

# ENTSO-E Market Report 2024



# ENTSO-E Mission Statement

## Who we are

ENTSO-E, the European Network of Transmission System Operators for Electricity, is the **association for the cooperation of the European transmission system operators (TSOs)**. The **40 member TSOs**, representing 36 countries, are responsible for the **secure and coordinated operation** of Europe's electricity system, the largest interconnected electrical grid in the world. In addition to its core, historical role in technical cooperation, ENTSO-E is also the common voice of TSOs.

ENTSO-E **brings together the unique expertise of TSOs for the benefit of European citizens** by keeping the lights on, enabling the energy transition, and promoting the completion and optimal functioning of the internal electricity market, including via the fulfilment of the mandates given to ENTSO-E based on EU legislation.

## Our mission

ENTSO-E and its members, as the European TSO community, fulfil a common mission: Ensuring the **security of the interconnected power system in all time frames at pan-European level** and the **optimal functioning and development of the European interconnected electricity markets**, while enabling the integration of electricity generated from renewable energy sources and of emerging technologies.

## Our vision

ENTSO-E plays a central role in enabling Europe to become the **first climate-neutral continent by 2050** by creating a system that is secure, sustainable and affordable, and that integrates the expected amount of renewable energy, thereby offering an essential contribution to the European Green Deal. This endeavour requires **sector integration** and close cooperation among all actors.

Europe is moving towards a sustainable, digitalised, integrated and electrified energy system with a combination of centralised and distributed resources.

ENTSO-E acts to ensure that this energy system **keeps consumers at its centre** and is operated and developed with **climate objectives** and **social welfare** in mind.

ENTSO-E is committed to using its unique expertise and system-wide view – supported by a responsibility to maintain the system's security – to deliver a comprehensive roadmap of how a climate-neutral Europe looks.

## Our values

ENTSO-E acts in **solidarity** as a community of TSOs united by a shared **responsibility**.

As the professional association of independent and neutral regulated entities acting under a clear legal mandate, ENTSO-E serves the interests of society by **optimising social welfare** in its dimensions of safety, economy, environment and performance.

ENTSO-E is committed to working with the highest technical rigour as well as developing sustainable and **innovative responses to prepare for the future** and overcoming the challenges of keeping the power system secure in a climate-neutral Europe. In all its activities, ENTSO-E acts with **transparency** and in a trustworthy dialogue with legislative and regulatory decision makers and stakeholders.

## Our contributions

**ENTSO-E supports the cooperation** among its members at European and regional levels. Over the past decades, TSOs have undertaken initiatives to increase their cooperation in network planning, operation and market integration, thereby successfully contributing to meeting EU climate and energy targets.

To carry out its **legally mandated tasks**, ENTSO-E's key responsibilities include the following:

- › Development and implementation of standards, Network Codes, platforms and tools to ensure secure system and market operation as well as integration of renewable energy;
- › Assessment of the adequacy of the system in different timeframes;
- › Coordination of the planning and development of infrastructures at the European level (**Ten-Year Network Development Plans, TYNDPs**);
- › Coordination of research, development and innovation activities of TSOs;
- › Development of platforms to enable the transparent sharing of data with market participants.

ENTSO-E supports its members in the **implementation and monitoring** of the agreed common rules.

**ENTSO-E is the common voice of European TSOs** and provides expert contributions and a constructive view to energy debates to support policymakers in making informed decisions.



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# Executive Summary

Capacity allocation and congestion management are the cornerstones of the European single electricity market as they harmonise the manner in which cross-border electricity markets operate from long-term to real-time. An interconnected, integrated and well-functioning European electricity market ensures the use of the most efficient resources and is key to ensuring security of supply at the lowest cost for consumers. Significant progress has again been made again during the reporting period from June 2023 to May 2024 across the market's various time frames, bringing an internal European electricity market for the benefit of all Europeans closer to full realisation.

In the reporting period, the power prices decreased from the elevated level seen in 2022 until the beginning of 2023 and have normalised within the second half of 2023 and the first half of 2024. The European Power Benchmark<sup>1</sup> averaged 85 €/MWh in Q3 2023, which is 74 % lower than in the third quarter of 2022.

As the war in Ukraine continued in the reporting period, cooperation between the Continental Europe TSOs and Ukrenergo was further strengthened to provide the support Ukrenergo required. Eventually, Ukrenergo became a full ENTSO-E member in January 2024. Capacity allocation was successfully extended to the Ukrainian borders with Poland, Hungary and Slovakia at the beginning of 2024, and resumed on the Ukrainian borders with Romania. This means that bilaterally coordinated capacity allocation now exists on all borders between previous ENTSO-E members and the new ENTSO-E member, Ukrenergo.

The cooperation between TSOs, Nominated Electricity Market Operators (NEMOs), the European Union Agency for Energy Regulators (ACER) and market participants was intensified, and a roadmap for the implementation of the most important projects to progress on European market integration has been developed. A major milestone marked the successful go-live of the Intraday Auctions (IDAs) in June 2024. TSOs and NEMOs are now tackling the next important steps, which will be the implementation of flow-based capacity calculation and allocation in the Nordic Capacity Calculation Region (CCR) in October 2024, followed by the switch to the 15 min market time unit (MTU) in the day-ahead and intraday markets across Europe, envisaged to go live in the first quarter of 2025.

During the past 12 months, the discussion on the evolution of the forward market has also further progressed. TSOs are developing an advocacy note dedicated to this topic that is planned to be published in Q3 2024.

The European Market Design (EMD) reform was adopted by the European Parliament and Council respectively in April and May 2024. After its publication in the Official Journal of the EU on 26 June 2024, it will enter into force on 16 July 2024. Regarding the forward market, a first step will be an impact assessment, to be performed by the EC, aiming to identify the optimal direction from a European perspective in which the forward market is going to be developed. The next step will be a respective amendment of the Forward Capacity Allocation (FCA) Guideline, expected to start end of 2025. The EMD reform also includes some elements impacting the short-term markets, which will need to be included in the amendments of the Capacity Allocation and Congestion Management Guideline (CACM) Guideline currently in preparation by the EC ('CACM2.0').

As usual in the past few years, the Market Report 2024 contains an assessment of the fulfilment of the minimum cross-zonal trading capacity targets of the Clean Energy for all Europeans Package (CEP) in the year 2023, called the 'CEP70 provisions'. Considerable progress has been made in the implementation of the 70 % requirement in Europe. Throughout the year 2023, Member States were able to comply with the (temporary) targets applicable at the national level. However, there is still some way to go to achieve a fully integrated European electricity market. Acknowledging that NRAs are responsible for assessing TSOs' compliance with the CEP70 provisions, this report aims to provide an easily accessible overview of the national assessments for external stakeholders.

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<sup>1</sup> Weighted average of nine representative European markets' (Belgium, Czechia, France, Italy, Germany, Netherlands, Spain, the United Kingdom and the Nord Pool system price) day-ahead contracts



In the 'country fact sheets' in the annex, stakeholders can find information on the applicable (temporary) minimum capacity target for 2023 in the relevant Member State, a description of the national compliance methodology and confirmation of whether it follows the ACER monitoring methodology – and if not, indications of the main differences. Furthermore, this year's report explains why the application of the 70 % requirement to the intraday timeframe (as discussed in the context of CACM 2.0) will not result in higher intraday capacities. To summarise, physical capacities cannot be increased

beyond security limits. TSOs have the legal duty to reconcile the 70 % with physical reality. However, TSOs agree that the provision of sufficient cross-zonal capacity for the intraday time frame is crucial to a well-functioning intraday market and in particular for RES Integration. However, CACM 2.0 must not pre-empt the long-term solution on how to align markets with physics. An improved alignment is more likely to be found in a structural market reform, and TSOs are keen to continue a constructive debate.

## Forward capacity allocation at a glance

In the FCA, where cross-zonal transmission rights are allocated in explicit allocations via a single pan-European platform, the high-quality level of the operation was maintained. Considerable attention was also dedicated to the introduction of long-term flow-based capacity allocation (LT FBA) which is, according to the current regulations, to be implemented in the Nordic and Core CCRs in the coming years. TSOs, together with the Joint Allocation Office (JAO), carried out an

ex-post analysis on the valuation of long-term transmission rights (LTTRs) for the years 2022 and 2023. This analysis has been rolled out as a regular reporting and is being published on a monthly respectively yearly basis on the [JAO's website](#). The aim is to increase transparency on the ex-post premium, which is the full payout result of the LTTR-options that are currently being allocated on most European bidding zone borders (BZBs).

## Market coupling at a glance

The Governance Task Force, tasked with the implementation of organisational improvements, was put on hold due to the delay of 'CACM 2.0'. On the other hand, in July 2023 the MCSC approved adding the 15 minute MTU testing group to the governance under Single Intraday Coupling Quality Assurance and Release Management (SDAC QARM). During the reporting period, Bursa Română de Mărfuri (BRM) adhered to the Day-ahead Operational Agreement (DAOA), and respectively became active in The Netherlands and in Romania, and the Energy Trading Platform Amsterdam (ETPA) became observer of the DAOA.

At the time of writing, they are non-operational members. Nasdaq exited from SDAC. For Single Intraday Coupling (SIDC), the only change consisted of the adherence of BRM to the Intraday Operational Agreement (IDOA). There were no further changes in memberships. In 2024, the main body and several exhibits of the IDOA were amended to develop the principles of the NEMOs and TSOs' cooperation in view of the current and future development, implementation, and operation of IDAs.

### 1) Single day-ahead coupling

SDAC utilises the day-ahead Market Coupling Operator (MCO) function<sup>2</sup> to calculate electricity prices and matched volumes across Europe, and to implicitly allocate cross-zonal capacity in a single auction. The algorithm used is called the Pan-European Hybrid Electricity Market Integration Algorithm (EUPHEMIA). For SDAC, the activation of linear Inter NEMO flow calculation (INFC) went live in August 2023. The lower threshold that triggers the second auction procedure for SDAC was decreased from -150 €/MWh to -500 €/MWh in June 2023.

Operations for both SDAC and SIDC remained stable, with no full decoupling of markets. On 28 October 2023, one partial decoupling event took place for SDAC due to a technical issue of the local NEMO trading system impeding validation of submitted orders. New releases for both SDAC (PMB and EUPHEMIA) and SIDC took place during the reporting period, as well as improvements to the SDAC algorithm. For SDAC, there was the go-live of the Multi-NEMO arrangement on the French side of the French-Spanish border in February 2024.

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<sup>2</sup> The function of the Market Coupling Operator, carried out by the NEMOs, is to operate the price coupling algorithm to match orders across BZs, and to allocate cross zonal capacity accordingly.

## 2) Single intraday coupling

SIDC enables continuous cross-border trading across Europe in the ID timeframe. It is based on a common IT system with a Shared Order Book (SOB), a single Capacity Management Module (CMM) and a Shipping Module (SM). The common XBID IT system facilitates the continuous matching of orders from market participants from several BZs, provided

that cross-zonal capacity is available. The IT system also enables multiple NEMOs to participate per country. Furthermore, for SIDC there was the successful go-live of the 15 min MTU capacity allocation on the HR-SI and HR-HU borders in January 2024, and the successful go-live of the ETPA in August 2023. IDAs went live on 13 June 2024 as planned.

## Integration of Balancing markets at a glance

European electric power systems are currently facing profound changes from both the regulatory and technical perspective, derived from the implementation of Electricity Balancing (EB) Regulation. In this sense, the implementation of the Trans-European Replacement Reserves Exchange (TERRE) platform in Q1 2020 (platform for Replacement Reserve [RR] activation), the International Grid Control Cooperation (IGCC) in Q2 2021 (platform for the netting of automatic Frequency Restoration Reserve [aFRR] needs), the Platform for the International Coordination of Automated Frequency Restoration and Stable System Operation (PICASSO) in Q2 2022 (platform for aFRR activation) and the Manually Activated Reserves Initiative (MARI) platform in Q4 2022 (platform for manual Frequency Restoration Reserve [mFRR] activation), have been important milestones for fulfilling the EB Regulation roadmap. These platforms not only foster collaboration among TSOs but also enhance the market liquidity, competition, system security and social welfare of the European energy system. The main achievements with respect to the balancing markets are:

- › Many TSOs are planning to connect to both the MARI and PICASSO platforms in 2024. A thorough planning of testing activities is being performed to ensure smooth integration and prevent bottlenecks.
- › The implementation of the Capacity Management IT Solution (CM IT solution) in 2023 further supports the efficiency of consecutive platforms. It ensures the continuous update and availability of interconnection capacity crucial for the seamless progression of the balancing activation process.
- › Despite advancements, challenges persist, particularly evidenced by frequent price incidents at the PICASSO platform. Consequently, it has become necessary to introduce price mitigation measures submitted by All TSOs to ACER in February 2024.
- › In July 2023, significant regulatory advancements occurred with the approval of the Methodology for Harmonising Cross-Zonal Capacity Allocation and associated methodologies about RCC's supporting tasks on capacity sizing and procurement. Ongoing market-based initiatives such as the Nordic and German-Austrian (DE-AT) initiatives are in progress to be further aligned with the Harmonised Cross-Zonal Capacity Allocation Methodology (HCZCAM).

- › A group of 13 TSOs are currently participating in the Common Optimisation of Balancing Reserve & Cross-Zonal Capacity Allocation (COBRA) project which is leading the development of harmonised software to efficiently allocate interconnection capacity between reserve and energy markets for future regional initiatives in Europe, using a market-based approach defined at HCZCAM.
- › Regarding Imbalance Settlement Harmonisation Methodology, TSOs have adjusted their systems since January 2022 to align with referred methodology. However, the ongoing process to transition to a 15-minute imbalance settlement period continues until 1 January 2025, as per the maximum derogation date.
- › A review process has been conducted for the Financial Settlement of KΔf, ACE and ramping period (FSkar) methodologies. The reviews found that no adjustments were necessary at the current point in time for the FSkar Within Synchronous Areas CE methodology, which was also shared in a report with each concerned national regulator. For the FSkar Between Synchronous Areas methodology, recent market changes needed to be included and amendments were made in the methodology.

Despite challenges, advancements in European electric power systems reflect the industry's commitment to regulatory compliance, system efficiency and collaboration among stakeholders. In parallel with the release of the Market Report 2024, ENTSO-E will also unveil the Balancing Report 2024. This document provides a more in-depth analysis of the dynamics of the balancing markets, offering insights such as performance indicators and executive summaries of the national balancing markets of each TSO.





# 1 Introduction

Every year, ENTSO-E monitors the progress of electricity markets<sup>3</sup>. This monitoring covers the different time periods for which electricity is traded, ranging from long-term to day-ahead (DA) markets and intraday (ID) to balancing markets. The 2024 version of ENTSO-E’s annual Market Report covers the period from June 2023 to May 2024. The report is formally submitted to the Agency for the Cooperation of Energy Regulators (ACER) and published on ENTSO-E’s website after the reporting period.

## Electricity markets from long-term to real-time

Electricity is a non-storable good which needs to be produced at the time in which it is to be consumed (in real time). Trading of electricity takes place before and after this point in time. Figure 1 gives an overview of the current trading time frames of the internal electricity markets. Transmission System Operators (TSOs) provide the basis for the efficient

performance of European electricity markets across these time frames by offering the optimal level of transmission capacity available for electricity trading. Integrated cross-border markets across all time frames lead to a more efficient European market overall, which will ultimately lead to benefits for all European customers.

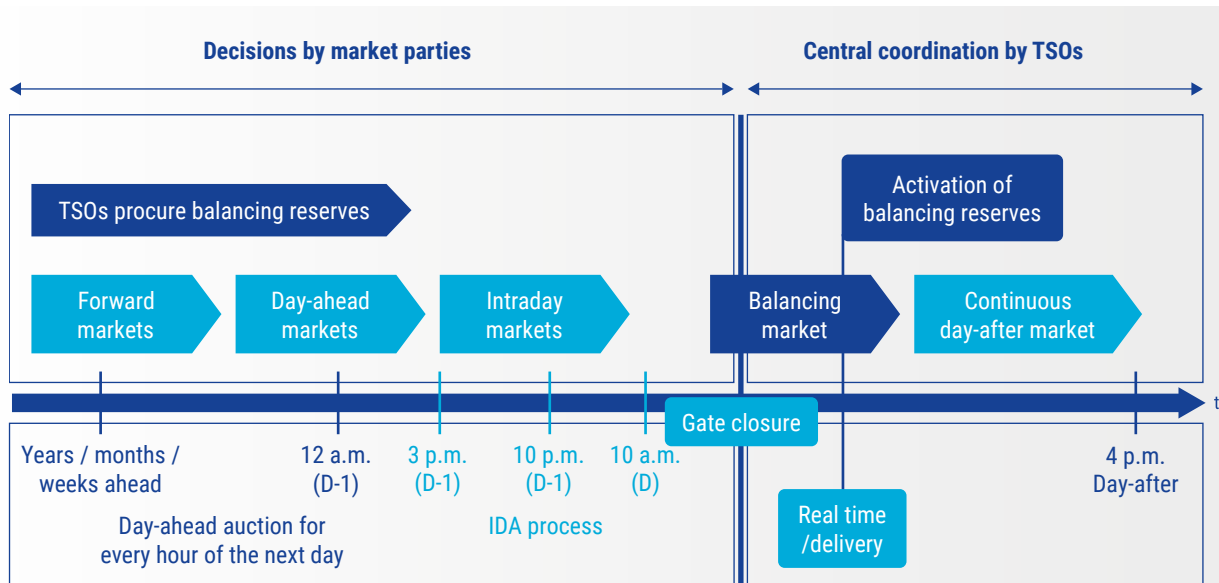


Figure 1: Overview of different time frames of the wholesale and balancing markets

3 For legal references, please see the [Annex I](#).

## Long-term capacity calculation

Currently up to one year in advance of the actual delivery date, TSOs determine the appropriate level of **long-term transmission capacity** at the borders they manage. Based on this calculation, long-term transmission rights (LTTRs) are offered at explicit auctions on the Single Allocation Platform (SAP), a role that has been assigned to the [Joint Allocation Office \(JAO\)](#). Calculating the appropriate level of long-term transmission capacity is a complex and challenging task given the high degree of uncertainty around long lead times. TSOs must make assumptions and ensure that the allocated LTTRs can be guaranteed during the entire time of the product period. Risks such as potential outages of transmission lines and varying generation and load patterns must be considered in this context. Given these uncertainties, the

long-term capacity calculation process greatly differs from capacity calculation processes that are closer to real-time, as then more reliable information is available. The Commission Regulation (EU) 2016/1719 (guideline on forward capacity allocation, FCA), which entered into force on 17 October 2016, sets out harmonised rules for the calculation and allocation of LTTRs, along with rules on how LTTR holders are compensated if their right is curtailed due to capacity recalculations before DA timeframe. The overarching goal is to provide market participants with the ability to hedge their risk associated with cross-border electricity trading where the electricity forward market does not already provide sufficient hedging opportunities.

## Short-term day-ahead and intraday capacity calculation

TSOs can perform more reliable forecasts of their electricity system's situation closer to the electricity's actual delivery date. The available electricity transmission capacity between bidding zones (BZs) is determined by translating physical transmission constraints into commercial transaction constraints. These commercial transaction constraints are then considered in the market clearing algorithm, which determines market prices and cross-zonal exchanges between BZs. These calculations are performed<sup>4</sup> between one day prior to the delivery date (e.g. DA capacity calculation and first ID capacity calculation for IDA1 and IDA2) and within the delivery date (second ID capacity calculation for IDA3 and continuous capacity assessment). Congestions occurring

after capacity allocation resulting from the different short-term markets require remedial actions (e.g. countertrading or redispatching measures), which are coordinated between all affected TSOs during real-time grid operation.

The rules set by the Commission Regulation (EU) 2015/1222 (guideline on capacity allocation and congestion management, CACM) provide the basis for implementing a single energy market across Europe in the DA and ID time frames. They outline how capacity is calculated across the different BZs and also define the conditions for the methods for allocating capacity in DA and ID time frames.

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4 Go-live of IDA1, IDA2 and IDA3 took place in June 2024.

# Real-time balancing

Power generation and demand are subject to forecasting errors and technical disturbances. To balance deviations and maintain the network frequency within permissible limits, TSOs operate load frequency control processes. The energy activated in this process is called balancing energy. The procurement and settlement of balancing energy is organised in **balancing markets**. The Commission Regulation (EU) 2017/2195 of 23 November 2017 (Electricity Balancing (EB) Regulation) establishes detailed rules for the implementation of these balancing energy markets in Europe which aim to foster effective competition, non-discrimination, transparency, and balancing market integration. This will ultimately enhance the efficiency of the European balancing system as well as the security of supply.

Imbalance settlement aims to ensure the efficient maintenance of the system balance by incentivising market participants to maintain, keep and restore their individual – and thereby ultimately the overall – system balance. In this sense, imbalance settlement constitutes a cornerstone to a fully and efficiently functioning internal electricity market. To ensure fairness, objectivity and transparency within the mechanism,

the EB Regulation sets out rules for the financial imbalance settlement that have to be implemented through terms and conditions for balance responsible parties (BRPs).

The EB Regulation lays down the guidelines for creating an integrated balancing market in different timeframes in which TSOs can share their resources to ensure that generation equals demand at all times. The final goal of the EB Regulation is to integrate balancing markets and promote the possibilities for the exchanges of balancing services while contributing to operational security.

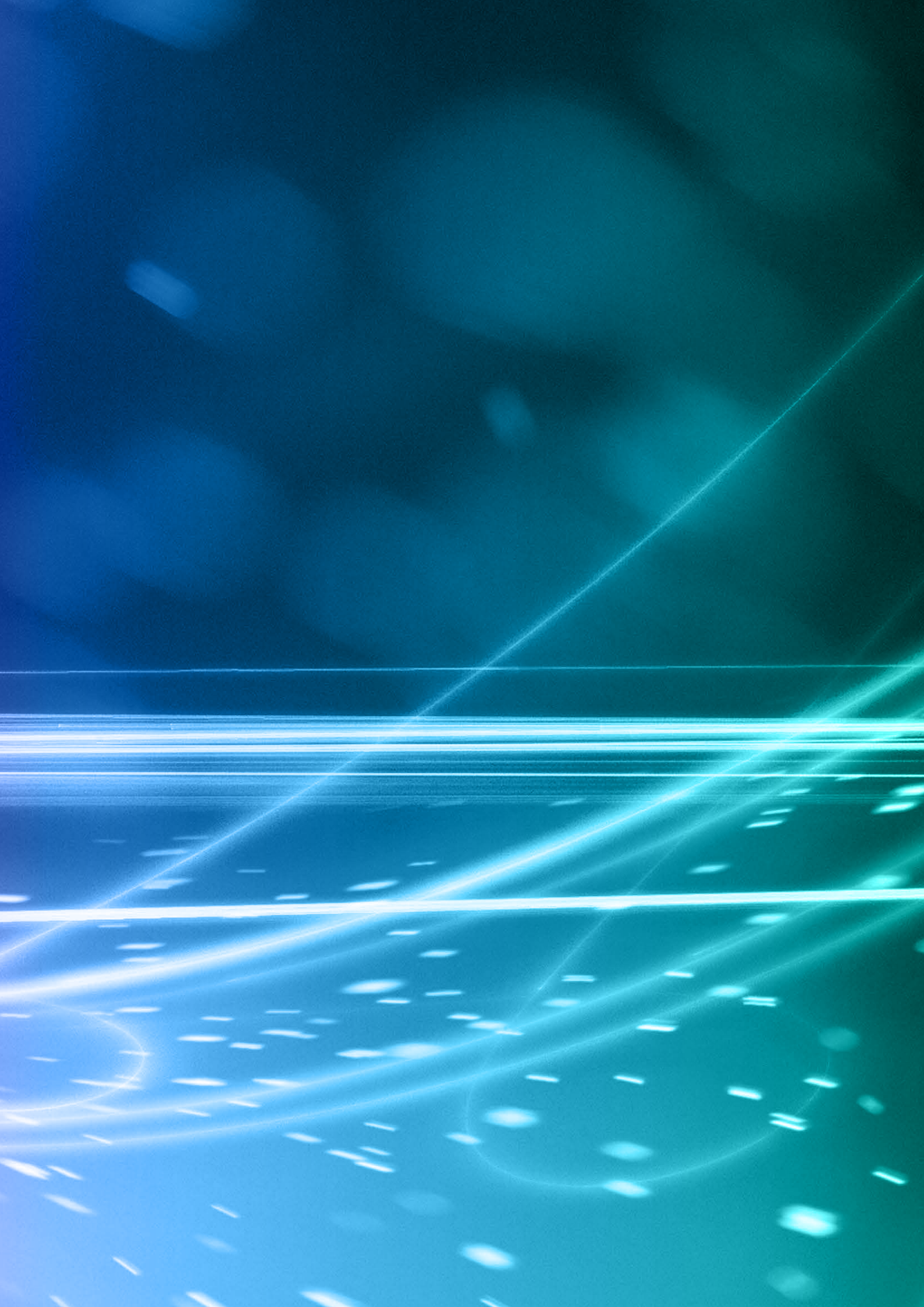
The regulation lays down principles for the exchange of balancing energy and the associated settlement among TSOs and between TSOs and connected balancing service providers (BSPs) regarding the following set of products: frequency restoration reserves (FRR – both with automatic [aFRR] and manual activation [mFRR]), replacement reserves (RR), and a common methodology for the exchange and sharing of reserves and for the procurement of frequency containment reserves (FCR), although to a lesser extent.

## Report structure

**This report is mainly structured according to the time frames described above:**

- › **Chapter 2** provides insight and ENTSO-E positions on current and future developments impacting the European electricity market.
- › **Chapter 3** introduces the progress of the electricity market across all time frames described previously.
- › **Chapter 4** provides a detailed overview of the common European processes of long-term electricity trading and transmission capacities according to the FCA regulation.
- › **Chapter 5** outlines the current situation in achieving a single European DA and ID coupling process according to the CACM regulation.
- › **Chapter 6** provides an update on the harmonisation and integration of European balancing markets governed by the implementation of the EB Regulation.
- › **The annex** includes additional information such as a market process overview of FCA, CACM and EB Regulation as well as an explanation of how TSOs comply with the 70 % minimum capacity target requirement per country.





# 2 Current and future developments impacting the European electricity market

## 2.1 Development of short-term markets

### 2.1.1 Transmission Access Guarantee Principles

Transmission Access Guarantee (TAG) is a framework introduced in the Electricity Market Design (EMD) reform as a mechanism to compensate offshore renewable generators in so-called hybrid projects that are connected to at least two different BZs. Offshore bidding zones (OBZs) are a promising solution to integrate hybrid projects into the EU electricity system and markets. In an OBZ, however, offshore renewable generators are faced with an additional revenue risk compared to radial connections, because their ability to sell energy to the market depends on the availability of sufficient transmission capacity. Transmission capacity from the OBZ to adjacent BZs and wider market can sometimes be limited as a result of the capacity calculation and/or allocation process. Consequently, offshore generators in those situations face a revenue risk because 1) they will not be able to sell the full volume of their production in neighbouring BZs; and 2) the limitation of the transmission capacity may result in a price drop in the OBZ that lowers achievable revenues. To mitigate this risk, the EMD reform introduces a new point c in article 19(2) of [EU Electricity Regulation](#) requiring TSOs to guarantee access to the onshore grid, even when this is technically/physically not possible, and to compensate generators using congestion income when capacity has been restricted.

The purpose of this section is to provide ENTSO-E's views on principles for the implementation of TAG in the CACM guideline, as part of the CACM 2.0 process announced by the EC, as well as for the possible implementing methodology that the revised CACM guideline may require. In this regard, ENTSO-E would like to suggest the following approach:

- › **CACM 2.0 should include a set of main principles** that address the most fundamental elements to provide a firm regulatory framework and legal basis for implementation.
- › **The more detailed design and implementation considerations may more ideally be included in an implementing methodology** to be developed by All TSOs and approved by ACER.

In the following paragraphs, ENTSO-E presents its recommendations on which elements to include in the CACM 2.0, and which to possibly include in an implementing methodology. In any case, considering the numerous implementation challenges highlighted below, ENTSO-E advises the EC to leave sufficient flexibility in the CACM 2.0 process to assess and agree which elements should be included in CACM itself and which should be included in other related methodologies or implementing acts. In the event that additional implementing acts touch upon TAG, ENTSO-E should be involved in a similar manner as for CACM.

## — Main principles to be included in CACM 2.0

ENTSO-E recommends that, wherever the TAG touches upon core matters of CACM, the main principles of the TAG mechanism are to be included in a dedicated article in the CACM. The purpose of this is to provide a firm regulatory framework on the design and implementation of the mechanism in the form of principles that are more elaborate than the legal framework provided by the article in the EMD reform. In this context, ENTSO-E's points of attention are:

- › **Clarify roles and responsibilities for TAG implementation:** in the event that CACM 2.0 requires an implementing methodology, it should be specified that the initial drafting would be assigned to ENTSO-E/All TSOs. Moreover, TAG implementation may require the involvement of NEMOs in providing the necessary data (SDAC order books and potentially counterfactual prices) as part of the TAG settlement process. This data provision role should thus be foreseen by CACM.
- › **Legal mandate to modify CID and UCI Methodologies:** TAG implementation will require a modification of the Congestion Income Distribution (CID) and Use of Congestion Income (UCI) Methodologies. For implementation, it should be clarified whether the EMD already provides the necessary legal basis for triggering such amendments, whether the CACM 2.0 should provide the legal basis to trigger an amendment of these methodologies, or whether a legal basis should be provided in another form to trigger such amendments. Regarding the UCI methodology, it should be remembered that All TSOs are currently investing significantly in their grid to facilitate the energy transition.
- › **Confirm the definition of minimum transmission capacity on critical network elements used in conditions for triggering TAG:** The EMD text refers to article 16(8) of the [EU Electricity Regulation](#) as one of two conditions to determine whether a TAG payment is due (also known as the 70 %-rule). This article further refers to paragraphs 3 and 9 that include derogations to the 70 %-rule and to article 15(2), which obligates Member States to ensure the minimum capacity is achieved. ENTSO-E proposes that the CACM clarifies that if a derogation is applied, the considered capacity therein should be the one considered for the TAG compensation, rather than the general level of paragraph 8, to ensure consistency with the electricity market regulation.
- › **Clarify the definition of maximum generation capacity eligible for TAG compensation.** It should be clarified that the connection agreement of wind farms in the OBZ should refer to the maximum connection capacity that can be guaranteed and compensated for based on the capacity of the interconnector, but not more than this. It should not be the capacity of the wind farm itself but only the firm connection capacity to correctly account for overplanting. When concluding connection agreements with offshore wind farms in OBZs, connecting TSOs should consult other TSOs sufficiently in advance as these TSOs may potentially be required to finance TAG compensations.
- › **Clarify that the TAG mechanism should only apply to the DA market timeframe:** Based on our preliminary assessment, for the sake of implementation feasibility, decreased risk of gaming and because of the DA market's significance in both cross-border capacity allocation and as reference market for later timeframes, ENTSO-E proposes that TAG only applies to the DA timeframe.
- › **Clarify situations that are outside the scope of the TAG mechanism:** CACM should clarify that offshore generation is not eligible for TAG compensation in situations where dispatch of the offshore generator is lower than generation potential due to market competition on grid capacity. In addition, CACM should clarify that offshore generators are not compensated through TAG, inter alia in the following cases (which may be better covered through separate, situation-specific arrangements):
  - Force majeure & emergency situations
  - Line maintenance and maintenance of the offshore generation assets
  - Cross-border redispatch; and
  - Coordination issue between grid and generation planning



## Conditions for TAG application: issues to be clarified in an implementing methodology

The more detailed design and implementation choices should be developed separately, possibly in an implementing methodology that has its legal basis in the CACM 2.0. ENTSO-E has made a non-exhaustive list of points that require clarification. Many of these points require extensive analysis as they are highly complex. No clear recommendations can therefore be given on how to address them at this point in time. The points that require further clarification are:

### Conditions for when TAG is triggered

- › Conditions for triggering TAG (when is an offshore generator eligible for compensation?)
- › Volume and price definition for TAG (how to calculate level of compensation?)
- › Expiration of TAG once there is sufficient demand in the OBZ (when does TAG not apply because the revenue risk in the OBZ is no longer present?)
- › Rules to avoid double-compensation via support schemes (when does TAG not apply because the revenue risk in the OBZ is managed via a support scheme?)
- › TAG for non-EU offshore generation/interconnectors (how to manage TAG compensation in cases where non-EU assets are connected to an OBZ?)

### Conditions for funding and settlement of TAG compensation

- › Clarify TAG settlement and source of funding for compensation (should TAG payments be settled based on the congestion income of individual TSOs or from the total regional congestion income pot?).
- › Allocation of TAG payments to specific capacity reductions and TSOs based on the polluter-pays principle (How should the costs of compensation be shared between TSOs by operationalising the polluter pays principle?)
- › Application of the cap and interpretation of the phrasing 'between concerned BZs' (how to identify the cap on the total annual TAG compensation when also considering that the CI earned on the interconnector can/is used for other priority uses or for LTTR-payments?)

- › Financing of 'residual compensation need' in the event the compensation sum exceeds the cap (how to understand the following phrase in the recital: 'any compensation not covered by this proportionate sharing may be divided between the relevant parties in the Member States involved in the offshore hybrid project as part of their cost sharing arrangements?')
- › TAG payments for multiple wind farms in OBZs (how TAG compensation is settled in practice in the event that wind farms in OBZs are owned and operated by multiple entities?)

### TAG and links to other regulations/methodologies

- › TAG and LTTRs – link to the FCA Regulation (how to avoid double-remuneration if LTTR payment and TAG compensation is to be paid on the same capacity, and which amendments may be needed to the FCA regulation?)
- › TAG and link to Congestion Income Distribution CID methodology (which amendments may be needed to the CID methodology?)
- › TAG and link to UCI methodology (which amendments may be needed to the UCI methodology?)

**ENTSO-E is ready for a key role in the elaboration of these points**, because TSOs have the necessary competences to support the more detailed design and implementation, i.e. competences on the use of congestion income, congestion income distribution, capacity calculation and allocation, congestion management, market design and market coupling.



## 2.1.2 Market coupling

Continuous enhancement and improvement of market functioning are key to the development of electricity markets. To fulfil the economic, operational and governance objectives of

European electricity market integration, TSOs' efforts align in several areas.

### 1) Transparent & level playing field in data access, use and exchange

Transparency is a pre-condition for efficient market operation and equitable participation in market coupling processes. Therefore, TSOs see great value in having the same access to all market data as NEMOs at no costs. Anonymised data

should also be available to market participants: improved level of access to market data will contribute to further efficiency gains in the entire European market.

### 2) Enhanced and continuous improvement of market coupling

As the European electricity market design evolves, we need to improve and enhance the operation of market coupling at the pan-European level. However, TSOs do not agree that this can be achieved via a Single Legal Entity. Accordingly, TSOs strongly support a further improved governance of market coupling to ensure enduring robustness which reflects the joint responsibilities of TSOs and NEMOs. The joint responsibility includes establishing, amending and operating market coupling. It also includes equitable cost sharing. The cost sharing between TSOs and NEMOs shall therefore remain at 50/50 (in line with voting rights).

We also ask for harmonised cost recovery among Member States where NEMOs recover their own costs via a market coupling fee to ensure timely cost recovery for the NEMOs. Finally, TSOs see value in understanding the MCO function as a coordinator of local market operators, a service which shall be operated by a small number of NEMOs and for which the resources shall be provided jointly by TSOs and NEMOs. Combined, this will allow for the most cost-effective and operationally secure use of the transmission infrastructure.

### 3) Ensuring integrity of the price coupling process

The price coupling process shall produce cost-effective results without endangering operational security. To reduce the risk of incidents caused by erroneous data submission, TSOs propose establishing routines that verify the quality of submitted data. This verification should be performed by the

parties submitting the data and be effectively enforceable. To grant NEMO a licence in the future it should be proven towards the relevant National Regulatory Authorities (NRAs) that NEMOs have the necessary tools available to check bidding data.

### 4) Furthering the implementation of flow-based market coupling

The implicit allocation of cross zonal capacity (CZC) represents the most economically efficient mode of capacity allocation. Moreover, in some regions, it is closely tied to the implementation of flow-based capacity allocation. Accordingly, TSOs agree that all capacity allocation in DA and ID trading shall be done implicitly. Should R&D efforts ongoing for the ID timeframe demonstrate difficulties with

the implementation of a flow-based allocation approach in continuous trading, TSOs favour the implementation of a (transitional) hybrid flow-based capacity allocation approach to be further pursued for this timeframe, meaning flow-based applied for ID auctions and net transfer capacity (NTC) based for continuous trading.

## 2.1.3 Structural congestion

A proper harmonisation between different levels of regulation ([EU Electricity Regulation](#), CACM) on the concept of structural congestion is necessary.

In light of the recently published study by ACER on this subject, TSOs identified points for clarification/improvement, and call for further debate both on how structural congestions are identified as well as the toolkit to address them.

In addition to the application of the improved definitions that will result in identifying structural congestions, it is important to subsequently identify the root cause of congestion and not solely focus on where the congestion is located. The study introduces the concept of 'areal congestion' for this purpose, yet does not contain criteria nor clear-cut solutions to apply it. The geographical stability of a congestion is to be demonstrated and the usability of backward assessments is challenging as these are de facto taking existing BZ configurations as a reference.

Regarding the definition of structural congestion, the time-span required to conclude that the congestion is 'stable over time', and therefore labelled as structural, remains to be clarified. Furthermore, robustness is needed in the definition as there can be multiple triggers to identify structural congestion. Some considerations:

- › A narrow focus on frequency as a threshold is deemed insufficient. Frequency is a weak proxy of the economic impact a congestion may have. The magnitude of congestions and related redispatching volumes and costs are also crucial.
- › Defining an appropriate frequency threshold is a challenge. The value of 10 % as put forward in the study seems to have been chosen arbitrarily rather than the result of an in-depth assessment.
- › The identification of structural congestion without a threshold must not be excluded. A key example are hybrid interconnectors, where structural congestion is by design part of the planned grid and an OBZ part of the efficient market design.
- › Defining a threshold creates a perception of precision that may be fine for evaluating historical congestions. However, when assessing future time horizons, a range of scenarios/hypotheses come into play.

The identification of structural congestion (via the technical report, the national report or in the BZ review) is a trigger to evaluate future BZ reconfigurations, and TSOs also see the need to discuss the toolkit on how to address structural congestions. The following fundamental challenges are identified in particular:

- › Congestion patterns will become more dynamic as the energy transition unfolds. Consequently, not all 'frequently occurring' congestions will be geographically stable over a time span of 3, 5, 10, ... years. This indicates that a variety of options could be necessary to address these congestions of a temporary nature.
- › The need for a sufficiently forward-looking approach. The focus seems to be on solving existing structural congestion, looking at historical data and doing a forward assessment up to 3 years ahead. However, BZ reconfiguration must not be seen solely as a tool complementary to operational processes. It also has a complementary role to grid planning to:
  - Enable a right balance between priority for intra-zonal trades and cross-zonal trades;
  - Deliver an efficient solution for offshore integration, where OBZs complement hybrid interconnectors; and
  - Provide stability and foresight for a well-functioning forward market, thereby facilitating investment decisions.
- › Without prejudice to the efficiency of policy options offered to Member States in the [EU Electricity Regulation](#) to implement the 70 % requirement (pay, build, BZ reconfiguration), TSOs observe that the study ignores the possibility of applying virtual capacity. This raises the question of how the application of remedial actions, the 'pay' policy option, is to be reconciled with the proposed definition of structural congestion. CACM 2.0 should not contradict the [EU Electricity Regulation](#).
- › TSOs consider the current BZ review methodology/process to be rather complex, lengthy, and demanding an extremely high resource effort to deliver technical input into a political decision-making process. The proposed simulation chain continues to promote the delivery of complex technical studies, whereas TSOs believe simplification is needed.

The definitions on (structural) congestion should consider the broader debate on how to align markets with physics. As the framework of policy options to achieve this objective is enshrined in primary regulation, TSOs believe this debate will take us beyond the update of CACM 2.0. Following the recent targeted reform of the electricity market design, an assessment on the effectiveness of the current structure and functioning of the short-term electricity markets is to be carried out by the EC by June 2026. It may thus be anticipated that an eventual structural market reform would (further) address the need of aligning markets with physics. As input for this debate, TSOs have identified above a series of challenges linked to the concept of congestions to address and reiterate their suggestions to future proof the zonal market design – see chapter 3 'Congestion management and spatial granularity' of ENTSO-E Discussion paper '[Options for the design of European Electricity Markets in 2030](#)'.

## 2.1.4 Capacity Calculation Regions

It is fundamental that TSOs and their NRAs are able to assess and choose the most efficient CCR configuration on the basis of technical, economic and governance-related criteria. CCR determination criteria must be carefully designed to avoid unnecessary changes to the current situation which would lead to no improvement in the capacities provided to the market and the security of the grid. Any eventual change to the configuration of CCRs should be backed-up with an economic and technical efficiency analysis. ENTSO-E published a [Framework for Assessing the Configuration of Capacity Calculation Regions](#) in December 2023.

Adding one BZB in two CCRs triggers critical issues such as coordination, in-efficiency and different sets of methodologies on each side of the border.

Concerning cNTC regions, CCR re-definition should not result in imposing calculation methods for the coordination of HVDC borders which have not yet been assessed by the concerned TSOs.

## 2.1.5 Third Countries

Agreements with some third countries on capacity calculation are in place or underway in several CCRs following the guidance form of the EC in its letter of July 2019.

In general, TSOs strongly call for a reasonable approach, by acknowledging the contribution of the 3rd country flows not only for cases where such agreements are in place but also where these are not yet concluded (the framework/timing to develop agreements is frequently determined by the political landscape).

From a legal perspective, any fundamental principles excluding third countries treatment cannot be handled in a network code or guideline from TSOs' perspective. The current practice of network codes is more open ended:

1. arrangements depend on political developments such as intergovernmental agreements (current CACM, EB GL) or
2. rules allow the TSOs to conclude contracts with third country TSOs (SO GL, NC ER)

## 2.2 Development of long-term markets

TSOs are eager to develop and structure a long-term market fit for hedging needs of future technologies and market participants without disrupting the current developments of

the long-term market. This will be the focus of the common TSO answer to the EC's upcoming consultation of the possible improvements to the European long-term market.

## 2.3 Trade development with Ukraine and Moldova

On 16 March 2022, Continental Europe (CE) TSOs performed the emergency trial synchronous operation of Ukrenerg and Moldelectrica. Since then, Ukrenerg has actively worked with CE TSO experts to ensure its compliance with its Catalogue of Measures, listing key requirements from the Operational Framework (Synchronous Area Framework Agreement (SAFA) + System Operations Guideline (SO GL) + Network Code Emergency and Restoration (NC ER) + Electricity Balancing Guideline (EB GL) Article 50.3 and 51.1).

Starting from 30 June 2022 commercial electricity exchange was allowed and the trade capacities in both directions were gradually increased, as presented in the graphs below.

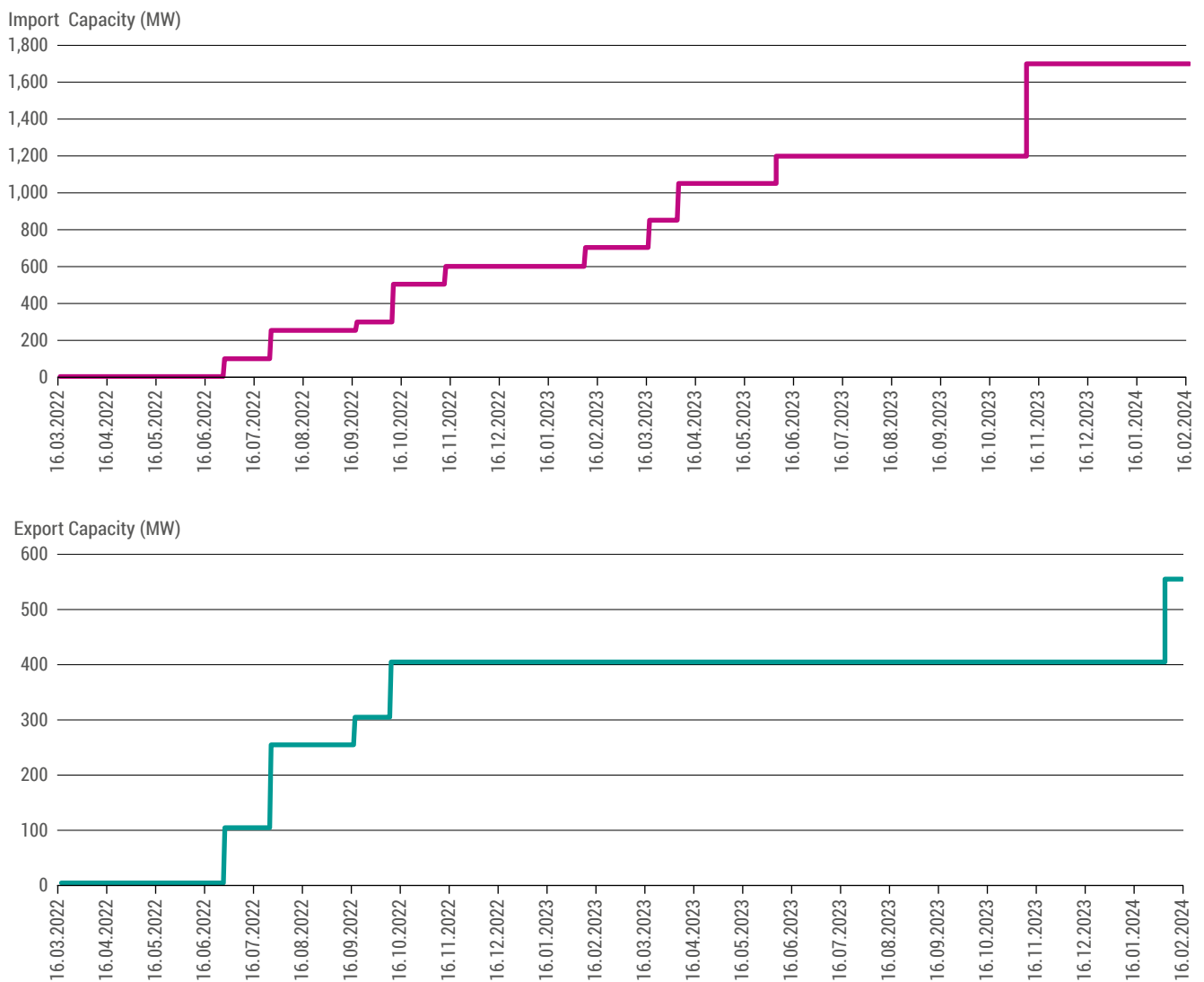


Figure 2: Import / Export capacity between Ukraine/Moldova control block and Continental Europe

**ENTSO-E played a key role in maintaining European electricity grid stability and ensuring trade progress between Ukraine/Moldova and CE. Beyond the gradual integration of Ukraine and Moldova into the European energy market, the synchronous operation and gradual increase of the trade capacity are vital to Ukraine’s security of supply.**

On 28 November 2023, CE TSOs confirmed the sufficient compliance of Ukrenergo, enabling them to be considered as permanently synchronised, to adhere to the SAFA, and to become eligible for ENTSO-E membership.

During 2023, a dedicated group of experts from ENTSO-E, TSOs and the JAO worked on completing the daily harmonised allocation rules needed to establish the go-live of common daily auctions on the Slovakia–Ukraine, Hungary–Ukraine and Poland–Ukraine borders organised by the JAO, in addition to daily allocation rules for auctions on the Romania–Ukraine border.

ENTSO-E acted in the role of a facilitator for communication between the TSOs and external stakeholders, in particular: the EC, EnCS, JAO and various national institutions, to reach the go-live of daily joint auctions.

**The common auctions went live as follows:**

- › Romania–Ukraine: 2 November 2023 – daily joint allocation run by UA party;
- › Poland–Ukraine: rules entered into force on 16 January 2024 for first bidding on 18 January 2024 – daily joint allocation by JAO;
- › Hungary–Ukraine: rules entered into force on 22 February 2024 for first bidding on 23 February 2024 – daily joint allocation by JAO; and
- › Slovakia–Ukraine: rules entered into force on 4 March 2024 for first bidding on 6 March 2024 – daily joint allocation by JAO.



A graphical representation of the continuity of the common joint auctions organised by JAO in the early stages is shown in the graphs below.

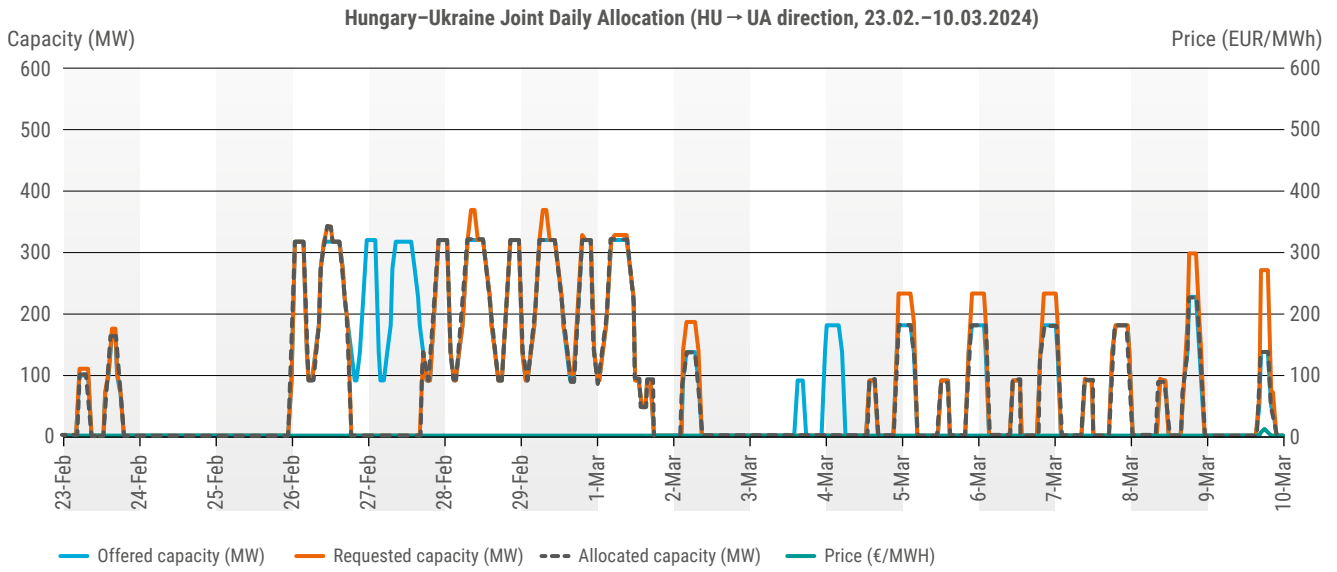


Figure 3: Hungary-Ukraine Joint Daily Allocation (HU→UA direction, 23.02.- 10.03.2024)

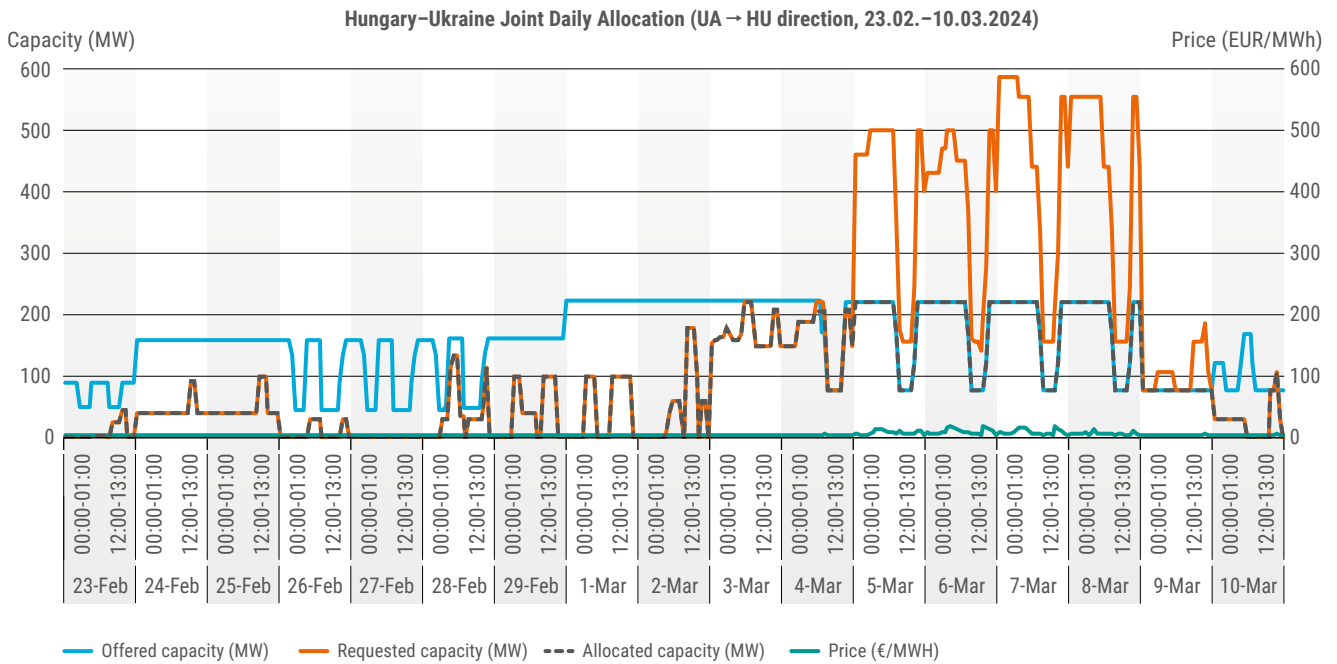


Figure 4: Hungary-Ukraine Joint Daily Allocation (UA→HU direction, 23.02.- 10.03.2024)

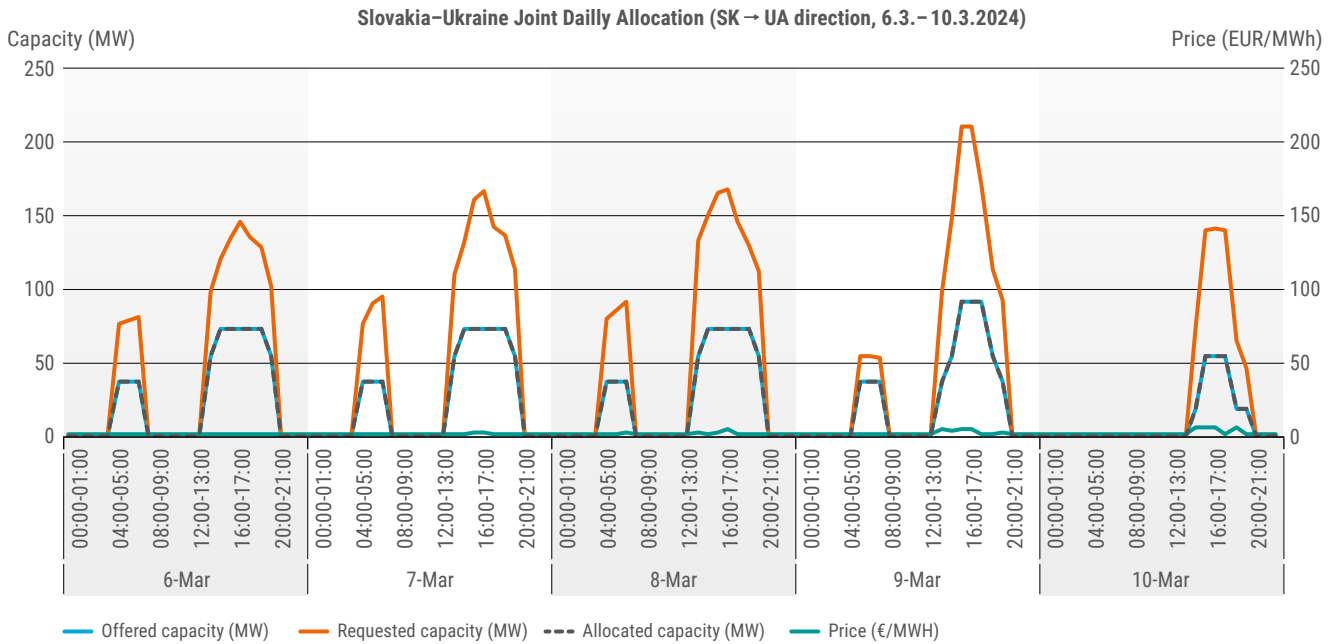


Figure 5: Slovakia-Ukraine Joint Daily Allocation (SK→UA direction, 6.3. – 10.3.2024)

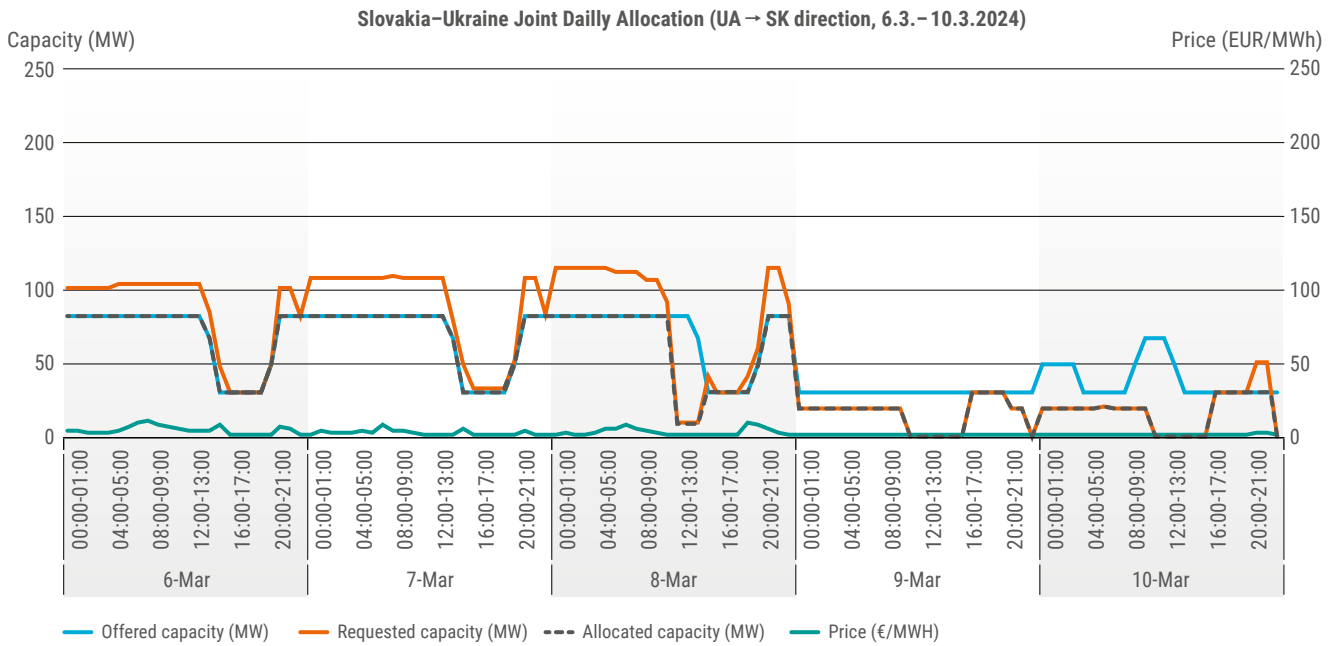


Figure 6: Slovakia-Ukraine Joint Daily Allocation (UA→SK direction, 6.3. – 10.3.2024)

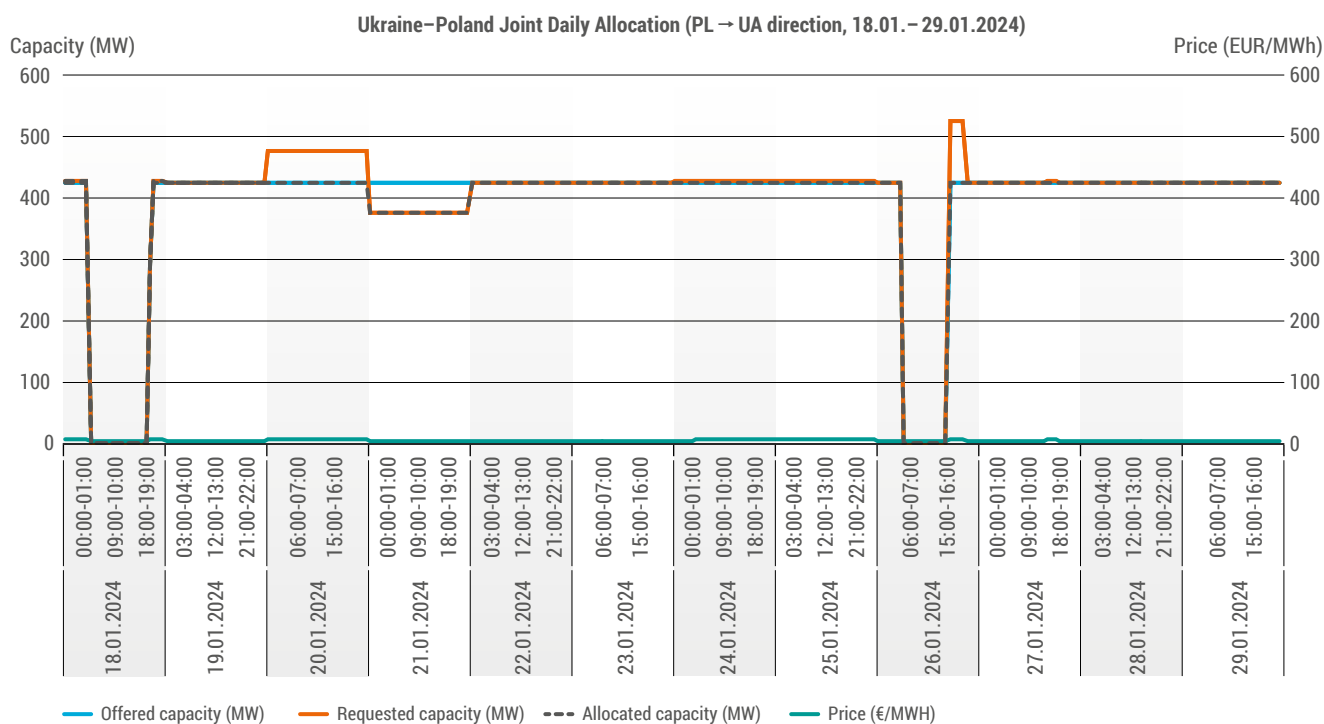


Figure 7: The graph shows the auctions in the direction Poland→Ukraine. The values in the other direction Ukraine→Poland are 0 most of the time for the indicated period.

The daily joint auctions on the Moldova–Romania border went live on 11 October 2022 and were continuous in 2023 and the first half of 2024. **The go-live of common daily coordinated capacity allocation between Ukrenergy,**

**Moldelectrica and neighbouring CE TSOs was a major milestone.** ENTSO-E would like to thank the external stakeholders and All TSOs involved for their support and assistance in the time during and after the synchronisation process.

## 2.4 Implementation of CEP 70% minimum capacity targets

### 2.4.1 What is the 70% rule about?

To foster non-discriminatory and cross-zonal trade in the internal market for electricity, Article 16(8) of [EU Electricity Regulation](#) requires European TSOs to make at least 70% of the transmission capacity (respecting operational security limits) available for cross-zonal electricity trading. Where TSOs have requested a 'derogation' from this requirement

pursuant to Article 16(9) or member states have invoked an 'action plan' pursuant to Article 15, a less ambitious target may apply for a given year or for a transitional period defined in the action plan. Figure 8 indicates which countries applied derogations and action plans in 2023.

### 2.4.2 A fully integrated market: clear improvements but still some way to go

Figure 8 shows that considerable progress has been made in the implementation of the 70% requirement across Europe. Most of the European countries are on their way to offering the minimum capacity of 70% by end of 2025. Which European countries are currently applying an action plan pursuant to Article 15 of the [EU Electricity Regulation](#) is indicated in Figure 8. Those countries will have to offer

the minimum capacity of 70% by 2026 at the latest. Until then, they incrementally increase capacity based on a linear trajectory. Figure 8 also indicates which TSOs request a derogation from the 70% requirement. NRAs typically provide a reasoning for approving the derogation and its conditions in a formal regulatory decision. Based on the assumption that those derogations are well-grounded, Figure 8 underscores

the progress towards a more integrated and efficient European electricity market. Most<sup>5</sup> NRAs confirmed that the TSOs fulfilled the 70 % requirement or, where applicable, the linear trajectory and/or the conditions stemming from

the regulatory approval of individual derogations requests. Throughout the year 2023, Member states were able to comply with the (temporary) targets applicable on the national level.

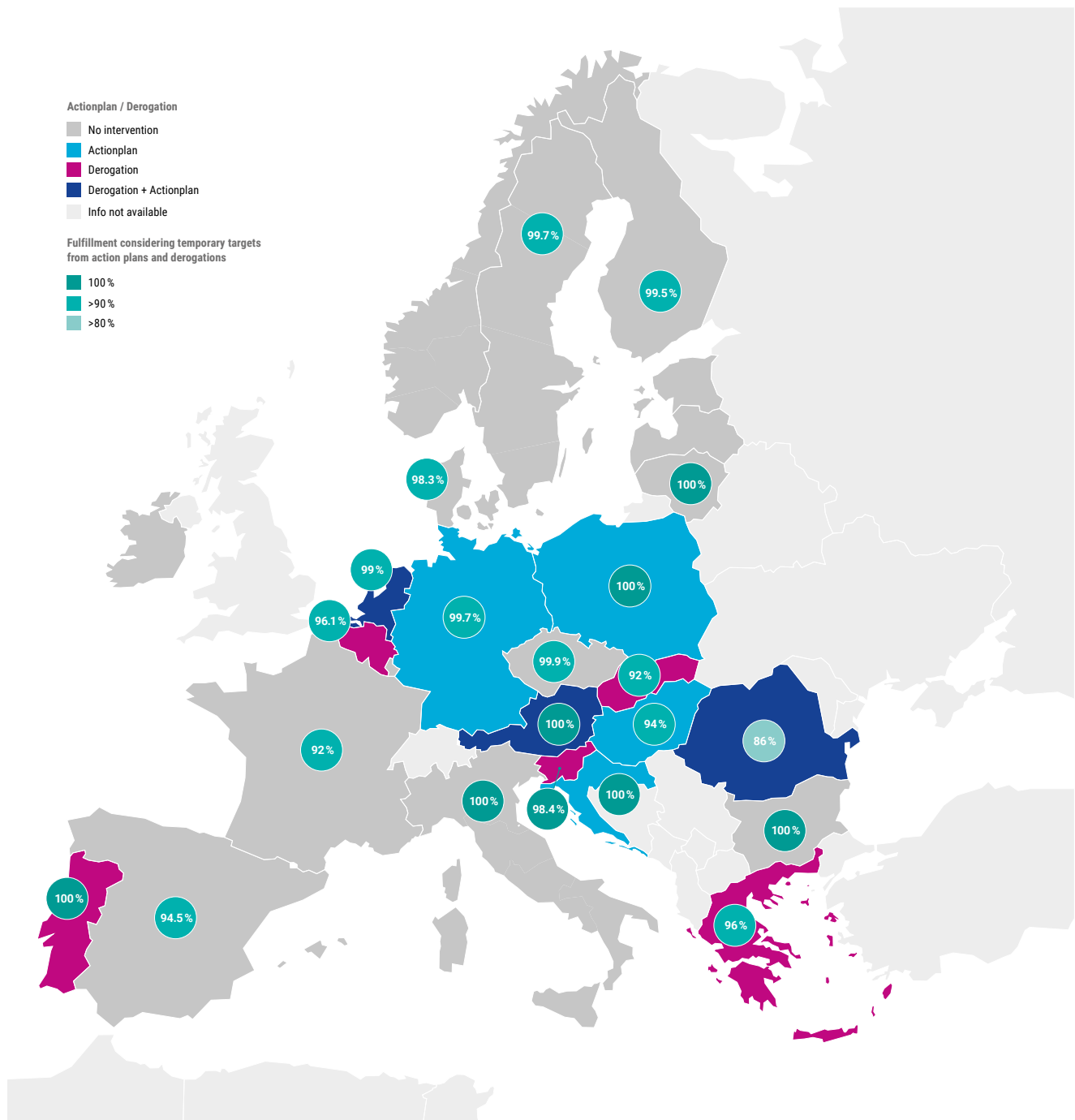


Figure 8: Map displaying derogations and action plans applied in 2023 as well as the average share of MTUs across borders and region during which the (transitional) minimum capacity has been reached (considering the individual targets set by action plans or derogations) by the member state<sup>6</sup>

5 Please note that not all NRAs have finalized their compliance monitoring for 2023 yet. Furthermore, not all NRAs publish a compliance report.

6 More detailed information on the national compliance assessments/decisions can be found in the fact sheets in the annex.



Acknowledging that NRAs are responsible for assessing TSOs' compliance with the CEP70 provisions, this report aims to provide an easily accessible overview of the national assessments for external stakeholders. Please note that the values shown in Figure 8 are based on the national compliance methodologies, which can diverge from another. Therefore, the comparability of the individual values is limited. For instance, some countries evaluate all contingencies for each critical network element per MTU (i. e. leading to multiple values per MTU); some take only a single value per MTU. Depending on the country, the indicator shown may combine NTC-borders and FB areas, thus combining different capacity calculation procedures from different capacity calculation regions. Under these circumstances, the individual values presented in Figure 8 should be understood as an indication of the individual levels of fulfilment. More detailed information on the national assessments can be found in the country fact sheets in the [annex IV](#). In addition to a brief description

of the national compliance assessments, the fact sheets also provide information on whether an NRA's compliance methodology followed ACER's monitoring methodology; and if not or only partially, it indicates the main differences between both assessments.

Furthermore, it should be noted that the minimum capacity of 70 % is not an 'absolute (minimum) target' as deviations for reasons of operational security are legally permitted. TSOs have the legal duty to reconcile it with physical reality. The [EU Electricity Regulation](#) foresees the possibility to deviate from the 70 % rule by the need to ensure the operational security of the grid. If necessary, such deviations i. e. capacity reductions, result from the mandatory validation step in capacity calculation. Capacity reduction is a last resort measure in case there are insufficient remedial actions to secure the grid.

### 2.4.3 TSOs call for prudence when it comes to applying the requirement in the ID timeframe: operational security is at stake

The provision of sufficient CZC for the ID timeframe is crucial to a well-functioning ID market and the integration of renewable energy resources into Europe's power system. TSOs provide sufficient cross-border capacities following their action plans and derogations (where applicable) for all time frames. TSOs firmly believe that repeating the (minimum) 70 % requirement from DA to ID will not help to reach that ambition. As explained in the following, an overarching approach on both timeframes is necessary:

Offering 70 % minimum capacity in the DA timeframe will frequently imply offering virtual capacities to the market. Specifically, this means: TSOs offer capacities to the market that may physically not exist (so-called virtual capacities to increase 'virtually' the cross-zonal trading). By doing so, TSOs assume that potential congestions in the transmission grid can be resolved after DA market clearing through so-called remedial actions, including redispatch of power plants. Hence, offering CZCs that fulfil the 70 % requirement implicitly requires anticipating the availability of sufficient measures to alleviate resulting congestions at a later stage. However, this does not apply in the ID timeframe for the following reasons:

1. In comparison to the DA market there **is no equivalent coordination process for remedial actions after the closure of the ID market**. Moreover, TSOs even lack the visibility of potential congestions resulting from ID market trades before real time and hence there is no time to react on those.

2. **The pool of remedial actions available to TSOs to maintain operational security of the grid diminishes as security processes move closer to real-time operation**. For example, lead times of generation units for redispatch are several hours, rendering such units unavailable closer to real time. With the ID market closing one hour prior to delivery (or even 30 minutes in the near future), current redispatch and coordination processes and generation units are unable to handle such short lead times, leaving no time for TSOs to activate remedial actions before real-time. Therefore, TSOs are unable to provide virtual CZCs at the minimum level of 70 % that can be allocated so close to real time without endangering secure system operation.

3. **The liquidity of the ID market is not homogenous, with much more trading interest visible close to real-time operation and limited interest many hours in advance**. However, the ability to apply remedial actions close to real-time to allow for virtual capacities is mostly limited, if feasible at all. This aspect becomes even more relevant with the implementation of the new ID market closure time (i. e. 30 minutes before real-time). As many changes in the ID timeframe today already occur shortly before delivery, trading up to 30 minutes before real-time will leave even less time for TSOs to act.

4. Finally, **when approaching real-time grid operation, other technical aspects such as reactive power control and voltage regulation gain importance** and need to be considered when taking remedial actions.

To summarise, physical capacity cannot be increased beyond the security limits. TSOs are responsible for maintaining operational security. A strict minimum capacity requirement of 70 % applied in ID will in reality be offset to maintain operational security – and therefore will not lead to additional capacity being available for trade in the ID timeframe.

Alternative measures such as grid investments and BZ reconfigurations will not mitigate this as these alternative measures interact on a longer-time timescale and are geared to address congestion of a more structural nature. Furthermore, congestion patterns will become more variable and of a more temporary nature. Therefore, TSOs will, complementing long-term measures, need to rely on daily capacity calculation and allocation to address these congestions efficiently.

This discussion took place not only in the context of the ongoing CACM amendment but also during the approval process of the 2<sup>nd</sup> and 3<sup>rd</sup> amendment of the ID Capacity Calculation Methodology of the CCR Core. Here, a part of the compromise solution has been found by not enforcing an infeasible requirement to apply virtual capacity and instead requiring Core TSOs to run a study (by April 2025) to identify measures to improve capacities in ID, without pre-empting

what these measures could be, and subsequently submit an amendment proposal by October 2025. The establishment of a monitoring approach on the level of capacity in ID could support this assessment.

As already stated above, TSOs provide sufficient cross-border capacities following their action plans and derogations (where applicable) for all time frames, and we are already investing greatly in expanding grids, including cross-border connections. To fulfil the CEP70 requirements, TSOs are working hard and support each other. One example of this collaboration is the DAVinCy validation process in the CCR Core, in which the German, Austrian and Dutch TSOs jointly assess validation adjustments in the DA capacity calculation.<sup>7</sup>

TSOs see a risk of being practically pushed to an infeasible requirement to provide virtual capacities in the ID timeframe. This requirement distorts the fragile balance between maximisation of CZC and the need to ensure operational security of the grid. Clarifying contradictions in the current regulation, and focusing on an efficient transmission system in addition to ID markets which reflect the physics, will pose an effective contribution for all parties amid a challenging energy transition.

#### 2.4.4 Future perspective: where are we heading to?

For several countries, the fulfilment of the 70 % requirement by the application of virtual capacities comes at costs. Virtual capacities provided to the (DA) market need to be realised physically by costly remedial actions. However, the [EU Electricity Regulation](#) allows Member States to choose the path of redispatch to implement the 70 % rule. The concept of minimum 70 % in ID cannot be technically reconciled with this path.

A reconfiguration of BZs may reduce the role of virtual capacities and loop flows, yet it is not a silver bullet solution.

During the last few years, considerable progress has been made in the implementation of the (minimum) 70 % requirement across Europe. However, there are derogations in place the justification for which is likely to also exist in 2026 and beyond. This is particularly true for derogations that have been granted due to excessive loop flows. Removing the need for such derogations can be done through the implementation of important processes such as the coordinated validation of capacities and the Regional Operational Security Coordination including Cost Sharing. We observe that, in addition to the ongoing legal appeals on the methodologies underpinning these processes, there are also technical challenges making it unlikely the implementation of these processes will be completed by the end of 2025. However,

as already stated above, when monitoring compliance, the Regulation permits to deviate from the (minimum) 70 % requirement for reasons of operational security (e.g. which may be present due to the possible specificity of the transmission network situation or the necessary application of fallback procedures). However, this does not mean that TSOs will automatically be non-compliant with the (minimum) 70 % requirement as, first, the [EU Electricity Regulation](#) allows NRAs to grant derogations where necessary to maintain operational security, and second a deviation from the (minimum) 70 % requirement during the capacity calculation is justified as a last resort measure to maintain operational security.

In the context of the restarted CACM amendment process and the discussions linked to (minimum) 70 % in ID and structural congestion, TSOs would like to highlight that a broader perspective will help to get a better alignment of markets and physics. As the framework of policy options to achieve this objective is enshrined in primary regulation, TSOs believe this debate will take us beyond the update of CACM and could be subject of a structural market reform. In any case, TSOs are keen to continue a constructive debate. We are deeply committed to continuing our work towards a fully integrated market, and we are working hard to maximise the market trade capacities and ensure the secure operation of the interconnected European power system at the same time.

<sup>7</sup> In this joint DAVinCy (i.e. DA validation of capacity) process IVAs (i.e. individual validation adjustments) are frequently applied to solve congestion located in another TSO's control area. By such a coordinated assessment potential cross-impacts between control areas can be significantly reduced.



0.5302

0.9524

0.9950

0.8753

0.9708

0.8560

1.0950

# 3 Implementation progress of the FCA, CACM and EB regulations

## 3.1 FCA regulation

The FCA regulation, which entered into force on 17 October 2016, sets out rules for the calculation and allocation of long-term cross-border capacity as appropriate risk hedging opportunities that might need to be provided on individual BZ borders. One of these risk hedging opportunities is the issuing of LTTRs that can be allocated via explicit auctions. Besides LTTRs, other hedging opportunities can also be

implemented. The FCA regulation also contains the basic rules for the manner in which holders of LTTRs are compensated if their right is curtailed. Annex II outlines the implementation progress of this regulation, including links to all relevant documents such as TSO proposals and ACER decisions.

### Long-Term flow-based allocation

The long-term flow-based allocation (LTFBA) project, whose go-live is expected by the end of 2025 (first for the yearly auction of market period 2026, shortly followed by the January monthly auction), required the amendment of four All TSOs methodologies already in 2022/2023 for a timely implementation of the Flow-based (FB) allocation approach in the concerned Capacity Calculation Regions, CCRs (Core and Nordic).

**In 2021, ACER requested that ENTSO-E submits proposals for the amendment of the following FCA methodologies:**

- › Harmonised Allocation Rules (HAR) in accordance with Article 51 of the FCA regulation;

- › SAP requirements in accordance with Article 49 of the FCA regulation;
- › Congestion Income Distribution (CID) methodology in accordance with Article 57 of the FCA regulation;
- › Methodology for ensuring the firmness and remuneration of LTTRs (FRC) in accordance with Article 61 of the FCA regulation.

The amendment of the four methodologies was performed in parallel with the implementation of the long-term Capacity Calculation methodologies for the Nordic and Core CCRs. More details on the project and on the collaboration with the JAO to make it possible can be found in chapter 4.4.3.

### Harmonised Allocation Rules methodology (Articles 51 and 52 of the FCA regulation)

ENTSO-E has reviewed the HAR methodology according to Article 68(5) of HAR and in line with ACER's request to update the necessary FCA methodologies to adapt to the LTFBA project. HAR should be periodically reviewed by the SAP and the relevant TSOs (at least every two years involving the Registered Participants). The All TSO submission to ACER

was done 1 March 2023 according to the biennial update. A second submission containing elements related to the LTFBA not solved in the first submission was done 1 August 2023. The new HARs were approved by ACER 22 December 2023. Further information on the specific changes made in the methodology are found in chapter 4.4.2.



## 3.2 CACM regulation

The rules set by the CACM regulation provide the basis for implementing a single energy market across Europe in DA and ID timeframes. All the Terms and Conditions deriving from the CACM Regulation have been submitted

and approved, and the implementation of these Terms and Conditions is still ongoing. Annex II provides tables showing the implementation progress of this regulation.

### 3.2.1 Main developments in All TSOs' deliverables

#### **Determination of the Capacity Calculation Regions ('CCRs') (Article 15 of the CACM regulation)**

In its letter to TSOs from 17 July 2023, ACER requested that All TSOs develop an amendment of the Determination of CCRs to merge Core and Italy North for the DA timeframe by 30 November 2023. TSOs developed and All TSOs approved the amendment to merge Core and Italy-North into a new Central Europe CCR, starting with the DA timeframe.

The Single Electricity Market (SEM) does not have any interconnector with the EU, and the former IU CCR (SEM-GB CCR) no longer exists due to Brexit. SEM is expected to be re-coupled with EU in 2026, when the Celtic Interconnector is planned to go live. The Celtic Interconnector is a planned 700 MW subsea link to allow the exchange of electricity between Ireland and France. The Celtic Interconnector will create a new BZ Border between the BZs of SEM and FR (France). All TSOs approved the proposal to include the Celtic cable interconnector in the Core CCR. The decision included merging the changes required for Celtic cable inclusion with the above mentioned changes required for the merge of the

Core and Italy North CCRs into the Central Europe CCR for the DA timeframe.

The amendment proposal containing both the inclusion of the Celtic cable interconnector in Core CCR and the merge of Core and Italy North for the DA timeframe was submitted to ACER for approval on 1 November 2023. ACER approved the proposal on 19 March 2024.

During 2023, the Energy Community Task Force (EnC TF) explored options for either maintaining the default CCR configurations as defined by Annex I to the adapted CACM Guideline or proposing alternative configurations. The EnC TF established three work streams: Italy-Montenegro (IT-ME), East Europe (EE) and South-East Europe (SEE), with the purpose of tackling the three default CCR configurations as proposed by the adapted CACM Guideline. The work continues in 2024.

#### **Day Ahead Scheduled Exchanges Methodology (Article 43 of the CACM Regulation)**

The scheduled exchange calculation (SEC) methodology is a regional methodology according to CACM Article 49(7). In 2023, a new amendment proposal for the SEC methodology was prepared and submitted for public consultation on 30 November. The SEC is an optimisation problem build into the day-ahead market coupling algorithm (Euphemia). This is a process that provides the so-called commercial flows on interconnectors as output of Euphemia in addition to net positions and prices that are also output variables of a separate optimisation problem solved in the market coupling process.

With the transition of the market time unit (MTU) in the DA market coupling process from 60 minutes to 15 minutes expected in Q1 2025, the algorithm needed some performance improvement to cope with the increased amount of data and deliver timely results. The amendment proposal introduced a back-up calculation of the day-ahead SEC that will be activated if the Euphemia algorithm takes too long to find a solution, thereby preventing a decoupling. The amendment proposal containing this back-up of SEC was submitted to all NRAs for approval beginning of Q2 2024.

## Congestion Income Distribution (Article 73 of the CACM regulation)

On 21 December 2023, ACER published their decision approving the amendment of the CID methodology for European electricity markets. The amendment proposal was submitted by All TSOS to ACER on 5 July 2023. The proposal for amendment was submitted following previous ACER's decision from December 2021 which requested that TSOs develop an amendment to address the treatment of non-intuitive flows<sup>8</sup>.

In the previous CID methodology, negative CI resulting from non-intuitive flows was socialised by other borders with positive CI within the respective CCR in which it occurred by the application of the absolute value rule and scaling factor. Therefore, the methodology did not address the transfer of congestion income among different CCRs in the case of non-intuitive flows. In this amendment, TSOs analysed the possible situations that cause non-intuitive flows and their impact and developed a proposal to address them accordingly.

## Five situations of non-intuitive flows were identified.

For those two cases with a cross-CCR impact, namely due to cross-CCR allocation constraints or due to the application of advanced hybrid coupling, a new solution was proposed: the

virtual hub approach. For those three cases with an impact inside a CCR, the virtual hub approach or the absolute value and scaling rule approach is used.

## Core flow-based market coupling project

Since April 2023, the Core intraday capacity calculation (IDCC) methodology 2<sup>nd</sup> and 3<sup>rd</sup> amendments have been in an escalation procedure with ACER, after the Core NRAs could not agree on the Core TSOs' proposal. After postponing the decision several times, ACER decided on both amendments on 14 March 2024.

In previous iterations, ACER put forward the requirement to apply 70 % in the ID timeframe. The Core TSOs agree that a sufficient cross-zonal capacity for the ID timeframe is crucial to a well-functioning ID market and the integration of renewable energy resources into Europe's power system; however, this is not feasible through the application of 70 % in ID as this would require the massive use of virtual capacity. While TSOs have managed to implement virtual margins in DA, this approach cannot be extended to ID. Aside from the technical limitations in terms of available RA potential to act very close to real-time, Core TSOs have underlined the impossibility of coordinating the remedial actions as a

showstopper. Core TSOs have also addressed their concerns to the Commissioner for Energy, Kadri Samson. Multiple NRAs in the Core and outside share the Core TSOs' concern.

The latest information provided by ACER on the expected content of the ID amendment indicates that a minimum capacity requirement from ER Article 16(8) in principle applies to intraday, but no AMR (adjustment for minRAM) in the methodology as a tool to reach the 70 % threshold, and ACER considers in the current state of the market that it is acceptable that TSOs do not immediately implement the 70 % requirement, and no derogations for this will be necessary. TSOs are, according to the latest shared information from ACER, expected to deliver an analysis by 1 April 2025 detailing how to increase ID capacities in general & how to reach 70 % through time, at each Critical Network Elements under a Contingency (CNEC). Based on the results of the analysis, TSOs shall submit an amendment by 1 October 2025.

8 Non-intuitive flows are physical cross-zonal electricity flows in the opposite direction of a cross-zonal price difference.

## Nordic flow-based market coupling project

In 2023 the Nordic TSOs, NEMOs and RCC collectively decided to temporarily delay the scheduled implementation of FB capacity calculation in the Nordic Region originally planned for the first half of 2024. A new timeline for FB activities and eventual go-live was communicated and the new go-live is expected to be October 2024. The delay was attributed to unexpected challenges in the development and coordination of the various IT systems and procedures necessary for the execution of FB capacity calculation and allocation. The FB external parallel run is also experiencing some challenges in the ID ATC extraction process. Limited capacity is being extracted from DA in the parallel run. Different methods are being tested to enhance the volume in an operationally

safe process. For instance, manipulating the threshold for when a CNEC can be limiting and the so-called RAM relaxation, which adds extra capacity to some CNECs to make them less limiting. There are no specific KPIs for ID capacity; a satisfactory solution will therefore rely on an overall assessment. From the National Regulatory Authorities (NRAs') side, there are also no specific requirements. The parallel run will continue until go-live. The market reports, containing the comparison of the FB and NTC market results for W50 2022 and onwards, are available on the [Nordic RCC website](#): The FB data are published daily (before 11.00 CET) on the JAO Publication Tool, on the custom site for the [Nordic CCR](#).

## 3.2.2 Main developments in the NEMOs' deliverables

### CACM Annual Report

On 20 September 2023, the All NEMO Committee organised their first Annual Conference. Part of this conference was dedicated to the key findings from the [CACM Annual Report 2022](#) that was delivered on 14 July 2022. The report focused on demonstrating the robustness of the operating of the market coupling during the energy crisis.

NEMOs and TSOs developed and published the 2022 CACM cost report in September 2023. This report presents an exhaustive view of the spending to develop the market coupling in Europe.

At ACER's request, NEMOs have also amended the Algorithm methodology Art 37, to consider the requirements submitted by the TSOs for the co-optimisation of the balancing Energy. Further work will still be needed as the concept is not defined and will require research and development work. The amendment proposal was submitted by the NEMOs to ACER on 24 November 2023. TSOs have provided inputs to the public consultation from ACER in January 2024, highlighting their support to the NEMOs in the research and development phase, and confirming the development of the market-based process to enable participation by interested TSOs (as per the CZCA Harmonised Methodology, Article 38(3) of EB Regulation). ACER's decision is expected on 27 September 2024.

## 3.2.3 Single Day-Ahead and Intraday Coupling Observership and Non-Disclosure Agreement

The CACM GL requires that TSOs, ENTSO-E, power exchanges (PXs) and market operators or PXs in their quality of NEMO cooperate and exchange information to fulfil the obligations described in the CACM GL for the completion of the single day-ahead and intraday coupling. To protect the exchange of confidential information, the Single Day-Ahead and Intraday Coupling Observership and Non-Disclosure Agreement (CACM Global NDA) came into effect on 23 February 2016. At the time, the CACM Global NDA replaced individual NDAs from early implementation projects prior to the date the CACM GL entered into force.

Following up on the information presented in the previous edition of this report ([ENTSO-E Market Report 2023](#)), this section provides an update on the new parties that have joined the CACM Global NDA between June 2023 and March 2024. Importantly, in accordance with Article 8 of the CACM Global NDA, the parties must give their consent to the adherence of a new party.

On the basis of the above-mentioned Article 8, Bursa Română de Mărfuri (BRM) became part of the CACM Global NDA on 11 October 2023. BRM has been designated as NEMO for the Romanian BZ area. Table 2 lists all parties under the CACM Global NDA (until March 2024) and the date upon which each party became part of this agreement.

Name of party	Member since
Affärsverket Svenska Kraftnät	23 February 2016
Amprion GmbH	23 February 2016
Austrian Power Grid AG	23 February 2016
Britned Development Limited	23 February 2016
Creos Luxembourg S.A	23 February 2016
Elia System Operator NV/SA	23 February 2016
Energinet Elsystemansvar A/S	23 February 2016
Fingrid Oyj	23 February 2016
National Grid Interconnectors Limited	23 February 2016
Red Eléctrica de España, S.A.U.	23 February 2016
REN – Rede Eléctrica Nacional, S.A.	23 February 2016
RTE Réseau de transport d'électricité	23 February 2016
Statnett SF	23 February 2016
TenneT TSO B.V	23 February 2016
TenneT TSO GmbH	23 February 2016
TransnetBW GmbH	23 February 2016
50Hertz Transmission GmbH	23 February 2016
Vorarlberger Übertragungsnetz GmbH	23 February 2016
Elektroenergien Systemen Operator EAD	23 February 2016
Swissgrid AG	23 February 2016
Cyprus TSO	23 February 2016
ČEPS a.s	23 February 2016
Elering AS	23 February 2016
National Grid Electricity Transmission plc	23 February 2016
SONI Limited	23 February 2016
Moye Interconnector Limited	23 February 2016
Independent Power Transmission Operator S.A	23 February 2016
Croatian Transmission System Operator PLC.	23 February 2016
MAVIR – Hungarian Independent Transmission Operator Company Ltd	23 February 2016
EirGrid plc	23 February 2016
Landsnet hf	23 February 2016
Terna – Rete Elettrica Nazionale S.p.A	23 February 2016
Litgrid AB	23 February 2016
AS 'Augstsprieguma tīkls'	23 February 2016
CGES AD	23 February 2016
MEPSO – Operator na elektroprenosniot sistem na Makedonija AD	23 February 2016
Polskie Sieci Elektroenergetyczne S.A	23 February 2016
Compania Națională de Transport al Energiei Electrice Transelectrica SA	23 February 2016

Name of party	Member since
EMS – JOINT STOCK COMPANY Elektromreža Srbije BeLGRADE	23 February 2016
Slovenská elektrizačná prenosová sústava, a.s	23 February 2016
ELES, d.o.o, sistemski operater prenosnega elektroenergetskega omrežja	23 February 2016
SP Transmission Limited	23 February 2016
Scottish Hydro Electric Transmission plc	23 February 2016
APX Power B.V. and APX Commodities Ltd.	23 February 2016
Belpex NV	23 February 2016
Croatian Power Exchange Ltd.	23 February 2016
EPEX SPOT SE	23 February 2016
Gestore dei Mercati Energetici S.p.A	23 February 2016
Nord Pool AS	23 February 2016
OMI – Polo Español S.A.	23 February 2016
OTE A.S.	23 February 2016
LAGIE, Operator of Electricity Market S.A	23 February 2016
HUPX Hungarian Power Exchange Company Limited by Shares	23 February 2016
EirGrid plc	23 February 2016
Towarowa Gielda Energii S.A.	23 February 2016
Operatorul Pieței de Energie Electrică și de Gaze Naturale SA	23 February 2016
OKTE a.s	23 February 2016
BSP Regional Energy Exchange LLC	23 February 2016
SONI Limited	23 February 2016
Independent Bulgarian Energy Exchange EAD	23 February 2016
EXAA Abwicklungsstelle für Energieprodukte AG	23 February 2016
SEEPEX	13 June 2016
Nemo Link Limited	26 July 2017
Operatori i Sistemit të Transmetimit Albania sh.a	29 January 2018
ElecLink Limited	9 March 2018
Kraftnät Åland	27 March 2019
Nasdaq Oslo ASA	1 April 2019
National Grid NSL Ltd.	28 June 2019
National Grid IFA2 Ltd.	28 June 2019
Berza elektricne energije d.o.o. (BELEN)	21 January 2020
MEMO	17 July 2021
Baltic Cable	13 August 2021
ETPA	02 August 2022
JSC MO	17 November 2022
BRM	11 October 2023

Table 1: Overview of global non-disclosure agreement signatories (in chronological order, until March 2024)

## 3.3 EB regulation

The EB Regulation establishes a set of technical, operational and market rules to govern the functioning of electricity balancing markets, and to integrate balancing energy markets across the EU. It sets out rules for the allocation of cross-zonal transmission capacity for cross-border procurement of balancing capacity, the activation of balancing energy, and the financial settlement of BRPs and BSPs. This part of

the report describes the main achievements regarding the EB Regulation roadmap, with an emphasis on cross-border balancing capacity procurement development, the imbalance settlement harmonisation process, the implementation of the FSkar process (focused on financial settlement of unintended exchanges) and regulatory developments on high balancing energy prices mitigation measures.

### 3.3.1 Regulatory developments regarding procurement of balancing capacity and associated allocation of cross-zonal transmission capacity

In December 2022, All TSOs submitted the proposal for a Harmonised Allocation Process of Cross-Zonal Capacity Methodology (HCZCAM), in accordance with Article 38(3) of EB Regulation. This methodology integrates co-optimised and market-based allocation processes and consists of cross-border procurement processes taking place a day ahead of the provision of the balancing capacity. While ACER approved the methodology in July 2023, they requested that TSOs make amendments, particularly focused on governance and maximum volume limits for the exchange of balancing capacity. TSOs plan to submit the amended

documents to ACER in July 2024. In addition, TSOs are currently collaborating to draft business requirements for the market based Cross Zone Capacity Allocation Optimisation Function (CZCAOF) software (also known as blueprint) under the COBRA-project, ensuring consistency across platforms while allowing regional specifications. Moreover, additional supporting tasks related to market-based allocation processes are assigned to Regional Coordination Centres (RCCs), aligning efforts to ensure effective implementation and support where necessary.

### 3.3.2 Regulatory developments regarding Imbalance Settlement Harmonisation

Regulatory developments concerning Imbalance Settlement Harmonisation (ISH) aim to standardise rules across the European electricity market. Introduced in July 2020 under EB Regulation Article 52(2) by ACER, ISH requires national implementation by January 2022. The ISH standardises additional price components and conditions for dual imbalance pricing and introduces a 15-minute Imbalance Settlement Period (ISP) for BRPs' imbalances calculation (with an optional

maximum derogation until 1 January 2025 for ISP = 15 min). In addition, it sets the minimum time interval for Nominated Electricity Market Operators (NEMOs), by which they shall provide market participants with the opportunity to trade in energy, for both DA and ID markets. Based on this methodology, connecting TSOs calculate final positions for BRPs based on self-dispatching or central dispatching models, ensuring consistency with EB Regulation guidelines.

### 3.3.3 Regional implementation of FSkar process

An analysis performed by CE TSOs with regards to the review of the FSkar methodologies has been finalised by end of June 2023. This study showed that at this stage, no adjustments to the methodology for FSkar within the Synchronous Area (SA) are necessary, which followed the report being sent to relevant NRAs for information. The study analysed general FSkar behaviour as well as specific aspects such as volume components and pricing, concluding that no short or mid-term changes were analysed. Similar to the FSkar Within SA review, a parallel study was conducted by the FSkar

between SA TSOs, identifying that amendments to the methodologies were needed to include recent market changes. Amendments included changes to the settlement rules for the HVDC interconnector owned by TenneT DE and Statnett SF in Annex 10 of the respective methodologies and changes to the respective Annexes following the introduction of single imbalance pricing as part of the Nordic imbalance settlement. Following the review process, all relevant documents were shared with the respective NRAs for final approval, ensuring coherence and alignment within the regulatory framework.



### 3.3.4 Regulatory developments regarding high prices mitigation measures

A non-negligible share of balancing energy bids was submitted to PICASSO and MARI platforms along 2023 with bid prices higher than 50 % of the transitional price limit (e.g. more than 10 % of the submitted bids for positive aFRR energy exceeded 7,500 €/MWh over a period of several months). The risk of high prices for balancing energy exists but does not always materialise compared to the number of quarter hours considered. The evaluation of submitted balancing energy bids in these integrated markets [reveals that a significant number are unrelated to wholesale energy prices](#).

**This divergence between spot-market prices and balancing energy bids prompts a need for amendments to the current regulatory framework. Proposed mitigation measures include:**

- › the introduction of permanent maximum and minimum prices for balancing energy below the current technical price limit for balancing energy;
- › the reduction of currently valid transitional price limits for balancing energy;
- › the introduction of elastic TSO demand for the activation of aFRR balancing energy via PICASSO platform to be applied on voluntary basis; and
- › the adaption of the determination of aFRR CBMP to further mitigate price spikes occurring on the European aFRR platform.

The measures address improvements across the three fundamental pillars of price formation: demand side (voluntary price elastic aFRR demand), supply side (maximum and minimum prices for balancing energy), and price determination (aFRR CBMP better reflecting aFRR activated).

### 3.3.5 Overview of European and regional implementation of the EB regulation

This section provides the status of the balancing energy procurement and activation deliverables (Table 1), the status of the balancing capacity procurement and Cross Zonal

Capacity (CZC) allocation deliverables (Table 2), and the status of the imbalance settlement and other settlements deliverables (Table 3). Please refer to the tables in [Annex II](#).



# 4 Forward capacity allocation

All TSOs have appointed a JAO in accordance with Article 49 of the FCA regulation<sup>9</sup>, to act as the single allocation platform (SAP) for FCA as of 1 November 2018. JAO is a joint service company currently owned by 25 TSOs<sup>10</sup> that hosts SAP services for TSOs.

SAP enables long-term auctions of transmission capacity and currently services 25 TSOs from 22 EU countries. The IT system is scalable border by border, allowing for annual, non-calendar annual, half-yearly, quarterly, monthly, weekly, weekend, daily and ID auctions.

## 4.1 Governance

In accordance with Article 1 of the approved SAP methodology, All TSOs and regulatory authorities<sup>11</sup> bound to the FCA regulation agreed to appoint JAO as the SAP operator. Consequently, the SAP Cooperation Agreement ('SAP CA'), according to Article 2(2)(t) of the SAP methodology, was developed and signed by All TSOs that issue LTTRs.

The SAP operator is governed by the SAP Council, consisting of TSOs and JAO representatives, which is the sole competent body for deciding on operational topics and budget related to the fulfilment of SAP tasks, in accordance with the FCA regulation<sup>12</sup>.



Figure 9: Countries whose TSOs are obliged to be part of the SAP Council and are part of the SAP CA (as of May 2024)<sup>13</sup>

- 
- 9 All TSOs' proposal of 7 April 2017 for the establishment of SAP in accordance with Article 49 of the FCA regulation and for the cost sharing methodology in accordance with Article 59 of the FCA regulation.
- 10 Also includes TSOs/companies operating undersea cable interconnectors. These are: 50Hertz, Amprion, APG, ČEPS, Creos, EirGrid, ELES, ELIA, EMS, Energinet, ESO, HOPS, IPTO, MAVIR, Moyle, PSE, RTE, SEPS, Statnett, Swissgrid, TenneT DE, TenneT NL, Terna, Tranelectrica and TransnetBW.
- 11 Some Regulatory Authorities (the Regulatory Authorities of Lithuania, and Sweden) have exempted their TSOs pursuant to Article 30(1) of FCA regulation from issuing LTTRs and therefore, according to Article 30(7) of the FCA regulation and these TSOs, are not part of the SAP CA yet.
- 12 Further details on the governance structure of JAO can be found in the ENTSO-E Market Report of 2020
- 13 Creos does not issue LTTRs, nor commercialise any interconnector. Brexit did not have any impact on EirGrid participation as a full member of SAP CA and SAP Council

## 4.2 Operations

JAO performs all tasks in compliance with the SAP CA, the SAP methodology and the HAR.<sup>14</sup> As of 2024, the SAP operator organises forward capacity rights auctions at 67 BZ directional borders and provides services via a common IT system for more than 440 registered market participants<sup>15</sup>. Only yearly, quarterly and monthly products are being allocated at EU borders in 2024. A gradual shift is being observed

from physical transmission rights (PTR) to financial transmission rights (FTR) options at EU borders. This tendency is supported by the fact that PTR holders on average nominate only around 4.88 % of allocated rights. A broad transition to FTRs happened in the context of the launch of FB DA market coupling in Core CCR, when a vast majority of remaining BZBs in the region switched to FTRs.

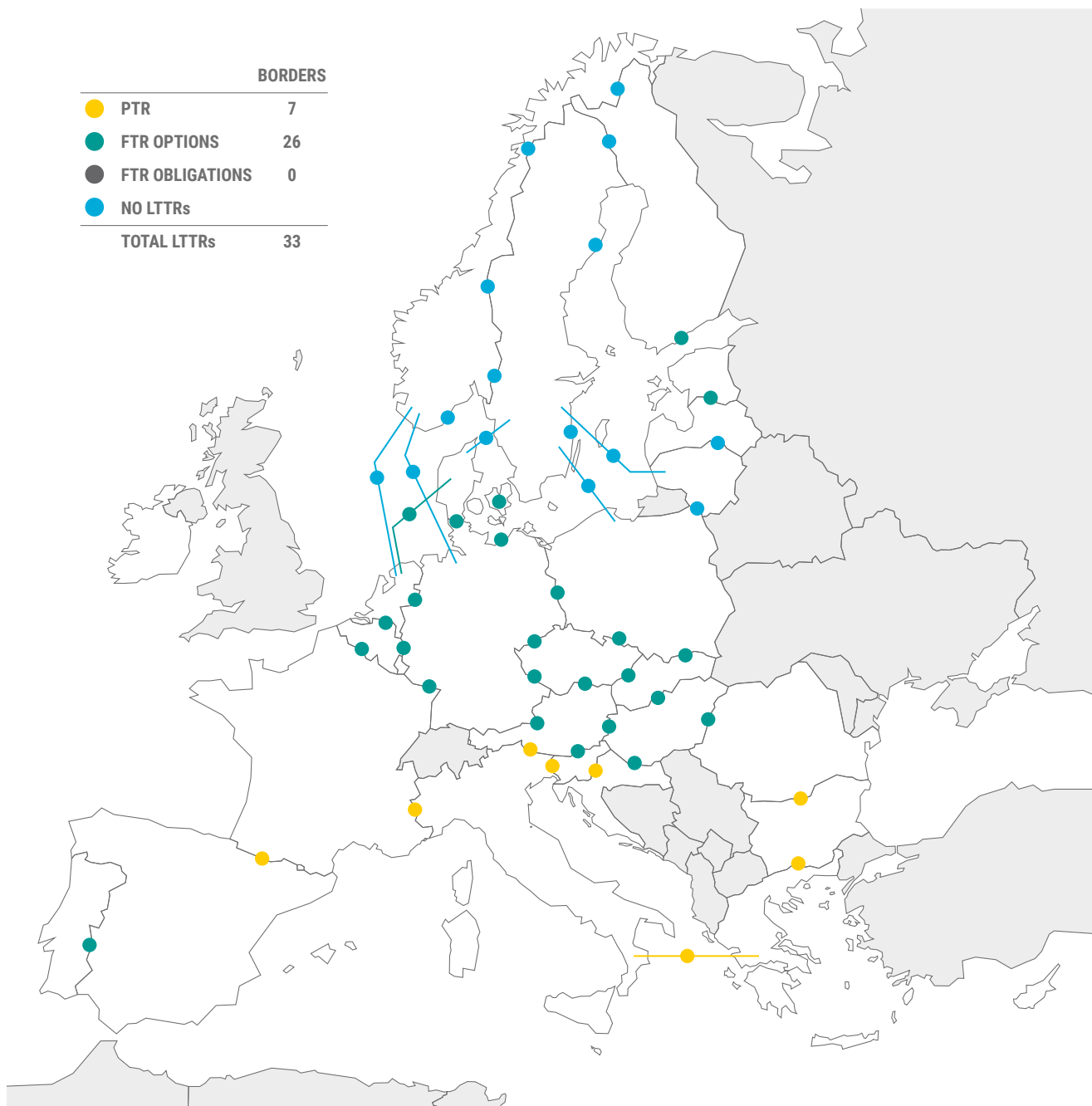


Figure 10: Overview of products offered at SAP (as of 2024)<sup>16</sup>

14 More details on SAP tasks are described in the [ENTSO-E Market Report of 2020](#)

15 A detailed description of the common IT System eCAT can be found in the ENTSO-E Market Report 2019.

16 At the border DE-CZ, FTR Options are offered for CZ-DE (TenneT) and CZ-DE (50Hertz), at the borders EE-LV and FI-EE FTR Options are only offered for the directions EE to LV and FI to EE.

Regarding the above-mentioned borders, the SAP operator organised in 2023 more than 880 auctions with LTRs, and similar amounts are anticipated for 2024.



Figure 11: Number of participants in every auction versus number of participants that win the capacity during 2022 and 2023

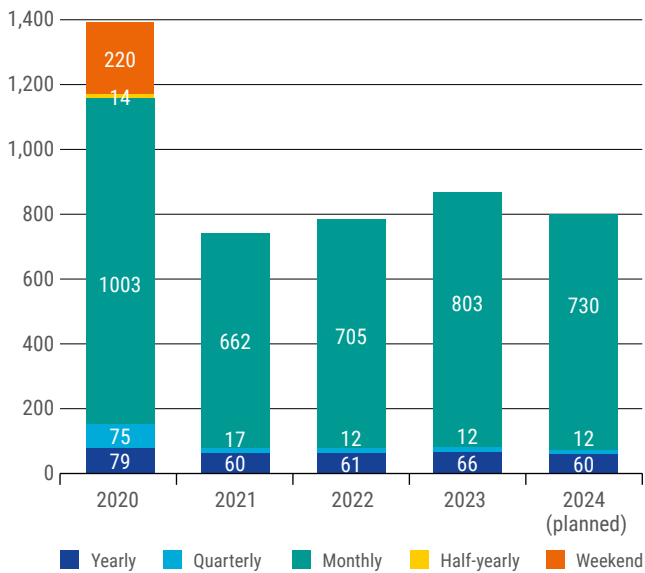


Figure 12: Overview of auctions

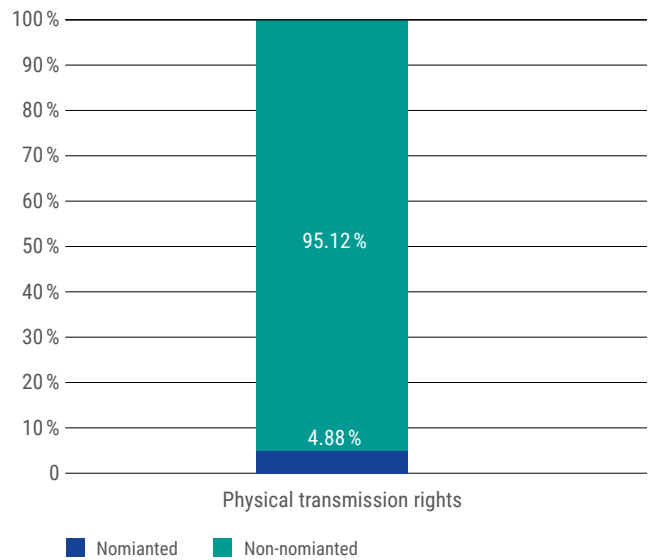


Figure 13: Usage (nomination) rate of long-term transmission rights

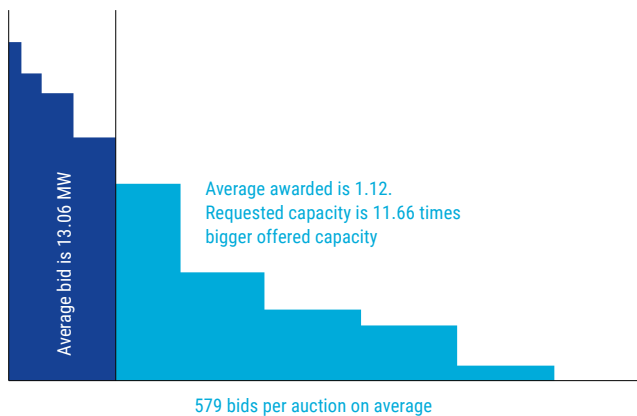


Figure 14: Average long-term capacity rights auction structure

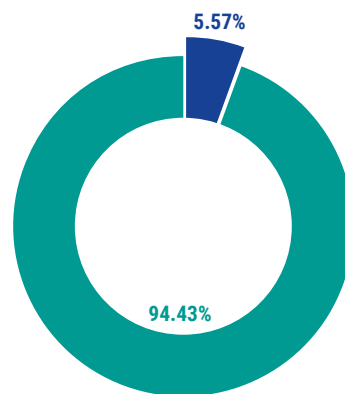


Figure 15: Rate of return of long-term capacity rights for reallocation at subsequent long-term auction



## 4.2.1 Quality of operations

The SAP Council regularly monitors the quality of operations performed by the SAP operator. More than 5200 auctions have taken place since SAP operations began. As for last year, no incidents occurred.

To monitor the SAP operator's operation quality, the TSOs of the SAP Council calculated 23 detailed key performance indicators (KPIs) which were merged into three meta-KPIs<sup>17</sup> (see Table 2).

CATEGORIES	DETAILS
› Fulfilling reporting Obligations	› Whether data to be reported was provided to EMFIP and ACER platform in line with Transparency and REMIT Regulations and whether the data were correct
› Operational Effectiveness	› SAP system availability – Invoicing correctness – Operational incidents occurrence
› Customer Satisfaction	› User's satisfaction with JAO – SAP's effectivity in solving user's problems and requests – Website usability

Figure 16: SAP key performance indicators

Month	Fulfilling Reporting Obligations	Operational Effectiveness	Customer Satisfaction	TOTAL	Quarterly Score
Jan-23	10.00	10.00	9.00	9.67	8.94
Feb-23	10.00	8.00	6.00	8.00	
Mar-23	10.00	10.00	7.50	9.17	
Apr-23	10.00	10.00	9.00	9.67	9.33
May-23	10.00	10.00	6.00	8.67	
Jun-23	10.00	10.00	9.00	9.67	
Jul-23	10.00	10.00	7.50	9.17	9.11
Aug-23	10.00	10.00	7.50	9.17	
Sep-23	10.00	8.00	9.00	9.00	
Oct-23	10.00	10.00	7.50	9.17	9.00
Nov-23	10.00	10.00	7.50	9.17	
Dec-23	10.00	10.00	6.00	8.67	
Jan-24	10.00	10.00	7.00	9.00	9.11
Feb-24	10.00	10.00	9.00	9.67	
Mar-24	10.00	10.00	6.00	8.67	

Table 2: Overview operation Meta-KPIs of SAP (as of March 2024)

17 More detailed description is available in the last [ENTSO-E Market Report 2020](#)

## Customer interaction and satisfaction

JAO has created a platform to gather the feedback and requests from users of the JAO eCAT system, related to IT interfaces and other services performed. The users' expertise and views are essential for the continuous improvement of the services provided by JAO. Therefore, JAO has established the User's Group, which serves as a platform for relevant stakeholders. The User's Group comprises representatives from key European stakeholder organisations interested in participating therein while ensuring broad geographical coverage by the group.

According to the SAP operator annual survey that took place early 2023 and is being repeated in 2024, market participants rated the SAP operator's performance as very good. We witness stable scores as the general satisfaction value from the last survey was 4.0 points out of 5.0. The SAP Council continuously works with the JAO to identify key elements for improvement, which are incorporated into the SAP operator workplan.

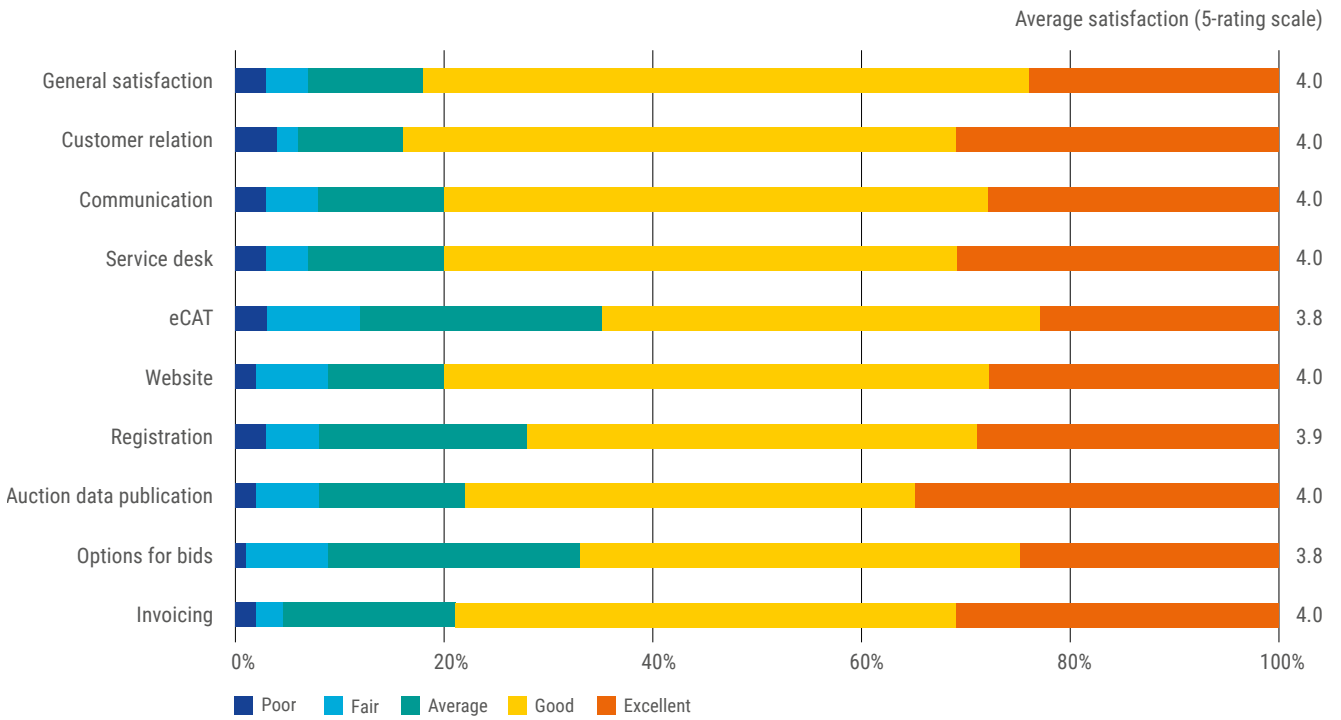


Figure 17: SAP customer interaction and satisfaction

## 4.3 Expenditures

This report provides a summary of TSOs' common costs of establishing, amending and operating the SAP. The figure below depicts the planned and actual costs since 2018<sup>18</sup>. Larger investment costs are anticipated due to changes needed for FB DA and long-term allocation.

The reported establishment and development costs consist of annual depreciation and amortisation of investments to establish and develop SAP in addition to the existing tools in JAO. The operational costs for SAP consist of annual depreciation and amortisation of the tools and other assets used for LT auctions. Furthermore, they consist of the financial clearing and settlement of auction revenues (including bank fees) and operational support covering the entire long-term allocation process, contact with market participants, service desk, risk management and other related services. Compared

to SDAC/SIDC projects, the SAP costs cover the whole business chain for capacity allocation to market participants. The organisation and meeting of the SAP Council did not cause any direct costs.

The fee principles for the SAP are defined based on the SAP methodology, which is derived from the All TSOs' proposal for the establishment of the SAP in accordance with Article 49 and the cost-sharing methodology in accordance with Article 59 of the FCA regulation.

The SAP methodology is applicable to the costs of running the long-term auctions on the SAP borders only, and to the relevant SAP tasks, as defined in Article 9 of the rules establishing the SAP as of October 2018 (i. e. the date of establishing the SAP).

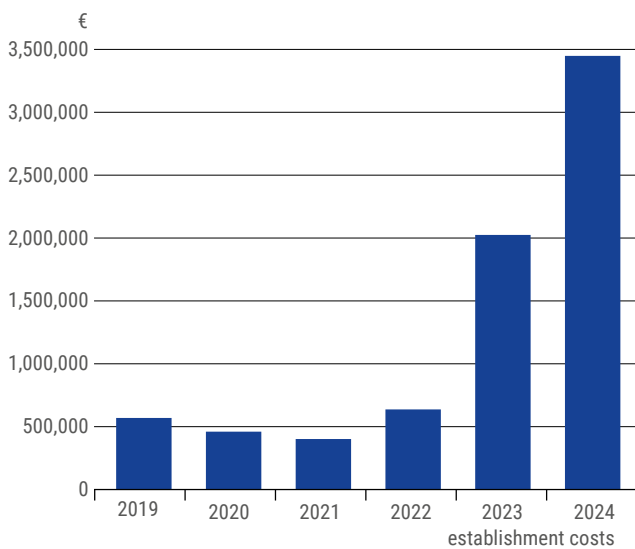


Figure 18: Overview of the single allocation platform for establishing and amending costs

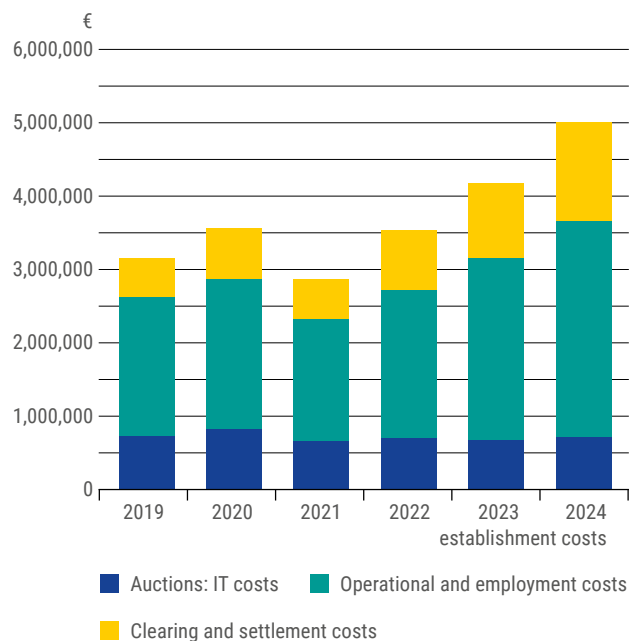


Figure 19: Overview of the single allocation platform operating costs

18 In line with the regulatory guidance costs for the coupling, projects are planned and shared between TSOs and/or NEMOs as of 14 February 2017.

## 4.4 Evolution of services

The SAP operator has implemented and operates all obligations stemming from the FCA regulation. All TSOs focus on the continuous improvement of SAP operator services provided to both TSOs and market participants.

### 4.4.1 Operations

With the go-live of the DA FB market coupling in the Core CCR, a shift from PTR to FTR options happened for the majority of the Core CCR BZBs.

With the introduction of 15-minute DA market products, the SAP operator will also need to adapt IT tools and procedures to this new market scheme.

### 4.4.2 Harmonised Allocation Rules update

The LTBA project in the Core and Nordic CCRs made an amendment of several regulations necessary. On 22 December 2023, ACER approved the update of the HAR.

As introduced in 3.1, a first amendment proposal was submitted on 1 March, while not all issues related to the introduction of LTFBA were solved at the point of time. Consequently, further analysis was carried out in collaboration between TSOs and JAO, and a second version was submitted

on 1 August. The most relevant update was the introduction of a new method for calculating the collaterals required from the market participants for their bids. LTFBA leads to the simultaneous allocation of yearly and monthly products. To avoid an unnecessary increase of the collateral requirements with the risk of reducing liquidity, a new scheme is introduced to soften the requirements. Furthermore, auction timings have been updated to allow all processes needed for LTFBA.

### 4.4.3 Long-term Flow-Based Allocation

Since 2022, the TSOs and JAO have been working to implement the LTFBA project in Core and Nordic CCRs by end of 2024 and by 2025 respectively.

The LTFBA project includes two major workstreams: 1) The process for the calculation of the FB capacity domain, which is developed by the TSOs of the respective CCR (Capacity Calculation). 2) The process for the allocation of capacities from the FB domain, which is developed by JAO with the support of TSOs of both CCRs, Core and Nordics (Capacity Allocation). While the capacity calculation process developed by the TSOs of the Core CCR is on-time for a go-live in 2024, the development of the capacity allocation processes turned out to be more challenging.

Despite JAO's significant progress and efforts in the IT implementation during 2023 and 2024, and different mitigation measures explored, the TSOs communicated at the beginning of 2024 that the project could not go-live as expected in November 2024 without compromising the quality of the project. The TSOs communicated that a mid-year go-live would not be possible, which implies a one-year delay, putting the go-live of Core CCR to the end of 2025.

The main reason behind the delay is the additional scope requested from the last changes from the HAR amendment (December 2023), which resulted in dynamic or changing requirements. Such new requirements translated into additional time needed for the design of the toolings, their development and their proper testing in an already tight planning and complex IT ecosystem.



## 4.4.4 SAP Analysis – LTTR Valuation

In January 2024, JAO as SAP shared an analysis about the Ex-Post Premium, which is the full payout result of LTTR options via monthly and yearly reports. The reports have also

been provided for previous years and can be found in the [Market Opportunities section of the jao.eu website](#).

### Ex-Post Premium – full payout result of LTTR-options

The below analysis (Figure 20) shows the ex-post results over all borders (see full exact borders list here<sup>19</sup>) between the DA option spread of the two BZ prices for a given border and the auctioned price(s) for the yearly/monthly LTTRs at JAO.

The turnout of the LTTRs products is calculated with the following formula:

$$\text{Full valuation payout result of LTTR-options in €} \\ = (\text{Option\_Spread\_DA} - \text{LTTR\_Auction\_Result}) [\text{€/MWh}] \times \text{Capacity\_Auctioned [MW]} \times \text{\#Hours [h]}$$

- › In case of a positive value, market participants received a positive financial return
- › Maintenance periods are considered in the number of hours and in the Option\_Spread\_DA of the concerned LTTR product.
- › In the graphic on the next page, the sum of the valuation over all borders is displayed for monthly and yearly products.

Below is the total valuation in M€ across all borders (excl. CH/UK) for the LTTRs that All TSOs auctioned via JAO in the form of monthly or annual products for the 2018–2023 period.

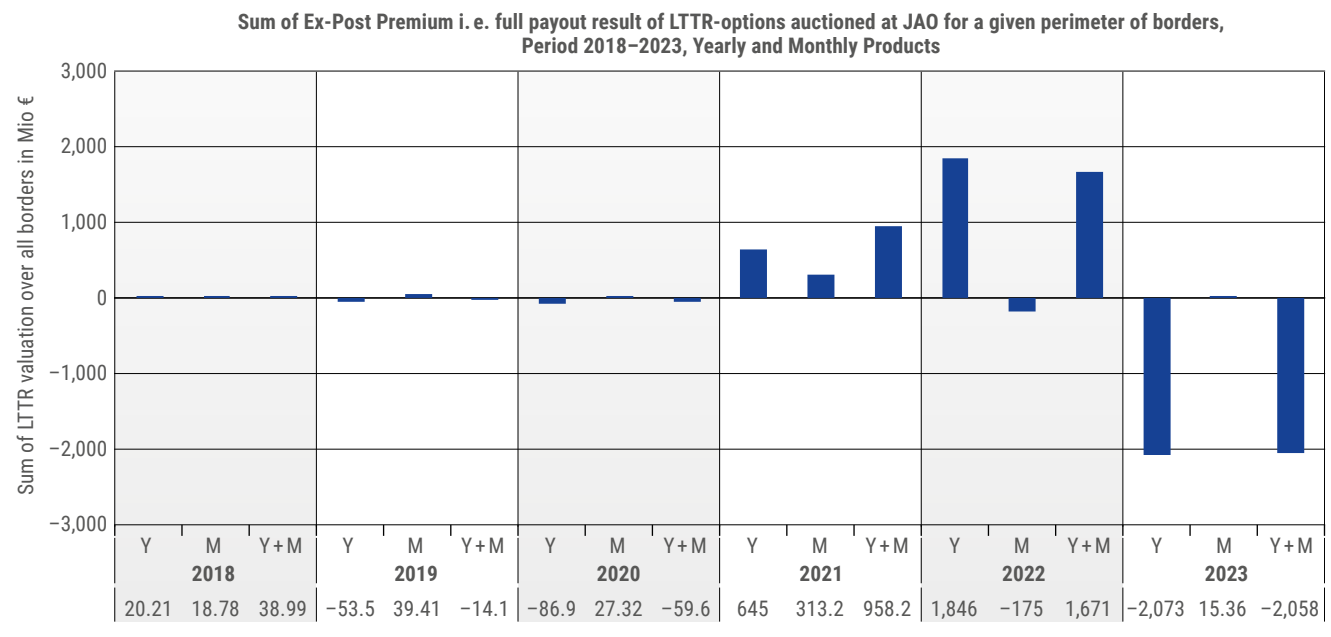


Figure 20: Sum of Ex-Post Premium i. e. full payout result of LTTR-options auctioned at JAO for a given perimeter of borders, Period 2018–2023, Yearly and Monthly Products

19 AT-CZ, AT-DE, AT-HU, AT-IT, AT-SI, BE-DE, BE-FR, BE-NL, BG-GR, BG-RO, BG-RS, CZ-AT, CZ-DE(50Hz), CZ-DE(TenneT), CZ-SK, D1-D2, D1-DE, D2-D1, D2-DE, DE(50Hz)-CZ, DE(TenneT)-CZ, DE-AT, DE-BE, DE-D1, DE-D2, DE-FR, DE-NL, DK-NL, EE-LV, ES-FR, ES-PT, FR-BE, FR-DE, FR-ES, FR-IT, GR-BG, GR-IT, HR-HU, HR-RS, HR-SI, HU-AT, HU-HR, HU-RO, HU-SK, IT-AT, IT-FR, IT-GR, IT-SI, NL-BE, NL-DE, NL-DK, PT-ES, RO-BG, RO-HU, RS-BG, RS-HR, SI-AT, SI-HR, SI-IT, SK-CZ, SK-HU

## LTTR valuation over the period 2018–2023

- Over all borders as a helicopter view, the payout result was:
  - highly positive in 2021 (958 M€) and 2022 (1,671 M€), due to sharply rising market prices (and differences between expected and realised prices);
  - highly negative in 2023 (2,058 M€), due to strong decreasing prices (and differences between expected and realised prices).
- For the delivery years 2021, 2022 & 2023, the main bulk of the valuation comes from yearly products.

Figures 21 and 22 show the difference between the average day ahead market spread and LTTR auction price for each border for the delivery year 2023, for two different product types: yearly and monthly.

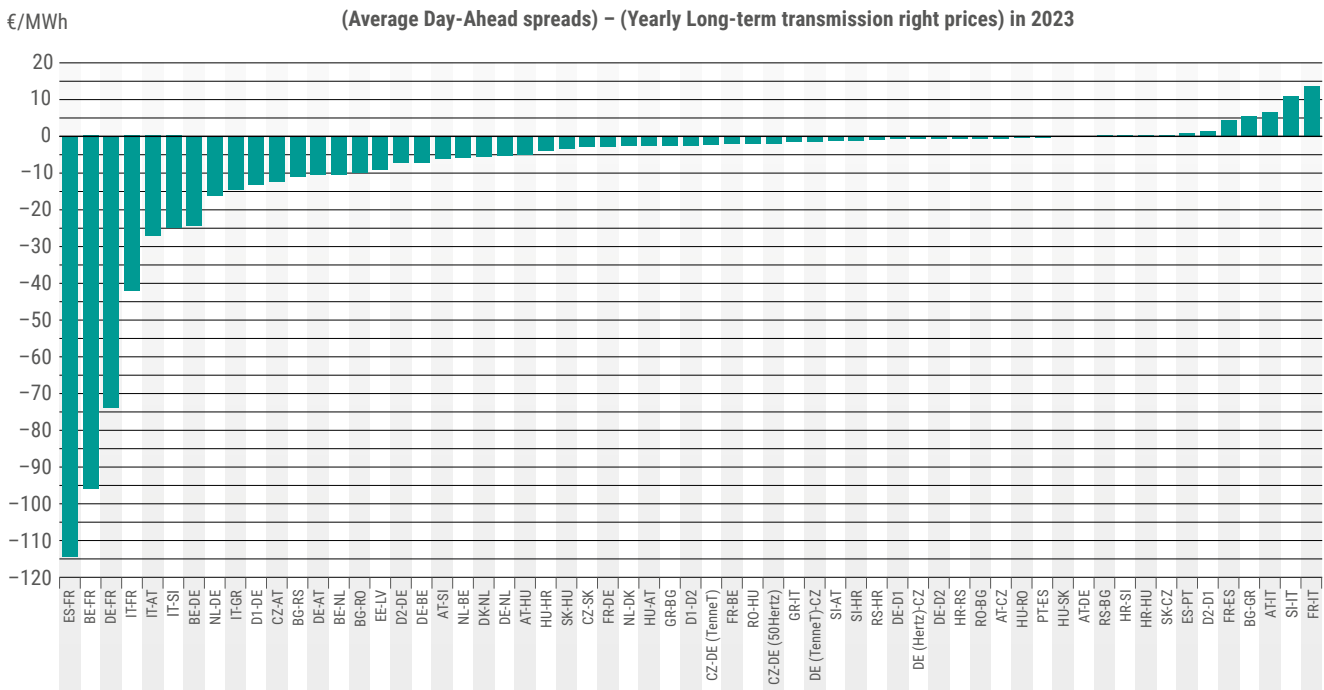


Figure 21: Ex-Post premium of LTTR valuation for yearly products, delivery year 2023

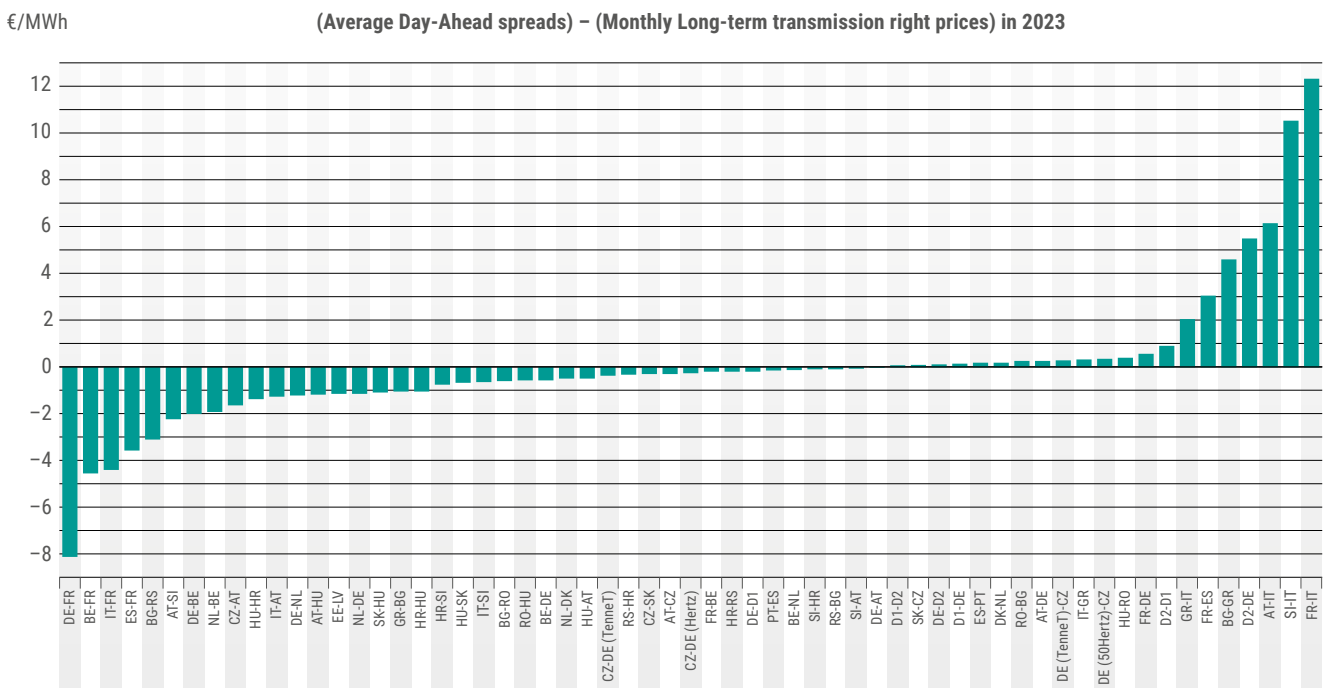


Figure 22: Ex-Post premium of LTTR valuation for monthly products, delivery year 2023

#### 4.4.5 Upcoming EC assessment of possible measures to improve the forward markets

EMD reform was adopted by the European Parliament and Council respectively in April and May 2024. After its publication in the Official Journal of the EU on 26 June 2024, it will enter into force on 16 July 2024.

Regarding the forward markets, the text establishes as a first step the development of an impact assessment by the EC, aiming to identify the optimal model for the forward markets from a European perspective. The next step will be the respective amendment of the FCA Guideline, expected to start end of 2025.

ENTSO-E welcomes the aim of improving forward markets and cross-zonal hedging and looks forward to participating in such an assessment. The TSOs are committed to further developing these markets in cooperation with stakeholders and the EC. ENTSO-E still highlights how the current shortcomings of forward markets such as limited liquidity should be addressed with practical evolutions of the current set-up (e.g. more frequent auctions, improved products, etc.). The proposal of Regional Virtual Hubs is still deemed a disruptive approach with long implementation times (5–10 years) based on untested solutions and with significant uncertainties on cost and risks for both TSOs and market participants, whose interest in such Virtual Hub arrangements is far from evident.











# 5 Market Coupling

This chapter has been prepared in cooperation with the All NEMO Committee. The All NEMO Committee has reviewed the content and accompanying illustrations for compliance, taking into account confidentiality requirements. The information on costs provided by this report is a summary of the full content from the CACM Cost Report 2024 to be released by All TSOs and All NEMOs later in the year.

SDAC makes use of the day-ahead Market Coupling Operator (MCO) function to calculate electricity prices and match volumes across Europe, and to implicitly allocate CZC in a single auction. The algorithm used is called the Pan-European Hybrid Electricity Market Integration Algorithm (EUPHEMIA).

SIDC, so far, enables continuous cross-border trading across Europe. IDAs are, at the time of writing, planned to go live in June 2024. SIDC is based on a common IT system with a

Shared Order Book (SOB), a Capacity Management Module (CMM) and a Shipping Module (SM). This common IT system facilitates the continuous matching of orders from market participants from several BZs, provided that CZC is available.

The design of SDAC and SIDC enables the competition of multiple NEMOs proposing trading solution within the relevant BZs, following the provisions of CACM.

## 5.1 Governance

The joint Market Coupling Steering Committee (MCSC) was established in January 2022. The joint governance (organisation) **was formalised in September 2022**. The set-up of the Working Groups has been mirrored between SDAC and SIDC to ensure efficiency, and to secure synergies between the projects. The dedicated Market Coupling Consultative Group (MCCG) was established in June 2022. Over the course of 2022 and 2023, MCSC approved improvements in the decision-making process and quantity of market party engagements. Regarding voting principles, Qualified Majority Voting (QMV) was introduced at the steering committee level as of the September 2022 MCSC meeting. To further optimise and harmonise the governance structure of MCSC and to ensure coordination of the interactions with system providers in

the DA cooperation, the SDAC QARM (Quality and Release Management) was established at the very beginning of 2023. To further harmonise the MCSC project, a single Project Management Office (PMO) team was established in March 2023 to support the integrated governance.

Regarding governance changes during the period covered by the 2024 Market Report, the MCSC approved putting the Governance Task Force, tasked with the implementation of organisational improvements, on hold, due to the persistent delay of 'CACM 2.0'. In addition, in July 2023 the MCSC approved the addition of the 15 min MTU testing group to the governance under SDAC QARM.

## 5.1.1 Single Day-Ahead Coupling

Since June 2023, there have been several changes in membership. The NEMO BRM<sup>20</sup> adhered to the Day-ahead Operational Agreement (DAOA) and ETPA (Energy Trading Platform Amsterdam) became an observer of the DAOA.

At the time of writing, they are non-operational members. Nasdaq exited from SDAC. As such, SDAC continues to serve 27 countries. In total, 32 TSOs<sup>21</sup> and 16 NEMOs<sup>22</sup> cooperate under the DAOA.

## 5.1.2 Single Intraday Coupling

In total, 30 TSOs and 15 NEMOs from 27 countries cooperate under the Intraday Operational Agreement (IDOA), governing SIDC. With the go-live of the 4<sup>th</sup> wave of SIDC in November 2022, 25<sup>23</sup> countries are operational with at least one border. In the 5<sup>th</sup> go-live of SIDC in August 2023, ETPA went live as the third operating NEMO in the Dutch market. The IDOA governs the pan-European SIDC and regulates the cooperation of TSOs and NEMOs regarding the establishment,

amendment and operation of the market coupling. In 2024, several exhibits of the IDOA were amended to further develop the principles of the NEMOs and TSOs' cooperation in view of the current and future development, implementation and operation of IDAs. Thereby, compliance with the ACER Decision 01/2019 establishing IDAs as a basis for the pricing mechanism for ID CZC is ensured.

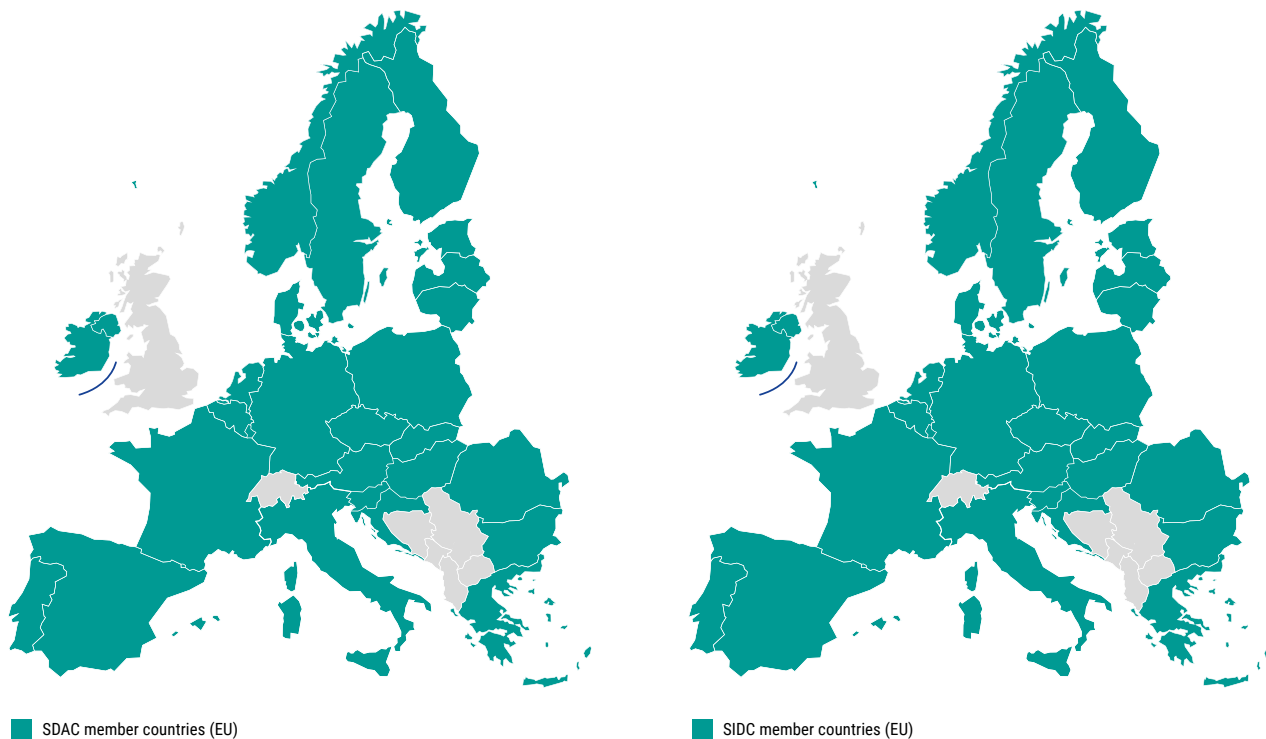


Figure 23: Countries of SDAC (left) and SIDC (right) (as of June 2024)

20 Bursa Romana de Marfuri (Romanian Commodities Exchange)

21 50Hertz, Amprion, APG, AST, Baltic Cable, ČEPS, Creos, HOPS, EirGrid, ESO, Elering, ELES, Energinet, Elia, Fingrid, IPTO, Kraftnät Åland, Litgrid, MAVIR, Transelectrica, PSE, Red Eléctrica, REN, RTE, SEPS, SONI, Statnett, Svenska Kraftnät, TenneT NL, TenneT DE, Terna, and TransnetBW.

22 BRM (non-operational until accession), BSP SouthPool, CROPEX, EirGrid and SONI acting jointly as SEMOpX, EPEX SPOT, EXAA, GME, HEnEx, HUPX, IBEX, Nord Pool EMCO, OKTE, OMIE, OPCOM, OTE, and TGE.

23 Austria, Belgium, Bulgaria, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Norway, The Netherlands, Poland, Portugal, Romania, Slovenia, Slovakia, Spain and Sweden.

## 5.2 Operations

While unprecedented negative prices were seen, which were extensively addressed by the projects, operations were robust over the course of 2023.

### 5.2.1 Single Day-Ahead Coupling

[The go-live of DA FB market coupling in the CCR on 8 June 2022 \(for delivery on 9 June\)](#) constituted a major milestone in implementing the CACM Guideline and its target model. A low occurrence rate of fallback capacity calculations has been seen since the Core DA CC go-live, meaning there has been a high process stability. Furthermore, the go-live of Core FB has led to increased price convergence across the region.

In August 2023, the activation of the linear Inter NEMO flow calculation (INFC) went live. Before a change to the new approach could be made, a change to the (All TSO) SEC Methodology that governs all flow calculation related requirements was required. ENTSO-E supported this amendment process, and on 30 May 2023 [ACER made their approval decision for this change](#). TSOs were given three months, until the end of August 2023, to [implement the methodology for calculating scheduled exchanges resulting from SDAC](#).

In June 2023, in response to multiple days on which the low second auction threshold was reached in The Netherlands, the threshold for triggering second auction was changed from -150 €/MWh to -500 €/MWh by several NEMOs operating in SDAC.

On 24 November 2023, the market results in the Finnish area were set to the minimum of -500 €/MWh due to the inclusion of a significantly erroneous sell bid submitted by one participant. The event and potential mitigating measures are being analysed within MCSC and currently ongoing investigations were launched by concerned regulatory authorities.

SDAC continues to operate successfully without full decoupling. In fact, no full decoupling of markets has occurred since the operation began in February 2014. However, the fifth partial decoupling occurred on 28 October 2023 due to a technical issue in the local NEMO trading system impeding the validation of submitted orders.

Other minor operational incidents have occurred since the previous report, which have been communicated actively to market participants in line with the SDAC operational procedures. All operational incidents are monitored and analysed on a regular basis. Updates of the processes are introduced via the SDAC operational steering committee (OPSCOM) to mitigate relevant risks. The figure below depicts these two types of incidents. Details on the incidents can be found in the annual CACM report<sup>24</sup>.

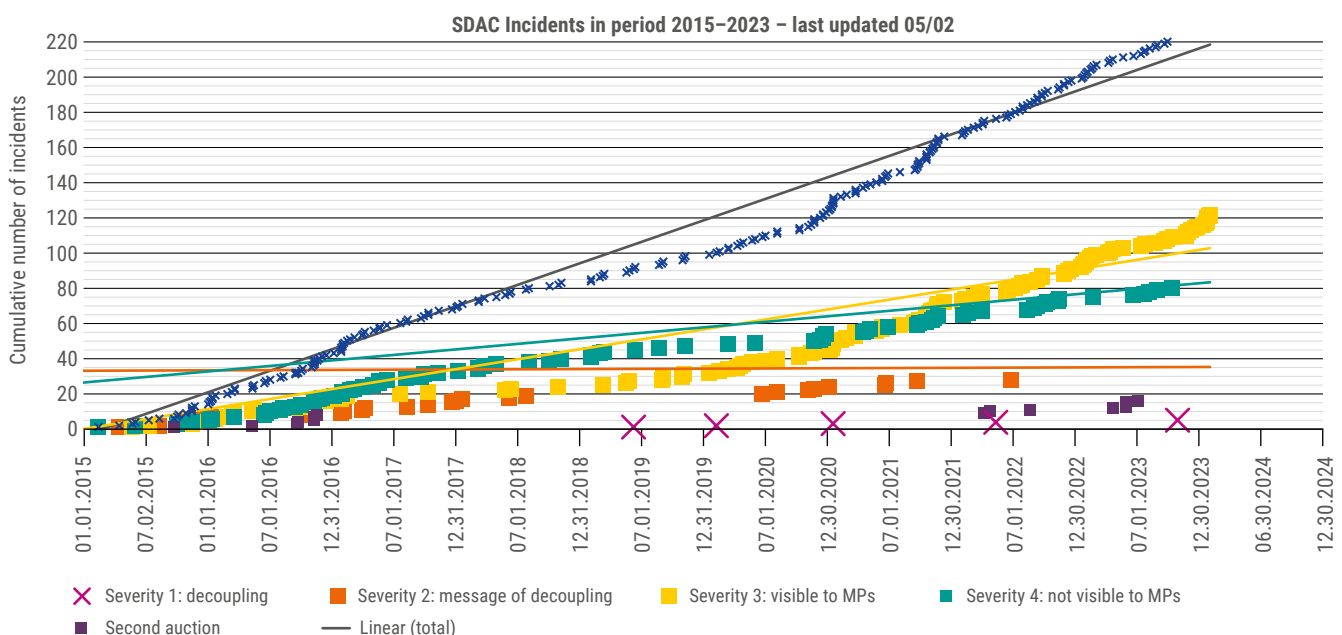


Figure 24: SDAC Incidents in period 2015-2023

24 See CACM reports of [2018](#), [2019](#), [2020](#), [2021](#), [2022](#), [2023](#)

## 5.2.2 Single Intraday Coupling

SIDC has been operational in 15 countries since 12 June 2018. The first delivery was on 13 June 2018 and was subsequently extended by the second go-live wave to seven additional countries (Bulgaria, Croatia, Czechia, Hungary, Poland, Romania and Slovenia), with the **first deliveries** taking place on 20 November 2019. The **third go-live wave** on 21 September 2021 integrated the Northern Italian borders (IT-FR, IT-AT and IT-SI) as well as the Italian internal BZBs into the already coupled ID region. The **fourth go-live wave**

took place in November 2022, including Greece and Slovakia. On 1 August 2023, the **fifth wave go-live** took place, integrating an additional NEMO, namely ETPA in the Netherlands into operations. The joint TSOs and NEMOs single ID coupling IT system with one SOB, a CMM and a SM **continue to perform operationally robustly**. In total, circa 371 million trades have been executed within SIDC since its inception in June 2018 (counting until the end of December 2023) (see Figures 25 and 26).

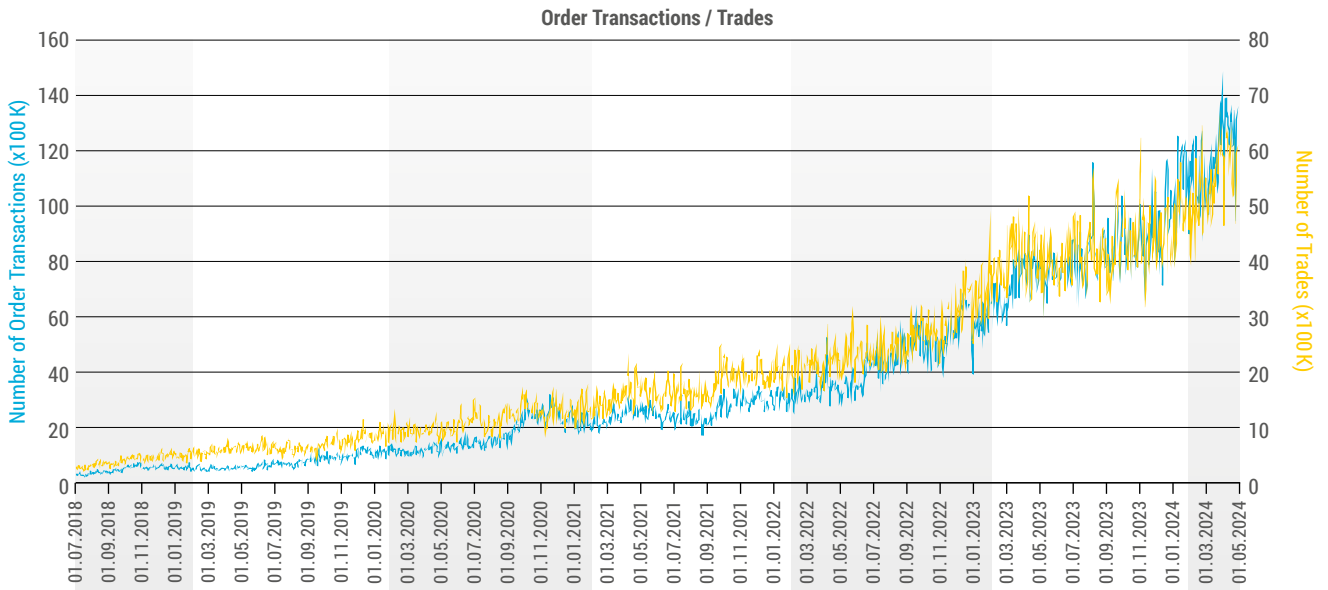


Figure 25: SIDC daily order transactions/trades since 2018

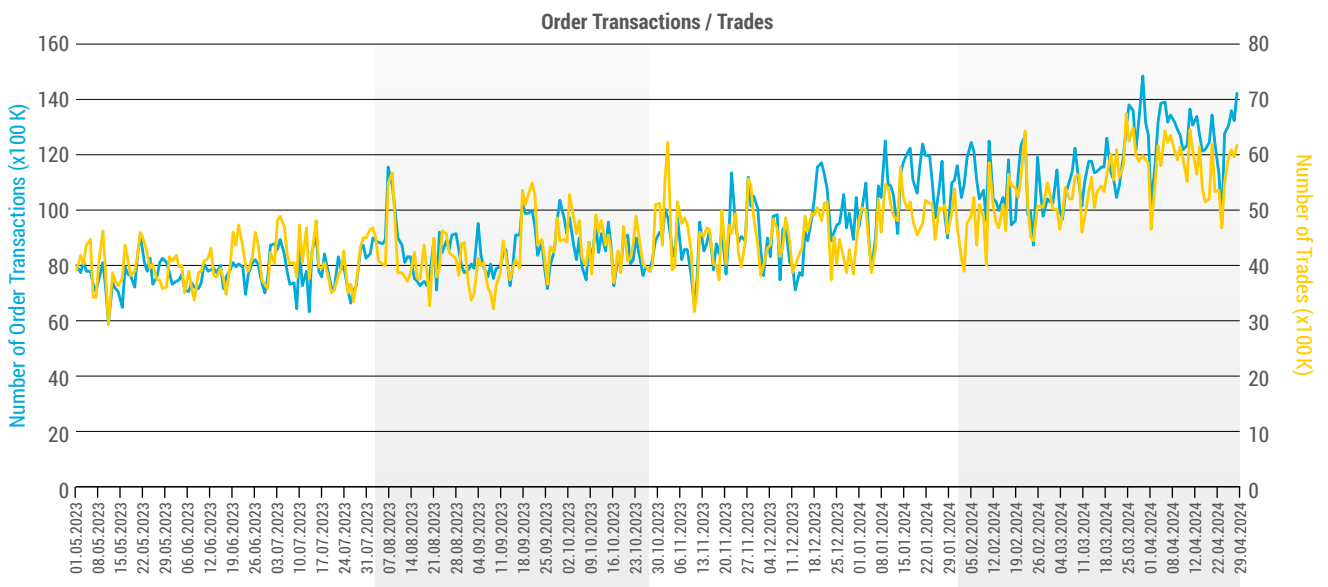


Figure 26: SIDC daily order transactions/trades within the last 12 months

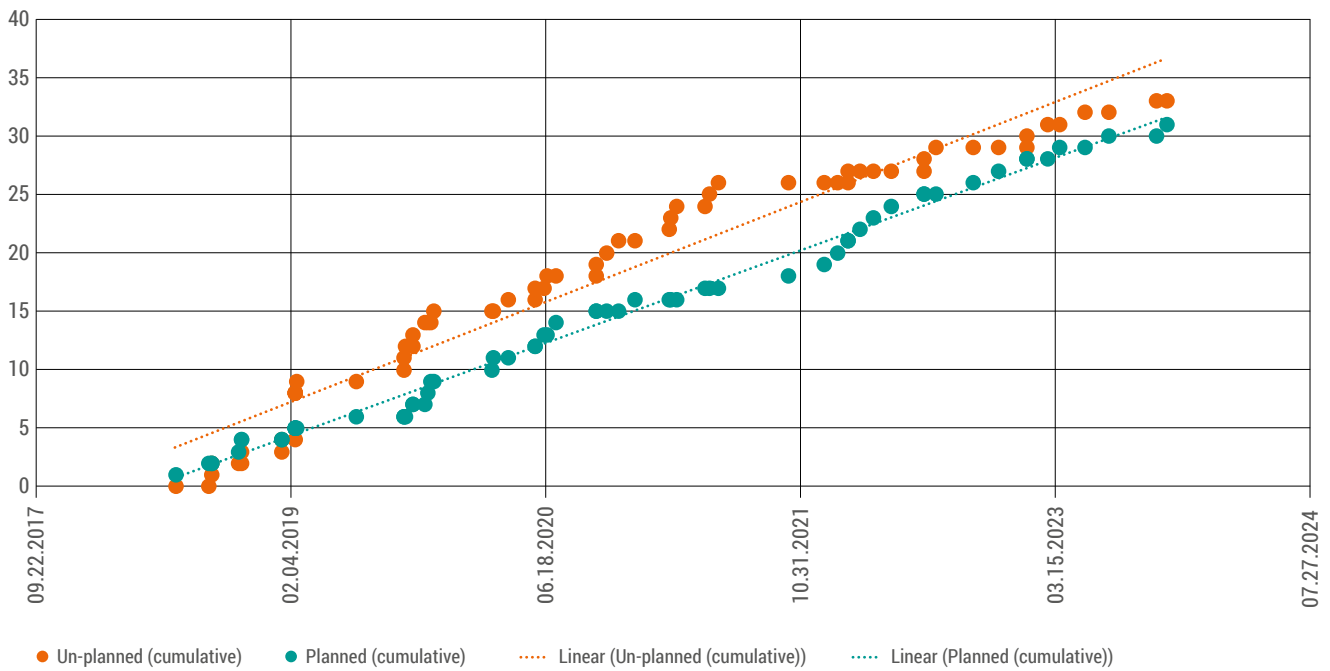


Figure 27: Number of unplanned and planned non-availabilities of SIDC (as of February 2023)

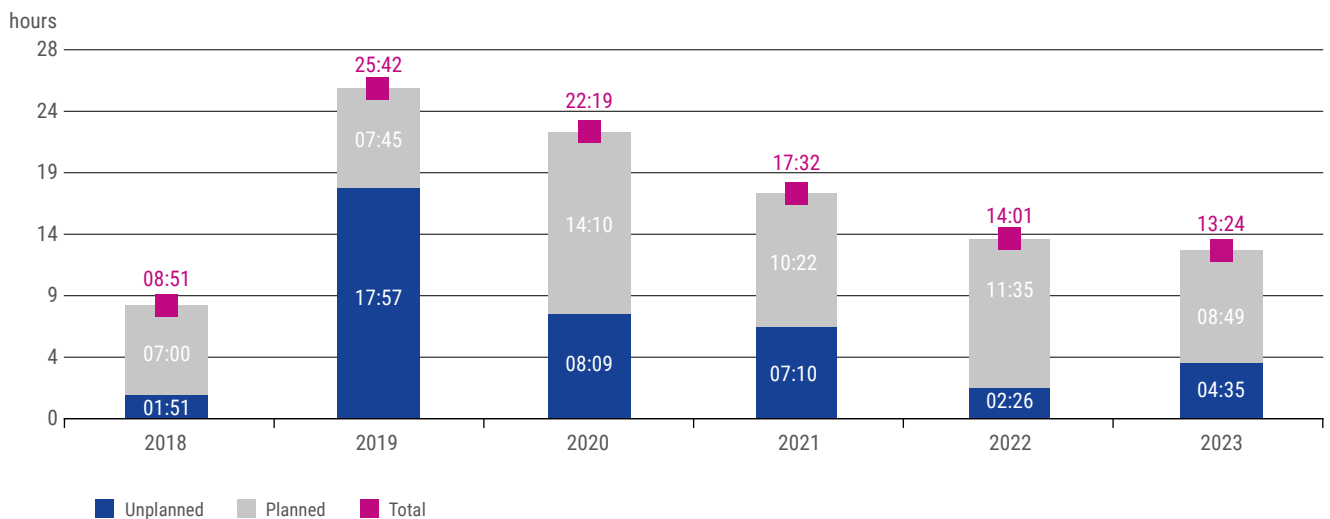


Figure 28: Time of unplanned and planned non-availabilities of SIDC (as of December 2021)

No critical incidents have occurred during the reporting period at the time of writing. Other minor operational incidents have occurred since the previous report, some of which have been communicated actively to market participants in line with the SIDC operational procedures. All operational incidents are monitored and analysed on a regular basis. Updates of the processes are introduced via the SIDC operational steering committee (OPSCOM) to mitigate relevant risks.

As was the case for the previous Market Report, in the period covered by this report, two releases were used for production. This concerned the fifth and sixth release, respectively release 3.2 and 3.3. The fifth release (Release 3.2) was focused on necessary technical updates and was in use for the 4<sup>th</sup> go-live wave. The sixth release (Release 3.3) was developed, tested and approved in 2022 and deployed on 18 January 2023 and covered all performance optimisation measures to fully support the geographical extension of SIDC.



## 5.3 Expenditures

TSOs and NEMOs provide an annual detailed cost report to ACER and the NRAs in accordance with Article 80 of the CACM regulation<sup>25</sup>.

### 5.3.1 Single Day-Ahead Coupling

This section provides a summary of the costs of establishing, amending and operating the SDAC, categorised by TSO-only costs, NEMO-only costs and joint costs (All TSOs and All NEMOs). Figure 29 and Figure 30 show the budgeted and actual costs since 2017<sup>26</sup>. The second Y axes show the total MWh traded for SDAC. The same (total) amounts are incorporated into both graphs.

All-TSOs costs (e.g. external TSO support), All-NEMOs costs (e.g. third-party services) and All-TSOs and All-NEMOs cost are governed by the respective cooperation agreements (i.e. Transmission Cooperation Agreement [TCID], All NEMO Cooperation Agreement [ANCA] and DAOA).

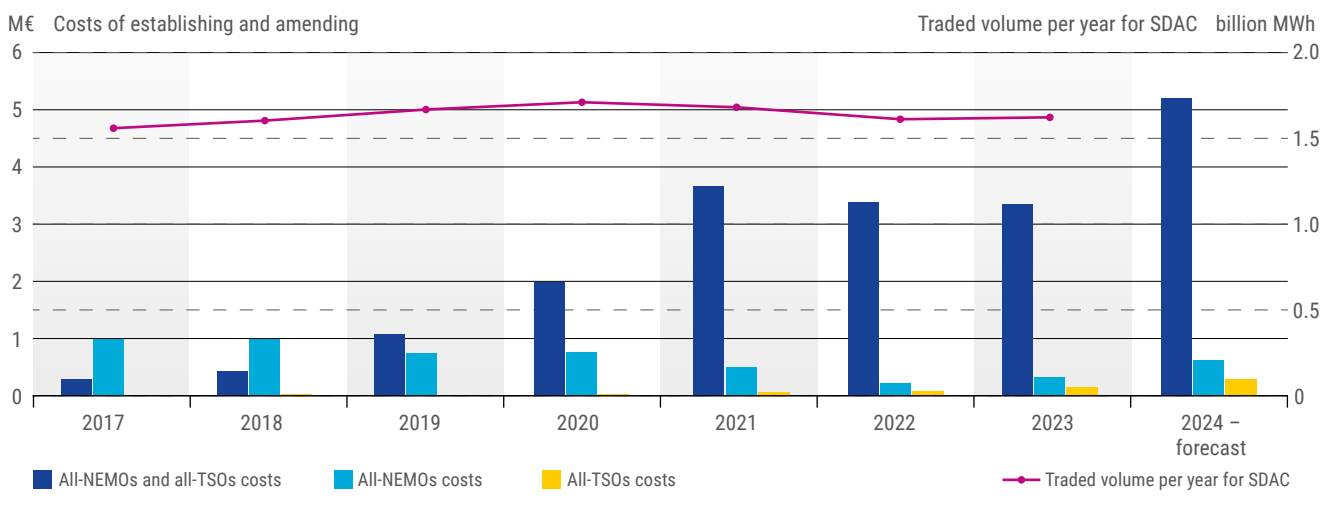


Figure 29: Overview of SDAC for 'All-TSOs costs', 'All-NEMOs costs' and 'All-NEMOs and All-TSOs costs' of establishing and amending

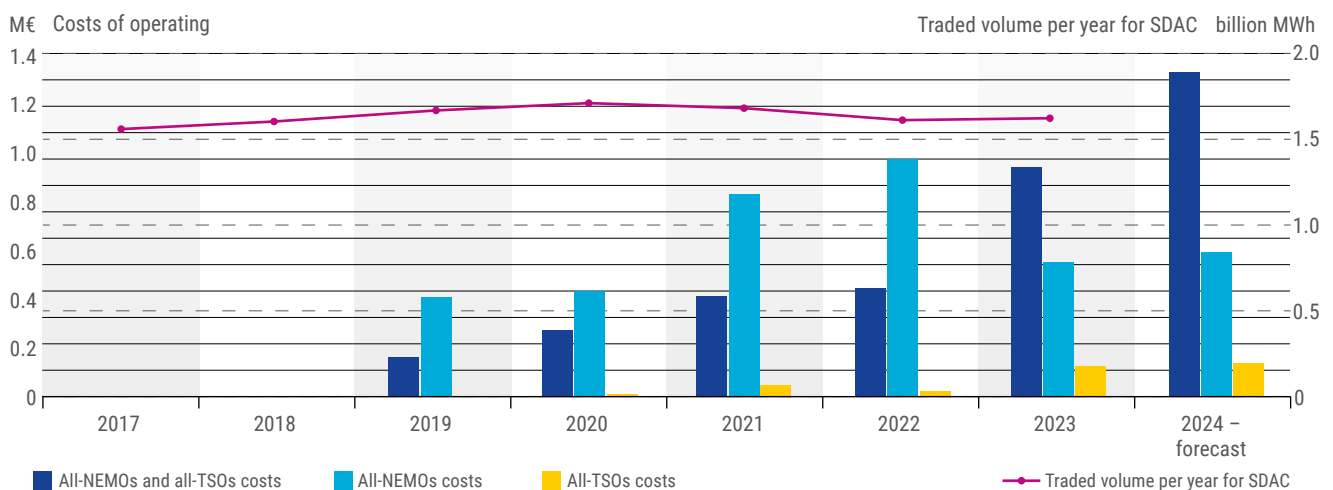


Figure 30: Overview of SDAC for 'All-TSOs costs', 'All-NEMOs costs' and 'All-NEMOs and All-TSOs costs' of operating

25 See CACM reports of [2018](#), [2019](#), [2020](#), [2021](#), [2022](#), 2023

26 In line with the regulatory guidance, costs for the coupling projects are planned and shared between TSOs and/or NEMOs as of 14 February 2017.

### 5.3.2 Single Intraday Coupling

This section provides a summary of the common costs of establishing, amending and operating the SIDC, categorised by TSO-only costs, NEMO-only costs and joint costs. Figures 31 and 32 show the budgeted and actual costs since 2017<sup>27</sup>. On the second Y axes you can see the total MWh traded for SIDC. The same (total) amounts are incorporated into both graphs.

All-TSOs costs (e.g. external TSO support), All-NEMOs costs (e.g. third-party services) and All-TSOs and All-NEMOs cost (e.g. advanced SIDC solution) are governed by the respective cooperation agreements (i.e. TCID, ANCA and IDOA).

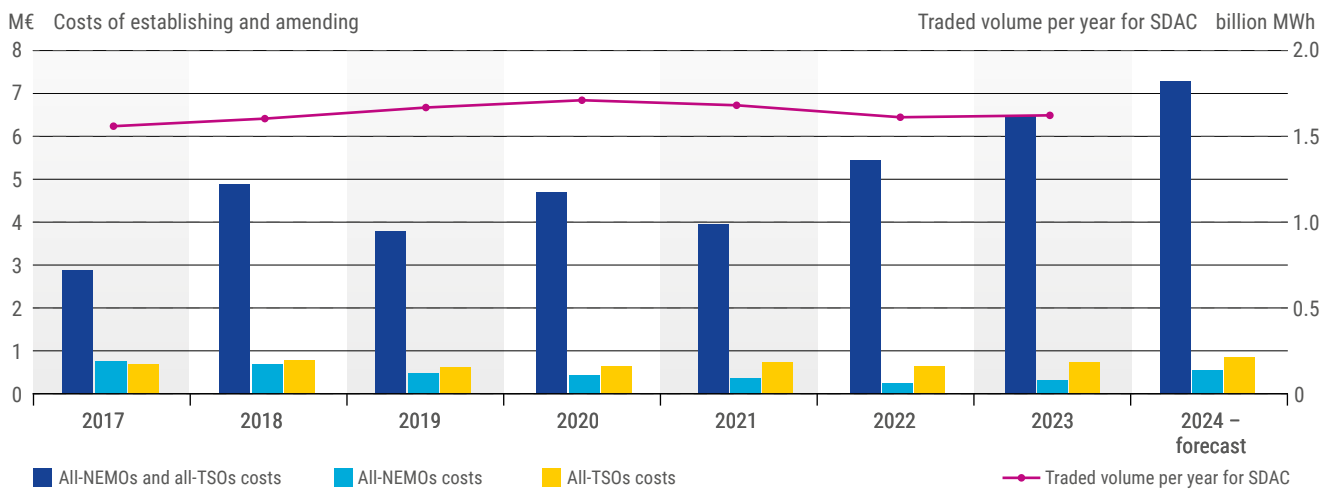


Figure 31: Overview of SIDC for 'All-TSOs costs', 'All-NEMOs costs' and 'All-NEMOs and All-TSOs costs' of establishing and amending

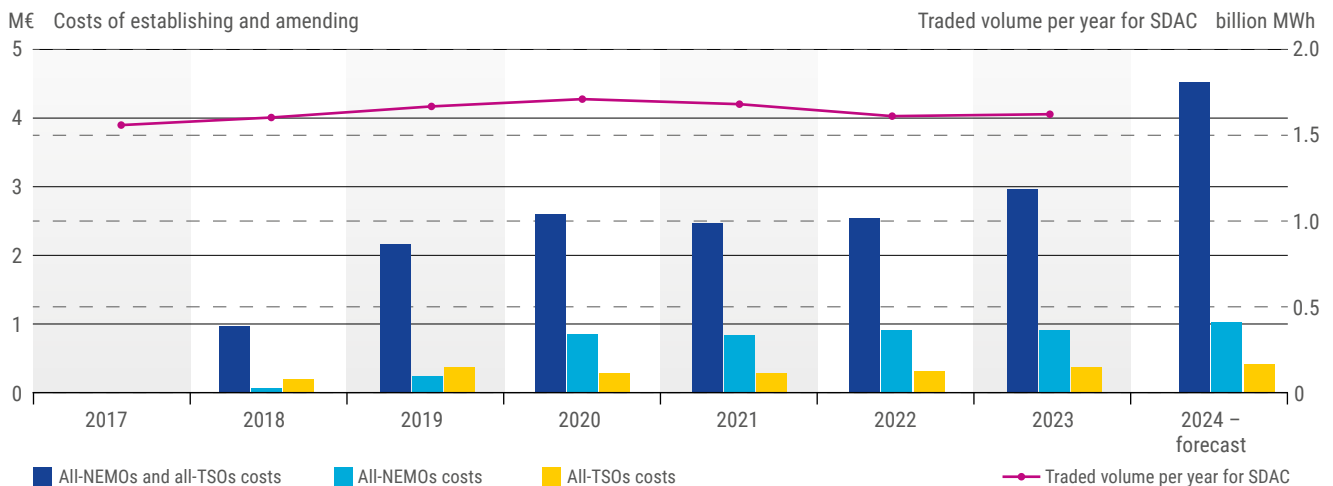


Figure 32: Overview of SIDC for 'All-TSOs costs', 'All-NEMOs costs' and 'All-NEMOs and All-TSOs costs' of operating

27 In line with the regulatory guidance, costs for the coupling projects are planned and shared between TSOs and/or NEMOs as of 14 February 2017.

## 5.4 Evolution of services

### 5.4.1 Single Day-Ahead Coupling

**The SDAC is continuously being developed with respect to topology and system functionalities. Over the current reporting period, the following SDAC functional projects went live:**

1. New releases of both PMB and the EUPHEMIA algorithm in November 2023. The new releases, 12.1 for PMB and 11.2 for EUPHEMIA, contained updates related to fallback procedures, as well as functionalities related to IDAs (IDAs use the same assets). There were also several technology updates and inclusion of functionalities needed for the 15 min MTU project that is planned to go-live in 2025.
2. The Multi-NEMO arrangement (MNA) on the French side of the French–Spanish border went live in February 2024.

Technical advancements were planned and implemented, as part of the SDAC research and development programme. The improvements were developed under the Euphemia Lab R&D programme, where the challenges related to optimality, repeatability and scalability are being addressed. The current version of Euphemia release in production is E11.2 and went live in November 2022, and the next version E11.3 is planned to go live in 2024.

#### Regional projects

For several regional projects, SDAC changes or support (in testing) is needed. These projects include Celtic Cable (planned to go live in 2026), Hansa CCR phase 2, Multi-NEMO

#### Multi-NEMO arrangement

The functionality of handling multiple NEMOs in and between BZs was first utilised in SDAC for the CWE CCR in July 2019. Since then, this functionality has been sequentially introduced in the Nordics (June 2020), for the Hansa CCR (for NorNed in November 2020; for the Cobra cable and the Danish borders in June 2021), in Poland (for the SwePol cable and LitPol Link in February 2021 and for the remaining

Algorithm improvements are made through the change control procedure and the [Algorithm Methodology](#). Both frameworks aim to address changes efficiently with minimal disruption and controlled risk: the change control procedure sets out the process for implementing changes in the SDAC operations, while the NEMO algorithm methodology sets out transparent rules and principles for the management (submission, evaluation, decision and implementation) of requests for changes related to the SDAC algorithm (EUPHEMIA). During the current reporting period, MCSC improved the change control procedure to ensure the effective handling of change requests. Since its launch, EUPHEMIA has been continuously developed further. With the latest releases, changes needed for future projects, such as IDAs and 15 min MTU have been introduced and refined. In addition, the behaviour for fallback situations has been improved.

arrangements (see section below), Nordic Flow-Based, and Advanced Hybrid Coupling in Core CCR.

borders in June 2021), and for some borders of the Italian Borders Working Table (IBWT) (June 2022). The Baltic CCR is also a multiple-NEMO region. However, so far only one NEMO is active in this region. During the current reporting period, the MNA on the French side of the FR–ES border went into effect in February 2024.

## Implementation of a 15-minute MTU considering the granted 15-minute imbalance settlement period derogations

According to the EB Regulation, TSOs should apply an ISP of 15 minutes in all scheduling areas. The deadline for introducing this ISP in all scheduling areas was 1 January 2021, unless regulatory authorities had granted a derogation or an exemption. Article 8 of the [EU Electricity Regulation](#) obliges NEMOs to provide market participants with the opportunity to

trade energy in time intervals that are at least as short as the ISP for both DA and ID markets. Consequently, a project was established under the MCSC to coordinate the implementation of 15-minute products in the DA time frame across the EU (15-minute MTU implementation).

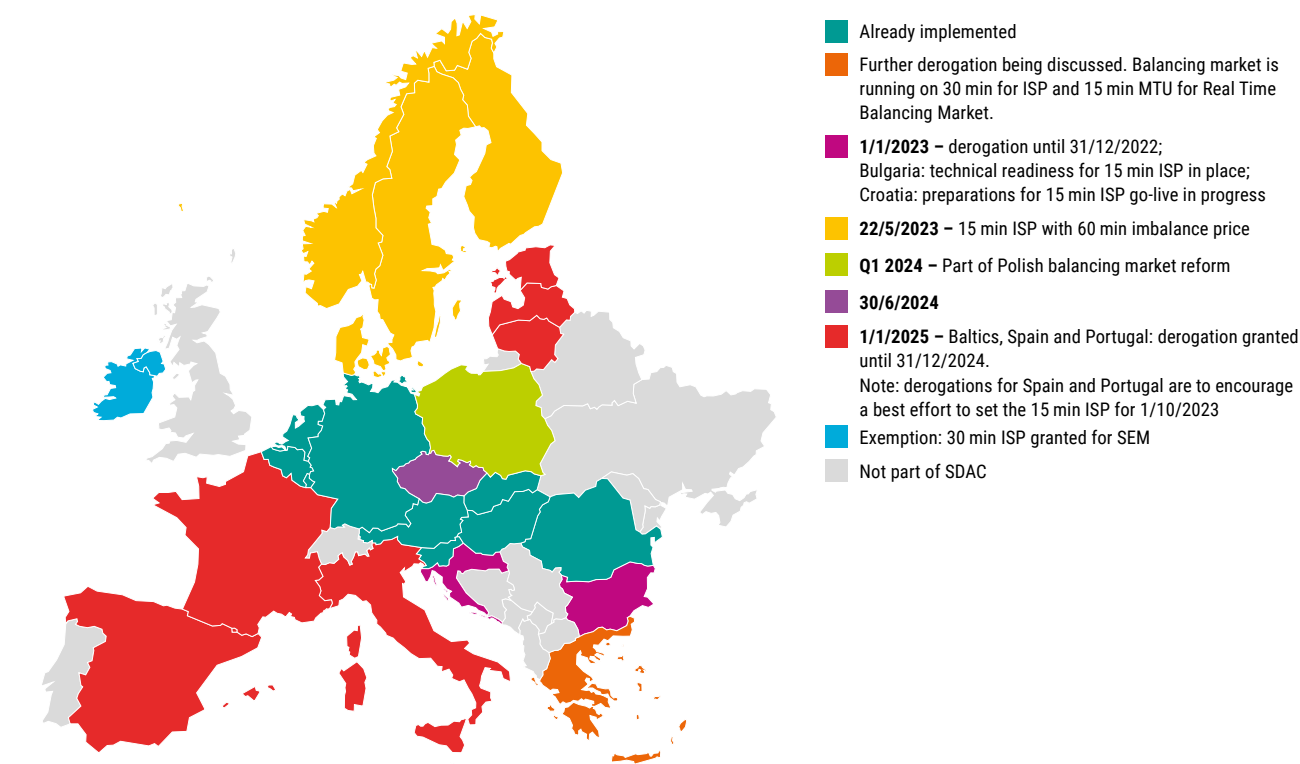


Figure 33: Current status of ISP readiness/derogations in each country

Originally, NRAs decided on the gradual implementation of 15- or 30-minute ISPs, which also requires cross-matching (product cross-matching and network cross-matching). Given the impact on the whole chain of market coupling processes, regional implementation projects were established. However, due to algorithm performance issues, rather than an incremental go-live approach, the Big Bang implementation approach was agreed upon in June 2022, with the new go-live expected in Q1 2025. The Big Bang 15-minute MTU implementation approach means there is one single go-live where every BZ and BZB in SDAC needs to switch from 60 min MTU data to 15 min MTU data jointly at the same time. The target approach is then that all BZs (and all its TSOs and NEMOs) and BZBs will jointly switch to the final expected MTU setup in Q1 2025. A detailed implementation plan will be finalised before Summer 2024. An exemption is granted to Ireland, where the finest granularity will be 30 min MTU.

From a product design perspective, within a BZ the Big Bang Approach can still be with products in multiple MTUs (15 min, 30 min and 60 min), as approved by the MCSC.

### The MCSC has agreed on the following measures for algorithm improvements needed for the 15min MTU implementation:

- › Removal of PUN product from SDAC;
- › Transition from Complex order to Scalable complex order;
- › Additional time to the algorithm in the DA MC process (13 minutes more, a total of 30 minutes as of 15 min MTU go-live);
- › Deployment of the Distributed Computing hardware and software environment.

## Research and development programme

A significant part of the SDAC budget is spent investigating ways to improve the performance of the algorithm so that it can accommodate all required changes. Research is carried

out under the umbrella of the EUPHEMIA Lab programme, which shows positive results overall and promising improvements in the algorithm.

## Flow-based capacity allocation

In line with the legal requirements, flow-based market coupling (FBMC) is being rolled out across Europe. On 8 June 2022, the Core CCR, comprising the former CWE CCR and CEE CCR, introduced FBMC. The go-live of DA FBMC for the Nordics was postponed in November 2023 and is now expected to go-live in October of 2024. The Core CCR is

currently working on the implementation of advanced hybrid coupling (AHC) and Nordic FB is expected to go-live directly with AHC on the Hansa CCR BZBs and internal borders (comprising the HVDC interconnector and the AC border DE–DK1). Following the ACER determination, work has been further initiated on the [Central Europe CCR](#).

## 5.4.2 Single Intraday Coupling

### Extensions

The second to last geographical extension for SIDC was in November 2022 when the fourth wave went live, which integrated the Greek borders (GR–IT and GR–BG)<sup>28</sup> and Slovak borders (SK–CZ, SK–HU and SK–PL)<sup>29</sup>. In August 2023, the

fifth go-live wave was completed with the addition of ETPA as intraday NEMO in The Netherlands. Furthermore, the 15-minute MTU capacity allocation on the HR–SI and HR–HU borders went live on 12 January 2024.

### New functionalities

The development of the market and a geographical extension contribute to an increase in system performance needs. The performance is constantly monitored and improved if necessary. Analysis of the first set of performance optimisation measures (RTS4 slice A) was finalised and implemented as part of the R3.3 developed and validated at the end of 2022 and released to production in January 2023. From then on, new improved SLAs were agreed with the system provider. SIDC is also developing and preparing the testing of the next release (R4.0) which shall be deployed into production 2024 to support the introduction of IDAs. A second release (R4.1) is scheduled for Q4 of 2024, embedding lower priority change requests not included in R4.0 version, in order to not delay the IDAs. In addition, additional Service Requests (ASR) to analyse how to update the XBID platform were agreed upon in 2023 and will be analysed in 2024 to push SLA boundaries to respectively 20 million (RTS4 Slice B) and 30 million (RTS4 Slice C) orders per day.

### (a) European Intraday Auctions

The current SIDC continuous trading mechanism does not allow for an optimal allocation of CZC when congestion takes place as it is based on the first-come first-serve principle, with different transaction prices per trade. Hence, the cross-zonal capacity is not priced. With the implementation of the IDAs, SIDC will incorporate three implicit auctions, similar to the DA market, leading to a more efficient allocation of CZC when congestion occurs. The implementation of IDAs is a project prioritised by ACER and Market Coupling Steering Committee. The technical design has been concluded; extensive functional and integration testing have been concluded. The go-live of IDAs is currently planned for 13 June 2024, when simulation testing (including with market participants) would be successfully finalised.

28 Terna, ESO and IPTO, and Gestore dei Mercati Energetici SpA (GME), IBEX and HEnEx

29 ČEPS, MAVIR, PSE and SEPS, and EPEX SPOT, EMCO, HUPX, OKTE, OTE and TGE.



### **(b) Flow-based allocation in continuous trading**

Two CCRs within the SIDC are currently implementing FB capacity calculation in intraday: Core and Nordics. In accordance with the Algorithm Methodology, the allocation of capacity in IDA could stay in ATC until FB allocation is implemented in the XBID platform for the continuous trading. This implementation is also a priority of SIDC after the implementation of IDA. Design work has started, including concept and performance analysis with the IT provider. To address efficiently the expected performance impact, the design and implementation started in 2023 (and will continue in 2024) with the realisation of a minimum viable product.

### **(c) Implicit intraday losses**

In line with algorithm methodology requirements, the continuous trading matching algorithm shall consider losses on interconnectors between BZs during capacity allocation. Applying the losses will, in most cases, require regulatory approval. Losses in continuous trading imply that the volumes and prices are different on both side of the respective interconnector. Design of Losses are currently on hold, similarly to cross product matching, due to huge negative performance impact and the necessary technical complex investments.





# 6 Balancing markets

## 6.1 Procurement and Activation of Balancing Energy

**The main achievements of this reporting period are:**

- › The Austrian TSO APG (June 2023) connected to the MARI platform, joining the German TSOs and ČEPS;
- › [Italian TSO Terna successfully joining PICASSO](#) on the 19<sup>th</sup> of July 2023;
- › Baltic TSOs (Litgrid, AST and Elering) becoming full members of IGCC in Q1/2024;

Several TSOs must join the MARI and PICASSO platforms in the upcoming months, so further information can be found in the respective accession roadmaps. In general, there has been good progress by TSOs using standard products in Europe (on going aFRR full activation time, FAT, harmonisation towards FAT= 5 min) by connecting to the different balancing platforms or by previously adapting their local market designs prior to their planned connections.

### 6.1.1 RR Platform (led by the TERRE Project)

The Trans European Replacement Reserves Exchange (TERRE) project is the European implementation project for exchanging replacement reserves. The TERRE project comprises seven TSO members and one observer. National Grid ESO (Great Britain) exited the project in December 2022. In addition, Amprion, Statnett, and Svenskå Kraftnät are project members involved in the development of the IT solution, named LIBRA. The LIBRA platform has proven to be a robust and reliable IT solution: only one price incident

occurred in the platform due to an unlikely configuration of the market on 30 July and four critical incidents due to technical issues. Significant milestones for this reporting period include the simplification of MSM reports, increasing the number of clearings in the RR process, implementing the Affected TSO procedure, connecting to the Capacity Management IT Solution, and amending the Replacement Reserve Implementation Framework (RR IF).

### 6.1.2 mFRR Platform (led by MARI Project)

Manually Activated Reserves Initiative (MARI) is the European implementation project for the creation of the European mFRR platform. MARI consists of 29 member TSOs and five observers, including ENTSO-E. There are currently six TSOs connected to the mFRR platform. 50Hertz, Amprion, ČEPS, Tennet Germany, and TransnetBW connected on 5 October 2022, and APG connected on 20 June 2023.

**During the period June 2023 to May 2024, the following main goals have been achieved in the scope of the MARI project:**

- › The Austrian TSO APG (June 2023) was connected to the mFRR platform, joining the German TSOs and ČEPS;
- › Design, development, testing and deployment with regards to two mFRR platform releases with improved and new functionalities (versions 5&6);

- › EU tender identifying the suppliers to support the further development, maintenance and support of the mFRR platform from 2024 onwards;
- › The Balancing platforms stakeholder's workshop, held on 30 November 2023, informing stakeholders of the evolution of the platform, and gathering feedback for future developments.

An accession roadmap<sup>30</sup> is defined per the mFRR implementation framework, updated at least biannually. It outlines TSOs' planning to connect to the platform, with several expected to join during the second half of 2024.

30 [mFRR-Platform Accession Roadmap – Last updated on 26th April 2024](#)

### 6.1.3 aFRR Platform (led by the PICASSO Project)

The PICASSO project is leading the design and implementation of the aFRR platform, which comprises 26 TSO members and 4 TSO observers. Since 2017, the PICASSO project has been responsible for TSOs implementing the aFRR European platform. On 1 June 2022, the platform was brought successfully into operation (according to the EB Regulation, 24 July 2022 was the legal deadline to implement and make the platform operational). After connecting to the platform, All TSOs will use the aFRR platform to submit all standard aFRR balancing energy bids, exchange all aFRR balancing energy bids and strive to fulfil all their corresponding balancing energy needs.

**During the time period June 2023 to May 2024, the following main goals have been achieved in the scope of the PICASSO project:**

- › Continued accession of TSOs to the platform, including Terna in July 2023 and scheduled future go-lives in 2024.
- › Development and revision of essential documents such as the aFRR Implementation Guide and PICASSO KPI report.
- › Enhancements in operational aspects including updates to the Operational Handbook and addressing issues such as high prices in PICASSO (see Chapter 3.3).

The evolution of PICASSO is outlined through the implementation timeline and TSOs' accession roadmap<sup>31</sup>.

### 6.1.4 IN Platform (led by the IGCC Project)

IGCC was launched in October 2010 as a regional project and has grown to cover 28 countries (31 TSOs) across continental Europe, including all those that need to implement the IN-Platform according to the EB Regulation. The three Baltic TSOs (LitGrid, AST and Elering) joined the IN platform as full members in Q1/2024.

The increase in the participation of TSOs in the imbalance netting process has enabled energy savings to reach a record of more than 1.25 TWh in November 2023, corresponding to a value of monthly savings of nearly 60 million euros.

### 6.1.5 Capacity Management in Real Time (CM IT solution)

Throughout 2022, TSOs developed the Capacity Management IT tool to achieve a minimum viable solution, operational as of 24 November, 2023. In 2024, TSOs focus on implementing

the full scope of the IT solution and facilitating continuous TSO accession to Capacity Management Module (CMM).

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31 [aFRR-Platform Accession Roadmap – Last updated on 25<sup>th</sup> April 2024](#)

## 6.2 Reserve Platforms Development

This section provides an overview of the existing reserve platforms in Europe which are operating on a voluntary basis.

### 6.2.1 Nordic aFRR Market

The Nordic aFRR Capacity Market, established in December 2022, unites the four Nordic TSOs: Statnett, SvK, Fingrid and Energinet. Its aim is to optimise capacity utilisation across borders, enhancing socioeconomic welfare and improving supply security. Market performance indicates efficient capacity transfer and increased competition, leading to decreased price differentials and volatility. The

total economic surplus for 2023 was approximately € 28.7 M, despite a negative effect on the SDAC market due to reduced transfer capacity. An analysis comparing perfect DA energy market (DAM) foresight with actual forecasted values used at market-based scheme suggests the efficacy of the reference day method to forecast the DAM behavior.

### 6.2.2 German–Austrian aFRR Balancing Capacity Cooperation + future ALPACA Cooperation

The German–Austrian Balancing Capacity Cooperation called 'DE–AT–BCC' was created end of 2017 with the intention to allocate not more than 80 MW of CZC for the exchange of aFRR between Germany and Austria. German TSOs and Austrian TSO APG want to extend the possibility for balancing capacity exchange to other TSOs (including Czech TSO ČEPS) for the common procurement of aFRR BC through an additional cooperation called the 'Allocation of CZC and Procurement of aFRR Cooperation Agreement' (ALPACA). ALPACA is pursuing the application of the probabilistic method in accordance with Article 33(6) EB Regulation to be

applied on the DE–CZ and AT–CZ borders. For this purpose, the cooperation has drafted and publicly consulted the methodologies according to Article 33(1), 33(6) and 58(3) EB Regulation and submitted them for approval to local NRAs at the end of 2023. The current planning foresees implementing the methodologies in the course of 2024 and go-live in 2025. In addition to the six current member TSOs (ČEPS, APG and German TSOs) TenneT NL, MAVIR, ELES and HOPS are observing the progress with the possibility of joining the cooperation in future.

### 6.2.3 FCR Cooperation

The FCR cooperation currently involves 12 TSOs from 9 countries. The main principles, governance and decision-making process did not change in 2023. A detailed overview can be found in the [ENTSO-E Balancing Report 2020](#) and [Market Report 2021](#). Market developments include MAVIR (the Hungarian TSO) and SEPS (the Slovak TSO) becoming observing members of the FCR Cooperation. Other market developments include extreme events such as the Dutch FCR market's high-priced bid on 2 November 2023 due to provider unavailability. Evolution of FCR prices between 2017 and 2020 showed a downward trend, with exceptions due

to market transitions. 2021 saw price increases, while 2022 saw slower or decreased price rises. In 2023, FCR prices decreased to levels similar to those in 2020/2021. Monthly price convergence in 2023 showed high convergence in Austria, Denmark, Germany, the Netherlands, Slovenia and Switzerland, while Belgium, Czechia and France experienced lower convergence due to export limits or constraints. France emerged as the primary exporter of FCR, with Germany and Switzerland also exporting, while Belgium, Czechia, Denmark, the Netherlands and Slovenia imported FCR.





# Annexes

## Annex I – Legal references and requirements

The report is based on previous ENTSO-E legal monitoring obligations pursuant to Regulation (EC) No. 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003 (previous EU Electricity Regulation). Nevertheless, the entry into force of the Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (recast EU Electricity Regulation) repealed the previous EU Electricity Regulation.

The recast EU Electricity Regulation does not include an equivalent of Article 8 (8) of the previous EU Electricity Regulation and does not foresee new monitoring tasks of network codes and guidelines implementation for ENTSO-E. Therefore, general monitoring obligations in the network codes and guidelines linked to the previous EU Electricity Regulation cannot be considered binding after the recast Electricity Regulation enters into force. However, ENTSO-E has decided to continue with the monitoring activities as a good project management practice to ensure high-quality deliverables of network codes and guidelines. This report focuses on Article 82(2)(a) of the Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management (CACM Regulation); Articles 63(1)(a) and 63(1)(d) of the Commission Regulation (EU) 2016/1719 of 26 September 2016 on forward capacity allocation (FCA Regulation); and Article 63(3) of the Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing (EB Regulation).

## Annex II – Overview of All TSOs’ FCA, CACM and EB deliverables

The following table provides an overview of All TSOs’ deliverable based on FCA

Proposal	FCA regulation article(s)	First submission	NRA’s request for amendments	TSO Submission after Request for Amendment	NRA’s approval or ACER decision	TSOs’ request for amendment
Common Grid Model (CGM)	17 <sup>32</sup> 18 <sup>33</sup>	<a href="#">May 2017</a> <a href="#">June 2017</a>	– <a href="#">February 2018</a>	– <a href="#">May 2018</a>	<a href="#">October 2017</a> <a href="#">June 2018</a>	
Harmonised Allocation Rules (HAR) <sup>34</sup>	51	<a href="#">April 2017</a>			<a href="#">October 2017</a> <sup>35</sup> <a href="#">October 2017</a> <sup>36</sup> <a href="#">October 2017</a> <sup>37</sup>	<a href="#">July 2019</a>
Single Allocation Platform (SAP)	49 59	<a href="#">April 2017</a>			<a href="#">September 2017</a>	<a href="#">September 2022</a>
Congestion Income Distribution (CID)	57	<a href="#">May 2018</a>	<a href="#">November 2018</a>	<a href="#">March 2019</a>	<a href="#">May 2019</a>	<a href="#">September 2022</a>
Cost of ensuring firmness and remuneration of LTTRs (FRC)	61	<a href="#">April 2020</a>			<a href="#">October 2020</a> <a href="#">October 2020</a>	

Table 3: Regulatory process of the proposal for the determination of capacity calculation regions

The following table provides an overview of All TSOs’ deliverable based on CACM

Type	Proposal	CACM regulation Art.	First submission	NRA’s approval(s) or ACER decision	TSOs’ request for amendment	NRA’s approval(s) or ACER decision
All-TSO (I)	Capacity calculation Regions	15(1)	October 2015	November 2016 <sup>41</sup>	June 2017 <sup>42</sup>	<a href="#">September 2017</a>

Table 4: Regulatory process of the proposal for the determination of capacity calculation regions

- 32 Generation and load data provision methodology for long-term time frames
- 33 CGM methodology for long-term time frames
- 34 As part of the biennial review of the HAR, All TSOs submitted a [third TSO proposal](#) on June 2021, and ACER made a [decision \(No 15/2021\)](#) on November 2021, approving a [new HAR methodology](#).
- 35 On 17 August 2017, all NRAs referred to [ACER to adopt a decision](#).
- 36 On 2 October 2017, ACER took a decision ([No 03/2017](#))
- 37 HAR 2017 approved methodology
- 38 On 29 October 2019, ACER adopted a decision ([No 14/2019](#))
- 39 HAR 2019 approved methodology
- 40 ‘EFTA Surveillance Authority decision’ to be considered in a footnote also for other relevant decisions ([a link will be added](#))
- 41 [Referral to ACER](#) from all NRAs
- 42 All TSOs drafted an amendment to Annex I of the CCRs established by ACER decision 06/2016 (‘the draft CCR Amendment Proposal’) to include the BZB between Belgium and Great Britain (BE–GB) and to assign this new BZB to the Channel CCR by 17 January 2018. The CCR amendment proposal was adopted upon the decision of the last Regulatory Authority concerned (14 February 2018).
- 43 All TSOs drafted an amendment to include the new BZB:
  - DK1–NL and its corresponding TSOs to the Hansa CCR
  - add the TSOs National Grid IFA2 Limited and Eleclink Limited to the FR–GB BZB in the Channel CCR, and
  - add the TSO Amprion to the BE–DE/LU BZB in the Core CCR.
- 44 [Referral to ACER](#) from all NRAs
- 45 As a result of the General Court decisions on T-332/17 and T-333/17 cases towards ACER appeal (A-001-2017), on 22 May 2020 issued a decision inviting the competent party or parties to the concerned proposal. Then, ACER addressed All TSOs to amend or confirm it.

ACER decision	TSOs' request for amendment	ACER decision	TSOs' request for amendment	ACER decision	TSOs' request for amendment	ACER decision
<a href="#">October 2019</a> <sup>38</sup> <a href="#">October 2019</a> <sup>39</sup>	<a href="#">June 2021</a>	<a href="#">November 2021</a> <a href="#">November 2021</a>	March 2023 resubmitted in August		<a href="#">August 2023</a>	<a href="#">December 2023</a> <a href="#">December 2023</a>
<a href="#">March 2023</a> <a href="#">March 2023</a>						
<a href="#">March 2023</a> <a href="#">March 2023</a>						
<a href="#">October 2021</a> <a href="#">October 2021</a>	<a href="#">September 2022</a>	<a href="#">March 2023</a> <a href="#">March 2023</a>				

TSOs' request for amendment	NRAs' approval(s) or ACER decision	TSOs' request for amendment	ACER decision	TSOs' request for amendment	ACER decision <sup>40</sup>	TSOs' request for amendment
March 2018 <sup>43</sup>	April 2019 <sup>44</sup>	November 2020 <sup>45</sup>	May 2021	<a href="#">October 2022</a>	<a href="#">April 2023</a> <a href="#">April 2023</a>	<a href="#">November 2023</a>

Type	Proposal	CACM regulation Art.	First submission	NRAs' request for amendment	First Submission request for amendment
All-TSO (II)	Common grid Model	16 17	May 2016	December 2016	April 2017
	ID cross zonal GOT ID cross zonal GCT	59	December 2016	June 2017	August 2017
	Scheduled exchange	43 56	<b>February 2018</b> <sup>47</sup> <b>February 2018</b>	<b>September 2018</b>	December 2018 December 2018
	ID cross zonal capacity pricing	55(3)	August 2017	Referred to ACER	
	Congestion income distribution	73	June 2016	January 2017	April 2017

Table 5: Overview of All TSOs' CACM regulation deliverables (as of May 2024)

Type	Proposal	CACM regulation Art.	First submission	NRAs' request for amendment	First Submission request for amendment
All-TSOs & All-NEMOs	Day-ahead and intraday algorithm	37	<b>February 2017</b> <sup>53</sup>	July 2017	November 2017
	Max/min price	41 54	February 2017 February 2017	Referred to ACER	

Table 6: Overview of All TSO and All NEMO CACM regulation deliverables (as of May 2022)

Type	Proposal	CACM regulation Art.	First submission	NRAs' request for amendment
All-NEMOs	plan of the market coupling operator	7(3)	April 2016	September 2016
	Back-up methodology	36	<b>February 2017</b>	July 2017
	Products accommodated	40 53(4)	February 2017 February 2017	<b>July 2017</b> July 2017

Table 7: Overview of All NEMOs' CACM regulation deliverables (as of May 2022)

- 46 [Referral to ACER](#) from all NRAs  
47 For DA and ID proposals, only the TSOs which intended to calculate scheduled exchanges  
48 DA proposal  
49 ID proposal  
50 DA Costs coefficients – [2021 update](#)  
51 ID Costs coefficients – [2021 update](#)  
52 [All-NRAs' referral to ACER](#)  
53 DA and ID requirements as annexes  
54 [Referral to ACER](#) from all NRAs  
55 All NEMOs' request for amendment  
56 On 22 December 2020, ACER took a decision ([No 37/2020](#))  
57 SDAC Products  
58 On 30 January 2020, ACER took a decision ([No 05/2020](#))  
59 SIDC Products



Submission after the request for amendment	NRAs' approval(s) or ACER decision	Request for amendment	ACER decision	Request for amendment	ACER decision
	May 2017				
	April 2018 <sup>46</sup> <b>April 2018</b>				
<sup>48</sup>	February 2019 <sup>50</sup>	December 2022	<b>May 2023</b>	<b>April 2024</b>	
<sup>49</sup>	February 2019 <sup>51</sup>		<b>May 2023</b>		
	January 2019				
	December 2017 <sup>52</sup>	July 2021	December 2021 December 2021	<b>June 2023</b>	<b>December 2023</b> <b>December 2023</b>

Submission after the request for amendment	NRAs' approval(s) or ACER decision	Request for amendment	ACER decision	Request for amendment	ACER decision
	July 2018 <sup>54</sup>	<b>August 2019</b>	<b>January 2020</b>	<b>November 2023</b>	
	November 2017 <b>November 2017</b> November 2017 <b>November 2017</b>	Day Ahead: <b>September 2022</b>  Intraday: <b>September 2022</b>	Day Ahead: <b>January 2023</b> <b>January 2023</b>  Intraday: <b>January 2023</b> <b>January 2023</b>		

Submission after the request for amendment	First Submission after the request for amendment	NRAs' approval(s) or ACER decision	Request for amendment	ACER decision
	December 2016	June 2017		
	November 2017	January 2018		
	November 2017 November 2017	January 2018 January 2018	<b>June 2020</b> <sup>55</sup> August 2019	<b>December 2020</b> <sup>56</sup> <b>December 2020</b> <sup>57</sup> <b>January 2020</b> <sup>58</sup> <b>January 2020</b> <sup>59</sup>

## Balancing implementation status

Type	Proposal	EB Art	First TSOs' submission	NRAs' approval/1 <sup>st</sup> request amendment/Referral to AC
All-TSOs	Implementation framework for the European RR platform	19	18 June 2018	15 January 2019 (approval)
All-TSOs	1 <sup>st</sup> Amendment of the Implementation framework for the European RR platform	19	16 March 2021	18 October 2021 <sup>60</sup>
All-TSOs	2 <sup>nd</sup> Amendment of the Implementation framework for the European RR platform	19	31 March 2022	
All-TSOs	Implementation framework for the European mFRR platform	20	11 February 2019	24 July 2019 (referred to A)
All-TSOs	1 <sup>st</sup> Amendment of the Implementation framework for the European mFRR platform	20	31 March 2022	
All-TSOs	2 <sup>nd</sup> Amendment of the Implementation framework for the European mFRR platform	20	31 March 2022	
All-TSOs	Implementation framework for the European aFRR platform	21	11 February 2019	24 July 2019 (referred to A)
All-TSOs	1 <sup>st</sup> Amendment for the Implementation framework for the European aFRR platform	21	31 March 2022	
All-TSOs	2 <sup>nd</sup> Amendment for the Implementation framework for the European aFRR platform	21	<b><u>31 January 2024</u></b>	
All-TSOs	Implementation framework for the European IN platform	22	18 June 2018	9 November 2018 (RfAs by individual NRAs)
All-TSOs	1 <sup>st</sup> Amendment for the Implementation framework for the European IN platform	22	31 March 2022	
All-TSOs	Classification of the activation purposes of balancing energy bids	29	11 February 2019	23 July 2019 (RfAs by individual NRAs)
All-TSOs	Pricing method for all products	30	11 February 2019	24 July 2019 (referred to A)
All-TSOs	1 <sup>st</sup> Amendment – Pricing method for all products	30	28 August 2021	
All-TSOs	2 <sup>nd</sup> Amendment – Pricing method for all products	30	<b><u>31 January 2024</u></b>	

Table 8: Status of the balancing energy procurement and activation deliverables

60 Approval from RR NRAs was received via email. No official letter/document has been issued at the point of publication of this report.

61 2<sup>nd</sup> RfAs are not available (same as 1<sup>st</sup> RfAs) as those requests made by each NRA to their respective TSO.

62 2<sup>nd</sup> RfAs are not available (same as 1<sup>st</sup> RfAs) as those requests made by each NRA to their respective TSO.

Request for ACER	1 <sup>st</sup> TSOs' submission after the request for amendment	NRAs' approval/2 <sup>nd</sup> request for amendment/Referral to ACER	2 <sup>nd</sup> TSOs' submission after the request for amendment	ACER/NRAs decision
)				
ACER)				24 January 2020
				30 September 2022
ACER)				24 January 2020
				30 September 2022
	23 January 2019	19 July 2019 (2 <sup>nd</sup> RfA <sup>61</sup> ) 16 January 2020 (referred to ACER)	10 September 2019	24 June 2020 Corrigendum: 8 December 2020
				30 September 2022
	11 November 2019	19 July 2019 (2 <sup>nd</sup> RfA <sup>62</sup> ) 16 January 2020 (referred to ACER)		15 July 2020
ACER)				24 January 2020
				25 February 2022

Type	Proposal	EB Art.	First TSOs' submission	NRAs' approval/1 <sup>st</sup> amendment/Referr
All-TSOs	List of standard balancing capacity products for FRR and RR	25	18 December 2019	
All-TSOs	Methodology for the allocation of cross-zonal capacity based on the co-optimisation allocation process	40	18 December 2019	
All-TSOs	Cross-Zonal Capacity Allocation Harmonised Methodology (HCZCA)	38	17 December 2022	
All-TSOs	ENTSO-E Proposals for the Regional Coordination Centres' (RCCs) Procurement and Sizing		17 March 2023	
Regional	Methodology for the allocation of the cross-zonal capacity market-based allocation process	41	Baltic: 18 December 2019	18 June 2020
Regional			Core: 18 December 2019	12 August 2020
Regional			GR/IT: 18 December 2019	1 July 2020
Regional			Hansa: 18 December 2019	24 July 2020
Regional			IT North: 18 December 2019	29 June 2020
Regional			Nordic: 7 April 2019	17 October 2019
Regional	Methodology for the allocation of cross-zonal capacity based on an economic analysis	42	Core: 18 December 2019	12 August 2020
Regional			GR/IT: 18 December 2019	1 July 2020
Regional			Hansa	Did not submit.
Regional			IT North: 18 December 2019	29 June 2020

Table 9: Status of the balancing capacity procurement and CZC allocation deliverables

Type	Proposal	EB Art.	First TSOs' submission	NRAs' approval/1 <sup>st</sup> amendment/Referr
All-TSOs	TSO-TSO settlement of intended exchanges of energy as a result of the RRP, FRP and INP	50.1	18 December 2018	23 July 2019
All-TSOs	TSO-TSO settlement of intended exchanges of energy due to ramping restrictions and FCR between synchronous areas	50.4	18 June 2019	4 December 2019
All-TSOs	TSO-TSO settlement of unintended exchanges between synchronous areas	51.2	18 June 2020	
Regional	TSO-TSO settlement of intended exchanges of energy due to ramps and FCR within synchronous area continental Europe and of unintended exchanges of energy within synchronous area continental Europe	50.3	18 June 2019	4 December 2019
Regional		51.1	18 June 2019	4 December 2019
Regional	TSO-TSO settlement of unintended exchanges within synchronous area Nordics TSOs of synchronous area and TSO-TSO settlement of intended exchanges of energy due to ramps and FCR within the Nordic synchronous area	50.3a	18 June 2019	18 December 2019
Regional		51.1b		
All-TSOs	Imbalance settlement harmonisation	52	11 February 2019	11 July 2019

Table 10: Status of the imbalance settlement and other settlements deliverables (FSkar)

request for amendment to ACER	1 <sup>st</sup> TSOs' submission after the request for amendment	NRAs' approval/2 <sup>nd</sup> request for amendment/Referral to ACER	2 <sup>nd</sup> TSOs' submission after the request for amendment	ACER/NRAs decision
				17 June 2020
				17 June 2020
				Decision No 11/2023 of 19 July 2023
				Decision No 12/2023 of 19 July 2023
	28 August 2020	30 October 2020 (2 <sup>nd</sup> RfA)	30 December 2020 (NRAs forwarded for decision to ACER on 19 February 2021)	ACER approved on 13 August 2021
	6 December 2020	NRAs forwarded for decision to ACER on 22 February 2021		ACER approved on 13 August 2021
	24 September 2020	1 December 2020 (2 <sup>nd</sup> RfA)	1 April 2021	NRAs approved on 22 June 2021
	13 October 2020	Withdrawn by respective TSOs on 12 May 2021		
	4 September 2020	15 December 2020 (2 <sup>nd</sup> RfA)	26 March 2021	NRAs approved on 1 June 2021
	17 December 2019	28 February 2020 (referred to ACER)		5 August 2020
	4 December 2020	Withdrawn by respective TSOs on 24 May 2021		
	24 September 2020	1 December 2020 (2 <sup>nd</sup> RfA)	9 April 2021	NRAs approved on 22 June 2021
	4 September 2020	15 December 2020 (2 <sup>nd</sup> RfA)	26 March 2021	Withdrawn by corresponding TSOs on 27 May 2021

request for amendment to ACER	1 <sup>st</sup> TSOs' submission after the request for amendment	NRAs' approval/2 <sup>nd</sup> request for amendment/Referral to ACER	2 <sup>nd</sup> TSOs' submission after the request for amendment	ACER/NRAs decision
	11 November 2019	16 January 2020 (referred to ACER)		16 July 2020
	27 March 2020	22 May 2020 (NRAs' approval)		
		4 December 2019 (NRAs' approval)		
	15 March 2020	27 May 2020 (NRAs' approval)		
	15 March 2020	27 May 2020 (NRAs' approval)		
	18 February 2020	31 March 2020 (NRAs' approval)		
		16 January 2020 (referred to ACER)		15 July 2020



# Annex III – Market Process Overview of FCA, CACM and EB regulation

## Abbreviations and legend used in the following process overview:

<b>AC</b>	Allocation Constraint	<b>EBP</b>	European balancing platforms: European platforms for operating the imbalance netting process and exchanging the balancing energy from aFRR, mFRR and RR
<b>AOF</b>	Activation Optimisation Function		
<b>aFRP</b>	Automatic Frequency Restoration Process	<b>FRP</b>	Frequency Restoration Process (aFRP + mFRP)
<b>aFRR</b>	Automatic Frequency Restoration Reserves	<b>GCT</b>	Gate Closure Time
<b>BC</b>	Balancing Capacity	<b>GOT</b>	Gate Opening Time
<b>BE</b>	Balancing Energy	<b>GSK</b>	Generation Shift Key
<b>BRP</b>	Balancing Responsible Party	<b>ID</b>	Intraday
<b>BSP</b>	Balancing Service Provider	<b>IDA</b>	Intraday Auction
<b>CCC</b>	Central Capacity Calculator	<b>IDCF</b>	Intraday Congestion Forecast
<b>CCP</b>	Central Counter Party	<b>IDCZGCT</b>	Intraday Cross Zonal Gate Closure Time
<b>CET</b>	Central European Time	<b>IDCZGOT</b>	Intraday Cross Zonal Gate Opening Time
<b>CGM</b>	Common Grid Model	<b>IGM</b>	Individual Grid Model
<b>CI</b>	Congestion Income	<b>IN</b>	Imbalance Netting
<b>CID</b>	Congestion Income Distributor	<b>ISP</b>	Imbalance Settlement Period
<b>CNEC</b>	Critical Network Element with a Contingency	<b>LT</b>	Long Term
<b>CPOF</b>	Capacity Procurement Optimisation Function	<b>LT Nom. Long Term Nomination</b>	
<b>CZC</b>	Cross Zonal Capacity	<b>MCO</b>	Market Coupling Operator
<b>D2CF</b>	D-2 Congestion Forecast	<b>mFRP</b>	Manual Frequency Restoration Process
<b>DA</b>	Day-ahead	<b>mFRR</b>	Manual Frequency Restoration Reserves
<b>DACF</b>	Day-ahead Congestion Forecast	<b>mFRR-DA</b>	Direct activation of mFRR
<b>DAFD</b>	Day-ahead Firmness Deadline	<b>mFRR-SA</b>	Scheduled activation of mFRR

<b>MP</b>	Market Participant
<b>MR</b>	Market Result
<b>MTU</b>	Market Time Unit
<b>NEMO</b>	Nominated Electricity Market Operator
<b>PTR</b>	Physical Transmission Rights
<b>RA</b>	Remedial Action
<b>RRP</b>	Reserve Restoration Process
<b>RR</b>	Restoration Reserves
<b>RCC</b>	Regional Coordination Centre
<b>SA</b>	Shipping Agent
<b>SAO</b>	Shadow Auction Organiser(s)
<b>SAP</b>	Single Allocation Platform
<b>SEC</b>	Scheduled Exchange Calculator
<b>T&amp;C</b>	Terms and conditions for BSPs / BRPs
<b>TSO</b>	Transmission System Operator
<b>UIOSI</b>	Use it or sell it

### Legend

Approved target model timing
Draft target model timing
Applied best practice
Task can be done well in advance
Recurrent task
Regional task

# Forward capacity allocation process

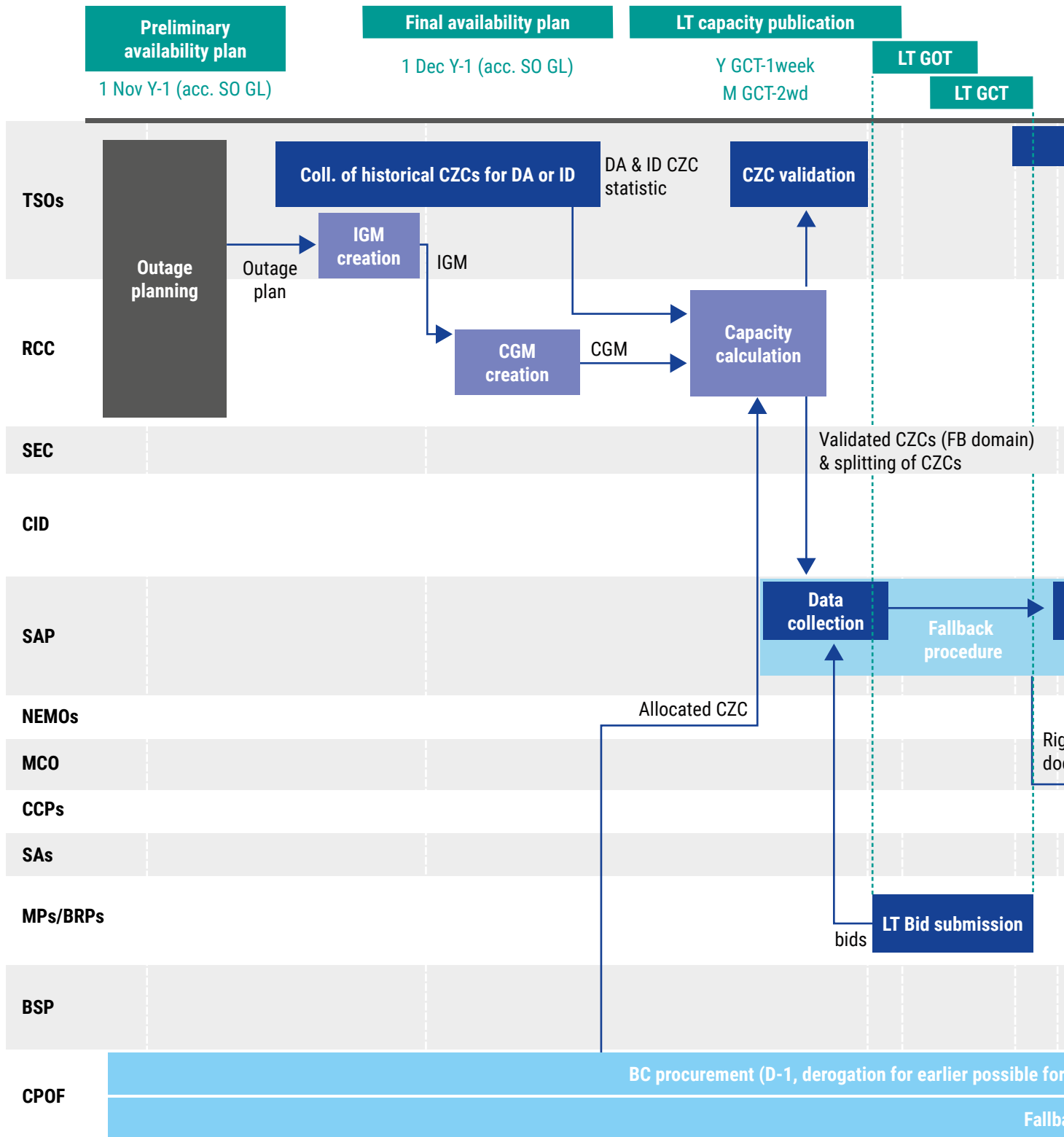
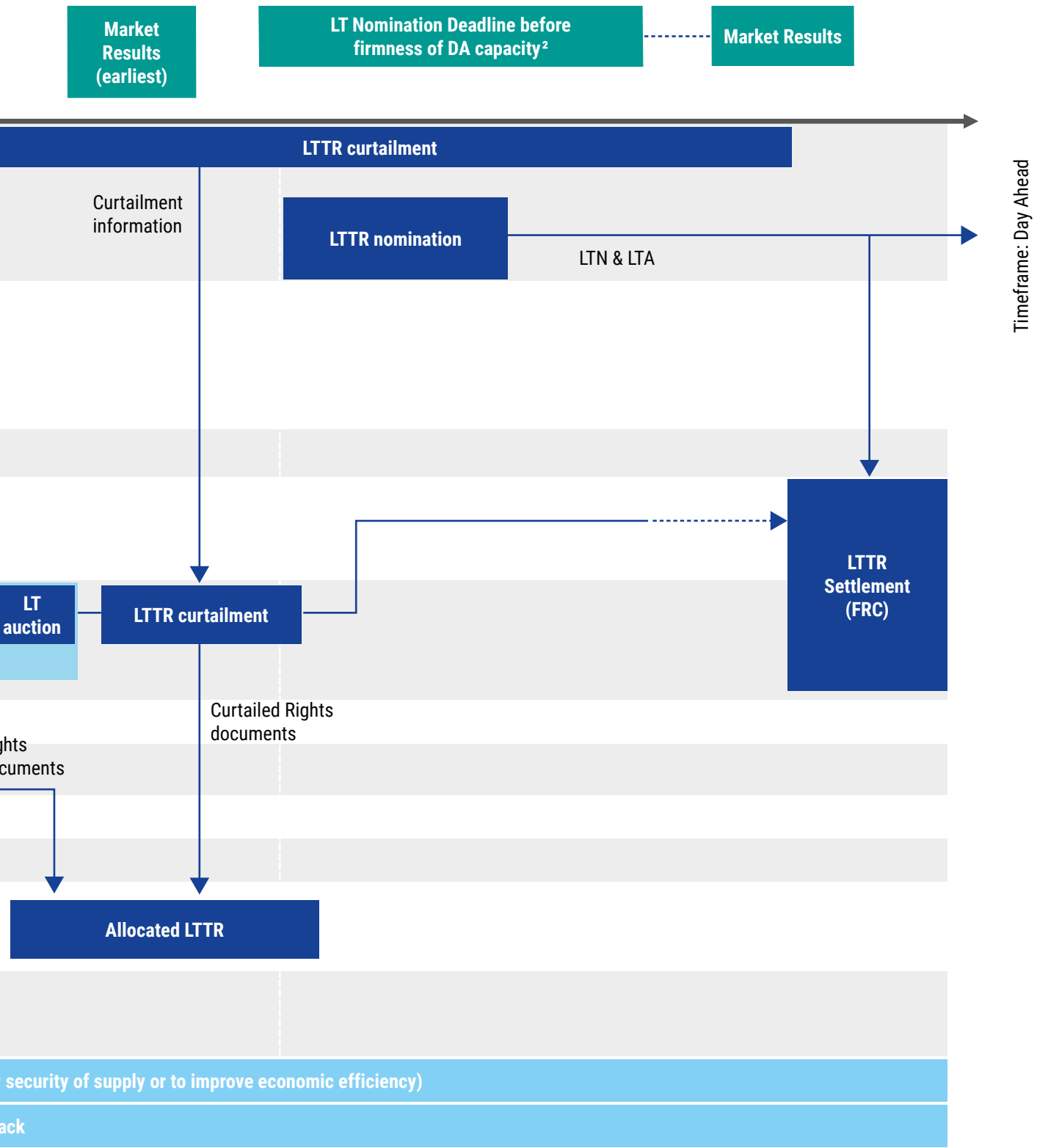
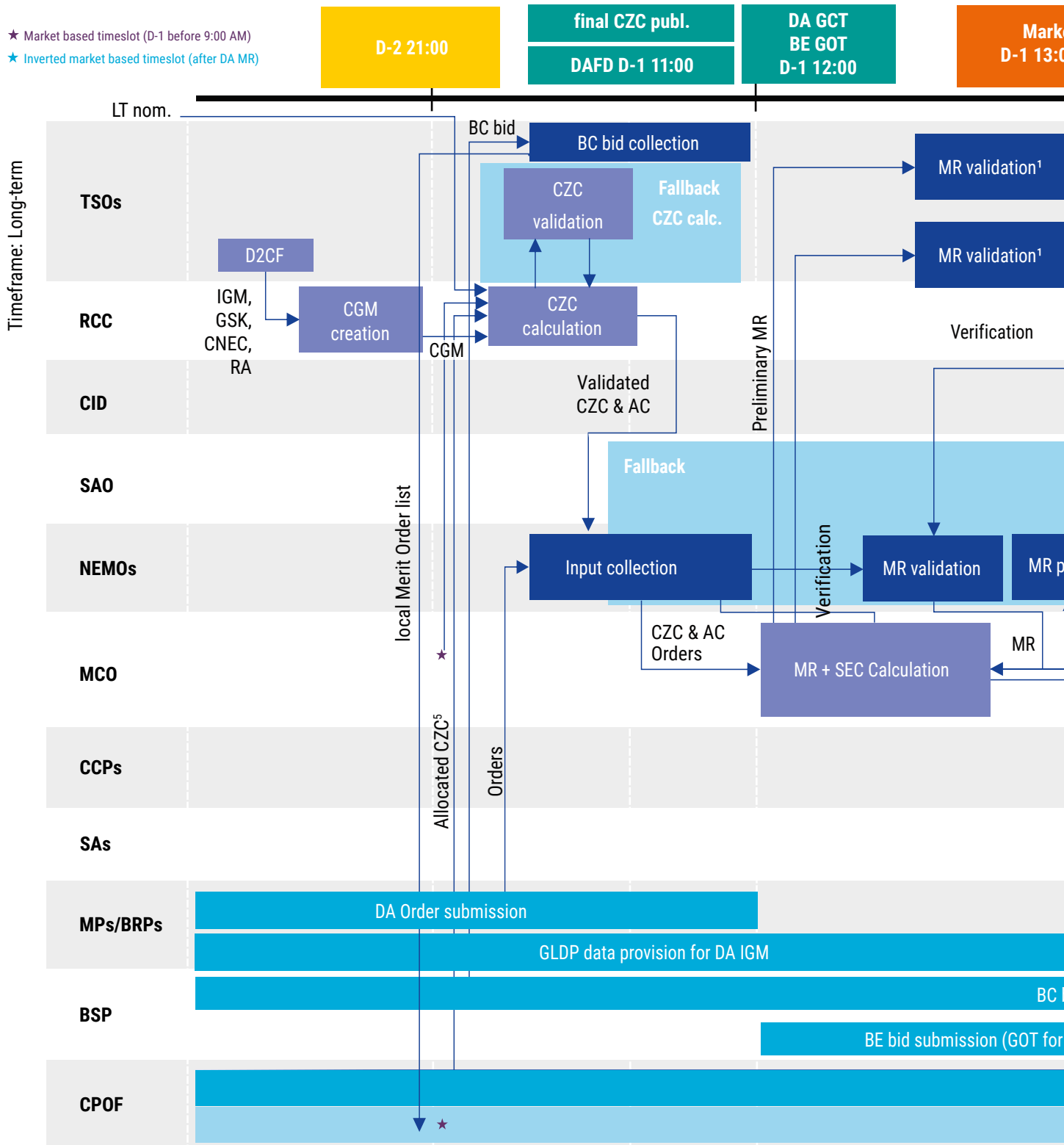


Figure 34: Forward capacity allocation process

Forward capacity allocation process



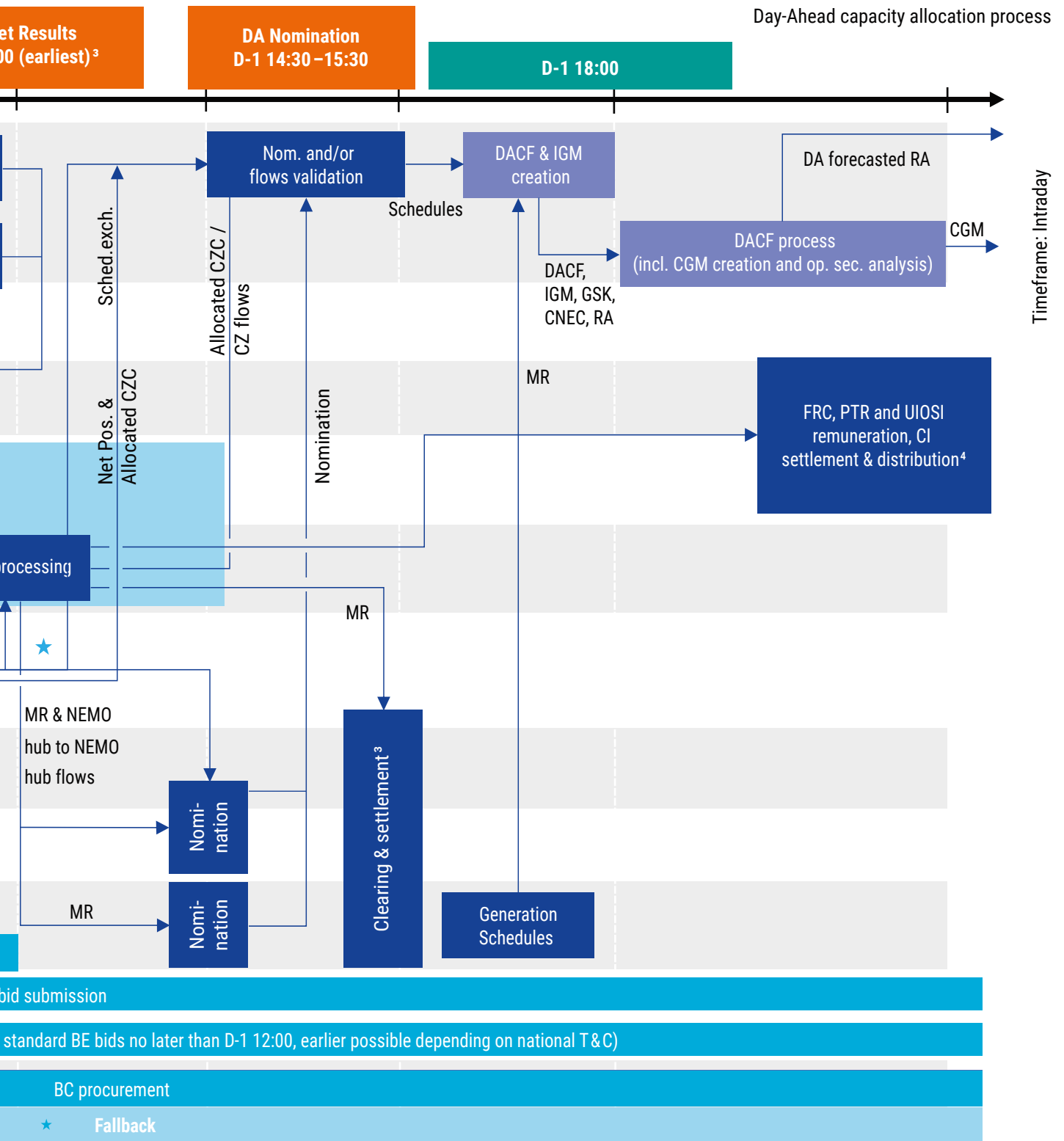
# Day-Ahead Capacity Allocation Process



1) No parallel processes, solution depends on the regional design. 2) Only in case of market-based allocation and economic efficiency analysis based allocation.  
 4) This processes are performed close to the delivery date or even after delivery. 5) The implementation design of the co-optimized CZC allocation according to E

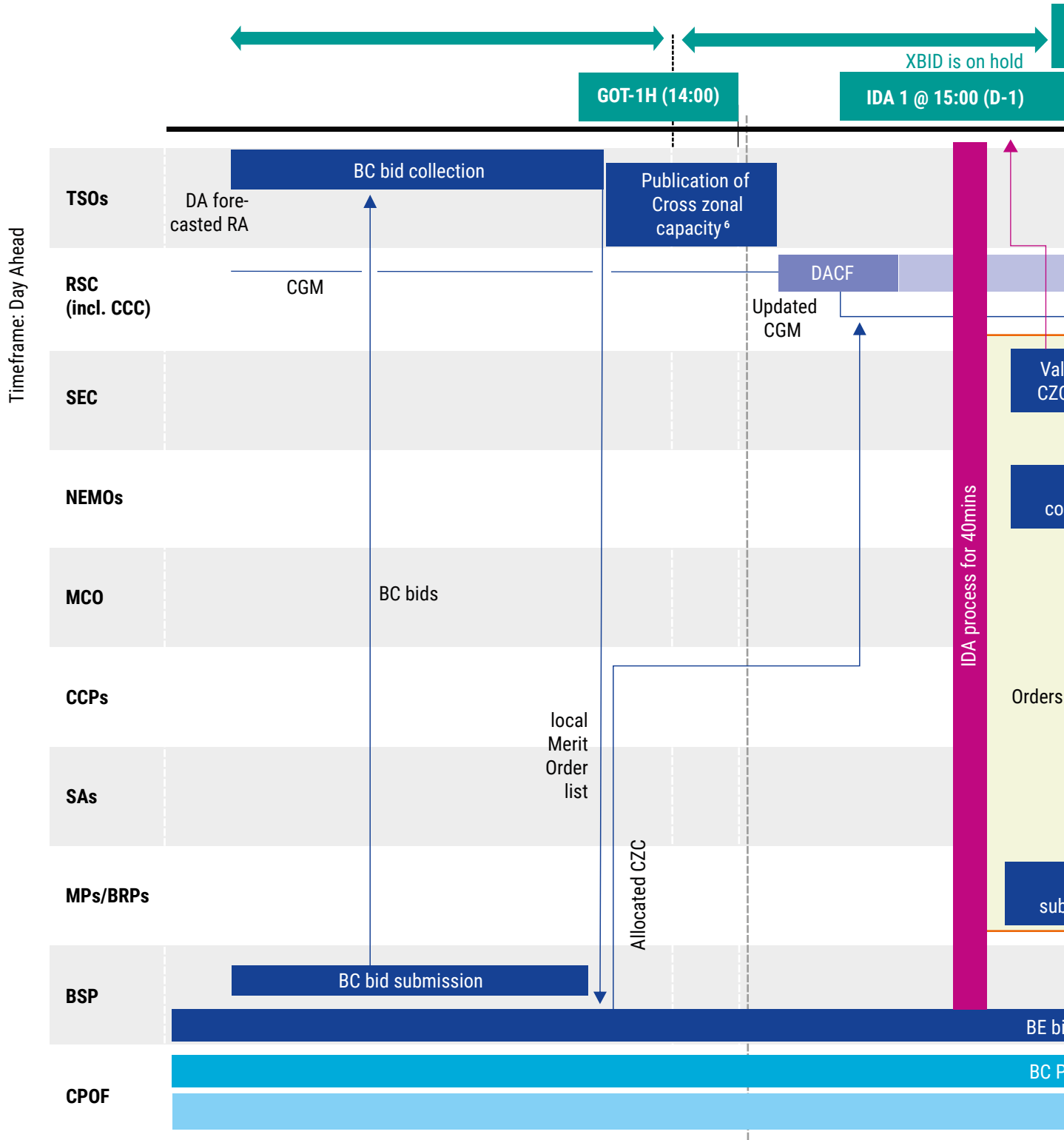
Figure 35: Day-Ahead Capacity Allocation Process





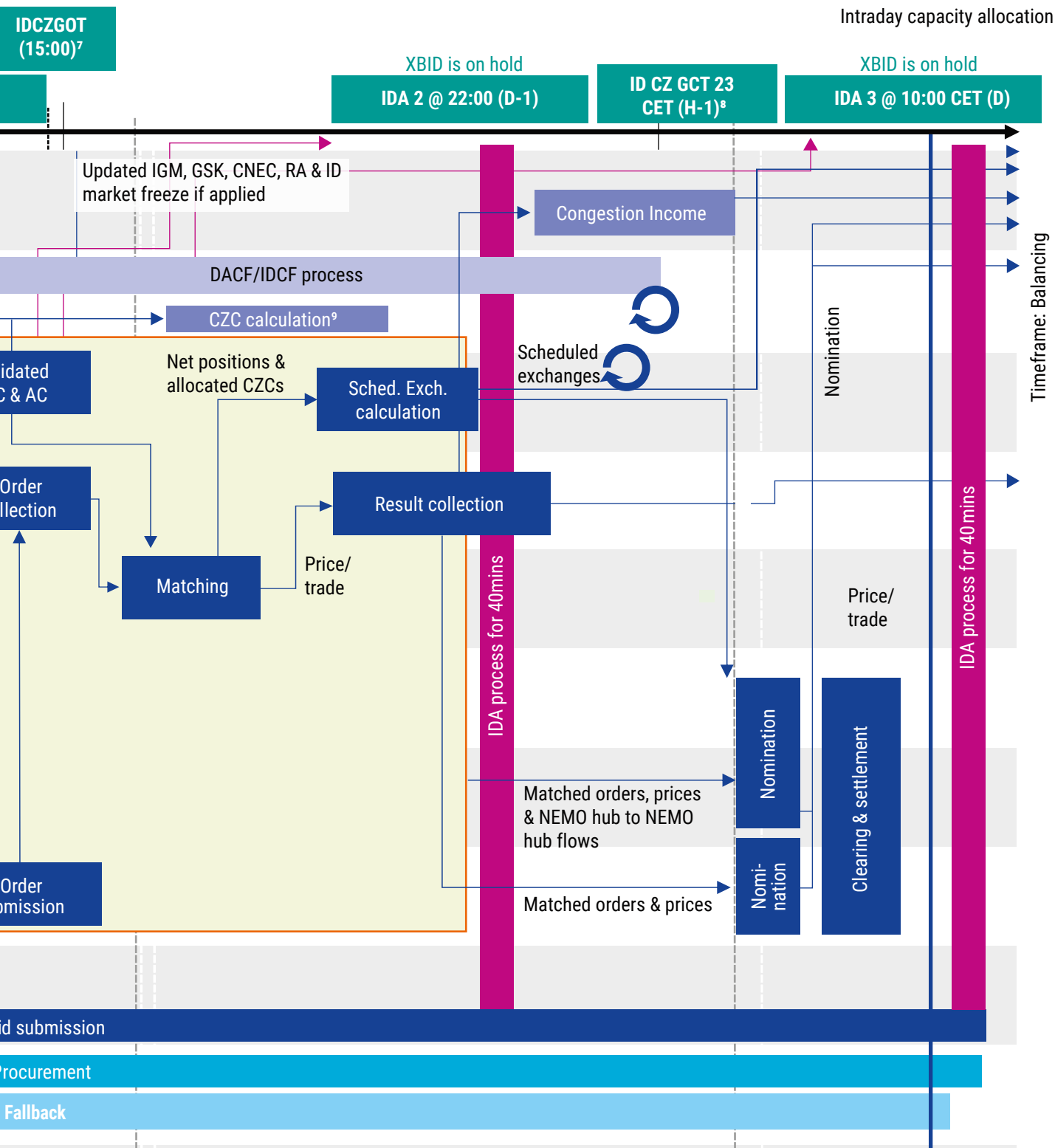
Please note that co-optimization is not shown on the slide. **3)** The latest possible time of market results publication is D-1 15:30 (in fallback situations). **4)** The methodology for FRC, PTR and UIOSI remuneration, CI settlement & distribution is under discussion until mid-2022.

# Intraday capacity allocation



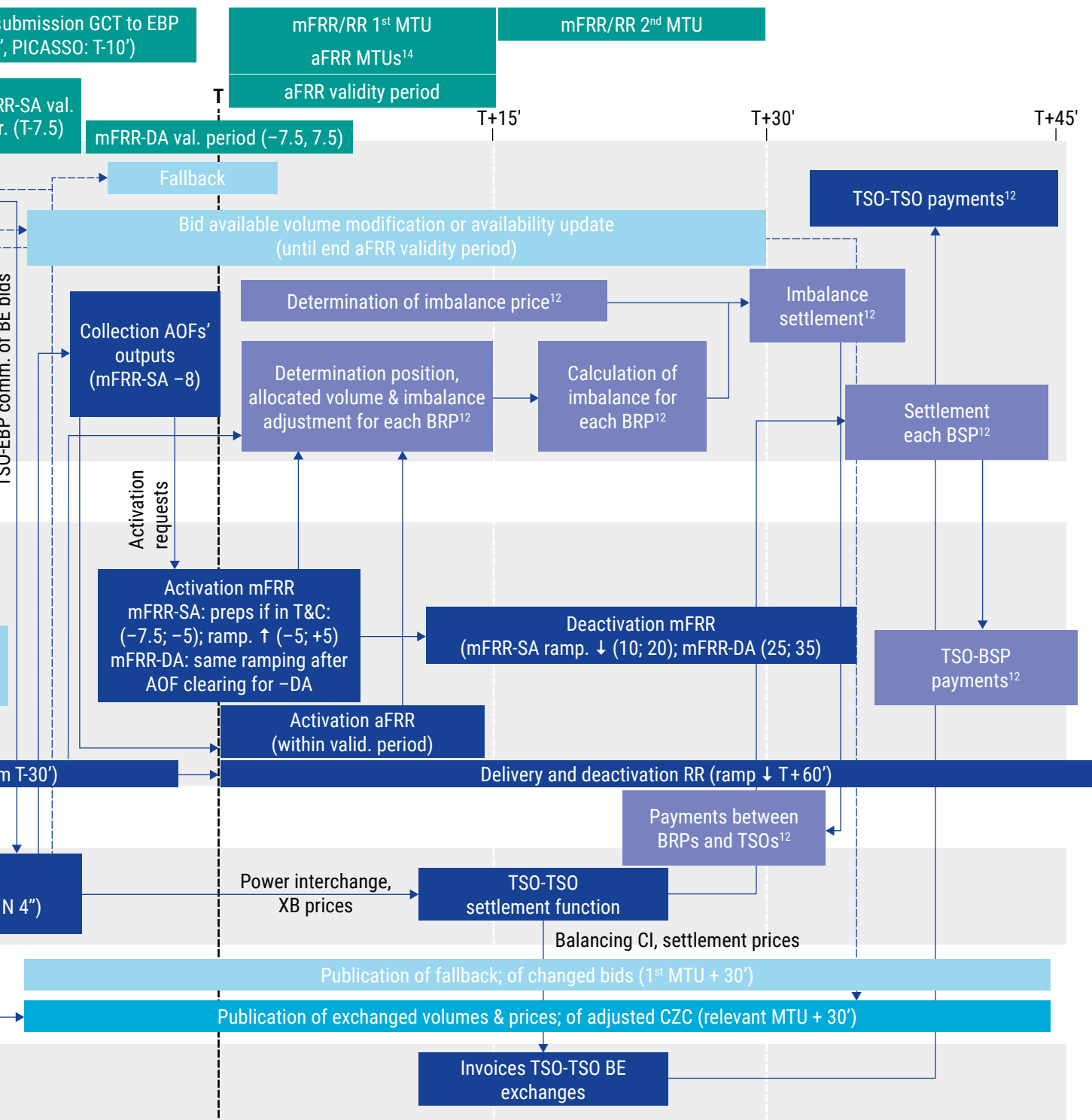
6) Preparation of CGM might be completed close or even after publication deadline. 7) IDCZGOT-15:00 D-1, IDCZ capacity might not be available at IDCZGOT on D-1. 8) Time suspension of the continuous trading for IDAs is 40 min in the target model and one hour in an interim phase of one year. 8) first GCT for the first MTU of t

Figure 36: Intraday capacity allocation



<sup>7</sup> For some interconnections and might be provided only at 22:00 D-1 depending on CCR.  
<sup>8</sup> The next day is 23 D-1 <sup>9</sup> first IDCC is carried out ahead of IDA at 10





of bids EB 29(14), validation, preparation for submission and submission of standard BE bids to EBP.  
 CCs, TSOs...)  
 not represent actual timings.

## Annex IV – CEP70 country fact sheets

In chapter 2 of this report, TSOs provided an overview on their performance regarding to the CEP70 provision in 2023 (cf. Figure 8). Acknowledging that NRAs are responsible for assessing TSOs' compliance with the CEP70 provisions, this report aims to provide an easily accessible overview of the national assessments for external stakeholders. As mentioned in section 2, this year's ENTSO-E market report facilitates the comparison of all national compliance assessments by the introduction of short fact sheets per country. These fact sheets include a short description of the national assessment methodology and its results while also indicating whether an action plan or a derogation (or both) has been applied. Furthermore, all country fact sheets include a graph representing the 'relative cross-zonal trading margin'.

Please note, that the underlying figures and assumptions for these graphs stem from the national assessments. To what extent these assumptions and figures might differ from the methodology applied by ACER is also indicated in the factsheet.

Furthermore, we would like to highlight that also in 2023, the application of fallback procedures<sup>63</sup> due to a failure in capacity calculation has been again quite rare all over Europe. For instance, in CCR Core, in 2023 default flow-based

parameters/spanning had to be applied in only 4 hours. As a general remark, please note that outages of DC cables are not reported separately in the graphs of the fact sheets.

For Ireland, please note that as the grids on the island of Ireland are not connected to the EU system and have no capacity to share it, is not appropriate to provide article 16 type data at this point. However Ireland will recommence submission of this type of data when the Celtic Interconnector becomes operational which is planned for 2026.

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63 A high process stability in capacity calculation is important in the context of the CEP70 monitoring as MTUs during which problems in capacity calculation that occur cannot be monitored.



# Austria

## TSO(s)

Austrian Power Grid AG (APG)

## Borders/Region

Core Region and Italy North

## Competent regulatory authority

Energie-Control Austria (E-Control)

## Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- [Yes, the Member state invoked an action plan pursuant to Art. 15 of Regulation \(EU\) 2019/943](#)
- [Yes, the TSO requested derogation pursuant to Art. 16 \(9\) of Regulation \(EU\) 2019/943](#)



## Applicable target in 2023

39.0 % (not including Core CCR derogation on CNEC level, respecting the MTU situation)

## Summary of national compliance assessment for 2023

In the report submitted to the national regulatory authority, APG finds that the minimum capacity requirement (considering the national action plan, the approved derogation and the compliance methodology of E-Control) was fulfilled in all hours – respectively:

- › Compliance for Core CCR
- › Compliance for Italy North CCR

The assessment of the APGs report by E-Control is not closed yet (April 2024)

## Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

## Explanation

- › Where the Agency only assesses the Critical Network Element with the lowest trade margin per MTU, E-Control assesses each Critical Network Element (including contingencies, 'CNEC') of each relevant MTU of the year 2023.

- › Each of those CNEC entries is assessed with a Compliance Value (respecting the approved derogation and action plan target). The compliance of a CCR is based on the average of all related CNEC entries.
- › Where as in Core all CNECs of the final domain are considered relevant, in Italy North only the CNECs which where potentially limiting the coordinated NTC are assessed.

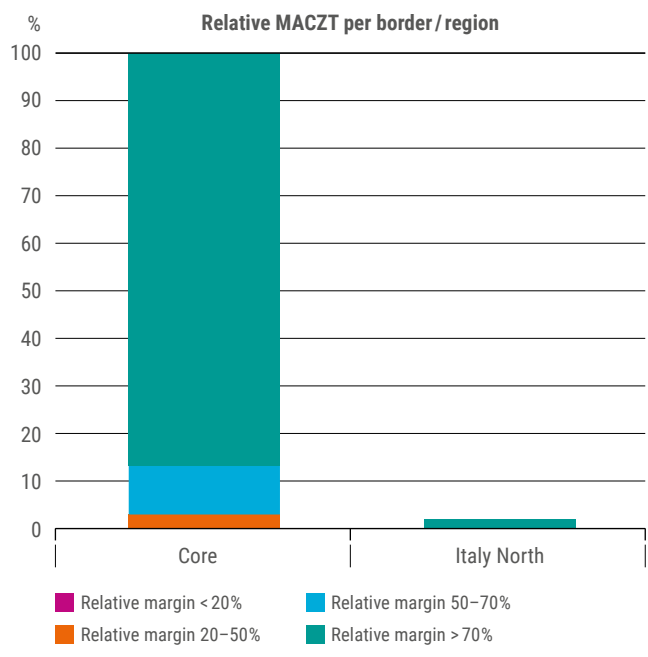


Figure 38: Relative MACZT per border/region for Austria

# Belgium

## TSO(s)

Elia

## Borders/Region

Core Region

## Competent regulatory authority

Commission de Régulation de l'Electricité et du Gaz (CREG)

## Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16(9) of Regulation (EU) 2019/943

## Applicable target in 2023

70 % MACZT in at least 92,6 % of the hours

## Summary of national compliance assessment for 2023

During ~98 % of the time the minimum target is reached on all CNECs. The target of minMACZT is defined as per the rules embedded in the derogation on excessive loopflows that was granted to Elia. Hereby, 70 % is taken as a starting point and reduced only for the amount of excessive loopflows observed during the capacity calculation on that particular CNEC in that particular MTU. Elia makes use of the possibility to apply remedial actions to reduce excessive loopflows by optimising the settings of its PSTs, hereby further reducing the extent of the derogation.

On the 19 April 2023, Elia had to apply a fallback during the local validation process for one BD which limited the import & export capabilities of Belgium.

When a fallback is triggered, Elia's policy is to secure a minimum capacity of 20 % for exchanges within Core. This policy is coherent with best practices to maintain a fair balance between operational security and market functioning. Unfortunately, a more restrictive fallback was applied as the operator was facing ambiguity in the procedures and in the centralised tooling.

To avoid similar issues occurring again, local procedures were strengthened and local tools were improved to identify blocking issues more easily during the local Elia processes. In addition, refresh training focusing on fall back application has been given to the operators. Discussions with other Core TSOs have taken place to improve the regional coordinated capacity calculation tool. Finally, a detailed report of the event was sent to the Belgian NRA.



## Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

## Explanation

- › CREG evaluated Elia's compliance with the target from its derogation and concluded that Elia is compliant on 99,7% of the observed network elements, during 96,2 % of the hours in 2023. [Link](#) to CREG's report.

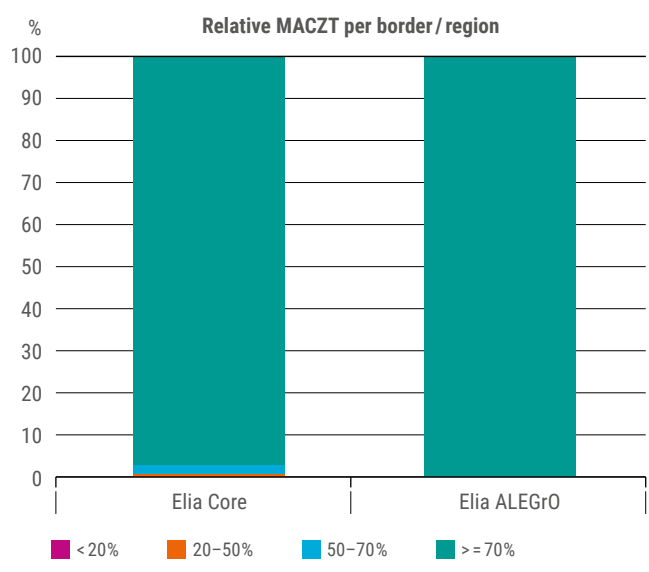


Figure 39: Relative MACZT per border/region for Belgium

# Bulgaria

## TSO(s)

ESO EAD

## Borders/Region

SEE Region

## Competent regulatory authority

Energy and water regulatory commission (EWRC)

## Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16(9) of Regulation (EU) 2019/943

## Applicable target in 2023

70 %

## Summary of national compliance assessment for 2023

Summary of national compliance assessment for 2023 (max. 300 words)

The MACZT results for Bulgaria are based on the results received from the ACER calculations, based on limiting CNECs from the DA capacity calculation provisions received from the SEE RSC SELENE.

The reason for the several timestamps with values of MAZCT below 70 % is because the flows with third countries in our region are currently threatened according to the current version of the SEE coordinated capacity calculation methodology. According to the ACER recommendation, the calculation of MACZT is determined by margin from coordinated capacity calculation (MCCC) and from non-coordinated capacity calculation (MNCC). According to the ACER calculations, MNCC for part of our timestamps is negative (due to the fact that the flows from the non-EU member states are considered to be non-coordinated calculated), which leads to extremely low MACZT values for these several timestamps. Three of our five borders are with non EU members who are not obliged to comply with EU Regulations, and in light of this the only way to fully reach the 70 % requirement according to the ACER recommendations is to have agreements signed with third countries in the region (Serbia, North Macedonia and Turkey). The three SEE TSOs have already made first steps toward the initiative for concluding agreements with third countries in the region (Serbia, North Macedonia and Turkey), taking into account the EU Commission letter regarding the capacity calculation and third countries' flows



sent to ENTSO-E and ACER on 16 September 2019. On 05 October 2020, a letter was sent on behalf of the three SEE EU TSOs (Bulgaria, Romania and Greece) to the non-EU TSOs of Albania, Turkey, North Macedonia and Serbia.

Considering the recommendations given by the EC, it was proposed to conclude agreements with neighbouring countries to address in a common coordinated manner the treatment of the capacity calculation constraints and the cost sharing of remedial actions in the region. The signing of such agreements with neighbouring non EU-countries would have been a good starting point for an amendment of the Methodology for calculating CZC for the DA and ID timeframe, already adopted by National regulators in the South East Europe region. By changing the existing methodology and including the BG–NMK, BG–SR, GR–AL, GR–NMK and RO–SR borders, a balance will be achieved between a more efficient CZC calculation and considering all the peculiarities while maintaining the secure operation of the electricity systems in the region. So far, it is not clear whether the above mentioned countries are willing to join the requirement of at least 70% for their borders with Bulgaria, Romania and Greece. Nevertheless, in connection with the need to include the requirements to reach a minimum threshold of 70 % of the transmission capacity between commercial zones, respecting the safety standards for the secure operation of the network under Article 16(8) of REGULATION (EU) 2019/943 in the SEE CCM at the end of 2021, preliminary discussions with experts from the operators of Greece and Romania have been launched. At the end of July 2022, the draft methodology was developed where, to reach the 70 % requirement in the capacity calculation process, the borders with non-EU borders were incorporated. After public consultations, the methodology

was sent for approval to SEE NRAs at the end of February 2023 and was approved by the SEE NRAs on 31 August 2023. Unfortunately, without the consent of all parties (including the third countries), we cannot fully implement the amended Methodology for the calculation of cross-zonal transmission capacity and adequately calculate the MACZT according to the ACER recommendations. We must also note that there are no internal limiting elements in our network, and in normal operation conditions, the limiting elements from our perspective are the interconnection lines with neighbouring countries or elements in the networks of neighbouring TSOs. Therefore, the net transfer capacity values with the Member State countries proposed and validated by us in the DA CC process respect the 70 % requirement, taking into account the ratings of the interconnection lines.

Considering all the explanations above and the fact that for 99.86 % of the MTUs for the BG–GR direction, 100 % of the MTUs for the GR-BG direction, 77.6 % of the MTUs for the BG–RO direction (in addition to 10.3 % of the MTUs calculated by ACER for this border and direction MACZT is >70 %) and 71.6 % of the MTUs for the RO–BG direction (in addition to 15.5 % of the MTUs calculated by ACER for this border and direction MACZT is >70 %), there are no limiting CNECs in our control area, we are stating that we are compliant with the 70 % rule.

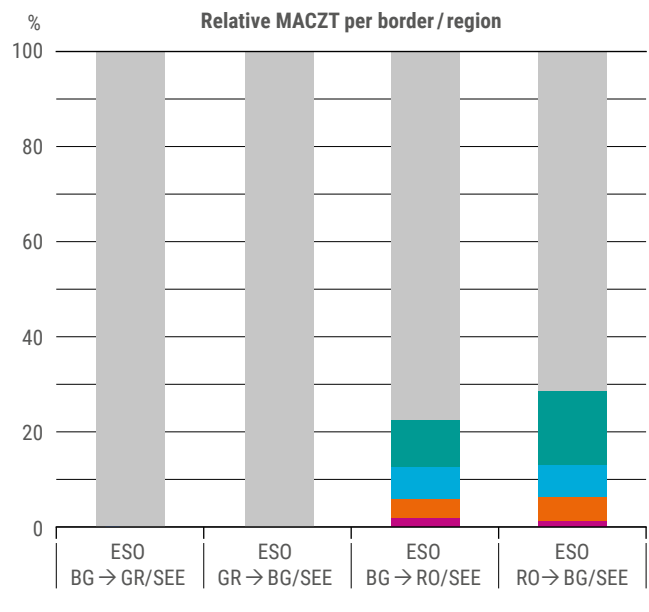


Figure 40: Relative MACZT per border/region for Bulgaria

**Methodology**

Did the competent regulatory authority adopt the non-binding ACER’s Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

# Croatia

## TSO(s)

Croatian Transmission System Operator (HOPS)

## Borders/Region

Core Region

## Competent regulatory authority

Croatian Energy Regulatory Agency (HERA)

## Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943**
- Yes, the TSO requested derogation pursuant to Art. 16(9) of Regulation (EU) 2019/943



## Applicable target in 2023

Core Region: 32.8 % on all CNECs for each MTU

## Summary of national compliance assessment for 2023

- › In the report submitted to the Croatian Energy Regulatory Agency (HERA), HOPS finds that the minimum capacity was provided to the market in all relevant hours
- › The report needs to be approved by the Croatian Energy Regulatory Agency (HERA)
- › Core

## Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

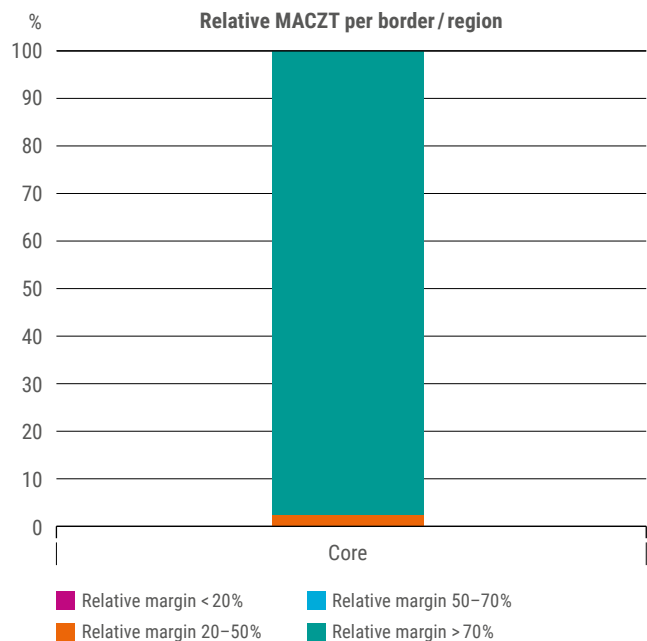


Figure 41: Relative MACZT per border/region for Croatia

## Czech Republic

### TSO(s)

ČEPS

### Borders/Region

Core region

### Competent regulatory authority

ERÚ

### Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16(9) of Regulation (EU) 2019/943

### Applicable target in 2023

70 %

### Summary of national compliance assessment for 2023

The Czech Republic is in full compliance with Art. 16 of Regulation (EU) 2019/943. There are only minor deviations in the CZ→Core direction, where the so-called IVA (Individual Value Adjustment) had to be used to reduce capacities to maintain operational safety. The IVA, which reduced the MACZT below 70 %, was applied for 0.16 % of the MTUs in the export direction.

### Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

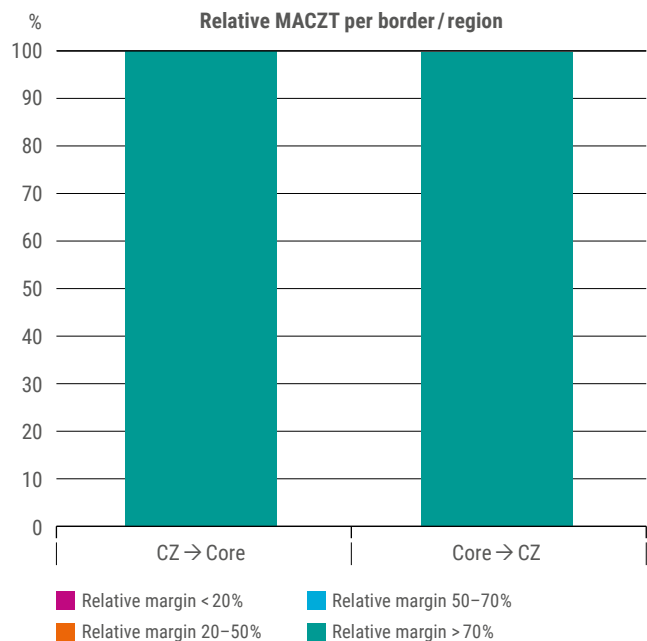


Figure 42: Relative MACZT per border/region for Czech Republic



# Denmark

## TSO(s)

Energinet

## Borders/Region

DK1-DE\_LU/Hansa CCR

DK1-NL/Hansa CCR

DK2-DE\_LU/Hansa CCR

DK1-DK2/Nordic CCR

DK1-NO2/Nordic CCR

DK1-SE3/Nordic CCR

DK2-SE4/Nordic CCR

## Competent regulatory authority

Danish Utility Regulator

## Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16(9) of Regulation (EU) 2019/943

## Applicable target in 2023

70 %



## Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

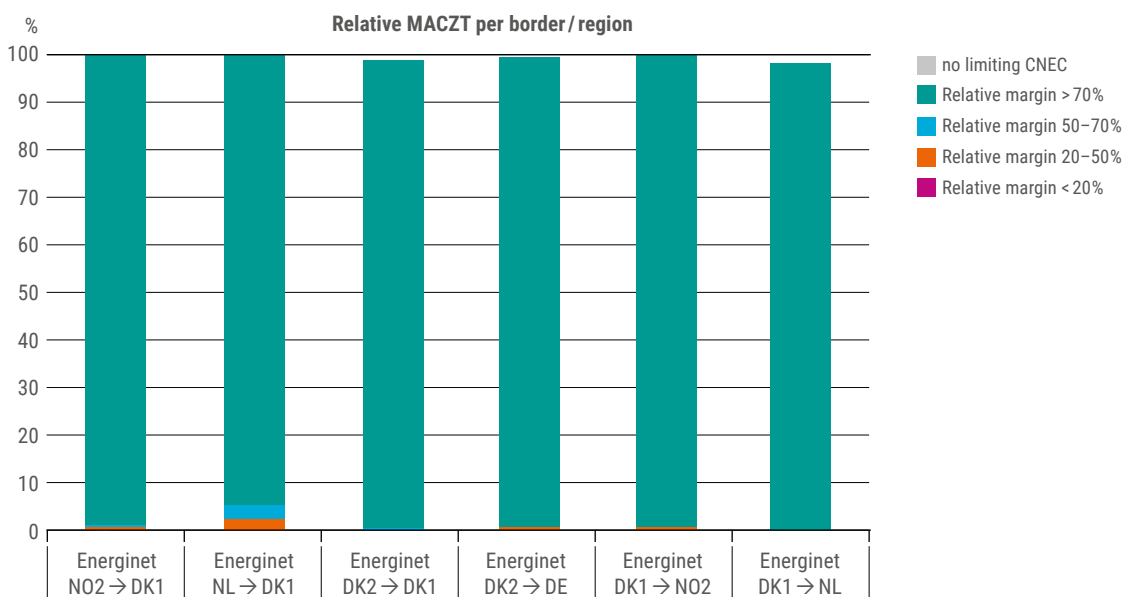


Figure 43: Relative MACZT per border/region for Denmark

# Estonia

## TSO(s)

Elering

## Borders/Region

EE→FI

FI→EE

LV→EE

EE→LV

## Competent regulatory authority

Estonian Competition Authority

## Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943 (if applicable, Insert URL to governmental action plan)
- Yes, the TSO requested derogation pursuant to Art. 16 (9) of Regulation (EU) 2019/943 (if applicable, insert URL to derogation request)

## Applicable target in 2023

70 %

## Summary of national compliance assessment for 2023

Most of the time the minimum target was reached on all CNECs

## Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

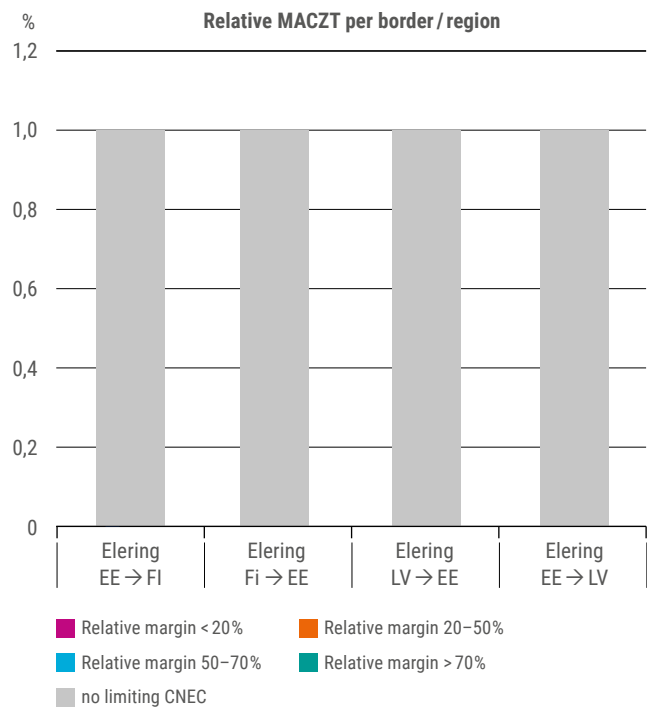


Figure 44: Relative MACZT per border/region for Estonia

# Finland

## TSO(s)

Fingrid

## Borders/Region

FI > SE1

FI > SE3

FI > EE

## Competent regulatory authority

EV (Energiavirasto)

## Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16 (9) of Regulation (EU) 2019/943



## Applicable target in 2023

70 %

## Summary of national compliance assessment for 2023

### Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

### Explanation

- > Minimum target reached for most MTUs in 2023

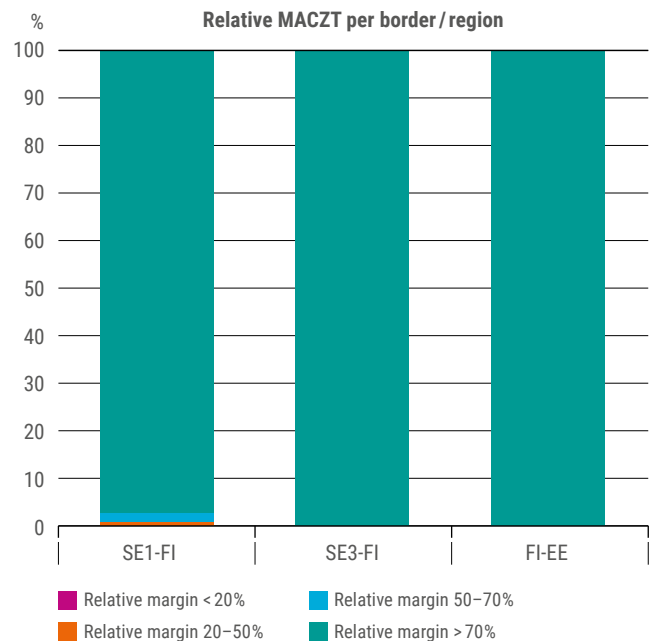


Figure 45: Relative MACZT per border/region for Finland

## France

### TSO(s)

RTE

### Borders/Region

Core region, Italy North region, SWE region

### Competent regulatory authority

CRE

### Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16(9) of Regulation (EU) 2019/943



### Applicable target in 2023

70 %

### Summary of national compliance assessment for 2023

- › The results of 2023 are fairly satisfying regarding the criterion of compliance agreed with the French regulator CRE.
- › A report regarding the application of 70 % on French borders is published each year by CRE to assess the national compliance.

### Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

### Explanation

According to the Smart compliance agreed with CRE, TS where at least one criterion is fulfilled, is deemed as compliant regarding the 70 %:

- › Price convergence is reached with BZs inside the corresponding CCR
- › All limiting CNECs are in a neighbouring country
- › Minimum MACZT is above 70 %

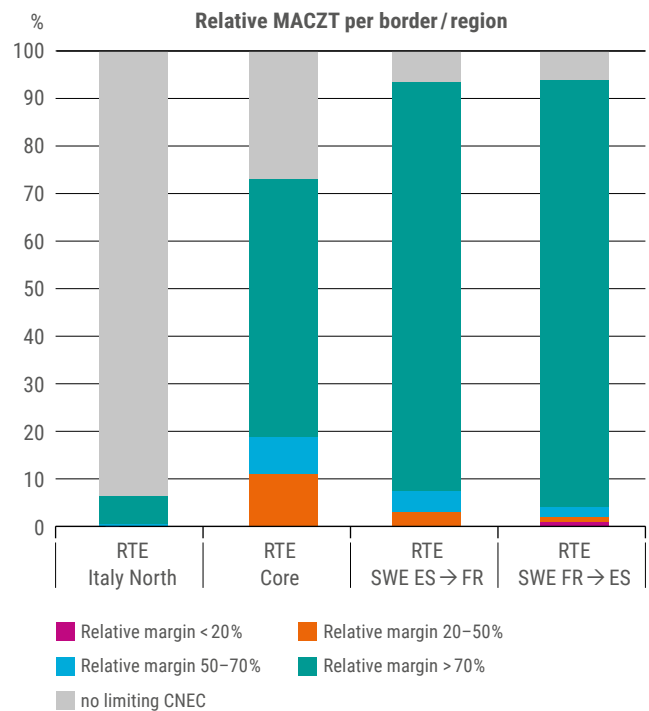


Figure 46: Relative MACZT per border/region for France

# Germany

## TSO(s)

50Hertz Transmission GmbH, Amprion GmbH, Baltic Cable AB, TenneT TSO GmbH, TransnetBW GmbH

## Borders/Region

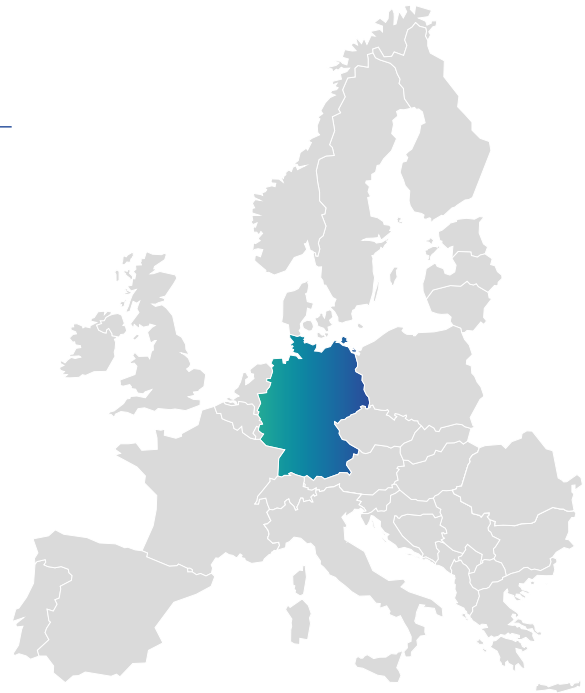
CCR Core, CCR Hansa

## Competent regulatory authority

Bundesnetzagentur (BNetzA)

## Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943**
- Yes, the TSO requested derogation pursuant to Art. 16 (9) of Regulation (EU) 2019/943



## Applicable target in 2023

CCR Core borders: 40.8 % on all CNEs for each MTU

- › DE – DK1: 47 % on all CNEs for each MTU
- › DE – DK2: 70 % for Kontek cable/35 % for KF CGS
- › DE – SE4: 55.7 % of the NTC of Baltic Cable
- › DE – NO2: 35 % on all CNEs for each MTU

## Summary of national compliance assessment for 2023

- › In the report submitted to the regulatory authority the German TSOs find that the minimum capacity was provided to the market in all relevant hours.
- › The report still requires approval by the BNetzA.

## Explanation

- › Where the Agency only assesses the Critical Network Element with the lowest trade margin per MTU, the BNetzA assesses each Critical Network Element per MTU (taking into account the most limiting contingency).
- › Diverging MNCC calculation: Where ACER recommends using forecasted transfer capacities, the BNetzA uses offered transfer capacities
- › BNetzA also considers the additional capacity provided as a result of the Extended LTA Inclusion

## Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes  Partially (see explanation)
- No (see explanation)

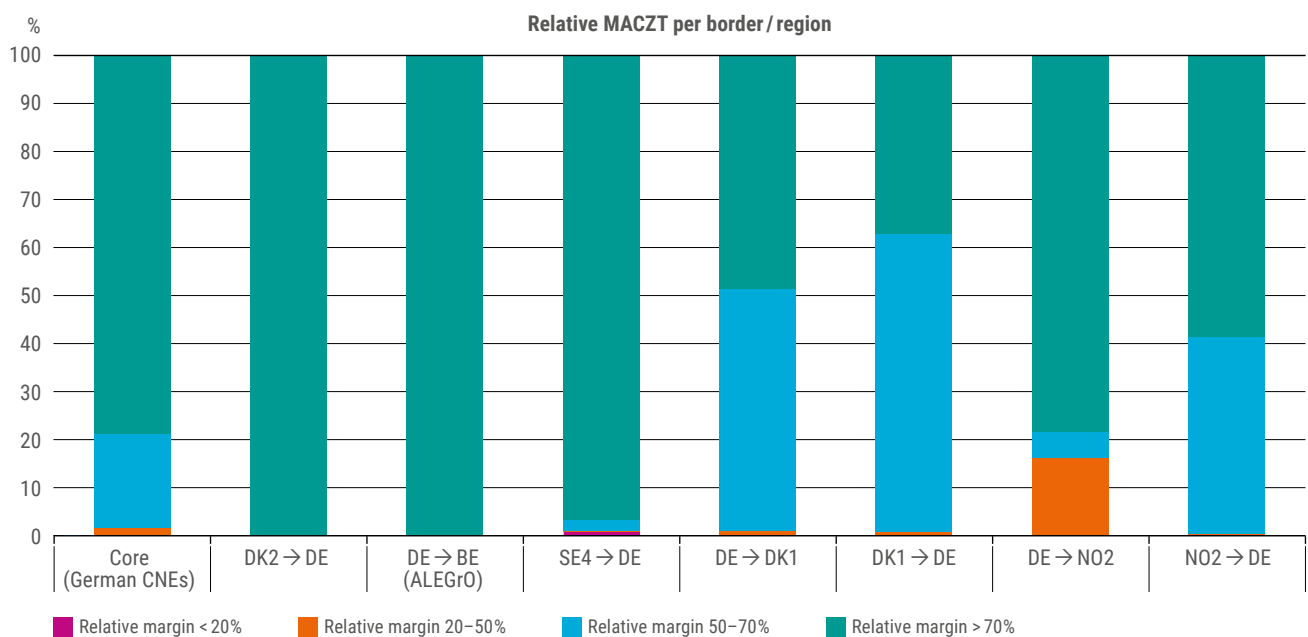


Figure 47: Relative MACZT per border/region for Germany

## Greece

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### TSO(s)

IPTO

### Borders/Region

SEE

### Competent regulatory authority

RAE

### Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16(9) of Regulation (EU) 2019/943

### Applicable target in 2023

15 % of MCCC, excluding third countries

### Summary of national compliance assessment for 2023

IPTO has a derogation in place for the north Greek borders for 2023. As Greece is heavily influenced by 3<sup>rd</sup> country flows – because 3 out of its 4 borders are with non-EU countries, a target considering only the MCCC was used.

The results for 2023 are satisfying. A report regarding the monitoring of MACZT is published by RAEYY every year assessing the national compliance.



### Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)



# Hungary

## TSO(s)

MAVIR

## Borders/Region

Core region

## Competent regulatory authority

Magyar Energetikai és Közmű-szabályozási Hivatal (MEKH)

## Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16(9) of Regulation (EU) 2019/943

## Applicable target in 2023

70 %

Exceptions: applicable for 5 CNEs

Different minimum capacity per CNEC in line with Action Plan

36.25 % for 4 CNEs

42.25 % for 1 CNE

## Summary of national compliance assessment for 2023

In accordance with our expectations, most of the transmission lines fulfil the 70 % requirement. For the 5 network elements pre-recorded in the adopted Action Plan, the threshold values stated in the linear trajectory were met every hour of the year 2023.

The national compliance report was sent to our national regulator (MEKH) on 28 March in the Hungarian language.

*Relative cross zonal trading margin*

## Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)



## Explanation

In accordance with our expectations, most of the transmission lines fulfill the 70 % requirement, for the 5 network elements pre-recorded in the adopted Action Plan, the threshold values stated in the linear route were met every hour of the year 2023.

In the our Action Plan, we did not reach the limit value of certain network elements at least 95 % of the time only because there was a minRAM factor error (IT technical error) for 2 months. This is now a 3 % deterioration in the statistical data, so 94.25 % of time we were compliant with the 70 % rule and our individual minimum capacity according to our Action Plan.

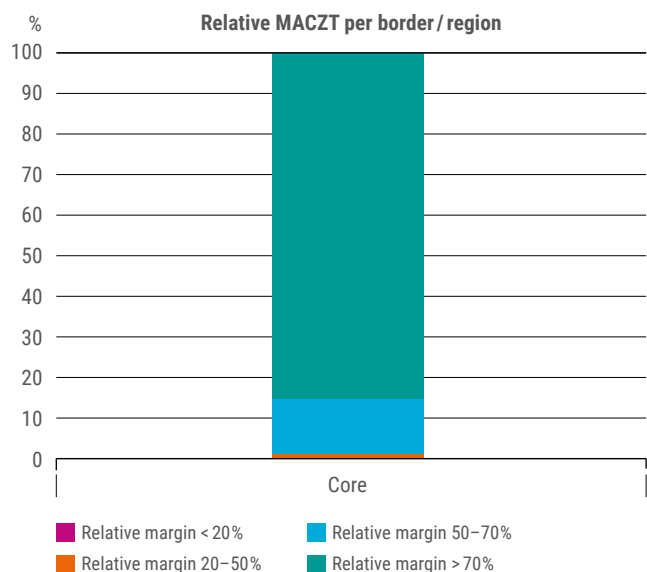


Figure 48: Relative MACZT per border/region for Hungary

# Italy

## TSO(s)

TERNA

## Borders/Region

Italy North, GRIT

## Competent regulatory authority

ARERA

## Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- [Yes, the TSO requested derogation pursuant to Art. 16 \(9\) of Regulation \(EU\) 2019/943](#)

## Applicable target in 2023

70 % except derogation period (Allocation constraints, export)

## Summary of national compliance assessment for 2023

For Italy North, a derogation was in place for 2023, for all MTUs where allocation constraints are applied. No minimum capacity target was defined.

The fulfilment of the 70 % criterion is considered achieved, once at least one limiting CNEC of the Italian North Border satisfies this condition, despite the single National frontier where it is located. According to the methodology approved by the NRAs of the CCR, the Italian Northern border is indeed considered as a whole.

## Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

## Explanation

According to the methodology in force, all the borders of Italy North are considered together

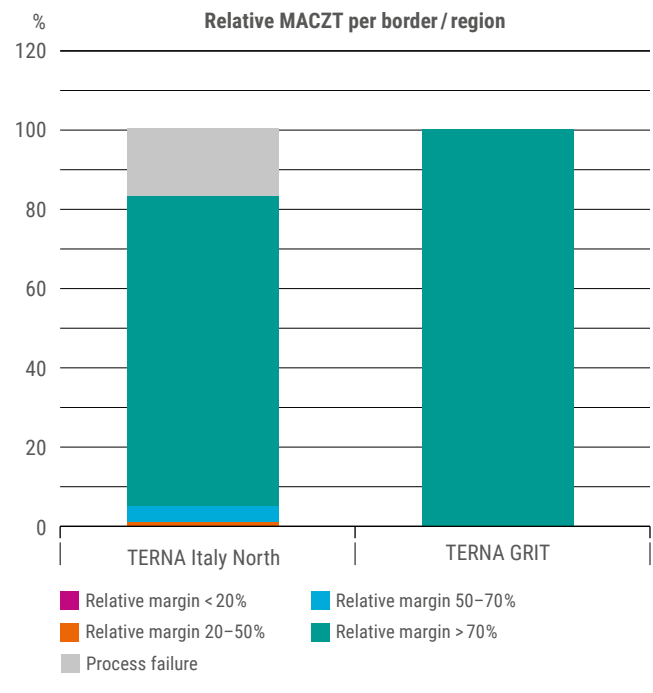


Figure 49: Relative MACZT per border/region for Italy

# Latvia

## TSO(s)

AST

## Borders/Region

EE-LV/LV-LT/Baltics

## Competent regulatory authority

The public Utilities Commission Regulation eng(PUC) lv(SPRK)

## Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16(9) of Regulation (EU) 2019/943

## Applicable target in 2023

70 %

## Summary of national compliance assessment for 2023

During ~100 % of the time the minimum target is reached on all CNECs

Relative cross zonal trading margin

## Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

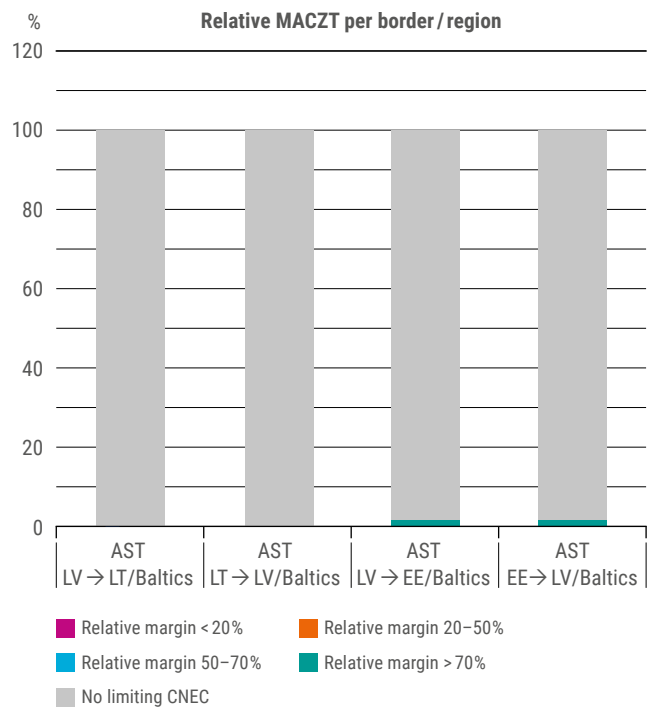


Figure 50: Relative MACZT per border/region for Latvia

# Lithuania

## TSO(s)

LITGRID

## Borders/Region

LT-LV/LT-SE/LT-PL/Baltics

## Competent regulatory authority

National energy regulatory council (NERC)

## Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16(9) of Regulation (EU) 2019/943



## Applicable target in 2023

70 %

## Summary of national compliance assessment for 2023

Most of the time the minimum target is reached on all CNECs

Relative cross zonal trading margin

## Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

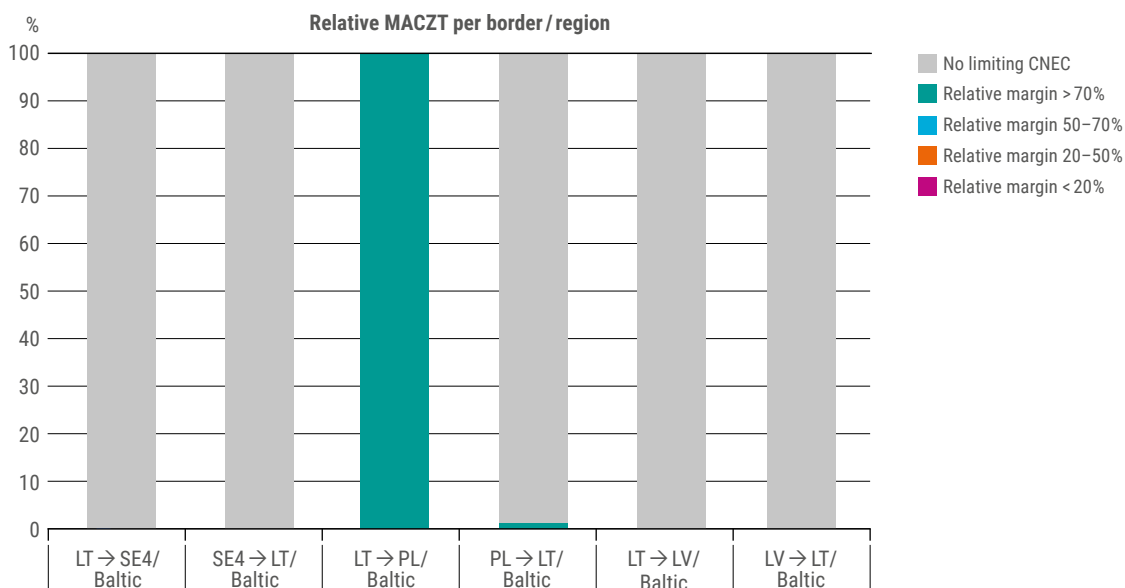


Figure 51: Relative MACZT per border/region for Lithuania

## Luxembourg

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### TSO(s)

Creos Luxembourg

### Borders/Region

Core Region

### Competent regulatory authority

Institut Luxembourgeois de Régulation (ILR)

### Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16(9) of Regulation (EU) 2019/943

### Applicable target in 2023

70 %

### Summary of national compliance assessment for 2023

› N/A

### Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

### Explanation

- › §16.8 CEP does not apply to the specific Luxembourg situation as the Creos transmission system does not limit flows for cross-zonal exchanges. Luxembourg is part of the German/Luxembourg BZ and cross-border capacities are currently not available due to operational constraints.



# Netherlands

## TSO(s)

TenneT TSO BV

## Borders/Region

Core Region, HVDC

## Competent regulatory authority

Autoriteit Consument & Markt

## Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16(9) of Regulation (EU) 2019/943



## Applicable target in 2023

Changes by CNE, statistics:

Minimum: 50 %

Maximum: 70 %

Average: 54 %

Median: 53 %

## Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

## Summary of national compliance assessment for 2023

> [Link](#) to the national compliance report

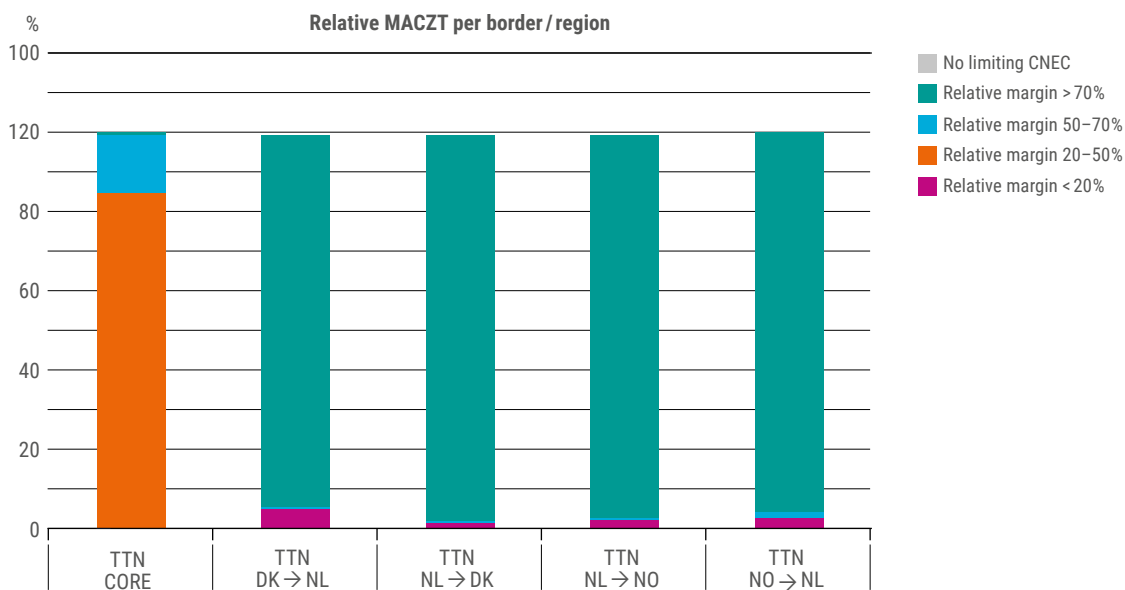


Figure 52: Relative MACZT per border/region for Netherlands



## Norway

### TSO(s)

Statnett SF

### Borders/Region

NO1-NO2, NO1-NO3, NO1-NO5, NO2-NO5, NO5-NO3, NO3-NO4, NO2-NO2\_NK, NO2-NO2\_ND, NO2-NO2\_SK, NO1-SE3, NO3-SE2, NO4-SE2, NO4-SE1

### Competent regulatory authority

Reguleringsmyndigheten for energi (RME)

### Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is not fully applicable in Norway due to that Regulation (EU) 2019/943 is not implemented in the EEA-agreement
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16 (9) of Regulation (EU) 2019/943

### Applicable target in 2023

None

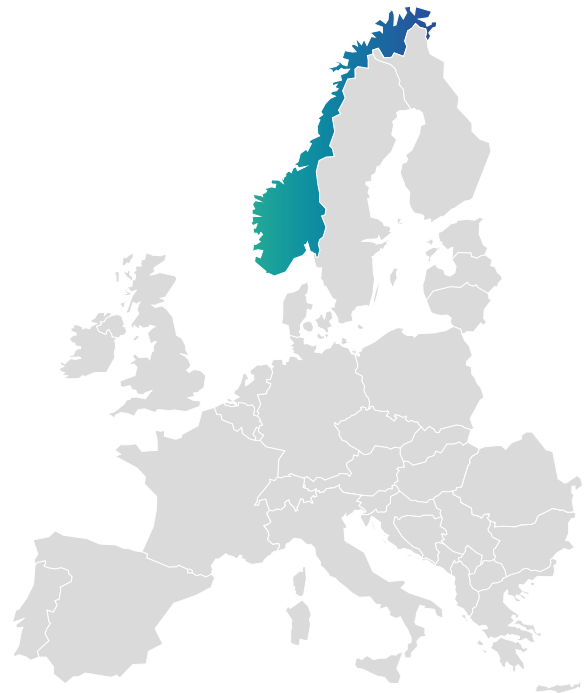
### Summary of national compliance assessment for 2023

The graph shows a duration curve for max flow allowed by the current NTCs on all relevant CNECs for each MTU in 2023. We have applied PTDF-matrixes derived during FB external parallel run from 2023 to associate the actual NTCs from 2023 to the individual CNE. The vertical axis measures the maxNTC flow/Fmax on CNEs, and the horizontal axis is percentages of observations.

### Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)



### Explanation

- › The 70 % requirement is not implemented nor measured for Norway. However, the intention of Statnett is to provide sufficient capacity (70 %). Measuring the correct values for the 70 % requirement, before flowbased is implemented (October 2024) is however not possible due to the manual nature of the current NTC approach.

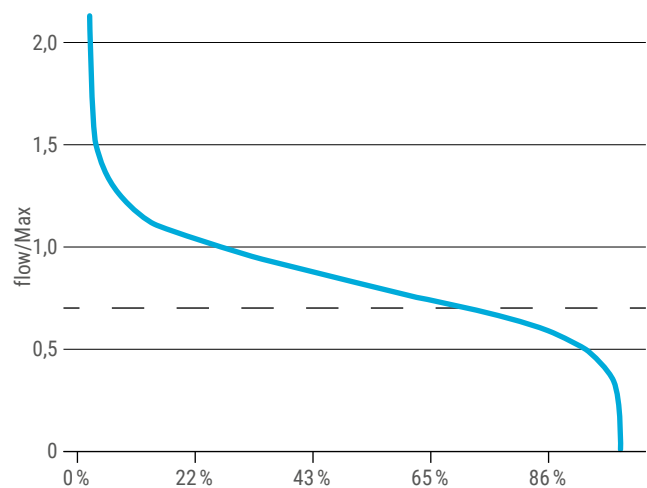


Figure 53: Duration curve for max flow allowed by the current NTCs on all relevant CNECs for each MTU in 2023 in Norway

# Poland

## TSO(s)

Polskie Sieci Elektroenergetyczne S.A. (PSE)

## Borders/Region

Core Region, PL-LT, PL-SE4

## Competent regulatory authority

Urząd Regulacji Energetyki (URE)

## Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16(9) of Regulation (EU) 2019/943



## Applicable target in 2023 (Different minimum capacity per CNEC in line with Action Plan)

Minimum: 0 %  
 Maximum: 39 %  
 Average: 17.77 %  
 Median: 17 %

## Summary of national compliance assessment for 2023

In the national report submitted to the NRA (URE), the PSE consider that the minimum capacity requirement was fulfilled in all hours. Hours where the minimal required MACZT levels were fulfilled are marked as fulfilled. Similarly, hours in which the minimal MACZT levels were considered as conditionally fulfilled due to legitimate reasons (outages, derogations, lack of redispatching potential) are also marked as fulfilled.

A link to the national compliance report is not yet available as the approval is pending (June 2024).

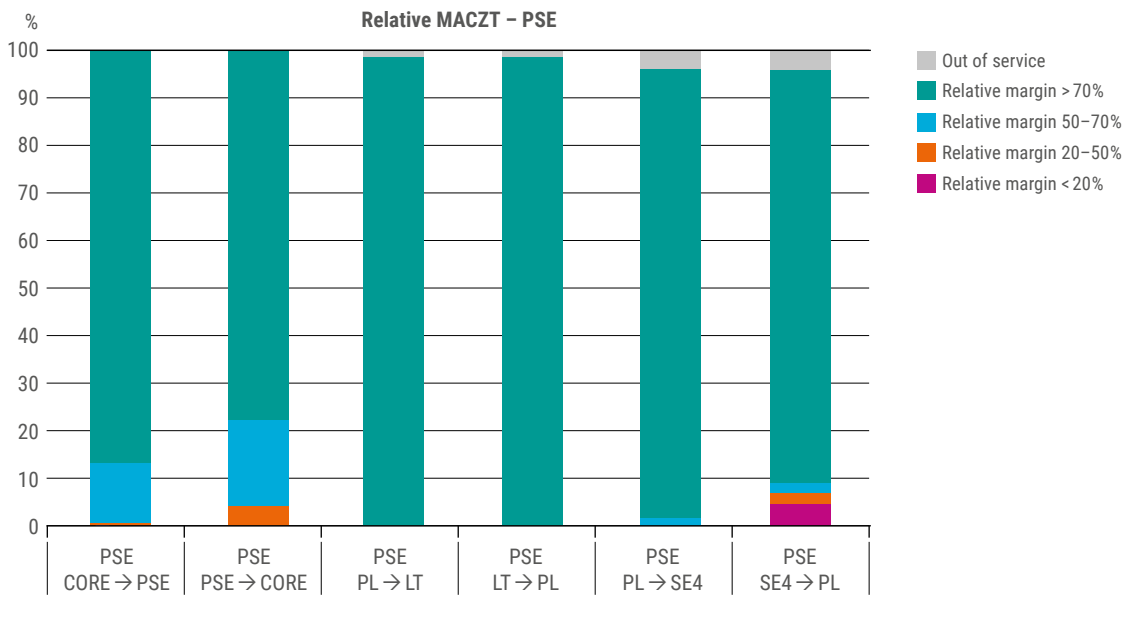


Figure 54: Relative MACZT per border/region for Poland

## Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

## Explanation

- › ACER only evaluates the Critical Network Element with the lowest trade margin per MTU, whereas URE evaluates each Critical Network Element (including contingencies (CNEC)) for each relevant MTU.
- › An important difference from the approach applied by the Agency is the treatment of allocation constraints, which are defined as 'constraints to be respected during capacity allocation to maintain the transmission system within operational security limits and have not been translated into cross-zonal capacity or that are needed to increase the efficiency of capacity allocation'. As minimal capacity obligations consider the percentage of capacity that respects operational security limits, the application of allocation constraints cannot be considered to reduce capacities below the trajectory thresholds. However, in its monitoring report, ACER has recalculated the CZC figures for Poland by reducing the capacities made available on the Polish DC borders, even though the full capacity of the link was usually offered (or at least the minimal threshold or derogation was respected). The basis for assuming such an interpretation is unclear as the applicable legal framework undoubtedly allows for the application of allocation constraints. Apart from having the purpose of keeping the system within operational security limits, allocation constraints are not listed in Regulation 2019/943 as factors to be included within the 30 % margin that is foreseen for inter alia loop flows. It should be emphasised that for hours marked by ACER as not fulfilled, the respective DC borders were used for transits through Poland (often to the full capacity of the links), thus contributing to European social welfare. The above are reasons for differences between the PSE assessment and the one shown by ACER.

# Portugal

## TSO(s)

REN - Rede Eléctrica Nacional, S.A.

## Borders/Region

SWE Region

## Competent regulatory authority

ERSE - Entidade Reguladora dos Serviços Energéticos]

## Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- [Yes, the TSO requested derogation pursuant to Art. 16 \(9\) of Regulation \(EU\) 2019/943](#)

## Applicable target in 2023

70 % MACZT in at least 82,5 % of the hours

## Summary of national compliance assessment for 2023

Some improvements implemented in the SWE region regarding 70 %:

- › CZC Regional monitoring process done by SWE RCC since April 2021.
- › CZC recalculation using countertrading since February 2022
- › Use of a fallback-CNEC to compute the MACZT when the CNEC is not available (since 2022).
- › For 2023, there was a derogation for REN. During this period, REN applied the amendment capacity calculation methodology proposal in the SWE CCR for the operational DA coordinated capacity calculation process (approved by SWE NRA in January 2022), in this way ensuring the maintenance of the operational security in the SWE CCR. REN offered to this process at least the minimum levels of capacity in accordance with article 16(8)(a) of Regulation 2019/943 during 82.5 % of the hours on which this 1-year derogation was applied. The minimum levels were provided in accordance with article 16(8)(a) of Regulation 2019/943 and with paragraphs 4.2 and 5.1 of ACER Recommendation 01/2019 on the limiting CNECs.
- › SWE capacity calculation methodology includes the use of a CNEC-fallback, which allows for the assessment of the compliance of CEP 70 % when the CNEC is not available within the allotted time for the calculation process.
- › For the assessment of 70 % rule in the previous chapter, the following criteria have been applied:



1. MTUs with limiting CNEC outside Portugal are deemed as compliant.
2. For MTUs where the SWE capacity calculation process did not provide a limiting CNE, the SWE capacity calculation methodology includes the use of a CNEC-fallback which enables the assessment of the compliance of CEP 70 %.

## Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes  Partially (see explanation)
- No (see explanation)

## Explanation

- › ERSE's compliance assessment for 2023 is not closed.

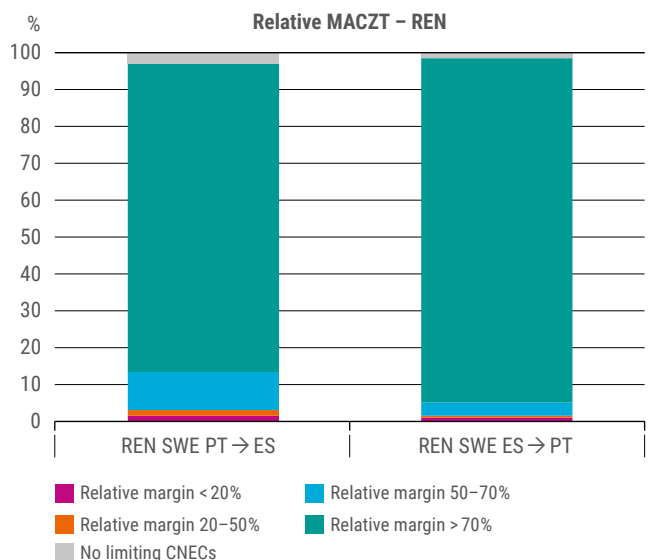


Figure 55: Relative MACZT per border/region for Portugal

## Romania

### TSO(s)

Transelectrica

### Borders/Region

Romania – Hungary/Core

Romania – Bulgaria/SEE

### Competent regulatory authority

National Energy Regulatory Authority (ANRE)

### Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943 ([Romanian Action Plan](#))
- Yes, the TSO requested derogation pursuant to Art. 16(9) of Regulation (EU) 2019/943 ([Derogation for 2023](#))

### Applicable target in 2023

Romania – Hungary: Derogation: 33 % on all CNEs for each MTU.

Romania – Bulgaria: Action Plan: 43 % on all CNEs for each MTU.

CNTEE Transelectrica SA applied for a derogation from the obligations laid down under Article 16(8) of the Regulation (EU) 2019/943 for the Romania – Hungary border, in accordance with Article 16(9) of the Regulation (EU) 2019/943. The Decision of ANRE no. 2359 from 28.12.2022 granted the derogation for Transelectrica SA from the obligations laid down under Article 16(8) of the Regulation (EU) 2019/943 with the obligation of maintaining the available minimum capacity for cross-zonal trade at 800 MW (meaning the level of 33 % of the transmission capacity) for the Romania – Hungary border in 2023. For the Romania – Bulgaria border CNTEE Transelectrica SA did not request a derogation, meaning that the cross-zonal trade level target was set at 1560 MW (43 % of the transmission capacity).

### Summary of national compliance assessment for 2023

- › Transelectrica applies ACER'S Recommendation no. 1/2019 for assessing the compliance of its borders with the interim targets set by the Action Plan (RO-BG border) and Derogation (RO-HU border).
- › The national compliance report is split between the SEE and Core region as follows:



#### a) Core (RO-HU)

The assessment is done relative to the 70 % target and also a 33 % interim target according to the Derogation given by ANRE. CNECs with the lowest RAM per MTU are used for these results.

The results show values including and excluding third countries. As Romania is heavily influenced by flows of third countries, it is mandatory to use the values including the flows induced by these.

Moreover, the report shows the average values of the MACZT in total, MACZT where targets are reached and where these are not met.

Furthermore, figures are also represented using all presolved CNECs per MTU and month, as well as their average value.

Another strong influence is the MNCC values as Romania has four borders with third countries for which there is a daily allocation.

#### b) SEE (RO-BG)

The assessment is done relative to the 70 % target and also a 43 % interim target according to the Action Plan. Limiting CNECs per MTU and direction are used for these results.

The results show the values including and excluding third countries, in addition to the results split by direction. As Romania is heavily influenced by flows of third countries, it is mandatory to use the values including the flows induced by these. Moreover, the report shows the average values of the MACZT in total, MACZT where targets are reached and where these are not met.

Another strong influence is the MNCC values, as Romania has four borders with third countries on which there is a daily allocation.

Furthermore, as the Action Plan also states a target value of NTC [MW] to be reached every year, the report also presents the results of the capacity calculation, in addition to the validated NTC values by Transelectrica.

**Methodology**

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

**Explanation**

> The assessment for 2023 has not yet started.

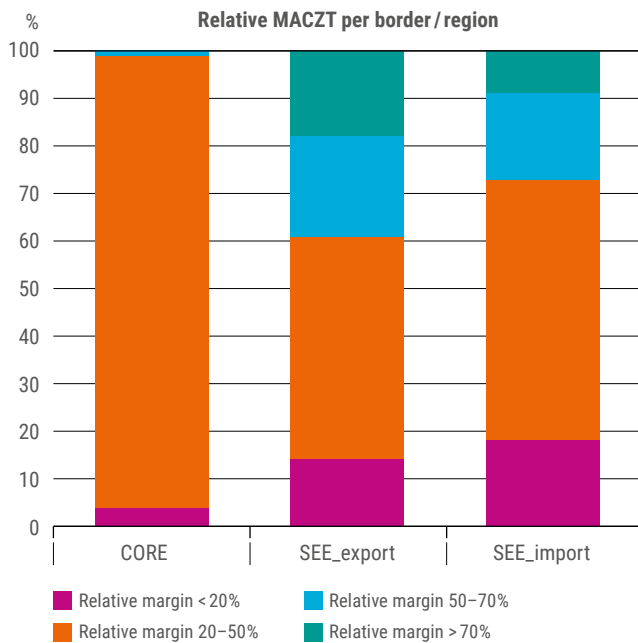


Figure 56: Relative MACZT per border/region for Romania

## Slovak Republic

### TSO(s)

Slovenská elektrizačná prenosová sústava, a.s. (SEPS)

### Borders/Region

Core Region

### Competent regulatory authority

Úrad pre reguláciu sieťových odvetví (ÚRSO)/The Regulatory Office for Network Industries (RONI)

### Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16 (9) of Regulation (EU) 2019/943

### Applicable target in 2023

50 % MACZT (applicable for 6 CNEs, in at least 80 % of MTUs if security of the power system is secured)  
70 % MACZT (applicable for the remaining CNEs)

### Summary of national compliance assessment for 2023 .

- › In accordance with the granted derogation for year 2023, the target value was reached in 100 % MTUs of the year.

### Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

### Explanation

- › SEPS is not aware if RONI fully adopted the non-binding ACER's Recommendation 01/2019 for its compliance assessment.

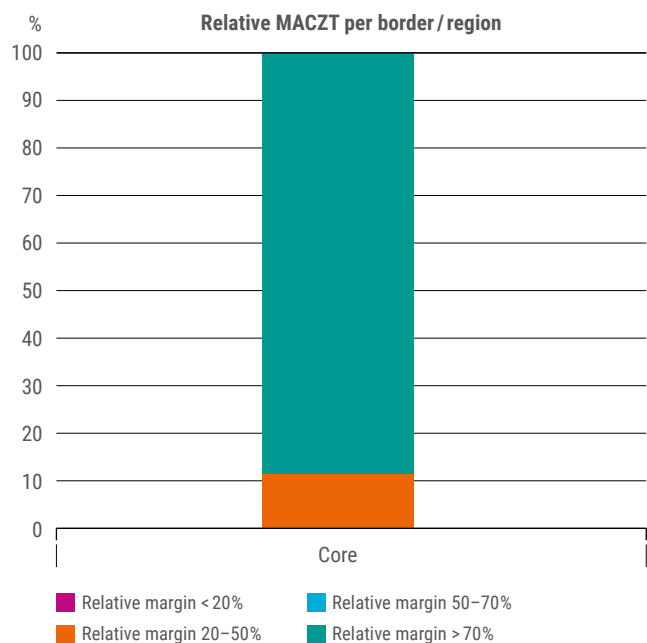


Figure 57: Relative MACZT per border/region for Slovak Republic



# Slovenia

## TSO(s)

ELES

## Borders/Region

Core and Italy North

## Competent regulatory authority

Agencija za energijo

## Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16(9) of Regulation (EU) 2019/943



## Applicable target in 2023

70 %

## Summary of national compliance assessment for 2023

- › In the Core region, the target of 70 % was reached for 96.8 % MTUs.
- › In the event the 70 % target was not reached (3.2 %), the MACZT fell into the 50 %–70 % category.
- › In the Italy North region, Slovenian CNECs did not limit the capacity calculation in 2023; therefore, no MACZT values were calculated.

## Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

## Explanation

- › In the Core region, the CNEC with the lowest MACZT in considered for each MTU
- › In the Italy North region, CNEC(s) that limit the coordinated NTC calculation are considered. Slovenian CNECs did not limit the capacity calculation in 2023.

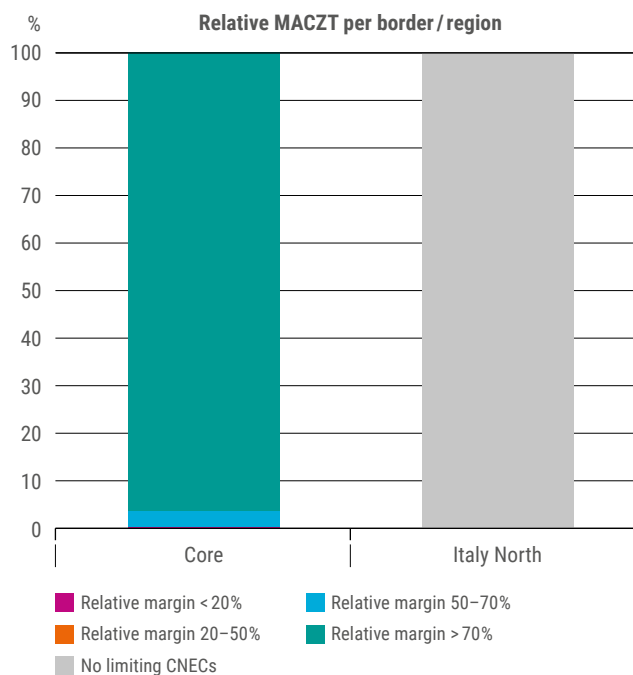


Figure 58: Relative MACZT per border/region for Slovenia

# Spain

## TSO(s)

Red Eléctrica de España S.A.U. (Red Eléctrica)

## Borders/Region

SWE CC region. Borders: Spain-France and Spain-Portugal

## Competent regulatory authority

Comisión Nacional de los Mercados y la Competencia (CNMC)

## Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16 (9) of Regulation (EU) 2019/943



## Applicable target in 2023

70 %

## Summary of national compliance assessment for 2023

The CC methodology currently implemented in SWE CCR has the following relevant features related to 70 %:

1. The regional monitoring process has been done by the SWE RCC since April 2021.
2. There has been CZC recalculation using countertrading since February 2022.
3. There has been the use of a fallback-CNEC to compute the MACZT when the CNEC is not available since 2022, which guarantee the monitoring for the 100 % of the MTUs.

Since February 2022, the SWE region has applied an amended SWE capacity calculation methodology for the operational DA coordinated capacity calculation process, approved by SWE NRAs in January 2022. The mentioned amendment introduced the principles and goals set out in the EU Regulation to fulfil the minimum capacity requirements according to Article 16 of the Electricity Regulation, considering the availability of costly remedial actions. Thus, in the event a limiting CNEC is not fulfilling the CEP 70 % criterion, Red Eléctrica provide some costly remedial actions (i.e. countertrading available) to increase the MACZT and consequently the capacity in order to reach the 70 %.

In addition, the methodology defines the use of a CNEC-fallback, which allows the assessment of compliance of CEP 70 % when the CNEC is not initially available within the allotted time for the calculation process due to any failure in the regional capacity calculation tool. In this manner, a

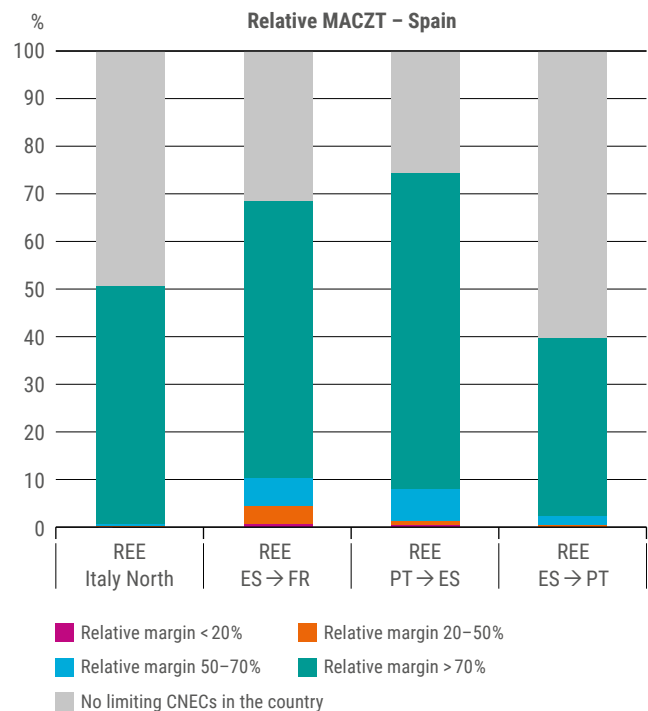


Figure 59: Relative MACZT per border/region for Spain

limiting CNEC and its corresponding MACZT is identified for 100% of the hours for the two directions of each border.

These improvements in the SWE CC methodology have enabled a very high level of fulfilment to be reached. For this reason, no derogation nor action plan has been requested since January 2023.

Finally, in the compliance assessment it is considered that MTUs with limiting CNEC outside Spain are deemed as compliant as the limitation of the NTC is not in the country.

### Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

### Explanation

The methodology proposed by ACER's Recommendation 01/2019 is implemented in the SWE CC methodology to calculate the MACZT for each limiting CNEC, per border, direction and MTU.

## Sweden

### TSO(s)

Svenska kraftnät

### Borders/Region

DE-SE4, DK1-SE3, DK2-SE4  
FI-SE1, FI-SE3, LT-SE4  
PL-SE4, SE1-SE2, SE2-SE3  
SE3-SE4

### Competent regulatory authority

Energimarknadsinspektionen (Ei)

### Is any transitional regulation in place?

- No, the minimum trade requirement pursuant to Art. 16 of Regulation (EU) 2019/943 is fully applicable
- Yes, the Member state invoked action plan pursuant to Art. 15 of Regulation (EU) 2019/943
- Yes, the TSO requested derogation pursuant to Art. 16(9) of Regulation (EU) 2019/943

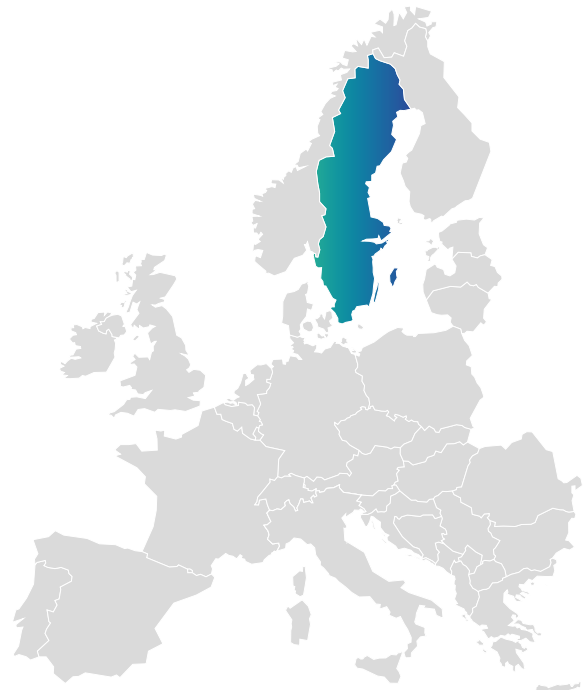
### Applicable target in 2023

70 %

### Summary of national compliance assessment for 2023

- › National regulatory authority Energimarknadsinspektionen (Ei) has not completed a compliance assessment for 2023.

To better understand the graphs, please find their general description on page X.



### Methodology

Did the competent regulatory authority adopt the non-binding ACER's Recommendation 01/2019 for its compliance assessment?

- Yes
- Partially (see explanation)
- No (see explanation)

### Explanation

- › The compliance assessment for 2023 is not yet completed, but it will rely on ACER methodology.

## Annex V – Glossary

<b>4M MC</b>	4M Market Coupling between the Czech Republic, Slovakia, Hungary, Romania	<b>CCR</b>	Capacity Calculation Region
<b>50Hertz</b>	50Hertz Transmission GmbH (1 out of 4 German TSOs)	<b>CEE</b>	Central Eastern Europe
<b>ACER</b>	Agency for the Cooperation of Energy Regulators	<b>CGES</b>	Crnogorski Elektroprenosni Sistem AD
<b>aFRR</b>	Frequency Restoration Reserves with automatic activation	<b>CGM</b>	Common Grid Model
<b>AL</b>	Albania	<b>CGMM</b>	Common Grid Model Methodology
<b>Amprion</b>	Amprion GmbH (1 out of 4 German TSOs)	<b>CH</b>	Switzerland
<b>ANDOA</b>	All NEMOs Day-Ahead Operational Agreement	<b>CID</b>	Congestion Income Distribution
<b>ANIDOA</b>	All NEMOs Intraday Operational Agreement	<b>CMM</b>	Capacity Management Module
<b>AOF</b>	Activation Optimisation Function	<b>CMOL</b>	Common Merit Order List
<b>APG</b>	Austrian Power Grid AG	<b>CNTC</b>	Coordinated Net Transmission Capacity
<b>AST</b>	AS Augstsprieguma tikls (Latvian TSO)	<b>CWE</b>	Central Western Europe
<b>AT</b>	Austria	<b>CZ</b>	Czech Republic
<b>ATC</b>	Available transfer capability	<b>CZC</b>	Cross-Zonal Capacity
<b>BA</b>	Bosnia and Herzegovina	<b>DAOA</b>	Day-Ahead Operational Agreement
<b>BE</b>	Belgium	<b>DC</b>	Direct Current
<b>BEPP</b>	Balancing Energy Pricing Periods	<b>DE</b>	Germany
<b>BG</b>	Bulgaria	<b>DK</b>	Denmark
<b>BRP</b>	Balance Responsible Party	<b>EB</b>	Commission Regulation (EU) 2017/2195 of 23 November
<b>BSP</b>	Balancing Service Provider	<b>EE</b>	Estonia
<b>BZB</b>	Bidding Zone Border	<b>ELIA</b>	ELIA Elia System Operator SA
<b>CA</b>	Cooperation Agreement	<b>EMD</b>	Electricity Market Design
<b>CACM</b>	Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management	<b>EMS</b>	Joint Stock Company Elektromreža Srbije
<b>CCM</b>	Capacity Calculation Methodology	<b>ENTSO-E</b>	European Network of Transmission System Operators for Electricity
		<b>ES</b>	Spain
		<b>ESO</b>	Electroenergien Sistem Operator EAD
		<b>EU</b>	European Union

<b>EUPHEMIA</b>	Pan-European Hybrid Electricity Market Integration Algorithm	<b>IPTO</b>	Independent Power Transmission Operator S.A.
<b>FAT</b>	Full Activation Time	<b>ISP</b>	Imbalance Settlement Period
<b>FB</b>	Flow-based	<b>IT</b>	Italy
<b>FBMC</b>	Flow-based market coupling	<b>JAO</b>	Joint Allocation Office
<b>FCA</b>	Forward Capacity Allocation	<b>KPI</b>	Key Performance Indicator
<b>FCR</b>	Frequency Containment Reserve	<b>LFC area</b>	Load-Frequency Control area
<b>FI</b>	Finland	<b>LIP</b>	Local Implementation Project
<b>FR</b>	France	<b>LTTR</b>	Long-Term Transmission Rights
<b>FRR</b>	Frequency Restoration Reserves	<b>LU</b>	Luxembourg
<b>FTR</b>	Financial Transmission Right	<b>MARI</b>	Manually Activated Reserves Initiative
<b>GB</b>	Great Britain	<b>MAVIR</b>	Magyar Villamosenergia-ipari Átviteli Rendszerirányító Zártkörűen Működő Részvénytársaság
<b>GCT</b>	Gate Closure Time	<b>MC</b>	Market Coupling
<b>GOT</b>	Gate Opening Time	<b>MCO</b>	Market Coupling Operator
<b>GR</b>	Greece	<b>ME</b>	Montenegro
<b>HAR</b>	Harmonised Allocation Rules	<b>MEMO</b>	Electricity Market Operator of North Macedonia
<b>HOPS</b>	Croatian Transmission System Operator Plc.	<b>MEPSO</b>	Macedonian Transmission System Operator AD
<b>HR</b>	Croatia	<b>mFRR</b>	Frequency Restoration Reserves with manual activation
<b>HU</b>	Hungary	<b>MNA</b>	Multiple NEMOs Arrangement
<b>HVDC</b>	High-Voltage Direct Current	<b>MRC</b>	Multi Regional Coupling
<b>IBWT</b>	Italian working table	<b>MTU</b>	Market Time Unit
<b>IDOA</b>	Intraday Operational Agreement	<b>NDA</b>	Non-disclosure agreement
<b>IDSC</b>	Intraday Steering Committee	<b>NEMO</b>	Nominated Electricity Market Operator or Power Exchange
<b>IE</b>	Ireland	<b>NL</b>	Netherlands
<b>IFA</b>	Interconnexion France-Angleterre	<b>NO</b>	Norway
<b>IGCC</b>	International Grid Control Cooperation		
<b>IGM</b>	Individual Grid Model		
<b>IN</b>	Imbalance Netting		

<b>NOS BiH</b>	Nezavisni Operator Sustava u Bosni i Hercegovini	<b>SEPS</b>	Slovenská elektrizačná prenosová sústava, a.s. (Slovakian TSO)
<b>NRA</b>	National Regulatory Authority	<b>SI</b>	Slovenia
<b>OPSCOM</b>	Operational Committee	<b>SIDC</b>	Single Intraday Coupling
<b>OST</b>	OST sh.a – Albanian Transmission System Operator	<b>SK</b>	Slovakia
<b>PCR</b>	Price Coupling of Regions	<b>SM</b>	Shipping Module
<b>PICASSO</b>	Platform for the International Coordination of Automated Frequency Restoration and STable A-System Operation	<b>SOB</b>	Shared Order Book
<b>PL</b>	Poland	<b>SONI</b>	System Operator for Northern Ireland Ltd.
<b>PMB</b>	PCR Matcher and Broker IT system	<b>Statnett</b>	Statnett SF (Norway TSO)
<b>PSE</b>	Polskie Sieci Elektroenergetyczne	<b>Svenskä</b>	Svenskä kraftnät (Swedish TSO)
<b>PT</b>	Portugal	<b>SWE</b>	South-Western Europe
<b>PTR</b>	Physical Transmission Right	<b>Swissgrid</b>	Swissgrid ag (Swiss TSO)
<b>R&amp;D</b>	Research and Development	<b>TCDA</b>	TSO Cooperation Operational Agreement
<b>RA</b>	Regulatory Authorities	<b>TCID</b>	TSO Co-operation Agreement for Single Intraday Coupling
<b>REE</b>	Red Eléctrica de España S.A.U.	<b>TCOA</b>	TSO Co-operation Agreement for Day-ahead Coupling
<b>REN</b>	Rede Eléctrica Nacional, S.A.	<b>TenneT DE</b>	TenneT TSO GmbH (1 out of 4 German TSOs)
<b>RO</b>	Romania	<b>TenneT NL</b>	TenneT TSO NV (Dutch TSO)
<b>RR</b>	Replacement Reserves	<b>Terna</b>	Rete Elettrica Nazionale SpA (Italian TSO)
<b>RS</b>	Serbia	<b>TERRE</b>	Trans-European Restoration Reserves Exchange
<b>RTE</b>	Réseau de Transport d'Electricité	<b>Transelectrica</b>	National Power Grid Company Transelectrica S.A. (Romanian TSO)
<b>SA</b>	Synchronous Areas	<b>TransnetBW</b>	TransnetBW GmbH (1 out of 4 German TSOs)
<b>SAFA</b>	Synchronous Area Framework Agreement	<b>TSO</b>	Transmission System Operator
<b>SAP</b>	Single Allocation Platform	<b>XBID</b>	Cross-Border Intraday project
<b>SAP CA</b>	Single Allocation Platform Cooperation Agreement		
<b>SDAC</b>	Single Day-Ahead Coupling		
<b>SE</b>	Sweden		
<b>SEE</b>	South-East Europe		

The terms used in this document have the meaning of the definitions included in Article 2 of the CACM, FCA and EB Regulations.

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