ACER
European Union Agency for the Cooperation of Energy Regulators

ACER Decision on the Congestion Income Distribution methodology:

Annex I

Congestion Income Distribution methodology

in accordance with Article 73 of the Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on Capacity Allocation and Congestion Management

21 December 2023

Contents

Whereas

(1) This document establishes the methodology for congestion income distribution (hereafter referred to as "CID methodology") in accordance with Article 73 of Commission Regulation (EU) 2015/1222 establishing a guideline on Capacity Allocation and Congestion Management (hereafter referred to as the "CACM Regulation").

(2) This CID methodology takes into account the general principles, goals and other methodologies set out in the CACM Regulation. The goal of the CACM Regulation is the coordination and harmonisation of capacity calculation and capacity allocation in the day-ahead and intraday cross-zonal markets, and it sets requirements for the Transmission System Operators (hereafter referred to as "TSOs") to co-operate on the level of capacity calculation regions (hereinafter referred to as "CCRs"), on a pan-European level and across bidding zone borders. The CACM Regulation sets also rules for establishing capacity calculation methodologies based either on the flow-based approach ("FB approach") or, subject to conditions specified therein, the coordinated net transmission capacity approach ("coordinated NTC approach").

(3) In accordance with Article 73 of the CACM Regulation, the CID methodology should cover the congestion income distribution in both the day-ahead and the intraday timeframe. The intraday timeframe is operated in a hybrid solution combining a continuous market with implicit auctions. Intraday congestion income to be distributed under the CID methodology is not created during the continuous trading and is originating only from the Intraday Capacity Pricing Auctions (hereinafter referred to as "IDA"). IDA references can be in some cases also understood as references to Single Intraday Coupling, however only IDA will be used in the document as it refers to a specific part of the coupling.

(4) The CID methodology is designed in three layers. First, for each CCR the congestion income generated by exchanges within a CCR is calculated and collected. The calculation is based on the results of the single day-ahead coupling (hereinafter referred to as "SDAC") or the IDAs. Second, the congestion income of a CCR is distributed among the bidding zone borders of this CCR. Third, the congestion income attributed to a bidding zone border is distributed among TSOs or other legal entities owning interconnectors on that bidding zone border.

(5) Application of congestion income distribution is currently based on regional application to reflect the following: First, the congestion income from SDAC includes also the congestion income resulting from reallocated long-term transmission rights ("LTTR"), for which TSOs need to coordinate in capacity calculation and allocation, as well as guaranteeing their firmness and remuneration including sharing of related costs in accordance with Article 61 of the Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation (hereinafter referred to as the "FCA Regulation").

These requirements are defined at CCR level. Second, the definition of commercial flow is not harmonised across EU mainly because CCRs with coordinated NTC and FB approach allocate cross-zonal capacity in a fundamentally different way. In CCRs with a coordinated NTC approach, the commercial flows can be set to equal allocated cross-zonal capacities, which are directly resulting from the SDAC or IDA algorithm. In CCRs with a FB approach, where the SDAC or IDA algorithm does not provide allocated capacities on bidding zone borders, the commercial flows need to be calculated additionally. This is done by first calculating, for each bidding zone, the net position resulting from exchanges within the CCR (i.e. the regional net positions).Then the physical flows resulting from the regional net positions are calculated for each bidding zone border of the CCR.[1] For those bidding zones, where part of the regional net position is physically realised through borders outside of its CCR, the external flow is calculated such that the sum of calculated physical flows on internal borders and the external flow is equal to the regional net position of a bidding zone.

(6) In some specific cases, unintuitive flows (flows against prices differences) may happen to achieve the highest social welfare possible across CCRs. Two major situations are treated into this methodology, where the unintuitive flows impact first, inside a CCR and second, across multiples CCRs. The current proposal for amendments contains solutions to address all kind of unintuitive flows. In order to alleviate the effect of unintuitive flows from advanced hybrid coupling and allocation constraints, the virtual hub approach is introduced to better consider all the flows from advanced hybrid coupling or allocation constraints to determine the congestion income distribution in a fair and efficient way.

(7) The congestion income from SDAC also contains the congestion income generated by non-nominated LTTRs (i.e. non-nominated PTRs or FTRs), which TSOs have the obligation to remunerate in accordance with the FCA Regulation. The relevant principles are reflected in the methodology for sharing costs incurred to ensure firmness and remuneration of long- term transmission rights in accordance with Article 61(3) of the FCA Regulation.

(8) The CID methodology also needs to consider congestion income from the allocation of cross-zonal capacity for the exchange of balancing capacity or sharing of reserves via the co-optimised allocation process pursuant to Article 40 of the Commission Regulation on (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing (hereafter referred to as the "EB Regulation") and the market-based allocation process pursuant to Article 41 of the EB Regulation. In accordance with the harmonised cross-zonal capacity allocation methodology pursuant to Article 38(3) of the EB Regulation and regional market-based allocation methodologies pursuant to Article 41(1) of the EB Regulation, the CID methodology should specify the principles how to distribute the congestion income from the exchange of balancing capacity or sharing of reserves.

(9) The CID methodology does not cover the situation in which the monthly congestion income generated from an application of the market-based allocation in accordance with

[1] These flows are calculated based on power transfer distribution factors, which are calculated based on thecommon grid model.

Article 38(1) of the EB Regulation is lower than the congestion income which could have been generated for the amount of cross-zonal capacity allocated for the exchange of balancing capacity or sharing of reserves if allocated to the single day-ahead coupling instead. The reason is that this situation is already treated in the methodology of Article 38(3) of the EB Regulation.

(10) According to Article 9(9) of the CACM Regulation, the expected impact of the CID methodology on the objectives of the CACM Regulation has to be described and is presented below.

(11) The CID methodology generally contributes to the achievement of the objectives of Article 3 of CACM Regulation or the usage principles for congestion income set in Regulation (EU) 2019/943. In particular, the CID methodology serves the objective of promoting effective competition in the trading and supply of electricity, non-discriminatory access to cross-zonal capacity as it lays down the exact methodology for the distribution of congestion income to be applied by all involved TSOs, thus, creating a solid basis for congestion income distribution at European level.

(12) Congestion income indicates how much market participants value the possibility for cross-border trade, how interconnections are used and where capacity should be increased. Via the possibility to consider investment costs in the sharing key, more certainty can be achieved for a more optimal sharing key for future investments and thus, long-term operation and development of the electricity transmission system and electricity sector in the European Union is supported.

(13) Furthermore, the CID methodology ensures non-discriminatory treatment of all affected parties, as it sets rules to be applied by all parties. Further, the methodology takes into account congestion income derived by interconnections on bidding zone borders owned by legal entities other than TSOs, preventing exclusion of such congestion income from the application of the CID methodology as long as these interconnections are operated by TSOs.

(14) Regarding the objective of transparency and reliability of information, the CID methodology provides clear rules and a solid basis for congestion income distribution in a transparent and reliable way.

(15) In conclusion, the CID methodology contributes to the general objectives of the CACM Regulation to the benefit of all market participants and electricity end consumers.

Title 1
General provisions

Article 1
Subject matter and scope

1. This CID methodology is established in accordance with Article 73 of the CACM Regulation and shall cover the congestion income distribution for:
    a. All existing and future bidding zone borders and interconnectors within and between Member States, to which the CACM Regulation applies and where congestion income is collected;
    b. Interconnectors which are owned by TSOs or by other legal entities;
    c. Congestion income derived from capacity allocation in the day-ahead and the intraday timeframe;
    d. Congestion income derived from capacity allocation based on coordinated NTC approach and FB approach;
    e. Congestion income derived from capacity allocation based on coordinated NTC approach only used in a first stage of IDA for some CCRs before FB approach is applied; and
    f. Congestion income derived from the allocation of cross-zonal capacity for the exchange of balancing capacity or sharing of reserves as foreseen in the methodologies pursuant to Article 38(3) and Article 41(1) of the EB Regulation.

2. The CACM CID methodology shall apply to the TSOs listed in Annex 1 (hereafter referred to as “TSOs”).

3. Where congestion income derives from transmission assets owned by legal entities other than TSOs, these parties shall be treated in a transparent and non-discriminatory way. The TSOs operating these assets shall conclude the necessary agreements compliant with this CID methodology with the relevant transmission asset owners to remunerate them for the transmission assets they operate on their behalf.

Article 2
Definitions and interpretation

1. For the purpose of the CID methodology, terms used in this document shall have the meaning of the definitions included in Article 2 of the CACM Regulation, of the FCA Regulation, of Regulation (EU) 2019/943, Directive (EU) 2019/944 and Commission Regulation (EU) 543/2013.

2. In addition, in this CID methodology the following terms shall apply:
    a. "Commercial flow" means the flow over a bidding zone border resulting from SDAC or IDA where it is distinguished as follows:
        i. for CCRs applying the FB approach it is the additional aggregated flow (AAF) and if applicable the external flow as specified in Article 4
        ii. for CCRs applying a coordinated NTC approach it means the allocated capacities on the bidding zone border
    b. "Balancing capacity commercial flow" means, for a given border, the net capacity allocated resulting from allocation of cross-zonal capacity for the exchange of balancing capacity or sharing of reserves, where it is distinguished as follows:
        i. for CCRs applying the FB approach it is the additional aggregated flow (AAF) and if applicable the balancing capacity external flow as specified in Article 5
        ii. for CCRs applying a coordinated NTC approach it means the difference between the capacity allocated in one direction and the capacity allocated in the other direction on the bidding zone border
    c. "External flow" means the calculated physical flow resulting from exchanges within a CCR from the SDAC or IDA that cannot be directly assigned to a bidding zone border of that CCR and therefore represents exchanges within a CCR, which are physically realised through borders outside of a CCR.
    d. "Balancing capacity external flow" means the calculated balancing capacity flow resulting from the allocation of cross-zonal capacity for the exchange of balancing capacity or sharing of reserves exchanges within a CCR that cannot be directly assigned to a bidding zone border of that CCR and therefore represents exchanges within a CCR, which are realised through borders outside of a CCR.
    e. "Slack hub" means a common virtual sink or source for all external flows originating from a bidding zone assigned to it.
    f. "Balancing capacity slack hub" means a common virtual sink or source for all balancing capacity external flows originating from a bidding zone assigned to it.
    g. "Adjusted demand" means the demand for balancing capacity obtained after scaling the original demand down to the overall procurement volume.
    h. "Virtual hub" means a virtual bidding zone used to represent the imports and exports on a border where advanced hybrid coupling is applied. In contrast to real bidding zones, there do not exist any bids at the virtual hubs in the price coupling algorithm and therefore there is also no congestion income generated for virtual hubs.
    i. "Virtual hub net position" means the cross-zonal exchange over the interconnectors represented by the virtual hub.
    j. "Net border income" means the congestion income allocated per bidding zone border as defined in Article 7 of this CID methodology.
    k. "balancing capacity net position" means the netted sum of exports and imports for a given balancing capacity product for each market time unit for a bidding zone;
    l. "Interconnector" means a line between bidding zones.
    m. "MTU" means the finest market time unit occurring in the CCR within the given timeframe. If this finest market time unit is not implemented throughout the whole CCR, calculated congestion income values must be divided to match the corresponding finest market time unit breakdown. This definition deviates from the approach used in the Regulations referred to in paragraph 1 of this Article but shall

be applicable solely within the application of this methodology.

n. "Advanced Hybrid Coupling" or "AHC" refers to the combined application of Flow-Based (FB) allocation in a FB CCR, and Available Transmission Capacity (ATC) allocation at a BZ border external to the FB CCR, in one single capacity allocation mechanism. That external BZ border applying AHC is represented in a FB CCR by virtual hub. The PTDFs calculated for the virtual hub map the impact of the exchanges on the CNECs of the FB CCR during market coupling. This measure results from the process of capacity calculation methodology within respective CCR in accordance with Articles 20 and 21 of the CACM Regulation and impacts allocation of capacity on bidding zone borders located in different CCRs.

o. "Allocation constraint", means a constraint limiting net-position of given bidding zone defined pursuant to Article 2(6) of the CACM Regulation. This constraint results from the process of capacity calculation methodology within respective CCR in accordance with Articles 20 and 21 of the CACM Regulation and refers to both internal allocation constraint (impacting allocation of capacity on bidding zone borders located in single CCR) and cross-CCRs allocation constraint (impacting allocation of capacity on bidding zone borders located in different CCRs).

p. "Ramping constraint", means the constraint applied for some HVDC interconnectors limiting the allowed change in flow from one MTU to the next MTU to a certain level. This could result in a situation that the change of flow on a bidding zone border is limited in a way that change of direction of the flow is not possible from one MTU to the next MTU.

q. "Allocation mechanisms with cross-CCRs impact" means Advanced Hybrid Coupling or cross-CCRs allocation constraint.

3. In addition, in this CID methodology, unless the context requires otherwise:
   a. a bidding zone border may consist of one or more interconnector(s) for the purposes of the congestion income distribution;
   b. unless specified otherwise, the terms used apply in the context of the SDAC and IDA;
   c. the singular also includes the plural and vice versa;
   d. 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.

Title 2
Calculation of congestion income and distribution to bidding zone borders

Article 3
Collection and calculation of congestion income per CCR

1. In accordance with Article 68(7) and (8) of the CACM Regulation, the relevant central counter parties or shipping agents shall collect the congestion income arising from the SDAC or the IDA and shall ensure that collected congestion income is transferred to the TSOs or entities appointed by TSOs no later than two weeks after the date of the settlement.

2. The congestion income generated within a CCR (CI_{CCR}) shall be calculated for each MTU by using the results of the SDAC or IDA according to one of the following formulas depending on the capacity calculation approach and the availability of information on CCR level:

   a. Calculation based on net positions (at least for all CCRs using the FB approach)

$$CI_{CCR} = -\sum_{j \in Z_{CCR}} NP_j \times P_j$$

with

NP_j regional net position of bidding zone *j* resulting from the SDAC or IDA (the position of virtual hubs – if any – is added to derive the net position of the bidding zone)

P_j clearing price of bidding zone *j* resulting from the SDAC or IDA

Z_{CCR} set of bidding zones in the CCR

The regional net positions shall be derived from the total net positions resulting from SDAC or IDA and subtracting the exchanges with bidding zones outside of a CCR.

   b. Calculation based on allocated capacities

$$\mathrm{CI}_{CCR} = \sum_{b \in B_{CCR}} \mathrm{S_b} \times \mathrm{MS_b}$$

with

S_b allocated capacity on bidding zone border b resulting from the SDAC or IDA

MS_b market spread on bidding zone border b resulting from the SDAC or IDA

B_{CCR} set of all borders in the CCR

3. The calculation of CI_{CCR}, including the subsequent step described in Article 7(2), may be omitted in CCRs, in which unintuitive flows and network losses according to Article 7(1) do not occur.

4. In case of allocation of cross zonal capacity for the exchange of balancing capacity or sharing of reserves, the congestion income generated from such allocation has to be shared per each application pursuant to Article 38(1) of the EB Regulation , separately for each standard balancing capacity product.

Article 4
Calculation of commercial flows in FB approach

1. For CCRs applying the FB approach, the commercial flow shall be based on calculated physical flow on internal and external bidding zone borders of a CCR, which result from regional net positions of bidding zones in a CCR.

2. On the internal bidding zone borders of a CCR the commercial flow shall be equal to *AAF*, which is the calculated physical flow on internal bidding zone borders of a CCR resulting from the electricity exchanges within a CCR. *AAF* shall be calculated with the following formula:

$$AAF_b = \sum_{j \in Z_{CCR}, k \in K_b} PTDF_{k,j} \cdot NP_j$$

with

AAF_b additional aggregated flow on bidding zone border *b*

NP_j regional net position of bidding zone *j* resulting from the SDAC or IDA (the position of virtual hubs – if any – is added to derive the net position of the bidding zone)

$PTDF_{k,j}$ power transfer distribution factor for bidding zone *j* on interconnector *k* located on bidding zone border *b*

Z_{CCR} set of bidding zones in the CCR$K_b$set of interconnectors on bidding zone border b

3. For each bidding zone, which has the regional net position not equal to the sum of all commercial flows calculated on the CCR internal bidding zone borders of such bidding zone pursuant to paragraph 2, the external flow is needed as additional commercial to balance the regional net position of such bidding zone. The external flow of such bidding zone shall be calculated using the following formula:

$$EF_j = NP_j - \sum_{b \in B_j} AAF_b$$

with

EF_j external flow for bidding zone *j*

NP_j regional net position of bidding zone *j* resulting from the SDAC or IDA (the position of virtual hubs – if any – is added to derive the net position of the bidding zone)

AAF_b additional aggregated flow on bidding zone border *b*

B_j subset of bidding zone borders within a CCR connected to bidding zone *j*

4. For bidding zones, where the additional commercial flow is calculated based on external flow pursuant to paragraph 3, the market spread of such commercial flow used in accordance with Article 7(1) shall be calculated as:

$$EMS_j = P_j - P_{SH,n}$$

where $P_{SH,n}$ is the price(s) that minimises the sum of congestion income from external flows over all bidding zones connected to the relevant slack hub *n* (where each external flow for one bidding zone is calculated in accordance with paragraph 3) using the following optimisation:

$$\arg\min_{P_{SH,n}} \sum_{j \in B_n} \left| (P_j - P_{SH,n}) \cdot EF_j \right|$$

with

EMS_j market spread for external flow of bidding zone j connected to slack hub n

EF_j external flow for bidding zone *j*

P_j clearing price of bidding zone *j* resulting from SDAC or IDA

$P_{SH,n}$ price of slack hub *n*

B_n set of bidding zone borders connected to slack hub n

If there is no unique solution for $P_{SH,n}$, $P_{SH,n}$ shall be calculated as the average of the maximum and the minimum value from a set of $P_{SH,n}$ satisfying the formula above.

5. The determination of the number of slack hubs and their associated bidding zones introduced for the calculation as described in paragraph 4 should be unambiguous for each CCR. There shall be one slack hub for a CCR. Multiple slack hubs for a CCR may be allowed only if all of the following conditions are met:
    a. Each bidding zone and related external flows may only be assigned to one slack hub.
    b. There shall be no direct flows between slack hubs meaning that the sum of all external flows towards a slack hub and therefore its net position is zero.
    c. A slack hub is defined only in case the external flow can re-enter the relevant CCR via a different external border, but within the same slack hub.

Article 5
Calculation of balancing capacity commercial flow resulting from the allocation of cross-zonal capacity for the exchange of balancing capacity or sharing of reserves in FB approach

1. For CCRs applying the FB approach, the balancing capacity commercial flow shall be based on calculated reservation on internal and external bidding zone borders of a CCR, which result from balancing capacity net positions of bidding zones in a CCR.
2. The balancing capacity net positions of bidding zones as described in the previous paragraph are to be calculated as the difference between the adjusted demand and the volume of standard balancing capacity product bids which are procured in the relevant bidding zone. Balancing capacity net positions need to reflect the import or export characteristic of the allocated product.
3. The calculation of balancing capacity commercial flows resulting from the allocation of cross-zonal capacity for the exchange of balancing capacity or sharing of reserves in a FB approach shall be performed separately per standard balancing capacity product.
4. On the internal bidding zone borders of a CCR the balancing capacity commercial flow shall be equal to *AAF* In case all AAF in given CCR for given standard balancing capacity product are equal 0 then all AAF should be set to 1 for this CCR and this standard balancing capacity product. *AAF* shall be calculated with the following formula:

$$AAF_b = \sum_{j \in Z_{CCR}, k \in K_b} PTDF_{k,j} \cdot BCNP_j$$

with

AAF_b additional aggregated flow on bidding zone border *b*

$BCNP_j$ balancing capacity net position of bidding zone *j* resulting from the allocation of cross-zonal capacity for the exchange of balancing capacity or sharing of reserves

$PTDF_{k,j}$ power transfer distribution factor for bidding zone *j* on interconnector *k*

Z_{CCR} set of bidding zones in the CCR

K_b set of interconnectors on bidding zone border b

5. For each bidding zone, which has the net position not equal to the sum of all balancing capacity commercial flows calculated on the CCR internal bidding zone borders of such bidding zone pursuant to paragraph 4, the balancing capactiy external flow is needed as additional balancing capacity commercial flow in order to balance the regional balancing capacity net position of such bidding zone. The balancing capacity external flow of such bidding zone shall be calculated using the following formula:

$$BCEF_j = BCNP_j - \sum_{b \in B_j} AAF_b$$

with

$BCEF_j$ balancing capacity external flow for bidding zone *j*

$BCNP_j$ balancing capacity net position of bidding zone *j* resulting from allocation of cross-zonal capacity for the exchange of balancing capacity or sharing of reserves

AAF_b additional aggregated flow on bidding zone border *b*

B_j subset of bidding zone borders within a CCR connected to bidding zone *j*

6. For bidding zones, where the additional balancing capacity commercial flow is calculated based on balancing capactiy external flow pursuant to paragraph 5, the market spread of such balancing capacity commercial flow used in accordance with Article 7(5) shall be calculated as:

$$EMS_j = P_j - P_{SH,n}$$

where $P_{SH,n}$ is the price(s) that minimises the sum of congestion income from balancing capacity external flows over all bidding zones connected to the relevant balancing capacity slack hub *n* (where each balancing capacity external flow for one bidding zone is calculated in accordance with paragraph 3) using the following optimisation:

$$\arg\min_{P_{SH,n}} \sum_{j \in B_n} \left| (P_j - P_{SH,n}) \cdot EF_j \right|$$

with

EMS_j market spread for balancing capacity external flow of bidding zone j connected to balancing capacity slack hub n

$BCEF_j$ balancing capacity external flow for bidding zone *j*

P_j clearing price of bidding zone *j* resulting from SDAC

$P_{SH,n}$ price of balancing capactiy slack hub *n*

B_n set of bidding zone borders connected to balancing capacity slack hub n

If there is no unique solution for $P_{SH,n}$, $P_{SH,n}$ shall be calculated as the average of the maximum and the minimum value from a set of $P_{SH,n}$ satisfying the formula above.

7. The rules for balancing capacity slack hubs determination should be the same as the one for slach hubs determination defined in paragraph 5 of Article 4 .

Article 6
Calculation of congestion income on bidding zone borders affected by advance hybrid coupling or allocation constraints

1. For the day-ahead and intra-day timeframes, the calculation of congestion income generated within a flow-based CCR must consider the allocation constraints and the implementation of Advanced Hybrid Coupling (AHC). In such cases, the formula stated in Article 3.2 should be broadened to incorporate these additional factors.

$$CI_{CCR} = -\sum_{j \in Z_1} NP_j \times P_j - \sum_{i \in Z_2} NP_i \times P_i' + \sum_{l \in Z_2} \sum_{b \in B_l} addpot_{b,l}$$

with

NP_z regional net position of bidding zone *z* resulting from the SDAC or IDA

P_z clearing price of bidding zone *z* resulting from the SDAC or IDA

P'_z clearing price of bidding zone *z* resulting from the SDAC or IDA with filtered out effect of the allocation constraint, if the zone applies it

$$P'_z = P_z - \Delta\mu_z^{AC}$$

$$\Delta\mu_z^{AC} = \mu_z^{AC-} - \mu_z^{AC+}$$

μ_z^{AC-} shadow price for constraint for minimum NP of bidding zone z resulting from SDAC or IDA

μ_z^{AC+} shadow price for constraint for maximum NP of bidding zone z resulting from SDAC or IDA

Z_1 set of bidding zones, which do not use allocation constraint in the CCR, including virtual hubs on the AHC borders belonging to this CCR

Z_2 set of bidding zones (i.e. i or l) which use allocation constraint in the CCR

B_z set of bidding zone borders or slack hub borders of zone z belonging to the CCR

$addpot_{b,z}$ part of additional pot, generated by the allocation constraint of bidding zone z, assigned to bidding zone border b, as in Article 6.4.c

2. For the day-ahead and intra-day timeframes, the calculation of congestion income generated within a CCR using a coordinated NTC approach shall follow the provisions of Article 3.2.b. In the case of AHC borders, only the congestion income related to the coordinated NTC part of the border (as defined in Articles 6.3.c. and 6.3.d.) shall be assigned to the coordinated NTC CCR. For calculation of market spreads, the adjusted price P'_j as defined in the Article 6.1, for the zone that applies am allocation constraint shall be used. For bidding zone borders impacted by an allocation constraint, the part of additional pot assigned to the bidding zone border shall be added.
3. For CCRs applying AHC or being under influence of AHC, the congestion income generated on a bidding zone border shall be calculated considering the following specific conditions:
    a. In order to calculate CI pot in a CCR and on the AHC borders, it is necessary to calculate the prices at the virtual hubs. Prices at the virtual hubs follow the flow-based principles and should be calculated using the following formula:

$$P_j = \lambda - \sum_o \mu_o^{CNEC} \cdot PTDF_{o,j}$$

with

P_j clearing price of a virtual bidding zone j

λ shadow price associated with constraint on regional balance (sum of regional net positions equal to zero)

$PTDF_{o,j}$ power transfer distribution factor for bidding zone *j* on CNEC o

μ_o^{CNEC} shadow price of CNEC *o*

    b. On the AHC borders of a CCR, the commercial flow should be equivalent to the physical flow (AAF) on the HVDC interconnector for that border. The AAFs on the AHC borders shall be calculated using the following formula:

$$AAF_b = NP_j$$

with

AAF_b additional aggregated flow on AHC bidding zone border *b*

NP_j regional net position of a virtual bidding zone *j on a border b* resulting from the SDAC or IDA

c. In the case of a single-sided AHC border, the border is divided into two sections for the purpose of calculation and distribution of congestion income: the flow-based part, which is related to the FB CCR, and the coordinated NTC part, which is related to the coordinated NTC CCR. The congestion income assigned to the flow-based section of the bidding zone border should be calculated as the maximum of zero and the result of multiplying the commercial flow by the market spread between the flow-based bidding zone and the virtual hub. The congestion income assigned to the coordinated NTC part of the border will be calculated as the result of multiplying the commercial flow by the market spread between the virtual hub and the bidding zone in the CCR not implementing advanced hybrid coupling.

d. In the case of a double-sided AHC border, the border is divided into three sections for the purpose of calculation and distribution of congestion income: two flow-based parts, each related to different FB CCR, and the coordinated NTC part, which relate to the coordinated NTC CCR. The congestion income assigned to the flow-based parts of the bidding zone border should be calculated as the maximum of zero and the result of multiplying the commercial flow by the market spread between the flow-based bidding zone and the virtual hub. The congestion income assigned to the coordinated NTC part of the border will be calculated as the result of multiplying the commercial flow by the market spread between the two virtual hubs on this border.

e. If an allocation constraint is applied to a bidding zone on the AHC border, the market spread for calculating CI per border in Articles 6.3.c and 6.3.d will be calculated using the adjusted price P'_j , as defined in Article 6.1.

4. CCRs under influence of allocation constraint, the congestion income generated on a bidding zone border or on a slack hub border shall be calculated considering the following specific conditions:
   a. The congestion income generated on a bidding zone border or on a slack hub border, where one or both bidding zones apply an allocation constraint, should be calculated as the absolute value of the product of the commercial flow multiplied by the market spread, at which the additional pot assigned to this bidding zone border according to the Article 6.4c is added. The market spread should be calculated using adjusted price P'_j as defined in Article 6.1. for the borders impacted by allocation constraints.
   b. If the allocation constraint of bidding zone j is active and the adjusted prices are used to calculate the congestion income on the bidding zone borders and slack hub border, there exists an unassigned portion associated with zone j, referred to as an additional pot. The overall additional pot can be determined using the following equation:

$$addpot_j^{tot} = NP_j^{global} \cdot \left(P'_j - P_j\right)$$

with

NP_j^{global} – global net position of bidding zone j resulting from SDAC or IDA on which allocation constraint is applied

c. The additional pot, which is always non-negative, is distributed between the borders and slack hub borders of bidding zone j on which the flow has the same direction as the sign of the active allocation constraint. The distribution of the additional pot is proportional to the congestion income accumulated on these borders scaled to the total CI generated within the CCR without additional pot:

$$addpot_{b,j} = addpot_j^{tot} \cdot \frac{CI_b}{\sum_{b \in B_j} CI_b}, \forall b \in B_j$$

Where

$addpot_{b,j}$ is the additional congestion income from the total additional pot $addpot_j^{tot}$ assigned to bidding zone border b.

$addpot_j^{tot}$ is the total additional pot generated by the allocation constraint of bidding zone j.

$CI_b$is the congestion income generated on border b scaled to the total CI generated within the CCR without additional pot.

B_j, set of borders adjacent to bidding zone j which have the same direction as the sign of the allocation constraint.

d. If there are no positive congestion incomes on any of the borders where flow has the same direction as the sign of the allocation constraint, the additional pot is distributed equally among the borders that align with the direction of active allocation constraints.

Article 7
Distribution of congestion income to bidding zone borders

1. For both the day-ahead and intraday timeframe, the congestion income attributed to a bidding zone border shall be calculated as the absolute values of the product of the commercial flow (as defined in Article 2.2a) multiplied by the market spread. However, bidding zone borders affected by advanced hybrid coupling or allocation constraints are excluded from this calculation, and their congestion income is calculated as described in Article 6. Bidding zone borders affected by ramping constraints, shall also be excluded from using the absolute value rule and the congestion income shall be calculated as the product of the commercial flow (as defined in Article 2.2a) multiplied by the market spread. The relevant market spread shall be reduced to reflect the costs of network losses in case these are considered in capacity calculation and allocation on the given bidding zone border or interconnector.

2. In case the sum of congestion income attributed to all bidding zone borders within a CCR (including external borders and the part of the borders affected by advanced hybrid coupling assigned to the CCR, but excluding borders affected by ramping constraints) is not equal to

the total congestion income generated by electricity exchanges within a CCR according to Article 3 (in case there is no cross CCR impact) or Article 6 (in case there is cross CCR impact), the congestion income attributed to the bidding zone borders within a CCR (including external borders and the part of the borders affected by advanced hybrid coupling assigned to the CCR but excluding borders affected by ramping constraints) shall be adjusted proportionally in order to match the total congestion income generated by electricity exchanges within a CCR.

3. The negative congestion income, resulting from the specific cases described below, does not equal the congestion income calculated according to Article 3 and shall be shared equally among all TSOs whose bidding zone borders are assigned to the relevant CCR:
    a. the application of curtailment mitigation and curtailment sharing in the SDAC or IDA algorithm[2];
    b. congestion income is positive or zero using initial SDAC or IDA results, but becomes negative due to the application of rounding; and
    c. initially calculated prices need to be capped because they do not comply with the defined harmonised maximum and minimum clearing prices for single day-ahead coupling in accordance with Article 41(1) of the CACM Regulation.

4. For cross-zonal capacity allocated for the exchange of balancing capacity or sharing of reserves inside a CCRs applying the coordinated NTC approach, the congestion income attributed to a bidding zone border shall be calculated as the product of the allocated cross-zonal capacities for balancing multiplied by the price of the cross-zonal capacity for balancing.

5. For cross-zonal capacity allocated for the exchange of balancing capacity or sharing of reserves inside a CCRs applying the FB approach, the congestion income attributed to a bidding zone border shall be calculated:

    a. for borders of which both TSOs are part of the application, as the absolute values of the product of the balancing capacity commercial flow (as calculated in accordance with Article 5) multiplied by the relevant balancing capacity market spread.
    b. for borders of which at least one TSO is not part of the application, as the absolute values of the product of the balancing capacity commercial flow (as calculated in accordance with Article 5) multiplied by the relevant day-ahead market spread (where the adjusted prices are used, as defined in Article 6, in case the bidding zone is affected by advanced hybrid coupling or allocation constraints).

6. Once all bidding zones of a CCR are part of an application pursuant to Article 38(1) of the EB Regulation, balancing capacity prices shall be used also to calculate the slack hub price as defined in Article 5(7). In case the sum of congestion income attributed to all bidding zone borders within a CCR (and external borders where relevant) is not equal to the total congestion income generated within a CCR according to Article 3(4), the congestion income attributed to the bidding zone borders within a CCR (and external borders where relevant)

[2] This specific patch (also called "adequacy patch") is defined and included in Annex II of the ACER Decision 04/2020 on the algorithm methodology (common set of requirements for the price coupling algorithm).

shall be adjusted proportionally in order to match the total congestion income allocated from the application of CZC for balancing.

7. The CID methodology does not cover the situation in which the monthly congestion income generated from an application of the market-based allocation in accordance with Article 38(1) of the EB Regulation is lower than the congestion income which could have been generated for the amount of cross-zonal capacity allocated for the exchange of balancing capacity or sharing of reserves if allocated to the single day-ahead coupling instead. This is treated in the methodology of Article 38(3) of the EB Regulation.

Title 3
Congestion income distribution on the bidding zone border

Article 8
Sharing keys

1. For the bidding zone borders where congestion income was calculated based on allocated capacities or AAF, the TSOs on each side of the bidding zone border shall receive their share of net border income based on a 50%-50% sharing key. For the bidding zone parts of the AHC borders where congestion income was calculated based on allocated capacities or AAF, the TSOs on each side of the bidding zone border should receive their respective shares of the income based on a 50%-50% sharing key. In specific cases, the concerned TSOs may also use a sharing key different from a 50%-50% split. The sharing keys different from 50%-50% may be based on different ownership shares between TSOs, different shares of investments costs between TSOs, exemption decisions[3] or decisions on cross-border cost allocation[4] by the competent regulatory authorities or ACER. The sharing keys for these specific cases shall be published in a common document by ENTSO-E on its web page for information purposes only. This document shall list all these specific cases with the name of the interconnector, the bidding zone border, the involved TSOs/parties, the specific sharing key applied and the reasons for the deviation from the 50%-50% sharing key. The document shall be updated and published promptly as soon as any changes occur. Each publication shall be announced in an ENTSO-E's newsletter.

2. The congestion income calculated based on external flow (resp. balancing capacity commercial flow) shall be attributed to TSO(s) of a bidding zone for which the associated external flow (resp. balancing capacity commercial flow) was calculated and have interconnectors through which the external flows (resp. balancing capacity commercial flow) are realised.

3. For bidding zone borders consisting of several interconnectors where the capacity is auctioned

[3] Decisions on exemptions pursuant to Article 63 of Regulation (EU) 2019/943.

[4] Decisions on cross-border cost allocation pursuant to Article 12(4) or Article 12(6) of Regulation (EC)347/2013.

separately for interconnectors, the congestion income associated with each interconnector is directly allocated to the TSO(s) of that interconnector based on relevant auctions.

4. In case the bidding zone border consists of several interconnectors with different sharing keys, or which are owned by different TSOs and where the capacity is allocated jointly, the net border income shall be assigned first to the respective interconnectors on that bidding zone border based on each interconnector's contribution to the allocated capacity. The interconnector's contribution to capacity allocation is determined according to the agreement between all the relevant TSOs on the bidding zone border based on the technical evaluation of the capacity contribution of each interconnector to the capacity allocation also considering the availability of each interconnector. The principles of the technical evaluation for these specific cases shall be published in a common document by ENTSO-E on its web page for information purposes only. The document shall be updated and published promptly as soon as any changes occur. Each publication shall be announced in an ENTSO-E's newsletter.

5. The final congestion income attributed to each TSO shall consist of congestion income calculated pursuant to paragraphs 1 to 4. In the case of SDAC, the remuneration of LTTRs to be paid in accordance with Article 61 of the FCA Regulation also needs to be applied. Only the costs for remuneration of those LTTRs, which have been offered for re-allocation at the day- ahead timeframe shall be covered.

6. In case specific interconnectors are owned by entities other than TSOs or entities other than TSOs have a share in the investment costs of an interconnector, the reference to TSOs in this Article shall be understood as referring to those entities. Where applicable, the sharing keys are calculated according to an exemption decision concerning these entities taken in accordance with Article 63 of Regulation (EU) 2019/943.

Title 4
Transparency of information

Article 9
Publication of data

1. No later than at the time of implementation of this methodology, all TSOs shall publish the following information required for the transparency of congestion income distribution:
    a. for CCRs applying the FB approach:
        - power transfer distribution factors showing the influence of the change in the net position of each bidding zone on the physical flows on each interconnector on each bidding zone border within a CCR;
        - regional net position of each bidding zone within a CCR;
        - price(s) of slack hub(s);
        - price(s) of balancing capacity slack hub(s); and
        - clearing price for each bidding zone within a CCR.
    b. for all CCRs:
        - commercial flows and the corresponding clearing prices used for the purpose of congestion income distribution in accordance with this methodology.
        - Balancing capacity commercial flows and the corresponding clearing prices

used for the purpose of congestion income distribution in accordance with this methodology.

2. The information pursuant to paragraph 1 shall be published with MTU resolution and at least on a monthly basis.

Title 5
Final provisions

Article 10
Publication, implementation and future amendment of the CID methodology

1. The TSOs shall publish the CID methodology without undue delay after a decision has been taken by ACER in accordance with Article 9(5) and 9(6) of the CACM Regulation.

2. The TSOs from CCRs mutually affected by allocation mechanisms with cross-CCR impact shall jointly develop, test and validate the algorithms, tools and procedures for the cross-CCRs mechanisms defined in this methodology. The TSOs from CCRs mutually affected by allocation mechanisms with cross-CCR impact in SDAC or IDA such as cross-CCRs allocation constraints and/or AHC shall jointly implement Article 6 of this methodology at the date of implementation of allocation constraints and/or AHC in SDAC or IDA in affected CCRs but not earlier than the date of implementation of this methodology set in paragraph 3 for SDAC and paragraph 4 for IDA of this article.

3. The TSOs of each CCR shall implement the provisions of this methodology related to the congestion income arising from SDAC at the date of implementation of the capacity calculation methodology within their respective CCR in accordance with Articles 20 and 21 of the CACM Regulation. For CCRs in which CCM are already implemented at the date of issuance of this decision, the TSOs shall implement the changes related to the congestion income arising from SDAC no later than 18 months after the date of issuance of this decision by ACER in accordance with Article 9 (5) and Article 9 (6) of the CACM Regulation.

4. The TSOs of each CCR shall implement the provisions of this methodology related to the congestion income arising from IDA at the date of implementation of the IDA for intraday timeframe.

5. The TSOs of each CCR shall implement the provisions of this methodology related to the congestion income derived from allocation of cross-zonal capacity for the exchange of balancing capacity or sharing of reserves at the date of implementation of the methodologies pursuant to Article 38(3) or pursuant to Article 41(1) of the EB Regulation.

6. During the development, testing and the first year of implementation of the cross-CCR mechanisms, the TSOs shall assess the results of the application of the CACM CID methodology with regard to the requirement of ensuring fair and non-discriminatory treatment in accordance with Article 3(e) of the CACM Regulation and share their assessment with all regulatory authorities and ACER. If necessary to ensure fair and non-discriminatory treatment, TSOs shall propose amendments of the congestion income distribution methodology in accordance with Article 9(13) of the CACM Regulation in order to fulfil the

objective set in Article 3(e) of the CACM Regulation. This is without prejudice of the TSOs right to propose any other amendments to ACER according to Article 9(13) of the CACM Regulation.

7. Additional amendments to the CACM CID methodology are also foreseen to correctly address the future offshore bidding zones where AHC is expected to be applied.

Article 11
Language

1. The reference language for this CID methodology shall be English. For the avoidance of doubt, where TSOs need to translate this CID methodology into their national language(s), in the event of inconsistencies between the English version published by TSOs in accordance with Article 9(14) of the CACM Regulation and any version in another language the relevant TSOs shall, in accordance with national legislation, provide the relevant regulatory authorities with an updated translation of the CID Methodology.

ANNEX 1

List of TSOs subject to the approved CACM CID methodology:

- APG - Austrian Power Grid AG,
- Elia - Elia Transmission Belgium S.A.
- ESO – Electroenergien Sistemen Operator EAD
- HOPS d.d. - Croatian Transmission System Operator Plc.
- ČEPS - ČEPS, a.s.
- Energinet – Energinet
- Elering - Elering AS
- Fingrid - Fingrid OyJ
- Kraftnät - Kraftnät Åland Ab
- RTE - Réseau de Transport d'Electricité S.A
- Amprion - Amprion GmbH
- BCAB - Baltic Cable AB
- TransnetBW -TransnetBW GmbH
- TenneT GER - TenneT TSO GmbH
- 50Hertz - 50Hertz Transmission GmbH
- IPTO - Independent Power Transmission Operator S.A.,
- MAVIR ZRt. - MAVIR Magyar Villamosenergia-ipari Átviteli Rendszerirányító Zártkörűen Működő Részvénytársaság ZRt.
- EirGrid - EirGrid plc
- Terna - Terna SpA
- Augstsprieguma tïkls - AS Augstsprieguma tïkls
- LITGRID - LITGRID AB
- CREOS Luxembourg - CREOS Luxembourg S.A.
- TenneT TSO - TenneT TSO B.V.
- PSE - Polskie Sieci Elektroenergetyczne S.A.
- REN - Rede Eléctrica Nacional, S.A.
- Transelectrica - Compania Nationala de Transport al Energiei Electrice S.A.
- SEPS - Slovenská elektrizačná prenosovú sústava, a.s
- ELES - ELES,d.o.o
- REE - Red Eléctrica de España S.A.U,
- Svenska Kraftnät - Affärsverket Svenska Kraftnät
- SONI - System Operator for Northern Ireland Ltd