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IU 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

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All TSOs, 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) This document, including its annexes, is a common proposal developed by all Transmission System Operators (hereafter referred to as “TSOs”) of the IU Capacity Calculation Region (hereafter referred to as “IU 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 “IU CC Methodology Proposal”) is required by Article 20 (2) of the CACM Regulation.
- (3) The IU 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 IU 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 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”;
  - d. According to Article 9 (9) of the CACM Regulation, the expected impact of the IU CC Methodology Proposal on the objectives of the CACM Regulation has to be described. The impact is presented below (recital 3 of this Whereas Section);
  - e. The TSOs of the IU 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
  - f. This methodology assumes, (for the purpose for avoiding undue discrimination between internal and cross-zonal exchanges) but does not consider the details of, compensation that would be payable to an interconnector in the event that its capacity is restricted.
- (4) The IU 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 IU 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 objective of ensuring fair and non-discriminatory treatment of TSOs, NEMOs and market participants in accordance with Article 3 (e) of the CACM Regulation by providing rules for avoiding undue discrimination between internal and cross-zonal exchanges to ensure compliance with point 1 .7 of Annex I to Regulation (EC) No 714/2009
- f. 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 using the best possible forecast of the transmission systems at the time of each capacity calculation within the IU region and providing economic signals to TSOs and regulators for investment where cross-zonal capacity is restricted.
- g. 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.
- h. 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 IU CC METHODOLOGY PROPOSAL TO ALL NATIONAL REGULATORY AUTHORITIES:**

## **TITLE 1**

### **General Provisions**

#### **Article 1**

##### **Subject matter and scope**

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

#### **Article 2**

##### **Definitions and interpretation**

1. For the purposes of the IU 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 Regulation (EC) 2015/1222.
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.
  - b. ‘timestamp’ means the mid-point of each market time unit.
  - c. ‘business day’ shall mean Monday through Sunday including public holidays and holidays normally observed by the TSOs and coordinated capacity calculator.
3. In this IU 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 IU CC methodology Proposal applies solely to the day-ahead and intraday capacity calculation within the IU 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**

**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 follows:
2. The cross-zonal capacity 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 or an alternative lower firm capacity value is stated in a connection agreement between an interconnector owner and a connecting TSO. Outages expected to have a significant impact on interconnector capacity will be those listed as CNECs, where a CNEC is considered to be a circuit or branch whose load will change by at least 5 MW in response to a change in an interconnector flow of 100 MW, assuming an intact transmission network.
3. Where the firm capacity value stated in a connection agreement between an interconnector owner and a connecting TSO is lower than MPTC and one or more TSOs forecast that the MPTC cannot be made available to the market for the relevant day, a daily cross-zonal capacity calculation will be triggered by the TSO(s). Where this is the trigger for capacity calculation, the day-ahead cross-zonal capacity made available to the market from the cross-zonal capacity calculation will not be less than the capacity stated in the connection agreement. Where no day-ahead cross-zonal capacity calculation is triggered, the cross-zonal capacity made available to the market will be equal to the MPTC value.
4. In case a capacity calculation is triggered, 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
5. Each TSO shall provide transparency on the conditions under which Article 4(2) would apply by providing a public ex-post explanation.

**Article 5**

**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 IU 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. All calculations would be conducted in line with the timescales depicted within this methodology. There is a possibility that additional calculations would occur in cases where an event has the potential to impact capacity and further intraday allocations of capacity are expected to occur. An example of this is where an outage on a Critical Network Element and Contingency (CNEC) has occurred after completion of the original intraday calculation as such an outage would have the potential to impact interconnector capacity. In this case, the TSOs of the IU region may trigger an additional intraday calculation. The output of this additional intraday calculation shall not curtail already allocated capacity.

## **Chapter 2**

### **Methodologies for the provision of the inputs for calculation**

#### **Article 6**

#### **Critical Network Element and Contingency (CNEC) methodology**

1. Each TSO of the IU region shall perform the selection of the CNECs based on the assessment of the cross-zonal flow sensitivity.
2. For the IU 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 SEM;
3. According to Article 29 (3) of the CACM Regulation, each TSO of the IU Region shall ignore network elements which are not significantly sensitive by changes in bidding zone net positions. .
4. The TSOs of the IU Region shall apply a common threshold value which can be different for the Day-Ahead or Intraday capacity calculation process. The value for the GB synchronous area can differ from the common threshold of the SEM synchronous area.
5. The cross-zonal flow sensitivity threshold will be:

	Day-ahead	Intraday
SEM	5%	5%
GB	5%	5%

The threshold level for identifying network elements that are sensitive to such changes is determined by simulating the change in flow across each network element in the IU Region for a change of flow across the associated interconnectors based on a suitable power system model of the transmission systems in the IU Region. The threshold selected to delineate between network elements that are to be considered as CNECs for the purposes of this CCM and those that are not, would typically be expected to encompass those network elements which are electrically close to the point at which an interconnector connects to a synchronous area of the IU Region. The term ‘electrically close’ would be expected to include network elements that are located within the substation where an interconnector connection point is located, network elements located within neighbouring substations and any transmission circuits terminating within those substations. Analysis conducted by the TSOs of the IU Region would indicate that a threshold of 5% adequately identifies network elements that should be considered in the capacity calculation. Nonetheless, TSOs will endeavour to minimise the number of CNECs, particularly when a reduction of calculated interconnector capacity is likely to occur.

6. Each TSO of the IU Region shall monitor the Critical Network Elements and Contingencies in order to assess the relevance of the threshold over time.



7. Each TSO of the IU Region shall critically assess the relevance of the CNECs against the fixed threshold 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.
8. The initial list of CNECs to be considered in the cross-zonal capacity calculation for the IU region, are listed in [Annex 1]
  - CNECs relating to Moyle Interconnector in SONI control area
  - CNECs relating to Moyle Interconnector in National Grid control area
  - CNECs relating to East West Interconnector in EirGrid control area

The TSOs of the IU Region shall regularly challenge and if needed change the threshold in order to ensure that there is no undue reduction of cross border capacity. TSOs shall perform analysis and share such analysis with all other TSOs of the IU Region on at least an annual basis in order to demonstrate the continued applicability of such threshold. Issues likely to result in a modified threshold would typically include:

- a. changes to the thermal rating of CNECs,
- b. the development of new network elements liable to cause a material change to the sensitivity of existing network elements to interconnector flows,
- c. the permanent disconnection of existing network elements where this is liable to cause a material change to the sensitivity of remaining network elements to interconnector flows.

## **Article 7**

### **Reliability margin methodology**

Reliability margins shall not be considered within the IU Region.

## **Article 8**

### **Methodologies for operational security limits**

1. In accordance to Article 23 of the CACM Regulation,
  - a. Each TSO within the IU Region shall define 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 IU 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 IU Region may consider the application of dynamic line rating for the determination of the maximum permanent and/or temporary allowable current of some CNE.

## **Article 9**

### **Methodologies for External Constraints**

1. In line with Article 23(3)(a) of the CACM Regulation, each TSO of the IU 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;
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 10**

### **Generation shift keys methodology**

1. The TSOs of IU Region shall define the generation shift keys in accordance with Article 24 of CACM Regulation.
2. In day ahead and intraday, the Great 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.
3. In day ahead and intraday, the SEM 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.
4. Generation shift keys should be developed in accordance with the ENTSO-E Generation and Load Shift Key Implementation Guide as currently drafted and amended. Following consultation and agreement with the coordinated capacity calculator, TSOs of the IU Region should specify generation shift keys according to one of the following descriptions:
  - Proportional to committed generation in each base case.
  - Proportional to participation factors provided by the relevant TSO of the IU Region.
  - Proportional to the remaining capacity available on already committed generation in each base case.
  - In accordance with a merit order provided by the relevant TSO.
  - By the use of an interconnection shift key to alter flows across interconnections with other capacity calculation regions.

**Article 11**  
**Methodology for remedial actions in capacity calculation**

1. Each TSO of IU Region shall define individually the remedial actions that shall be made available for the day-ahead or intraday Capacity Calculation within the IU Region in accordance with Article 25 of CACM Regulation and shall at minimum respect that;
  - a. All relevant available non costly remedial actions according to the TSO's 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.
  - 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 IU region shall make available costly remedial actions which the TSO deems as reasonable, proportionate and efficient.
  - a. In determining which costly remedial actions to make available the TSO shall consider whether these are efficient when compared to the alternative compensation cost of interconnector capacity reduction.
  - b. The compensation cost of interconnector capacity reduction shall be determined relative to the firm capacity value stated in the relevant connection agreements, and shall reflect the value of interconnector capacity to the market.
3. When defining a remedial action, each TSO of the IU 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
  - 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 IU Region 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.
5. In the case of non- costly remedial actions an example within the IU region would involve the tapping of phase shifting transformers, and in the case of costly remedial actions a typical example would involve the redispatching of generation.

**Chapter 3**  
**Input gathering phase**

**Article 12**  
**Provision of the inputs for the Day-ahead Capacity Calculation**

1. The TSOs of the IU region shall provide the coordinated capacity calculator before a deadline commonly agreed between the TSOs and the coordinated capacity calculator the following inputs:
  - a. Individual Grid Models (IGM) respecting the methodology developed in accordance with Article 19 of the CACM Regulation
  - b. Generation Shift Key (GSK) in accordance with Article 10
  - c. Maximum permanent technical capacity in accordance with Article 2

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(2), the concerned TSO of the IU 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 6
  - b) Flow Reliability Margin (FRM) in accordance with Article 7
  - c) Maximum current on a Critical Network Elements ( $I_{max}$ ) / Maximum allowable power flow ( $F_{max}$ ) in accordance with Article 8
  - d) Remedial actions in accordance with Article 11
  - e) External constraints: specific limitations not associated with Critical Network Elements in accordance with Article 9
3. When providing the inputs, the TSOs of the IU Region shall respect the formats commonly agreed between the TSOs and the coordinated capacity calculators of the IU 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 IGMs to create the 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 13**

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

1. The TSOs of the IU 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) IGMs respecting the methodology developed in accordance with Article 18 of the CACM Regulation
  - b) Generation Shift Key (GSK) in accordance with Article 10
  - c) Critical Network Elements (CNEs) and Contingencies (Cs) in accordance with Article 6
  - d) Flow Reliability Margin (FRM) in accordance with Article 7
  - e) Maximum current on a Critical Network Elements ( $I_{max}$ ) / Maximum allowable power flow ( $F_{max}$ ) in accordance with Article 8
  - f) Remedial actions (RAs) in accordance with Article 11
  - g) External constraints: specific limitations not associated with Critical Network Elements in accordance with Article 9
  - h) Maximum permanent technical capacity in accordance with Article 2.
2. When providing the inputs, the TSOs of the IU 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 IGMs to create the Common Grid Models respecting the methodology developed in accordance with Article 16 of the CACM Regulation.
4. The TSOs of the IU Region shall send for each time unit of the day the already allocated capacities (AAC) to the coordinated capacity calculator.

## **Chapter 4**

### **Qualification phase**

#### **Article 14**

##### **Day-ahead capacity calculation**

1. In accordance with Article 5 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 IU Region bidding zone borders in following the process outlined in Article 15.

#### **Article 15**

##### **Intraday capacity calculation**

1. In accordance with Article 5 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 IU Region bidding zone borders in following the process outlined in Article 14.

#### **Article 16**

##### **Coordinated NTC 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 18 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, the effect of this constraint will be reflected in the starting point (maximum import/maximum export).
2. External constraints in the IU Region are: A 300MW limits on exports from Northern Ireland to Great Britain resulting from statutory voltage limits under a secured outage contingency on the 275kV network. If technically feasible, the Northern Ireland TSO should endeavour to represent this external constraint limitation as congestion.
3. Maximum import and export constraints for Great Britain will be based on offline studies of voltage collapse, voltage step change within standards, stability analysis, and ability to procure enough generation capacity for rebalancing without causing additional overloads on grid elements Also, the maximum imports/exports constraints for Britain will depend on how much generation is available within the Biding Zone.
4. The coordinated capacity calculator shall run a contingency analysis on the base case using the CNEC list provided by the TSOs of the IU Region 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.
5. 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. The base case otherwise known as the operational starting point is the initial snapshot of the system where all interconnector flows have been aligned between the synchronous areas of the IU region; this is the starting point for triggering the calculation. 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 17. 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 17** **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 6 and proportionally to their influence.

### **Article 18** **Implementation of a shift of import/export**

1. When computing the import/export capacity calculations, the coordinated capacity calculator shall implement any shift of the power transfer between 2 bidding zones by increasing the generation in one of the bidding zones and decreasing the generation in the other bidding zone. The GSK of the bidding zones will be used as the basis for applying the increases and decreases to generation in the respective bidding zones.

### **Article 19** **Computation of maximum import/export for the 24 hours of the business day**

1. The coordinated capacity calculator shall perform the computation for the 24 timestamps of the business day.
2. In order to cope with situations when computation of the 24 time stamps cannot be performed by the coordinated capacity calculator, due to technical limitations of their computational and/or communication capabilities:
  - a. The coordinated capacity calculator shall perform the computation 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 IU 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 IU 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.

3. The minimum number of reference time units will be increased from 2 to at least 4 reference time units in line with the implementation timescale set out in Article 26.

## **Article 20**

### **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 16 and the long term allocated capacity (LTA) shall be taken<sup>1</sup>.
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 16 and the day-ahead already allocated capacity (AAC) shall be taken.

## **Chapter 5**

### **Validation phase**

## **Article 21**

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

1. In accordance with Article 30 of the CACM Regulation, each TSO of the IU Region shall validate the cross-zonal capacities calculated by the coordinated capacity calculator of the IU Region.
2. Each TSO of the IU Region may reassess the computed NTCs on the interconnectors of his bidding zone if unforeseen changes in grid conditions have occurred during the qualification phase. For the purposes of this Capacity Calculation Methodology, unforeseen changes in grid conditions means any changes in the availability of one or more CNECs that could reasonably be expected to impact NTC had such availability been taken into account for the qualification phase. The reassessments of NTCs shall be per individual cross-zonal interconnector of its bidding zone.
3. Following previous paragraph, one or more of the TSOs in the IU 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, and each TSO in the IU region, 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. Whilst Regulation 2015/1222 contains no explicit requirement for TSOs to report NTC reductions to the NRAs, TSOs will report to NRAs any NTC reduction resulting from the validation phase and the related CNEC. Such reporting will be conducted by email by the 7<sup>th</sup> calendar day of the following month or as otherwise agreed between TSOs and NRAs.

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<sup>1</sup> Where the trigger for the capacity calculation was a connection agreement as per Article 5(2), the maximum value between the results obtained in Article 16 and the firm capacity in the connection agreement shall be taken

**Article 22**  
**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 IU Region by a deadline which TSOs and the coordinated capacity calculator have agreed upon.
2. Each TSO in the IU 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 IU 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 IU 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 the IU Region in accordance with this Article 22, it shall immediately issue a global acceptance message to all TSOs in the IU Region.
6. If a TSO in the IU Region issues a rejection of NTC values to the coordinated capacity calculator in accordance with this Article 22, then the coordinated capacity calculator shall immediately issue for information a rejection message to each TSO in the relevant capacity calculation region.

**Article 23**  
**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 IU 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 IU 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 IU 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 IU 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 23, it shall immediately issue a global acceptance message to all TSOs in the IU Region.
6. If a TSO in the IU Region issues a rejection of initial 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.
7. In order to protect system security, TSOs shall have the right to reduce or freeze NTC at the level required to alleviate the risk to security of supply. For the avoidance of doubt, the relevant TSOs shall have the right to reduce or freeze NTC if the 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 or freeze including the CNEC involved as appropriate.

## **Chapter 6**

### **Allocation constraint**

#### **Article 24**

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

1. The relevant TSOs within the IU Region shall define 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 market coupling processes. The loss factors reflect the actual electrical losses across the interconnectors and are determined on the basis of quadratic equations taking into account convertor station losses, no-load losses and IR cable losses.
2. To maintain system security, a system ramp rate limit of 10 MW/minute is used to set the maximum rate of change of flow on the Moyle and EWIC interconnectors. This ramp rate limit is set by the TSOs (EirGrid and SONI) at a level that reflects the reliable and secure ramping capability of the all-island system. The ramp rate limit is apportioned equally among the two interconnectors (i.e. 5 MW/minute each for Moyle and EWIC). To take account of system ramp rate limits Euphemia uses a 'step change limit' whereby the maximum volume by which the day-ahead interconnector schedule can change from one hour to the next is limited. In September 2017 the SEM Committee published a decision that the Euphemia step change limit for the Moyle and East West Interconnectors should be 300MWh/h. This limit will be provided to NEMOs as an allocation constraint for the single day ahead and intraday market coupling processes until such time as the relevant NRAs determine or confirm that a different step change limit should be used. Ramp rate restrictions are reviewed periodically by the relevant TSOs of the IU Region. Such reviews assess the suitability of the existing ramp rate limitations and the feasibility of increasing the ramp rates whilst maintaining operational security.

## **TITLE 3**

### **Fall-back**

#### **Article 25**

##### **Fall-back procedures**

For day-ahead and intraday:

1. If, due to system failure or other unforeseen circumstance, at the time the capacities have to be provided to TSOs for validation, no results are available for all or some hours of the day, then the coordinated capacity calculator shall 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, at the time the capacities have to be provided to the relevant NEMOs, 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 to provide this information through email. .

## **TITLE 4**

### **Publication and Implementation**

#### **Article 26**

##### **Publication and Implementation of the IU CC methodology Proposal**

1. The TSOs of the IU Region shall publish the IU CC Methodology Proposal without undue delay after all national regulatory authorities have approved the proposed IU CC Methodology or a decision has been taken by the Agency for the Cooperation of Energy Regulators in accordance with Article 8 (10), Article 8(11) and 8(12) of the CACM Regulation.
2. The TSOs of the IU Region shall implement the IU CC Methodology Proposal for the capacity calculation performed in D-2 no later than Q4-2018.
3. The TSOs of IU Region shall implement the IU CC Methodology Proposal for the capacity calculation performed in D-1 and during the day no later than Q1-2020.
4. The increased level of computation described in Article 20 shall be implemented by Q1-2020.
5. The deadlines defined in Article 26 (2), (3), (4) can be modified on request of all TSOs of the IU Region in case the testing results of the foreseen testing period do not meet the necessary conditions for implementation.

#### **Article 27**

##### **Publication of information**

1. The following items related to the IU capacity calculation shall be published:
  - a. A list of critical network elements
  - b. Where relevant hourly limiting CNECs, disclosing I<sub>max</sub>, F<sub>max</sub> and Remaining Available Margin (RAM),
  - c. Hourly Day-ahead and Intraday NTCs for each IU interconnector,
  - d. Hourly Day-ahead and Intraday MPTC for each IU interconnector,
  - e. Hourly Day-ahead and Intraday External Constraints,
  - f. Instances and justification of the specific outage where NTCs has been calculated in accordance to Article 5 (2).
2. Each TSO of the IU Region shall publish and maintain an indicative list of planned outages in the vicinity of HVDC interconnector that may trigger a day-ahead capacity calculation. The list of planned outages will be published on the TSO's website by 31 December at the latest for outages planned to take place during the subsequent calendar year.

#### **Article 28**

##### **Language**

1. The reference language for this IU CC Methodology Proposal shall be English. For the avoidance of doubt, where TSOs need to translate this IU 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 IU CC Methodology Proposal to their relevant national regulatory authorities.

## Annex 1

### List of CNECs to be considered in the cross-zonal capacity calculation for the IU region.

#### Great Britain:

The below list consists of the GB grid elements which when not in operation due to planned or forced outage, will lead to a redistribution of flow that will significantly impact the Moyle Interconnector, are CNECs defined according to Article 7 on selection of Critical Network Element and may then trigger and be considered in a DA capacity calculation:

- Auchencrosh – Mark Hill
- Mark Hill – Coylton

#### Ireland:

The list below consists of the Ireland grid elements which when not in operation due to planned or forced outage, will lead to a redistribution of flow that will significantly impact the East West Interconnector, are CNECs defined according to Article 7 on selection of Critical Network Element and may then trigger and be considered in a DA capacity calculation:

- EWIC – Portan 380kV
- Woodland – Portan 380kV
- Woodland 380/220kV transformers
- Woodland – Maynooth 220kV
- Woodland – Oldstreet 380kV
- Woodland – Corduff 220kV 1 & 2
- Woodland – Louth 220kV

#### Northern Ireland:

The list below consists of the Northern Ireland grid elements which when not in operation due to planned or forced outage, will lead to a redistribution of flow that may significantly impact the Moyle Interconnector, are CNECs defined according to Article 7 on selection of Critical Network Element and may then trigger and be considered in a DA capacity calculation:

- <sup>2</sup>Ballycronan More – Ballylumford 275kV & Ballylumford – Hannahstown 275kV
- Ballycronan More – Hannahstown 275kV & Ballylumford – Hannahstown 275kV
- Ballylumford – Kells 275kV & Ballylumford – Magherafelt 275kV

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<sup>2</sup> Ballylumford 275kV substation is immediately adjacent to the Moyle Interconnector connection point at Ballycronan More substation. The CNECs for Northern Ireland are exclusively based on secured double circuit outage contingencies where at least one of the listed circuits terminate at Ballycronan More or Ballylumford substations.