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Channel TSOs proposal of common capacity calculation methodology for the day-ahead and intraday market timeframe in accordance with Article 20 of Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management

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**May 23<sup>th</sup>, 2018**

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All TSOs of the Channel Region, taking into account the following:

### Whereas

- (1) Commission Regulation (EU) 2015/1222 establishes a guideline on capacity allocation and congestion management (hereinafter referred to as the “CACM Regulation”), which entered into force on 14 August 2015.
- (2) On 15 September 2017, the Channel TSOs have submitted the “Channel TSOs proposal of common capacity calculation methodology for the day-ahead and intraday market timeframe in accordance with Article 20 of Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management”, together with an explanatory note to their respective regulatory authorities.
- (3) On 20 March 2017, the regulatory authorities of the Channel Region have issued their “Request for amendment by the Channel regulatory authorities of the Channel TSO proposal for the common capacity calculation methodology”. This request was received by all TSOs of the Channel Region on 23 March 2017.
- (4) This document, including its annexes, is the amended common proposal developed by all Transmission System Operators (hereinafter referred to as “TSOs”) of the Channel Capacity Calculation Region (hereinafter referred to as “Channel Region”) regarding the proposal for the common capacity calculation performed for the capacity allocation within the day-ahead and intraday market timeframes in accordance with Article 21 of the CACM Regulation. This proposal (hereinafter referred to as the “Channel CC Methodology Proposal”) is required by Article 20 (2) of the CACM Regulation.
- (5) Upon request of the NRAs of the Channel Regions, the Channel TSOs shall submit a separate methodology for justifying their choice for the application of a Coordinated Net Transfer Capacity (CNTC) approach for the capacity calculation in the Channel Region pursuant to Article 20(7) of the CACM Regulation.
- (6) The Channel CC Methodology Proposal takes into account the general principles and goals set in the CACM Regulation.
  - a. According to Article 20 (1) of the CACM Regulation, the approach to use in the common capacity calculation methodologies shall be the flow-based approach, unless the TSOs concerned are able to demonstrate that the application of the capacity calculation methodology using the flow-based approach would not yet be more efficient compared to the coordinated net transmission capacity approach and assuming the same level of operational security in the concerned region, in which case a coordinated net transmission capacity approach can be applied. This coordinated net transmission approach is set up in accordance with the definition of Article 2 (8) of the CACM Regulation;
  - b. In accordance with Article 20 (2) of the CACM Regulation, the Channel CC Methodology Proposal shall be submitted within 10 months after the approval of the proposal for a capacity calculation region in accordance with Article 15 (1) of the CACM Regulation;
  - c. In accordance with Article 9(12) of the CACM Regulation, TSOs shall submit a proposal for amended methodologies for approval within two months following the requirement from regulatory authorities;

- d. In the context of this proposal, the definition of “coordinated capacity calculator” is important and is defined in Article 2 (11) of the CACM Regulation as: “the entity or entities with the task of calculating transmission capacity, at regional level or above”;
  - e. According to Article 9 (9) of the CACM Regulation, the expected impact of the Channel CC Methodology Proposal on the objectives of the CACM Regulation has to be described. The impact is presented below (recital 4 of this Whereas Section);
  - f. The TSOs of the Channel Region aim at ensuring consistency with the other CCRs in which same bidding zones are concerned whilst acknowledging different characteristics of the interconnectors within the CCRs; and
  - g. This methodology does not deal with any compensation<sup>1</sup> that would be payable to an interconnector in the event that its capacity is restricted.
- (7) The Channel CC Methodology Proposal contributes to and does not in any way hinder the achievement of the objectives of Article 3 of the CACM Regulation. In particular this Channel CC Methodology Proposal:
- a. Establishes a common and coordinated processes for the capacity calculations by defining a set of harmonised rules for capacity calculation and congestion management within the day-ahead and intraday market timeframes and as such serves the objective of promoting effective competition in the generation, trading and supply of electricity in accordance with Article 3(a) of the CACM Regulation;
  - b. Contributes to the objective of ensuring optimal use of the transmission infrastructure in accordance with Article 3 (b) of the CACM Regulation by using last available inputs based on the best possible forecast of transmission systems at the time of each capacity calculation, updated in a timely manner;
  - c. Contributes to the objective of ensuring operational security in accordance with Article 3 (c) of the CACM Regulation by coordinating the capacity calculation with updated inputs for the day-ahead and intraday market timeframe at regional level to ensure its reliability;
  - d. Contributes to the objective of optimising the calculation and allocation of cross-zonal capacity in accordance with Article 3 (d) of the CACM Regulation by coordinating the timings for the delivery of inputs, calculation approach and validation requirements of the coordinated capacity calculator between TSOs and the coordinated capacity calculator;
  - e. 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 CACM Regulation by ensuring that the results of each capacity calculation within the Channel Region are based on the best possible forecast of the transmission systems at that point in time. Furthermore, this Channel CC Methodology outlines how future interconnectors joining the Channel Region would be incorporated within the capacity calculation,
  - f. Contributes to respecting the need for a fair and orderly market and fair and orderly price formation in accordance with Article 3 (h) of the CACM Regulation by respecting the already allocated capacity, and by delivering the capacities to the single day ahead and intraday coupling processes.
  - g. Does not hinder in any way for providing non-discriminatory access to cross-zonal capacity in accordance with Article 3 (j) of the CACM Regulation by delivering the capacities to the single day ahead and intraday coupling processes.

**SUBMIT THE FOLLOWING CHANNEL CC METHODOLOGY PROPOSAL TO ALL REGULATORY AUTHORITIES OF THE CHANNEL REGION:**

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<sup>1</sup> 1 Any compensation arrangement will be discussed on a national basis with the relevant regulatory authority.

## **TITLE 1 General Provisions**

### **Article 1 Subject matter and scope**

The common capacity calculation methodology as determined in this Channel CC Methodology Proposal is the common proposal of all the TSOs of the Channel Region in accordance with Article 20(2) of the CACM Regulation.

### **Article 2 Definitions and interpretation**

1. For the purposes of the Channel CC methodology Proposal, the terms used shall have the meaning given to them in Article 2 of Regulation (EC) 714/2009, Article 2 of Regulation (EC) 2013/543 and Article 2 of the CACM Regulation.
2. In addition, the following definitions shall apply:
  - a. 'MPTC' means, for the relevant market time unit(s), the maximum permanent technical capacity which is the maximum continuous active power which a cross-zonal network element (interconnector/HVDC system) is capable of transmitting (taking into account potential reduced availability due to planned and unplanned outages of the interconnector asset). This parameter is defined by the interconnector's asset operators, and only considers the interconnector asset availability.
3. In this Channel CC Methodology Proposal, unless the context requires otherwise:
  - a) the singular indicates the plural and vice versa;
  - b) headings are inserted for convenience only and do not affect the interpretation of this proposal; 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 Application of this proposal**

This Channel CC Methodology Proposal applies solely to the day-ahead and intraday capacity calculation within the Channel Region. Common capacity calculation methodologies within other Capacity Calculation Regions or other timeframes are outside the scope of this proposal.

## **TITLE 2 Requirements for intraday and day-ahead capacity calculation**

### **Chapter 1 General consideration**

#### **Article 4 Capacity calculation approach**

This Channel CC Methodology Proposal is based on a Coordinated Net Transmission Capacity (CNTC) approach for the day-ahead and intraday capacity calculation in the Channel Region.

#### **Article 5**

##### **General principles for cross-zonal capacities for the day-ahead market**

1. For the day-ahead time-frame, the coordinated capacity calculator shall calculate the cross-zonal capacity for each interconnector on a bidding zone border and for each day ahead market time unit using the coordinated net transmission capacity approach as follow :

- a. The cross-zonal capacity that will be proposed by the coordinated capacity calculator to the TSO for validation phase as described in Chapter 5 shall be equal to the MPTC value unless a specific planned or unplanned outage with significant impact on the interconnector exists in one of the bidding zones to which that interconnector is connected. The specific planned or unplanned outages with significant impact on the interconnector shall be defined as follow :
    - i. Planned or unplanned outage on one grid elements listed in the Annex 1 of this methodology. Any change on the content of the Annex 1 shall be subject to NRA approval and shall be published on TSO website before its application.
    - ii. Any other pre-determined conditions defined by the TSO, agreed with the relevant NRA and published on its website before its application or any combination of planned and/or unplanned outage on grid elements not listed in Annex 1 that may lead to N-1 violation in case of full use of the MPTC of the cables connected in the bidding zone. In such a case, the concerned TSO shall have to explicitly publish without delay on its website the list of concerned grid elements and the estimated duration of the application of this specific grid condition when known.
  - b. In case of occurrence of a specific planned or unplanned outage defined in Article 5(1)(a) in the bidding zone of a TSO, the cross-zonal capacity for each day-ahead market time unit may be calculated using the latest Common Grid Models (CGMs) developed according to the common grid model methodology in accordance with Article 17 of the CACM Regulation. The day-ahead capacity calculation shall be composed of the following 3 phases in accordance with Article 21 of the CACM Regulation; Input gathering phase as described in Chapter 3, Qualification phase as described in Chapter 4 and the Validation phase as described in Chapter 5.
2. Each TSO shall provide transparency on the conditions under which Article 5(1)(b) would apply by providing a public ex-post explanation.

#### **Article 6 General principles for cross-zonal capacities for the intraday market**

1. For the intraday market time-frame, the cross-zonal capacity for each interconnector and for remaining intraday market time units shall be calculated using the coordinated net transmission capacity approach using the latest CGMs developed according to the common grid model methodology in accordance with Article 17 of the CACM Regulation.
2. The intraday capacity calculation shall be composed of the following 3 phases in accordance with Article 21 of the CACM Regulation; Input gathering phase as described in Chapter 3, Qualification phase as described in Chapter 4 and the Validation phase as described in Chapter 5.
3. The TSOs of the Channel Region shall perform at minimum one intraday capacity calculation one day before the day of delivery based on the latest CGMs developed according to the common grid model methodology in accordance with Article 17 of the CACM Regulation.
4. The TSOs of the Channel Region shall perform, no later than two years after the implementation of the Channel intraday capacity calculation methodology, a study on the number of intraday capacity re-computations, thereby considering at least following aspects:
  - a. Socio-economic benefits of increasing the number of intraday capacity calculations, taking into account the technical feasibility of performing more than one intraday capacity calculation;
  - b. Availability of qualitative Intraday Congestion Forecast models; and
  - c. Effect on operational security of increasing the number of intraday capacity calculations. The Channel TSOs will publish the results of the study and subject to the outcome of the study apply for an amendment of the methodology in accordance with Art. 9(13) of CACM Regulation.

## Chapter 2 Methodologies for the provision of the inputs for calculation

### Article 7 Critical Network Element and Contingency (CNEC) methodology

1. Each TSO of the Channel Region shall perform the selection of the CNECs based at least on the assessment of the cross-zonal flow sensitivity trade sensitivity.
2. For the Channel Region, the cross-zonal flow sensitivity shall correspond to maximum of the following bidding zone to bidding zones power transfer distribution factor (PTDF) absolute value:
  - i. Great Britain to France;
  - ii. Great Britain to Belgium;
  - iii. Great Britain to The Netherlands.
3. According to Article 29 (3) of the CACM Regulation, each TSO of the Channel Region shall consider as not significantly influenced the CNECs with cross-zonal flow sensitivity below a certain threshold. Those not significantly influenced CNECs shall be ignored for the cross-zonal capacity calculation.
4. The cross-zonal flow sensitivity threshold will be:

	Day-ahead	Intraday
France, Belgium, and the Netherlands	5%	5%
Great Britain	5%	5%

5. Each TSO of the Channel Region shall monitor the Critical Network Elements and Contingencies to assess the relevance of the sensitivity threshold over time.
6. Each TSO of the Channel Region shall critically assess the relevance of the CNECs against its CNEC selection criteria and may decide to discard some of the CNEC from the list. This will be based either on a study performed by the TSO or from operational experience.
7. The TSOs of the Channel Region shall regularly challenge and if feasible change the threshold to maintain consistency within the Channel CCR and with other CCRs.

### Article 8 Reliability margin methodology

1. TSOs shall consider reliability margin in the form of Flow Reliability Margins (FRMs) applied on each Critical Network Element (CNE).
2. For both the day ahead and intraday capacity calculation, when applying FRM the TSOs of Channel Region shall define the FRM in line with Article 22 of the CACM Regulation and based on the analysis of the uncertainties resulting from the following phenomena:
  - a. Unintentional flow deviations due to operation of load-frequency controls;
  - b. External trade;
  - c. Internal trade in each bidding zone;
  - d. Uncertainty in wind generation forecast;
  - e. Uncertainty in Load forecast;
  - f. Uncertainty in Generation pattern;
  - g. Assumptions inherent in the Generation Shift Key (GSK); and
  - h. Uncertainty in the topology.
3. In accordance with Article 22 (1) of the CACM Regulation, the reliability margins for critical elements (hereafter referred to as “FRM”) are calculated in a three-step approach on a yearly basis

- a. The TSOs from the Channel Region shall compare the flow on each CNE between the D-2 or D-1 CGM and the snapshot of the transmission system corresponding to the same timestamp of the respective day. The TSOs of the region shall first adjust the CGMs to take into account the real-time situation of at least the remedial actions that are considered in the common capacity calculation and defined in Article 12. These remedial actions are controlled by Channel TSOs and thus not considered as an uncertainty. This step is undertaken by copying the real-time configuration of these remedial actions (Alignment of taps on Power Shift Transfers (PSTs) from snapshot towards the CGM) and applying them into the historical D-2 or D-1 CGM. The power flows of the latter modified D-2 or D-1 CGM are computed ( $\vec{F}_{ref}$ ) and then adjusted to realised commercial exchanges inside the Channel CCR (by shifting net position to the value of the snapshot) with the PTDFs calculated based on the historical GSK and the modified D-2 or D-1 CGM per the methodology as described in Article 11. Consequently, the same commercial exchanges in the Channel CCR are taken into account when comparing the power flows based on the day-ahead common capacity calculation with flows in the real-time situation. These flows are called expected flows ( $\vec{F}_{exp}$ ), see the following equation:

$$\vec{F}_{exp} = \vec{F}_{ref} + \sum_1^n PTDF_k \times (\vec{NP}_{k,real} - \vec{NP}_{k,ref})$$

with:

$\vec{F}_{exp}$	expected flow per CNEC in the realised commercial situation;
$\vec{F}_{ref}$	flow per CNEC in the CGM (reference flow);
$PTDF_k$	power transfer distribution factor matrix;
$\vec{NP}_{k,real}$	Channel net position per bidding zone in the realised commercial situation;
	and
$\vec{NP}_{ref}$	Channel net position per bidding zone in the CGM.

The power flows on each CNEC of the Channel CCR, as expected with the day-ahead common capacity calculation methodology are then compared with the real-time flows observed on the same CNEC. All differences covering at least the last 6 months of operation are stored to build up a database sufficient for the probability distribution.

- b. In a second step and in accordance with Article 22(3) of the CACM Regulation, based on experience in existing flow-based market coupling initiatives, the 90th percentiles of the probability distributions of all CNECs are calculated. This means that the Channel TSOs apply a common risk level of 10% i.e. the FRM values cover 90% of the historical errors. Channel TSOs can apply then:
- Directly take the 90th percentile of the probability distributions to determine the FRM of each CNEC. This means that a CNE can have different FRM values depending on the associated contingency;
  - Only take the 90th percentile of the probability distributions calculated on CNEs without contingency. This means that a CNE will have the same FRM for all associated contingencies;
- c. When probability distribution is not available, a value at 10% of the Fmax calculated under normal weather conditions is chosen as FRM value for a given CNE  
TSOs shall store the differences between the predicted and observed flows in order to build up a database covering at least the last 6 months of operation

Such comparison is not required where reliability margins are defined as zero.

4. Once the database defined in the previous paragraph is built, each TSO of the Channel Region shall perform a statistical analysis of the values stored in the database in order to quantify the reliability margin of each CNE. Such analysis is not required where reliability margins are defined as zero.

5. Each TSO may apply an operational adjustment before practical implementation of the FRMs into their CNE definition. Each TSO shall submit to the NRAs for monitoring any new value of the FRM with relevant justification for each CNE.
6. The TSOs of the Channel Region shall regularly challenge and if needed change the reliability margin principles in order to ensure at least the consistency with the other CCRs.

### **Article 9 Methodologies for operational security limits**

1. In accordance to Article 23 of the CACM Regulation,
  - a. Each TSO within the Channel Region shall define at least per season for each CNE the maximum permanent allowable current according to its operational security limits criteria defined in line with Article 25 of the SO GLs.
  - b. When applicable, each TSO within the Channel Region may define for all or some of the CNE the maximum temporary allowable current according to its operational security limits criteria defined in line with Article 25 of the SO GLs.
  - c. When applicable, each TSO of the Channel Region may consider the application of dynamic line rating for the determination of the maximum permanent and/or temporary allowable current of some his CNE.
2. The TSOs of the Channel Region shall regularly challenge and if needed change the operational security limits in order to ensure at least the consistency with their neighbouring CCRs. TSO of the Channel Region who are also active in neighbouring regions, shall apply the operational security limits as defined in these neighbouring regions.

### **Article 10 Methodologies for External Constraints**

1. In line with Article 23(3)(a) of the CACM Regulation, each TSO of the Channel Region shall, if required, define external constraints as part of the allocation constraints. These external constraints shall be taken as potential capacity limitation at the end of the qualification phase and may be deemed necessary for one of the following reasons that cannot be captured only based on flow computation:
  - a In case the level of export or import on the cable or sum of the cable(s) connected to the bidding zone operated by the TSO can endanger either the voltage management within the operational limits defined per SO GLs Article 25 or the voltage stability of the system within the synchronous area per SO GL Article 38;
  - b In case the level of export or import on the cable or sum of the cable(s) connected to the bidding zone operated by the TSO can endanger the dynamic stability within the synchronous area per SO GL Article 38;
  - c In case the level of export or import on the cable or sum of the cable(s) connected to the bidding zone operated by the TSO can lead to situations which are too far away from the reference flows going through the network in the D-2, D-1, CGM, and which, in exceptional cases, would induce extreme additional flows on grid elements resulting from the use of a linearized GSK, leading to a situation where the rebalancing introduces overload on grid elements that leads to a situation which could not be validated as safe by the concerned TSO;
  - d RoCoF (Rate of Change of Frequency) or the possibility of loss of a large system infeed (interconnector loss) that triggers embedded generation relays and disconnects further generation and causes deviation of frequency outside of operational limits;
  - e In case the level of export/import on the cable or sum of the cable(s) connected to the bidding zone operated by the TSO can cause commutation failure within the bidding zone; and/or

- f In case the level of export/import on the cable or sum of the cable(s) connected to the bidding zone operated by the TSO can cause sub synchronous resonance issues which affect the level of import/export across interconnector(s).
2. The TSOs shall define how external constraints will be applied per interconnector and provide the information per interconnector.
3. The external constraints shall be based on a system study and shall be regularly reviewed and, in any case, at least once a year. The concerned TSO shall submit the system study justifying their application to their NRA for monitoring.
4. The TSOs shall define in the study referred to in the Article 10(3) how and when the external constraint(s) will be applied per interconnector and provide the information per interconnector.

### **Article 11 Generation shift keys methodology**

1. The TSOs of Channel Region shall define the generation shift keys in accordance with Article 24 of the CACM Regulation.
2. In day ahead, the Belgian GSK shall be determined for the Belgian bidding zone based on a defined list of nodes located where most relevant flexible and controllable production units are connected. This list shall be defined in a way to limit as much as possible the impact of model limitations on the loading of the CNEs. The variation of the generation pattern inside the GSK shall be such that for each of these nodes, the sum of the generation which are in operations on each of these nodes in the CGM will follow the change of the Belgian net position in such a way that the generation at the node will reach its maximum when the maximum generation capability of the Belgian bidding zone is reached and will reach its minimum when the minimum generation capability of the Belgian bidding zone is reached.
3. In intraday, the Belgian GSK shall be determined for the Belgian bidding zone based on a defined list of nodes located where most relevant flexible and controllable production units are connected. This list shall be defined in a way to limit as much as possible the impact of model limitations on the loading of the CNEs. The variation of the generation pattern inside the GSK shall be such that for each of these nodes, the sum of the generation which are in operations on each of these nodes in the CGM will follow the change of the Belgian net position on a pro-rata basis. That means, if for instance one node is representing n% of the sum of the generation on all these nodes, n% of the shift of the Belgian net position will be attributed to this node.
4. In day ahead and intraday, the French GSK will be composed of all the units connected to RTE's network. The variation of the generation pattern inside the GSK is the following: all the units which are in operations in the base case will follow the change of the French net position on a pro-rata basis. That means, if for instance one unit is representing n% of the total generation on the French grid, n% of the shift of the French net position will be attributed to this unit.
5. In day ahead, the Dutch GSK will dispatch the main generators in a manner which avoids extensive and unrealistic under- and overloading of the units for extreme import or export scenarios. The GSK is directly adjusted in case of new power plants. Also unavailability of generators due to outages are considered in the GSK. All GSK units are re-dispatched pro rata on the basis of predefined maximum and minimum production levels for each active unit. The total production level remains the same. The maximum production level is the contribution of the unit in a predefined extreme maximum production scenario. The minimum production level is the contribution of the unit in a predefined extreme minimum production scenario. Base-load units will

- have a smaller difference between their maximum and minimum production levels than start-stop units.
6. In intraday, a proportional Dutch GSK based on the results of day ahead will be used using the same set of GSK units. It is to be expected that, for relatively small volumes of additional capacity given in intraday, this will not result in less reliable results.
  7. In day ahead and intraday, the Britain GSK shall represent the best forecast of the relation of a change in net position of the bidding zone to a specific change of generation or load in the common grid model.
  8. The TSOs of the Channel Region shall regularly challenge and if needed change the generation shift keys in order to ensure at least the consistency with their neighbouring CCRs.

### **Article 12 Methodology for remedial actions in capacity calculation**

1. Each TSO of Channel Region shall define individually the remedial actions, used for the calculation defined in Article 17, that shall be made available for the day-ahead or intraday Capacity Calculation within Channel Region in accordance with Article 25 of the CACM Regulation and shall at minimum respect that:
  - a. All relevant available non-costly remedial actions according to his operational principles are made available to the coordinated capacity calculator. The type of non-costly remedial action shall cover, among others, topological changes and Phase Shifting Transformer tap changes; and
  - b. All remedial actions considered in the day-ahead capacity calculation and remaining available shall be made available for the intraday capacity calculation.
2. Each TSO of the Channel Region may decide to make available costly remedial actions, including actions as defined under Article 35 of the CACM Regulation. Where compensation arrangements payable to interconnectors in case of capacity restriction are agreed on national level, these shall be applied.
3. When defining a remedial action, each TSO of the Channel Region shall specify at minimum:
  - a. The type of the remedial action and the sequence of actions to be implemented;
  - b. In case of quantifiable remedial action, the maximum and minimum values of the scalable quantity;
  - c. Whether the remedial action has to be applied in a preventive or curative context; and
  - d. Whether the remedial action is a shared remedial action and can be considered for all contingencies or whether it shall be limited to a subset of contingencies. In the latter case, the TSO shall specify the list of contingencies.
4. In case a remedial action made available for the capacity calculation in the Channel is also one which is made available in another capacity calculation region, the TSO taking control for the remedial action shall take care when defining it of a consistent use in his potential application in both regions to ensure a secure power system operation.

## **Chapter 3 Input gathering phase**

### **Article 13 Provision of the inputs for the Day-ahead Capacity Calculation**

1. The TSOs of the Channel Region shall provide the coordinated capacity calculator before a deadline commonly agreed between the TSOs and the coordinated capacity calculator the following inputs:
  - a. D-2 Individual Grid Models (IGMs) respecting the methodology developed in accordance with Article 19 of the CACM Regulation;

- b. Generation Shift Key (GSK) in accordance with Article 11; and
  - c. Maximum permanent technical capacity in accordance with Article 2 (a).
2. In case of occurrence of a planned or unplanned outage triggering a day-ahead capacity calculation in accordance with the principles defined in Article 5(1)(b), the concerned TSO of the Channel Region shall provide the coordinated capacity calculator before a deadline commonly agreed between the TSOs and the coordinated capacity calculator the following inputs:
  - a. Critical Network Elements (CNEs) and Contingencies (Cs) in accordance with Article 7;
  - b. Flow Reliability Margin (FRM) in accordance with Article 8;
  - c. Maximum current on a Critical Network Elements ( $I_{max}$ ) / Maximum allowable power flow ( $F_{max}$ ) in accordance with Article 9;
  - d. Remedial actions in accordance with Article 12; and
  - e. External constraints: specific limitations not associated with Critical Network Elements in accordance with Article 10.
3. When providing the inputs, the TSOs of the Channel Region shall respect the formats commonly agreed between the TSOs and the coordinated capacity calculators of the Channel Region, while respecting the requirements and guidance defined in the CGMES methodology developed in accordance with Section 2 of CACM Regulation.
4. When applicable, the coordinated capacity calculator shall merge the D-2 IGMs to create the D-2 CGMs respecting the methodology developed in accordance with Article 17 of the CACM Regulation.
5. The TSOs shall send, for each time unit of the day, the already allocated capacities (AAC) to the coordinated capacity calculator.

#### **Article 14 Provision of the inputs for the Intraday Capacity Calculation**

1. The TSO of the Channel Region shall provide to the coordinated capacity calculator before a deadline commonly agreed between the TSOs and the coordinated capacity calculator the following inputs:
  - a) Day Ahead (DA) IGMs respecting the methodology developed in accordance with Article 19 of the CACM Regulation;
  - b) Generation Shift Key (GSK) in accordance with Article 11;
  - c) Critical Network Elements (CNEs) and Contingencies (Cs) in accordance with Article 7;
  - d) Flow Reliability Margin (FRM) in accordance with Article 8;
  - e) Maximum current on a Critical Network Elements ( $I_{max}$ ) / Maximum allowable power flow ( $F_{max}$ ) in accordance with Article 9;
  - f) Remedial actions (RAs) in accordance with Article 12;
  - g) External constraints: specific limitations not associated with Critical Network Elements in accordance with Article 10; and
  - h) Maximum permanent technical capacity in accordance with Article 2 (a).
2. When providing the inputs, the TSOs of the Channel Region shall respect the formats commonly agreed while respecting the requirements and guidance defined in the CGMES methodology developed in accordance with Section 2 of CACM Regulation.
3. When applicable, the coordinated capacity calculator shall merge the DA IGMs to create the DA CGMs respecting the methodology developed in accordance with Article 17 of the CACM Regulation.
4. The TSOs shall send for each time unit of the day the already allocated capacities (AAC) to the coordinated capacity calculator.

## **Chapter 4 Qualification phase**

### **Article 15 Day-ahead capacity calculation**

1. In accordance with Article 5 (1) (b), the coordinated capacity calculator shall calculate
  - a. the maximum secure value of simultaneous import; and
  - b. the maximum secure value of simultaneous export,

over all the interconnectors of the Channel Region bidding zone borders in following the process outlined in Article 17.

### **Article 16 Intraday capacity calculation**

1. In accordance with Article 6 (1), the coordinated capacity calculator shall calculate
  - a. the maximum secure value of simultaneous import;
  - b. the maximum secure value of simultaneous export ;

over all the interconnectors of the Channel Region bidding zone borders in following the process outlined in Article 17.

### **Article 17 Coordinated Net Transmission Capacity process**

1. For both day-ahead and intraday timeframes, the coordinated capacity calculator shall prepare the CGM base cases for the reference timestamps and shall use Generation Shift Keys (GSK) following Article 19 to each base case in order to reflect the starting point (maximum import/maximum export) for exchanges on the interconnectors. If there is any external constraint, it will be the starting point.
2. The coordinated capacity calculator shall run, with the objective to maximize cross-zonal capacity, a contingency analysis on the base case using the CNEC list provided by the TSOs and evaluate results to identify base cases either that permit interconnector capacity at maximum import/export without further actions or indicating a potential interconnector import or export limitation as a result of a negative margin on a Critical Network Element violation or Operational Security Standard.
3. For each base case with negative margin on a CNE, the coordinated capacity calculator shall deploy the list of remedial actions to alleviate the negative margin on the Critical Network Element. If remedial actions can mitigate the CNE, the interconnector maximum import/export capacity can be made available for that base case. If the remedial actions provided cannot alleviate the CNE violation, the interconnector import/export of the bidding zone where the limiting CNEC(s) is/are located should be progressively reduced in steps from starting points following Article 18. Following each import/export reduction, the contingency analysis should be repeated with the remedial actions already deployed until a level of interconnector import/export has been identified for which no CNE violations occur.

### **Article 18 Implementation of reduction of the import/export**

1. In case of negative margin on the CNECs which cannot be solved with available remedial actions, the coordinated capacity calculator shall in his binary approach reduce the import or export value of the interconnectors in the bidding zone where the limiting element is located.
2. In case several interconnectors are located in the concerned bidding zone, the reduction shall be applied only to the interconnectors which have an influence on the limiting CNE above the thresholds defined in Article 7 and proportionally to their influence.

## **Article 19 Implementation of a shift of import/export**

1. When computing the capacity, the coordinated capacity calculator shall implement any shift of the power transfer between 2 bidding zones by adjusting the generation in each of the bidding zones using the GSK of the bidding zones.

## **Article 20**

### **N-1 security assessment of maximum import/export for the 24 hours of the business day**

1. The coordinated capacity calculator shall perform N-1 security assessments for the 24 timestamps of the business day.
2. When, due to technical limitations, the N-1 security assessment of the 24 time stamps cannot be performed by the coordinated capacity calculator:
  - a. The coordinated capacity calculator shall perform the N-1 security assessment on a maximum number of reference time units and considering a minimum of 2 reference time units. The coordinated capacity calculator shall apply the results of each reference time unit to the time units of the associated period.
  - b. The TSOs of the Channel Region shall commonly agree on a selection and prioritization of reference time units representing the day and on the periods of the day to which the result of the reference time unit shall apply. The definition of the periods shall depend on the number of computed reference time units. The TSOs of the Channel Region shall define the reference time units and their associated periods as defined in the previous paragraph at least per season and for each season, differentiating the week days, the Saturday and the Sunday.
  - c. The TSOs and the CCC of the Channel region shall reassess on a yearly basis the possibility to increase the number of time stamps and notify to Channel NRAs the results and its justification.

## **Article 21 Already allocated cross-zonal capacity and Available Transfer Capacity**

1. For day-ahead, for each time unit of the day, for each interconnector, in both import and export, the maximum value between the results obtained in Article 17 and the Long Term Allocated capacity (LTA) shall be taken as the capacity to be validated in accordance with chapter 5.
2. For intraday, for each remaining time unit of the day, for each interconnector, in both import and export, the maximum value between the results obtained in Article 17 and the day-ahead already allocated capacity (AAC) shall be taken as the capacity to be validated in accordance with chapter 5.

## **Chapter 5 Validation phase**

### **Article 22 Cross-zonal capacity validation methodology**

1. In accordance with Article 30 of the CACM Regulation, each TSO of the Channel Region shall validate the cross-zonal capacities calculated by the coordinated capacity calculator of the Channel Region.
2. Each TSO of the Channel Region may reassess the computed Net Transmission Capacities (NTC) on the interconnectors of his bidding zone if unforeseen changes in grid conditions have occurred during the qualification phase. The reassessments of NTCs shall be per individual cross-zonal interconnector of its bidding zone such as:

- a. Forced outage on one interconnector or one element defined as CNE or Contingency according to Article 7 of this methodology, or on a grid element defined in Annex 1 as defined in Article 5 of this methodology;
  - b. Change in the weather or operation conditions which shall trigger the application of additional exceptional contingencies according to the methodology which shall be developed according to Article 75 of the SO GLs;
  - c. A mistake in input data, that leads to incorrect cross-zonal capacity; and/or
  - d. Any other criteria that the TSO shall have previously defined, agreed by its NRA and published on its website before its application.
3. Following previous paragraph, one or more of the TSOs in the Channel Region may have to reject the calculated NTCs on the interconnectors of its bidding zone. Those TSOs shall be entitled to reduce the proposed NTC towards its own interconnector to a level that mitigates the potential risk to Security of Supply in its bidding zone. For monitoring purposes, the relevant TSO shall identify the limiting CNEC and provide the coordinated capacity calculator with an explanation of the unforeseen event causing the NTC reduction. Under these circumstances, the final NTC shall be the value provided by the TSO conducting the reassessment.
  4. TSOs shall report to NRAs any NTC reduction resulting from the validation phase and the related CNEC.

### **Article 23 Day-ahead Cross-Zonal capacity validation**

1. The coordinated capacity calculator shall send the proposed cross-zonal capacity values for the day ahead market, calculated in accordance with Chapter 4, to all TSOs in the Channel Region by a deadline which TSOs and the coordinated capacity calculator have agreed upon.
2. Each TSO in the Channel Region shall consider for the interconnectors of its bidding zone the proposed cross-zonal NTC values and indicate their rejection or acceptance to the coordinated capacity calculator by a deadline which TSOs and the coordinated capacity calculator have agreed upon.
3. If a TSO in the Channel Region rejects a proposed NTC value for the day ahead market, that TSO shall provide to the coordinated capacity calculator by a deadline which TSOs and the coordinated capacity calculator have agreed upon:
  - a. An explanation of the unforeseen event that has rendered the proposed NTC value invalid;
  - b. Identification of the CNEC which necessitates the rejection of proposed NTC; and
  - c. The value of NTC which the TSO can accommodate for the interconnector of its bidding zone.
4. If the coordinated capacity calculator has not received acceptance/rejection responses from each TSO in the Channel Region by a deadline which TSOs and the coordinated capacity calculator have agreed upon, the coordinated capacity calculator shall assume this as a deemed acceptance of each NTC value for which rejection/acceptance has not been indicated by a TSO.
5. If the coordinated capacity calculator receives acceptances from all TSOs in accordance with this Article 23, it shall immediately issue a global acceptance message to all TSOs in the Channel Region.
6. If a TSO in the Channel Region issues a rejection of NTC values to the coordinated capacity calculator in accordance with this Article 23, then the coordinated capacity calculator shall immediately issue for information a rejection message to each TSO in the relevant capacity calculation region.

### **Article 24 Intraday Cross-Zonal capacity validation**

1. The coordinated capacity calculator shall send the initial proposed cross-zonal capacity values for the intraday market, calculated in accordance with Chapter 4, to all TSOs in the Channel Region by a deadline which TSOs and the coordinated capacity calculator have agreed upon and on the day which is immediately before the delivery day being considered.

2. Each TSO in the Channel Region shall consider the initial proposed cross-zonal NTC values for the interconnector of its bidding zone and indicate their rejection or acceptance to the coordinated capacity calculator by a deadline which TSOs and the coordinated capacity calculator have agreed upon.
3. If a TSO in the Channel Region rejects an initial proposed NTC value for the intraday market on one interconnector of its bidding zone, that TSO shall provide to the coordinated capacity calculator by a deadline which TSOs and the coordinated capacity calculator have agreed upon:
  - a. An explanation of the unforeseen event that has rendered the initial proposed NTC value invalid;
  - b. Identification of the CNEC which necessitates the rejection of initial proposed NTC; and
  - c. The value of NTC which the TSO can accommodate on the interconnector of its bidding zone.
4. If the coordinated capacity calculator has not received acceptance/rejection responses from each TSO in the Channel Region by a deadline which TSOs and the coordinated capacity calculator have agreed upon, the coordinated capacity calculator shall assume this as a deemed acceptance of each initial NTC value for which rejection/acceptance has not been indicated by a TSO.
5. If the coordinated capacity calculator receives acceptances from all TSOs in accordance with this Article 24, it shall immediately issue a global acceptance message to all TSOs in the Channel Region.
6. If a TSO in the Channel Region issues a rejection of initial NTC values to the coordinated capacity calculator in accordance with this Article 24, then the coordinated capacity calculator shall immediately issue for information a rejection message to each TSO in the relevant capacity calculation region.
7. In order to protect system security and only as an exceptional measure, TSOs shall have the right to set the NTC in one or both directions equal to the value of the AAC, such that ATC will equal zero, to alleviate the risk to security of supply. For the avoidance of doubt, this may be the case where an interconnector assets become unavailable. In each case, the relevant TSOs provide the coordinated capacity calculator with an explanation of the factors which have led to the NTC reduction including the CNEC involved as appropriate.

## **Chapter 6 Allocation Constraints**

### **Article 25 Provision of allocation constraints to the NEMOs**

1. In line with Article 23 of the CACM Regulation, each TSO of the Channel Region shall, if required, define allocation constraints.
2. The relevant TSOs within the Channel Region shall define, and publish, a single loss factor for each interconnector, which shall be provided to the NEMOs as an allocation constraint for the single day-ahead and intraday (where applicable) coupling processes.
3. Allocation constraints may be taken as potential net position limitation of a bidding zone that shall be provided to the NEMOs as an allocation constraint for the single day-ahead and intraday market coupling such allocation constraint may be deemed necessary for one of the following reasons that cannot be captured only by capacity calculations:
  - i. In case the level of export or import of the bidding zone operated by the TSO is extremely different from the reference flows in the CGMs submitted at D-2, D-1 and Intraday, such that there are not enough generation from the GLSK to rebalance the network;
  - ii. In case the level of export or import of the bidding zone operated by the TSO can endanger either the voltage management within the operational limits defined according to SO GLs Article 25 or the voltage stability of the system within the synchronous area according to SO GL Article 38;
  - iii. In case the level of export or import of the bidding zone operated by the TSO can endanger the dynamic stability within the synchronous area; and/or
  - iv. In case the level of export or import of the bidding zone operated by the TSO, leading to a situation which could not be validated as safe by the concerned TSO.

4. The relevant TSOs within the Channel Region may define ramping limitations for each interconnector, which shall be provided to the NEMOs as an allocation constraint for the single day-ahead and intraday market coupling processes. Ramping limitations can be defined by the TSOs depending on grid conditions such as:
  - i. Types of response and reserve carried by the TSO and the ramping up or down rates available within the bidding zone operated by the TSO to help keep frequency balance at all times within the operational limits and quality targets defined according to SO GL Article 127, considering among other ramping rate limitations defined and agreed as per the Operating Protocol between TSO and cable operator.
5. Any other criteria that the TSO shall have previously defined, and agreed by its NRA and published in its website before its application.
6. The allocation constraints defined in article 25(2) and 25(3) shall be based on a system study and shall be regularly reviewed and, in any case, at least once a year. The concerned TSO shall submit the system study justifying their application to their NRA for monitoring.

### **TITLE 3 Fall-back**

#### **Article 26 Fall-back procedures for day-ahead and intraday timeframes**

1. The coordinated capacity calculator shall, in case for the day-ahead or intraday timeframe no results are available for all or some hours of the day due to system failure or other unforeseen circumstance at the time the capacities have to be provided to TSOs for validation, provide capacities calculated from a previous calculation for the same business day. If no such values exist, the MPTC values will be used. The values still remain subject to the validation phase according to Chapter 5.
2. If for the day-ahead or intraday timeframe, at the time the capacities have to be provided to the allocation platform, the relevant TSO fails to receive capacities values from the coordinated capacity calculator, due to a communication system failure or other unforeseen circumstance, the TSO will agree on an alternative way of communication.

### **TITLE 4 Publication and Implementation**

#### **Article 27 Publication of information**

1. In accordance with Article 3(f) of the CACM Regulation aiming at ensuring and enhancing the transparency and reliability of information to the regulatory authorities and market participants, at least the following data items shall be published in addition to the data items and definitions of Commission Regulation (EU) No 543/2013 on submission and publication of data in electricity markets:
  - a. Hourly Day-ahead NTCs for all Channel interconnectors will be individually/commonly published by TSOs/CCC on a daily basis not later than 11h00 D-1
  - b. Hourly Intraday NTCs for all Channel interconnectors will be individually/commonly published by TSOs/CCC on a daily basis not later than 22h00 D-1
2. According to CACM GL (article 26 (5)), the coordinated capacity calculator shall, every three months, report all reductions made during the validation of cross-zonal capacity to all regulatory authorities of the capacity calculation region. This report shall include the location and amount of any reduction in cross-zonal capacity and shall give reasons for the reductions.
3. In addition, TSO shall publish to the regulatory authorities and market participants a quarterly report that shall include statistics based on:
  - a. The list of critical network elements

- b. Where relevant hourly limiting CNECs, disclosing  $I_{max}$ ,  $F_{max}$  and Remaining Available Margin (RAM),
  - c. Hourly Day-ahead and Intraday MPTC for all Channel interconnectors,
  - d. Hourly Day-ahead and Intraday External Constraints,
  - e. Instances and justification of the specific outage where NTCs has been calculated in accordance to Article 5 (1) b
4. The final, exhaustive and binding list of all publication items, respective templates and the data-access points and the plan for their implementation shall be developed in dedicated workshops with the Channel Stakeholders and regulatory authorities. An agreement between Stakeholders, Channel regulatory authorities and Channel TSOs shall be reached before the go-live as described in Article 28(2) and 28(3).

### **Article 28 Publication and Implementation of the Channel CC methodology Proposal**

1. The TSOs of the Channel Region shall publish the Channel CC Methodology Proposal without undue delay after all national regulatory authorities have approved the proposed Channel CC Methodology or a decision has been taken by the Agency for the Cooperation of Energy Regulators in accordance with Article 9 (10), Article 9(11) and 9(12) of the CACM Regulation.
2. The TSOs of the Channel Region shall implement the Channel CC Methodology Proposal for the capacity calculation performed in D-2 no later than Q2 2019, except for the methodology of the Reliability Margin that has been included in the Channel CC Methodology Proposal in accordance with Article 22 of the CACM Regulation. FRM values will be computed no later than 18 months after the end of the implementation of the Channel capacity calculation methodology. During the interim period during the Go-live and first FRM computation, TSOs will apply as FRM one of the following values:
  - a. FRM computed for neighbouring CCRs FRM studies for CNEs which are present in such CCR.; or
  - b. A value at 10% of the  $F_{max}$  calculated under normal weather conditions value for a given CNE.
3. The TSOs of the Channel Region shall implement the Channel CC Methodology Proposal for the capacity calculation performed in D-1 no later than Q2-2019, except for the methodology of the Reliability Margin that has been included in the Channel CC Methodology Proposal in accordance with Article 22 of the CACM Regulation. FRM values will be computed no later than 18 months after the end of the implementation of the Channel capacity calculation methodology. During the interim period during the Go-live and first FRM computation, TSOs will apply as FRM one of the following values:
  - c. FRM computed for neighbouring CCRs FRM studies for CNEs which are present in such CCR.
  - d. A value at 10% of the  $F_{max}$  calculated under normal weather conditions value for a given CNE
4. The deadlines defined in Article 28 (2) and Article 28 (3) can be modified on request of all TSOs of the Channel Region in case the testing results of the foreseen testing period do not meet the necessary conditions for implementation.
5. During the implementation period, and especially in case of new interconnector, each TSO may apply a stepwise implementation of the Channel capacity calculation methodology for the interconnectors connected to its bidding zone.

## **Article 29 Implementation of new interconnectors**

1. The Channel CC Methodology will apply by default for new interconnectors in case no need for amendment is identified by the TSOs of the Channel Region in accordance with Article 29(2).
2. The TSOs of the Channel Region shall jointly discuss, and not unreasonably withhold, proposed amendments to the Channel CC Methodology required for a new interconnector joining the Channel CCR.
3. Where required, the TSOs of the Channel Region shall investigate the need to amend the Channel CC Methodology to accommodate also for future interconnectors for which the connection agreement between the interconnector owner and a connecting TSO would state a connection capacity value below its MPTC.

## **Article 30 Language**

1. The reference language for this Channel CC Methodology Proposal shall be English. For the avoidance of doubt, where TSOs need to translate this Channel CC Methodology Proposal 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 be obliged to eliminate any inconsistencies by providing a revised translation of this Channel CC Methodology Proposal to their relevant national regulatory authorities.

## Annex 1

### List of elements for which a planned or unplanned outage may trigger a detailed day-ahead capacity calculation<sup>1</sup>

#### France:

The below list consists of French grid elements which, when not in operation due to planned or forced outage, will lead to a redistribution of flow that will significantly impact French Critical Network Element defined according to Article 7 on selection of Critical Network Element and may then trigger the need for DA capacity calculation.

- Mandarins-Warande n°1 400 kV
- Attaques-Warande n°1 400 kV
- Fruges-Mandarins n°1 400 kV
- Argoeuves-Fruges n°1 400 kV
- Argoeuves-Mandarins n°1 400 kV
- Chevalet-Warande n°1 400 kV
- Chevalet-Warande n°2 400 kV

#### Belgium:

The below list consists of Belgian grid elements which, when not in operation due to planned or forced outage, will lead to a redistribution of flow that will significantly impact Belgian Critical Network Element defined according to Article 7 on selection of Critical Network Element and may then trigger the need for DA capacity calculation.

- Avelgem - Mastaing 380.79
- Avelgem - Avelin 380.80
- Avelgem - Horta 1 380.101
- Avelgem - Horta 2 380.102
- Mercator - Horta 1 380.73
- Mercator - Horta 2 380.74
- Doel -Mercator 1 380.51
- Doel -Mercator 2 380.52
- Doel -Mercator 3 380.53
- Doel -Mercator 4 380.54
- Doel - Zandvliet 1 380.25
- Doel - Zandvliet 2 380.26
- Zandvliet - Borsele 380.29
- Zandvliet - Geertruidenberg 380.30
- Horta - Maerlandt 1 380.103
- Horta - Maerlandt 2 380.104
- Maerlandt - Gezelle 1 380.107

- Maerlandt - Gezelle 2 380.108
- Maerlandt - Gezelle 3 380.109
- Maerlandt - Gezelle 4 380.110

#### **Netherlands:**

TenneT TSO B.V. applies a subset of their 380kV lines as a critical outage for which a day-ahead capacity calculation will be triggered. These grid elements all have a high impact on the Dutch critical branches used in the Channel DA/ID capacity calculation methodology, which in turn are highly influenced by cross-zonal flows. The occurrence of one of the critical outages defined may therefore lead to a situation in which the full cross-zonal capacity cannot be allocated without the risk on large overloads. The considered elements are:

- Borssele - Geertruidenberg BSL-GT380Z
- Crayestein - Krimpen CST-KIJ380W
- Crayestein - Krimpen CST-KIJ380Z
- Diemen - Lelystad DIM-LLS380W
- Diemen - Lelystad DIM-LLS380Z
- Ens - Lelystad LLS-ENS380W
- Ens - Lelystad LLS-ENS380Z
- Krimpen - Geertruidenberg KIJ-GT380W
- Krimpen - Geertruidenberg KIJ-GT380Z
- Zandvliet - Borsele BSL-ZVL380 G
- Zandvliet - Geertruidenberg ZVL-GT380 W
- Van Eyck - Maasbracht MBT-VYK380 Z
- Van Eyck - Maasbracht MBT-VYK380 W

#### **Great Britain:**

- No critical outages