ENTSO-E
Market report 2021

entsoe

About ENTSO-E

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 42 member TSOs, representing 35 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 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.

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Executive Summary

Capacity allocation and congestion management are the cornerstones of the European single electricity market as they harmonise the way cross-border markets operate from long-term to real-time. Significant progress has been made over the past year across the market's various time frames, bringing a single European electricity market for the benefit of all Europeans closer to full realisation.

This could be achieved despite the increasing challenges of implementing an ever more comprehensive overall regulatory framework that is subject to continuous change processes. The increasing requirements towards transmission system operators (TSOs) and other involved parties require good cooperation between all stakeholders as well as political and regulatory stability, which are the key prerequisites for delivering innovative solutions on time while ensuring the highest quality standards.

This applies in particular to the minimum capacity target of the Clean Energy for all Europeans Package (CEP). Following the CEP's publication in July 2019, TSOs invested substantial efforts to implement all relevant 'CEP70 provisions' on time, by 1 January 2020. With few exceptions, TSOs reached the required capacity targets in 2020.

Further to the CEP70 capacity assessment, this ENTSO-E Market Report outlines key developments and the main highlights of the past year across the market's time frames.

Forward capacity allocation (FCA) at a glance

- FCA uses a single pan-European platform, established in October 2018, to explicitly allocate auction-based cross-zonal transmission rights.
- The project includes 22 countries with 25 TSOs that cover 63 serviced borders and have more than 300 active market participants.
- In total, more than 2 000 cross-border auctions have been successfully completed since the go-live in October 2018.

Single day-ahead coupling (SDAC) at a glance

- SDAC uses one common price coupling algorithm to implicitly calculate electricity prices across Europe and to allocate auction-based cross-zonal capacity.
- The project includes 27 countries with 30 TSOs and 17 nominated electricity market operators (NEMOs) that so far cover 61 bidding zones in two operational projects.
- During Q2 2021, the implementation of implicit capacity allocation on PL–DE, PL–CZ, PL–SK, CZ–DE, CZ–AT, HU–AT and BG[1] borders will go live. This will mark the transition to a single coupled auction for the day-ahead market across all European Union (EU) countries.
- In total, more than 2 600 market sessions have been successfully completed since the go-live in February 2014.

Single intraday coupling (SIDC) at a glance

- SIDC uses one common information technology (IT) system to continuously perform adjustments in their positions until one hour before delivery time taking into account available cross-zonal capacity across Europe.[2]
- The project includes 27 countries[3] with 30 TSOs and 15

1 The Bulgarian day-ahead market is now integrated via the Greek border in the pan-European day-ahead power market.
2 Explicit (capacity only) is provided where requested by NRAs, i.e. at the French, German and Croatian, Slovenian borders
3 Of which 22 are operational with at least one border: Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany,

NEMOs that so far cover 47 integrated bidding zones.

- In total, more than 80 million trades had been executed since the go-live in June 2018.

- Local Implementation Project 14 (encompassing IT, GR, BG, FR and SI borders) and Local Implementation Project 17 (including CZ, SK, PL and HU borders) will culminate the intraday coupling of all European borders by 2022.

- The successive extension of the continuous intraday product suite for cross-border trading (i.e. 30- and 15-minute products) enable the Austrian, Belgian, Dutch, French, German, Hungarian and Slovenian market participants to sell or buy cross-border products with different time resolutions, enhancing the imbalance management.

The withdrawal of the United Kingdom (UK) from the EU has impacted the implementation of the internal energy market, among other domains and sectors. The EU–UK Trade and Cooperation Agreement (TCA), which was enforced as of 1 January 2021, sets out preferential arrangements in various areas, including energy (Title VIII of the TCA). The relationship between the TSOs for electricity will be based on a framework for cooperation and technical procedures, which is developed by ENTSO-E in collaboration with the UK TSOs for electricity. The technical procedures include multi-region loose volume coupling (MRLVC) and the Inter-TSO Compensation (ITC) for transits. Covering these two technical procedures will ensure efficient trading over interconnectors.

During the transition period (31 January to 31 December 2020), pan-European capacity allocation projects (i.e. SDAC[4], SIDC, single allocation platform – SAP) assessed the impact of Brexit on implicit allocation in their processes and IT solutions.

Balancing markets at a glance

European TSOs are continuously working to harmonise electricity balancing services through implementing common rules for European or regional balancing markets, with a view to fostering efficiency and competition through harmonised processes that are fair and transparent to ensure the security of supply. Key features of the European balancing platforms are:

- that there are three separate platforms for the exchange of balancing energy from replacement reserves (RR), frequency restoration reserves with manual (mFRR) and automatic (aFRR) activations, and the imbalance netting (IN) process;

- that at the time of writing, the RR cooperation includes 11 countries with 11 TSOs (8 members and 3 observers) and more than 17 active market participants; the mFRR cooperation includes 31 countries with 34 TSOs (30 members and 4 observers); the aFRR cooperation includes 27 countries with 30 TSOs (26 members and 4 observers); and the IN cooperation includes 24 countries with 27 TSOs (19 operational members, 5 non-operational members and 3 observers).

The balancing platforms were legally requested to go live on different dates. The RR platform went live in January 2020, while the aFRR and mFRR platforms are expected to become operational in Q1 2022 and Q2 2022, respectively. The IN platform was formally considered to be operational in Q2 2020.

- In its first year of operating, six TSOs were connected to the RR platform, which ran robustly with 99.90% system availability. Almost 1.6 million bids were submitted, totalling 88 million MWh.

- In 2020, the IN resulted in total savings of approximately EUR 155 million.

Some TSOs have also committed to implementing voluntary regional balancing cooperations for the exchange of balancing capacity or sharing of reserves. The largest one, the frequency containment reserves (FCR) cooperation launched in 2015, currently involves 11 TSOs and ensures the procurement of 1 400 MW of FCR. Other projects concern frequency restoration reserves (FRR) balancing capacity procurement, such as the cooperation developed by Nordic TSOs or the cooperation between Germany and Austria. In order to enable the cross-border procurement of balancing capacity, the TSOs are jointly developing methodologies to allocate cross-zonal capacity for the exchange of balancing services or sharing of reserves, as requested by the Commission Regulation (EU) 2017/2195 of 23 November 2017. The documented progress is focused on recent developments and milestones achieved since the 2020 Market Report[5] and the 2020 Balancing Report.[6] Key achievements in the efficient implementation of the balancing platforms were:

- **Harmonisation and synergies between the IT systems and communication channels:** the same IT systems and communication channels will be used for both IN and aFRR platforms; the IT system developed for the RR platform will be re-used as a starting point for the implementation of the mFRR platform.

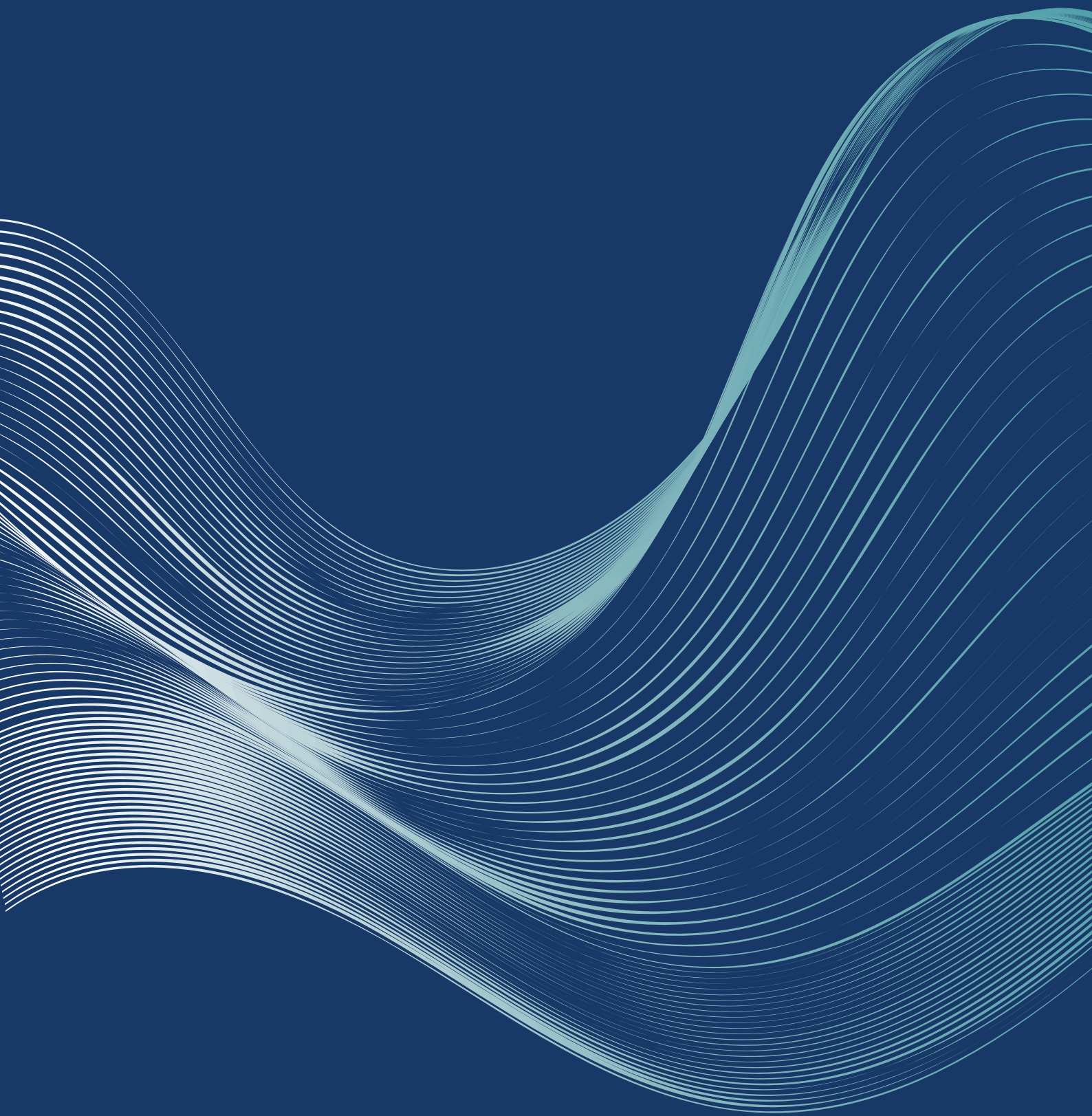
- **Centralised information on available cross-zonal capacities:** TSOs will implement a capacity management module (CMM) across the platforms that collates the information on available cross-zonal capacities to facilitate communication between the TSOs and platforms and among the platforms.

Hungary, Latvia, Lithuania, Luxembourg, Norway, the Netherlands, Poland, Portugal, Romania, Slovenia, Spain and Sweden.

4 EU-UK Trade and Cooperation Agreement: New Day Ahead Trading Arrangements – [Link]

5 See ENTSO-E Market Report 2020.

6 See ENTSO-E Balancing Report 2020.



1. Introduction

Every year, ENTSO-E monitors the progress of electricity markets. This monitoring covers the different time periods for which electricity is traded, ranging from long-term to day-ahead markets and intraday to balancing markets. This activity aims to meet ENTSO-E's monitoring obligations, which stem Commission Regulation (EU) 2017/2195 of 23 November 2017 (the electricity balancing (EB) regulation), Commission Regulation (EU) 2015/1222 of 24 July 2015 (the capacity allocation and congestion management (CACM) regulation) and Commission Regulation (EU) 2016/1719 of 26 September 2016 (forward capacity allocation (FCA) regulation).

The 2021 version of ENTSO-E's annual **Market Report** covers the period from July 2020 to May 2021.[7] The report is formally submitted to the European Union Agency for the Cooperation of Energy Regulators (ACER) and published on ENTSO-E's website immediately after the reporting period.

Electricity markets from long-term to real-time

Electricity is a non-storable good that 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 wholesale and balancing markets. Transmission system operators (TSOs) are establishing the basis for the efficient performance of European wholesale electricity markets across these time frames by offering the optimal level of transmission capacity.

Harmonised 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.

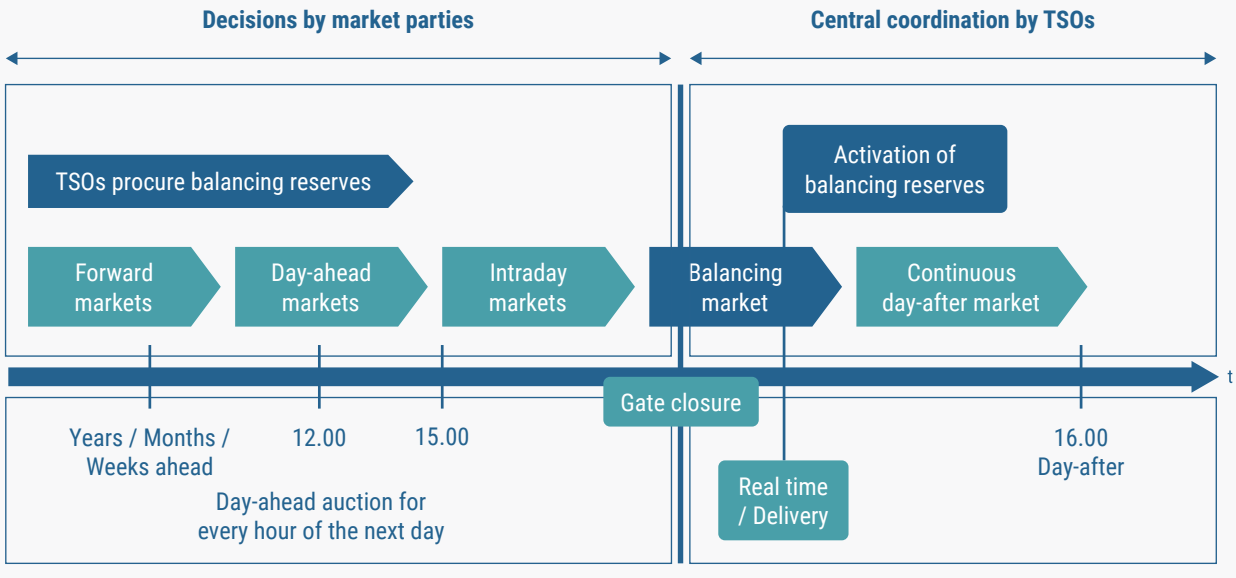


Figure 1 - Overview of different time frames of the wholesale and balancing markets

7 All previous editions of this report can be found at https://www.entsoe.eu/network_codes/monitoring/

Long-term capacity calculation

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 are managing. Based on this assessment, long-term transmission rights (LTTRs) are allocated via explicit auctions by allocation entities such as the Joint Allocation Office (JAO).[8] These LTTRs provide the right for cross-border electricity trading during the product period, for example, a specific year or month. 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 all times of the product period. Risks such as potential outages of transmission lines along 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 more relevant information is available. The FCA regulation, which entered into force on 17 October 2016, sets out harmonised rules for the calculation and allocation of LTTRs, along with the way in which holders of transmission rights are compensated if their right is curtailed. The overarching goal is to promote the development of liquid and competitive forward markets in a coordinated way across Europe and to provide market participants with the ability to hedge their risk associated with cross-border electricity trading.

Short-term day-ahead and intraday capacity calculation

TSOs are able to perform more reliable forecasts of a grid's situation closer to the electricity's actual delivery date. The available electricity transmission capacity between bidding zones is determined by translating physical transmission constraints into commercial transaction constraints. These simplified commercial transaction constraints are then considered in the market clearing algorithm, which determines market prices and cross-zonal exchanges between bidding zones. This action is performed one day prior to the delivery date, i.e. the **day-ahead capacity calculation and allocation**, and also continuously throughout the delivery date, i.e. the **intraday capacity calculation and allocation**. Congestions occurring after the market coupling process require redispatching measures, which are coordinated between all affected TSOs during real-time grid operation.

The rules set by the CACM regulation provide the basis for implementing a single energy market across Europe in day-ahead and intraday time frames. They also establish the methods for allocating capacity in day-ahead and intraday time frames and outline how capacity will be calculated across the different zones.

Real-time balancing

Power generation and demand are subject to forecast errors and technical disturbances. To balance such deviations and maintain the network frequency within permissible limits, TSOs operate the load-frequency control (LFC) processes. The energy activated in this process is called **balancing** energy. The procurement and settlement of balancing energy is organised in balancing markets. The EB regulation establishes detailed rules for the implementation of these balancing energy markets in Europe that 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.

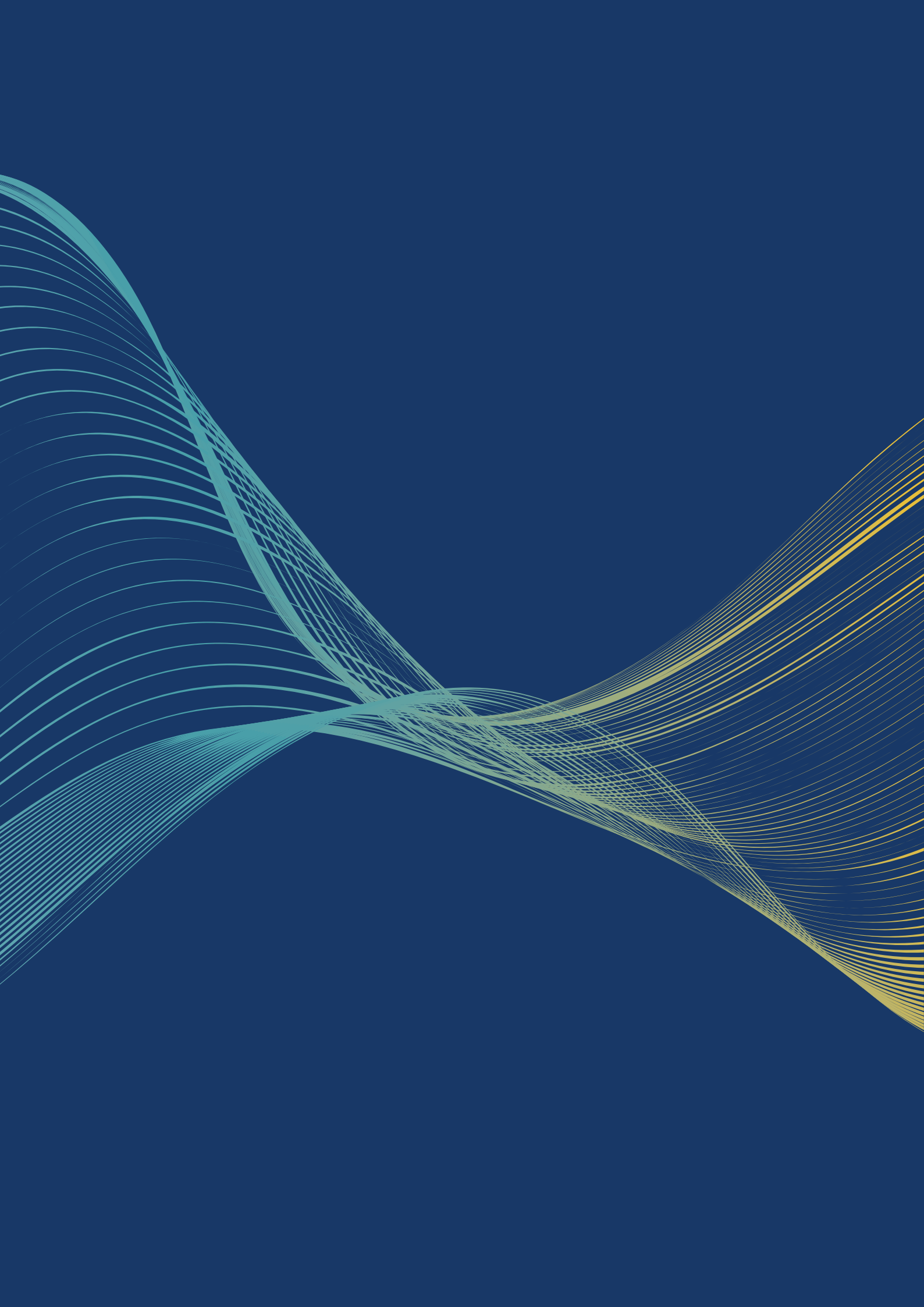
Imbalance settlement aims at ensuring an efficient maintenance of the system balance by incentivising market participants to maintain, keep and restore their individual and thereby ultimately the overall system balance. In this sense, imbalance settlement constitutes a cornerstone to a fully and efficiently functioning internal energy market. In order 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.

Report structure

This report is mainly structured according to the time frames described previously.

- **Chapter 2** provides suggestions for the integrated 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 day-ahead and intraday 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 annexes** provided include additional information, such as a market process overview and explanation on how TSOs comply with the 70% minimum capacity target requirement per country.

8 See www.jao.eu.



2. Suggestions for improving the integration of the European electricity market

2.1 A reliable future-oriented regulatory framework for continuous innovation

TSOs are in charge of large power systems that are among the most complex systems ever created, both in terms of their spatial and temporal dimensions. Due to this responsibility, TSOs have a natural key role in the implementation of the EU's internal electricity market. Their responsibility and expertise are crucial for achieving most pan-European and regional-level energy policy goals.

TSOs consider themselves as the link between stakeholders seeking consensus among consumers, policymakers, regulators, non-governmental organisations and other stakeholders involved. In practice, TSOs communicate their work and ideas in implementation groups, stakeholder committees or topic-specific public stakeholder workshops. TSOs are therefore always open for discussion and ready to receive energy policy direction from different policy and regulatory authorities. Within this framework, TSOs strive to provide feedback and technical insight on the implications of policy decisions to the large and complex systems for which the TSOs are responsible. **Table 1** includes a non-exhaustive list of main topics for which TSOs see the need of further increasing discussions with policy and regulatory authorities.

Topic/Project	Description
Multi Regional Loose Volume Coupling (MRLVC)	Following the result of the cost-benefit analysis (CBA) study recently published as required by TCA, the TSOs are looking forward to further cooperating in the detailed design of the solution for interconnections with the UK. EU TSOs are currently awaiting guidance from the EC on how to proceed, given the significant risks highlighted in the CBA.
"Complex products" in long-term auctions	Following NRAs' request, TSOs ran a public consultation on market parties appetite for new LTTR products. TSOs are assessing whether there is a potential for development.
CEP70% minimum target	As further described in the dedicated chapter of this report, the required minimum cross-zonal capacity target of 70% requires further collaboration in assessing its implications and potential adaptation because of the ongoing improvements in European electricity markets.
Regional Cooperation Centres (RCCs)	Regarding the obligation of the 'Clean Energy Package for all Europeans' (CEP) to establish RCCs and in view of the ongoing progressive implementation of RSCs' services to enhance TSOs' regional coordination, it would be positive that TSOs and regulatory authorities assess the feasibility and benefits of transferring existing and new functions to the RCCs.
Transit Shipping – SIDC	Significant efforts incurred by SIDC parties, but the regulatory decision cannot be expected until CACM 2.0 has entered into force. SIDC was requested to conduct extensive CBA on the enduring shipping options, which lasted more than a year. At the end of the exercise, it turned out that the topic will remain undecided as long as CACM 2.0 is not finalised, which could very well mean that no decision will be taken in the coming two years.
Market coupling operator (MCO) governance	Given the recent CACM 2.0 consultation, TSOs would like to remind the good work already done jointly between NRAs, ACER, NEMOs and TSOs in the past 3 years in defining the proper evolution of MCO governance and encourage to take advantage of the progress made in that framework in the discussions for MCO governance in CACM 2.0.
LTTRs remuneration in case of decoupling	TSOs and the tariffs payers have faced financial impacts of the three decoupling events in the day-ahead time frame As further detailed in section 3.1, TSOs seek to review the LTTRs remuneration scheme once decoupling events occur, particularly when it comes to impact on tariff payers.

Table 1 – Non-exhaustive list of main topics for which TSOs see the need of further increasing discussions with policy and regulatory authorities.

TSOs would like to strengthen their high level of commitment towards the already-established cooperation with policy and regulatory authorities in order to implement the European internal electricity market. TSOs wish to highlight the utmost importance of technical expertise implication in the design of ambitious and robust policy targets.

The development of new processes and robust information technology (IT) solutions is a challenging task. It is especially challenging for European TSOs, due to high security standards, the number of stakeholders involved and the complex structure, which has multiple interrelations. Against this background, policy stability is a key prerequisite for delivering innovative solutions on time, while also ensuring the highest quality standards to create value for Europe.

2.2 Implementation of the Clean Energy Package's 70% minimum capacity target

The CEP entered into force on 4 July 2019. As one of the main provisions of Regulation (EU) 2019/943 on the internal market for electricity (EU electricity regulation), from 1 January 2020, at least 70% of the capacity of internal and cross-zonal critical network elements (CNEs) must be made available for cross-zonal electricity trading of borders that use a flow-based approach, with 70% of the transmission capacity respecting operational security limits after deductions of contingencies set for trading of borders that use a coordinated net transmission capacity approach (Article 16(8)). The inclusion of 'derogations'[9] and 'action plans'[10] in the EU electricity regulation provides temporary exemptions, which can be applied to achieve the 70% (CEP70) target via a transitionary phase.

During the legislative process, ENTSO-E raised concerns as to whether a general minimum cross-zonal trading margin would be an appropriate instrument to enhance European market integration. While ENTSO-E fully supports the general optimisation of the use of trading capacities, the economic and technical impact of the CEP70 target needs further analysis and discussion. Such an assessment should particularly focus on system security, economic efficiency and decarbonisation targets.

Nevertheless, TSOs and ENTSO-E continue to invest significant efforts and apply the appropriate tools to implement the existing CEP70 rule and achieve compliance with the legal provisions, while also accommodating fallback options to ensure system security at all times.

According to the EU electricity regulation, the national regulatory authorities (NRAs) are responsible for assessing the TSOs' compliance with the CEP70 rule. Moreover, ENTSO-E is required to publish a technical report every three years, which should assess whether the cross-zonal trade capacity met the CEP70 target (Article 14(2)). Although the full technical report is not due for publication until November 2021, the key findings on CEP70 are included in this report.

CEP70: situation in 2020

Table 2 presents the status of CEP70 provisions from 2020. As a central performance indicator, the share of market time units (MTUs) during which the respective TSO achieved compliance with the CEP70 provisions is shown. Additional information and detailed graphs can be found in the Annex II to this report.

9 Option to deviate from the minimum cross-zonal capacity target for a predefined period of time. In 2020 applied by Sweden, the Netherlands, Belgium, France, Spain, Portugal, Italy, Austria, Czech Republic, Poland, Hungary, Slovakia, Croatia, Romania, Bulgaria and Greece.

10 Option to achieve the 70 % minimum cross-zonal trading capacity via a linear trajectory by 31 December 2025 in case of internal structural congestions. In 2020 applied by the Netherlands, Germany and Poland.

Country	TSO	Border / Region	% of MTUs in which minimum target was reached (considering action plans and/or derogations)	% of MTUs in which TSOs consider themselves as compliant[11]	Exemption clause applied
Austria	APG	AT-CZ--HU--SI_AT	100%	100%	Derogation
Austria	APG	CWE	100%	100%	Derogation
Austria	APG	INB	100%	100%	Derogation
Belgium	Elia	CWE	81.3%	NRA appreciation	Derogation
Belgium	Elia	BE→GB	95.5%	NRA appreciation	Derogation
Belgium	Elia	GB→BE	99.7%	NRA appreciation	Derogation
Bulgaria	ESO	BG→GR	100%	100%	Derogation
Bulgaria	ESO	GR→BG	100%	100%	Derogation
Bulgaria	ESO	BG→RO	100%	100%	Derogation
Bulgaria	ESO	RO→BG	100%	100%	Derogation
Croatia	HOPS	HR→SI	100%	100%	Derogation
Croatia	HOPS	SI→HR	100%	100%	Derogation
Croatia	HOPS	HR→HU	100%	100%	Derogation
Croatia	HOPS	HU→HR	100%	100%	Derogation
Czech Republic	EPS	CZ→(AT + DE + PL + SK)	100%	100%	Derogation
Czech Republic	EPS	(AT + DE + PL + SK)→CZ	100%	100%	Derogation
Denmark	Energinet	NO2→DK1	99.59%	99.59%	
Denmark	Energinet	DK1→NO2	99.37%	99.37%	
Denmark	Energinet	DK1→SE3	95.45%	99.45%	
Denmark	Energinet	SE3→DK1	92.71%	92.71%	
Denmark	Energinet	DK2→DK1	99.51%	99.51%	
Denmark	Energinet	DK1→DK2	97.75%	97.75%	
Denmark	Energinet	DK1→NL	91.73%	91.73%	
Denmark	Energinet	NL→DK1	100%	100%	
Denmark	Energinet	DK2→DE	99.32%	99.32%	
Denmark	Energinet	DE→DK2	99.32%	99.32%	
Estonia	Elering	EE-FI	100%	100%	

11 Article 16 of EU electricity regulation allows – as a measure of last resort – the reduction of the offered cross-zonal capacity below the minimum targets, if TSOs respectively RCCs can justify that their application would endanger system security. Among many reasons, this can particularly apply due to insufficient availability of remedial actions to solve grid overloads resulting from the application of the CEP's minimum targets. Therefore, a given MTU can still be considered as compliant with the CEP's provisions, although the minimum target was not reached. Consequently, two different performance indicators are presented in the table above.

Country	TSO	Border / Region	% of MTUs in which minimum target was reached (considering action plans and/or derogations)	% of MTUs in which TSOs consider themselves as compliant[11]	Exemption clause applied
Estonia	Elering	EE-LV	N/A	N/A	According to approved CACM CCM in Baltic CCR, CC process does not foresee daily CC with CGM and therefore CNEs cannot be provided
Finland	Fingrid	FI-SE1	100%	100%	
Finland	Fingrid	FI-SE3	100%	100%	
Finland	Fingrid	FI-EE	100%	100%	
France	RTE	CWE	100%	100%	Derogation
France	RTE	SWE	100%	100%	Derogation
France	RTE	NIB	100%	100%	Derogation
Germany	Amprion	CWE	100%	100%	Action Plan
Germany	Amprion	ALEGrO (CWE)	100%	100%	Action Plan
Germany	TransnetBW	CWE	100%	100%	Action Plan
Germany	50Hertz	DK2→DE	100%	100%	Action Plan
Germany	50Hertz	DE→DK2	100%	100%	Action Plan
Germany	TenneT DE	DE→SE4	99.31%	100%	Action Plan
Germany	TenneT DE	SE4→DE	99.99%	100%	Action Plan
Germany	TenneT DE	CWE	100%	100%	Action Plan
Germany	50Hertz/TenneT DE	DE→PL/CZ	100%	100%	Action Plan
Germany	50Hertz/TenneT DE	PL/CZ→DE	100%	100%	Action Plan
Germany	TenneT DE	DE→DK1	100%	100%	Action Plan
Germany	TenneT DE	DK1→DE	100%	100%	Action Plan
Germany	TenneT DE	DE→NO2	100%	100%	Action Plan
Germany	TenneT DE	NO2→DE	100%	100%	Action Plan
Greece	IPTO	SEE	100%	100%	Derogation
Greece	IPTO	GRIT	100%	100%	Derogation
Hungary	MAVIR	AT→HU	100%	100%	Derogation
Hungary	MAVIR	HR→HU	100%	100%	Derogation
Hungary	MAVIR	RO→HU	100%	100%	Derogation
Hungary	MAVIR	SK→HU	100%	100%	Derogation
Hungary	MAVIR	HU→AT	100%	100%	Derogation
Hungary	MAVIR	HU→HR	100%	100%	Derogation
Hungary	MAVIR	HU→RO	100%	100%	Derogation
Hungary	MAVIR	HU→SK	100%	100%	Derogation
Ireland	EirGrid		N/A	N/A	
Italy	Terna	Italy North	100%	100%	Derogation
Italy	Terna	IT-GR	100%	100%	

Country	TSO	Border / Region	% of MTUs in which minimum target was reached (considering action plans and/or derogations)	% of MTUs in which TSOs consider themselves as compliant[11]	Exemption clause applied
Latvia	AST		N/A	N/A	According to approved CACM CCM in Baltic CCR, CC process does not foresee daily CC with CGM and therefore CNEs cannot be provided
Lithuania	Litgrid AB	LT-SE4	97.6%	100%	
Lithuania	Litgrid AB	LT-PL	100%	100%	According to approved CACM CCM in Baltic CCR, CC process does not foresee daily CC with CGM and therefore CNEs cannot be provided
Lithuania	Litgrid AB	LT-LV	N/A	N/A	Creos does not have commercialised borders
Luxembourg	Creos		N/A	N/A	
Norway	Statnett		N/A	N/A	Derogation and Action Plan
Poland S1 2020	PSE	CZ-DE-SK->PL	100%	100%	Derogation and Action Plan
Poland S1 2020	PSE	PL->CZ-DE-SK	100%	100%	Derogation and Action Plan
Poland S1 2020	PSE	PL→LT	100%	100%	Derogation and Action Plan
Poland S1 2020	PSE	LT→PL	100%	100%	Derogation and Action Plan
Poland S1 2020	PSE	PL→SE4	100%	100%	Derogation and Action Plan
Poland S1 2020	PSE	SE4→PL	100%	100%	
Poland S2 2020	PSE	CZ-DE-SK->PL	99.98%	99.98%	Derogation and Action Plan
Poland S2 2020	PSE	PL->CZ-DE-SK	100%	100%	Derogation and Action Plan
Poland S2 2020	PSE	PL→LT	100%	100%	Action Plan
Poland S2 2020	PSE	LT→PL	100%	100%	Action Plan
Poland S2 2020	PSE	PL→SE4	100%	100%	Derogation and Action Plan
Poland S2 2020	PSE	SE4→PL	100%	100%	Action Plan
Portugal	REN	PT-ES	100%	100%	Derogation
Romania	Transelectrica	RO_Import	100%	100%	Derogation
Romania	Transelectrica	RO_Export	100%	100%	Derogation
Slovak Republic	SEPS	SK-CZ	100%	100%	Derogation
Slovak Republic	SEPS	SK-PL	100%	100%	Derogation
Slovak Republic	SEPS	SK-HU	100%	100%	Derogation
Slovenia	ELES	SI-AT	100%	N/A	
Slovenia	ELES	SI-HR	100%	N/A	
Slovenia	ELES	CSE	100%	N/A	
Spain	REE	FR→ES	100%	100%	Derogation
Spain	REE	ES→FR	100%	100%	Derogation
Spain	REE	PT→ES	100%	100%	Derogation
Spain	REE	ES→PT	100%	100%	Derogation
Sweden	Svenskä Kraftnät		N/A	N/A	Derogation
The Netherlands	TenneT NL	CWE	84%	99%	Derogation and Action Plan
The Netherlands	TenneT NL	DK1→NL	81%	100%	Derogation

Country	TSO	Border / Region	% of MTUs in which minimum target was reached (considering action plans and/or derogations)	% of MTUs in which TSOs consider themselves as compliant[11]	Exemption clause applied
The Netherlands	TenneT NL	NL→DK1	100%	100%	Derogation
The Netherlands	TenneT NL	NO2→NL	86%	100%	Derogation
The Netherlands	TenneT NL	NL→NO2	100%	100%	Derogation
The Netherlands	BritNed	NL→GB	100%	100%	Derogation
The Netherlands	BritNed	GB→NL	100%	100%	Derogation

Table 2 – TSO's performance in regards to the CEP70 provisions from 2020

ACER Report

ACER has also published reports[12,13] on the implementation of the CEP70 provisions. The reports have no direct legal reference and was written on a voluntary basis under ACER's broader market monitoring competencies. ENTSO-E understands that the reports intend to deliver a harmonised view on the state of CEP70 across Europe.

The results of these reports should be interpreted in the context of the specific analytical assumptions that ACER had taken. ENTSO-E has published its view on these assumptions in a technical document available from its website.[14]

The following general aspects are relevant with regard to the assessment of the CEP70 rule:

- An assessment must consider the full capacity offered for cross-zonal trading, including day-ahead, intraday and a long-term time frame, as well as balancing.
- Electricity exchanges with non-EU countries (for example, Switzerland) have an impact that TSOs must cope with daily. It should therefore be possible for such exchanges to be considered in the margin available for cross-zonal trade where needed.
- TSOs believe that the assessment should reflect operational reality. Data delivered by TSOs must not be recalculated to make them fit for purpose.
- The assessment must respect transitional arrangements applied by many TSOs (derogations, action plans) in accordance with the approval of competent NRAs as set out in the CEP70 provisions. It is apparent that these TSOs cannot be benchmarked against the 70% criterion.
- The same principles and standards must be applied for all Member States, especially with respect to the presentation of the results. A harmonised view cannot be achieved if the presentation varies from country to country in terms of the covered period, definition of coordination areas, consideration of allocation constraints and inclusion of exchanges with non-EU countries.
- Network elements should be fully assessed. An assessment that focuses on a worst-case scenario by solely considering network elements that provided the smallest margins for cross-zonal trading during the respective MTUs will not deliver an accurate picture.

12 Published on 18 December 2020. Available from: https://acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/MACZT%20report%20-%20S1%202020.pdf.

13 Published on 2 June 2021 and available online: https://documents.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/ACER%20MACZT%20Report%20S2%202020.pdf

14 Published on 23 December 2020. Available from: https://www.entsoe.eu/news/2020/12/22/entso-e-highlights-key-aspects-to-consider-with-regards-to-the-implementation-of-the-70-minimum-capacity-rule/.

Do CEP minimum targets for cross-zonal trading capacity create value for Europe?

The economic efficiency (along with many other impacts) of the CEP minimum targets has not been deeply assessed. This is particularly surprising, as virtual cross-zonal trading capacities do not create economic welfare gains under all circumstances and can even reduce economic efficiency. In times of price convergence, in which the offered trading capacity fully satisfies market demand (and is therefore not limited by congestions), additional fictive trading capacity will not create any additional cross-zonal trade or increase economic value. The benefit of the increased offered capacity should always be assessed against the corresponding increase of the overall costs for remedial actions required to ensure system security.

In recent years, electricity markets have become fully interconnected and their performance has greatly improved. TSOs, in cooperation with all stakeholders, are continuously working to ensure the optimal use of transmission infrastructure and market functioning while maintaining the highest system security. Transmission investments and improved coordination are resulting in the continuously increasing availability of cross-border capacities and price convergence in Europe.

However, the CEP70 provisions and its assessment by European authorities do not recognise that more cross-border capacity during hours with price convergence will not benefit consumers. TSOs are therefore of the opinion that the European electricity market performs better than many stakeholders believe and advise policymakers to reassess the economic efficiency of the CEP70 provisions.

2.3 Joint Allocation Office (JAO) as a cross-time frame service provider

JAO was established in 2015 following the merger of two auction offices – Capacity Allocation Service Company (CASC.eu) and Central Allocation Office (CAO) – and is owned by 25 TSOs. Starting as an allocation office, JAO has developed into a key service provider for many European TSO activities. With a wealth of experience in the capacity allocation process, operation of business processes and financial clearing and settlement, JAO is helping TSOs build extensive know-how and strengthen their activities, thereby ensuring the smooth operation of EU electricity markets. As a central party, JAO also simplifies and increases the efficiency of data and financial flows.

JAO currently provides the following main services:

- cross-zonal capacity allocation (explicit auctions for long-term, day-ahead and intraday time frames) covering the whole business chain between market participants and TSOs (i.e. including operation, contracts, helpdesk, financial clearing and settlement and congestion income distribution);
- fallback capacity allocations, which are in place in the event that all NEMOs performing MCO functions are unable to deliver part or all of the results of the price coupling algorithm (i.e. shadow explicit auctions);
- provision of data to the ENTSO-E Transparency Platform and publication of data on compliance with the Regulation on wholesale energy market integrity and transparency (REMIT);
- financial settlement of congestion income distribution for implicit allocation (day-ahead and intraday);
- financial settlement of control energy from balancing platforms;
- post-coupling related activities for single day-ahead coupling (SDAC);
- primary configuration and administration of static data in single intraday coupling (SIDC) systems;
- inside information platform for TSOs to publicly disclose inside information according to Article 4(1) of REMIT;
- market surveillance activities to identify breaches of Articles 3 or 5 of REMIT at the long-term capacity rights market;
- know-your-customer processes to verify the identity, suitability, and risks involved with maintaining a business relationship with market participants in order to comply with anti-money laundering regulations;
- central procurement and cost-sharing platform and budget management for European projects.

Since many electricity market integration projects request similar services, JAO builds on its experience and fosters harmonisation across the TSO community. It enables TSOs to avoid bilateral and multilateral contracts while significantly reducing transaction costs and related efforts.

JAO has built a strong team of experts with knowledge of various financial transactions and related fiscal and contractual matters of both EU and bordering non-EU countries. Regular financial and cybersecurity audits and the ongoing implementation of ISO 27001 and ISO 9001

ensure high-quality services and security for TSOs in line with market standards, which coupled with the company's keen interest to understand all stakeholders' needs and best possible practices is helping to strengthen the European electricity market. Given the cost-plus approach to financing JAO services with pre-agreed fee principles, the TSOs have a transparent view on the fees paid while ensuring non-discrimination among TSOs and cost-efficient services.

2.4 Further analysis on the Electricity Balancing Guideline

In this section, the TSOs would like to mention some of the risks that could lead to adverse effects on the balancing markets and for which amendments of the methodologies could be needed in order to mitigate possible negative consequences. One of these risks concerns the effect of the marginal pricing scheme in case of malfunctioning of the market, and the potential consequences to the European balancing platforms.

The implementation of the marginal pricing scheme is a key feature of the European target design for balancing energy markets. In accordance with the pricing methodology, the marginal price for activated balancing energy will not only be valid in a bidding zone, but the same price will be applied for an entire uncongested area which may consist of several bidding zones for each market time unit. This means that the activation of a balancing energy bid in one imbalance area may also set the imbalance settlement price for balancing energy in another imbalance area.

There are permanent structural risks resulting from applying marginal pricing in the balancing energy market. The imbalance settlement price shall guarantee a reliable incentive for BRPs to stay balanced. Therefore, its level should be correlated with the real-time value of energy and the current system state at any time. Common transitory effects of implementing the EB regulation target market design leading to artificial scarcity situations or possible market abuse by powerful balancing service providers (BSPs) may lead to disruptive imbalance settlement prices, from which BRPs and customers are unprotected under the current conditions of the EU target design for balancing energy markets. The risk of high imbalance settlement prices could also lower the willingness to invest into renewables and to enter into the energy markets in general.

Additionally, there are temporary risks resulting from the foreseen changes in balancing energy market design. Generally, changing a complex market design is not a process which is carried out from one day to the next. There is always a transition period leading to transitory effects as market participants need time to adapt their processes to the new market design and to anticipate the new market conditions. Market confidence is of uppermost importance for the market participants in order to continue participating or even enter the market. Therefore, a robust market design, providing reliable perspectives to all market participants, is indispensable. It is not possible for TSOs to predict how the participants anticipate the new market conditions. Furthermore, the TSOs consider the risk of transitory effects (e.g. price spikes) being even higher as market design changes will take place simultaneously in several countries, due to the ongoing connections to the balancing platforms.

Regarding the automatic and manual frequency restoration reserves (aFRR and mFRR balancing energy platforms, the TSO accession process will last approximately two and a half years, from the beginning of 2022 (i.e. in case of early accessions to the platforms) to mid-2024, as the EB regulation allows the possibility of derogation within two years after the legal deadline. The European market design for balancing energy markets needs the participation of a certain number of BSPs via the connecting TSOs on each balancing energy platform for the market to function effectively and efficiently. The TSOs consider that this requirement may not be fulfilled at the legal deadline for the go-live of the platforms due to the expected derogations to be granted to several TSOs.

A smooth and successful transition to integrated balancing energy markets must be guaranteed to facilitate a timely connection of all TSOs. Financial risks are present by default when applying a marginal pricing scheme and are even more uncontrollable and unpredictable when participating in the cross-border exchange of balancing energy via the balancing energy platforms. These risks should be mitigated to ensure a smooth transition to integrated balancing energy markets as foreseen by the EB regulation and, thus, to facilitate a successful go-live of balancing platforms. Therefore, TSOs consider it as crucial to implement accompanying measures during the transition phase to allow all market participants and TSOs to get used to the new market design. The implementation of the EU target design for balancing energy markets means a significant change and evolutionary step from the existing local market design for most countries.

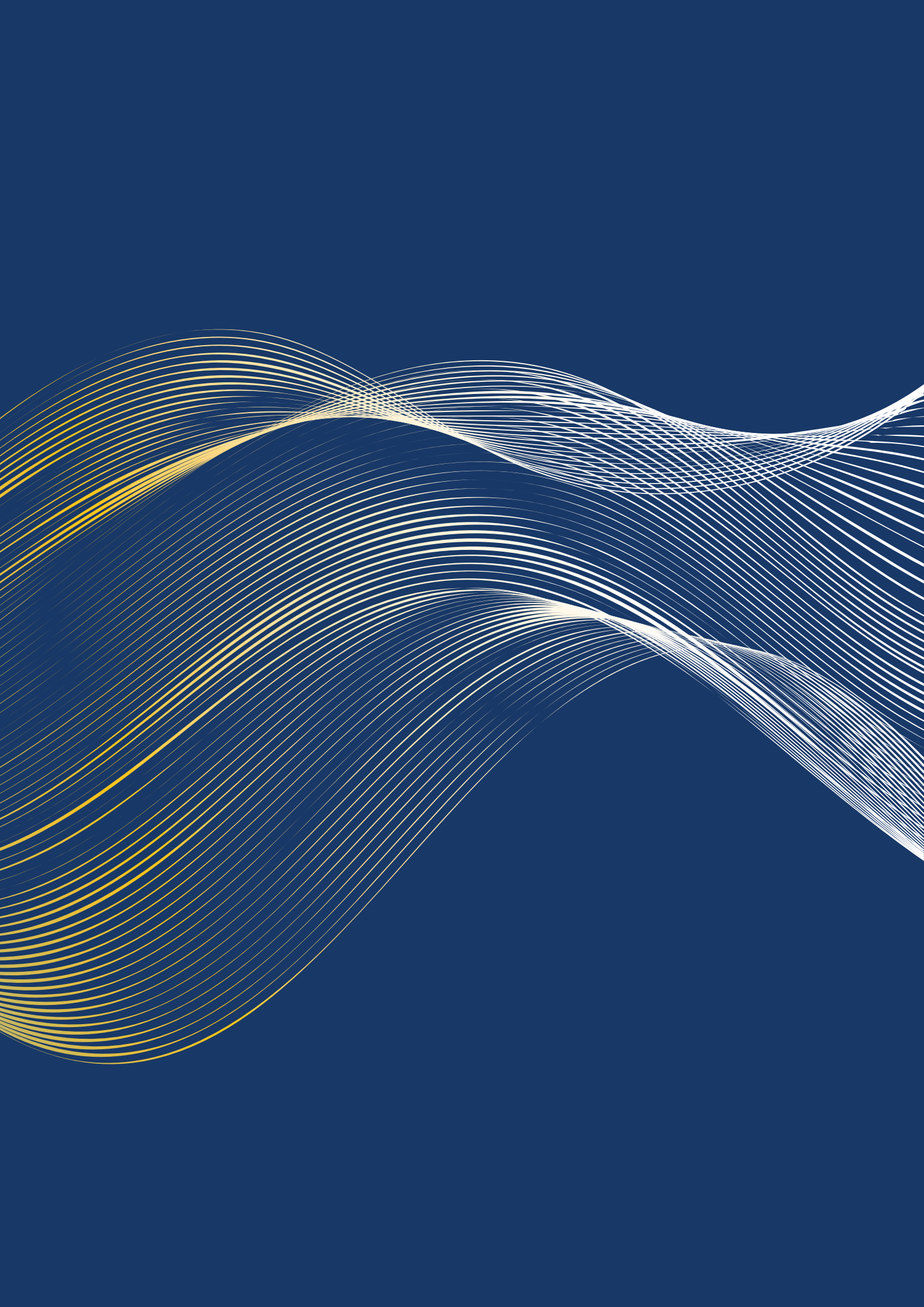
The Trans European Replacement Reserves Exchange (TERRE) experience of temporary price spikes is a good example of how BSPs and market participants as well as TSOs need time to adapt to new market rules that lead to transitory effects. These transitory effects are common but may create artificial scarcity situations or can limit the efficient functioning of the market which both can lead to unreasonably high prices for BRPs not being able to forecast and counter such situations.

Article 30(2) of the EB regulation enables the TSOs to propose harmonised maximum and minimum balancing

energy prices in case technical price limits are needed for an efficient functioning of the market. Due to the above-mentioned reasons, the TSOs are convinced that an amendment of the pricing proposal is needed, to implement an adjusted maximum balancing energy price that mitigates the listed risks resulting from the EB regulation target market design (e.g. high and volatile imbalance prices, transitory effects of market design changes, etc.).

In its decision on the pricing methodology,[15] ACER has acknowledged that Regulation (EU) 2019/943 does not restrict the possibility of introducing technical price limits in the balancing time frame provided by Article 30(2) of the EB regulation.

15 https://acer.europa.eu/en/Electricity/MARKET-CODES/ELECTRICITY-BALANCING/07%20Pricing/Action%203%20-%20Pricing%20ACER%20decision.pdf



3. Implementation progress of the forward capacity allocation, capacity allocation and congestion management and electricity balancing regulations

3.1. Forward capacity allocation regulation

The FCA regulation, which entered into force on 17 October 2016, sets out rules for the type of LTTRs that can be allocated via explicit auction, and the way in which holders of transmission rights are compensated if their right is curtailed.

Table 3 outlines the implementation progress of this regulation.

	Proposal	FCA regulation article(s)	First submission	NRAs' request for amendments	TSO Submission after Request for Amendment	NRAs approval or ACER decision	Second TSO proposal	ACER decision
All-TSOs	Common Grid Model (CGM)	17[16] 18[17]	May 2017 June 2017	- February 2018	- June 2017	October 2017 June 2018		
	Harmonised Allocation Rules (HAR)	51	April 2017			October 2017[18] October 2017[19]	July 2019	October 2019[20]
	Single Allocation Platform (SAP)	49 59	April 2017			September 2017		
	Congestion Income Distribution (CID)	57	May 2018	November 2018	March 2019	May 2019		
	Cost of ensuring firmness and remuneration of LTTRs (FRC)	61	April 2020			October 2020		

Table 3 – Overview of all TSO FCA regulation deliverables (as at May 2021)

16 Generation and load data provision methodology for long-term time frames
17 CGM methodology for long-term time frames
18 On 17 August 2017, all NRAs referred to ACER to adopt a decision:
19 On 2 October 2017, ACER took a decision (No 03/2017)
20 On 29 October 2019, ACER adopted a decision (No 14/2019)

Harmonised Allocation Rules methodology ('HAR') (Articles 51 and 52, FCA regulation)

ENTSO-E is reviewing the HAR methodology according to Article 68(5) of HAR. This methodology establishes the regional Allocation Rules and the borders specified in Annex I[21] thereof. Article 68(5) prescribes that the HAR methodology shall be periodically reviewed by the Single Allocation Platform (SAP) and the relevant TSOs (at least every two years involving the Registered Participants). The all-TSO submission to ACER is expected for during June 2021, the approval expected by 1 December 2021.

Cost of ensuring firmness and remuneration of LTTRs ('FRC') (Article 61, FCA regulation)

In April 2020, all TSOs submitted the cost of ensuring firmness and remuneration of LTTRs (FRC) proposal to ACER. The methodology determines two sets of rules for sharing the costs incurred by TSOs.

- The first principle regulates the costs incurred in case of long-term cross-zonal capacity curtailment before the day-ahead firmness deadline. This can happen to ensure the operation remains within the operational security limits.

- The second principle manages the costs incurred to remunerate the LTTRs after the reallocation of cross-zonal capacity to the SDAC.

On 23 October 2020, ACER took a decision that will see the implementation of the methodology in line with the regional capacity calculation methodologies (CCMs). In parallel, PSE[22] appealed against this ACER decision. On 19 April 2021 the Board of Regulators[23] adopted a decision and it is now remitted to ACER.

Long-term flow-based allocation assessment:

ACER has requested ENTSO-E to start working on updating the FCA methodologies to enable the long-term flow-based allocation. ACER has identified the following methodologies to be amended: HAR (Article 51 of the FCA regulation), the SAP requirements (Article 49 of the FCA regulation), the FCA firmness and remuneration cost-sharing (Article 61 of the FCA regulation) and the FCA congestion income distribution (Article 57 of the FCA regulation). The requested work is performed in parallel to the implementation of the long-term CCM (i.e. Nordic capacity calculation region – CCR) and the ongoing approval processes (Core CCR) of the CCR's long-term CCMs.

Block bids

During the Market European Stakeholder Committee meeting (MESC) of 17 June 2020, some market participants requested that alongside the already existing standard LTTR products for the yearly and monthly time frame, a further LTTR allocation approach is considered in order to individualise hedging strategies and to align them to flexible market conditions – the so-called 'block bids' approach. Following this request, NRAs expressed their interest to open a discussion with TSOs on the forward capacity market design. During Q4 2020, TSOs and NRAs have been drafting a consultation document so that both TSOs and NRAs could assess the market appetite towards more advanced bidding products, so-called 'block bids'. Based on the views expressed during the consultation, there was no clear preference on the products that should be implemented, TSOs will, therefore, further assess solutions that could be implemented in the future.

3.2 Capacity allocation and congestion management regulation

The rules set by the CACM regulation provide the basis for implementing a single energy market across Europe in day-ahead and intraday time frames.

During December 2020 and the first six months of 2021, ACER[24] scoped the CACM topics that ACER proposes to amend in the course of the CACM update. Based on this, the European Commission[25] will decide on the final amendments to be included in the new CACM regulation, which is referred to as 'CACM 2.0'

21 Harmonised allocation rules for long-term transmission rights – [Link]
22 Case A-007-2021 – [Link]
23 Case A-009-2020 Board decision – [Link]
24 Letter from ACER to the European Commission on 23 December 2020 on the scoping results for the ACER recommendation on reasoned proposals for amendments to the CACM regulation.
25 Letter from the European Commission to ACER on 21 January 2021 in response to the 23 December 2020 letter.

Type	Proposal	CACM regulation Art.	First submission	NRAs approval(s) or ACER decision	First TSOs' request for amendment	NRAs approval(s) or ACER decision	Second TSOs' request for amendment	Second NRAs approval(s) or ACER decision	Board of Regulators (BoR)	ACER decision
All-TSO (I)	Capacity calculation regions	15(3)	October 2015	November 2016[26]	August 2017[27]	February 2018	March 2018[28]	April 2019[29]	November 2020[30]	May 2021

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

Type	Proposal	CACM regulation Art.	First submission	NRAs request for amendment	First Submission after the request for amendment	NRAs approval(s) or ACER decision	Second TSOs' request for amendment	ACER decision
All-TSO (II)	Common Grid Model	16 17	May 2016	December 2016	April 2017	May 2017		
	ID cross-zonal GOT ID cross-zonal GCT	59	December 2016	June 2017	August 2017	April 2018[31]		
	Scheduled exchange	43 56	December 2016[32] February 2018	September 2018[33] [34]	December 2018[33] December 2018[34]	February 2019 February 2019		
	ID Cross-zonal capacity pricing	55(3)	August 2017	**Referred to ACER**		January 2019		
	Congestion income distribution	73	June 2016	January 2017	April 2017	December 2017[35]		

Table 5 – Overview of All TSOs CACM regulation deliverables (as at May 2021)

26 Referral to ACER from all NRAs

27 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 bidding zone border between Belgium and Great Britain (BE-GB) and to assign this new bidding zone border 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).

28 All TSOs drafted an amendment to include the new bidding zone border:

- DK1-NL and its corresponding TSOs to the Hansa CCR
- add the TSOs National Grid IFA2 Limited and ElecLink Limited to the FR-GB bidding zone border in the Channel CCR, and
- add the TSO Amprion to the BE-DE/LU bidding zone border in the Core CCR.

29 Referral to ACER from all NRAs

30 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 amend or confirmed it.

31 Referral to ACER from all NRAs

32 For day-ahead and intraday proposals, **only** the TSOs, which intended to calculate scheduled exchanges

33 Day-ahead proposal

34 Intraday proposal

35 All-NRAs referral to ACER – [Link]

Type	Proposal	CACM regulation Art.	First submission	NRAs request for amendment	First Submission after the request for amendment	NRAs approval(s) or ACER decision	Second request for amendment	ACER decision
All-TSOs & All-NEMOs	Day-ahead and intraday algorithm	37	February 2017[36]	July 2017	November 2017[37]	July 2018	July 2019	January 2020
	MAX/MIN price	41 54	February 2017 February 2017	Referred to ACER		November 2017 November 2017		

Table 6 – Overview of All TSO and All NEMO CACM regulation deliverables (as at May 2021)

Type	Proposal	CACM regulation Art.	First submission	NRAs request for amendment	First Submission after the request for amendment	NRAs approval(s) or ACER decision	Second request for amendment	ACER decision
All-NEMOs	Plan of the market coupling operator	7(3)	April 2016	September 2016	December 2016	June 2017		
	Backup methodology	36	July 2017	November 2017	November 2017	January 2018		
	Products accommodated	40 53(4)	February 2017 February 2017	July 2017 July 2017	November 2017 November 2017	January 2018 January 2018	June 2020	January 2020 (SIDC) December 2020 (SDAC)

Table 7 – Overview of All NEMOs CACM regulation deliverables (as at May 2021)

3.2.1. Main development in all TSOs' deliverables

— **Determination of the Capacity Calculation Regions (hereinafter as 'CCRs')** (Article 15 of the CACM regulation)

Following the ACER request of 5 June 2020, all TSOs amended the CCRs proposal approved by ACER on 17 November 2016.[38] All TSOs updated this proposal based on the 'all NRAs' CCR Decision of March 2017[39] and ACER Decision No. 04/2019.[40] In addition, all TSOs ran a public consultation[41] from 19 August to 19 September 2020 and included the stakeholder feedback before submitting it to ACER. The resulting proposal was submitted to ACER for approval on 9 November 2020. From 5 to 25 January 2021, ACER launched a public consultation[42] on the all-TSOs

36 Day-ahead – [Link] and intraday in November 2016 – [Link]
37 Day-ahead – [Link] and intraday – [Link]
38 ACER Decision 06/2016 – [Link]
39 all NRAs CCR Decision 2017 – [Link]. Germany/Austrian border will include a disclaimer stipulating that DE/AT border was a consequence of a previous ACER's Opinion of 09/2015 dated 23 September 2015, ACER's decision No 06/2016 from the 17 November 2016, as well as BnetzA and E-Control`s agreement to introduce a congestion management scheme for the exchange of electricity at the border between Austria and Germany as from 1 October 2018
40 ACER Decision 04/2019 – [Link]
41 https://consultations.entsoe.eu/markets/ccr_proposal/
42 https://www.acer.europa.eu/Media/News/Pages/ACER-consults-on-the-definition-of-capacity-calculation-regions.aspx

submitted CCR proposal. The ACER decision was adopted 7 May 2021 following a hearing phase and final vote by the Board of Regulators (end of April 2021).

ACER had an exchange with the European Commission and concluded that following Brexit, all the bidding zone borders of the Channel and Ireland United Kingdom (IU) CCR would no longer be under the scope of EU legislation. These CCRs have therefore been deleted from the current proposal.

As part of the all-TSOs review, the Hansa CCR determination was assessed against the COBRAcable. The TSO-certified Baltic Cable AB was also evaluated and is now included in the CCR proposal as part of the Hansa CCR. The Swedish and German NRAs Energimarknadsinspektionen and BNetzA asked to clarify the status of Kraftnät Åland, which is TSO certified in accordance with Article 52 of Directive (EU) 2019/944 and operates interconnectors between FI and SE3 bidding zone borders. Since the relevant Member State granted no derogation, Kraftnät Åland has been listed as a TSO in the all-TSOs submitted proposal.

No border reassignment is provided for the Hansa or Core CCRs. All TSOs will be asked to submit an assessment analysing alternative determinations of at least the Hansa, Nordic and Core CCRs no later than three months after the implementation of the first version of the regional operational security coordination in accordance with Article 76(1) of Commission Regulation 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation (SO regulation).

— **CCR assessment report:**

ACER Decision No. 04/2019 also mandates all TSOs to analyse the optimal determination of the Hansa and Channel CCRs. An all-TSOs CCR assessment report was submitted to ACER in October 2020.

— **Harmonisation of the capacity calculation methodologies ('CCMs')** (Article 21(4) of the CACM regulation)

ENTSO-E has assessed the need to harmonise the CCMs according to Article 21(4) of the CACM regulation. The first conclusion is that the harmonised CCM condition is not yet in place, meaning the 3 December 2020 deadline is not applicable. On 1 July 2020, during the CACM and FCA coordination group meeting, ACER agreed that the conditions stated in Articles 20(5) and 21(4) of the CACM regulation on the harmonisation of the CCMs were not yet applicable as the articles were specifically for Central Western Europe and Central Eastern Europe. Nevertheless, ACER encouraged TSOs to propose plans for CCM harmonisation, one for a flow-based approach and one for a net transfer capacity approach. TSOs agreed to propose a plan in response to this suggestion.

A preliminary timeline that includes at least two years to collect information after the go-live of most of the methodologies expected around 2022–2023 has been proposed. Based on the information gathered, a harmonisation assessment will be prepared by 2025, which could be included in the 2025 biennial report on capacity calculation. This date provides enough time to scope the future analysis, collect data from the different implementations across regions and develop a reporting structure. The previous capacity calculation reports (to be published in June 2021 and June 2023) could include information on the progress of CCM implementation, along with a preliminary assessment of harmonisation areas.

— **Harmonisation of the redispatching and countertrading cost-sharing methodologies** (Article74(7) of the CACM regulation)

ENTSO-E has established a dedicated group to harmonise as far as possible further the regional RDCT cost-sharing methodologies in accordance with Article 74(7) of CACM regulation. The process in the Italy North CCR was placed on hold after TSOs and NRAs were unable to reach an agreement on the proposed methodology. Italy North CCR TSOs and NRAs are currently discussing a temporary methodology. Given the situation, the methodology for the Italy North CCR may not receive final approval unit the second half of 2021.

— **Fallback procedure methodology** (Article 44 of the CACM regulation)

According to the common assessment from NEMOs and TSOs in the SDAC performed last year, it was decided to move the time for decoupling by 10 min and to allocate to the SDAC algorithm. This has an impact on the fallback procedures according to Article 44 of CACM developed by the CCRs. Core, SWE, Italy North and GRIT have amended the proposals accordingly. The Core proposal has been referred to ACER. In March 2021, the Board of Regulators approved it within the same deadline for the other CCR.

— **Congestion Income Distribution ('CID')** (Article 73 of the CACM regulation)

The Core CCR has requested to amend the CACM congestion income distribution methodology to take into account a flow-based approach and LTTR remuneration. This will allow the Core CCR to use more than one slack zone for external flows in the future. Slack zones are a common virtual sink or source for all external flows originating from an assigned bidding zone. Each bidding zone may only be assigned to one slack zone. Although multiple slack zones are possible, there will be no direct flow between them.

The congestion income distribution methodology has also been identified as an opportunity to include the intraday time frame and further extend the scope of the methodology to include an interim CCM for some CCRs. The methodology is expected to be approved before the Core CCR CCM day-ahead go-live in February 2022. The final submission date is expected for during Q2 2021.

— **SDAC and SIDC costs** (Article 80 of the CACM regulation)

The 2019 CACM cost report was submitted on 30 July 2020. NEMOs, TSOs and NRAs are further working to improve the process and the cost report itself. The main findings will be potentially included in the CACM amendments proposal.

3.2.2. Main developments in the NEMOs deliverables

— **Products of the single day-ahead coupling** (Article 40 of the CACM regulation)

On 22 December 2020, ACER[43] determined which products can be taken into account in SDAC. In line with this decision, these products require each NEMO to publish in its market rules the list of SDAC products that are available in its NEMO trading hub. All order resulting from the products submitted to the price coupling algorithm are to be expressed in euros and refer to an MTU. NEMOs are entitled to arrange for orders submitted by market participants to be expressed and settled in local currencies or euros.

In terms of the differentiation between mandatory and optional products, ACER clarifies in Annex II of Decision No. 37/2020 that 'the meaning of "mandatory products" is that it represents a list of products that must be (as a minimum legal requirement) accommodated by the price coupling algorithm. Therefore, the choice of mandatory products is fixed, because it is determined by the provisions set out in the CACM regulation. Thus, the group of mandatory products cannot be extended by any other products. On the other hand, any product that complies with the objectives of the CACM regulation can be added to the list of optional products.'

Moreover, the 'set of optional products should reflect the market participants needs and establishes the choice of products the NEMOs can offer to market participants if the price coupling algorithm's performance allows for it. The elimination or replacement of products from the list of optional products represents the NEMOs' choice and ACER did not alter the listed products anyhow. All the governance and rules that enable the NEMOs to make choices and to develop/operate the functionalities of the price coupling algorithm are established in the Algorithm methodology.'

— **Multiple NEMO arrangements ('MNA')** (Articles 45 and 57 of the CACM regulation)

On 9 February 2021, the Polish multiple nominated electricity market operator arrangements (MNA) for the day-ahead market went live. With this important milestone, Poland has become the third major geographical zone in Europe, after Central Western Europe in 2019 and the Nordic region in 2020, to implement the day-ahead MNA framework. The Danish Hansa interconnectors MNA it is expected to go live on 16 June 2021

3.2.3. Main development on the joint work of the TSOs and NEMOs

— **Day-to-day management of the SDAC and SIDC** (Article 10 of the CACM regulation)

The day-to-day management of SDAC and SIDC has faced some delays in 2020 due to the COVID-19 pandemic. The focus had been placed on the proper operation of market coupling processes. Nevertheless, parties have agreed on a new timeline to implement the Market Coupling Steering Committee, which will serve as a high-level decision body for both SDAC and SIDC. The go-live of this new structure is expected for first quarter in 2022.

— **Scheduled exchanges methodology ('SEC')** (Articles 43(4) and 56(4) of the CACM regulation)

In accordance with the CACM, the intraday and day-ahead scheduled exchanges methodologies must be reviewed two years after the latest NRA approvals.[44] All TSOs have reviewed the methodologies according to Articles 43.4 and 56.4 of the CACM regulation. The result of this review is that there is no need to amend the methodologies in 2021. The only change will concern the cost coefficients deriving from the go-live of the Interim Coupling Project, which will be reflected in the annex to the methodology (and not in the official decision) to be published on the ENTSO-E website. There is no impact from the cost coefficients on the market clearing itself, only on the post-coupling processes (shipping and settlement), meaning cost coefficients do not impact market parties.

43 ACER Decision No. 37/2020.

44 Intraday on 5 June 2019 and day-ahead on 19 March 2019.

CACM annual report: (Annex I to the ACER Decision 04/2020)

The 2019 CACM annual report was published on 30 September 2020.[45] This report was prepared by NEMOs in cooperation with TSOs. It can be found on the NEMO Committee website

3.3. Electricity balancing regulation

3.1.1 Overview of the electricity balancing regulation

The EB regulation establishes a set of technical, operational and markets rules to govern the functioning of electricity balancing markets. It sets out rules for the procurement of balancing capacity and for the allocation of cross-zonal transmission capacity for cross-border trades, for the activation of balancing energy and the financial settlement of balance responsible parties.

To carry out these goals, TSOs have developed the following methodologies covering the following topics:

Procurement of balancing capacity and allocation of cross-zonal transmission capacity for cross-border trades

The procurement of balancing capacity ensures that resources will be available to provide balancing energy in real-time when needed. The characteristics and volumes of the reserves required to maintain the operational security throughout the EU are defined by each TSO in accordance with the SO regulation.

There is no requirement in the EB regulation to procure balancing capacity at a regional level, but in case TSOs are mutually willing to exchange balancing capacity, they shall develop a proposal in accordance with Article 33 to define common and harmonised rules for the exchange and procurement of balancing capacity. The electricity regulation of the Clean Energy Package instructs TSOs to facilitate the dimensioning of reserve capacity on a regional level.[46]

For TSOs exchanging balancing capacity or sharing reserves, the EB regulation offers the possibility to allocate cross-border transmission capacity for the cross-border capacity trades through three processes: the co-optimised allocation process pursuant to Article 40 (European methodology), the market-based allocation process pursuant to Article 41 and the allocation process based on economic efficiency analysis pursuant to Article 42 (methodologies to be developed at the level of the regions defined for capacity calculation). The cross-zonal capacities allocated for the exchange of balancing capacity or sharing of reserves shall be used exclusively for frequency restoration reserves (FRR) and replacement reserves (RR).

The exchange of frequency containment reserves (FCR) relies on reliability margins in accordance with the CACM regulation. Five years after the EB regulation entered into force, the TSOs shall develop a European proposal to harmonise the regional methodologies for the allocation process of cross-zonal capacity for the exchange of balancing capacity (or sharing of reserves).

Procurement and activation of balancing energy

The EB regulation integrates the balancing market with the establishment of European platforms to operate the imbalance netting (IN) process and enable the exchange of balancing energy from frequency restoration and replacement reserves. The European platforms shall ensure cost-efficient activation of bids across the whole EU with the implementation of common merit order lists. The European balancing platforms are implemented according to Articles 19, 20, 21 and 22 of the EB regulation. The implementation frameworks pursuant to Article 19(1), 20(1), 21(1), 22(1) include, among others, the description of the high-level design of the platform, the definition of the functions required to operate the platform and the governance and operation rules. The balancing platforms also take into account the methodology for pricing balancing energy in accordance with Article 30(1), the methodology for classifying the activation purposes of balancing energy bids in accordance with Article 29(3), the common settlement rules applicable to all intended exchanges of energy as a result of the RR, FRR and IN processes in accordance with Article 50(1).

Imbalance settlement

The main provisions of the EB regulation regarding imbalance settlement concern are (i) the application of an imbalance settlement period of 15 minutes in all scheduling areas within three years after the entry into force (January 2021), with the possibility for a derogation until January 2025 or for an exemption if jointly requested by all the TSOs of a synchronous area, (ii) the establishment of a methodology to harmonise the main features of the imbalance settlement (ISH methodology) in accordance with Articles 52, 54 and 55 of the EB regulation.

45 The first CACM annual report was published in 2018 in accordance with Article 20(3) of the Algorithm methodology (ACER decision of 26 July 2018) and was drafted by NEMOs in cooperation with TSOs. The report was approved by the NEMO Committee on 29 November 2018. On 10 December 2018, in the context of the Trilateral Coordination Group meeting, NEMOs submitted the report to regulatory authorities, ACER and the European Commission.
46 See Regulation (EU) 2019/943 Art. 6.

Overview of European and regional implementation of EB regulation

The technical, operational and markets rules set by the EB regulation for the functioning of electricity balancing markets have to be implemented by developing specific methodologies for the balancing markets. The TSOs develop joint proposals on implementing the deliverables that are submitted to the responsible regulatory authority (i.e. NRAs or ACER) and be approved before they are implemented. The overview of the current progress[47] on European and regional deliverables summarises the status of the balancing energy procurement and activation deliverables (**Table 8**), the status of the balancing capacity procurement and cross-zonal capacity (CZC) allocation deliverables (**Table 9**) and the status of the imbalance settlement and other settlements deliverables (**Table 10**).

Type	Proposal	EB regulation Art.	First TSOs' submission	NRAs approval/ 1st request for amendment	First Submission after the request for amendment	NRAs' approval/ 2nd request for amendment	Second TSOs' Submission after the request for amendment	ACER decision
All-TSOs	Implementation framework for the European RR platform	19	18 June 2018	14 December 2018 (Approval)				
All-TSOs	Implementation framework for the European mFRR platform	20	11 February 2019	24 July 2019 (referred to ACER)				24 January 2020
All-TSOs	Implementation framework for the European aFRR platform	21	11 February 2019	24 July 2019 (referred to ACER)				24 January 2020
All-TSOs	Implementation framework for the European IN platform	22	18 June 2018	9 November 2018 (RfAs by individual NRAs)	23 January 2019	19 July 2019 (2nd RfA)[48] 16 January 2020 (referred to ACER)	10 September 2019	24 June 2020 Corrigendum: 8 December 2020
All-TSOs	Classification of the activation purposes of balancing energy bids	29	11 February 2019	23 July 2019 (RfAs by individual NRAs)	11 November 2019	19 July 2019 (2nd RfA)[49] 16 January 2020 (referred to ACER)		15 July 2020
All-TSOs	Pricing method for all products	30	11 February 2019	24 July 2019 (referred to ACER)				24 January 2020

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

47 Updates and documents can be found at ENTSO-E Electricity Balancing.

48 2nd RfAs are not available (same as 1st RfAs) as those requests made by each NRA to their respective TSO.

49 2nd RfAs are not available (same as 1st RfAs) as those requests made by each NRA to their respective TSO.

Type	Proposal	EB regulation Art.	First TSOs' submission	NRAs approval/ 1st request for amendment	First Submission after the request for amendment	NRAs' approval/ second request for amendment	Second TSOs' Submission after the request for amendment	ACER decision
All-TSOs	List of standard balancing capacity products for FRR and RR	25	18 December 2019					17 June 2020
All-TSOs	Methodology for the allocation of cross-zonal capacity based on the co-optimisation allocation process	40	18 December 2019					17 June 2020
Regional	Methodology for the allocation of the cross-zonal capacity market-based allocation process	41	Baltic: 18 December 2019	18 June 2020	28 August 2020	30 October 2020 (2nd RfA)		
Regional			CORE: 18 December 2019	12 August 2020	6 December 2020			
Regional			GR/IT: 18 December 2019	1 July 2020	24 September 2020	1 December 2020 (2nd RfA)	1 April 2021	
Regional	Methodology for the allocation of the cross-zonal capacity market-based allocation process	41	Hansa: 18 December 2019	24 July 2020	13 October 2020[50]			
Regional			IT North: 18 December 2019	29 June 2020	4 September 2020	15 December 2020 (2nd RfA)	26 March 2021	
Regional			Nordic: 7 April 2019	17 October 2019	17 December 2019	28 February 2021 (referred to ACER)		5 August 2020

50 Hansa TSOs have withdrawn the proposal pursuant to Article 41(1) of the EB regulation from the regulatory approval process on 12/05/2021.

Type	Proposal	EB regulation Art.	First TSOs' submission	NRAs approval/ 1st request for amendment	First Submission after the request for amendment	NRAs' approval/ second request for amendment	Second TSOs' Submission after the request for amendment	ACER decision
Regional	Methodology for the allocation of cross-zonal capacity based on an economic analysis	42	CORE: 18 December 2019	12 August 2020	4 December 2020[51]			
Regional			GR/IT: 18 December 2019	1 July 2020	24 September 2020	1 December 2020 (2nd RfA)	9 April 2021	
Regional			Hansa					
Regional			IT North: 18 December 2019	29 June 2020	4 September 2020	15 December 2020 (2nd RfA)	26 March 2021	
Regional			Nordic:					

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

51 Core TSOs have withdrawn the proposal pursuant to Article 42(1) of the EB regulation from the regulatory approval process on 12/05/2021.

Type	Proposal	EB Art.	First TSOs' submission	NRAs approval/ 1st request for amendment	1st TSOs' Submission after the request for amendment	NRAs' approval/ 2nd request for amendment	2nd TSOs' Submission after the request for amendment	ACER decision
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	11 November 2019	16 January 2020 (referred to ACER)		16 July 2020
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	27 March 2020	22 May 2020 (NRAs' approval)		
All-TSOs	TSO-TSO settlement of unintended exchanges between synchronous areas	51.2	18 June 2020			4 December 2019 (NRAs' approval)		
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 a	18 June 2019	4 December 2019	15 March 2020	27 May 2020 (NRAs' approval)		
Regional		51.1 a	18 June 2019	4 December 2019	15 March 2020	27 May 2020 (NRAs' approval)		
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	50.3 a	18 June 2019	18 December 2019	18 February 2019	31 March 2020 (NRAs' approval)		
Regional		51.1 b						
All-TSOs	Imbalance settlement harmonisation	52	11 February 2019	11 July 2019		16 January 2020 (referred to ACER)		15 July 2020

Table 10 – Status of the imbalance settlement and other settlements deliverables

Main developments in European and regional deliverables

The provisions of the EB regulation are continuously being implemented. The main developments in European and regional deliverables are listed below.

Implementation frameworks for the mFRR and aFRR balancing platforms ('mFRRIF' and 'aFRRIF') (Articles 20 and 21 of the EB regulation)

ACER adopted decisions in January 2020 regarding the aFRR and mFRR implementation frameworks. The implementation frameworks include the high-level designs and the functions required to operate the balancing platforms:

- the Activation Optimisation Function (AOF), which selects the bids in order to maximise the economic surplus;
- the TSO-TSO settlement for the calculation of the financial settlement that each TSO has to bear for the exchange of balancing energy; and
- the Capacity Management Function (CMF),[52] which is to be implemented no later than two years after the legal deadline for the implementation of the mFRR/aFRR platforms and which will update continuously the cross-zonal capacity available for the exchange of balancing.

The implementation frameworks define the standard mFRR and aFRR balancing energy products and the timelines and processes required for the exchange and activation of the standard balancing energy products.

Implementation framework for a European platform for the imbalance netting process ('INIF') (Article 22 of the EB regulation)

ACER adopted a decision in June 2020 regarding the imbalance netting implementation framework. As for the other platforms, the implementation framework includes a description of the high-level design of the platform and the functions required to operate the IN platform, the imbalance netting process function, the TSO-TSO settlement function, and the CMF[53], which has to be implemented no later than two years after the legal deadline for the implementation of the aFRR platform.

Methodology for pricing balancing energy and cross-zonal capacity used for the exchange of balancing energy and operating the imbalance netting process ('pricing methodology') (Article 30 of the EB regulation)

ACER adopted a decision in January 2020 regarding the pricing methodology.

The pricing methodology establishes rules for the pricing of balancing energy resulting from the activation of the frequency restoration and replacement reserve processes. By default, it applies to all balancing energy product bids. But the TSOs have the possibility to apply different rules for locally activated products. The general principle is applying a cross-border marginal price (CMBP) that reflects the equilibrium that clears the market per MTU (i.e. 15 min for TERRE and MARI, an optimisation cycle for PICASSO) and per uncongested area. The CBMP calculated by the AOF of the balancing platforms takes into account equally all balancing energy bids selected by the AOF, independently of the activation purpose, as long as the bids are selected according to the merit order.

The cross-zonal capacity price for the exchange of balancing energy is 0 EUR/MWh within an uncongested area and equal to the difference between the CBMPs on the balancing borders separating two uncongested areas.

Methodology for classifying the activation purposes of the balancing energy bids ('activation purposes methodology') (Article 29 of the EB regulation)

ACER adopted a decision in July 2020 regarding the activation purposes methodology.

This activation purposes methodology describes the possible purposes for the activation of balancing energy bids for frequency restoration reserves and replacement reserves and defines the classification criteria for each possible activation purpose. The methodology is applicable for all balancing energy bids; however, the implementation is only required for bids activated from the common merit order lists. The methodology defines two activation purposes: balancing and system constraints and defines when they can be used according to a list of criteria.

52 Even if the TSOs agree with ACER on the merit to implement a centralised module for the management of the available cross-border capacity for the exchange of balancing energy, they do not consider that this module should be defined as a function in the implementation frameworks. Some TSOs decided to legally challenge the validity of ACER's requirement to introduce the capacity management module (CMM) as a function.

53 Same comment as for aFRR and mFRR implementation frameworks.

Common settlement rules applicable to all intended exchange of balancing energy as a result of the RR process, the FRR process and the imbalance netting process ('settlement methodology') (Article 50 of the EB regulation)

ACER adopted a decision in July 2020 regarding the settlement methodology.

The settlement methodology provides the common settlement rules to be applied by each TSO participating in any of the European balancing platforms. The settlement amounts are calculated from the outputs of the AOFs (i.e. volumes of balancing energy exchange and CBMP). The methodology also defines the rules for the calculation of balancing congestion income and its distribution to the relevant TSOs. The general principle is an attribution of the balancing congestion income to the balancing borders, except for the negative congestion income related to non-intuitive flows due to the adjustment of cross-zonal capacity, which shall be paid by the TSOs who requested the adjustment.

Methodology for a list of standard products for balancing capacity for frequency restoration reserves and replacement reserves (Article 25 of the EB regulation)

ACER adopted a decision in June 2020 regarding the standard product for balancing capacity.

The standard balancing capacity products must be associated with standard balancing energy bids. For the standard balancing capacity products, the TSOs shall define at least the validity period, the direction, the minimum duration between deactivation and the subsequent activation according to the possibilities listed in the annex of the methodology. The validity period cannot exceed one week. In case two or more TSOs jointly procure balancing capacity, all the characteristics shall be harmonised and defined in the common proposal in accordance with Article 33 of the EB regulation.

Methodologies for cross-zonal capacity allocation for the exchange of balancing capacity or sharing of reserves (Articles 40, 41 and 42 of the EB regulation)

The EB regulation foresees three processes to allocate cross-zonal capacity for the exchange of balancing capacity or sharing of reserves: the co-optimised allocation process, for which a European methodology the market-based allocation process and the economic efficiency analysis for which each CCR may propose a methodology

ACER adopted a decision in June 2020 regarding the European methodology for the co-optimised allocation process of cross-zonal capacity.

The methodology foresees an integration of the co-optimised allocation process within the SDAC algorithm. The gate closure time for balancing capacity bids is the same as for the day-ahead energy market and the contracting period for capacity bids has to be consistent with the day-ahead MTUs. The allocation of cross-zonal capacity for the exchange of balancing capacity or sharing of reserves, or for the exchange of energy is optimised simultaneously with the objective to maximise the sum of the economic surplus for both markets. The optimisation function takes into account the bids received from the BSPs and from the market players and the balancing capacity demand received from the TSOs.

The methodology defines the steps towards the implementation of the co-optimisation allocation process:

- Firstly, 18 months after the decision, the TSOs shall publish an impact assessment which addresses the main elements for the implementation (i.e. governance, technical feasibility, compatibility with flow-based methodologies, level of linkage between the bids etc.).

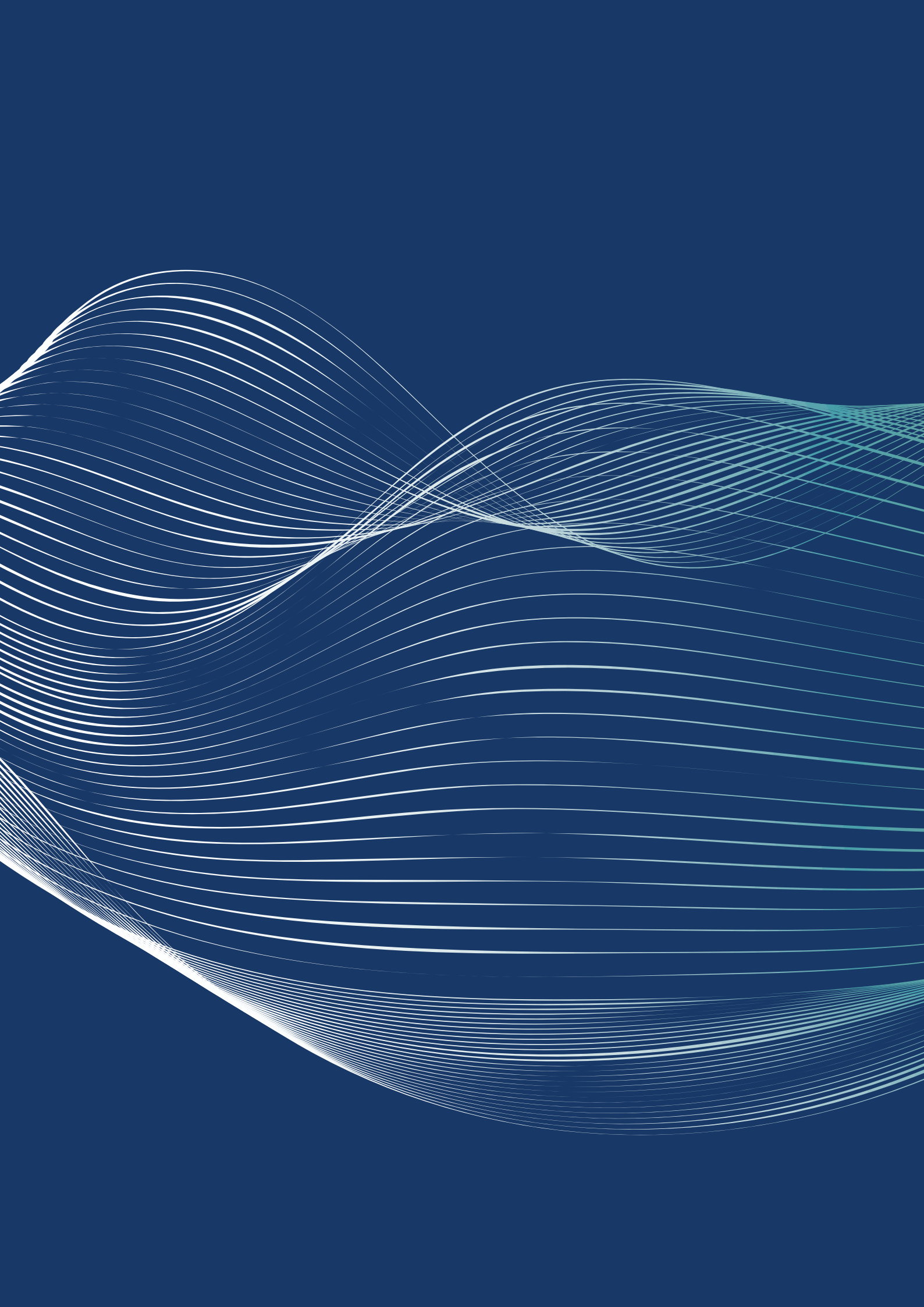
- Secondly, two years after the decision, the TSOs shall send a new set of requirements for the single day-ahead market coupling (SDAC) algorithm to the NEMOs.

ACER adopted a decision in August 2020 regarding the market-based allocation process proposed by the Nordic CCR. Regarding the other methodologies, decisions from NRAs or ACER are expected mid-2021. In comparison with the co-optimised allocation process which is based on actual market values of cross-zonal capacity, the market-based allocation process and the economic efficiency analysis can take into account forecasted values in accordance with Article 39 of the EB regulation.

Imbalance settlement harmonisation ('ISH methodology') (Article 52 of the EB regulation)

ACER adopted a decision in July 2020 regarding the ISH methodology. The ISH methodology specifies and harmonises the imbalance calculation with one single position for each imbalance settlement period and for each BRP, the use of single imbalance price with specification and harmonisation of the price calculation in accordance with Article 55 of the EB regulation, the definition of conditions and methodology for applying dual imbalance pricing.

The ISH methodology must be implemented no later than 18 months after approval, and the TSOs shall assess the need for further harmonisation of the imbalance settlement two years after the implementation of the balancing platforms, taking into account comments received from stakeholders.



4. Forward capacity allocation

All TSOs have appointed a joint allocation office (JAO) in accordance with Article 49 of the FCA regulation[54], 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[55] that hosts SAP services for TSOs.

SAP enables long-term auctions of transmission capacity and currently serves 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 intraday auctions.

4.1 Governance

In accordance with Article 1 of the approved SAP methodology, all TSOs and regulatory authorities[56] bound to the FCA regulation agreed to appoint JAO as the SAP operator. In doing so, all TSOs that issue LTTRs developed and signed an agreement called the SAP Cooperation Agreement ('SAP CA'), as included in Article 2(3)(g) of the SAP methodology.

The SAP operator and operation of FCA 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 fulfilment of the SAP tasks, in accordance with the FCA regulation.[57]

54 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.

55 Includes TSOs / companies operating undersea cable interconnectors as well. These are 50Hertz, Amprion, APG, EPS, Creos, EirGrid, ELES, ELIA, EMS, Energinet, ESO, HOPS, IPTO, MAVIR, Moyle, PSE, RTE, SEPS, Statnett, Swissgrid, TenneT DE, TenneT NL, Terna, Transelectrica and TransnetBW.

56 Some Regulatory Authorities (the Regulatory Authorities of Finland, 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.

57 Further details on the governance structure of JAO can be found in the ENTSO-E Market Report of 2020

Figure 2 – Countries whose TSOs have obligation to be part of the SAP Council and are part of the SAP Cooperation Agreement (as at May 2021)[58]

4.2 Operations

JAO, as the SAP operator, performs all tasks in compliance with the SAP CA, the SAP methodology and the HAR.[59]

The SAP operator organises forward capacity rights auctions at 63 oriented EU bidding zone borders (see **Table 11**). The scope of SAP operator services has decreased due to Brexit, with FCA being stopped at all UK interconnectors as of 2021, in line with the FCA guidelines. Any capacity that had been allocated at these interconnectors for any time frame beyond the date of Brexit was cancelled.

As of 2021, SAP covers 63 bidding zone directional borders and provides services by use of a common IT system for more than 300 registered market participants.[60] Only yearly, quarterly and monthly products are allocated at EU borders in 2021. We are also witnessing a gradual shift 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 13% of allocated rights.

58 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

59 More details on SAP tasks are described in the ENTSO-E Market Report of 2020

60 A detailed description of the common IT System e-cat can be found in the ENTSO-E Market Report 2019.

#	Border	Auctions	Type
1	AT-CZ	Y, M	FTR
2	AT-DE	Y, M	FTR Options
3	AT-HU	Y, M	FTR
4	AT-IT	Y, M	PTR
5	AT-SI	Y, M	PTR
6	BE-FR	Y, M	FTR Options
7	BE-NL	Y, M	FTR Options
8	BG-GR	Y, M	PTR
9	BG-RO	Y, M	PTR
10	CZ-AT	Y, M	PTR
11	CZ-DE (50Hertz)	Y, M	PTR
12	CZ-DE (TenneT)	Y, M	PTR
13	CZ-SK	Y, M	PTR
14	CZ-PL	Y, M	PTR
15	D1-D2	Y, M	FTR Options
16	D1-DE	Y, M	FTR Options
17	D2-D1	Y, M	FTR Options
18	D2-DE	Y, M	FTR Options
19	DE-AT	Y, M	FTR Options
20	DE-CZ (50Hertz)	Y, M	PTR
21	DE-CZ (TenneT)	Y, M	PTR
22	DE-D1	Y, M	FTR Options
23	DE-D2	Y, M	FTR Options
24	DE-FR	Y, M	FTR Options
25	DE-NL	Y, M	FTR Options
26	DK1-NL	Y, M	FTR Options
27	EE-LV	Y, Q, M	FTR Options
28	ES-FR	Y, M	PTR
29	ES-PT	Y, Q, M	FTR Options
30	FR-BE	Y, M	FTR Options
31	FR-DE	Y, M	FTR Options
32	FR-ES	Y, M	PTR
33	FR-IT	Y, M	PTR
34	GR-BG	Y, M	PTR
35	GR-IT	Y, M	PTR
36	HR-HU	Y, M	PTR
37	HR-SI	Y, M	PTR

#	Border	Auctions	Type
38	HU-AT	Y, M	PTR
39	HU-HR	Y, M	PTR
40	HU-RO	Y, M	PTR
41	HU-SK	Y, M	PTR
42	IT-AT	Y, M	PTR
43	IT-FR	Y, M	PTR
44	IT-GR	Y, M	PTR
45	IT-SI	Y, M	PTR
46	NL-BE	Y, M	FTR Options
47	NL-DE	Y, M	FTR Options
48	NL-DK1	Y, M	FTR Options
49	PL-CZ	Y, M	PTR
50	PL-SK	Y, M	PTR
51	PT-ES	Y, Q, M	FTR Options
52	RO-BG	Y, M	PTR
53	RO-HU	Y, M	PTR
54	SI-AT	Y, M	PTR
55	SI-HR	Y, M	PTR
56	SI-IT	Y, M	PTR
57	SK-CZ	Y, M	PTR
58	SK-HU	Y, M	PTR
59	SK-PL	Y, M	PTR
60	PL-DE	Y, M	PTR
61	DE-PL	Y, M	PTR
62	DE-BE	Y, M	FTR
63	BE-DE	Y, M	FTR

Table 11 – Overview of borders served, and products offered at SAP (as at May 2021)

On these borders, the SAP operator organised in 2021 more than 1 391 auctions with LTTRs. Due to Brexit, around 739 auctions are anticipated for 2021 because half-yearly and weekend products are no longer offered at any EU border.

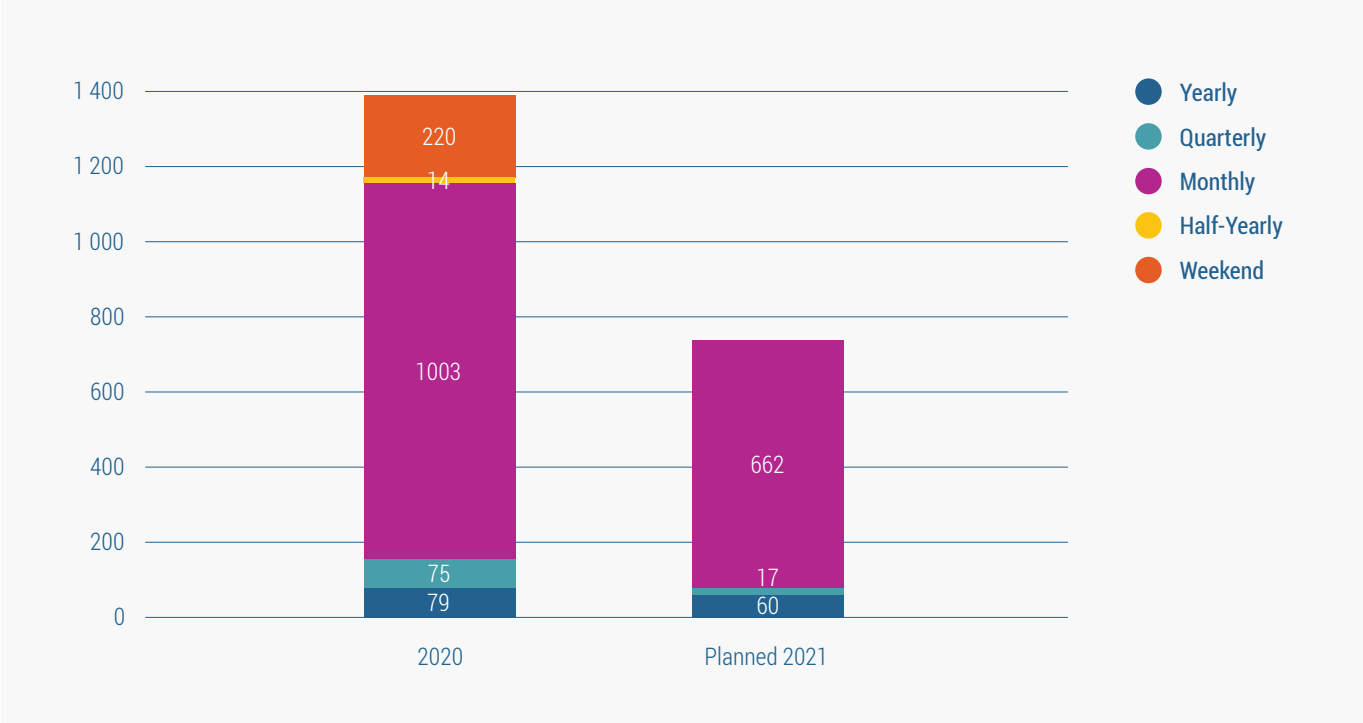


Figure 3 – Comparison between 2020 and anticipated auctions for 2021

Figure 4 – Number of participants in every auction versus the number of participants that win the capacity during 2020 and 2021

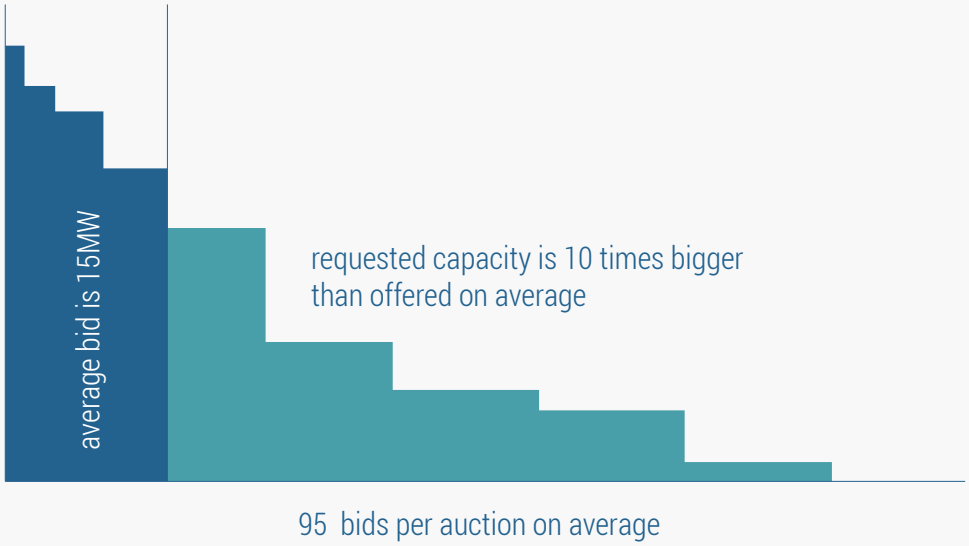


Figure 5 – Average long-term capacity rights auction structure

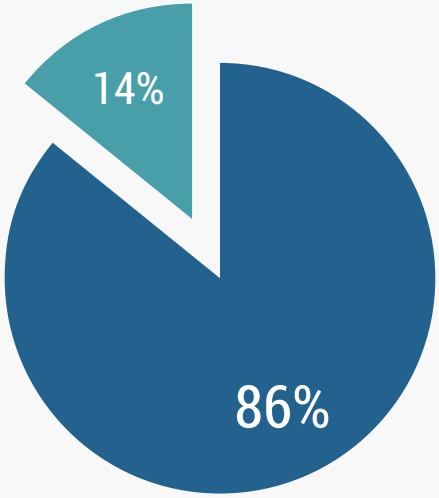


Figure 6 – Rate of return of long-term capacity rights for reallocation at subsequent long-term auction

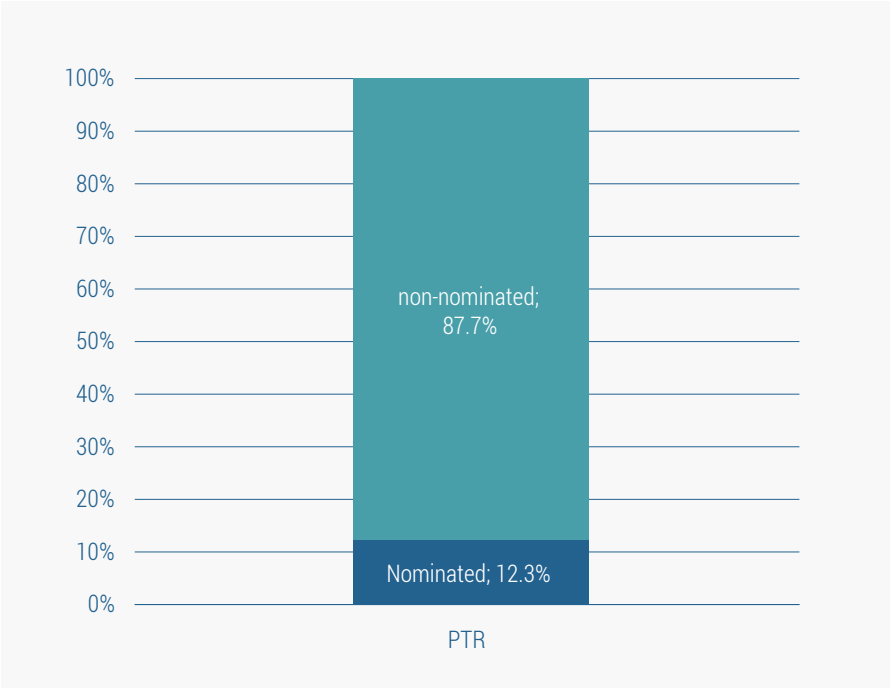


Figure 7 – Usage (nomination) rate of long-term transmission rights

4.2.1 Quality of operations

The SAP Council regularly monitors the quality of operations performed by the SAP operator. More than 2 996 auctions have taken place since SAP operations began. Only about eight incidents were visible to market parties: three caused by SAP and five caused by TSOs. All incidents were solved in due time and capacity was always allocated in line with HAR.

The SAP Council TSOs monitor the SAP operator's operation quality with 23 detailed key performance indicators (KPIs) which are merged into three meta-KPIs[61] (see **Table 12**).

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	Users' satisfaction with JAO SAP's effectivity in solving user's problems and requests Website usability

Table 12 – SAP key performance indicators

61 More detailed description is available in the last ENTSO-E Market Report 2020

SAP operator is continuously improving the provided services and sees the major progress in the area of customer satisfaction.

Month	Fulfilling reporting Obligations	Operational Effectiveness	Customer Satisfaction	TOTAL	Quarterly Score
XI.18	8,50	9,00	7,77	8,42	7,92
XII.18	8,50	8,00	5,77	7,42	
I.19	8,50	8,00	7,27	7,92	8,37
II.19	8,50	10,00	8,77	9,09	
III.19	8,50	10,00	5,77	8,09	
IV.19	8,50	10,00	8,27	8,92	8,15
V.19	8,50	10,00	5,77	8,09	
VI.19	8,50	8,00	5,77	7,42	
VII.19	8,50	10,00	8,77	9,09	8,59
VIII.19	8,50	8,00	8,27	8,26	
IX.19	8,50	9,50	7,27	8,42	
X.19	8,50	10,00	7,27	8,59	8,81
XI.19	8,50	10,00	8,27	8,92	
XII.19	8,50	10,00	8,27	8,92	
I.20	8,50	10,00	8,47	8,99	8,60
II.20	8,50	10,00	7,47	8,66	
III.20	8,50	10,00	5,97	8,16	
IV.20	8,50	10,00	8,97	9,16	8,66
V.20	8,50	10,00	7,47	8,66	
VI.20	8,50	10,00	5,97	8,16	
VII.20	8,50	10,00	8,97	9,16	8,77
VIII.20	8,50	10,00	5,97	8,16	
IX.20	9,50	10,00	7,47	8,99	
X.20	9,50	9,50	5,97	8,32	8,77
XI.20	9,50	10,00	8,97	9,49	
XII.20	9,50	10,00	5,97	8,49	
I.21	9,50	10,00	9,20	9,57	9,23
II.21	9,50	10,00	6,20	8,57	
III.21	9,50	10,00	9,20	9,23	

Table 13 – Overview operation Meta-KPIs of single allocation platform (as of March 2021)

The outbreak of the COVID-19 pandemic and the announced lockdown measures defined by the Government of Luxembourg triggered the activation of a pandemic contingency plan as of 13 March 2020. The SAP operator ensured continuity of all critical business processes while employees were working remotely from their home by reviewing key processes and implementing, where necessary, adequate information and communication tools in order to perform and document them. There were no operational issues registered in consequence of COVID-19 pandemic.

Customer interaction and satisfaction

Next to the operational KPIs, 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 as the single allocation platform. The users' expertise and views are essential for the continuous improvement of the services provided by JAO. To organise discussions, JAO established the User's Group, which serves as a platform for relevant stakeholders.

The User's Group comprises of representatives from key European stakeholder organisations interested in participating therein while ensuring broad geographical coverage by the group. During 2020 the meetings were devoted mainly to discuss impact of COVID-19 pandemic related restrictions and way of working.

In the SAP operator annual survey that took place early 2021 and see that market participants rate SAP operator's performance very high. We witness improvement of the scores as the general satisfaction value from the last survey was 4.0 points out of 5.0. SAP Council identified key elements for improvement that were incorporated in SAP operator goals for the upcoming months.

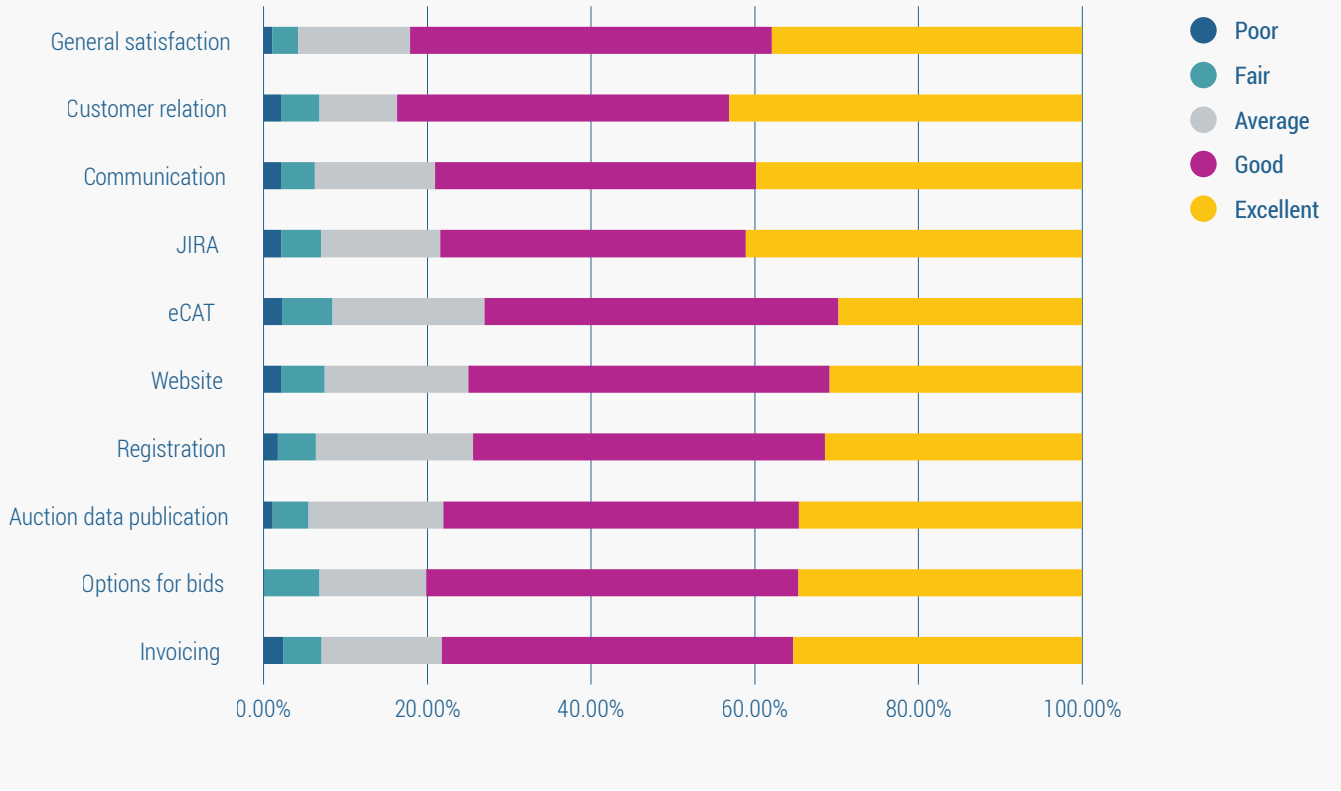


Figure 8 – SAP customer interaction and satisfaction

4.3 Expenditures

This report provides a summary of TSOs common costs of establishing and amending as well as of operating the single allocation platform. In the figure below, the planned, as well as actual costs since 2018, are depicted.[62]

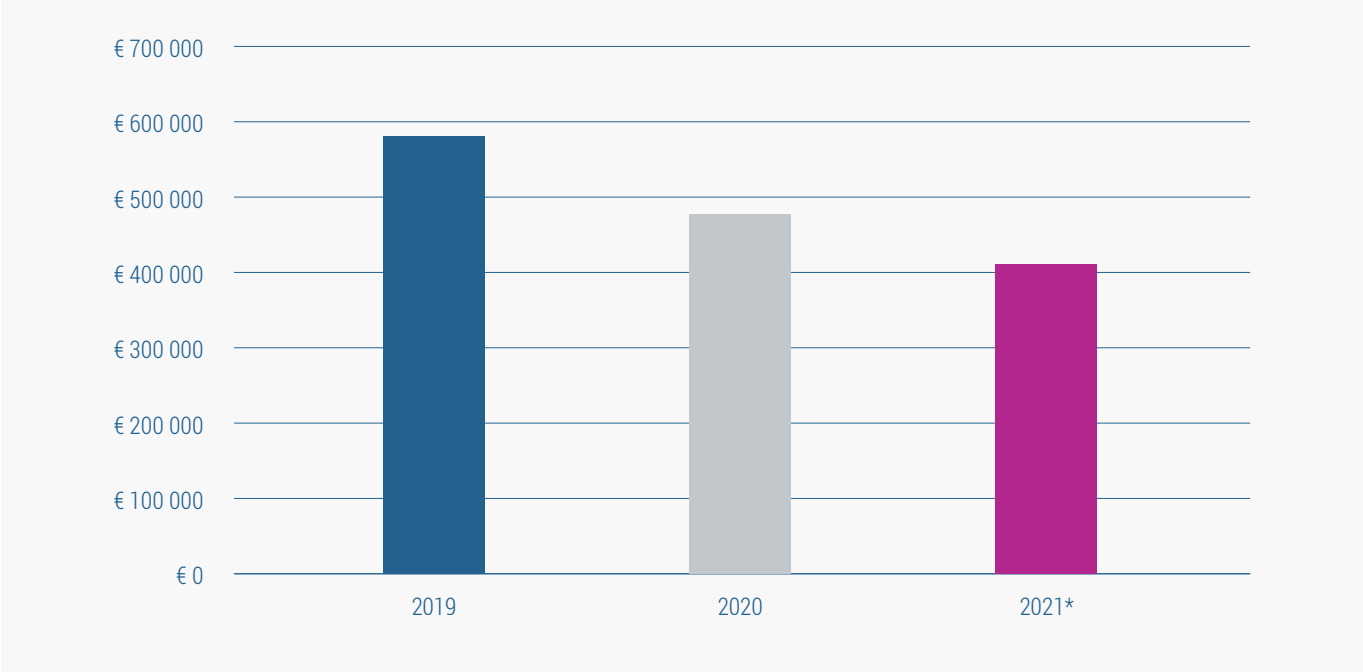


Figure 9 – Overview of the single allocation platform for establishing and amending costs (*budgeted costs for 2021)

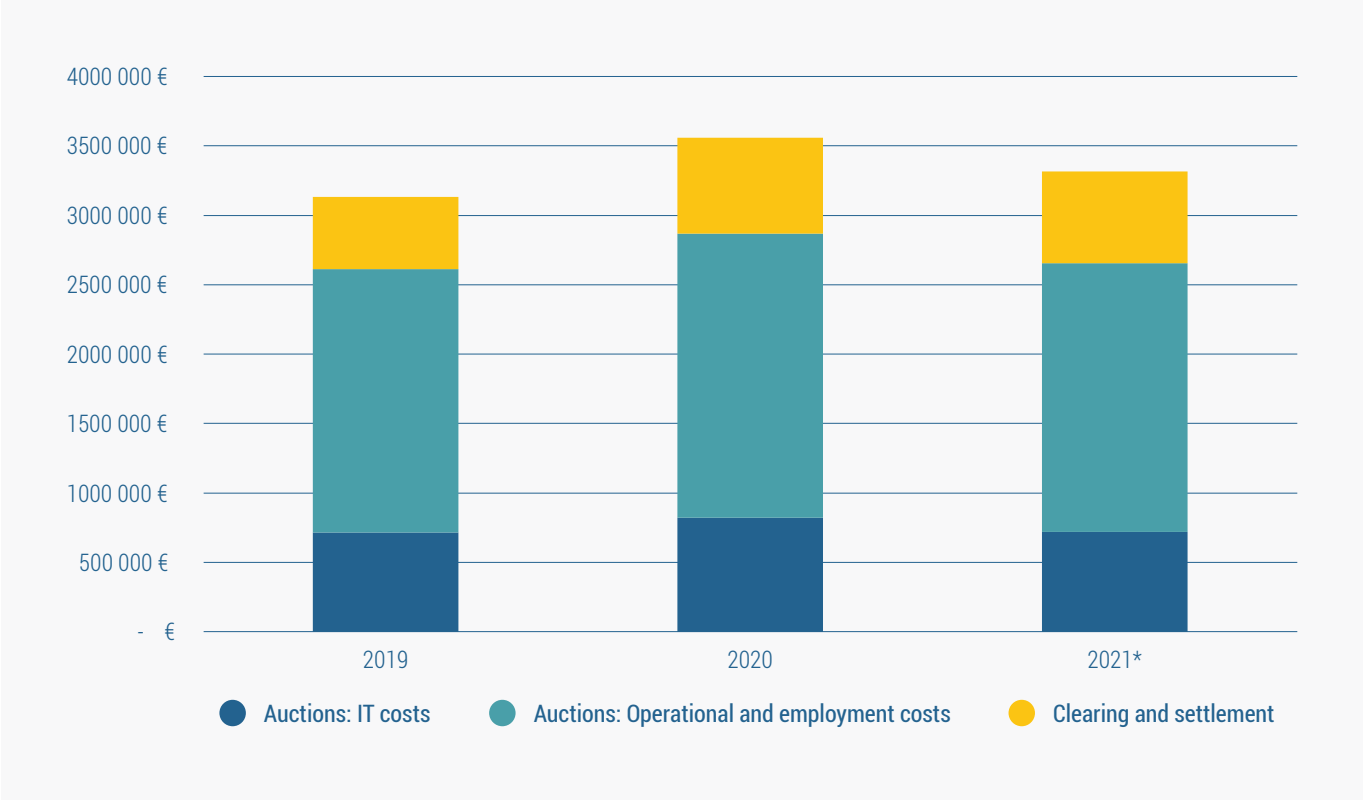


Figure 10 – Overview of the single allocation platform operating costs (*budgeted costs for 2021)

62 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.

The reported establishment and development costs consist of annual depreciation and amortisation of investments to establish and develop SAP on top of 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. Further, they consist of 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 FCA regulation.

The SAP methodology is applicable to 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).

4.4 Evolution of services

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

(a) Information technology (IT):

In 2020 and early 2021 JAO started testing for new web pages and enabled a public application programming interface (API) for all stakeholders interested in integrating JAO's auction data into their own applications. The API enables the retrieval of auction specifications, offered capacity, anonymised bids, auction results and capacity curtailments, for all borders and time horizons for which JAO performs explicit auctions. All of these data are provided in real time.[63]

(b) Legal compliance:

The requirements to which the SAP operator must comply in the area of KYC/AML[64] become increasingly demanding. Significant development and implementation of additional checks was performed recently. These checks affect both shareholders and market participants. Furthermore, these requirements are mandatory both at EU-level and by the Luxembourg law and standards. The basis for requesting the additional information is being integrated into the HAR that are to be applicable from 2022.

(c) Operations:

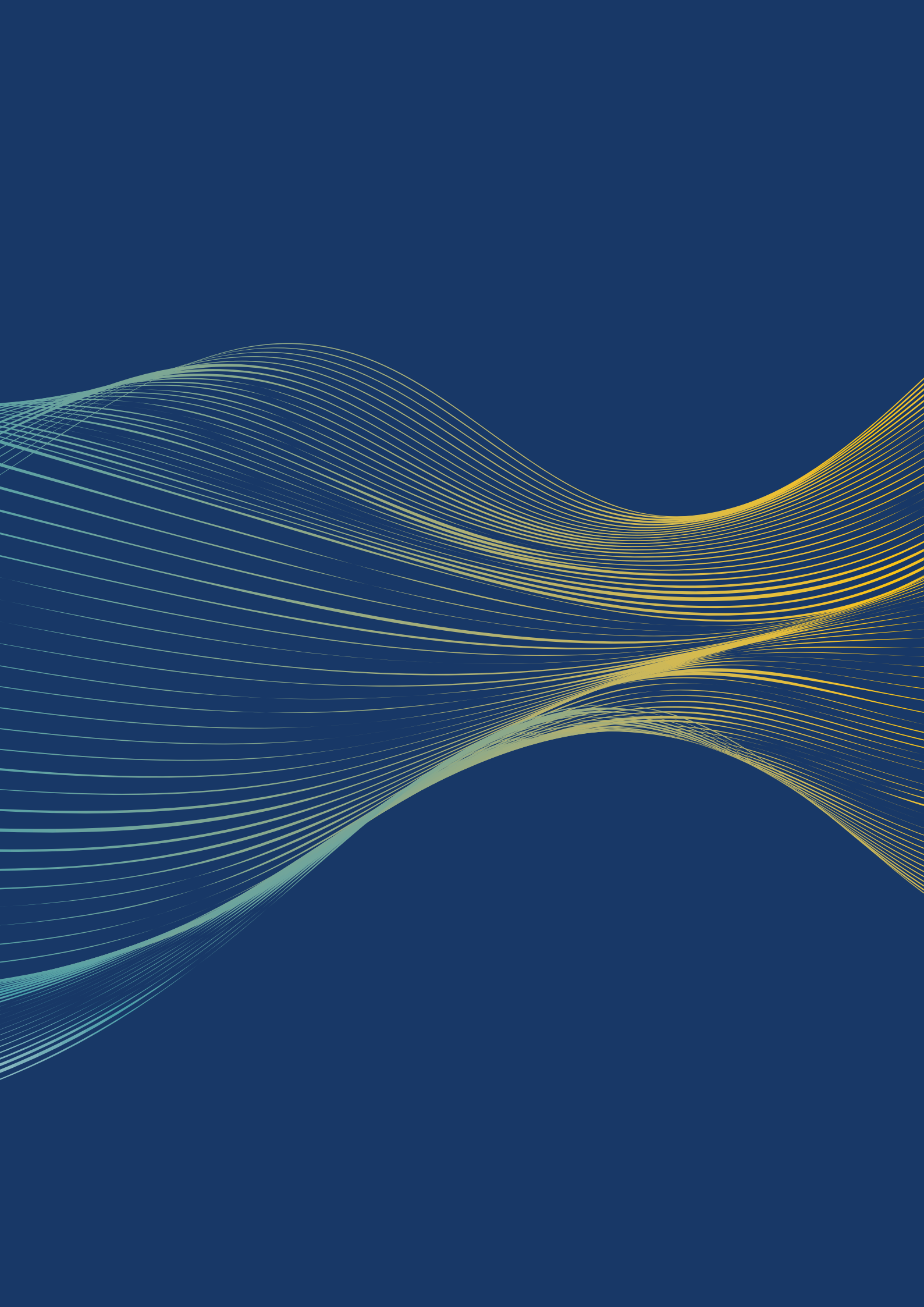
- Soon, the SAP operator will face the major challenge of implementing the flow-based allocation of LTTRs, as requested by the CCMs of the Core CCR and Nordic CCR. This project significantly affects the main SAP operator IT tools (auction system and web pages), market rules and operational procedures.

- With the go-live of the day-ahead flow-based market coupling in the Core CCR, a shift is expected from PTR to mostly FTR options for the Core CCR bidding zone borders.

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

63 https://www.jao.eu/news/messageboard/view?parameters=%7B%22NewsId%22%3A%227184a471-f770-4640-853a-acb800c2c5da%22%2C%22FromOverview%22%3A%221%22%7D

64 Know-Your-Customer and Anti-Money-Laundering



5. Single day-ahead and intraday coupling

In coordination with

ALL NEMO COMMITTEE

The single intraday and single day-ahead coupling section (Chapter 5) has been prepared in cooperation with the NEMO Committee. The NEMO Committee has reviewed the content and accompanying illustrations for compliance taking into account confidentiality requirements. The information on the costs provided by this report is a summary of the full content from the 'CACM Cost Report 2020' to be released by all-NEMOs and all-TSOs in the second quarter of 2021.

5.1. Single day-ahead coupling

5.1.1 Governance

The pan-European single day-ahead coupling ('SDAC') serves, at the time of this report, 27 countries.[65] In total, 30 TSOs[66] and 17 NEMOs[67] cooperate under the agreement[68] aimed to govern the SDAC, namely the Day-ahead Operational Agreement ('DAOA'). This agreement [69]regulates the cooperation of TSOs and NEMOs regarding the establishment, amendment, and operation of day-ahead coupling. It was agreed by all TSOs[70] and NEMOs of the EU Member States plus Norway and Northern Ireland.

The SDAC makes use of the day-ahead market coupling operator ('MCO') function, with an algorithm called the Pan-European Hybrid Electricity Market Integration Algorithm ('EUPHEMIA'), to calculate electricity prices across Europe and to implicitly allocate auction-based cross-border capacity. In parallel with the multi-regional coupling (MRC), the 4M market coupling between the Czech Republic, Hungary, Romania and Slovakia (4M MC) is also applying the day-ahead MCO function until the two operations are merged.

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65 Northern Ireland is still part of the SDAC

66 Svenska Kraftnät, Amprion, APG, AST, EPS, Creos, HOPS, EirGrid, ESO, Elering, ELES, Energinet, Elia, Fingrid, IPTO, Litgrid, MAVIR, Transelectrica, PSE, REE, REN, RTE, SEPS, SONI, Statnett, TenneT NL, TenneT DE, Terna, TransnetBW, 50Hertz

67 BSP SouthPool, CROPEX, EPEX SPOT, EXAA, GME, HEnEx, HUPX, IBEX, EMCO, NordPool, OMIE, OTE, OKTE OPCOM, TGE, SONI, EirGrid, and Nasdaq OMX

68 Entered into force on 28 March 2019

69 The contractual framework is complemented by a TSO cooperation agreement for single day-ahead coupling (hereafter referred to as 'TCDA'). In the same fashion, NEMOS signed NEMOs only agreements, the All NEMO Cooperation Agreement (ANCA) and the All NEMO day-ahead operational agreement (hereafter referred to as 'ANDOA'), and arrangements that contribute to the operation of the single day-ahead coupling by specifying or completing the general principles described in the day-ahead operational agreement

70 EMS, MEPSO, OST and Swissgrid are observers of SDAC.

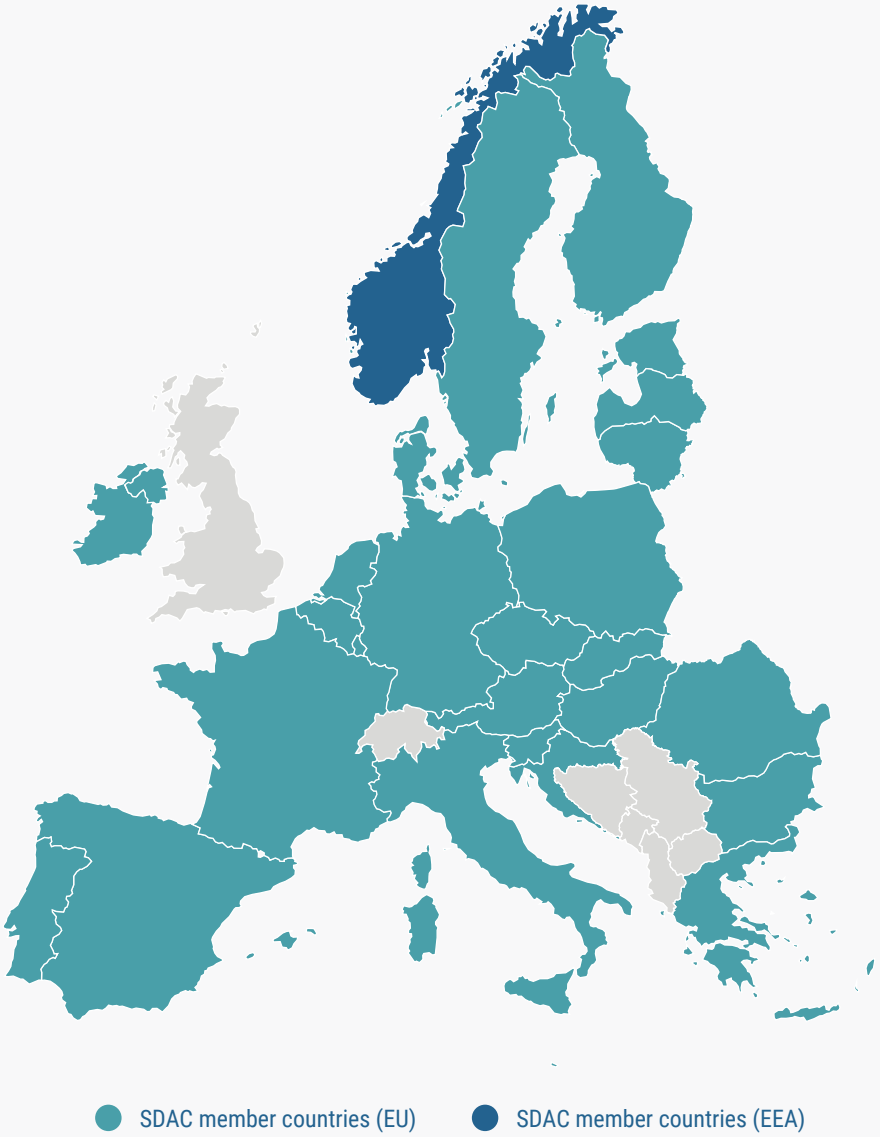


Figure 11 – Countries of SDAC (as at June 2021)

5.1.2 Operations

SDAC, two couplings operate in parallel using infrastructure based on EUPHEMIA: MRC and 4M MC.[71] **Figure 12** depicts the current status of SDAC markets.

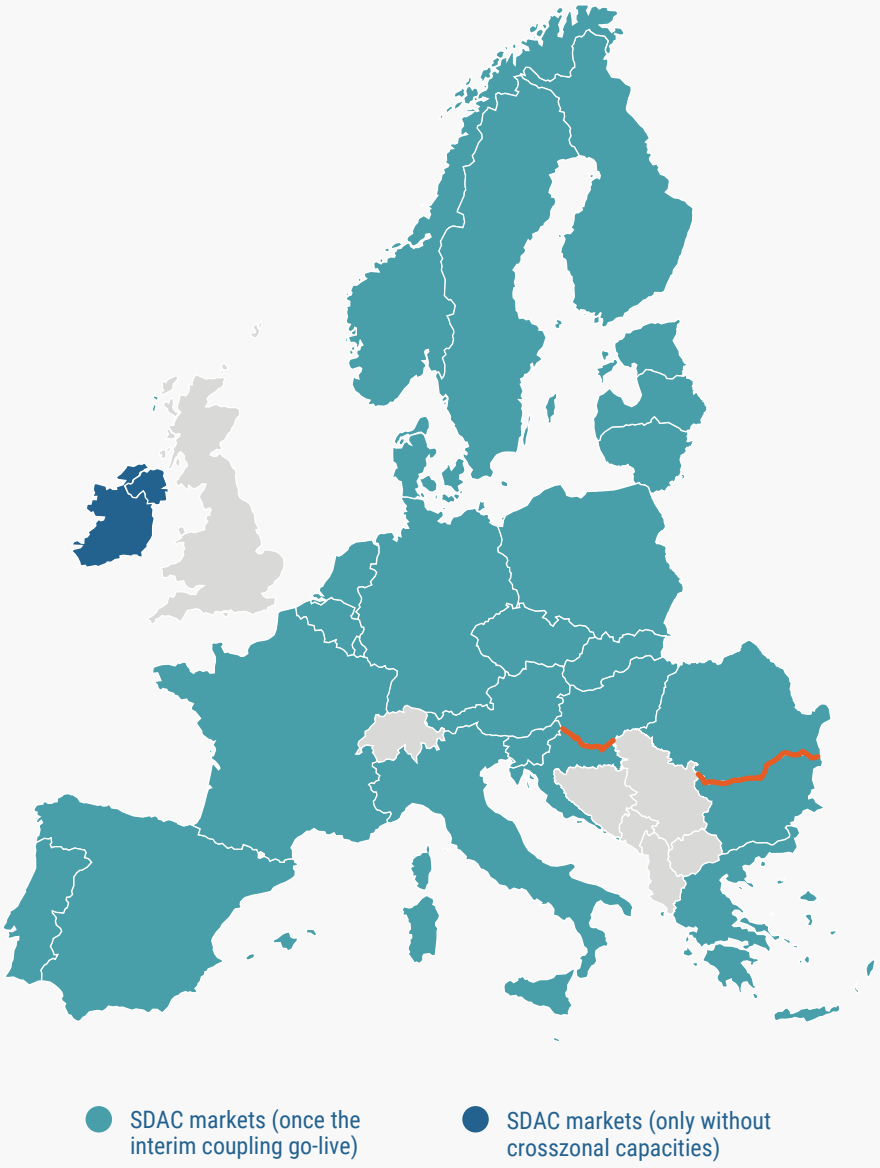


Figure 12 – Countries of SDAC (as at mid-June 2021)[72]

5.1.2.1 Multi-regional coupling operations

At the time of this report, MRC integrates 23 countries,[73] representing more than 95% of European electricity consumption and averaging circa 1 500 TWh/ year, in one market solution.

MRC continues to operate successfully without full

71 Details on the operations of SDAC (MRC and 4M MC) are published via the CACM Report: Version 2018, Version 2019

72 The bidding zones of Bulgaria, Ireland and Northern Ireland operate under MRC without cross-zonal capacities.

73 The MRC operational countries are Austria, Belgium, Bulgaria Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovenia, Spain and Sweden. Northern Ireland and Ireland are also operational, even though at the moment in isolated mode.

decoupling. In fact, no full decoupling of markets has occurred since the operation began in February 2014. However, there have been three partial decouplings during this period. The first two occurred on 7 June 2019 and 4 February 2020, respectively.[74] The third occurred on 13 January 2021.

That day, a technical issue led to a partial decoupling of the GME, BSP, EXAA, HEnEx and CROPEX order books, affecting the day-ahead trades with a delivery date of 14 January. Due to GME's partial decoupling, the BSP, HEnEx and EXAA markets were decoupled from the MRC process. The CROPEX market was run together with the market coupling session, but with no capacity for MRC markets, due to the impacted interconnector SI–HR, which is currently the only link to MRC. The following five borders were decoupled: IT–FR, IT–AT, SI–AT, SI–HR and IT–GR. GME and BSP remain coupled via the SI–IT border in line with Italy North TSO fallback procedures.

The cause was an unexpected technical issue in GME's Local Trading System that left GME unable to create the order books. The problem was solved at around 13.00, after the partial decoupling had been declared.

Following the partial decoupling of GME, BSP, EXAA and HEnEx from the MRC, shadow auctions for cross-zonal capacity were run for five borders by JAO. Local auctions were successfully completed shortly after 14.00 for the local markets concerned (BSP, EXAA, GME and HEnEx).

Although this partial decoupling did not lead to any grid security issues anywhere in Europe, this incident caused a disruption of the day-ahead market within the MRC. More specifically, the processes of market parties and TSOs were impacted, and Greece, Italy and Slovenia were decoupled. Croatia remained part of the MRC, albeit without capacity to be allocated and therefore decoupled from a market perspective. The investigation and lessons learned were published on 8 February 2021.[75]

As a result of these three partial decouplings pay-outs for long-term transmission rights (LTTR) from TSOs to the market parties have been made. **Table 14** breaks down each partial decoupling, comparing it with the LTTRs congestion income and the shadow auction congestion income.

Decoupling date	Long-term transmission rights congestion income (EUR)	Shadow auction congestion income (EUR)	Long-term transmission rights for market parties (EUR)
07 June 2019	1,9 M€	716 k€	**19,6 M€**
04 February 2020	62 k€	26 k€	**208 k€**
13 January 2021	526 k€	268 k€	**4,0 M€**
Total	**2,5 M€**	**1,0 M€**	**23,9 M€**

Table 14 – Partial decoupling pay-outs

74 For more information, see the 2019 Market Report and the 2020 ENTSO-E Market Report.
75 SDAC report on the 'partial decoupling' incident on 13 January 2021 – [Link]

Moreover, several operational incidents have occurred, some of which have been communicated actively to market participants, and some of which have not been communicated in line with MRC operational procedures. In any case, all operational incidents are analysed frequently, and changes, e.g. of processes, are introduced to mitigate relevant risks via SDAC Operational Committee (OPSCOM). **Figure 13** below depicts these two types of incidents.

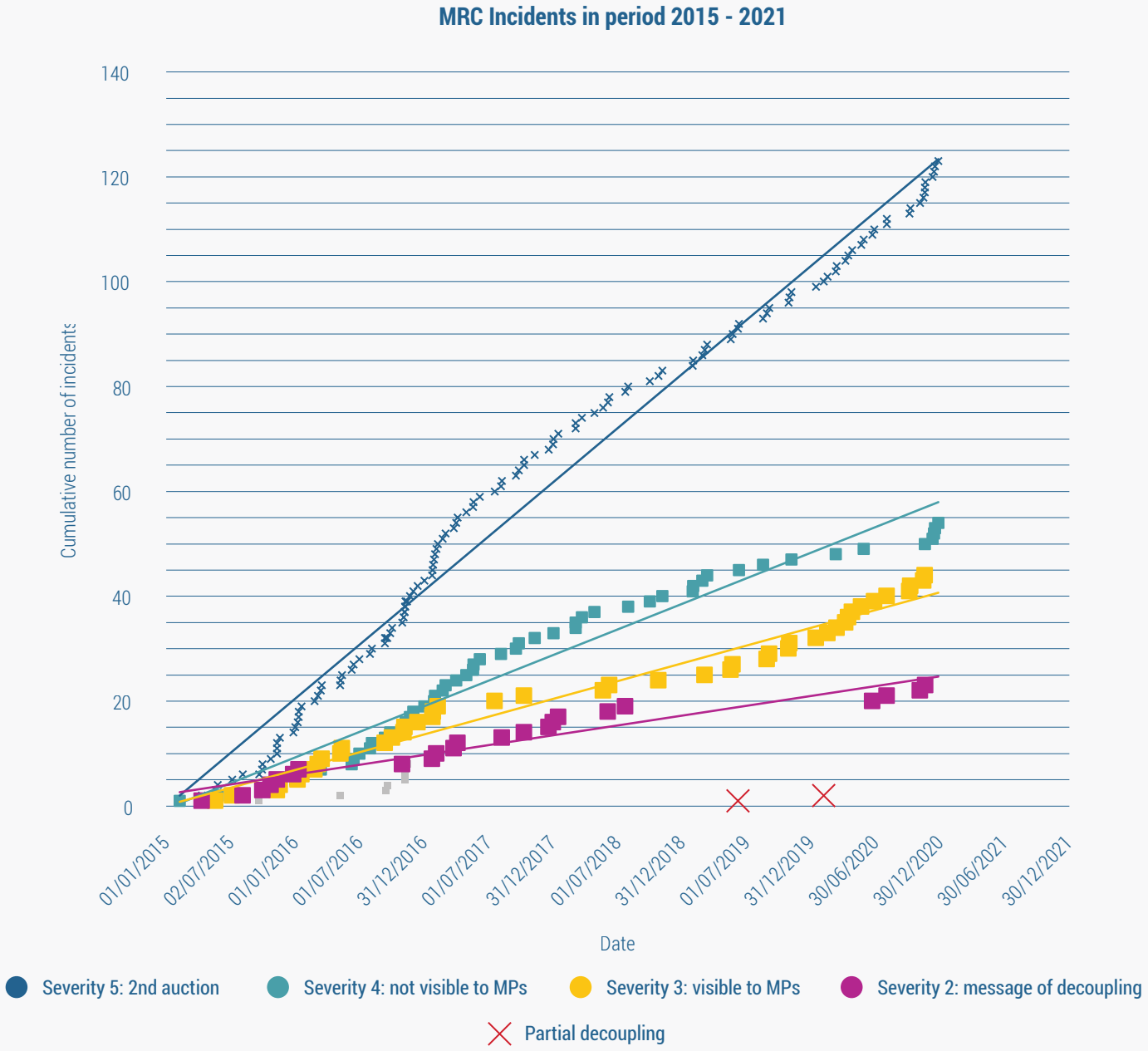


Figure 13 – MRC incidents between 2015 to 2020 (as of December 2021)

A total of 114 MRC incidents occurred from February 2015 to the end of May 2021, of which 34 occurred between June 2020 and May 2021 (the period following the 2020 Market Report). In terms of severity, only 18 incidents out of the 66 occurred in the current reporting period, were visible to market participants (i.e. could not be solved within procedural timings).

5.1.2.2 Operations of 4M MC

Since the 4M market coupling began on 19 November 2014, it has operated successfully with the exception of 30 operational incidents, one of which was a technical issue (Java failure) that led to a decoupling on 19 March 2016.

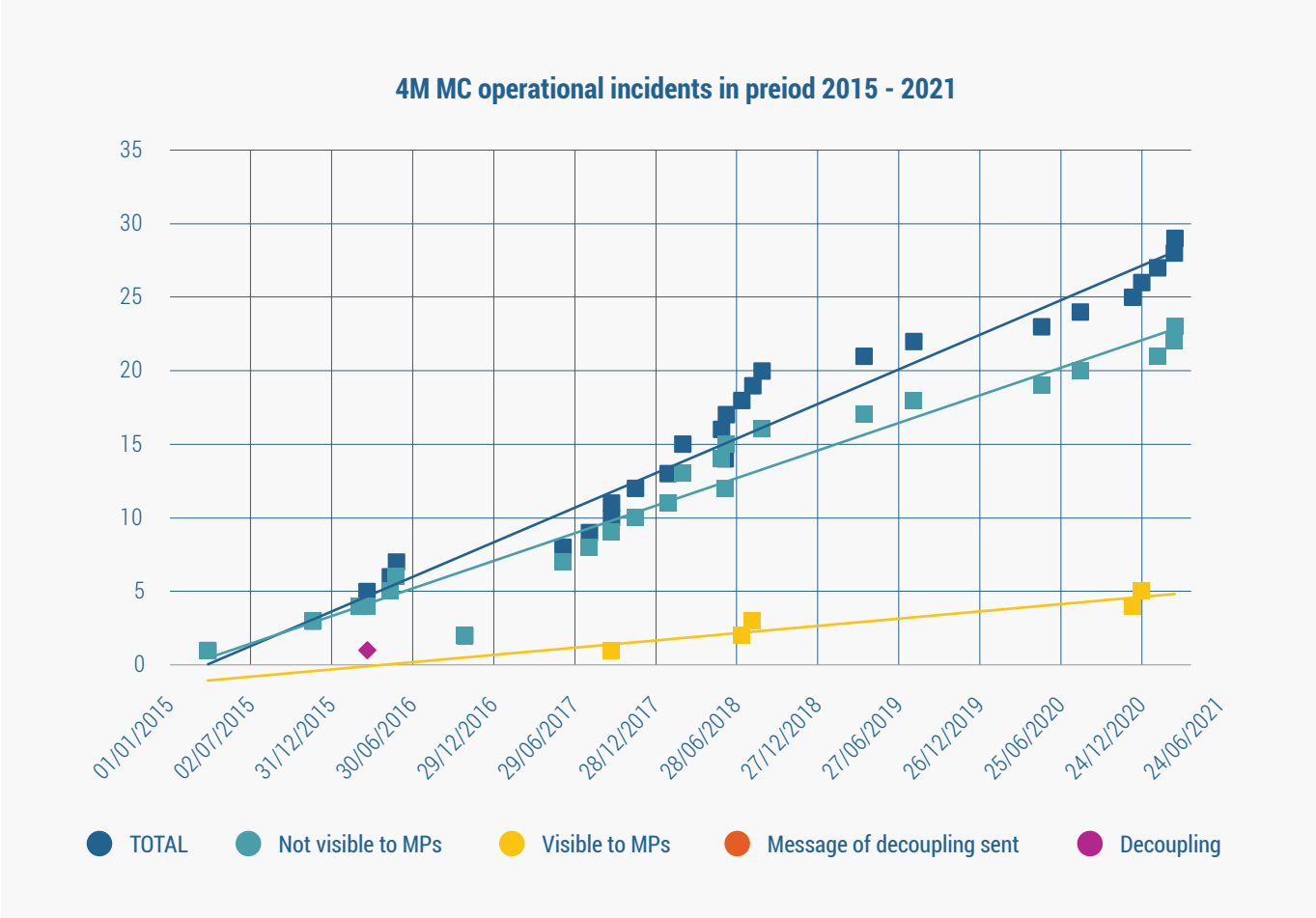


Figure 14 – 4M MC operational indicators[76] (from 2015 to 2021)

Between 1 May 2020 and 13 April 2021 (i.e. the period after the last market report provided data), seven incidents occurred in operation of 4M MC, of which in respect to the severity only two were visible for market participants; other incidents were minor issues without visibility for market participants and have been solved in a timely manner without causing significant delay in the procedural timings.

76 The data shown covers the time from 1 January 2015 until 13 April 2021. The operational indicators are comparable to the ones applied for MRC operations.

5.1.3 Expenditures

TSOs and NEMOs provide an annual detailed cost report to ACER and the NRAs in accordance with Article 80 of the CACM regulation. [77]

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 (all-TSOs and all NEMOs) costs. **Figure 15** and **Figure 16** depict the budgeted and actual costs as of 2017. [78]

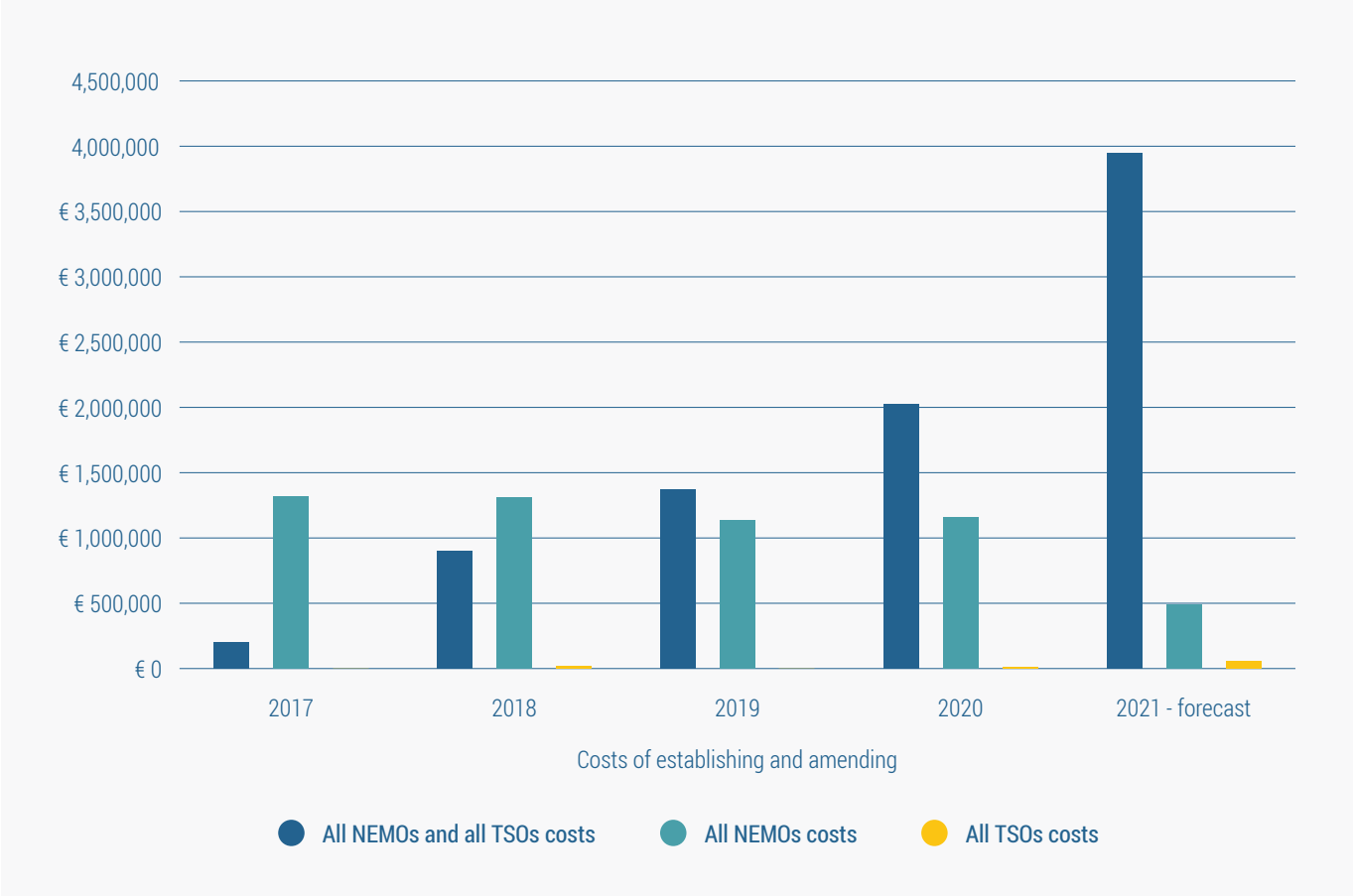


Figure 15 – Overview of single day-ahead coupling for "all TSOs costs", "all NEMOs costs" and "all NEMOs and all TSOs costs" for establishing and amending

77 CACM Cost Reports: 2018, 2019.

78 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.

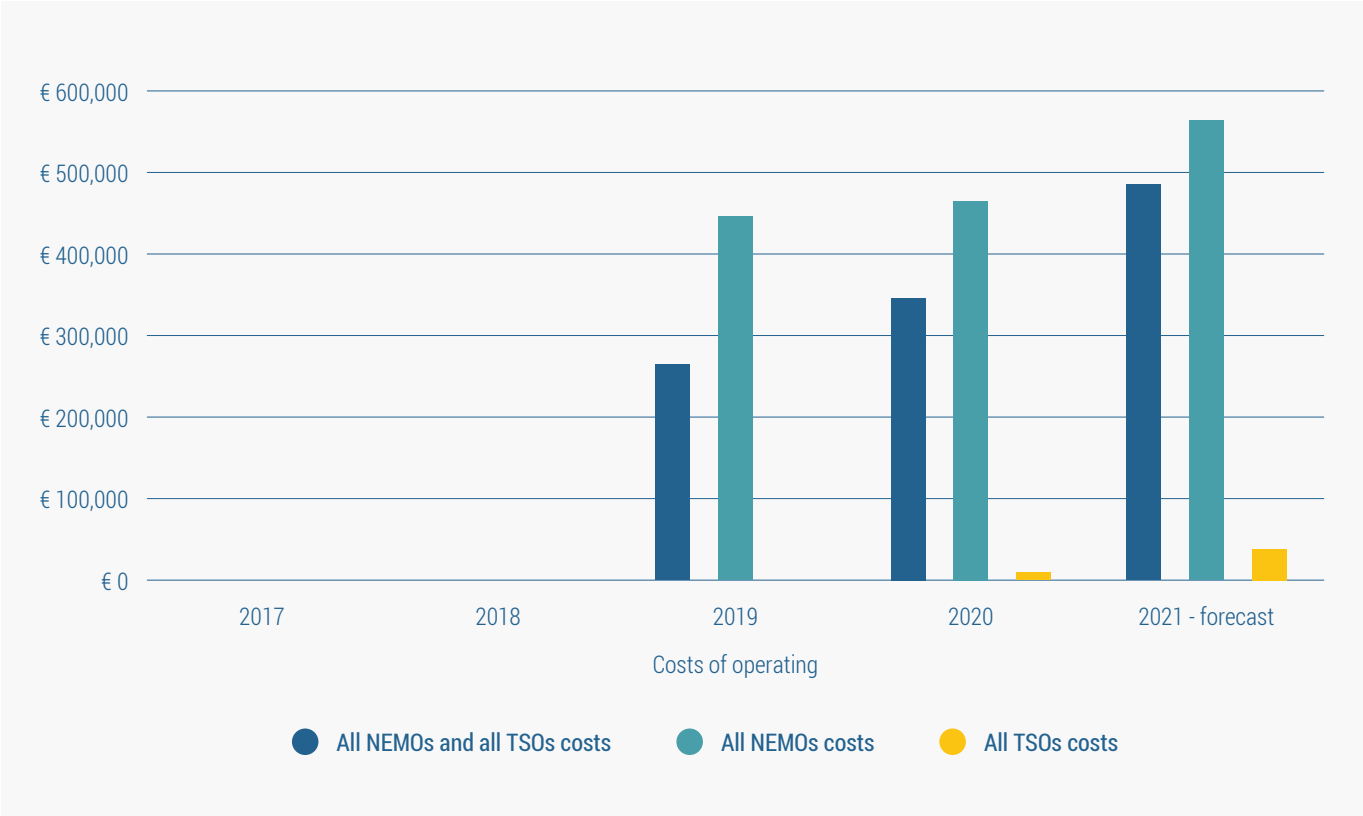


Figure 16 – Overview of single day-ahead coupling for "all TSOs costs", "all NEMOs costs" and "all NEMOs and all TSOs costs" for operating

All TSOs common costs governed by the TCDA. All NEMOs common costs refer, include third-party services and are governed by the ANDOA. All TSOs and NEMOs common costs refer, include the introduction of the multi-NEMO arrangement (MNA) and are governed by the DAOA.

Training market participants

As part of the evaluation of the partial decoupling incidents of 2019 and 2020, regular training sessions have been recommended, involving all operational parties: TSOs, NEMOs, central clearing counterparties, shadow auction entities (JAO) and market participants. The training sessions aim to ensure that market parties are properly prepared to handle a day-ahead market decoupling incident in real operations and real-life conditions. So far, training sessions have been held on 30 September 2020 and 3 March 2021.

Fallback procedures

A dedicated group under the Operation Committee ('OPSCOM') is investigating the possibility of further developing fallback procedures, particularly to allow more time for algorithm calculation in daily processes.

5.1.4. Evolution

The SDAC is continuously being developed with respect to topology and system functionalities.

Over the current reporting period, five extensions and/or functional projects went live under market coupling of regions:

1. Implementation of Evolved Flow-based with EUPHEMIA due to the commissioning of Aachen – Liège Electricity Grid Overlay (ALEGrO) in November 2020
2. NordLink cable (NO-DE) commercially went live on 8 December 2020
3. Extension of MRC to Greece went live on 15 December 2020
4. Losses functionality on the Skagerrak cable went live on the 17 February 2021
5. Extension of MRC to Bulgaria went live on 11 May 2021

Multi-NEMO arrangement

The functionality of handling multiple NEMOs in and between bidding zones was introduced in SDAC in April 2019, and first utilised in the Central Western Europe region in July 2019.

In 2020 and 2021, this functionality has been sequentially introduced in other regions/bidding zones:

- Poland (SwePol cable and LitPol Link) on 9 February 2021
- NorNed (Hansa) go-live on 17 November 2020
- Nordic on 3 June 2020

The go-live of the MNA for Danish Hansa+[79] interconnectors is planned for the third quarter of 2021. The remaining interconnectors (Baltic and Italian Borders Working Table – IBWT) have some preconditions/requirements. The Baltic is pending on a second power exchange to become active in order to perform single day-ahead tasks as a NEMO within the region. Meanwhile, the IBWT implementation is linked to the Core flow-based market coupling (FBMC) project.

In contrast, other borders were removed as of 1 January 2021 from the implicit SDAC topology: the UK is no longer participating in the EU's dedicated platforms. See **Figure 17**.

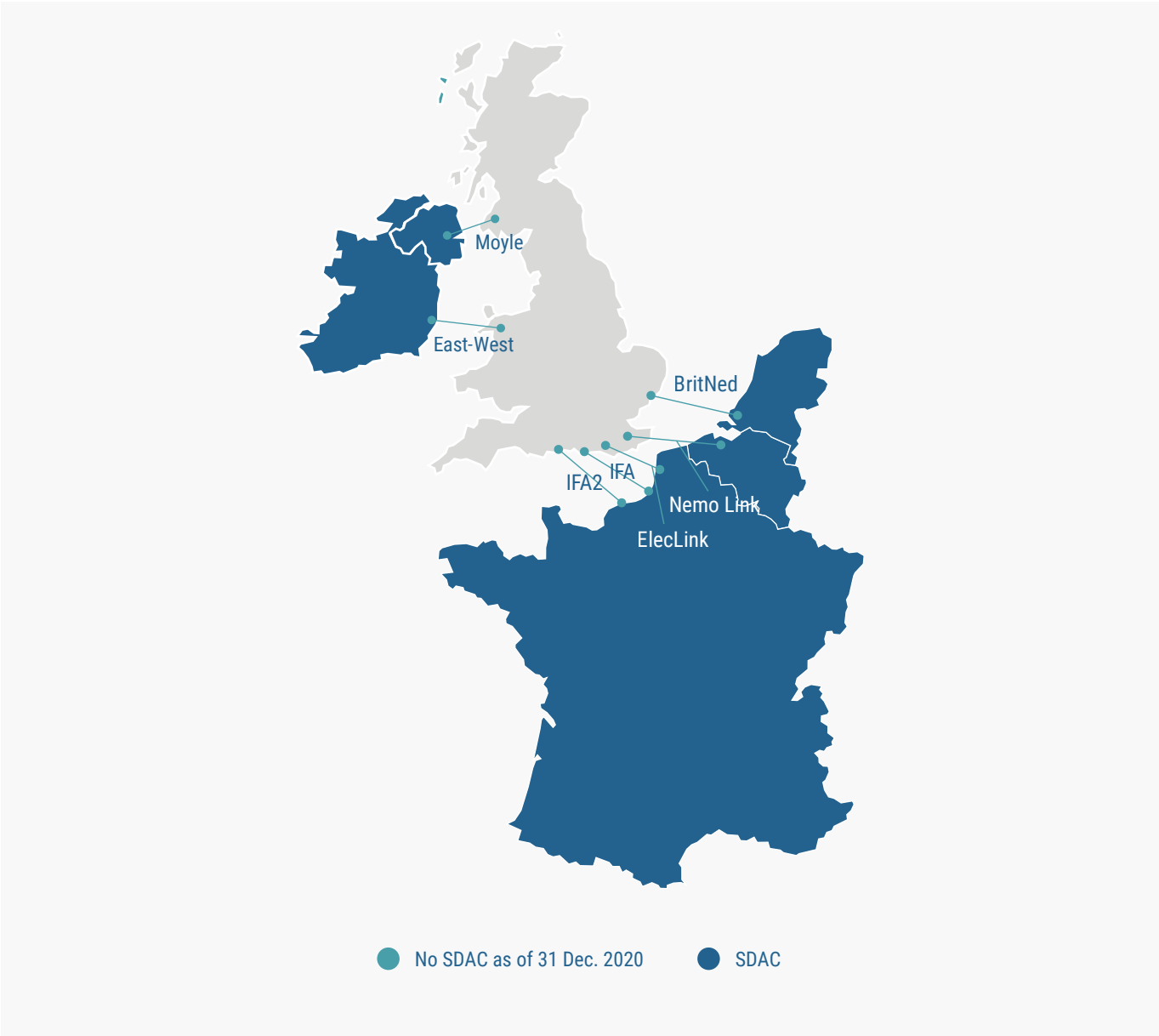


Figure 17 – EU-GB interconnectors affected by Brexit (as at 31 December 2020)

79 The implementation of an MNA in CCR Hansa is being organised via various border to border projects

By this means:[80]

- **BritNed** is offering capacity via explicit day-ahead capacity auctions from Thursday 31 December 2020, via JAO. The rules under which this capacity will be offered (including timings) can be found in BritNed's 'Non-IEM [internal energy market]' Access Rules.[81]

- **East West and Moyle** are the interconnectors of the Single Electricity Market (SEM) from Ireland and Northern Ireland, respectively. They will continue to operate in an isolated, all-island market within the SDAC. No day-ahead capacity is being allocated between the SEM (GB) and the wider EU market as of 1 January 2021. Intraday capacity on East West and Moyle between the SEM and GB will be offered via the separate Interim Intraday Markets, which will remain unaffected.

- **ElecLink** When ElecLink goes commercially live, it will be offering capacity via explicit capacity auctions (including day-ahead auctions) via JAO. The rules under which this capacity will be offered (including timings) can be found in ElecLink's 'Non-IEM' Access Rules.

- **IFA and IFA2 interconnectors**. Capacities will be offered via explicit day-ahead capacity auctions from 31 December 2020, via JAO. The rules for day-ahead capacity allocation and nomination (including timings) can be found in IFA and IFA2's approved 'Non-IEM' Access Rules.

- **Nemo Link** is offering day-ahead capacity via explicit capacity auctions, hosted by the JAO, as of 31 December 2020. The rules for day-ahead capacity allocation and nomination (including timings) can be found in Nemo Link's approved 'Non-IEM' Access Rules.

The key evolution of SDAC is the operational 'merge' of MRC and 4M MC, which constitutes the enduring phase in accordance with the DAOA. The DE–AT–PL–4M MC (interim coupling) project aims to achieve this major advancement before the go-live of the Core FBMC, via the introduction of net transmission capacity-based implicit allocation at six borders (see **Table 15**).

The interim coupling project was initiated on 21 December 2018, following a request from concerned regulatory authorities. It involves eight TSOs[82] and eight NEMOS.[83]

Bidding zone border	The current type of allocation
Germany – Czech Republic	Explicit allocation
Germany – Poland	Explicit allocation
Poland – Czech Republic	Explicit allocation
Poland – Slovakia	Explicit allocation
Austria – Czech Republic	Explicit allocation
Austria – Hungary	Explicit allocation
Czech Republic - Slovakia	Implicit allocation (4MMC)
Hungary – Slovakia	Implicit allocation (4MMC)
Hungary – Romania	Implicit allocation (4MMC)

Table 15 – Interim coupling project bidding zone borders

80 Official SDAC press release – [Link]
81 For more information, see the ENSTO-E Market Report 2016
82 50Hertz, APG, EPS, MAVIR, PSE, SEPS, TenneT Germany and Transelectrica.
83 EMCO, EPEX SPOT, EXAA, HUPX, OKTE, OPCOM, OTE and TGE.

The design phase for the interim coupling project was completed in 2020 and joint testing started in January 2021. The project went live on 17 June 2021.

The bidding zone border between Bulgaria and Romania is scheduled to be added three months after the project becomes operational.

Table 16 lists all bidding zone borders adhering to the CACM regulation that are not fully coupled (as of May 2021). However, the dates displayed are only indicative and do not account for contingencies. Moreover, some extensions might partially or fully change, or be cancelled in favour of alternatives.

CCR	Bidding zone border	Project(s)	Planned go-live
Core	Germany – Poland	Interim Coupling / Core FBMC project	June 2021 / February 2022
	Germany – Czech Republic	Interim Coupling / Core FBMC project	June 2021 / February 2022
	Poland – Slovakia	Interim Coupling / Core FBMC project	June 2021 / February 2022
	Poland – Czech Republic	Interim Coupling / Core FBMC project	June 2021 / February 2022
	Czech Republic – Austria	Interim Coupling / Core FBMC project	June 2021 / February 2022
	Austria – Hungary	Interim Coupling / Core FBMC project	June 2021 / February 2022
	Hungary – Croatia	Core FBMC project	February 2022
	Bulgaria – Romania	BG-RO MC project	Q3 2021
Ireland and United Kingdom	Ireland – France	N/A	2025

Table 16 – SDAC extension roadmap (as at May 2021)

In addition to the geographical extensions, various technical advancements have been planned and implemented within the time scope of this report, as part of the SDAC research and development programme.

Algorithm improvements are made through the change control procedure and NEMO 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 MRC and 4M MC 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).

In addition to this, SDAC is looking into the following:

a) Change of the operational timing

A change of operational timing (i.e. allowing 10 additional minutes for the day-ahead algorithm calculation) is ready to be implemented from a procedural perspective. This change will have an impact on the shadow auction rules and on fallback procedure methodologies for some of the CCRs (Core, Italy North, Greece–Italy, South West Europe and Channel). The updated documents have been submitted to the relevant NRAs and were approved by April. The new operational timing will be implemented together with the interim coupling go-live on 17 June 2021.

b) Implementation of a 15-minute MTU considering the granted 15-minute imbalance settlement period (ISP) derogations

Article 8(2) of the CEP requires that NEMOs provide market participants with the opportunity to trade in energy in time intervals which are at least as short as the ISP for both day-ahead and intraday markets.

Furthermore, according to the Electricity Balancing Guideline, TSOs should apply an ISP of 15 minutes in all scheduling areas. The deadline to introduce 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 Regulation 2019/943 on the internal market for electricity 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 day-ahead and intraday markets. The NEMO algorithm methodology (Article 4.14.d) states that NEMOs are obliged to implement 15-minute products together with other future requirements by August 2022. Consequently, a project has been established under the SDAC Joint Steering Committee to coordinate the implementation of 15-minute products in the day-ahead time frame across the EU (15-minute MTU implementation).

Figure 18 illustrates the current status of ISP readiness/derogations in each country.

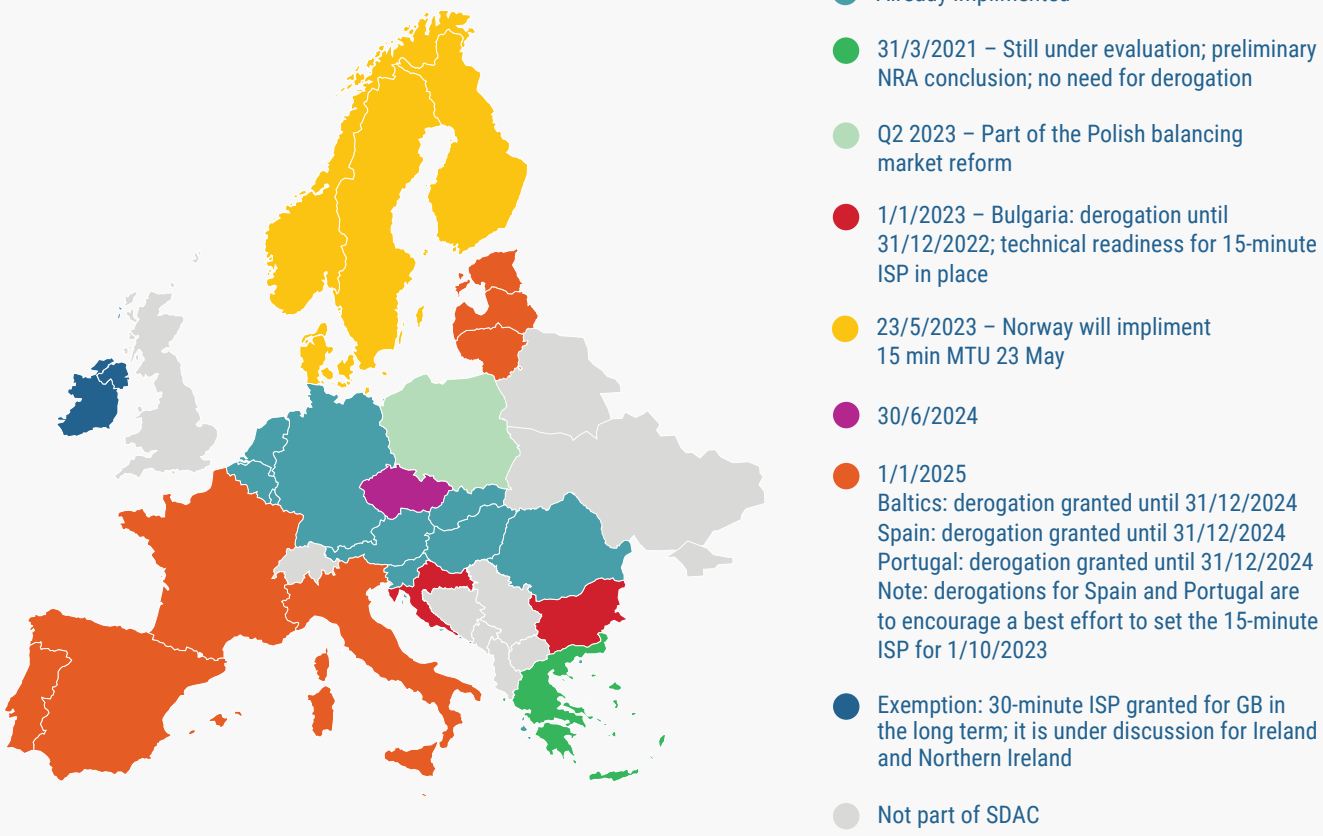


Figure 18 – 15-minutes ISP readiness/derogation status map (as at May 2021)

The pros and cons of two implementation approaches have been analysed in close cooperation with NRAs. NRAs decided on gradual implementation of 15- or 30-minute ISPs, which also requires cross-matching[84] (product cross-matching and network cross-matching[85]).

Given the impact on the whole chain of market coupling processes, regional implementation projects were established. Regional implementation projects are forecast to go live in consecutive waves, with the first expected in the first half of 2024. If a party is not ready to join a particular go-live wave, it will be able to join the subsequent wave.

The description of the changes to EUPHEMIA required to enable the 15-minute MTU functionality were finalised in May. The implementation of the functionality is planned for the EUPHEMIA release next winter. This will be done in close coordination with the SIDC, which will use the same algorithm version for the intraday auctions.

In parallel, the SDAC is working on the performance and scalability of the algorithm and the cross-matching functionality technical design, as part of the research and development programme.

c) Research and development programme

A significant part of the SDAC budget is used to research 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 overall positive results and is leading to the industrialisation of promising improvements to the algorithm (complex orders first, scalable complex orders, extended long-term allocation inclusion).

The challenging improvements to be implemented over the next few years (flow-based in Core and Nordic, 15-minute MTU and cross-matching functionality, increased volume of trades and implementation of a co-optimisation balancing allocation), will require SDAC to revisit the current design. Heuristics or distributed computing are considered the mid-term solution and are not expected to handle the 15-minute MTU implementation. Ongoing discussions within SDAC foresee a disruptive solution to meet these and other challenges in the long-term.

Non-uniform pricing has been identified as the most promising option. The current design enforces strict to the linear pricing, hence solution's additional complexity results in loss of welfare (paradoxically accepted orders), fairness issues (rejecting in-the-money orders), and performance issues (such as suboptimal solutions). At the end of March 2021, a study was conducted that provided greater insight into side payments, impacts on the market, legal aspects and possible interdependencies.

d) Flow-based capacity allocation and the integration of Evolved Flow-based into EUPHEMIA

In line with the legal requirements, in the coming years FBMC will be sequentially extended beyond the Central Western Europe CCR, which went live in May 2015 in the SDAC. The next go-live is planned for the Core CCR in February 2022, comprising the former Central Western Europe CCR and Central Eastern Europe CCR. Following this go-live, Evolved Flow-based is planned to be implemented in the Nordic CCR. Other CCRs will follow in the years thereafter, in line with the requirements of the respective CCMs.

Following the go-live of the ALEGrO high-voltage direct current (HVDC) cable in November 2020, a completely new methodology to integrate the first controllable direct current-interconnector into the Central Western Europe flow-based capacity calculation was developed, called Evolved Flow-based. It is based on the introduction of virtual hubs into the capacity calculation process on both sides of the connecting stations of the ALEGrO cable, which are treated similarly to bidding zones. This represents a significant improvement in existing technologies within the framework of the developments also for the benefit of future (Core) market coupling.

Two design changes have improved EUPHEMIA's performance. Firstly, the computation time for the market coupling algorithm has been reduced by a new approach to long-term allocation. Secondly, Central Western Europe has transitioned from intuitive to plain FBMC. This means that non-intuitive flows from a bidding zone with a higher price, to a bidding zone with a lower price, are allowed if they are increasing overall welfare in Central Western Europe.

84 This means that products can be matched with different time granularities.
85 Possibility to define network constraints under different time granularities

5.2 Single intraday coupling

At the time of this report, the pan-European SIDC serves 27 countries (see **Figure 19**), 22 of which are operational with at least one border.[86] In total, 30 TSOs and 15 NEMOs cooperate under the Intraday Operational Agreement ('IDOA') aimed at governing the SIDC.

SIDC enables continuous cross-border trading across Europe. It is based on a common IT system with a shared order book, a single capacity management module ('CMM') and a shipping module. The common IT system facilitates the continuous matching of orders from market participants from several bidding zones, provided that cross-zonal capacity is available. The IT system also enables multiple NEMOs to participate per country.

5.2.1 Governance

IDOA governs the pan-European SIDC. This agreement regulates the cooperation of TSOs and NEMOs regarding the establishment, amendment and operation of the market coupling. It was agreed to by all TSOs[87] and NEMOs[88] of the EU Member States plus Norway. Several TSOs and NEMOs from Non-EU Member States (such as the Serbian TSO, EMS) are currently in the process of becoming observers to SIDC.

The TSO Cooperation Agreement for Intraday Coupling ('**TCID**'), and a NEMO-only agreement, the All-NEMOs Intraday Operational Agreement[89] ('**ANIDOA**') complements the contractual framework. Local arrangements contribute to the operation of the SIDC by specifying or completing the general principles described in the IDOA. These contracts have been amended in 2019 to bring them in line with IDOA.

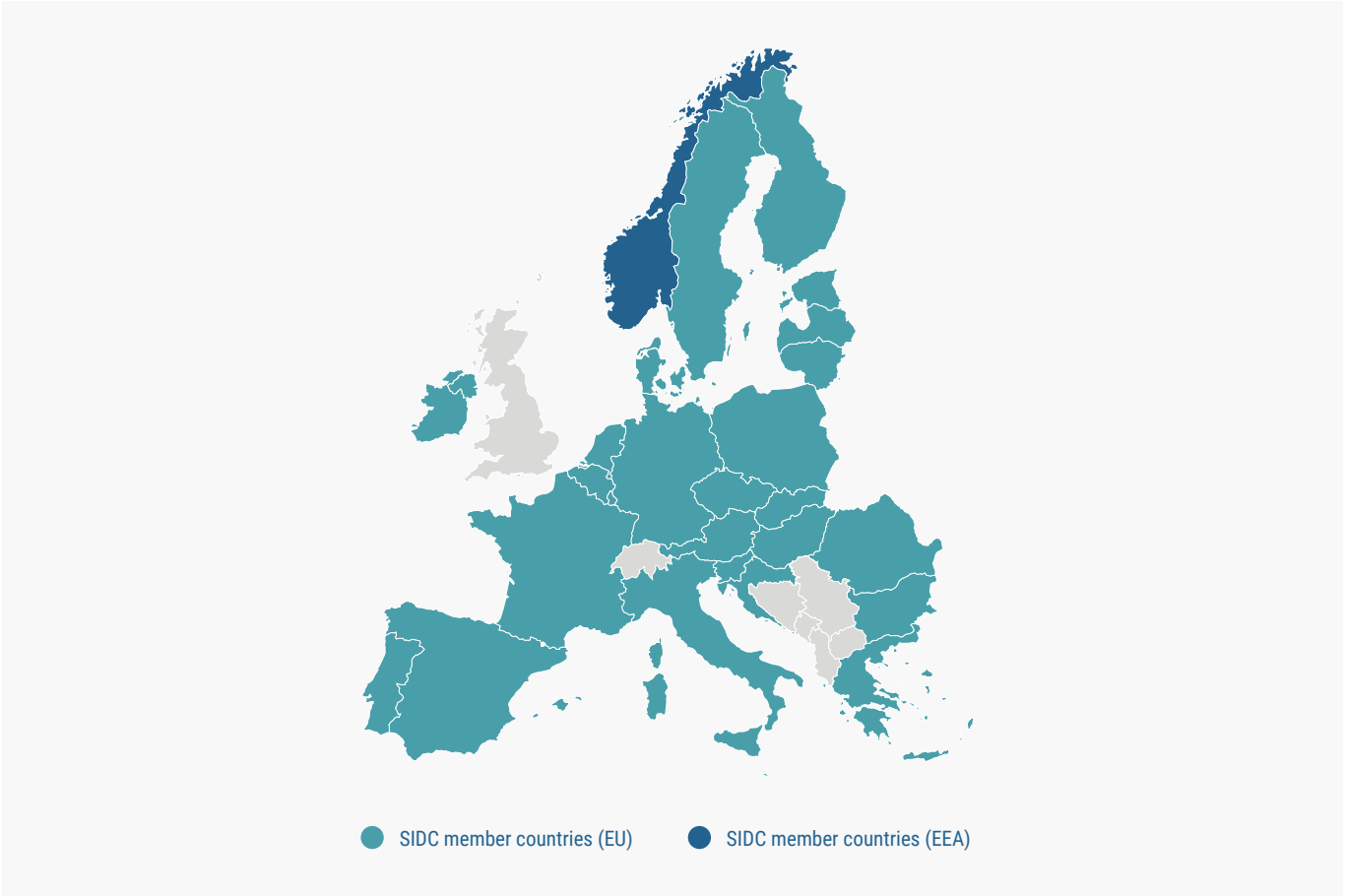


Figure 19 – SIDC member countries (as at May 2021)

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

87 50Hertz, Amprion, AST, APG, EPS, Creos, ESO, Elering, ELES, Elia, Energinet, EirGrid, Fingrid, HOPS, IPTO, Litgrid, MAVIR, Transelectrica., PSE, REE, REN, RTE, SONI, Statnett, Svenska Kraftnät, TenneT Germany, TenneT NL, Terna and Transnet BW.

88 BSP SouthPool, CROPEX., EirGrid, EPEX SPOT, EMCO, GME, HEnEx, HUPX, IBEX, OKTE, OMIE, OPCOM, OTE, SONI and TGE

89 The intraday operational agreement sets forth the rights and obligations of NEMOs and TSOs with respect to the implementation of the CACM regulation, which requires the cooperation of all TSOs and NEMOs at a European level, including sharing of common NEMO and TSO costs.

5.2.2 Operations

The SIDC has been operational in 15 countries since 12 June 2018. The first delivery was on 13 June[90] and it was subsequently extended to seven additional countries (Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania and Slovenia), with the first deliveries taking place on 20 November 2019.[91]

As s of June 2021, the joint TSOs and NEMOs single intraday coupling IT system with one shared order book ('SOB'), the CMM, and a shipping module ('SM') continues to perform operationally robust,[92] even after significant extensions end of 2019 and significant market growth in intraday. In total, almost 80 million trades have been executed within SIDC since its inception in June 2018 (counting until end of February 2021[93]). See **Figure 20**.

Figure 21 shows all unplanned and planned non-availabilities of the SIDC since the go-live in June 2018. In 2018 the total downtime summed up to 8 hours and 51 minutes, of which 46 minutes were unexpected and 8 hours and 5 minutes were planned. In the full year 2019, the total downtime summed up to 25 hours and 42 minutes, of which 17 hours and 57 minutes were unexpected and 7 hours and 45 minutes planned. In 2020, the total downtime summed up to 22 hours and 19 minutes, of which 8 hours and 9 minutes were unexpected. In the year 2021 (until the end of April), the total downtime summed up to 13 hours and 56 minutes, of which 8 hours and 47 minutes were planned. In total, since the go-live about 3 years ago, the downtime summed up to 70 hours and 48 minutes.

In the observational period, two 'hotfixes' solved problems with downloading shipping module reports and duplicated netted schedule files in the CMM. A third release of the SIDC solution, developed during the agile pilot phase, introduced three major functionalities necessary for the secure operation of the intraday market. Shortly after this third release, a smaller dedicated release enhanced the submission of offered capacity data from the cross-border intraday (XBID) CMM to the ENTSO-E Transparency Platform. A fourth release (called Release 3.1) introduces a CMM graphical user interface refresh function, which makes operation more secure. The release also includes additional reporting features related to introduction of new indicators according to algorithm monitoring requirements. It aligns existing reporting on the lifecycle of orders and trades in the cross-border intraday (XBID) system with REMIT requirements.

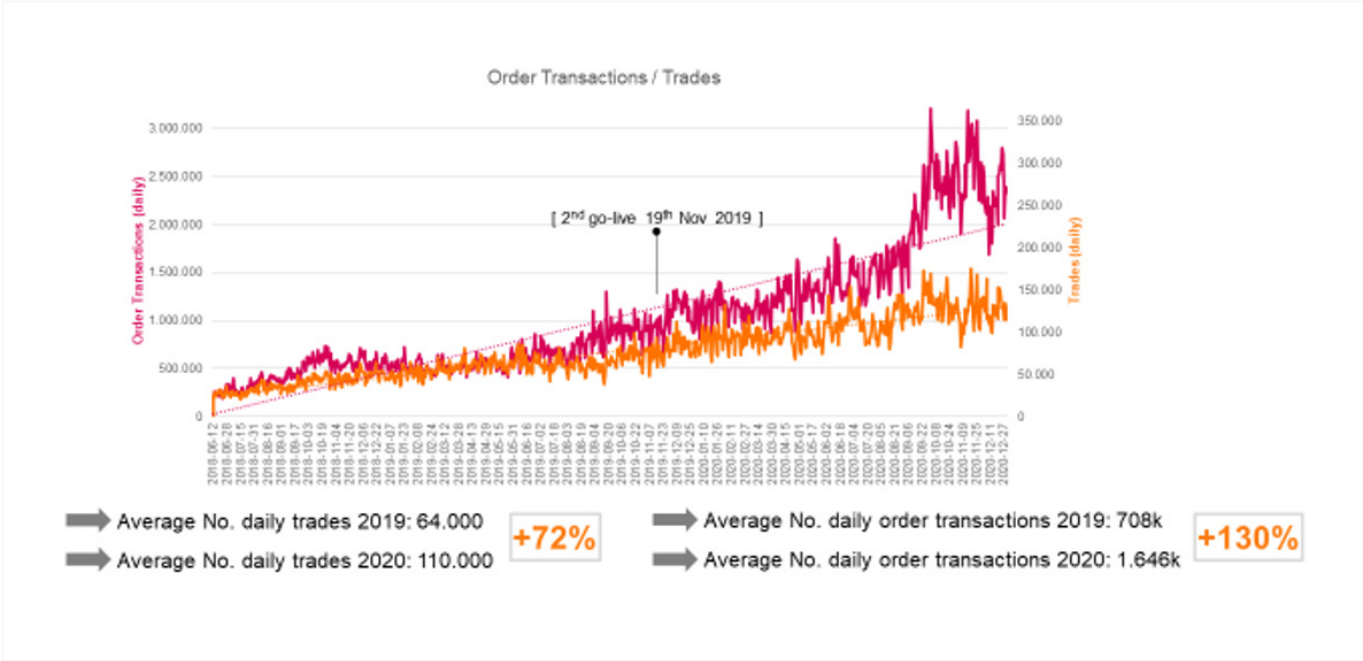


Figure 20 – SIDC order transactions/trades

90 See this ENTSO-E article.
91 See also – [Link]
92 https://www.entsoe.eu/network_codes/cacm/implementation/sidc/
93 See also – [link]

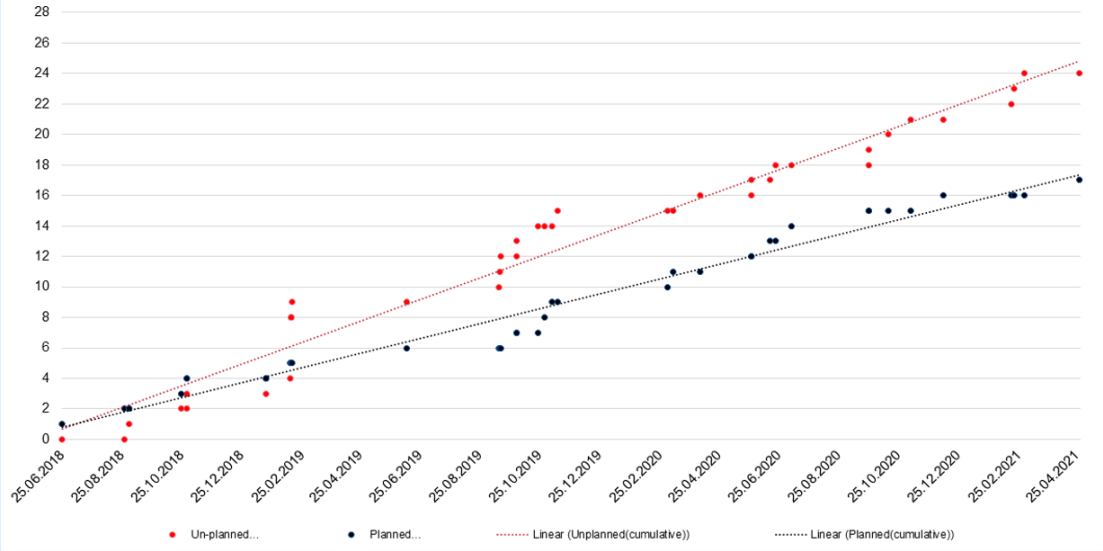


Figure 21 – Unplanned and planned non-availabilities of SIDC (as of April 2021)

CCR	Bidding zone border[94]	Effective Gate Opening Time (GOT)[95] as of time of this report	Cross-border capacities published at effective GOT	The point in time cross-border capacity is made available after effective GOT
Baltic	EE – FI EE – LV LV – LT LT – SE4	15:00 CET D-1	Calculated cross-border capacity	N/A
	LT - PL		0	18:00 CET D-1
Core	DE – NL FR – BE BE – NL DE – FR DE – AT DE – PL DE – CZ CZ – PL CZ – AT HU – RO SI – AT HR – SI HR – HU	15:00 CET D-1	0	22:00 CET D-1[96]
Hansa[97]	DE – DK1 DK1 – NL DE – DK2 NO2 – NL PL – SE4 DE – NO2 DK1 – DK2	15:00 CET D-1	0	18:00 CET D-1

Table 17 – Overview of SIDC gate opening times (as of May 2021)

Additionally, the ACER decision of 24 April 2018[98] on intraday cross-zonal gate opening and closing times was put into operation on 1 January 2019, prior to the set timeline on all borders of the first go-live wave, and on 20 November 2019 for the countries that went operational during the second go-live wave. **Table 17** and **Table 18** show the opening times of all currently operational borders.

94 Border of the "Third Wave" are displayed in cursive.
95 As defined in ACER Decision No. 04/2018 – [Link]
96 At the latest
97 SE4-DE/LU is currently under the "start-up phase" of entering Hansa CCR
98 ACER Decision No. 04/2018.

CCR	Bidding zone border	Effective GOT as of as of time of this report	Cross-border capacities published at effective GOT	The point in time cross-border capacity is made available after effective GOT
Nordic	DK1 – NO2 DK1 – SE3 DK2 – SE4 FI – SE1 FI – SE3 NO1 – NO2 NO1 – NO3 NO1 – NO5 NO1 – SE3 NO2 – NO5 NO3 – NO5 NO3 – SE2 NO3 – SE4 NO4 – SE1 NO4 – SE2 SE1 – SE2 SE2 – SE3 SE3 – SE4 NO3 – NO4	15:00 CET D-1	Calculated cross-border capacity	N/A
SEE	RO – BG	15:00 CET D-1	0	16:30 CET D-1
SWE	FR – ES	22:00 CET D-1	Under the NRA's assessment	22:00 CET D-1
	ES – PT	15:00 CET D-1	Calculated cross-border capacity	15:00 CET D-1

Table 18 – Overview of SIDC gate opening times (as of May 2021, continued)

Tables 17 and **18** distinguish between borders that provide cross-zonal capacities at 15:00h and borders that provide cross-zonal capacities in line with the cross-zonal intraday gate opening time proposal of the relevant CCRs.

Besides, the four German TSOs (50Hertz, Amprion, TenneT Germany, TransnetBW) and the German Nominated Electricity Market Operators (NEMOs) EPEX SPOT and Nord Pool are pleased to announce that market participants will soon be able to trade in the continuous intraday time frame across all four TSO scheduling areas in the German/Luxembourg bidding zone from 15:00h CET. The agreement to this effect between all parties was facilitated by the Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway (Bundesnetzagentur). Testing has already started, with go-live envisaged for 31 May 2021.

Market participants will then be able to trade without limitations in the German/Luxembourg bidding zone from 15:00 CET on the day before delivery, based on combined market liquidity from the continuous markets of all German NEMOs (irrespective of which NEMO they have chosen as a service provider) - three hours earlier than currently.

Under the newly agreed arrangements, both NEMOs have committed to use the SIDC (XBID) system from 15:00 CET each day, meaning that they will provide all orders received from their market participants entirely to the SIDC system

5.2.3 Expenditures

TSOs and NEMOs provide an annual detailed cost report to ACER and the NRAs in accordance with Article 80 of the CACM regulation. [99]

This section provides a summary of common costs of establishing, amending and operating the SIDC, categorised by TSO-only costs, NEMO-only costs and joint costs. **Figure 22** and **Figure 23** depict the budgeted and actual costs as of 2017.[100]

All TSO cost (e.g. external TSO support), all NEMO cost (e.g. third-party services) as well as all TSOs and NEMOs cost (e.g. advanced SIDC solution) are governed by the respective cooperation agreements (i.e. all-TSO cooperation agreement for single intraday coupling, all-NEMO Intraday cooperation agreement and Single Intraday Coupling Operations Agreement).

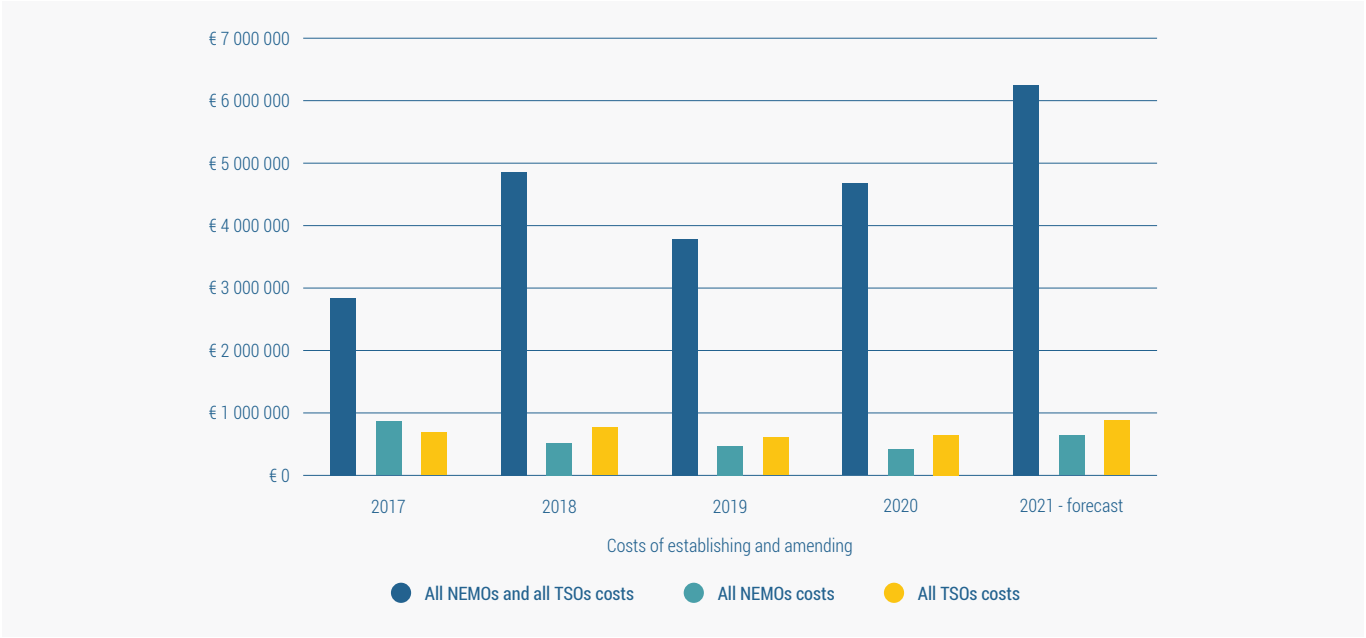


Figure 22 – Overview of SIDC for "all TSOs costs", "all NEMOs costs" and "all NEMOs and all TSOs costs" for the establishing and amending

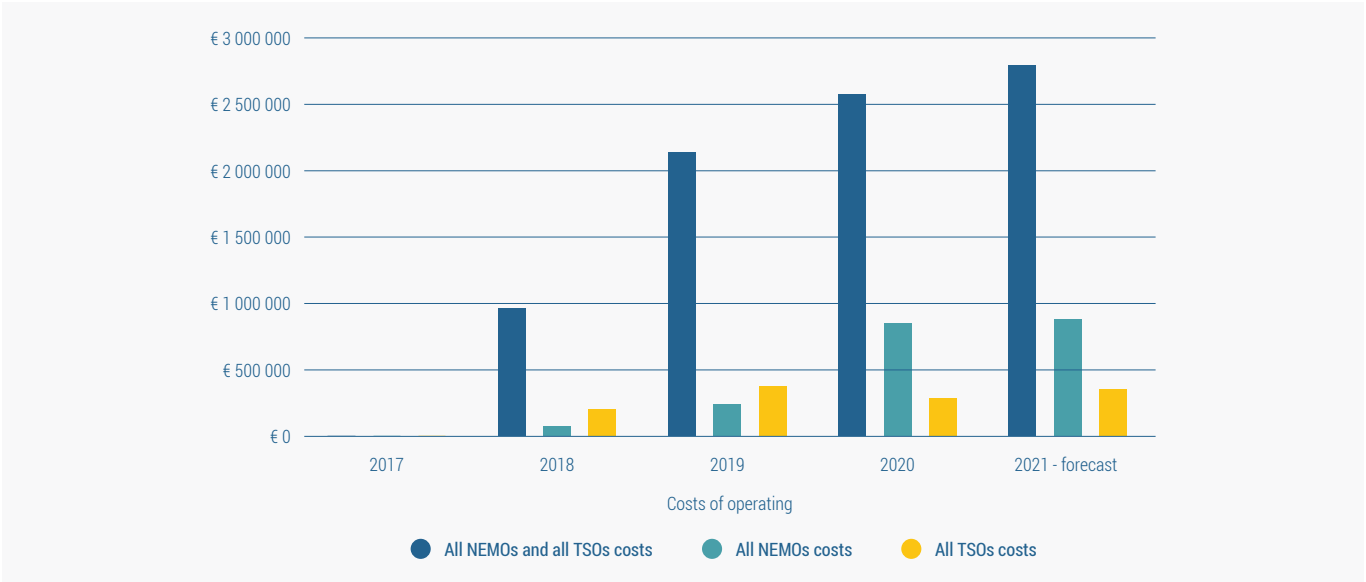


Figure 23 – Overview of SIDC for "all TSOs costs", "all NEMOs costs" and "all NEMOs and all TSOs costs" for operating

99 CACM Cost Reports: 2018, 2019.

100 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.

5.2.4 Evolution

A. Extensions:

SIDC continues to be developed with respect to topology and system functionalities.

The next SIDC topology extension is the planned go-live of the third wave, which aims to integrate the northern Italian borders (IT–FR, IT–AT and IT–SI) and the Italian internal bidding zone borders into the already coupled intraday region.

Third wave go-live

- The third wave go-live integrates the AT–IT, IT–FR and IT–SI borders, as well as the Italian internal bidding zone borders, into SIDC and involves the TSOs[101] and NEMOs[102] of Austria, France, Italy and Slovenia.
- Project governance has been formalised in the Cooperation Agreement for the Design and Implementation Phases of the Intraday Italian Borders Working Table, to which the Bulgarian TSO and NEMO were added in early 2020. The project foresees the implementation of implicit auctions complementing continuous trading on selected bidding zone borders (Italian bidding zone borders, and the IT–SI and GR–IT borders), in accordance with the TSO proposal approved by the relevant regulatory authorities on complementary regional auctions, in accordance with Article 63 of the CACM regulation.
- The testing campaign is progressing well. Functional integration tests were successful and simulation integration tests are under way.
- the Italian ancillary services market is undergoing a major reform, meaning that the two projects will go live at the same time. Market participants have therefore requested that sufficient time be allowed to adapt to the forthcoming changes. The project timeline has been revised so that this request can be fulfilled.[103]
- The go-live and the complementary implicit auctions of the said borders are expected to take place on 21 September 2021.[104]

101 Terna, APG, RTE, ELES and IPTO.
102 BSP Energy Exchange LLC, EPEX SPOT, GME, HEnEx, EMCO and IBEX.
103 See this press release on 30- and 15-minute products and go-live update.
104 A pre-launch event was held on 29 April and a trial period with market parties will start on 21 June 2021.

Fourth wave go-live

- The fourth wave go-live integrates the GR–IT and GR–BG bidding zone borders into SIDC and involves the TSOs[105] and NEMOs[106] of Bulgaria, Greece and Italy.
- The go-live is expected in the first quarter of 2022.

Fifth wave go-live

- The fifth wave go-live integrates the CZ-SK, PL-SK and SK-HU bidding zone borders into SIDC and involves the TSOs[107] and NEMOs[108] of Czech Republic, Hungary, Poland and Slovakia.
- This project is expected to go live in Q4 the last quarter of 2022.

Capacity calculation region	Bidding zone border	Project	Planned go-live date
Greece–Italy	NORD – CNOR	LIP 14	Q3 2021
Greece–Italy	CNOR – CSUD	LIP 14	Q3 2021
Greece–Italy	CNOR – SARD	LIP 14	Q3 2021
Greece–Italy	SARD – CSUD	LIP 14	Q3 2021
Greece–Italy	CSUD – SUD	LIP 14	Q3 2021
Greece–Italy	SUD – CALA	LIP 14	Q3 2021
Greece–Italy	CALA – SICI	LIP 14	Q3 2021
Greece–Italy	IT – GR	LIP 14	Q1 2022
South East Europe	GR – BG	LIP 14	Q1 2022
Italy North	IT – AT	LIP 14	Q3 2021
Italy North	IT – FR	LIP 14	Q3 2021
Italy North	IT – SI	LIP 14	Q3 2021
Core	CZ – SK	LIP 17	Q4 2022
Core	PL – SK	LIP 17	Q2 2023
Core	SK – HU	LIP 17	Q4 2022
Core	HU – SI	N/A[109]	Q1 2022

Table 19 – SIDC extension roadmap (as at May 2021)

B. New functionalities:

New releases of the SIDC IT solution

The SIDC IT solution based on the share order books, capacity management and shipping modules continues to be periodically improved. In the second quarter of 2021, release 3.1 was launched, which will add functionality required for regulatory reporting purposes and important usability improvements for SIDC operations. For 2022, SIDC is planning a major release (release 4.0) for which scoping is ongoing. This IT release includes:

a) Cross-product matching

The cross-product matching feature will enable products with different delivery periods to be matched and involves matching one order with several others. It enables the matching of 15-minute and 60-minute products, 30-minute and 60-minute products, 15-minute and 30-minute products, and any combination of the above (such as two 15-minute products and one 30-minute product with one 60-minute product).

The technical design is still being finalised. SIDC will organise a stakeholder event to inform market

105 Terna, ESO and IPTO.
106 GME, IBEX and HEnEx.
107 EPS, MAVIR, PSE and SEPS.
108 EPEX SPOT, EMCO, HUPX, OKTE, OTE, and TGE.
109 As all Parties involved are operational in SIDC formal LIP establishment is not foreseen for now.

participants of the forthcoming changes once the design is sufficiently developed.

As of 10 December 2020, 30-minute cross-border products are tradable on the Belgian–French border, 15- and 30-minute cross-border products are tradable on the BE–DE, BE–NL and NL–DE borders and 15-minutes products are tradable on the AT–HU border. This provides Dutch and Belgian market participants with access to the existing liquidity of 30-minute products already available in France and Germany. In addition, the already coupled intraday market for Austria, Germany and Slovenia's 15-minute products will be extended to Belgium, Hungary and the Netherlands. Finally, the HU–RO border introduced 15–minute products on the 10 February 2021.

Additional border adaptations are planned to further extend cross-border trading opportunities for smaller granularity products (see **Figure 24**).

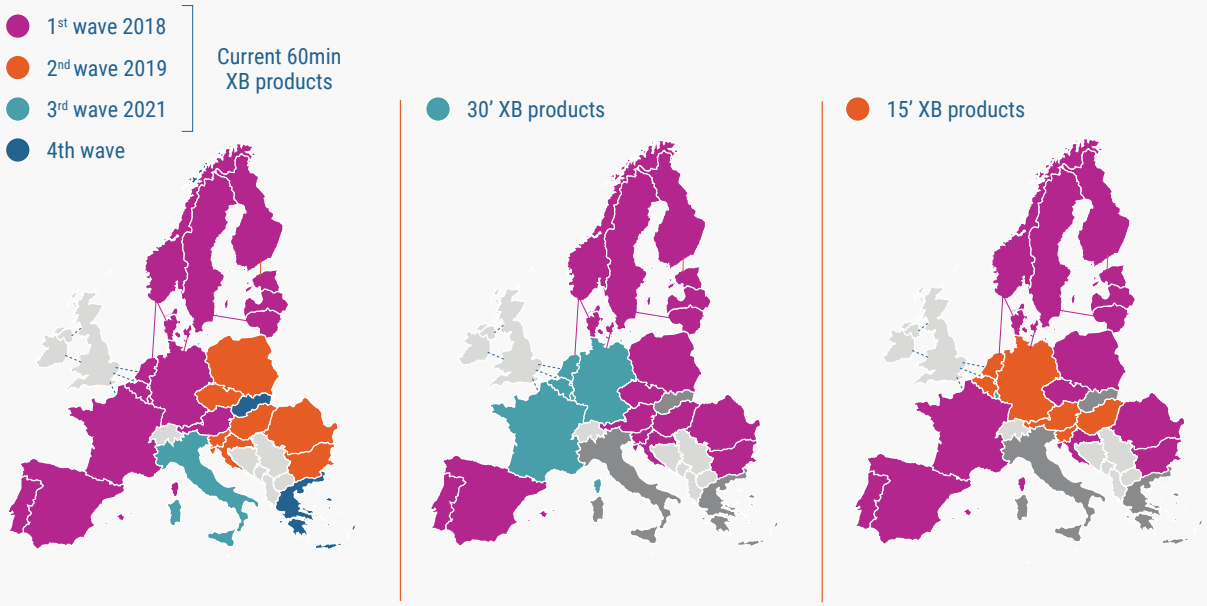


Figure 24 – Map of the implementation of 30-minute and 15-minute cross-border products

The introduction of these products will allow market participants to sell or buy cross-border products with the same resolution as the ISPs within the bidding zones concerned. This will enhance the possibilities for imbalance management by market parties, closer to real time. It will also allow market parties to access existing market liquidity where cross-border products with such a resolution are already in place.

These products will supplement the 60-minute cross-border products currently in place. Bids for 15- and 30-minute products will be added to the shared order books of the NEMOs, which will contain 15-, 30- and 60-minute products.

Bids made for 15-, 30- and 60-minute products will be matched with other cross-border products with the same time resolution. For example, a bid for a 15-minutes product will be matched with another bid for a 15-minute product. The possible implementation of a cross-product matching functionality in the SIDC platform, through which multiple 15-minutes products could be matched with a 30- or 60-minute product, is under investigation by the TSOs and NEMOs.

b) Transit shipping: a short-term and enduring solution

The transit shipping functionality is needed to clear transactions across the entire coupled region. Transit shipping can be defined as the shipping of energy and related financial rights and obligations originating from trades through delivery areas along the allocation path in which neither source nor sink NEMOs, their CCPs or shipping agents are active.

To ensure a timely go-live of the second wave in November 2019, EMCO and EPEX/ECC implemented a six-month interim rotational scheme under which EMCO provided transit shipping services to all NEMOs in the first three months, and EPEX/ECC took over this task for three months afterwards. Upon NRAs' request, the rotational scheme was extended until November 2020, before the previous period ended.

On 15 September 2020, the ACER Board of Regulators requested by formal letter that EMCO and EPEX/ECC extend the rotational approach until a long-term shipping solution is implemented.

To decide on a long-term shipping solution, the NRAs asked the SIDC parties to conduct a cost-benefit analysis (CBA) on the feasible options.[110] This analysis was delivered by SIDC in three parts, the last of which was submitted to the NRAs in April 2021.

c) Flow-based allocation in continuous trading

SIDC is required to implement flow-based allocation by August 2023. Two regions within the SIDC are currently implementing flow-based: Core and Nordics. The design work has started and will require investigations beyond pure allocation matters, such as on how shipping needs to be adapted to enable flow-based implementation.

d) European intraday auctions

The current SIDC continuous trading mechanism does not allow for congestion rent generation. As a consequence, the transmission capacity is not priced: any remaining or newly released capacity after the day-ahead market clearing is allocated for free, on a first-come first-served basis.

After handing over the responsibility from the NEMO Committee in February 2020, the work on the implementation of intraday auctions (IDAs) to enable capacity pricing has been carried out under SIDC responsibility. At the moment of writing of this report, the decision on how EUPHEMIA (where the IDAs will be executed) and SIDC will be connected is still to be taken.

In parallel with the technical design SIDC parties-initiated discussion with SDAC as well as PCR (SDAC service provider) on the terms of reference that will define the cooperation between the three projects for the implementation and operation of IDAs.

e) Implicit intraday losses

In the SDAC, implicit losses on HVDC interconnectors have been possible to apply since 2014 as an integrated part of the day-ahead algorithm. Applying the losses will, in most cases, require regulatory approval. Implicit losses prevent electricity from flowing on the interconnector if the price difference between adjacent bidding zones is lower on the losses on the interconnector. As of spring 2021, a solution in the intraday time frame is still being designed.

f) Offered capacity published at ENTSO-E Transparency Platform

The current means of publishing offered capacity does not offer the option to indicate that no transmission capacity is available during an interconnector halt. As an interim solution, a disclaimer will be included on the ENTSO-E Transparency Platform. As a long-term solution, the available capacity will be indicated as '0' when cross-border trading is halted.

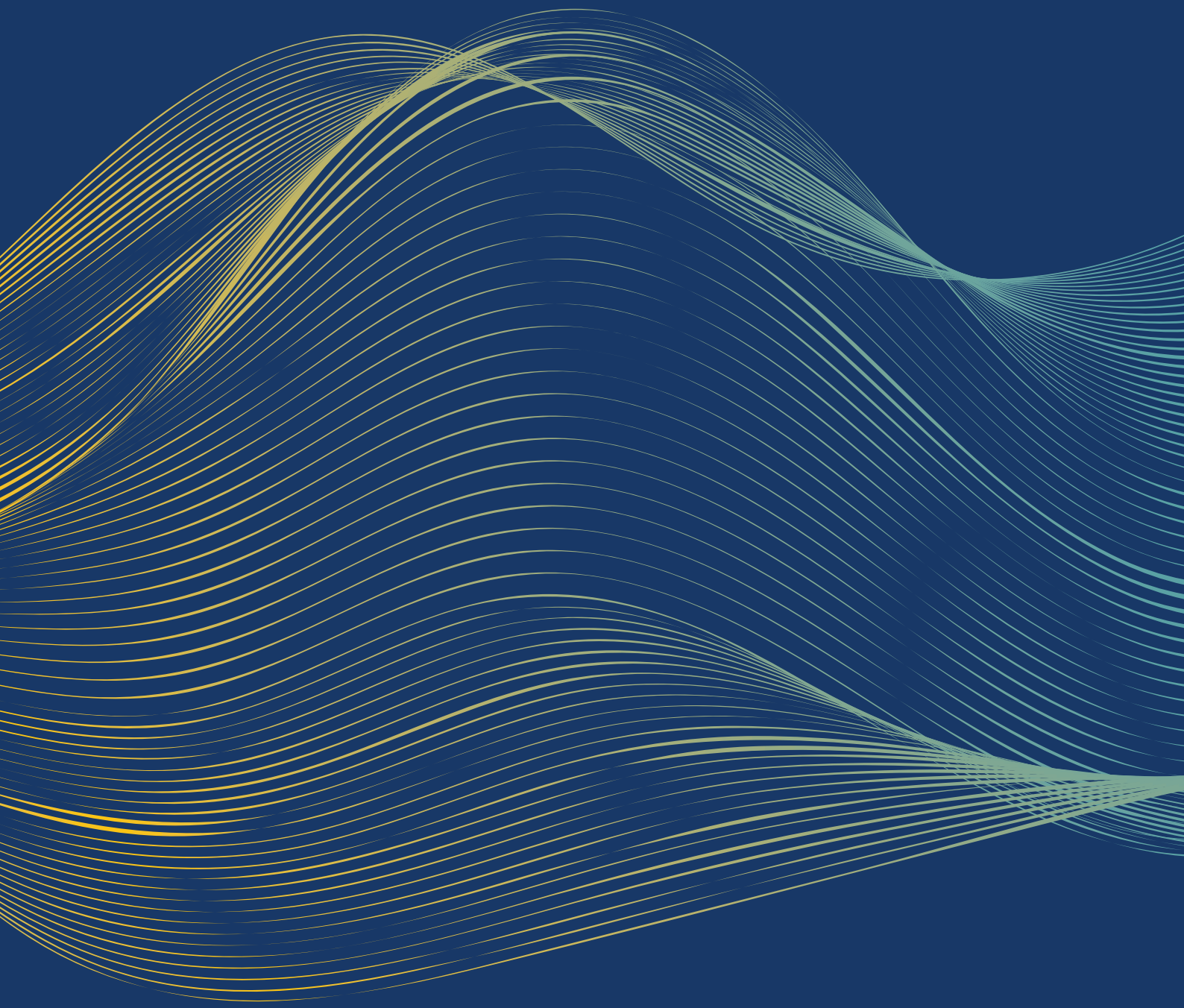
5.3. Common SDAC and SIDC governance

TSOs and NEMOs are working more efficiently within SDAC and SIDC, and also in terms of governance by designing a joint governance structure called the Market Coupling Steering Committee for both time frames, which will be progressively implemented in 2022. As part of this governance change, the legal and communication task forces of both projects will be merged.

5.4. Impact of the Brexit Withdrawal Agreement

The UK Withdrawal Agreement's EU signature was followed by a transition period of 11 months. When this transition period ended on 31 December 2020, the UK parties could no longer participate in the EU's dedicated platforms. The UK parties have been working on alternative fallback solutions that have been used since 1 January 2021 to trade electricity on interconnectors with the connected EU countries, namely BritNed, East West, IFA, IFA2, Moyle and Nemo Link. As such, the electricity trade is continuing, albeit not with the same efficiency as under the Single Market. For more information about the specific interconnectors, see section 5.1.4 – SDAC Evolution.

110 Eight options have been analysed. Four belong to the so-called Europe-wide competing approach, in which shipping is either performed entirely by the NEMOs (from sink to source, even outside their designated territory), or outsourced to another party. The other options to be investigated are the central shipper, single shipper per country and two variants of the hub-to-hub shipping approach.



6. Balancing markets

The European harmonisation of balancing markets and the implementation of the frameworks and methodologies are organised in various projects and cooperations. The European platforms for the exchange of balancing energy play a key role in their implementation and are described in detail in section 6.1. Following the EB regulation, the TSOs define the allocation process of CZC for the exchange of balancing capacity or sharing of reserves through the establishment of a cooperation of two or more TSOs.

The implementation of the cross-zonal capacity allocation and already existing balancing capacity cooperations are described in section 6.2.

The implementation status of the ISH methodology that harmonises the main features of the imbalance settlement is presented in section 6.3

6.1. European platforms for the exchange of balancing energy

The implementation of European platforms for the exchange of balancing energy is an important part of the EB regulation. The platforms ensure that each country's balancing demand is met through activating the most efficient bids in Europe, while also considering operational security constraints. TSOs are required to establish four platforms, each of which are designed and implemented by the following implementation projects:

- the **T**rans-**E**uropean **R**eplacement **R**eserves **E**xchange ('**TERRE**') for the **RR platform;**
- the **M**anually **A**ctivated **R**eserves **I**nitiative ('**MARI'**) for the **mFRR platform;**
- the **P**latform for the **I**nternational **C**oordination of **A**utomated **F**requency **R**estoration and **S**table **S**ystem **O**peration ('**PICASSO**') for the **aFRR platform; and,**
- the **I**nternational **G**rid **C**ontrol **C**ooperation ('**IGCC**') for the **IN platform.**[111]

6.1.1. Framework to implement and operate the platforms

Through Articles 19, 20, 21 and 22, the EB regulation gives all TSOs the responsibility to implement and make operational four European balancing platforms.[112]

The platforms apply a multilateral TSO-TSO model, which means that the BSPs provide services directly to the connecting TSOs, who are TSOs responsible for implementing common merit order lists, the selection of the most efficient bids and the exchange of balancing energy through the AOF, along with the TSO-TSO settlement function.

In addition to the platforms' implementation frameworks, the TSOs have designed and entered into a dedicated contractual framework that further implements the EB regulation, along with three types of agreement:

- **The principal agreement**, which sets out the mutual rights and obligations of TSOs for the implementation of the EB regulation with respect to the platforms and cross-platform functions. The principal agreement covers the four electricity balancing platforms, MARI, PICASSO, TERRE and IGCC. Complementary regional and local activities are outside the scope of the principal agreement.
- **A platform cooperation** agreement per platform, which contain detailed rules concerning the governance and operation of the platform. An operational handbook is attached as an annex to the platform cooperation

111 The IN platform contrary to the other platforms presented in this chapter is not for the exchange of balancing energy, but for the imbalance netting process.

112 RR platform (Article 19(5)), mFRR platform (Article 20(6)), aFRR platform (Articles 21(6)) and IN platform (Article 22(5)).

agreements.

- **Common service provider agreements (CSP)**[113] which establish rules for the development, operation and maintenance of the software to run the platforms and the hosting of the platforms by a CSP (i.e. a TSO among the TSOs).

MARI (mFRR)	PICASSO (aFRR)	TERRE (RR)	IGCC (IN)
mFRR Implementation framework in accordance with EB regulation, Article 20	aFRR Implementation framework in accordance with EB regulation, Article 21	RR Implementation framework in accordance with EB regulation, Article 19	IN Implementation framework in accordance with EB regulation, Article 22
Principal agreement for all the balancing platforms			
MARI platform Cooperation Agreement	PICASSO platform Cooperation Agreement	TERRE platform cooperation agreement	IN platform cooperation agreement
MARI CSP agreement	PICASSO CSP agreement	N/A[114]	N/A - The CSP for IGCC will be included in the PICASSO CSP (shared IT system for both platforms).

Table 20 – Implementation frameworks and agreements on the European balancing platforms

The principal agreement covers the different platforms and therefore contains general provisions (commitments and obligations of the parties, cost-sharing rules, intellectual property, liability, data security, etc.).

The platform cooperation agreements relate to the operation and governance of each platform and can be considered as a link between the implementation framework on the one hand and the operational handbook on the other hand. It contains, for example, provisions on the general framework and structure of the operational handbook, go-live and technical readiness of a platform, the functioning of the Steering Committee, and a procedure for new TSOs to join the platform as a member or an observer.

The CSP agreement contains provisions on common services to be provided by the common service provider, standards of performance, intellectual property of the IT solution, transparency obligations on the common service provider, security and data protection, liability of the common service provider.

Considering the above, the framework designed by TSOs places the operation of the balancing platforms under the overall and direct responsibility of the TSOs, except for what concerns the development, operation, and maintenance of the software to run the mFRR and the aFRR platforms, and the hosting of the mFRR and aFRR platforms, for which a single TSO is mandated as a common service provider. For the mFRR platform, Amprion has been mandated as a common service provider; for the aFRR platform, this is TransnetB. For the RR platform, all the RR TSOs are responsible for the operation of the functions; the hosting and monitoring of the software is contracted by the RR TSOs to an IT service provider.

This framework has allowed several achievements that lead to an efficient implementation of the balancing platforms. For example:

- The TSOs will use the same IT systems and communication channels for the operation of the IN and aFRR platforms.
- The TSOs will re-use the IT system implemented for the RR platform to build the IT system for the mFRR platform.
- The TSOs will implement a capacity management module (CMM) across the platforms. The CMM will centralise the information on the available cross-zonal capacities for all balancing platforms and facilitate its communication between the TSOs and the platforms and between the platforms themselves.

113 The TERRE platform does not have a Common Service Provider (CSP) agreement.

114 For the RR platform, all the RR TSOs are responsible for the operation of the platform. The hosting and monitoring of the IT system are contracted to an IT service provider.

6.1.2. RR platform (led by the TERRE project)

The TERRE project was designated in 2016 to implement the RR platform for exchanging replacement reserves in line with the EB regulation. The year 2020 was the first year of operation of the RR platform with the go-live and the accession of the first TSO, ČEPS, on 6 January 2020.

6.1.2.1. Governance

The TERRE implementation project is under the responsibility of 11 TSO[115] members and observers.

In addition, 3 TSOs are TERRE project members: Svenská Kraftnät, Amprion, and Statnett. The term "project member" was intentionally distinguished from the terms operational and non-operational members. Project members join the TERRE project for the sole purpose of participating in the development operation and management of the IT solution (LIBRA) and obtaining the intellectual property rights of the IT solution in order to make use of and continue to develop it as part of a regional project in the case of the Nordics TSO, or as part of the MARI project.

The structure and governance of the project, and a description of the high-level architecture of the platform were included in the 2020 market report.[116]

6.1.2.2 Operation: market development

The first year of operations of the RR platform with six connected TSO was characterised by a high system availability due to a robust and reliable IT solution. The EB performance indicators presented in this section are described in the 2020 Balancing Report.[117] There were less than five critical incidents affecting usage of the platform. The bidders on the platform submitted 1 638 292 bids amounting to 87 977 859 MWh (monthly offered volumes see **Figure 26**). On average the hourly activations represent 315 MWh (monthly activation volumes see **Figure 27**) with a significantly increasing trend as new BSPs and markets were connected to the platform.

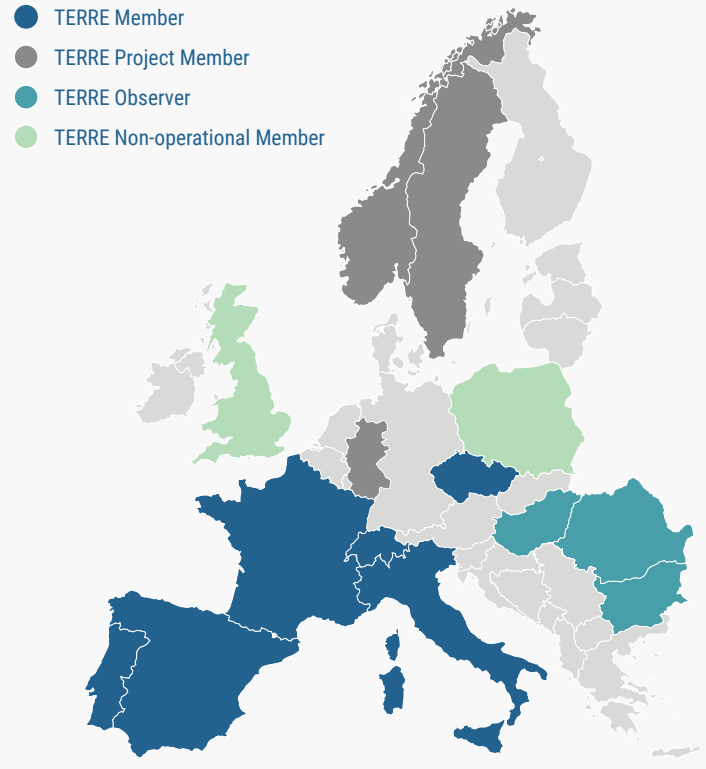


Figure 25 – RR platform: TSO part of the TERRE implementation project (as of June 2021)

115 11 TSOs: 6 operational members RTE, ČEPS, Terna, REN, REE and Swissgrid, 2 non-operational members PSE, and National Grid ESO, and 3 Observers ESO, MAVIR, Transelectrica. ENTSO-E is also an observer

116 See ENTSO-E Market Report 2020, p.19-20.

117 See ENTSO-E Balancing Report 2020, p. 32 f.

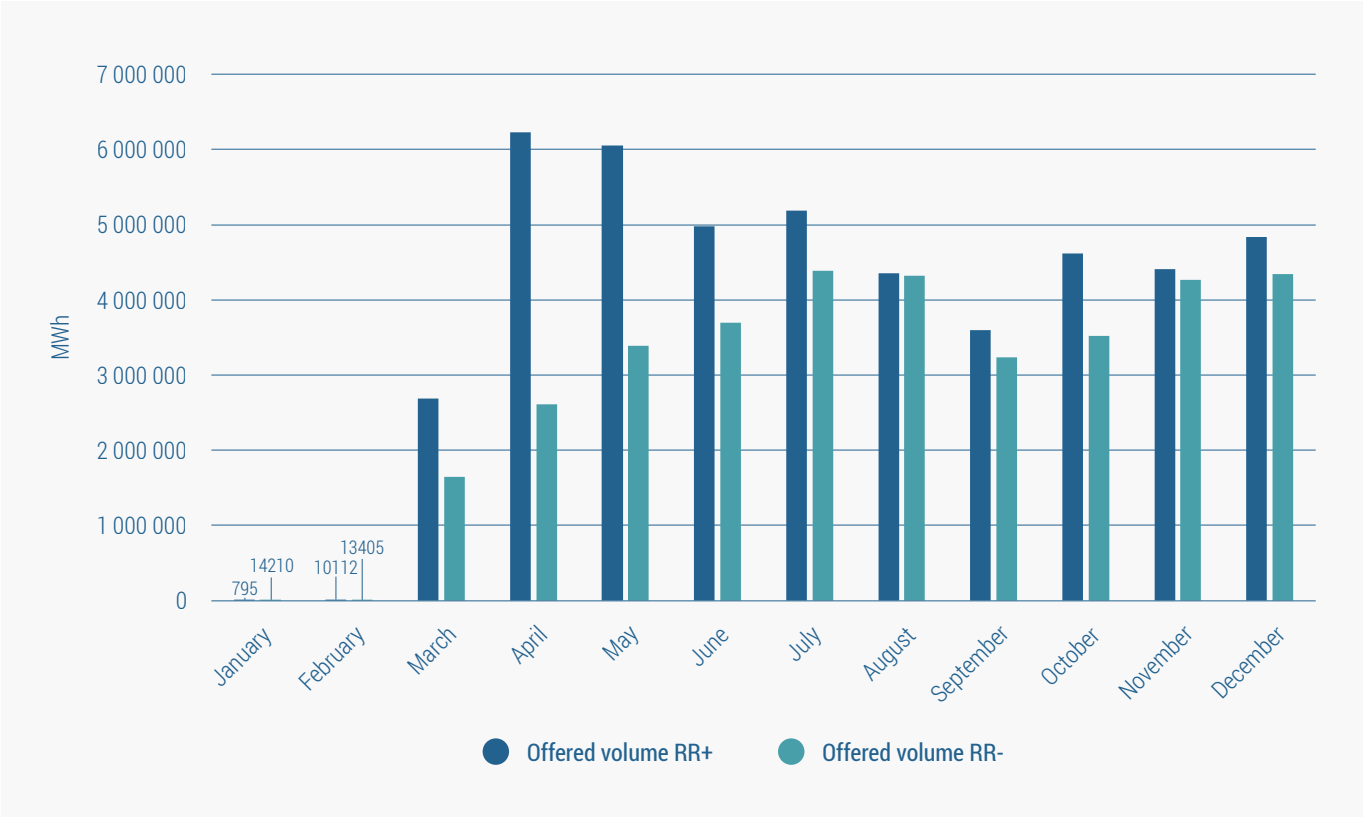


Figure 26 – Monthly offered volume (in MWh) on the RR platform in 2020

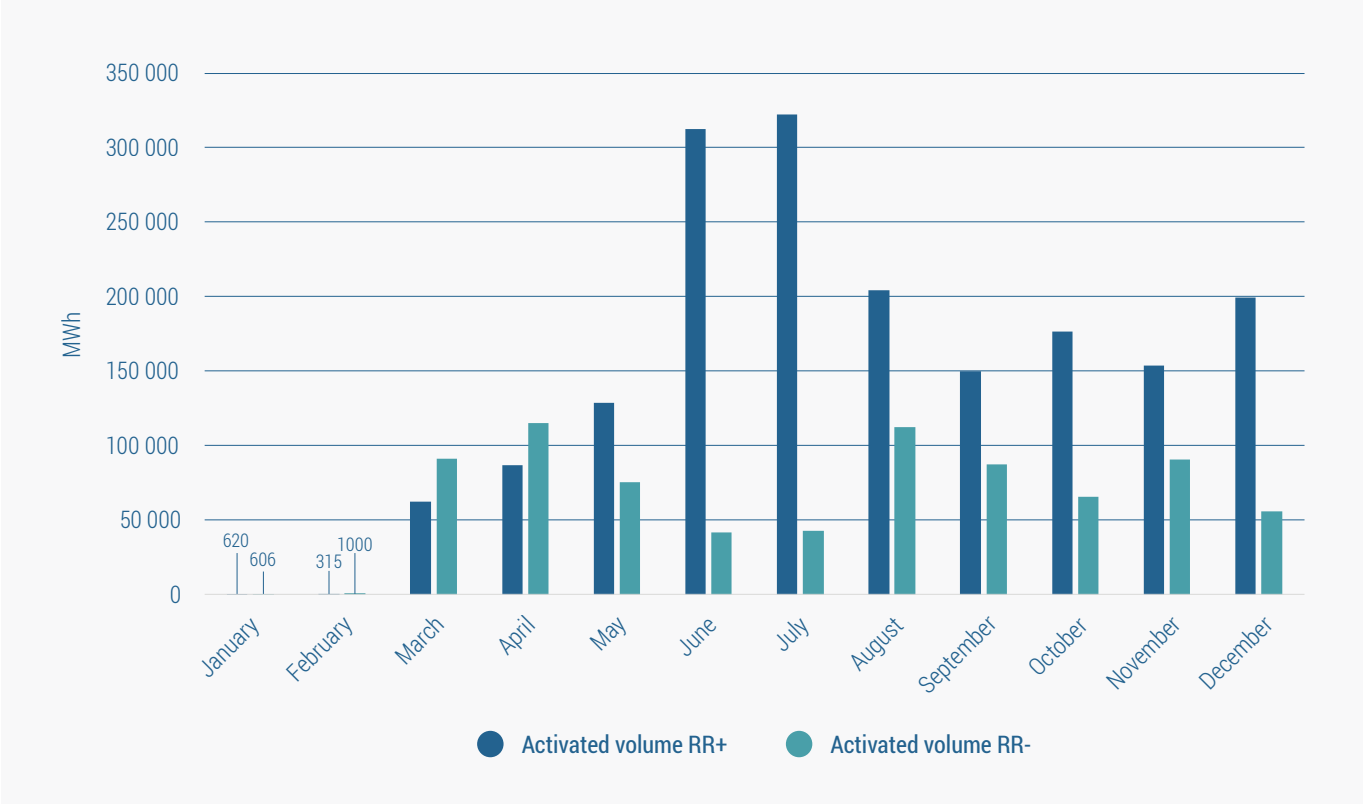


Figure 27 – Monthly activated volume (in MWh) on the RR platform in 2020

The reliability of balancing markets is measured as the level of satisfied competitive TSO balancing energy needs.[118] The ratio of volume of satisfied competitive needs[119] was 99.90 % in 2020. Another indicator is the ratio of hours where the needs (competitive and non-competitive) are not fully satisfied. This was the case in 21.23% of the hours in 2020.[120] Regarding the availability of the bids, **Table 21** indicates the ratio of available bids in comparison with the total offered bids for the year 2020 and for the two TSOs which have been connected on a significant part of the year (ČEPS and REE). It shows a high availability of both upward and downward standard RR balancing energy bid for REE and ČEPS.

The availability over the whole year 2020 for upward bids is depicted in **Figure 28** and the availability for downward bids in **Figure 29**. The volumes significantly increase after REE joined the platform.

	Available upwards standard bids	Available downward standard bids
REE	45 939 366 MW (98,28%)	34 700 972 (99,15%)
EPS	88 495 MW (100%)	261 129 MW (100%)

Table 21 – availability of standard RR balancing energy bids in 2020

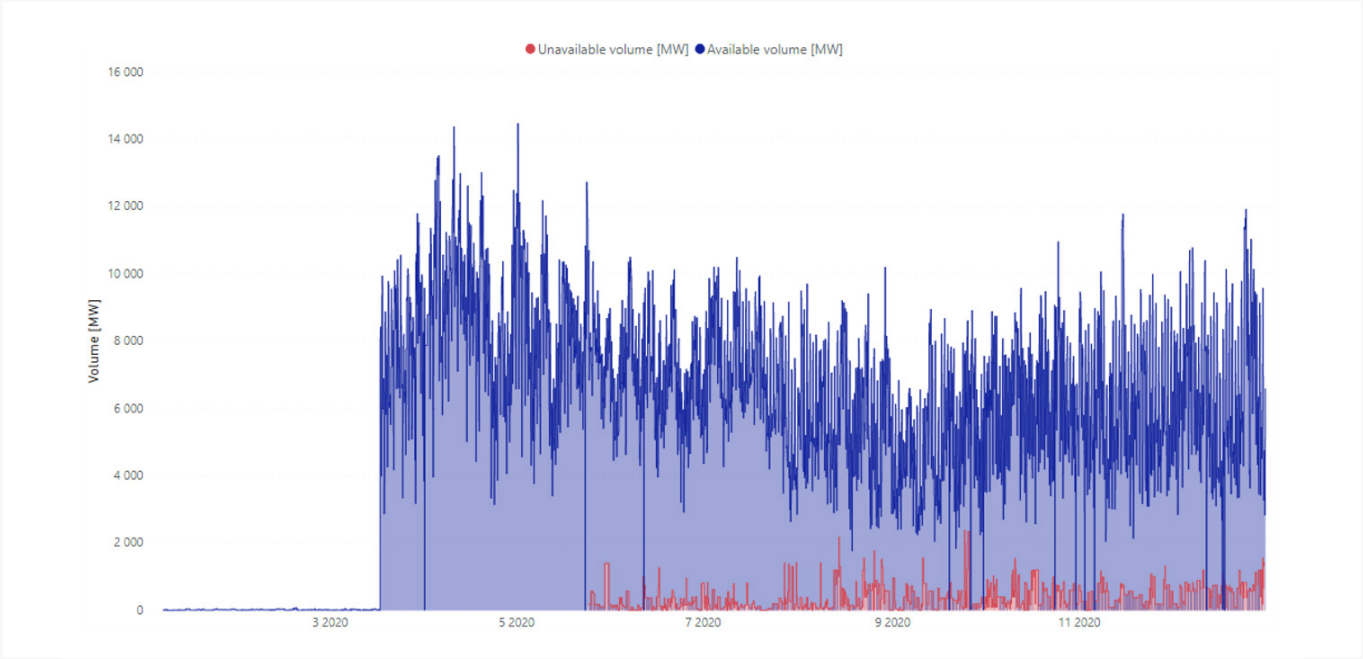


Figure 28 – Availability of upward standard RR balancing energy bids in 2020

118 All inelastic needs are considered as competitive needs. The positive (negative) elastic need is competitive if its price is higher (lower) than the Cross Border Marginal Price (CBMP). An inelastic need does not have a price and may be understood as a need that has to be satisfied "at all costs".

119 Competitive needs include all inelastic needs and only elastic needs whose price is higher for upward need (or lower for downward need) than resulting marginal price.

120 The number of hours with unsatisfied needs is influenced by small amounts of elastic need from EPS which was not satisfied in many hours. Because of the difference in volumes between EPS and REE the reliability is 99.9% (driven by the high amounts of satisfied needs of REE) even though there 21,23% of hours of unsatisfied needs.

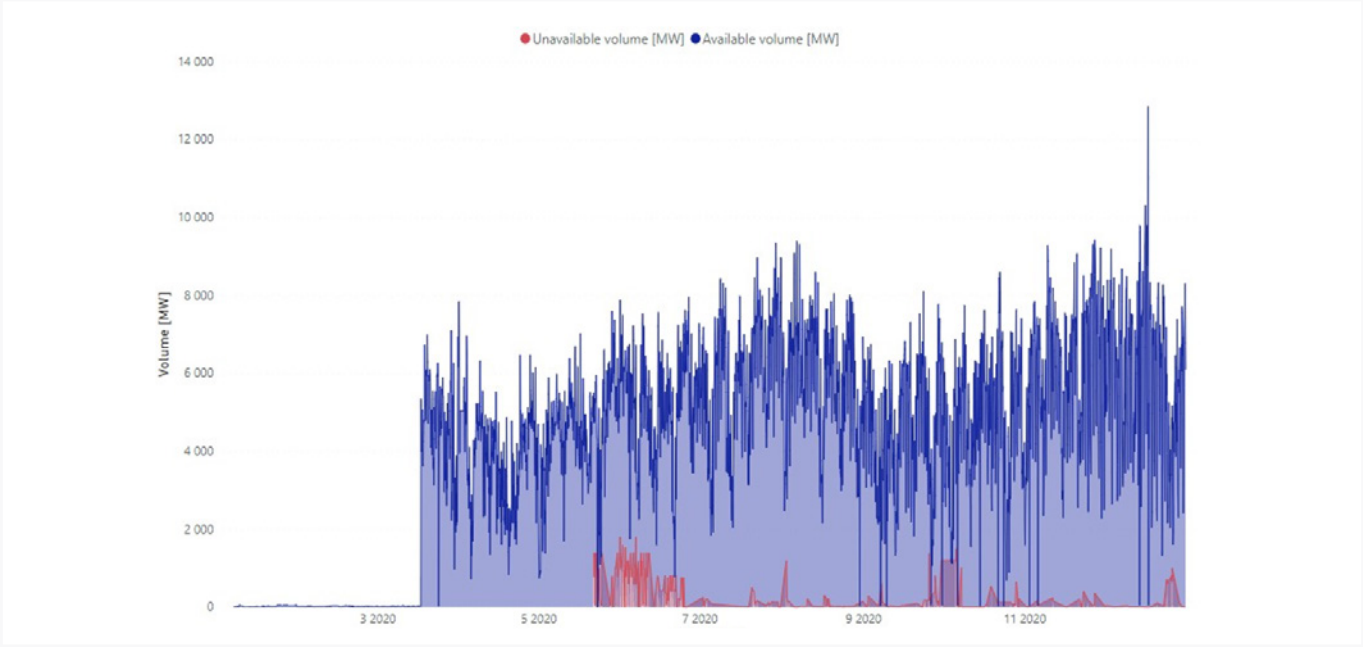


Figure 29 – Availability of downward standard RR balancing energy bis in 2020

Benefits from the use of standard products

This indicator is calculated as the ratio between the sum of balancing energy from standard product imported by the TSOs and the traded volume. The imported by REE volume was 87,183 MWh,[121] the traded volume was 2,202,578 MW in 2020. As ČEPS did not have a neighbouring TSO operational on the TERRE platform in 2020, its import volume is 0. Therefore, the benefits from the use of standard product are 0 for ČEPS.

The possible inefficiencies and distortions on balancing markets

In 2020, the sum of satisfied inelastic needs was equal to 2,389,023 MWh. With the sum of requested inelastic needs [122]of 2,395,546 MWh, the resulting unsatisfied inelastic needs amounted to 6,523 MWh. The inelastic needs and unsatisfied inelastic needs over the course of 2020 are depicted in **Figure 30**.

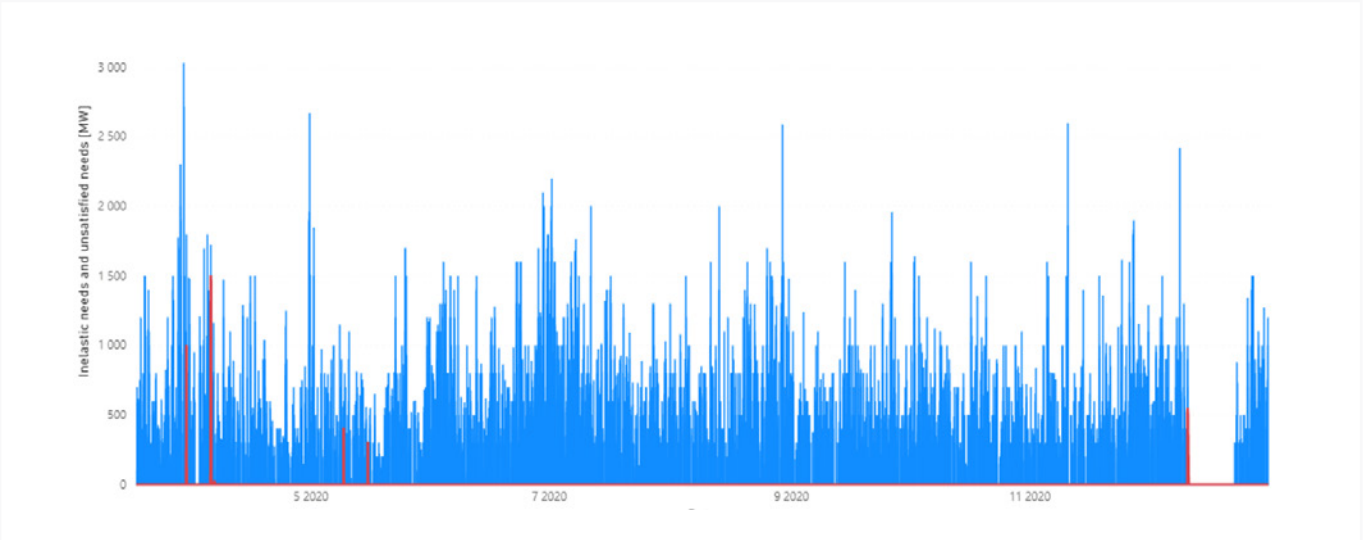


Figure 30 – Inelastic need and unsatisfied inelastic needs in 2020[123]

121 The import volumes do not reflect transit, but only volumes that remain in the country

122 Calculated without the tolerance band which is an additional need quantity that may be satisfied (partially or entirely) in order to accept a bid that is not fully divisible.

123 The data only reflects REE volumes as ČEPS did not use inelastic need in 2020. The gap at the end of 2020 represents a time where no inelastic needs were submitted by REE. The price spikes at the end of 2020 are addressed in **Error! Reference source not found.** of this report.

The volume and price of balancing energy used for balancing purposes, both available and activated, from standard products and specific products

Figure 31 highlights the sum of available upward standard bids submitted by REE and ČEPS per hour, the weighted average price of these bids is presented on the secondary axis. In most hours, the offered price of available upward RR bids is between 40 to 100 EUR/MWh.

Figure 32 below presents the sum of available downward standard bids submitted by REE and ČEPS per hour. The weighted average price of these bids is presented on the secondary axis.

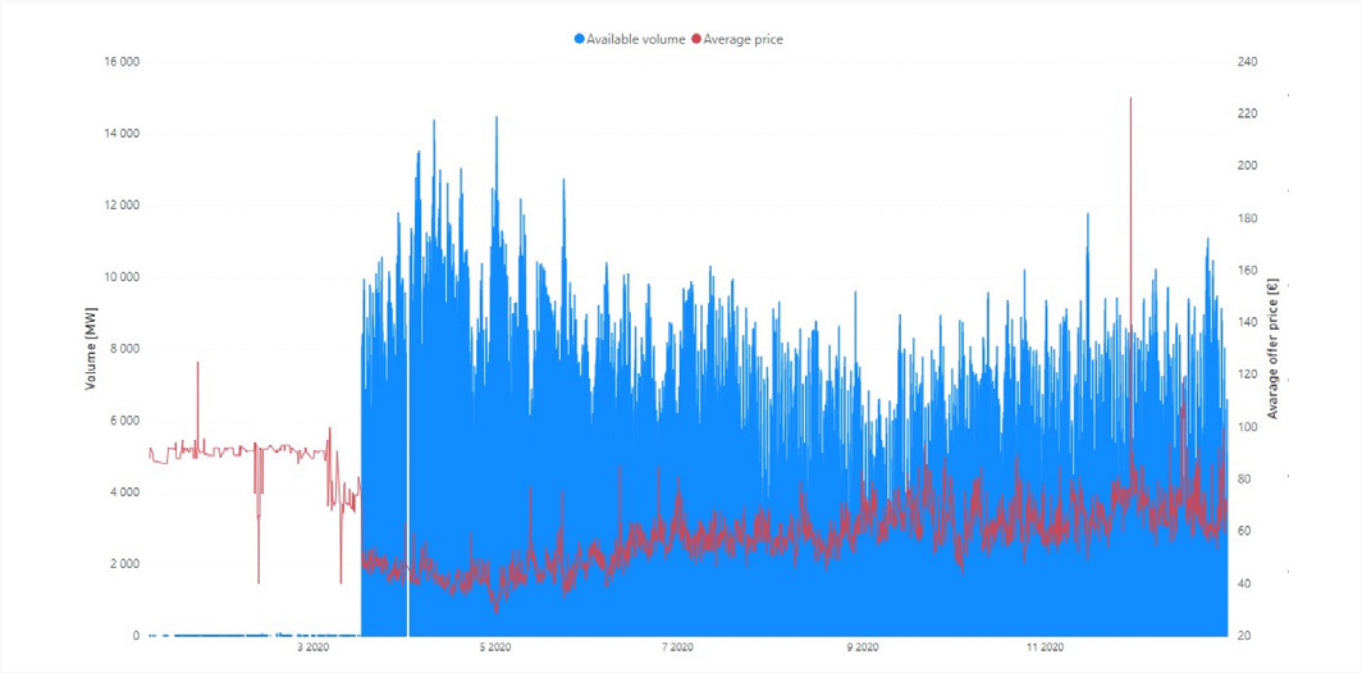


Figure 31 – Volume and average price of available upward standard balancing RR bids

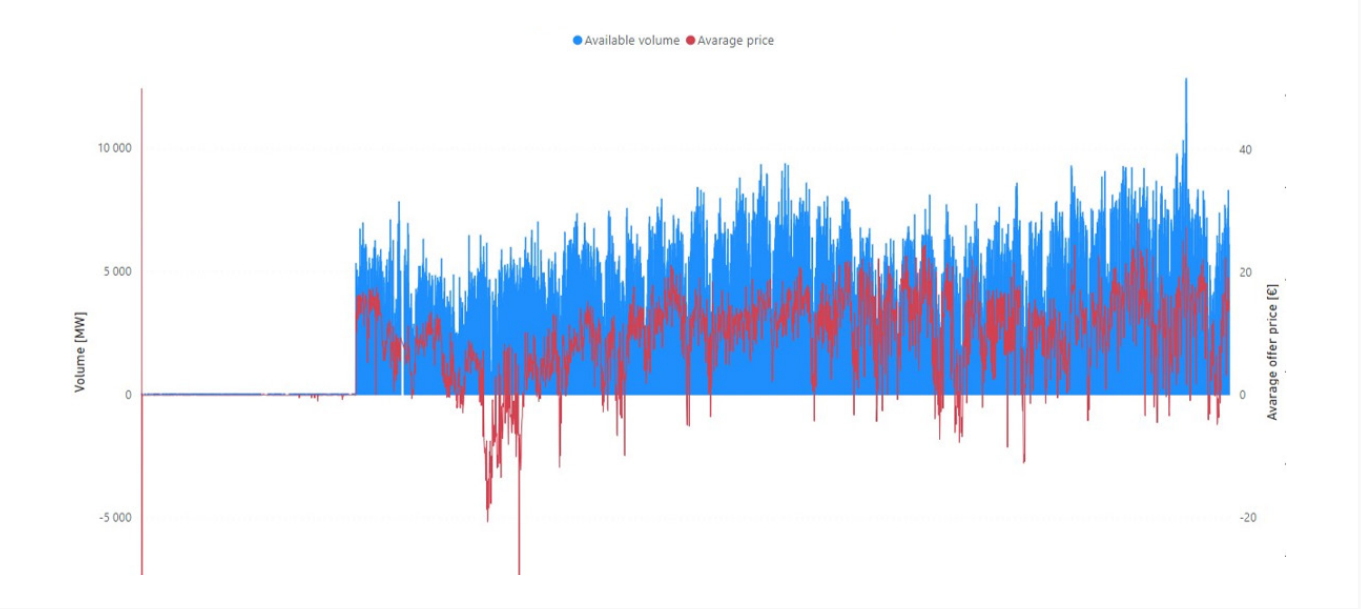


Figure 32 – Volumes and average price of available downward standard balancing RR bids

Figure 33 depicts the sum of activated upward standard RR bids, activated by REE and ČEPS per hour. The weighted average marginal price of these activated bids is shown on the secondary axis. On average, the marginal price of upward bids is around 50 euros. The calculation of the average is based on the separation of RR region 1 and RR region 2.

Figure 34 depicts the sum of activated downward standard RR bids, activated by REE and ČEPS per hour. The weighted average marginal price of these activated bids is shown on the secondary axis. Usually, the marginal price for downward bids is between 0 And 50 Euro, with peaks in October and December. The calculation of the average is based on the separation of RR region 1 and RR region 2.

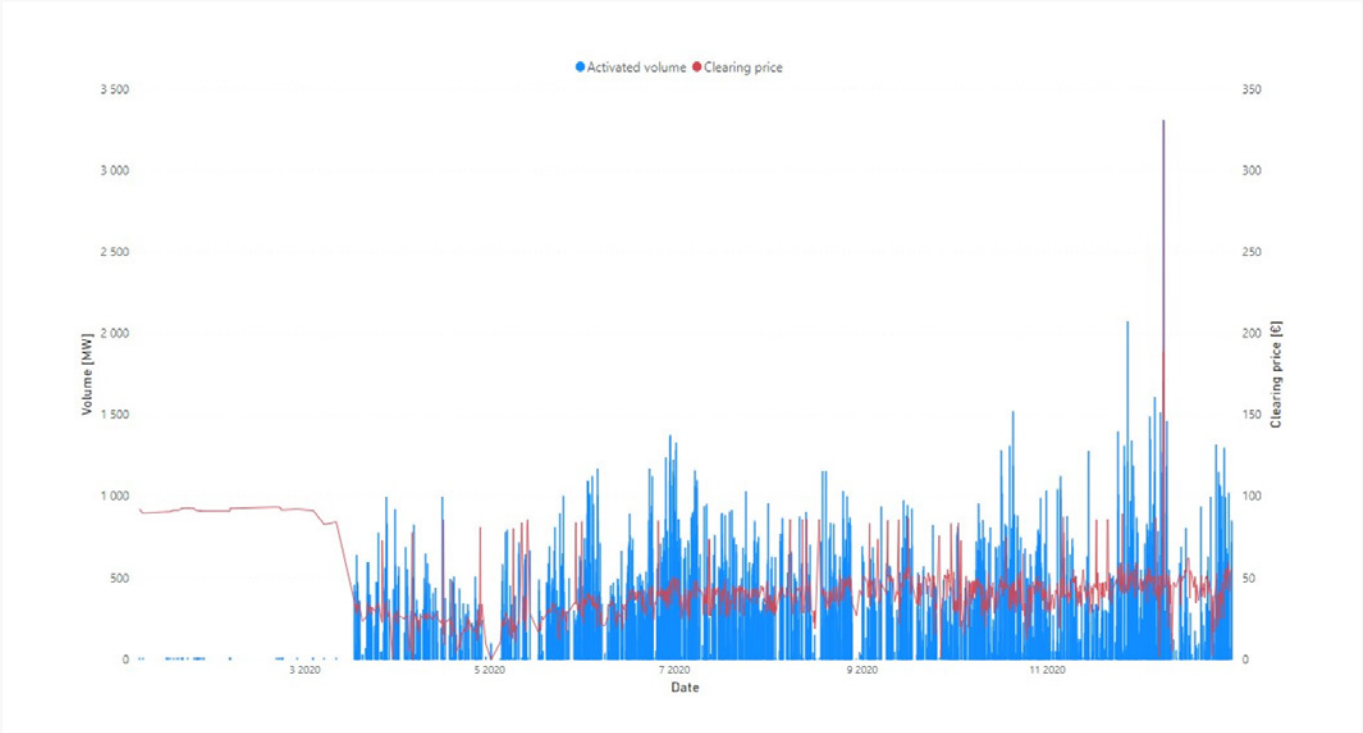


Figure 33 – Volumes and clearing price of activated upward standard balancing RR bids

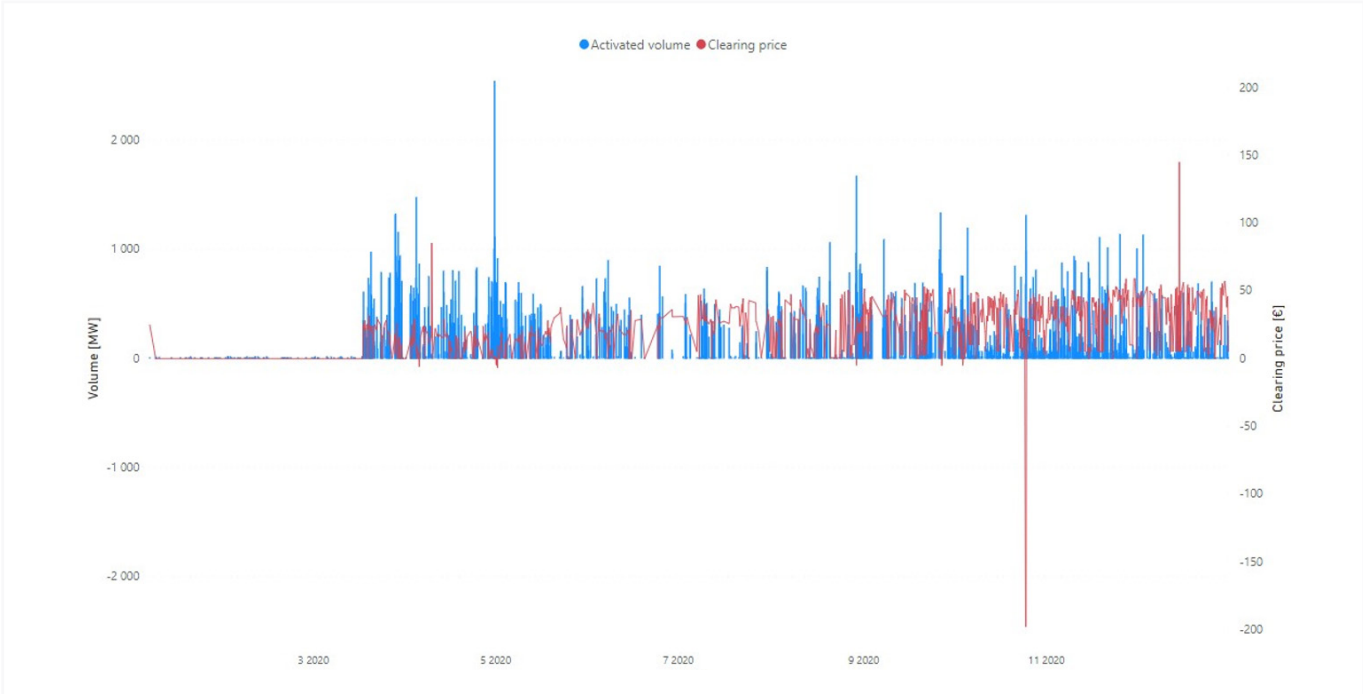


Figure 34 – Volumes and clearing price of activated downward standard balancing RR bids

6.1.2.3 Evolution: accession and project timelines

At the time of writing this report, 6 TERRE members are connected to the TERRE platform in two disconnected regions (i.e. REE, REN, RTE, Swissgrid and Terna in Region 1, ČEPS in Region 2) and, as such, are effectively enabling RR cross-border exchanges between countries in Region 1. The accession of PSE (Poland) is now foreseen in the first half-year period of 2023. The accession of National Grid (Great Britain) is on hold due to the Brexit agreement. **Table 22** gives an overview of the recent and foreseen connections to the RR platform.

Country	TSO	Date of accession
Czech Republic	ČEPS	6 January 2020
Spain	REE	3 March 2020
Portugal	REN	29 September 2020
France	RTE	2 December 2020
Italy	Terna	13 January 2021
Poland	PSE	Q1/Q2 2023
Non-EU Member		
Switzerland[124]	Swissgrid	8 October 2020
Great Britain	National Grid ESO	**On hold**
Observers		
Bulgaria	ESO	**Observer**
Hungary	MAVIR	**Observer**
Romania	Transelectrica	**Observer**

Table 22 – Accession roadmap of the RR platform

124 The participation of Switzerland in the RR-Platform, the aFRR-Platform and mFRR-Platform is regulated based on article 1.6 and 1.7 of the EB regulation and currently the subject of litigation by Swissgrid at the General Court of the European Union.

Regarding the project timeline, the first version of the IT system was developed for the go-live of the RR platform in January 2020. In 2020 and 2021, the project focused on the cooperation with the other projects (MARI implementation project and the cooperation between the Nordics TSOs) in order to define the framework to allow the re-use of the LIBRA system. The next steps within the TERRE project implementation are depicted in **Figure 35**.

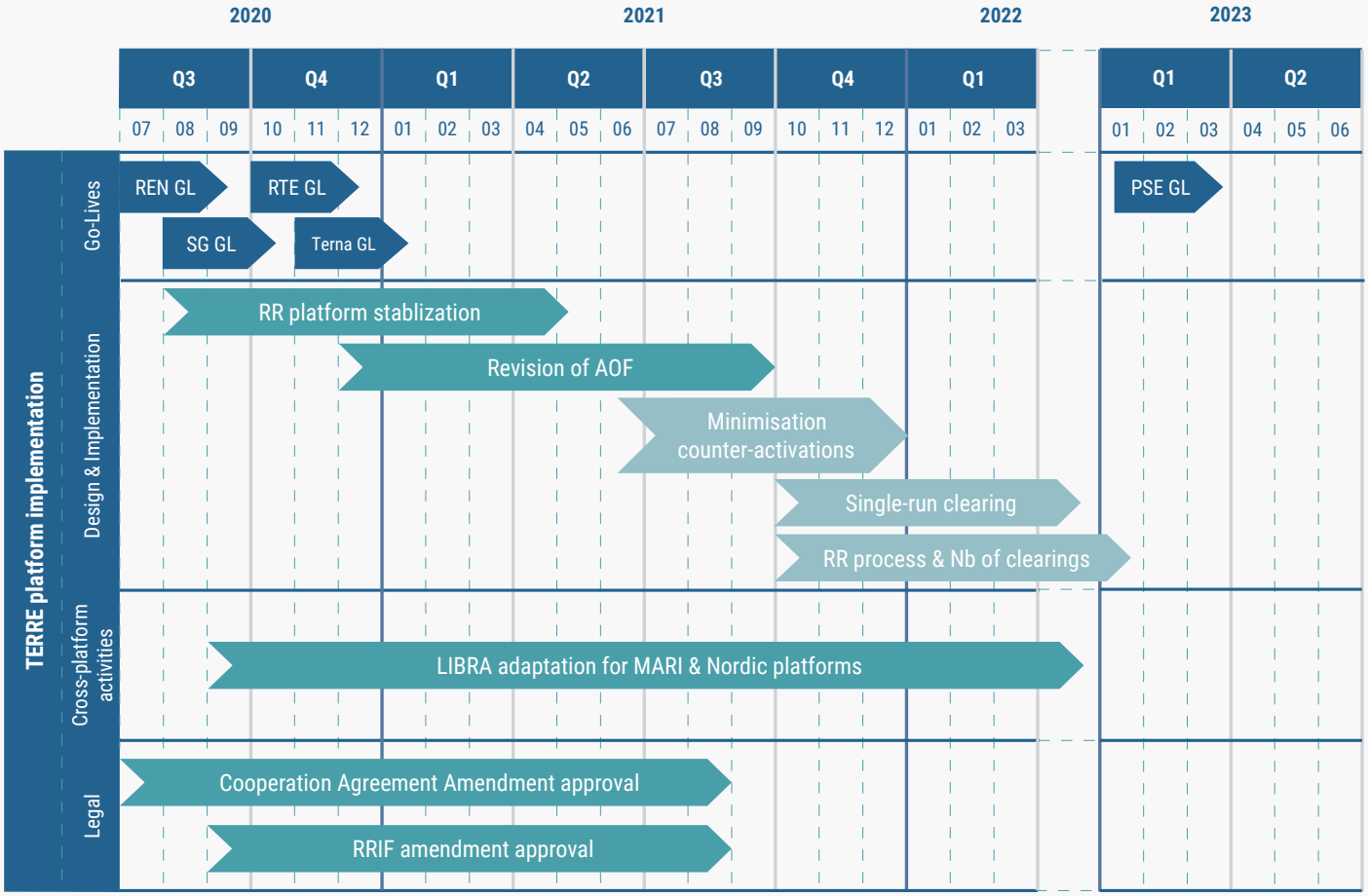


Figure 35 – Project timeline in the TERRE project

6.1.2.4 Expenditures

The annual expenditures on establishing, amending and operating the RR platform from 2018 to 2020 are graphed below.

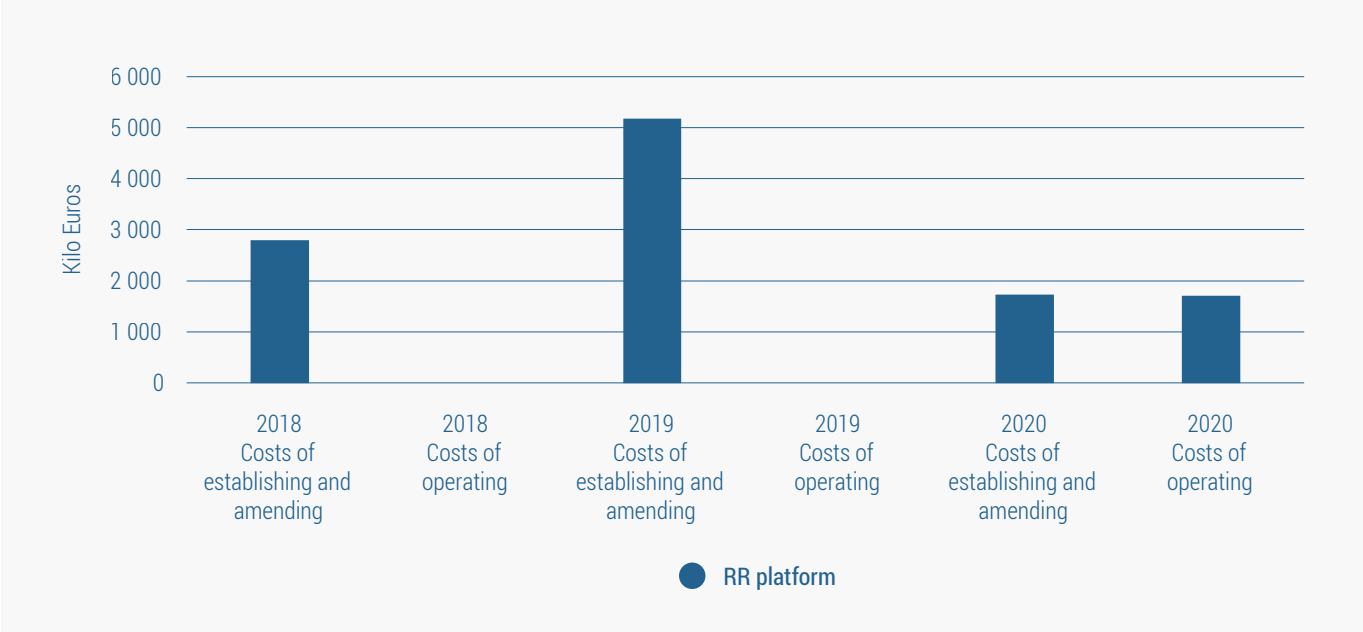


Figure 36 – Overview of costs for establishing and operating the RR platform

6.1.3. mFRR platform (led by MARI project)

Since 2017, the MARI project has been responsible for TSOs implementing the mFRR European platform. According to the EB regulation, July 2022 is the legal deadline to implement and make operational the platform. All TSOs will use the mFRR platform to submit all standard mFRR balancing energy bids, exchange all mFRR balancing energy bids and strive to fulfil all their corresponding balancing energy needs.

Due to the participation of all EU TSOs from all synchronous areas, as requested by the EB regulation, the MARI project is the largest implementation project in terms of the number of TSOs involved.

6.1.3.1 Governance

The MARI implementation project is under the responsibility of 34[125] TSO members and observers. The organisational structure of the MARI project is depicted in **Figure 37**.[126] The decision-making body of the MARI implementation project is the Steering Committee (SC). The SC has the right to make any binding decision on any matter related to the MARI project. The SC is responsible for the interaction with NRAs and stakeholders; the SC steers the working groups which constitute the expert bodies: the technical working group addresses topics related to market design and establishes the technical requirements of the platform, the IT working group is in charge on the IT implementation of the platform, the operational working group defines the framework to operate the platform, the legal working group implements the legal framework for both MARI and PICASSO platforms.

In relation to the role of the MARI project regarding the implementation of the cross-platform modules, the implementation of the capacity management module (CMM) is also under the responsibility of the MARI SC, with a dedicated working group.

125 MARI Members are composed by (30 TSOs) including APG, IPTO, Elia, Terna, HOPS. AST, EPS, Litgrid, Energinet, Statnett, Elering, TenneT NL, Fingrid, REN, RTE, PSE, MAVIR, Transelectrica, Amprion, TenneT DE, TransnetBW, 50Hertz, SEPS, ELES, REE, Svenska Kraftnät, Swissgrid, National Grid ESO, ESO and Creos. In addition, 4 TSOs are observers EMS, SONI, EirGrid, MEPSO and ENTSO-E also as Observer

126 This is an updated depiction of the organisational structure that can be found in the ENTSO-E Market Report 2020, p.23.

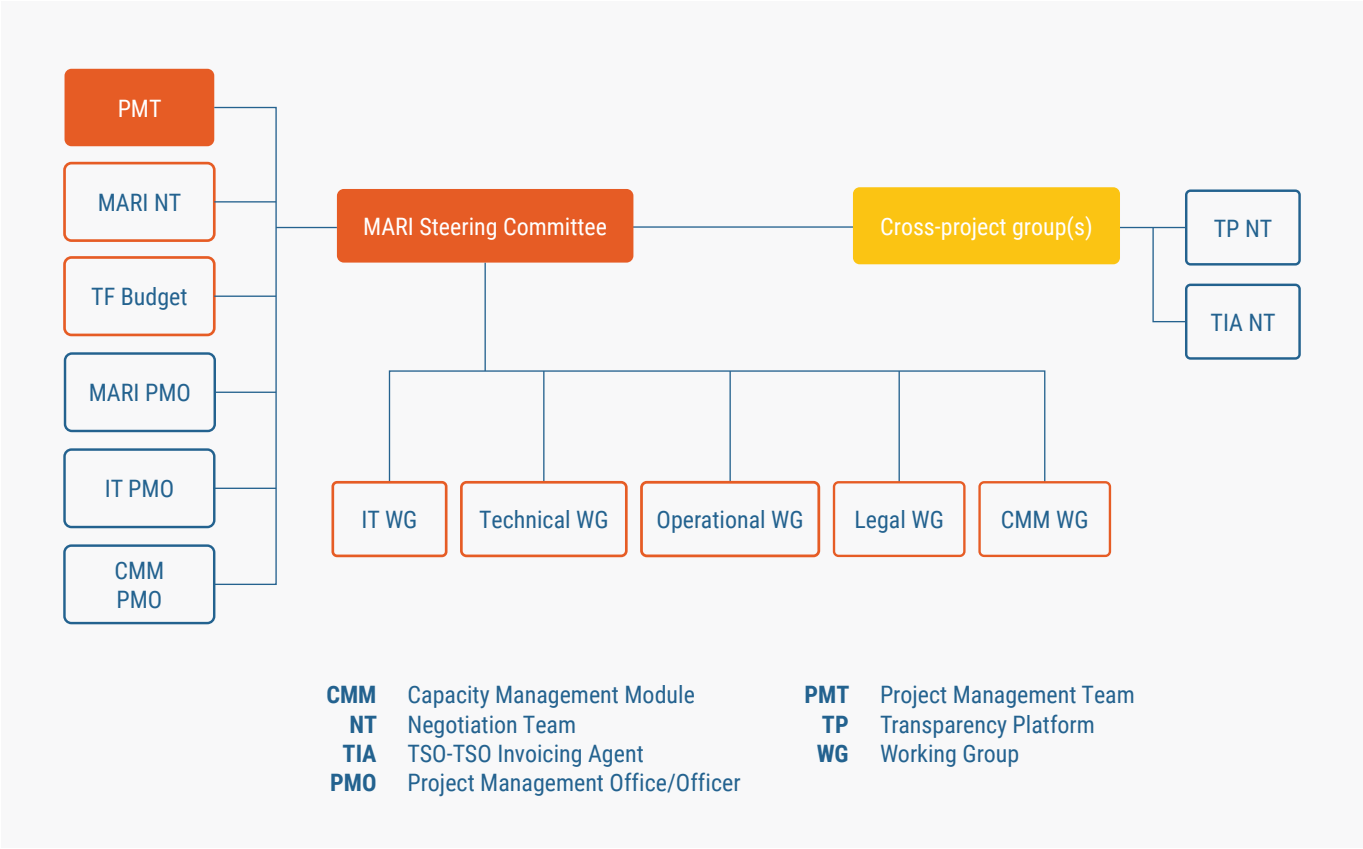


Figure 37 – MARI implementation project organisation (as of June 2021)

6.1.3.2. Implementation of the mFRR balancing energy market

High-level design of the platform

The mFRR platform is implemented in compliance with the TSO-TSO model, which means that the platform receives and returns information to the TSOs but is not directly interacting with the BSPs. The BSPs send the bids to the connecting TSO and each TSO sends the collected bids to the platform per LFC area or bidding zones. Each TSO also addresses to the platform the demand to satisfy (per LFC area or bidding zone) for each market time unit, and the mFRR balancing border capacity limits which set out the limits for the exchange of mFRR balancing energy.

Once the AOF has selected the most efficient bids in order to maximise the economic surplus while satisfying the TSO needs, the resulting activation requests and the demand satisfaction are sent back to the TSOs. The platform also sends back to the TSOs the exchange of mFRR balancing energy and the remaining capacity on all the mFRR borders.

The following **Figure 38** represents the high-level design of the mFRR platform according to the principles described above.

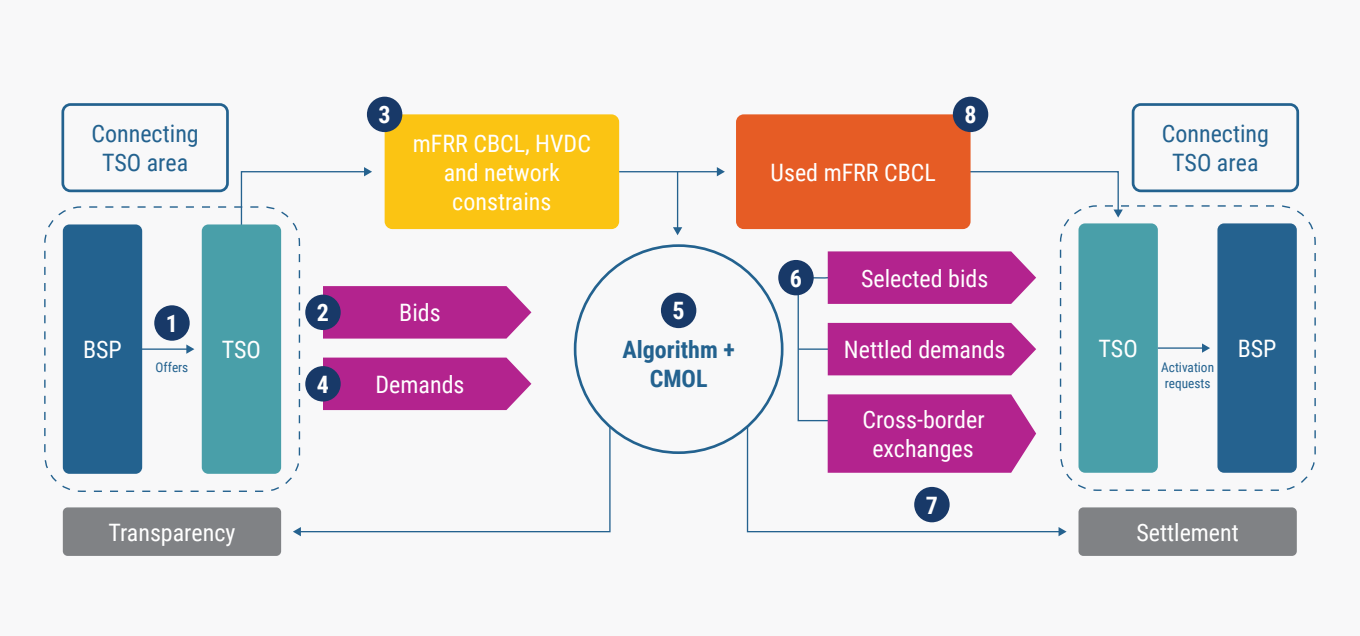


Figure 38 – MARI High-Level Design (as of June 2021)

The steps included in **Figure 38** are as follows:

1. TSOs receive bids from BSPs in their imbalance area.
2. TSOs forward standard mFRR balancing energy product bids to the mFRR Platform.
3. TSOs communicate the available mFRR cross-border capacity limits (CBCL) and any other relevant network constraints as well HVDC constraints.
4. TSOs communicate their mFRR balancing energy demands.
5. Optimisation of the clearing of mFRR balancing energy demands against BSPs' bids.
6. Communication of the accepted bids, satisfied demands and prices to the local TSOs as well as the resulting manual frequency restoration power interchange of each LFC area or bidding zone.
7. Calculation of the commercial flows between imbalance areas and settlement of the expenditure and revenues between TSOs.
8. Remaining mFRR CBCL are sent to the TSOs.
9. TSO sends activation requests BSPs in their imbalance area.

BSPs providing a standard mFRR balancing energy product to an mFRR-participating TSO have to submit their offers from D-1 12 p.m. (i.e. gate opening time) to 25 minutes before the beginning of the mFRR MTU of the respective standard mFRR balancing energy product bid (gate closure time).

These energy product bids shall be related to a specific mFRR MTU, the full activation time (FAT) is 12.5 minutes, and they can be activated via scheduled or direct activations. The BSPs can choose whether their bids are available for scheduled and direct activations or only for scheduled activation.

Figure 39 represents the process for scheduled and direct activations. The bids received until T-25min can be activated in a scheduled way for the concerned quarter hour (i.e. T; T+15min), the request has to be sent to the BSP before T-7.5min. After T-7.5 min, the bids can also be activated in a direct way, if applicable, and in this case the energy is delivered until the end of the following quarter hour (T+15; T+30).

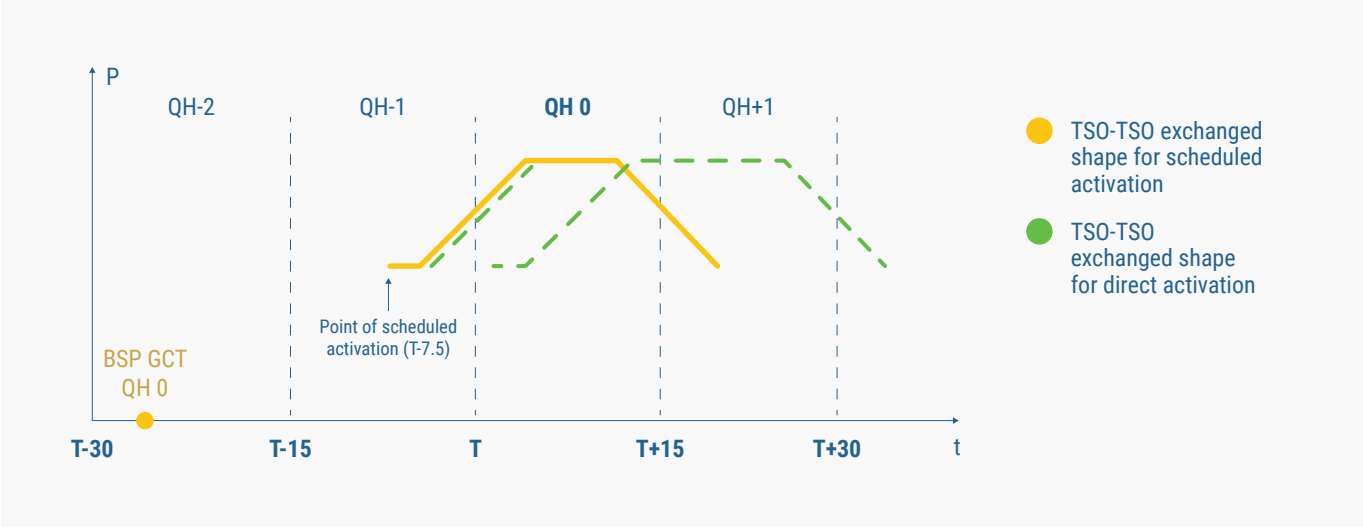


Figure 39 – Scheduled and direct activation process

Scheduled activation will be run every 15 minutes, once for each quarter hour throughout the day, with delivery for the next full quarter hour.

- TSO – TSO delivery shape:[127]
  - 12.5 minutes Full Activation Time, consisting of 2.5 minutes preparation time (from T-7.5 to T-5) and 10 minutes start ramping (T-5 to T+5)
  - 5 minutes full delivery (from T+5 to T+10)
  - 10 minutes end ramping (from T+10 to T+20)

Direct Activation will run on-demand, with delivery from the remainder of one quarter hour and to the end of the subsequent quarter hour.

- TSO – TSO delivery shape (Direct Activation in QH0):
  - 12.5 minutes Full Activation Time, consisting of 2.5 minutes preparation time and 10 minutes start ramping
  - 5 – 20 minutes full delivery (from T+X to T+25)
  - 10 minutes end ramping (around the end of QH+1, i.e. fromT+25 to T+35)

127 TSO – BSP delivery shape will be defined in the national terms and conditions.

6.1.3.3. Expenditures

The annual expenditures on establishing, amending and operating the mFRR platform from 2018 to 2020 are shown in **Figure 40**.

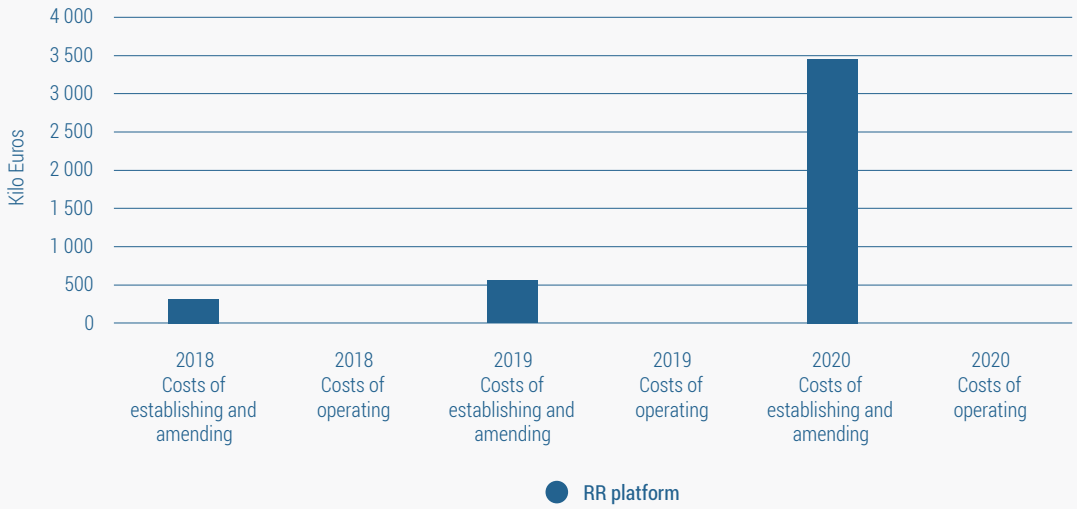


Figure 40 – Overview costs for establishing and operating the mFRR platform

6.1.3.4. Evolution: Implementation timeline and TSOs accession roadmap

According the mFRR implementation framework, the TSOs have to develop and update the implementation timeline of the platform (**Figure 41**).

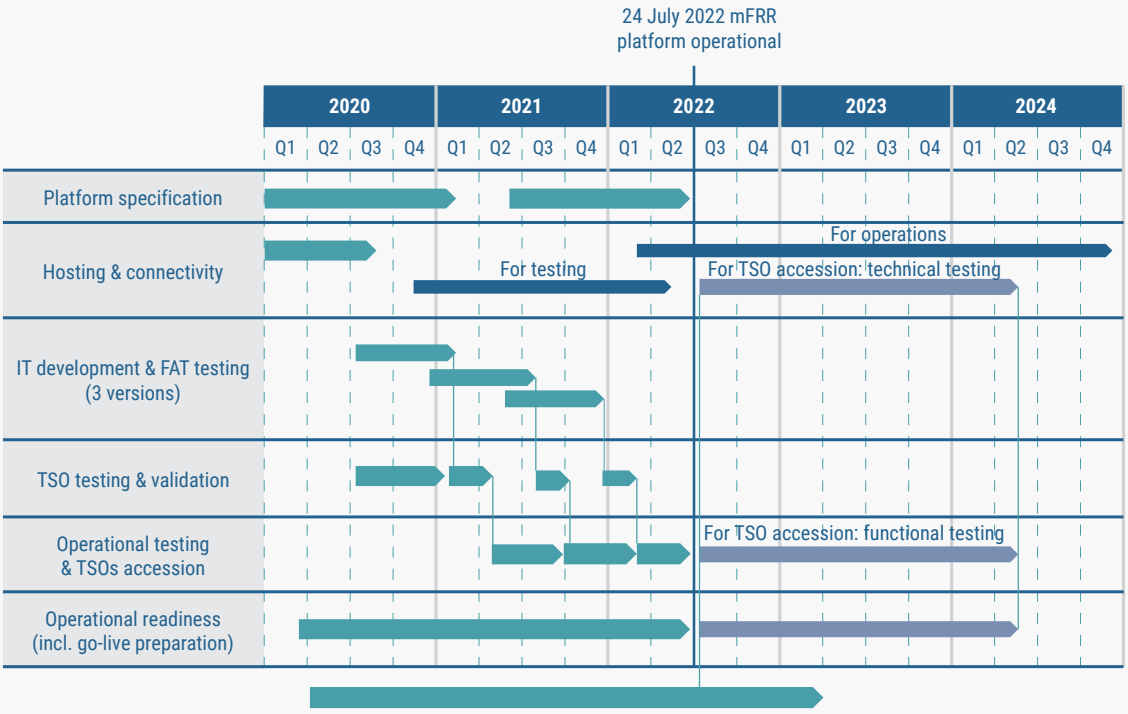


Figure 41 – Project timeline for the MARI platform implementation

The following accession road map[128] is updated at least twice a year to provide stakeholders with current information on developments.[129]

Country	TSO	Date of accession
Germany	50Hertz, Amprion, TrannetNW, TenneT DE	Q1 2022
Austria	APG	Q1 2022
Romania	Transelectrica	Q3 2022
Greece	IPTO	Q2 2024
Latvia	AST	Q3 2023 – Q3 2024
Estonia	Elering	Q3 2023 – Q3 2024
Slovenia	ELES	Q2 2022
Belgium	Elia	Q2 2022
Lithuania	Litgrid	Q3 2023 – Q3 2024
Hungary	MAVIR	Q2 2022
Spain	REE	Q4 2022
Portugal	REN	Q4 2023
Slovakia	SEPS	Q3 2024
Italy	Terna	Q2 2022
Czech Republic	EPS	Q3 2022
Denmark	Energinet	Q3 2023 – Q2 2024
Finland	Fingrid	Q3 2023 – Q2 2024
Croatia	HOPS	Q3 2022
Poland	PSE S.A.	H1 2024
France	RTE	H1 2024
Sweden	Svenskä Kraftnät	Q3 2023 – Q2 2024
Netherlands	TenneT NL	Derogation
Bulgaria	ESO	Q3 2022
EEA:		
Norway	Statnett	Q3 2023 – Q2 2024
Non-EU Members:		
Great Britain	National Grid ESO	Under consideration
Switzerland[130]	Swissgrid	Q2 2022
Observers:		
Northern Ireland	SONI	Observer
Ireland	EirGrid	Observer
Serbia	EMS	Observer
North Macedonia	MEPSO	Observer

Table 23 – Accession roadmap of the mFRR platform[131] (as of April 2021)[132]

128 The accession of member TSOs to the mFRR platform is planned in accordance with the accession road map. MARI member TSOs and ENTSO-E share this road map for informative purposes only and it does not, in any case, represent a firm, binding or definitive position of MARI on the content, which is subject to change as the implementation progresses, and new information becomes available.

129 For updates see MARI's website.

130 The participation of Switzerland in the RR-Platform, the aFRR-Platform and mFRR-Platform is regulated based on article 1.6 and 1.7 of the EB regulation and currently the subject of litigation by Swissgrid at the General Court of the European Union.

6.1.4. aFRR platform (led by the PICASSO project)

Since 2017, the PICASSO project has been responsible for TSOs implementing the aFRR European platform. According to the EB regulation, July 2022 is the legal deadline to implement and make operational 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.

The PICASSO project leads the development of the aFRR platform in close coordination with other implementation projects via ENTSO-E and International Grid Control Cooperation (IGCC) project (see 6.1.5 of this report). As worded before [see Section 6] the project leading the design and implementation of the aFRR platform is the PICASSO project which comprises 30 TSO[133] members and observers.

6.1.4.1. Governance

Figure 42 – aFRR platform: TSO members of the PICASSO implementation project (as of June 2021)

The PICASSO implementation project's organisation is described in the 2020 ENTSO-E Market Report.[134]

131 Derogations are requested in accordance with Article 62 of the EB regulation. At the moment of writing this report these can be in any of these three states: considered/requested/granted. The accession date of the Baltic TSOs (AST, Elering and Litgrid) depends on the neighbouring TSOs. Their aim is not to operate inefficiently in a decoupled mode with other areas on the mFRR platform. Detailed timing will be provided at a later stage.

132 Updated accession roadmap of MARI – accession roadmap for the mFRR-Platform (24 April 2021)

133 26 TSO members: APG, Elia, HOPS, EPS, Creos, Energinet, Fingrid, RTE, Amprion, TenneT DE, TransnetBW, 50Hertz, Svenska Kraftnät, ESO, Swissgrid, MAVIR, Terna, TenneT NL, Statnett, PSE, REN, Transelectrica, SEPS, ELES, REE and IPTO, 4 TSO members: AST, Litgrid, Elering and MEPSO. ENTSO-E is also an Observer.

134 See ENTSO-E Market Report 2020, p. 26

6.1.4.2. Implementation of the aFRR balancing energy market: high-level design of the platform

The aim of the aFRR platform is to select the most economical and efficient bids while considering available cross-border capacities. The AOF optimises the activation of standard aFRR balancing energy bids and the demand of the TSOs connected to the platform. The TSO-TSO settlement function calculates the settlement amount of each TSO connected to the platform for the exchange of energy resulting from the automatic frequency restoration process.

Figure 43 shows the high-level design of the aFRR platform according to the principles described previously:

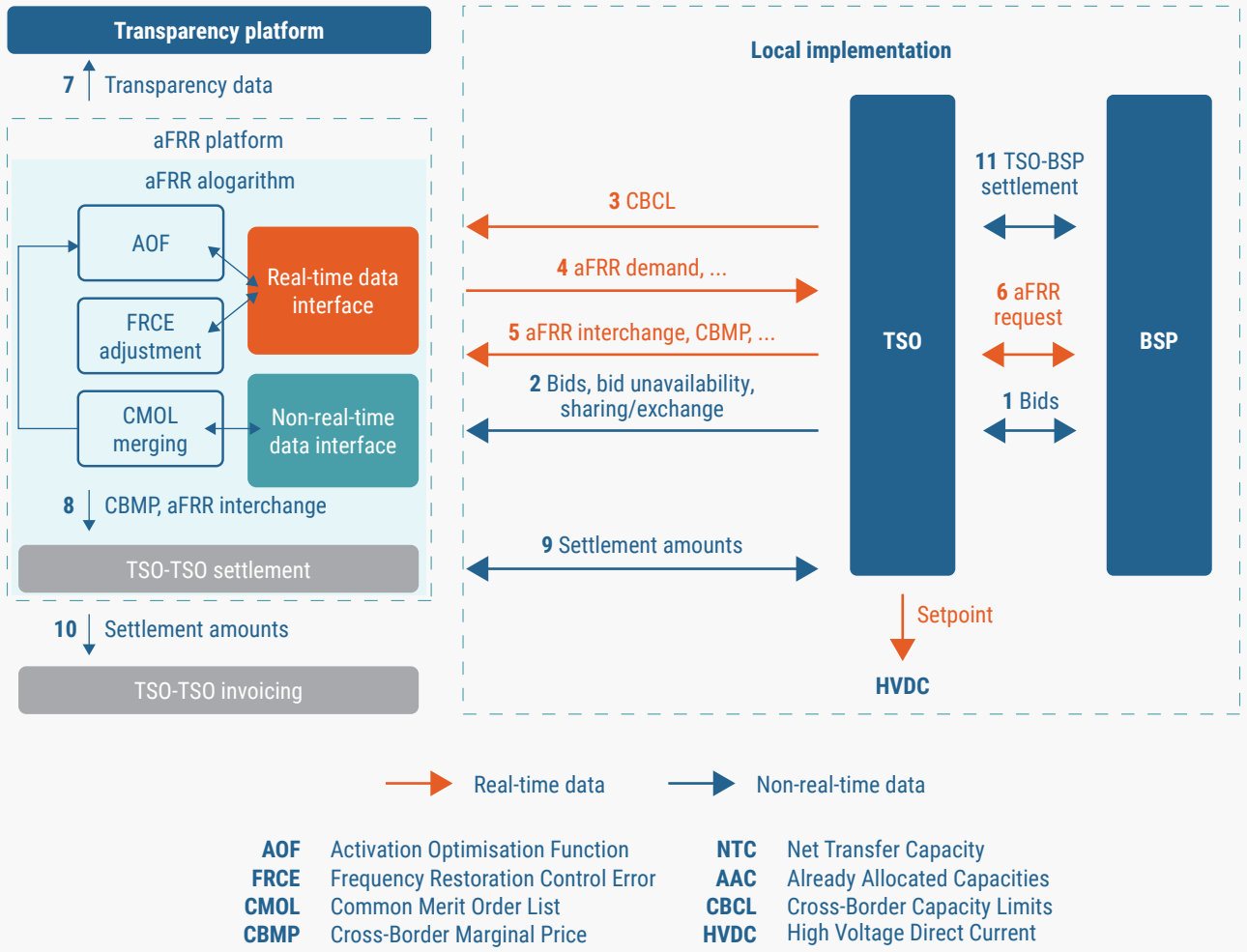


Figure 43 – PICASSO High-Level Design (as of February 2021)

Steps 1 to 11 included in **Figure 43** are defined below:

1. TSO receives bids from BSPs in their LFC area
2. TSO forwards standard aFRR balancing bids to platform
3. TSOs/CMM communicate CBCL to platform
4. TSOs communicate aFRR demands to platform
5. Communication of clearing results to TSO
6. Communication of aFRR request from each LFC to BSP
7. Data Publication
8. TSO-TSO settlement process,
9. Settlement validation,
10. Financial clearing,
11. TSO-BSP settlement process and invoicing.

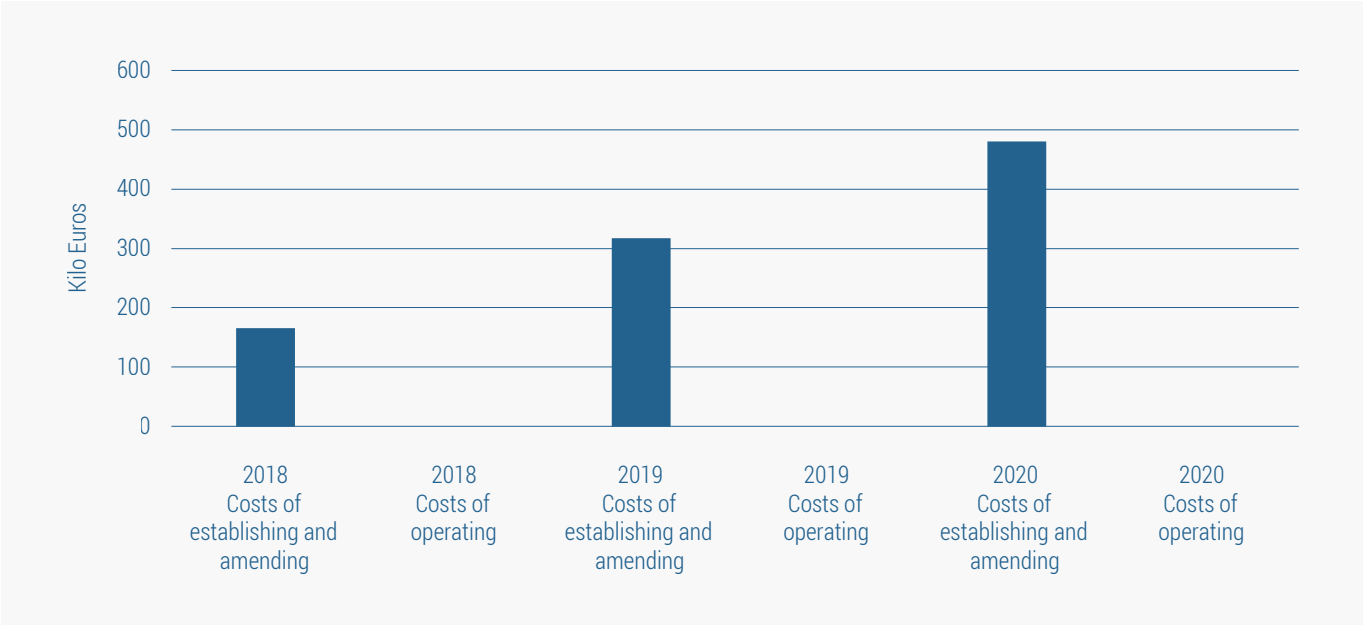


Figure 44 – Overview costs for establishing and operating the aFRR platform

The coordinated approach followed by PICASSO is the Control Demand Model. Each TSO calculates in each control cycle the aFRR demand for each of its load-frequency control areas (LFC area). The aFRR demand resembles the imbalance before any aFRR activation but takes into account all earlier processes (including activation of mFRR). The aFRR demand cannot be measured directly but must be determined by the addition of the measured, uncorrected FRCE and the already activated aFRR. The amount of already activated aFRR is determined either based on the requested volumes or measurement. The same aFRR demand is used for sequential optimisation of aFRR AOF and INF performed by the aFRR Platform.

The aFRR demand is provided as input to the AOF, which then uses it to determine the aFRR correction value for each LFC area based on the common merit order list (CMOL) and at least available aFRR cross-border capacity limit. The aFRR correction equals the automatic frequency restoration power interchange of the LFC area.

6.14.3. Expenditures

The annual expenditures on establishing, amending and operating the aFRR platform from 2018 to 2020 are graphed shown in **Figure 44**.

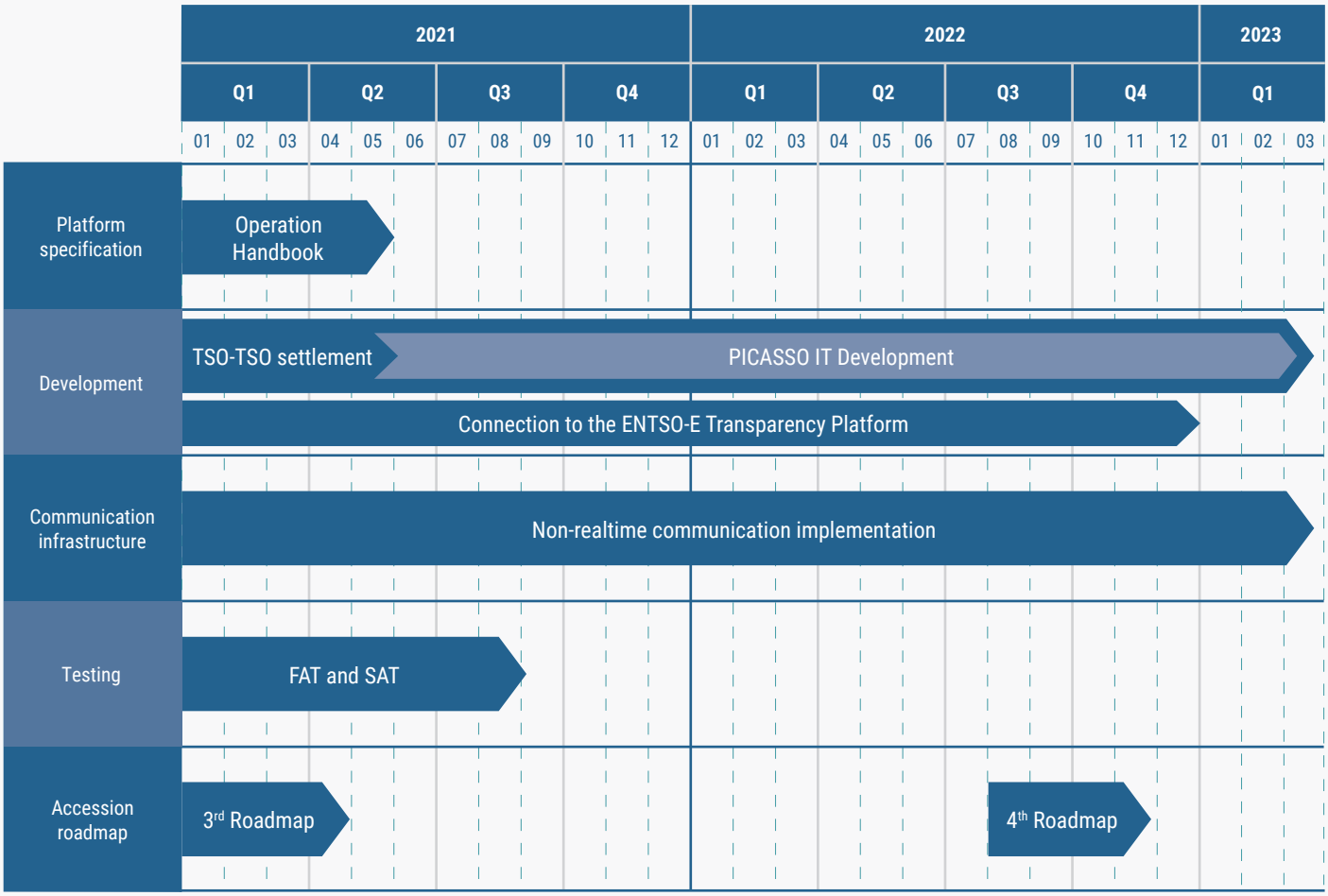


Figure 45 – Project timeline for PICASSO platform implementation

6.1.4.5. Evolution: Implementation timeline and TSOs accession roadmap

According to the aFRR implementation framework, the TSOs must develop and update the platform's implementation timeline (**Figure 45**).

The accession of new PICASSO TSOs members[135] to the aFRR platform is planned in accordance with the accession road map.[136] Further detailed information can be found in the second[137] accession road map developed by TSOs that are members of the aFRR platform. This accession road map is updated at least twice a year to provide stakeholders with current information on the developments.[138]

135 On 16 October 2019, through PICASSO's Steering Committee, all PICASSO member TSOs decided to initiate the process for Baltic TSOs to become project observers.

136 PICASSO TSO members and ENTSO-E share this accession roadmap for informative purposes only and does not, in any case, represent a firm, binding or definitive position of PICASSO on the content. The content is subject to change as the implementation progresses, and new information becomes available.

137 aFRR platform accession road map.

138 For updates see PICASSO website.

Country	TSO	Date of accession
Germany	50Hertz, TenneT DE, TransnetBW, Amprion	Q1 2022
Austria	APG	Q1 2022
France	RTE	Q1 2022
Czech Republic	EPS	Q2 2022
Slovenia	ELES	Q2 2022
Belgium	Elia	Q2 2022
Hungary	MAVIR	Derogation[137]
Bulgaria	ESO	Q3 2022
Croatia	HOPS	Q3 2022
Italy	Terna	Q3 2022
Romania	Transelectrica	Q3 2022
Greece	ADMIE	Derogation[137]
Denmark	Energinet	Derogation[137]
Finland	Fingrid	Derogation[137]
Hungary	MAVIR	Derogation[137]
Netherlands	TenneT NL	Derogation[137]
Poland	PSE	Derogation[137]
Portugal	REN	Derogation[137]
Slovakia	SEPS	Derogation[137]
Spain	REE	Derogation[137]
Sweden	Svenskä Kraftnät	Derogation[137]
EEA:		
Norway	Statnett	Derogation[137]
Non-EU Member:		
Switzerland[139]	Swissgrid	Q2 2022
Observers:		
Latvia	AST	Observer
Lithuania	Litgrid	Observer
Estonia	Elering	Observer
North Macedonia	MEPSO	Observer

Table 24 – Accession road map of the aFRR platform (as at April 2021)[140]

139 The participation of Switzerland in the RR-Platform, the aFRR-Platform and mFRR-Platform is regulated based on article 1.6 and 1.7 of the EB regulation and currently the subject of litigation by Swissgrid at the General Court of the European Union.

140 Updated accession roadmap of PICASSO – accession roadmap for the aFRR-Platform (27 April 2021)

6.1.5. IN platform (led by the IGCC project)

The current IGCC will become the future European platform for the IN process (IN platform) as defined by Article 22 of the EB regulation.

6.1.5.1. Governance

As noted earlier (Section 6) the design and implementation of the IN platform is led by the IGCC implementation project, which has **27** TSO[141] members and observers.

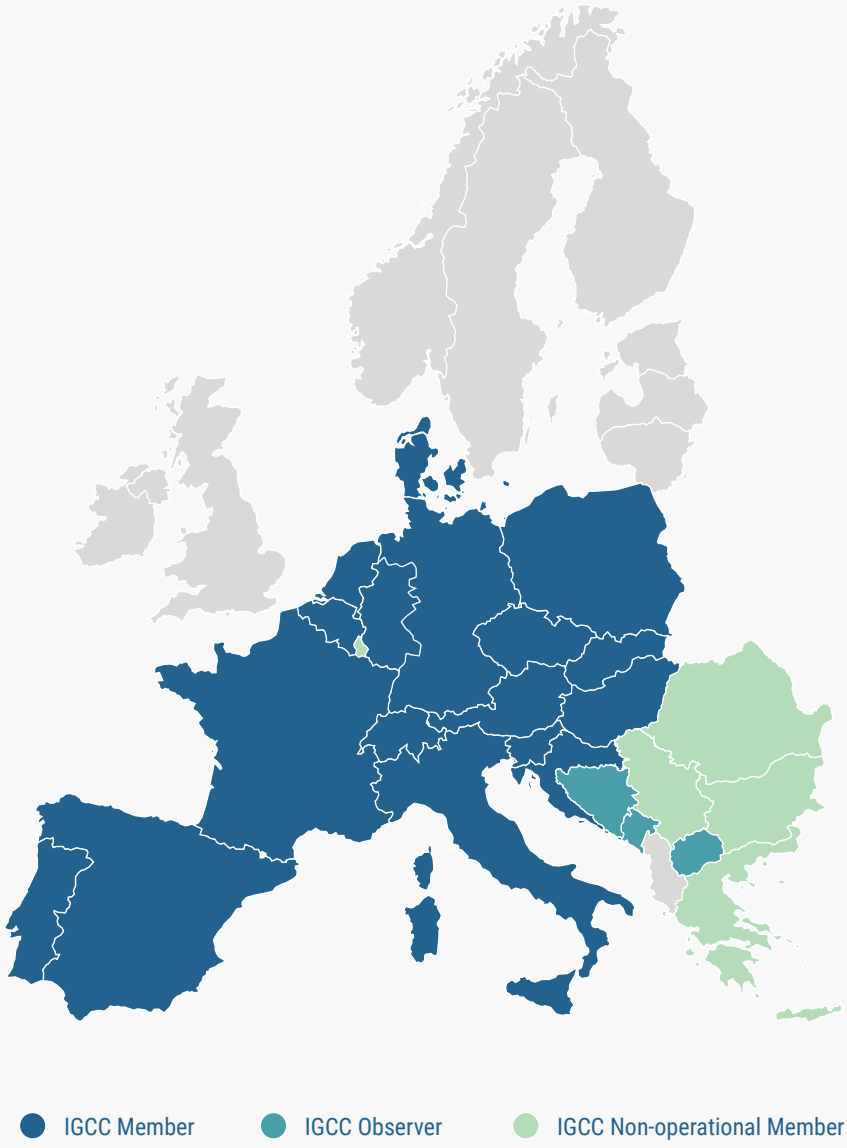


Figure 46 – IN platform: TSO members of the IGCC implementation project (as of May 2021)

141 19 TSOs are operational members: 50Hertz, Amprion, APG, EPS, HOPS, Elia, Energinet, ELES, MAVIR, PSE, REE, REN, RTE, SEPS, Swissgrid, TenneT NL, TransnetBW, TenneT DE and Terna, 5 TSOs are non-operational members: EMS, Creos, IPTO, ESO, Transelectrica and 3 TSOs serve as observers: Crnogorski elektroprenosni sistem, NOS BiH and MEPSO and ENTSO-E

6.1.5.2. Operation of the IN platform

The IN process of the IGCC has successfully operated since 2011 without a major incident. The high-level design of the platform is described in the ENTSO-E Balancing Report 2020. [142]

Performance indicators on Monetary saving due to imbalance netting

In the last years, the imbalance netting within the IGCC resulted in total annual savings depicted in **Figure 47**. The recent increase was mainly caused by the accessions of new member TSOs in 2019 and 2020.

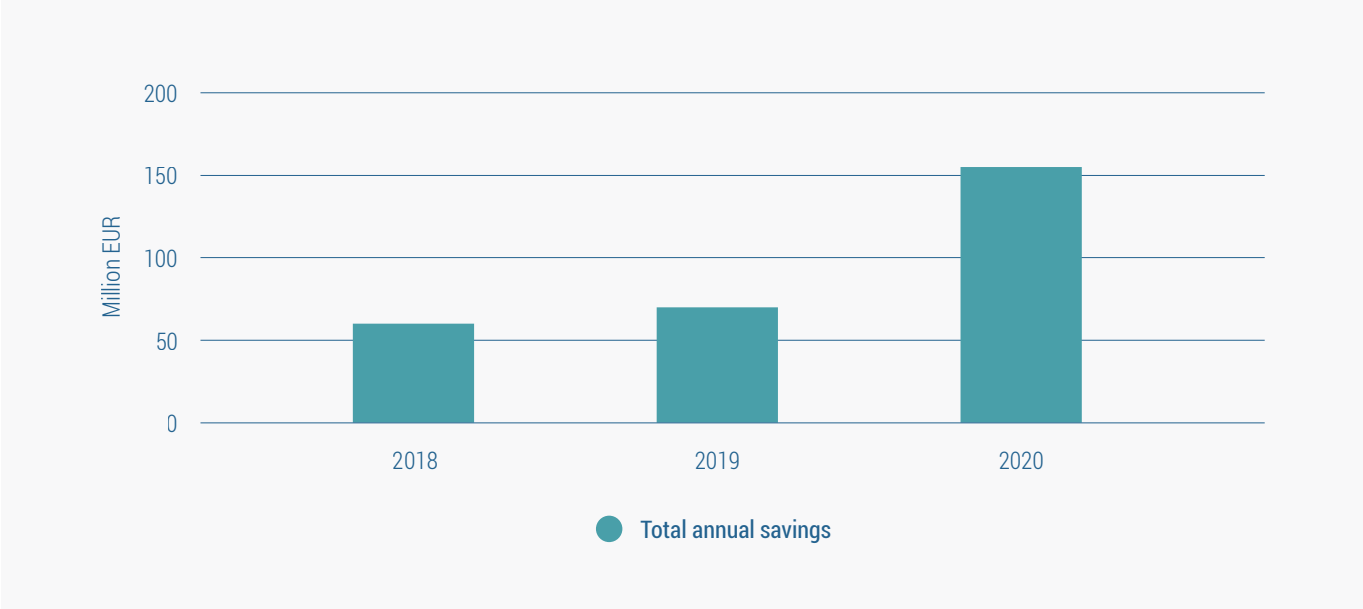


Figure 47 – Total annual savings due to imbalance netting

The cumulative savings generated through international cooperation by IGCC since the start of the project in October 2011 is roughly EUR 660 million. The energy exchange caused by the activation of the IN process is currently published on the German tender platform.[143] The reports on imbalance netting volumes are published on a dedicated site at ENTSO-E.[144]

6.1.5.3 Evolution: TSOs accession roadmap

The IN platform expects to continue to increase the number of TSOs connected within Q2 2021 (see **Table 25**).

Country	TSO	Quarter of accession
Romania	Transelectrica	Q2 2021
Bulgaria	ESO	Derogation
Greece	IPTO	Q2 2021

Table 25 – Accession of TSOs to the IGCC implementation project.

As of May 2021, 19 TSOs from 16 countries are performing the IN process using the IGCC. REE, REN have recently started in Q4 2020.

142 See ENTSO-E Balancing Report 2020, p.29
143 See the German tender platform
144 See imbalance netting website.

6.1.5.4 Expenditures

The annual expenditures on establishing, amending and operating the IN platform from 2018 to 2020 are graphed below

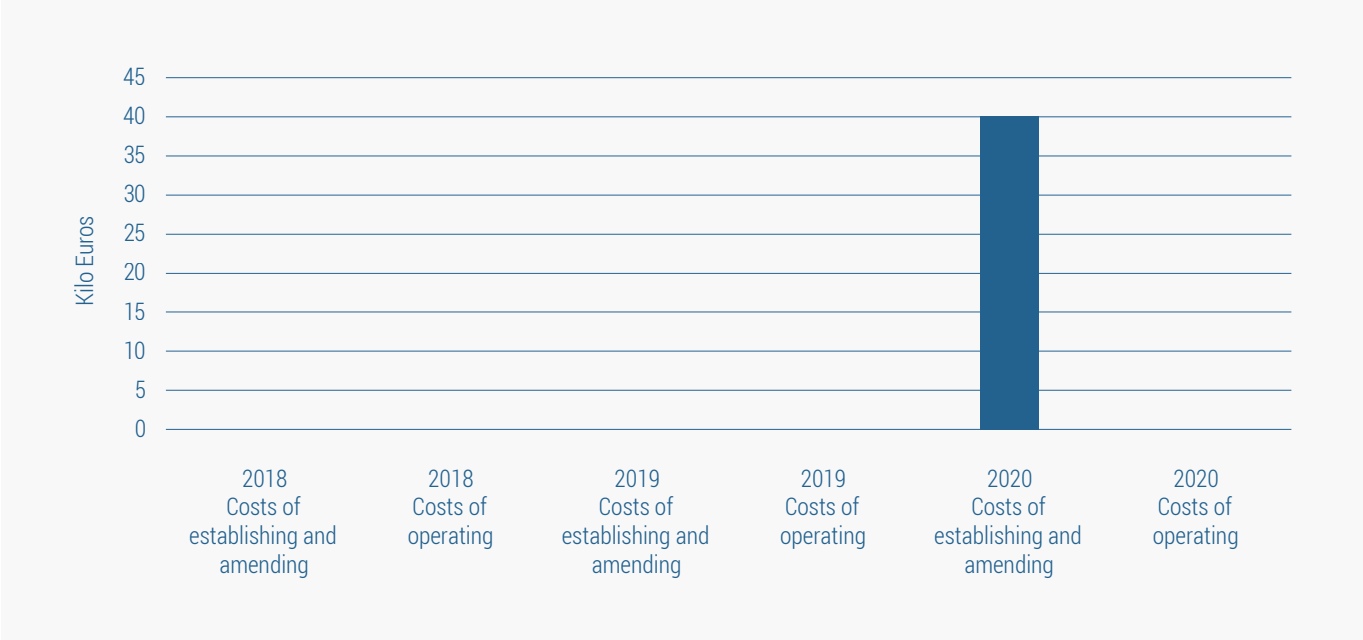


Figure 48 – Overview costs for establishing and operating the IGCC platform[145]

6.1.6. Capacity Management Module

All European balancing platforms must be provided with the available CBCL to optimise the activation of the balancing energy bids while also considering possible cross-border exchanges. Even if not operational for the platforms' go-lives, the TSOs intend to implement a joint solution that will provide the platforms with CBCL values. This solution will also enable the TSOs to update the CBCLs, and thus respect operational security limits.

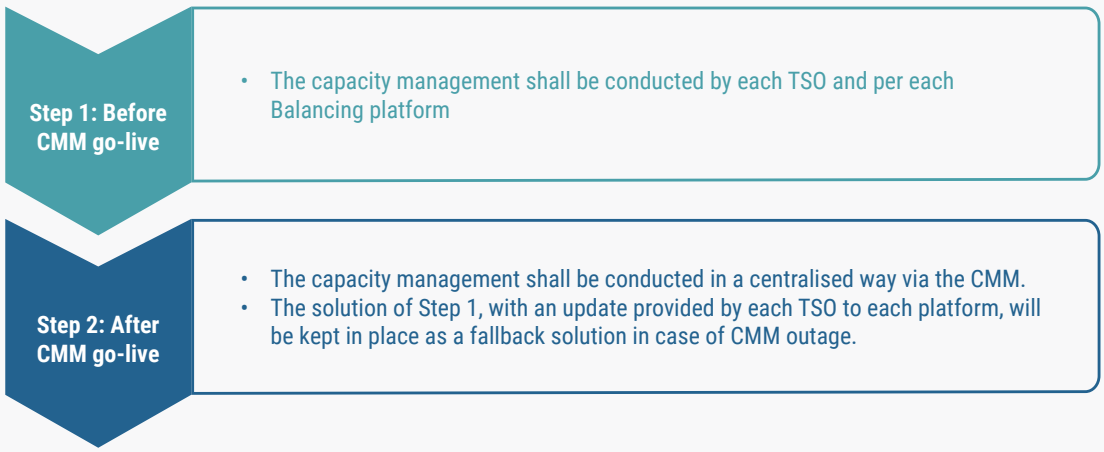


Figure 49 – Capacity Management Process

145 Reflecting the development of the IGCC project into the IN platform

Figure 50 represents the high-level design of the CMM:

- Each TSO sends the information about the cross-zonal capacity calculated for the intraday time frame, along with the information about the capacity already allocated during the previous time frames (long-term, day-ahead, intraday) for the relevant borders.
- Each TSO in a balancing capacity cooperation, or a dedicated TSO per balancing capacity cooperation, also sends the information about the capacity already allocated for exchange of balancing energy in relation to the exchange or sharing of balancing capacities.
- The CMM determines the CBCL following the intraday time frame for each border and sends the information on the relevant borders to the RR platform.
- The CMM receives the optimised flows on the borders from the RR platform and determines the CBCL for the relevant borders to be sent to the mFRR platform.
- The CMM receives optimised flows on the borders from the mFRR platform and determines the CBCL after each mFRR AOF run (either direct or scheduled).
- The CMM forwards the CBCL on the relevant borders to PICASSO/IN platforms. As the same IT system is used for PICASSO and IN platforms, the CMM sends the data for both platforms at the same time, the updates between aFRR and IN processes are jointly managed by the same IT solution.
- At any point in time, the TSOs can update their input data due to the operational situation (for example, in the case of an application of the affected TSO procedure or changes in NTC values).
- The CMM stores all capacity management-related data.

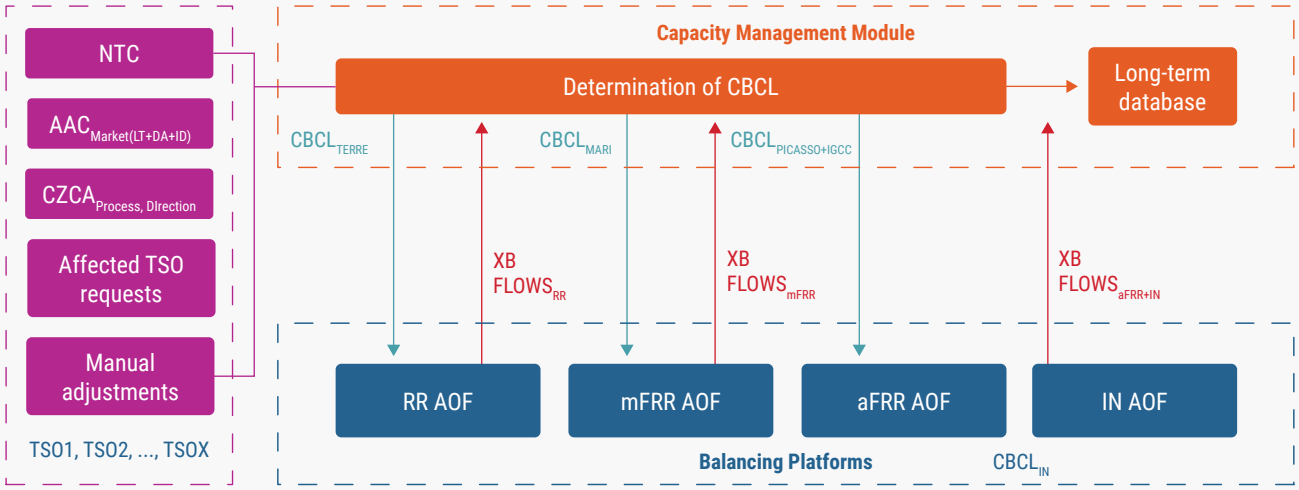


Figure 50 – CMM high-level design

6.2 Cross-zonal capacity allocation and balancing capacity cooperations

The EB regulation foresees that each TSO shall regularly review and define the reserve capacity requirements in accordance with the provisions defines by the SO regulation and that this analysis shall take into account the possibilities of the exchange of balancing capacity or sharing of reserve. Thus, there is no obligation to jointly procure balancing capacity at European or regional level, it is conditional to an analysis provided by the TSOs, assessing for example the potential benefits for end consumers, market players or TSOs themselves. The electricity regulation of the Clean Energy Package however instructs TSOs to facilitate the dimensioning of reserve capacity on a regional level.[146] In case, two or more TSOs are mutually willing to exchange balancing capacity, they shall develop common and harmonised procurement rules in accordance with Article 33 of the EB regulation. In addition to the common rules, and in case the common rules concern frequency restoration or replacement reserves, the TSOs shall implement either a methodology for calculating the probability of available cross-zonal capacity, or a methodology for allocating cross-zonal capacity to the balancing time frame. In case of joint procurement of FCR capacity, the reliability margins calculated in the application of the CACM regulation shall be used for operating and exchanging the reserves and it is not possible to allocate cross-zonal capacity for this purpose.

This part presents an overview on the implementation of the methodologies for allocating cross-zonal capacity to the balancing time frame and on the balancing cooperations for the exchange of balancing capacity or sharing of reserves.

6.2.1. Cross-zonal capacity allocation for the balancing time frame and co-optimised methodology implementation

For the exchange of FRR or RR balancing capacity or sharing of these reserves, TSOs have to define methodologies for the allocation of cross-zonal capacity for the exchange of balancing capacity or the sharing of reserves based on three processes (i.e. co-optimised allocation, market-based allocation and allocation based on economic efficiency analysis).[147] The methodology proposal for a co-optimised CZC allocation (according to Article 40 of the EB regulation) has been defined by all TSOs. In contrast, the regional methodology proposals for market-based CZC allocation (according to Article 41 of the EB regulation) and CZC allocation based on economic efficiency analysis (according to Article 42 of the EB regulation) were voluntarily developed by every capacity calculation region (CCR) interested in potentially implementing such CZC allocation approaches.[148]

All TSOs submitted a proposal (pursuant to Article 40 of the EB regulation) for a methodology for co-optimised allocation of cross-zonal capacity (CZC) in December 2019, which was approved with amendments by ACER in June 2020.

The application of the methodology is voluntary, and it requires two or more TSOs to establish a cooperation for the exchange of balancing capacity or sharing of reserves and establish common rules pursuant to Article 33(1) of the EB regulation. Nevertheless, the implementation of tools that are capable of performing the processes described in the methodology is considered mandatory.

The co-optimised allocation of CZC is based on the comparison between the actual market value of CZC for the exchange of energy and the actual market value of CZC for the exchange of balancing capacity or sharing of reserves. In such a process, the energy market and the balancing capacity market compete for the same amount of CZC, which shall be allocated to one or the other in a way that maximises the overall economic surplus across both markets.

146 See Regulation (EU) 2019/943 Art. 6.
147 See ENTSO-E Balancing Report 2020, p. 24
148 See ENTSO-E Balancing Report 2020, p. 25

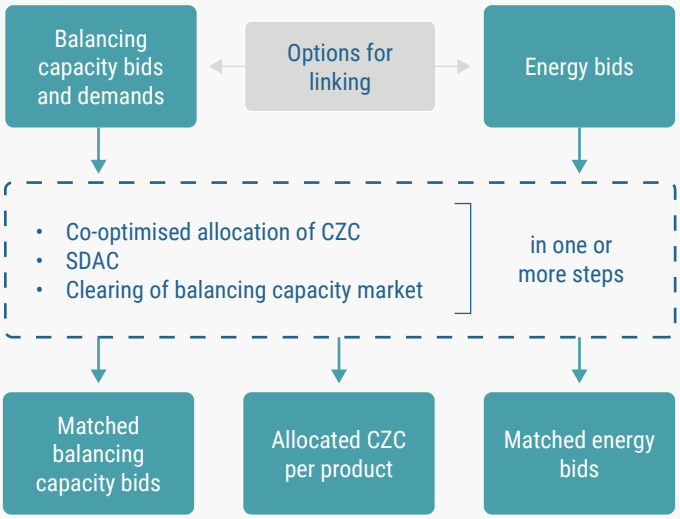


Figure 51 – High-level process for a co-optimised allocation of CZC

The implementation of a co-optimised allocation of cross-zonal capacity requires the inclusion of new requirements in the algorithm and the processes of the SDAC, which all TSOs shall submit within two years after the approval of the methodology.

An implementation impact assessment has been established in collaboration with NEMOs, to be completed by the end of 2021. The assessment covers the topics depicted in **Figure 52**).

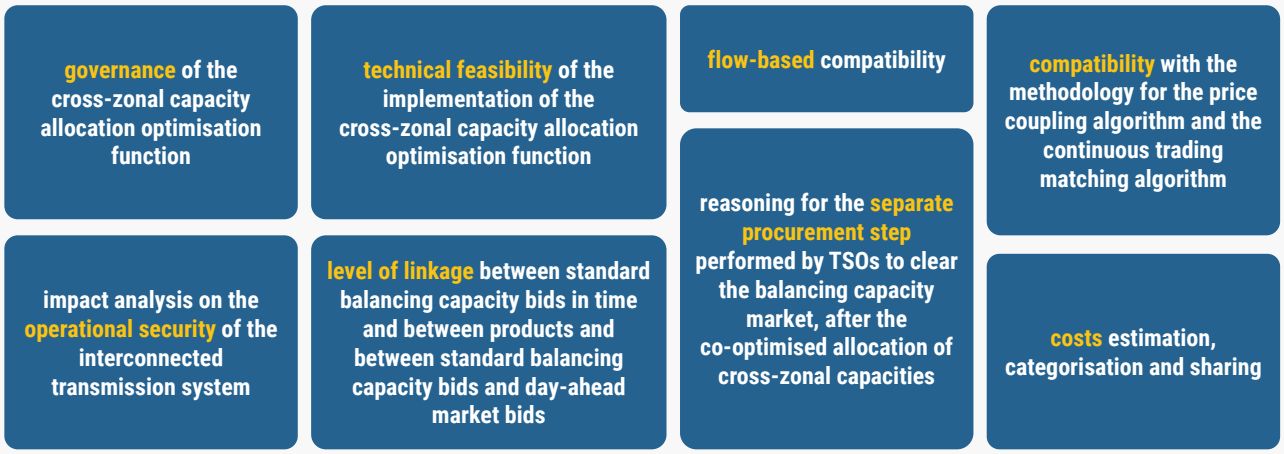


Figure 52 – Topics covered by the impact assessment of the CZC

In the fourth quarter of 2020, flow-based compatibility and linking of bids, in all of its possible variations, were the subjects of two in-depth studies, which additionally assessed how to allocate CZC to a balancing capacity market and the overall technical feasibility of the implementation of the CZC allocation optimisation function (see **Figure 54**). The remaining topics will be furtherly investigated during the year 2021.

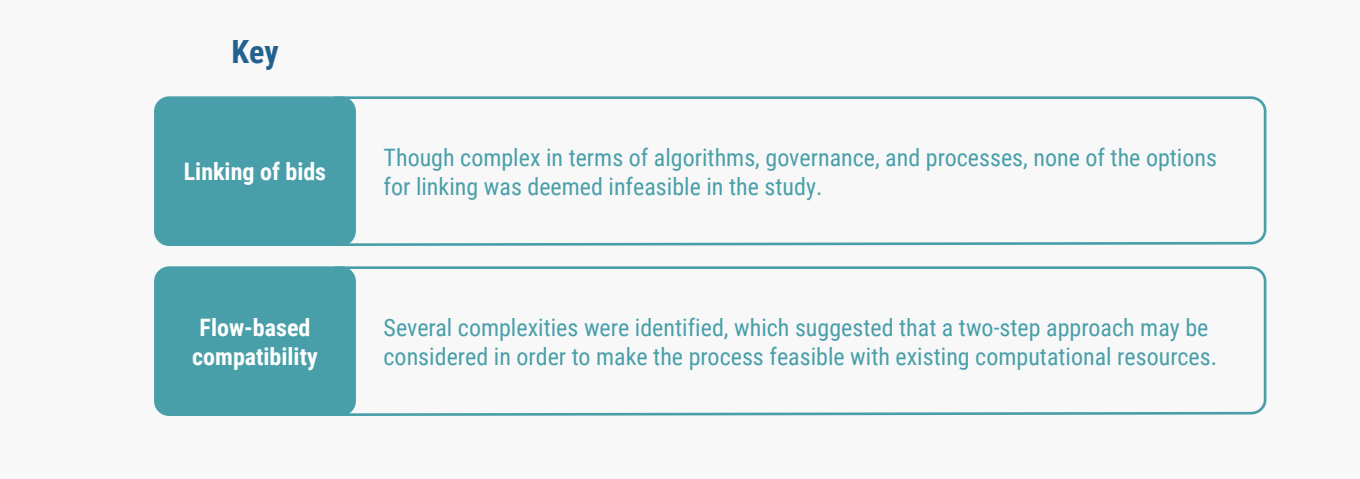


Figure 53 – Key findings of cross-zonal capacity studies

6.2.2. FCR cooperation

In accordance with the objectives of the EB regulation, the FCR cooperation,[149] a common market for procurement and exchange of FCR capacities, currently involves 11 TSOs[150] from 8 countries. As explained above, the exchange of FCR capacity does not require the application of a methodology to ensure the availability of cross-zonal capacity.

6.2.2.1. Main principles, governance, and decision-making process

The FCR cooperation is a framework between 11 TSOs of the continental synchronous area to jointly procure FCR capacities. It is organised through a TSO-TSO model. The main achievement of the cooperation is to select capacities through common auctions based on CMOLs, where the TSOs pool all offers received from the BSPs connected to their respective grid. The interaction with the BSPs and the contracts between the TSOs and BSPs are handled on a national basis, along with the responsibility of delivery.

The optimisation function of the platform selects the best offers from the BSPs in order to satisfy the demand of each TSOs, the core share (which represents the minimum volume of FCR that has to be procured within the LFC block), and the export limit (defined by each TSO in accordance with SO regulation Annex VI).

The decision-making body of the FCR cooperation is the Steering Committee (SC). The SC has the right to make any binding decision on any matter related to the FCR cooperation. The SC is responsible for the interaction with NRAs and stakeholders; the SC steers two groups that constitute the expert bodies: the Market Expert Group (MEG) addresses market-related topics, and the Technical Expert Group (TEG) focusing on technical topics. Each member TSO of the FCR cooperation shall appoint at least one regular representative to the SC, MEG and TEG.

6.2.2.2. Implementation

The first auction of FCR cooperation took place in April 2015 under the initiative of the German, Austrian, Dutch and Swiss TSOs, after the merger of different regional projects. The rules of the cooperation were defined in close cooperation with the relevant NRAs.

149 See FCR website.

150 These are the TSOs from Austria (APG), Belgium (Elia), Slovenia (ELES), Switzerland (Swissgrid) Germany (50Hertz, Amprion, TenneT DE, and TransnetBW), Western Denmark (Energinet.dk), France (RTE), and the Netherlands (TenneT NL).

Figure 54 – FCR cooperation members

After 2015, the FCR cooperation regularly welcomed new members: Elia joined the cooperation in July 2016, RTE in January 2017, ELES and Energinet in January 2021.

Table 26 represents the date of accession for each TSO and the current demand, core shares, and export limits.

In 2021, the total FCR demand to be procured by the FCR cooperation represents 1,444 MW (i.e. approximately 50% of the total amount of 3000 MW FCR needed for continental Europe synchronous area).

Country	TSO	Date of accession	FCR demand (MW)	Core share (MW)	Export limit (MW)
Austria	APG	April 2015	71	22	100
Belgium	Elia	July 2016	87	27	100
France	RTE	January 2017	508	153	152
Germany	TransnetBW TenneT DE Amprion 50Hertz	April 2015	562	169	168
Netherlands	TenneT NL	April 2015	114	35	100
Slovenia	ELES	January 2021	15	0	100
Switzerland	Swissgrid	April 2015	67	21	100
Western Denmark	Energinet	January 2021	20	6	6

Table 26 – Accession of new FCR members since 2015

In January 2017, the FCR cooperation launched a public consultation to gather the views from stakeholders on detailed market design options. In May 2017, the TSOs published a report to summarise the main outputs of the consultation and to present the TSOs' analysis and proposals. The main points to be addressed after the consultation concerned the evolution of the auction frequency (i.e. from weekly to daily auctions); the evolution of the product duration (i.e. from weekly to four-hour products); the possibility to submit indivisible bids (i.e. with the condition that divisible bids cannot be paradoxically rejected); the introduction of pay-as-cleared pricing for the bids; the commitment to investigate further harmonisation of the rules for BSPs on the following topics: possibilities of aggregation and centralised frequency measurement, the monitoring of availability and activation and penalties, the backup requirements.

In April 2018, the TSOs of the FCR cooperation submitted to the NRAs a proposal of common and harmonised rules for the exchange and procurement of balancing capacities for FCR in accordance with Article 33(1) of the EB regulation. This submission intervened after a public consultation held at the beginning of 2018 in accordance with Article 10 of the EB regulation. This proposal foresaw several steps of evolution of the design of the auctions, the main objective was to move the auctions closer to real-time (i.e. daily auctions instead of weekly auctions) and to change the TSO-BSP pricing modalities with a transition towards a pay-as-clear remuneration instead of the previous pay-as-bid one.

At the end of September 2018, NRAs submitted a request to amend the proposal to update the timeline of the different evolutions to give more available lead-time to the BSPs to adapt themselves to the evolutions. The new rules in accordance with Article 33(1) were approved in November 2018. **Table 27** represents the market design evolution due to the entry into force of the updated rules of the FCR cooperation.

	Until June 2019	July 2019 onwards	July 2020 onwards
Auctions timing	Weekly auctions	Daily auctions	Daily auctions
		D-2 in accordance with the auction calendar	D-1
Product	Duration is one week	Duration is one day	Duration is 4h (6 products for each daily auctions)
Bids	The Auction Allocation Algorithm allows only divisible bids in Austria, Belgium, Germany, France and the Netherlands	The Auction Allocation Algorithm allows only divisible bids in Austria, Belgium, Germany, France and the Netherlands	The Auction Allocation Algorithm allows divisible bids together with
Bids	Only in Switzerland indivisible bids may be used, with a maximum bid size of 50 MW	Indivisible bids will have a maximum bid size of 25 MW	
Bids	Except for Switzerland, submitting of exclusive bids (only one bid of a certain group of bids can be accepted) is not allowed	Exclusive bids will not be allowed in the FCR cooperation	
Bids	• The minimum bid size is 1 MW • The bid resolution is 1 MW (the result of dividing a bid should be a whole number) in the FCR cooperation		
	The TSO-BSP settlement of the FCR procurement is based on a pay-as-bid mode	The TSO-BSP settlement will be based on pay-as-cleared pricing (marginal pricing)	
TSO – BSP settlement	Exporting TSOs bear the costs that they incur if they procure at the national level, hence they pay for the cheapest local bids to cover demand	The compensation between TSOs for imported or exported volumes is first calculated using the CBMP	
TSO – TSO settlement	The costs of the more expensive bids that were procured additionally are then passed on to the importing TSOs using an 'exported bid average price'	Each importing TSO country has to pay to the exporting TSOs countries the LMP for the imported volume of FCR. Similarly, the exporting TSOs countries will receive the LMP for the amount of the volumes they export[151]	

Table 27 – Summary of the auction timings, products, bids, TSO – BSP settlement and TSO – TSO settlement

151 If the import limit of a country is hit, the country must pay a higher or equal price (LMPi) to BSPs than for compensation to the other (exporting) TSOs (CBMP). Whereas, if the export limit of a country is hit, the country has to pay a lower or equal price (LMPe) to BSPs than it will receive as compensation from the other (importing) TSOs (CBMP). In both cases the difference between the payment to the BSPs and the compensation from TSOs is combined.

6.2.2.3. Market development

The analysis of the evolution of the annual prices (**Figure 56**) for FCR capacities procured by the FCR cooperation shows a significant decrease of the prices over the past four years, except for Belgium and the Netherlands, where the transition to marginal pricing seems to have broken the downward trend over the past years. The overall downward trend can be linked to the accession of new entrants in the market, associated with the increased competition due to the exchange of FCR capacities. The evolution of the market design (e.g. auctions in D-2/D-1, marginal pricing, etc.) also contributed to the improvement of the conditions for new market participants.

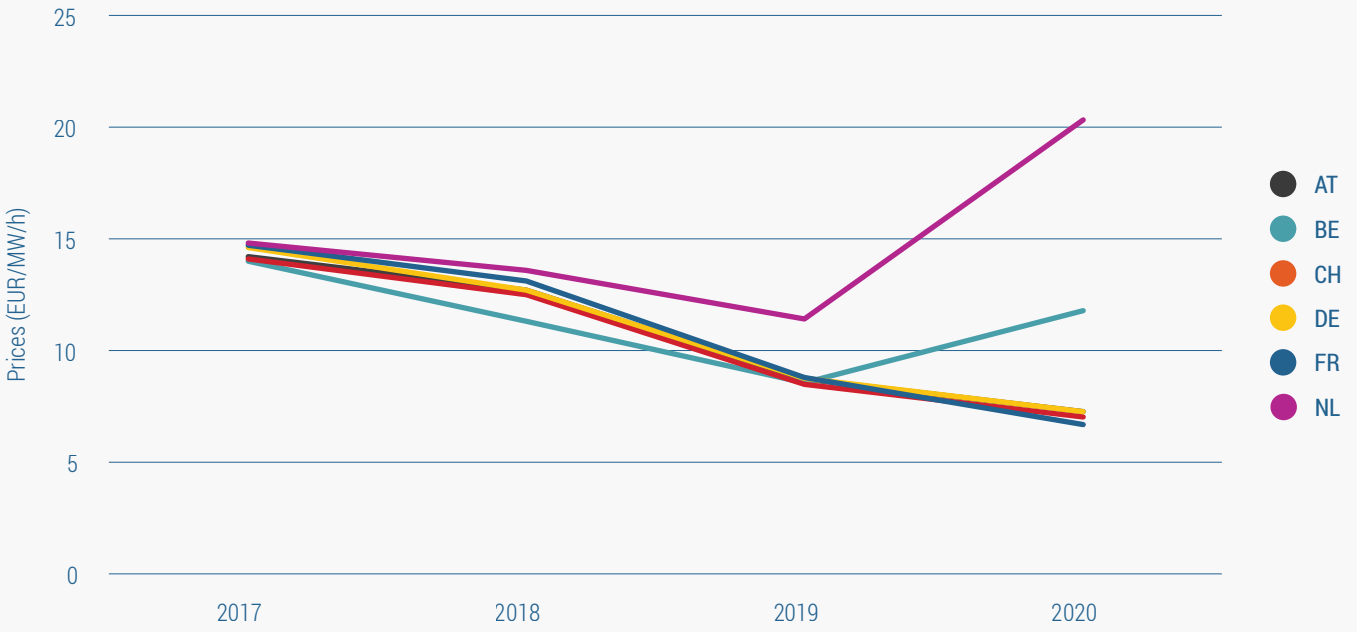


Figure 55 – Evolution of the annual prices of the FCR cooperation

Figure 57 show the monthly prices for each country of the FCR cooperation for the year 2020 and the level of convergence of the prices.[152] Switzerland, Germany, France and Austria have a very high level of convergence of the prices, whereas Belgium and the Netherlands often reach their import limits (see **Figure 59**) and prices then being decoupled from the rest of the cooperation.

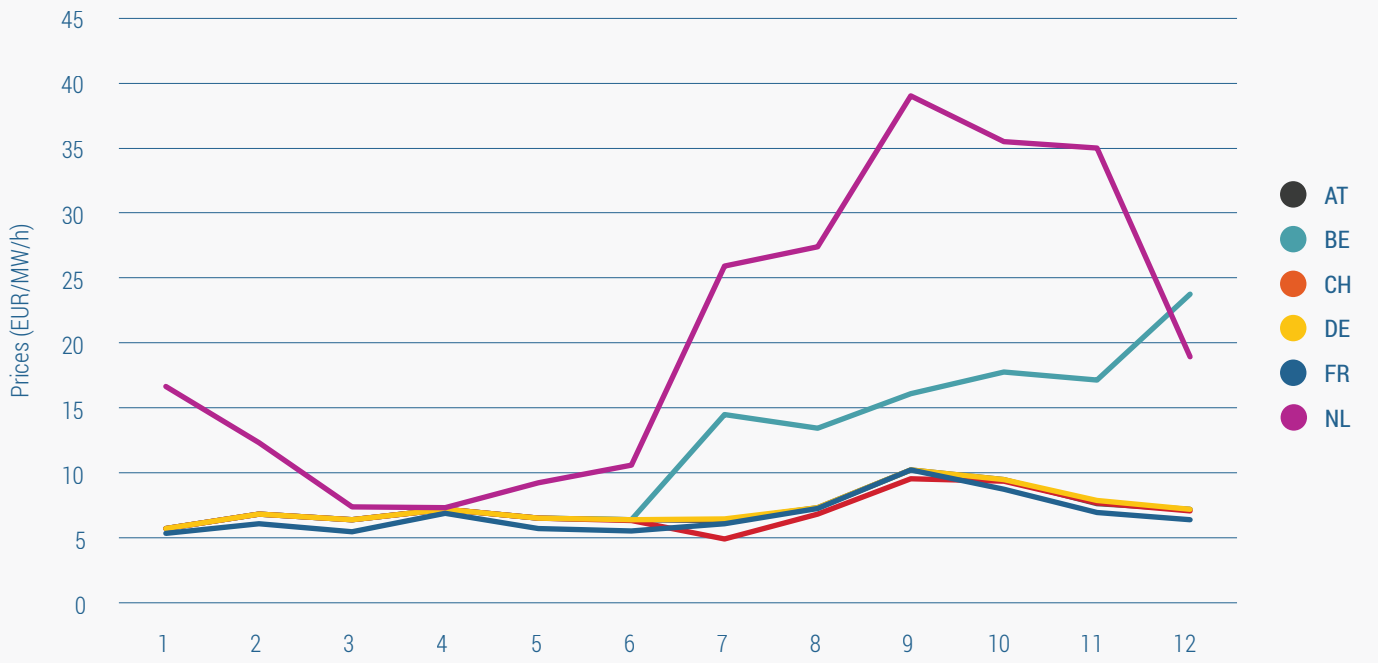


Figure 56 – Evolution of the monthly prices (year 2020)

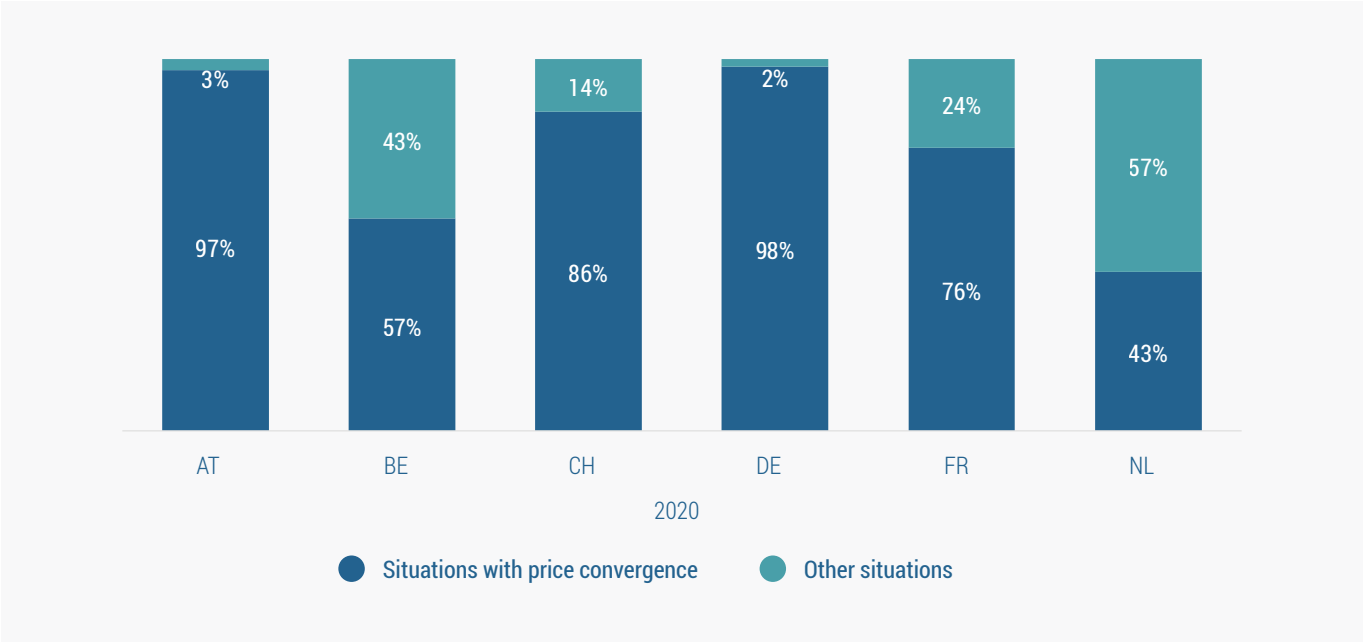


Figure 57 – Level of price convergence (2020)

152 The situations of price convergence correspond to the situations for which the export and import limits are not active.

Figure 58 – Import and export position (MW) of each country

6.2.2.4. Evaluation of the benefits

Benefits are evaluated based on a comparison between two situations (see Figure 61).

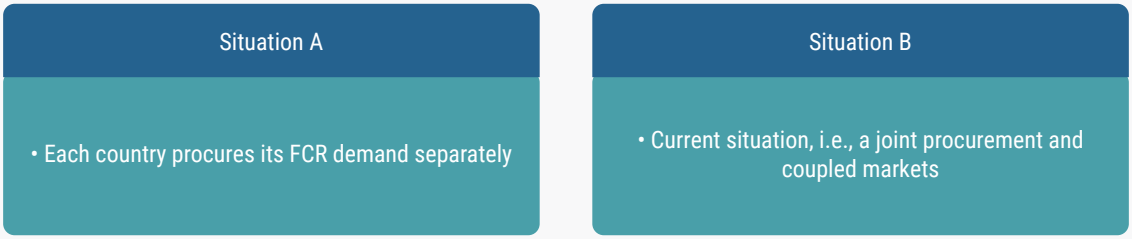


Figure 59 – Two situations for benefits evaluation

The above-mentioned scenarios are analysed in a simulation for one-year period, between July 2019 and June 2020. In both scenarios, the same FCR demand and the same bids from the BSPs are used. In the simulation B, the core share of each country and the export limits are taken into account.

For the two situations, the procurement costs and the impact on the BSP surplus (i.e. difference between the marginal price and the bid price for the activated bids) are compared. The overall impact on procurement costs and BSP surplus provides an evaluation of the benefits linked to the joint procurement and terms of social welfare. The simulation considers identical sets of bids in both scenarios. In reality it is likely that the different conditions of the scenarios would affect the bids.

In the simulation A, there is a significant volume of under-procurement (i.e. 22 MW on average, 262 days with under-procurement and for these days 30 MW on average of under-procurement). Under-procurement occurs in a country in the case that there are insufficient bids to cover the demand for that country. This is not a problem in the current situation as imports are possible. This occurs because due to the cooperation some BSPs have withdrawn expensive bids from the market. This under-procurement reveals the limit of this analysis, in particular, as identical sets of bids have been used for simulation of both situations. It is likely indeed that the cooperation discouraged some BSPs to bid their entire FCR flexibility, as the most expensive bids were unlikely to be selected. It can be concluded that, without FCR cooperation, more assets would have been offered in the market. The results are summarised in **Table 28**.

The impact of the FCR cooperation on the procurements costs is a decrease of EUR 227 million,[153] but the global optimisation has also a negative impact on the BSP surplus (i.e. the difference between marginal prices and bids prices). Under the limitations of the simulation analysis described above the impact on the social welfare is estimated at over EUR 60M per year.

	Procurement costs (million EUR p.a.)	BSP surplus (million EUR p.a.)	Under-procurement	Impact on social welfare (million EUR p.a.)
Simulation A	313	231	22 MW	
Simulation B	86	64	0 MW	
B-A	-227	-167		60

Table 28 – Evaluation of the benefits of the FCR cooperation

6.2.3. Nordic cooperation (NBM)

The future common capacity market is developed by the Nordic TSOs within the joint programme of the Nordic Balancing Model (NBM). For the cross-zonal capacity allocation within this cooperation, the Nordic TSOs will use a market-based allocation method.

6.2.3.1. Main principles, governance, and decision-making process

Finland, Norway, Sweden and Eastern Denmark (DK2) constitute one common synchronous area, known as the Nordic synchronous area. Interconnections from the Nordic synchronous area to Western Denmark (DK1) are also part of the Nordic CCR, though DK1 is part of the Continental Europe synchronous area.

To meet the changes in electricity markets, the Nordic TSOs are developing the NBM. Through automation and new markets, it will facilitate the energy transition, enhance the socioeconomic benefits from the common Nordic market and provide a safe connection to the European balancing platforms for the exchange of balancing energy. The implementation of the NBM depends on close cooperation with stakeholders and approvals by NRAs.

The NBM is organised as a programme that is running until 2024. A dedicated steering committee with two representatives from each TSO, Svenska Kraftnät, Energinet, Fingrid and Statnett, governs the programme. Svenska Kraftnät and Statnett are Common Service Provider (CSP) with the responsibility to deliver common services.

As part of this program the four TSOs are developing a common capacity market (CM) for aFRR. A scheme of the aFRR capacity market in the Nordic synchronous area can be found in the 2020 Balancing report.[154] Later, a mFRR capacity market will be developed using similar

153 Note that the underprocurement has not been compensated in this analysis, so the total cost relates to a smaller volume than the volume contracted in reality.

154 See ENTSO-E Market Report 2020, p.27.

methodology and IT solutions. The EB regulation allows for the reservation of cross-zonal capacity (CZC) for the exchange of balancing capacity. There are substantial socioeconomic gains to be made from the exchange of balancing capacity, especially in a power system like the Nordic one with many small bidding zones.

6.2.3.2. Implementation

Reserving cross-zonal capacity for balancing capacity exchanges implies that the capacity given to the day-ahead and intraday markets is reduced. TSOs must therefore assess whether the loss of reserving some capacity for balancing outweighs the benefits. To forecast the future value of cross-zonal capacity, the Nordic TSOs use a market-based allocation method with a reference day. The forecasted market value of the cross-zonal capacity between two bidding zones will total the price difference of the corresponding MTU on a reference day for the day-ahead market. The forecast is made more conservative by adding a mark-up to the forecast. To further limit the impact on the energy markets, cross-zonal capacity is only reserved up to a pre-defined maximum level (by default 10% of the cross-zonal capacity).

In the common Nordic aFRR CM the procurement will be executed in D-1. The gate closure time (GTC) for BSPs will be at 07:30. This allows for sufficient time for backup and fallback procedures before the GCT in the SDAC. Standard aFRR capacity bids will be used with a minimum bid size of 1 MW and hourly granularity. TSOs will inform an aFRR demand in MW per direction per bidding zone per market time unit. Marginal pricing (pay-as-cleared) will be used for the pricing of selected bids. Procurement will be optimised across all 11 Nordic bidding zones using the aFRR capacity bids, TSO demand and the cost of cross-zonal transmission capacity as input.

The common Nordic IT system is being finalised during the winter 2021 and is tested towards BSPs in April/May. From September 2021 onwards, it's expected that the IT system can be used to support local aFRR market.

6.2.3.3. Market development

For the go-live of a Nordic aFRR CM, ACER has set the condition that the capacity in the Nordics reserved for the SDAC is calculated based on the flow-based methodology. Hence, national markets will be established as a bridge to the Nordic market in order to make use of the IT system and reap the benefits from a capacity market within the limits set by ACER and the Nordic regulators.

The Norwegian market is expected to go live in September 2021, the Danish market in November 2021 and the Swedish and Finish markets in January 2022. The earliest possible go-live date of the Nordic aFRR capacity market is February 2022.

Milestone	Date
National aFRR capacity markets:	
• Norway	September 2021
• Denmark	November 2021
• Sweden	January 2022
• Finland	January 2022
Single Price Model	Q4 2021
Nordic aFRR capacity market	Earliest Q2 2022
Automated Nordic mFRR EAM	Q4 2022
15 min intraday market and 15 min ISP	Q2 2023
Nordic mFRR capacity market	Q4 2023
European aFRR EAM (PICASSO)	Latest Q2 2024
European aFRR EAM (MARI)	Latest Q2 2024

Table 29 – Roadmap of the Nordic Balancing Model cooperation

6.2.3.4 Evaluation of the benefits

In the Nordic aFRR CM benefits are calculated as procurement costs and welfare gains with and without CZC reservation. Hence the benefit is the difference between having CZC reservations and not having them available for the procurement of aFRR, with corrections for congestion income and change in BSP surplus. Benefits are calculated per bidding zone and not bidding zone border. It is not possible to calculate the correct benefit per bidding zone border for a common market and bidding zones with more than one connection to other bidding zones.

Since the Nordic market is not yet operational, performance indicators on monetary savings due to exchange and sharing of balancing capacity are not yet relevant.

6.2.4. German–Austrian aFRR capacity cooperation

German and Austrian TSOs cooperate on several products, processes and markets in relation to balancing, including imbalance netting and the common activation of aFRR and mFRR. As the products and processes are highly harmonised, TSOs have decided to increase their cooperation towards a common procurement of aFRR balancing capacity. This is the first cooperation for a common procurement of balancing capacity in the Synchronous Area Continental Europe. The allocation of cross-zonal-capacities within this cooperation is based on a CBA.

6.2.4.1 Main principles, Governance and Decision-making process

The balancing capacity, as well as the balancing energy cooperation, is based on a TSO-TSO model. Both market areas have their own tendering platforms to which the local BSPs send their offers. After the gate closure time, the TSOs forward these offers to a central matching function, where the bid selection takes place. A schematic diagram of the Germany–Austria aFRR balancing capacity cooperation and its market rules are described in the 2020 ENTSO-E Balancing Report.[155]

As part of the balancing capacity cooperation, TSOs have to ensure that sufficient cross-zonal-capacities are available, which requires a methodology to allocate this capacity. As the cooperation was initiated before entry into force of EB GL, the German and Austrian TSOs had more freedom to set up the CBA for the allocation, which enabled the TSOs to collect some experience before developing the methodologies required by the EB regulation.

The German and Austrian TSOs agreed to limit capacity allocation to 80 MW, which is the upper limit for the CBA. The CBA is based on a comparison of the day-ahead market and the capacity and energy prices on the aFRR market, including a probability for activation. The allocation is based on the optimisation of both market values per product (the aFRR product is currently a four-hour product).

Input-Parameter to CBA	
Value of cross-zonal capacity on day-ahead market	Value of cross-zonal capacity on aFRR market
hourly day-ahead prices for DE and AT	• aFRR results for capacity and energy • aFRR activation probability

Table 30 – Inputs for the cost-benefit analysis performed to allocate cross-zonal capacity

155 See ENTSO-E Market Report 2020,p. 28.

The optimisation will be performed on both a monthly and weekly basis. The result of the monthly optimisation will be considered in JAO's monthly capacity auction for the upcoming month. The weekly CBA is a re-evaluation of the monthly CBA and is also limited by the result of the monthly CBA. The weekly CBA is a re-evaluation of the monthly CBA and is also limited by the result of the monthly CBA. If the result of the weekly optimisation is smaller than the monthly result, the difference will be returned to the energy market within the intraday increase or decrease process. The optimisation of the weekly and monthly processes both use the same methodology, though the weekly optimisation is based on more recent data. The result of the weekly CBA is used as a limit for the bid selection process. **Figure 62** provides an overview on the timeline for the optimisation and allocation.

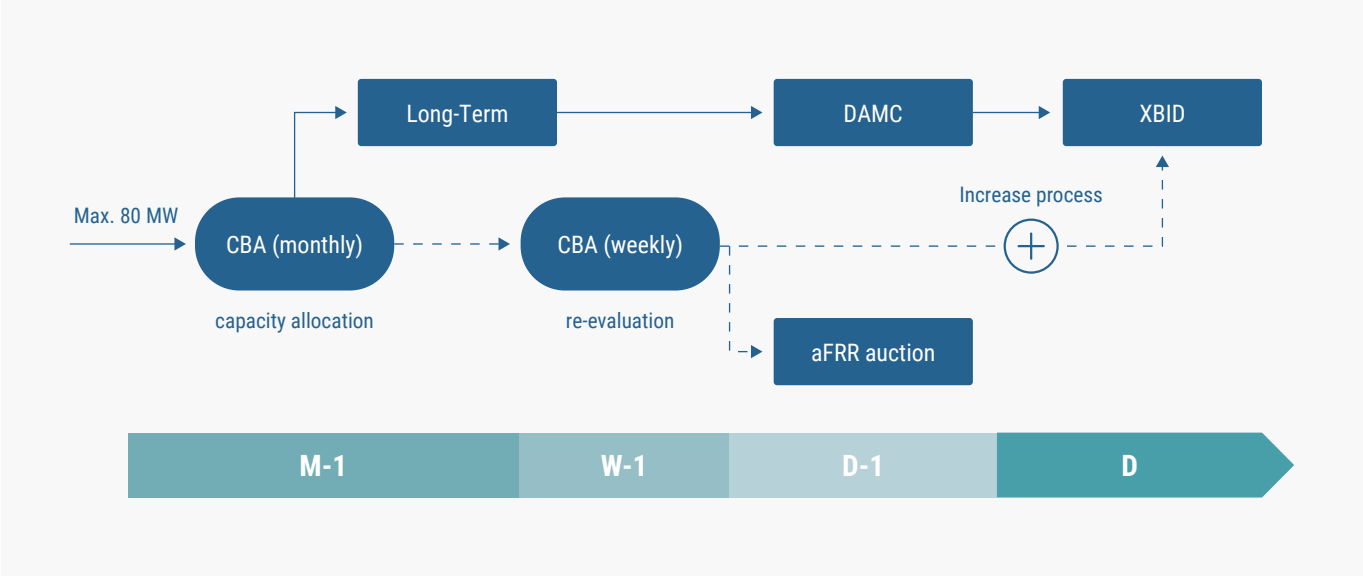


Figure 60 – Timeline for the optimisation and allocation of cross-zonal capacity within the aFRR cooperation

After the bid selection, the BSPs and TSO will be informed about the result, and the merit order list will be forwarded to the local LFC of each TSO, along with the central optimisation function for the common activation of aFRR energy.

The German and Austrian TSOs formed a governance structure comprising a Steering Committee and an Expert Group, with different task forces (TFs) and work streams. The single point of contact convenes the Expert Group, prepares information for the Steering Committee and leads the Steering Committee's meetings. The Expert Group develops their own processes and reports to the Steering Committee, which includes the preparation of decisions when needed.

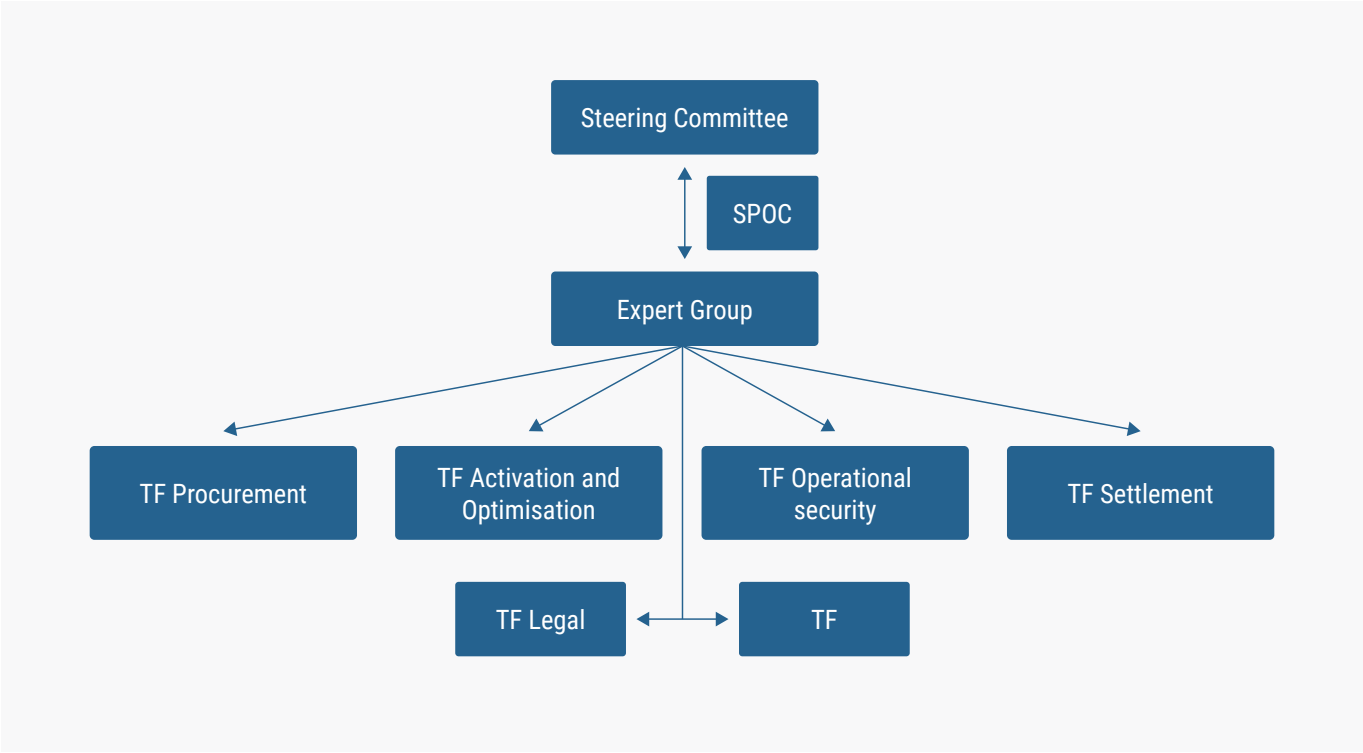


Figure 61 – Governance structure of the aFRR cooperation

6.2.4.2 Implementation

According to an impact analysis regarding the market in Austria and Germany, the TSOs had to request NRA approval for applying the cooperation including the harmonisation of market rules and the application of the CBA, which were approved at the end of 2018. Based on the approval the TSOs have developed the IT-specification and implementation as well as the required monitoring of costs for congestion management to ensure the allocated capacity. After finalisation of all these tasks, the German and Austrian TSO started the cooperation with the first procurement for the delivery day 1 February 2020. The results, i.e. volumes and prices of selected bids, are published on the Austrian[156] and German[157] tendering platforms respectively.

In November and December 2020, Austrian and German TSOs implemented local balancing energy markets, which required a slight updating of the CBA per the resolution of the balancing energy results.

6.2.4.3 Market development

By November 2021 the TSOs plan to implement the standard products for balancing capacity according to the approved methodology, which is mainly a reduction of the minimum bid size to 1 MW for Germany, as well as the resolution of the balancing capacity price of EUR/MWh.

The German–Austrian cooperation was established prior to the entry into force of the EB regulation. Parts of the contract for the German–Austrian cooperation, which was signed at the end of 2017, will expire by the end of 2022. Until then, the TSOs can apply the current CBA. After the end of 2022, and once approved, the new market-based methodology (Article 41of the EB regulation) will need to be applied.

Other TSOs, (e.g. TenneT NL) have shown their interest to take part in the cooperation. The first alignments have been initiated, but the accession will only take place after the go-live of the aFRR platform, as it is a basic requirement to have balancing energy cooperation with a central optimisation function before initiating balancing capacity cooperations.

6.2.4.4 Evaluation of the benefits

Performance indicators

The performance indicator on monetary savings due to exchange of balancing capacity can currently be calculated in a different way as proposed, as the CBA of the cooperation considers balancing capacity and energy prices. Looking just on the monetary savings by taking into account the balancing capacity prices will give wrong implications regarding the benefits of the cooperation.

As already mentioned, the cooperation was initiated before the EB regulation entered into force, which allows the cooperating TSOs to make use of Article 38 (1) of the

156 See Austrian tender platform
157 See German tender platform

EB regulation. This article allows TSOs to make use of their agreed allocation methodology as long as the contract of this cooperation persists. The contract will persist till the end of 2022. Once the market-based methodology according to Article 41 of the EB regulation will be approved, the cooperating TSOs will implement this methodology by the end of 2022/beginning of 2023. With the application of this methodology, the cooperation will deliver the performance indicator on monetary savings as requested.

Based on the experience from the first year of the cooperation, significant reductions of costs from the allocation of cross-zonal capacity have been reached. Taking into account the reduction of balancing capacity cost due to the common procurement and the reduction of balancing energy costs due to the allocated cross-zonal capacities delivered savings in Austria of up to EUR 3 million (approximately -10 % of total costs for aFRR) and for Germany up to EUR 15 million (approximately -8.4 % of total costs for aFRR). Looking just on the savings from the common procurement, the benefit of the cooperation is about EUR 6 million, with remaining EUR 12 million accruing as a result of the effect of allocated cross-zonal capacity for the exchange of balancing energy. **Figure 64** shows the development of balancing capacity costs per month, as a comparison of costs without common procurement (light blue) and with common procurement (dark blue).

The total capacity costs of the cooperation are EUR 82.5 million (EUR 78.9 million for Germany and EUR 3.6 million for Austria), while the costs without cooperation are EUR 88.7 million. **Figure 65** shows in dark blue the difference between common procurement costs and the sum of local procurement costs, while the light blue line shows the increasing benefit over the year.

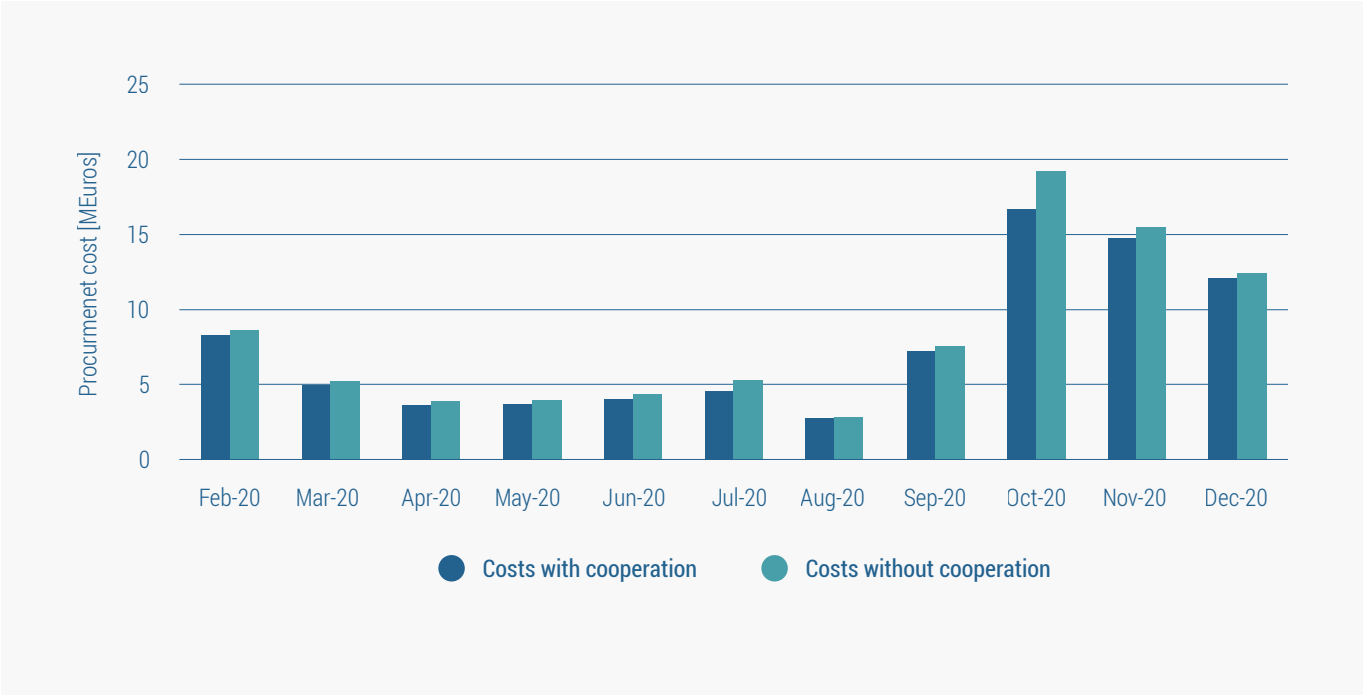


Figure 62 – Comparison of procurement cost with and without the aFRR cooperation (year 2020)

Figure 63 – Savings of the aFRR cooperation (2020)

6.3. Imbalance settlement harmonisation

As the EB regulation states, the general objective of imbalance settlement is to ensure that balance responsible parties efficiently support the system's balance and incentivise market participants to keep and/or help restore the system's balance. This is crucial to ensuring the full and efficient functioning of the internal energy market.

To ensure fairness, objectivity and transparency of the mechanism, the EB regulation sets out rules for the financial imbalance settlement, which must be implemented through terms and conditions for balance responsible parties.

The EB regulation's main provisions on imbalance settlement concern:

- The establishment of a methodology to harmonise the main features imbalance settlement (i.e. the ISH methodology), which was approved by ACER in July 2020 in accordance with Article 52(2) and must be implemented by all TSOs within 18 months after the decision. The ISH methodology contains provisions on the specification and harmonisation of the imbalance calculation with one single position for each BRP, the use of a single imbalance price, the definition of conditions and a methodology for applying dual imbalance pricing.
- The EB regulation also specifies that a 15-minute ISP must be applied in all scheduling areas within three years after the regulation's entry into force (January 2021), with the possibility for a derogation until January 2025 or for an exemption if jointly requested by all the TSOs of a synchronous area.

Table 31 summarises the progress of the TSOs in implementing the ISH methodology. A survey was carried out among 26 TSOs,[158] of which 25 replied. The detailed answers of each TSO are provided in Annex VI.

Questions:	Yes	No
Was 15-min Imbalance Settlement Period (ISP) implemented by 1 Jan 2021?	9	16
Has your TSO made a proposal for amendments to your national terms and conditions for BRPs, to comply with the ISHM?	11	14
Is your TSO calculating for each ISP one single final position for each BRP (scheduling unit for CDM) in acc. with ISH method Art. 3?	18	7
Is your TSO using single imbalance pricing for all imbalances?	13	12
Has your TSO submitted a request to your NRA for dual imbalance pricing?	1	24
Has your TSO developed a proposal for additional settlement mechanism[159] to BRPs in accordance with EB 44(3)?	12	13
Is your TSO already publishing nationally in ≤ 30 min after delivery the estimated imbalance price and estimated balancing energy prices? [160]	7	18

Table 31 – Implementation of Imbalance settlement harmonisation by the TSOs

6.4 Market development indicators 2020

This section describes the performance indicators to monitor the operation of the balancing market and its processes per TSO. The hereafter presented indicators have been agreed in cooperation with ACER, during Q1 and Q2 2021.

It has to be noted, that the information provided by this report refer only to the year 2020 to avoid overlapping of two subsequent years. Besides, ENTSO-E and ACER have agreed that a full four months is the shortest (minimum) reporting time unit to be considered part of the performance indicator calculation. For example, if a TSO joins a platform or cooperation in mid-September, this information is considered as not representative and will be used together with the information of the following year in two years' time.

Considering this fact and having in mind that some TSOs have commenced their balancing market during Q4 2020 (e.g. Greece) the corresponding indicators will be provided in the balancing report of 2022.

Unless explicitly stated otherwise, the resolution of data is per ISP. The time interval covered by these performance indicators is one year, and data are reported per scheduling area or LFC areas (exceptionally imbalance area or imbalance price area). Bidding zone is used if the bidding zone covers several scheduling areas for the given process (e.g. Germany).

158 The four German TSOs are counted as one in the evaluation of this survey
159 e.g. procurement costs, administrative costs, other
160 in accordance with Elec Reg 6(13)

(a) Available and unavailable balancing energy bids per TSO

Pursuant to Article 59 (4)(a) of the EB regulation an indicator on the availability of balancing energy bids is reported describing the volume of available and unavailable bids of balancing energy collected by the TSO.A TSO may declare a bid as unavailable due to internal congestion or operational security constraints (Article 29(14) of the EB regulation). In this case, the unavailable bid will not be forwarded to the European platforms and hence will not be used either by the connecting TSO nor by the relevant platform.

(a1) Yearly average of the available and unavailable volumes of balancing energy per TSO during 2020 [MW]

This indicator represents the cumulative average of the total value of available and unavailable bids for balancing energy (MW per ISP), divided by 8,784 hours

For TSOs applying the central dispatching model, the indicator is calculated based on the volume of an available and unavailable standard balancing energy bids resulting from the conversion of the integrated scheduling bids.

The indicator is separated per direction (upward and downward) and per reserve type.

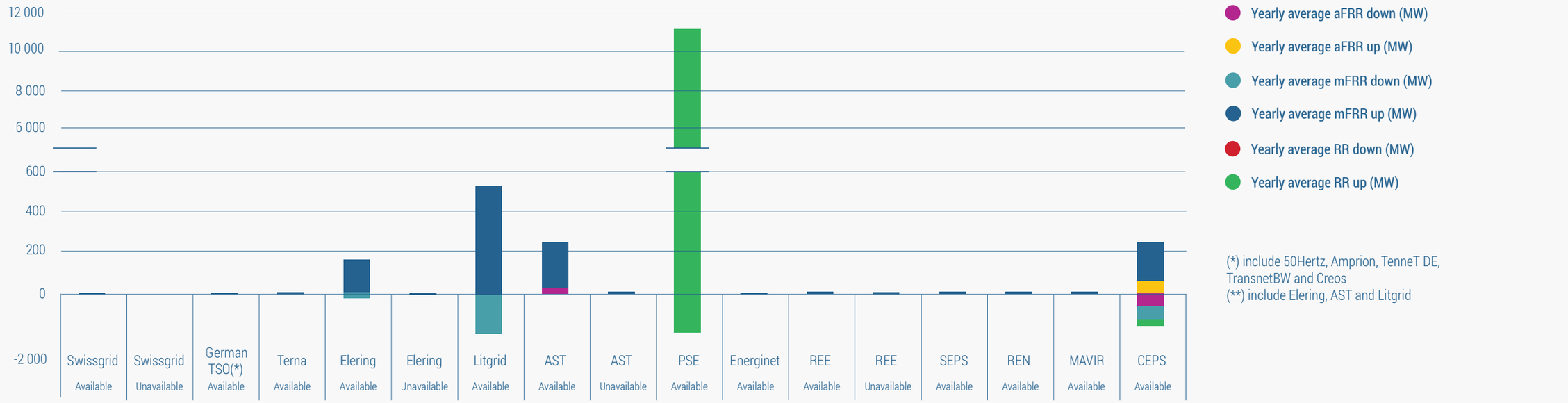


Figure 64 – Available and unavailable balancing energy bids per TSO during 2020 (Source: Data submitted by each TSO[161])

(b) Total cost of balancing

The total cost of balancing is calculated pursuant to Article 59 (4)(d) of the EB regulation for each TSO.

This performance indicator splits into procurement cost of balancing capacity (**b1**) and activation cost of balancing energy (b2):

(b1) the procurement costs [EUR] of balancing capacity reserves

The procurement costs (EUR) of balancing capacity reserves are calculated through the combination of volumes of contracted balancing reserves and the corresponding price. The procurement costs are differentiated with respect to the type of reserve.

161 MAVIR data - currently only has local product which is reported as specific product in this report. REE data - the activation of aFRR energy is done on a pro-rata basis of allocated aFRR reserves instead of from energy bids. The values provided in this figure correspond to average allocated aFRR balancing upward capacity

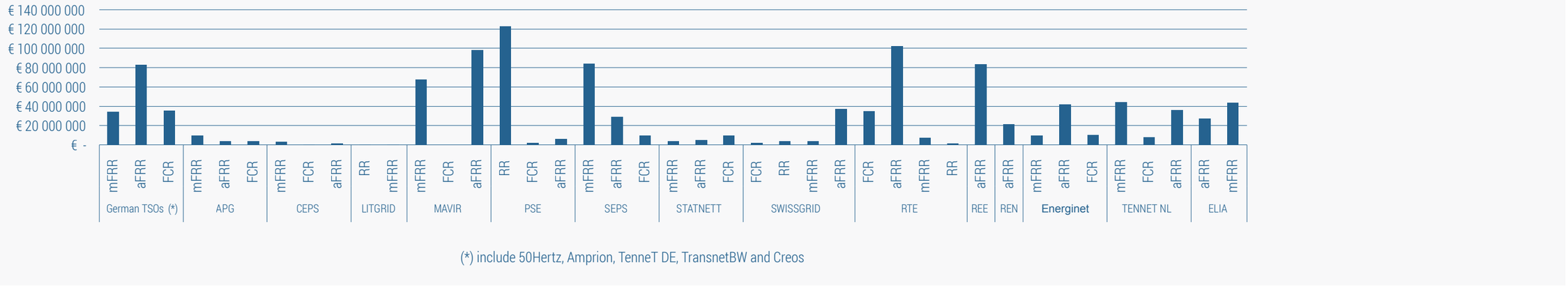


Figure 65 – Total yearly cost of reservation/procurement of balancing capacity (Source: Data submitted by each TSO)

— (b2) the cost (EUR) for the activation of the balancing energy

The cost (EUR) for the activation of the balancing energy during 2020 are based on requested or metered activation multiplied by the prices of activated balancing energy.

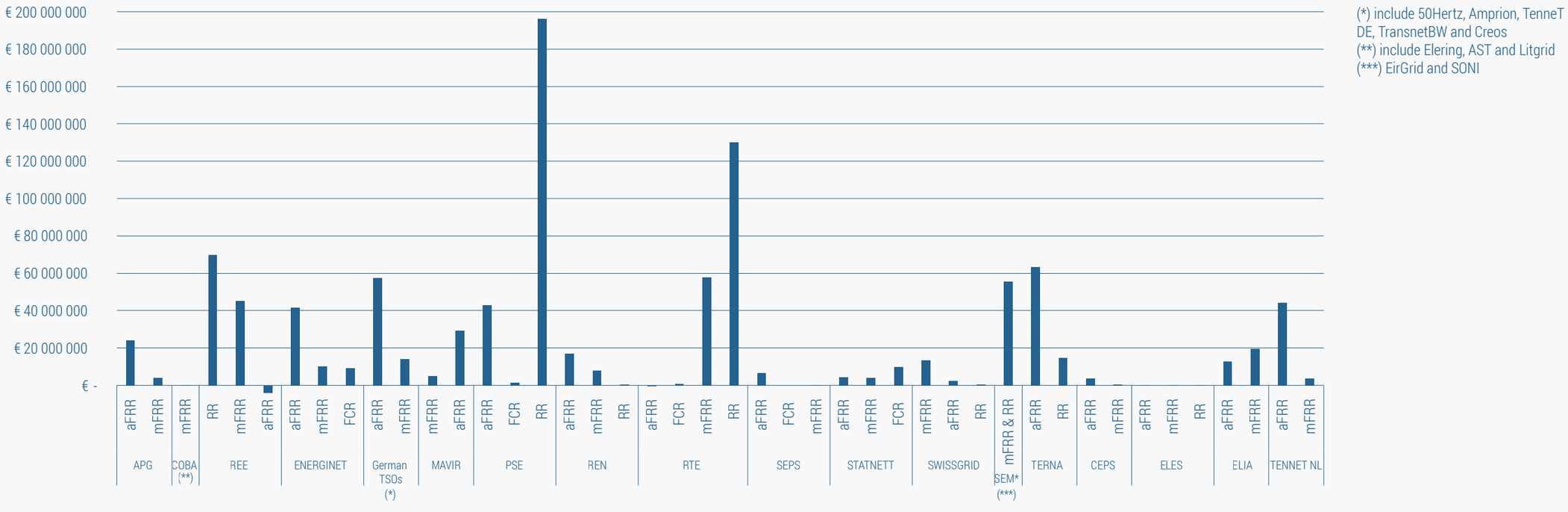


Figure 66 – Total yearly cost of activation of balancing energy from contracted (Source: Data submitted by each TSO)

— c) Volume and price of balancing energy activated for balancing purposes, from standard products and specific/local products

Pursuant to Article 59(4)(h) of the EB regulation the volume (c1) and the average price of balancing energy used for balancing purposes are reported for specific products (c2).

(c1) The sum of the activated volumes (MWh)

The sum of the activated volumes of balancing energy are separated by direction and reserve type. For TSOs applying the central dispatching model, the volumes for standard products are calculated based on the standard balancing energy bids, resulting from the conversion of the integrated scheduling bids.

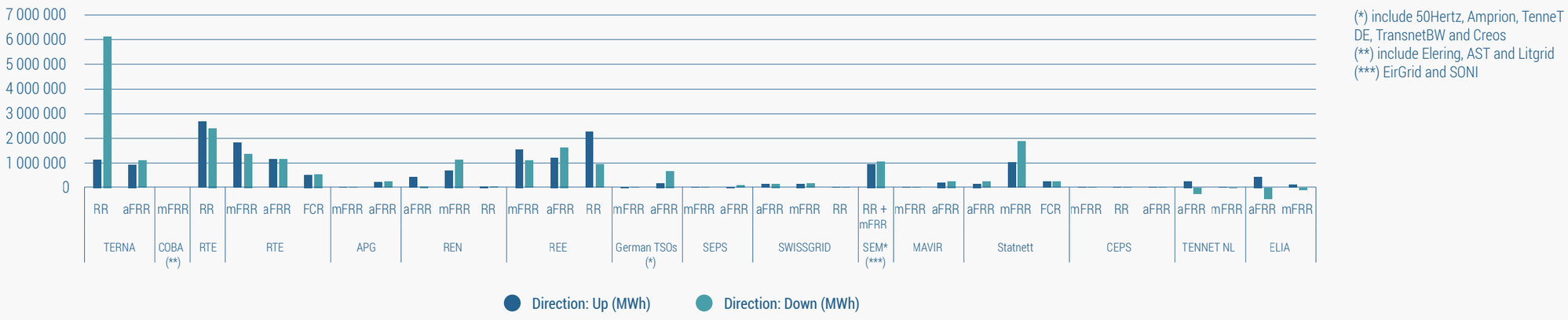


Figure 67 – The sum of the yearly activated volumes of balancing energy [MWh] (Source: Data submitted by each TSO[162])

(c2) The average price [EUR/MWh] of balancing energy for activated energy from specific products.

This indicator is provided per direction and reserve type.

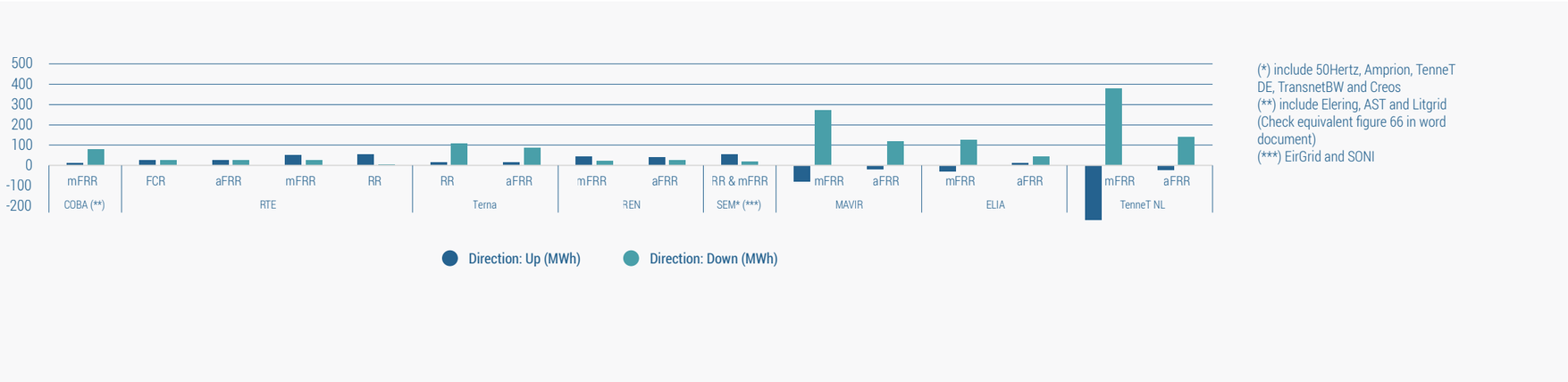


Figure 68 – Total yearly cost of reservation/procurement of balancing capacity (Source: Data submitted by each TSO)

162 MAVIR data - currently only has local product which is reported as specific product in this report. REE data - intended as national balancing energy activated to cover both internal and cross-border external needs

— (d) Yearly average imbalance prices (EUR/MWh) (positive and negative) at each system imbalances (surplus and deficit)

Article 59 (4)(i) of the EB regulation prescribes an indicator on the imbalance prices at each system imbalance. Both an average negative imbalance price and an average positive imbalance price are calculated.

The imbalance prices are provided separately for single and dual pricing. Single pricing means that, for a given ISP in a given imbalance price area, the price for negative imbalance and the price for positive imbalance are equal in sign and size. The prices for negative and positive imbalances only differ when dual pricing is applied.

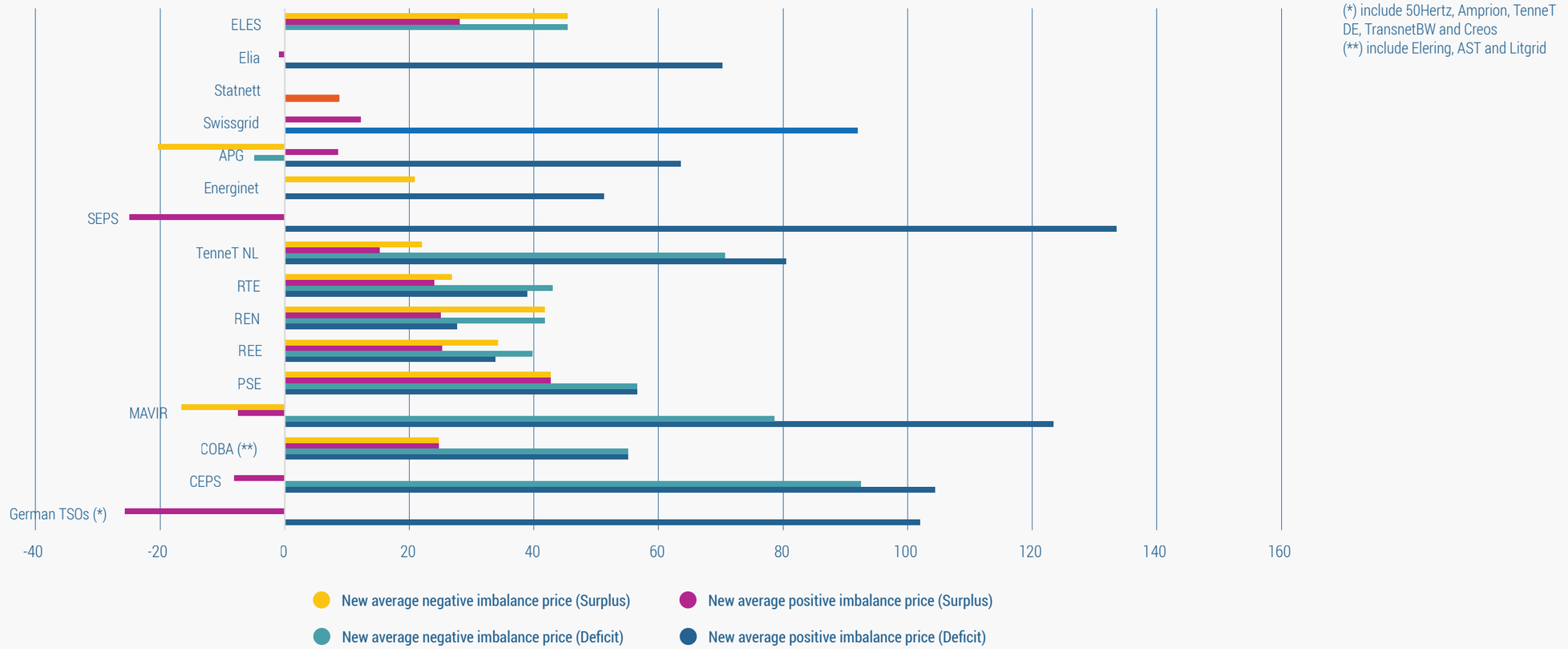


Figure 69 – The yearly average imbalance prices [EUR/MWh] (positive and negative) at the system imbalances (surplus and deficit) (Source: Data submitted by each TSO[163])

163 In orange is the average imbalance price in Norway (including the 5 biding zones); this value doesn't include the surplus/deficit and positive/negative imbalance at the moment

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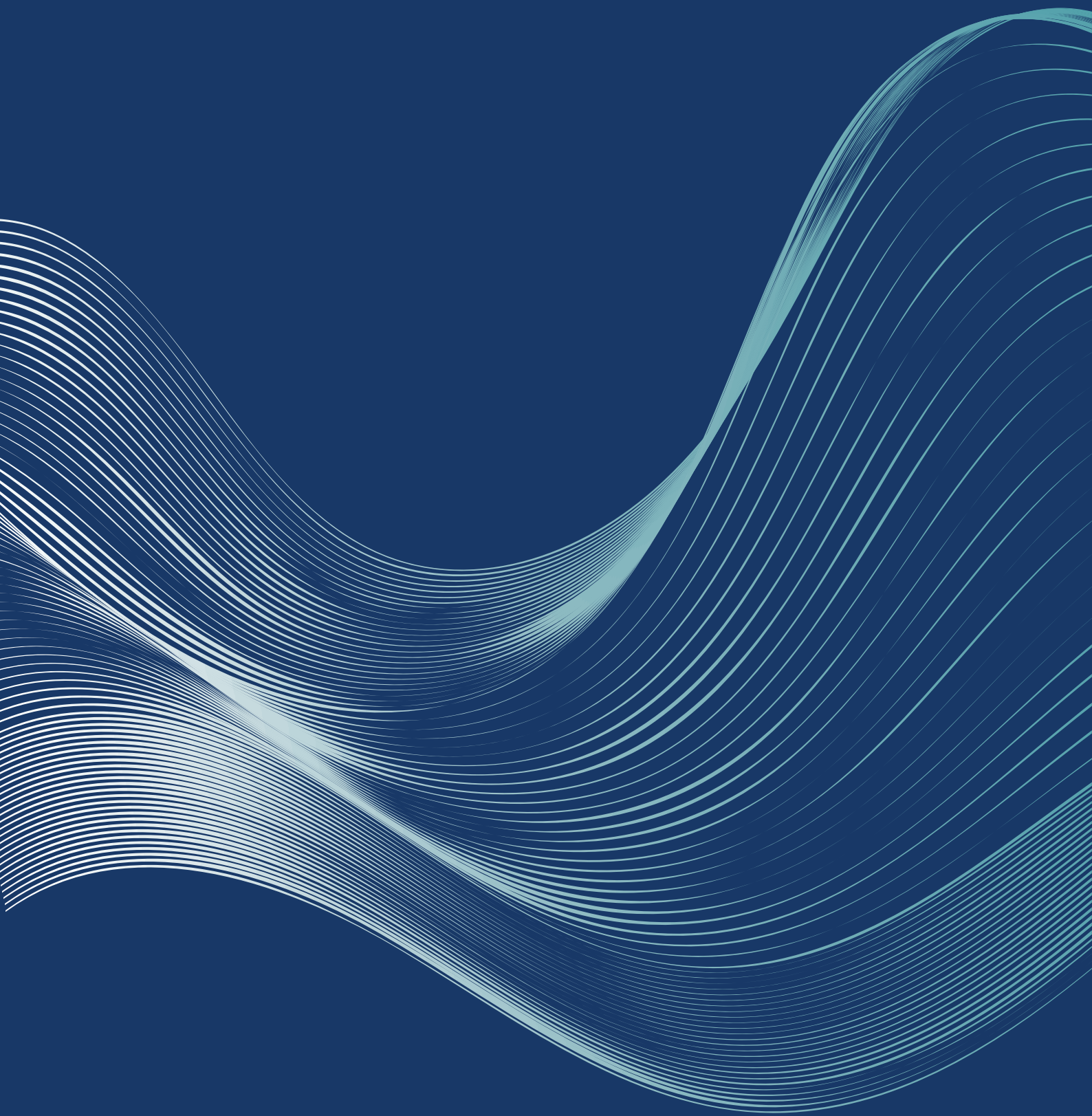
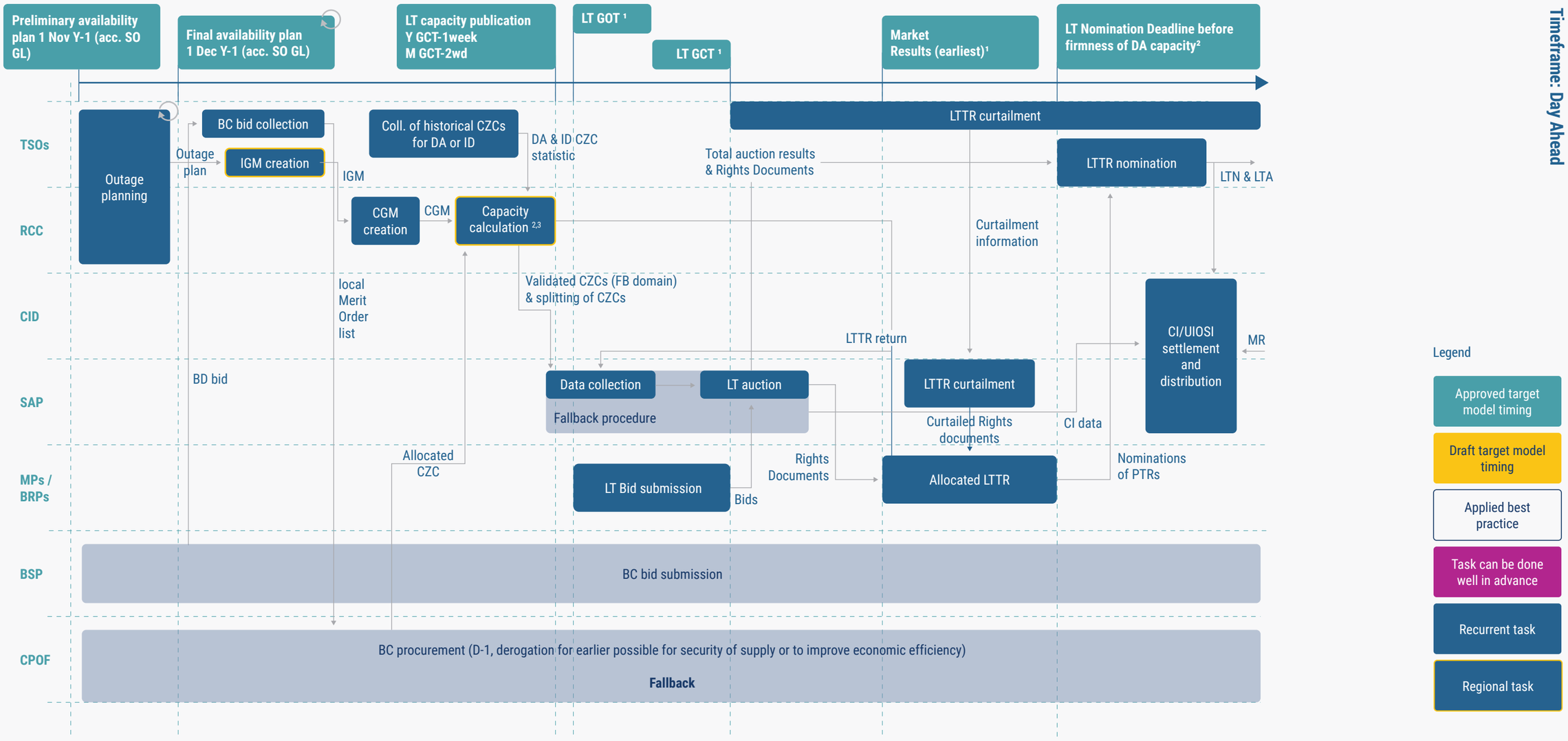


Annexes

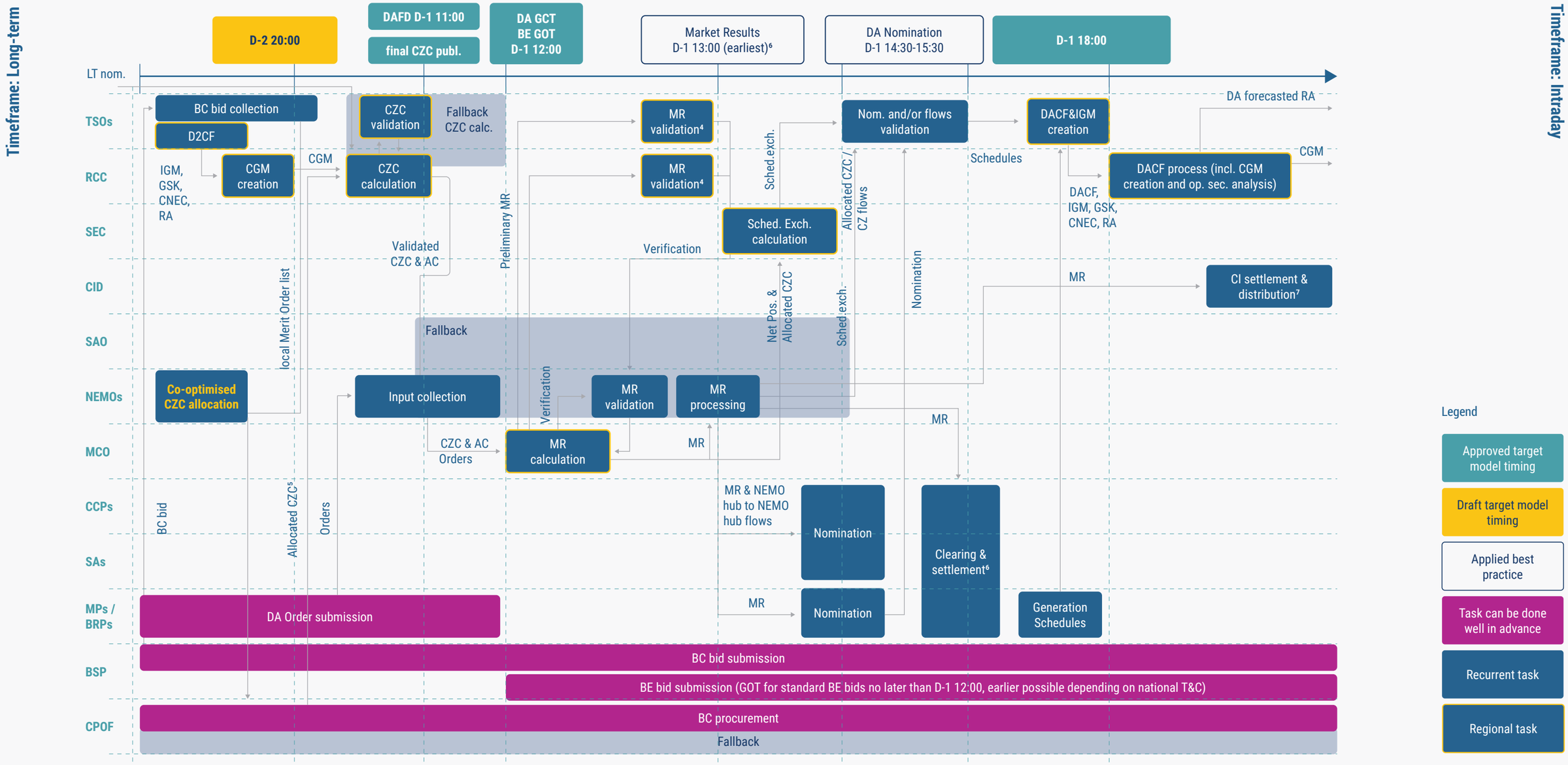
Annex I – Market process overview of FCA, CACM and EB regulations

Forward capacity allocation process



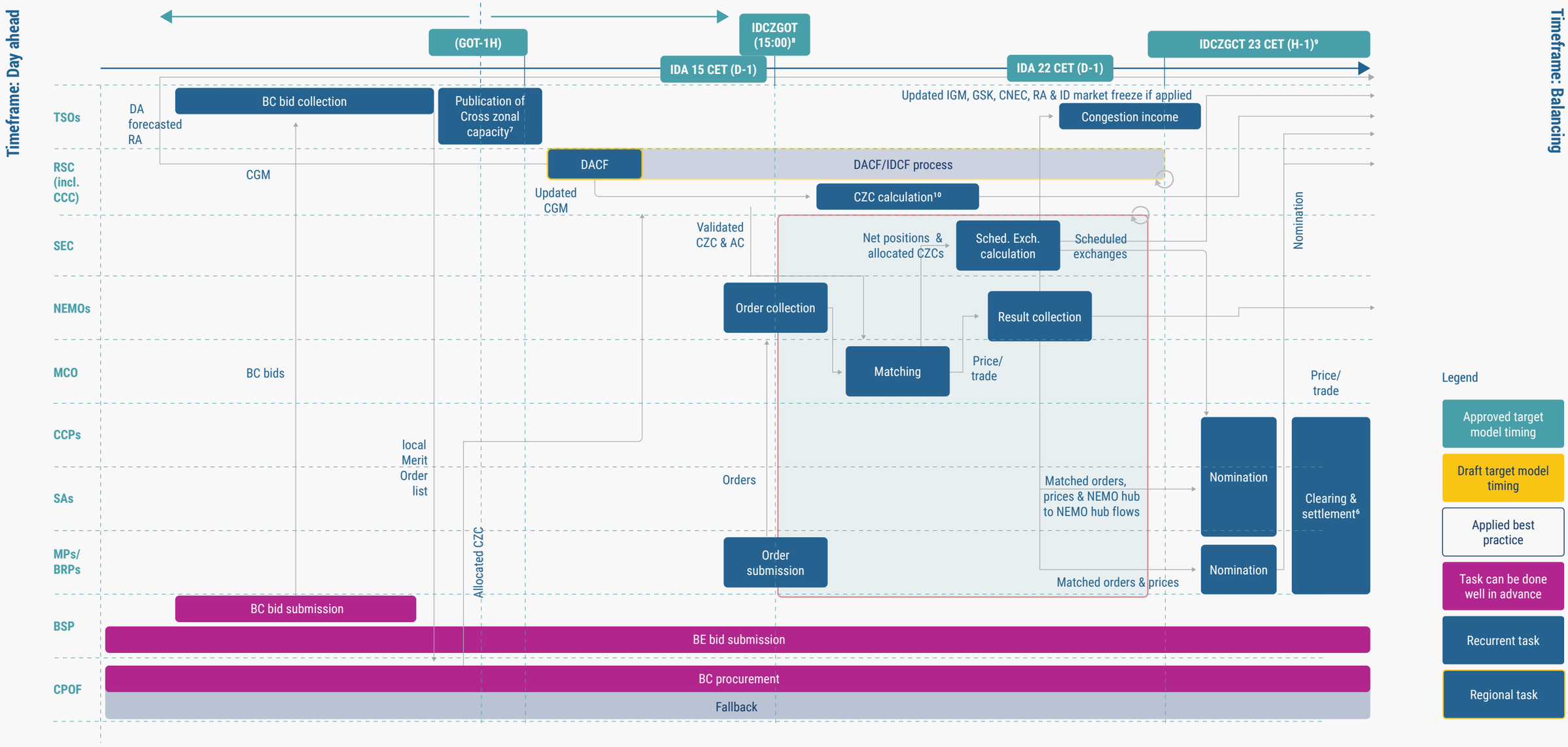
1. According to Auction Calendar there is no unique LT GOT, GCT and publication deadline for whole Europe.
2. To be harmonized under FCA implementation.
3. There are two different options for CZC calculation but only one will be applied per CCR for a given calculation period. Final availability of yearly outage plan might be too late to use as an input for yearly CZC calculation.

Day-Ahead capacity allocation process



4. No parallel processes, solution depends on the regional design. 5) Only in case of market-based allocation and economic efficiency analysis based allocation. Please note that co-optimization is not shown on the slide.
5. The latest possible time of market results publication is D-1 15:30 (in fallback situations).
6. This processes are performed close to the delivery date or even after delivery.
7. The implementation design of the co-optimized CZC allocation according to EB Art. 40 and its respective methodology is under discussion until mid-2022.

Intraday capacity allocation

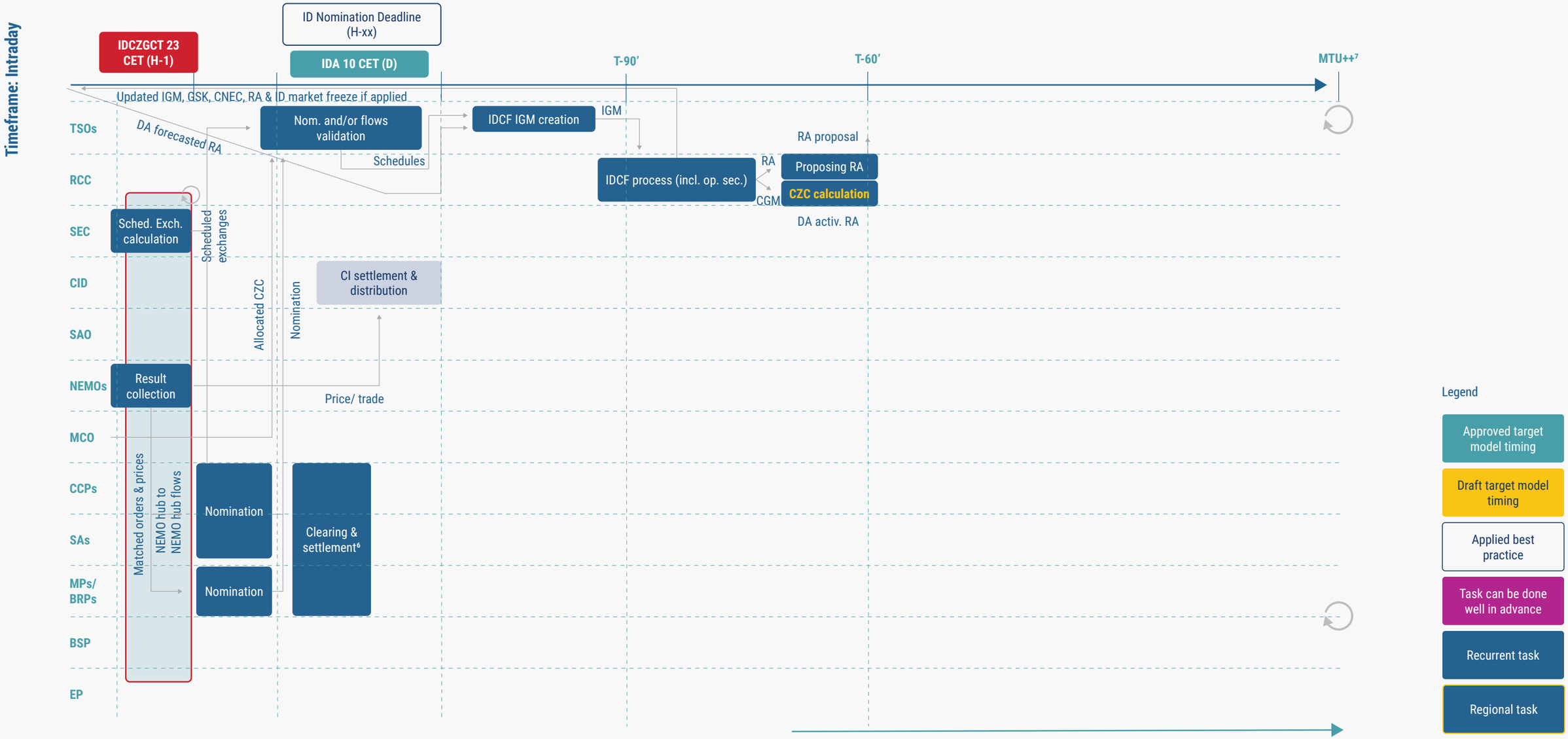


8. Preparation of CGM might be completed close or even after publication deadline.

9. IDCZGOT- 15:00 D-1, IDCZ capacity might not be available at IDCZGOT on some interconnections and might be provided only at 22:00 D-1 depending on CCR. 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

10. First GCT for the first MTU of the next day is 23 D-1 10) first IDCC is carried out ahead of IDA at 10

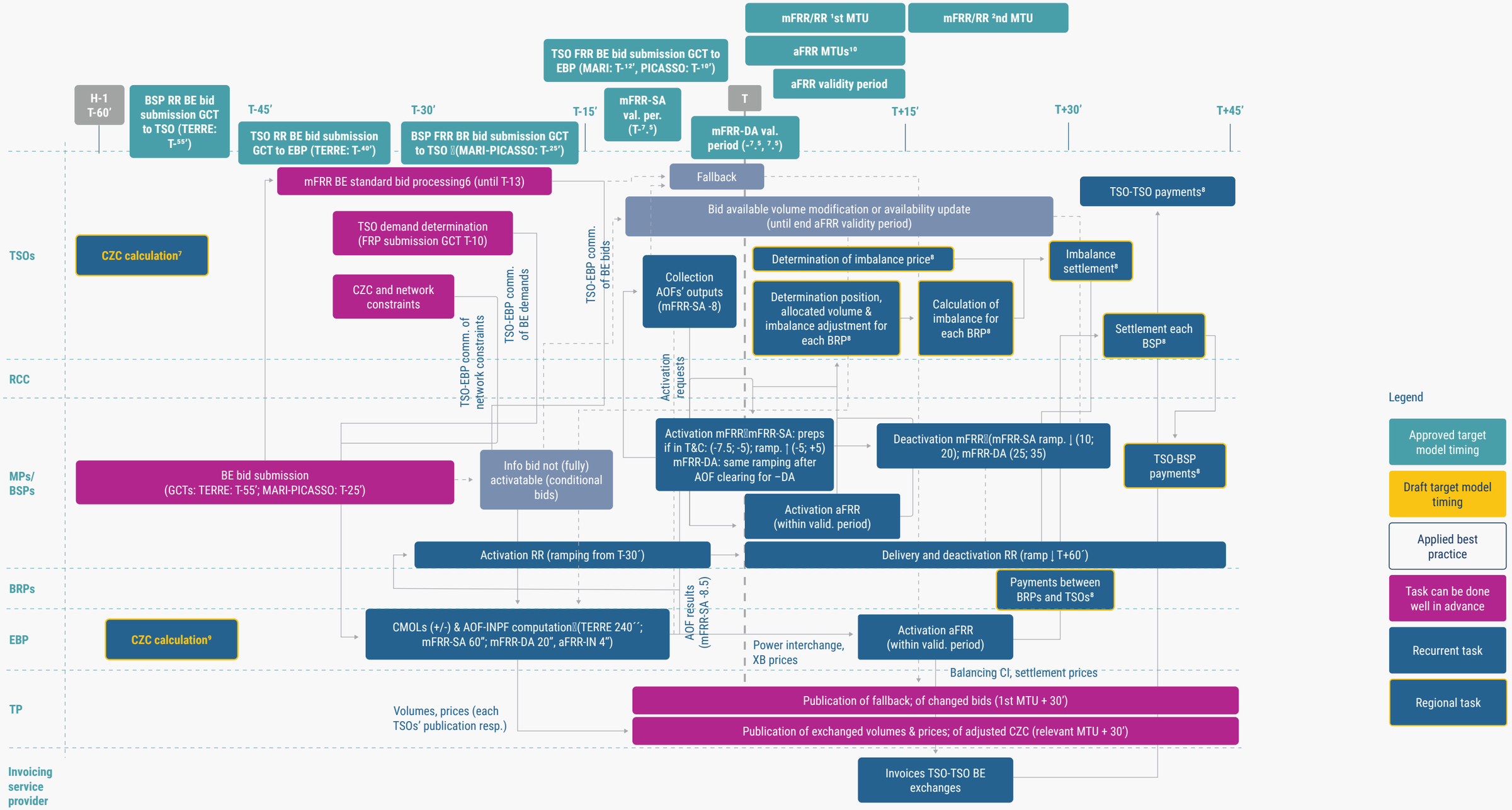
Cross-Zonal balancing processes



11. Including collecting, validation, updating on unavailability of bids, preparation for submission and submission of bids to EP. 7) for data publishing – not later that H+30', for settlement – different times for different platforms/ISPs.

12. The bid processing times for the aFRR, mFRR and RR differ.

Cross-zonal Balancing Energy Processes



13. According to Auction Calendar there is no unique LT GOT, GCT and publication deadline for whole Europe.

14. To be harmonized under FCA implementation.

15. There are two different options for CZC calculation but only one will be applied per CCR for a given calculation period. Final availability of yearly outage plan might be too late to use as an input for yearly CZC calculation.

Annex II[164] – Additional assessments of the state of CEP70

1 Austria

1.1 Current status of the implementation of CEP70 requirements

A derogation with no minimum capacity value for cross zonal trade (expressed as a% of MACZT per CNEC) was applied in 2020 for both, Core and INB CCRs. The derogation was granted based on foreseen security issues linked to missing concepts and industrialized IT-tools for the operational calculation and validation of capacities according to a certain MACZT target, as well as the uncertainties coming from the non-existence of a common net position forecasting process. Furthermore, the derogation is also based on other foreseeable grounds affecting the security of system operation, meaning the lack of (cross-border) RD potential due to the non-existence of certain bilateral contracts and excessive loop- and PST flows going over a certain predefined threshold.

In December 2020, an action plan was released by the Austrian government (BMK), which is valid from 1st of January 2021 onwards. Besides improvements and projects to increase the available capacity for cross-zonal trade, it also includes the linear trajectory for reaching 70 % MACZT by the end of December 2025. According to this action plan, the MACZT-target for 2021 (starting point of the linear trajectory) is 18.4 %, but this value is only to be applied once the corresponding tools have been finalized and put into operation, as stated in the derogation for Core and INB for the year 2021 (granted by Austrian Regulatory Authority, E-Control, in December 2020).

The concept for capacity calculation approved in derogation 2021 is built upon the one from derogation for 2020, and therefore allows for the application of a margin reflecting the uncertainties of MNCC flows ("MNCC Margin") due to a missing common net position forecasting process as well as the possible reduction of the MACZT target in case of excessive loop- and PST flows exceed a certain predefined threshold. Such design parameters are necessary as the network of APG is located between Core and INB CCR and needs to cope with large uncertainties caused by the different assumptions and non-harmonized capacity calculation approaches active in both regions.

1.2 Assessment methodology

The methodology according to ACER's Recommendation No 01/2019 is applied, except for the different monitoring of the Austrian-Italian border, which is part of the INB CCR. Due to the non-existence of IT tools, the assessment couldn't be performed considering the granted reasons for derogation, such as MNCC Margin and loop flow threshold.

This results in the following assessment of the three border types:

DESIGN ELEMENT	DESIGN CHOICE OF AUSTRIA		
BORDER/REGION	AT-CZ--HU--SI_AT	CWE	INB
GRID ELEMENTS CONSIDERED	All limiting CNECs	All CNECs	All limiting CNECs
THIRD COUNTRIES CONSIDERED	Yes	Yes	Yes
HOURS CONSIDERED	All hours	All hours	All hours, not only those in which APG had a limiting CNEC
TIMEFRAMES CONSIDERED	DA	DA	DA

Prominent design choices of the assessment methodology of Austria

164 In order to harmonise the numbers, results have been rounded with no decimal value.

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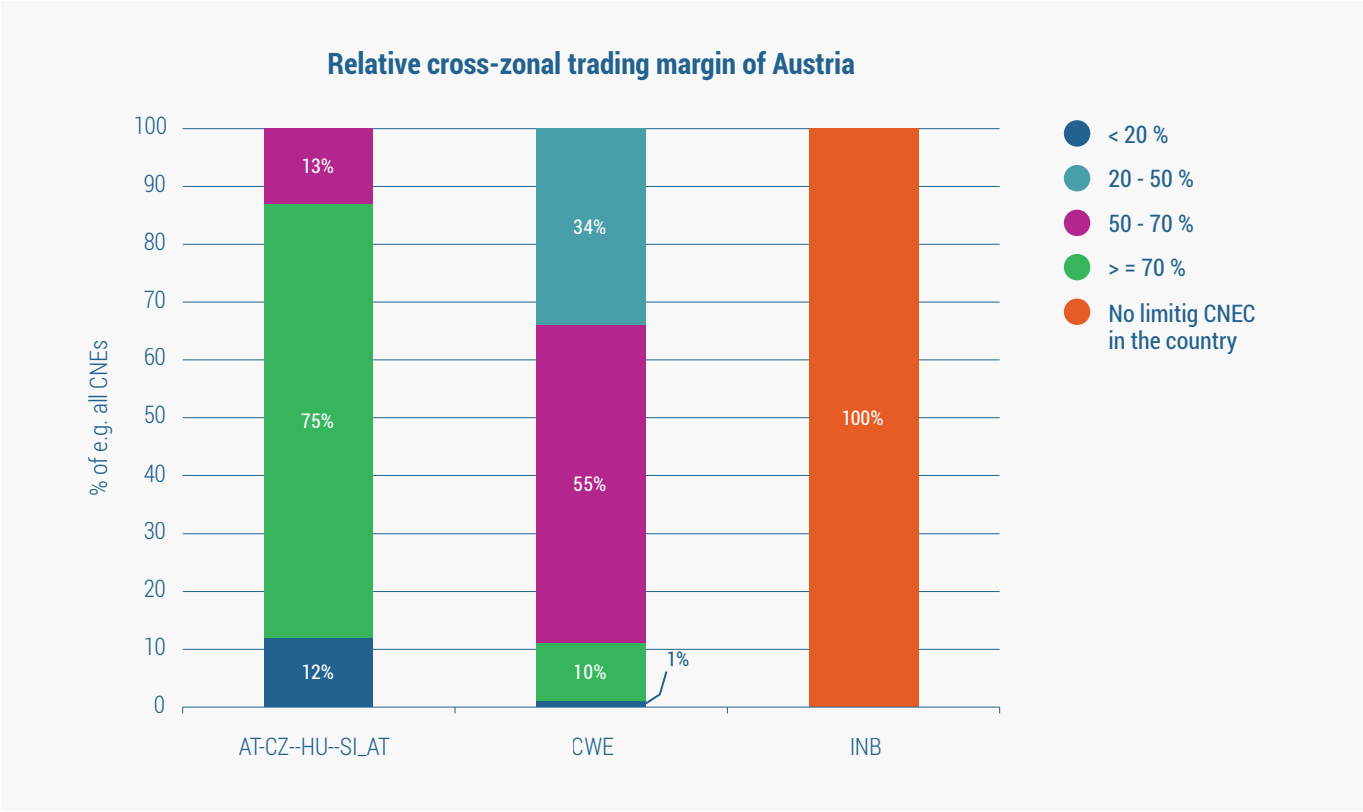
1.3 Assessment results

Based on the above assessment methodology, for Austria the following results are obtained.



Based on Figure above, the INB border monitoring shows that in almost 100 % (99.84 %) of hours of the year 2020, APG had no limiting CNEC during the DA CC process of this CCR. APG considers those hours as hours with more than 70 % MACZT available as there was no impact from APG's network elements on the DA CC results and allocation.

For the CCR Core (CWE and NTC borders AT<->CZ-HU-SI<->AT) Figure 1 shows the monitoring result based on ACERs monitoring assessment, which always takes the "worst" CNEC (CNEC with lowest MACZT) as representative for the hour and calculation area. In case of AT<->CZ-HU-SI<->AT the lower MACZT of the limiting CNEC for import and export direction defines the hour (e.g. if the MACZT on the limiting CNEC in one direction of the border is <20% while the MACZT of the limiting CNEC in the other direction is higher, than the entire profile is labeled as <20% for this hour). This means that this bars show a negatively distorted image of the real performance of APG in Core.

Due to missing tools for operational MACZT calculation, APG had no possibility to reflect the granted MNCC margin as well as the loop flow threshold in the calculations for 2020, which would have resulted in higher MACZT values. As these derogation reasons are still valid and granted by the national regulatory authority, they will be considered once the operational calculation with the industrialized tool can be performed and put into operation (expected in 2021).

2 Belgium

2.1 Current status of the implementation of CEP70 requirements

For region CWE, as in 2020, BE has been granted a derogation for excessive loop flows in 2021.

2.2 Assessment methodology

For region CWE, BE applies ACER's recommendation, complementing the "lowest MACZT per MTU" view expressed in the main table above with an "All CNECs" view for which the assessment results are shown below. In this way a complete picture is devised.

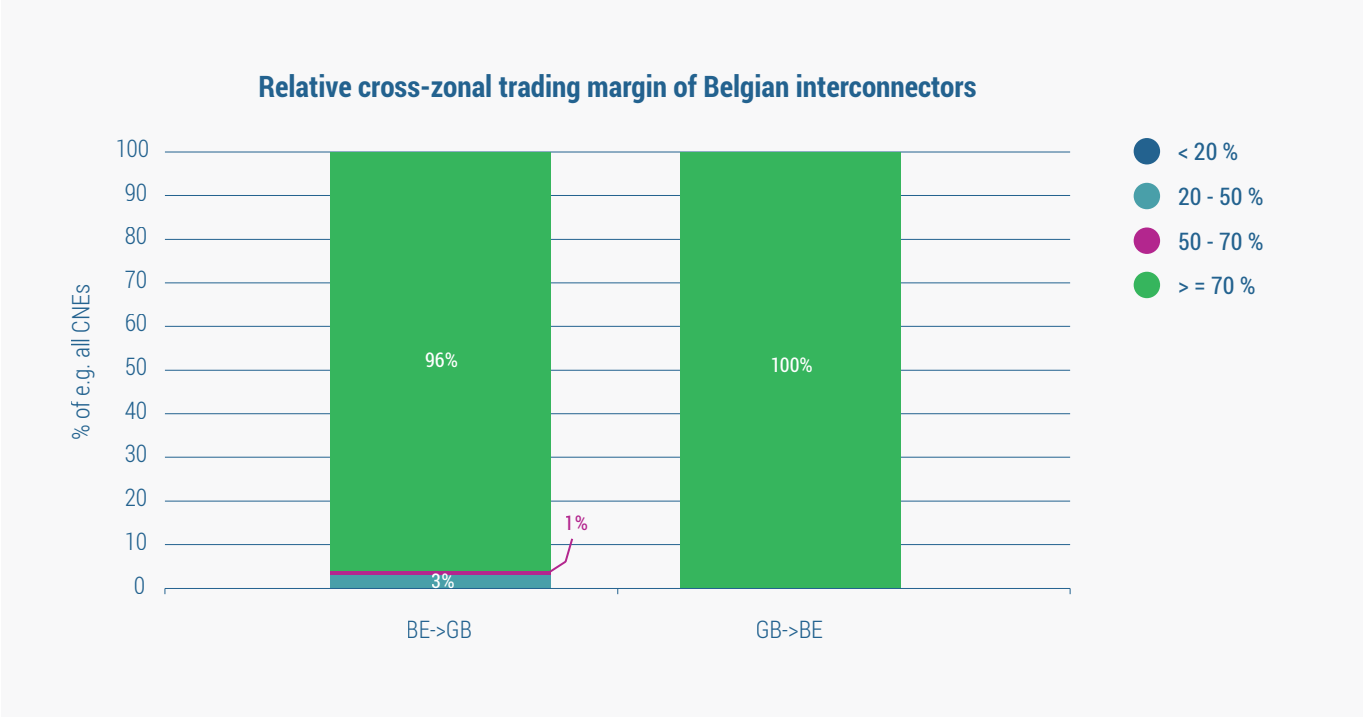
For borders BE→GB and GB→BE, BE applies ACER's recommendation, illustrated in this report as the monitoring of the NTC provided on the DC link.

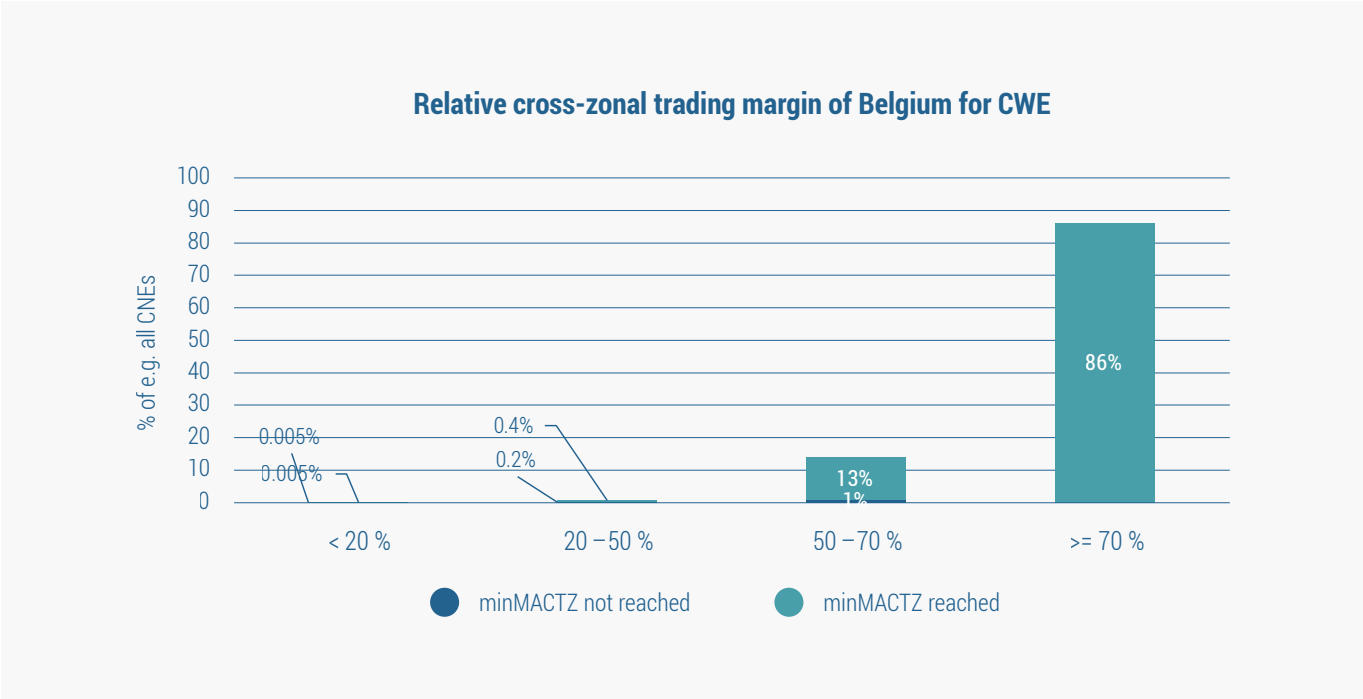
DESIGN ELEMENT	DESIGN CHOICE OF BELGIUM	
BORDER/REGION	CWE	BE→GB, GB→BE
GRID ELEMENTS CONSIDERED	All CNECs	Monitoring NTC provided on the DC link
THIRD COUNTRIES CONSIDERED	Yes	N/A
HOURS CONSIDERED	All hours from Q2 onwards thus Apr 1 - Dec 31 2020 as per the derogation applicable in 2020	All hours 2020
TIMEFRAMES CONSIDERED	DA	DA

Prominent design choices of the assessment methodology of Belgium

2.3 Assessment results

Based on the above assessment methodology, for Belgium the following results are obtained.



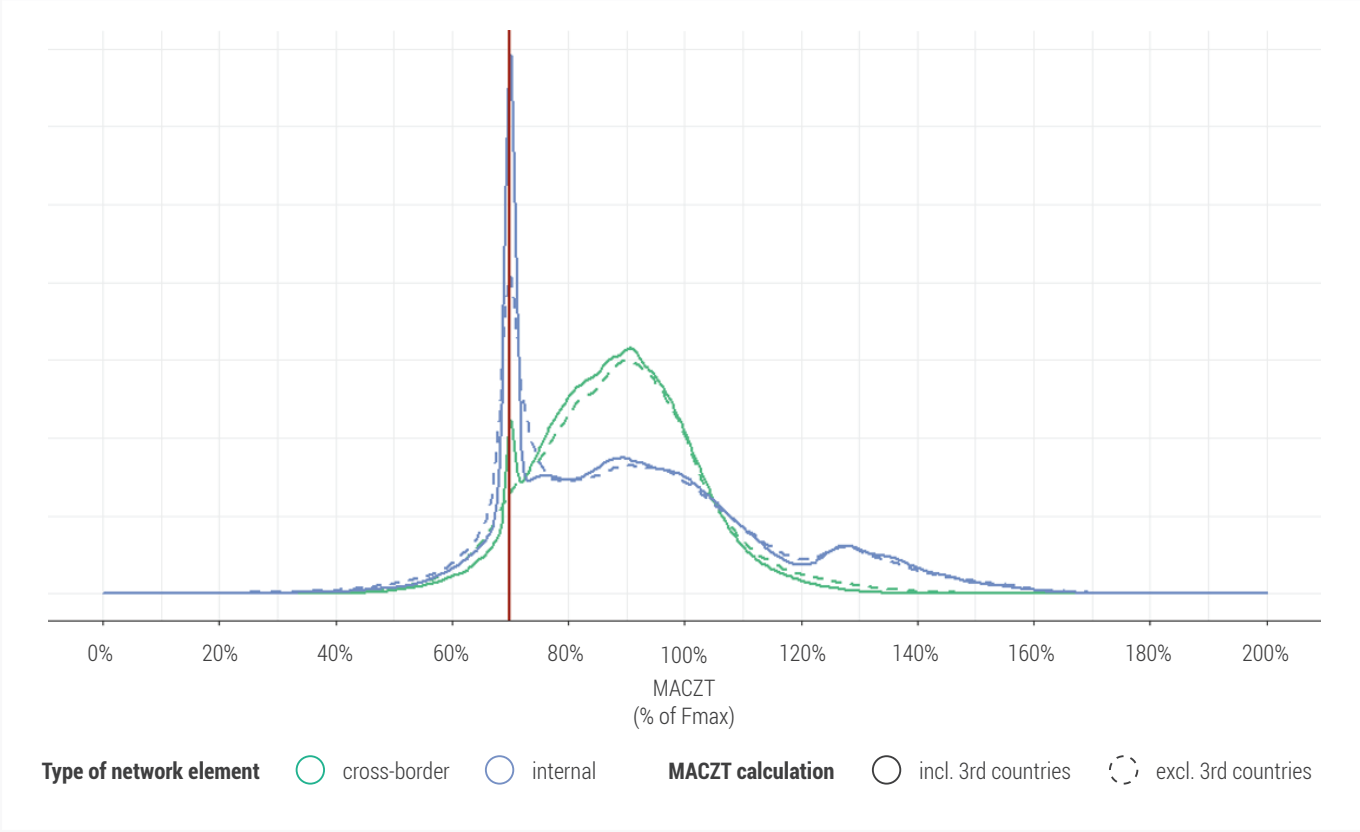


2.4 Additional information

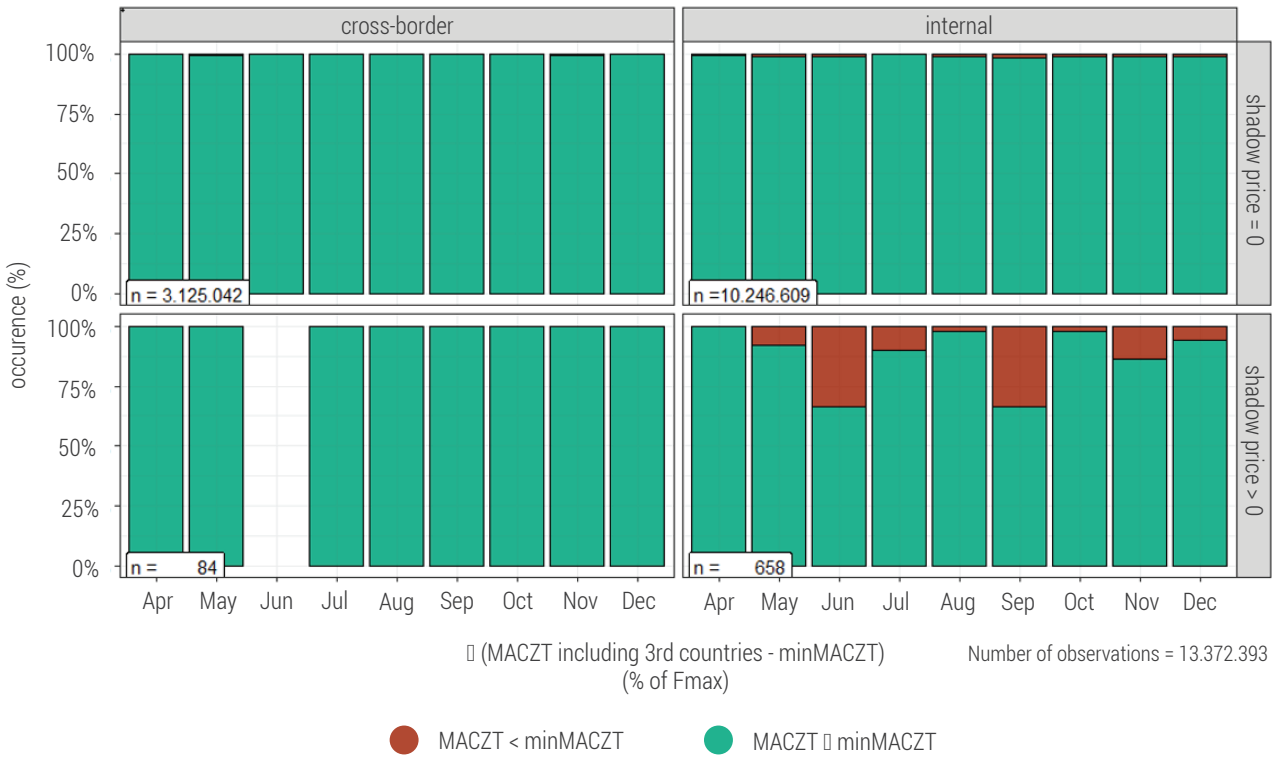
The Belgian NRA CREG published its first study on the performance of Elia's compliance in 2020 . For the purpose of this study CREG performed calculations upon the data provided by Elia whereas this data is aligned to the principles laid down in ACER's recommendation.

As illustrated in below figures, the study highlights the following for Belgian CNECs in CWE:

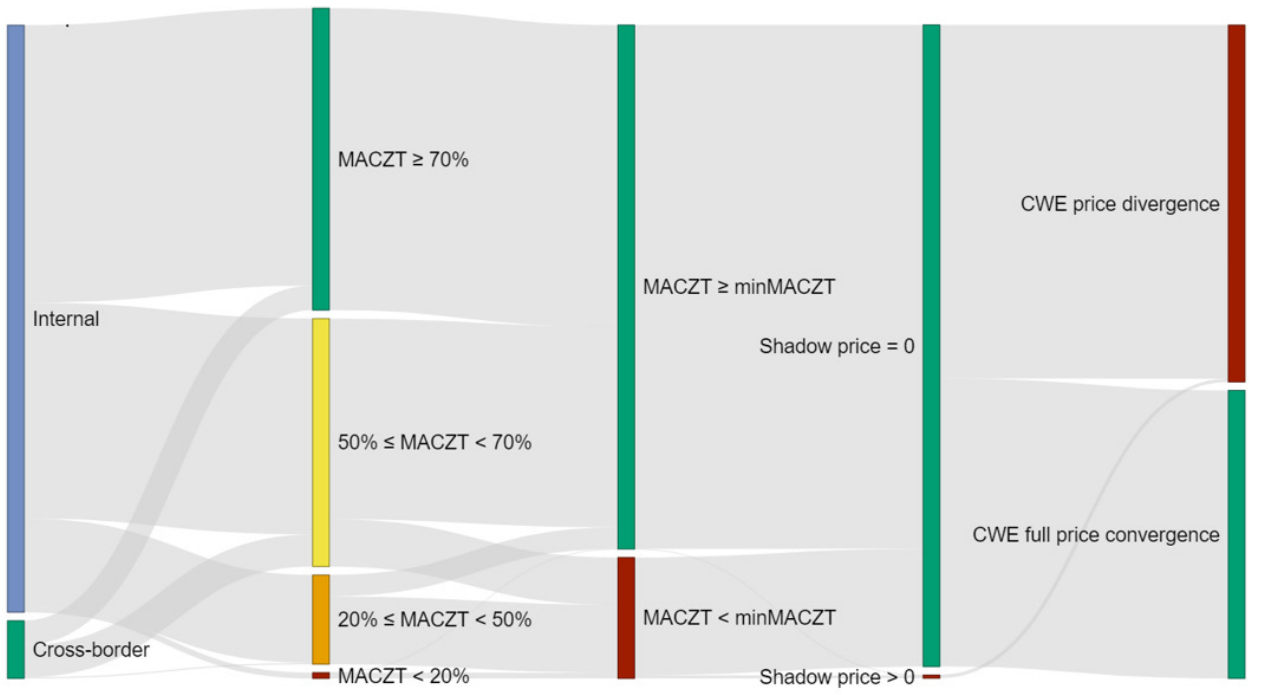
- In 81.3% of MTUs the minimum capacity target is reached simultaneously on each CNEC. Whereas looking at the totality of all CNECs across all MTUs, the minimum capacity in reached in more than 99% out of the +13 million CNECs;
- On the vast majority of CNECs 70% or more capacity has been offered for market exchanges;
- Also CNECs on which less than 70% capacity is offered can be compliant. This follows from the application of the derogation for excessive loop flows. Excessive loop flows lead in majority of cases to a capacity reduction up to 20%, and in some cases to a capacity reduction up to 50%;
- It is rather rare that a grid element on which the minimum capacity was not reached was limiting the market i.e. it concerns 75 CNECs spread across 66 hours out of +13 million CNECs across 6528 MTUs.



all observed MACZT



all observed deltas between target (minMACZT) and offered capacity (MACZT)



Sankey diagram with lowest observed delta between target (minMACZT) and offered capacity (MACZT) per MTU

3 Bulgaria

3.1 Current status of the implementation of CEP70 requirements

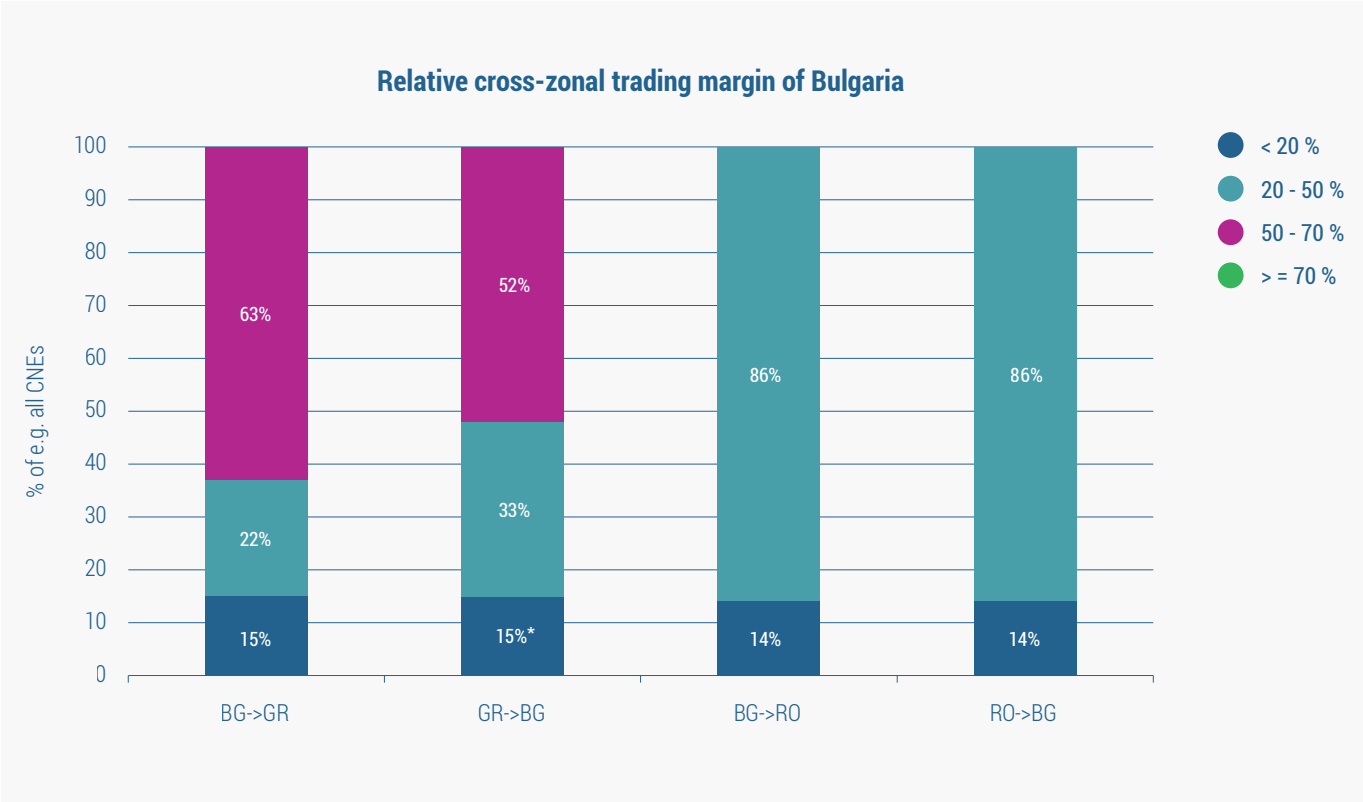
As in 2020, BG has been granted a derogation for 2021.

3.2 Assessment methodology

The MACZT data in this report are the NTC values agreed bilaterally between ESO (BG) and Transelectrica (RO), and between ESO (BG) and IPTO (GR) respectively. These NTC values have been published on the ESO-EAD web site. The results are based on AC load-flow calculations using the common grid model of the SEE Region. The MACZT takes into account the voltages and other additional operational specifics, which are not yet possible to consider based only on the ACER's recommendation 01/2019 on MACZT calculation. The results take into consideration the long-term available capacities on the given borders and on operational experience with neighboring third countries (TR, NMK, RS). The provided MACZT data is the calculated NTCs on a given border in each of both directions, divided by the rating/ratings of the interconnection line/lines.

DESIGN ELEMENT	DESIGN CHOICE OF BULGARIA
GRID ELEMENTS CONSIDERED	All limiting CNECs, but please refer to explanations in 3.2 and 3.4
THIRD COUNTRIES CONSIDERED	Yes, but please refer to explanations in 1.2 and 1.4
HOURS CONSIDERED	Yes, but please refer to explanations in 1.2 and 1.4
TIMEFRAMES CONSIDERED	LT

Prominent design choices of the assessment methodology of Bulgaria



*Concerning the values <20% for the borders BG→GR and GR→BG:

In both direction, the percentage pointed in the row <20% is related to the periods when the only interconnection line between Bulgaria and Greece was out of operation according to the Maintenance program for 2020. Namely in this period the NTC value was 0, and respectively the MACZT should be 0 as well.

3.4 Additional information

The computation of the MACZT is assumed to be performed by SEE RSC in Thessaloniki (SELENE). The SEE RSC in Thessaloniki will implement the Coordinated Capacity Calculation Methodology of the SEE region for day ahead and intraday time frame. Currently, SEE TSOs and SEE RSC are performing implementation tests. It is expected from 01.07.2021 the methodology for day ahead capacity calculation to go live. Then we expect to cooperate with the RSC regarding calculation of the day ahead available capacities made available to the market.

The 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 ant third countries flows sent to ENTSO-E and ACER on 16.09.2019. On 05.10.2020 a letter has been 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. Taking into account the recommendations given by the European Commission, it was proposed to conclude agreements with neighboring countries to address in a common coordinated way the treatment of the capacity calculation constraints and the cost sharing of remedial actions in the region. Signing of such agreements with neighboring non EU-countries would be a good starting point for an amendment of the Methodology for calculating cross zonal capacity for the day ahead and intraday timeframe, already adopted by National regulators in the South East Europe region. By changing the existing methodology and including the BG-MK, BG-SR, BG-TR, GR-AL, GR-MK, GR-TR and RO-SR borders, a balance will be achieved between a more efficient cross zonal capacity calculation and considering all the peculiarities while maintaining the secure operation of the electricity systems in the region. So far, we do not have an official response to the letter we sent and it is not clear whether the above countries are willing to join the requirement of at least 70% for their borders with Bulgaria, Romania and Greece. Without the consent of these parties, we cannot include the above mentioned borders in our methodology for day ahead and intraday capacity calculation timeframes and adequately calculate the MACZT according to the ACER recommendations.

4 Croatia

4.1 Current status of the implementation of CEP70 requirements

A derogation with no minimum capacity is applied in 2020.

4.2 Assessment methodology

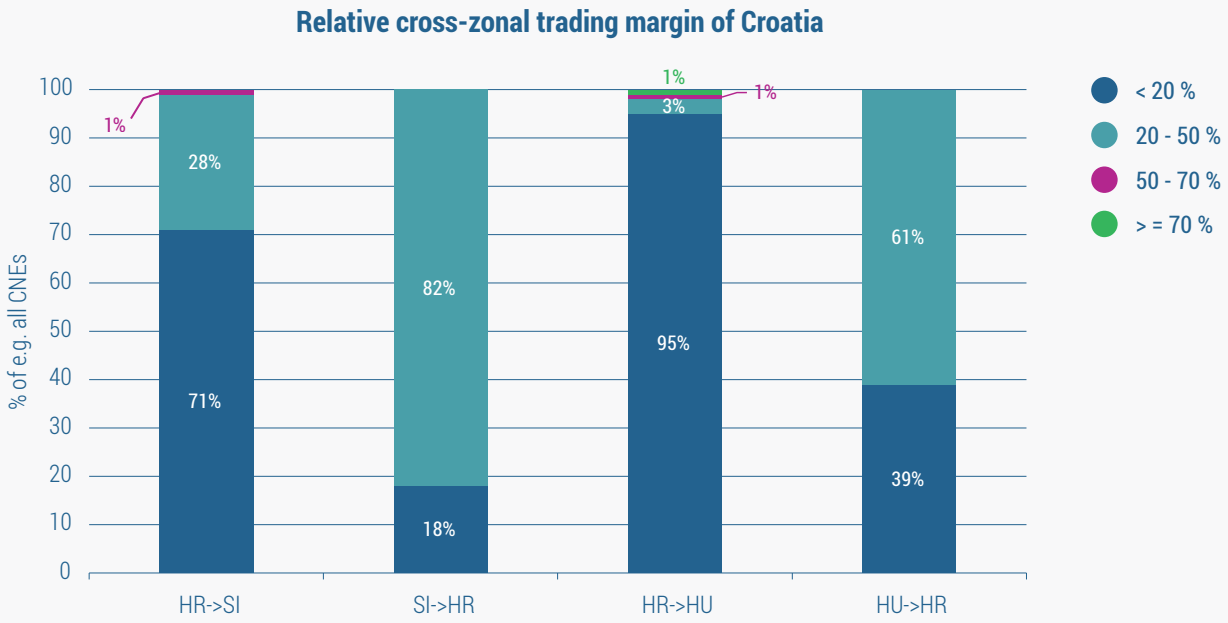
The methodology according to ACER's Recommendation No 01/2019 is applied.

DESIGN ELEMENT	DESIGN CHOICE OF CROATIA
GRID ELEMENTS CONSIDERED	All limiting CNECs
THIRD COUNTRIES CONSIDERED	No
HOURS CONSIDERED	All hours for first semester 2020
TIMEFRAMES CONSIDERED	Only DA

Prominent design choices of the assessment methodology of Croatia

4.3 Assessment results

Based on the above assessment methodology, for Croatia the following results are obtained.



5 Czech Republic

5.1 Current status of the implementation of CEP70 requirements

A derogation with no minimum capacity is applied in 2020.

5.2 Assessment methodology

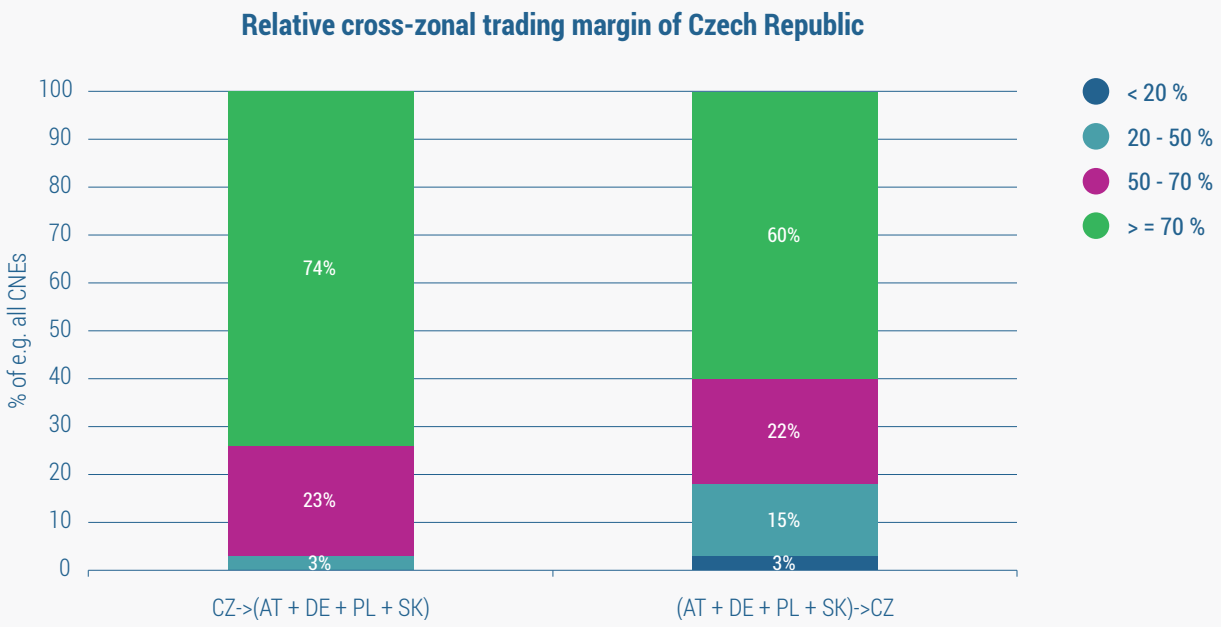
The methodology according to ACER's Recommendation No 01/2019 is applied.

DESIGN ELEMENT	DESIGN CHOICE OF CZEECH REPUBLIC
GRID ELEMENTS CONSIDERED	All CNECs
THIRD COUNTRIES CONSIDERED	No
HOURS CONSIDERED	All hours
TIMEFRAMES CONSIDERED	DA

Prominent design choices of the assessment methodology of Czech Republic

5.3 Assessment results

Based on the above assessment methodology, for Czech Republic the following results are obtained.



6 Denmark

6.1 Current status of the implementation of CEP70 requirements

The 70% rule is applied in 2020.

6.2 Assessment methodology

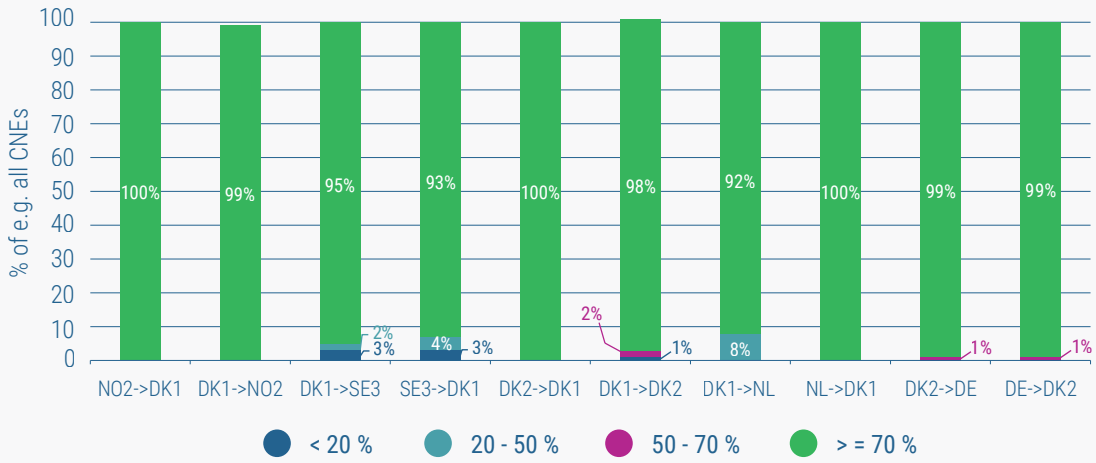
The methodology according to ACER's Recommendation No 01/2019 is applied.

DESIGN ELEMENT	DESIGN CHOICE OF DENMARK
GRID ELEMENTS CONSIDERED	All limiting CNEs
THIRD COUNTRIES CONSIDERED	N/A
HOURS CONSIDERED	All hours
TIMEFRAMES CONSIDERED	DA

Prominent design choices of the assessment methodology of Denmark

6.3 Assessment results

Based on the above assessment methodology, for Denmark the following results are obtained.



7 Estonia

7.1 Current status of the implementation of CEP70 requirements

The 70% rule is applied in 2020.

7.2 Assessment methodology

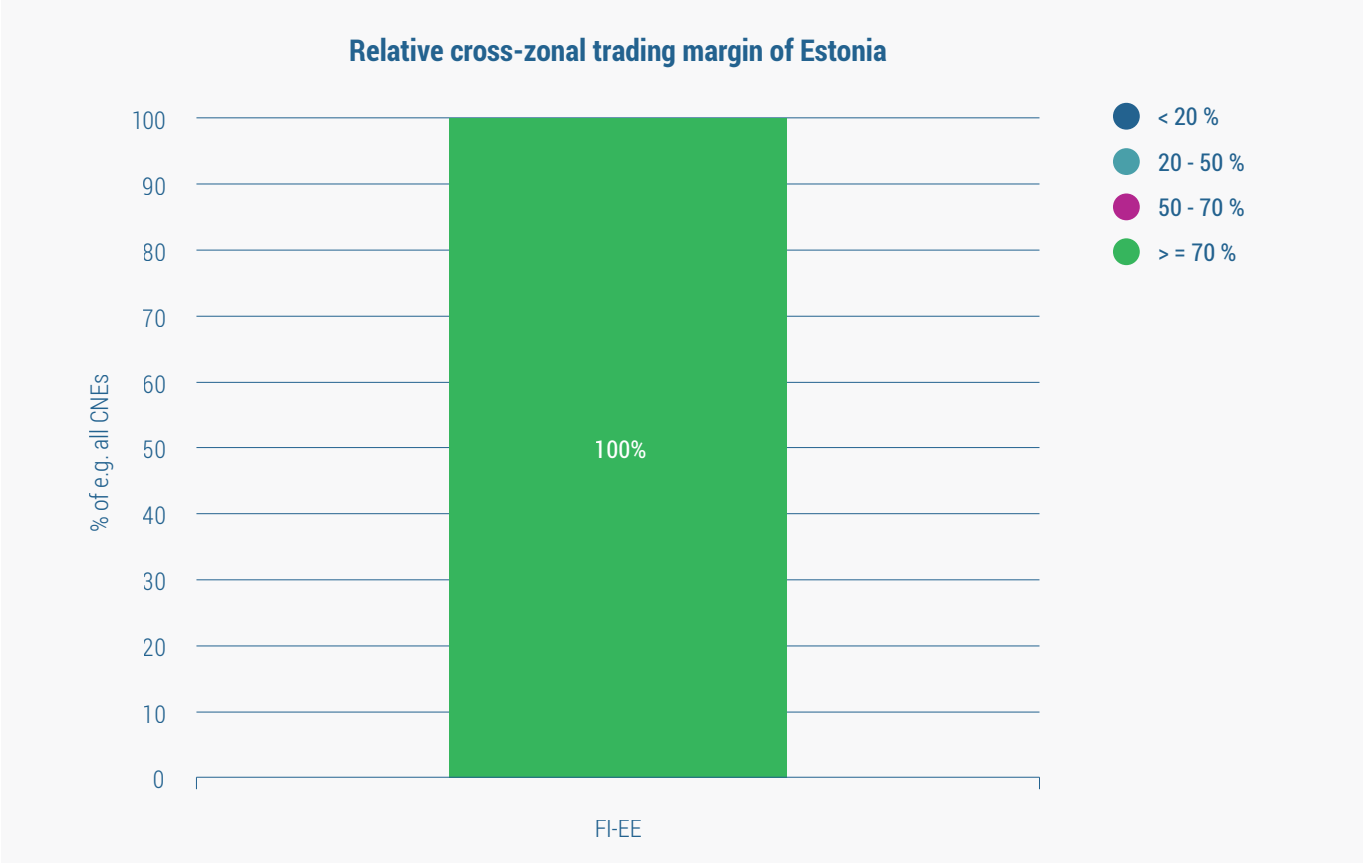
70% rule according to Article 16(8) of Regulation (EU) 2019/943 and ACER recommendation.

DESIGN ELEMENT	DESIGN CHOICE OF DENMARK
GRID ELEMENTS CONSIDERED	All CNECs
THIRD COUNTRIES CONSIDERED	No
HOURS CONSIDERED	All hours
TIMEFRAMES CONSIDERED	DA

Prominent design choices of the assessment methodology of Estonia

7.3 Assessment results

Based on the above assessment methodology, for Estonia the following results are obtained.



8 Finland

8.1 Current status of the implementation of CEP70 requirements

The 70% rule is applied in 2020

8.2 Assessment methodology

For the border FI-SE1, AC-tielines include 100 MW TRM as market constraint. Below 70% would be reached only with lower than 240 MW NTC.

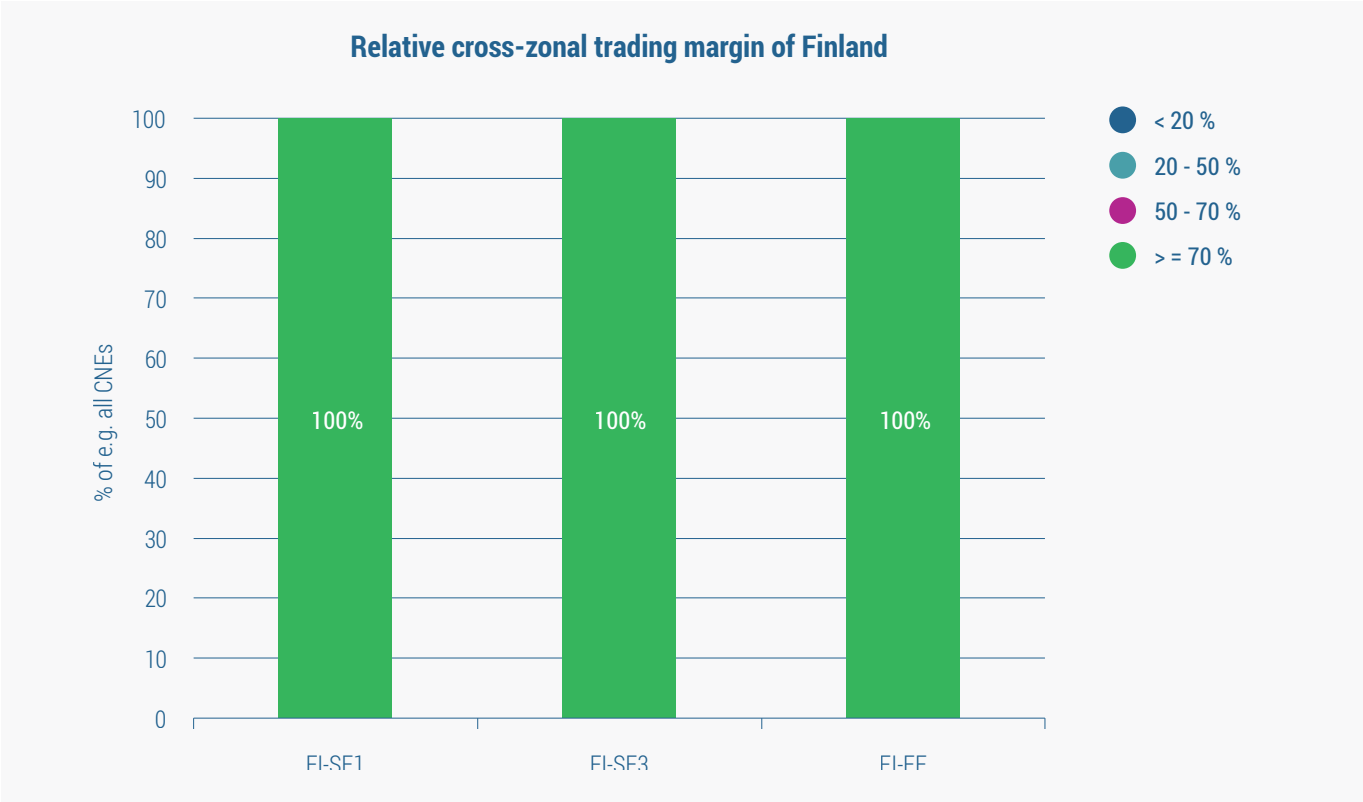
For the borders FI-SE3 and FI-EE, Fingrid does not apply any market constraints to DC-tielines.

DESIGN ELEMENT	DESIGN CHOICE OF FINLAND
GRID ELEMENTS CONSIDERED	All CNECs
THIRD COUNTRIES CONSIDERED	Yes
HOURS CONSIDERED	All hours
TIMEFRAMES CONSIDERED	LT, DA, ID, Balancing
TIMEFRAMES CONSIDERED	DA

Prominent design choices of the assessment methodology of Finland

8.3 Assessment results

Based on the above assessment methodology, for Finland the following results are obtained.



8.4 Additional information

Dynamic angle and voltage stability limits are considered to the border FI-SE1. Export capacity from Sweden to Finland is limited by dynamic angle stability due to long-distance transmission path between southern Finland and southern Sweden. This is done in order to limit undamped oscillation between large production units (e.g. nuclear power plants) in southern Finland and southern Sweden via AC-network. This phenomenon limits the transmission capacity below thermal limit of the cross-border line

Import capacity from Finland to Sweden is limited due to voltage stability. After major production contingency, voltage has to remain on predefined level (>370kV). This is quite close to the thermal limit of the cross-border lines.

9 France

9.1 Current status of the implementation of CEP70 requirements

There is no more derogation in CWE region for 2021: We consider the CEP 70% already implemented for RTE.

There is no more derogation in NIB for 2021. The CEP 70% criteria is soon to be implemented in NIB, and furthermore the rare case a French Element is limiting, the amount of MACZT is always extremely high (above 70% for more than 99% of MTUs).

There is still a derogation for SWE region in 2021. The CEP 70% will be implemented at the end of the year 2021 in this region.

Then, the situation depicted by ACER for 2021 is therefore not true for France as two out of three CCRs do not have any derogation anymore.

9.2 Assessment methodology

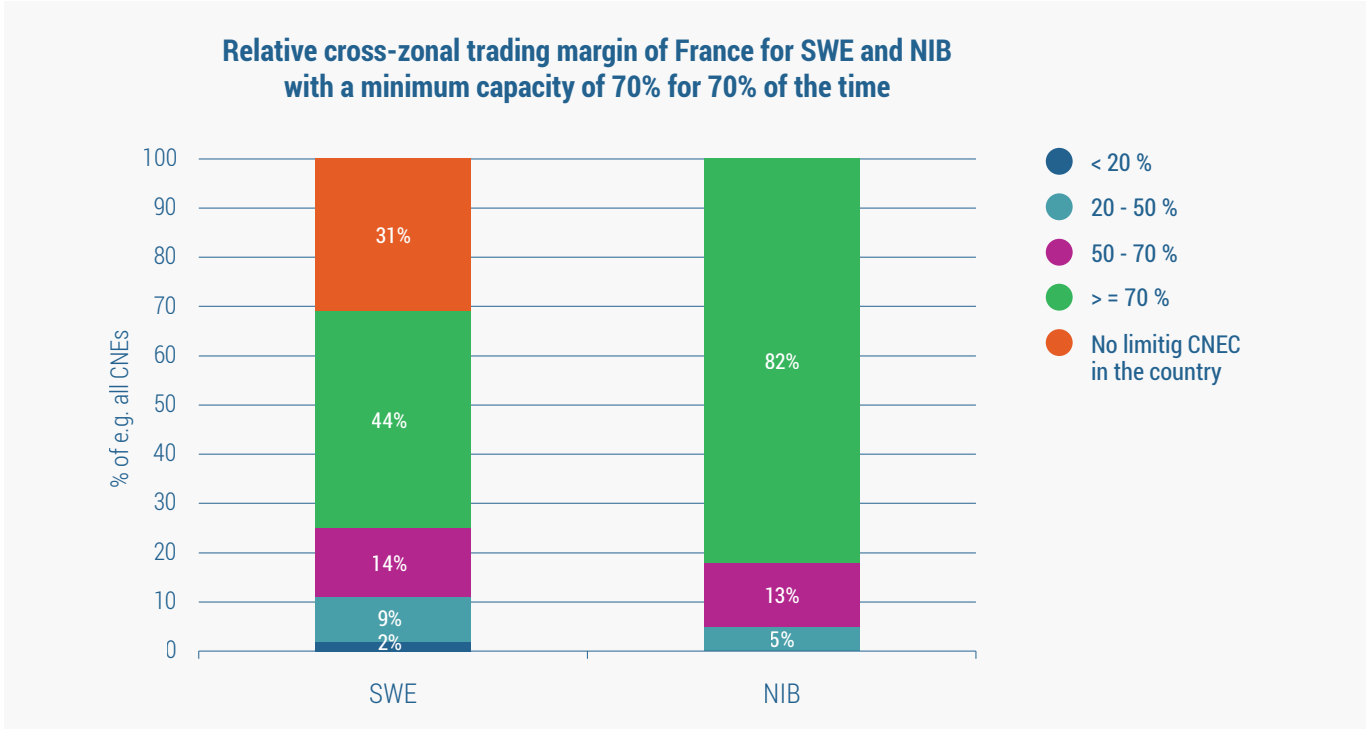
RTE applies ACER's recommendation to determine MACZT by taking into account Third Countries. Regarding the compliance to the 70% rule, all French non limiting CNECs & MTUs with price convergence are deemed as compliant.

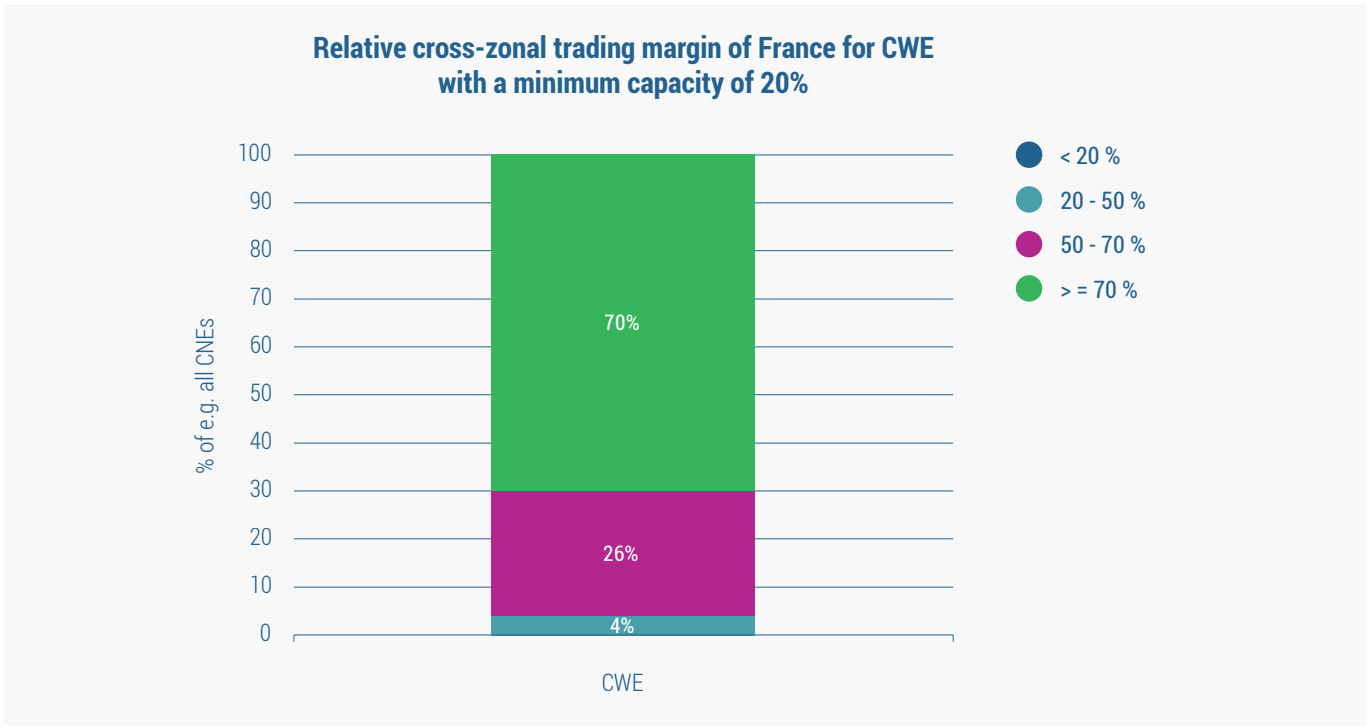
DESIGN ELEMENT	DESIGN CHOICE OF FRANCE
GRID ELEMENTS CONSIDERED	All CNECs
THIRD COUNTRIES CONSIDERED	Yes
HOURS CONSIDERED	All hours are considered.
TIMEFRAMES CONSIDERED	But in the calculation for compliance to our derogation, the MTUs with price convergence are deemed as compliant.
TIMEFRAMES CONSIDERED	DA

Prominent design choices of the assessment methodology of France

9.3 Assessment results

Based on the above assessment methodology, for France the following results are obtained.





9.4 Additional information

It would be interesting for ACER to broaden their vision and consider the relevant points raised by different NRAs all across Europe according to the compliance of 70% Rule, by either making some analysis on the timestamps with price convergence (e.g. increasing capacity would not bring any benefit for the market) or representing the timestamps without price convergence & making analysis on the limiting elements only (or even a step further only on the limiting market elements).

10 Germany

10.1 Current status of the implementation of CEP70 requirements

Pursuant to Art. 15 (1) of the EU Electricity Market Regulation (EU) 2019/943, EU member states with identified structural grid congestion can submit an action plan to reduce this congestion. This leads to a situation where the minimum capacity of 70% must be achieved via a linear trajectory by 31 December 2025 (Art. 15, Para. 2). In this context, the Federal Republic of Germany - after prior consultation with stakeholders and member states - submitted the Action Plan Bidding Zone to the European Commission and the European Union Agency for the Cooperation of Energy Regulators (ACER) on December 28, 2019. The Action Plan Bidding Zone contains concrete measures through which Germany will counteract the previously identified structural bottlenecks and gradually achieve the minimum capacity for cross-bidding zone electricity trading of 70% by December 31, 2025.

10.2 Assessment methodology

The applied methodology for monitoring the compliance in regards to the available margin for cross-zonal electricity trade is based on the Electricity Market Regulation (EU) 2019/943 and the specifications of the German National Regulatory Authority Bundesnetzagentur (BNetzA).

Accordingly, the available margin is determined either per Critical Network Element with the respective Contingency (CNEC) or per Net Transfer Capacity (NTC) and must respect the applicable minimum value (in line with the German action plan) per market time unit (MTU), i.e. in each hour, and in both directions. This minimum value defines the minimum capacity which should be made available/offered to the market.

The available margin per CNEC offered to the market consists of two components. The first one is the coordinated margin, which represents the offered capacity on the analyzed CNE with the respective capacity calculation region. The second component reflects the uncoordinated margin, which depicts the impact of capacity offered on borders that do not participate in the capacity calculation region. In practical terms, the uncoordinated margin is calculated by multiplying the corresponding burdening Power Transfer Distribution Factors (PTDFs) with the respective NTCs in order to determine the impact of these NTCs on the respective CNEC. The total uncoordinated margin of a specific CNEC equals the sum of the individual uncoordinated margins of the different NTC borders.

More detailed information about the methodology applied and the compliance monitoring can be found in the national monitoring report.[165]

165 Published on 10 June 2021 and available online: https://www.netztransparenz.de/Pressebereich/Detail/7855/bericht-zur-verfuegbaren-gebotszonenueberschreitenden-kapazitaet-report-on-available-cross-zonal-capacity

DESIGN ELEMENT	DESIGN CHOICE OF 50HERTZ	
BORDER/REGION	DK2→DE	DE→DK2
GRID ELEMENTS CONSIDERED	All limiting CNECs	All limiting CNECs
THIRD COUNTRIES CONSIDERED	No	No
HOURS CONSIDERED	6.199: Within the remaining hours no interconnector was available due to maintenance or disturbance.	6.244; Within the remaining hours no interconnector was available due to maintenance or disturbance.
TIMEFRAMES CONSIDERED	Only DA	Only DA

Prominent design choices of the assessment methodology of 50Hertz

DESIGN ELEMENT	DESIGN CHOICE OF 50HERTZ/TENNET	
BORDER/REGION	DE→PL/CZ	PL/CZ→DE
GRID ELEMENTS CONSIDERED	All limiting CNECs	All limiting CNECs
THIRD COUNTRIES CONSIDERED	Yes	Yes
HOURS CONSIDERED	All hours	All hours
TIMEFRAMES CONSIDERED	Only DA	Only DA

Prominent design choices of the assessment methodology of 50Hertz

DESIGN ELEMENT	DESIGN CHOICE OF AMPRION	
BORDER/REGION	CWE	ALEGrO (CWE)
GRID ELEMENTS CONSIDERED	all CNEs (Most critical contingency is determining the trading margin of the CNE per MTU)	N/A
THIRD COUNTRIES CONSIDERED	Yes	No
HOURS CONSIDERED	All hours except 24 MTUs in which Default Flow-Based Parameter had been applied	All hours from go-live (18/11/2020)
TIMEFRAMES CONSIDERED	Only DA	Only DA

Prominent design choices of the assessment methodology of Amprion

DESIGN ELEMENT	DESIGN CHOICE OF TENNET GERMANY			
BORDER/REGION	DE→SE4, SE4→DE	CWE	DE→DK1, DK1→DE	DE→NO2, NO2→DE
GRID ELEMENTS CONSIDERED	NTC of both directions	All CNEs (Most critical contingency is determining the trading margin of the CNE per MTU)	NTC of both directions	All limiting CNECs
THIRD COUNTRIES CONSIDERED	No	Yes	No	Yes
HOURS CONSIDERED	All 7,748 operational hours of Baltic Cable	All hours except 24 MTUs in which Default Flow-Based Parameter had been applied	All hours	All hours since start of operation on Dec. 9th 2020
TIMEFRAMES CONSIDERED	Only DA	Only DA	Only DA	Only DA

Prominent design choices of the assessment methodology of TenneT Germany

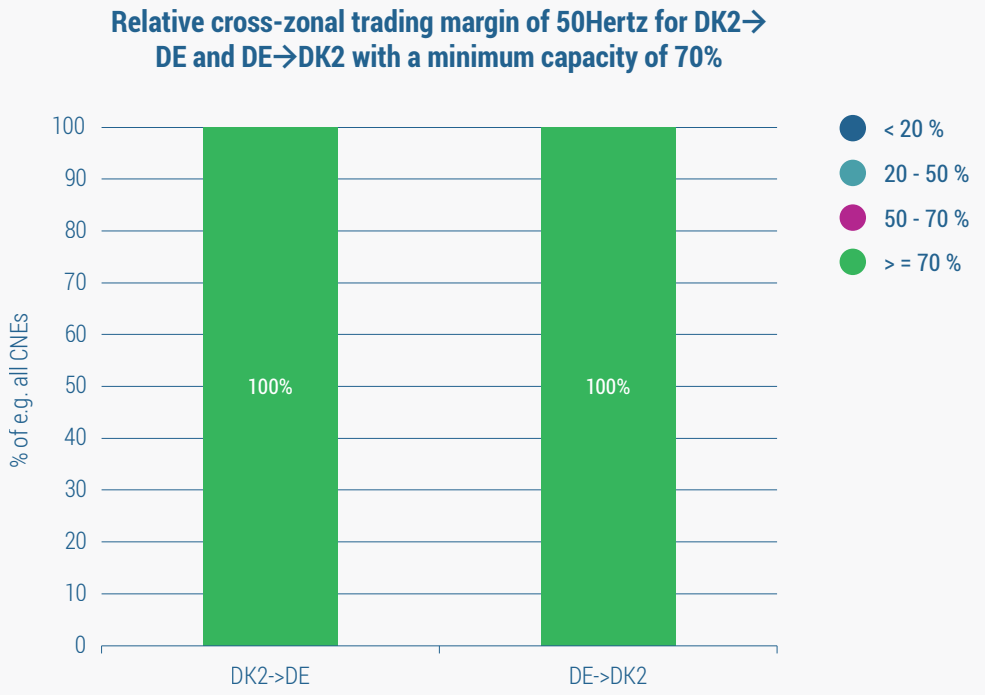
DESIGN ELEMENT	DESIGN CHOICE OF TRANSNETBW
GRID ELEMENTS CONSIDERED	All CNEs (Most critical contingency is determining the trading margin of the CNE per MTU)
THIRD COUNTRIES CONSIDERED	Yes
HOURS CONSIDERED	All hours except 24 MTUs in which Default Flow-Based Parameter had been applied
TIMEFRAMES CONSIDERED	Only DA

Prominent design choices of the assessment methodology of TransnetBW

10.3 Assessment results

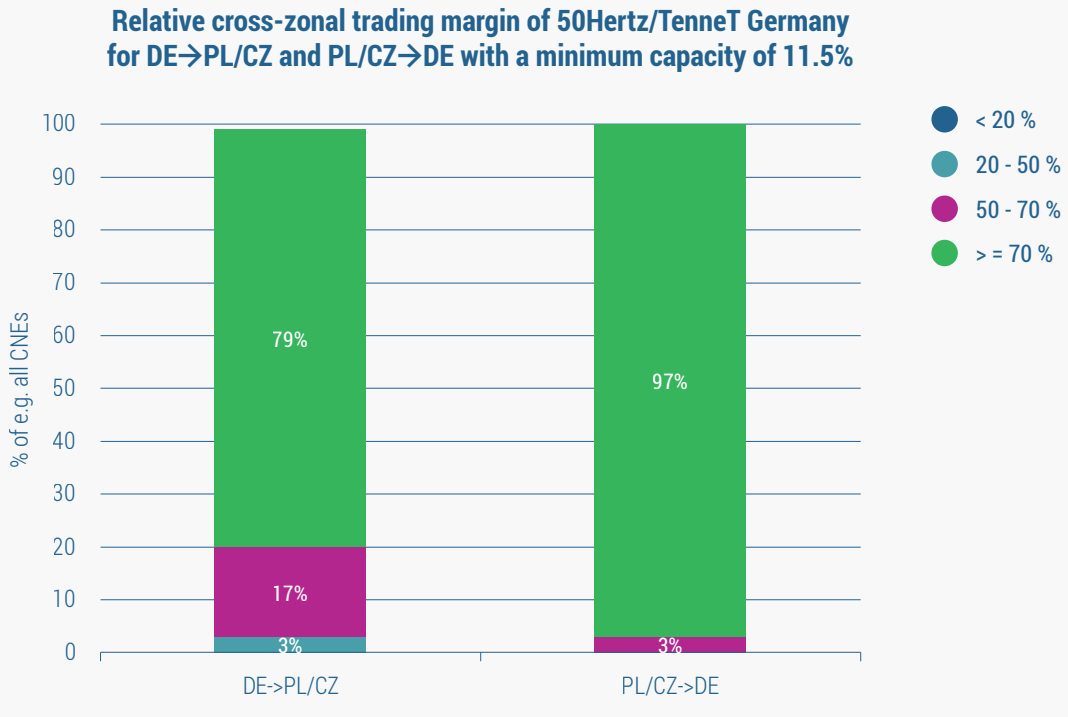
10.3.1 50Hertz

Based on the above assessment methodology, for 50Hertz the following results are obtained.



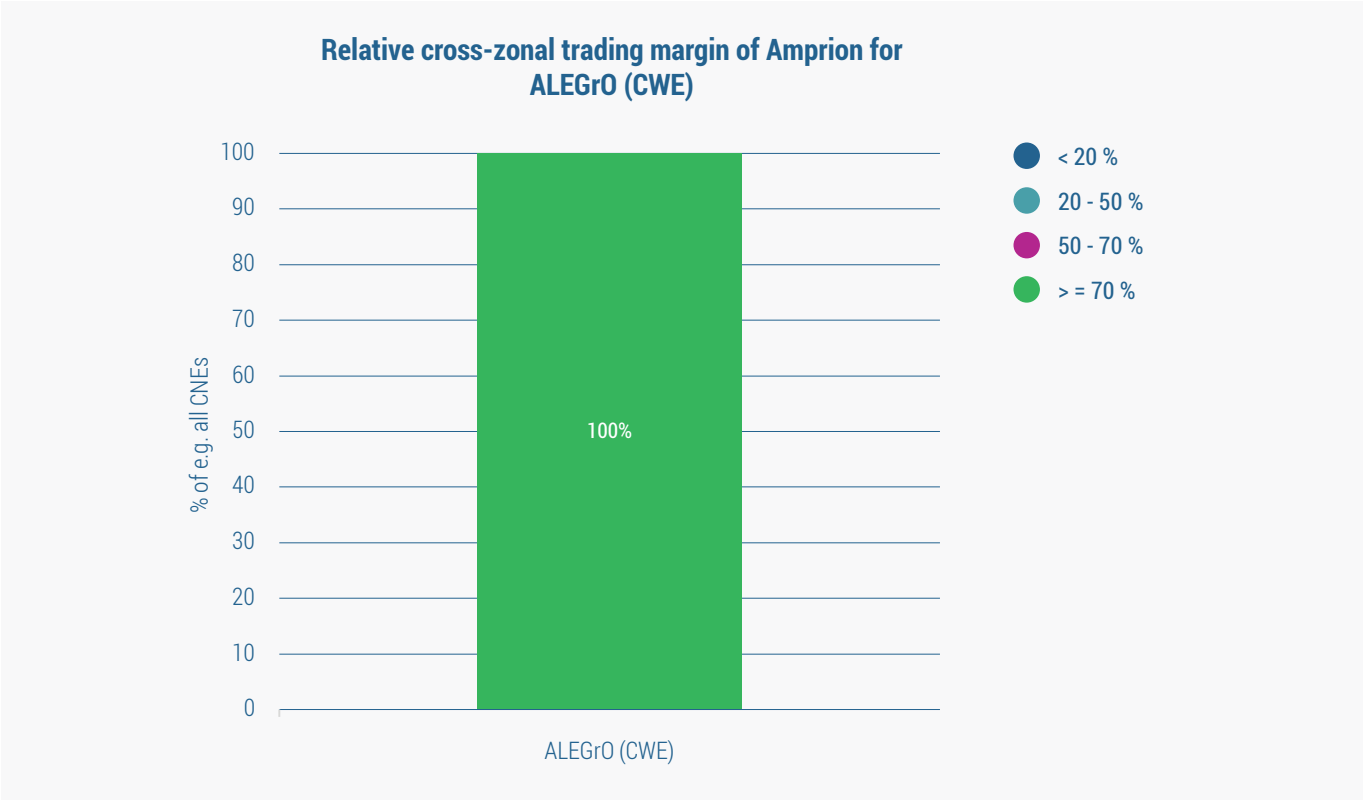
10.3.2 50Hertz/TenneT Germany

Based on the above assessment methodology, for 50Hz and Tennet Germany for the border to PL/CZ the following results are obtained.

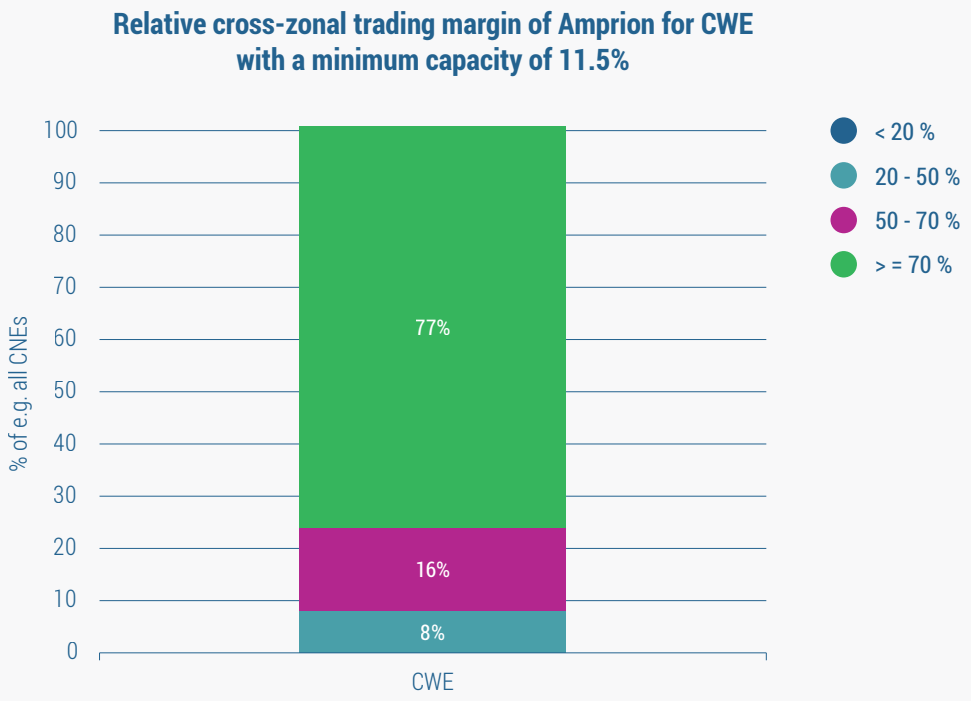


10.3.3 Amprion

Based on the above assessment methodology, for Amprion the following results are obtained.

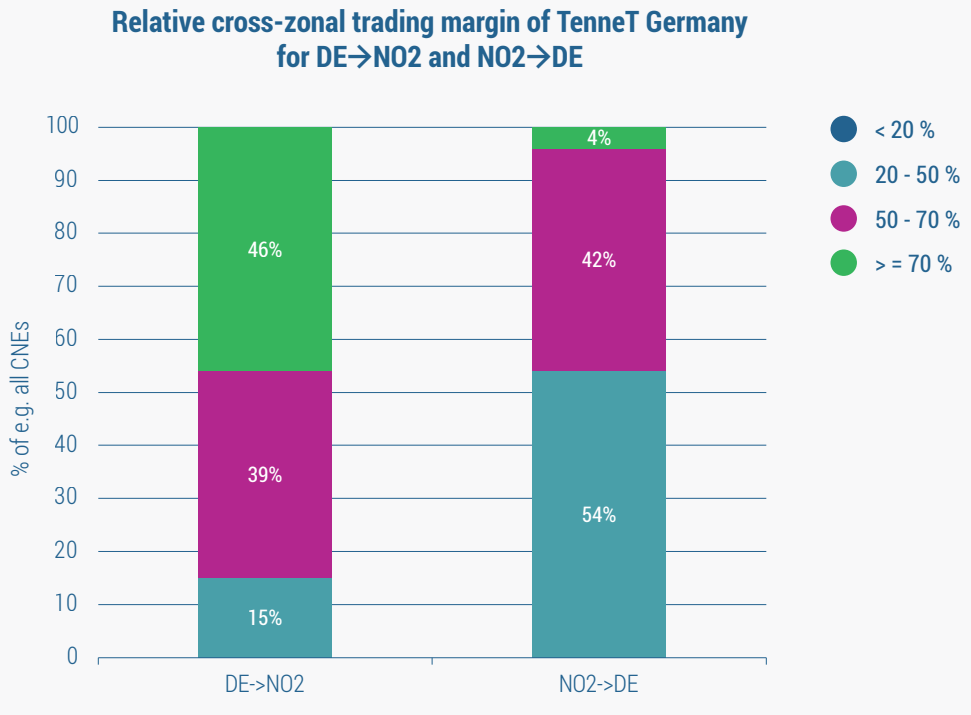


ALEGrO (Amprion), the first interconnector between Belgium and Germany, had been offered to the day-ahead market from 18/11/2020 in the course of the so-called stepwise 'ramp-up approach' by Elia and Amprion. At any MTU 100 % of the technically possible ramp-up capacity was offered for cross-zonal trading.

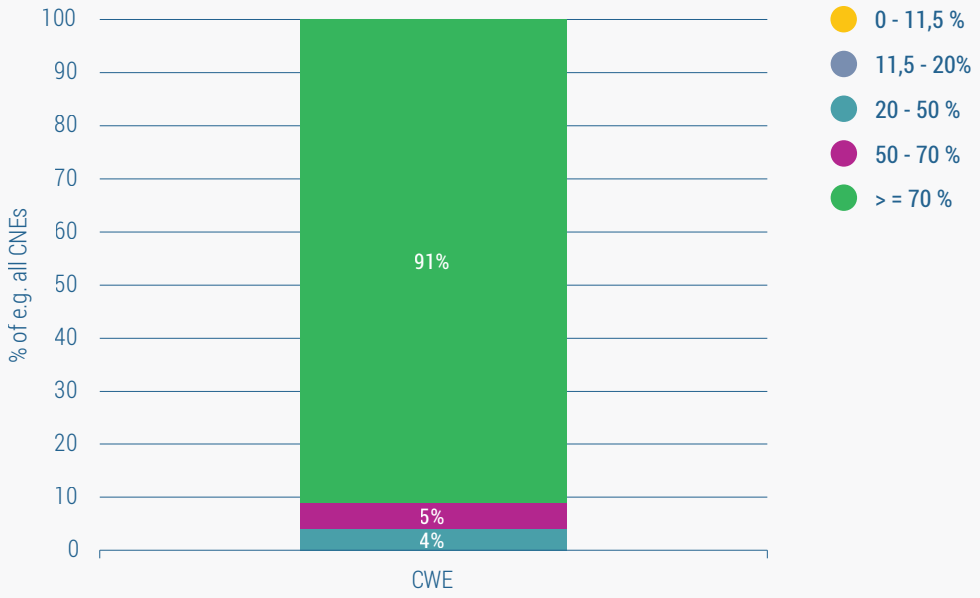


10.3.4 TenneT Germany

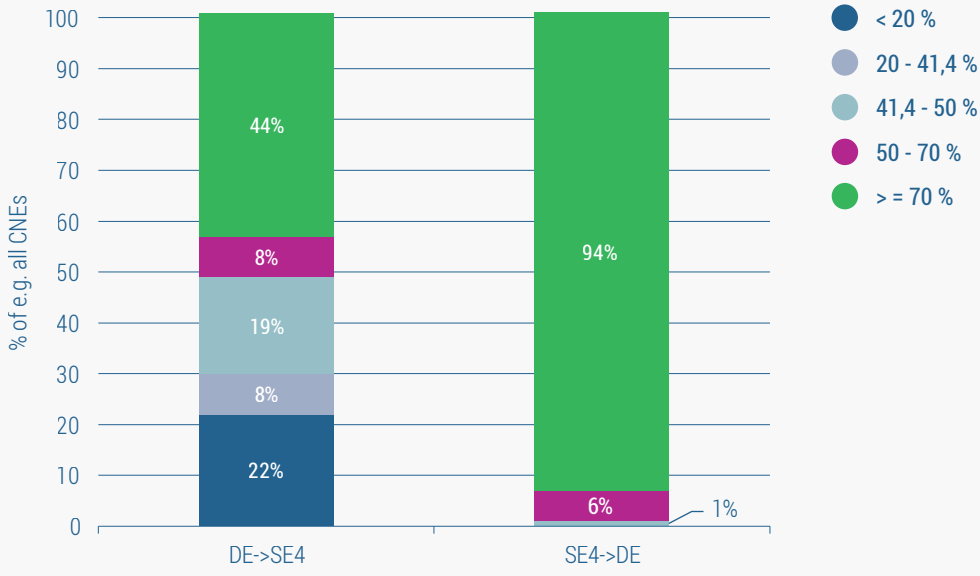
Based on the above assessment methodology, for TenneT Germany the following results are obtained.

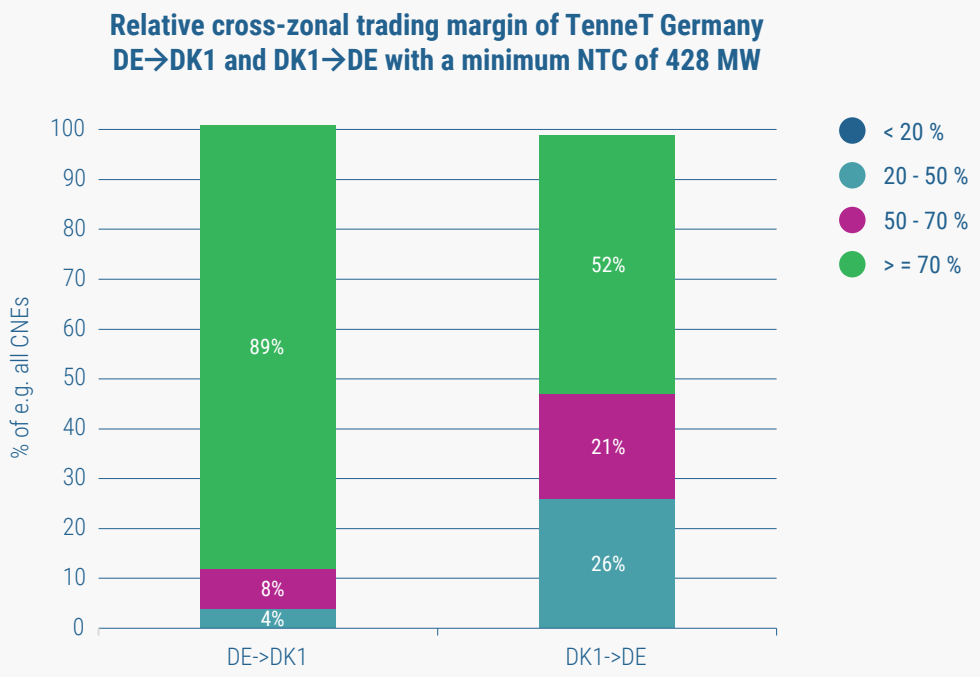


Relative cross-zonal trading margin of TenneT Germany for CWE with a minimum capacity of 11.5%



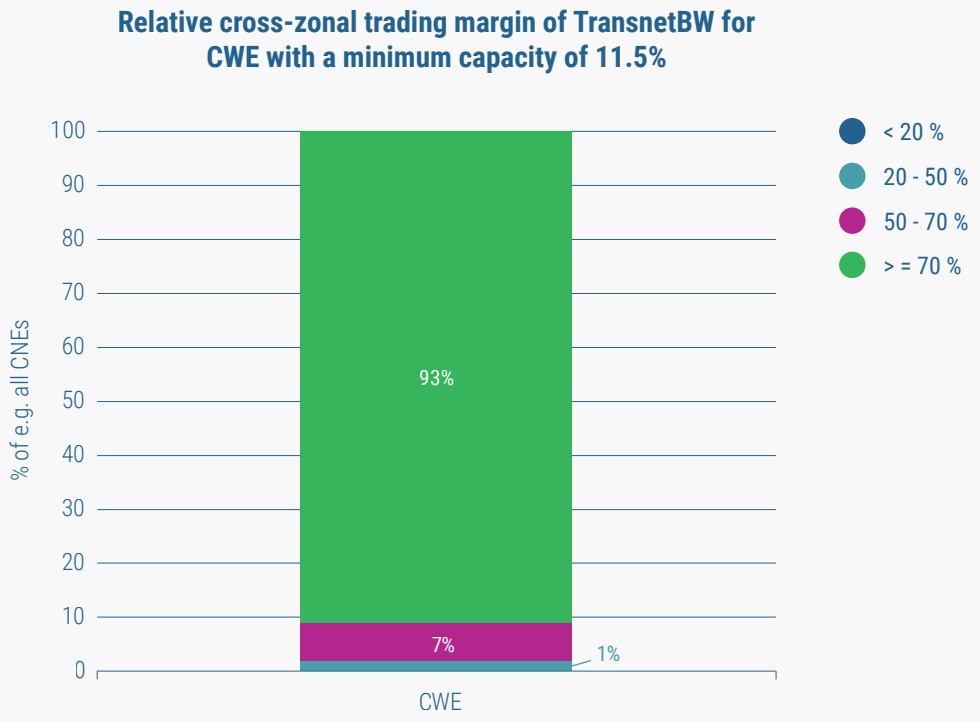
Relative cross-zonal trading margin of TenneT Germany for DE→SE4 and SE4→DE with a minimum capacity of 41.4%





10.3.5 TransnetBW

Based on the above assessment methodology, for TransnetBW the following results are obtained.



11 Greece

11.1 Current status of the implementation of CEP70 requirements

For region SEE, as in 2020, IPTO has been granted a derogation for commercial flows from 3rd countries, insufficient potential for remedial actions and development of new processes and tools.

11.2 Assessment methodology

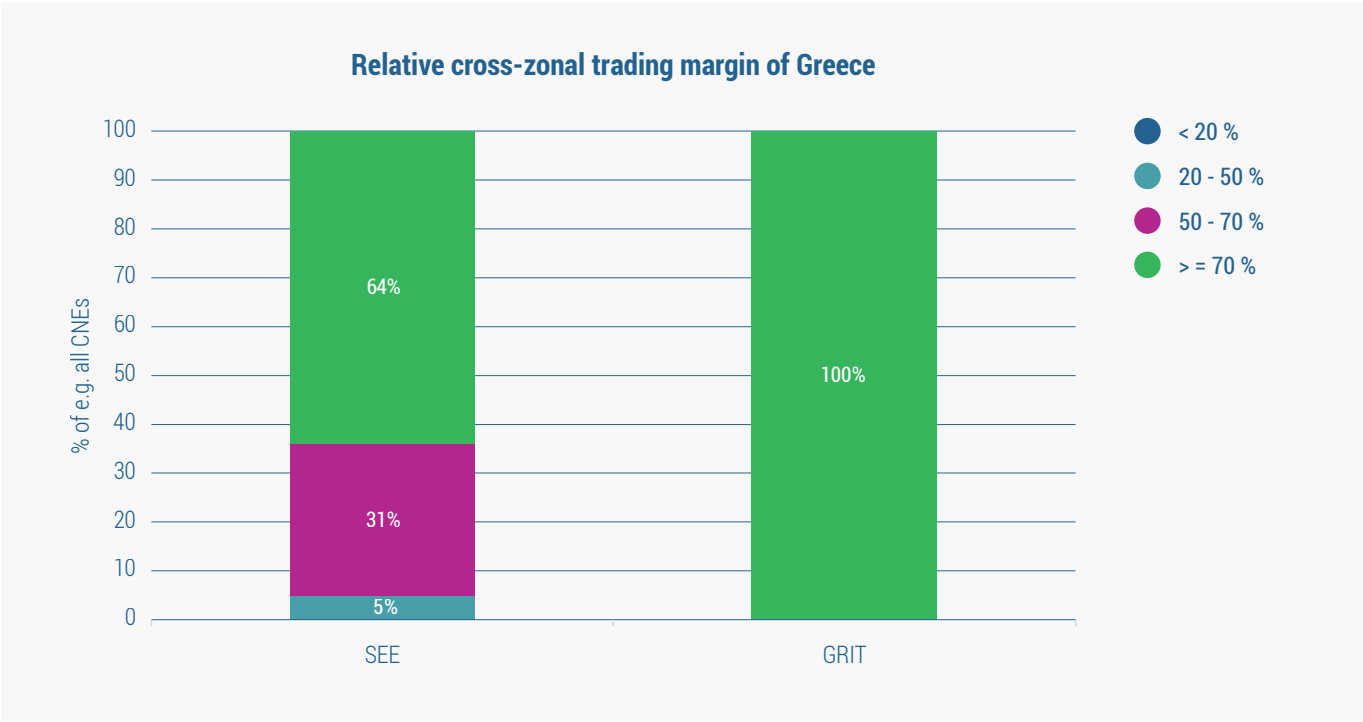
The methodology according to ACER's Recommendation No 01/2019 is applied.

DESIGN ELEMENT	DESIGN CHOICE OF GREECE	
BORDER/REGION	SEE	GRIT
GRID ELEMENTS CONSIDERED	All limited CNECs provided	N/A
THIRD COUNTRIES CONSIDERED	Yes	Yes
HOURS CONSIDERED	All hours with the tie line BG-GR in operation	All hours with the tie line IT-GR in operation
TIMEFRAMES CONSIDERED	DA	DA

Prominent design choices of the assessment methodology of Greece

11.3 Assessment results

Based on the above assessment methodology, for Greece the following results are obtained.



12 Hungary

12.1 Current status of the implementation of CEP70 requirements

A derogation with no minimum capacity is applied in 2020.

12.2 Assessment methodology

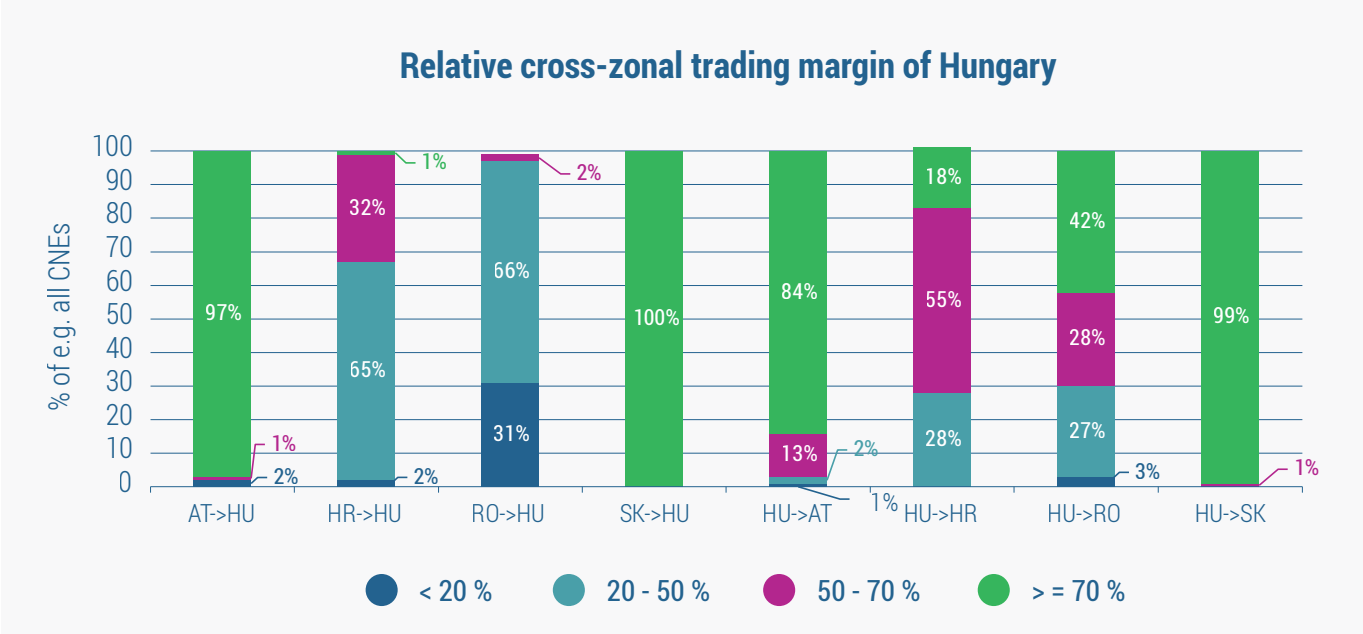
We perform our assessment by calculating PTDFs on the merged DACF models, simulating the potential flows for the case when all available capacities offered to the market was scheduled. This is the worst case scenario from the perspective of the security of supply, and shall be considered by a TSO.

DESIGN ELEMENT	DESIGN CHOICE OF FRANCE
GRID ELEMENTS CONSIDERED	The CNECs considered relevant during the capacity calculation were chosen
THIRD COUNTRIES CONSIDERED	Yes
HOURS CONSIDERED	Yes
TIMEFRAMES CONSIDERED	DA

Prominent design choices of the assessment methodology of Hungary

12.3 Assessment results

Based on the above assessment methodology, for Hungary the following results are obtained.



13 Italy

13.1 Current status of the implementation of CEP70 requirements

For Italy North, based on the derogation in place for 2020, no minimum capacity target was defined.

13.2 Assessment methodology

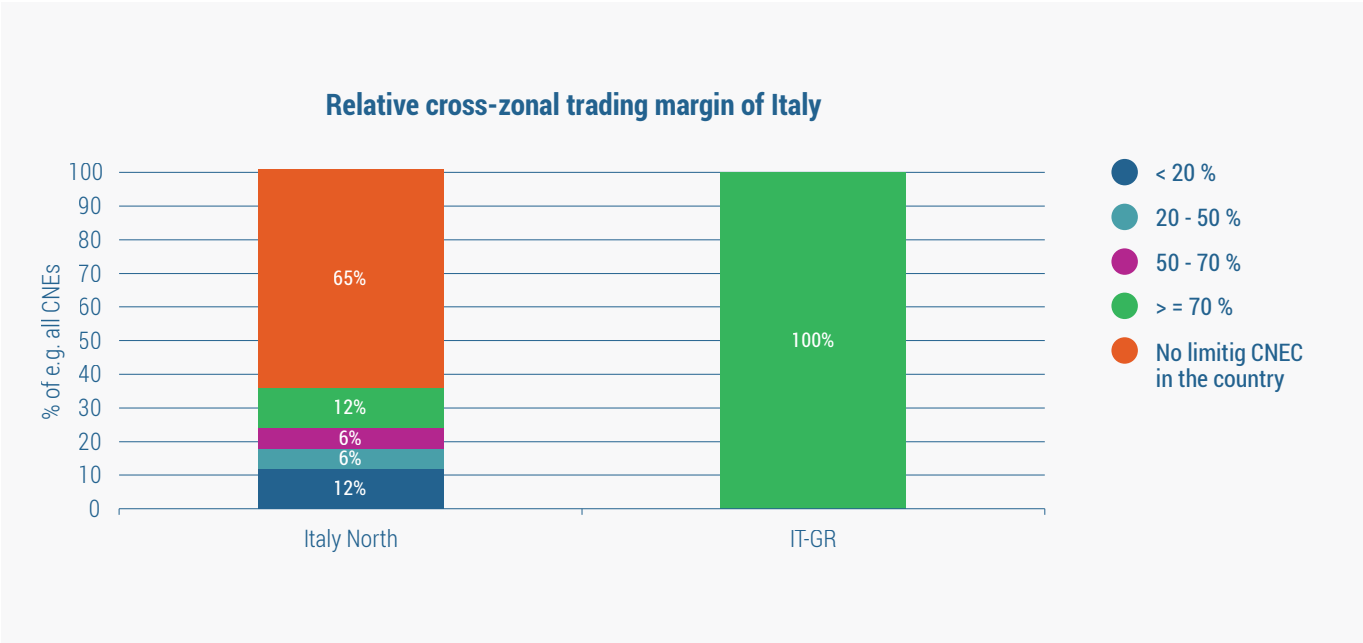
For Italy North, the MACZT values are the ones calculated by ACER. For Italy-Greece, the methodology according to ACER's Recommendation No 01/2019 is applied.

DESIGN ELEMENT	DESIGN CHOICE OF COUNTRY	
BORDER/REGION	Italy North	IT-GR
GRID ELEMENTS CONSIDERED	All CNECs	N/A
THIRD COUNTRIES CONSIDERED	Yes	Yes
HOURS CONSIDERED	Hours when DA capacity calculation process has been limited by at least one CNEC (788 h). Only first semester is considered.	All hours
TIMEFRAMES CONSIDERED	DA	DA

Prominent design choices of the assessment methodology of Italy

13.3 Assessment results

Based on the above assessment methodology, for Italy the following results are obtained.



13.4 Additional information

Italy North is a CCR where cNTC approach is used, according to the approved methodology. The calculation is performed in a coordinated manner, considering simultaneously all the involved borders, so that a single CNEC of one TSO can limit the capacity for all the borders, differently from the flow-based approach. In light of that, the outcomes obtained by ACER are resulting from wrong assumptions and are not reflecting the capacity calculation approach in place. Compliancy to the 70% criterion should be evaluated for the whole region and not independently for each TSO. That is why Terna provided ACER with the limiting CNECs of the region, also including non-Italian elements, and expected results for around 800 hours (and not only 276 hours).

For PTDFs computation, results are highly affected by the usage of few CGMs representative for the semester. This approach strongly impacts on the reliability of the results.

In particular for Italian elements, the line Baggio – Magenta (IBAGM12X IMAGMA2X) is always associated to PTDFs equal to zero, due to the grid configuration included in that specific grid model, which is not representative for all the days where this line is limiting.

ACER calculated MNCCs considering the scheduled exchanges of the previous day reported in ENTSO-E Transparency Platform. Two issues come from this:

- ACER uses exchange schedules that are not available when capacity calculation is performed.
- Italy North's capacity calculation process is using a specific reference day calendar. So that, for many days, especially weekends, the reference day is different than d-1.

14 Lithuania

14.1 Current status of the implementation of CEP70 requirements

The 70% rule is applied in 2020.

14.2 Assessment methodology

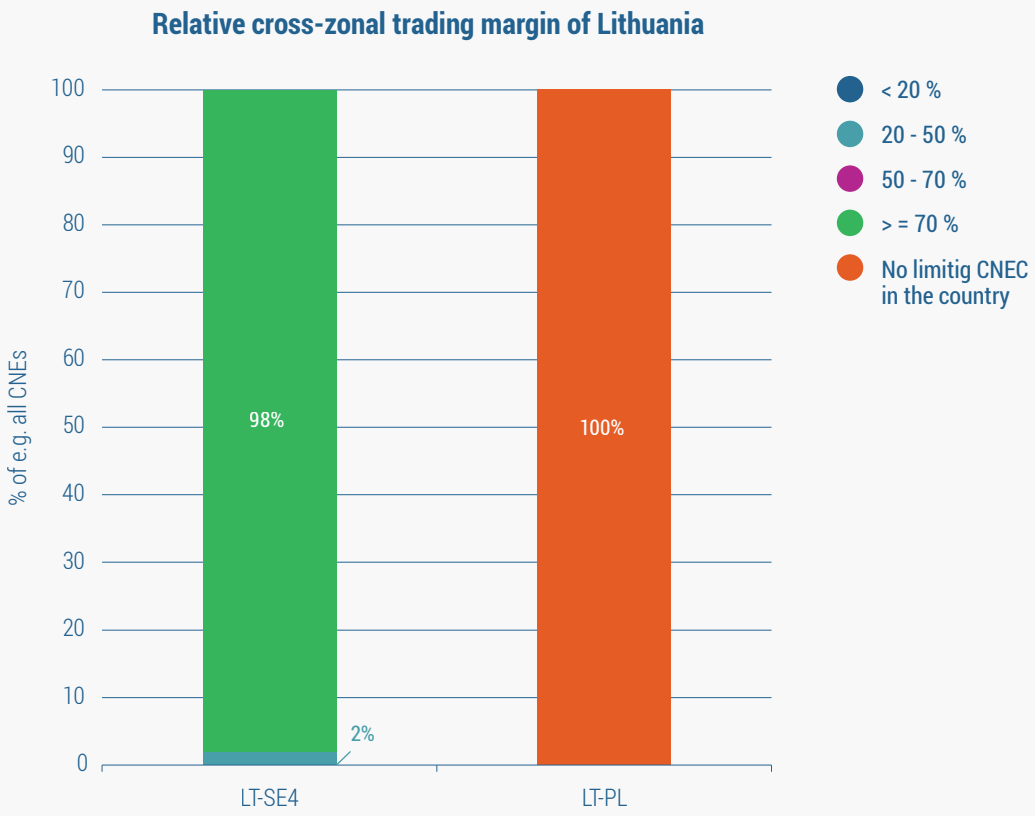
70% rule according to Article 16(8) of Regulation (EU) 2019/943 and ACER recommendation.

DESIGN ELEMENT	DESIGN CHOICE OF LITHUANIA
GRID ELEMENTS CONSIDERED	All CNECs
THIRD COUNTRIES CONSIDERED	No
HOURS CONSIDERED	All hours
TIMEFRAMES CONSIDERED	DA

Prominent design choices of the assessment methodology of Lithuania

14.3 Assessment results

Based on the above assessment methodology, for Lithuania the following results are obtained.



15 Poland

15.1 Current status of the implementation of CEP70 requirements

Poland has adopted an action plan in December 2019, pursuant to Article 15 (1) of the Electricity Market Regulation (EU) 2019/943. Polish action plan foresees a number of transmission investments that are to be carried out in order to ensure that the 70% obligation is fulfilled by 31 December 2025. The action plan foresees that the level of cross-zonal capacities available for trade between bidding zones are gradually increased from 2020 until 2025 by means of a linear trajectory, until the level foreseen by Article 16 (8) of Regulation 2019/943 are met.

Additionally, Poland has obtained a derogation for 2020 based on foreseeable grounds affecting the security of system operation in accordance with Article 16(9) of the Regulation 2019/943. The granted derogation has covered three different reasons to deviate from the CEP70 requirement: (i) implementation of the new processes and tools to calculate cross-zonal transmission capacities (until 30 June 2020), (ii) excessive loop flows through the Polish grid and lack of coordinated redispatching and countertrading (until the end of 2020) and (iii) uncertainties of uncoordinated transits (until the end of 2020). The obtained derogation concerns all Polish bidding zone borders, though the derogation due to excessive loopflows and uncertainties of uncoordinated transits only apply to the borders belonging to the CORE CCR (synchronous AC borders: DE-PL, CZ-PL and SK-PL).

Finally, planned and unplanned outages of transmission elements affect the level of cross-zonal capacities which can be safely offered to the market. In case of prolonged outages of transmission elements impacting the ability to meet the CEP70 requirement, especially when they are required to perform the necessary grid reinforcements or modernization works, cases with such outages are not treated as non-compliance with Article 16(8) of the Regulation 2019/943.

15.2 Assessment methodology

PSE calculates cross-zonal capacities according to the NTC methodology approved by the Polish NRA. Capacity calculations are based on the D2CF file prepared by PSE using latest available Intra-Day models within the CEE region. When calculating capacities to be made available for the day-ahead market, PSE carefully monitors the calculated NTC and transit flows against the required minimum capacities coming from the linear trajectory obligations. When the cross-zonal capacities (including transits through the Polish grid) do not fulfil the criterion of minMACZT, the offered day-ahead capacities are increased to the required minimum threshold, upon checking the availability of remedial actions.

DESIGN ELEMENT	DESIGN CHOICE OF POLAND	
BORDER/REGION	CZ-DE-SK->PL, PL->CZ-DE-SK	PL→LT, LT→PL, PL→SE4, SE4→PL
GRID ELEMENTS CONSIDERED	All limiting CNECs	NTC provided on the DC link
THIRD COUNTRIES CONSIDERED	Yes	N/A
HOURS CONSIDERED	All hours are monitored, monitoring accounts for the obtained derogations and ability to ensure secure operation (availability of redispatching potential to increase MACZT)	All hours are monitored, monitoring accounts for the obtained derogations and ability to ensure secure operation (availability of redispatching potential to increase MACZT)
TIMEFRAMES CONSIDERED	DA	DA

Table 1: Prominent design choices of the assessment methodology of Poland

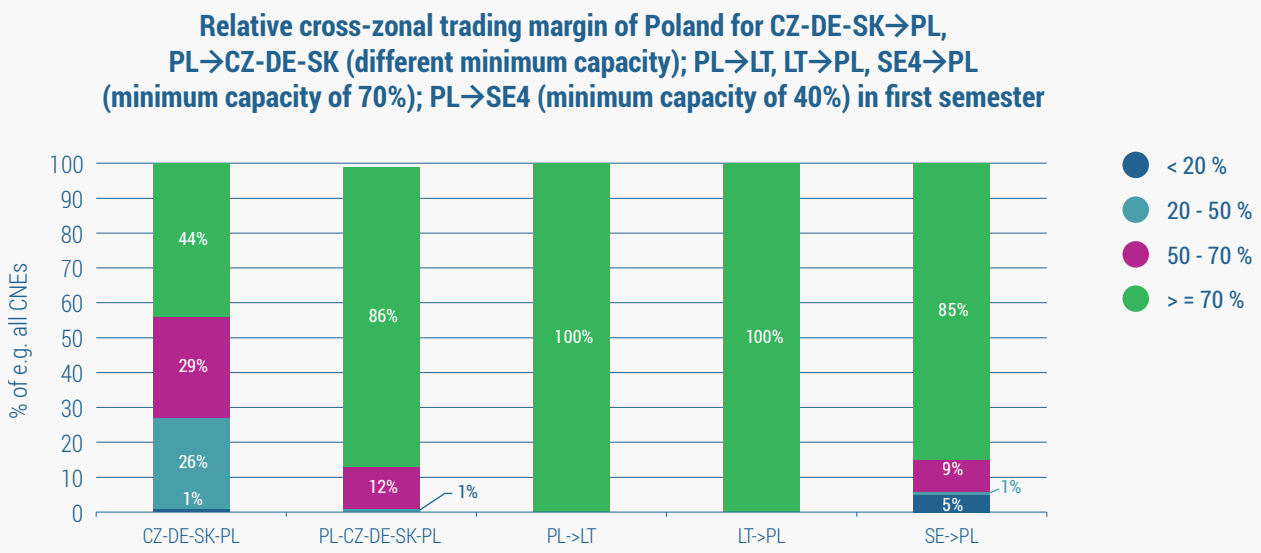
15.3 Assessment results

CEP70 reporting is split into 2 parts, considering that in the first semester of 2020 there was a general derogation from CEP70 obligation to allow for implementation of needed new tools and processes.

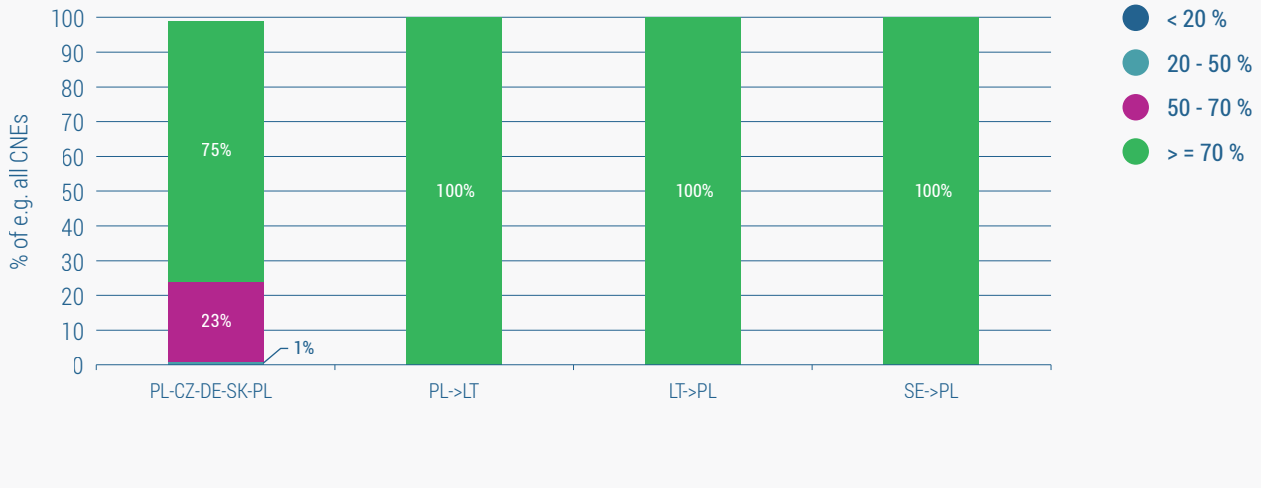
The following presents the monitoring results obtained for Poland. Hours where the minimal required MACZT levels were fulfilled are marked as fulfilled. Similarly the hours where the minimal MACZT levels were considered as conditionally fulfilled due to legitimate reasons (outages, derogations, lack of redispatching potential).

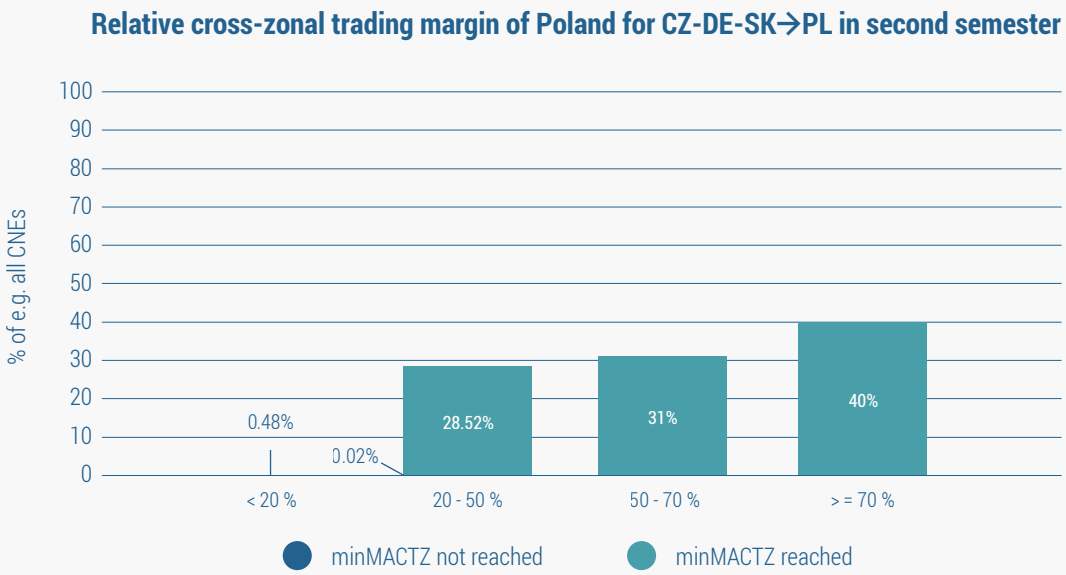
It is to be highlighted, that in its assessment PSE considered the applicable market design in Poland, and in particular the application of capacity allocation constraints. The detailed information on the usage and application of capacity allocation constraints is available in the regional capacity calculation methodologies for the CORE, HANSA and BALTIC CCRs. For borders belonging to the CORE CCR where uncoordinated NTC is applied and the allocation mechanism is based on explicit auctions, the capacities offered for the market are verified to account for allocation constraints. However, for the purpose of CEP70 monitoring, PSE checks the linear trajectory based on the calculated NTC capacities non-verified for allocation constraints. In the light of the Regulation 2019/943 and the 2015/1222 Regulation (CACM), allocation constraints serve to maintain the system within operational security limits, while minimal capacity obligations considers the percentage of capacity that is respecting operational security limits. Hence application of allocation constraints cannot be considered as causing reduction of the capacities offered by PSE below the trajectory thresholds.

15.3.1 Assessment results for the first semester of 2020 with derogations



15.3.1 Assessment results for the first semester of 2020 with derogations





15.4 Additional information

When ensuring fulfillment of CEP70 trajectory, PSE was guided by the methodology adopted by the Agency. However, some minor details of the monitoring calculations might differ from the ACER approach due to differences between ex-ante operational process as applied by PSE when calculating capacities and ensuring trajectories on limiting CNECs, and the ex-post monitoring process as applied by the Agency.

However, one 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". Considering the fact that minimal capacity obligations considers the percentage of capacity that is respecting operational security limits, application of allocation constraints cannot be considered as reducing the capacities below trajectory thresholds. However, ACER in its monitoring report has recalculated the cross-zonal capacity figures for Poland by reducing the capacities made available on Polish DC borders, even though full capacity of the link was usually offered (or at least minimal threshold or derogation was respected). The basis for assuming such an interpretation is not clear, since 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 to be included within 30% margin that is foreseen for inter alia loop flows. It is to be highlighted that for hours marked by ACER as not-fulfilled, the respective DC borders were used for transits though Poland (often to full capacity of the links), contributing to European social welfare. The above are reasons for differences between the PSE assessment and the one shown by ACER.

16 Portugal

16.1 Current status of the implementation of CEP70 requirements

A derogation with no minimum capacity is applied in 2020.

16.2 Assessment methodology

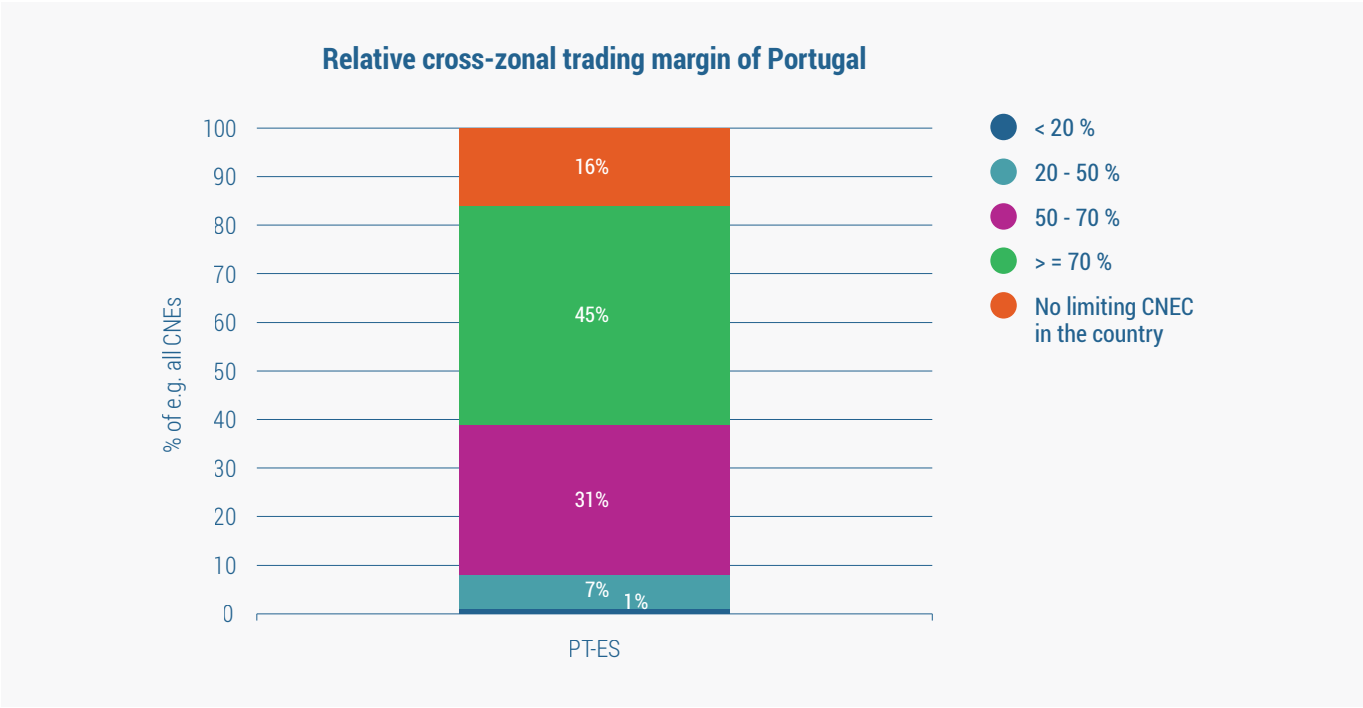
The methodology according to ACER's Recommendation No 01/2019 is applied.

DESIGN ELEMENT	DESIGN CHOICE OF PORTUGAL
GRID ELEMENTS CONSIDERED	All CNECs
THIRD COUNTRIES CONSIDERED	No
HOURS CONSIDERED	16% of the time was not considered due to: IT issues, load flow divergences, etc.
TIMEFRAMES CONSIDERED	DA

Prominent design choices of the assessment methodology of Portugal

16.3 Assessment results

Based on the above assessment methodology, for Portugal the following results are obtained.



17 Romania

17.1 Current status of the implementation of CEP70 requirements

For 2020 Transelectrica had a derogation without a minimum capacity. Starting with 2021, there is an Action Plan in order to reach the 70% capacity. For this year, there is a minimum capacity of 33% on RO-HU border and 25% on RO-BG border.

17.2 Assessment methodology

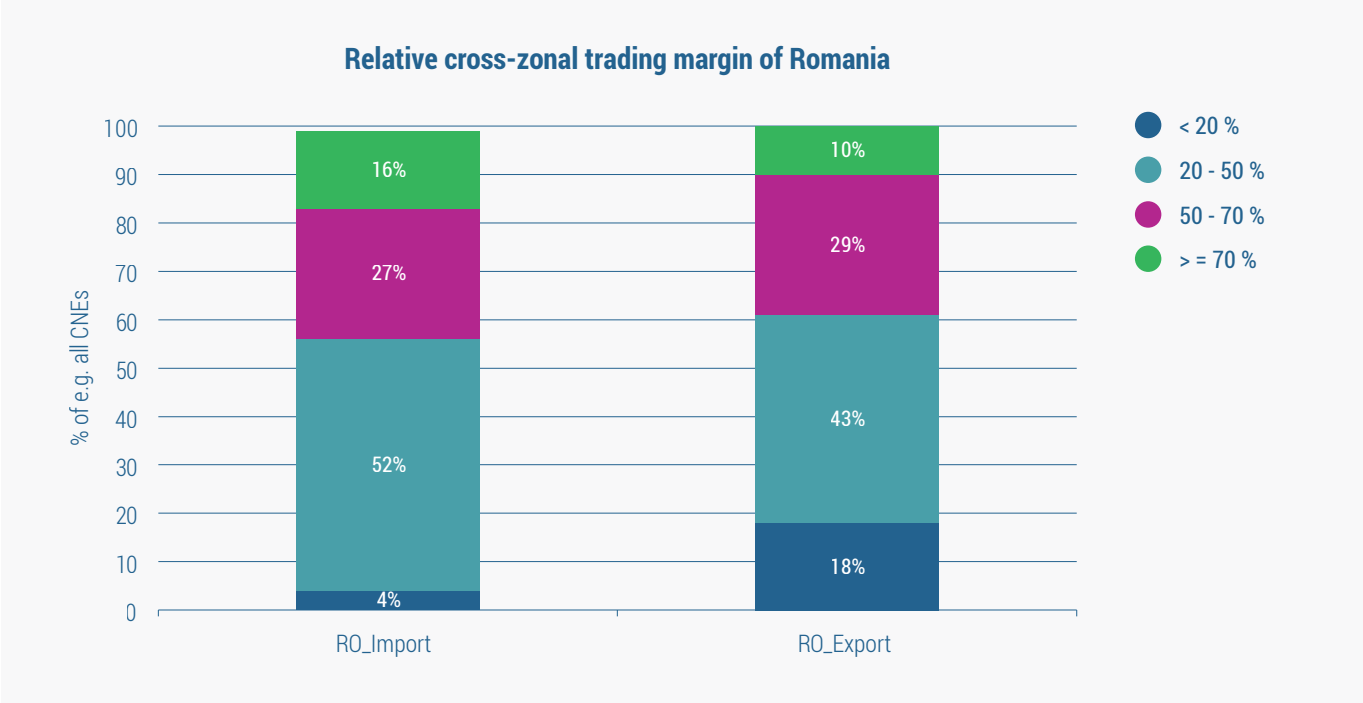
Transelectrica applies ACER's recommendation. Third countries are included and values are given as a percentage of time for all limiting CNECs which have a positive MACZT.

DESIGN ELEMENT	DESIGN CHOICE OF ROMANIA
GRID ELEMENTS CONSIDERED	All limiting CNECs
THIRD COUNTRIES CONSIDERED	Yes
HOURS CONSIDERED	All hours for 2020 in which positive MACZT values are considered.
TIMEFRAMES CONSIDERED	DA

Prominent design choices of the assessment methodology of Romania

17.3 Assessment results

Based on the above assessment methodology, for Romania the following results are obtained.



17.4 Additional information

Values for MNCC should be considered in absolute values in order to keep in MACZT values all the exchanges of a BZ.

18 Slovakia

18.1 Current status of the implementation of CEP70 requirements

A derogation is applied in 2020.

18.2 Assessment methodology

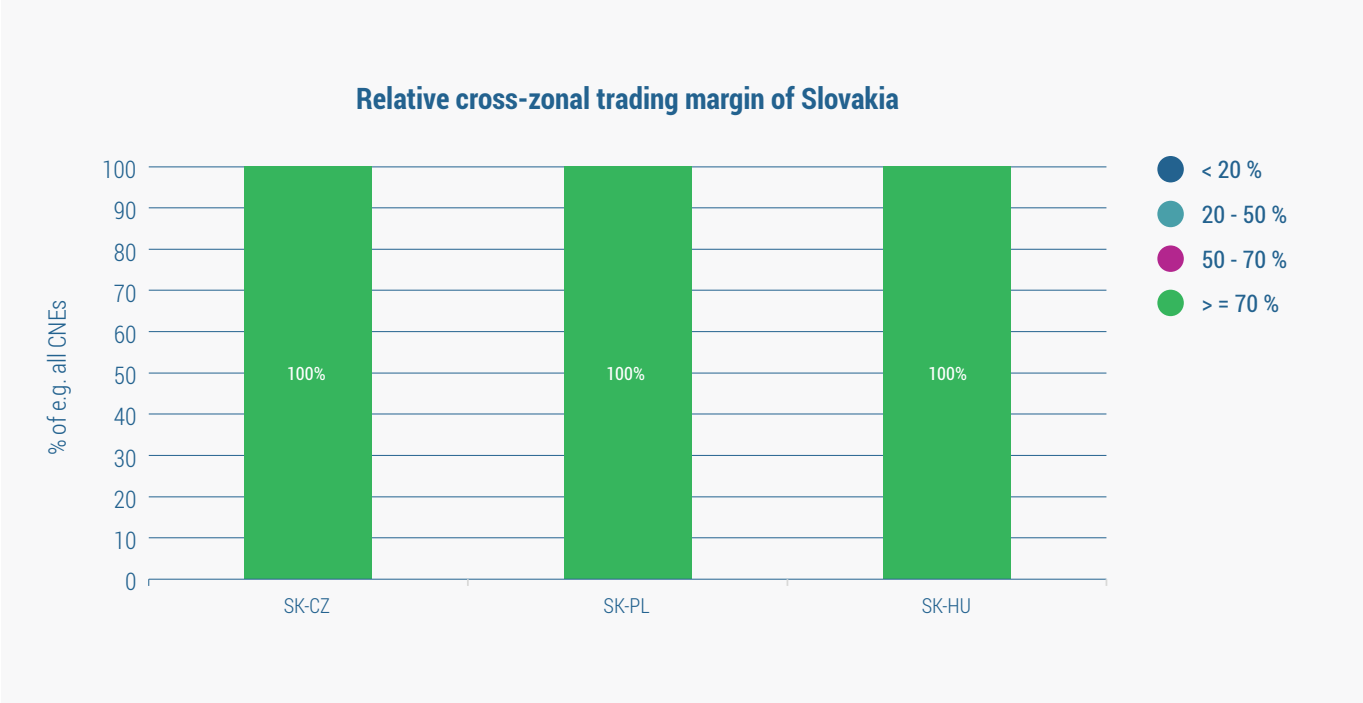
The methodology according to ACER's Recommendation No 01/2019 is applied.

DESIGN ELEMENT	DESIGN CHOICE OF SLOVAKIA
GRID ELEMENTS CONSIDERED	All CNECs
THIRD COUNTRIES CONSIDERED	Yes
HOURS CONSIDERED	All hours
TIMEFRAMES CONSIDERED	DA

Prominent design choices of the assessment methodology of Slovakia

18.3 Assessment results

Based on the above assessment methodology, for Slovakia the following results are obtained.



19 Slovenia

19.1 Current status of the implementation of CEP70 requirements

For the borders SI-AT and SI-HR, we did not perform detailed calculations due to the fact that we have no limiting elements (e.g. NTC is limited by other party).

19.2 Assessment methodology

For the borders SI-AT and SI-HR, we followed ACER Recommendations No 01/2019.

For the region CSE, we followed ACER Recommendations No 01/2019, the limiting elements were determined by joint DA and ID CC methodology of the region, which lead to no limiting elements on our side.

DESIGN ELEMENT	DESIGN CHOICE OF SLOVENIA		
BORDER/REGION	SI-AT	SI-HR	CSE
GRID ELEMENTS CONSIDERED	Limiting CNECs	Limiting CNECs	Limiting CNECs
THIRD COUNTRIES CONSIDERED	No	No	Yes
HOURS CONSIDERED	All hours	All hours	All hours
TIMEFRAMES CONSIDERED	Only DA	Only DA	Only DA

Prominent design choices of the assessment methodology of Slovenia

19.3 Assessment results

Based on the above assessment methodology, for Slovenia the following results are obtained.

19.4 Additional information

Since the PSTs are used to increase overall capacities, PST flows can be considered as market flows, however, ACER does not consider them as such in the MACZT monitoring.

20 Spain

20.1 Current status of the implementation of CEP70 requirements

Derogation for ES in 2021. The CEP 70% will be implemented at the end of the year 2021 in ES within SWE Capacity Calculation roadmap.

20.2 Assessment methodology

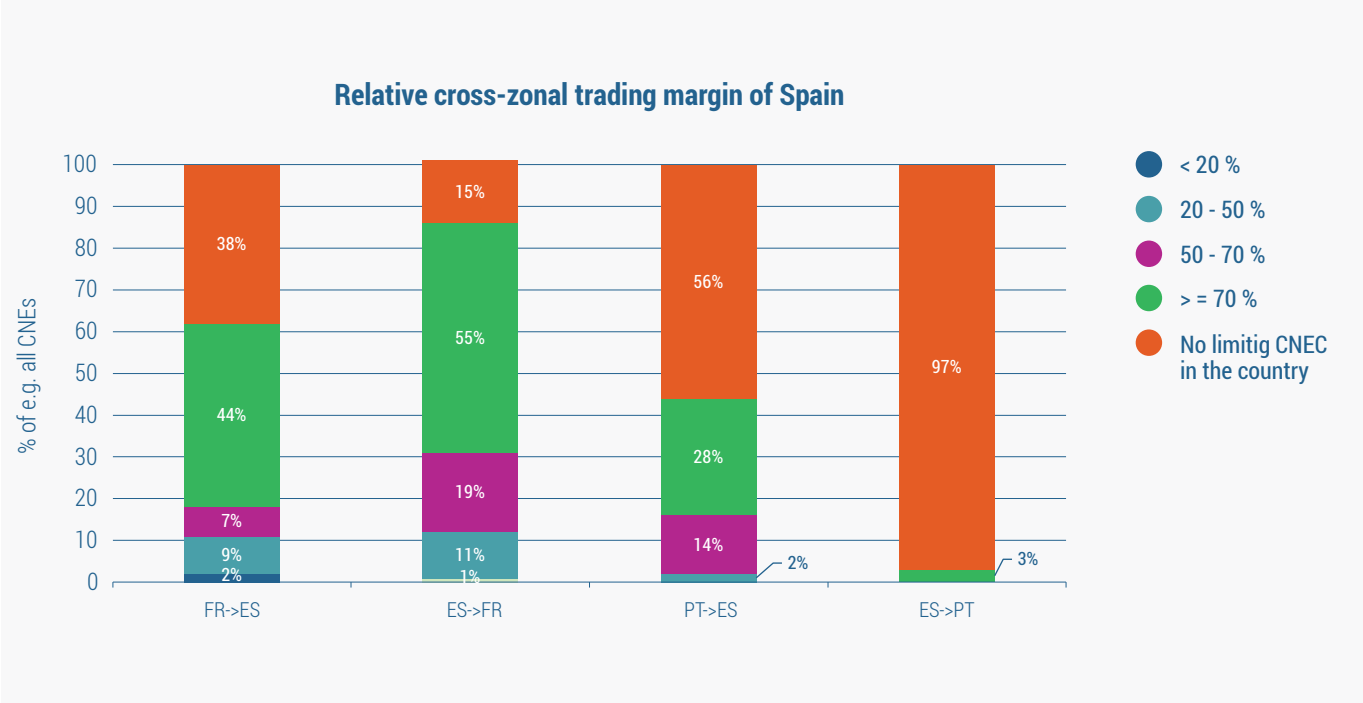
The methodology according to ACER's Recommendation No 01/2019 is applied.

DESIGN ELEMENT	DESIGN CHOICE OF SPAIN
GRID ELEMENTS CONSIDERED	All limiting CNECs
THIRD COUNTRIES CONSIDERED	No
HOURS CONSIDERED	All hours when the limiting element is identified from 29/1/2020 to 31/12/2020
TIMEFRAMES CONSIDERED	DA

Prominent design choices of the assessment methodology of Spain

20.3 Assessment results

Based on the above assessment methodology, for Spain the following results are obtained



20.4 Additional information

For the Compliance to the 70% rule, the MTU with limiting elements outside Spain are deemed as compliant.

21 The Netherlands

21.1 Current status of the implementation of CEP70 requirements

For region CWE, we would like to make a reference to the NL MACZT monitoring report, which will be published in Q2 2021.

21.2 Assessment methodology

For region CWE:

For each MTU, the CNEC with the lowest margin (difference between the provided MACZT and required minimum MACZT) is selected. The MTU is deemed compliant when this margin is equal to or above 0%.

For borders DK1→NL, NL→DK1, NO2→NL, NL→NO2:

For each MTU, the relative capacity in a certain direction on HVDC cable is calculated (available capacity / total capacity). MTU is labeled as "no limiting CNEC in country", when the MACZT was below 70% and the reduction was applied by a TSO other than TTN

For borders NL→GB and GB→NL:

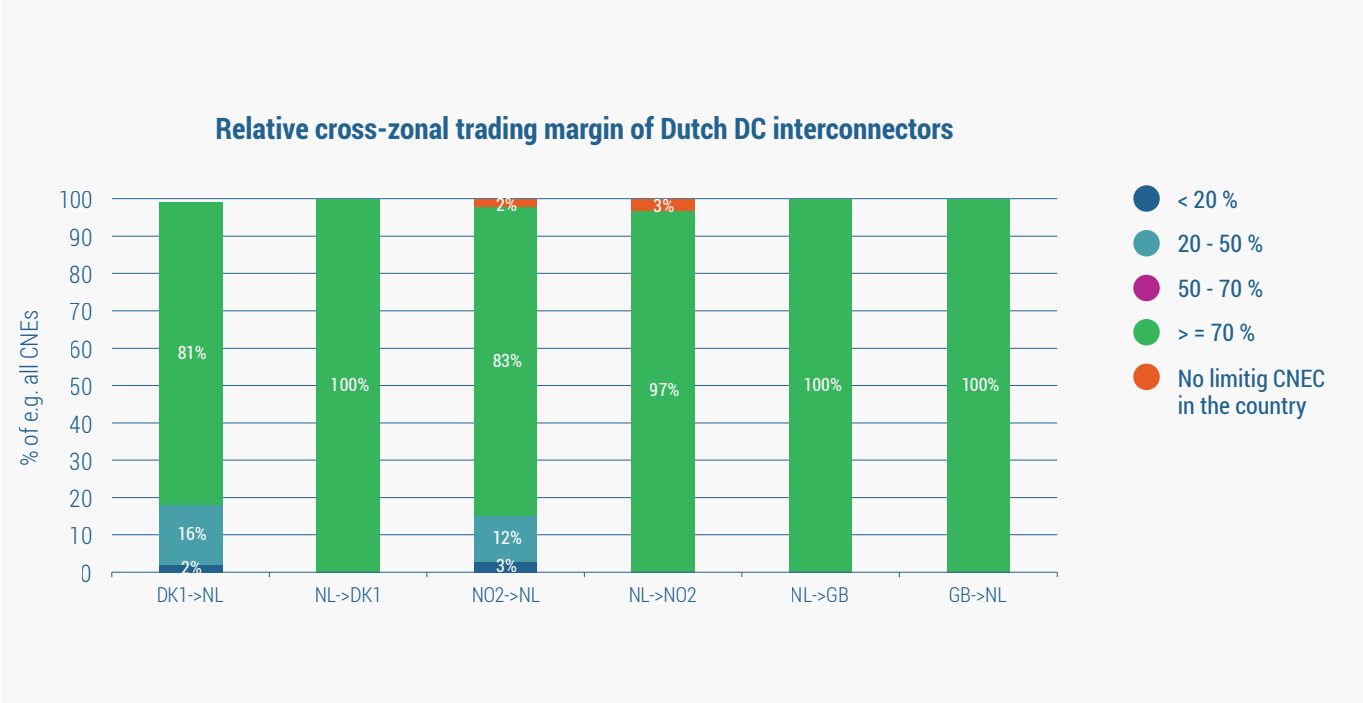
Responsibility for 2020 lies with BritNed. Numbers as included in this report are from BritNed as provided by them to ACER for the ACER MACZT Report of 2020 S1 and 2020 S2.

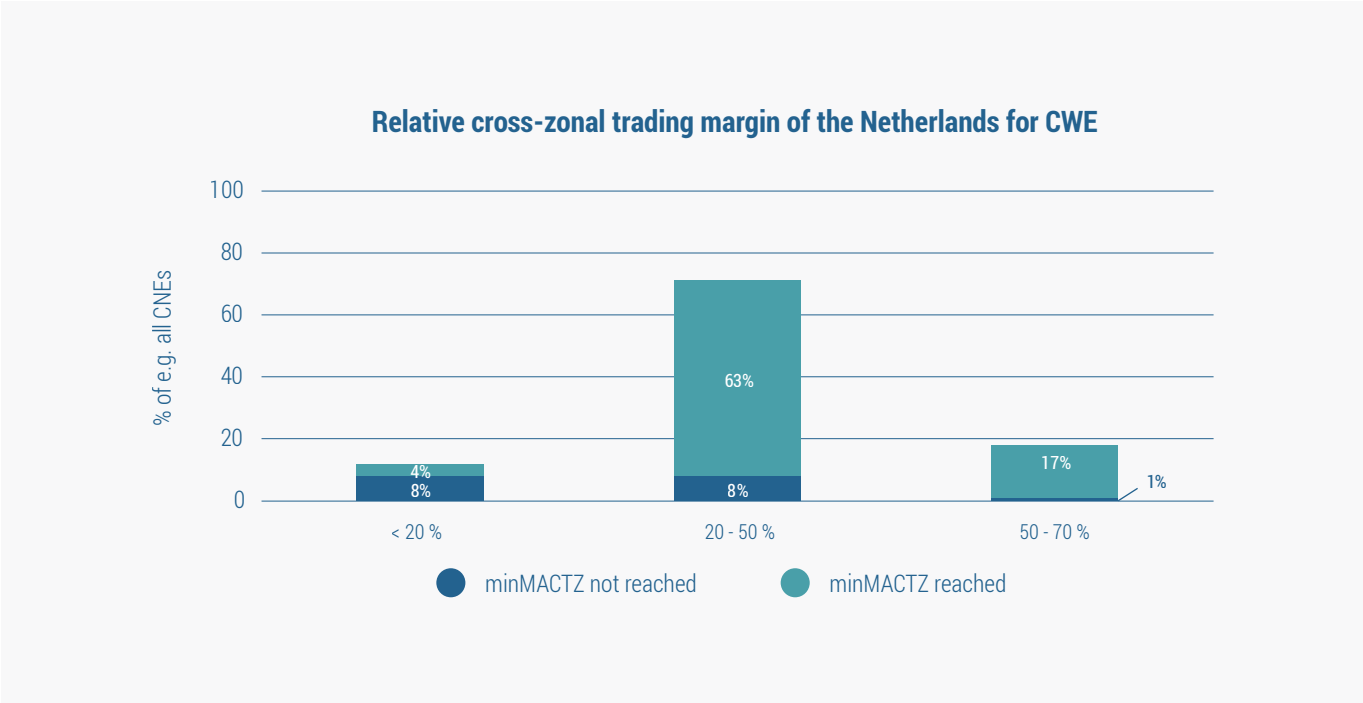
DESIGN ELEMENT	DESIGN CHOICE OF THE NETHERLANDS		
BORDER/REGION	CWE	DK1→NL, NL→DK1, NO2→NL, NL→NO2	NL→GB, GB→NL
GRID ELEMENTS CONSIDERED	For each MTU, compliance is based on the CNEC with the lowest MACZTmargin (difference between provided MACZT and required minimum MACZT)	All CNECS included	All CNECS included
THIRD COUNTRIES CONSIDERED	Including third countries	N/A	Yes
HOURS CONSIDERED	MTUs from 01/04 onwards are included, with exception of 3 Business Days (4 June, 25 Oct, 4 Nov) where no data was available. Q1 2020 was excluded on basis of derogation.	All hours	S1 2020
TIMEFRAMES CONSIDERED	DA	DA	Only DA

Prominent design choices of the assessment methodology of the Netherlands

21.3 Assessment results

Based on the above assessment methodology, for the Netherlands the following results are obtained.





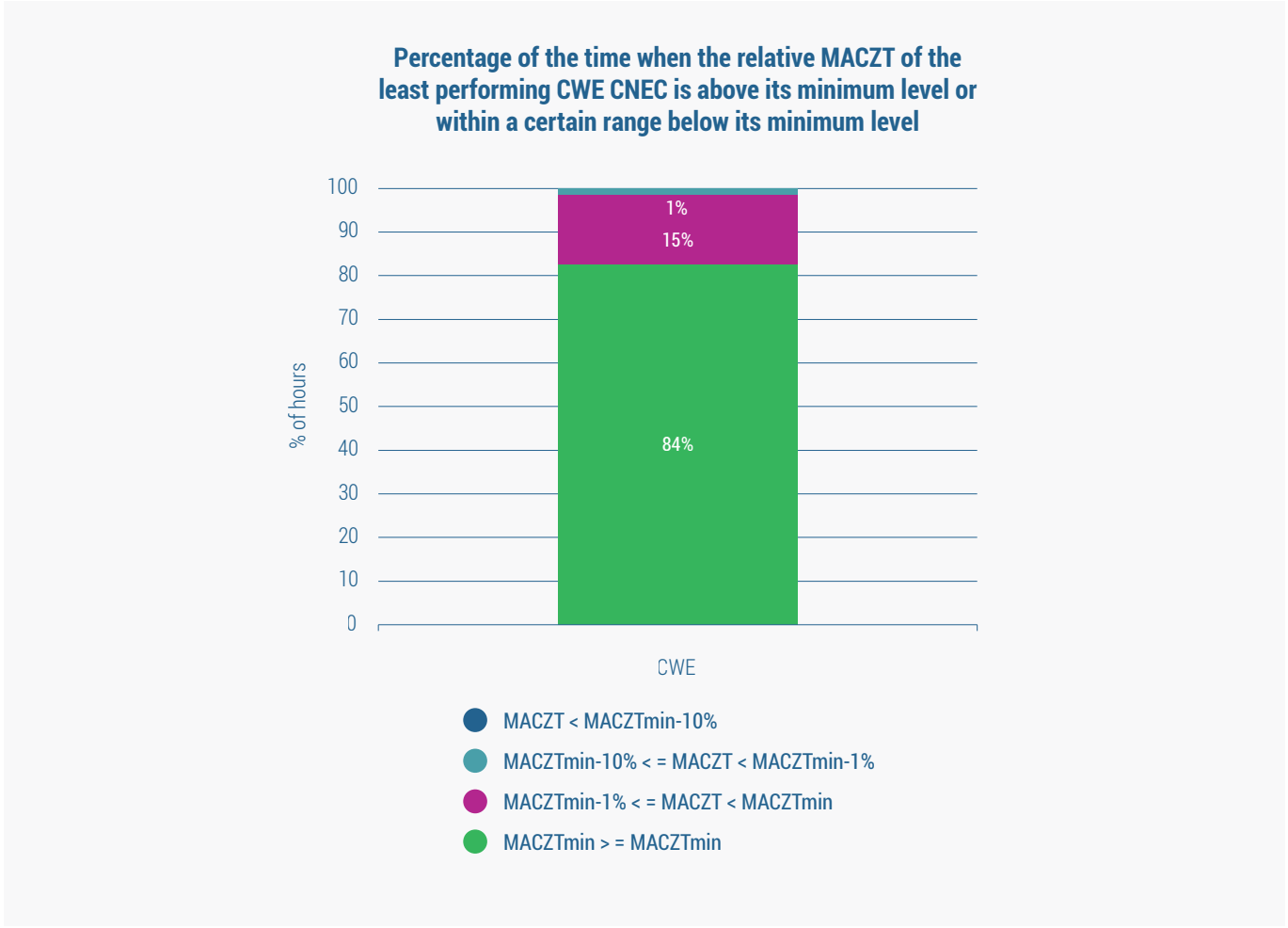
21.4 Additional information

In accordance with article 15(4) of the Electricity Regulation, TenneT has delivered an assessment of the cross-border capacity made available in the year 2020, and whether this was in accordance with the various provisions on minimum capacities that were applicable to TenneT in the year 2020. The figures included below are taken from the report from this assessment. For more information on this matter and a more in-depth explanation of the numbers of the Netherlands, we refer the reader to this report.

For region CWE:

For the Netherlands, an action plan and a derogation were adopted as transitory measures to reach gradually the minimum capacity margin of 70% on the critical network elements included in CWE flow-based day-ahead capacity calculation. Because of the interplay between action plan, derogation and CWE flow-based capacity calculation methodology, it is not straightforward to assess whether the capacity made available was in accordance with all the applicable provisions, in particular because they result in different MACZT target levels for individual CNEs.

In order to evaluate whether TenneT complied with the applicable provisions on the minimum levels of MACZT, TenneT has performed an assessment where for each MTU, the CNEC with the lowest $MACZT_{margin}$ (difference between provided MACZT and required minimum MACZT) is taken and categorized to a certain range. This has led to **Figure** below, which shows the percentage of time when the $MACZT_{margin}$ of the least performing CNEC was above its minimum MACZT level or within a certain range below its minimum level.



Percentage of time when the relative MACZT of the least performing CNEC in the coordination area of CWE is above its minimum MACZT or within a certain range below its minimum MACZT. For each MTU the CNEC with the lowest $MACZT_{margin}$ was selected and categorised to one of the ranges. Period April-December 2020.

The figure shows that:

- For 84% of the time, TenneT has provided capacity margins at or above the required minimum levels on all its network elements;
- For 15% of the time, TenneT has not provided capacity at or above the required minimum levels for a few network elements. However, the capacity margins provided on the least performing network element were very close to the required minimum levels as the deficit was only less than 1% below its required minimum level; and
- For the remaining 1% of the time, TenneT has offered insufficient capacity margins. However, the effect on cross-zonal trade has been almost negligible as:
    - only for four MTUs (0,06% of the time) TenneT could have potentially had limited cross-zonal trade as the related CNEC was presolved; and
    - only for a single MTU (0,015% of the time) cross-zonal trade was limited because the CNEC became an active constraint in day-ahead market coupling.

For the HVDC bidding zone borders NL-DK1, NL-NO2):

Figure 1 shows that:

- For 100% of the time for the NL→DK1 (COBRAcable) and NL→NO2 (NorNed) bidding zone border, TenneT has provided capacity margins at or above the required minimum level of 70%.
- For 81% of the time for the DK1→NL and 86% of the time for the NO2→NL bidding zone border, TenneT has provided capacity margins at or above the required minimum level of 70%. For the remaining period of time, insufficient capacity margins were provided due to reductions by TenneT.

The reductions on NorNed and COBRAcable were for the vast majority of the time related to the fact that throughout 2020 there have been several planned long duration outages in the north of the Netherlands, related to investments of TenneT following our grid investment plan. Also, TenneT faced a long duration unplanned outage on a critical network element in the north of the Netherlands.

As a consequence of these outages insufficient capacity was available on the remaining internal Dutch network elements to accommodate the full extent of cross-zonal and internal flows. In order to respect operational security limits, TenneT had to take measures including the reduction of cross-zonal capacity on the interconnectors. TenneT regards these reductions as an unavoidable consequence in the process of upgrading its grid to be able to make more cross-zonal capacity available in the future.

Annex III – Glossary

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

Elia	Elia System Operator SA
ESO	Electroenergien Sistemen Operator EAD
EMS	Akcionarsko dru□tvo Elektromre□a Srbije
ENTSO-E	European Network of Transmission System Operators for Electricity
ES	Spain
EU	European Union
FAT	Full Activation Time
FB	Flow-based
FCA	Forward Capacity Allocation
FCR	Frequency Containment Reserve
FI	Finland
FTR	Financial Transmission Right
FR	France
FRR	Frequency Restoration Reserves
GB	Great Britain
GCT	Gate Closure Time
GOT	Gate Opening Time
GR	Greece
HAR	Harmonised Allocation Rules
HOPS	Croatian Transmission System Operator Ltd.
HR	Croatia
HU	Hungary
HVDC	High-Voltage Direct Current
IDOA	Intraday Operational Agreement
IDSC	Intraday Steering Committee
IFA	Interconnexion France-Angleterre
IGCC	International Grid Control Cooperation
IE	Ireland
IGM	Individual Grid Model
IN	Imbalance Netting
IPTO	Independent Power Transmission Operator S.A.
IT	Italy
JAO	Joint Allocation Office
KPI	Key Performance Indicator
LIP	Local Implementation Project
LFC area	Load-Frequency Control area
LTTR	Long-Term Transmission Rights
LU	Luxembourg
MC	Market Coupling
MARI	Manually Activated Reserves Initiative
MAVIR	Magyar Villamosenergia-ipari Átviteli Rendszerirányító Zártkör□en M□köd□ Részvénytársaság
MCO	Market Coupling Operator
ME	Montenegro
MEPSO	Macedonian Transmission System Operator AD

mFRR	Frequency Restoration Reserves with manual activation
MNA	Multiple NEMOs Arrangement
MRC	Multi Regional Coupling
MTU	Market Time Unit
NEMO	Nominated Electricity Market Operator or Power Exchange
NDA	Non-disclosure agreement
NL	Netherlands
NO	Norway
NOS BiH	Nezavisni Operator Sustava u Bosni i Hercegovini
NRA	National Regulatory Authority
OPSCOM	Operational Committee
OST	OST sh.a – Albanian Transmission System Operator
PCR	Price Coupling of Regions
PICASSO	Platform for the International Coordination of Automated Frequency Restoration and Stable System Operation
PL	Poland
PMB	PCR Matcher and Broker IT system
PSE	Polskie Sieci Elektroenergetyczne
PT	Portugal
PTR	Physical Transmission Right
RA	Regulatory Authorities
REE	Red Eléctrica de España S.A.U.
REN	Rede Eléctrica Nacional, S.A.
RO	Romania
RS	Serbia
RR	Replacement Reserves
RTE	Réseau de Transport d'Electricité
SAFA	Synchronous Area Framework Agreement
SA	Synchronous Areas
SAP	Single Allocation Platform
SAP CA	Single Allocation Platform Cooperation Agreement
SDAC	Single Day-Ahead Coupling
SE	Sweden
SEPS	Slovenská elektriza□ná prenosová sústava, a.s. (Slovakian TSO)
SI	Slovenia
SIDC	Single Intraday Coupling
SEE	South-East Europe
SK	Slovakia
Statnett	Statnett SF (Norway TSO)
SM	Shipping Module
SOB	Shared Order Book
SONI	System Operator for Northern Ireland Ltd.
Svenskä	Svenskä kraftnät (Swedish TSO)
SWE	South-Western Europe
Swissgrid	Swissgrid ag (Swiss TSO)

TCDA	TSO Cooperation Operational Agreement
TCID	TSO Co-operation Agreement for Single Intraday Coupling
TCOA	TSO Co-operation Agreement for Day-ahead Coupling
TenneT NL	TenneT TSO NV (Dutch TSO)
TenneT DE	TenneT TSO GmbH (1 out of 4 German TSO)
Terna	Rete Elettrica Nazionale SpA (Italian TSO)
Transelectrica	National Power Grid Company Transelectrica S.A. (Romanian TSO)
TransnetBW	TransnetBW GmbH (1 out of 4 German TSO)
TERRE	Trans-European Restoration Reserves Exchange
TSO	Transmission System Operator
XBID	Cross-Border Intraday project

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

Annex IV – List of Figures

Annex V – List of Tables

Annex VI – The progress of the implementation of Imbalance Settlement Harmonisation by the TSOs (March – May 2021 Survey)

TSO	Was 15-min Imbalance Settlement Period (ISP) implemented by 1 Jan 2021? If not, when is implementation expected?	Has your TSO made a proposal for amendments to your national T&C for BRPs, to comply with the ISHM? When was/will it be approved by NRA?	Is your TSO calculating for each ISP one single final position for each BRP (scheduling unit for CDM) in acc. with ISH method Art. 3?"	Is your TSO using single imbalance pricing for all imbalances? If not, by when is this intended?[166]	Has your TSO submitted a request to your NRA for dual imbalance pricing? For which conditions? What was the justification? Has your NRA approved?	Has your TSO developed a proposal for additional settlement mechanism[167] to BRPs in accordance with EB 44(3)? When was/ will it be submitted to/approved by your NRA?	Is the information on the additional settlement mechanism publicly available?	Is your TSO already publishing nationally in ≤ 30 min after delivery the estimated imbalance price and estimated balancing energy prices[168]?	Link to national Terms & Conditions for BRPs.
50Hertz, Amprion, TenneT DE, TransnetBW	Yes	Yes, NRA approval expected Q3/2021	Yes	Yes	No	No	-	No	√
ADMIE	Yes	Yes, NRA approval 07.07.2020	Yes	Yes	No	Yes, approved 07.07.2020 for procurement cost of balancing capacity, system losses cost, TSO financial neutrality	√	No	√
APG (repr. VUEN)	Yes	Yes, NRA approval expected 1/7/2021	Yes	Yes	No	Yes, submitted end of 2018 & approved for procurement cost of negative mFRR capacity[169]	√	Yes	√
AST	31.12.2024	No, submission to NRA Q2 2021	Yes	Yes	No	Yes, submitted & approved 14.12.2017, in force since 01.01.2018 for additional single price for administrative costs set for all BRPs	√	No	√
EPS	31.12.2024	No, submission to NRA Q2 2021	Yes	No, connected to the implementation of 15-min ISP[170]	No, pursuant on ISHM Art. 11.1.e Approval by the end of the year 2021	No	-	Yes	√
Creos Luxembourg	Yes	No, submission to NRA foreseen yet	Yes	Yes	No	No	-	No	√
EirGrid, SONI	Exemption granted rather than derogation.[171] 30-min ISP currently in place	Yes, NRA approval expected Q4 2021	Yes	Yes	No	Yes, approved end of 2016, in force since 01/10/2018 for uninstructed imbalance charges, adjustments to settle decremental volumes, direct adjustments to settle "undo" actions[172]	√	Yes	√
Elering	31.12.2024	No submission to NRA Q2 2021	Yes	Yes	No	Yes, submitted end of 2017. Approved by NRA. In force since 01.01.2018 for all the residual costs or income related to balancing[173]	√	No	√

166 Excluding approved/requested cases for dual imbalance pricing acc. to ISHM Art. 11.
167 E.g. procurement costs, administrative costs, etc.
168 In accordance with Elec Reg 6(13).
169 Not covered in the existing national law after EBGL articles 44, 55 entry into force date.
170 Once 15-min ISP is implemented "single imbalance pricing" will be used.
171 Exemption under Article 53 of the Regulation (EU) 2017/2195 and Article 8(4) of the Regulation (EU) 2019/943. No end date with exemption, requires CBA every three years.
172 Uninstructed Imbalance Charges: Additional charge as a percentage of the settlement price for deviations from TSO instructed levels; Adjustments to settle decremental volumes from units with non-firm grid access as imbalances rather than as balancing actions; Direct payments for fixed unit costs when energy settlement is not sufficient; Adjustments to settle "undo" actions at bid price only rather than cleared market price.
173 The aim of the additional element is to ensure the financial neutrality of the TSO

TSO	Was 15-min Imbalance Settlement Period (ISP) implemented by 1 Jan 2021? If not, when is implementation expected?	Has your TSO made a proposal for amendments to your national T&C for BRPs, to comply with the ISHM? When was/will it be approved by NRA?	Is your TSO calculating for each ISP one single final position for each BRP (scheduling unit for CDM) in acc. with ISH method Art. 3?"	Is your TSO using single imbalance pricing for all imbalances? If not, by when is this intended?[166]	Has your TSO submitted a request to your NRA for dual imbalance pricing? For which conditions? What was the justification? Has your NRA approved?	Has your TSO developed a proposal for additional settlement mechanism[167] to BRPs in accordance with EB 44(3)? When was/ will it be submitted to/approved by your NRA?	Is the information on the additional settlement mechanism publicly available?	Is your TSO already publishing nationally in ≤ 30 min after delivery the estimated imbalance price and estimated balancing energy prices[168]?	Link to national Terms & Conditions for BRPs.
ELES	Yes	No, submission to NRA Q2-Q3 2021	No, TSO is not responsible for calculation of BRP positions	No, intended by Q1 2022	No	No	-	No	√
Elia	Yes	No, submission not foreseen yet	Yes	Yes	No	No		Yes	√
Energinet	No, 15-min ISP will be implemented from 22.05.2023	Yes, NRA approval expected by end of June 2021	No, intended from 01.11.2021	No, intended from 01.11.2021	No	Yes, submitted in the end of 2017. Approved by NRA. In force since 01.01.2018 for additional single price for TSOs administrative costs	√	No	√
ESO	Derogation until 2022	No	Yes	No, intended from 01.01.2023	No				
Fingrid	No, 15-min ISP will be implemented from 22.05.2023	Yes, NRA approval expected by end of June 2021	No, intended from 01.11.2021	No, intended from 01.11.2021	No	Yes, submitted 22.12.2020, approval expected by end of June 2021 for fees to the BRPs to cover additional balancing costs	√	No	√
HOPS	Derogation until 1.1.2023	Yes	Yes	Yes	No	No	NA	No	√
Litgrid	31.12.2024	No, submission to NRA Q2 2021	Yes	Yes	No	Yes, submitted in the end of 2017. Approved by NRA. In force since 01.01.2018 for additional single price for TSOs administrative costs	√ (in Lithuanian)	No	√
MAVIR	Yes	No, submission to NRA until 15/07/2021	Yes	No, intended from 01.01.2022	No	No	-	Yes	√
PSE	Q1/Q2 2023	Yes, NRA approval Dec 2020	Yes	Yes	No	No	-	Yes	√
REE	Q4 2023 (15-min ISP)	No submission to NRA Q2 2021	No	No, intended by Q4 2023	No, not yet submitted to NRA Article 11(a) of ISHM: specific ISPs in which there is a request of both positive and negative balancing energy from FRR	Yes, submission to NRA Q2 2021	-	No	√
REN	31/12/2024 Derogation for Portugal encourage for a best effort to set the ISP to 15min for 1/10/2023	No, submission to NRA Q3 2021	No, intended by Q1 2022	No, intend to request dual imbalance price	No, not yet submitted to NRA	No	-	No	√

TSO	Was 15-min Imbalance Settlement Period (ISP) implemented by 1 Jan 2021? If not, when is implementation expected?	Has your TSO made a proposal for amendments to your national T&C for BRPs, to comply with the ISHM? When was/will it be approved by NRA?	Is your TSO calculating for each ISP one single final position for each BRP (scheduling unit for CDM) in acc. with ISH method Art. 3?"	Is your TSO using single imbalance pricing for all imbalances? If not, by when is this intended?[166]	Has your TSO submitted a request to your NRA for dual imbalance pricing? For which conditions? What was the justification? Has your NRA approved?	Has your TSO developed a proposal for additional settlement mechanism[167] to BRPs in accordance with EB 44(3)? When was/ will it be submitted to/approved by your NRA?	Is the information on the additional settlement mechanism publicly available?	Is your TSO already publishing nationally in ≤ 30 min after delivery the estimated imbalance price and estimated balancing energy prices[168]?	Link to national Terms & Conditions for BRPs.
RTE	No, 31.12.2024	Yes, NRA approval is expected in July 2021	Yes	RTE is using a single imbalance price reference[174]	It could be considered a dual imbalance pricing according to Article 11.1.e, even if RTE is using a single imbalance price reference[175]	No[176]	Yes	Yes	√
SEPS	Yes	No, NRA approval expected before 15.01.2022	Yes	Yes	No	No		No	√
Statnett[177]	No, 15-min ISP will be implemented from 22.05.2023[178]	Yes, NRA is amending national legislation for SN to be compliant with the ISH[179]	No	No intended from 01.11.2021	No	Yes, fees to the BRPs to cover additional costs related to balancing[180]		No	
Svenskä Kraftnät	No, 15-min ISP will be implemented from 22.05.2023	Yes, NRA approval expected by end of June 2021	No	No, intended from 01.11.2021	No	Yes, fees to the BRPs to cover additional costs related to balancing	√		-[181]
TenneT NL (repr. BritNed)	Yes		Yes	No, see next question	Yes, pursuant ISH Article 11(1)(a) NRA approved with no restriction in time				√
Terna	31.12.2024	No, will be submitted in next few month	Yes	No, it is still under evaluation	No				√

174 If the single price reference used by RTE cannot be considered as a single imbalance price, it might be needed to consider such single imbalance pricing when adopting the ISP of 15 minutes (by 1 January 2025).
175 It is justified by the financial modelling of the BRP mechanism in France, which enables an efficient balance of the system by sending an appropriate, but well proportioned, signal to incentivise BRP. The amendments of the national terms
176 RTE did not developed a new settlement mechanism. One existed in the national T&C but it is inactive due to a decision of the NRA "Délibération de la CRE du 9 mars 2017 portant approbation de la révision du « coefficient c », proportionnel au soutirage physique des responsables d'équilibre – CRE".
177 Statnet is not bound by the EBGL. However, Norway has a common balancing market with the Nordics including harmonised imbalance settlement. Imbalance settlement scheme in Norway is adapted together with the rest of the Nordics so to ensure a harmonised imbalance settlement.
178 SN is not bound by the EB regulation and has not formally applied for a derogation.
179 SN is not bound by the EB regulation and does not have terms and conditions for BRPs.
180 Statnett is allowed by national legislation to charge these fees.
181 There are no approved BRP terms and conditions in Sweden yet, but they are under NRA approval.