Explanatory Document to the first amendment of the Intraday Capacity Calculation Methodology of the Core Capacity Calculation Region

in accordance with article 20ff. of the Commission Regulation (EU) 2015/1222 of 24th July 2015 establishing a guideline on capacity allocation and congestion management

Public Consultation

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Purpose:	☐ methodology draft ☐ for NRA approval	☒ for public consultation ☐ for final publication
Status:	☒ draft	☐ final
TSO approval:	☒ for approval	☐ approved
NRA approval:	☒ outstanding	☐ approved

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1. Introduction

The Commission Regulation (EU) 2015/1222 establishing a guideline on Capacity Calculation and Congestion Management ('CACM') requires the development and implementation of a common Day-Ahead Capacity Calculation Methodology ('DA CCM') and Intraday Capacity Calculation Methodology ('ID CCM') per Capacity Calculation Region ('CCR').
CCR Core ('Core') submitted the proposal for the Core ID CCM on 15th September 2017 and received a Request for Amendment ('RfA') by Core National Regulatory Authorities ('NRAs') on 15th March 2018. On 4th June 2018 Core Transmission System Operators ('TSOs') re-submitted the Core ID CCM. The Core NRAs could not reach a common approval and the Core ID CCM got send to the Agency ('ACER'). In 21st February 2019 ACER published its decision on the Core ID CCM.

In this explanatory document Core TSOs will explain the changes included in the proposal for amendment of the Core ID CCM. A track-change version of the Core ID CCM reflecting the proposed changes is shared for informative purpose.

2. Context linked to Extended LTA Inclusion in DA CCM

In May 2021, the first amendment of the Core DA CCM was approved by Core NRAs. This amendment introduces the concept of the Extended LTA Inclusion. It is foreseen at Core DA Go-Live that Extended LTA Inclusion (or ELI) will be in place. The original LTAmargin approach was kept as an alternative in case Extended LTA Inclusion is not in operation for the DA timeframe.

The origin of the Extended LTA inclusion approach comes from a R&D track under SDAC governance. This study successfully elaborated an alternative way of doing the LTA inclusion directly in the market coupling algorithm EUPHEMIA, resulting in a much reduced time to reach the first solution for market coupling. This LTA inclusion approach was born and named "Extended LTA inclusion". With this approach, EUPHEMIA expects as input from the capacity calculation process two separate domains representing the cross-zonal capacity, namely the virgin FB domain (minRAM included, without LTA inclusion) and the LTA domain (also called BEX restrictions domain: for Bilateral Exchange restrictions domain). EUPHEMIA is allowed to choose which combination of both domains creates most social welfare in the SDAC. To perform this optimisation EUPHEMIA applies the so-called "Balas formulation" where the variable "alpha" represents the optimal share of the virgin FB domain (alpha) versus the optimal share of the LTA domain (1-alpha).

Aside from the further explanation on the new ID ATC extraction methodology coming in the next section, it is important to remind that LTA inclusion perform with Extended LTA inclusion had been proven as a sound mathematical approach and leads to better

performance and less risk for operational security.

3. New ID ATC Extraction Methodology under Extended LTA inclusion

The combination of the ELI methodology applied in Core DA CCM and the possibility for Core TSOs to (partly) deduct virtual capacities in the Core ID CCM (article 11(2) ID CCM) prior computing the ID ATCs e.g. to determine the DA Leftovers requires a new approach.

In fact, with ELI, (partly) removing the virtual capacities caused by LTA inclusion, can't be performed directly at CNEC level, but has to be performed at border level (i.e. by adapting the LTA domain). However, the known iterative ATC extraction described in article 21 of the ID CCM cannot handle the separate LTA domain and hence can no longer cover all individual Core TSO preferences in terms of the application of LTA domain at the individual Core borders that are in line with article 11 of the ID CCM. In other words, the known iterative ATC extraction would force all Core TSOs to remove the LTA domain completely when ELI is applied.

In order to comply with the needed methodological change, a new ID ATC extraction approach, optimizing the ID ATC using both the FB domain and the LTA domain as inputs, based on the same concept behind ELI has been designed.

Both the known iterative approach and the new approach with ELI are needed:

- The approach with ELI is to be applied upon the left-overs from the day-ahead domain in order to deliver the cross-zonal capacities for the following use cases:
    - ID gate opening at 10 pm D-1, as transitional approach until the flow-based IDCC is put in place

- The known iterative approach is to be applied in order deliver the cross-zonal capacities in the form of ATCs until SIDC has implemented flow-based allocation, and this for the following use cases:
    - ID gate opening at 10 pm D-1 once the flow-based IDCC is put in place
    - ID gate opening at 10 am D once the flow-based IDCC is put in place

- In case DA would apply the LTA margin approach for LTA inclusion, the known iterative approach is to be applied for all use cases.

What are the differences between the original approach (or know iterative approach) and the new one

First point, the flexibility allowed in Core ID CCM to (partly) deduct virtual capacities on border level as LTAs before calculating ID ATCs.

The original approach deducts virtual capacity directly at CNEC level, while with the new approach this flexibility on deducing virtual capacity offered by LTA is performed at border level.

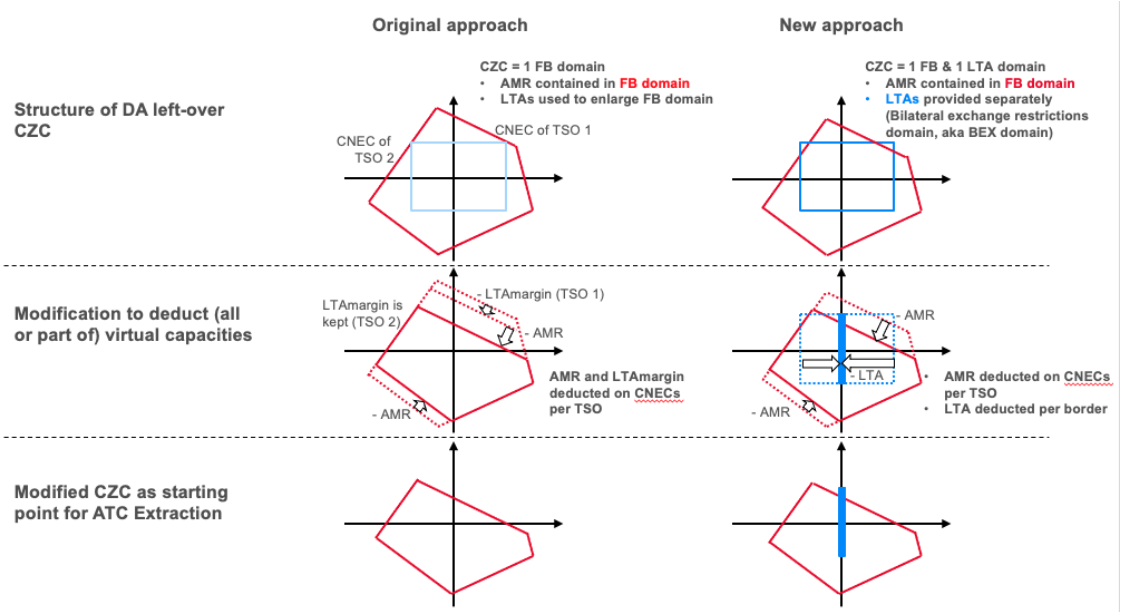

Figure 1: differences with removal of virtual capacities between original and new approach

Second point is on how the ATC are extracted.

The original approach (same method as used in CWE for NTC/ATC extraction) consists of several iterations. In each iteration, each of the n oriented borders may "consume" 1/n of the RAM on each CNEC. A maximum possible increment to each border's ATC is computed, and an actual consumption of RAM is deducted for each CNEC. A next iteration starts from the RAM remaining on each CNEC after the previous iteration. The process stops when the difference between the sum of all ATCs from the last iteration compared to the previous iteration does not exceed 1kW.

The new approach consists in the application of this objective function:

$$Maximize\ [\left(\sum \overrightarrow{ATC} / N_{oriented\ borders}\right) * W_{sum} + \left(\text{Min}\ \overrightarrow{ATC}\right) * (1 - W_{sum})]$$

- Wsum is a weighting factor (value between 0 and 1) requiring a trade-off between maximizing the sum of ATCs averaged across all Core borders versus maximizing the lowest ATC across all borders. A Wsum set to 1 delivers the highest average (and total) ATC, but risks that a number of borders will receive zero ATC, whilst a Wsum set to 0 attracts more ATC to the border with the lowest ATC but risks to deliver lower average (and total) ATCs across the Core region.
- N oriented borders is the number of oriented borders in Core at the time the ID ATC extraction is performed.

This objective function is applied upon the DA cross-zonal capacities, which under ELI

consist of a flow-based domain and a LTA domain. Similarly to the ELI implementation in SDAC, a Balas approach is applied, meaning that an optimisation variable alpha determines the share of the flow-based domain versus the share of the LTA domain used in the optimisation.

The only difference to the ELI approach in SDAC, is that the ID ATC extraction approach determines the alpha for optimising all Core borders whilst in SDAC the alpha is determined to maximize social welfare.

The proposed amendment introduces the option of using this new ID ATC extraction methodology when ID ATC have to be determined from Cross Zonal Capacities resulting from a Flowbased capacity calculation approach in DA with ELI.

Please note that the ID ATC extraction methodology under ELI introduces a new parameter (Wsum). This parameter is to be set at Core level.