DECISION No 03/2023
OF THE EUROPEAN UNION AGENCY
FOR THE COOPERATION OF ENERGY REGULATORS

of 18 January 2023

on the long-term capacity calculation methodology of the Core capacity calculation region

THE EUROPEAN UNION AGENCY FOR THE COOPERATION OF ENERGY REGULATORS,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EU) 2019/942 of the European Parliament and of the Council of 5 June 2019 establishing a European Union Agency for the Cooperation of Energy Regulators[1] ('ACER'), and, in particular, Article 5(3) and Article 6(10) thereof,

Having regard to Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation ('FCA Regulation')[2], and, in particular, Article 4, paragraphs (5), (7)(a) and (10) thereof,

Having regard to the outcome of the consultation with the concerned regulatory authorities and transmission system operators,

Having regard to the outcome of the consultation with ACER's Electricity Working Group ('AEWG'),

Having regard to the favourable opinion of the Board of Regulators of 13 January 2023, delivered pursuant to Article 22(5)(a) of Regulation (EU) 2019/942,

Whereas:

[1] OJ L 158, 14.6.2019, p. 22.
[2] OJ L 259, 27.9.2016, p. 42.

1 INTRODUCTION

(1) The FCA Regulation sets out requirements for cross-zonal capacity allocation and congestion management in the long-term time frame in electricity. These requirements include the development of a common capacity calculation methodology ('CCM') in each of the capacity calculation regions ('CCR') in accordance with Article 10 of this Regulation.

(2) Pursuant to Article 4(1), Article 4(7)(a) as well as Article 10 of the FCA Regulation, transmission system operators ('TSOs') of each CCR, such as those of the Core CCR ('Core TSOs'), are required to jointly develop a proposal for a common CCM for long-term time frames within their respective region and submit it to the regulatory authorities of that region for approval. The regulatory authorities are required to reach an agreement and take a decision on the proposal for CCM within six months after the receipt of the proposal by the last regulatory authority, according to Article 4(9) of the FCA Regulation. Where the regulatory authorities have not been able to reach an agreement within the six-month period, or upon their joint request, ACER shall adopt a decision concerning the proposal within 6 months, in accordance with Article 4(10) of the FCA Regulation, as well as Article 5(3) and point (b) of the second subparagraph of Article 6(10) of Regulation (EU) 2019/942.

(3) By Decision No 14/2021 of 3 November 2021 on the long-term capacity calculation methodology of the Core capacity calculation region ('Decision 14/2021'), ACER approved the Core TSO's proposal of November 2021 for a 'common coordinated long-term capacity calculation methodology in accordance with article 10 of Commission Regulation (EU) 2016/1719', on which the regulatory authorities of the Core CCR ('Core regulatory authorities') could not agree. ACER approved the long-term CCM ('LT CCM') proposed by the Core TSOs subject to amendments.

(4) Following an appeal by Polish TSO Polskie Sieci Elektroenergetyczne S.A. ('PSE') against Decision 14/2021, ACER's Board of Appeal remitted the case to the competent body of ACER by Decision A-001-2022 of 7 July 2022 ('BoA Decision A-001-2022').

(5) The present Decision replaces Decision 14/2021. Annex I to this Decision sets out the Core LT CCM as decided by ACER.

2 PROCEDURE

2.1 Proceedings before the Core regulatory authorities

(6) By letter of 29 August 2019, the Core TSOs informed the Core regulatory authorities and ACER that they had failed to meet the deadline set out in Article 10(1) of the FCA Regulation regarding the development of a proposal for the Core LT CCM.[3]

(7) During a teleconference of 5 December 2019 between representatives of the European Commission, ACER, the Core regulatory authorities and the Core TSOs, the following was agreed:

(a) By 9 December 2019, the Core TSOs would submit to the Core regulatory authorities the results of their first experimentation and a high-level explanation, followed by an oral assessment of the results during the Core Implementation Group (IG) meeting of 13 December 2019;

(b) By 17 December 2019, the Core TSOs would provide a report with a more detailed assessment of the preliminary results, together with an updated timeline for adopting the methodology; and

(c) By 19/20 December 2019, the European Commission would discuss the results of the first experimentation with ACER and the Core regulatory authorities, and define the way forward.

(8) By email of 27 January 2020, the Core TSOs provided to the Core regulatory authorities the "Core TSOs' Long-Term Capacity Calculation Interim Experimentation Report" ('Experimentation Report'). In the accompanying letter, the Core TSOs proposed further experimentation.

(9) During a conference call on 11 February 2020 between the European Commission, ACER, the Core regulatory authorities and the Core TSOs, it was questioned whether further experimentations would bring fundamentally different results to those already presented by the TSOs. It was decided to stop experimentations and to explore three alternative approaches: (a) a statistical approach with coordinated NTC allocation, (b) a scenario-based approach with flow-based allocation; and (c) a statistical approach

[3] Article 10(1) of the FCA Regulation requires the submission of the proposal no later than six months after the approval of the common coordinated capacity calculation methodology referred to in Article 9(7) of Commission Regulation (EU) 2015/1222 ('CACM Regulation'). This methodology was approved for the Core CCR on 21 February 2019 by ACER Decision No 02/2019. Therefore, the Core TSOs were required to submit the proposal for the Core LT CCM by 21 August 2019.

with flow-based allocation. The Core TSOs agreed to provide a high-level qualitative analysis of the three alternative approaches by 20 March 2020.

(10) At the Core IG meeting of 15 April 2020, the Core TSOs informed that there was no agreement among them as to the preferred approach. ACER proposed for the Core LT CCM the scenario-based approach with flow-based allocation, and with a possibility for a coordinated NTC as a transitional solution. The Core TSOs were asked to provide their position on ACER's proposed approach.

(11) At the Core IG meeting of 25 May 2020, the Core regulatory authorities supported the approach proposed by ACER.

(12) By email of 3 September 2020, the Core TSOs communicated that at their Steering Group meeting of 2 September 2020, they had agreed to focus on the targeted methodology for the implementation, i.e. with flow-based calculation and allocation, consequently to leave aside coordinated NTC extraction including the ideas of min-max bounds or variable minimum RAM calibrated on historical capacities that would have been included in the methodology, and to continue the discussion on the implementation timeline.

(13) On 16 September 2020, the Core TSOs launched a public consultation on a proposal for a common LT CCM based on a direct implementation of a scenario-based flow-based approach. On 21 October 2020, the Core regulatory authorities provided their shadow opinion on the consulted proposal to the Core TSOs.

(14) On 26 November 2020, the Core TSOs started the formal submission process to the Core regulatory authorities. The last Core regulatory authority received the Proposal on 23 December 2020. The formal submission included the following documents:

(a) Core CCR TSOs common coordinated long-term capacity calculation methodology in accordance with Article 10 of Commission Regulation (EU) 2016/719 of 26 September 2016 establishing a guideline on forward capacity allocation ('the Proposal')[4]; and

(b) Explanatory document to the Core CCR TSOs common coordinated long-term capacity calculation methodology in accordance with Article 10 of Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation ('Explanatory document');

[4] The Core TSOs' Proposal is referred to in this Decision as 'the Proposal'. The same proposal amended by ACER and provided in Annex I to this Decision is referred to as 'the amended Proposal'.

(c) Consultation Report on Core CCR TSOs' methodology for long-term capacity calculation in accordance with Article 10 of the Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity Allocation.[5]

2.2 Proceedings before ACER

(15) By letter of 29 April 2021, the Chair of the Core Energy Regulators' Regional Forum (CERRF)[6], acting on behalf of the Core regulatory authorities, referred the Proposal to ACER for a decision pursuant to Article 4(10) of the FCA Regulation. As explained in the letter, the Core regulatory authorities jointly concluded that the Proposal insufficiently takes into account their shadow opinion of 21 October 2020 and provides an excessively long implementation timeline. Furthermore, the Core regulatory authorities concluded that they are not in a position to approve the submitted Proposal, or request further amendments, since they are not able to find a common agreement on several key aspects of the Proposal.

(16) A detailed description of the individual and joint positions of the Core regulatory authorities are presented in the "Non-paper of all Core regulatory authorities on Core TSOs common coordinated long-term capacity calculation methodology proposal in accordance with Article 10 of Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation" ('non-paper') provided to ACER on 2 June 2021. In particular, the Core regulatory authorities had divergent views on the following key aspects of the Proposal:

(a) Methodology for allocation constraints;

(b) Methodology for critical network elements and contingencies (CNECs)[7] selection;

(c) Scenarios and calculation timestamps;

(d) Computation of power transfer distribution factors (PTDF);

[5] Available at: https://eepublicdownloads.entsoe.eu/clean-documents/Network%20codes%20documents/Implementation/ccr/methodologies/20201125_Core_LTCC_Public_Consultation_Report.pdf.
[6] CERRF is a platform of the Core regulatory authorities to consult and cooperate for reaching a unanimous agreement on NEMO's and TSO's proposals.
[7] The acronym for Critical Network Element is 'CNE' and for Critical Network Element with Contingency it is 'CNEC'.

(e) Computation of the remaining available margin (RAM) on critical network elements;

(f) Validation methodology;

(g) Long-term product definition;

(h) Publication of data; and

(i) Timescale for implementation and connection to other acts.

(17) On 5 July 2021, ACER launched a public consultation[8] on the Proposal, inviting all the interested parties to submit their comments by 31 July 2021. In the consultation survey, ACER asked stakeholders to provide views on six key aspects of the Proposal: (i) application of the flow-based approach; (ii) selection of critical network elements; (iii) application of minimum remaining available margin (minimum RAM); (iv) application of allocation (external) constraints limiting total import or export of a bidding zone; (v) implementation timeline and revision of the methodology; (vi) other proposed amendments, such as the application of alternating current (AC) load flow, fallback procedure and data publication. The summary and evaluation of the responses received are presented in Annex II to this Decision.[9] ACER also organised a public consultation workshop with all the interested stakeholders, on 9 July 2021.

(18) Moreover, ACER has engaged in extensive discussions with the Core TSOs and the Core regulatory authorities and consulted them on the amendments to the proposed LT CCM via numerous teleconferences and exchanges of documents, including a hearing phase between 3 and 17 September 2021. ACER has also carried out an experimentation of the proposed LT CCM by simulating the yearly capacity calculation and auctions on the basis of the grid data from 2020 provided by the Core TSOs and market participants' bids available at the Joint Allocation Office (JAO). The complete experimentation results were shared with all Core regulatory authorities and TSOs.

(19) In particular, the following procedural steps have been taken:

26 May 2021	Kick-off meeting (teleconference) with the Core TSOs and the Core regulatory authorities;
2 June 2021	Working meeting (teleconference) with the Core TSOs and the Core regulatory authorities;

[8] PC_2021_E_06.
[9] Non-confidential responses are published on ACER's consultation page: PC_2021_E_06.

8 June 2021	Information on the Core LT CCM process provided to the Forward Capacity Allocation Task Force (FCA TF);
16 June 2021	Working meeting (teleconference) with the Core TSOs and the Core regulatory authorities;
21 June 2021	Mathematical formulation of explicit flow-based auctions provided to the Core TSOs and the Core regulatory authorities;
30 June 2021	Working meeting (teleconference) with the Core TSOs and the Core regulatory authorities;
1 July 2021	Information on the Core LT CCM process provided at the Core regulatory authorities meeting;
5 July 2021	Draft amended Proposal for the Core LT CCM provided to the Core TSOs and the Core regulatory authorities;
7 July 2021	Working meeting (teleconference) with the Core TSOs and the Core regulatory authorities;
7 August 2021	Preliminary flow-based capacity calculation results from ACER's experimentation provided to the Core TSOs and the Core regulatory authorities;
24 August 2021	Information on the Core LT CCM process provided to the FCA TF;
30 August 2021	Draft amended Proposal for the Core LT CCM, including ACER's reasoning for amendments, as well as draft experimentation results (auctions simulations) provided to the Core TSOs and the Core regulatory authorities;
31 August 2021	Working meeting (teleconference) with the Core TSOs and the Core regulatory authorities;
31 August 2021	Full experimentation results (auctions simulations with original bids from 2020) and examples of the minimum RAM and PTDF threshold application provided to the Core TSOs and the Core regulatory authorities;
1 September 2021	ENTSO-E feedback regarding the common grid modelling action plan provided to the Core TSOs and the Core regulatory authorities;
3 September 2021	Draft amended Proposal for the Core LT CCM, public consultation replies and additional examples of minimum RAM

	application provided to the Core TSOs and the Core regulatory authorities (start of the hearing phase);
7 September 2021	Working meeting (teleconference) with the Core TSOs and the Core regulatory authorities, dedicated to the experimentation results;
7 September 2021	Information on the Core LT CCM process provided to the AEWG;
8 September 2021	Additional experimentation results (auctions with bids with averaged prices), minimum RAM examples and the example of calculating clearing prices and congestion revenue provided to the Core TSOs and the Core regulatory authorities;
9 September 2021	Information on the Core LT CCM process provided to the Core national regulatory authorities meeting;
10 September 2021	Additional experimentation results (auctions with minimum RAM based on historical NTC values) provided to the Core TSOs and the Core regulatory authorities;
15 September 2021	Oral hearing of the French TSO and the French regulatory authority;
16 September 2021	Oral hearing of the Dutch, Belgian and French regulatory authorities;
17 September 2021	Examples of calculation of economic surplus (social welfare) and maximum non-simultaneous bilateral exchanges provided to the Core TSOs and the Core regulatory authorities;
17 September 2021	Closure of the hearing phase;
8 October 2021	AEWG's advice on the draft amended Proposal for the Core LT CCM;
27 October 2021	BoR's opinion on the draft amended Proposal for the Core LT CCM;
3 November 2021	BoR's favourable opinion on the final amended Proposal for the Core LT CCM.

(20) On 15 November 2021, ACER published its Decision 14/2021.

(21) On 3 January 2022, PSE brought an appeal against Decision 14/2021.

(22) On 7 July 2022, by Decision A-001-2022, the Board of Appeal declared part of PSE's appeal as well-founded and remitted the case to the competent body of ACER. The Board of Appeal found an error in the way in which Article 17(1)(c) of Annex I to Decision 14/2021 restricted the TSOs' right to correct long-term capacity at the validation stage. Article 17(1)(c) of Annex I to Decision 14/2021 provided that a Core TSO may do an individual validation adjustment where the TSO requiring an adjustment provides justification that the calculated level of a RAM is unable to ensure operational security, which cannot be modelled via the input data for the capacity calculation process. According to the Board of Appeal, this provision did not cover security constraints that can be modelled, and which are overwritten by the minRAM application (precisely because they can be modelled), thereby creating an ambiguity.

(23) Following the BoA Decision A-001-2022, the following steps were taken:

7 October 2022	Teleconference meeting with PSE;
17 October 2022	Teleconference meeting with PSE;
19 October 2022	Information on the Core LT CCM amendment process provided to the Core regulatory authorities;
20 October 2022	Information on the Core LT CCM amendment process provided to the Core regulatory authorities and TSOs at the Core Implementation Group meeting;
11 November 2022	Draft amended Decision and Core LT CCM provided to the Core TSOs and Core regulatory authorities;
23 November 2022	Discussion of ACER's intended revisions of the Decision and Core LT CCM at the AEWG;
25 November 2022	Oral hearing meeting with Core TSOs and regulatory authorities;
5 December 2022	AEWG's advice on the draft amended Decision and Core LT CCM;
13 January 2023	BoR's favourable opinion on the draft amended Decision and Core LT CCM.

3 ACER'S COMPETENCE TO DECIDE ON THE PROPOSAL

(24) Pursuant to point (b) of the first subparagraph of Article 5(3) of Regulation (EU) 2019/942, all regulatory authorities of the region concerned shall unanimously agree on proposals for terms and condition or methodologies for the implementation of those network codes or guidelines that were adopted before 4 July 2019 and require the

approval of all the regulatory authorities of the region concerned; pursuant to the second subparagraph of Article 5(3) of Regulation (EU) 2019/942, those regulatory authorities may refer the proposals to ACER for approval pursuant to point (b) of the second subparagraph of Article 6(10) of Regulation (EU) 2019/942, and they shall do so pursuant to point (a) of the second subparagraph of Article 6(10) of that Regulation where they did not reach a unanimous agreement.

(25) Pursuant to Article 4(7)(a) of the FCA Regulation, which has been adopted as a guideline before 4 July 2019, the proposal for a common capacity calculation methodology pursuant to Article 10 of the same Regulation shall be subject to approval by all regulatory authorities of the concerned region.

(26) Pursuant to Article 4(10) of the FCA Regulation, where the regulatory authorities have not been able to reach an agreement on the submitted proposal within 6 months, or upon their joint request, ACER shall adopt a decision concerning the submitted proposal in accordance with Article 5(3) and the second subparagraph of Article 6(10) of Regulation (EU) 2019/942.

(27) Pursuant to Article 4(5) of the FCA Regulation, ACER, before approving the terms and conditions or methodologies, shall revise the proposals where necessary, after consulting the respective TSOs, in order to ensure that they are in line with the purpose of the FCA Regulation and contribute to market integration, non-discrimination, effective competition and the proper functioning of the market.

(28) On 29 April 2021, the Core regulatory authorities informed ACER that they are not able to reach an agreement on the Proposal, nor request amendments, and have jointly requested ACER to take a decision in that matter. Therefore, ACER is competent to decide on the Proposal based on Article 4(10) of the FCA Regulation, Article 5(3) and point (b) of the second subparagraph of Article 6(10) of Regulation (EU) 2019/942.

4 SUMMARY OF THE PROPOSAL

(29) The Core TSOs' Proposal for the LT CCM consists of the following elements:

'Whereas'	Recitals 1 to 16	Explains the purpose of the LT CCM and how it promotes the objectives of the FCA Regulation;
Title 1	Articles 1 to 3	**General provisions** cover the subject matter and the scope of the methodology, definitions and a high-level long-term capacity calculation process;
Title 2	Articles 4 to 11	**Treatment of input** describes methodologies for the calculation of the inputs, i.e. reliability margin, operational security limits, allocation constraints, critical network elements with contingencies, generation shift keys, remedial actions in capacity calculation, scenarios and calculation

		timestamps, and integration of cross-zonal high voltage direct current interconnectors;
Title 3	Articles 12 to 16	**Description of the capacity calculation process** provides a description of the capacity calculation approach; i.e. treatment of inputs and capacity calculation outputs, calculation of PTDF, the calculation of RAM on CNECs, consideration of non-Core bidding zone borders and the fallback procedure;
Title 4	Article 17	**Validation process** provides the capacity validation methodology;
Title 5	Article 18	**Updates** set out the provisions on methodology review and updates;
Title 6	Articles 19 to 20	**Report** covers the publication of data, provision of information for monitoring by the regulatory authorities;
Title 7	Articles 21 to 22	**Implementation and language** sets out the implementation timeline for the methodology and language provisions; and
Annex 1		Provides the justification for calculation of external constraints and its application.

5 SUMMARY OF THE OBSERVATIONS RECEIVED BY ACER

5.1 Initial views of the Core regulatory authorities

(30) In the letter of the Chair of the CERRF of 29 April 2021, and the non-paper of 2 June 2021, the Core regulatory authorities reported shortcomings of the Proposal.

(31) In the non-paper, the Core regulatory authorities have reached an agreement on several aspects of the Proposal, in particular:

(a) The Core regulatory authorities recognise that the process of preparing scenarios and calculation timestamps could improve in several aspects, such as base case quality and the application of the common grid model exchange standard (‘CGMES’) format;

(b) The Core regulatory authorities expect that in order to be efficiently implemented in the future, the Proposal should provide concrete steps, or at least references, for the formation of the long-term products, and its correlation with applied network scenarios;

(c) Regarding the calculation of reference flow (Fref), the Core regulatory authorities are of the view that common grid models should be robust enough to support the alternating current ('AC') load flow solution;

(d) The Core regulatory authorities support the increase in transparency of the LT CCM;

(e) The Core NRAs agree that the proposed implementation timescale of five years is excessively long for the required developments.

(32) In the non-paper, the Core regulatory authorities failed to reach an agreement on several aspects of the Proposal, in particular:

(a) The application of the allocation constraints, in particular the external constraints, by the Dutch and the Polish TSOs, as explained in Annex 1 of the Proposal;

(b) The methodology for CNEC selection, in particular its compatibility with the DA CCM;

(c) The application of the PTDF sensitivity threshold for the long-term capacity allocation;

(d) The level of minimum RAM threshold; and

(e) The proposed validation methodology.

5.2 Engagement with the Core TSOs and the Core regulatory authorities

(33) During the decision-making process for Decision 14/2021, ACER engaged in in-depth discussions with the Core TSOs and the Core regulatory authorities. In particular, ACER:

(a) took into account the Core TSOs' proposals and the improvements aspects suggested by the Core regulatory authorities with regard to the application of common grid models on the basis of the Common Grid Model Methodology ('CGMM')[10] pursuant to Article 18 of the FCA Regulation, and proposed amendments to the Proposal which enable a flexible modelling approach (increased CGM granularity and application of planned outages), suitable for the Core LT CCM, until the next CGMM amendment;

[10] https://eepublicdownloads.entsoe.eu/clean-documents/nc-tasks/CGMM%20amended%20proposal%20approved.pdf

(b) specified the capacity calculation outputs in relation to the possible application for the long-term flow-based capacity auctions, providing the definition of these outputs as a union of constraints calculated on the basis of all applied common grid models at yearly and monthly auctions respectively;

(c) provided concrete analyses to support the application of AC load flow for the reference flow calculation, based on experimentation;

(d) aligned transparency requirements with the corresponding requirements of the Core DA CCM;

(e) discussed the implementation process in detail, in order to define a feasible implementation deadline in the light of required developments;

(f) analysed the need for the application of allocation constraints to ensure compatibility with their application in the day-ahead time frame;

(g) discussed the reasons for ensuring compatibility between the initial CNEC list applied in the long-term time frames with the one applied in the day-ahead time frame;

(h) provided relevant examples to support the proposal to omit the PTDF sensitivity threshold for the long-term capacity allocation, based on the need to maintain the additivity of applied PTDF values and the consequential clearing prices;

(i) carried out necessary experimentation to support the decision of the minimum RAM selection, by simulating the yearly auctions with different level of minimum RAM applied; and

(j) aligned the validation methodology with realistic assumptions regarding its application in the long-term time frame.

(34) Following the remittal of the case by BoA Decision A-001-2022, ACER consulted PSE about possible ways to address the error found by the Board of Appeal and informed the Core regulatory authorities and the TSOs at meetings on 19 and 20 October accordingly.

(35) At the Core Implementation Group meeting on 20 October 2022 amendments of the Core long-term splitting methodology were discussed, including the combined application of minimum RAM at yearly level and long-term splitting factor, which would ensure the availability of minimum RAM upon the yearly capacity calculation process. Some Core TSOs and regulatory authorities were of the opinion that such a provision is more suitable for the Core LT CCM than for the Core long-term splitting methodology. To this end, ACER proposed to use the opportunity of amending the Core

LT CCM to also modify the provisions related to the application of splitting factor in combination with yearly minimum RAM.

(36) In response to ACER's preliminary position for the present Decision, which focused on the changes to the proposed Core LT CCM compared to the one under Decision 14/2021, the following comments were received:

(a) All Core TSOs submitted a joint response. They expressed legal and substantive concerns against including the proposed modification related to the application of the splitting factor in the present methodology amendment. They did not object the proposed changes to Article 17(1) and (2), but suggested improvements of the wording in Article 17(2);

(b) URE partially shared the TSOs' legal concerns against including the proposed modification related to the application of the splitting factor in the present methodology amendment; and

(c) ILR commented on the consequences of the application of proposed modification to the different levels of minimum RAM.

5.3 Public consultation

(37) Responses to ACER's public consultation (see paragraph (17) above) are summarised in Annex II to this Decision. A summary of key comments is provided below:

(a) Majority of stakeholders supported the application of a flow-based approach, while some did not agree that the flow-based approach would be more efficient than the coordinated NTC-based approach;

(b) Majority of stakeholders supported ACER's proposal for a more coordinated approach to the CNEC selection.

(c) Majority of stakeholders supported the application of a minimum RAM value higher than 20% of maximum flow (Fmax) provided in the Core TSOs' Proposal;

(d) Majority of stakeholders were against the inclusion of external constraints, while some stakeholders saw the need to apply them in the long-term time frame;

(e) Some stakeholders were concerned about the 2.5 years implementation deadline proposed by ACER and stressed the importance of providing sufficient time for the application of the Core LT CCM;

(f) Some stakeholders highlighted the need for additional transparency in data publication, in particular in the context of the reliability margin, operational security limits, and capacity validation.

5.4 Consultation of the AEWG

(38) With regard to the draft Decision underlying Decision 14/2021, the AEWG provided its advice on 8 October 2021 and broadly endorsed that draft Decision, noting that:

(a) the set minRAM values of 20% (yearly) + 10% (monthly) seem to be a good starting point, further analyses are needed during the implementation period;

(b) the final Core LT CCM Decision should balance the need for proper governance related to crucial elements of the methodology with avoiding barriers for the timely implementation of the methodology; and

(c) stakeholders should be informed in more detail about the consequences of the Core LT CCM Decision.

(39) Five regulatory authorities provided individual comments during the consultation phase. These related to:

(a) the setup of minimum RAM values and/or its governance; in particular, two regulatory authorities were concerned about the possibility of amending the minRAM values by the Core TSOs' Steering Committee;

(b) the need to inform market participants about the experimentation results provided at the market electricity system committee (MESC) held on 29 September 2021; and

(c) potential interactions of the Core LT CCM with other methodologies.

(40) With regard to the present Decision, the AEWG provided its advice on 5 December 2022 and broadly endorsed the draft Decision. In that context, ARERA, the Italian Regulatory authority, noted that regulatory authorities other than those of the Core CCR should be invited to the technical discussions concerning the Core CCR, and that in particular ARERA should be involved in the technical debates in view of the expectation that the Italy North CCR and the Core CCR would be merged. ARERA did not have any content-related comments on the present LT CCM.

(41) ACER has considered AEWG's advices and the individual comments in finalising this Decision, and further discussed bilaterally with the respective regulatory authorities, where needed.

6 ASSESSMENT OF THE PROPOSAL

6.1 Legal framework

(42) Article 4(1), Article 4(7) (a) and Article 10(1) of the FCA Regulation require the TSOs of each CCR to develop a proposal for a common long-term CCM within their

respective region and submit it to the regulatory authorities of that region for approval by the deadline set out in the Regulation.

(43) Article 10(1) of the FCA Regulation further specifies that the TSOs of a CCR shall submit the proposal for a common long-term CCM no later than six months after the approval of the common coordinated capacity calculation methodology referred to in Article 9(7) of the CACM Regulation, and that such proposal shall be consulted in accordance with Article 6 of the FCA Regulation.

(44) Article 10(2) of the FCA Regulation requires that the approach used in the common long-term CCM shall be either a coordinated NTC approach or a flow-based approach.

(45) Article 10(5) of the FCA Regulation sets out three conditions for the application of the flow-based approach for long-term capacity calculation time frames. First, the flow-based approach must lead to an increase of economic efficiency in the CCR with the same level of system security. Second, the transparency and accuracy of the flow-based results must be confirmed in the CCR. Third, the TSOs must provide market participants with six months to adapt their processes.

(46) Article 10(3) of the FCA Regulation requires that the common long-term CCM shall be compatible with the DA and IT CCM pursuant to Article 21(1) of the CACM Regulation.

(47) Pursuant to Article 10(4) of the FCA Regulation, uncertainty associated with long-term capacity calculation time frames shall be taken into account when applying a security analysis pursuant to subparagraph (a) of that paragraph; or a statistical approach based on historical cross-zonal capacity for DA or ID time frames under conditions listed in subparagraph (b) of that paragraph.

(48) Pursuant to Article 10(6) of the FCA Regulation, where a security analysis based on multiple scenarios is applied for developing the CCM, the requirements for the capacity calculation inputs, the capacity calculation approach and the validation of cross-zonal capacity as provided for in Article 21(1) of the CACM Regulation, except Article 21(1) (a) (iv) where relevant, shall apply.

(49) In terms of capacity calculation approach, Article 21(1)(b) of the CACM Regulation requires that such approach shall include the following:

(a) a mathematical description of the applied capacity calculation approach with different capacity calculation inputs;

(b) rules for avoiding undue discrimination between internal and cross-zonal exchanges to ensure compliance with point 1.7 of Annex I to Regulation (EC) No 714/2009. While this Regulation, including point 1.7 of Annex I, has been repealed by Regulation (EU) 2019/943, the principle of non-discrimination has been retained under Article 16 of Regulation (EU) 2019/943.

(c) rules for taking into account, where appropriate, previously allocated cross-zonal capacity;

(d) rules on the adjustment of power flows on critical network elements or of cross-zonal capacity due to remedial actions in accordance with Article 25 of the CACM Regulation;

(e) for the flow-based approach, a mathematical description of the calculation of power transfer distribution factors and of the calculation of available margins on critical network elements;

(f) where the power flows on critical network elements are influenced by cross-zonal power exchanges in different capacity calculation regions, the rules for sharing the power flow capabilities of critical network elements among different capacity calculation regions in order to accommodate these flows.

(50) Article 10(7) of the FCA Regulation requires that the common long-term CCM applies the requirements for the fallback procedures and the requirement provided for in Article 21(3) of the CACM Regulation.

(51) Article 11 of the FCA Regulation requires that the proposal for a common long-term CCM includes a reliability margin methodology in line with requirements of Article 22 of the CACM Regulation.

(52) Article 12 of the FCA Regulation requires that the proposal for a common CCM includes methodologies for operational security limits and contingencies which comply with Article 23, paragraphs (1) and (2), of the CACM Regulation.

(53) Article 13 of the FCA Regulation requires that the proposal for a common CCM includes a methodology to determine generation shift keys which complies with Article 24 of the CACM Regulation.

(54) Article 14 of the FCA Regulation states that if remedial actions are taken into account in the long-term capacity calculation, each TSO shall ensure that those remedial actions are technically available in real time operation and meet the requirements set out in Article 25 of the CACM Regulation.

(55) Article 15 of the FCA Regulation requires that the proposal for a common CCM shall include a cross-zonal validation methodology which complies with Article 26 of the CACM Regulation.

(56) Regarding the capacity calculation process, Article 21(2) of the FCA Regulation requires that coordinated capacity calculators (‘CCC’) shall calculate the long-term cross-zonal capacities, and Article 21(3) of the FCA Regulation requires that it complies with the relevant requirements set in Article 27 of the CACM Regulation.

(57) Regarding regional calculations of long-term cross-zonal capacities, Article 23(2) of the FCA Regulation requires that Article 29 of the CACM Regulation (except Article 29(4) where relevant) applies to long-term capacity calculation time frames in CCRs where TSOs apply security analysis based on multiple scenarios.

(58) Article 24 of the FCA Regulation sets requirements related to the validation and delivery of cross-zonal capacity.

(59) In addition, Article 4(8) of the FCA Regulation requires that the proposals for terms and conditions or methodologies include a proposed timescale for their implementation and a description of their expected impact on the objectives of the Regulation.

6.2 Assessment of the legal requirements

6.2.1 Assessment of the requirements for the development of the LT CCM

6.2.1.1 Development of the Proposal

(60) In developing the Proposal, the Core TSOs partially fulfilled the requirements of Article 4(1), Article 4(7)(a) and Article 10(1) of the FCA Regulation. As required by these Articles, the Proposal covers a common LT CCM for the Core CCR, it has been developed jointly by the Core TSOs and subject to public consultation in accordance with Article 6 of the FCA Regulation (see next paragraph). However, the Core TSOs failed to submit the Proposal to the Core regulatory authorities by the required deadline, as noted in paragraphs (6) to (8).

(61) In developing the Proposal, the Core TSOs met the publication requirements set out in Article 6 of the FCA Regulation. In particular, on 16 September 2020 the Core TSOs organised a month-long public consultation on the draft Proposal, in line with Article 6(1) of the FCA Regulation. In November 2020, the Core TSOs have published a report[11] from the consultation providing justification for including or not the views resulting from the consultation, as required by Article 6(3) of the FCA Regulation.

6.2.1.2 Assessment of the general requirements (Article 10 of the FCA Regulation)

(62) The Proposal is compliant with Article 10(2) of the FCA Regulation in that the capacity calculation is based on a flow-based approach, as noted in Recital (11) of the Proposal.

(63) The Proposal does not fully comply with Article 10(3) of the FCA Regulation. Generally, compatibility with the DA and ID CCM is ensured by applying the same principles in the calculation of cross-zonal capacity and consistency in terms of considering the capacity calculation inputs across the different time frames. However,

[11] See footnote 5.

the selection of the initial CNEC list provided in Article 7 of the Proposal is not consistent with the selection of CNECs in the DA and ID CCM. ACER has amended the Proposal in this respect, in order to fully align it with the selection of CNECs in the DA and ID CCM (see section 6.2.2.3.1 of this Decision).

(64) The Proposal complies with Article 10(4) of the FCA Regulation as it applies a security analysis based on multiple scenarios.

(65) The Proposal does not specify how it complies with the conditions for the application of the flow-based approach set out in Article 10(5) of the FCA Regulation. ACER has amended the Proposal in order to ensure compliance with these conditions, and in the following paragraphs provides additional demonstration of meeting these conditions:

(a) Regarding the condition of Article 10(5)(a) according to which the flow-based approach must increase economic efficiency in the CCR with the same level of system security, ACER has performed an experimentation with the following steps:

(i) The aim was to compare the proposed long-term flow-based approach with the existing Net Transmission Capacity (NTC) approach, by comparing the simulated flow-based auctions with different levels of minimum RAM, with the realised NTC-based auctions, by using the same bids from realised auctions;

(ii) ACER used the TSOs' network input data from 2020 to calculate the flow-based parameters, and the data from realised NTC-based yearly long-term auctions from 2020, from the Joint Allocation Office ('JAO');

(iii) The outcomes of yearly NTC-based auctions from 2020 (data marked with 'ntc' in Figure 1) were compared with the simulated flow-based yearly auctions (data marked with 'fb' in Figure 1) with the same bids from the realised yearly auctions. At the 'fb' auctions, the calculated flow-based parameters were adjusted with the minimum RAM which reflects the NTC values applied at the yearly auctions, thus providing the same level of system security for both the currently applied NTC approach and the proposed flow-based approach;

(iv) The simulations have shown that the application of the flow-based approach increases economic efficiency in the Core CCR (characterised by highly meshed network and physically interdependent bidding zone borders) while maintaining the same level of system security. In such circumstances, the flow-based auctions ('fb') provide a 27% higher economic surplus (increase from 350 million EUR to 446 million EUR).

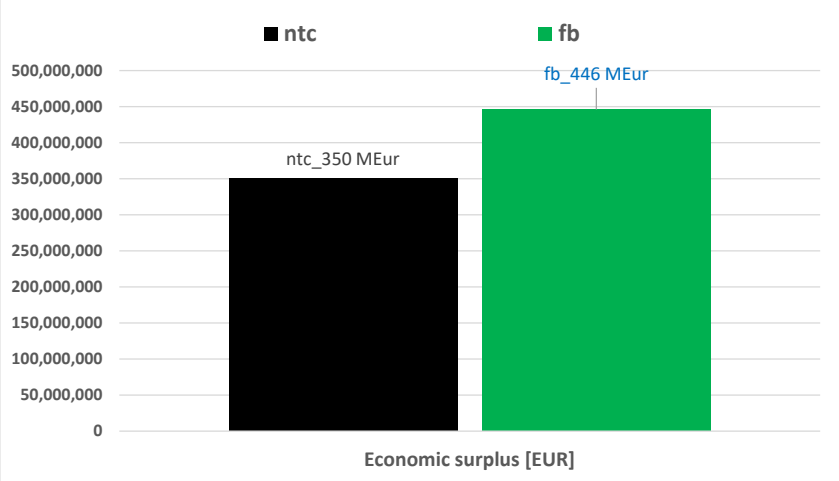


Figure 1: ACER's experimentation: comparison of Core NTC-based yearly auctions from 2020 with simulated flow-based yearly auctions with the same network security level

(b) In ACER's view, the Proposal does not fully comply with Article 10(5)(b) of the FCA Regulation requiring transparency and accuracy of the flow-based results to be confirmed in a CCR. ACER has thus amended the Proposal so that it meets this requirement:

(i) In order to enhance transparency, ACER has amended the provisions related to the publication of data, taking into account the recommendations of the Core regulatory authorities provided in the non-paper (Article 20 of the amended Proposal, see section 6.2.6.3 for more details).

(ii) In order to improve accuracy of the flow-based results, ACER has amended the application of AC load flow for the calculation of maximum flow (see paragraph (78)) and reference flow (see paragraph (114)), as well as removed the PTDF sensitivity threshold (see paragraph (105));

(c) The Proposal complies with Article 10(5)(c) of the FCA Regulation, as it provides a sufficiently long transitional period to the market participants to adapt their processes. The initial implementation phase of 5 years has been shortened by ACER to 3 years (see section 6.2.7), which still allows to provide the minimum period of 6 months required by Article 10(5)(c) of the FCA Regulation for testing the new approach with market participants.

(66) The Proposal complies with Article 10(6) of the FCA Regulation as it applies security analyses based on multiple scenarios pursuant to subparagraph (a) of Article 10(4) of the FCA Regulation and refers to the requirements set out in Article 21(1) of the CACM Regulation, as provided in paragraphs (68) and (69).

(67) The Proposal complies with Article 10(7) of the FCA Regulation, as it defines a fallback procedure in case the initial capacity calculation does not lead to any results, and refers to Article 21(3) of the CACM Regulation.

(68) The Proposal includes all the elements listed in Article 21(1)(a) of the CACM Regulation (as required by Article 10 of the FCA Regulation):

(a) a methodology for determining the reliability margin in Article 4 of the Proposal;

(b) a methodology for determining operational security limits in Article 5 of the Proposal;

(c) a methodology for allocation constraints in Article 6 of the Proposal and in Annex 1 of the Proposal;

(d) a methodology for determining contingencies relevant to capacity calculation in Article 7 of the Proposal;

(e) a methodology for determining generation shift keys in Article 8 of the Proposal; and

(f) a methodology for determining the remedial actions to be considered in capacity calculation in Article 9 of the Proposal.

(69) The Proposal includes a detailed description of the capacity calculation approach in line with the requirements of Article 21(1)(b), subparagraphs (i), (iii), (iv), (v) and (vii), of the CACM Regulation (as required by Article 10 of the FCA Regulation),[12] as it includes:

(a) a mathematical description of the applied capacity calculation approach, including the calculation of PTDF and RAM values, in Articles 13 and 14 of the Proposal;

(b) rules for taking into account previously allocated cross-zonal capacity in Article 14 of the Proposal;

(c) rules on the adjustment of power flows on critical network elements or of cross-zonal capacity due to remedial actions in Article 9 of the Proposal; and

(d) rules for sharing the power flow capabilities of critical network elements among different CCRs in order to accommodate these flows, in Article 15 of the Proposal.

[12] Article 21(1) (b) (vi) of the CACM Regulation does not apply as it refers to the NTC approach.

(70) ACER notes that the Proposal does not sufficiently include rules for avoiding undue discrimination between internal and cross-zonal exchanges, required by Article 21(1)(b)(ii) of the CACM Regulation. ACER has amended the Proposal requiring consistency of the initial CNEC selection with the DA CCM. As such, the rules governing the CNEC selection under DA CCM which avoid undue discrimination between internal and cross-zonal exchanges, would also apply to the long-time frame. ACER's amendment thus brings the Proposal in compliance with Article 21(1)(b)(ii) of the CACM Regulation.

(71) The Proposal includes, in its Article 17, a methodology for the validation of cross-zonal capacity in line with Article 21(1)(c) of the CACM Regulation (as required by Article 10 of the FCA Regulation).

6.2.2 Assessment of the requirements for the capacity calculation inputs

(72) Articles 11 to 14 of the FCA Regulation provide requirements for the capacity calculation inputs by referring to the corresponding provisions of the CACM Regulation, requiring methodologies for reliability margin, operational security limits and contingencies, generation shift keys and the rules for the use of remedial actions. In addition, for the LT CCM with a security analysis based on multiple scenarios, Article 23(2) of the FCA Regulation refers to Article 29 of the CACM Regulation, which includes, in paragraph 1, the requirement for TSOs to provide the CCC with the above mentioned capacity calculation inputs. While the CGM is also considered as a capacity calculation input for capacity calculation where security analysis based on multiple scenarios is applied, the methodology governing its establishment is defined in the CGMM pursuant to Article 22 of the FCA Regulation and therefore falls outside the scope of the LT CCM.

6.2.2.1 Methodology for reliability margin

(73) Article 4 of the Proposal meets the requirement of Article 11 of the FCA Regulation, in that it applies a flow reliability margin from the DA flow-based calculation for the long-term time frames.

(74) While there are more uncertainties in the long-term time frames than in the day-ahead one, ACER considers that the day-ahead reliability margin can be efficiently used in the long-term time frame under certain conditions. ACER notes that these conditions are met in the Proposal, as amended by ACER, therefore making the flow reliability margin from the day-ahead capacity calculation process suitable for the long-term time frames. In particular:

(a) The union of flow-based constraints from all calculation scenarios is used as a common set of constraints for each long-term auction, as this represents sufficiently conservative consideration of various constraints from different applied CGMs;

(b) The AC load flow is applied for the calculation of reference flow in the long-term time frame, as the day-ahead Core flow-based approach applies the direct current (DC) load flow, but does not take into account the inaccuracies originating from the differences between AC and DC load flow;

(c) The fact that applying options at the long-term explicit auctions of cross-zonal capacity does not allow for the formal consideration of netting of counter flows, ensures a sufficiently conservative capacity calculation approach.

(75) Having consulted with the Core TSOs and the Core regulatory authorities, ACER has amended Article 4 of the Proposal by adding a paragraph about the reliability margin for potential new critical network elements, with the initial flow reliability margin of 10% of the Fmax, which is also the value used in the Core DA CCM.

6.2.2.2 Methodologies for operational security limits and contingencies

(76) Article 5 and Article 7 of the Proposal relate to Article 12 of the FCA Regulation, which – by referring to the corresponding provisions of the CACM Regulation – requires that the TSOs apply the same operational security limits and contingencies that are used in operational security analysis, or, in the alternative, that the TSOs describe in the capacity calculation methodology the particular method and criteria for determining operational security limits and contingencies in the capacity calculation. These requirements relate to the choice of CNEs, contingencies and operational security limits applicable for CNEs. Article 5 of the Proposal specifies the methodology for the applicable operational security limits, whereas Article 7 of the Proposal specifies the methodology for determining critical network elements with contingencies.

6.2.2.3 Operational security limits

(77) The Proposal complies with the requirements of Article 23(1) and (2) of the CACM Regulation (referenced in Article 12 of the FCA Regulation). Article 5 of the Proposal requires the TSOs to apply the same operational security limits as in the operational security analysis pursuant to Article 25 of Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation, in a form of maximum current (‘Imax’).

(78) With regard to the calculation of maximum flow (Fmax), the Proposal defines a formula based on the reference voltage and the power factor equal to 1. Since, according to ACER’s proposal described in paragraph (114), AC load flow would be used for the reference flow calculation, ACER has amended the calculation of Fmax, by applying the voltages and the power factor resulting from the AC load flow, with the floor of 0.95 for both. The reference voltages and power factor equal to 1 would be used in case of AC load flow implausibility, as a fallback.

(79) In its experimentation on the basis of four CGMs, ACER has demonstrated the application of AC load flow values for the Fmax calculation, which is by definition

more accurate than using the reference values and power factor equal to 1. ACER has showed that using the AC load flow values also slightly increases the RAM values on average, and that auction simulations with AC load flow values of Fmax have a slightly higher economic surplus. These experimentation results have been shared with all Core TSOs and regulatory authorities.

6.2.2.3.1 Critical network elements and contingencies

(80) Article 7 of the Proposal provides the definition of the initial and final CNEC list. The selection is based on principles which treat all cross-border elements as CNEs, while the only limitation of the internal CNEs is the sensitivity towards the cross-zonal exchanges with a zone-to-zone PTDF threshold of 5%. As a result of this proposed approach, the LT CNEC list would potentially contain more internal CNECs than the corresponding day-ahead or intraday CNEC list, as at day-ahead and intraday processes, the internal CNECs are selected also taking into account the principles of economic efficiency.

(81) ACER notes that Article 10(3) of the FCA Regulation requires that the long-term capacity calculation methodology shall be compatible with the capacity calculation methodology established for the day-ahead and intraday time frames. In ACER's view, the initial selection of CNECs in long-term time frames should be the same as the initial selection of CNEC applied in the day-ahead and intraday time frame. Therefore, the LT CCM determines the CNECs by means of reference to the CNECs selected under the DA CCM. This way the LT CCM ensures coherence in all market time units, which is vital, resulting in a uniform initial list of CNECs applicable to all time frames.[13] The only exception to this compatibility may be the new network elements that are expected to come into operation during the time frame for which the capacities are being calculated. Accordingly, ACER has amended Article 7 of the Proposal to ensure that the selection of CNECs is the same as selection of CNECs in the DA and ID time frame.

(82) Some TSOs and one regulatory authority expressed concerns during the proceedings, that including additional internal CNECs would be required compared to DA and ID CCM in order to avoid an over-allocation of cross-zonal capacity in the long-term time frames causing either negative financial consequences or operational security problems. These TSOs and the regulatory authority explained that over-allocation of cross-zonal capacity would occur if the day-ahead cross-zonal capacities needed to be lower than long-term capacities and in such cases the costs of remuneration of LTTRs would be higher than the congestion income from reallocation of these LTTRs because not all

[13] By dynamically referring to the DA CCM, the LT CCM ensures coherence with the CNEC selection mechanism established in the DA CCM also in respect of the outcome of the pending judicial proceedings in case T-283/19, Germany v ACER, and the judgment of 7.11.2022 in case T-631/19, BNetzA v ACER.

LTTRs could be reallocated. On the other hand if TSOs needed to reallocate all LTTRs to day-ahead time frame, this could in case of over-allocation in long term time frame imply operational security problems in the day-ahead time frame.

(83) To address these concerns, ACER first notes that negative financial consequences due to over-allocation are unlikely because, according to Article 20 of the DA CCM (validation of flow-based parameters), the day-ahead cross-zonal capacities cannot be decreased below the level allocated in the long-term time frames. While ACER acknowledges that such prohibition could in theory lead to operational security problems in case of over-allocation, ACER has invited TSOs to review the prohibition of reduction of cross-zonal capacities in the DA CCM as this prohibition has been proposed by the TSOs themselves, and does not stem from any legal requirement. Secondly, ACER notes that if the day-ahead cross-zonal capacities could be reduced below the level of allocated long-term capacities, this would not necessarily imply negative financial consequences. These negative financial consequences would only occur if some long-term capacities were not reallocated in the day-ahead time frame and long-term congestion income would need to be used instead. However, the long term congestion income can either be lower or higher than remuneration costs and therefore, the TSOs could either lose or benefit from this situation. On average however, TSOs are not expected to lose or benefit from any situation where not all LTTRs are reallocated in the day-ahead time frame.

(84) Furthermore, ACER is of the view that over-allocation in the long-term time frames is highly unlikely due to the application of a conservative approach in the calculation and allocation of the long-term cross-zonal capacities. In particular, ACER notes that:

(a) The long-term auctions would simultaneously apply the union of constraints by all common grid models, with increased number of considered CGMs as described in Article 10 of the amended Proposal;

(b) The long-term time frame applies the explicit auctions for physical transmission rights (‘PTR’) or financial transmission rights-options (‘FTR-options’), which means that the corresponding flows are calculated in a worst-case manner, i.e. as if all burdening transactions would realise, and none of the relieving transactions would realise (thus without applying any netting among burdening and relieving flows). This further implies that the flows assumed in long term capacity calculation will less likely consume the available capacity in the form of RAM in the day-ahead time frame. Hence, the minimum RAM value in the long-term time frame is not directly comparable with the minimum RAM value in the day-ahead time frame[14],

[14] The minimum RAM in the day-ahead time frame is applied in the capacity calculation for the market coupling process assuming that cross-zonal capacities are allocated as obligations (in the sense that allocation by default

as it would likely not be fully exploited. For the same reason, allowing for a higher minimum RAM in the long-term time frame would not endanger network security;

(c) The level of minimum RAM provided in the long-term time frames (20% of Fmax in the yearly time frame and 10% of Fmax in the monthly time frame) is in sum much lower than the minimum requirement for the day-ahead time frame (70% of Fmax[15]) which the TSOs in any case need to accommodate on the same CNECs pursuant to Article 16(8) of Regulation (EU) 2019/943;

(d) According to the experimentation results, the minimum RAM of 30% (which to the high extent mirrors the simulated case of 30% of Fmax) actually implies somewhat less allocation of cross-zonal capacities compared to the actual auctions. The concern is therefore the opposite, i.e. that the methodology might under-allocate cross-zonal capacities. Yet ACER at this stage is unable to impose higher allocation through the further increase of minimum RAM, until the security concerns are verified in the implementation phase;

(e) Despite over-allocation is unlikely, Article 17 of the amended Proposal provides the possibility to adjust (i.e. to decrease) the corresponding RAM even below the minimum RAM value in the capacity validation phase if the TSOs' analysis shows that the calculated level of RAM is unable to ensure operational security, as specified in paragraphs (1) and (2) of Article 17 (see section 6.2.4).

6.2.2.4 Methodology for allocation constraints

(85) Article 6 of the Proposal provides a possibility for TSOs to apply allocation constraints, in accordance with Articles 21(1)(a)(ii) and Article 23(3)(a) of the CACM Regulation. These additional constraints were envisaged as the external constraints, i.e. export/import limits of the Dutch and Polish bidding zones, which the relevant TSOs also exercise in the day-ahead time frame. This approach is further justified in Annex 1 to the Proposal. During the discussions with ACER, the Core TSOs as well as the Core regulatory authorities had diverging views as to whether external constraints should be applied in the long-term time frame, or not.

means that these capacities shall be used) and, consequently the capacities causing relieving flows on a CNEC allow for consideration of netting effect, i.e. further allocation of capacities causing burdening flows on the same CNEC. While this allows for higher capacity allocation it also means that it is much more likely that the flows assumed in capacity calculation will consume the available capacity in the form of RAM in the day-ahead time frame.

[15] Indeed the CEP requirement of 70% includes also the unscheduled allocated flows (UAF) by the non-Core CCRs, however such flows are not of the extent to use the remaining 40% of the Fmax.

(86) ACER considers that the reasoning of the Core TSOs in Annex 1 of the Proposal is suitable for external constraints applied in the day-ahead time frame only, and not in the long-term time frame. Accordingly, ACER has deleted Annex 1 from the Proposal as it is not relevant to the LT CCM.

(87) Based on the discussions with the Core TSOs and the Core regulatory authorities, ACER understands that as long as the external constraints are applied in the day-ahead time frame, they are also required in the long-term one, in order to avoid over-allocation.

(88) Therefore, ACER has amended Article 6 of the Proposal by allowing for external constraints in the long-term time frame only as long as they serve to accommodate the existing day-ahead external constraints. In addition, ACER has strengthened the monitoring of the applied values of external constraints by specifying the relevant monitoring requirements.

6.2.2.5 Methodology for generation shift keys

(89) Article 8 of the Proposal relates to the requirement of Article 13 of the FCA Regulation which, by reference to Article 24 of the CACM Regulation, requires that the LT CCM includes a methodology to determine a common generation shift key for each bidding zone and scenario. The Proposal complies with Article 24 of the CACM Regulation in this respect.

(90) Article 8(2) of the Proposal aims towards the harmonisation of the generation shift keys methodology in relation to the corresponding process in the DA CCM. Namely, it requires the Core TSOs to amend the generation shift keys methodology in the long-term time frames not later than twelve months after the implementation of the proposal for further harmonisation of the corresponding methodology of the Core DA CCM.

(91) Article 12(1) of the Proposal specifies that the TSOs shall provide the generation shift keys to the CCC and therefore complies with Article 29(1) of the CACM Regulation (referred to in Article 23(2) of the FCA Regulation).

6.2.2.6 Methodology for remedial actions in long-term capacity calculation

(92) Article 9 of the Proposal allows the Core TSOs to define remedial actions in the long-term capacity calculation, in line with Article 14 of the FCA Regulation.

(93) However, during the proceedings, the Core TSOs proposed a new approach, whereby they should not consider remedial actions in the long-term capacity calculation. The TSOs argued that the long-term capacity calculation assumes very high uncertainty for assessing the availability of remedial actions far ahead of the real-time system operation, and that, in such circumstances, the process of coordination or even consideration of remedial actions would increase the complexity of the capacity calculation process without a clear added value.

(94) ACER notes that Article 14 of the FCA Regulation does not require the application of remedial actions in the long-term time frame. Based on the discussions with the Core TSOs and the Core regulatory authorities, ACER thus amended Article 9 of the Proposal to omit the use of remedial actions, as proposed by the Core TSOs.

6.2.2.7 Provision of information on previously allocated capacities

(95) Article 12 of the Proposal covers the provision of information about the already allocated capacities from previous time frames.

(96) ACER extended the paragraph 12 of the Proposal, specifying that this information is relevant as the input from preceding yearly auction to monthly auctions, and that it needs to include the returned capacity.

6.2.3 Assessment of the requirements for the capacity calculation process

(97) Article 10 and Chapter 1, Section 4, of the FCA Regulation regulate the capacity calculation process in the long-term time frames. In particular, these provisions refer to Article 21(1)(b), Article 27 and Article 29 of the CACM Regulation, which specify the necessary content and detail all the steps of the capacity calculation process for the day-ahead and intraday capacity calculation.

(98) In Article 3 and Article 12 of the Proposal, the Core TSOs sufficiently specified the CCC role of calculating the long-term cross-zonal capacities, pursuant to Article 21(2) of the FCA Regulation. In addition, ACER amended the Recitals of the Proposal, explaining the planned operational changes related to the CCC role. Namely, as of 1 July 2022, after the regional coordination centres ('RCC') entered into operation,[16] the RCCs of the Core CCR are expected to take over the role of the CCC in the LT CCM.

6.2.3.1 Rules for taking into account previously allocated cross-zonal capacity

(99) ACER notes that the mathematical formulation of the RAM calculation in Article 14 of the Proposal does not consider the flows originating from the previously allocated cross-zonal capacity. ACER has amended Article 14 in order to adapt it to the flow-based approach and to comply with Article 29(7)(c) of the CACM Regulation. More specifically, ACER has introduced a formula describing the conversion of the previously allocated cross-zonal capacities, decreased for returned capacities, into the required flows at the CNEC level. Since cross-zonal capacities are previously allocated in the form of options for a specific direction, only positive zone-to-zone PTDFs can be used to calculate the relevant flow per each CNEC.

[16] See Article 35(2) of Regulation (EU) 2019/943.

6.2.3.2 Rules on the adjustment of power flows on critical network elements or of cross-zonal capacity due to remedial actions

(100) Article 21(1)(b)(iv), Article 25 and Article 29(7)(f) of the CACM Regulation (as referred to in the FCA Regulation) require the consideration of remedial actions and the corresponding flows on CNECs resulting from their application. Article 14 of the Proposal provides the calculation of RAM with its components, however it fails to include the adjustment of power flows by remedial actions application, pursuant to the initial wording of Article 9 of the Proposal.

(101) Since Article 9 of the Proposal has been amended in order to omit remedial actions in the long-term capacity calculation (see paragraphs (92) to (94)), ACER considers that amending the mathematical formulation of the RAM calculation to adjust the power flows due to remedial actions is not necessary.

6.2.3.3 Mathematical description of the capacity calculation approach

(102) Article 12, Article 13 and Article 14 of the Proposal provide the list of capacity calculation inputs and a mathematical description of the applied capacity calculation approach in accordance with Article 21(1)(b)(i) of the CACM Regulation and referring specifically to the flow-based approach of Article 21(1)(b)(v) of the CACM Regulation.

(103) Based on the discussions with the Core TSOs and the Core regulatory authorities, ACER has improved the mathematical approach, and supplemented the necessary missing elements of the capacity calculation inputs and outputs, as explained in the dedicated sub-chapters.

6.2.3.3.1 Capacity calculation inputs

(104) Article 12 of the Proposal provides for the capacity calculation inputs and outputs. In order to align the capacity calculation inputs with Article 9 of the amended Proposal, ACER has removed the provision related to the delivery of remedial actions. Also, in the inputs provided by the CCC, ACER has added the provision of the returned allocated capacities.

(105) Article 12(3) of the Proposal requires the provision of a sensitivity threshold for the consideration of PTDF in the capacity calculation, in order to reduce the influence of certain allocated transactions to the distant borders. Most of the Core regulatory authorities and ACER disagreed with this approach, as it is important that the allocation uses the calculated flow-based parameters in the most accurate way possible and ensures the additivity of market clearing prices to the maximum extent. ACER has demonstrated that the applied PTDF sensitivity threshold would have a detrimental effect on the additivity of clearing prices and accepted quantities at explicit auctions, leading to different outcomes. Therefore, ACER has removed the provision on the PTDF sensitivity threshold.

(106) In the non-paper, the Core regulatory authorities were of the view that for effective implementation, the Proposal should provide concrete steps, or at least references, for the formation of the long-term products, and its correlation with applied network scenarios. While the definition of long-term product is subject to the harmonised allocation rules (HAR), ACER considers it relevant to clearly specify the form of flow-based capacity calculation output that needs to be provided as the input to the allocation process. ACER has therefore expanded Article 12 of the Proposal, requiring that a union of flow-based constraints from all applied long-term scenarios is provided.

6.2.3.3.2 Calculation of Power Transfer Distribution Factors

(107) Article 13 of the Proposal sets out the principles for the calculation of power transfer distribution factors. In order to align Article 13 with the amended Article 12, ACER has removed paragraph (3) on the provision of sensitivity threshold for the inclusion of PTDF in the allocation. ACER has also moved paragraph (2) of Article 13 on calculation of flows to Article 14, which covers the RAM calculation.

(108) In Article 13 of the Proposal, ACER has inserted a new paragraph (2) on the slack node treatment through different CGMs of a long-term calculation. Also, ACER has inserted a new paragraph (4) with a mathematical formulation for the calculation of the maximum zone-to-zone PTDF of CNECs, required for the filtering of the final list of CNECs, provided in Article 14 in the amended Proposal.

6.2.3.3.3 Calculation of the available margin before validation

(109) Article 14 of the Proposal sets out the principles for the calculation of the remaining available margin as well as the application of minimum RAM. ACER has rearranged Article 14, aligning the formulations and notations with other amendments of the LT CCM and the Core DA CCM, where appropriate.

(110) ACER has moved the determination of the final CNEC list from Article 7(3) of the Proposal to Article 14(1) of the amended Proposal, as it is a step in the capacity calculation process and not capacity calculation inputs. A minimum threshold of the maximum zone-to-zone PTDF, below which all CNECs shall be removed from the list of CNECs, set to 5% in the Proposal, remains unchanged in the amended Proposal. ACER considers that this threshold ensures that CNECs having the maximum zone-to-zone PTDF below 5% are not limiting cross-zonal capacities.

(111) ACER has moved the provision on the calculation of flows without Core exchanges (F0) from Article 13(2) of the Proposal to Article 14(2) of the amended Proposal, as it is a step in the calculation of the available margin.

(112) Article 13(2) of the Proposal assumes DC load flow for the calculation of reference flow (Fref). In the non-paper, the Core regulatory authorities indicated that common grid models should be robust enough to support the AC load flow solution. As a more accurate representation of network conditions, AC load flow provides the active power

losses, reactive power flows and losses and the voltages different from reference voltage, while DC load flow is lossless, without reactive power or voltage results. Therefore, DC load flow requires at least the supplemented treatment of active power losses, which are of the typical size of 5500-7500 MW for the CGM of Continental Europe.

(113) In its experimentation, ACER has analysed the alternatives of applying AC load flow, with the DC load flow solution ('DC1') with assignment of active power imbalance of each modelled area proportionally to the loads, and the hybrid solution ('DC2') of applying AC load flow to determine the losses in (n-0) topology, and then assigning the losses of each network branch to the accidental nodes, where the CGM adjusted in this way can be used for the advanced DC load flow solution for contingency topologies (n-1). The comparison of AC load flow results for two CGMs at the level of critical network elements, showed that the DC1 solution records high differences on certain CNEs, while the differences for the DC2 solution are smaller. The detailed results of these simulations has been shared with the Core TSOs and the Core regulatory authorities.

(114) Since ACER considers that gaining additional precision in obtaining reference flow is an important element in the RAM calculation, it is a valid reason for introducing the AC load flow, having in mind that, contrary to the day-ahead process, the long-term process provides sufficient time for its application. In case of implausibility to apply the AC load flow in certain CGMs, the DC solutions can be considered as a fallback. To reflect this, ACER has amended Article 14(3) of the Proposal accordingly.

(115) Article 14(2) of the Proposal provides the value of minimum RAM of 20% of Fmax, which automatically refers to the yearly time frame, without specifying the separate minimum RAM value for the monthly time frame.

(116) ACER notes that the minimum RAM of 20% represents the current level of the minimum RAM applied in the Core day-ahead flow-based capacity calculation. However, ACER has concerns that both the level of proposed minimum RAM for the long-term time frame and the fact that no minimum RAM is appointed to the monthly auctions, would be inadequate to promote the effective long-term cross-zonal trade with long-term cross-zonal hedging opportunities for market participants, being one of the key objectives listed in Article 3 of the FCA Regulation.

(117) Majority of respondents to ACER's public consultation supported the application of a minimum RAM higher than 20%. This was also the view of one regulatory authority in the non-paper, while all the other Core regulatory authorities found the value of 20% acceptable, but were open to further modifications. However during the hearing, many Core regulatory authorities raised concerns about the insufficiency of a 20% minimum RAM value.

(118) During the proceedings, ACER has demonstrated through a number of examples that it is necessary to define two separate minimum RAM values higher than zero, in order to

ensure the offered capacity at both yearly and monthly auctions. The application of a splitting factor according to the methodology for splitting long-term cross-zonal capacity pursuant to Article 16 of the FCA Regulation cannot ensure the minimum capacity at the monthly time frame.

(119) The main part of ACER's experimentation is the consideration of different levels of minimum RAM for the simulation of yearly flow-based auctions based on the 2020 data and comparison of the results with the realised NTC-based yearly auctions at the Core borders for 2020.

(a) The results of the experimentation are illustrated in Figure 2, and present the outcomes of flow-based auctions with minimum RAM levels of 20%, 30% and 40% at the yearly flow-based auctions. The auctions with 30% of Fmax provide similar economic surplus as the realised yearly NTC auctions for 2020, along with lower allocated quantities[17];

(b) with the same level of system security as with the currently applied NTC approach, the equivalent minimum RAM (obtained on the basis of applied NTC values) at certain CNECs would need to be quite high. The minimum RAM at the congested CNECs in the observed experimentation case 'fb' was in the range between 20% and 80%, with an average of 43% of Fmax. The outcome of this analysis is provided in paragraph (65);

[17] The NTC allocation at different borders is independent, therefore bids on a given border do not compete with bids on other borders. Consequently, certain capacities may be allocated on a given border even if the offered prices are lower than the bids on another border for an order of magnitude.
On the contrary, flow-based explicit auctions apply the interdependent optimisation of quantities (converted into flow contributions via PTDF) and offer prices across all borders of a region. Therefore, the bids with a higher price formally allocated on one border might outbid the low-price bids on another border, as their common influence is observed at each CNEC in a flow-based region.
The optimisation criterion is the maximisation of economic surplus, which provides more valuable quantities to be allocated, and this might in turn result in a lower total amount of allocated quantities. This is the expected outcome of coordinated flow-based auctions.

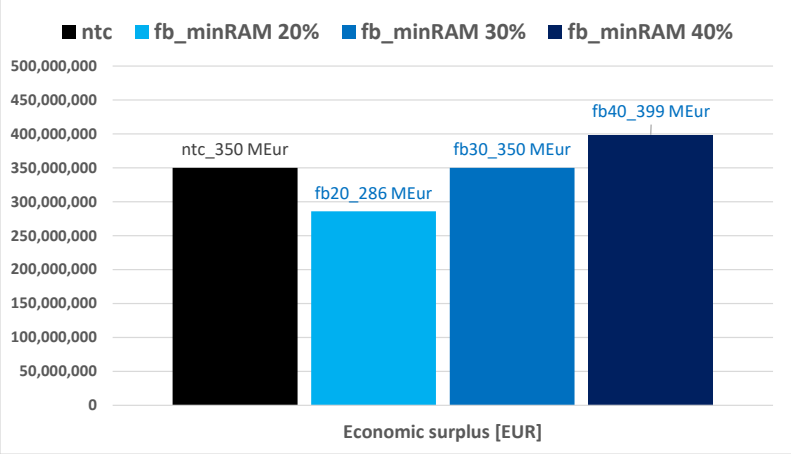


Figure 2: ACER's experimentation: comparison of Core NTC-based yearly auctions from 2020 with simulated flow-based yearly auctions with different level of minimum RAM

(120) On the basis of discussions during the proceedings, applied simulations, and the need to ensure offered capacities at both the yearly and monthly time frame, ACER has amended Article 14 of the Proposal by providing the minimal values of minimum RAM at the level of 20% of Fmax for yearly auctions and 10% of Fmax for monthly auctions.

(121) During the hearing phase, the majority of the Core TSOs expressed concerns about the application of the proposed level of minimum RAM (20% for yearly auctions and 10% for monthly auctions) due to operational security risks. In ACER's view, the proposed values of minimum RAM are the minimum required for ensuring compliance with the objective of effective long-term cross-zonal trade referred to in Article 3 of the FCA Regulation.

(122) ACER sees no network security concerns from the application of the proposed minimum RAM values. Moreover, any potential operational security risks in this respect are in any case mitigated by the possibility to efficiently reduce the capacities during the capacity validation, if necessary, in accordance with Article 17(1) and Article 17(2) of the amended Proposal (as further explained in section 6.2.4). In paragraph (84) ACER provided the additional explanations why the minimum RAM values at the long-term time frames are not directly comparable with the minimum RAM at the day-ahead time frame and why the proposed level of minimum RAM at the long term time frame would not endanger network security.

(123) ACER considers that its proposal on the minimum RAM values strikes a balance between the opposite expectations of the Core regulatory authorities, market participants and the Core TSOs. Notwithstanding the above, in view of the concerns expressed by the Core TSOs and the Core regulatory authorities, and bearing in mind

the limitations of ACER's experimentation[18], ACER has provided a possibility for the Core TSOs to increase the minimum RAM values[19] during the implementation phase. Such adjustment would have to be (a) based on a comprehensive analysis performed by the Core TSOs and consistent with the objectives of the FCA Regulation, and (b) consulted with the Core regulatory authorities and stakeholders. ACER has amended Article 14(5) of the Proposal to reflect this possibility.

(124) ACER notes that the above adjustment is without prejudice to the Core regulatory authorities' right to request amendments to the LT CCM, including the applied values of minimum RAM, at any time, pursuant to Article 4(12) of the FCA Regulation. However, in ACER's view, requesting amendments should not delay the implementation of the LT CCM.

(125) Notwithstanding the above possibilities to change the minRAM values, ACER considers that any eventual security concerns requiring lower capacities than those provided, could be addressed in the validation phase. The validation methodology pursuant to Article 17(1) and Article 17(2) of the amended Proposal allows to decrease the RAM value even below the minimum RAM if the operational security needs to be ensured (as further explained in section 6.2.4).

(126) ACER notes that the draft Proposal for the Core LT CCM consulted with the AEWG provided the Core TSOs with a wider margin of discretion to amend the minimum RAM values[20] based on further experimentations. ACER has duly considered the AEWG advice and the individual comments submitted by the regulatory authorities (see paragraph (38)) and has amended the Proposal as follows:

(a) ACER has kept the minimum RAM values of 20% (yearly) and 10% (monthly) since they have been endorsed by the AEWG (see paragraph (38), point (a)).

(b) ACER has restricted the TSOs' discretion to amend the minimum RAM values in order to ensure balance between the need for appropriate governance regarding the key aspects of the methodology and the need for timely implementation (see paragraph (38), point (b)). Namely, the Core TSOs may now only increase the minRAM values based on their experimentation, up to 40% for the yearly time frame and up to 20% for the monthly time frame. The Core TSOs may not go above these limits nor decrease the minRAM without the amendment process pursuant to

[18] This is related to the limited number of observed cases and the limited number of CGMs considered for the calculation of flow-based approach.
[19] With upper limits: minimum RAM of 40% for the yearly time frame and 20% for the monthly time frame.
[20] The Proposal consulted with AEWG provided only for lower limits (15% for yearly time frame and 10% for monthly time frame). No upper limits were proposed.

Article 4(12) of the FCA Regulation. ACER considers that these new limits are reasonable for the following reasons:

(i) The Core TSOs' discretion to decrease the minimum RAM values is not necessary since, as noted in paragraph (125), the Core TSOs may always decrease the RAM value even below the minimum RAM during the validation phase, if necessary, in accordance with Article 17(1) and Article 17(2) of the amended Proposal (as explained in section 6.2.4); and

(ii) The Core TSOs' discretion to increase the minimum RAM values up to 40% (yearly) and 20% (monthly) is based on the results of ACER experimentations, in particular the obtained level of economic surplus, as well as a typical ratio[21] among realised yearly and monthly capacities allocated at the yearly and monthly auctions in Core CCR. These values are expected to provide a sufficient range to enable adequate economic surplus without endangering system security. However, ACER notes that the exact values would need to be determined on the basis of further experimentations by the Core TSOs.

(c) In addition to the above amendments, ACER has commenced a process of increased stakeholder engagement in order to properly inform the market participants about the consequences of the Core LT CCM Decision (see paragraph (38), point (c)). As a first step, ACER scheduled a meeting with EFET and Eurelectric on 15 October 2020, to provide more details on the proposed methodology and to hear their concerns in this respect. The Core regulatory authorities were invited to this meeting.

(127) ACER is of the view that the minimum RAM values of 20% for the yearly and 10% for the monthly time frame provide a higher level of security, but likely lower economic surplus than the currently applied long-term NTC values at the Core CCR borders. ACER expects that through additional experimentations during the implementation the Core TSOs gain confidence in the applied long-term flow-based approach and apply higher minimum RAM values, which would provide higher surpluses under secure network conditions[22].

[21] According to the data from JAO, the ratio between the allocated capacities at yearly auctions for 2020 and monthly auctions for January 2020 was approximately 68%:32%.

[22] Following the discussion on the proposed modification of the application of the splitting factor (see recitals (35) and (36)), ACER came to the conclusion that it is not appropriate to include such a modification in the present amendment of the Core LT CCM.

6.2.4 Assessment of the requirements for the capacity validation

(128) Article 17 of the Proposal describes the capacity validation process performed by the Core TSOs and the CCC, in line with Article 26 of the CACM Regulation, as required by Article 15 of the FCA Regulation.

(129) In that regard it is first to note, in view of Articles 15 and 24 of the FCA Regulation and Article 26 of the CACM Regulation and in view of BoA Decision A-001-2022, that the TSOs have a right to correct cross-zonal capacity at the validation stage, and to reduce such capacity for reasons of operational security.[23] However, this right is not absolute and it is not solely for individual TSOs to decide which operational security concerns justify correcting long-term capacity.[24] ACER is entitled, and indeed mandated, to determine, with a greater level of technical detail than that contained in the regulatory framework, how operational security is best protected and under which conditions TSOs are entitled to exercise their right to correct long-term capacity at the validation stage. The respective powers of ACER find their limits where the TSOs' right to correct operational security is restricted in such a way that operational security could no longer be guaranteed or that the regulatory framework would be violated.[25]

(130) In view of the need to specify the conditions under which TSOs may correct long-term capacity at the validation stage, ACER amended Article 17 of the Proposal by listing the situations in which a TSO may change the long-term capacity on their own CNECs during the validation process. ACER considers that, for the reasons explained in recitals (133) to (136), the list mentions all situations possibly requiring a correction of the long-term capacity for reasons of operational security during the validation stage. Having an exhaustive list of situations is also consistent with the approach applied in the Core DA CCM. Such a list does not limit the TSOs' right to perform individual validation, nor the TSO's right to correct long-term capacities in a way that operational security could no longer be guaranteed because, in line with Articles 15 and 24 of the FCA Regulation or Article 26 of the CACM Regulation, the listing only specifies and categorises, in a more detailed and comprehensive manner, all the different reasons of operational security to correct (i.e., reduce) long-term capacity covered by those Articles. Given this specification and categorisation, it also does not violate the regulatory framework.

(131) ACER has removed paragraph (1)(a) of Article 17 of the Proposal as it referred to exceptional contingency or forced outages and those outages cannot efficiently be assessed in the long-term time frames.

[23] BoA Decision A-001-2022, para. 53.
[24] BoA Decision A-001-2022, para. 59.
[25] BoA Decision A-001-2022, para. 60.

(132) Considering that remedial actions are not taken into account in the long-term time frame (see section 6.2.2.6), ACER has amended Article 17(1)(b) of the Proposal (Article 17(1)(c) of the amended Proposal) by deleting the reference to the availability of remedial actions. The amended Article complies with Article 26(3) of the CACM Regulation.

(133) ACER has amended paragraph (1)(d) of Article 17 of the Proposal by removing the consideration of reactive power flows, as it is not necessary when the AC load flow is applied for the reference flow calculation. Instead, the consideration of power factor and voltage is addressed in Article 17(1)(b) of the amended Proposal.

(134) ACER has introduced paragraph (1)(c) in Article 17 of the amended Proposal to cover exceptional topologies from the outage planning coordination process, which are not modelled through the reference timestamps and CGMs defined in Article 10(2) of the amended Proposal. In this way the TSOs can analyse and include the effects of planned outages valid for the timestamps other than the reference timestamps, if these outages influence the capacities on their own CNECs considerably, without the need to increase the overall number of reference timestamps. This allows the TSOs adjusting the RAM without burdening the central capacity calculation process performed by the Core CCC.

(135) ACER has introduced paragraph (1)(d) in Article 17 of the amended Proposal to list the situations and operational security limits which the flow-based approach (being based on static AC or DC load flow) is unable to capture. According to Article 1(7) of the CACM Regulation, 'operational security limits' means the acceptable operating boundaries for secure grid operation such as thermal limits, voltage limits, short-circuit current limits, frequency and dynamic stability limits. While thermal limits can be modelled with the flow-based approach and be considered in the input data for the capacity calculation process, other limits referred to under Article 1(7) of the CACM Regulation might not be. Listing these additional operational security limits, i.e. voltage limits, short-circuit current limits, frequency and dynamic stability limits, in paragraph (1)(d) of Article 17 of the amended Proposal ensures that TSOs can make the necessary adjustments to the RAM during the validation process also for these reasons of operational security.

(136) There may be situations where the operational security limits could be modelled with the input data for the flow-based approach, but they would be overwritten by the application of the minimum RAM. However, such operational limits can also require an adjustment of the RAM during the validation process. To ensure that such adjustments are possible, ACER has added paragraph (1)(e) in Article 17 of the amended Proposal which refers to them explicitly. Addressing also PSE's concern underlying the error found by the Board of Appeal in Article 17(1)(c) of Annex I to Decision 14/2021, this provision covers operational security issues which can be modelled via the input data, but still need an adjustment in the validation phase because the capacity calculation process does not fully capture them.

(137) ACER has extended paragraph (2) of Article 17 of the Proposal to enable TSOs to decrease the RAM value even below the minimum RAM if necessary, for the situations listed under points (b) to (e) of Article 17(1) of the amended Proposal.

(138) ACER has introduced paragraph (3) of Article 17 of the Proposal to ensure that the TSOs' individual validation adjustments in the situations listed under points (c) to (e) of Article 17(1) of the amended Proposal are justified.

(139) ACER has also introduced changes to the reporting obligations listed in Article 17, paragraphs (4), (5) and (6) of the Proposal, so that they are fully consistent with the requirements of Article 26 of the CACM Regulation.

(140) Finally, ACER specified that Article 17 of the amended Proposal concerns only the individual validation by the Core TSOs. The coordinated validation which is currently left out of the amended Proposal, may be considered as a potential amendment of the LT CCM at a later date, once the LT CCM has been fully implemented.

6.2.5 Assessment of the requirement for the fallback procedures

(141) Article 16 of the Proposal provides for a fallback procedure, as required by Article 10(7) of the FCA Regulation, which further refers to Article 21(3) of the CACM Regulation. However, ACER notes that this Article lacks transparency on the proposed approach, and refers to the bilateral NTC values. Based on the discussions with the Core TSOs and the Core regulatory authorities, ACER has added more details in this Article to increase transparency and replaced the reference to the NTC values with a reference to the latest available flow-based capacity calculation outputs.

6.2.6 Assessment of other requirements

6.2.6.1 Scenarios and common grid models

(142) Article 19 of the FCA Regulation requires that all TSOs in CCRs where security analysis based on multiple scenarios is applied, shall jointly develop a common set of scenarios to be used in the common grid model for each long-term capacity calculation time frame. The development of a common set of scenarios must be consistent with the requirements of Article 18 of the CACM Regulation. That Article specifies in its paragraph (1) that the common scenarios shall be used to describe a specific forecast situation for generation, load and grid topology for the transmission system in the common grid model. The CGMM for the long-term time frame has been developed pursuant to Article 18 of the FCA Regulation.

(143) Article 10 of the Proposal covers the application of scenarios. The Core TSOs are of the view that the CGMs defined pursuant to Article 3 of the CGMM are not sufficiently suitable for the application in the Core LT CCM, since the CGMM:

(a) provides for 8 CGMs for the yearly time frame, while the Core TSOs consider that 24 CGMs are required;

(b) provides for 2 CGMs for the monthly time frame, while the Core TSOs consider that 2 CGMs per each week of the corresponding month are required;

(c) provides CGMs with planned outages applied only if they relate to the whole modelled period, while the Core TSOs consider that the most critical topology in terms of planned outages needs to be applied; and

(d) provides for the fixed calculation timestamps, while the Core TSOs consider that the timestamps should be flexibly selectable according to the highest number of simultaneous planned outages pursuant to the outage planning coordination (OPC) process.

(144) For the reasons outlined in paragraph (143), the Proposal defines a regional Core procedure for the development of the additional CGMs on the basis of initial CGMs from the CGMM, but with the application of the same net positions and OPC data to reflect the required planned outages.

(145) The Core TSOs also recognised a potential delay in the provision of monthly CGMs[26] and envisaged their development in the proposed Core temporary regional procedure.

(146) On the one hand, ACER takes into account the need to ensure availability and proper granularity of the application of planned outages in the CGMs used for the LT CCM, highlighted by the Core TSOs. On the other hand, ACER also sees the importance of ensuring coordination of the CGMs at the European level, in line with Article 18 of the FCA Regulation and Article 18 of the CACM Regulation. A coordinated use of the CGMs for the long-term capacity calculation across all the European CCRs is of mutual benefit and increases the accuracy and credibility of calculated cross-zonal capacities.

(147) Therefore, ACER has amended Article 10 of the Proposal, pragmatically allowing for a temporary procedure of the CGM development in the Core CCR, to ensure the required specifics of the CGMs' application in the Core CCR. This temporary procedure may increase the granularity of the required CGMs, apply the outage topologies pursuant to the OPC data, and have flexible timestamps for the additional CGMs (excluding the initial timestamps defined pursuant to CGMM). The Core TSOs may apply the temporary procedure only until the first next CGMM amendment,

[26] As reported by ENTSO-E at the working meeting of 31 August 2021 with the Core TSOs and the Core regulatory authorities.

assuming the willingness of the Core TSOs and ENTSO-E to support the inclusion of the elements of the temporary procedure in the CGMM amendment.[27]

6.2.6.2 Governance

(148) In order to ensure efficient cooperation of the Core TSOs with regard to the implementation, operation, decision-making, amendment and dispute resolution processes, ACER has added a new Article 19 to the Proposal, covering governance aspects. In this Article, ACER has envisaged a Core TSOs' governance process and structure which is common for all the Core methodologies carried out by Core TSOs. To this aim, Article 19 of the amended Proposal designates the Core TSOs' steering committee as the main decision-making body for the implementation of the LT CCM.

(149) ACER notes that Article 19 does not aim to create parallel TSO structures in the Core CCR. When requiring the establishment of a steering committee, Article 19(2) does not decide whether the steering committee is established outside or within the existing TSOs structures. Thus, Article 19(2) leaves this decision to the Core TSOs.

(150) Upon request of a Core regulatory authority, ACER has added paragraph (4) to Article 19 of the amended Proposal to clarify that the decisions adopted by the Core TSOs' common bodies and the steering committee are without prejudice to regulatory decisions adopted by the competent regulatory authorities.

6.2.6.3 Transparency and monitoring

(151) Article 19 of the Proposal (Article 20 of the amended Proposal) specifies publication requirements to promote the objective of transparency and reliability of information on forward capacity allocation pursuant to Article 3(f) of the FCA Regulation.

(152) In order to enhance transparency and reliability of the provided information, ACER has amended Article 19 of the Proposal, taking into account the relevant recommendations of the Core regulatory authorities provided in the non-paper. In Article 20 of the amended Proposal, ACER has listed the most relevant information to be published by the Core TSOs, also requiring the publication of a handbook to facilitate stakeholders' understanding of the published data.

[27] In its appeal of 3 January 2022, PSE contested Article 10 of the amended Proposal as approved by Article 10 of Annex I to Decision 14/2021, arguing in essence that its provisions would infringe Article 10(3) and Article 10(4) of the FCA Regulation, by setting rules for the usage of the CGMM or temporary procedures for building this CGM in the long-term capacity calculation which would result in planned outages not being sufficiently reflected in the capacity calculation process (see BoA Decision A-001-2022, para. 14). In that regard, the Board of Appeal found no error in Article 10 of Annex I to Decision 14/2021 and dismissed the related plea of PSE as unfounded (see BoA Decision A-001-2022, para. 96).

(153) Article 20 of the Proposal (Article 21 of the amended Proposal) specifies the monitoring arrangements and reporting to the Core regulatory authorities. ACER has improved the proposed monitoring framework by removing the obsolete requirements, such as PTDF sensitivity threshold, and adding the provisions on the annual monitoring report.

(154) ACER has also deleted paragraph (7) of Article 19 of the Proposal, relating to situations where no capacity can be allocated to the monthly auctions. With the introduction of the minimum RAM in the monthly time frame, such situation is no longer expected.

6.2.6.4 Reviews and updates

(155) Article 18 of the Proposal sets out the conditions for reviews and updates of the LT CCM. ACER has amended this Article to bring it in line with the requirements of Article 27(4) of the CACM Regulation (referred to in Article 21(3) of the FCA Regulation) and to promote transparency and reliability of information in line with Article 3(f) of the FCA Regulation. The amended Article 18 provides for the necessary reviews of the inputs to the long-term capacity calculation, including the time reviews and a procedure in case of possible updates. ACER has also provided the possibility for the Core TSOs and the CCC to revise the methodology 18 months after its full implementation, and if relevant, to submit a proposal for its amendment.

(156) In line with the non-paper of the Core regulatory authorities, ACER has added paragraph (8) in Article 18 of the amended Proposal, specifying the deadline for the application of CGMES format.

6.2.7 Implementation timescale and expected impact on the objectives of the FCA Regulation

(157) The Proposal meets the requirement of Article 4(8) of the FCA Regulation related to the implementation timescale. Article 21 of the Proposal provides a timescale of 5 years for the implementation of the LT CCM, split into implementation phases.

(158) However, as noted in paragraph (15), the Core regulatory authorities are of the view that the proposed timescale of 5 years is excessively long. Taking into account the Core regulatory authorities' view, and considering the required developments and the experience with the flow-based approach acquired in the day-ahead time frame, ACER has shortened the proposed implementation timeline, specifying that the first long-term auctions to be implemented are yearly flow-based auction for 2025, and the monthly flow-based auction for January 2025. Any eventual delay in the implementation of either of these auctions for whichever reason, should not delay the implementation of the other auction.

(159) The Proposal meets the requirement of Article 4(8) of the FCA Regulation to provide a description of the expected impact of the Core LT CCM on the objectives of the FCA Regulation. This impact is described in Recitals (3) to (9) of the Proposal.[28]

6.3 Transitional solution for the calculation and allocation of long-term cross-zonal capacities

(160) Article 21 of the Proposal (Article 22 of the amended Proposal) provides that the Core TSOs would continue to apply the existing NTC capacity calculation approach until the implementation of the flow-based capacity calculation methodology.

(161) While a flow-based LT CCM provides flow-based parameters for the allocation of cross-zonal capacities, the following EU-wide terms and conditions or methodologies would need to be amended in order to support the allocation based on flow-based parameters:

(a) the requirements for the single allocation platform pursuant to Article 49 of the FCA Regulation ('SAP');

(b) the harmonised allocation rules pursuant to Article 51 of the FCA Regulation ('HAR');

(c) the congestion income distribution methodology pursuant to Article 57 of the FCA Regulation (FCA CIDM);

(d) the methodology for sharing costs incurred to ensure firmness and remuneration of long-term transmission rights pursuant to Article 61 of the FCA Regulation ('FRC').

(162) In this respect, ACER has requested ENTSO-E to report on the status of these planned amendments. In particular, by letter of 12 July 2021, ACER has formally requested all TSOs to submit the relevant proposals for amendments of the above terms and conditions and methodologies as soon as possible, and no later than 1 June 2022. On 14 December 2021, the TSOs presented the preliminary timeline for the submission of the proposals for amendment of the FCA methodologies. By letter of 26 January 2022 ACER agreed with the proposed timeline. Consequently, on 28 September 2022 all TSOs provided the proposals for the SAP, FCA CIDM and FRC, while the proposal for the HAR is scheduled for delivery by 1 March 2023.

(163) For the efficient functioning of the flow-based approach at the long-term time frame, certain regional terms and conditions or methodologies for the Core CCR should also

[28] ACER has introduced a number of editorial changes to improve the description of the expected impact.

be amended, such as the methodology for splitting long-term cross-zonal capacity pursuant to Article 16 of the FCA Regulation, and the regional design of long-term transmission rights pursuant to the Article 31 of the FCA Regulation.

6.4 Editorial amendments

(164) ACER has introduced a number of editorial amendments to improve clarity, conciseness, consistency and readability of the Proposal, while preserving the intended meaning of the content. These editorial amendments generally relate to amendments of wording and improvements of structure.

7 CONCLUSION

(165) For the above reasons, ACER considers that the amendments which are detailed in section 6, and which have been consulted with the Core TSOs and the Core regulatory authorities, are necessary in order to ensure that the Proposal is in line with the purpose of the FCA Regulation and contributes to market integration, non-discrimination, effective competition and the proper functioning of the market.

(166) Therefore, ACER approves the Proposal subject to the necessary substantive and editorial amendments. Annex I to this Decision sets out the LT CCM for the Core CCR, as amended and approved by ACER,

HAS ADOPTED THIS DECISION:

Article 1

The long-term capacity calculation methodology of the Core capacity calculation region pursuant to Article 10 of Regulation (EU) 2016/1719 is approved as set out in Annex I to this Decision.

Article 2

ACER's Decision No 14/2021 of 3 November 2021 on the long-term capacity calculation methodology of the Core capacity calculation region is repealed.

Article 3

This Decision is addressed to:

Austrian Power Grid AG
Elia System Operator S.A.
ČEPS a.s.
Réseau de Transport d'Electricité
HOPS d.o.o., Hrvatski operator prijenosnog sustava
MAVIR ZRt
Creos Luxembourg S.A.
TenneT TSO B.V.
Polskie Sieci Elektroenergetyczne S.A.
C.N.T.E.E. Transelectrica S.A.
ELES, d.o.o. sistemski operater prenosnega elektroenergetskega omrežja
Slovenská elektrizačná prenosová sústava, a.s.
50Hertz Transmission GmbH
Amprion GmbH
TenneT TSO GmbH
TransnetBW GmbH

Done at Ljubljana, on 18 January 2023.

- SIGNED -

For the Agency
The Director

C. ZINGLERSEN

Annexes:

Annex I	Long-term capacity calculation methodology of the Core capacity calculation region
Annex Ia	Long-term capacity calculation methodology of the Core capacity calculation region (track-change version, for information only)
Annex II	Evaluation of responses to the public consultation on the proposal for long-term capacity calculation methodology of the Core capacity calculation region (for information only)

In accordance with Article 28 of Regulation (EU) 2019/942, 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 ACER within two months of the day of notification of this Decision.

In accordance with Article 29 of Regulation (EU) 2019/942, the addressees may bring an action for the annulment before the Court of Justice only after the exhaustion of the appeal procedure referred to in Article 28 of that Regulation.

ACER Decision on the long-term capacity calculation methodology of the Core capacity calculation region: Annex I

Long-term capacity calculation methodology of the Core capacity calculation region

in accordance with Article 10 of Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation

18 January 2023

Contents

Whereas

(1) This document is the common coordinated long-term capacity calculation methodology ('LT CCM' or 'this methodology') for the Core capacity calculation region ('Core CCR') in accordance with Article 10 of Commission Regulation (EU) 2016/1719 establishing a guideline on Forward Capacity Allocation ('FCA Regulation').

(2) The LT CCM takes into account Regulation (EC) No 2019/943 on the internal market for electricity ('Electricity Regulation'), the general principles of forward capacity allocation set out in Article 10 of the FCA Regulation and the objectives listed in Article 3 of the FCA Regulation.

(3) Pursuant to Article 10(2) of the FCA Regulation, the LT CCM uses the flow-based approach.

(4) Pursuant to Article 10(3) of the FCA Regulation, the LT CCM is compatible with the day-ahead and intraday capacity calculation methodologies established in accordance with Article 21(1) of Commission Regulation (EU) 2015/1222 establishing a guideline on capacity allocation and congestion management ('CACM Regulation').

(5) Pursuant to Article 10(4)(a) of the FCA Regulation, the LT CCM takes into account the uncertainty associated with long-term capacity calculation time frames when applying a security analysis based on multiple scenarios i.e. Common Grid Models (CGM) and using the capacity calculation inputs, the capacity calculation approach referred to in Article 21(1)(b) of the CACM Regulation and the validation of cross-zonal capacity referred to in Article 21(1)(c) of the CACM Regulation.

(6) Pursuant to Article 10(5) of the FCA Regulation, the LT CCM applies the flow-based approach since:

(a) the flow-based approach leads to an increase of economic efficiency in the Core CCR with the same level of system security;

(b) the transparency and accuracy of the flow-based results have been confirmed in Core CCR; and

(c) the implementation timeframe provided in the methodology is sufficient for the market participants to adapt their processes[1];

(7) Pursuant to Article 10(6) of the FCA Regulation, as the LT CCM applies a security analysis based on multiple scenarios, it also applies the requirements for the capacity calculation inputs, the capacity calculation approach and the validation of cross zonal capacity as provided for in Article 21(1) of the CACM Regulation, except Article 21(1)(a)(iv) where relevant.

(8) Pursuant to Article 10(7) of the FCA Regulation, the LT CCM takes into account the requirements for the fallback procedures and the requirement provided for in Article 21(3) of the CACM Regulation.

(9) The LT CCM covers the yearly and monthly long-term time frames pursuant to Article 9 of the FCA Regulation.

(10) The LT CCM provides yearly and monthly capacity calculation outputs. Splitting of long-term capacity is subject to a separate methodology for splitting long-term cross-zonal capacity developed pursuant to Article 16 of the FCA Regulation, and is not addressed in this LT CCM. Splitting of long-term capacity may reduce the yearly capacity calculation outputs in order to provide more capacity at a monthly level.

(11) During the development of the LT CCM, it has been recognised that outputs of the common grid model methodology ('CGMM') are insufficient for the Core LT CCM, which requires higher granularity of common grid models ('CGM') and a flexibility in defining the timestamps for additional CGMs, as well as the application of planned outages, to properly represent the network

[1] The fulfilment of these three conditions is discussed in section 6.2.1.2 of ACER's Decision: *Assessment of the general requirements (Article 10 of the FCA Regulation).*

for the capacity calculation. In addition, in order to ensure a coordinated approach for the long-term network modelling, the CGMM needs to be amended to incorporate the common elements of the Core temporary procedure. The temporary procedure in Core may be applied only until such amendment of the CGMM takes place. After that, the Core LT CCM should apply the amended CGMM.

(12) In line with Article 37(1)(a) of the Electricity Regulation, the regional coordination centres ('RCCs') need to carry out the coordinated capacity calculation in accordance with the methodologies developed pursuant to the capacity allocation and congestion management guideline adopted on the basis of Article 18(5) of Regulation (EC) No 714/2009. Article 35(2) of the Electricity Regulation requires that RCCs enter into operation by 1 July 2022. Thereby, as of this date, RCCs of the Core CCR will take over the role of the coordinated capacity calculator ('CCC') as referred to in this LT CCM.

(13) The LT CCM contributes to the achievement of the objectives of forward capacity allocation listed in Article 3 of the FCA Regulation. In particular, this LT CCM:

(a) Takes into account the hedging needs of electricity market participants by calculating reliable capacities at an early stage and making them available to market participants, which makes long-term planning possible. Thus it is promoting effective long-term cross-zonal trade with long-term cross-zonal hedging opportunities for electricity market participants in accordance with Article 3(a) of the FCA Regulation;

(b) Takes into account all critical network elements, coordinates the timings of delivery of inputs, provides a calculation approach and coordinates validation requirements of the capacity calculation between the Core TSOs and the Core CCC. The flow-based capacity calculation is a result of a close cooperation of TSOs and the CCC and establishes a reliable and coordinated input towards the capacity allocation process for market participants. The flow-based approach allocates the cross-zonal capacities by putting the different bidding zone borders in competition with each other in order to receive a portion of the remaining available margin (RAM) of a critical network element with contingency (CNEC) and therefore increases economic efficiency. In contrast, the application of net transmission capacity (NTC) is based on a fixed distribution of capacities of each CNEC over the interdependent borders. Consequently, these NTCs are allocated independently on each interdependent border which essentially limits the competition between interdependent borders. Lack of competition among borders for the capacity of CNECs, which these borders are significantly impacting, inevitably leads to loss of economic efficiency in allocating the capacity of such network elements. Thus, by applying the flow-based approach this LT CCM contributes to the optimisation of the calculation and allocation of long-term cross-zonal capacity in Core, in accordance with Article 3(b) of the FCA Regulation;

(c) Applies equally to all market participants on all respective bidding zone borders in the Core CCR, thereby ensuring a level playing field amongst market participants, and providing non-discriminatory access to long-term cross-zonal capacity in accordance with Article 3(c) of the FCA Regulation;

(d) Has been developed and adopted in a transparent process involving all the relevant stakeholders. This ensures fair and non-discriminatory treatment of the TSOs, ACER, regulatory authorities and market participants in accordance with Article 3(d) of the FCA Regulation;

(e) Allows timely release of information about cross-zonal capacities and provides a backup solution when capacity calculation fails to provide results. In this way, it respects the need for a fair and orderly forward capacity allocation and orderly price formation in accordance with Article 3(e) of the FCA Regulation;

(f) Requires the Core TSOs to provide market participants with reliable information on cross-zonal capacities for the forward allocation in a transparent and continuous way by publication of the validated results. This includes regular reporting on specific processes within capacity

calculation. As such, it ensures and enhances the transparency and reliability of information on forward capacity allocation in accordance with Article 3(f) of the FCA Regulation;

(g) Enables the allocation of long-term cross-zonal capacities and this provides long-term price signals and hedging and thus facilitates efficient investments in transmission, generation and consumption and contributes to the efficient long-term operation and development of the electricity transmission system and electricity sector in the Union in accordance with Article 3(g) of the FCA Regulation.

TITLE 1: GENERAL PROVISIONS

Article 1
Subject matter and scope

1. This LT CCM is the methodology pursuant to Article 10 of the FCA Regulation and applies to the bidding zone borders of the Core CCR.
2. This LT CCM applies to the long-term capacity calculation within the Core CCR and covers the yearly and monthly long-term time frames pursuant to Article 9 of the FCA Regulation and in line with the regional design of the long-term transmission rights in the Core CCR.
3. This LT CCM applies to all TSOs and CCC within the Core CCR.

Article 2
Definitions

1. For the purpose of the LT CCM, the definitions in Article 2 of the Electricity Regulation, Article 2 of the FCA Regulation, Article 2 of the CACM Regulation as well as Article 2 of Regulation (EC) 2013/543 of 14 June 2013 on submission and publication of data in electricity markets, shall apply.
2. In addition, the following abbreviations shall apply. In the event of any inconsistency between the following abbreviations and the definitions pursuant to paragraph (1),[2] the latter shall prevail.
   (a) 'AC' means: Alternating Current;
   (b) 'AHC' means: Advanced Hybrid Coupling;
   (c) 'AMR' means: Adjustment of Minimum RAM;
   (d) 'CC' means: Capacity Calculation;
   (e) 'CCC' means: Coordinated Capacity Calculator, as defined in Article 2(11) of the CACM Regulation;
   (f) 'CCM' means: Capacity Calculation Methodology;
   (g) 'CCR' means: Capacity Calculation Region, as defined in Article 2(3) of the CACM Regulation;
   (h) 'CGM' means: Common Grid Model, as defined in Article 2(2) of the CACM Regulation;
   (i) 'CGMES' means: Common Grid Model Exchange Standard, developed by ENTSO-E pursuant to the CGMM;
   (j) 'CGMM' means: Common Grid Model Methodology pursuant to Article 18 of the FCA Regulation;
   (k) 'CNE' means: Critical Network Element;
   (l) 'CNEC' means: Critical Network Element and Contingency;
   (m) 'cNTC' means: coordinated Net Transmission Capacity;
   (n) 'DA' means: Day-Ahead, as defined in Article 2(34) of the CACM Regulation;
   (o) 'DA CCM' means: Day-Ahead Capacity Calculation Methodology approved under Article 20 of the CACM Regulation;
   (p) 'DC' means: Direct Current

[2] References to paragraphs are to be read as references to paragraphs within a given Article of Annex I, unless explicitly stated otherwise.

(q) ‘EFB’ means: Evolved Flow Based

(r) ‘EIC’ means: Energy Identification Code;

(s) ‘ENTSO-E’ means: European Network of Transmission System Operators for Electricity;

(t) ‘FB’ means: Flow Based;

(u) ‘Fmax’ means: Maximum Admissible Power Flow;

(v) ‘Fref’ means: Reference Flow;

(w) ‘FRM’ means: Flow Reliability Margin;

(x) ‘F0,Core’ means: Flow without commercial exchanges within Core CCR;

(y) ‘GSK’ means: Generation Shift Key, as defined in Article 2(12) of the CACM Regulation;

(z) ‘HVDC’ means: High-Voltage Direct Current;

(aa) ‘IGM’ means: Individual Grid Model, as defined in Article 2(1) of the CACM Regulation;

(bb) ‘Imax’ means: Maximum Admissible Current;

(cc) ‘LF’ means: Load Flow;

(dd) ‘LT’ means: Long-Term;

(ee) ‘LTCC’ means: Long-Term Capacity Calculation;

(ff) ‘LT CCM’ means: Long-Term Capacity Calculation Methodology;

(gg) ‘kA’ means: Kilo Ampère;

(hh) ‘kV’ means: Kilo Volt;

(ii) ‘minRAM’ means: Minimum Remaining Available Margin;

(jj) ‘MPTC’ means: Maximum Permanent Technical Capacity;

(kk) ‘MTU’ means: Market Time Unit;

(ll) ‘MW’ means: Megawatt;

(mm) ‘NP’ means: Net Position;

(nn) ‘NRA’ means: National Regulatory Authority;

(oo) ‘NTC’ means: Net Transfer Capacity;

(pp) ‘OPC’ means: Outage Planning Coordination;

(qq) ‘OPDE’ means: Operational Planning Data Environment, as defined in Article 3(74) of the SO Regulation;

(rr) ‘PST’ means: Phase-Shifting Transformer;

(ss) ‘PTDF’ means: Power Transfer Distribution Factor;

(tt) ‘RA’ means: Remedial Action, as defined in Article 2(13) of the CACM Regulation;

(uu) ‘RAM’ means: Remaining Available Margin;

(vv) ‘Ramr’ means: Minimum RAM factor;

(ww) ‘RM’ means: Reliability Margin;

(xx) ‘RCC’ means: Regional Coordination Centre;

(yy) ‘SAP’ means: Single Allocation Platform;

(zz) ‘SO’ means: System Operation;

(aaa) 'SO Regulation' means: Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation;

3. In this LT CCM, unless the context clearly indicates otherwise:

   (a) the singular also includes the plural and vice versa;

   (b) headings are inserted for convenience only and do not affect the interpretation of this LT CCM; and

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

Article 3
Long-Term Capacity Calculation Process

1. The capacity calculation process for the long-term time frames in the Core CCR shall apply the FB approach, pursuant to Article 10(1) of the FCA Regulation.

2. The year-ahead and month-ahead capacity calculation process shall consist of three main stages:

   (a) the creation of capacity calculation inputs by the Core TSOs, in accordance with Title 2;[3]

   (b) the capacity calculation process by the Core CCC, in accordance with Title 3; and

   (c) the capacity validation by the Core TSOs in coordination with the Core CCC, in accordance with Title 4.

[3] References to Titles and/or Articles are to be read as references to Titles and/or Articles of Annex I, unless explicitly stated otherwise.

TITLE 2: CAPACITY CALCULATION INPUTS

Article 4
Reliability Margin Methodology

1. The uncertainty associated with long-term capacity calculation shall be taken into account by the application of multiple scenarios i.e. CGMs pursuant to Article 10. The capacity calculation outputs obtained based on these CGMs shall represent the joint set of constraints to the long-term allocation pursuant to Article 12(6). For this reason, the flow reliability margin (FRM) for long-term capacity calculation shall correspond to the values from the DA time frame, according to paragraph 2.

2. For all CNECs, the Core TSOs shall use the latest available FRM from the DA time frame. The latest available FRMs are the yearly updated FRMs as defined per CNEC in the Core DA CCM and in accordance with Article 22 of the CACM Regulation. They shall be applied for all yearly and monthly capacity calculations. In case the FRM considered in the DA CC have been updated between the yearly and the monthly capacity calculation, the latest FRM shall be considered in the subsequent monthly capacity calculation.

3. For the new CNEs coming into operation during the forthcoming long-term capacity calculation period, the initial FRM shall be equal to 10% of Fmax.

4. As provided in the Core DA CCM, the FRM is a portion of Fmax of a CNEC given in megawatts, which covers the uncertainties within capacity calculation.

5. The Core TSOs, with support of the Core CCC, shall review and update the methodology for reliability margin in accordance with Article 18(5).

Article 5
Methodology for Operational Security Limits

1. In accordance with Article 12 of the FCA Regulation, referring to Article 23 of the CACM Regulation, each Core TSO shall respect in the LT CC the operational security limits of Critical Network Elements (CNEs). The operational security limits used in the LT CCM are the same as those used in the operational security analysis. In particular:

   (a) to take into account the thermal limits of CNEs, the Core TSOs shall use the maximum admissible current limit (Imax) which is the physical limit of a CNE according to the operational security limits in line with Article 25 of the SO Regulation. The maximum admissible current can be defined by:

      i. fixed limits for all CGMs in the case of CNEs which are transformers or certain types of conductors which are not sensitive to ambient conditions;

      ii. fixed limits for all CGMs of a specific season for all other CNEs.

   (b) when applicable, Imax shall be defined as a temporary current limit of a CNE in accordance with Article 25 of the SO Regulation. A temporary current limit means that an overload is only allowed for a certain finite duration.

   (c) Imax is not reduced by any security margin, as all uncertainties in the LT CCM are covered on each CNEC by the reliability margin in accordance with Article 4.

2. The Fmax value, expressed in MW, describes the maximum admissible active power flow on a CNE. Fmax is calculated by the Core CCC on the basis of Imax by the given formula:

$$F_{max} = \sqrt{3} \cdot I_{max} \cdot U \cdot \cos \varphi \qquad (1)$$

With:

Imax	maximum admissible current of a CNE, in kA
U	average voltage, expressed in kV, on two connecting nodes of a CNE resulting from AC load flow calculation with applied reactive power constraints; It shall not be lower than 95% of reference voltage of the CNE; $U = \max(U_{average}, 0.95 \cdot Uref)$ For transformers, voltages shall be normalised to the side of a transformer for which Imax is defined;
cos φ	average power factor on two connecting nodes of a CNE resulting from AC load flow calculation and shall not be lower than 0.95 $\cos \varphi = \max(\cos \varphi_{average}, 0.95)$

In case that either AC load flow without reactive power constraints or DC load flow have to be applied for a CGM as a fallback pursuant to Article 14, U [kV] shall be equal to reference voltage, and cos φ shall be equal to 1.

3. The Core TSOs shall aim towards determining the maximum admissible current using seasonal limits pursuant to paragraph (1)(a)(ii). The Core TSOs shall insert this information into the list of CNECs where Imax of a CNE is defined.
4. The Core TSOs, with support of the Core CCC, shall review and update the values and methodology for operational security limits in accordance with Article 18(5).

Article 6
Methodology for Allocation Constraints

1. In case operational security limits cannot be transformed efficiently into Imax pursuant to Article 5, the Core TSOs may transform them into allocation constraints. For this purpose, the Core TSOs may only use external constraints as a specific type of allocation constraint that limits the maximum import and/or export of a given Core bidding zone.
2. Borders with existing external constraints at the day-ahead level may be also subject to the application of external constraints at the long-term level, but only as long as the external constraints at the long-term level serve to accommodate the existing day-ahead external constraints.
3. The TSOs applying the long-term external constraints shall:
    a) update the calculation of external constraints at least on a quarterly basis; and
    b) provide to all Core TSOs and NRAs the detailed calculation and its results upon each update of the external constraints' values.
4. A Core TSO may discontinue the use of external constraints. The concerned Core TSO shall communicate this change to the other Core TSOs, all Core NRAs and market participants at least one month before discontinuation.
5. The Core TSOs, with support of the Core CCC, shall review and update the methodology for allocation constraints in accordance with Article 18(5).

Article 7
Methodology for Critical Network Elements and Contingencies Selection

1. The Core TSOs shall use the latest available initial CNEC list from the DA time frame defined according to the Core DA CCM, for each subsequent long-term capacity calculation, as an initial list.
2. New network elements coming into operation during the subsequent time frame of yearly or monthly auctions, may be included in the initial CNEC list according to the principles set out in Article 5 of the Core DA CCM.
3. The Core TSOs, with support of the Core CCC, shall review and update the application of the methodology for determining CNECs in accordance with Article 18(5).

Article 8
Generation Shift Keys Methodology

1. In line with Article 13 of the FCA Regulation, the Core TSOs shall determine common Generation Shift Keys(GSK) according to the following methodology:
   (a) each Core TSO shall define for its bidding zone and for each CGM a GSK, which translates a Net Position (NP) change of a given bidding zone into estimated specific injection increases or decreases in the Common Grid Model (CGM). A GSK shall have fixed values, which means that the relative contribution of generation or load to the change in the bidding zone NP shall remain the same, regardless of the volume of the change;
   (b) the Core TSOs shall take into account the actual information on generation, load and/or other elements connected to the network, such as storage equipment, available in the CGM for each scenario developed in accordance with Article 19 of the FCA Regulation, in order to select the nodes that shall contribute to the GSK;
   (c) each Core TSO shall apply a GSK that resembles the dispatch and the corresponding flow pattern;
   (d) the Core TSOs shall define a GSK for each long-term calculation time frame. This GSK created by each Core TSO can be different for each CGM or can be the same for all CGMs of a calculation time frame; and
   (e) the Core TSOs belonging to the same bidding zone shall jointly define a common GSK for that bidding zone and shall agree on a methodology for such coordination. For Germany and Luxembourg, each TSO shall define its individual GSK and the Core CCC shall combine them into a single GSK for the whole German-Luxembourgian bidding zone, by assigning relative weights to each country's GSK. The German and Luxembourgian TSOs shall agree on these weights, based on the share of generation in each Core TSO's control area which is responsive to changes in NP, and provide them to the Core CCC.
2. Not later than twelve months after implementation of the amendment related to further harmonization of the GSK methodology, referred to in Article 9(6) of the Core DA CCM, the Core TSOs shall submit to the Core NRAs a proposal for amendment of this LT CCM in accordance with Article 4(12) of the FCA Regulation for which the Core TSOs shall use the DA GSK methodology as the basis. The proposal shall include at least:
   (a) the criteria and metrics for defining the efficiency and performance of GSKs and allowing for quantitative comparison of different GSKs; and

(b) a harmonised GSK methodology combined with, where necessary, rules and criteria for TSOs to deviate from the harmonised GSK methodology.

Article 9
Application of Remedial Actions

1. The Core TSOs shall not apply remedial actions in the Core LT CC.
2. The Core TSOs, with support of the Core CCC, shall review the approach to applying remedial actions in the LT CC in accordance with Article 18(5).

Article 10
Common Grid Models

1. In accordance with Article 19 of the FCA Regulation, the Core TSOs shall use the ENTSO-E CGMs for each LTCC time frame, provided on the basis of the CGMM for FCA.
2. For the needs of the Core LT CCM, the Core TSOs may establish a temporary procedure of building the CGMs suitable for the Core LT CCM, with respect to:
    a) Providing the non-available yearly and monthly CGMs from paragraph (1), or increasing the granularity of CGMs from paragraph (1), assuming additional calculation timestamps on top of those defined in the CGMM. The Core TSOs may include additional calculation timestamps on top of those defined in CGMM, up to 24 calculation timestamps for yearly auctions (2 calculation timestamps a month) and up to 10 calculation timestamps for monthly auctions (2 calculation timestamps a week);
    b) Application of outage topologies. The Core TSOs may adjust all applied CGMs, by applying the planned outages from the Outage Planning Coordination (OPC) database at reference timestamps.
3. The temporary procedure referred to in paragraph 2 shall be replaced by the first next CGMM amendment in that regard. As soon as the relevant amendment is implemented, the Core TSOs shall use the CGMs pursuant to the amended CGMM for FCA.
4. The Core TSOs, with support of the Core CCC, shall review and update the methodology for the usage of CGMs in the LT CC either in accordance with Article 18(5) or following the implementation of the CGMM amendment referred to in paragraph 3, whichever comes first.

Article 11
Integration of HVDC Interconnectors at the Core Bidding Zone Borders

1. The Core TSOs shall provide information on the capacity of their High-Voltage Direct Current (HVDC) interconnector located within the Core CCR in the long-term time frame, the so-called maximum permanent technical capacity (MPTC).
2. The calculation of impact of cross-zonal exchange over an HVDC interconnector on the CNECs relies on the evolved flow-based (EFB) concept. Based on this concept, the converter stations of the cross-zonal HVDC shall be modelled as two virtual hubs which function equivalently as bidding zones. Then, the impact of an exchange between two real bidding zones A and B over such HVDC interconnector shall be expressed as an exchange from the bidding zone A to the virtual hub representing the sending end of the HVDC interconnector plus an exchange from the virtual hub representing the receiving end of the interconnector to the bidding zone B:

$$PTDF_{A\rightarrow B,l} = (PTDF_{A,l} - PTDF_{VH\_1,l}) + (PTDF_{VH\_2,l} - PTDF_{B,l}) \quad (2)$$

With:

$PTDF_{VH\_1,l}$ zone-to-slack $PTDF$ of Virtual hub 1 on a CNEC l, with virtual hub 1 representing the converter station at the sending end of the HVDC interconnector located in bidding zone A

$PTDF_{VH\_2,l}$ zone-to-slack $PTDF$ of Virtual hub 2 on a CNEC l, with virtual hub 2 representing the converter station at the receiving end of the HVDC interconnector located in bidding zone B

3. The PTDFs for the two virtual hubs $PTDF_{VH\_1,l}$ and $PTDF_{VH\_2,l}$ are calculated for each CNEC considered during the calculation and they are added as two additional columns (representing two additional virtual bidding zones) to the existing PTDF matrix, one for each virtual hub.

4. The exchange over the respective HVDC shall be limited to the value of its MPTC, which represents the maximum continuous active power an HVDC element is capable of transmitting, taking into account potential reduced availability due to planned outages of the interconnector asset. This parameter is defined by the interconnector's asset operators. In case of a planned outage of the HVDC interconnector, the MPTC shall be set to zero.

TITLE 3: CAPACITY CALCULATION PROCESS

Article 12
Description of the CC inputs and outputs

1. For each calculation time frame and CGM, the Core TSOs shall provide the Core CCC with the following inputs:

   (a) GSKs in accordance with Article 8;

   (b) MPTCs of HVDCs inside the Core CCR in accordance with Article 11;

   (c) CNECs in accordance with Article 7;

   (d) Reliability margin in accordance with Article 4;

   (e) Imax per CNE in accordance with Article 5(1)(a);

   (f) External constraints in accordance with Article 6; and

   (g) OPC data in accordance with Article 10.

2. For each calculation time frame, the Core CCC shall provide the following inputs:

   (a) CGMs for each calculation time frame in accordance with Article 10;

   (b) for monthly auctions, the already allocated capacities (AAC) from the Single Allocation Platform (SAP) operator of the preceding yearly auction and the portion of AAC returned before the monthly auction; and

   (c) the Fmax per CNE pursuant to Article 5(2).

3. For each calculation time frame, the Core CCC shall use the R_{amr} threshold for the adjustment of the minimum Remaining Available Margin (minRAM) pursuant to Article 14.

4. When providing the capacity calculation inputs pursuant to paragraph (1), the Core TSOs shall respect the formats commonly agreed between the Core TSOs and the Core CCC while fulfilling the requirements and guidance provided in the CGMM pursuant to Article 18 of the FCA Regulation.

5. The capacity calculation process shall be performed by the Core CCC and shall provide the calculated flow-based parameters, computed in accordance with Article 13 and Article 14 respectively, subject to the Core TSOs' validation in accordance with Article 17.

6. As the capacity calculation outputs, the calculated flow-based parameters shall be provided by the Core CCC in the following form:

   a) the CNECs with calculated Remaining Available Margin (RAM) and PTDFs from all CGMs (scenarios) of a calculation period (yearly or monthly), as a union of constraints, before removing redundant CNECs; and

   b) the non-redundant CNECs from point a) remaining after removing the redundant CNECs. This non-redundant set of CNECs with associated RAM and PTDFs shall be provided to the long-term capacity auction operator (SAP) as a union of constraints for each related auction.

Article 13
Computation of Power Transfer Distribution Factors

1. For each calculation time frame using the associated CGM, CNECs and GSKs, the Core CCC shall calculate for each CNEC its PTDFs for each Core bidding zone representing the influence of a variation of a commercial exchange between bidding zones on a CNEC. The calculation process is mathematically described below. Firstly, zone-to-slack PTDFs shall be derived as follows:

$$\mathbf{PTDF}_{\text{zone-to-slack}} = \mathbf{PTDF}_{\text{node-to-slack}}\,\mathbf{GSK}_{\text{node-to-zone}} \qquad (3)$$

With:

$\mathbf{PTDF}_{\text{zone-to-slack}}$	matrix of zone-to-slack PTDFs (columns: bidding zones; rows: CNECs)
$\mathbf{PTDF}_{\text{node-to-slack}}$	matrix of node-to-slack PTDFs (columns: nodes; rows: CNECs)
$\mathbf{GSK}_{\text{node-to-zone}}$	matrix containing the GSKs of all bidding zones (columns: bidding zones; rows: nodes; sum of each column equal to one)

2. The slack node shall be the same node across all CGMs of a capacity calculation time frame.

3. The zone-to-slack PTDFs as calculated above can also be expressed as zone-to-zone PTDFs. A zone-to-slack $PTDF_{A,l}$ represents the influence of a variation of a NP of bidding zone A on a CNEC l and assumes a commercial exchange between a bidding zone and a slack node. A zone-to-zone $PTDF_{A\rightarrow B,l}$ represents the influence of a variation of a commercial exchange from bidding zone A to bidding zone B on CNEC l. The zone-to-zone $PTDF_{A\rightarrow B,l}$ can be derived from the zone-to-slack PTDFs as follows:

$$PTDF_{A\rightarrow B,l} = PTDF_{A,l} - PTDF_{B,l} \qquad (4)$$

4. The maximum zone-to-zone $PTDF$ of a CNEC ($PTDF_{z2zmax,l}$) is the maximum influence that any Core exchange has on a respective CNEC, including exchanges over HVDC interconnectors which are integrated pursuant to Article 11.

$$PTDF_{z2zmax,l} = max\left(\max_{A\in BZ}\left(PTDF_{A,l}\right) - \min_{A\in BZ}\left(PTDF_{A,l}\right), \max_{B\in HVDC}\left(PTDF_{B,l}\right)\right) \qquad (5)$$

With:

$\mathbf{PTDF_{A,l}}$	zone-to-slack $PTDF$ of bidding zone A on a CNEC l
HVDC	set of HVDC interconnectors integrated pursuant to Article 11
BZ	set of all Core bidding zones
$\max_{A\in BZ}(\text{PTDF}_{A,l})$	maximum zone-to-slack PTDF of Core bidding zones on a CNEC l
$\min_{A\in BZ}(\text{PTDF}_{A,l})$	minimum zone-to-slack PTDF of Core bidding zones on a CNEC l

Article 14
Computation of Remaining Available Margin

1. The Core CCC shall use the initial list of CNECs determined pursuant to Article 7, and, by using the CGMs pursuant to Article 10, shall remove those CNECs for which the maximum zone-to-zone Power Transfer Distribution Factor (PTDF) is not higher than 5%. The remaining CNECs shall constitute the final list of CNECs for the actual long-term capacity calculation.

2. Using zone-to-hub PTDFs, the Core CCC shall determine the flow on a CNEC in the situation without commercial exchanges within the Core CCR as follows:

$$\vec{F}_{0,Core} = \vec{F}_{ref} - \mathbf{PTDF_{z2h}}\ \overrightarrow{NP}_{ref,Core} \qquad (6)$$

with:

$\vec{F}_{0,Core}$	flow per CNEC in the situation without commercial exchanges within the Core CCR
$\vec{F}_{ref}$	flow per CNEC obtained with the CGM
$\mathbf{PTDF_{z2h}}$	zone-to-hub power transfer distribution factor matrix for CNECs of the Core CCR
$\overrightarrow{NP}_{ref,Core}$	The net positions of Core bidding zones calculated from the commercial cross-border exchanges among the Core bidding zones as provided in the reference program associated with the CGMs of the ENTSO-E scenarios

3. The load flow solution for the F_{ref} calculation shall be as follows:

   a) AC load flow solution with respecting reactive power limits of modelled generation for base (n-0) topology and for contingency topologies, by default;

   b) In case of divergence of solution under a) for certain contingency topologies, the AC load flow solution without respecting reactive power limits of modelled generation shall be used for such topologies, as a first fallback;

   c) In case of divergence of both solutions under a) and b) for certain contingency topologies, DC load flow shall be used for such topologies as a second fallback, with the active power losses as obtained at the AC load flow of the base (n-0) topology, assigned to the active power-sending node of each branch of the CGM;

   d) In case of divergence of AC load flow for the base (n-0) topology, the lossless DC load flow shall be applied as a last resort solution. An imbalance from the expected NP of each modelled area caused by the lack of losses shall be assigned to all area's load nodes in proportion to the amount of a particular load.

4. The flows resulting from previously allocated cross-zonal capacities within the Core CCR in accordance with Article 29(7)(c) of the CACM Regulation:

   a) for yearly capacity calculation, they shall be equal to zero for all CNECs;

   b) for monthly capacity calculation, they shall be calculated for each CNEC by multiplying the volumes of previously allocated cross-zonal capacities at yearly Core flow-based auctions reduced by the returned AACs, with the positive zone-to-zone $PTDFs$, as follows:

$$\vec{F}_{AAC} = \mathbf{pPTDF_{z2z}} \cdot \overrightarrow{AAC} \qquad (7)$$

with:

$\vec{F}_{AAC}$	flows resulting from previously allocated cross-zonal capacities in Core CCR
$\mathbf{pPTDF_{z2z}}$	positive zone-to-zone power transfer distribution factor matrix
$\overrightarrow{AAC}$	already allocated capacities on Core bidding zone borders

All Core TSOs shall ensure that the RAM for each CNEC is equal or higher than a given percentage of Fmax of a given CNEC of as specified in paragraph 5. For this purpose, the Core TSOs shall calculate the following adjustment of minimum RAM:

$$AMR = \max\left(R_{amr} \cdot F_{max} - \left(F_{max} - FRM - F_{0,Core} - F_{AAC}\right), 0\right) \quad (8)$$

with:

AMR	adjustment of minimum RAM
R_{amr}	percentage of F_{max} for adjustment of minimum RAM

5. Each Core TSO shall define the minimum percentage of Fmax for RAM for its own CNECs. This value shall be at least 20% of Fmax for the yearly time frame and 10% of Fmax for the monthly time frame. If, during the experimentation, before the implementation of this LT CCM, the Core TSOs experience that the experimentation and its analysis do not reveal network security risks, they shall increase these values pursuant to the decision-making process referred to in Article 19 in order to better achieve the objectives of the FCA Regulation, with upper limits of minimum RAM of 40% of Fmax for the yearly time frame and 20% of the Fmax for the monthly time frame. Before doing so, the Core TSOs shall provide a comprehensive analysis consistent with the objectives listed in Article 3 of the FCA Regulation, and consult the modified minimum RAM with the Core regulatory authorities and stakeholders.
6. Finally, the RAM before validation shall be calculated according to the following equation:

$$\overrightarrow{RAM}_{bv} = \vec{F}_{max} - \overrightarrow{FRM} - \vec{F}_{0,Core} + \overrightarrow{AMR} - F_{AAC} \quad (9)$$

Article 15
Consideration of Non-Core CCR Bidding Zone Borders

1. Where CNEs within the Core CCR are impacted by electricity exchanges outside the Core CCR, the Core TSOs shall take this impact into account.
2. The Core TSOs shall consider the electricity exchanges with and among the bidding zones outside the Core CCR as fixed input to the LT CCM, as provided in the common set of ENTSO-E yearly and monthly reference scenarios, with unchanged NPs. These electricity exchanges, defined as best forecasts of NPs and flows in the LTCC CGMs, are defined and agreed based on the CGMM developed in accordance with Article 18 of the FCA Regulation, and incorporated in the CGMs.
3. Treatment of non-Core bidding zone borders in the LT CCM shall be studied by the Core TSOs in order to take into account their influence in the most efficient and accurate manner, and to heed

Article 21(1)(b)(vii) of the CACM Regulation. The Core TSOs shall start to study solutions for considering influence of non-Core CCR bidding zone borders immediately upon the implementation of Advanced Hybrid Coupling (AHC) in the Core DA CCM, and shall provide a report with the proposal for the improvements of treatment of non-Core exchanges in the LT CCM within 12 months after AHC implementation in Core DA CCM.

Article 16
Fallback Procedure

1. Taking into account the requirements stipulated in Article 10(7) of the FCA Regulation, in the event that a LTCC process is unable to produce results, a fallback procedure shall be applied.
2. In case the initial capacity calculation does not lead to any results, the Core CCC shall try to solve the problem and perform the LTCC again within a new time frame, jointly agreed with the Core TSOs.
3. In accordance with Article 42 of the FCA Regulation, in the event that the Core CCC is unable to produce results, the default fallback procedure shall be the postponement of the forward capacity allocation and a reasonable deadline shall be agreed by the Core TSOs and the Core CCC to retry the calculation.
4. In case the postponement of the forward capacity allocation is not possible, or the new deadline has been reached and the results are still not available, the Core CCC shall deliver the following fallback long-term FB parameters to the SAP:
    a) For the yearly capacity calculation, the FB parameters calculated for the equivalent CGMs of the previous year shall be used as a basis;
    b) For the monthly capacity calculation, the FB parameters calculated for the corresponding time horizon at the preceding yearly auction shall be used as a basis;
5. The fallback FB parameters under paragraph (4) shall be commonly validated by the Core TSOs and the Core CCC.

TITLE 4: VALIDATION PROCESS

Article 17
Validation Methodology

1. In accordance with Article 15 and Article 24 of the FCA Regulation, referring to Article 26 of the CACM Regulation, the Core TSOs shall have the right to correct long-term capacity on their CNECs for reasons of operational security during the validation process. The individual validation adjustments may be done by a Core TSO only in the following situations:

   (a) where a mistake in the input data has occurred, resulting in a wrong estimation of long-term capacity from an operational security perspective;

   (b) where there is a potential need to reconsider voltage or cosφ on certain CNECs;

   (c) where there is an exceptional outage topology which considerably limits the RAM of the CNEC, and which is not covered with the CGMs defined in Article 10(2);

   (d) where the calculated level of a RAM is unable to ensure operational security and the adjustment required by the TSO cannot be modelled via the input data for the capacity calculation process. Such situations can concern voltage limits, short-circuit current limits, frequency and dynamic stability limits; or

   (e) where the calculated level of a RAM is unable to ensure operational security and the adjustment required by the TSO would, under the attempt to be modelled via the input data, be overwritten by the application of the minimum RAM.

2. The Core TSOs shall perform individual validation adjustments under paragraph (1) as follows:

   (a) in case of a required reduction due to situations defined in points (b), (c), (d) and (e) of paragraph (1), a Core TSO may decrease RAM for its own CNECs, even below the minimum RAM specified in Article 14(5), if necessary;

   (b) in case of a situation according to point (a) of paragraph (1), each Core TSO or the Core CCC may request a common decision by all Core TSOs to calculate capacities with the correct input data. If the TSOs find errors in cross-zonal capacity provided for validation, the relevant TSOs shall provide updated capacity calculation inputs to the Core CCC for recalculation of cross-zonal capacities. The Core CCC shall repeat calculation with updated capacity calculation inputs and send the recalculated cross zonal capacity values again for validation. Recalculations shall be executed until the critical process end time. If there is still no result by this time, then the fallback process shall be triggered.

3. The Core TSOs shall justify individual validation adjustments under paragraph (1) as follows:

   (a) in case of a situation according to point (c) of paragraph (1), the TSO requiring the adjustment shall provide a justification that explains the effects and capacity calculation results due to the exceptional outage topologies, as well as the CGMs with those topologies applied;

   (b) in case of a situation according to point (d) of paragraph (1), the TSO requiring the adjustment shall provide a justification that explains the need to adjust the RAM level and the inability to model this adjustment via the input data;

   (c) in case of a situation according to point (e) of paragraph (1), the TSO requiring the adjustment shall provide a justification that explains the need to adjust the RAM level and the consequence of a potential application of the minimum RAM.

4. Pursuant to Article 26(5) of the CACM Regulation, every three months, the Core CCC shall report all reductions made during the validation of cross-zonal capacity to all Core NRAs, including the location, amount and reasons for the reductions.

5. Every year, the Core CCC shall provide the annual report with all the information on the reductions of cross-zonal capacity, as communicated to the CCC by the Core TSOs. The report shall include at least the following information for each CNEC of the pre-solved domain affected by a reduction and for each DA CC MTU:

    a) the identification of the CNEC;

    b) volume of change of RAM value;

    c) the reason(s) for reduction, and the operational security limit(s) that would have been violated without reduction, and under which circumstances they would have been violated;

    d) statistics on the estimated loss of economic surplus of applied validation reductions; and

    e) general measures to avoid validation reductions in the future.

6. Pursuant to Article 24(5) of the FCA Regulation, upon request of the Core NRAs, the Core TSOs shall provide a report detailing how the value of long-term cross-zonal capacity for a specific long-term capacity calculation time frame has been obtained.

7. The Core TSOs, with support of the Core CCC, shall review and update the validation methodology in the LT CC, also assessing the need for coordinated validation, in accordance with Article 18(5).

TITLE 5: UPDATES

Article 18
Review and Updates

1. Based on Article 3(f) of the FCA Regulation and in accordance with Article 21(3) of the FCA Regulation, referring to Article 27 of the CACM Regulation, the Core TSOs shall regularly, and at least once a year, review and update the key input parameters listed in Article 27(4) of the CACM Regulation. Should the operational security limits, CNEs, contingencies and import/export limits used for the common capacity calculation need to be updated based on this review, the Core TSOs shall publish the changes simultaneously with the update and publication requirements of the Core DA CCM.
2. In case the review proves the need of an update of the reliability margins, the Core TSOs shall publish the updated values of the reliability margin at least one month before their implementation.
3. In case the review proves the need for updating the application of the methodologies for determining GSKs, CNEs, and contingencies referred to in Articles 12 and 13 of the FCA Regulation, referring respectively to Articles 23 to 24 of the CACM Regulation, Article 4(12) of the FCA Regulation applies. After approval by the Core NRAs, the Core TSOs shall publish changes made in the methodologies at least three months before their implementation.
4. Any changes of parameters listed in paragraphs (1), (2) and (3) have to be communicated to market participants, ACER and the Core NRAs.
5. Within eighteen months after the go-live of the Core LT CCM in accordance with Article 22, all Core TSOs, with support of the Core CCC, shall review the methodology and, if relevant, submit by the same deadline to all Core NRAs a proposal for its amendment in accordance with Article 4(12) of the FCA Regulation, and in particular, in the following areas if improvements are possible:
    a) Reliability margin, pursuant to Article 4;
    b) Operational security limits, pursuant to Article 5;
    c) Allocation constraints, pursuant to Article 6;
    d) Critical network elements with contingencies, pursuant to Article 7;
    e) Remedial actions, pursuant to Article 9;
    f) CGMs, pursuant to Article 10;
    g) Remaining Available Margin, including the minimum RAM approach, pursuant to Article 14;
    h) Fallback procedure pursuant to Article 16; and
    i) Validation methodology pursuant to Article 17.
6. As defined in Article 8(2), the deadline for the amendment of GSK methodology is connected to its application in the Core DA CCM.
7. In case the calculation parameters under paragraph 5 are subject to change, the Core TSOs shall publish and implement the updated calculation parameters after approval by the Core NRAs, not later than three months before their application.
8. The Core TSOs shall assure that CGMES shall be applied in the long-term capacity calculation not later than 12 months after its application in the Core DA CCM.

TITLE 6: GOVERNANCE

Article 19
Rules Concerning Governance and Decision Making Among the Core TSOs

1. All Core TSOs shall cooperate for the implementation and operation of this LT CCM. This cooperation shall be carried out through common bodies where each TSO shall have at least one representative. The members of the common bodies shall aim to make unanimous decisions. Where unanimity cannot be reached, qualified majority voting based on the voting principles established in accordance with Article 4(3) of the FCA Regulation shall apply.
2. For the purpose of paragraph 1, all Core TSOs shall establish at least a steering committee consisting of one representative from each Core TSO. The steering committee shall make binding decisions on any matter or question related to the implementation and operation of this LT CCM. The steering committee shall adopt rules governing its operation.
3. The steering committee shall also act as a body for settlement of disputes among the Core TSOs regarding the implementation and operation of this LT CCM. The steering committee shall solve the problems and disputes regarding, but not limited to, the following issues:
    (a) resolution of disputes on the interpretation of aspects of this LT CCM, which may not be clear;
    (b) resolution of disputes on design choices required for implementation and operation of this LT CCM, which are not defined in this methodology; and
    (c) resolution of possible disputes in the implementation and operation of this LT CCM, including the disputes related to the provisions governing the day-to-day operation, but excluding the day-to-day operation itself.
4. The decisions adopted by the common bodies and the steering committee is without prejudice to any regulatory decision adopted by the competent NRAs.

TITLE 7: REPORTING

Article 20
Publication of Data

1. In accordance with Article 3(f) of the FCA Regulation, the Core CCC shall publish at least the following data items, in addition to the data items set out in Commission Regulation (EU) No 543/2013 on submission and publication of data in electricity markets:

   (a) CNECs' names;

   (b) CNECs' Energy Identification Codes (EIC);

   (c) indication if a CNEC is redundant or not, including the information on a CGM;

   (d) GSK relative weights among the TSOs belonging to the same bidding zone;

   (e) detailed breakdown of the final FB parameters per CNEC: Imax, U, cosφ, Fmax, Fref, F(0,Core), FRM, F_{AAC}, RAM, minRAM application, zone-to-zone PTDFs;

   (f) external constraints including their calculation details (reasoning, methodology and results) in accordance with Article 6;

   (g) flow-based parameters applied in case of activation of the fallback procedure in accordance with Article 16(3);

   (h) maximum non-simultaneous bilateral exchanges on Core bidding zone borders, pursuant to Article 20(9) of the CACM Regulation;

   (i) forecast information contained in the CGM:

      i. vertical load for each Core bidding zone and each TSO;

      ii. production for each Core bidding zone and each TSO;

      iii. reference net positions of all bidding zones in the synchronous area of Continental Europe and reference exchanges for all HVDC interconnectors within the synchronous area of Continental Europe and between the synchronous area of Continental Europe and other synchronous areas; and

   (j) information about the capacity validation, as provided in Article 17.

2. The Core CCC shall publish the data items listed in paragraph 1 on a monthly basis, after each LTCC, on a dedicated online communication platform representing all Core TSOs. To facilitate the readability of the published data, the Core TSOs shall include the information related to the LTCC in the handbook which is published on the communication platform in the framework of the DA CCM, using the same data format.

3. Any change in the identifiers listed in paragraph 1, point (a) and point (b), shall be publicly notified at least one month before its entry into force.

4. Any Core TSO may withhold the information referred to in paragraph 1, point (a) and point (b) if it is classified as sensitive critical infrastructure protection related information in its Member State as provided for in point (d) of Article 2 of Council Directive 2008/114/EC on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection. In such a case, the information referred to in paragraph 1, point (a) and point (b), shall be replaced with an anonymous identifier which shall be the same for each CNEC across all LT CC time frames. The anonymous identifier shall also be used in all TSO communications related to the CNEC and when communicating about an outage or an investment in infrastructure. The Core TSOs shall publish the communication about which information has

been withheld pursuant to this paragraph, on the communication platform referred to in paragraph 2.

5. The Core NRAs may request additional information to be published by the Core TSOs. For this purpose, all Core NRAs shall coordinate their requests among themselves and consult it with the Core TSOs, ACER and all the relevant stakeholders. Any Core TSO may refuse to publish any additional information which has not been requested by its competent NRA.

Article 21
Monitoring and Reporting to the National Regulatory Authorities

1. The Core TSOs shall provide data on LTCC to the Core NRAs for the purpose of monitoring its compliance with this methodology and the relevant legislation. The reporting framework shall be developed by the Core TSOs in coordination with the Core NRAs, and reviewed and updated as required.

2. The data provided to the Core NRAs shall at least include the information on non-anonymized names of CNECs as referred to in Article 20(1), point (a) and point (b):

    a) on a yearly basis for each CNEC after the yearly calculations; and

    b) on a monthly basis for each CNEC after each monthly calculation.

    This information shall be in a format that allows easily to combine the CNEC names with the information published in accordance with Article 20(1).

3. The Core NRAs may request additional information from the Core TSOs. For this purpose, the Core NRAs shall coordinate their requests and forward a single, coordinated request to the Core TSOs. Individual information requests of NRAs, not coordinated with the other Core NRAs, are beyond the scope of this methodology, and shall be dealt with on a national level.

4. The Core CCC, with support and after approval of the Core TSOs, shall submit to the Core NRAs an annual monitoring report containing:

    (a) an assessment of the quality of the data published on the dedicated online communication platform referred to in Article 20, accompanied by a detailed analysis of a failure to achieve sufficient data quality standards by the concerned Core TSOs, where relevant;

    (b) the Core TSOs´ and the Core CCC's report pursuant to Article 22(4) on their continuous monitoring of the effects and performance of the application of the LT CCM, in a commonly agreed template;

    (c) the monitoring of the accuracy of non-Core exchanges' forecasts in the CGM;

    (d) validation monitoring pursuant to Article 17;

    (e) the pre-solved CNECs that were subject to minimum RAM adjustment; and

    (f) statistics on CNECs with minimum RAM applied pursuant to Article 14.

TITLE 8: IMPLEMENTATION AND LANGUAGE

Article 22
Timescale for Implementation

1. The Core TSOs shall publish this LT CCM without undue delay after its adoption pursuant to Article 4(10) of the FCA Regulation.
2. The Core TSOs shall implement this LT CCM in accordance with processes and deadlines provided in paragraph 3 point (c).
3. The implementation process shall consist of the following steps:
   (a) an internal parallel run during which the Core TSOs and the Core CCC shall test the operational processes for the LT CC inputs, the LT CC process and the long-term capacity validation, and develop appropriate IT tools and infrastructure;
   (b) an external parallel run during which the Core TSOs and the Core CCC shall continue testing their internal processes and IT tools and infrastructure. In addition, the Core TSOs shall involve the SAP to test the implementation of this methodology, and market participants to test the effects of applying this methodology to the market and allow them to adapt their processes. In accordance with Article 10(5)(c) of the FCA Regulation, this phase shall not be shorter than 6 months;
   (c) implementation by the following deadlines:
      i. a flow-based yearly auction for 2025; and
      ii. a flow-based monthly auction for January 2025.
4. During the internal parallel run, the Core TSOs and the Core CCC shall continuously monitor the effects and the performance of the application of the LT CCM, and shall develop the monitoring and performance criteria, in coordination with the Core NRAs. During the external parallel run the Core TSOs and the Core CCC shall publish the monitoring and performance criteria indicators on a monthly basis. After the implementation of this methodology, the outcome of this monitoring shall be summarised in an annual report.
5. Until the implementation of this Core LT CCM, the Core TSOs shall continue to apply the NTC capacity calculation approach.

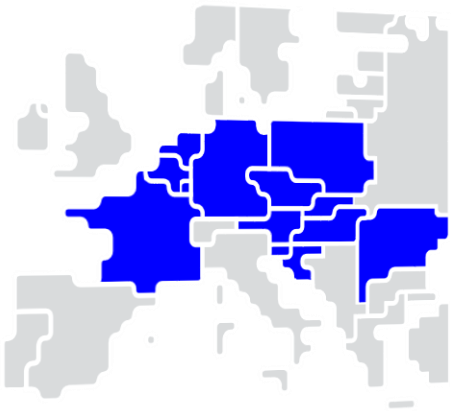
Article 23
Language

1. The reference language for this LT CCM shall be English.
2. For the avoidance of doubt, where the Core TSOs need to translate the LT CCM into their national language(s), in the event of inconsistencies between the English version published by the Core TSOs in accordance with Article 4(13) of the FCA Regulation and any version in another language, the relevant Core TSOs shall clarify any inconsistencies by providing a revised translation of the LT CCM to their respective NRAs.

ACER
European Union Agency for the Cooperation of Energy Regulators

~~Core TSOs common coordinated long-term capacity calculation methodology in accordance with article 10 of Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation~~

~~November 2020~~



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Long-term capacity calculation methodology of the Core capacity calculation region

in accordance with Article 10 of Commission Regulation (EU) 2016/1719 of 26 September 2016
establishing a guideline on forward capacity allocation

~~13~~ 18 January 2023

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Whereas

(1) This document ~~sets out~~is the common coordinated long-term capacity calculation methodology (‘LT CCM’ or ‘this methodology’) for the Core capacity calculation region (‘Core CCR’) in accordance with Article 10 ~~seq.~~ of Commission Regulation (EU) 2016/1719 ~~of 26 September 2016~~ establishing a guideline on Forward Capacity Allocation ~~(hereafter referred to as the “~~(‘FCA ~~Regulation”). This methodology is hereafter referred to as the "Long-Term Capacity Calculation Methodology" (LT CCM~~Regulation’).

~~1.~~ The LT CCM takes into account ~~the general principles and goals set in the FCA Regulation as well as~~ Regulation (EC) No 2019/943 ~~of the European Parliament and of the Council of 5 June 2019~~ on the internal market for electricity ~~(hereafter referred to as "Regulation (EC) No 2019/943”.~~

(2) ~~The LT CCM serves the objective of promoting effective long-term cross-zonal trade with long-term cross-zonal hedging opportunities for market participants (~~(‘Electricity Regulation’), the general principles of forward capacity allocation set out in Article 10 of the FCA Regulation and the objectives listed in Article 3~~(a~~ of the FCA Regulation.

(3) Pursuant to Article 10(2) of the FCA Regulation, the LT CCM uses the flow-based approach.

(4) Pursuant to Article 10(3) of the FCA Regulation~~) by taking~~, the LT CCM is compatible with the day-ahead and intraday capacity calculation methodologies established in accordance with Article 21(1) of Commission Regulation (EU) 2015/1222 establishing a guideline on capacity allocation and congestion management (‘CACM Regulation’).

(5) Pursuant to Article 10(4)(a) of the FCA Regulation, the LT CCM takes into account the ~~hedging~~uncertainty associated with long-term capacity calculation time frames when applying a security analysis based on multiple scenarios i.e. Common Grid Models (CGM) and using the capacity calculation inputs, the capacity calculation approach referred to in Article 21(1)(b) of the CACM Regulation and the validation of cross-zonal capacity referred to in Article 21(1)(c) of the CACM Regulation.

(6) Pursuant to Article 10(5) of the FCA Regulation, the LT CCM applies the flow-based approach since:

(a) the flow-based approach leads to an increase of economic efficiency in the Core CCR with the same level of system security;

(b) the transparency and accuracy of the flow-based results have been confirmed in Core CCR; and

(c) the implementation timeframe provided in the methodology is sufficient for the market participants to adapt their processes[1];

(7) Pursuant to Article 10(6) of the FCA Regulation, as the LT CCM applies a security analysis based on multiple scenarios, it also applies the requirements for the capacity calculation inputs, the capacity calculation approach and the validation of cross zonal capacity as provided for in Article 21(1) of the CACM Regulation, except Article 21(1)(a)(iv) where relevant.

(8) Pursuant to Article 10(7) of the FCA Regulation, the LT CCM takes into account the requirements for the fallback procedures and the requirement provided for in Article 21(3) of the CACM Regulation.

(9) The LT CCM covers the yearly and monthly long-term time frames pursuant to Article 9 of the FCA Regulation.

[1] The fulfilment of these three conditions is discussed in section 6.2.1.2 of ACER’s Decision: *Assessment of the general requirements (Article 10 of the FCA Regulation).*

(10) The LT CCM provides yearly and monthly capacity calculation outputs. Splitting of long-term capacity is subject to a separate methodology for splitting long-term cross-zonal capacity developed pursuant to Article 16 of the FCA Regulation, and is not addressed in this LT CCM. Splitting of long-term capacity may reduce the yearly capacity calculation outputs in order to provide more capacity at a monthly level.

(11) During the development of the LT CCM, it has been recognised that outputs of the common grid model methodology ('CGMM') are insufficient for the Core LT CCM, which requires higher granularity of common grid models ('CGM') and a flexibility in defining the timestamps for additional CGMs, as well as the application of planned outages, to properly represent the network for the capacity calculation. In addition, in order to ensure a coordinated approach for the long-term network modelling, the CGMM needs ~~of~~to be amended to incorporate the common elements of the Core temporary procedure. The temporary procedure in Core may be applied only until such amendment of the CGMM takes place. After that, the Core LT CCM should apply the amended CGMM.

(12) In line with Article 37(1)(a) of the Electricity Regulation, the regional coordination centres ('RCCs') need to carry out the coordinated capacity calculation in accordance with the methodologies developed pursuant to the capacity allocation and congestion management guideline adopted on the basis of Article 18(5) of Regulation (EC) No 714/2009. Article 35(2) of the Electricity Regulation requires that RCCs enter into operation by 1 July 2022. Thereby, as of this date, RCCs of the Core CCR will take over the role of the coordinated capacity calculator ('CCC') as referred to in this LT CCM.

(13) The LT CCM contributes to the achievement of the objectives of forward capacity allocation listed in Article 3 of the FCA Regulation. In particular, this LT CCM:

(a) Takes into account the hedging needs of electricity market participants by calculating reliable capacities at an early stage and making them available to market participants, which makes long-term planning possible. Thus it is promoting effective long-term cross-zonal trade with long-term cross-zonal hedging opportunities for electricity market participants in accordance with Article 3(a) of the FCA Regulation;

~~2. The LT CCM contributes to the optimal calculation of long-term capacity (article 3(b) of the FCA Regulation) since it~~ Takes into account all critical network elements, coordinates the timings of delivery of inputs, provides a calculation approach and coordinates validation requirements of the capacity calculation between the Core TSOs and the ~~Coordinated Capacity Calculator of Core (~~Core CCC~~).~~. The ~~optimal~~flow-based capacity calculation is a result of a close cooperation ~~and establishment of a smooth interface between capacity calculation by Core~~ of TSOs and ~~allocation of~~ the CCC and establishes a reliable and coordinated input towards the capacity allocation process for market ~~parties.~~

~~3. The LT CCM contributes to the objective of providing non-discriminatory access to long-term cross-zonal capacity (article 3(c) of the FCA Regulation) by allowing each market~~ participants ~~to access and participate to Long-Term (LT) Auctions organized transparently by the Singe Allocation Platform (SAP) operator. The Core TSOs ensure that the cross-zonal capacity is calculated in such a way that the same LT CCM will apply to all market participants on all respective bidding zone borders in the Core CCR, thereby framing a non-discriminatory playing field amongst market participants.~~

~~4. The LT CCM is designed to ensure a fair and non-discriminatory treatment of Core TSOs, ACER, regulatory authorities and market participants (article 3(d) of the FCA Regulation) since it has been developed and adopted within a process that ensures the involvement of all relevant stakeholders and independence of the approving process. Transparency and monitoring of capacity calculation are~~

~~essential for ensuring its efficiency and understanding. This methodology establishes significant requirements for Core TSOs to publish the information required by market participants, to report the information to regulatory authorities and to analyse the impact of capacity calculation on the market functioning.~~

~~5. This LT CCM also contributes to the objective of respecting the need for a fair and orderly forward capacity allocation and orderly price formation (article 3(e) of the FCA Regulation) by making available in due time the information about cross-zonal capacities to be released in the market, and by ensuring a backup solution when capacity calculation fails to provide results.~~

~~6. The LT CCM requires Core TSOs to provide market participants with reliable information on cross-zonal capacities and import/export limits for year and month ahead allocation in a transparent and continuous way by publication of the validated results at the Transparency Platform. This includes regular reporting on specific processes within capacity calculation. The LT CCM therefore contributes to the objective of transparency and reliability of information (article 3(f) of the FCA Regulation).~~

~~7. Finally, the LT CCM provides a long-term signal for efficient investments in transmission, generation and consumption, and thereby contributes to the efficient long-term operation and development of the electricity transmission system and electricity sector in the Union (article 3 (g) of the FCA Regulation).~~

~~8. The LT CCM covers the annual and monthly long-term time frames pursuant to article 9 of the FCA Regulation.~~

~~9. In August 2019, the Core TSOs reached the situation described on the article 4(4) of the FCA Regulation. Starting from this date, an iterative process took place, involving Core TSOs, National Regulatory Authorities (NRAs), ACER, the European Commission (EC) for designing an acceptable methodology for all parties. Following the guidance of ACER, this LT CCM considers the flow-based calculation as a target.~~

(b) ~~The LT CCM for the Core CCR is composed of a~~. The flow-based ~~(FB)~~ approach ~~in accordance with article 10(5) of the FCA Regulation. In accordance with article 10(5)(a) of the FCA Regulation the FB approach leads to an increase of economic efficiency in the capacity calculation region with the same level of system security. The LT CCM calculates the annual and monthly cross-zonal capacities based on selected timestamps corresponding to different scenarios. Each timestamp delivers for each Critical Network Element and Contingency (CNEC), aside its Power Transfer Distribution Factors (PTDFs) for each of the Core Bidding Zone Borders (BZBs), the Remaining Available Margin (RAM) respecting the operational security limits (in accordance with Article 5 subject to Article 4 describing the Flow Reliability Margin). Those PTDFs and RAM values form identical inputs to perform either a coordinated Net Transfer Capacity (cNTC) extraction or a FB allocation. Therefore, a FB approach clearly respects the same level of security for the grid. Additionally, a FB approach will allocate~~allocates the cross-zonal capacities by putting the different ~~BZBs~~bidding zone borders in competition with each other in order to receive a portion of the remaining available margin (RAM) of ~~the~~ a critical network element with contingency (CNEC) and therefore ~~lead to a better~~increases economic efficiency. In ~~opposite, a cNTC extraction~~contrast, the application of net transmission capacity (NTC) is based on a fixed ~~and predefined formula to distribute the RAM~~ distribution of capacities of each CNEC over the interdependent borders ~~before converting them into NTC values for each border~~. Consequently, these NTCs are allocated independently on each interdependent border which essentially limits the competition between interdependent borders. Lack of competition ~~between~~among borders for

the capacity of ~~network elements~~CNECs, which these borders are significantly impacting, inevitably~~,~~ leads to loss of economic efficiency in allocating the capacity of such network elements. Thus, by applying the flow-based approach this LT CCM contributes to the optimisation of the calculation and allocation of long-term cross-zonal capacity in Core, in accordance with Article ~~10(5)(~~3(b) of the FCA Regulation~~ the transparency and accuracy of the flow-based results shall have been confirmed in the capacity calculation region. The LT CC Methodology foresees the reporting and publication of the FB results in accordance with Article 19 and Article 20 in order to obtain a full transparency and accuracy. In accordance with article 10(5)(c) of the FCA Regulation Core TSOs will provide market participants with at least six months to adapt their processes. ~~;

~~10. The LT CCM is structured in three consecutive stages: (i) the definition and provision of capacity calculation inputs by the Core TSOs, (ii) the capacity calculation process by the Core CCC in coordination with the Core TSOs, and (iii) the capacity validation by the Core TSOs in coordination with the Core CCC.~~

(c) ~~Core TSOs determine the final capacity values~~Applies equally to ~~meet the form of product regulated in the Core Design of Long-Term Transmission Rights (in accordance with article 31(3) of the FCA Regulation). Those capacity values are subject to the Core Methodology for splitting~~ all market participants on all respective bidding zone borders in the Core CCR, thereby ensuring a level playing field amongst market participants, and providing non-discriminatory access to long-term cross-zonal capacity ~~(in~~ in accordance with Article 3(c) of the FCA Regulation;

~~(c)~~(d) Has been developed and adopted in a transparent process involving all the relevant stakeholders. This ensures fair and non-discriminatory treatment of the TSOs, ACER, regulatory authorities and market participants in accordance with Article ~~16~~3(d) of the FCA Regulation~~).~~;

~~11. The LT CCM is based on forecast models of the transmission system. The inputs of the LT CCM are determined more than a year, respectively more than a month, before the electricity delivery date taking into account the available knowledge at that time. Therefore, the outcomes are subject to inaccuracies and uncertainties that are higher than the inaccuracies and uncertainties of the Day-Ahead (DA) capacity calculation methodology (CCM). The aim of the reliability margin is to cover the risk induced by these forecast errors.~~

~~12. Core TSOs remain responsible for maintaining operational security regardless of whether there is a coordinated application of capacity calculation or not. For this reason, they need to validate the calculated capacities to ensure that they do not violate operational security limits. This step may lead to reductions of the values given by the LT CC process. In order to avoid undue discrimination these measures of reduction have to be performed in a coordinated way. In case of missing coordination, the results might be that a Core TSO might have more capacities to the detrimental effect (operational security issues) of another Core TSO.~~

~~SUBMIT THE FOLLOWING LT CCM TO THE NATIONAL REGULATORY AUTHORITIES OF THE CORE CCR:~~

~~1. General Provisions~~

~~1. Subject, Matter and Scope~~

~~1. The long-term common capacity calculation methodology as determined in this LT CCM is the common proposal of all Core Transmission System Operators (hereafter referred to as "Core TSOs") in accordance with article 10 seq. of the FCA Regulation and shall cover the BZBs of the Capacity Calculation Region Core (hereafter referred to as "the Core CCR" as established by the determination of capacity calculation regions pursuant to article 15 of the CACM Regulation).~~

(e) Allows timely release of information about cross-zonal capacities and provides a backup solution when capacity calculation fails to provide results. In this way, it respects the need for a fair and orderly forward capacity allocation and orderly price formation in accordance with Article 3(e) of the FCA Regulation;

(f) Requires the Core TSOs to provide market participants with reliable information on cross-zonal capacities for the forward allocation in a transparent and continuous way by publication of the validated results. This includes regular reporting on specific processes within capacity calculation. As such, it ensures and enhances the transparency and reliability of information on forward capacity allocation in accordance with Article 3(f) of the FCA Regulation;

(g) Enables the allocation of long-term cross-zonal capacities and this provides long-term price signals and hedging and thus facilitates efficient investments in transmission, generation and consumption and contributes to the efficient long-term operation and development of the electricity transmission system and electricity sector in the Union in accordance with Article 3(g) of the FCA Regulation.

TITLE 1: GENERAL PROVISIONS

Article 1
Subject matter and scope

1. This LT CCM is the methodology pursuant to Article 10 of the FCA Regulation and applies ~~solely~~to the bidding zone borders of the Core CCR.

~~1.~~2. This LT CCM applies to the long-term capacity ~~calculations~~calculation within the Core CCR and covers the ~~annual~~yearly and monthly long-term time frames pursuant to Article 9 of the FCA Regulation and in line with the regional design ~~for LTTR in the Core CCR. Common capacity calculation methodologies within other capacity calculation regions or other timeframes are outside the scope of this proposal~~of the long-term transmission rights in the Core CCR.

~~2. The methodology for splitting long-term capacity is out of scope of this LT CCM, but in the scope of the methodology pursuant to article 16 of the FCA Regulation.~~

~~1. Definitions and Interpretation~~

3. ~~For the purposes of the LT CCM, the terms used shall have the meaning given to them in article 2 of Regulation (EC) 2019/943,~~This LT CCM applies to all TSOs and CCC within the Core CCR.

Article 2
Definitions

1. For the purpose of the LT CCM, the definitions in Article 2 of the Electricity Regulation, Article 2 of the FCA Regulation, Article 2 of the CACM Regulation as well as Article 2 of Regulation (EC) 2013/543 of 14 June 2013 on submission and publication of data in electricity markets, ~~article 2 of Regulation (EC) 2015/1222 establishing a guideline on Capacity Allocation and Congestion Management (hereafter referred to as the "CACM Regulation") and article 2 of the FCA Regulations~~shall apply.

2. In addition, the following ~~definitions,~~abbreviations shall apply. In the event of any inconsistency between the following abbreviations and ~~notations shall apply:~~the definitions pursuant to paragraph (1),[2] the latter shall prevail.

~~ACER~~	~~Agency for the Cooperation of Energy Regulators~~
~~AHC~~	~~Advanced Hybrid Coupling~~
~~AMR~~	~~Adjustment of Minimum RAM~~
~~BZBs~~	~~Bidding Zone Border standing also for set of BZBs~~
~~C~~	~~Contingency~~
~~CACM Regulation~~	~~Capacity Allocation and Congestion Management Regulation~~
~~CC~~	~~Capacity Calculation~~

[2] References to paragraphs are to be read as references to paragraphs within a given Article of Annex I, unless explicitly stated otherwise.

~~CCC~~	~~Coordinated Capacity Calculator, as defined in article 2(11) of the CACM Regulation~~
~~CCM~~	~~Capacity Calculation Methodology~~
~~CCR~~	~~Capacity Calculation Region, as defined in article 2(3) of the CACM Regulation~~
~~CHP~~	~~Combined Heat and Power plant~~
~~CGM~~	~~Common Grid Model, as defined in article 2(2) of the CACM Regulation~~
~~CGMM~~	~~Common Grid Model Methodology~~
~~CNE~~	~~Critical Network Element~~
~~CNEC~~	~~Critical Network Element and Contingency~~
~~cNTC~~	~~Coordinated Net Transfer Capacity~~
~~DA~~	~~Day-Ahead, as defined in article 2(34) of the CACM Regulation~~
~~DA CCM~~	~~Day-Ahead Capacity Calculation Methodology~~
~~EC~~	~~European Commission~~
~~EIC~~	~~Energy Identification Code~~
~~ENTSO-E~~	~~European Network of Transmission System Operators for Electricity~~
~~EU~~	~~European Union~~
~~FCA Regulation~~	~~Forward Capacity Allocation Regulation~~
~~FB~~	~~Flow Based~~
~~F_{max}~~	~~Maximum Admissible Power Flow~~
~~F_{ref}~~	~~Reference Flow~~
~~$F_{0, Core}$~~	~~Flow without commercial exchanges within Core CCR~~
~~FRM~~	~~Flow Reliability Margin~~
~~GSK~~	~~Generation Shift Key, as defined in article 2(12) of the CACM Regulation~~
~~HVDC~~	~~High Voltage Direct Current~~
~~IGM~~	~~Individual Grid Model, as defined in article 2(1) of the CACM Regulation~~

~~I_{max}~~	~~Maximum Admissible Current~~
~~LT~~	~~Long Term~~
~~LTCC~~	~~Long-Term Capacity Calculation~~
~~LT CCM~~	~~Common Coordinated Long-Term Capacity Calculation Methodology~~
~~kA~~	~~Kilo-Ampère~~
~~kV~~	~~Kilo-Volt~~
~~minRAM~~	~~Minimum Remaining Available Margin~~
~~MPTC~~	~~The Maximum Permanent Technical Capacity represents the maximum continuous active power an HVDC element is capable of transmitting, taking into account potential reduced availability due to planned outages of the interconnector asset. This parameter is defined by the interconnector's asset operators.~~
~~MTU~~	~~Market Time Unit~~
~~MW~~	~~Megawatt~~
~~NP~~	~~Net Position~~
~~NRA~~	~~National Regulatory Authority~~
~~NTC~~	~~Net Transfer Capacity~~
~~OPC~~	~~Outage Planning Coordination~~
~~OPDE~~	~~Operational Planning Data Environment, as defined in article 3(74) of the SO GL Regulation~~
~~PTDF~~	~~Power Transfer Distribution Factor~~
~~PST~~	~~Phase-Shifting Transformer~~
~~R_{amr}~~	~~Minimum RAM factor~~
~~RA~~	~~Remedial Action, as defined in article 2(13) of the CACM Regulation~~
~~RAM~~	~~Remaining Available Margin~~
~~RG CE~~	~~Regional Group Continental Europe~~
~~RM~~	~~Reliability Margin~~
~~SAP~~	~~Single Allocation Platform~~

~~SCED~~ ~~Security Constrained Economic Dispatch~~

~~SCUC~~ ~~Security Constrained Unit Commitment~~

~~SO GL Regulation~~ ~~Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation.~~

(a) 'AC' means: Alternating Current;

(b) 'AHC' means: Advanced Hybrid Coupling;

(c) 'AMR' means: Adjustment of Minimum RAM;

(d) 'CC' means: Capacity Calculation;

(e) 'CCC' means: Coordinated Capacity Calculator, as defined in Article 2(11) of the CACM Regulation;

(f) 'CCM' means: Capacity Calculation Methodology;

(g) 'CCR' means: Capacity Calculation Region, as defined in Article 2(3) of the CACM Regulation;

(h) 'CGM' means: Common Grid Model, as defined in Article 2(2) of the CACM Regulation;

(i) 'CGMES' means: Common Grid Model Exchange Standard, developed by ENTSO-E pursuant to the CGMM;

(j) 'CGMM' means: Common Grid Model Methodology pursuant to Article 18 of the FCA Regulation;

(k) 'CNE' means: Critical Network Element;

(l) 'CNEC' means: Critical Network Element and Contingency;

(m) 'cNTC' means: coordinated Net Transmission Capacity;

(n) 'DA' means: Day-Ahead, as defined in Article 2(34) of the CACM Regulation;

(o) 'DA CCM' means: Day-Ahead Capacity Calculation Methodology approved under Article 20 of the CACM Regulation;

(p) 'DC' means: Direct Current

(q) 'EFB' means: Evolved Flow Based

(r) 'EIC' means: Energy Identification Code;

(s) 'ENTSO-E' means: European Network of Transmission System Operators for Electricity;

(t) 'FB' means: Flow Based;

(u) 'Fmax' means: Maximum Admissible Power Flow;

(v) 'Fref' means: Reference Flow;

(w) 'FRM' means: Flow Reliability Margin;

(x) 'F0,Core' means: Flow without commercial exchanges within Core CCR;

(y) 'GSK' means: Generation Shift Key, as defined in Article 2(12) of the CACM Regulation;

(z) 'HVDC' means: High-Voltage Direct Current;

(aa) 'IGM' means: Individual Grid Model, as defined in Article 2(1) of the CACM Regulation;

(bb) ‘Imax’ means: Maximum Admissible Current;

(cc) ‘LF’ means: Load Flow;

(dd) ‘LT’ means: Long-Term;

(ee) ‘LTCC’ means: Long-Term Capacity Calculation;

(ff) ‘LT CCM’ means: Long-Term Capacity Calculation Methodology;

(gg) ‘kA’ means: Kilo Ampère;

(hh) ‘kV’ means: Kilo Volt;

(ii) ‘minRAM’ means: Minimum Remaining Available Margin;

(jj) ‘MPTC’ means: Maximum Permanent Technical Capacity;

(kk) ‘MTU’ means: Market Time Unit;

(ll) ‘MW’ means: Megawatt;

(mm) ‘NP’ means: Net Position;

(nn) ‘NRA’ means: National Regulatory Authority;

(oo) ‘NTC’ means: Net Transfer Capacity;

(pp) ‘OPC’ means: Outage Planning Coordination;

(qq) ‘OPDE’ means: Operational Planning Data Environment, as defined in Article 3(74) of the SO Regulation;

(rr) ‘PST’ means: Phase-Shifting Transformer;

(ss) ‘PTDF’ means: Power Transfer Distribution Factor;

(tt) ‘RA’ means: Remedial Action, as defined in Article 2(13) of the CACM Regulation;

(uu) ‘RAM’ means: Remaining Available Margin;

(vv) ‘Ramr’ means: Minimum RAM factor;

(ww) ‘RM’ means: Reliability Margin;

(xx) ‘RCC’ means: Regional Coordination Centre;

(yy) ‘SAP’ means: Single Allocation Platform;

(zz) ‘SO’ means: System Operation;

(aaa) ‘SO Regulation’ means: Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation;

3. In this LT CCM, unless the context ~~requires~~clearly indicates otherwise:

   (a) the singular ~~indicates~~also includes the plural and vice versa;

   (b) headings are inserted for convenience only and do not affect the interpretation of this LT CCM; and

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

Article 3
Long-Term Capacity Calculation Process

1. The capacity calculation process for the long-term time ~~frame~~frames in the Core CCR shall apply the FB approach, pursuant to Article 10(1) of the FCA Regulation.

2. The year-ahead and month-ahead capacity calculation process shall consist of three main stages:

(a) the creation of capacity calculation inputs by the Core TSOs, in accordance with Title 2;[3]

(b) the capacity calculation process by the Core CCC, in accordance with Title 3; and

(c) the capacity validation by the Core TSOs in coordination with the Core CCC, in accordance with Title 4.

~~1. In accordance with article 24 of the FCA Regulation, each Core TSOs shall validate the results.~~

[3] References to Titles and/or Articles are to be read as references to Titles and/or Articles of Annex I, unless explicitly stated otherwise.

~~2. Treatment of Input~~

TITLE 2: CAPACITY CALCULATION INPUTS

Article 4
Reliability Margin Methodology

1. ~~The Core TSOs shall use the latest available Flow~~ The uncertainty associated with long-term capacity calculation shall be taken into account by the application of multiple scenarios i.e. CGMs pursuant to Article 10. The capacity calculation outputs obtained based on these CGMs shall represent the joint set of constraints to the long-term allocation pursuant to Article 12(6). For this reason, the flow reliability margin (FRM) for long-term capacity calculation shall correspond to the values from the DA ~~timeframe.~~time frame, according to paragraph 2.

~~1.~~2. For all CNECs, the Core TSOs shall use the latest available FRM from the DA time frame. The latest available FRMs are the yearly updated FRMs as defined per CNEC in ~~article 8(11) of~~ the Core DA CCM and in accordance with Article 22 of the CACM Regulation. They ~~are~~shall be applied for all yearly and monthly capacity calculations. In case the FRM considered in the DA CC have been updated between the yearly and the monthly capacity calculation, the latest FRM ~~is~~shall be considered in the subsequent monthly capacity calculation.

3. ~~As stated in article 8 of~~For the new CNEs coming into operation during the forthcoming long-term capacity calculation period, the initial FRM shall be equal to 10% of Fmax.

~~2.~~4. As provided in the Core DA CCM, the FRM is a ~~percentage~~portion of Fmax of a CNEC given in megawatts, which covers the uncertainties within capacity calculation.

~~1. Referring to Article 18(1)(2), Core TSOs shall regularly review the FRMs following Article 4(1)(2) and if needed change the FRMs for LT timeframe in order to ensure at least the consistency with their neighbouring CCRs and to ensure an adequate consideration of the uncertainties in the capacity calculation for the long-term timeframes.~~

5. ~~Methodologies~~The Core TSOs, with support of the Core CCC, shall review and update the methodology for reliability margin in accordance with Article 18(5).

Article 5
Methodology for Operational Security Limits

1. In accordance with Article 12 of the FCA Regulation, referring to Article 23 of the CACM Regulation, each Core ~~TSOs~~TSO shall respect in the LT ~~CCM~~CC the operational security limits ~~in line with article 72 of the SO GL Regulation.~~Critical Network Elements (CNEs). The operational security limits used in the LT CCM are the same as those used in the operational security analysis. In particular:

   (a) to take into account the thermal limits of ~~Critical Network Elements (~~CNEs~~),~~, the Core TSOs shall use the maximum admissible current limit (~~I_{max}~~Imax) which is the physical limit of a CNE according to the operational security limits in line with Article 25 of the SO ~~GL~~ Regulation. The maximum admissible current can be defined by:

      i. fixed limits for all ~~timestamps~~CGMs in the case of CNEs which are transformers ~~and~~or certain types of conductors which are not sensitive to ambient conditions;

      ii. fixed limits for all ~~timestamps~~CGMs of a specific season~~. Fixed limits are determined separately~~ for ~~each of the seasons.~~all other CNEs.

   (b) when applicable, ~~I_{max}~~Imax shall be defined as a temporary current limit of ~~the~~a CNE in accordance with Article 25 of the SO ~~GL~~ Regulation. A temporary current limit means that an overload is only allowed for a certain finite duration.

(c) ~~I_{max}~~Imax is not reduced by any security margin, as all uncertainties in the LT CCM are covered on each CNEC by the reliability margin in accordance with Article 4.

2. The Fmax value ~~F_{max}~~, expressed in MW, describes the maximum admissible active power flow on a CNE. ~~F_{max}~~Fmax is calculated by the Core CCC ~~from I_{max}~~on the basis of Imax by the given formula:

$$F_{max} = \sqrt{3} \cdot I_{max} \cdot U \cdot \text{~~cos(φ)~~} \cos \varphi \qquad (1)$$

~~where I_{max} is the maximum admissible current in kA of a CNE, U is a fixed reference voltage in kV for each CNE, and cos(φ) the power factor. Core CCC shall assume that the share of the CNE loading by reactive power is negligible (i.e. the angle φ = 0). Thus, factor cos φ equals 1, which means that the element is assumed to be loaded only by active power.~~

With:

Imax	maximum admissible current of a CNE, in kA
U	average voltage, expressed in kV, on two connecting nodes of a CNE resulting from AC load flow calculation with applied reactive power constraints; It shall not be lower than 95% of reference voltage of the CNE; $U = \max(U_{average}, 0.95 \cdot Uref)$ For transformers, voltages shall be normalised to the side of a transformer for which Imax is defined;
cos φ	average power factor on two connecting nodes of a CNE resulting from AC load flow calculation and shall not be lower than 0.95 $\cos \varphi = \max(\cos \varphi_{average}, 0.95)$

In case that either AC load flow without reactive power constraints or DC load flow have to be applied for a CGM as a fallback pursuant to Article 14, U [kV] shall be equal to reference voltage, and cos φ shall be equal to 1.

3. The Core TSOs shall aim towards determining the maximum admissible current using seasonal limits pursuant to ~~Article 5(1)(a)(ii). If a~~paragraph (1)(a)(ii). The Core ~~TSO uses the seasonal limits of Imax, this Core TSO has to~~TSOs shall insert this information into the list of CNECs where ~~I_{max}~~Imax of a CNE is defined.

~~1. For each CNEC the respective I_{max} and the respective F_{max} of the CNE is used.~~

4. The Core TSOs, with support of the Core CCC, shall review and update the values and methodology for operational security limits in accordance with Article 18~~.~~(5).

Article 6
Methodology for Allocation Constraints

1. In case operational security limits cannot be transformed efficiently into ~~I_{max}~~ Imax pursuant to Article 5, the Core TSOs may transform them into allocation constraints. For this purpose, the Core TSOs may only use external constraints as a specific type of allocation constraint that limits the maximum import and/or export of a given Core bidding zone.

2. ~~For the implementation of the LT CCM,~~Borders with existing external constraints ~~are applied by TenneT TSO B.V. and PSE during a transition period of two years following~~at the day-ahead level may be also subject to the application of external constraints at the ~~implementation of this LT CCM in accordance with Article 21(2),~~long-term level, but only as ~~specified in Annex 1 to this LT CCM, explaining~~ long as the ~~reasons and~~ external constraints at the ~~methodology for~~long-term level serve to accommodate the existing day-ahead external constraints.

3. The TSOs applying the long-term external constraints shall:

a) update the calculation of external constraints~~. During the transition period for allocation constraints, the concerned Core TSOs shall calculate the value of external constraints on a yearly and monthly basis for all allocation periods (for PSE only) or~~ at least on a quarterly basis; and ~~publish~~

~~a)~~b) provide to all Core TSOs and NRAs the detailed calculation and its results ~~as described in Article 19 of the underlying analysis (this obligation is for TenneT TSO B.V. only).~~upon each update of the external constraints' values.

~~1. In case Core TSOs could not find and implement alternative solutions referred to in the previous paragraphs, they may, by eighteen months after the implementation of this LT CCM in accordance with Article 21(2), together with all other Core TSOs, submit to all Core NRAs a proposal for amendment of this LT CCM in accordance with article 4(12) of FCA Regulation. Such a proposal shall include the following:~~

~~1. the technical and legal justification for the need to continue using the external constraints or introducing external constraints indicating the underlying operational security limits and why they cannot be transformed efficiently into I_{max} and F_{max};~~

~~2. the methodology to calculate the value of external constraints including the frequency of recalculation.~~

~~In case such a proposal has been submitted by all Core TSOs, the transition period for allocation constraints referred to in paragraph 3 shall be extended until the decision on the proposal is taken by all Core NRAs.~~

~~2.~~4. A Core TSO may discontinue the use of ~~an~~ external ~~constraint~~constraints. The concerned Core TSO shall communicate this change to the other Core TSOs, ~~to~~ all Core NRAs~~,~~ and ~~to the~~ market participants at least one month before discontinuation.

~~3.~~5. The Core TSOs, with support of the Core CCC, shall review and update the methodology for allocation constraints in accordance with Article 18~~.~~(5).

Article 7
Methodology for Critical Network Elements and Contingencies Selection

~~1. Each Core TSO shall provide a list of CNEs, including by default all cross zonal network elements and a list of associated contingencies (Cs) of its own control area based on operational experience to the Core CCC. The result of the process will be an initial pool of CNECs in all subsequent steps of the common Long-Term Capacity Calculation (LTCC).~~

~~2. Only those CNECs of the initial pool are considered by each Core TSO for the common LTCC that are marked by the Core CCC to be significantly influenced by the changes in bidding zone Net Positions (NPs) in accordance with article 23(2) of the FCA Regulation.~~

3. The CNECs shall have a maximum zone-to-zone PTDF higher than a common threshold of 5%. The CNECs of this category will be taken into account by the Core TSOs in all subsequent steps of the common capacity calculation and will determine the long-term capacity.

4. The list of CNEs and the associated Cs can be updated monthly by the respective Core TSOs and published in accordance with Article 19(2).

1. The Core TSOs shall use the latest available initial CNEC list from the DA time frame defined according to the Core DA CCM, for each subsequent long-term capacity calculation, as an initial list.

2. New network elements coming into operation during the subsequent time frame of yearly or monthly auctions, may be included in the initial CNEC list according to the principles set out in Article 5 of the Core DA CCM.

3. The Core TSOs, with support of the Core CCC, shall review and update the application of the methodology for determining CNECs in accordance with Article 18(5).

Article 8
Generation Shift Keys Methodology

1. In accordanceline with Article 13 of the FCA Regulation, the Core TSOs developed the following methodology toshall determine the common Generation Shift Key Keys(GSK):) according to the following methodology:

   (a) each Core TSO shall define for its bidding zone and for each timestampCGM a GSK, which translates a Net Position (NP) change of a given bidding zone into estimated specific injection increases or decreases in the Common Grid Model (CGM). A GSK shall have fixed values, which means that the relative contribution of generation or load to the change in the bidding zone NP shall remain the same, regardless of the volume of the change;

   (b) the Core TSOs shall take into account the actual information on generation, load and/or loadother elements connected to the network, such as storage equipment, available in the CGM for each scenario developed in accordance with Article 19 of the FCA Regulation, in order to select the nodes that willshall contribute to the GSK;

   (c) each Core TSO shall aim to apply a GSK that resembles the dispatch and the corresponding flow pattern, thereby contributing to minimizing ;

      1. the FRMs;

   (c)(d) Core TSOs shall define a GSK for the each long-term calculation periodtime frame. This GSK created by each Core TSO can be different for each timestampCGM or can be the same for all timestamps; CGMs of a calculation time frame; and

   (d)(e) the Core TSOs belonging to the same bidding zone shall jointly define a common GSK for that bidding zone and shall agree on a methodology for such coordination. For Germany and Luxembourg, each TSO shall calculatedefine its individual GSK and the Core CCC shall combine them into a single GSK for the whole German-Luxembourgian bidding zone, by assigning relative weights to each Core TSO'scountry's GSK. The German and Luxembourgian TSOs shall agree on these weights, based on the share of the generation in each Core TSO's control area thatwhich is responsive to changes in NP, and provide them to the Core CCC.

2. ~~When the proposal for~~Not later than twelve months after implementation of the amendment related to further harmonization of the GSK methodology ~~as listed~~ , referred to in Article 9(6) of the Core DA CCM ~~is implemented, then no later than twelve months after~~, the Core TSOs shall ~~use this GSK methodology as a basis to~~ submit to ~~all~~the Core NRAs a proposal for amendment of this LT CCM in accordance with Article 4(12) of the FCA Regulation~~.~~ for which the Core TSOs shall use the DA GSK methodology as the basis. The proposal shall include at least ~~include~~:

   (a) the criteria and metrics for defining the efficiency and performance of GSKs and allowing for quantitative comparison of different GSKs; and

   (b) a harmonised GSK methodology combined with, where necessary, rules and criteria for TSOs to deviate from the harmonised GSK methodology.

~~Methodology for~~

Article 9
Application of Remedial Actions

~~2.~~ The Core TSOs shall not apply remedial actions in ~~Capacity Calculation~~

1. ~~Each Core TSO may define a set of available Remedial Actions (RAs), which is located in its control area. For transparency reasons, all~~ the Core ~~TSOs have to be informed about this set of RAs in advance~~LT CC.

~~1. Only the following RAs are considered:~~

~~1. opening or closing of one or more line(s), cable(s), transformer(s), bus bar coupler(s);~~

~~2. switching of one or more network element(s) from one bus bar to another;~~

~~3. transformer and Phase Shifting Transformer (PST) tap adjustment.~~

2. ~~During the implementation timeline as described in Article 21(2), all~~ The Core TSOs, with ~~the~~ support of the Core CCC ~~will define a common procedure to handle~~, shall review the ~~use of RAs defined~~approach to applying remedial actions in the LT CC in accordance with Article ~~9(1).~~ 18(5).

~~1. Scenarios and Calculation Timestamps~~

Article 10
Common Grid Models

~~1.~~ In accordance with Article 19 of the FCA Regulation, ~~referring to article 10(4)(a) of the FCA Regulation, all TSOs in the CCRs shall jointly develop a common set of scenarios to be used in the CGM~~the Core TSOs shall use the ENTSO-E CGMs for each LTCC time frame~~.~~

1. ~~In order to meet the above requirements, for each LTCC time frame the Core TSOs shall use the annually created ENTSO-E year-ahead reference scenarios (i.e. default scenarios), in accordance with article 3(1) of CGMM for FCA Regulation in conjunction with article 65 of the SO GL Regulation. This Pan-European process is based~~, provided on the ~~CGMM as developed in accordance with article 18 of the FCA Regulation and respecting the merging and alignment processes developed in accordance with article 27 of the CACM Regulation~~basis of the CGMM for FCA.

~~2. For the month-ahead capacity calculation timeframe, in case of a considerable change such as for example a change in generation pattern following untypical climate and hydrological conditions, compared to the~~

~~Individual Grid Model (IGM) for the ENTSO-E year-ahead reference scenario, in the grid of a Core TSO, this Core TSO shall update its IGM by incorporating the latest available information as regard to the generation pattern and topology (due to grid element commissioning or decommissioning), while the NP of the bidding zone is maintained unchanged when changing the generation pattern/topology. Therefore, the described updating process with the latest available data does not imply creation of a new scenario for the monthly timeframe and hence does not require approval process specified in article 3(5) of CGMM for FCA Regulation.~~

~~3. For each calculation timestamp the Core CCC shall implement the latest available outage plans on the (updated) ENTSO-E CGM by applying the relevant planned outages together with the associated topological switches related to a planned outage using the Outage Planning Coordination (OPC) database (foreseen to be replaced by the Operational Planning Data Environment (OPDE) in accordance with Title 7 of the SO GL Regulation), where all ENTSO-E RG CE TSOs' planned outages and the associated topological switches are stored and regularly updated pursuant to the articles 99 and 100 of the SO GL Regulation.~~

2. ~~Based on the database mentioned in the previous~~ For the needs of the Core LT CCM, the Core TSOs may establish a temporary procedure of building the CGMs suitable for the Core LT CCM, with respect to:

~~4.~~ Providing the non-available yearly and monthly CGMs from paragraph ~~the selection of calculation timestamp is as follows:~~

~~1. two timestamps will be selected per~~ (1), or increasing the granularity of ~~the concerned period, one peak and one valley. This granularity is fixed in advance and is as following:~~

~~1.~~ CGMs from paragraph (1~~ month for the year-ahead timeframe;~~

~~2. 1 week for the month-ahead timeframe.~~

~~2. the selected~~), assuming additional calculation timestamps ~~are the ones with the biggest simultaneous amount~~on top of ~~planned relevant grid element outages within~~those defined in the CGMM. The Core ~~CCR.~~

~~5. Core TSO~~TSOs may ~~require to~~ include additional ~~planned outages to the~~calculation timestamps on top of those defined in CGMM, up to 24 calculation timestamps for yearly auctions (2 calculation ~~process if they are critical and not contained within the set of outages selected based on the Article 10(4)(5).~~

a) ~~The Core CCC shall generate, after each long term~~timestamps a month) and up to 10 calculation~~, a reporting of the base case quality of the CGM for each~~ timestamps for monthly auctions (2 calculation ~~timestamp after the application of the planned outages pursuant Article 10(4) and Article 10(6). This report shall consist of and include at least the following CNECs per calculated timestamp:~~timestamps a week);

~~1. the overloaded CNE(C)s and its level of overload in base case before the application of Minimum Available Remaining Margin (minRAM), i.e. the negative RAM occurred pursuant Article 14 but before application of minRAM pursuant Article 14(4);~~

~~2.the pre-solved branches that were not subject to minRAM.~~

~~6. Following the report specified in Article 10(7), Core TSOs shall commonly take necessary actions in a timely manner to improve the base case quality.~~

7. This improvement of this base case may be achieved by adjusting among others the following settings in Article 10(9) (i-iv), based on a unanimous agreement among Core TSOs:
    1. the minRAM threshold pursuant to Article 14;
    2. the application of RA pursuant to Article 9;
    3. the sensitivity threshold pursuant to Article 13(3);
    4. the topological switches related to a planned outage pursuant Article 10(4).

    The aforementioned measures influence the size of FB domain without impact on NPs and therefore increase the available margin for trading.
8. Core CCC will report on base case quality of each calculated timestamp pursuant to Article 20(4)(5).

b) Application of outage topologies. The Core TSOs may adjust all applied CGMs, by applying the planned outages from the Outage Planning Coordination (OPC) database at reference timestamps.

3. The temporary procedure referred to in paragraph 2 shall be replaced by the first next CGMM amendment in that regard. As soon as the relevant amendment is implemented, the Core TSOs shall use the CGMs pursuant to the amended CGMM for FCA.

4. The Core TSOs, with support of the Core CCC, shall review and update the methodology for the usage of CGMs in the LT CC either in accordance with Article 18(5) or following the implementation of the CGMM amendment referred to in paragraph 3, whichever comes first.

Article 11
Integration of ~~Cross-Zonal~~ HVDC Interconnectors ~~Located within~~at the Core ~~CCR~~Bidding Zone Borders

1. The Core TSOs shall provide information on the capacity of their High-Voltage Direct Current (HVDC) interconnector located within the Core CCR ~~at~~in the long-term ~~timeframe~~time frame, the so-called maximum permanent technical capacity (MPTC).

2. ~~In order to calculate the~~ The calculation of impact of ~~the~~ cross-zonal exchange over ~~a~~an HVDC interconnector on the CNECs~~,~~ relies on the evolved flow-based (EFB) concept ~~is applied as a basis. Due to~~. Based on this concept, the converter stations of the cross-zonal HVDC shall be modelled as two virtual hubs~~,~~ which function equivalently as bidding zones. Then, the impact of an exchange between two real bidding zones A and B over such HVDC interconnector shall be expressed as an exchange from the bidding zone A to the virtual hub representing the sending end of the HVDC interconnector plus an exchange from the virtual hub representing the receiving end of the interconnector to the bidding zone B:

$$PTDF_{A\rightarrow B,l} = (PTDF_{A,l} - PTDF_{VH\_1,l}) + (PTDF_{VH\_2,l} - PTDF_{B,l}) \quad (2)$$

With:

$PTDF_{VH\_1,l}$ zone-to-slack $PTDF$ of Virtual hub 1 on a CNEC l, with virtual hub 1 representing the converter station at the sending end of the HVDC interconnector located in bidding zone A

$PTDF_{VH\_2,l}$ zone-to-slack $PTDF$ of Virtual hub 2 on a CNEC l, with virtual hub 2 representing the converter station at the receiving end of the HVDC interconnector located in bidding zone B

3. The PTDFs for the two virtual hubs $PTDF_{VH\_1,l}$ and $PTDF_{VH\_2,l}$ are calculated for each CNEC considered during the calculation and they are added as two additional columns (representing two additional virtual bidding zones) to the existing PTDF matrix, one for each virtual hub.

~~1. In case of a planned outage of the respective HVDC interconnector, the MPTC will be set to zero.~~

~~2. Description of the Capacity Calculation Process~~

4. The exchange over the respective HVDC shall be limited to the value of its MPTC, which represents the maximum continuous active power an HVDC element is capable of transmitting, taking into account potential reduced availability due to planned outages of the interconnector asset. This parameter is defined by the interconnector's asset operators. In case of a planned outage of the HVDC interconnector, the MPTC shall be set to zero.

TITLE 3: CAPACITY CALCULATION PROCESS

Article 12
Description of the CC inputs and outputs

1. For each calculation ~~timestamp~~time frame and CGM, the Core TSOs shall provide the Core CCC with the following inputs:

   (a) GSKs in accordance with ~~Article 8;~~Article 8;

   (b) ~~MPTC~~MPTCs of ~~HVDC~~HVDCs inside the Core CCR in accordance with Article 11;

   (c) ~~CNEs and C(s)~~CNECs in accordance with ~~Article 7;~~Article 7;

   (d) Reliability margin in accordance with ~~Article 4;~~Article 4;

   (e) ~~$Imax$~~Imax per CNE in accordance with ~~Article 5(~~Article 5(1)(a);

~~1. RAs in accordance with Article 9;~~

   (f) ~~allocation~~External constraints in accordance with ~~Article 6.~~Article 6; and

   (g) OPC data in accordance with Article 10.

2. For each calculation ~~timestamp~~time frame, the Core CCC shall provide the following inputs:

   (a) CGMs for each ~~selected timestamp and the outage planning from OPC~~ calculation time frame in accordance with ~~Article 10;~~Article 10;

   (b) for monthly auctions, the already allocated capacities (AAC) from the Single Allocation Platform (SAP) operator of ~~previous timeframes;~~the preceding yearly auction and the portion of AAC returned before the monthly auction; and

   (c) the ~~F_{max}~~Fmax per CNE pursuant to Article 5(~~1)(d~~2).

~~1.~~ For each calculation ~~timestamp~~time frame, the Core CCC shall use the ~~following calculation parameters:~~

3. ~~the minRAM~~R_{amr} threshold for the adjustment of the minimum Remaining Available Margin (minRAM) pursuant to Article 14~~;~~.

   ~~1. the sensitivity threshold pursuant to Article 13(3).~~

4. When providing the capacity calculation inputs pursuant to ~~Article 12(~~paragraph (1), the Core TSOs shall respect the formats commonly agreed between the Core TSOs and the Core CCC while fulfilling the requirements and guidance ~~defined~~provided in the CGMM ~~developed in accordance with Section 2~~pursuant to Article 18 of the FCA Regulation.

5. ~~For each~~The capacity calculation ~~timestamp~~ process shall be performed by the Core CCC and shall provide the ~~FB~~calculated flow-based parameters, ~~RAM and PTDFs~~ computed in accordance with Article 13 and Article 14 respectively, ~~for TSOs~~subject to the Core TSOs' validation in accordance with Article 17.

6. As the capacity calculation outputs, the calculated flow-based parameters shall be provided by the Core CCC in the following form:

   a) the CNECs with calculated Remaining Available Margin (RAM) and PTDFs from all CGMs (scenarios) of a calculation period (yearly or monthly), as a union of constraints, before removing redundant CNECs; and

b) the non-redundant CNECs from point a) remaining after removing the redundant CNECs. This non-redundant set of CNECs with associated RAM and PTDFs shall be provided to the long-term capacity auction operator (SAP) as a union of constraints for each related auction.

Article 13
Computation of Power Transfer Distribution Factors

1. For each calculation ~~timestamp~~time frame using the associated CGM, CNECs and GSKs, the Core CCC shall calculate for each CNEC its PTDFs for each Core ~~BZB~~bidding zone representing the influence of a variation of a commercial exchange between bidding zones on a CNEC. The calculation process is mathematically described below. Firstly, zone-to-slack PTDFs shall be derived as follows:

$$\mathbf{PTDF}_{\text{zone-to-slack}} = \mathbf{PTDF}_{\text{node-to-slack}} * \mathbf{GSK}_{\text{node-to-zone}} \quad (3)$$

With:

~~$\mathbf{PTDF}_{zone-to-slack}$ matrix of zone-to-slack $PTDFs$ (columns: bidding zones; rows: CNECs)~~

~~$\mathbf{PTDF}_{node-to-slack}$ matrix of node-to-slack $PTDFs$ (columns: nodes; rows: CNECs)~~

~~$\mathbf{GSK}_{node-to-zone}$ matrix containing the $GSKs$ of all bidding zones (columns: bidding zones; rows: nodes; sum of each column equal to one).~~

$\mathbf{PTDF}_{\text{zone-to-slack}}$	matrix of zone-to-slack PTDFs (columns: bidding zones; rows: CNECs)
$\mathbf{PTDF}_{\text{node-to-slack}}$	matrix of node-to-slack PTDFs (columns: nodes; rows: CNECs)
$\mathbf{GSK}_{\text{node-to-zone}}$	matrix containing the GSKs of all bidding zones (columns: bidding zones; rows: nodes; sum of each column equal to one)

2. The slack node shall be the same node across all CGMs of a capacity calculation time frame.

2.3. The zone-to-slack ~~$PTDFs$~~PTDFs as calculated above can also be expressed as zone-to-zone ~~$PTDFs$~~PTDFs. A zone-to-slack $PTDF_{A,l}$ represents the influence of a variation of a NP of bidding zone ~~A~~A on a CNEC ~~l~~l and assumes a commercial exchange between a bidding zone and a slack node. A zone-to-zone $PTDF_{A\rightarrow B,l}$ represents the influence of a variation of a commercial exchange from bidding zone A to bidding zone B on CNEC ~~l~~l. The zone-to-zone $PTDF_{A\rightarrow B,l}$ can be derived from the zone-to-slack ~~$PTDFs$~~PTDFs as follows:

$$PTDF_{A\rightarrow B,l} = PTDF_{A,l} - PTDF_{B,l} \quad (4)$$

4. The maximum zone-to-zone $PTDF$ of a CNEC ($PTDF_{z2zmax,l}$) is the maximum influence that any Core exchange has on a respective CNEC, including exchanges over HVDC interconnectors which are integrated pursuant to Article 11.

$$PTDF_{z2zmax,l} = max\left(\max_{A\in BZ}(PTDF_{A,l}) - \min_{A\in BZ}(PTDF_{A,l}), \max_{B\in HVDC}(PTDF_{B,l})\right) \quad (5)$$

With:

$\mathbf{PTDF_{A,l}}$	zone-to-slack $PTDF$ of bidding zone A on a CNEC l
HVDC	set of HVDC interconnectors integrated pursuant to Article 11
BZ	set of all Core bidding zones
$\max_{A\in BZ}(\text{PTDF}_{A,l})$	maximum zone-to-slack PTDF of Core bidding zones on a CNEC l
$\min_{A\in BZ}(\text{PTDF}_{A,l})$	minimum zone-to-slack PTDF of Core bidding zones on a CNEC l

Article 14
Computation of Remaining Available Margin

1. The Core CCC shall use the initial list of CNECs determined pursuant to Article 7, and, by using the CGMs pursuant to Article 10, shall remove those CNECs for which the maximum zone-to-zone Power Transfer Distribution Factor (PTDF) is not higher than 5%. The remaining CNECs shall constitute the final list of CNECs for the actual long-term capacity calculation.

~~1.~~2. Using zone-to-~~zone~~hub PTDFs, the Core CCC shall determine the flow on a CNEC in the situation without commercial exchanges within the Core CCR as follows:

$$\vec{F}_{0,Core} = \vec{F}_{ref} - \mathbf{PTDF_f}\ \overrightarrow{Exchanges_{ref,Core}}\mathbf{PTDF_{z2h}}\ \overrightarrow{NP}_{ref,Core} \quad (6\text{~~5~~}6)$$

with:

$\vec{F}_{0,Core}$	flow per CNEC in the situation without commercial exchanges within the Core CCR
$\vec{F}_{ref}$	flow per CNEC ~~in the CGM with commercial exchanges~~ obtained ~~using DC load flow for the calculation timestamp~~with the CGM
$\mathbf{PTDF_f}$$\mathbf{PTDF_{z2h}}$	zone-to-~~zone~~-hub power transfer distribution factor matrix for CNECs of the Core CCR
$\overrightarrow{Exchanges_{ref,Core}}$$\overrightarrow{NP}_{ref,Core}$	The net positions of Core bidding zones calculated from the commercial cross-border exchanges ~~between~~among the Core bidding zones as ~~mentioned~~provided in the reference program associated with the CGMs of the ENTSO-E scenarios

~~1. The Core CCC may apply the common threshold~~The load flow solution for ~~minimum sensitivity of CNECs using the following formula:~~

~~If $PTDF_{A\rightarrow B,l} \leq threshold$ then the $PTDF_{A\rightarrow B,l}$ is set to zero before starting the~~ the F_{ref} calculation ~~process.~~

~~1. Computation of the available margins on critical network elements~~

~~2.~~3. ~~Following the PTDFs' computation of Article 13, the Core CCC~~ shall ~~compute the RAM based on CNEC maximum admissible power flow in accordance with Article 5 at Core zero-balance situation. The uncertainties of flows by using an FRM in accordance with Article 4 should be taken into account. The RAM calculation is mathematically described~~be as follows:

~~$RAM_t^+ = Fmax_t - FRM_t^+ - \vec{F}_{0,Core}$ (6)~~

a) ~~$RAM_t^- = Fmax_t - FRM_t^- + \vec{F}_{0,Core}$~~ AC load flow solution with respecting reactive power limits of modelled generation for base (n-0) topology and for contingency topologies, by default;

b) In case of divergence of solution under a) for certain contingency topologies, the AC load flow solution without respecting reactive power limits of modelled generation shall be used for such topologies, as a first fallback;

c) In case of divergence of both solutions under a) and b) for certain contingency topologies, DC load flow shall be used for such topologies as a second fallback, with the active power losses as obtained at the AC load flow of the base (n-0) topology, assigned to the active power-sending node of each branch of the CGM;

d) In case of divergence of AC load flow for the base (n-0) topology, the lossless DC load flow shall be applied as a last resort solution. An imbalance from the expected NP of each modelled area caused by the lack of losses shall be assigned to all area's load nodes in proportion to the amount of a particular load.

4. The flows resulting from previously allocated cross-zonal capacities within the Core CCR in accordance with Article 29(7)(c) of the CACM Regulation:

a) for yearly capacity calculation, they shall be equal to zero for all CNECs;

b) for monthly capacity calculation, they shall be calculated for each CNEC by multiplying the volumes of previously allocated cross-zonal capacities at yearly Core flow-based auctions reduced by the returned AACs, with the positive zone-to-zone $PTDFs$, as follows:

$$\vec{F}_{AAC} = \mathbf{pPTDF_{z2z}} \cdot \overrightarrow{AAC} \quad (7)$$

with:

~~RAM_t^+ and FRM_t^+~~ ~~RAM and FRM of CNEC l in one direction of monitoring (direction is defined by TSO)~~

~~RAM_t^- and FRM_t^-~~ ~~RAM and FRM of CNEC l in direction of monitoring opposite to the previous direction (direction is defined by TSO).~~

~~To calculate the minRAM in accordance with Article 14(4), the minRAM factor (R_{amr}) is defined as 20% and will be subject to a review by~~

$\vec{F}_{AAC}$	flows resulting from previously allocated cross-zonal capacities in Core CCR
$\mathbf{pPTDF_{z2z}}$	positive zone-to-zone power transfer distribution factor matrix

$\overrightarrow{AAC}$ already allocated capacities on Core bidding zone borders

~~1. All Core TSOs 2 years after the LT CCM go live.~~

~~2. The Core CCC~~ shall ~~check if~~ensure that the RAM for each CNEC ~~determining the cross zonal capacity is not below the defined minRAM.~~

~~3. In case the RAM determined according to Article 14(1) is below the minRAM, the Core CCC shall increase the RAM according to the following process:~~

~~The main objective of the minRAM is to ensure that at least a specific~~is equal or higher than a given percentage of ~~F_{max},~~Fmax of a ~~minRAM factor (R_{amr})~~given CNEC of as ~~defined~~specified in ~~Article 14(4)(c), of F_{max} is reserved for~~paragraph 5. For this purpose, the ~~commercial exchanges. Therefore,~~Core TSOs shall calculate the following ~~equation needs to apply for each CNEC l~~adjustment of minimum RAM:

~~$RAM_t \geq R_{amr} * F_{max_t}$~~

$$AMR = \max\left(R_{amr} \cdot F_{max} - \left(F_{max} - FRM - F_{0,Core} - F_{AAC}\right), 0\right) \quad (8)$$

~~1. The Adjustment of Minimum RAM (AMR) aims to ensure that the previous inequality is always fulfilled; therefore, AMR is added as follows:~~

~~$RAM_t + AMR = R_{amr} * F_{max_t}$~~

with:

AMR	adjustment of minimum RAM
R_{amr}	percentage of F_{max} for adjustment of minimum RAM

5. Each Core TSO shall define the minimum percentage of Fmax for RAM for its own CNECs. This value shall be at least 20% of Fmax for the yearly time frame and 10% of Fmax for the monthly time frame. If, during the experimentation, before the implementation of this LT CCM, the Core TSOs experience that the experimentation and its analysis do not reveal network security risks, they shall increase these values pursuant to the decision-making process referred to in Article 19 in order to better achieve the objectives of the FCA Regulation, with upper limits of minimum RAM of 40% of Fmax for the yearly time frame and 20% of the Fmax for the monthly time frame. Before doing so, the Core TSOs shall provide a comprehensive analysis consistent with the objectives listed in Article 3 of the FCA Regulation, and consult the modified minimum RAM with the Core regulatory authorities and stakeholders.

6. Finally, the RAM before validation shall be calculated according to the following equation:

$$\overrightarrow{RAM}_{bv} = \vec{F}_{max} - \overrightarrow{FRM} - \vec{F}_{0,Core} + \overrightarrow{AMR} - F_{AAC} \quad (9)$$

~~2. The AMR for a CNEC is determined with the following equation:~~

~~$$AMR = \max\left(R_{amr} * F_{max_t} - \left(F_{max_t} - FRM - F_{0,Core}\right), 0\right) \quad (10)$$~~

~~3. Finally, the RAM will be adjusted due to the following equation:~~

$$RAM_t = F_{max_t} - FRM - F_{0,Core} + AMR \qquad (11)$$

Article 15
Consideration of Non-Core CCR Bidding Zone Borders

1. Where CNEs within the Core CCR are impacted by electricity exchanges outside the Core CCR, the Core TSOs shall take this impact into account.

2. The Core TSOs shall consider the electricity exchanges ~~on BZBs~~with and among the bidding zones outside the Core CCR as fixed input to the LT CCM, as ~~prepared~~provided in the common set of ENTSO-E ~~year-ahead~~yearly and monthly reference scenarios, with unchanged NPs. These electricity exchanges, defined as best forecasts of NPs and flows in the LTCC ~~models~~CGMs, are defined and agreed based on the CGMM ~~as~~ developed in accordance with Article 18 of the FCA Regulation, and ~~are~~ incorporated in the ~~CGM. Uncertainties related to the electricity exchanges forecasts are implicitly considered within the FRM.~~CGMs.

3. Treatment of non-Core ~~CCR BZBs with adjacent CCRs~~bidding zone borders in the LT CCM ~~will~~shall be studied by the Core TSOs in order to take into account ~~non-Core CCR~~their influence in the most efficient and accurate manner, and to heed Article 21(1)(b)(vii) of the CACM Regulation. The Core TSOs ~~will~~shall start to study solutions for considering influence of non-Core CCR ~~BZBs~~bidding zone borders immediately ~~after~~upon the implementation of Advanced Hybrid Coupling (AHC) in the Core DA CCM~~.~~, and shall provide a report with the proposal for the improvements of treatment of non-Core exchanges in the LT CCM within 12 months after AHC implementation in Core DA CCM.

Article 16
Fallback ~~Procedures~~Procedure

1. Taking into account the requirements stipulated in Article 10(7) of the FCA ~~Regulation, and referring to article 21(3) of the CACM~~ Regulation, in the event that a LTCC process is unable to produce results, a fallback procedure shall be applied.

2. In case the initial capacity calculation does not lead to any results, the Core CCC shall try to solve the problem and perform the LTCC again within a new time frame, jointly agreed ~~timeframe to make such calculation.~~ with the Core TSOs.

3. ~~If~~In accordance with Article 42 of the FCA Regulation, in the event that the Core CCC is ~~not able~~unable to produce results, the default fallback procedure shall be the postponement of the forward capacity allocation and a reasonable deadline shall be agreed by the Core TSOs and the Core CCC to retry the calculation.

4. In case the postponement of the forward capacity allocation is not possible, or the new deadline has been reached and the results are still not available, the Core CCC shall deliver the following fallback long-term FB parameters to the SAP ~~within the new timeframe in accordance with Article 19(2), Core TSOs shall bilaterally agree on NTC values~~:

    a) For the yearly capacity calculation, the FB parameters calculated for the ~~relevant~~equivalent CGMs of the previous year shall be used as a basis;

    b) For the monthly capacity calculation, the FB parameters calculated for the corresponding time ~~frame(s).~~horizon at the preceding yearly auction shall be used as a basis;

~~3.~~5. The fallback FB parameters under paragraph (4) shall be commonly validated by the Core TSOs ~~shall commonly coordinate and validate these bilaterally agreed NTC values.~~ and the Core CCC.

~~The Core CCC shall send the NTC values following~~

TITLE 4: VALIDATION PROCESS

~~1.~~ Article ~~19(3) to the SAP.~~

~~2. Validation process~~

17
Validation Methodology

1. In accordance with Article 15 and Article 24 of the FCA Regulation, referring to Article 26 of the CACM Regulation, the Core TSOs shall have the right to correct long-term capacity ~~relevant to the Core TSO's BZBs~~on their CNECs for reasons of operational security during the validation process. ~~In exceptional~~The individual validation adjustments may be done by a Core TSO only in the following situations ~~long-term capacities can be reduced by all Core TSOs. These potential situations are at least~~:

   ~~1. an occurrence of an exceptional contingency or forced outage as defined in article 3 of the SO GL Regulation;~~

   ~~2. when RAs, pursuant to Article 9, that are needed to ensure the calculated capacity on all CNECs, are not sufficient;~~

   (a) where a mistake in the input data~~, that leads to an overestimation~~ has occurred, resulting in a wrong estimation of long-term capacity from an operational security perspective~~, occurred~~;

   (b) where there is a potential need to ~~cover reactive power flows~~reconsider voltage or cosφ on certain CNECs~~.~~;

   (c) ~~The validation process refers to~~ where there is an exceptional outage topology which considerably limits the ~~outcomes~~RAM of the ~~long-term~~CNEC, and which is not covered with the CGMs defined in Article 10(2);

   ~~(c)~~(d) where the calculated level of a RAM is unable to ensure operational security and the adjustment required by the TSO cannot be modelled via the input data for the capacity calculation process ~~within the Core CCR. The validation process is composed of two parts and explained in more detail in Article 17(3)(4):~~. Such situations can concern voltage limits, short-circuit current limits, frequency and dynamic stability limits; or

   ~~1. individual verification of the calculated capacities for each calculated timestamp after the change of input parameters in accordance with Article 17(3);~~

   ~~2. coordinated validation of the final capacities.~~

   (e) where the calculated level of a RAM is unable to ensure operational security and the adjustment required by the TSO would, under the attempt to be modelled via the input data, be overwritten by the application of the minimum RAM.

2. The Core TSOs shall ~~analyse individually whether the calculated capacity could violate operational security limits, and whether they have sufficient measures to avoid such violations. The verification is performed~~perform individual validation adjustments under paragraph (1) as follows:

   (a) in case of a required reduction due to situations ~~as~~ defined in ~~Article 17(1)(a),~~points (b), (c), (d) and (~~d~~e) of paragraph (1), a Core TSO may ~~correct its initial FRM in accordance with Article 4; or~~ decrease RAM~~, even below the minRAM threshold in accordance with Article 14(2) if necessary,~~ for its own CNECs, even below the minimum RAM specified in Article 14(5), if necessary;

~~1.~~ in case of a situation ~~as defined in Article 17(1)(a), Core TSOs using external constraints may also request~~according to ~~adapt~~point (a) of paragraph (1), each Core TSO or the ~~external constraints to reduce the capacity for its BZBs;~~

~~2. in case of a situation as defined in Article 17(1)(c),~~ Core ~~TSOs~~CCC may ~~also~~ request a common decision by all Core TSOs to calculate capacities with the correct input data.

(b) ~~When the process of individual verification of the calculated capacities is completed, then the final capacity~~ If the TSOs find errors in cross-zonal capacity provided for validation ~~process takes place in a coordinated way, whereby Core~~, the relevant TSOs ~~may require a reduction in calculated capacities for reasons of operational security.~~ shall provide updated capacity calculation inputs to the Core CCC for recalculation of cross-zonal capacities. The Core CCC shall repeat calculation with updated capacity calculation inputs and send the recalculated cross zonal capacity values again for validation. Recalculations shall be executed until the critical process end time. If there is still no result by this time, then the fallback process shall be triggered.

~~3. Updates~~

3. The Core TSOs shall justify individual validation adjustments under paragraph (1) as follows:

   (a) in case of a situation according to point (c) of paragraph (1), the TSO requiring the adjustment shall provide a justification that explains the effects and capacity calculation results due to the exceptional outage topologies, as well as the CGMs with those topologies applied;

   (b) in case of a situation according to point (d) of paragraph (1), the TSO requiring the adjustment shall provide a justification that explains the need to adjust the RAM level and the inability to model this adjustment via the input data;

   (c) in case of a situation according to point (e) of paragraph (1), the TSO requiring the adjustment shall provide a justification that explains the need to adjust the RAM level and the consequence of a potential application of the minimum RAM.

4. Pursuant to Article 26(5) of the CACM Regulation, every three months, the Core CCC shall report all reductions made during the validation of cross-zonal capacity to all Core NRAs, including the location, amount and reasons for the reductions.

5. Every year, the Core CCC shall provide the annual report with all the information on the reductions of cross-zonal capacity, as communicated to the CCC by the Core TSOs. The report shall include at least the following information for each CNEC of the pre-solved domain affected by a reduction and for each DA CC MTU:

   a) the identification of the CNEC;

   b) volume of change of RAM value;

   c) the reason(s) for reduction, and the operational security limit(s) that would have been violated without reduction, and under which circumstances they would have been violated;

   d) statistics on the estimated loss of economic surplus of applied validation reductions; and

   e) general measures to avoid validation reductions in the future.

6. Pursuant to Article 24(5) of the FCA Regulation, upon request of the Core NRAs, the Core TSOs shall provide a report detailing how the value of long-term cross-zonal capacity for a specific long-term capacity calculation time frame has been obtained.

7. The Core TSOs, with support of the Core CCC, shall review and update the validation methodology in the LT CC, also assessing the need for coordinated validation, in accordance with Article 18(5).

TITLE 5: UPDATES

Article 18
Review and Updates

1. Based on Article 3(f) of the FCA Regulation and in accordance with Article 21(3) of the FCA Regulation, referring to Article 27 of the CACM Regulation, ~~all~~the Core TSOs shall regularly, and at least once a year, review and update the key input ~~and output~~ parameters listed in Article 27(4~~)(a) to (d~~) of the CACM Regulation. Should the operational security limits, CNEs, ~~Cs~~contingencies and import/export limits used for the common capacity calculation need to be updated based on this review, the Core TSOs shall publish the changes simultaneously with the update and publication ~~as mentioned in article 24~~requirements of the Core DA CCM.

2. In case the review proves the need of an update of the reliability margins, the Core TSOs shall publish the updated values of the reliability margin at least one month before their implementation.

~~1. The review of the methodology for allocation constraints by the Core TSOs shall take place before the start of each LT capacity calculation timeframe.~~

~~2. The review by the Core TSOs of the set of RAs taken into account in capacity calculation, in accordance with Article 9 shall include at least an evaluation of the efficiency of the RAs applied.~~

3. In case the review proves the need for updating the application of the methodologies for determining GSKs, CNEs, and ~~Cs~~contingencies referred to in Articles 12 and 13 of the FCA Regulation, referring respectively to ~~the~~ Articles 23 to 24 of the CACM Regulation, Article 4(12) of the FCA Regulation applies. After approval by the Core NRAs, the Core TSOs shall publish changes made in the methodologies at least three months before their implementation.

4. Any changes of parameters listed in ~~article 27(4) of the CACM Regulation~~paragraphs (1), (2) and (3) have to be communicated to market participants, ACER and the Core NRAs.

5. ~~The impacts of any changes of parameters listed in article 27(4)(d) of~~ Within eighteen months after the ~~CACM Regulation~~go-live of the Core LT CCM in accordance with Article 22, all Core TSOs, with support of the Core CCC, shall review the methodology and ~~of import/export limits have~~, if relevant, submit by the same deadline to ~~be communicated to market participants, ACER and~~ all Core NRAs ~~. If any change leads to an adaption of the methodology, the Core TSOs shall make~~ a proposal for its amendment ~~of this methodology according to~~in accordance with Article 4(12) of the FCA Regulation ~~and submit it~~, and in particular, in the following areas if improvements are possible:

   a) Reliability margin, pursuant to Article 4;

   b) Operational security limits, pursuant to Article 5;

   c) Allocation constraints, pursuant to Article 6;

   d) Critical network elements with contingencies, pursuant to Article 7;

   e) Remedial actions, pursuant to Article 9;

   f) CGMs, pursuant to Article 10;

   g) Remaining Available Margin, including the minimum RAM approach, pursuant to Article 14;

   h) Fallback procedure pursuant to Article 16; and

   i) Validation methodology pursuant to Article 17.

~~5.~~6. As defined in Article 8(2), the deadline for ~~approval~~the amendment of GSK methodology is connected to its application in the Core ~~NRAs.~~DA CCM.

~~3.~~ In case the ~~following~~ calculation parameters under paragraph 5 are subject to change, the Core TSOs ~~will~~shall publish and implement the updated calculation parameters after approval by the Core NRAs~~:~~

~~1. minRAM factor according to Article 14(2);~~

~~2. PTDF threshold according to Article 7(3).~~

~~6.~~7. ~~Core TSOs shall publish updated set of calculation parameters~~, not later than three months before their application.

8. The Core TSOs shall assure that CGMES shall be applied in the long-term capacity calculation not later than 12 months after its application in the Core DA CCM.

TITLE 6: GOVERNANCE

Article 19
Rules Concerning Governance and Decision Making Among the Core TSOs

1. All Core TSOs shall cooperate for the implementation and operation of this LT CCM. This cooperation shall be carried out through common bodies where each TSO shall have at least one representative. The members of the common bodies shall aim to make unanimous decisions. Where unanimity cannot be reached, qualified majority voting based on the voting principles established in accordance with Article 4(3) of the FCA Regulation shall apply.
2. For the purpose of paragraph 1, all Core TSOs shall establish at least a steering committee consisting of one representative from each Core TSO. The steering committee shall make binding decisions on any matter or question related to the implementation and operation of this LT CCM. The steering committee shall adopt rules governing its operation.
3. The steering committee shall also act as a body for settlement of disputes among the Core TSOs regarding the implementation and operation of this LT CCM. The steering committee shall solve the problems and disputes regarding, but not limited to, the following issues:
    (a) resolution of disputes on the interpretation of aspects of this LT CCM, which may not be clear;
    (b) resolution of disputes on design choices required for implementation and operation of this LT CCM, which are not defined in this methodology; and
    (c) resolution of possible disputes in the implementation and operation of this LT CCM, including the disputes related to the provisions governing the day-to-day operation, but excluding the day-to-day operation itself.
4. The decisions adopted by the common bodies and the steering committee is without prejudice to any regulatory decision adopted by the competent NRAs.

TITLE 7: REPORTING

Article 20
Publication of Data

~~1. The data as set forth in Article 19(2) shall be published regularly by the Core CCC on a dedicated online communication platform representing all Core TSOs. To enable market participants to have a clear understanding of the published data, the handbook that has been prepared and published by Core TSOs on this communication platform in the framework of article 25(1) of the DA CCM, shall be extended with the information related to the LTCC, using the same format and data platform.~~

1. In accordance with Article 3(f) of the FCA Regulation, the Core CCC shall publish at least the following data items ~~shall be published after each LTCC by the Core CCC~~ , in addition to the data items ~~and definitions of~~set out in Commission Regulation (EU) No 543/2013 on submission and publication of data in electricity markets:

   (a) ~~CNECs~~CNECs' names;

   ~~1. CNECs EIC codes;~~

   (b) CNECs' Energy Identification Codes (EIC);

   (c) indication if a CNEC is redundant or not, including the information on a CGM;

   (d) GSK relative weights among the TSOs belonging to the same bidding zone;

   ~~(b)~~(e) detailed breakdown of the final FB parameters per CNEC: ~~RAM,~~ Imax, U, cosφ, Fmax, Fref, ~~$F_{0,core}$, respective reliability margin~~F(0,Core), FRM, F_{AAC}, RAM, minRAM application, zone-to-~~slack~~zone PTDFs;

   ~~2. allocation constraints;~~

   (f) ~~NTC values~~external constraints including their calculation details (reasoning, methodology and results) in accordance with Article 6;

   ~~(c)~~(g) flow-based parameters applied in case of activation of the fallback procedure in accordance with Article 16(3~~).~~);

   (h) maximum non-simultaneous bilateral exchanges on Core bidding zone borders, pursuant to Article 20(9) of the CACM Regulation;

   (i) forecast information contained in the CGM:

      i. vertical load for each Core bidding zone and each TSO;

      ii. production for each Core bidding zone and each TSO;

      iii. reference net positions of all bidding zones in the synchronous area of Continental Europe and reference exchanges for all HVDC interconnectors within the synchronous area of Continental Europe and between the synchronous area of Continental Europe and other synchronous areas; and

   (j) information about the capacity validation, as provided in Article 17.

2. The Core CCC shall publish the data items listed in paragraph 1 on a monthly basis, after each LTCC, on a dedicated online communication platform representing all Core TSOs. To facilitate the readability of the published data, the Core TSOs shall include the information related to the LTCC in the handbook which is published on the communication platform in the framework of the DA CCM, using the same data format.

2.3. Any change in the identifiers ~~used~~listed in ~~paragraphs 2~~paragraph 1, point (a) and ~~2~~point (b~~) of Article 19~~), shall be publicly notified at least one month before its entry into force.

3.4. ~~An individual~~Any Core TSO may withhold the information referred to in paragraph ~~2~~1, point (a) and ~~2~~point (b~~) of Article 19~~ if it is classified as sensitive critical infrastructure protection related information in ~~their~~its Member ~~States~~State as provided for in point (d) of Article 2 of Council Directive 2008/114/EC ~~of 8 December 2008~~ on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection. In such a case, the information referred to in paragraph ~~2~~1, point (a) and ~~2~~point (b~~) of Article 19~~), shall be replaced with an anonymous identifier which shall be ~~stable~~the same for each CNEC across all ~~LTCC timeframes.~~LT CC time frames. The anonymous identifier shall also be used in ~~the other~~all TSO communications related to the CNEC and when communicating about an outage or an investment in infrastructure. The ~~information~~ Core TSOs shall publish the communication about which information has been withheld pursuant to this paragraph ~~shall be published~~, on the communication platform referred to in ~~Article 19(1).~~paragraph 2.

4.5. The Core NRAs may request additional information to be published by the Core TSOs. For this purpose, all Core NRAs shall coordinate their requests among themselves and consult it with the Core TSOs, ACER and all the relevant stakeholders ~~and ACER. Each~~. Any Core TSO may ~~decide not~~refuse to publish ~~the~~any additional information~~,~~ which ~~was~~has not been requested by its competent NRA.

Article 21
Monitoring and ~~Information~~Reporting to the National Regulatory Authorities

1. The Core TSOs shall provide ~~to Core NRAs~~ data on LTCC to the Core NRAs for the purpose of monitoring its compliance with this methodology and ~~other~~the relevant legislation. The reporting framework shall be developed by the Core TSOs in coordination with the Core NRAs, and reviewed and updated ~~and improved when needed~~as required.

2. The data provided to the Core NRAs shall at least~~,~~ include the information on non-anonymized names of CNECs as referred to in Article ~~19(2)~~(20(1), point (a)~~(~~) and point (b~~) shall be provided to Core NRAs~~):

   a) on a yearly basis for each CNEC after the yearly calculations; and

   b) on a monthly basis for each CNEC after each monthly calculation.

   This information shall be in a format that allows easily to combine the CNEC names with the information published in accordance with Article ~~19(2~~20(1).

2.3. The Core NRAs may request additional information ~~to be provided by~~ from the Core TSOs. For this purpose, the Core NRAs shall coordinate their requests and forward ~~the~~a single, coordinated request to the Core TSOs. Individual information requests of NRAs, not coordinated ~~requests of one NRA~~with the other Core NRAs, are ~~not in~~beyond the scope of this methodology, and shall be dealt with on a national level.

3.4. The Core CCC, with ~~the~~ support and after approval of the Core TSOs ~~where relevant~~, shall submit to the Core NRAs an annual monitoring report containing:

~~1. the RAs in accordance with Article 9 on capacity calculation and in accordance with Article 10 on increasing base case quality;~~

~~1. additional planned outages with requesting Core TSO names applied in accordance with Article 10(6);~~

(a) an assessment of the quality of the data published on the dedicated online communication platform ~~as~~ referred to in Article ~~19, with a supporting~~20, accompanied by a detailed analysis of a failure to achieve sufficient data quality standards by the concerned Core TSOs, where relevant;

(b) the Core TSOs´ ~~report~~and the Core CCC's report pursuant to Article 22(4) on their continuous monitoring of the effects and performance of the application of ~~this methodology~~the LT CCM, in a commonly agreed template;

(c) the monitoring of the accuracy of non-Core ~~exchanges~~exchanges' forecasts in the CGM~~.~~;

~~2. The Core CCC shall submit a quarterly monitoring report on capacity validation to the Core NRAs after approval by the Core TSOs. In each quarterly monitoring report, the Core CCC shall provide all the information on the reductions of calculated capacity after individual validation and coordinated validation of capacities according to Article 17(3)(4). The quarterly monitoring report shall include at least the following information for each reduced capacity and for each timestamp:~~

~~1. the identification of the CNEC;~~

~~2. the volume of reduction of capacity;~~

~~3. the detailed reason(s) for reduction, including the operational security limit(s) that would have been violated without reductions, and under which circumstances they would have been violated;~~

~~4. the proposed measures to avoid similar reductions in the future.~~

~~3. The quarterly monitoring report of the Core CCC shall also include at least the following aggregated information:~~

(d) validation monitoring pursuant to Article 17;

(e) the pre-solved CNECs that were subject to minimum RAM adjustment; and

~~1.~~ statistics on ~~the number, causes, volume and estimated loss of economic surplus of~~CNECs with minimum RAM applied ~~reductions by different Core TSOs; and~~

~~(d)~~(f) ~~general measures~~pursuant to ~~avoid capacity reductions in the future~~Article 14.

~~4. Core TSOs shall report to the Core NRAs in the situation when no capacity is offered by the Core TSOs via the monthly timeframe. This report shall contain a justification for the difference between the predicted monthly capacity in the yearly timeframe and the actual allocated monthly capacity.~~

~~5. Implementation and language~~

TITLE 8: IMPLEMENTATION AND LANGUAGE

Article 22
Timescale for Implementation

1. The Core TSOs shall publish this ~~methodology~~LT CCM without undue delay after ~~it has been approved by the relevant NRAs or a decision has been taken by ACER in accordance with~~ its adoption pursuant to Article 4(~~9~~10) of the FCA Regulation.

~~1. Core TSOs shall implement this FB capacity calculation methodology allowing a FB allocation for LT timeframe within 5 years after approval of this methodology. The implementation process shall start on the date of approval of this methodology. The Core coordinated LT capacities are the ones resulting from the FB capacity calculation process after the implementation of this methodology.~~

2. The Core TSOs shall implement this LT CCM in accordance with processes and deadlines provided in paragraph 3 point (c).

~~2.~~3. The implementation process shall consist of the following steps:

(a) an internal parallel run~~,~~ during which the Core TSOs and the Core CCC shall test the operational processes for the ~~LTCC~~LT CC inputs, the ~~LTCC~~LT CC process and the long-term capacity validation, and develop ~~the~~ appropriate IT tools and infrastructure;

(b) an external parallel run~~,~~ during which the Core TSOs ~~will~~and the Core CCC shall continue testing their internal processes and IT tools and infrastructure. In addition, the Core TSOs ~~will~~shall involve the SAP ~~operator~~ to test the implementation of this methodology, and market participants to test the effects of applying this methodology ~~on~~to the market~~.~~ and allow them to adapt their processes. In accordance with Article 10(5)(c) of the FCA Regulation, this phase shall not be shorter than 6 months~~.~~;

(c) implementation by the following deadlines:

i. a flow-based yearly auction for 2025; and

ii. a flow-based monthly auction for January 2025.

~~3.~~4. During the internal parallel run, the Core TSOs and the Core CCC shall continuously monitor the effects and the performance of the application of ~~this methodology.~~the LT CCM, and shall develop the monitoring and performance criteria, in coordination with the Core NRAs. During the external parallel run the Core TSOs and the Core CCC shall publish the monitoring and performance criteria ~~without undue delay. For this purpose, Core TSOs will develop in coordination with the Core NRAs the monitoring and performance criteria.~~indicators on a monthly basis. After the implementation of this methodology, the outcome of this monitoring shall be ~~summarized~~summarised in an annual report.

~~4.~~5. Until the implementation of this ~~FB methodology~~Core LT CCM, the Core TSOs ~~will~~shall continue to apply the NTC ~~allocation and will improve the coordination at Core CCR level.~~ capacity calculation approach.

Article 23
Language

1. The reference language for this LT CCM shall be English.

2. For the avoidance of doubt, where the Core TSOs need to translate ~~this~~the LT CCM into their national language(s), in the event of inconsistencies between the English version published by the Core TSOs in accordance with Article 4(13) of the FCA Regulation and any version in another

language, the relevant Core TSOs shall ~~be obliged to dispel~~clarify any inconsistencies by providing a revised translation of ~~this~~the LT CCM to their ~~relevant Core~~respective NRAs.

ANNEX 1: JUSTIFICATION FOR CALCULATION OF EXTERNAL CONSTRAINTS AND ITS APPLICATION

The following section depicts in detail the justification of usage and methodology currently used by each Core TSO to design and implement external constraints, if applicable. The legal interpretation on eligibility of using external constraints and the description of their contribution to the objectives of the FCA Regulation is included in the Explanatory Document.

1. Netherlands:

TenneT TSO B.V. may use an external constraint to limit the import and export of the Dutch bidding zone.

Technical and legal justification

The combination of voltage constraints and limitations following from using a linearized GSK make it necessary for TenneT TSO B.V. to apply external constraints. Voltage constraints justify the use of a maximum import constraint, because a certain amount of power needs to be generated within the Netherlands to prevent violation of voltage constraints (i.e. to prevent voltage dropping below the lower safety limit). To prevent the deviations between forecasted and realised values of generation in-feed following from the linear GSK to reach unacceptable levels, it is necessary to limit the feasible net position range for the Dutch import and export net position. This last point is explained in more detail below.

The long-term capacity calculation methodology uses a Generator Shift Key (GSK) to determine how a change in net position is mapped to the generating units in a specific bidding zone. The algorithm requires that the GSK is linear and that by applying the GSK the minimum and maximum net position ('the feasibility range') of a bidding zone can be reached. TenneT TSO B.V. applies a GSK method that aims at establishing a realistic generator schedule for every hour and which is applicable to every possible net position within the flow-based domain. In order to realise this, generators can be divided in three groups based on a merit order: (i) rigid generators that always produce at maximum power output, (ii) idle generators that are out-of-service and (iii) 'swing generators' that provide the 'swing capacity' to reach all intermediate net positions required by the algorithm for a specific grid situation. To reach the maximum net position, all 'swing generators' shall produce at maximum power. To reach the minimum net position, all 'swing generators' shall produce at minimum power. The absolute difference between the minimum and maximum net position thus determines the amount of required 'swing capacity', i.e. the total capacity required from 'swing generators'.

If TenneT TSO B.V. would not apply this limitations and higher import and export net positions would be possible, several generators that in practice operate as rigid generators (e.g. CHPs, coal fired power plants etc.) would need to be modelled as 'swing generators'. In some cases, a switch of a generator from 'idle' to 'swing' or from 'rigid' to 'swing' could mean a jump of roughly 50% in the power output of such a power plant, which in turn has significant impact on the forecasted power flows on the CNECs close to that power plant. This results in a reduced accuracy of the GSK as the generation of these plants is modelled less accurately and the deviations between the forecasted and realised flows on particular CNECs increase to unacceptable levels with significant impact on the capacity domain. The consequence of this would be that higher FRMs need to be applied to partly cover these deviations, which will constantly limit the available capacity for the market. To prevent too large deviations in generation in-feed, the total feasibility range, which should be covered by the GSK, thus needs to be limited with external constraints.

The Netherlands is a small bidding zone with, in comparison to other bidding zones, a lot of interconnection capacity which implies a very large feasibility range compared to the total installed capacity. E.g. TenneT TSO B.V. has applied limit of 5 GW for both the import and export position in the past, already implying a feasibility range of 10 GW on a total of roughly 15 GW generation capacity included in the GSK at that point in time. For other bidding zones with a much higher amount of installed capacity or relatively less interconnection capacity, the relative amount of 'swing capacity' in their GSK is much lower and therefore also the deviations between forecasted and realised generation are lower. Or in other words, the maximum feasibility range which can be covered by the GSK without increasing deviations between forecasted and realised generation to unacceptable levels, is larger than

the total installed interconnection capacity for these bidding zones, making it not necessary to use external constraints as a measure to limit these deviations.

Methodology to calculate the value of external constraints

TenneT TSO B.V. determines the maximum import and export constraints for the Netherlands based on studies, which combine a voltage collapse analysis, stability analysis and an analysis on the increased uncertainty introduced by the (linear) GSK during different extreme import and export situations in accordance to Article 38 of the SO GL Regulation. The studies shall be performed and published at least on an annual basis and updated every time this external constraint had a non-zero shadow price in more than 0.1% of hours in a given quarter.

2. Poland:

PSE may use an external constraint to limit the import and export of the Polish bidding zone.

Technical and legal justification

Implementation of external constraints as applied by PSE is related to integrated scheduling process applied in Poland (also called central dispatching model) and the way how reserve capacity is being procured by PSE. In a central dispatching model, in order to balance generation and demand and ensure secure energy delivery, the TSO dispatches generating units taking into account their operational constraints, transmission constraints and reserve capacity requirements. This is realised in an integrated scheduling process as a single optimisation problem called security constrained unit commitment (SCUC) and economic dispatch (SCED).

The integrated scheduling process starts after the day-ahead capacity calculation and SDAC and continues until real-time. This means that reserve capacity is not blocked by TSO in advance of SDAC and in effect not removed from the wholesale market and SDAC. However, if balancing service providers (generating units) would already sell too much energy in the day-ahead market because of high exports, they may not be able to provide sufficient upward reserve capacity within the integrated scheduling process4. Therefore, one way to ensure sufficient reserve capacity within integrated scheduling process is to set a limit to how much electricity can be imported or exported in the SDAC. External constraints are determined for the whole Polish power system, meaning that they are applicable simultaneously for all CCRs in which PSE has at least one bidding zone border (i.e. Core, Baltic and Hansa). This solution is the most efficient. Considering such constraints separately in each CCR would require PSE to split global constraints into CCR-related sub-values, which would be less efficient than maintaining the global value. Moreover, in the hours when Poland is unable to absorb any more power from outside due to violated minimal downward reserve capacity requirements, or when Poland is unable to export any more power due to insufficient upward reserve capacity requirements, Polish transmission infrastructure is still available for cross-border trading between other bidding zones and between different CCRs.

Methodology to calculate the value of external constraints

When determining the external constraints, PSE takes into account the most recent information on the technical characteristics of generation units, forecasted power system load as well as minimum reserve margins required in the whole Polish power system to ensure secure operation and forward import/export contracts that need to be respected from previous capacity allocation time frames. The constraints are calculated according to the below equations:

$$EXPORT_{constraint} = P_{CD} - (P_{NA} + P_{ER}) + P_{NCD} - (P_L + P_{UPres}) \quad (1)$$

$$IMPORT_{constraint} = P_L - P_{DOWNres} - P_{CD_{min}} - P_{NCD} \quad (2)$$

Where:

P_{CD}	Sum of available generating capacities of centrally dispatched units as declared by generators5
$P_{CD_{min}}$	Sum of technical minima of available centrally dispatched generating units

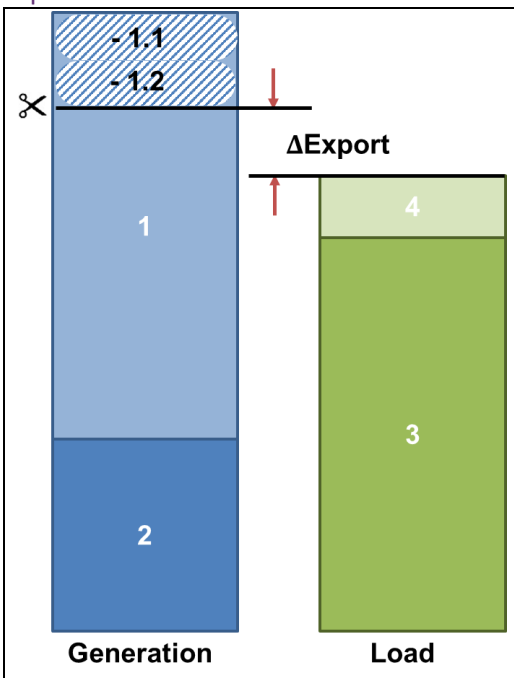
[4] This conclusion equally applies for the case of lack of downward balancing capacity, which would be endangered if balancing service providers (generating units) sell too little energy in the day-ahead market, because of too high imports.

[5] Note that generating units which are kept out of the market on the basis of strategic reserve contracts with the TSO are not taken into account in this calculation.

~~P_{NCD}~~	~~Sum of schedules of generating units that are not centrally dispatched, as provided by generators (for wind farms: forecasted by PSE)~~
~~P_{NA}~~	~~Generation not available due to grid constraints (both planned outage and/or anticipated congestions)~~
~~P_{ER}~~	~~Generation unavailability's adjustment resulting from issues not declared by generators, forecasted by PSE due to exceptional circumstances (e.g. cooling conditions or prolonged overhauls)~~
~~P_{L}~~	~~Demand forecasted by PSE~~
~~P_{UPres}~~	~~Minimum reserve for upward regulation~~
~~$P_{DOWNres}$~~	~~Minimum reserve for downward regulation~~

For illustrative purposes, the process of practical determination of external constraints in export direction in the framework of the long-term capacity calculation is illustrated below in Figure 1. The figure illustrate how a forecast of the Polish power balance for the delivery period is developed by PSE in order to determine reserves in generating capacities available for potential exports, for the long-term market.

External constraint in export direction is applicable if Export is lower than the sum of cross-zonal capacities on all Polish interconnections in export direction.



1. Sum of available generating capacities of centrally dispatched units as declared by generators, reduced by:
   1. Generation not available due to grid constraints
   2. Generation unavailability's adjustment resulting from issues not declared by generators, forecasted by PSE due to exceptional circumstances (e.g. cooling conditions or prolonged overhauls)
2. Sum of schedules of generating units that are not centrally dispatched, as provided by generators (for wind farms: forecasted by PSE)
3. Demand forecasted by PSE
4. Minimum necessary reserve for up regulation

Figure 1 Determination of External constraint in export direction (generating capacities available for potential exports) in the framework of the long-term capacity calculation.

Frequency of review

External constraints are determined in a continuous process based on the most recent information, for each capacity allocation time frame.

ACER
European Union Agency for the Cooperation of Energy Regulators

ACER Decision on the long-term capacity calculation methodology of the Core capacity calculation region: Annex II

Evaluation of responses to the public consultation on the long-term capacity calculation methodology of the Core capacity calculation region

1. INTRODUCTION

(1) This document provides a summary of responses to ACER's public consultation (PC_2021_E_06) on the Core TSOs' proposal for the long-term capacity calculation methodology for the Core capacity calculation region (Core LT CCR), together with an explanation how the points raised have been addressed by ACER in the amendments set out in Annex I to this Decision.

(2) In particular, ACER asked stakeholders to comment on the following aspects of the Core LT CCM:

(a) application of the flow-based approach;

(b) selection of critical network elements;

(c) application of minimum remaining available margin (minimum RAM);

(d) application of allocation (external) constraints limiting total import or export of a bidding zone;

(e) implementation timeline and revision of the methodology; and

(f) other proposed amendments, such as the application of alternating current (AC) load flow, fallback procedure and data publication.

2. LIST OF RESPONDENTS

ACER has received 12 responses.[1] All responses are published on ACER's consultation page (PC_2021_E_06).

Organisation	Country	Type
Österreichs Energie – Association of Austrian Electricity Companies	AT	Association
Energie AG Oberösterreich Trading GmbH	AT	Energy company
CRE	FR	Regulatory authority
TIWAG-Tiroler Wasserkraft AG	AT	Energy company

[1] EFET and Eurelectric provided a joint response.

Organisation	Country	Type
EFET - European Federation of Energy Traders		Association
Eurelectric - Union of the Electricity Industry		Association
MAVIR Zrt.	HU	TSO
HEP d.d.	HR	Energy company
PSE s.a.	PL	TSO
HEP-Trade Ltd, member of HEP group	HR	Energy company
EdF Trading	FR	Energy company
Magnus Red - on behalf of the Core TSOs		Association
Market Parties Platform (MPP)		Association

3. SUMMARY OF VIEWS AND EVALUATION

ACER has carefully considered all stakeholders' comments in assessing the proposed Core LT CCM and finalising its positions. In some areas, this is explicit in the amendments made and reasoning presented in the Decision. In these instances, the table below refers to the relevant amendments and paragraphs of the Decision. This is complemented by additional observations in response to the main points raised by the stakeholders.

The structure of the table corresponds to the questions of the consultation. Respondents' views are summarised in the left side of the table, and ACER's views are provided in the right side of the table.

4. STAKEHOLDER ANSWERS

Respondents' views	ACER views
Topic 1: Application of the flow-based approach *Context: The Core LT CCM applies a flow-based approach with multiple scenarios on a yearly and a monthly level for the calculation of flow-based parameters. ACER supports the application of a flow-based approach, as this approach is in line with the Commission Regulation (EU) 2016/1719 establishing a guideline on forward capacity allocation (FCA Regulation [2] and the Commission Regulation (EU) 2015/1222 establishing a guideline on capacity allocation and congestion management (CACM Regulation)[3]. In ACER's view, a flow-based approach is appropriate for meshed networks such as the Core CCR and consistent with the approach applied in Core Day-Ahead (DA) CCM. Most importantly, ACER understands that all efforts of the Core TSOs to implement the coordinated Net Transfer Capacities (cNTC) approach in Core CCR have failed, as the TSOs could not to agree how to split the interdependent cross-zonal capacities among different bidding zone borders. In case of flow-based approach, such a split is not necessary, since the flow-based allocation determines the volume of allocated capacities per each border based on maximisation of economic surplus.* **Question 1: Do you agree with the application of the flow-based approach in the Core LT capacity calculation?**	
11 respondents provided an answer to this question.	
8 respondents agreed with the proposed application of flow-based approach.	ACER welcomes these comments and agrees that the requirements of Article 10(5) of the FCA Regulation need to be verified before implementing the flow-based approach in the Core CCR in the long-term time frame. This verification has been explained in paragraph (55) of this Decision. ACER has conducted an experimentation which aimed to verify, among other aspects, whether the flow-based approach provides higher economic efficiency under the same level of network security, in line with Article 10(5)(a) requirement. ACER has simulated the flow-based capacity calculation and flow-based explicit auctions and applied the minRAM that corresponds to the level of RAM required to accommodate the flows originating from the NTC values in Core from the yearly auctions for 2020. These simulations show that the application of the flow-based approach increases economic efficiency in the Core CCR (characterised by highly meshed network and physically interdependent bidding zone borders) with the same level of system security. In such circumstances, the flow-based auctions provide 27% higher economic surplus than the realised yearly NTC auctions from 2020 at the Core borders. Thereby, ACER considers that the condition set out in Article 10(5)(a) of the FCA Regulation is met. Nevertheless, ACER recognises the risk that the actually offered cross-zonal capacities may be lower than the capacities offered today. To this end, ACER and the regulatory authorities will closely follow the implementation and request from the TSOs the level of cross-zonal capacities offered to the market similar to today's levels, keeping in mind the security constraints. Stakeholders will also be consulted on these levels before the implementation.
3 respondents expressed concerns about fulfilling the requirements set out in Article 10(5) of the FCA Regulation. In particular, one of the conditions to apply the flow-based approach for long-term capacity calculation time frames is that the flow-based approach leads to an increase of economic efficiency in the capacity calculation region with the same level of system security (Article 10(5)(a)). The respondents claimed that the TSOs and ACER support the implementation of flow-based approach in LT capacity calculation for the Core region but neither the TSOs, nor ACER have demonstrated that this condition is verified.	
1 respondent stated that the Core TSO's proposal lacks details on the allocation process.	The Core LT CCM is related to capacity calculation, while the allocation process is subject to other methodologies adopted pursuant to the FCA Regulation. The proposed application of a flow-based approach implies that flow-based parameters will be used for allocating capacities (see

[2] OJ L 259, 27.9.2016, p. 42.
[3] OJ L 197, 25.7.2015, p. 24.

Respondents' views	ACER views
	Article 29 and Article 30 of the CACM Regulation). As the auctions currently performed by the single allocation platform (SAP) do not support the use of flow-based parameters for capacity allocation, ACER has requested all TSOs to provide amendments to the following terms and conditions or methodologies in order to accommodate the long term flow-based capacity allocation approach: • requirements for the single allocation platform pursuant to Article 49 of the FCA Regulation (SAP); • harmonised allocation rules pursuant to Article 51 of the FCA Regulation (HAR); • congestion income distribution methodology pursuant to Article 57 of the FCA Regulation (CiD); and • methodology for sharing costs incurred to ensure firmness and remuneration of long-term transmission rights pursuant to Article 61 of the FCA Regulation (FRC). ACER has provided the required level of details in the Core LT CCM related to capacity allocation, by defining the capacity calculation outputs (union of flow-based constraints by all observed scenarios).
Topic 2: Selection of critical network elements *Context: ACER is of the view that the list of Critical Network Elements and Contingencies (CNEC list) in the long-term time frame should be consistent with the CNEC list in the DA time frame. According to the Core DA CCM, day-ahead validation cannot lower the remaining available margin (RAM) values below the level required to accommodate the long-term allocation. As such, ACER sees no financial risk to the TSOs. ACER also considers it unlikely that alignment between the two CNEC lists would endanger network security since the LT CCM needs to ensure that LT capacities are always feasible with the application of remedial actions.* **Question 2: Do you agree with the proposed CNEC selection principles?**	
11 respondents provided an answer to this question.	
9 respondents agreed with the approach proposed by ACER, i.e. that the CNEC approach for long-term (LT) capacities should explicitly follow the principles of the day-ahead/intra-day approach.	ACER agrees that the level of uncertainty in the long-term time frame is higher than in the day-ahead time frame, and that the LT CC should be applicable while ensuring system security without using remedial actions. In this respect, the Core LT CCM does not apply the RA in the CC. ACER however disagrees that extending the CNEC list would address increased uncertainty in the long-term time frame. ACER explains in paragraph (74) of the Decision that over-allocation in the long-term time frames is highly unlikely due to the application of a conservative approach in the calculation and allocation of the long-term cross-zonal capacities. This approach assumes: • simultaneous application of the union of constraints by all scenarios; • the allocation of options, which means that the corresponding flows are calculated in a worst-case manner, i.e. without netting. This further implies that the flows assumed in long-term capacity calculation will less likely consume the available capacity in the form of RAM in the day-ahead time frame; • The level of minimum RAM provided in the long-term time frames is in sum much lower than the minimum requirement for the day-ahead time frame (70% of Fmax);
2 respondents disagreed with ACER's proposal, stating that: - during the DA capacity calculation process, CNECs are defined on hourly level, which would not be relevant in LT, which implies a false consistency between DA and LT capacity calculation. In the respondent's view, the LT CCM, under a higher level of uncertainty than in DA, should be able to handle any possible status of the system regardless the direction of flows, therefore an extended list of CNECs would be needed. - LT CC should be applicable with ensuring system operational security without the usage of remedial actions (RA).	

Respondents' views	ACER views
- CNECs are not always same at long and short-term level.	• The experimentation results show that the methodology might result in under-allocation of cross-zonal capacities, rather than their over-allocation; • Despite over-allocation is unlikely, the Core LT CCM provides the possibility to adjust (i.e. decrease) the corresponding RAM even below the minimum RAM value in the capacity validation phase if the TSOs' analysis shows that the calculated level of RAM is unable to ensure operational security.
3 respondents who agreed with the approach proposed by ACER, commented on the application of zone-to-zone PTDF threshold of 5%. They claimed that although this 5% criterion is apparently currently being applied, it has never been approved.	ACER disagrees. The 5% threshold reflects the requirement of Article 29(3)(b) of the CACM Regulation and has been approved in the Core day-ahead and intraday capacity calculation methodology. Article 29(3)(b) of the CACM Regulation requires removal of insignificant CNECs and 5% is s standard measure of insignificance in statistics. There is no legal obligation to make a cost benefit analysis on this level of insignificance. Further, it is not the PTDF threshold that counts. It is actually the flow, which means that very high exchange and very low PTDF can still impose very high flow and have very high impact on security.
Topic 3: Minimum remaining available margin (RAM) *Context: ACER had concerns that the minRAM of 20% proposed by the Core TSOs may likely lead to much lower long-term cross-zonal capacities than nowadays. ACER intended to investigate the effect of no-netting on minimum RAM and level of offered capacities and propose a higher minimum RAM value for the long-term frame, if needed. In addition, in order to provide comparable levels of capacity allocation in a possible transitional period, ACER has been investigating the options of using historical long-term NTCs converted into minimum RAM, or statistical analysis of day-ahead RAMs as input to the long-term minRAM.* **Question 3.1: What are your expectations and needs regarding the volume of offered capacities in the long-term time frame?**	
9 respondents provided an answer to this question.	
3 respondents underlined the importance of sufficient capacity at DE-AT border for their hedging opportunities. They were also concerned that if the 70% target is not met, there would be lower auctioned capacities and insufficient incentives to establish long-term business. These respondents also claimed that the current proposal would bring uncertainty as to the level of cross-border capacity, arguing that the calculation process is not transparent and would leave businesses with a rather short-termed cross-border market. In respondents' view, weak harmonisation and the vague description of the methodology would open doors for nationally confined markets. In their opinion, there should be a regular assessment of the historical levels of available cross-border capacity, converted to historical minRAMs, and minRAM results of the proposed Core LT CCM. This "backtesting" should give insights into how the cross-border capacity and minRAM have increased, or not, following the introduction of the proposed method.	While ACER understands these concerns, the coordinated flow-based approach cannot and should not give priority to any border in advance, but aims to establish a level playing field for all market participants among all borders based on their bid prices and network reality. The 70% requirement pursuant to Article 16(8) of the Electricity Regulation is not applicable to the long-term time frame, however ACER confirms the need for sufficient long-term capacities in order to provide proper hedging possibilities to market participants who need those hedging instruments. Regarding the stability of outputs and alleged uncertainty about the level of cross-border capacity, ACER is of the opinion that with the amended Core LT CCM methodology the stability of the LT CC outputs is sufficiently ensured by the application of minimum RAM. ACER is of the position that the historical auctioned levels are not a proper benchmark, as the historical capacities were not coordinated. ACER notes that the only objective in this respect is to increase economic efficiency with the same level of network security, pursuant to Article 10(5)(a) of the FCA Regulation. Nevertheless, ACER has provided a framework for testing the results before its implementation and a strong incentive for the TSOs to increase the available capacities so they can reach today's levels.

Respondents' views	ACER views
1 respondent expected that on average, the auctioned capacities would be equal to, or higher than, the historical ones, but with the exception of DE-AT border where the high current LT capacities are the result of an intergovernmental agreement and not TSOs' calculation.	
2 respondents questioned the claim that the minimum RAM level is not defined in the Core TSOs' proposal. They also welcomed the revision of the minimum RAM level if it is proven that its effect is not comparable with the same level applied in the DA time frame. They also referred to the regulatory authorities' commitments given at Core Consultative Group meetings during 2020, that the average levels of allocated capacity in the forward time frame should not decrease following the implementation of the Core LT CCM.	ACER agrees with the first comment, as the proposed minimum RAM of 20% is defined in the Article 14(2) of the Core TSOs' proposal. ACER agrees with the second comment. Reasons for the difference between the DA and LT minimum RAMs are set out in ACER's reply to comments on Question 2 above. ACER is of the position that historical auctioned levels are not the proper benchmark, as the historical capacities were not coordinated. The only objective in this respect is the increase of economic efficiency, pursuant to Article 10(5)(a) of the FCA Regulation.
2 respondents stated that the real value of capacity should be provided, as calculated, respecting the physical limits, without applying the artificial capacities, and allowing for secure power system.	ACER in principle agrees with this statement, however having in mind that a certain level of minimum RAM is required at both yearly and monthly time frame, in order to promote the effective long-term cross-zonal trade with long-term cross-zonal hedging opportunities for market participants in line with Article 3 of the FCA Regulation. In any case, application of minimum RAM should not compromise network security.
Topic 3: Minimum remaining available margin (RAM) **Question 3.2: Do you agree with using a minimum RAM higher than 20% for the LT time frames?**	
11 respondents provided an answer to this question.	
9 respondents agreed with the proposed approach. 1 respondent underlined that the minRAM value must be carefully calculated so that it is secure. This respondent also supported the use of a statistical analysis of the DA RAMs for a transitional period, and was not in favour of using the historical LT NTCs and converting them into RAMs as some LT NTCs are the result of intergovernmental agreements and not TSO calculations.	ACER agrees with these statements and has made amendments in this respect (see Article 14 of Annex I) ACER also welcomes the use of the statistical approach for the calculation of minRAM values as one of the future possibilities. However, in this case, it is to be decided whether to use statistical approach only to determine the minRAM values, or to determine all FB parameters. ACER has decided to not impose any solution in this respect yet, but will invite TSOs to investigate this aspect after the go-live of the Core LT CCM.
2 respondents expressed concerns about increasing the minRAM values without proper operational experience.	In its experimentation, ACER has simulated different levels of the minRAM. The results are discussed in paragraphs (105)-(118) of the Decision. Based on the applied simulations, discussions with the Core TSOs and the Core regulatory authorities, and considering the need to ensure offered capacities at both yearly and monthly time frame, ACER has proposed the minimal values of minimum RAM at the level of 20% of Fmax for yearly auctions and 10% of Fmax for monthly auctions. ACER is of the position that the proposed values of minimum RAM are the minimum required for ensuring compliance with the objective of effective long-term cross-zonal trade referred to in Article 3 of the FCA Regulation. ACER sees no

Respondents' views	ACER views
	network security concerns from the application of the proposed minimum RAM values. Moreover, any potential operational security risks in this respect are in any case mitigated by the possibility to efficiently reduce the capacities during the capacity validation, if necessary. ACER considers that its proposal on the minimum RAM values strikes a balance between the opposite expectations of the Core regulatory authorities, Core TSOs and market participants. In view of the expressed concerns and bearing in mind the limitations of ACER's experimentation, ACER has provided for a mechanism whereby the Core TSOs increase the minimum RAM values during the implementation if their analysis and experimentations do not reveal network security risks (with the cap of 40% at yearly and 20% at monthly level). Such adjustment would have to be based on a comprehensive analysis performed by the Core TSOs and consistent with the objectives of the FCA Regulation, and consulted with the Core regulatory authorities and stakeholders.
Topic 4: Application of allocation (external) constraints *Context: ACER notes that external constraints are currently exercised by TenneT (NL) and PSE (PL) in the day-ahead timeframe. ACER aimed to keep the possibility for the external constraints at the LT level as long as they are existing on the DA level.* **Question 4: Do you agree with the proposed way of application of allocation (external) constraints in the Core LT CCM?**	
10 respondents provided an answer to this question.	
4 respondents agreed with the proposed approach. 6 respondents disagreed with this proposal, as they considered that the flow-based approach should be consistent enough on its own, and the application of external allocation constraints would only dilute the results of the flow-based approach. The respondents were of the view that if such constraints were imposed, it should be mandatory that those constraints are consulted with the Core TSOs and market participants, and approved by all Core regulatory authorities.	ACER is generally not in favour of external constraints as long as there are other ways to address underlying operational security issues. However, ACER also understands that as long as external constraints are applied in the day-ahead time frame, they are also required in the long-term one, in order to avoid over-allocation. Therefore, ACER has allowed external constraints in the long-term time frame only as long as they serve to accommodate the existing day-ahead external constraints. In addition, ACER has strengthened the monitoring of the applied values of external constraints by specifying the relevant monitoring requirements.
Topic 5: Implementation timeline and revision *Context: The Core TSOs' proposal provides for an implementation timeline of 5 years. ACER has proposed to shorten this timeline to 2.5 years, and to allow for a subsequent revision of the methodology 18 months following its go-live. This would assume the application of monthly flow-based auctions for July 2024 and yearly flow-based auctions for January 2025.* **Question 5: Do you agree with the proposed implementation deadline?**	
6 respondents provided an answer to this question.	
1 respondent agreed with the proposed approach. 5 respondents were concerned that the complexity of the LT CCM requires more time than the proposed 2.5 years. 2 of those respondents provided reasons for extending the timeline to 3 years, starting with yearly auctions for 2025 and then monthly auctions, instead of mixing the NTC-based	ACER has carefully assessed these concerns and agreed to extending the implementation timeline to 3 years, specifying that the first long-term auctions to be implemented are yearly flow-based auction for 2025 and the monthly flow-based auction for January 2025. However, any eventual delay in the implementation of either of these auctions for whichever reason, should not delay the implementation of the other auction.

Respondents' views	ACER views
approach at monthly and flow-based approach at yearly level. The respondents argued that due to dependencies among yearly Common Grid Models (CGMs), LT CC and Outage Planning Coordination (OPC) process, the go-live of LTCC should be with calculation of yearly values for 2025.	
Topic 6: Other proposed amendments *Context: ACER's further amendments proposed for the Core LT CCM included:* • *applying AC load flow for the reference load flow calculation in order to obtain more accurate results;* • *applying the fallback procedure based on the FB parameters from previous yearly auction (at Y level), i.e. parameters from the corresponding season of the previous yearly auction (at M level);* • *aligning the provisions on the publication of data with the corresponding provisions in the Core day-ahead and intraday CCMs.* **Question 6: Do you agree with the proposed amendments?**	
10 respondents provided an answer to this question.	
3 respondents stated that the methodologies for reliability margin and for operational security limits have to be as transparent as possible.	Although there are more uncertainties in the long-term time frames than in the day-ahead one, ACER considers that the DA reliability margin can be efficiently used in the long-term time frame under certain conditions. ACER notes that these conditions are met in the Core TSOs' proposal, as amended by ACER, therefore making the flow reliability margin from the day-ahead capacity calculation process suitable for the long-term time frames. These conditions are: • The union of flow-based constraints from all calculation scenarios is used as a common set of constraints for each long-term auction, as this represents sufficiently conservative consideration of various constraints from different applied CGMs; • The AC load flow is applied for the calculation of reference flow in the long-term time frame, as the day-ahead Core flow-based approach applies the direct current (DC) load flow, but does not take into account the inaccuracies originating from the differences between AC and DC load flow; • The fact that applying options at the long-term explicit auctions of cross-zonal capacity does not allow for the formal consideration of netting of counter flows, ensures a sufficiently conservative capacity calculation approach. Having the above in mind, ACER considers that transparency of the reliability margin approach is ensured as well.
4 respondents argued that the proposed Generation Shift Keys (GSK) methodology lacks transparency.	ACER broadly agrees with this statement. To increase transparency, the Core LT CCM aims towards harmonisation of the GSK methodology with the corresponding process in the DA CCM. Namely, it requires the Core TSOs to amend the GSK methodology in the long-term time frames no later than 12 months after the implementation of the proposal for further harmonisation of the corresponding methodology of the Core DA CCM.

Respondents' views	ACER views
3 respondents proposed to include costly remedial actions in the LT CC.	ACER disagrees with this proposal. As the long-term capacity calculation assumes very high uncertainty for assessing the availability of remedial actions far ahead of the real-time system operation, and that, in such circumstances, the process of coordination or even consideration of remedial actions would increase the complexity of the capacity calculation process without a clear added value, no remedial actions should be considered in the LT CC.
3 respondents suggested that third countries should be more accurately represented in the flow-based approach, with details like grid structure, grid and plant outages, remedial actions' potential and the variability of production and consumption.	The CGM used for the LT CCM includes grid models of third countries for the Continental European synchronous area. The CGMM amendment proposed by ACER would further improve the planned outage modelling, as it would be harmonised at the European level, at least for the EU regions, but opened as well for non-EU countries. However, third country TSOs cannot be formally included in the Core capacity calculation.
2 respondents questioned the added value of applying the AC load flow for the reference flow calculation, expecting no significant increase in accuracy or economic efficiency.	ACER's experimentation showed significant improvements of the accuracy in calculating the reference flows with AC LF, or at least with combined AC LF (n-0) and DC (for contingencies, with losses from AC (n-0)). The descriptions is provided in paragraphs (102)-(104) of the Decision. ACER considers that gaining additional precision in obtaining reference flow is an important element in the RAM calculation, it is a valid reason for introducing the AC load flow, having in mind that, contrary to the day-ahead process, the long-term process provides sufficient time for its application. In case of implausibility to apply the AC load flow in certain CGMs, the DC solutions can be considered as a fallback.
3 respondents argued that there should be no CGMM amendment (CGMM being pan-European process) to include the planned outages, but the Core LT CC should apply the region-specific LT modelling concept.	ACER takes into account the need to ensure availability and proper granularity of the application of planned outages in the CGMs used for the LT CCM. On the other hand, ACER also sees the importance of ensuring coordination of the CGMs at the European level, in line with Article 18 of the FCA Regulation and Article 18 of the CACM Regulation. A coordinated use of the CGMs for the long-term capacity calculation across all the European CCRs is of utmost importance since the assumptions on generation load and topology for capacity calculation need to be the same in all regions. For example, TSOs in Italy north CCR need to have full visibility of the assumptions made in capacity calculation in Core CCR as these assumptions impact cross-zonal capacities e.g. in Italy North. In addition, regional CGM which is not used in other regions would contradict the concept of an EU-wide common grid model. Given the above, ACER has pragmatically allowed for a temporary procedure of the CGM development in the Core CCR, in order to ensure the required specifics of the CGMs' application in Core CCR. This temporary procedure may increase the granularity of the required CGMs, apply the outage topologies pursuant to the OPC data, and have flexible timestamps for the additional CGMs (excluding the initial timestamps defined pursuant to CGMM). The Core TSOs may apply the temporary procedure only until the first next CGMM amendment, assuming the willingness of the Core TSOs and ENTSO-E to support the inclusion of the elements of the temporary procedure in the CGMM amendment.
1 respondent noted the need that the fallback values are confirmed by all Core TSOs.	Article 16 of the Core LT CCM defines that the Core CCC shall provide the LT flow-based fallback parameters to the SAP, also requiring their common validation by the Core TSOs and the Core CCC.