

**DECISION OF THE AGENCY FOR THE COOPERATION OF ENERGY
REGULATORS No 08/2018**

of 26 July 2018

**ON THE NOMINATED ELECTRICITY MARKET OPERATORS' PROPOSAL
FOR THE PRICE COUPLING ALGORITHM AND FOR THE CONTINUOUS
TRADING MATCHING ALGORITHM, ALSO INCORPORATING TSO AND
NEMO PROPOSALS FOR A COMMON SET OF REQUIREMENTS**

THE AGENCY FOR THE COOPERATION OF ENERGY REGULATORS,

HAVING REGARD to the Treaty on the Functioning of the European Union,

HAVING REGARD to Regulation (EC) No 713/2009 of the European Parliament and of the Council of 13 July 2009 establishing an Agency for the Cooperation of Energy Regulators¹, and, in particular, Article 8(1) thereof,

HAVING REGARD to Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management², and, in particular, Article 9(12) thereof,

HAVING REGARD to the outcome of the consultation with the concerned regulatory authorities, transmission system operators and nominated electricity market operators,

HAVING REGARD to the favourable opinion of the Board of Regulators of 18 July 2018, delivered pursuant to Article 15(1) of Regulation (EC) No 713/2009,

WHEREAS:

1 INTRODUCTION

- (1) Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management (the 'CACM Regulation') laid down a range of requirements for cross-zonal capacity allocation and congestion management in the day-ahead and intraday markets in electricity. These requirements also include specific provisions for the development and maintenance of a price coupling algorithm and of a continuous trading matching algorithm for the single day-ahead coupling ('SDAC') and for the single intraday coupling ('SIDC'), in accordance with Chapters 4 to 6 of the CACM Regulation.

¹ OJ L 211, 14.8.2009, p. 1.

² OJ L 197, 25.7.2015, p. 24.

- (2) Pursuant to Articles 9(1), 9(6)(g) and 37(5) of the CACM Regulation, all nominated electricity market operators ('NEMOs') are required to develop, in cooperation with all transmission system operators ('TSOs'), a proposal for the price coupling algorithm and for the continuous trading matching algorithm and to submit it to all regulatory authorities for approval. Then, according to Article 9(10) of the CACM Regulation, the regulatory authorities receiving the proposal for the algorithms should reach an agreement and take a decision on that proposal, in principle, within six months after the receipt of the proposal by the last regulatory authority. According to Article 9(11) of the CACM Regulation, if the regulatory authorities fail to reach an agreement within the six-month period, or upon their joint request, the Agency is called upon to adopt a decision concerning the all-NEMOs' proposal. According to Article 9(12) of the CACM Regulation, if the regulatory authorities request an amendment to approve the proposal for the algorithms, all NEMOs shall submit an amended proposal within two months following the request from the regulatory authorities. All regulatory authorities shall decide on the amended proposal within two months following its submission. Where all regulatory authorities are not able to reach an agreement or upon their joint request, the Agency becomes responsible for adopting a decision concerning the all-NEMOs' proposal.
- (3) The present Decision of the Agency follows from the regulatory authorities' request that the Agency adopts a decision on the amended proposal for the algorithms which the NEMOs submitted to the regulatory authorities for approval. Annexes I, II and III to this Decision set out the Algorithm methodology with its two annexes on the common set of requirements, developed pursuant to Article 37 of the CACM Regulation and as decided by the Agency.

2 PROCEDURE

2.1 Proceedings before regulatory authorities

- (4) On 3 November 2016, the NEMO committee, representing all NEMOs being responsible under Article 54(1) of the CACM Regulation, published the '*All NEMOs' draft proposal for the price coupling algorithm and for the continuous trading matching algorithm, also incorporating TSO and NEMO proposals for a common set of requirements*' for public consultation. The consultation lasted from 3 November until 2 December 2016. During the public consultation period, all NEMOs organised, on 14 November 2016, a stakeholder workshop to discuss different all-NEMOs' proposals, among them the draft proposal for price coupling algorithm and continuous trading matching algorithm, giving the opportunity to interested stakeholders and various organisations impacted by the price coupling and the continuous trading matching algorithms to raise questions and ask for clarifications from the NEMOs.
- (5) On 17 February 2017, all NEMOs submitted to the regulatory authorities an '*All NEMOs' proposal for the price coupling algorithm and for the continuous trading matching algorithm, also incorporating TSO and NEMO proposals for a common set of requirements*' (the 'Proposal'), jointly with a '*Proposal for a common set of requirements for the DA price*

coupling algorithm’ and a *‘Proposal for a common set of requirements for the continuous trading matching algorithm’*, dated 14 February 2017³.

- (6) On 24 July 2017, all regulatory authorities issued a *‘Request for amendment by all regulatory authorities agreed at the energy regulators’ forum on the all NEMOs’ proposal for the price coupling algorithm and for the continuous trading matching algorithm, also incorporating TSO and NEMO proposals for a common set of requirements’*, by which all regulatory authorities requested an amendment to the proposal pursuant to Article 9(11) of the CACM Regulation.
- (7) On 13 November 2017, all NEMOs submitted to the regulatory authorities an amended *‘All NEMOs’ proposal for the price coupling algorithm and for the continuous trading matching algorithm, also incorporating TSOs’ and NEMOs’ proposals for 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’*, dated 13 November 2017 (the *‘Amended Proposal’*)⁴. The Amended Proposal was received by the last regulatory authority on 1 December 2017.

2.2 Proceedings before the Agency

- (8) In a letter dated 30 January 2018 and received by the Agency on the same day, the Chair of the Energy Regulators’ Forum⁵, on behalf of all regulatory authorities, informed the Agency that all regulatory authorities agreed to request the Agency to adopt a decision on the Amended Proposal, pursuant to Article 9(12) of the CACM Regulation.
- (9) In a document titled *‘Non-paper of all regulatory authorities agreed at the energy regulators’ forum on the amended all NEMOs’ proposal for the price coupling algorithm and for the continuous trading matching algorithm, also incorporating TSO and NEMO proposals for a common set of requirements, in accordance with Article 37(5) of the Commission Regulation 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management’* (*‘Non-paper’*) and dated 15 February 2018, all regulatory authorities explained that, although the Amended Proposal presented significant improvements with respect to the Proposal, all NEMOs did not fully take into account the regulatory authorities’ request for amendment. The document listed sixteen elements from the regulatory authorities’ request for amendment, which all NEMOs did not take fully into account. Based on this analysis, all regulatory authorities suggested that the Agency takes into account this analysis. Specifically, all regulatory authorities suggested that the Agency introduces specific amendments to the Amended Proposal, before adopting it.

³ <http://www.europex.org/all-nemos/all-nemos/>

⁴ <https://www.europex.org/all-nemos/nemos-submit-revised-proposals-on-methodologies-for-day-ahead-and-intraday-algorithms/>

⁵ The regulatory authorities’ platform to consult and cooperate for reaching a unanimous agreement on NEMO’s and TSOs’ proposals.

- (10) The Non-paper suggested that the Agency review:
- (i) the completeness and relevance of all definitions;
 - (ii) the structure of the document, its editing, the references, the consistency with other terms and conditions or methodologies, the clarity of terms and expressions etc.;
 - (iii) the non-discriminatory rules for all decision-making processes (e.g. application of correction measures);
 - (iv) the scope of the proposal and to ensure that scalability covers the SIDC as well;
 - (v) the clarity and appropriateness of the algorithm's stopping criteria;
 - (vi) the minimum set of metrics and definitions of indicators and thresholds for monitoring the algorithm performance;
 - (vii) the alignment of the methodology for calculating scheduled exchanges with the algorithm methodology;
 - (viii) the elimination of the liabilities of the TSOs or other third parties and any cost related aspects, as these are out of the scope of the algorithm methodology;
 - (ix) the timing, updating and consulting of the external documents linked to the algorithm methodology (e.g. the algorithm monitoring procedure, operational procedure and timings, etc.);
 - (x) the existence of an interim solution, which was viewed by some regulatory authorities as non-compliant with the CACM Regulation; and
 - (xi) the overall governance of the algorithms.
- (11) On 26 April 2018, the Agency launched a public consultation on the Amended Proposal, inviting all market participants to submit their comments by 18 May 2018. The consultation document asked stakeholders to provide views on three topics which were deemed the most relevant for them: (i) the application of corrective measures to maintain the algorithm performance; (ii) the metrics and thresholds to assess and monitor the algorithm performance with regard to its optimality, repeatability and scalability; and (iii) the approach towards the enduring algorithm solution. The summary and the evaluation of the responses received are presented in Annex IV to this Decision.
- (12) Moreover, the Agency closely cooperated with all NEMOs, all regulatory authorities and all TSOs and further consulted on the amendments to the proposed algorithm methodology during numerous teleconferences and meetings and through exchanges of amendments. In particular, the following procedural steps were taken (all in 2018):
- (i) 13 April: teleconference with all regulatory authorities, which subsequently provided their suggestions through written input by 16 April;
 - (ii) 24 May: teleconference with all NEMOs;
 - (iii) 4 June: teleconference with all NEMOs;
 - (iv) 5 June: the Agency circulated the first draft of the proposed amendments to the proposed algorithm methodology to all regulatory authorities, all NEMOs and all TSOs;
 - (v) 8 June: teleconference with regulatory authorities;

- (vi) 10 June: the Agency circulated the second draft of the proposed amendments to the proposed algorithm methodology to all regulatory authorities, all NEMOs and all TSOs;
- (vii) 13 June: teleconference with all TSOs;
- (viii) 18 June: teleconference with all NEMOs;
- (ix) 20 June: discussion with regulatory authorities during the CACM Task Force meeting⁶;
- (x) 21 June: discussion with NEMOs and regulatory authorities during the NEMO/NRA Coordination Group⁷ teleconference;
- (xi) 25 June: teleconference with NEMOs and TSOs;
- (xii) 28 June: discussion with all regulatory authorities at the ACER Electricity Working Group⁸ meeting; and
- (xiii) 28 June: teleconference with all NEMOs.

3 THE AGENCY'S COMPETENCE TO DECIDE ON THE AMENDED PROPOSAL

- (13) Pursuant to Article 9(12) of the CACM Regulation, where the regulatory authorities have requested the relevant applicants (i.e. all NEMOs or all TSOs) to amend the proposal and have not been able to reach an agreement on the amended terms and conditions or methodologies within two months after their resubmission, or upon the regulatory authorities' joint request, the Agency shall adopt a decision concerning the amended terms and conditions or methodologies within six months, in accordance with Article 8(1) of Regulation (EC) No 713/2009.
- (14) According to the letter of the Chair of the Energy Regulators' Forum of 30 January 2018, all regulatory authorities agreed to request the Agency to adopt a decision on the Amended Proposal pursuant to Article 9(12) of the CACM Regulation.
- (15) Therefore, under the provisions of Article 9(12) of the CACM Regulation, the Agency has become responsible to adopt a decision concerning the submitted Amended Proposal by the referral of 30 January 2018.

4 SUMMARY OF THE PROPOSAL

- (16) The Amended Proposal includes the following elements:
 - (a) The 'Whereas' section and Articles 1 and 2 that include general provisions, the scope of application and the definitions;
 - (b) Articles 3 to 7 that include the summary of the algorithm requirements, the provisions on the price coupling algorithm and the continuous trading matching algorithm, including the timelines for the implementation of specific requirements;
 - (c) Articles 8 to 10 that include provisions on the day-today-management of the algorithm, provisions on the monitoring of the algorithm performance and provisions on the maintenance and future development of the algorithms; and
 - (d) Articles 11 and 12 that include provisions on the transparency and applicable language.

⁶ The Agency's and regulatory authorities' platform for discussing issues connected to the CACM Regulation.

⁷ The NEMOs' and regulatory authorities' platform for mutual cooperation.

⁸ The Agency's and regulatory authorities' platform for discussing all electricity related regulatory issues.

5 ASSESSMENT OF THE PROPOSAL

5.1 Legal framework

- (17) According to Article 7(1)(b) of the CACM Regulation, NEMOs are responsible for establishing collectively the requirements for the single day-ahead and intraday coupling, the requirements for the market coupling operator ('MCO') functions and the price coupling algorithm with respect to all matters related to electricity market functioning in accordance with Article 7(2) and Articles 36 and 37 of the CACM Regulation.
- (18) According to Article 7(2) of the CACM Regulation, NEMOs have to carry out the MCO functions jointly with other NEMOs and those functions need to include the following: (i) developing and maintaining the algorithms, systems and procedures for single day-ahead and intraday coupling in accordance with Articles 36 and 51 of the CACM Regulation; (ii) processing input data on cross-zonal capacity and allocation constraints provided by coordinated capacity calculators in accordance with Articles 46 and 58 of the CACM Regulation; (iii) operating the price coupling and continuous trading matching algorithms in accordance with Articles 48 and 60 of the CACM Regulation; and (iv) validating and sending single day-ahead and intraday coupling results to the NEMOs in accordance with Articles 48 and 60 of the CACM Regulation.
- (19) According to Article 8(1) and 8(2)(a) and (b) of the CACM Regulation, all TSOs in Member States electrically connected to another Member State must participate in the single day-ahead and intraday coupling and jointly establish the TSOs requirements for the price coupling and continuous trading matching algorithms for all aspects related to capacity allocation in accordance with Article 37(1)(a) of the CACM Regulation, and jointly validate the matching algorithms against the above mentioned requirements in accordance with Article 37(4) of the CACM Regulation.
- (20) Article 9(6)(g) of the CACM Regulation requires the NEMOs' algorithm proposal according to Article 37(5) of the CACM Regulation, including the TSOs' and NEMOs' sets of requirements for algorithm development in accordance with Article 37(1) of the same Regulation, to be approved by all regulatory authorities.
- (21) According to Article 36(1) and (2) of the CACM Regulation, all NEMOs must develop, maintain and operate a price coupling algorithm and a continuous trading matching algorithm. They must ensure that the price coupling algorithm and the continuous trading matching algorithm meet the requirements provided for, respectively, in Articles 39 and 52 of the CACM Regulation.
- (22) According to Article 36(4) of the CACM Regulation, where possible, NEMOs must use already agreed solutions efficiently to implement the objectives of the CACM Regulation.
- (23) According to Article 37(1) of the CACM Regulation, by eight months after the entry into force of the CACM Regulation, (i) all TSOs need jointly to provide all NEMOs with a proposal for a common set of requirements for efficient capacity allocation to enable the

development of the price coupling algorithm and of the continuous trading matching algorithm, where these requirements shall specify the functionalities and the performance, including the deadlines for the delivery of single day-ahead and intraday coupling results and the details of the cross-zonal capacity and allocation constraints to be respected; and (ii) all NEMOs need jointly to propose a common set of requirements for efficient matching to enable the development of the price coupling algorithm and of the continuous trading matching algorithm.

- (24) According to Article 37(2) of the CACM Regulation, no later than three months after the submission of the TSOs' and NEMOs' proposals for a common set of requirements mentioned above, all NEMOs must develop a proposal for the algorithms in accordance with these requirements. This proposal shall indicate the time limit for the submission of the received orders by NEMOs required to perform the MCO functions in accordance with Article 7(1)(b) of the CACM Regulation.
- (25) According to Article 37(3) of the CACM Regulation, the all NEMOs' proposal mentioned above has to be submitted to all TSOs. If additional time is required to prepare this proposal, all NEMOs must work together supported by all TSOs for a period of not more than two months to ensure that the proposal complies with Article 37(1) and (2) of the CACM Regulation.
- (26) According to Article 37(4) of the CACM Regulation, the proposals referred to in Article 37(1) and (2) of the CACM Regulation shall be subject to consultation in accordance with Article 12 of the CACM Regulation.
- (27) According to Article 37(5) of the CACM Regulation, all NEMOs must submit the proposal developed in accordance with Article 37(2) and (3) of the CACM Regulation to the regulatory authorities for approval by no later than 18 months after the entry into force of this Regulation.
- (28) According to Article 38 of the CACM Regulation, the price coupling algorithm should produce the results set out in Article 39(2) of the CACM Regulation in a manner which: (i) aims at maximising the economic surplus for single day-ahead coupling for the price-coupled region for the next trading day; (ii) uses the marginal pricing principle according to which all accepted bids will have the same price per bidding zone per market time unit; (iii) facilitates efficient price formation; (iv) respects cross-zonal capacity and allocation constraints; and (v) is repeatable and scalable. Moreover, the price coupling algorithm shall be developed in such a way that it would be possible to apply it to a larger or smaller number of bidding zones.
- (29) According to Article 39(1) of the CACM Regulation, in order to produce results, the price coupling algorithm shall use: (i) allocation constraints established in accordance with Article 23(3) of the CACM Regulation; (ii) cross-zonal capacity results validated in accordance with Article 30 of the CACM Regulation; and (iii) orders submitted in accordance with Article 40 of the CACM Regulation.

- (30) According to Article 39(2) of the CACM Regulation, the price coupling algorithm should produce at least the following results simultaneously for each market time unit: (i) a single clearing price for each bidding zone in EUR/MWh; (ii) a single net position for each bidding zone; (iii) the information which enables the execution status of orders to be determined.
- (31) According to Article 39(3) of the CACM Regulation, all NEMOs must ensure the accuracy and efficiency of results produced by the single price coupling algorithm.
- (32) According to Article 51(1) of the CACM Regulation, from the intraday cross-zonal gate opening time until the intraday cross-zonal gate closure time, the continuous trading matching algorithm shall determine which orders to select for matching such that matching:
 - (i) aims at maximising economic surplus for single intraday coupling per trade for the intraday market time-frame by allocating capacity to orders for which it is feasible to match in accordance with the price and time of submission;
 - (ii) respects the allocation constraints provided in accordance with Article 58(1) of the CACM Regulation;
 - (iii) respects the cross-zonal capacity provided in accordance with Article 58(1) of the CACM Regulation;
 - (iv) respects the requirements for the delivery of results set out in Article 60 of the CACM Regulation; and
 - (e) is repeatable and scalable.
- (33) According to Article 51(2) of the CACM Regulation, the continuous trading matching algorithm should produce the results provided for in Article 52 of the CACM Regulation and correspond to the product capabilities and functionalities set out in Article 53 of the CACM Regulation.
- (34) According to Article 52(1) of the CACM Regulation, all NEMOs, as part of their MCO function, need to ensure that the continuous trading matching algorithm produces at least the following results: (i) the execution status of orders and prices per trade; and (ii) a single net position for each bidding zone and market time unit within the intraday market.
- (35) According to Article 52(2) of the CACM Regulation, all NEMOs must ensure the accuracy and efficiency of results produced by the single continuous trading matching algorithm.
- (36) According to Article 62 of the CACM Regulation, as soon as the orders are matched, each NEMO must publish for relevant market participants at least the status of execution of orders and prices per trade produced by the continuous trading matching algorithm in accordance with Article 52(1)(a) of the CACM Regulation and each NEMO must ensure that information on aggregated executed volumes and prices is made publicly available in an easily accessible format for at least 5 years. The information to be published should be proposed by all NEMOs within the proposal for continuous trading matching algorithm pursuant to Article 37(5) of the CACM Regulation.
- (37) As a general requirement, Article 9(9) of the CACM Regulation demands that every proposal for terms and conditions or methodologies includes a proposed timescale for their implementation and a description of their expected impact on the objectives set out in Article 3 of the CACM Regulation.

5.2 Assessment of the requirements of the CACM Regulation

5.2.1 Requirements of Article 7 of the CACM Regulation

- (38) The Amended Proposal fulfils the requirements of Article 7(1)(b) of the CACM Regulation, as all NEMOs and, where required in cooperation with all TSOs, collectively established the requirements for the single day-ahead and intraday coupling, as set out in Annex 1 and Annex 2 to the Amended Proposal.
- (39) The Amended Proposal fulfils the requirements of Article 7(2)(a) and (b) of the CACM Regulation by: (i) providing rules and procedures for developing and maintaining the algorithms, systems and procedures as described in Articles 4 to 7 and 10 of the Amended Proposal; and (ii) taking into account the cross-zonal capacity and allocation constraints, as set out in Articles 3(7)(a) and 3(8)(a) of the Amended Proposal.
- (40) The Amended Proposal does not fulfil the requirements of Article 7(2)(c) and (d) of the CACM Regulation and the requirements of Article 48(1)(a) and (b) and Article 48(3) of the CACM Regulation because it does not specify the necessity to deliver single day-ahead coupling results: (i) to all NEMOs and all coordinated capacity calculators for the results set out in Article 39(2)(a) and (b) of the CACM Regulation; and (ii) to all NEMOs for the results set out in Article 39(2)(c) of the CACM Regulation. The Agency addresses this issue in Recital (85) below.

5.2.2 Requirements of Articles 8, 36 and 37 of the CACM Regulation

- (41) The Amended Proposal fulfils the requirements of Article 8(2)(a) and (b) of the CACM Regulation by establishing the requirements for the price coupling and continuous trading matching algorithms in Annex 1 and Annex 2 of the Amended Proposal and providing them to all NEMOs in accordance with Article 37(1)(a) of the same Regulation.
- (42) The Amended Proposal fulfils the criteria set out in Article 36(1) and (2) of the CACM Regulation, because all NEMOs submitted both the price coupling algorithm and the continuous trading matching algorithm to all regulatory authorities. Moreover, Articles 3 to 10 of the Amended Proposal determine the way all NEMOs maintain and operate the price coupling algorithm and the continuous trading matching algorithm.
- (43) The Amended Proposal fulfils the requirements of Article 36(4) of the CACM Regulation by using and defining the existing day-ahead and intraday algorithm solution in Article 2(7) and (8) of the Amended Proposal.
- (44) The Amended Proposal fulfils the requirements of Article 37(1) to (5) of the CACM Regulation, because all NEMOs developed the Proposal in accordance with Article 37(1) to (3) of the CACM Regulation, consulted on it and submitted it to all regulatory authorities (including the common set of requirements for the price coupling algorithm and for the continuous trading matching algorithm in annexes) not later than 18 months after entry into force of the CACM Regulation.

- (45) The time limit for the submission of received orders by NEMOs required to perform the MCO functions in accordance with Article 7(1)(b) of the CACM Regulation is set out in Article 4(17) of the Amended Proposal. The obligation under Article 37(2) of the CACM Regulation demands the time to be mentioned in the common set of requirements for the algorithms. Even though the time is determined in the body text of the Amended Proposal and not in the common set of requirements, these requirements form part of the Amended Proposal. Therefore, the Amended Proposal fulfils the criteria of Article 37(2) of the CACM Regulation to include the time for the delivery of the day-ahead coupling results.

5.2.3 Requirements of Articles 38 and 39 of the CACM Regulation

- (46) The Amended Proposal fulfils the requirements of Article 38 of the CACM Regulation, as Article 3(7) of the Amended Proposal addresses all the objectives and describes the way the price coupling algorithm should reach a result.
- (47) The Amended Proposal fulfils the requirements of Article 39(1) of the CACM Regulation as Article 3(7)(a) of the Amended Proposal specifies that the price coupling algorithm shall use the orders submitted in accordance with Article 40 of the CACM Regulation, as well as allocation constraints in accordance with Article 23(3) of the CACM Regulation and cross-zonal capacity results validated in accordance with Article 30 of the CACM Regulation.
- (48) The Amended Proposal fulfils the criteria of Article 39(2) of the CACM Regulation, as Article 4(2) of the Amended Proposal presents a list of necessary results the price coupling algorithm should produce.
- (49) The Amended Proposal fulfils the criteria of Article 39(3) of the CACM Regulation, as Article 4(10) of the Amended Proposal indicates that the price coupling algorithm performs checks on every solution found to validate that all the market and network constraints are respected within a given tolerance.

5.2.4 Requirements of Articles 51, 52 and 62 of the CACM Regulation

- (50) The Amended Proposal fulfils the requirements of Article 51(1) of the CACM Regulation as Article 3(8) of the Amended Proposal addresses all the objectives and describes the way the continuous trading matching algorithm should reach a result.
- (51) The Amended Proposal fails to fulfil the criteria of Article 52(1) of the CACM Regulation because it does not contain the information about execution status, prices per trade and single net positions, as explained in more detail in Recital (89) below.
- (52) The Amended Proposal fails to fulfil the requirements of Article 62(2) of the CACM Regulation because the Amended Proposal does not oblige all NEMOs to publish aggregated executed volumes and prices, as explained in more detail in Recital (115) below.

- (53) The Amended Proposal fulfils the criteria of Article 52(2) of the CACM Regulation, as the general approach and steps used by the continuous trading matching algorithm described in Article 6 of the Amended Proposal ensures that any matching done by the continuous trading matching algorithm is accurate and efficient.

5.2.5 Requirements of Article 9(9) of the CACM Regulation

- (54) The Amended Proposal partly fulfils the criteria of Article 9(9) of the CACM Regulation. On the one hand, the Amended Proposal describes in detail the proposed implementation timescale in Articles 5 and 7 of the Amended Proposal and, in that respect, complies with the requirements of Article 9(9) of the CACM Regulation. On the other hand, the description of the expected impact on the objectives of the CACM Regulation is not sufficient, as explained in more detail in Recitals (57) and (58) below. In that regard the Amended Proposal fails to comply with the requirements of Article 9(9) of the CACM Regulation.

5.2.6 Public consultation

- (55) The NEMO Committee, representing all NEMOs, consulted stakeholders on the draft Proposal Union-wide, from 3 November to 2 December 2016. Moreover, on 14 November 2016, all NEMOs organised a stakeholder workshop to discuss various all-NEMOs' proposals, including the draft proposal for the price coupling algorithm and the continuous trading matching algorithm.
- (56) Therefore, the initial Proposal, on which the Amended Proposal is based, has been subject to a public consultation in accordance with Article 12 of the CACM Regulation and complies with Article 37(4) of the CACM Regulation.

5.3 Expected impact on the objectives of the CACM Regulation

- (57) Recitals (11) to (15) of the Amended Proposal describe the expected impact on the objectives of the CACM Regulation. They explicitly mention the objectives referred to in Article (3)(a), (b), (d), (e), (f), (h) and (i) of the CACM Regulation. However, in many of these references, the Amended Proposal fails to explain how exactly it impacts those objectives. Furthermore, the impact on the objectives referred to in Article (3)(c), (g) and (j) of CACM Regulation is not mentioned in the Amended Proposal.
- (58) Therefore, the Agency has amended the Amended Proposal by adding a description of the impact of the algorithm methodology on the objectives referred to in Article (3)(c), (g) and (j) of the CACM Regulation, and by clarifying and more precisely describing the impact on the objectives referred to in Article (3)(a), (b), (d), (e), (f), (h) and (i) of the CACM Regulation.

5.4 Recitals

- (59) In addition to the amendment of Recitals of the Amended Proposal describing the impact of the algorithm methodology on the objectives of the CACM Regulation, the Agency has also amended other Recitals of the Amended Proposal to clarify the intent and purpose of the methodology, as well as to reflect the changes in the Articles of the Amended Proposal. All the Recitals of the Amended Proposal related to the proposed implementation timeline have been deleted, since the concept of the interim and enduring algorithm solution was replaced by the implementation of a single algorithm solution as explained in Section 5.5 below.
- (60) Furthermore, the Agency has also removed the Recitals of the Amended Proposal related to the day-to-day management, since the corresponding Article of the Amended Proposal was also removed from the main part of the algorithm methodology (see details in Section 5.6.5 below).

5.5 Proposed timescale for implementation

- (61) Article 5 of the Amended Proposal defines the implementation timelines of the algorithm methodology as regards the implementation of the price coupling algorithm. This implementation is structured in three phases as follows:
- (a) During the prototyping phase, lasting up to three years, all NEMOs propose to develop and implement an interim solution for the price coupling algorithm. This includes the deadline of June 2018 by which the price coupling algorithm should meet all initial day-ahead algorithm requirements and the deadline of June 2020 by which the price coupling algorithm should be adequately repeatable. During this period, all NEMOs also propose to develop the change control procedure and the algorithm monitoring procedure.
 - (b) During the extended prototyping phase, lasting up to one year after the end of the prototyping phase, all NEMOs aim to engage in further research and development of the price coupling algorithm. At the end of this period, all NEMOs aim to inform all regulatory authorities and stakeholders on the outcome of the research and development.
 - (c) During the industrialisation phase, lasting up to one year after the end of the extended prototyping phase, all NEMOs aim to implement an enduring solution of the price coupling algorithm developed during the extended prototyping phase. The specific features of the enduring solution would be conditional on the outcome of the research and development during the extended prototyping phase. Regardless of this outcome, the enduring solution should be able to support all future day-ahead algorithm requirements and the requirement of adequate scalability.
- (62) Article 7 of the Amended Proposal defines the implementation timelines of the algorithm methodology as regards the implementation of the continuous trading matching algorithm. This implementation is structured in four phases as follows:

- (a) During the first implementation phase, lasting up to one year, all NEMOs will devote their efforts to the implementation of the existing intraday algorithm solution, which is considered as an interim SIDC solution. This includes the deadline of end-2018 by which the continuous trading matching algorithm should meet all the initial intraday algorithm requirements.
 - (b) During the prototyping phase, lasting up to three years after the end of the first implementation phase, all NEMOs propose to devote their effort to research and development to find an enduring SIDC solution. This includes the deadline of 2019 by which the interim SIDC solution should be updated with the functionality of the enhanced preferred shipper. At the end of this period, NEMOs also propose to develop the change control procedure and the algorithm monitoring procedure.
 - (c) During the extended prototyping, lasting up to one year after the end of the prototyping phase, all NEMOs aim to continue and finalise further research and development on the continuous trading matching algorithm if requested by all NEMOs and granted by all regulatory authorities. No further details on the process how regulatory authorities could grant such extension is provided.
 - (d) During the industrialisation phase, lasting up to one year after the end of the extended prototyping phase, all NEMOs aim to implement an enduring solution of the price coupling algorithm developed during the extended prototyping phase. The specific features of the enduring solution would be conditional on the outcome of the research and development performed during the extended prototyping phase. Regardless of this outcome, the enduring solution should be able to support all the future intraday algorithm requirements and the requirement of adequate scalability.
- (63) The Agency has amended the timescale of implementation with regard to (i) the structure; (ii) the design of the timescale; and (iii) the proposed implementation times.
- (64) First, to provide clarity, the structure was changed and Articles 5 and 7 of the Amended Proposal dealing with the implementation timeline were merged with adjacent Articles 4 and 6 describing the price coupling algorithm and the continuous trading matching algorithm respectively.
- (65) Second, the Agency finds the Amended Proposal with different stages of development and implementation, as well as its conditionality on research and development, not compliant with Article 36(2) of CACM Regulation, which requires that the price coupling algorithm and the continuous trading matching algorithm meet the algorithm requirements. For this reason, the Agency finds it necessary to amend the Amended Proposal such that the implementation of the algorithm requirements becomes legally binding, clearer and unconditional. Therefore, the Agency has introduced a firm implementation timeline for the development of the price coupling algorithm and the continuous trading matching algorithm such that all algorithm requirements are met within a timeframe of four years for the price coupling algorithm and five years for the continuous trading matching algorithm after the entry into force of this Decision.

- (66) Third, to avoid undue delays and to provide clarity, the deadlines for the implementation were amended such that the relative deadlines conditional on the ending of previous phases were replaced by absolute deadlines with specific dates for implementation. In order to reflect the structure of the algorithm requirements, the Agency has introduced a gradual implementation approach, where the implementation of some of the initial requirements is required at the entry into force of the Algorithm methodology and additional requirements need to be implemented within a period of four years after the entry into force of the Algorithm methodology. During this period, the algorithms should be complemented with functionalities supporting the requirement for the operation of multiple NEMOs in a bidding zone, the requirement of adequate repeatability and the requirement of the enhanced preferred shipper and, finally, all future algorithm requirements as defined in the annexes to the Algorithm methodology.
- (67) As regards the final deadline for the implementation of all future algorithm requirements (i.e. four and five years after the entry into force of Algorithm methodology, respectively for the price coupling algorithm and the continuous trading matching algorithm), this deadline is shorter than the deadline for the industrialisation phase as proposed in the Amended Proposal. This amendment also ensures that the implementation of the future requirements is not conditional on the outcome of the research and development. This implies that all NEMOs should guarantee that, within this deadline, the algorithm supports all initial and future algorithm requirements as defined in the annexes to the Algorithm methodology.
- (68) The Agency has defined the above mentioned deadlines after consultation with all NEMOs, all TSOs, all regulatory authorities and market participants. The Agency understands that the NEMOs face the risk of not meeting the adequate algorithm performance criteria once all the future algorithm requirements are implemented. Nevertheless, the Agency considers that the NEMOs should manage this risk via a revision of the definition and usage of products as well as reasonable specification of requirements, particularly those having a significant impact on the algorithm performance. Therefore, the Agency considers that all NEMOs should be able to maintain an adequate performance of the algorithms without jeopardising the implementation of the future algorithm requirements.

5.6 Specific issues of the algorithm methodology

5.6.1 Definitions

- (69) Article 2 of the Amended Proposal sets out the definitions used throughout the document.
- (70) In order to improve the general understanding of the algorithm methodology, the Agency finds it important to improve the definitions as follows:
- (71) First, in order to avoid duplications, the Agency has deleted the definitions, which are already included in the legislation, namely Regulation (EC) No 714/2009, Regulation (EU) No 543/2013, the CACM Regulation, Directive 2009/72/EC, and Regulation (EU) 2017/1485, and in the plan on joint performance of the MCO functions developed in accordance with Article 7(3) of the CACM Regulation ('MCO Plan').

- (72) Second, in order to improve consistency with their meaning and usage in the algorithm methodology, the Agency has amended some of the proposed definitions:
- (a) the definition of scheduled flow was aligned with the definition of scheduled exchange as defined by the CACM Regulation. A specific definition of scheduled exchanges between NEMO trading hubs was added as outlined in Recital (82) below;
 - (b) the definition of the NEMO trading hub was amended in order to clarify that NEMO trading hubs are actually virtual trading points of NEMOs collecting orders with a delivery in a specific scheduling area;
 - (c) the definition of anticipated usage was simplified and the description of how it is calculated has been moved to the change control methodology, as amended in Article 7(2) of the Algorithm methodology;
 - (d) the definition of the scheduling area as defined in Regulation (EU) 2017/1485 was extended to a scheduling area with at least one NEMO trading hub, in order to cover all existing geographical settings in Europe;
 - (e) the definitions of the initial and future requirements was amended to reflect the changes in the Algorithm methodology with regard to the implementation timescales; and
 - (f) the procedures for change control and algorithm monitoring were renamed into methodologies better to describe the nature of the documents, which should set general rules rather than prescribe concrete steps of procedures.
- (73) Third, the Agency has added the definition of paradoxically rejected orders since they are referenced in the algorithm monitoring methodology.
- (74) Finally, the Agency has added several new definitions in order to simplify the references to:
- (a) already existing and approved terms and conditions or methodologies, namely the MCO Plan, the back-up methodology, the fallback methodology and the products that can be taken into account in SDAC and SIDC products; and
 - (b) terms and conditions or methodologies currently being developed or approved by regulatory authorities, namely the methodologies for calculating scheduled exchanges for the day-ahead and the intraday timeframe.

5.6.2 Algorithm requirements

- (75) Article 3 of the Amended Proposal summarises the main requirements of the price coupling algorithm and the continuous trading matching algorithm, the details of which are defined in Annex 1 and Annex 2 to the Amended Proposal.
- (76) The Agency generally agrees with the substance of Article 3. However, to enhance readability, as well as the clarity of this Article and better to reflect the newly used definitions and taking into account the changed content of other Articles in the Algorithm methodology, the Agency has clarified the requirement for the calculation of scheduled exchanges, the

requirement of algorithm optimality, the requirement of algorithm repeatability, the requirement of algorithm scalability and the requirement of algorithm reliability, including the requirement to ensure a fair and orderly price formation.

- (77) With regard to the support of specific combinations of products in Article 3(6) of the Amended Proposal, the Agency has clarified the principles under which the support of products or requirements can be limited. Such limitations can only apply in case of a deterioration of the algorithm performance and thereby all NEMOs may decide to apply specific corrective measure or deny specific request for change by which some products or requirements, as well as their usage, could be limited. This is described in Article 3(6) of the Algorithm methodology.
- (78) The Agency has amended and complemented the requirement of repeatability of the price coupling algorithm by adding an all NEMOs' responsibility to be able fully to replicate the results of the price coupling algorithm for a specific historic delivery day if requested by any regulatory authority or the Agency, in order to allow for an investigation of possible price manipulations or any other infringements of law. Since repeatability of the algorithm is an essential requirement for the algorithms (Article 38(1)(e) of the CACM Regulation), regulatory authorities or the Agency should be able to monitor its compliance in accordance with Article 82(1) of CACM Regulation.
- (79) The Amended Proposal defined algorithm scalability as a requirement to be able to accommodate all bidding zones in the EU and in Norway. The Agency has amended this concept of algorithm scalability and replaced it by a general requirement that the algorithms should always be able to accommodate all bidding zones and all NEMOs eligible to participate in the SDAC and SIDC. This amendment ensures that any bidding zone or country that is able legally to participate in SDAC and SIDC should be accommodated by the algorithms.

5.6.3 Price coupling algorithm

- (80) Article 4 of the Amended Proposal determines the main features of the price coupling algorithm. It provides details on the algorithm outputs, on the calculation of scheduled exchanges and on the way to find the optimal solutions. It also provides some details on the operational procedures and timings and put some obligations on NEMOs regarding the provision of data and information to TSOs and market participants, including the public description of the algorithm.
- (81) The Agency has significantly amended this Article in order to improve the clarity on the functioning of the price coupling algorithm and to ensure the enforceability of the related provisions.
- (82) First, the Agency has clarified the obligations related to the calculation of scheduled exchanges. The Amended Proposal refers to three types of scheduled flows, i.e. those between bidding zones, those between scheduling areas and those between NEMO trading

hubs. The first two are needed by TSOs for their scheduling purposes and the third group is needed by NEMOs to schedule energy transfers between individual NEMOs. The Agency has aligned the concept of scheduled flow between bidding zones and between scheduling areas with the definition of scheduled exchange provided in Article 2(32) of the CACM Regulation, which refers to an electricity transfer scheduled between geographic areas, for each market time unit and for a given direction. As regards the scheduled flows between NEMO trading hubs, these flows are not explicitly covered by the definition pursuant to Article 2(32) of the CACM Regulation. Therefore, the Agency added a specific definition for scheduled exchanges between NEMO trading hubs.

- (83) For the scheduled exchanges between bidding zones and scheduling areas, Articles 43 and 56 of the CACM Regulation requires to define their calculation in the respective methodologies for calculating scheduled exchanges for the day-ahead and intraday timeframes, and Article 9(7)(d) of the CACM Regulation subjects these methodologies to the approval of all regulatory authorities of the concerned region. As regards the methodology for calculating scheduled exchanges between NEMO trading hubs, the CACM Regulation does not explicitly mention the development and regulatory approval of such a methodology. In the Agency's view, this can be explained by the fact that scheduled exchanges between NEMO trading hubs were not known to exist at the time of adoption of the CACM Regulation and therefore could not be considered by the CACM Regulation. The Agency is, however, also of the view that the rationale of Articles 43 and 56 of the CACM Regulation is equally valid for scheduled exchanges between NEMO trading hubs and that the non-inclusion of scheduled exchanges between NEMO trading hubs in those Articles constitutes an unreasonable regulatory lacuna which should be closed by applying Articles 43 and 56 of the CACM Regulation by analogy. Therefore, the Agency considers that the calculation for all three types of scheduled exchanges - i.e. between bidding zones, between scheduling areas and between NEMO trading hubs - should be described in the methodologies for calculating scheduled exchanges pursuant to Articles 43 and 56 of the CACM Regulation. Based on this understanding, the Agency has simplified the algorithm requirements such that the algorithms should support the calculation of all types of scheduled exchanges as defined in the methodology for calculating scheduled exchanges. The Agency has also clarified that all NEMOs should be obliged to adapt the algorithm methodology with regard to the functionality for the calculation of scheduled exchanges in case of changes in the methodologies for calculating scheduled exchanges in order to ensure consistency between the two methodologies. Moreover, the Agency has added a requirement for all NEMOs to include the detailed description of the calculation of scheduled exchanges between NEMO trading hubs in a public document with the detailed description of the price coupling algorithm.
- (84) Second, the Agency has improved the description of the process for finding an optimal solution. The complex stopping criteria has been simplified and clarified such that the algorithm stops either when it finds an optimal solution or when the maximum calculation time is reached.

- (85) Finally, the Agency has clarified the obligations set out in Article 48 of the CACM Regulation regarding the delivery of specific results of the price coupling algorithm to TSOs and NEMOs. The Agency has also added the coordinated capacity calculators to the list of entities receiving the relevant information.

5.6.4 Continuous trading matching algorithm

- (86) Article 6 of the Amended Proposal determines the main features of the continuous trading matching algorithm.
- (87) To ensure compliance with Article 48(1)(b) of the CACM Regulation, the Agency has amended the Amended Proposal by adding an obligation for all NEMOs to deliver the execution status of orders and prices per trade and a single net position for each bidding zone per market time unit to all NEMOs.
- (88) The Agency has clarified the obligations related to the calculation of scheduled exchanges in line with the amendments related to the calculation of scheduled exchanges by the price coupling algorithm (see Recitals (82) and (83) for details).
- (89) To fulfil the requirement set out in Article 52(1) of the CACM Regulation, the Agency has included the requirement that the continuous trading matching algorithm produces at least the execution status of orders and prices per trade and a single net position for each bidding zone participating in SIDC and each market time unit.

5.6.5 Day-to-day management

- (90) Recitals 41 to 43 and Article 8 of the Amended Proposal relate to the day-to-day management. They describe the process and governance for the cooperation between NEMOs and TSOs in the day-to-day management of the SDAC and SIDC, which include the joint drafting of the operational procedures, of the procedures for the management of operational incidents, of the procedures for monitoring the algorithm performance and of the procedures for the management of requests for changes.
- (91) The Agency finds the provisions of the Amended Proposal out of scope of the algorithm methodology. The requirements for the day-to-day management as referred to Article 10 of the CACM Regulation are indeed an important part of the operation of SDAC and SIDC, but they are not directly related to the development and maintenance of the algorithms. Therefore, the Agency considers that the day-to-day management can be organised between all NEMOs and all TSOs based on agreements, since the CACM Regulation does not require the development of a specific methodology to govern this process.
- (92) Nevertheless, the Agency has retained in the Amended Proposal the processes for the development of the operational procedures, of the procedures for the management of operational incidents, of the procedures for monitoring the algorithm performance and of the procedures for the management of requests for changes. These procedures are indeed an

important element for the development and maintenance of the algorithms and the obligations to develop them have been retained in other Articles of the Algorithm methodology.

5.6.6 Algorithm performance management

- (93) Article 9 of the Amended Proposal defines the main principles for monitoring and managing the performance of the algorithms. As regards the monitoring of the algorithm performance, the Amended Proposal obliges all NEMOs to develop a detailed algorithm monitoring procedure that aims to detect any deterioration of the algorithm performance and its non-compliance with the algorithm requirements. Article 9 of the Amended Proposal defines some high-level indicators for such monitoring, which are to serve as a basis for developing a detailed monitoring procedure.
- (94) The Agency finds the proposed concept for monitoring the algorithm performance inadequate. First, since all NEMOs are performing a public service function (i.e. SDAC and SIDC), they should generally not monitor their own performance. Such monitoring should be independent and allow for independent conclusions. Nevertheless, due to the complexity of this monitoring process, the Agency deems it reasonable, in order to guarantee a sufficient neutrality of the monitoring process, that:
- (a) the algorithm monitoring procedure is approved by all regulatory authorities. The Agency has amended Article 9 such that the algorithm monitoring procedure should be developed by all NEMOs in coordination with all TSOs and then all NEMOs submit it for approval to all regulatory authorities as an amendment to the Algorithm methodology following the process pursuant to Article 9(13) of the CACM Regulation. The involvement of TSOs in the development of the monitoring procedure should provide some level of neutrality in the monitoring of the algorithm performance and the approval of the procedure by regulatory authorities should enable proper regulatory oversight;
 - (b) regular reporting on the outcome of the monitoring of the algorithm performance. The Agency has added an additional paragraph to Article 9, requiring from all NEMOs in coordination with all TSOs to produce a public yearly report on the outcome of the monitoring of the algorithm performance.
 - (c) all the underlying data and information used in the algorithm monitoring are provided to any regulatory authority or the Agency at their request. The Agency has added a new Article 14(1) that provides the obligation to all NEMOs to share all underlying information and data used when monitoring the algorithm performance to the requestor. This will ensure that regulatory authorities or the Agency are able to verify the conclusions from the monitoring process.
- (95) Second, the Agency has renamed the algorithm monitoring procedure into an algorithm monitoring methodology to reflect the fact that this methodology should contain detailed principles for monitoring, but is not required to include all the details of the procedure for performing the algorithm monitoring.

- (96) Further, Article 9 of the Amended Proposal defines some principles according to which all NEMOs propose to meet the requirement of adequate scalability. This is done by calculating, for each algorithm functionality, a usage range with the help of future anticipated usage of each existing and new algorithm functionality. Based on these usage ranges, all NEMOs will test the algorithm performance and the level of scalability which means the ability of the algorithms to accommodate new functionalities and extend the usage of existing ones.
- (97) The Agency has amended this part of Article 9 of the Amended Proposal (Article 7 of the Algorithm methodology) to provide more clarity and legal certainty to the requirements, but without significant changes to the concept proposed by all NEMOs. First, those obligations without clearly assigned responsible person were assigned to all NEMOs. Second, the Agency has clarified the principles for calculating the usage range and anticipated usage and moved a part of the description in the definitions of the Amended Proposal to Articles 7(2) and (4) of the Algorithm methodology. The Agency has also clarified the estimation of the level of scalability and associated reporting.
- (98) Article 9 of the Amended Proposal also defines the process of how all NEMOs propose to maintain the algorithm performance in case of an unexpected degradation. In such cases, all NEMOs propose to apply corrective measures such as limitation of products that NEMOs are allowed to use, limitation to the usage of products or limitation to the algorithm requirements. In case those requirements were defined by all TSOs, the latter can reject such a corrective measure.
- (99) The Agency has deemed it necessary to amend this part of Article 9 of the Amended Proposal in order to improve clarity, legal enforceability and transparency of this process.
- (100) First, the Agency has introduced several amendments aiming to improve the clarity on the conditions for the introduction of corrective measures and on their time limitation. With this respect, the Agency has limited the scope of corrective measures only to (i) limitation of products that NEMOs are allowed to use, (ii) limitation to the usage of products, (iii) limitation to the algorithm requirements and (iv) the changes in parameters related to the operation of the algorithm, the algorithm monitoring methodology or the change control methodology.
- (101) Second, the Agency has provided more clarity on the governance of the corrective measures and the involvement of TSOs. Based on the consultation with all NEMOs and all TSOs, the Agency has clarified that corrective measures are considered as a specific form of requests for change and can, therefore, be proposed by any NEMO(s) or TSO(s) and the subsequent procedure for evaluating and deciding on the proposal is equivalent to the procedure for evaluating and deciding on a request for change. In this respect, the Agency has defined some high level principles of this process in the Algorithm methodology, whereas the detailed governance should be defined by all NEMOs in coordination with all TSOs in the change control methodology.

- (102) Third, the Agency finds it necessary to clarify the provisions related to the imposition of individual NEMO's usage limits for products and requirements. The Agency has clarified when and how these limits can be defined, the obligation of NEMOs to comply with these limits and the reporting to regulatory authorities in case specific NEMOs fail to comply.
- (103) Finally, the Agency has added specific obligations to improve the transparency of this process, namely the requirements for a public notification on the introduction and discontinuation of corrective measures and the requirement for reporting by all NEMOs on the applied corrective measures.

5.6.7 Algorithm change management

- (104) Article 10 of the Amended Proposal defines the main principles for managing the requests for change to the algorithms functionalities or their usage. These principles are to be further detailed in the change control procedure developed by all NEMOs in coordination with all TSOs. The principles established by Article 10 of the Amended Proposal essentially establish rules for TSOs and NEMOs to define their requests for changes to the algorithms' functionalities or their usage. These requests are then evaluated in terms of their effect on the algorithm performance and separated in four different categories. Then, all NEMOs need to decide whether to accept or reject a request for change and, in case a rejection concerns the algorithm requirements imposed by all TSOs, the latter may oppose such a rejection. Finally, Article 10 of the Amended Proposal defines the decision-making rules for all NEMOs to decide on a request for change and an escalation procedure to address conflicts among NEMOs and between TSOs and NEMOs.
- (105) The Agency deems the general approach to manage the requests for change to the algorithms as appropriate. However, the Agency has significantly amended Article 10 of the Amended Proposal to improve clarity, consistency and the structure of the requirements. In particular, the Agency has split this Article into Articles 9 to 12 of the Algorithm methodology along the following structure:
- (a) development of a change control procedure and its scope;
 - (b) submission of requests for change;
 - (c) evaluation and treatment of requests for change; and
 - (d) decision making and implementation of requests for change.
- (106) As regards the development of the change control procedure, the Agency considers this procedure as too important to be left to the sole discretion of all NEMOs. Thus, similarly to the algorithm monitoring procedure, the Agency has amended Article 10 of the Amended Proposal such that the change control procedure is developed by all NEMOs in coordination with all TSOs and submitted to the approval of all regulatory authorities as an amendment to the Algorithm methodology following the process pursuant to Article 9(13) of the CACM Regulation. This should provide proper regulatory oversight on the important process of managing the request for change to the algorithm functionalities and their usage.

- (107) In line with Article 8(2)(d) of the Amended Proposal, the Agency finds the need for coordination between all NEMOs and all TSOs in the development of the change control methodology important, since the TSOs play an important role in the development and maintenance of the algorithms, e.g. by developing the algorithm requirements and by contributing, where so decided by competent regulatory authorities, to the costs of the development in accordance with Article 76(2) of the CACM Regulation. Similarly, the Agency considers the coordination between all NEMOs and all TSOs in the evaluation and decision making on requests for change as equally important to ensure an efficient, coherent and timely development and maintenance of the algorithms.
- (108) The Agency has also renamed the change control procedure into change control methodology to reflect the fact that this methodology should contain detailed principles for change requests, but is not required to include all the details of such procedure. As regards the scope of the change control methodology, the Agency has collected all the individual references and requirements which concern this methodology throughout the Algorithm methodology and defined them in Article 9(2) of the Algorithm methodology. In this way the scope of the change control methodology is better defined and clarified.
- (109) The Agency has grouped all provisions of Article 10 of the Amended Proposal that concern the development and submission of requests for change into Article 10 of the Algorithm methodology. In case of duplication, these paragraphs have been combined and amended in order to improve clarity on the rules for developing and submitting a request for change. In order to ensure consistency with Article 80 of the CACM Regulation, the Agency finds it necessary to specify that each request for change shall define whether the costs shall be treated as common, regional and national, as well as the sharing of these costs among the requestors. However, the Agency has deleted all the other cost sharing provisions related to the requests for change, since the costs sharing principles are already defined in the CACM Regulation and should therefore not be changed or duplicated in the Algorithm methodology.
- (110) Further, the Agency has grouped all provisions of Article 10 of the Amended Proposal concerning the evaluation and treatment of requests for change into Article 11 of the Algorithm methodology. These provisions have been further amended to improve their clarity, without any significant change in their concept and intent.
- (111) Finally, the Agency has grouped all the provisions of Article 10 of the Amended Proposal concerning the decision making and implementation of requests for change into Article 12 of the Algorithm methodology. These provisions have been further amended to improve their clarity. The Agency has clarified how the decision on requests for change is done by all NEMOs in coordination with all TSOs. Further, the Agency has clarified the procedure for the appointment of an independent arbitral tribunal by all NEMOs in coordination with all TSOs. To avoid possible deadlock situations in the decision-making process, the Agency has generalised the scope of this tribunal such that any TSO(s) or NEMO(s) may refer any decision of all NEMOs in coordination with all TSOs to the independent arbitral tribunal. Finally, the Agency has added the requirement on reporting for all decisions concerning the requests for change in order to ensure the transparency of this process.

5.6.8 Transparency and monitoring

- (112) Article 11 of the Amended Proposal describes the requirements for all NEMOs as regards the publication of documents and information concerning the development, management and understanding of the price-coupling algorithm and the continuous trading matching algorithm. Two categories of transparency are proposed, i.e. the publication of documents and the publication of records of various decisions and events.
- (113) The Agency finds this part of the Amended Proposal incomplete, since it does not include all the relevant documents and reports referred to in other parts of the Amended Proposal. The Agency has added the obligation to publish the reports on the algorithm scalability. For the obligations to publish the records on (i) the incidents visible to market participants and the application of back-up and fall-back procedures, (ii) the performance results of the algorithm, (iii) the applied corrective measures, and (iv) the records on the decisions on requests for change, the Agency has transformed these obligations into obligations to publish the respective reports. To that end, the Agency has changed the respective Articles of the Amended Proposal, providing that all NEMOs need to publish the relevant information in a form of reports and not just records.
- (114) With regard to the publication of documents, the Agency has removed the obligations to publish the algorithm monitoring procedure and change control procedure (changed to methodologies pursuant to this Decision), since these procedures will need to be submitted as an amendment to the Algorithm methodology and published in accordance with Article 9(14) of the CACM Regulation. Further, the Agency has removed the obligation to publish the appointment of the independent arbitral tribunal, since the rules and procedure for this appointment will need to be defined in the change control methodology, which will be published pursuant to Article 9(14) of the CACM Regulation.
- (115) To fulfil the requirements of Article 62(2) of the CACM Regulation, the Agency has added in Article 13 of the Algorithm methodology an obligation to all NEMOs to publish the information needed by market participants as regards the results of the intraday market. The Agency considers that the following information needs to be published for that purpose: (i) the aggregated volumes of all trades made per contract per bidding zone; (ii) the volume-weighted average intraday prices per contract and bidding zone; and (iii) the volume-weighted average intraday prices per contract and bidding zone that took place during the last trading hour.
- (116) The price coupling algorithm and continuous trading matching algorithm play a central role in the operation and functioning of the electricity market, both from a national as well as European perspective as they regulate the formation of prices and matching of bids and offers. For this reason, the algorithms need to be understandable to market participants, whereas regulatory authorities should be able to fully understand and access the algorithms, including the inputs data and results in order to be able to perform their monitoring and investigatory duties. For this reason, the Agency has added two specific obligations on all NEMOs as regards this area.

(117) First, the Agency has established an obligation for all NEMOs to provide to any regulatory authority or the Agency, based on their request, access to the source code of the algorithms, as well as to all the input data used by the algorithms for the calculation of results. Second, the Agency has added the obligation for all NEMOs to provide any regulatory authority or the Agency the possibility to simulate the algorithm results for them to be able to perform their monitoring and investigatory duties. These duties depend on the ability to perform counterfactual analyses (i.e. to simulate the algorithm results with different algorithm inputs and compare them with the original results), whose demonstrative value fundamentally depends on the certainty that the changes in the algorithm results are arising only from changes in the algorithm inputs and not from changes in the computer hardware and software. However, since the price coupling algorithm is repeatable only when using the same computer hardware and software and their specification, the algorithm repeatability can only be ensured by using hardware and software used by all NEMOs when calculating the original market results. All NEMOs should therefore provide any regulatory authority or the Agency the possibility to simulate algorithm results while respecting the repeatability of the algorithms.

5.7 Specific issues related to the annexed common sets of requirements

5.7.1 Annex 1: Common set of requirements for the price coupling algorithm

(118) Annex 1 of the Amended Proposal describes the all TSOs' and all NEMOs' common set of requirements for the price coupling algorithm in accordance with Article 37(1) of the CACM Regulation. The requirements listed in this Annex have to be fulfilled by the functionalities of the price coupling algorithm. Concerning the date of fulfilment, they are categorised into initial and future requirements which have to be in place according to the timeline defined in Article 5(4) of the Amended Proposal. Additionally, the requirements are assigned to NEMOs and/or TSOs according to the ownership of the requirement.

(119) The Agency finds the listed requirements incomplete and therefore added the following requirements:

- (a) The additional point 1.1(c) has been added to ensure compliance with Article 3(h) of the CACM Regulation concerning a fair and orderly price formation.
- (b) The requirement in point 1.1(k) was copied from Annex 2 (Common set of requirements for the continuous trading matching algorithm) to ensure the provision of data security for the price coupling algorithm.
- (c) The requirement in point 5.2(c) was added to the requirements to state that the price coupling algorithm provides the information on the execution status of orders.
- (d) The initial price coupling algorithm requirement in point 2.1(k) about hybrid coupling was replaced with a more generic description of hybrid coupling based on virtual bidding zones.

(120) To enhance readability, avoid unnecessary repetition and provide continuity between the Algorithm methodology and the common set of requirements for the price coupling algorithm, the Agency has deemed the following amendments necessary:

- (a) The content of chapter 1 of the proposed Annex 1 called ‘Background’ is already covered in the ‘whereas’ of the Algorithm methodology and has therefore been deleted.
 - (b) Chapter 2 of the proposed Annex 1, which contains the definitions, has been deleted as the definitions are already covered in Article 2 of the Algorithm methodology.
 - (c) The column assigning the content of the requirements to the category of market coupling operator functions or scheduled exchange calculation functions has been deleted as the assignments of requirements were very inconsistent in this category and the necessity of this categorisation was not given.
 - (d) Chapter 3 of the proposed Annex 1 covers the description of the columns which are categorising the different requirements. These descriptions are seen as redundant as the remaining labelled columns are understandable in combination with the content of the main document and have therefore been deleted.
 - (e) Chapter 5 ‘other functionalities’ in the proposed Annex 1 states that ‘These functionalities are not part of the requirements for the price coupling algorithm’. Hence, these additional requirements have been considered as out of scope and deleted in Annex 1.
 - (f) For a clearer distinction between the two algorithms throughout the whole document, the reference to ‘algorithm’ has been changed into ‘price coupling algorithm’.
 - (g) To ensure consistency with the Algorithm methodology, the terms used in Annex 1 have been aligned with the definitions. For example, the term ‘scheduled flows’ has been replaced by ‘scheduled exchanges’.
- (121) The Agency has deemed it necessary to make some additional minor editorial amendments to enhance readability.
- (122) The categorisation of ownership in the proposed Annex 1 was not always very plausible and it was difficult to follow a consistent line concerning the assignment of requirements to this category. Even though a lot of requirements can be assigned to either category in this column with some broader reasoning, in some cases this categorisation is obviously wrong. Therefore, amendments to this categorisation have been made in consultation with all NEMOs and all TSOs.

5.7.2 Annex 2: Common set of requirements for the continuous trading matching algorithm

- (123) Annex 2 of the Amended Proposal describes the all TSOs’ and all NEMOs’ common set of requirements for the continuous trading matching algorithm in accordance with Article 37(1) of the CACM Regulation. The requirements listed in this Annex have to be fulfilled by the functionalities of the continuous trading matching algorithm. Concerning the date of fulfilment, they are categorised into initial and future requirements which have to be in place

according to the timeline defined in Article 7(7) of the Amended Proposal. Additionally, the requirements are assigned to NEMOs and/or TSOs according to the ownership of the requirement.

(124) The Agency finds the listed requirements incomplete and therefore added the following requirements:

- (a) An additional point was added under point 1.1(o)(iii) to include the obligation to respect the cross-zonal capacity and allocation constraints in the matching of orders.
- (b) The Requirement in point 4.1(c) was added to ensure the provision of the execution status of orders and prices per trade through the continuous trading matching algorithm.

The initial continuous trading matching algorithm requirement in point 2.1(j) about hybrid coupling was replaced with a more generic description of hybrid coupling based on virtual bidding zones.

(125) To enhance readability, avoid unnecessary repetition and provide continuity between the Algorithm methodology and the two annexes, the Agency has deemed the following amendments necessary:

- (a) The content of chapter 1 of the proposed Annex 2 called 'Background' is already covered in the 'whereas' of the Algorithm methodology and has therefore been deleted.
- (b) Chapter 2 of the proposed Annex 2, which contains the definitions, has been deleted as this is already covered in Article 2 of the Algorithm methodology.
- (c) The column assigning the content of the requirements to the category of market coupling operator functions or scheduled exchange calculation functions has been deleted as the assignments of requirements were inconsistent in this category and the necessity of this categorisation was not given.
- (d) Chapter 3 of the proposed Annex 2 covers the description of the columns, which are categorising the different requirements. These descriptions are seen as redundant as the remaining labelled columns are understandable in combination with the content of the main document and have therefore been deleted.
- (e) Footnotes have been deleted when assessed as redundant or directly added to the concerned requirement.
- (f) For a clearer distinction between the two algorithms throughout the whole document, 'algorithm' in Annex 2 has been changed to 'continuous trading matching algorithm'.
- (g) To support consistency with the rest of the document concerning defined terms, some wordings have been adjusted, e.g. 'scheduled flows' has been replaced by 'scheduled exchanges'.
- (h) Additional adjustments of the text have been required to enhance better correspondence with the existing legislation, e.g. the requirement in point 1.1(s)(iv) 'Construction of the local view must take into account price limits set per bidding zone' has been changed to

'Construction of the local view must take into account the harmonised maximum and minimum clearing prices for SIDC'.

- (i) The structure of some sentences has been changed for a better understanding, e.g. the requirement in point 4.3 'Regarding the calculation results the output of the algorithm, that output shall be necessary for monitoring in accordance ...' has been changed to 'Regarding the calculation results the output of the continuous trading matching algorithm, shall be the output necessary for monitoring in accordance ...'.

(126) The Agency has deemed it necessary to perform some additional minor editorial amendments to enhance readability.

(127) The categorisation of ownership in the proposed Annex 2 was not always very plausible and it was difficult to follow a consistent line concerning the assignment of requirements to this category. Even though a lot of requirements can be assigned to either category in this column with some broader reasoning, in some cases this categorisation is obviously wrong. Therefore, amendments to this categorisation have been made in consultation with all NEMOs and all TSOs.

5.8 Assessment of other points of the Proposal

(128) The Agency has introduced several editorial amendments. The most significant one relates to the transformation of the document into a format which enables enforceability. Further, the wording and ordering of some chapters has been changed in order to improve readability and clarity.

6 CONCLUSION

(129) For all the above reasons, the Agency considers the Amended Proposal in line with the requirements of the CACM Regulation, provided that the amendments described in this Decision are integrated in the Amended Proposal, as presented in Annexes I, II and III to this Decision.

(130) Therefore the Agency approves the Amended Proposal subject to the necessary amendments and to the necessary editorial amendments. To provide clarity, Annexes I, II and III to this Decision set out the Amended Proposal as amended and as approved by the Agency,

HAS ADOPTED THIS DECISION:

Article 1

The methodology and the common set of requirements for the price coupling algorithm and the continuous trading matching algorithm, developed pursuant to Article 37 of Regulation (EU) 2015/1222, are adopted as set out in Annexes I, II and III to this Decision.

Article 2

This Decision is addressed to:

- BSP Regionalna Energetska Borza d.o.o.
- CROPEX Ltd
- DAPEEP SA
- EirGrid plc
- EPEX SPOT SE
- EXAA AG
- GME Spa
- HUPX Zrt.
- Independent Bulgarian Power Exchange (IBEX)
- NordPool AS
- OKTE a.s.
- OMIE S.A.
- OPCOM S.A.
- OTE a.s.
- SONI Ltd
- Towarowa Gielda Energii S.A.

Done at Ljubljana on 26 July 2018.

For the Agency:


Alberto Pototschnig
Director

Annexes:

Annex I – Methodology for the price coupling algorithm and the continuous trading matching 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

Annex Ia – Methodology for the price coupling algorithm and the continuous trading matching 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 in track change compared to the Amended Proposal (for information only)

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

Annex IIa - Annex 1 to the Algorithm methodology: Common set of requirements for the price coupling algorithm in track change compared to the Proposal for a common set of requirements for the price coupling algorithm (for information only)

Annex III - Annex 2 to the Algorithm methodology: Common set of requirements for the continuous trading matching algorithm

Annex IIIa - Annex 2 to the Algorithm methodology: Common set of requirements for the continuous trading matching algorithm in track change compared to the Proposal for a common set of requirements for the continuous trading matching algorithm (for information only)

Annex IV - Evaluation of responses to the consultation of regulatory authorities, NEMOs, TSOs and other market participants on the Amended Proposal

In accordance with Article 19 of Regulation (EC) No 713/2009, the addressees may appeal against this Decision by filing an appeal, together with the statement of grounds, in writing at the Board of Appeal of the Agency within two months of the day of notification of this Decision.