal use of the transmission infrastructure (Article 3(b) of the CACM Regulation).

~~(7)~~(8) ~~The~~This Algorithm methodology ensures that cross-zonal trading within the SDAC and SIDC respects the cross-zonal capacities and allocation constraints provided by coordinated capacity calculators and thereby ensures that operational security is not endangered by the operation of SDAC and SIDC (Article 3(c) of the CACM Regulation).

~~(8)~~(9) ~~The~~This Algorithm methodology facilitates both the coordinated net transmission capacity approach as well as flow-based approach and thereby supports the optimisation of the calculation of cross-zonal capacity (Article 3(d) of the CACM Regulation). As regards the allocation of cross-zonal capacity, the Algorithm methodology promotes implicit allocation of cross-zonal capacity, which is considered as more efficient than explicit allocation of cross-zonal capacity and allows for the usage of explicit cross-zonal capacity allocation.

~~(9)~~(10) ~~The~~This Algorithm methodology ensures fair and non-discriminatory treatment of TSOs, NEMOs and market participants (Article 3(e) of the CACM Regulation). The non-discriminatory treatment of TSOs and NEMOs is achieved by allowing an open access to participation in SDAC and SIDC to all NEMOs and TSOs and by allowing both to define their requirements in relation to the development and operation of SDAC and SIDC. Non-discriminatory treatment of market participants is achieved through ~~the support~~

5

of different products that meet the market participants' needs.their equal access to the SDAC and SIDC regardless of their origin or chosen NEMO in Member States with multiple NEMOs. Moreover, the matching of their orders is based on an objective function, which maximises the economic surplus. TheThis Algorithm methodology has no impact on the non-discriminatory treatment of the AgencyACER and regulatory authorities.

(10)(11)   TheThis Algorithm methodology ensures and enhances transparency and reliability of information (Article 3(f) of the CACM Regulation) through transparent management of the algorithms' development and operation. This is achieved via transparent rules for monitoring and managing the algorithm performance, the corrective measures and the requests for changes to the algorithms. Transparency and reliability is also achieved through the requirements on regular reporting, the publication of documents related to these processes and the disclosure to the interested public of information needed to monitor the functioning of the algorithms.

(11)(12)   TheThis Algorithm methodology contributes to an efficient long-term operation and development of the electricity transmission system and electricity sector in the Union (Article 3(g) of the CACM Regulation) as it ensures that all electricity markets and networks in the EU and other eligible third countries can participate in the SDAC and SIDC. This provides for an environment in which these markets can operate efficiently, where the cheapest generation can meet the highest demand and where efficient signals for the operation and development of the electricity sector are provided for.

(12)(13)   The algorithms apply clear rules for the price formation, which do not allow for discrimination among market participants. Therefore, thethis Algorithm methodology respects the need for a fair and orderly market and a fair and orderly price formation (Article 3(h) of the CACM Regulation) by ensuring that the algorithms always maximise the economic surplus and that their outcome is repeatable and scalable to the extent needed to support the extension of SDAC and SIDC to the whole EU and other eligible third countries.

(13)(14)   TheThis Algorithm methodology supports the creation of a level playing field for NEMOs (Article 3(i) of the CACM Regulation) as it allows the participation by more than one NEMO in one bidding zone and provides equal opportunities for all NEMOs to compete with their services, with the exception of the national legal monopoly, in accordance with Article 5 of the CACM Regulation. TheThis Algorithm methodology also ensures that the NEMOs' needs of NEMOs to customise the productsfor product customisation for their customers are treated equally and in a non-discriminatory way, while taking into account the impact of those needs on the algorithm performance.

(14)(15)   TheThis Algorithm methodology ensures non-discriminatory access to cross-zonal capacity (Article 3(j) of the CACM Regulation) as it ensures the application of implicit capacity allocation, which allocates cross-zonal capacities to market participants' orders in a way whichthat maximises the economic surplus at a specific point of time.

(15)(16)   TheThis Algorithm methodology should provide assurance that the price coupling algorithmSDAC and the continuous trading matching algorithmSIDC algorithms are able to find for all days a solution that is compliant with the concept of market coupling and implicit capacity allocation inwithin the permitted time. TheThis Algorithm methodology should provide an objective framework to monitor and communicate on the operational performance, as well as to ensure stakeholders' understanding of the functioning of the algorithmalgorithms.

(16)(17)   Changes to the price coupling algorithmSDAC and continuous trading matching algorithmSIDC algorithms should be managed in an open, transparent and non-discriminatory way by seeking stakeholderstakeholder's input, where relevant. These changes should provide assurance that the algorithmalgorithms' performance is maintained at adequate levels and over a reasonable period of time in the future, assuming plausible market growth and development. To achieve this, individual NEMO's or TSO's requests should be supported to the extent that they do not harm any PartyNEMO or TSO or include measures to mitigate any harm in a way that ensures non-discrimination.

(17)(18)   While the existing day ahead ('DA')SDAC and intraday ('ID')SIDC algorithm solutions support all existing requirements and all individual products established in the respective terms and conditions, which set the products that can be taken into account by NEMOs in the single day-ahead coupling and single intraday coupling ('DA and IDTerms and conditions on SDAC products' and 'Terms

and conditions on SIDC products'), such support may not be achievable in a situation where the SDAC and SIDC are extended to many additional bidding zones and where the usage of products is greatly increased. In such a situation, the algorithm should support at least a combination of products, which that does not significantly restrict the needs of market participants and requirements specified in a way that enables the TSOs to perform their duties pursuant to CACM Regulation. A specific set of articles for deciding on requests for changes and corrective measures areis included in this Algorithm methodology to provide clarity regarding suchpotential limitations to products or requirements.

(18)(19)   In order to address all the requirements of the CACM Regulation, the existing DASDAC and IDSIDC algorithm solutions require further research and development on the IT solution supporting the algorithm operation and the algorithm design, aiming to maintain adequate performance of the algorithm. All NEMOs should regularly inform the regulatory authorities and other stakeholders about the expected outcome of the research and development process, in order to allow for adapting their own operational processes to the newly developed solutions.

(19)(20)   The price couplingSDAC algorithm needsand the IDA algorithm need to support the products (and requirements) ranging across more than one market time unit ('MTU') and often having thehave an all-or-nothing acceptance criterion. This requires a complex combinatorial calculations to compute a number of alternative (compliant with the CACM Regulationcompliant) solutions. In order to allow the algorithm to provide the results within the time limit specified by all TSOs in accordance with Articles 48(1) and 59(4) of the CACM Regulation, the algorithm may not have enough time to search for all feasible solutions in order to find an optimal solution, which maximises the economic surplus. In that respect, the requirement to maximise the economic surplus for SDAC or SIDC should be understood as the requirement to find the highest possible economic surplus among all the feasible solutions found by the algorithm within the time constraints. This may, inIn specific cases, this may have an impact on the requirement to respect the need for a fair and orderly price formation in accordance with Article 3(h) of the CACM Regulation. Since the maximisation of the economic surplus (i.e. optimal solution) is considered as the best guarantee to fulfil this requirement, all NEMOs should minimise the degree to which the solution found within the time constraints deviates from the optimal solution.

(20)(21)   According to Article 38(1)(e) of the CACM Regulation, the price couplingSDAC algorithm must be repeatable, which means that it must consistently produce the same results during thea repeated execution with identical inputs. However, since the solution found by the price couplingSDAC algorithm and IDA algorithm is time dependent, the repeatability can only be ensured withinunder the same conditions, i.e. on the same specific configuration of hardware and software and the same number of algorithm iterations. Furthermore, the application of a concept of full repeatability in a "'multi-threading"threading' approach, as the one implemented in the price couplingSDAC algorithm and IDA algorithm in order to maximise its scalability and its ability to find more and better solutions given the constraints recalled in whereas (20), would drastically reduce such benefits. For this reason, the repeatability of the price couplingSDAC algorithm and IDA algorithm in operations should be adequate to accommodate the objectives of the CACM Regulation, meaning. It means that the differences between alternate runs of the algorithm onwith the same input data, (given the same specific configuration of hardware and software and the same number of algorithm iterations,) respect the conditions defined in the Article 3(4)(b) of the Annex 3.this Algorithm methodology. At the same time, the NEMOs should be able to fully replicate on dedicated instances of the algorithm the outcome of specific sessions underalgorithm runs upon the request of ACER or of one or more NRAsregulatory authorities.

(21)(22)   According to Article 51(1)(a) and (e) of the CACM Regulation, the continuous trading matching algorithm must be aim to maximiseat maximising the economic surplus and be repeatable and scalable. Since the matching of orders in the continuous trading matching algorithm is based on their price and submission time, the continuous trading matching algorithm does imply no not contain any welfare optimization feature on the welfare and does not contain any or any element of randomness. Therefore, the continuous trading matching algorithm is by default maximizing welfare and repeatable. For this reason, the monitoring of continuous trading matching algorithm's optimality and repeatability is not necessary.

(22)(23)   According to Articles 38(1)(e) and 51(1)(e) of the CACM Regulation, the algorithms must be scalable. This means that they must be able to accommodate an enlargement of the SDAC and SIDC to

new bidding zones (and new NEMOs), as well as the ~~enlargement~~increased usage of the ~~use of DA and ID~~ products and ~~an enlargement~~the implementation of the algorithm requirements. However, an unlimited scalability is (i) not feasible, since any configuration of hardware and software is subject to technical constraints that can become limiting under extreme conditions, (ii) not efficient, since it entails costs, which are not proportionate to the results that can be achieved and (iii) not needed, since the dimensions of the market coupling are not infinite in terms of geographical scope, number of NEMOs, products and requirements. Hence, the scalability should be adequate to accommodate the objectives of the CACM Regulation.

(23)(24)   With regard to additional bidding zones, the completion of a fully functioning and interconnected internal energy market makes the extension of market coupling to all eligible bidding zones and NEMOs the highest priority objective. Thus, at the time of the adoption of this Algorithm methodology, the algorithm should support all eligible bidding zones and NEMOs as well as the existing requirements of TSOs and existing ~~DA and ID products.~~. However, as the number of eligible bidding zones and NEMOs will increase in the future (e.g. due to extension to third countries), the algorithms should be continuously upgraded to accommodate all additional bidding zones (and NEMOs) eligible to participate in the SDAC and SIDC, as well as the additional requirements from TSOs that may arise from the development of capacity calculation methodologies in capacity calculation regions.

(24)(25)   The implementation and management of the SDAC and/or SIDC algorithms (according to the CACM ~~Regulation~~Regulation's requirements) in terms of security of operation as well as of adequate performance, trigger different activities in ~~charge~~the responsibility of all NEMOs and/or all TSOs. Such activities are the monitoring on a structured basis of the algorithm performance and of the usage of the functionalities therein supported, an efficient planning of the modifications to be implemented to the algorithms in the mid-long term, together with the establishment of a research and development process aimed at improving the SDAC and/or SIDC algorithm performance.

(25)(26)   ~~In~~If due to an unexpected evolution in the framework of the monitoring of the algorithm performance, ~~if due to unexpected evolution,~~ the performance of the algorithm deteriorates, all NEMOs ~~and~~in cooperation with all TSOs should apply corrective measures to restore the performance. These measures should be timely communicated to stakeholders. An efficient and transparent governance is crucial for this process.

(26)(27)   The future evolution of the algorithms in terms of their scalability requires changes to the algorithms' functionalities or to the usage of already existing functionalities. To accommodate these changes, all NEMOs should cooperate with all TSOs where these changes affect TSOs' algorithms' requirements or algorithms' performance and communicate these changes to stakeholders in a timely manner. An efficient and transparent governance is crucial for this process.

(27)(28)   In order to assess the impact on performance of the SDAC and/or SIDC algorithm ~~of~~by any ~~requested or uninstructed~~ change in the usage of its functionalities, all NEMOs ~~and~~in cooperation with all TSOs should define usage scenarios for each functionality, usage of ~~those functionalities~~ which ~~usage~~ could ~~varies~~vary on a daily basis ~~(such as orders submitted by market participants for each type of product supported by the algorithm, or the value of the ATC daily auctioned on the market by the TSOs or the value and number of daily flow base constraints defined by TSOs for each relevant bidding zone borders, as described in Scheduled Exchanges Calculation Methodology, Article 5, 1, iv). Such scenario and their applications are defined in the Annexes 3 and 4 relative to the monitoring of the price coupling algorithm and continuous trading matching algorithm.~~.

(28)(29)   The concept of ~~Effective Usage~~effective usage refers to the actual value of usage of these functionalities over a past period. This ~~is~~should be the basis for the monitoring of usage of requirements and the performance of the ~~algorithm~~SDAC and SIDC algorithms.

(29)(30)   The concept of ~~Anticipated Usage~~anticipated usage refers to the future value of the usage of ~~these~~the SDAC and SIDC algorithm's functionalities, when assessing an expected variation of the performance of the ~~algorithm~~algorithms due to the implementation of requests for change or due to the expected growth of their usage. ~~The Anticipated Usage is based on the application of standard growth rates to the Effective Usage for functionalities already applied or on information provided by the requesting Party in the case of a request for change introducing new usage of functionalities.~~ This ~~is~~should

be the basis for assessing the impact on the algorithms' performance induced by requests for change as well as for the periodic assessment of adequate scalability against anticipated growth of the usage of functionalities.

(30)(31)   The concept of ~~Usage Range~~usage range refers for each functionality to the maximum estimated usage of such functionality supported by the algorithm, consistent with adequate levels of scalability. The individual ~~Usage Ranges~~usage ranges of the functionalities ~~are~~should be jointly estimated on the basis of their ~~Anticipated Usage.~~anticipated usage. Considering that the joint usage of many functionalities affects performance, the ~~Usage Range does~~usage range should not represent any maximum allowed or reserved level of usage of the ~~single~~ functionalities~~.~~. The usage range should rather ~~indicates~~indicate a ~~prudential~~prudent measure of ~~an~~ individual usage consistent with overall adequate performance and ~~indicates~~indicate potential area of application of corrective measures in case the overall performance is reducing ~~below~~the predefined thresholds.

(31)(32)   The development and operation of the ~~price coupling algorithm~~SDAC and ~~the continuous trading matching algorithm~~SIDC algorithms require close cooperation between all NEMOs and all TSOs as part of the day-to-day management of the single day-ahead and intraday coupling pursuant to Article 10 of the CACM Regulation~~.~~, because the algorithms must satisfy the requirements from NEMOs and TSOs. For this purpose, NEMOs and TSOs should collaborate in the processes for managing the algorithm performance, in the processes leading to a change in the algorithms, as well as in the development of the underlying rules governing these processes.

(32)(33)   The development and operation of the algorithms require highly transparent processes. For this reason, all NEMOs should publish in a timely manner all relevant information, procedures, contracts, descriptions and reports having an impact on the algorithm operation, management, performance and future evolution. Moreover, all NEMOs should ensure that the interested public is able to understand the functioning of the ~~algorithm and therefore publish and continuously update a detailed description of the price coupling algorithm and of the continuous trading matching algorithm~~SDAC and SIDC algorithms.

(33)(34)   The future evolution of various terms and ~~condition~~conditions or methodologies developed by TSOs or NEMOs in accordance with the CACM Regulation may require some additional changes to the SDAC and SIDC algorithms. In such a case, all TSOs and all NEMOs should update the DA and ID algorithm requirements and subsequently all NEMOs should update ~~the~~this Algorithm methodology and submit it to ~~all regulatory authorities~~ACER for ~~approval~~decision, in accordance with Article 37(5) of the CACM Regulation.

(34)(35)   The SDAC and SIDC algorithm indicators ~~set forth in the Algorithm monitoring methodology annexes~~ are meant to provide an objective basis for the management of all the activities related to the management of the ~~SDCA/~~SDAC and/or SIDC coupling and ~~for the information~~ to inform stakeholders and ~~institutions~~interested public, as far as both operations and development are involved.

(35)(36)   The usage indicators ~~set forth in the Algorithm monitoring methodology annexes~~ are meant to support the day-to-day management of the ~~SDCA/~~SDAC and SIDC referred to in ~~CACM~~ Article 10 of the CACM Regulation. They provide the information on the evolution of the effective usage of the ~~DA/ID~~SDAC and SIDC algorithms over ~~an~~a historical ~~batch~~set and ~~so are~~serve as the basis for application of corrective measures. ~~These indicators are published in the yearly monitoring report and constitute the basis for periodic reporting from NEMOs and TSOs to the institutions in the relevant Fora.~~

(36)(37)   The performance indicators ~~set forth in the Algorithm Market Monitoring Methodology Annexes~~ are meant to measure the properties of the ~~algorithm~~algorithms in terms of compliance with the CACM Regulation's requirements of ~~optimality~~maximising the economic surplus, repeatability and scalability. They provide the information on evolution of the actual performance of the ~~DA/ID~~SDAC and/or SIDC algorithms over the same historical ~~batch~~scenario of the usage indicators, as a consequence of the growth of the ~~latter. These indicators are published in the yearly monitoring report and constitute the basis for periodic reporting from NEMOs and TSOs to the institutions in the relevant Fora, together with the~~ usage ~~indicators.~~.

(37)(38)   The performance indicators ~~set forth in the Algorithm monitoring methodology annexes~~ are also meant to measure the capability of the algorithm to support ~~in the medium and long term~~the anticipated market growth and extension of requirements in the medium and long term, thus providing

the basis for the decisions on the long-term development of the ~~DA/ID~~SDAC and SIDC algorithms. ~~They~~Moreover, they measure the impact on performance of any requests for change~~, assessed on a past and future batches. In order to ensure adequate transparency on the process of development of the DA/ID algorithms, these indicators are published in the yearly scalability report and in the yearly research and development report.~~.

~~(38)~~(39)   In particular, the performance indicators on scalability ~~set forth in the Algorithm monitoring methodology annexes are also meant to~~should provide the basis for ~~the~~an impact assessment of requests for change including, but not limited to, those for corrective measures ~~on~~, which secure the reliability of the algorithm's operation. They measure the impact of such changes on calculation time ~~on both an historical batch and a future batch,~~ based on the anticipated usage of SDCA~~/~~ and/or SIDC requirements, in order to assess the risk that the requests for change are expected to have on: (i) ~~in the short term~~ the reliability of operation of the existing version of the algorithms ~~(ii)~~ in the ~~medium or long~~short term~~.~~; (ii) the necessity of triggering or revising the research and development activity in order to be able to support the request for change in the medium or long term, or (iii) the likelihood that the proposed corrective measures are sufficient to restore adequate reliability of operation.

(40) In order to ensure transparency on the process of development of the SDAC and SIDC algorithms, all indicators should be published in the yearly reports and constitute the basis for periodic reporting from NEMOs and TSOs.

TITLE 1
General provisions

Article 1

Subject matter and scope

1. This Algorithm methodology determines the ~~single day ahead price coupling~~SDAC algorithm, the single intraday continuous trading matching algorithm and the ~~ID auction~~IDA algorithm in accordance with Article 37 and 55 of the CACM Regulation. The Algorithm methodology incorporates the DA and ID algorithm requirements (as per Annex 1 and Annex 2) and the DA and ID algorithm monitoring methodologies (as per Annex 3 and Annex 4).

2. This Algorithm methodology ~~set~~sets forth the principles for the submission, evaluation, decision and implementation of requests for change related to the SDAC and/or SIDC algorithms ~~incorporated and detailed in the change control procedures defined in the relevant operational agreements among all NEMOs, and/or or between all NEMOs and all TSOs in the day ahead and intraday framework~~.

3. ~~The Algorithm methodology incorporates the Algorithm monitoring methodology for DA and ID (as per Annex 3 and Annex 4)~~

~~4.~~3. The following provisions and related decisions of all NEMOs shall apply subject to applicable laws and regulations.

Article 2

Definitions and interpretation

1. The terms used in this Algorithm methodology shall have the meaning given to them in Article 2 of Regulation (EC) No 714/2009EU) 2019/943, in Article 2 of Regulation (EU) No 543/2013, in Article 2 of the CACM Regulation, in Article 2 of Directive 2009/72/EC, in Article 3 of Regulation (EU) 2017/1485, with the exception of the definition of 'scheduling area', and in the Market Coupling Operator ('MCO') Plan.

2. In addition, the terms used in this Algorithm methodology shall have the meaning given to them in the Methodology for pricing intraday cross-zonal capacity.

2.3. In addition, the following definitions shall apply:

a) **Algorithm monitoring methodology**: means a methodology developed jointly by all NEMOs in coordinationaccordance with all TSOs in orderArticle 8 of this Algorithm methodology, which is necessary to assess the performance of the price coupling algorithmSDAC and ofSIDC algorithms, as set out by Annex 3 and Annex 4 to this Algorithm methodology, for the continuous trading matching algorithm. DA and ID timeframes respectively.

b) **Algorithm monitoring procedure**: means a procedure, which provides in more detail the assessment of the performance of the respective SDAC and/or SIDC algorithms and the process of determining and calculating the algorithm monitoring indicators, and is developed in accordance to the principles set out in this Algorithm methodology as set out in Annex 3 and Annex 4 to this Algorithm methodology. It shall be published in accordance with Article 20(7).

b)c) **Algorithm performance**: means the ability of the price coupling algorithm and the continuous trading matching algorithm to (i)SDAC and SIDC algorithms to ensure reliability of the process to find solutions, (ii) maximise economic surplus, and (iii) ensure an adequate level of repeatability and scalability.

c) **Algorithm service provider**: the subject in charge of providing new versions of the algorithm as identified in the relevant operational agreements among all NEMOs, in the day ahead and intraday framework.

d) **Assessment Body**: the body in charge for the technical assessment of the request for change, as identified in the relevant operational agreements among all NEMOs, between all NEMOs and all TSOs, and among all TSOs, in the day ahead and intraday framework.

e)d) **Back-up methodology**: means the methodology developed in accordance with Article 36(3) of the CACM Regulation and approved in accordance with Article 9 of the CACM Regulation, including any amendments, which have been approved in accordance with that Article 9.

e) **Back-up procedure**: means a procedure, which provides in more detail the processes set out in the Back-up methodology. It shall be published in accordance with Article 20(7).

f) **Change control procedure:** means a procedure, annexed to the relevantwhich provides in more detail the process of managing requests for change in the respective DA and/or ID operational agreementstimeframe and is developed accordingin accordance to the principles reported in the present methodology in order to manage requests for change to the price coupling algorithm, to the continuous trading matching algorithm and the ID auction algorithm.set out in this Algorithm methodology. It shall be published in accordance with Article 20(7).

g) **Corrective measure**: means a last resort measure taken by all NEMOs andin cooperation with all TSOs in case of performance degradation of the price coupling algorithm or of the continuous trading matching algorithmSDAC and/or SIDC algorithms with the aim to restore their adequate performance.

h) **Decision Body**: the body in charge of activities described in Article 20, as identified in the relevant operational agreements among all NEMOs, between all NEMOs and all TSOs, and among all TSOs, in the day-ahead and intraday framework.

i)h) **Existing DA algorithm solution**: means the algorithm, which has been developed and implemented by some NEMOs for the day-ahead market coupling within the day-ahead coupling project pre-existing the CACM Regulation in accordance with the MCO Plan.

j)i) **Existing ID algorithm solution**: means the continuous trading algorithm, which has been developed and implemented by some NEMOs for the intraday market coupling within the intraday coupling project pre-existing the CACM Regulation in accordance with the MCO Plan.

k)j) **Fallback ~~Methodology~~methodology**: means the methodology developed for robust and timely fallback procedures to ensure efficient, transparent and non-discriminatory capacity allocation in the event that the single day-ahead coupling process is unable to produce results, in accordance with Article 44 of the CACM Regulation and approved in accordance with Article 9 of the CACM Regulation, including any amendments, which have been approved in accordance with that Article 9.

k) **Fallback procedure**: means a procedure, which provides in more detail the processes set out in the Fallback methodology. It shall be published in accordance with Article 20(7).

l) **First ~~"OK"~~ solution:** when referring to the ~~price coupling~~SDAC algorithm or the IDA algorithm, it means the first solution found that satisfies all input constraints up to a pre-defined numerical tolerance level, published in the public description of the algorithms. A solution is considered satisfactory when there exists an acceptance tolerance problem in all the constraints up to a maximum value known as the technical limit. SDAC algorithm provides the utility of each one of the solutions that improve the previously solutions found.

m) **Functionality**: means any market or network feature or design element embodied in the systems, communications and procedures that support the ~~price coupling algorithm or the continuous trading matching algorithm~~SDAC and SIDC algorithms in accordance with the DA and ID algorithm requirements.

~~n) **Future Requirements**: means requirements proposed according to Article 37 of the CACM Regulation, which are needed to extend further the functionalities of the price coupling algorithm and of the continuous matching algorithm.~~

o)n) **Go-live ~~Date~~date**: means, with respect to each request for change, the date within a specific ~~Go~~go-live ~~Window~~window on which such request for change is to be implemented in operation

p)o) **Go-live Window**: ~~single temporal slot reflecting the unit of partition of a calendar year, where different phases of requests for change management shall be implemented according to indications provided in Article 16. The number of Go-live Windows in a given year will be established periodically according to the relevant DA or ID change control procedure. Each individual Go-live Window may determine the period during which~~**Go-live window**: means a period in a calendar year, during which the: (i) requests for change may be submitted; (ii) the assessment process of requests for change will take place; or (iii) the request for change will go-live. It shall be managed in accordance with Article 16.

~~q) **IDA**: intraday auction as defined in Annex I article 2(1)(b) from ACER decision 1/2019 on the Methodology for pricing intraday cross-zonal capacity.~~

~~r) **Initial Requirements**: means requirements proposed according to Article 37 of the CACM Regulation, which need to be implemented at the beginning of the operation of the price coupling algorithm and of the continuous trading matching algorithm.~~

s)p) **MCO Plan**: means the plan on joint performance of market coupling operator functions developed in accordance with Article 7(3) of the CACM Regulation and approved in accordance with Article 9 of the CACM Regulation, including any amendments, which have been approved in accordance with that Article 9.

t)q) **Methodology for calculating scheduled exchanges**: means the methodology developed in accordance with Articles 43(1) and 56(1) of the CACM Regulation and approved in accordance with Article 9 of the CACM Regulation, including any amendments, which have been approved in accordance with that Article 9.

r) **Methodology for pricing intraday cross-zonal capacity**: means the methodology developed in accordance with Article 55 of the CACM Regulation and approved in accordance with Article 9 of the CACM Regulation, including any amendments, which have been approved in accordance with that Article 9.

u)s) **NEMO ~~Trading Hub~~trading hub**: means a virtual trading point collecting all orders received by a NEMO with delivery in a specific scheduling area.

12

t) **Operational contract:** means the contract between NEMOs only or TSOs only or between NEMOs and TSOs governing the SDAC or SIDC market coupling operations. It shall be published in accordance with Article 20(7).

u) **Operational procedure:** means a procedure, which provides in more detail the processes set out in this Algorithm methodology and is concluded between NEMOs only or TSOs only or between NEMOs and TSOs. It shall be published in accordance with Article 20(7).

v) **Originator**: ~~any Party~~means one or more NEMO(s) or TSO(s) submitting a request for change. ~~The request for change may be submitted by any individual Party or a working group comprising of any two or more parties, in each case in accordance with the relevant change control procedure for the DA or ID contractual framework.~~

w) **Paradoxically ~~Rejected Order~~rejected order**: means any sell/buy order covering multiple MTUs, which, although its order price is lower/higher than the average market clearing price for all the MTUs included in the order, are nonetheless rejected by the ~~price coupling~~SDAC algorithm on the grounds that, if they had been accepted, the average market clearing price in the respective MTUs would have either decreased/increased below/above their order price or the economic surplus calculated by the ~~price coupling~~SDAC algorithm would have decreased.

~~x) **Party**: any NEMO or TSO.~~

~~y)~~x) **DA products, ID products and IDA products**: means the products that can be taken into account in the ~~single day-ahead~~SDAC, intraday ~~coupling~~continuous trading or ~~intraday auction~~IDAs, respectively, developed in accordance with Articles 40(1~~),~~) and 53(1) of the CACM Regulation and approved in accordance with Article 9 of the CACM Regulation, including any amendments, which have been approved in accordance with that Article 9.

~~z)~~y) **Request for change**: means a formal request by ~~one or more NEMO(s) or TSO(s)~~an originator for any modification to the ~~price coupling algorithm, the continuous trading matching algorithm~~SDAC and ~~the intraday auction~~/or SIDC algorithm or to its usage.

~~aa)~~z) **Scheduling area**: means a scheduling area according to Article 3(2)(91) of the Regulation (EU) 2017/1485 with at least one NEMO trading hub.

~~bb)~~aa) **Scheduled exchange between NEMO trading hubs**: means an electricity transfer scheduled between NEMO trading hubs within or between scheduling areas or bidding zones.

~~cc) **Usage:** quantitative indication of the average usage of a functionality over a predefined time range. Such information is needed whenever the usage of such functionality is dependent to decisions of market participants (e.g. number of orders of a specific product) or a TSO (e.g. hourly value of ATC, number and value of PTDFs). Specific definition of Effective Usage, Anticipated Usage and Usage Range are provided in Article 7. .~~

bb) **Switchover**: means all the technical processes to be taken in advance or at the IDAs' deadline for bid submissions in order to switch from the intraday continuous capacity allocation mechanism to the intraday auction based capacity allocation mechanism, avoiding the double allocation of cross-zonal capacity.

cc) **Switchback**: means all the technical processes to be taken in order to continue with the intraday continuous capacity allocation once the allocation of capacity through an IDA has finished, avoiding the double allocation of cross-zonal capacity.

~~3.~~4. Unless the context requires otherwise or unless specified otherwise:

a) the singular indicates the plural and vice versa;

b) the table of contents and headings are inserted for convenience only and do not affect the interpretation of this Algorithm methodology; and

c) any reference to legislation, regulations, directives, decisions, orders, instruments, codes or any other enactment shall include any modification, extension or re-enactment thereof when in force.

TITLE 2
Algorithms

Article 3

Algorithm requirements

1. The DA and ID algorithm requirements comprise a common set of requirements proposed by all TSOs, a common set of requirements proposed by all NEMOs and a common set of requirements jointly proposed by both all TSOs and all NEMOs, in line with Article 37 (1) of the CACM Regulation and are set out in Annex 1 and Annex 2 of this Algorithm methodology.

2. ~~The common set of requirements for the price coupling algorithm, the continuous trading matching algorithm and the intraday auction algorithm are set out in Annex 1, Annex 2 TITLE 1 and Annex 2 TITLE 2, respectively, of this Algorithm methodology.~~

3.2. All NEMOs shall maintain the functionalities (following their implementation) to be compliant with the DA and ID algorithm requirements ~~that are set out in Annex 1 and Annex 2 of this Algorithm methodology~~.

4.3. ~~The price coupling algorithm, the continuous trading matching algorithm and the intraday auction algorithm~~The SDAC and SIDC algorithms shall support the requirements for the calculation of scheduled exchanges between bidding zones and between scheduling areas as well as scheduled exchanges between NEMO trading hubs in accordance with the methodology for calculating scheduled exchanges for the day-ahead, and intraday ~~timeframe and respectively intraday auction timeframe~~timeframes.

5.4. The ~~price coupling algorithm~~ SDAC and ~~the continuous trading matching algorithm~~SIDC algorithms shall support ~~all DA, ID and IDAs~~ products listed in the Terms and conditions on SDAC and ~~all~~ SIDC products and all DA and ID algorithm requirements ~~defined in Annex 1, Annex 2 TITLE 1 and Annex 2 TITLE 2 to this Algorithm methodology~~. However, if such support leads to a deterioration of the algorithm performance, all NEMOs may apply, through the procedures for corrective measure and/or change requests:

   a) limitations to specific products or their usage in specific bidding zones; and/or
   b) limitations to specific algorithm requirements or their usage, if these requirements are specified in a way that excessively impacts the algorithm performance.

   When applying those limitations, all NEMOs shall respect the rules referred to in Article 12 of this Algorithm methodology.

6.5. All NEMOs shall ensure that the ~~price coupling~~SDAC algorithm produces the results set out in Article 39(2) of the CACM Regulation while fulfilling the requirements referred to in Article 38(1) and Article 40(2) of the CACM Regulation:

   a) ~~The price coupling~~the SDAC algorithm shall aim at maximising the economic surplus for all biding zones participating in the SDAC for the next trading day while respecting cross-zonal capacity and allocation constraints within the maximum calculation time. The ~~price coupling~~SDAC algorithm shall facilitate efficient price formation by using the marginal price principle according to which all accepted orders have the same price per bidding zone and per MTU;
   b) ~~The price coupling~~the SDAC algorithm shall be repeatable, which means that the outcome of alternate executions of the algorithm on the same hardware and software and their configuration after the same number of iterations consistently delivers the same result and shall respect the ~~conditions~~thresholds set forth in Article 3(~~4~~)(~~b~~3) of Annex 3. All NEMOs shall be able to fully replicate the results of the ~~price coupling~~SDAC algorithm for a specific historic delivery day if requested by any regulatory authority or ~~the Agency~~ACER pursuant to their monitoring duties in accordance with Article 82(1) of CACM Regulation;

14

c) ~~The price coupling~~the SDAC algorithm shall be scalable, thus ensuring that it can support in a non-discriminatory way all bidding zones and all NEMOs eligible to participate in the SDAC at any time, all DA algorithm requirements and ~~all products set out in the~~ DA products, as well as their reasonable usage based on anticipated and ~~Effective Usage~~effective usage;

d) ~~The price coupling~~the SDAC algorithm shall be able to accommodate orders resulting from products covering one MTU and multiple MTUs;

e) ~~The price coupling~~the SDAC algorithm shall be reliable, which means that it shall be able to find at least one solution within the time limit as set out in the operational procedure and timings; and

f) ~~The price coupling~~the SDAC algorithm shall provide for a fair and orderly price formation as required by Article 3(h) of the CACM Regulation.

7.6. All NEMOs shall ensure that the continuous trading matching algorithm produces the results set out in Article 52(1) of the CACM Regulation while fulfilling the requirements of Article 51(1) and Article 53(3) of the CACM Regulation:

a) ~~The~~the continuous trading matching algorithm shall aim at maximising economic surplus for the SIDC per trade for the intraday market time-frame by allocating cross-zonal capacity to orders, which can be matched in accordance with their price and submission time, while respecting the cross-zonal capacity and allocation constraints;

b) ~~The~~the continuous trading matching algorithm shall be repeatable, which means that for a given (i) set of orders, their associated submission time and cross-zonal capacities and allocation constraints for a specified delivery date and (ii) an adequate and suitable storage and computational capacity of the algorithm and related IT assets, the same results originally obtained for the indicated delivery date can be reproduced;

c) ~~The~~the continuous trading matching algorithm shall be scalable, thus ensuring that it can support in a non-discriminatory way all bidding zones and all NEMOs eligible to participate in the SIDC at any time, all ID algorithm requirements and all products ~~set out~~listed in the ~~ID~~Terms and conditions on SDAC products, as well as their reasonable usage based on anticipated and ~~Effective Usage~~effective usage; and

d) ~~The~~the continuous trading matching algorithm shall be able to accommodate orders covering one MTU and multiple MTUs.

8.7. All NEMOs shall ensure that the ~~intraday auction~~IDA algorithm produces the results and fulfils the requirements defined for SDAC algorithm in the previous paragraph 5 ~~plus~~, mutatis mutandis, and in Title 2 of the ID algorithm requirements ~~defined~~as set out in ~~TITLE 2 of~~ Annex 2. ~~In case~~ of ~~discrepancy, TITLE 2 of Annex 2 shall prevail~~this Algorithm methodology.

Article 4

Price coupling algorithm

1. The ~~price coupling~~SDAC algorithm shall produce at least the following results simultaneously for each MTU:

a) a single clearing price for each bidding zone and MTU in EUR/MWh;

b) a single net position for each bidding zone and each MTU;

c) the matched volumes of each bidding zone for each relevant MTU;

d) the scheduled exchanges between bidding zones (in case of DC interconnectors separately for each of them) and between scheduling areas as well as scheduled exchanges between NEMO trading hubs for each relevant MTU;

e) the information which enables the execution status of orders to be determined; and

f) the acceptance ratio for each block as defined in the ~~DA~~Terms and conditions on SDAC products.

2. The ~~price coupling~~SDAC algorithm shall calculate scheduled exchanges between bidding zones and between scheduling areas as well as scheduled exchanges between NEMO trading hubs in accordance with the methodology for calculating scheduled exchanges for the day-ahead timeframe.

3. For the purpose of calculating scheduled exchanges, the ~~price coupling~~SDAC algorithm shall calculate the net positions as follows:

    ~~g)a)for the bidding zones consisting of more than one scheduling area, the net position for each MTU will be calculated for each scheduling area; and~~

    ~~h)a)for the scheduling areas where more than one NEMO operates, the net position for each MTU will be calculated for each NEMO trading hub.~~

    a) ~~To~~for the bidding zones consisting of more than one scheduling area, the net position for each MTU will be calculated for each scheduling area; and

    b) for the scheduling areas where more than one NEMO operates, the net position for each MTU will be calculated for each NEMO trading hub.

4. Where applicable, to find a solution, the ~~price coupling~~SDAC algorithm shall evaluate ~~different~~the acceptance criteria combinations of ~~block orders and complex orders and try to find values for the remaining variables~~all DA products, which are not simple or aggregated hourly, half-hourly or quarter-hourly products that fulfil the market and network DA algorithm requirements expressed as constraints in the optimisation problem. Every evaluated combination is a node.

5. In order to ensure reliability of operation, the ~~price coupling~~SDAC algorithm shall first aim to find a first solution compliant with the input constraints. In order to maximise the economic surplus, it shall then seek to find new solutions with higher economic surplus by exploring new nodes until the overall optimal solution is found and verified in the process of maximising the economic surplus or until the time limit referred to in paragraph 6 has been reached. In case the ~~price coupling~~SDAC algorithm finds two or more solutions with the same value of economic surplus, it shall select the one that maximises the traded volume.

6. Under normal operations, all NEMOs shall execute the ~~price coupling~~SDAC algorithm using the time limit stopping criterion, which shall be equal to the maximum calculation time established in the operational procedure and timings referred to in paragraph 16~~.~~.

7. The ~~price coupling~~SDAC algorithm shall perform checks on every solution found to validate that all the market and network requirements, expressed as constraints in the optimisation problem, are respected within a tolerance, which shall be ~~agreed between NEMOs and TSOs.~~defined in operational procedures. The last solution found that is fulfilling this condition shall be the result of the execution of the ~~price coupling~~SDAC algorithm.

8. Orders used in the ~~price coupling~~SDAC algorithm shall be anonymous and processed in a non-discriminatory way. There shall be no identification of the originating market participant or NEMOs.

9. A single execution of the ~~price coupling~~SDAC algorithm operated by the coordinator shall calculate the results for all NEMO trading hubs participating in the SDAC.

10. The input data to the ~~price coupling~~SDAC algorithm referred to in Article 39(1) of the CACM Regulation shall be available to any authorised operator, who is entitled to perform the ~~price coupling~~SDAC calculation in parallel.

11. Under normal operations, all NEMOs shall submit orders to the MCO function systems by the time defined in the operational ~~procedure or otherwise~~procedures. If applicable, back-up procedures shall be applied ~~as set out~~ in accordance with the ~~backup~~Back-up methodology.

12. Under normal operations, all NEMOs performing the MCO functions shall provide (i) all TSOs, all coordinated capacity calculators and all NEMOs with the results of the SDAC referred to in paragraph 1(a),(b),(c) and (d) above; and (ii) all NEMOs with the results specified in paragraph 1 above, by 13:00 market time day-ahead and anyway not later than 15:30 market time day-ahead.

13. All NEMOs shall provide TSOs with the scheduled exchanges between bidding zones and between scheduling areas as referred to in paragraph (2) above, calculated in accordance with the methodology for calculating scheduled exchanges for the day-ahead timeframe.

16

14. All NEMOs shall ensure that the ~~price coupling~~SDAC algorithm meets the algorithm requirements as follows:

    ~~i) by 1 August 2018,~~ the ~~price coupling~~SDAC algorithm shall be able to support~~:~~

    a) all ~~initial~~existing requirements~~,~~ and functionalities:

        (i) set out in Annex 1 to this Algorithm methodology~~, except the requirement referred to in point (b) of this paragraph~~ and denoted as 'existing';

        (ii) the requirement of maximisation of the economic surplus as referred to in Article 3(5)(a)~~ ; and~~;

        (iii) the requirement on delivery of results as referred to in paragraph 1~~.~~;

    ~~j) by 1 May 2019, the price coupling algorithm shall be able to support:~~

        ~~(i) the requirement for the operation of multiple NEMOs in a bidding zone;~~

        (iv) the requirement for the operation of multiple NEMOs in a bidding zone;

        ~~(ii)~~(v) the requirement of scalability as referred to in Article 3(5)(c)~~ ;~~; and

        ~~(iii)~~(vi) the requirement for the calculation of scheduled exchanges as referred to in paragraph 2.

    ~~k)~~b) by 1 February 2020, the ~~price coupling~~SDAC algorithm shall be able to support the requirement of adequate repeatability referred to in Article 3(5)(b)~~ ; and~~;

    c) by 1 January 2021, the SDAC algorithm shall be able to support half-hourly and quarter-hourly granularity of DA products as set out in paragraph 1.1(a)(i) in Annex 1 to this Algorithm methodology; and

    ~~l)~~d) by 1 August 2022, the ~~price coupling~~SDAC algorithm shall be able to support all ~~future~~ requirements denoted as 'AUG 2022' as set out in Annex 1 to this Algorithm methodology.

15. In the case of amendments of the ~~methodology~~Methodology for the calculation of scheduled exchanges for day-ahead timeframe ~~changes are required in the calculation of scheduled exchanges~~, the delivery of the amended functionality for the calculation of scheduled exchanges shall be postponed until 12 months after the approval of the methodology for the calculation of scheduled exchanges for the day-ahead timeframe.

16. All NEMOs ~~and~~in cooperation with all TSOs shall jointly establish the operational procedures and timings for the ~~price coupling~~SDAC algorithm to comply with Article 48 of the CACM Regulation. These operational procedures and timings shall define the modalities for coordinating the operation of the SDAC market between NEMOs and TSOs both in ordinary and non-ordinary conditions and shall detail all relevant actions to be taken together with relevant subjects, timings and processes. These operational procedures and timings shall make reference to the Back-up methodology developed in accordance with Article 36(3) of the CACM Regulation.

17. Every year, all NEMOs shall provide all regulatory authorities with a report on incidents in the operation of the ~~price coupling~~SDAC algorithm and the application of back-up and fallback procedures in accordance with the Back-up methodology and ~~fallback~~Fallback methodology. The report shall provide at least a list of incidents in the operation of the ~~price coupling~~SDAC algorithm and the application of back-up and fallback procedures, including the reasoning of their occurrence and applied or anticipated remedies to prevent ~~them~~their recurrence in the future.

18. All NEMOs shall create and maintain a document with the detailed description of the ~~price coupling~~SDAC algorithm, including the description of the calculation of scheduled exchanges in accordance with the methodology for calculating scheduled exchanges for the day-ahead timeframe. This document shall be published and kept updated with every new version of the ~~price coupling~~SDAC algorithm. The document shall be publicly available by all NEMOs on a public webpage.

Article 5

Continuous trading matching algorithm

1. All NEMOs, as part of their MCO function, shall ensure that the continuous trading matching algorithm produces at least the following results:

   a) the execution status of orders and prices per trade;
   b) a single net position for each bidding zone participating in the SIDC and each MTU; and
   c) the scheduled exchanges between bidding zones (in case of DC interconnectors separately for each of them) and between scheduling areas as well as scheduled exchanges between NEMO trading hubs for each relevant MTU.

2. The continuous trading matching algorithm shall comprise a shared order book ('SOB') module and a capacity management module ('CMM'). The SOB module shall manage order entry, order management and order matching, while the capacity management module shall manage and allocate cross-zonal capacities and allocation constraints.

3. The continuous trading matching algorithm shall enable all NEMOs to connect to the SOB module. All NEMOs shall enter orders into the SOB module through local trading solutions. All valid orders entered in time in the local trading solution shall automatically enter the SOB module. Market participants are not entitled to access the SOB module directly.

4. The continuous trading matching algorithm shall calculate the scheduled exchanges between bidding zones and between scheduling areas as well as scheduled exchanges between NEMO trading hubs in accordance with the methodology for calculating scheduled exchanges for the intraday timeframe. This functionality shall be implemented by all NEMOs, together with all TSOs, through the shipping module.

5. Matching of orders shall be performed within the SOB module, irrespectively of the scheduling areas through which the orders were entered, including from the same area. The SOB module shall maintain a consolidated order book for all contracts based on the available cross-zonal capacities and allocation constraints.

6. The CMM shall provide information on the currently available cross-zonal capacities and allocation constraints. When cross-zonal matching is performed, the required cross-zonal capacities shall be implicitly allocated in the CMM.

7. Market participants requesting explicit access to cross-zonal capacity in accordance with Article 64 of the CACM Regulation and subject to regulatory approval shall directly access the CMM for explicit cross-zonal capacity allocation.

8. The SOB module shall determine the local view of all orders that can be matched in a selected scheduling area.

9. The SOB module shall apply deterministic matching procedures. Orders shall be matched in the SOB module on the price-time-priority principle:

   a) Priceprice: orders shall be executed at the best price. This means that the best buy order, i.e. the order with the highest price, shall be executed against the best sell order, i.e. the order with the lowest price, first.
   b) Time: when an order is entered into the SOB, it shall be assigned a timestamp. This timestamp is used to prioritise orders with the same price. At the same price, orders with earlier timestamps shall be executed with a higher priority than orders with a later timestamp.

10. The trade execution price for a newly entered order that is matched shall be the order price of the best order which is already in the SOB:

    a) Ifif a newly entered buy order is matched against an existing sell order, the price of the sell order shall become the trade execution price.

b) ~~If~~if a newly entered sell order is matched against an existing buy order, the price of the buy order shall become the trade execution price.

11. Where a possible cross-zonal trade is identified in the SOB module, a request for implicit allocation of cross-zonal capacity shall be submitted to the CMM. Requests for implicit capacity allocation shall be queued along with requests for explicit capacity allocation, and cross-zonal capacity shall be allocated on a first-come-first serve basis respecting also allocation constraints. If the necessary cross-zonal capacity is not available, the cross-zonal trade shall not be matched.

12. CMM shall not discriminate between implicit capacity allocation for matching of single-time-unit products (e.g. hourly, half-hourly and quarter-hourly), implicit capacity allocation for matching of user-defined blocks and explicit capacity allocation to explicit capacity allocation requests. These requests from both implicit continuous matching and explicit allocation shall all be treated in the CMM on a first-come-first served basis.

13. NEMOs shall provide TSOs with the scheduled exchanges between bidding zones and between scheduling areas as referred to in paragraph 4 above and in accordance with the methodology for calculating of scheduled exchanges for the intraday timeframe.

14. All NEMOs shall ensure that the continuous trading matching algorithm meets the algorithm requirements as follows:

    a) ~~By 1 August 2018~~ the continuous trading matching algorithm shall be able to support all existing requirements and functionalities:

        (i) all requirements defined in Annex 2 ~~identified with deadline "IDC 1"~~ to this Algorithm methodology, denoted as 'existing';
        (ii) the requirement of maximisation of economic surplus as referred to in Article 3(6)(a) ~~;~~;
        (iii) the requirement for the operation of multiple NEMOs in a bidding zone;
        ~~(iii)(i)   the requirement for the operation of multiple NEMOs in a bidding zone;~~
        (iv) the requirement of scalability as referred to in Article 3(6)(c) ~~;~~;
        (v) the requirement of adequate repeatability as referred to in Article 3(6)(b) ~~;~~;
        (vi) the requirement on delivery of results as referred to in paragraph 1; ~~and~~
        (vii) the requirements for the calculation of schedule exchanges as referred to in paragraph 4; and
        (viii) ~~By 1 August 2019 the continuous trading matching algorithm shall be updated with~~ the complete functionality of the enhanced preferred shipper;

    b) by ~~end 2021~~1 January 2023, the continuous trading matching algorithm shall be able to support all requirements ~~identified with deadline "IDA 1"~~denoted as 'JAN 2023' set out in TITLE 1 of Annex 2 to this Algorithm methodology; and

    c) ~~By~~by 1 August 2023, the continuous trading matching algorithm shall be able to support all requirements ~~identified with deadline "IDC 2"~~denoted as 'AUG 2023' set out in Annex 2 to this Algorithm methodology.

15. ~~—~~In the case of amendments of the Methodology for the calculation of scheduled exchanges for ~~the~~ intraday timeframe ~~requires changes in the calculation of scheduled exchanges~~, the delivery of the amended functionality for the calculation of scheduled exchanges shall be postponed until 12 months after the approval of the methodology for calculating scheduled exchanges for the intraday timeframe.

16. All NEMOs ~~and~~in cooperation with all TSOs shall jointly establish the operational procedures and timings for the continuous trading matching algorithm to comply with Article 60 of the CACM Regulation. These operational procedures and timings shall define the modalities for coordinating the operation of the SIDC market between NEMOs and TSOs both in ordinary and non-ordinary conditions and shall detail all relevant actions to be taken together with relevant subjects, timings and processes. These operational procedures and timings shall make reference to the Back-up methodology developed in accordance with Article 36(3) of the CACM Regulation.

17. Every year, all NEMOs shall provide all regulatory authorities with a report on incidents in the operation of the continuous trading matching algorithm and the application of back-up and fallback procedures in

accordance with the Back-up methodology and ~~fallback~~Fallback methodology. The report shall provide at least a list of incidents in the operation of the continuous trading matching algorithm and the application of back-up procedures, including the reasoning of their occurrence and applied or anticipated remedies to prevent them in the future.

18. All NEMOs shall create and maintain a document with the detailed description of the continuous trading matching algorithm, including the description of calculation of scheduled exchanges in accordance with the methodology for calculating scheduled exchanges for the intraday timeframe. This document shall be published and kept updated with every new version of the continuous trading matching algorithm. The document shall be publicly available ~~by~~on all ~~NEMOs on~~NEMOs' public webpage.

~~19.~~ ~~Under normal operations, in~~ In order to ~~avoid double allocation of~~accommodate IDAs, the cross--zonal capacity~~, the cross zonal~~ allocation ~~in~~within the continuous SIDC shall be ~~interrupted starting no later than the GCT of the IDAs and shall remain interrupted until the end of the IDA process as referring in Article 6(2).~~

~~20.~~19. ~~Where so required by relevant regulation, interruption of cross-zonal allocation in~~ suspended for a limited period during which the cross-zonal capacities shall not be allocated through the continuous SIDC ~~may be anticipated no more than 15 minutes before the GCT of the IDAs. The 15 minutes for the interruption of cross zonal allocation in continuous SIDC can~~. This period for suspension shall not be ~~further extended by a maximum of 15 minutes to comply with regulatory requirements in case there is an obligation of publication of available capacity prior the IDA.~~longer than 40 minutes and shall consist of:

(a) the suspension before the deadline for bid submissions of each IDA. This suspension shall not be longer than 20 minutes and allow maximum of 5 minutes for recalculating and/or updating of cross-zonal capacities, which shall be published no later than 15 minutes before the deadline for bid submissions for each IDA as specified in the single methodology for pricing intraday cross-zonal capacity adopted in accordance with Article 55 of the CACM Regulation; and

(b) the suspension after the deadline for bid submissions of each IDA, which shall not be longer than 20 minutes and allow for the calculation of auction results, verification of results and the recalculation and/or update of cross-zonal capacities for the continuous SIDC.

20. If all NEMOs and/or all TSOs identify during the testing of IDAs, that they are not able to implement IDAs within the time constraints provided in paragraph 1, they may start the implementation of IDAs with extended time constraints which are 30 minutes for suspension before the deadline for bid submissions of each IDA and 30 minutes for the suspension after the deadline for bid submissions of each IDA. These extended time constraints may be applied for up to maximum 12 months starting from the implementation date of IDAs and shall not affect the deadline for publication of cross-zonal capacities as referred to in paragraph 1(a). All NEMOs shall announce and publish the start and end of the application of extended deadlines at least two months before their application.

Article 6

Intraday auction algorithm

1. The ~~ID auction~~IDA algorithm shall ~~respect the same provisions~~produce at least the following results simultaneously for each MTU:

   a) a single clearing price for each bidding zone and MTU in EUR/MWh;
   b) a single net position for each bidding zone and each MTU;
   c) the matched volumes of each bidding zone for each relevant MTU;
   d) the scheduled exchanges between bidding zones (in case of DC interconnectors separately for each of them) and between scheduling areas as well as scheduled exchanges between NEMO trading hubs for each relevant MTU;
   e) the information which enables the execution status of orders to be determined; and

f) the acceptance ratio for each block as defined in ~~article 4~~the Terms and conditions on SIDC products.

2. The IDA algorithm shall ~~apply~~calculate scheduled exchanges between bidding zones and between scheduling areas as well as scheduled exchanges between NEMO trading hubs in accordance with the methodology for calculating scheduled exchanges for the day-ahead timeframe, applied for the needs of IDAs mutatis mutandis.

3. For the purpose of calculating scheduled exchanges, the IDA algorithm shall calculate the net positions as follows:
    a) for the bidding zones consisting of more than one scheduling area, the net position for each MTU will be calculated for each scheduling area; and
    b) for the scheduling areas where more than one NEMO operates, the net position for each MTU will be calculated for each NEMO trading hub.

4. ~~exceptions~~Where applicable, to find a solution, the IDA algorithm shall evaluate the acceptance criteria combinations of all IDA products, which are not simple or aggregated hourly, half-hourly or quarter-hourly products that fulfil the market and network ID algorithm requirements expressed as constraints in the optimisation problem. Every evaluated combination is a node.

5. In order to ensure reliability of operation, the IDA algorithm shall first aim to find a first solution compliant with the input constraints. In order to maximise the economic surplus, it shall then seek to find new solutions with higher economic surplus by exploring new nodes until the overall optimal solution is found and verified in the process of maximising the economic surplus or until the time limit referred to in paragraph 6 has been reached. In case the IDA algorithm finds two or more solutions with the same value of economic surplus, it shall select the one that maximises the traded volume.

6. Under normal operations, all NEMOs shall execute the IDA algorithm using the time limit stopping criterion, which shall be equal to the maximum calculation time established in the operational procedure and timings referred to in Article 5(16).

~~21.~~7. The IDA algorithm shall perform checks on every solution found to validate that all the market and network requirements, expressed as constraints in the optimisation problem, are respected within a tolerance, which shall be defined in the operational procedures. The last solution found that is fulfilling this ~~article in the following paragraphs:~~condition shall be the result of the execution of the IDA algorithm.

8. ~~The results of the SIDC intraday auction referred to in Article 4(1)(a), (b), (c) and (d);, shall be made available allowing~~Orders used in the IDA algorithm shall be anonymous and processed in a non-discriminatory way. There shall be no identification of the originating market participants or NEMOs.

9. A single execution of the IDA algorithm operated by the coordinator shall calculate the results for all NEMO trading hubs participating in the IDA.

10. The input data to the IDA algorithm referred to in Article 39(1) of the CACM Regulation shall be available to any authorised operator, who is entitled to perform the IDA calculation in parallel.

11. Under normal operations, all NEMOs shall submit orders to the MCO function systems by the time defined in the operational procedures or otherwise back-up procedures shall be applied as set out in the Back-up methodology.

~~22.~~12. Under normal operations, all NEMOs performing the MCO functions shall provide (i) all TSOs, all coordinated capacity calculators and all NEMOs with the results of the IDA referred to in paragraph 1(a),(b),(c) and (d) above; and (ii) all NEMOs with the results specified in paragraph 1 above, in due time to allow at least 30 minutes of cross-zonal continuous trading for any given MTU after the publication of the auction results as ~~stated in Annex 1, article 4, paragraph 8 from ACER 01/2019~~set out in the Methodology for pricing intraday cross-zonal capacity.

13. All NEMOs shall provide TSOs with the scheduled exchanges between bidding zones and between scheduling areas as referred to in paragraph (2) above, calculated in accordance with the methodology for calculating scheduled exchanges for the day-ahead timeframe.

23.14. Under normal ~~circumstances, the SIDC intraday auction process~~operations, the IDA shall be completed ~~30~~and publish results no longer than 20 minutes after the ~~GCT of the relevant IDA~~deadline for bid submission.

24. ~~In case the TSOs are not able to provide the intraday cross-zonal capacity to an IDA, such capacity, when it becomes available, shall be allocated through the continuous SIDC, as stated in Annex 1, article 4, paragraph 6 from ACER 01/2019~~

25. ~~In case an IDA is not able to allocate intraday cross-zonal capacity, such capacity shall be subsequently offered and allocated through the continuous SIDC, as stated in Annex 1, article 4, paragraph 7 from ACER 01/2019~~

26.15. All NEMOs shall ensure that the ID auction algorithm meets the algorithm requirements as follows:

    a) by ~~end 2021,~~1 January 2023, all NEMOs shall organize and operate the ~~ID~~IDAs and the IDA auction algorithm shall be able to support:

        (i) all requirements ~~identified with deadline "IDA-1",~~denoted as 'JAN 2023', set out in TITLE 2 of Annex 2 to this Algorithm methodology~~, except the requirement referred to in point (b) of this paragraph~~;
        (ii) the requirement of maximisation of the economic surplus as referred to in Article 3(5)(a);
        ~~(iii) the requirement on delivery of results as referred to in paragraph 1.~~
        ~~(iv)~~(i) ~~the requirement for the operation of multiple NEMOs in a bidding zone;~~
        ~~(v) the requirement of scalability as referred to in Article 3(6)(c); and~~
        ~~(vi) the requirement for the calculation of scheduled exchanges as referred to in paragraph 2; and~~
        ~~(vii)~~(iii) the requirement of adequate repeatability referred to in Article 3(5)(b)~~.~~
        (iv) the requirement of scalability as referred to in Article 3(5)(c);
        (v) the requirement on delivery of results as referred to in paragraph 1;
        (vi) the requirement for the calculation of scheduled exchanges as referred to in paragraph 2 ; and
        (vii) the requirement for the operation of multiple NEMOs in a bidding zone.

    b) by 1 August 2023, the ID auction algorithm shall be able to support all requirements ~~identified with deadline "IDA-2"~~denoted as 'AUG 2023' set out in TITLE 2 of Annex 2 to this Algorithm methodology.

    c) by ~~end of 2021~~1 January 2023, only ~~hourly time resolution shall be implemented in operation. Further MTU products shall be implemented in operation when also implemented into the price coupling algorithm.~~

    ~~d) Requirements identified with deadline "IDA-1B" set out in TITLE 2 of Annex 2 to this Algorithm methodology may be implemented before the deadline defined in previous letter b) but the implementation date shall not be before the 1 August 2022, which is the deadline defined for this requirement in the price coupling algorithm in SDAC scope.~~

    ~~e)~~c)~~by end of 2021, pure NTC~~the net transfer capacity approach shall be implemented in operation. ~~Flow~~ The flow-based approach shall be implemented in operation for those regions where cross-zonal capacity is calculated following ~~Flow~~ the flow-based methodology no later than when continuous trading matching algorithm is adapted to support flow-based allocation. The evolution of the flow-based approach for auctions prior to the implementation of the full flow-based solution is subject to further technical evaluation.

16. All NEMOs shall create and maintain a document with the detailed description of the IDA algorithm, including the description of the calculation of scheduled exchanges in accordance with the methodology for calculating scheduled exchanges for the day-ahead timeframe, applied for the needs of IDAs mutatis mutandis. This document shall be published and kept updated with every new version of the IDA algorithm. The document shall be publicly available by all NEMOs on a public webpage from the date set out in paragraph 15(a).

TITLE 3
Algorithm performance management

Article 7

Calculation of ~~Effective~~ effective usage, anticipated usage and usage range

1. Usage~~, Anticipated Usage and Usage Range~~ is a quantitative indication of the average usage of a functionality over a predefined time range. Such information is needed whenever the usage of such functionality is dependent on decisions of market participants, thus can vary on daily basis (e.g. number of orders of a specific product) or TSOs (e.g. hourly value of ATC or the number and value of PTDFs).

2. All NEMOs in cooperation with all TSOs shall ensure that ~~for~~ each ~~of all those functionalities~~functionality of the SDAC~~/~~ and SIDC ~~algorithm which daily Usage can vary from one day to another according to definition provided in Article 2,~~algorithms is associated with a quantification of the ~~Effective Usage~~effective usage and the ~~Anticipated Usage. Such definitions shall~~anticipated usage. These usages provide the basis for the quantification of the ~~Usage Range,~~usage range and the assessment of the ~~impact on~~ performance ~~of~~impact on any request for change, according to the principles described in ~~the following~~ Article 13~~and~~. Moreover, they provide for the monitoring of the evolution of the performance of the SDAC~~/~~ and SIDC ~~algorithm~~algorithms, according to the provisions ~~set forth in~~of Article 8.

3. ~~Effective Usage~~The effective usage of a functionality is equal to the mean of its actual usage observed over ~~a predefined set of~~ the recent historical ~~sessions. Its calculation shall be performed according to~~set defined in Article 2(3)(a) of Annex 3 and Article 2(3)(a) of Annex 4 for the DA and ID timeframes respectively, based on the following principles:

   a) ~~The predefined set of~~the recent historical ~~sessions to be considered~~ set shall be ~~equal~~the same for all functionalities~~.~~; and
   b) ~~The~~the computation of the ~~Effective Usage~~effective usage shall reflect the observed historical growth trend in the assessment process and the application of corrective measures.

4. The ~~Anticipated Usage~~anticipated usage of a functionality is ~~its~~the expected ~~Effective Usage~~effective usage observed over ~~a predefined set of~~the near future ~~sessions. Its calculation shall be performed according~~ set defined in Article 2(3)(d) of Annex 3 and Article 2(3)(c) of Annex 4 for the DA and ID timeframes respectively, based on the following principles:

   a) ~~The predefined~~the near future set ~~of historical sessions to be considered~~ shall be ~~equal~~the same for all the functionalities and wide enough to avoid the influence of seasonal effects~~.~~;
   b) ~~In~~in case of existing functionalities already used in bidding zones or on the borders subject to assessment, the ~~Anticipated Usage~~anticipated usage shall be derived from the ~~Effective Usage~~effective usage, where relevant, according to a growth rate associated to the functionality~~. In other cases, all the necessary information for the calculation of the Anticipated Usage should be provided by the Assessment Body.~~; and
   c) ~~In~~in case of new functionalities or functionalities not already being used in bidding zones, scheduling areas, NEMO trading hubs or on the borders between them that are subject to assessment, the ~~Anticipated Usage~~anticipated usage shall be communicated by the ~~Originator~~originator in its request for change.

5. The ~~Usage Range~~usage range of a functionality is the maximum estimated usage of that functionality supported by the algorithm consistent with an adequate level of performance, according to the indicators defined in the Article 9 of Annex 3 and Article 87 of Annex 4~~.~~, for the DA and ID timeframes respectively. The ~~Usage Range~~usage range of each functionality shall be jointly estimated in a single simulation ~~scenario~~set with the purpose of calculating in a single step the individual ~~Usage Range~~usage range of all the functionalities, each based on its ~~Anticipated Usage. Usage Range may reflect limits included in the agreements with the relevant Algorithm service providers.~~

6.5. anticipated usage. All NEMOs and all TSOs shall review, when relevant, and at least annually, the ~~Usage Range~~usage range of any functionality impacting the algorithm performance on the basis of the estimated level of scalability indicated in the scalability report described in Article 9.

~~Article 7~~Article 8

Monitoring algorithm performance

7. All NEMOs, in coordination with all TSOs, shall monitor the performance of the ~~price coupling algorithm and the continuous trading matching algorithm~~SDAC and SIDC algorithms and their compliance with the CACM Regulation and this Algorithm methodology. This monitoring shall be based on the principles set out in this Article.

1. ~~The monitoring of SDAC~~ and~~/or SIDC algorithm performance shall be based~~ on the principles and the indicators ~~and the principles~~ described in the Algorithm monitoring methodology ~~included~~ in Annex 3 and Annex 4 ~~to this methodology. The principles~~ and ~~implementing details included in Annex 3 and Annex 4~~ shall be further detailed in the ~~operational~~monitoring procedures ~~attached to the relevant DA and ID Operational Agreements~~.

2. ~~The Algorithm monitoring methodology reported in Annex 3 and Annex 4 shall include at least:~~

    d) ~~the relevant indicators to monitor the SDAC and/or SIDC algorithm's performance, which shall include at least:~~

        (i) ~~with reference only to the price coupling algorithm, indicators on the ability to maximise the economic surplus;~~
        (ii) ~~with reference only to the price coupling algorithm, the indicators to monitor the algorithm repeatability;~~
        (iii) ~~the indicators to monitor the algorithm scalability.~~

    e) ~~The relevant indicators to monitor the usage of the algorithm requirements;~~
    f) ~~the relevant indicators to monitor the output produced by the algorithm;~~
    g) ~~the relevant thresholds (including critical thresholds) to identify performance deteriorations.~~

3.2. The algorithm performance shall be measured against the ~~criteria~~thresholds specified in ~~previous paragraphs and further elaborated in~~ the Article 3(3) and (4) of Annex 3 and Article 3(43) of Annex 4. In case all NEMOs detect an unanticipated degradation of the algorithms' performance below the thresholds referred to in Article 3(4)(c) of Annex 3 and Article 3(4)(a3) of Annex 4 or a non-compliance with an implemented functionality is detected according to Article 3(4)(c) of Annex 3 and Article 3(4)(a3) of Annex 4, all NEMOs ~~and~~in cooperation with all TSOs shall:

    a) promptly inform all regulatory authorities and ACER;
    b) investigate to the fullest extent possible and share its findings with relevant stakeholder fora organised in accordance with Article 11 of the CACM Regulation;
    c) evaluate any potential improvement of the algorithm performance, to be introduced following a request for change or following research and development activity as described in Article 1;
    d) communicate to all regulatory authorities the solution identified, supported by relevant documentation; and
    e) ~~eventually,~~ whenever the conditions described in Article 12(1) apply, initiate the request for change process described in that Article 12~~.~~.

3. ~~All~~By 1 July of every year, all NEMOs in coordination with all TSOs shall jointly develop and publish a ~~yearly~~ report on the outcome of the monitoring of the algorithm performance for the past calendar year and upon request provide ACER with the data (in electronic form, which ~~should~~allows for data processing) used for the production of the report. The report shall contain at least: ~~(i)~~

a) all items listed in ~~paragraph 3 of this Article; (ii) the value of the relevant parameters referred to in Article 2(4) of~~ Annex 3 and ~~Article 2(4) of~~ Annex 4 ~~for the calculation of the indicators and their thresholds, together with the value of the thresholds (iii)~~ of this Algorithm methodology;

b) all cases of performance deterioration or non-compliance with an implemented functionality; ~~(iv)~~

c) for the SDAC: analysis on the usage of each product and its impact on algorithm performance. The analysis on the usage shall include at least the total annual volume and number of orders submitted and cleared, number of bidding zones using each product and the number of NEMOs using each product. The impact of each individual product on algorithm performance shall contain a comparison of algorithm performance with and without the product on a historical sample of days from a at least previous calendar year;

d) a description of the reasons of these occurrences and the used or suggested remedies or future improvements, according to Article 5 of Annex 3 for SDAC and Article 5 of Annex 4 for SIDC; and ~~(v)~~

~~a)~~c) a presentation of the conclusions made in cooperation with the relevant stakeholder fora organised in accordance with Article 11 of the CACM Regulation.

~~Article 8~~Article 9

Scalability report

1. All NEMOs ~~and~~ in cooperation with all TSOs shall ~~assess~~identify the limit and monitor the usage of any functionality by any NEMO or TSO that ~~impacts~~affects the algorithm performance up to an upper bound defined by the ~~Usage Range~~usage range, taking into account the requirement of adequate scalability. The ~~Usage Range~~usage range shall take as basis the ~~Anticipated Usage~~anticipated usage and shall assess the usage beyond it.

2. When the algorithm supports a specific functionality, the ~~Effective Usage~~effective usage and the ~~Anticipated Usage~~anticipated usage of the functionality shall serve as the basis for future assumptions related to the impact on the algorithm performance of this functionality (including the testing of other requests for change).

3. All NEMOs in coordination with all TSOs shall estimate each year for the following years the level of scalability, according to Article 5 of Annex 3 and Article 5 of Annex 4, on the basis of at least the following information related to the received requests for change and research and development activities:

   a) the extension of the SDAC and SIDC to additional bidding zones and/or NEMOs;
   b) the implementation of operation of multiple NEMOs within a bidding zone or a scheduling area;
   c) the extension of the usage of products and requirements to additional bidding zones and/or NEMO trading hubs; and
   d) the anticipated results from the activity of research and development.

4. All NEMOs ~~shall develop,~~ in cooperation with all TSOs shall develop, publish and send to all regulatory authorities a yearly scalability report including at least:

   a) the outcome of the assessment of the estimated level of scalability for the following years and whether this level meets the adequate scalability, including the assessment of the ~~Effective Usage, Anticipated Usage and Usage Range~~effective usage, anticipated usage and usage range; and
   b) the perspective projects scoped for the research and development activity with the related estimated workload.

Article 9Article 10

Roadmap for planning of changes

1. In order to support a timely and consistent development of the SDAC and SIDC algorithms, every year all NEMOs andin cooperation with all TSOs shall agree on a multi-year roadmap incorporating all requests for change issued, related to, among others:

   a) new releases of the SDAC/ and SIDC algorithmalgorithms;
   b) amendments of requirements of the SDAC and SIDC algorithms;
   b)c) outcomes of the research and development activity under following, according to Article 1;
   c) amendments of requirements of the SDAC/SIDC algorithm;
   d) major amendments in the usage of the existing functionalities; and
   e) Futurefuture requirements as defined in the Annex 1 and 2 of the currentthis Algorithm methodology.

   This roadmap shall be updated at the end of each year and shall include requests for change with the expected Gogo-live Datedates for at least within next 24 months.

2. According to the roadmap, all NEMOs andin cooperation with all TSOs shall elaborate a feasible calendar for the implementation in production of each request for change;

3. In order to include a change request for change in the roadmap, the Originatororiginator shall prepare and submit to the relevant Assessment Bodyall NEMOs the related requests for change, which shall include at least information under Article 15(2), letters a), a), c), d), e)c), d), e), i), j), k) and l).

4. Requests for change included in the roadmap process shall be preliminary assessed by all NEMOs in cooperation with all TSOs by the end of the next go-live window, in accordance with Article 17(3).

4.5. The requests for change issued according to this Articlein the roadmap shall have a specific priority according to Article 17(7), under the condition that the complete set of information requested under Article 15(2) is received within maximum timeline requested under Article 16(7).) is received before the time requested under Article 16(5). Once the information is completely received, the request for change shall be assessed according to Article 17.

5. The specific priority mentioned in the previous paragraph shall not be considered by the Assessment Body in case the request for change:

   f) is only submitted to the Assessment Body at the moment that its expected Go-live Date lies within the first 12 months of the roadmap and;
   g) is postponed to a Go-live Date in a Go-live Window different from the one indicated as outcome of the assessment process by explicit request of the Originator.

1. All NEMOs andin cooperation with all TSOs shall perform continuous research and development activities to allow for incremental improvement of the performance of the continuous trading matching algorithm in order to DA and ID algorithms. This shall ensure an adequate scalability, according as referred to the principles laid out in Article 3(75)(e)c) in order to monitor and preserve the fairness of the price formation, according to the principles laid out in Article 3(h) of the CACM Regulation and to develop new functionalities.

2. At the end of every year, all NEMOs andin cooperation with all TSOs shall elaborate a research and development program for the next year. The program shall indicate at least the technical solutions subject to research and development, their qualitative expected impact on the CACM Regulation compliance, the timeline for prototyping and the estimated cost for prototyping costs. All NEMOs andin cooperation with all TSOs shall agree on the program.

3. The yearly research and development program shall have up to two iterationsyearly assessments, depending on the needs of requestthe originator and development activities. At the beginning of each assessment, new requests for change can be added.

4. According to the research and development program, all NEMOs andin cooperation with all TSOs shall elaborate a feasible calendar for the implementation of type IV requests for change, changes as defined in Article 14set out in Article 14(23)(d)d), including an estimation of the identified workload;

5. At the beginning of each iteration, new requests for change can be added and the planning is subject to be changed.

6.5. The algorithm providerAll NEMOs might be required to create algorithm prototypes in order to implement the list of type IV requests for changechanges elaborated by all NEMOs andin cooperation with all TSOs, if the Decision Bodydecision body considers it necessary.

7. Algorithm provider is entitled to suggest to all NEMOs and all TSOs ideas for exploring different configuration or strategies for the type IV request for change.

8.6. Assessment of type IV request for changes shall be carried out according to Article 6 of Annex 3 and Article 6 of Annex 4 that measure the performance of the algorithm, its scalability and its reproducibility.

9.7. If the outcome of the research and development is positive and improves beyond the thresholds defined in Article 6(32) of Annex 3 and Article 6(32) of Annex 4 for accepting the algorithm prototype, then a type I, II or III request for change might be issued for implementing the prototyped changes.

10.8.   Every year, all NEMOs andin cooperation with all TSOs shall provide all regulatory authorities with a report on research and development activities on the algorithm.SDAC and SIDC algorithms. All NEMOs shall consult the draft report with the relevant stakeholder forumsfora organised in accordance with Article 11 of the CACM Regulation, before submitting it to all regulatory authorities. The report shall provide at least:

a) the status of the research and development activity in relation to the earlier agreed all NEMOs' approaches and targets; and

b) the planning of the future research and development activity, including an estimation of the identified workload and the associated budget.

Article 12

Corrective measures

1. In case all NEMOs detect an unanticipated degradation of the algorithms' performance below the thresholds referred to in Article 3(4)(c) of Annex 3 and/or Article 3(43) of Annex 4, due to an overall Effective Usageeffective usage higher than the Usage Range, according to usage range, in accordance with Article 3(32) of Annex 3 and Article 3(32) of Annex 4, all NEMOs andin cooperation with all TSOs may decide to apply specific corrective measures with the aim to maintain an adequate performance of the SDAC and/or SIDC algorithms. Corrective measures shall be applied also in cases when the algorithms' performance is expected to be degraded by a request for change, which cannot be rejected or postponed, in accordance with Article 19(2).

2. Any NEMO(s) and/or TSO(s) may initiate a proposal for the application of a corrective measure. The proposal shall be submitted to all NEMOs by a request for change in accordance with Article 13.

3. All NEMOs andin cooperation with all TSOs shall jointly evaluate and decide on any requests for change proposing the application of corrective measures in an objective and non-discriminatory manner in accordance with the principles defined in Article 17 and Article 19. and based on the evidence of the impact a corrective measure would have on an algorithm's performance.

4. The corrective measures referred to in paragraph 1 may be applied only for a limited time period to solve unanticipated impacts on the algorithm performance. After the deadlines referred to in Article 4(14)(d) and Article 5(14)(c), the application of a corrective measure shall be limited to sixeight months and an extension of it shall not be possible. only in accordance with paragraph 5.

5. If the algorithm performance cannot be restored within this deadline as referred to in paragraph (4), all NEMOs shall address problems related to algorithm performance by developing a proposal for amendment of this Algorithm methodology or the Terms and conditions on SDAC or SIDC products. This proposal for amendment shall be submitted for approval by the expiry of the deadline as referred to in paragraph (4). The application of corrective measures shall, in such case, be extended until the algorithm performance can be restored pursuant to amended Algorithm methodology.

5.6. The corrective measures referred to in paragraph 1 shall be limited to:

a) limitations to combinationsthe selection of products that NEMOs are allowed to useoffer;

b) limitations to the availability of the technical features or parameters of a product or an algorithm requirements; andrequirement;

c) limitations on the overall usage of products or requirements based on Usage Rangeusage range; and

d) changes in parameters related to the operation of the SDAC and/or SIDC algorithmalgorithms, or to the thresholds described in Article 2(41(3) of Annex 3 and Article 2(41(3) of Annex 4 orand in the relevant DA and/or ID change control procedures.

6.7. Corrective measures referred to in paragraph 5(c) may be applied6 should only be applied based on evidence of the proportional impact of different product types on the algorithm performance. Such measures may be applied on requirements pursuant to Article 14(2) only if other corrective measures prove to be infeasible or insufficient for restoring the algorithm performance.

7.8. In case all NEMOs andin cooperation with all TSOs apply a corrective measure to limit the usage of products or requirements whose Effective Usage turns out to beeffective usage is higher than the Usage Rangeusage range pursuant to paragraph 6(c) ., they shall limit the usage of these functionalities according to the sharing rules that shall be defined in the relevant change control procedure.

8.9. Without prejudice to what is set out in previous paragraph 8, sharing rules shall ensure a reasonable limitation on the usage of involved products or requirements to all bidding zones and/or scheduling areas and/or NEMO trading hubs. The adoption of sharing rules shall restore a value of the overall ~~Effective Usage~~effective usage compatible with the ~~Usage Range~~usage range and thus an adequate level of SDAC~~/~~and/or SIDC algorithm performance. In particular, the sharing rules reported in the relevant change control procedures shall introduce a limitation on the overall usage of the involved product or requirement equal to the excess of overall ~~Effective Usage~~effective usage compared to the overall ~~Usage Range~~usage range, increased by a safeguard parameter. Such reduction shall be applied on a proportional basis to the ~~Parties~~NEMOs and/or TSOs using that product or requirement.

9.10. In case of application of corrective measures, all NEMOs ~~and~~in cooperation with all TSOs shall implement measures to ensure their compliance with these agreed limitations. In case any NEMO~~(s)~~ or TSO~~(s)~~ breaches such limitations and fails to take timely measures, each NEMO shall report such events to the competent regulatory authority.

10.11. Any corrective measure shall guarantee non-discriminatory principles among market participants and NEMOs.

11.12. All NEMOs shall announce publicly any introduction or discontinuation of a corrective measure at least seven calendar days before its introduction or discontinuation and maintain an up-to-date publicly accessible list of currently applied corrective measures.

12.13. No later than four weeks after the introduction of a corrective measure, all NEMOs shall publish a report indicating the corrective measure applied and the reasons for applying it. After the discontinuation of a corrective measure, the report shall be updated with additional information on the future measures planned by all NEMOs to address the problems that have caused the application of a corrective measure.

TITLE 4
Algorithm change management

Article 13

Principles and criteria for requests for change management

1. All NEMOs ~~and~~ in cooperation with all TSOs shall ~~jointly~~ manage all requests for change to the ~~price coupling algorithm's or continuous trading matching algorithm's~~SDAC and SIDC algorithms' functionalities and their usage ~~of the SDAC algorithm or SIDC algorithm~~, according to the principles set out in this Article.

2. Any approved change to the SDAC ~~algorithm~~ or SIDC algorithm and any changes to the MCO function systems, including any modifications needed to meet future requirements, shall be implemented ~~according to~~based on a request for change, which shall require an assessment of its feasibility and of its impact on the relevant algorithm's performance.

3. As a ~~basis~~basic principle, a decision on requests ~~of~~for change shall be made ~~jointly~~ by all NEMOs ~~and~~in cooperation with all TSOs. The related provisions concerning the decision~~-~~making shall be provided in the operational contracts among the ~~Parties, with the possibility for a simplified process if deemed relevant and efficient by all~~NEMOs and ~~all~~/or TSOs. All NEMOs in coordination with all TSOs shall ensure that the assessment of all requests for change is ~~conducted by the relevant Assessment Body and the decision taken by the relevant Decision Body,~~done according to the provisions established in the ~~relevant~~DA or ID change control procedures ~~attached to the operational contracts~~ among the ~~Parties~~NEMOs and/or TSOs.

4. ~~The~~ ~~Originators~~originator submitting a request for change shall include a preliminary assessment of feasibility and the expected impact on the relevant algorithm's performance, with the aim of demonstrating that the request for change will induce only a proportionate and controlled impact on the relevant

29

algorithm's performance ~~and~~, will avoid significant harm to any other functionality already included in the relevant algorithm and is in line with the objectives of the CACM Regulation.

5. ~~The Assessment Body~~All NEMOs in cooperation with all TSOs shall conduct assessments of all requests for change in an objective and non-discriminatory manner. In order to ensure the objectivity of the assessment process, all requests for change must be submitted according to a standard format and shall be assessed according to a standard procedure, as described in this methodology and as further detailed in the relevant ~~Change~~change control procedures.

6. When evaluating a request for change, ~~the Assessment Body~~all NEMOs in cooperation with all TSOs shall take into account any impact of a request for change on the performance of the MCO ~~function~~functions, systems and processes. The impact of a request for change on the relevant algorithm's performance, existing functionalities, adjacent systems and processes shall be evaluated based on the ~~Anticipated Usage~~anticipated usage of the new functionality, together with the ~~Effective Usage~~effective usage of existing functionalities, in order to ensure its technical feasibility and consistency with the performance criteria set forth in Annex 3 and Annex 4.

7. ~~The Decision Body~~All NEMOs in cooperation with all TSOs may reject any request for change, which induces an unproportionate and/or uncontrolled impact on the relevant algorithm's performance ~~which is not proportionate and/or controlled~~, or where ~~the Decision Body~~all NEMOs in cooperation with all TSOs reasonably ~~considers~~consider that the request for change could cause significant harm to another functionality of the relevant algorithm~~.~~, nevertheless in accordance with Article 19(1).

8. Requests for change shall be compatible with the algorithm requirements after they have been implemented in accordance with the deadlines specified in Article 4(14) and Article 5(14).

9. All NEMOs, in coordination with all TSOs, shall jointly ensure the transparency of the request for change process by publishing in due time all information relevant to the evaluation of the request for change ~~as more particularly described in~~, in accordance with Article 20.

Article 14

Request for change – purpose and types

1. The purpose of a request for change ~~subject to the provisions of the following Articles may include any~~ is (one or more ~~(in~~or any combination~~) of the following:~~):
   a) ~~Compliance~~compliance with any legal and/or regulatory requirement, including the DA and ID algorithm requirements;
   b) ~~Bug~~bug fixes and incomplete algorithm requirements;
   c) ~~Application~~application of corrective measures pursuant to Article 12;
   d) ~~Implementation~~implementation of modifications that affect the performance of the SDAC algorithm and/or SIDC algorithm, including those modifications arising from the research and development activity as described in Article 1;
   e) ~~Introduction~~introduction/removal/modification of an algorithm requirement requested by NEMOs and/or TSOs, including products and network elements;
   f) ~~Implementation~~implementation of a new release of the SDAC algorithm and/or SIDC algorithm, including those arising from research and development activity carried out pursuant to Article 1;
   g) ~~Modification~~modification of the topology not requiring changes in the algorithm requirements, but limited to the addition or removal of network elements (e.g. the addition or removal of bidding zone borders, scheduling areas, interconnectors between bidding zones or scheduling areas or PTDFs) or NEMO trading hubs;
   h) ~~Change~~change in configuration of the parameters of the SDAC algorithm and/or SIDC algorithm used to set the internal numerical tolerances or heuristics applied; and
   i) ~~Hardware~~hardware update, including but not limited to machine upgrades and firmware updates~~:~~.

2. ~~Such other purposes as the NEMOs and TSOs may determine~~The following requests for change shall be deemed to be a direct legal requirement pursuant to the ~~terms of~~ CACM Regulation:
   a) all requirements included in the DA and ID algorithm requirements;
   b) all requirements for scalability to all bidding zones eligible to participate in SDAC and SIDC;
   ~~j)~~c) ~~the relevant change control procedure.~~ following requirements in accordance with the Terms and conditions on SDAC products: orders covering single MTU and the simple block orders, which are block orders, excluding linked block orders, exclusive block orders and flexible MTU orders; and
   d) the following requirements in accordance with the Terms and conditions on SIDC products: continuous single intraday coupling products and mandatory products for intraday auctions.

~~2.~~3. Requests for change shall be classified, depending on the expected impact of the requested change on the SDAC ~~algorithm~~ and/or SIDC algorithm performance and on the market participants, into one of the following categories:
   a) Non-notifiable change ~~(~~('type I change'): is a change ~~either~~that does not directly ~~affecting~~affect the MCO function assets, ~~and~~does not ~~causing a~~cause any detriment to the performance of the relevant algorithm and is not relevant to market participants. Such changes are not included in the public list of all requests for change ~~described in~~required by Article 13(9) and Article 20.
   b) Fast-track change ~~(~~('type II change'): is a change that needs to be implemented with urgency. This type includes bug fixes and the application of corrective measures.
   c) Standard change ~~(~~('type III change'): is a change that has a potential detrimental impact on the performance of the relevant algorithm and/or market participants. Any request for change not being of type I, type II or type IV shall be considered as type III.
   d) Research and Development change ~~(~~('type IV change'): is a change aimed at activating the research and development analysis on the specific functionality involved. The assessment is carried out in the test framework according to the relevant research and development ~~agreement with the service provider,~~; hence, the management of such request for change is carried out according to a dedicated process as more particularly described in Article 1.

4. In derogation from general provisions under Article 16 and Article 19~~, requests for change of,~~ all NEMOs in cooperation with all TSOs shall assess type I changes and type II ~~(as defined in the previous paragraph) shall be assessed by the Assessment Body~~changes on a continuous basis (i.e. without the periodic assessment in a given ~~Go~~go-live ~~Window~~window). Decisions on ~~requests for change of~~ type I ~~shall be taken directly by the Assessment Body and assessment~~changes shall be completed within ~~1~~one month from the issuing date ~~and notified to the relevant Decision Body. .~~.

~~3.~~5. In derogation from general provisions under Article 15, Article 16, Article 17 and Article 19~~, relevant~~, a bug fix (as a subset of the type II change ~~control procedures)~~ may ~~specify~~be treated in a separate process for assessment and approval ~~of change of type II (as defined~~determined in the ~~previous paragraph) related to bug fix~~relevant change control procedure.

Article 15

~~Submission of requests~~Request for change – submission content

~~10.~~ Any ~~one or more of the NEMOs and/or TSOs are~~originator is entitled to submit to all ~~other~~ NEMOs at any time a request for change with respect to the ~~price coupling algorithm or continuous trading matching algorithm~~SDAC and/or SIDC algorithms and/or to the MCO function systems~~.~~

1. ~~The Originators shall submit every request for change to the Assessment Body according to the principles more particularly described in Article 14 and~~ in a format corresponding to the template annexed to the relevant DA and ~~the~~ ID change control procedures.

2. The request for change shall include~~, where relevant,~~ the following information to be considered as complete:
   a) ~~Aim~~the purpose of the request for change, according to Article 14~~, plus~~(1) and the general description of the request for change.

31

b) Originators;
c) Issuing date;
d) Expected go-live date;
e)b)Indicationindication of the type of request for change according to Article 14(2):(3);
c) Fullyoriginator;
d) issuing date;
e) expected go-live date;
f) fully specified technical requirement;
g) Anticipated Usageanticipated usage of the functionality;
h) Estimatedestimated impact on algorithm performance, following principles set in Article 13(4);
i) Estimatedestimated effect on other processes or systems;
j) Riskrisk assessment:;
k) Biddingbidding zones, scheduling areas or NEMO trading hubs affected by the implementation of the request for change.; and
l) Specifyspecification of the cost categorization in accordance with Article 80(2) of the CACM Regulation.

3. In any case where Where an assessment of a request for change is in contemplation of compliance with a request or instruction from , pursuant to Article 13(4), induced by one or more NRAs and the assessment under paragraph (3) h) aboveregulatory authorities indicates a possiblean adverse impact on algorithmthe algorithm's performance as a result of such change, the Originatorsoriginator shall inform the requesting regulatory authority(ies) and ACER about the impact. Consecutively, the originator shall enclose with the request for change written evidence of the approvaloriginal or amended instructions from the relevant NRAs regarding the preliminary report previously communicated by the Originating Party to the relevant NRAs. Such preliminary report shall include the description of the purpose of the request for change, its high level implementing features and rationale and an initial assessment of the impact of the requested changes on algorithm performance.regulatory authority(ies).

4. The Assessment BodyAll NEMOs in cooperation with all TSOs can decide at any moment to contact the Originatorsoriginator with the purpose of requesting an additional information on the request for change. Originators areThe originator is always entitled to receive all relevant information from the Assessment Body regarding the status of theirits request for change.

5. A request for change may be submitted at any time, provided that the timing requirements according to Article 16 and the criteria described according to Article 13 are fulfilled, also taking into account provisions under Article 10.

6.5. Any NEMO(s) or TSO(s) may join a request for change submitted by the Originatorsoriginator. The Originatorsoriginator and the NEMO(s) or TSO(s) joining the request for change may decide jointly to modify the submitted request for change.

7.6. Requests for change that aim to improve the algorithm performance shall be deemed beneficial to be to the benefit of all NEMOs and/or all TSOs and those NEMOs and/or TSOs shall be entitled to define such requests for change as a common proposal of all NEMOs and/or all TSOs.

8.7. The associated costs of any request for change shall be treated in accordance with Article 80 of the CACM Regulation.

Article 16

Timing for management ofRequest for changes – timing for submission and assessment

1. A request for changeschange may be submitted at any time, provided that the timing requirements according to this Article and the criteria described according to Article 13 are fulfilled, also taking into account provisions under Article 10.

2. The assessment ~~on~~ of requests for change shall be carried out periodically by ~~the Assessment Body~~all NEMOs in ~~different evaluation timeframes, named Go~~cooperation with all TSOs in go-live ~~Windows~~windows, based on the expected ~~Go~~go-live ~~Date~~date of the request for change.

3. The periodic assessment of a request for change with an expected ~~Go~~go-live ~~Date~~date within a specific ~~Go~~go-live ~~Window~~window shall include all requests for change with an expected ~~Go~~go-live ~~Date~~date within the same ~~Go~~go-live ~~Window~~window in such a manner as to allow a cumulative impact assessment tests.

4. Each DA and/or ID change control procedure shall define the number of ~~Go~~go-live ~~Windows~~windows in each calendar year. Additional ~~Go~~go-live ~~Windows~~windows can be introduced by ~~the Assessment Body~~all NEMOs in cooperation with all TSOs as a new ad-hoc ~~Go~~go-live ~~Window~~window or by increasing the frequency of regular ~~Go~~go-live ~~Windows. The Go-live Windows~~windows. There shall be at least two go-live windows in a calendar year.

5. ~~Originators~~The originator shall send each request for change to the ~~Assessment Body~~all NEMOs in cooperation with all TSOs by no later than ~~at~~ the end of the second ~~Go-Live Window~~go-live window prior to the ~~Go~~go-live ~~Window~~window during which the ~~Go~~go-live ~~Date~~date of such request for change is expected to occur.

6. In derogation from the previous paragraph, ~~the Assessment Body~~all NEMOs in cooperation with all TSOs shall carry out the assessment of ~~requests for change~~ type II ~~("fast track"),~~change, due to their exceptional urgency, within the same ~~Go~~go-live ~~Window~~window of their submission ~~if the level of criticality allows resulted in satisfactory timing of implementation~~ or in a separate additional ~~Go~~go-live ~~Window~~window for quicker implementation. In the first case, the requests for change can be collectively tested and shall be prioritized according to a principle of urgency by applying prioritization rules set out in Article 17 ~~(~~(7), to be justified by the ~~Assessment Body~~all NEMOs in cooperation with all TSOs, while in case of a dedicated ~~Go~~go-live ~~Window the Assessment Body~~window all NEMOs in cooperation with all TSOs shall implement an individual assessment of the request for change.

7. The assessment process of requests for change and the ~~relative decision~~decisions shall be concluded within the ~~Go~~go-live ~~Window~~window antecedent the one ~~of~~in which the ~~Go~~go-live ~~Date. In particular, the decision process shall be reserved at least one month out of the overall Go-live Window.~~date will occur. In case of a preliminary consultation under ~~following~~ Article 19(7) or escalation process ~~under following Article 21~~described in the relevant operational contract the time for the decision process ~~shall~~can be extended, even beyond the duration of the ~~Go~~go-live ~~Window, up to~~window.

7. ~~If the originator submits the conclusion of the relative consultation or escalation processes.~~

8. ~~Originators can submit to the Assessment Body their~~ requests for change to all NEMOs before the ~~minimum timing~~time set out in ~~previous~~ paragraph 5~~. In such a case,~~ the requests for change can be considered validly received even if they are not reporting all information under Article 15(2), provided that:

    a) ~~an indication~~the originator provides the list of ~~the possible~~considered options ~~being under discussion~~ and the ~~order of~~magnitude of new products or network elements (or constraints) to be added to the algorithm ~~should be provided;~~; and
    b) the missing information is provided to ~~the Assessment Body~~all NEMOs in cooperation with all TSOs by the ~~end of the minimum timing~~time set out in ~~previous~~ paragraph 5~~;~~.

9. ~~Requests for change included in the roadmap process described under previous Article 10:~~

    ~~c) shall be managed according to Article 17;~~
    ~~d) shall be "preliminary" assessed by the Assessment Body by the end of the next Go-live Window following its presentation in Article 17 (3).~~
    ~~e) shall be finally assessed by the Assessment Body within the Go-live Window antecedent the one of the Go-live Date according to previous paragraph 6;~~
    ~~f) shall receive specific priority according to Article 17(7), provided that final information referred to under paragraph 6 is received by the beginning of the second Go-Live Window antecedent the one of the expected Go-live Date.~~

33

Article 17   The Assessment Body

Request for change - assessment

1. All NEMOs in cooperation with all TSOs shall evaluate any request for change in an objective and non-discriminatory manner and shall issue an assessment report for each submitted request for change.

2. In case of a request for change ~~referred~~related to a development of the SDAC and/or SIDC algorithm, ~~the Algorithm service provider may be involved in the technical assessment set out in following paragraph 3. It~~it is ~~further allowed~~possible to reject the requests for change in case of unfeasibility or to request amendments in order to include additional ~~requirements~~amendments for solving interferences with other existing legal and/or regulatory requirements.

3. ~~The Assessment Body~~All NEMOs in cooperation with all TSOs shall, directly or in coordination with other bodies under the relevant operational ~~agreements and/or with the Algorithm service provider or third party suppliers~~contracts, assess for each request for change:

    a) ~~Correct~~correct indication of the purpose and type of the request for change, according ~~to categorization set out in~~ Article 14(~~2~~1) and (2);
    b) ~~Originator~~the originator of the request for change and impacted parties;
    c) ~~Potential~~potential prioritization criteria to be applied according to ~~Article 17;~~this Article below;
    d) ~~Impact~~impact assessment on the SDAC and/or SIDC algorithm performance as set out~~, respectively, in following Article 18 and Article 19~~ in Article 18.
    e) ~~Whether~~whether or not any development is required in the algorithm for the request for change, in accordance with ~~following~~ paragraph ~~13~~13;
    f) ~~Assignment~~assignment of the ~~assessment~~go-live window ~~and the Go-live Window~~ according to timings ~~described~~set out in ~~the previous~~ Article 16; and of the timeline to be followed during the assessment; and
    ~~f)~~g) whether it fulfils the objectives of Article 3 of the CACM Regulation.

4. In case the ~~verification~~assessment in paragraph ~~3~~3(~~a~~)a) proves that categorization of the request for change is not correct, the ~~Assessment Body~~all NEMOs in cooperation with all TSOs shall:

    a) assign the correct categorization of the request for change according to Article 14(2);
    b) apply the relevant assessment process in terms of timing and actions according to the relevant DA or ID change control procedure; and
    c) timely inform the ~~Originator(s)~~originator of the modification~~ occurred~~.

5. The impact assessment of the requests for change with expected ~~Go~~go-live ~~Dates~~dates within the same ~~Go~~go-live ~~Window~~window shall first be considered in combination.

6. In case the outcome of the combined impact assessment breaches the acceptance criteria described in Article 18 ~~for,~~ the ~~SDAC algorithm and in Article 19 for the SIDC algorithm, the Assessment Body~~assessment body shall carry out a second assessment based on individual impact assessments enclosed to the original request for change~~ according to Article 15(3).~~.

7. In case multiple requests for change have been received with the expected ~~Go~~go-live ~~Dates~~dates within the same ~~Go~~go-live ~~Window~~window, the following prioritization shall apply:

    i. ~~requests for change type II ("fast-track") according to previous Article 14(2)(b);~~
    i. type II change;
    ii. requests for change in accordance with Article 14(2)
    ~~ii.~~iii. requests for change from the roadmap, received ~~according to~~in accordance with Article 10; and

    iii.   other requests for change~~;~~.

8. In case several requests for change have the same priority according to the previous paragraph ~~(7),~~, the following sub-prioritization shall apply:

    i.   requests for change extending the SDAC and SIDC to all bidding zones, improving the SDAC and SIDC between existing bidding zones also through ~~a~~the implementation of flow-based capacity calculation, the modification of interconnections, amending TSOs configurations~~,~~ and extending the SDAC and SIDC to all NEMOs eligible to participate in the SDAC and SIDC;

    ii.   requests for change modifying the parameters for the usage of products or requirements used in the algorithm, including among others the modification of the ~~Usage Range~~usage range, the modification of the topology of bidding zones, scheduling areas or NEMO trading hubs different from those reported in point iii, the modification of the number of PTDFs;

    iii.   requests for change extending the set of products or requirements used in one or more bidding zones, scheduling areas or NEMO trading hubs;

    iv.   requests for change modifying the requirements included in this Algorithm methodology and/or the ~~list of~~ products included in the Terms and conditions on SDAC and/or SIDC products ~~methodologies.~~; and

    v.   requests for change from previous ~~G~~go-live ~~Windows~~windows postponed by the ~~Originating Party~~originator not received according to Article 10.

9. In case several requests for change have the same priority according to previous paragraph (8), the following sub-prioritization shall apply:

    a) requests for change from previous ~~G~~go-live ~~Windows~~windows, which were postponed ~~by the Decision Body~~;

    b) requests for change assessed in a preliminary impact assessment with a positive outcome according to ~~previous~~ Article 16~~(8)(b);~~7); and

    c) other requests for change.

10. The costs for assessment of requests for change shall be borne in shares~~,~~ according to CACM Regulation's sharing keys.

11. In case the ~~requests~~request for change involves simultaneously more than one of the principles referred to in ~~paragraph~~paragraphs 7, 8 or 9 above, the requests for change shall be assessed on a case-by-case basis depending on the specific nature of the request. Once the assessment process is concluded~~,~~ all NEMOs in ~~coordination~~cooperation with all TSOs shall take the final decision on the request for change according to the outcome of consultation and, if needed, to a new technical assessment.

12. The outcomes of the assessment ~~on~~of requests for change shall be included in an assessment report, containing all the relevant information on the process followed, including at least the following information:

    a) ~~Description~~description of the requests for change, including all information from ~~previous~~ Article 15(2);

    b) ~~Proposal~~proposal of prioritization of the requests for change with arguments when requests for change ~~combination breaches~~submitted for combined impact assessment breach the performance criteria referred to in paragraph~~ ~~6; and

    c) ~~Results~~results of the individual impact assessment ~~with reduced group of requests for change if~~, in case of the situation of paragraph b) occurs.

13. In case the request for change requires developments to be done ~~in the Algorithm,~~under previous paragraph 3(e), ~~the Assessment Body, after alignment with the relevant Algorithm service provider,~~all NEMOs in cooperation with all TSOs shall in derogation to Article 16:

    a) ~~Evaluate~~evaluate the ~~G~~go-live ~~Date~~date of the request for change, taking into account the time necessary for the estimated development required for the request for change~~.~~;

    b) ~~Send the request for change (including timing and costs) to the Decision Body for approval to initiate the development. The decision body may decide to~~amend, postpone or reject the ~~development~~start of the development upon consideration of ~~resources~~resource constraints~~.~~;

c) Coordinatecoordinate the follow-up of the developments required for the request for change with all NEMOs and the relevant Algorithm service provider to ensure a correct and timely implementation by the foreseen Gogo-live Window.window; and

d) Perform theperform an impact assessment of the request for change within the respective Gogo-live Windowwindow (combined with the impact assessments of other requests for change for such Gogo-live Windowwindow) once the developments have been completed, after which the request for change will follow the normal process of this Algorithm methodology.

14. For the decision to allow the go-live of requestrequests for changeschange, all assessments for requestrequests for change, and the version of the respective algorithm that shall be used in the assessment process shall be the same thanlike the one that is expected to be used in the implementation in production of the request for change.

Article 17Article 18

Impact

Request for change – impact assessment methodology for SDAC algorithm

1. The impact of a request for change on the performance of the price coupling algorithm of a request for change,SDAC and IDA algorithms, (respectively, continuous trading matching algorithm) in isolation or in combination, shall be assessed by monitoring the scalability indicator under Article 9 of Annex 3 (respectively, Article 7 of Annex 4) before and after the change.

2. To be accepted, a request for change shall fulfil a set of criteriathe thresholds defined in Article 4(32) of Annex 3. (respectively, Article 4(2) of Annex 4).

3. The impact on algorithmicthe algorithms' performance shall comprise at least two scenarios: athe historical-like scenario described under, according to Article 4(2)(a) of Annex 3, (respectively, Article 4(2)(a) of Annex 4), and athe near future scenario, described under Article 4(2)(b) of Annex 3. 3 (respectively, Article 4(2)(b) of Annex 4).

4. To accurately reflect the operational conditions of the SDAC, the tests shall be performed using the algorithm version that will be in production at the date the request for change is expected to go live. Shall the Go-live Date of the change be delayed; a new performance assessment may be required if the new expected Go-live Date occurs in a different Go-live Window.

Article 18

Impact assessment methodology for SIDC algorithm

5. The impact on the performance of the continuous trading matching algorithm of a request for change, in isolation or in combination, shall be assessed by monitoring the scalability indicator under Article 8 of Annex 4 before and after the change.

6. To be accepted, a request for change shall fulfil a set of criteria defined in Article 4(3) of Annex 4.

7. The impact on algorithmic performance shall comprise at least two scenarios: a historical scenario as described under Article 4(2)(a) of Annex 4 and a future scenario as described under Article 4(2)(b) of Annex 4.

8. The selection by the decisional body of the applicable scenarios will be made on a case by case basis dependent on the nature of the changes to be evaluated.

9.4. To accurately reflect the operational conditions of the SIDC, theTo reflect accurately the operational conditions of the algorithms, tests shall be performed using the algorithm version that will be in production at the date the request for change is expected to go live. Shall the Gogo-live Datedate of the change be delayed:, a new performance assessment may be required if the new expected Gogo-live Datedate occurs in a different Gogo-live Windowwindow.

Article 19

Decision-making and implementation of requests for change

1. The decisions by all NEMOs andin cooperation with all TSOs shall be justified byin the assessment report referred to in Article 17(12) and the objectives set out in Articles 3 and 37 of the CACM Regulation.

2. The relevant Decision BodyAll NEMOs in cooperation with all TSOs shall decide on the request for change based on the principles from Article 13(3).

3.2. The Decision Bodyand shall indicateissue for each assessed request for change one of the following possible decisions:

   a) Accepted: the request for change is ready to be used in production and the request for change shall be implemented within six months;

   b) Rejected: the implementation of the request for change is not compatible with the security of operation and, adequate performance criteria or resources, resource constraints or does not fulfil the objectives of the CACM Regulation;

   c) Postponed: the implementation of the request for change could be compatible to security of operation and adequate performance criteria, but it is necessary to postpone the Gogo-live Datedate or due to resources constraints; or

   d) Amended: the request for change as submitted is not fully compatible with an implementation compliant with security of operation and/or adequate performance criteria or demands disproportionate resources compared to its benefits, but could be so compatiblecompliant and therefore is accepted provided thatif appropriate amendments of it are carried out or due to resources constraints.

4. In case of a request for change of type I as referred to in Article 14(2)(c) above, formal approval and implementation shall be taken within 30 days.

   In case of a request for change ofRequests for change in accordance with Article 14(2) shall not be rejected or postponed beyond the legally binding deadlines. If necessary, to allow the acceptance of such request for change, the NEMOs in cooperation with TSOs shall apply corrective measures in accordance with Article 12.

3. All NEMOs in cooperation with all TSOs shall approve and implement type I changes within 30 days.

5.4. In case of a type III as referred to in Article 14(2)(c) abovechange, and provided that the combined impact assessment underin accordance with Article 17(3) of all the requests for change within a particular Go-Live Windowgo-live window has a positive outcome, all requests for change in such Go-Live Windowgo-live window shall be approved. The Decision BodyAll NEMOs in cooperation with all TSOs might, nevertheless, decide to carry out a case-by case qualitative assessment on individual requests for change considered in the combined impact assessment in case they collectively induce an excessive variation on the algorithm performance, even though thisit is below the combined acceptance criteria.

6.5. In case of a requests for change oftype III as referred to in Article 14(2)(c) abovechange, if the combined impact assessment of all the requests for change underin accordance with Article 17(35) has a negative outcome, depending on the assessment of algorithm performance with respect to the individual request for change, the relevant Partiesall NEMOs in cooperation with all TSOs can:

   i. request the issuing Partyoriginator to amend the request for change;

ii.   postpone its anticipated go--live under the conditions set out in paragraph 2(c) above and 2(d) above;

iii.   propose a modificationan update of the criteria to assess the market performance under Article 18 and Article 19, in case they are deemed no longer suited to properly assess algorithm performance. In such a case all NEMOs andin cooperation with all TSOs shall issue a revised proposal in accordance with Article 9(13) of the CACM Regulation within 30 days; or

iv.   trigger an escalation according to the arbitral tribunal in accordance with Article 21.relevant operational contract.

7.6. In case the actions taken by the Partiesall NEMOs in cooperation with all TSOs pursuant to Article 20(6paragraph (5) are not sufficient to change the combined impact assessment of all the requests for change under Article 17(3), the Decision Body5), all NEMOs in cooperation with all TSOs shall approve only those requests for change with individual positive impact assessment outcomes, in order of priority according to previous Article 17(7). If such an approval cannot not be achieved, an escalation according to the relevant operational contract shall be triggered.

8.7. The Decision BodyAll NEMOs in cooperation with all TSOs may decide to consult a "preliminary decision" on a Request for change type III change prior to taking a final decision. Such consultation shall be carried out only in exceptional cases, such as—, but not limited to—, significant changes on the market design, or if the request for change triggers an amendment of a methodology under Article 95(2) of CACM Regulation (EU) 2019/942. Once the consultation process is concluded, the Decision Bodyall NEMOs in cooperation with all TSOs shall consider the outcome of such process in order to express the final decision on the requests for change.

9. The decision on a request for change shall follow timing set out in Article 16 (6). Such timing shall apply also to the preliminary decision indicated in previous paragraph 7.

10.8. In case the Decision Body activatesall NEMOs in cooperation with all TSOs activate the consultation process according to previous paragraph 7, timing on final decision indicated in paragraph 9Article 16 shall be considered only once the consultation is concluded.

11.9. The voting rulerules that appliesapply for decisions on requests for change will beis defined in the relevant DA and ID operational agreementscontracts.

12.10. Any decision will be timely communicated by the Assessment Bodyall NEMOs in cooperation with all TSOs to the Originating Partyoriginator.

13.11. After the decision on the request for change, all NEMOs jointly in coordination with all TSOs shall issue a public evaluation report indicating the decision, the reason for the decision, the principles behind the decision and the assessment report as referred to in Article 17(12), in order to ensure transparency on the change request process.

14. The Decision Making Body shall base the decisions under previous paragraph 3 also on the relevant information about time, costs for implementations and budget constraints

Article 20

Escalation process

15. Decision Body may decide to refer their decision to an independent arbitral tribunal for a binding decision.

16. Any NEMO(s) and/or TSO(s) is entitled to challenge a decision by Decision Body by requesting a referral to an independent arbitral tribunal for a binding decision following the relevant procedures established in the contractual framework.

17. The NEMO(s) and/or TSO(s) requesting a referral to an independent arbitral tribunal shall do so by written request to the highest Decision Body where all TSOs and all NEMOs are represented.

18. The Decision Body and the requestor of the referral shall first meet in good faith to try to resolve the dispute within 14 days. The referralIn case of failure of the decision to the independent arbitral tribunal will be triggered only as a last resort measure in case internal ways to avoid the referral do not succeed.

19. If the dispute is not solved, the Decision Body and the requestor of the referral shall submit all the relevant materials for the dispute to the independent arbitral tribunal established in accordance with Article 22 without undue delay.

20. The relevant DA and/or ID change control procedure shall stablish the appropriate penalties in order to prevent an abusive usage of escalation process. The cost sharing of the arbitral tribunal cost will implicitly prevent the unjustified use of the escalation process.

21. In case a request of change of regulatory nature is not compatible with secure operation and adequate performance criteria and thus should be rejected by the Decision Body, the matter shall be escalated to ACER/all NRAs

Article 21

Establishment of arbitral tribunal

22. The independent arbitral tribunal shall take a decision on a request for change only if the decision is delegated by Decision Body.

23. The independent arbitral tribunal shall consist of 5 members whereof one is appointed chair and other is appointed as vice-chair in order to act as a replacement of the chair when necessary and additional 3 alternates already designated in a reserve list with the purpose of replacing existing 5 members when required. The members shall be considered experts by all NEMOs and all TSOs based on sufficient evidence of academic and professional competence in at least one of the following areas:

    e) Optimization Algorithms
    f) European electricity market regulation and operation
    g) Law and Economics

24. Regarding previous paragraph 2, in the designation of chair members it shall be assured, at any time, that at least 3 members of the arbitral tribunal are experts in algorithm optimization.

25. The members in the independent arbitral tribunal shall be appointed jointly by all NEMOs and all TSOs following a public call for candidates. Each member is appointed for an initial period of 3 years, renewable. However, all NEMOs and all TSOs may decide to terminate at any moment the appointment of the arbitral tribunal or any of its members. Each member shall be regarded as independent from the parties by all NEMOs and all TSOs. As a general rule, the members of the arbitral tribunal shall not belong to the staff of any NEMO or TSO and they shall not have worked either as staff or hired consultant in any NEMO or TSO at least in the previous 2 years, and shall be prevented from working with any NEMO or TSO either as staff or hired consultant in the next 2 years. Nevertheless, if a particular decision may create a conflict of interest for a given member, the chair of the arbitral tribunal will decide whether to replace or not the relevant member by an alternate in this particular case. The consideration of a potential conflict of interest concerning a particular member may be declared by the concerned member itself or may be requested by any NEMO or TSO.

26. According to decisions from All NEMOS and All TSOs, the cost of the arbitral tribunal may include.

    h) a component to guarantee the availability of the members
    i) a component related to the individual decisions to be taken

27. In order to prevent a potential abuse of the right to appeal decisions made, the costs under previous paragraph b) may include a share to be paid by the requestor of the referral that will be established in the relevant procedure. All other costs under previous paragraphs a) and b) shall be considered as a common

cost. In the case of referral of a decision by all NEMOs and all TSOs, the corresponding cost of the arbitral tribunal shall be considered as a joint common cost.

28. The arbitral tribunal may be used also for only TSOs or only NEMOs dispute. In such a case, only all TSOs or only all NEMOs respectively shall pay the cost of the decision requested to the arbitral tribunal.

29. Confidentiality clause: the members of the Arbitral tribunal shall not disclose any information concerning the cases that are addressed to them.

Article 22

Arbitral tribunal procedure for decision

30. All procedures set by the arbitral tribunal shall be in English.

31. Any NEMO and TSO may submit information to the arbitral tribunal and will provides the experts with such assistance and documents as the arbitral tribunal reasonably requires for the purpose of reaching a decision.

32. Each Party shall with reasonable promptness supply each other with all information and give each other access to all documentation as the other Party reasonably requires to make a submission.

33. The arbitral tribunal shall prepare a written decision within the deadline required, under simple majority, by all NEMOs and all TSOs. This deadline shall not be shorter than fifteen working days after all the relevant documentation has been received by the arbitral tribunal.

34. The arbitral tribunal will make a decision by consensus or by simple majority of the members represented.

35. To the extent not provided formaking process in this article, the arbitral tribunal may determine such other procedures to assist with the conduct of the deliberation as is considered just or appropriate. Any instruction of professional advisers to assist him in reaching the determination shall require prior approval of all NEMOs and all TSOs.

36. The decision of the arbitral tribunal will be final and binding upon all NEMOs and all TSOs.

12. All NEMOs in coordination with all TSOs shall implement the decisions escalation process shall be triggered according to previous paragraph 7.the relevant provisions set forth in the operational contracts.

TITLE 5
Transparency and reporting

~~Article 23~~Article 20

Publications and reporting

1. All NEMOs shall publish and maintain a set of documents to be formally updated and consulted with the relevant stakeholder fora, organised in accordance with Article 11 of the CACM Regulation.

2. All NEMOs shall publish, continuously update and consult in the relevant stakeholder fora the following draft documents:

   a) the public description of the ~~price coupling~~SDAC algorithm as referred to under Article 4(~~17~~18);
   b) the public description of the continuous trading matching algorithm as referred to under Article 5(18~~).~~); and
   c) the public description of the IDA algorithm as referred to under Article 6(16).

3. All NEMOs shall develop and publish with the relevant periodicity the following reports:

   a) the report on incidents in the operation of the ~~price coupling algorithm and the continuous trading matching algorithm~~SDAC and SIDC algorithms and on the application of back-up and fallback procedures in accordance with the Back-up methodology and ~~fallback~~Fallback methodology and in accordance with Article 4(~~18~~17) and Article 5(17);
   b) the report on research and development activities in accordance with Article 1(8);
   c) the reports on the outcome of the monitoring of the algorithm performance in accordance with Article 8~~.~~;
   d) the report on scalability in accordance with Article 9(4);
   e) the report on the application of corrective measures in accordance with Article 12(13); and
   f) the reports on the decisions on requests for change in accordance with Article 19(11).

4. All NEMOs shall publish and maintain a continuously updated record of the currently and historically applied corrective measures.

5. All NEMOs in coordination with all TSOs shall publish at least one month in advance the date of the yearly workshop with stakeholders and institutions on the requests for change Roadmap under Article 10.

6. All NEMOs shall publish, pursuant to Article 62(2) of the CACM Regulation:

   a) the aggregated volumes of all trades made per contract per bidding zone – two values are requested, sell volumes and buy volumes;
   b) the volume-weighted average intraday prices per contract and bidding zone[1]; and
   c) the volume-weighted average intraday prices per contract and bidding zone that took place during the last trading hour[2].

   The information shall be published no later than 12:00 on the day following the trading day.

7. By 1 September 2020, all NEMOs in coordination with TSOs shall publish and then continuously update the relevant parts of the following documents:

   a) operational contracts;
   b) operational procedures;
   c) change control procedures;

---

[1] For the calculation of this indicator, all trades where either the seller, the buyer or both are located in the relevant bidding zone are to be considered and weighed equally.

[2] See footnote 1

d) monitoring procedures;
e) fallback procedures; and
f) back-up procedures.

Whenever this Algorithm methodology refers to the 'relevant' procedures or contracts, it means the respective documents setting up any relationship among only NEMOs or among only TSOs or between NEMOs and TSOs, and shall cover either the DA or the ID timeframe.

~~Article 24~~Article 21

Access to data by regulatory authorities

1. The regulatory authorities or relevant authorities primarily responsible for monitoring NEMOs in accordance with Article 82(1) of the CACM Regulation shall have the power to request from the respective NEMOs all information and data used in the monitoring of the algorithm performance, historical input data used by the algorithms in calculating SDAC and SIDC results. They shall provide access to this information and data to other regulatory authorities and ~~the Agency~~ACER.

2. NEMOs shall also make the source code of the algorithms auditable by third parties mandated by the regulatory authorities and/or ~~the Agency~~ACER, subject to non-disclosure agreement and in coherence with contractual agreements with the relevant third parties.

3. The regulatory authorities ~~or relevant authorities primarily~~ responsible for monitoring NEMOs in accordance with Article 82(1) of the CACM Regulation ~~shall have the power to~~can request from the respective NEMOs the simulation of the algorithm results, respecting adequate repeatability pursuant to Article 3(5)(b) and Article 3(6)(b)) of this methodology. They shall provide access to this possibility to other regulatory authorities and ~~the Agency~~ACER.

TITLE 6
Final provisions

~~Article 25~~Article 22

Language

The reference language for this Algorithm methodology shall be English. For the avoidance of doubt, where NEMOs need to translate this Algorithm methodology into the national language(s) of a relevant national regulatory authority, in the event of inconsistencies between the English version published by the NEMOs in accordance with Article 9(14) of the CACM Regulation and any version in another language, the relevant NEMOs shall be obliged to dispel any inconsistencies by providing a revised translation of this Algorithm methodology to the relevant national regulatory authorities.