



Annual Monitoring Report
on activities related to cross-border transmission
capacity in the Energy Community

Reporting period 2019 - Publication December 2020

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1. Introduction

1.1. Background

The present report provides an update on results of the Market Monitoring Project for South East Europe for the 2019 period. The Market Monitoring Project originates from the 2006 Energy Community Annual Electricity Forum ('Athens Forum') that invited the United States Agency for International Development (USAID) to support the Energy Community regulators in developing common standards for monitoring the activities of electricity transmission system operators. This resulted in development of the so-called South East Europe Market Monitoring Guidelines (hereinafter 'the Guidelines')¹, prepared by the USAID-supported consultant Potomac Economics under the umbrella of the Electricity Working Group (EWG) of the Energy Community Regulatory Board (ECRB)². The purpose of the Guidelines is to harmonize and coordinate the activities of National Regulatory Authorities (hereinafter 'regulators' or NRAs) in monitoring electricity transmission grid activities to ensure that network users are granted access to the maximum amount of transmission transfer capacity on a non-discriminatory basis. This also includes monitoring the control of transmission transfer capacity by individual participants in order to identify potential market power.

The Guidelines define the data required to implement market monitoring, specific monitoring indicators, thresholds to establish a reasonable range for the indicator values and actions for regulators for cases where an indicator is outside the threshold ranges:³

- Indicator 1 - The Base Case Exchange (BCE) Indicator: compares Base Case Exchange assumptions in the network model to cross-border schedules.
- Indicator 2 - The Already Allocated Capacity (AAC) Indicator: compares AAC to peak commercial schedules.
- Indicator 3 - Critical Facilities Indicator: compares estimated flows on critical facilities in the network model to actual flows on the facilities.
- Indicator 4 - Load Forecast Indicator: compares forecast load in the network model to actual load.
- Indicator 5 – Generation Forecast Indicator: compares forecast generation in the network model to actual generation.
- Indicator 6 – Transmission Reliability Margin (TRM) Indicator: compares actual TRM values to proxy TRM values calculated using control area balance data and net exchanges.
- Indicator 7 – Market Share Indicator: calculates market shares using auction data on cross-border interconnections.

In addition to the Guidelines, assessment of another provisional indicator was discussed at the ECRB Electricity Working Group with the aim to test where the Contracting Parties stand in terms of the level of

¹ https://www.energy-community.org/dam/jcr:6ff463f1-4c0f-4c3f-943b-f769f2c065f9/ECRB_market_monitoring.pdf. Approved by ECRB in April 2014.

² The Energy Community Regulatory Board (ECRB) operates based on the Energy Community Treaty. As an institution of the Energy Community, ECRB advises the Energy Community Ministerial Council and Permanent High Level Group on details of statutory, technical and regulatory rules and makes recommendations in the case of cross-border disputes between regulators. The Energy Community comprises the EU and Albania, Bosnia and Herzegovina, North Macedonia, Kosovo*, Moldova, Montenegro, Serbia and Ukraine. Armenia, Georgia, Turkey and Norway are Observer Countries. [Throughout this document the symbol * refers to the following statement: *This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Advisory Opinion on the Kosovo declaration of independence*]. For more details on the Energy Community and ECRB see: www.energy-community.org.

³ The individual data requirements referred to as part of the Guidelines are in line with the Energy Community *acquis communautaire*.

capacity offered to the market having in mind the 70% criteria⁴ applicable in the EU. In this reports a very high level assessment is presented with the aim to improve analyses on the future reports.

2. Methodology

Along with the Guidelines, USAID supported development of the so-called South East Europe Automated Market Monitoring System (SEEAMMS). SEEAMMS allows transmission system operators (TSOs) to upload data to a web-based interface where the data is stored, processed, and reported to regulators. A dry run of SEEAMMS started in 2010. The ECRB approval of the Guidelines in April 2014 marked an important step supporting the cooperation among NRAs on market monitoring in accordance with Regulation (EC) 714/2009⁵ and Directive 2009/72/EC⁶. It ratified the project's dry run which expanded the capacity of regulators to oversee and monitor key activities of TSOs. SEEAMMS operates on regional basis with regulators acting as the regional monitor center on a rotating basis.

The present report was prepared by ECRB to summarize the periodic regional SEEAMMS results for the year of 2019. It summarizes recent results and explains the consequences of the various market monitoring indicators, including assessment of the level of the cross-border capacity offered to the market by the TSOs, which in future should be improved and developed as an indicator to assess the 70% criterion stemming from Regulation (EU) 2019/943.

2.1. Participation

The report covers those jurisdictions for which Contracting Parties' (CPs) TSOs submitted data to SEEAMMS, namely: Albania⁷, Bosnia and Herzegovina⁸, North Macedonia⁹, Georgia¹⁰, Kosovo^{*11}, Montenegro¹² and Serbia¹³.

4 Article 16(8) of Regulation 2019/943 reads: "Transmission system operators shall not limit the volume of interconnection capacity to be made available to market participants as a means of solving congestion inside their own bidding zone or as a means of managing flows resulting from transactions internal to bidding zones. [...] this paragraph shall be considered to be complied with where the following minimum levels of available capacity for cross-zonal trade are reached: (a) for borders using a coordinated net transmission capacity approach, the minimum capacity shall be 70 % of the transmission capacity respecting operational security limits after deduction of contingencies, as determined in accordance with the capacity allocation and congestion management guideline adopted on the basis of Article 18(5) of Regulation (EC) No 714/2009; (b) for borders using a flow-based approach, the minimum capacity shall be a margin set in the capacity calculation process as available for flows induced by cross-zonal exchange. The margin shall be 70 % of the capacity respecting operational security limits of internal and cross-zonal critical network elements, taking into account contingencies, as determined in accordance with the capacity allocation and congestion management guideline adopted on the basis of Article 18(5) of Regulation (EC) No 714/2009. The total amount of 30 % can be used for the reliability margins, loop flows and internal flows on each critical network element." The Agency for the Cooperation of European Regulators (ACER) in 2019 issued a recommendation for implementing the 70% minimum margin of capacity available for cross border trade in electricity, see: https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Recommendations/ACER%20Recommendation%2001-2019.pdf.

⁵ OJ L 211/15 of 14.08.2009. For Contracting Parties referring to the version adapted and adopted by Decision 2011/02 of the Ministerial Council of the Energy Community

⁶ OJ L 211/55 of 14.08.2009. For Contracting Parties referring to the version adapted and adopted by Decision 2011/02 of the Ministerial Council of the Energy Community

⁷ National electricity transmission system operator OST.

⁸ Independent electricity transmission system operator NOSBiH.

⁹ National electricity transmission system operator MEPSO.

¹⁰ National electricity transmission system operator GSE.

¹¹ National electricity transmission system operator KOSTT.

¹² National electricity transmission system operator CGES.

¹³ National electricity transmission system operator EMS.

2.2. Base Case Exchange Indicator

The main metric for cross-border trading capacity is the Net Transfer Capacity (NTC), established by TSOs for using the network model. The BCE indicator monitors BCE assumptions in the network model. BCE assumptions are forecasts of commercial schedules in the network model. The purpose of the BCE indicator is to monitor the accuracy of the BCE assumptions in order to help ensure an accurate network model and, consequently, accurate NTC values. It is important that the BCE value represents an accurate forecast of expected cross-border exchanges. If not, the NTC value will be inaccurate and may underestimate the cross-border transmission capacity, and thereby reduce opportunities for market activity.

The BCE indicator calculates a percentage of a forecast error between BCE values (the forecast) and the actual cross-border commercial schedules. There is a lack of consistency throughout the region for the interpretation of the BCE value. The related conclusions of this report are based on review of ENTSO-E documents¹⁴ as well as discussion between regulators and TSOs of the analyzed markets. It is recommended that the BCE value should reflect the best forecast of net commercial exchanges between two TSOs.

According to SEEAMMS records there were **195 BCE violations during the reporting period** on various interconnectors that is slightly higher than average number of violations per annum¹⁵. The violations are distributed among TSOs in the following manner¹⁶:

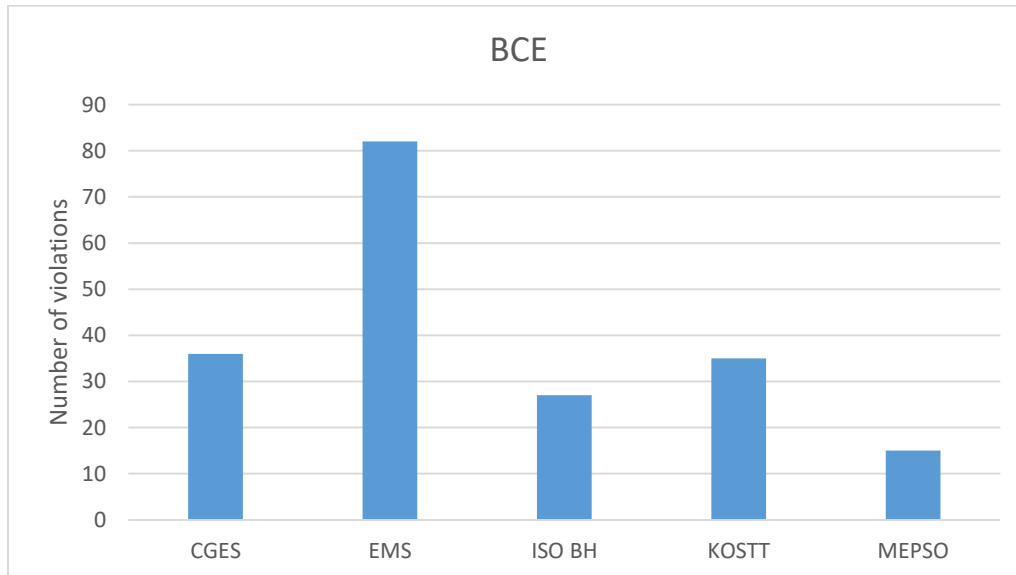


Figure 1 Distribution of BCE indicator violations among TSOs

¹⁴ https://www.entsoe.eu/publications/market-reports/Documents/entsoe_proceduresCapacityAssessments.pdf

¹⁵ It has to be noted that this is first annual report and previous reports were prepared based on bi-annual periods.

¹⁶ There were missing data from Georgian TSO (GSE), therefore GSE violations were not included in the chart.

The network operator with the most violations is Serbian TSO – EMS AD in this reporting period, as in previous reporting periods. Explanations on the violations were provided by EMS AD and the neighboring Contracting Party operator NOS BiH AD (ISO-BH) as follows:

- EMS AD: BCE - The forecasted values of exchanges are harmonized in the month M-2 for the month M for which the NTC is calculated. In the South East European region there is the practice that for each month, another TSO has the role of a coordinator for BCE harmonization and preparation of the regional model which is further used for the calculations. Each TSO creates its forecasted exchanges, based on the totals which were received from its balancing responsible parties¹⁷ and these calculations are communicated to that month's coordinator. EMS proposes BCE values based on historical exchanges. The coordinator harmonizes the BCE values and produces the regional model that is further used for the calculations and sends to the TSOs a table with the proposed BCE values for confirmation;
- ISO-BH: BCE Indicator Variances - the BCE can not be compared with peak net commercial schedule value because the BCE value is determined for one predefined hour in M-2 time horizon before time of commercial schedule appearances;

Recommendation 1: NRAs should closely monitor the increased number of BCE violations, an indicator that measures the accuracy of the BCE assumption used in the month-ahead network model and as a consequence the accuracy of the NTC calculation. In order to increase the accuracy, regulators shall require BCE values based on a forecast of net commercial schedules, using recent historical data, unless good reasons exist to use other methods. Further NRAs should put more effort in collecting reasonable and substantiated explanations from their national TSOs for deviation from the BCE indicator thresholds.

2.3. Transmission Reliability Margin Indicator

The TRM is an amount of cross-border capacity set aside for TSOs to respond to frequency deviations and emergencies exchanges and other uncertainties. As it consumes cross-border capacity, the higher the TRM value, the lower the NTC value and thus the possibilities for cross-border trade. The purpose of the indicator is to monitor the accuracy of TRM.

The TRM Indicator calculates a metric that is intended to track the ENTSO-E TRM formula¹⁸, which is also approved in the Market Monitoring Guidelines. This ENTSO-E metric is compared to the actual TRM used by the TSO and identifies any significant variance.

The TRM value is agreed bilaterally between TSOs as a fixed value, however it doesn't seem to be updated in order to reflect the up-to-date operating statics. The lack of coordination at a wider geographic scope undermines the calculation process.

¹⁷ In the Serbian PE EPS.

¹⁸ https://www.entsoe.eu/publications/market-reports/Documents/entsoe_proceduresCapacityAssessments.pdf

According to SEEAMMS records in the reporting period there were 57¹⁹ **TRM** violations that were assigned only to EMS. According to the explanations given by EMS, in the South East European region there is the practice that the values for Transmission Reliability Margin are defined in Agreement on Network and System Operation Management on yearly basis. It has to be noted that TRM violations dropped in 2019 compared to 2018 by 20 items.

Recommendation 2: As recommended in the previous reports, NRAs should start working with their TSOs to adopt the ENTSO-E TRM formula based on ECRB Recommendation on Harmonizing Cross-Border Transmission Capacity Calculations in Electricity. This would increase the level of transmission capacity made available to the market, therefore the regulators should enforce the requirement of the TSOs to make available for the market maximum level of cross-border capacity. .

2.4. Already Allocated Capacity Indicator

Already Allocated Capacity (AAC) is the cross-border capacity that is booked by market participants. The AAC indicator compares the booked values with the values that are actually scheduled in the operating period. The purpose of the indicator is to detect whether market participants are withholding capacity from the market by buying capacity but not using it. Capacity that is reserved but that is not scheduled on a sustained basis withholds transmission capacity from other participants or at least requires them to wait to for short-notice²⁰ release of this capacity. Monitoring capacity usage will deter participants from capacity hoarding and will open the market to wider competition.

The approach for this indicator involves identifying the hour with the greatest volume of commercial schedules (monthly peak schedules). This hour should be matched and compared with the corresponding reservations, i.e. the AAC, for that day.

The indicator confirms that **cross-border capacity hoarding is not problematic in the region**. The following figure shows the number of violations of 2019 year.

¹⁹ ISO BH and CGES didn't submit complete data and SEEAMMS couldn't calculate ranges, so as violations are not included in the number.

²⁰ Near in time to the operating horizon.

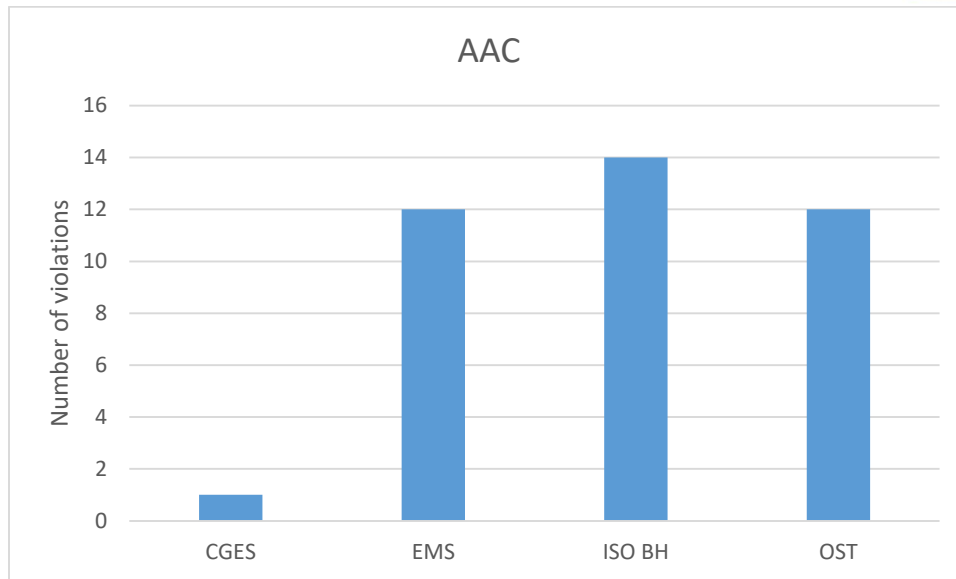


Figure 2. Summary of AAC indicator violations

According to the explanation provided by ISO BH, the common auctions rules for allocation of rights for the use of cross border transmission capacities allow netting effects on available capacities based on daily programs in the opposite direction and the principle of “use it or lose it” in daily and intraday allocation procedures which leads to differences between AAC and scheduled commercial transactions.

2.5. Critical Facilities Indicator

Critical facilities are electrical facilities, usually transmission facilities that are of security relevance when transferring power between TSOs. The Critical Facilities (CF) Indicator monitors simulated power flows on key transmission elements in the network model to determine whether these key elements are the limiting elements in actual system operations. The purpose of the indicator is to detect whether transmission constraints in the network model that limit NTC values are constraints that actually occur in real-time operations. The monitoring intends to ensure an accurate network model and, consequently, accurate NTC values.

In the reporting period, the Critical Facilities Indicator has produced results that support the hypothesis that **internal congestion is overestimated in many cases**. During the reporting period, TSOs tended to introduce lower values in the network model while actual flows were higher. It can be concluded that TSOs are not fully utilizing full transfer capacities of critical facilities in the network model that is resulting in lower NTCs as it could be. 96% of values show a 10% and greater error value while 48% of CF values have a more than 100% error variance. In a significant number of cases (24 records), actual flows are 10 times higher than the estimated flows. In these extreme cases, the model assumptions will likely lead to overestimating internal congestion and underestimating NTC values. **Error! Reference source not**

found.1 demonstrates the distribution of Critical Facilities Indicator values for the year of 2019. It is obvious that Critical facility indicator remains critical in the region.

PERCENTILE	ERROR VALUE
96%	10%
85%	30%
75%	50%
48%	100%
27%	400%
7%	1000% and more

Table 1: Distribution of Critical Facilities Indicator Values

Recommendation 3: Given these results, it is recommended that the NRAs engage directly with TSOs to better understand the source of these errors and consider potential follow-up activities at the ECRB EWG.

2.6. Generator Forecast Indicator

The Generator Forecast Indicator measures the accuracy of the generation forecast used in the network models. Accuracy of these forecasts helps to ensure accuracy in the network model and, consequently, accuracy of the NTC values. These indicators calculate a percentage of the forecast error between the forecasted load and the actual load. Generation forecast accuracy has increased since the last reporting period but TSOs still tend to forecast peak generation with lower values compared to realized peak output.

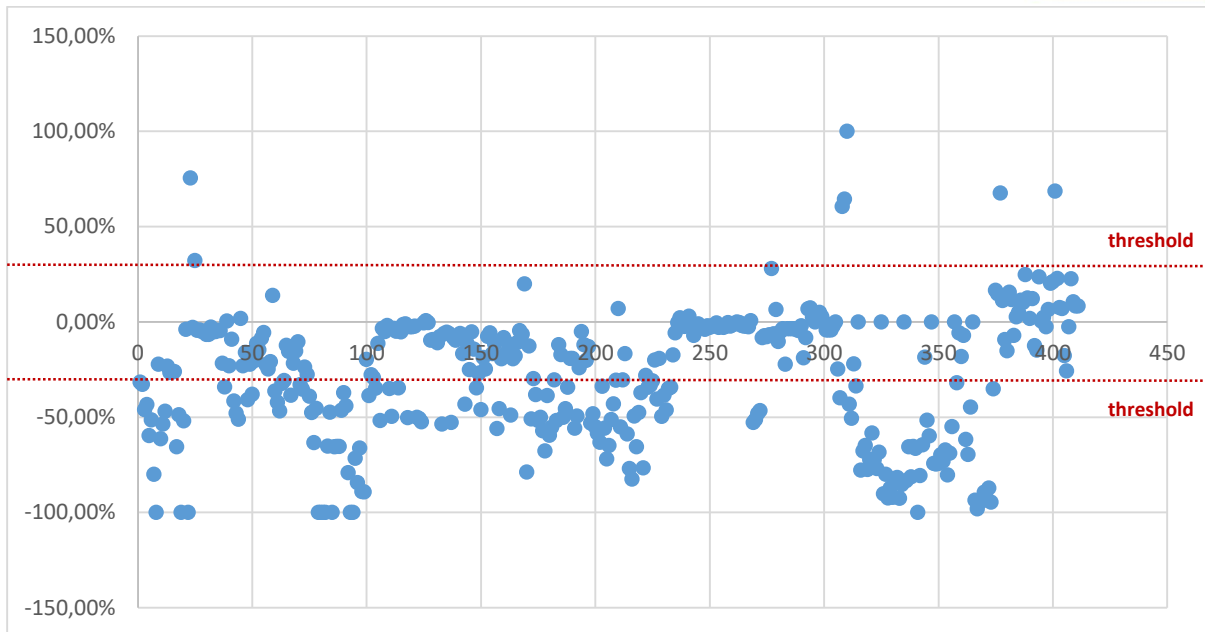


Figure 3. Distribution of generation forecast error

The following explanations have been provided by TSOs:

- EMS AD: the variance has occurred because of deviations from the forecasted generation values projected in PE EPS' scheduling plan/generation plan provided by PE EPS to EMS AD two months ahead the actual month);
- ISO BiH: bigger productions from HPPs may be reasoned in higher than scheduled exports; it is up to producers or owners of HPPs to change production plans. Unplanned outages of some TPPs may also be a reason for higher generation forecast error

Recommendation 4: TSO should ensure that the generation data, which is necessary to create the network model, is checked and validated by TSO before use for the network model and to the extent possibly make corrections to the potential errors, including the data provided by power producers. In case deviation continue several months in a row, TSOs must investigate the reason together with the data owners (generation companies).

Error! Reference source not found. Table 2: Load Forecast Indicator variances

2.7. Assessment of the level of cross-border capacity offered to the market

In 2019 the EU adopted a revision of the legislative framework, among which the rules for allocation of cross-border electricity transmission capacity. Article 16 of Regulation (EU) 2019/943, which currently is not applicable in the Contracting Parties, introduced new requirement, for the TSOs to make at least 70 %

of cross-border transmission capacity on interconnectors available to the market²¹. Regulation (This Regulation also allows for transitory measures, such as derogations pursuant to Article 16(9) or action plans pursuant to Article 15 based on which TSOs will gradually to reach this threshold by the end of 2025, latest. On 8 October 2019, ACER issued a Recommendation to national regulatory authorities in implementing consistent approach when monitoring this requirement²².

The coordinated capacity calculation under the CACM Regulation, implies the use of new taxonomy. In the process of capacity calculation, the TSOs identify the critical network elements on their areas and after the consideration of the flows from other areas, assess the power flow capabilities of the critical network element associated with contingency and calculate margin available for cross-zonal trade on such critical network element.

According to ACER's Recommendation, the capacity calculation within a coordination area needs to take into account the impact that bidding-zone borders outside such a coordination area have on the physical flows on the critical network elements used within such coordination area (Capacity Calculation Region – CCR). As the CCRs currently include only the EU Member States, the consideration of flows from third countries is possible in case an agreement has been concluded by all TSOs of a CCR with the TSO of the third country.

In the absence of coordinated capacity calculation in line with CACM regulation and in order to make a high-level and rough assessment for the Contracting Parties, the ECRB EWG discussed the use available SEEAMMS data and existing taxonomy to assess the state of play in relation to the level of capacity made available to the market. It should be noted that, contrary to EU calculations, which is based on hourly estimation of the 70% criteria, in case Contracting Parties, the estimations are based on average annual values calculated from the monthly data given there is no short term calculation of capacity for the market. Considering the above, the regulators from Contracting Parties for the time being are not able to assess the compliance with 70% criteria as per ACER's recommendation, however a rough estimation is made using total transfer capacity (TTC), which represents the thermal capacity of the interconnection (or group of interconnections) represented as a fixed value not taking into account critical elements in networks, already allocated capacity (AAC) and available transmission capacity (ATC). The sum of ATC and AAC is used as an indicative measure the capacity available for commercial use of market participants. As outlined in the table 3 below, the level of capacity made available compared to the TTC of the interconnection, is very low despite a conservative transmission reliability margin (TRM). It should be noted that the ATC

²¹ Article 16 (8): Transmission system operators shall not limit the volume of interconnection capacity to be made available to market participants as a means of solving congestion inside their own bidding zone or as a means of managing flows resulting from transactions internal to bidding zones. Without prejudice to the application of the derogations under paragraphs 3 and 9 of this Article and to the application of Article 15(2), this paragraph shall be considered to be complied with where the following minimum levels of available capacity for cross-zonal trade are reached:

(a) for borders using a coordinated net transmission capacity approach, the minimum capacity shall be 70 % of the transmission capacity respecting operational security limits after deduction of contingencies, as determined in accordance with the capacity allocation and congestion management guideline adopted on the basis of Article 18(5) of Regulation (EC) No 714/2009;

(b) for borders using a flow-based approach, the minimum capacity shall be a margin set in the capacity calculation process as available for flows induced by cross-zonal exchange. The margin shall be 70 % of the capacity respecting operational security limits of internal and cross-zonal critical network elements, taking into account contingencies, as determined in accordance with the capacity allocation and congestion management guideline adopted on the basis of Article 18(5) of Regulation (EC) No 714/2009.

The total amount of 30 % can be used for the reliability margins, loop flows and internal flows on each critical network element.

²²https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Recommendations/ACER%20Recommendation%2001-2019.pdf

allocated on long-term and short-term timeframe is a result of the long term capacity calculation process, therefore a lot of welfare loss results due to lack of short term and coordinated calculation of capacities. The data collected do not include the outcome of weekly capacity calculation process that is applicable in some borders in the Western Balkans. Next report will include more information on weekly capacity calculation process, and to what extent that process increases the capacity made available for the market.

As the existing calculation process and the taxonomy are not consistent with the processes used in the EU, also the assessment of the available capacity for the market is not consistent with ACER's methodologies. This outlines the need for significant improvements in the capacity calculation processes.

Indicator	EMS	CGES	ISO BH	MEPSO	OST	GSE ²³
(AAC+ATC)/TTC	39%	34%	41%	28%	16%	75%
TRM/(TRM+AAC+ATC)	27%	27%	28%	28%	40%	0%

Table 3 Summary of the estimated the level of cross-border capacity offered to the market

Data used for this assessment are aggregated per bidding zones and border-per-border representation is the objective in the future reports.

Recommendation 5: This assessment shall be performed in the future reports as a provisional indicator, with potential improvements of SEEAMMS software too, until coordinated capacity calculation, including also for short term timeframe, is implemented.

3. Conclusions

Monitoring of TSO activities on cross-border capacity revealed that the cross border capacity calculation methodologies are still not harmonized among TSOs of the region, mostly concerning calculation of the Base case Exchange indicator.

The Transmission Reliability Margin calculation is not done according to the ENTSO-E rules and ECRB Recommendations; instead, the practice of bilateral arrangements between TSOs determining the TRM value in advance as still in place.

The Critical Facilities Indicator has shown a very high degree of forecast errors in the estimates of internal congestion. This is one of the most difficult problems to monitor as regulators and market participants have very little insight into how internal congestion affects cross-border capacity. NRAs should aim to understand this indicator as a potential area affecting cross-border capacity calculations.

The reporting period showed increased variances in generation forecast and that TSOs tend to include pessimistic values (lower than expected and actual) in the model, a fact that deserves increased attention of TSOs and NRAs.

²³ Only January-April data was uploaded by GSE and result corresponds to this period and only to export direction because factually there is no capacity allocation for the import.



As follow up of the outlined recommendations (Recommendation 1 – 4), ECRB recommends that NRAs report to ECRB on steps and measures considered in monitoring and implementing the recommendations from this report. Part of 2021 report shall be dedicated to measures undertaken by the regulators in this respect.

In addition, ECRB recommends that NRAs keep monitoring the capacity calculation process of the TSOs and work ahead towards coordinated capacity calculation, including also short term calculation, as quickly as possible.