

**RECOMMENDATION No 01/2023
OF THE EUROPEAN UNION AGENCY
FOR THE COOPERATION OF ENERGY REGULATORS**

of 13 April 2023

on the Treatment of Losses for the Purpose of the ITC Mechanism

THE EUROPEAN UNION AGENCY FOR THE COOPERATION OF ENERGY REGULATORS,

Having regard to Regulation (EU) 2019/942 of the European Parliament and of the Council of 5 June 2019 establishing a European Union Agency for the Cooperation of Energy Regulators¹, and, in particular, Article 6(2) thereof,

Having regard to the outcome of the consultation with ACER's Electricity Working Group,

Having regard to the favourable opinion of the Board of Regulators of 29 March 2023, delivered pursuant to Article 22(5)(a) of Regulation (EU) 2019/942,

Whereas:

INTRODUCTION

- (1) The Inter-Transmission System Operator Compensation ('ITC') mechanism scheme is defined in Article 49 of Regulation (EU) 2019/943 and by Commission Regulation (EU) No 838/2010 on laying down guidelines relating to the ITC mechanism and a common regulatory approach to transmission charging (the 'ITC Regulation').
- (2) In line with the legal provisions set by these regulations, the ITC mechanism provides for compensation for the costs of hosting cross-border flows of electricity including providing cross-border access to the interconnected system. The compensation is financed through a fund, i.e. the ITC Fund, which is established by the European Network of Transmission System Operators for Electricity ('ENTSO-E').
- (3) According to point 1.2 of Annex Part A of the ITC Regulation, the ITC Fund shall provide compensation for:

¹ OJ L158, 14.6.2019, p. 22.

- the costs of losses incurred on national transmission systems as a result of hosting cross-border flows of electricity ('ITC losses fund'); and
 - the costs of making infrastructure available to host cross-border flows of electricity ('ITC infrastructure fund').
- (4) While the size of the ITC infrastructure fund is set at 100.000.000 EUR by point 5.4 of Annex Part A of the ITC Regulation, the size of the ITC losses fund depends on the estimated volumes of losses due to transits and the declared values of losses, according to point 4 of Annex Part A of the ITC regulation². More specifically, pursuant to point 4 of Annex Part A of the Regulation, the value of losses incurred by a national transmission system as a result of the cross-border flows of electricity has to be calculated on the same basis as the one approved by the regulatory authority in respect of all losses on the national transmission system.
- (5) The implementation of the provisions of the ITC Regulation regarding the ITC mechanism and the management of the ITC Fund is carried out by ENTSO-E through the contractual framework of the ITC Clearing and Settlement Multi-Year Agreement ('ITC Agreement') concluded on 9 February 2011. The ITC Agreement sets out the duties and entitlements of ENTSO-E and TSO or group of TSOs being treated as a single unit in the ITC mechanism ('ITC Parties'). It also sets out detailed ITC procedures, including the submission, audit and validation of data, calculation of compensation and contribution amounts, and the clearing and settlement of the ITC Fund.
- (6) In that context, ACER has the general duty, pursuant to point 1.4 of Annex Part A of the ITC Regulation, to oversee the implementation of the ITC mechanism and report to the Commission each year on the implementation of the ITC mechanism and the management of the ITC fund. With regard to the valuation of losses, ACER has the specific responsibility, pursuant to point 4.4 of Annex Part A of the ITC Regulation, to verify the criteria for the valuation of losses at national level taking particular account that losses are value in a fair and non-discriminatory way.

² In its Recommendation No 05/2013 on a new regulatory framework for the ITC mechanism ACER was of the view that the current infrastructure compensation should be limited to existing infrastructures and the corresponding ITC infrastructure fund should be phased out.

https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Recommendations/ACER%20Recommendation%2005-2013.pdf

1. RELEVANT FINDINGS FROM ACER MONITORING ON THE ITC MECHANISM

- (7) In section 5.2.2.1 of the ACER Report on the implementation of the ITC mechanism in 2021, ACER notes that:
- for the second time in a row, the volume of transmission losses due to transits increased significantly, i.e. by 19.6 % in 2021 and by 29.0 % in 2020,
 - similar sharp changes already occurred several times in the past, however, in absolute terms, the two recent increases stand out significantly,
 - compared to its amount 10 years ago, the volume of transmission losses due to transits increased by almost 150 %.
- (8) The criteria for valuing losses in EU/EEA ITC Party countries and Switzerland were presented in section 2.6. of the ACER Report on the implementation of the ITC mechanism in 2018. ACER noted in this report that:
- when calculating the value of losses for the ITC mechanism, the assessed ITC Parties in general applied the same basis as the one used for valuing the losses at national level. Differences which were reported lie mainly in the use of historical or estimated prices for the purpose of the ITC mechanism in lack of actual values at the time of calculation or in different time-horizons taken into account for the calculation of each value,
 - different basis/criteria were in use across countries for losses' valuation: most of the countries use market-based references (power-exchange prices, pool prices, auctions, tenders), while few applied (fully or partially) bilateral contracts or another basis for assigning a value to losses.
- (9) The values of losses used for the purpose of the ITC mechanism until 2018 were presented and analysed in section 2.7 of the ACER Report on the implementation of the ITC mechanism in 2018³. In this report, ACER noted that:
- the differences of energy prices for different products in different markets and from auctions and bilateral contracts result in a broad range of values of losses for the EU ITC Parties,
 - the values of losses used for the ITC mechanism appeared to correlate with the evolution of the actual values of national losses with a one-year lag, i.e. the values

³ ACER ITC monitoring report 2019, p. 12,
https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/ITC%20Monitoring%20Report%202019.pdf

used for the ITC mechanism tend to increase in the following year if the actual values for losses of the previous year increased, and vice-versa.

- (10) In its latest ITC monitoring report⁴, ACER considers that, in light of recent extreme price volatility and in line with the general tariffication principle of cost reflectivity introduced by Regulation (EU) 943/2019, there may be room for improvements regarding the way how, when and/or how often the values of losses are determined for the purpose of the ITC mechanism.
- (11) In addition to the above, in the last quarter of 2022 and in early 2023, ACER collected from the national regulatory authorities ('NRAs') of the EU/EEA ITC Party countries ('assessed countries') additional information on the valuation of losses for the purpose of the ITC mechanism in their respective countries. The information is provided in Annex 1 to this Recommendation. The requested information was not provided for Ireland, which is why for Ireland information provided for previous ACER activities was reused.

2. USE OF SNAPSHOTS FOR CALCULATING THE VOLUME OF LOSSES FOR THE ITC MECHANISM

- (12) Pursuant to points 4.2. and 4.3 of Part A of Annex to the ITC Regulation, ENTSO-E is responsible for the calculation of the amount of losses incurred on a national transmission system by calculating the difference between the amount of losses actually incurred on the transmission system during the relevant period and between the estimated amount of losses which would have been incurred on the system during the relevant period if no transits of electricity had occurred. This calculation may be derived from estimates for a number of points of time during the relevant period. ENTSO-E has to publish the calculation and its method in an appropriate format.
- (13) As described in more detail in section 1, ACER notes that the volume of transmission losses due to transits calculated by ENTSO-E, has changed significantly from year-to-year in recent years, and compared to its amount 10 years ago, the volume of transmission losses due to transits increased by almost 150 %. As a response to a data request of ACER, ENTSO-E provided some possible reasons for these changes (e.g. impact of renewable energy that can change significantly during the day and between different days, increased transits between bidding zones, new interconnectors and PSTs causing different flows).
- (14) On 13 December 2022, ENTSO-E published its ITC Transit Losses Data report 2021⁵. According to this report, the losses caused by transits in each transmission system are

⁴ ACER ITC monitoring report 2022, https://acer.europa.eu/sites/default/files/documents/Publications/ITC_MR_2022.pdf

⁵ ITC Transit Losses Data report 2021, https://eepublicdownloads.azureedge.net/clean-documents/mc-documents/ITC_Transit_Losses_Data/entso-e_ITC_Transit_Losses_Data_report_2021_211209.pdf

determined as the difference between the losses observed in the load flow situation with transit represented on the interconnected system and with transit represented on the disconnected system. For each ITC Party, six monthly snapshots are used (i.e. for 3rd Wednesdays and preceding Sundays at 3/30, 11.30 and 19.30 CET/CEST) and every hour of the month is attributed to one of the six snapshots, so each snapshot timestamp is given a specific weight. Finally, the overall monthly amount of losses due to transits for each ITC Party is derived by aggregating the weighted transits for the particular hours.

- (15) According to the ITC Agreement, ENTSO-E may decide to increase the number of snapshots collected in order to improve the settlement accuracy.
- (16) ACER notes that the estimated volume of losses due to transits directly impacts the size of the ITC losses fund. ACER therefore emphasizes the importance of using an accurate calculation method.
- (17) While historical reasons and computational constraints could have led to the use of a few snapshots, ACER does not deem the use of six snapshots per month anymore representative or ‘fit-for-purpose’ for the estimation of the overall monthly volume of losses. As indicated by the latest ENTSO-E CBA draft methodology (released for public consultation on 15 December 2022)⁶, today’s state-of-the-art approach regarding the calculation of losses seems an hourly resolution as a default rule⁷.

3. VALUES AND VALUATION OF LOSSES

3.1. Values of losses

- (18) Following the procedure laid down in the ITC Agreement, the ITC Parties shall report to ENTSO-E the value of losses for the purpose of the ITC mechanism on a yearly basis in advance, i.e. during the fall of the previous year for the next year.
- (19) By 15 January of the year for which the value of losses is provided, each ITC Party is asked to confirm the declared value of losses or provide its revised figure to ENTSO-

⁶ Draft ENTSO-E CBA 4.0

https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/CBA/CBA4/221215_CBA4-Guideline_v1.0_for-public-consultation.pdf

⁷ Draft ENTSO-E CBA 4.0, p. 64: ‘A calculation over the complete year, with sufficiently small timesteps (typically one hour), should aim to be the closest to reality. The chosen methodology must be representative for the considered period of time, which must be verified within the study (e.g., in the current TYNDP scenarios, this means one complete calendar year). (As a provisional exception, a computation of losses based on definite points in time can be used to approximate year-round losses. In such case, the chosen points in time should be numerous enough to ensure representativeness and weighted in a correct manner.)’ Link:

https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/CBA/CBA4/221215_CBA4-Guideline_v1.0_for-public-consultation.pdf

- E, along with an explanation on how the value has been determined and with references to the regulatory approval of the value (if any).
- (20) By 5 February of the year for which the value of losses is provided, an ITC Party may request an explanation from another ITC Party about its value of losses and in case of an insufficient explanation, a document certifying that the value of losses is compliant with the definitions in the ITC Agreement and with the methodology used in the calculation shall be provided by 15 February.
- (21) As described in Chapter 1 of this Recommendation, ACER noted that the values of losses used for the ITC mechanism appeared to correlate with the evolution of the actual values of national losses with a one-year lag, i.e. the values used for the ITC mechanism tend to increase in the following year if the actual values for losses of the previous year increased, and vice-versa.
- (22) Table 1 in Annex 1 to this Recommendation shows the values of losses used for the ITC mechanism in 2019, 2020 and 2021 as well as the values of losses used for tariffs and actual values of losses. The values of previous years can be found in Table 7 in the Annex to the ACER Report on the implementation of the ITC mechanism in 2018.
- (23) ACER compared the values of losses used for the purpose of the ITC mechanism in 2021 which was determined ex-ante, i.e. at the end of 2020, the value of losses used for national purposes (e.g. tariffs, determined ex-ante with or without ex-post reconciliation) and the ‘actual’ value of losses corresponding to the actual costs of the procurement of energy to cover losses usually done by the transmission system operator (‘TSO’) (determined ex-post, i.e. early 2022)⁸. ACER notes an increasing gap between the estimated and actual values, which may be explained to a great extent by recent market price volatility⁹.
- (24) Based on the above findings, ACER concludes that the ex-ante calculated values may fail to be a good estimation of the actual values. This effect, combined with the higher variation of prices during the last years, could result in unfair contributions and compensations to the ITC, which do not reflect the costs actually incurred.
- (25) In this respect, ACER underlines that, pursuant to Article 49(3) of Regulation (EU) 2019/943, ex-post adjustments of compensation paid shall be made where necessary, to reflect the costs actually incurred.
- (26) ACER considers that an ex-post reconciliation of the costs of losses due to transits (i.e. revision of the ITC settlements using actual values of losses for the relevant year)

⁸ In some ITC Party countries, one or more of these values are the same.

⁹ In 2019, the difference ranged from -16.9 EUR/MWh to 11.6 EUR/MWh, with an average value around -1 EUR/MWh, indicating a slight overestimation of the value used for the ITC mechanism. Next year, the interval broadened a bit, i.e. from -28.5 EUR/MWh to 6.5 EUR/MWh, with an average value around -10 EUR/MWh, again indicating an average underestimation of the value used for the ITC mechanism. Then a sharp increase occurred in 2021, ranging from -0.7 EUR/MWh to 88.2 EUR/MWh and this time, the ITC-used value was on average underestimated by 36 EUR/MWh.

would significantly improve the ITC mechanism's cost reflectivity, especially during the periods of high market price volatility, when the differences between the ex-ante declared values of losses and their actual values (in the majority of EU countries) are more likely to be high.

3.2. Valuation of losses

- (27) Pursuant to point 4 of Annex Part A of the ITC Regulation, the value of losses used for the ITC mechanism shall be calculated on the same basis as the one approved by the NRA in respect of all losses on the national transmission system.
- (28) ACER's latest review of the criteria for the valuation of losses at national level was carried out in 2019 when the data from the ITC mechanism for 2018 were considered¹⁰. In that report, ACER concluded that, in the vast majority of the EU/EEA ITC Party countries, the NRA is responsible for approving the basis for the calculation of the value of losses (implicitly or explicitly) and the basis/criteria are typically market based.
- (29) NRAs of the following five countries reported a revision or update of the determination of the value of losses in comparison to the process carried out for the ITC mechanism in 2018:
- In Bulgaria, a market-based approach was implemented using forecast and historical power exchange market data. Before, the price had been regulated by the NRA and it had corresponded to the price paid to the public supplier for the electricity to cover losses of TSO and DSOs. The regulated price reflected the costs in relation to the public supplier's portfolio.
 - In Croatia, the method to determine the value of losses for the purpose of the ITC mechanism was updated, because the TSO became able to procure a bigger share of electricity on short-term market (CROPEX). The new Methodology was issued in September 2020 and first used to determine the value of losses for 2021.
 - In Greece, the basis for charging losses and therefore the way the value of losses is calculated, changed on 1 November 2020 given the major Greek wholesale electricity market reform which resulted in three separate markets, namely day-ahead, intraday and balancing. Before that date, there was only a day ahead market which co-optimised energy and reserves and imbalance settlement, while losses were charged to generators. From November 2020 onwards, the TSO is responsible for the procurement of energy to cover losses and it recovers the cost of losses through a special Uplift Account charged to all suppliers pro rata on their consumption in each settlement period.

¹⁰ ACER ITC monitoring report 2019

- In Hungary, the basis of the calculation of the forecast and an ex-post settlement have been changed for the regulatory period 2021-2024.
 - In Spain, legal powers regarding the treatment of losses in the electricity power system have been transferred from the Ministry to the NRA.
- (30) Table 2 in Annex presents country-specific information about the basis for the calculation of losses, strategies of procurement of energy to cover losses and on the same basis being used or not for national purposes and the ITC mechanism. ACER also finds that, in the vast majority of the assessed countries, the basis/criteria applied for the valuation of losses for the ITC mechanism is/are the same as for national purposes. The two exemptions are Ireland and Portugal where no value of losses is applied for national purposes¹¹. In the vast majority of the countries, the costs for transmission grid losses are at least partially recovered via network tariffs. In the remaining countries (GR, IE, IT, PT, ES), such costs are borne by producers ('in kind') or by suppliers.
- (31) ACER notes that, in all countries, strategies of procurement of energy to cover losses and the prices used for the calculation of the value of losses for the ITC mechanism are fully consistent or there are only slight variations, due to an exclusion of a certain approach of procurement of energy to cover losses in the calculation of the value or considering forward market prices as the best estimate for future short-term market prices. ACER notes that strategies of procurement of energy to cover losses are to a great extent in line with the calculation method for the valuation of losses for the purpose of the ITC mechanism, e.g. both calculation of the values and the procurement of losses is based on the power exchange markets.
- (32) ACER notes that, in the vast majority of the assessed countries, the determination of the values of losses is market based. More specifically, in more than one third of the assessed countries (DE, DK, FI, GR, LT, NO, PL, SK, SE), the value of losses for the purpose of the ITC mechanism is calculated using mainly energy prices from the long-term markets; in about 20%, (EE, ES, IT, LV, PT) mainly prices from the short-term markets are used; in two countries (BG, HU), a combination of the long-term and short-term market data is used; in four (AT, BE, HR, CZ), results of tenders are considered in addition to the long-term and short-term market prices; in three countries (FR, NL, SI) it is calculated based on the long-term market data and tenders and in one country (LU), only results of tenders are taken into account (while the values from tenders are based on long-term market prices). In one country (Ireland), the value of losses is calculated based on the average price of Directed Contracts and in one (Romania), a combination of the prices from long-term and short-term market as well as from bilateral contracts is used.

¹¹ At national level, value of losses is typically set for the purpose of network tariffs. Other purposes of the use of the value of losses may be also possible.

- (33) Based on the above findings and differences presented in section 3.1, the assessed countries that use the data from the short-term markets in order to determine the value of losses for the ITC mechanism, are facing the largest differences between the actual values of losses and values of losses used for the ITC mechanism. On the contrary, lower differences occur in countries, where the value of losses for the purpose of ITC is determined based on long-term market data or tenders. Moreover, ACER noted in its policy paper that forward markets forecast day-ahead market prices¹².
- (34) ACER considers that the approach of using historical market prices was not heavily inappropriate as long as the energy prices were relatively stable. However, in recent years featuring high volatility of the energy prices¹³ historical prices failed to realistically forecast market prices for the subsequent year.
- (35) Ex-post reconciliation of the costs of losses due to transits applied in the ITC agreement would overcome the potential distortions coming from less accurate forecasts, while regulatory frameworks should ensure that system operators and system users are granted appropriate incentives, in both the short and the long term, to increase efficiencies¹⁴, including with regard to the procurement of the energy to cover losses. ACER also sees room to improve the estimations, mainly by using appropriate input data for the calculation of the value of losses or by increasing the frequency of providing the value of losses for the purpose of the ITC mechanism.

4. SHARING GOOD PRACTICES

- (36) Pursuant to Article 6(2) of Regulation (EU) 2019/942, ‘ACER may, in accordance with its work programme, at the request of the Commission or on its own initiative, make recommendations to assist regulatory authorities and market participants in sharing good practices’.
- (37) In 2013, ACER issued a recommendation to the European Commission for a reform of the ITC mechanism, including a phase out of the ITC infrastructure fund¹⁵. This recommendation is still valid.
- (38) In the present Recommendation, ACER focuses on addressing the lack of cost reflectivity flagged in its recent monitoring report on the implementation of the ITC mechanism, with measures which may be implemented without amendments of

¹² ACER Policy Paper on the Further Development of the EU Electricity Forward Market (p.3.) indicates that ‘The forward market allows market participants to stabilise and hedge their future cash flows and thereby secure their businesses against the risks of future price changes.’

https://acer.europa.eu/sites/default/files/documents/Position%20Papers/Electricity_Forum_Market_PolicyPaper.pdf

¹³ The prices first decreased due to the demand drop during the pandemic and then increased due to the demand increase and supply disruptions since summer 2021.

¹⁴ Cf. Article 58, point (f), of Directive (EU) 2019/944

¹⁵ ACER Recommendation 05/2013 on a New Regulatory Framework for the ITC

Regulation (EU) 2019/943 and without amendments of Regulation (EU) No 838/2010.

- (39) In its recent monitoring report on the implementation of the ITC mechanism and in the assessment provided in Sections 1–3 above, ACER identified some shortcomings in the implementation of the ITC mechanism regarding the treatment of losses, which merit recommendations on how to improve the ITC mechanism, in particular regarding the use of snapshots for calculating the volume of losses as well as how and when (how often) the values of losses are determined for the purpose of the ITC mechanism.
- (40) To overcome these shortcomings, ACER deems it appropriate and necessary to assist regulatory authorities and market participants in sharing good practices and provide recommendations. These recommendations concern (1) the number of snapshots used for the estimation of the volume of losses due to transits for the purpose of the ITC mechanism, (2) the ex-post reconciliation of the costs of losses due to transits, and (3) the determination of the relevant components of the value of losses for the purpose of the ITC mechanism; they are specified in detail below and are without prejudice to applicable legal requirements. In order not to discriminate regarding the treatment of ITC Parties as set out in Annex Part A of Regulation (EU) No 838/2010, the recommended practices should be applied not only to EU ITC Parties, but to all parties participating in the ITC mechanism,

HAS ADOPTED THIS RECOMMENDATION:

1. As soon as possible, ideally for the implementation of the ITC mechanism in 2023, but not later than for the implementation of the ITC mechanism in 2024, it is recommended that ENTSO-E and TSOs amend the ITC agreement by increasing the number of snapshots used for the estimation of the volume of losses due to transits for the purpose of the ITC mechanism, to an extent which ensures representativeness of the snapshots, aiming - as swiftly as possible – ideally at an hourly resolution.
2. From the implementation of the ITC mechanism in 2023 or, in case such timeline is not feasible for duly justified reasons, from implementation of the ITC mechanism in 2024, it is recommended that ENTSO-E and TSOs amend the ITC agreement by applying an ex-post reconciliation of the costs of losses due to transits, to reflect the costs actually incurred and audited/approved by NRAs, where relevant, in each ITC Party country. The ITC settlement would therefore consist of an initial process, in which the ex-ante set values of losses are provided (e.g. for the purpose of estimating the ITC economic impacts and their implications on national tariffs), and a final settlement (ex-post reconciliation of the values of losses, subject to ENTSO-E internal audits) as described above.
3. At least until an ex-post reconciliation of the costs of losses due to transits (recommended under point 2) is applied in the ITC mechanism, it is recommended that where procurement of energy to cover losses is done from the power exchange markets

and the valuation of losses (including for national purposes) is market based, TSOs determine the relevant components of the value of losses for the purpose of the ITC mechanism by considering liquid forward-market prices instead of historical prices. At the time of calculation, the most recent forward price should be taken into account to the extent feasible. In absence of a liquid forward-market, price evolution in non-liquid markets complemented with prices of long-term transmission rights between the non-liquid market and a liquid market may be considered.

Where a TSO's decision to act in accordance with the recommendation under the first subparagraph is subject to oversight or approval by an NRA, it is recommended that also the concerned NRA follows this recommendation.

This Recommendation is addressed to ENTSO-E, TSOs and NRAs.

Done at Ljubljana, on 13 April 2023.

- SIGNED -

For the Agency
The Director
C. ZINGLERSEN

Annex:

Annex I – Country specific data on the value and valuation of losses

Annex 1: Country specific data on the value and valuation of losses

Table 1: The values of losses used for the ITC mechanism, for national purposes (e.g. tariffs) and the value of losses corresponding to actual costs of procurement of energy to cover losses

ITC Party	Value used for the ITC mechanism [EUR/MWh]			Value used for tariffs (before reconciliation) [EUR/MWh]			Is the value used in tariffs reconciled ex-post based on actual costs?	Actual costs of procurement of energy to cover losses [EUR/MWh]		
	2019	2020	2021	2019	2020	2021		2019	2020	2021
Austria	47.04	57.54	50.74	47.04	57.54	50.74	yes	47.04	57.54	50.74
Belgium	44.44	53.84	55.76	44.44	53.84	55.76	yes ¹⁶	40.75	45.25	76.81
Bulgaria	56.18	56.76	58.4	56.18	56.76	58.4	no	55.61	48.99	105.41
Croatia	56.69	59.02	53.86	56.69	59.02	53.86	yes	62.72	51.63	79.8 ¹⁷
Czech Republic	55.24	55.73	44.3	55.24	55.73	44.3	yes	48.9	47.02	78.44 ¹⁸
Denmark	50.87	46.02	37.48	43.74	41.04	34.94	yes	34	20	79 ¹⁹
Estonia	47.57	45.23	42.12	36.002	36.002	36.002	yes	48.69	35.04	93.21
Finland	34.4	34.62	33.46	no data	no data	no data	no data	45.95	40.205	49.473
France	40.27	45.18	50.01	40.27	42.17	50.01	yes	37.94	45.28	49.81 ²⁰
Germany	36.59	49.32	45.27	36.59	49.32	45.28	yes ²¹	34.28	46.85	44.59
Greece	56.7	66.6	54	no value used			no value used	65.69	48.22	128.22
Hungary	49.05	58.09	48.32 ²²	59.37	57.31	51.24 ²³	yes	45.27	52.73	58.54
Ireland	64.14	59.44	50.61	no value used			no value used	no data	no data	no data
Italy	62.96	54.09	41.07	no value used			no value used	54.12	41.13	129.25
Latvia	47.9	46.06	41.9	44.43	31.28	36.07	yes	47.58	33.1	96.56
Lithuania	47.25	46.38	39.38	47.25	46.38	39.38	yes	48.08	33.43	95.34
Luxembourg	41.45	51.62	39.81	41.45	51.62	39.81	yes	42.73	54.84	43.76
the Netherlands	60.355	49.73	48.74	54.69	56.22	56.62	yes ²⁴	53.87	41.29	86.19
Norway	44.03	39.22	17.43	38.97	36.56	20.66	yes	40.11	10.74	65.94 ²⁵
Poland	56.06	62.85	53.94	56.06	62.85	53.94	no	58.86	55.95	69.74 ²⁶
Portugal	61	57.82	45.03	no value used			no value used	47.87	33.99	122.01

¹⁶ The Belgian NRA explains the tariffs for the ongoing period compensate the values before reconciliation but the tariffs for the next period will compensate for the difference between the actual costs and the value before reconciliation.

¹⁷ Yearly average exchange rates between HRK and EUR: 7.41 in 2019, 7.53 in 2020 and 7.52 in 2021

¹⁸ Yearly average exchange rates between CZK and EUR: 25.67 in 2019, 26.44 in 2020 and 25.65 in 2021 (for 'actual costs of procurement of losses'), 25.10 for 2019, 26.05 for 2020 and 27.00 for 2021 (for 'values used for the ITC mechanism' and 'value used for tariffs')

¹⁹ Yearly average exchange rates between DKK and EUR: 7.45 in 2019, 2020 and 2021

²⁰ The French NRA explains this value is not definite and will be updated in 2023.

²¹ The German NRA explains that the ex-ante estimated losses costs are reimbursed via tariffs. The difference between estimated and actual losses costs including a potential bonus or malus are reimbursed ex-post via a regulatory account.

²² The Hungarian NRA explains the exchange rate on the last day of the year was considered when providing this value.

²³ Yearly average exchange rates between HUF and EUR: 315 in 2019, 335 in 2020 and 375 in 2021

²⁴ The Dutch NRA explains 75% of the difference between the estimated the realized costs (volume*price) is settled ex-post. When the deviation between the estimated costs and realized costs exceeds 20%, all costs above the 20 % threshold are settled.

²⁵ Yearly average exchange rates between NOK and EUR: 9.8527 in 2019, 10.7207 in 2020 and 10.1648 in 2021

²⁶ Yearly average exchange rates between PLN and EUR: 4.2980 in 2019, 4.4448 in 2020 and 4.5674 in 2021

ITC Party	Value used for the ITC mechanism [EUR/MWh]			Value used for tariffs (before reconciliation) [EUR/MWh]			Is the value used in tariffs reconciled ex-post based on actual costs?	Actual costs of procurement of energy to cover losses [EUR/MWh]		
	2019	2020	2021	2019	2020	2021		2019	2020	2021
Romania	43.15	57.18	57.26	43.15	57.18	57.26	yes	53.71	53.14	92.03 ²⁷
Slovakia	45.2687	58.1579	52.286	45.2687	58.1579	52.286	no	information not available to the NRA		
Slovenia	46.08	45.8	45.8	46.08	45.8	45.8	yes	51.52	52.32	70.85
Spain	57.34	55.48	34.06	no value used			no value used	48.24	34.83	112.16
Sweden	28.45	43.73	33.21	38.3	18.3	56	yes	38.3	18.3	56 ²⁸

Table 2: Country-specific information on the procurement of losses, on determination of the value of losses and on the respective basis

	How are losses procured?	What is the basis for the calculation of losses and how is the value of losses determined (for the purpose of the ITC mechanism)?	How is the basis for the valuation of losses defined?	Is the value of losses used for the ITC mechanism calculated on the same basis/criteria as for national purposes?
Austria	The TSO procures the energy on the short-term and long-term market and organizes tenders.	Power exchange market and tenders <u>Calculation method: Long-term market data, short-term market data and tenders</u> The average price of TSO's procurement in year Y becomes the value of losses in year Y+2, which is audited and approved by the NRA. This value is also used for the ITC monitoring in year y+2.	The procurement path is confirmed at the beginning of the period. The final value is confirmed by the NRA via the cost audit process based on the costs occurred by the procurement of energy to cover losses.	yes
Belgium	Balance Responsible Parties compensate transmission losses of voltage level >70 kV 'in kind' and TSO compensates at regional level, i.e. between 30kV and 70 kV) by organising monthly, yearly and quarterly tenders.	Power exchange market and tenders <u>Long-term market data, short-term market data and tenders</u> Valuation of losses is done with the tariffs proposal every four years taking into account historical, present and forward (Cal 1, 2, 3) market values. The value of losses used for the purpose of the ITC mechanism are approved values in the tariff proposal.	Proposed by the TSO in the tariffs proposal and approved by the NRA.	yes
Bulgaria	The TSO procures the energy on the short-term and long-term market.	Power exchange market <u>Long-term market and short-term market data</u> Prices of futures traded at Power Exchange for the next regulatory period are multiplied by an adjustment factor reflecting the deviations between the average day-ahead market price for base load for the preceding calendar year and the TSO's achieved weighted average day-ahead market price for the preceding calendar year.	set by the NRA	yes

²⁷ Yearly average exchange rates between LEI and EUR: 4.7793 in 2019, 4.8694 in 2020 and 4.9481 in 2021

²⁸ Yearly average exchange rates between SEK and EUR: 10.5892 in 2019, 10.4867 in 2020 and 10.1449 in 2021



	How are losses procured?	What is the basis for the calculation of losses and how is the value of losses determined (for the purpose of the ITC mechanism)?	How is the basis for the valuation of losses defined?	Is the value of losses used for the ITC mechanism calculated on the same basis/criteria as for national purposes?
Croatia	The TSO procures the energy on the short-term and long-term market and organizes tenders.	<p>Power exchange market and tenders</p> <p><u>Long-term market data, short-term market data and tenders</u></p> <p>The value is usually determined in September for the next year. Previous tenders for the planned year are considered. For the remaining part, futures contracts on HUDEX are used and projections using day-ahead prices from CROPEX. The ratio of long and short-term procurement is determined by the TSO for the next year. The usual delivery period of the tendered energy is 1 year or several years and less often 1 quarter or 1 month.</p>	The TSO sends annually to the NRA the document including the value and the corresponding calculation method and the NRA approves it.	yes
Czech Republic	The TSO procures the energy on the short-term market and suppliers via tenders.	<p>Power exchange market and tenders</p> <p><u>Long-term market data short-term market data and tenders</u></p> <p>Future contracts (BL CAL, BL Q) and day-ahead market data are used. All the tenders already organised are also considered. Tenders are organised approximately 4 times per year with the delivery period of 3 months or 1 year.</p>	Valuation of losses is done in regard with Methodology set by the NRA.	yes
Denmark	The TSO procures the energy on the short-term market.	<p>Power exchange market</p> <p><u>Long-term market data</u></p> <p>Weighted average value of Nasdaq commodities OMX forward price is used. The price used in year Y is based on the forward price from November of year Y-1. Price of the EPAD contracts and balancing costs is also included.</p>	The TSO determines the value of losses for the purpose of the ITC without NRA approval, however the NRA assesses whether the method defined by the TSO meets certain high-level principles, such as being objective, reasonable, non-discriminatory and transparent.	yes ²⁹
Estonia	The TSO procures the energy on the short-term market.	<p>Power exchange market</p> <p><u>Short-term market data</u></p> <p>Day-ahead prices of Nord Pool market are used. 1/2/3/6/12 months average price of the Estonian price area is used.</p>	The value of losses for the purpose of the ITC mechanism in 2021 is determined by the TSO without NRA approvals.	yes

²⁹ The Danish NRA explains the only difference is that for internal losses, the TSO uses a price based on actual short-term market price per bidding zone with an additional supplement to cover risks.

	How are losses procured?	What is the basis for the calculation of losses and how is the value of losses determined (for the purpose of the ITC mechanism)?	How is the basis for the valuation of losses defined?	Is the value of losses used for the ITC mechanism calculated on the same basis/criteria as for national purposes?
Finland	The TSO procures the energy on the short-term market.	<p>Power exchange market</p> <p><u>Long-term market data</u></p> <p>The estimated total cost of losses is calculated by grid losses x (system price+SYS-FI area price difference)+half of the estimated losses on the FI-SE interconnectors x (system price + SYS-SE area price difference) + hedged volume x (hedged price - system price), where system price, SYS-FI&SYS-SE area price differences are based on Nasdaq's forward prices at the time of budgeting; SYS-SE price difference = average of SYS-SE1 and SYS-SE3 prices; hedged price does not include SYS-FI area price difference; resolution is one month and yearly cost is sum of monthly costs.</p>	set by the TSO, whereas the NRA is only able to supervise calculation methods and costs of losses ex-post	yes
France	The TSO procures the energy on the short-term and long-term market and it organizes tenders.	<p>Power exchange market</p> <p><u>Long-term market data and tenders</u></p> <p>Future prices from market exchange are used to adjust the historical data about cost of energy and capacity for losses compensation. For the value in 2021, the prices published in October 2020 were used. The historical data used is based on the actual costs of purchases made by the TSO and on costs from the previous years. The value of losses for the purpose of the ITC mechanism in 2021 is the cost of losses in 2021 as defined by the tarif d'utilisation des réseaux publics de transport d'électricité (TURPE HTB) deliberation (published January 21st, 2021).</p>	The basis is set by the NRA in the tarif d'utilisation des réseaux publics de transport d'électricité.	yes
Germany	The TSO procures the energy on the short-term and long-term market and organizes tenders.	<p>Power exchange market</p> <p><u>Long-term market data</u></p> <p>The value of losses is calculated as the weighted average of the base and peak future prices. The future prices are the mean of the settlement prices over a fixed period (1 July of Y-3 to 30 June of Y-1) and the weighting of the Base and Peak Future prices is based on historical data.</p>	The methodology for valuing losses is laid down in the respective TSOs' voluntary self-commitments on grid losses which is approved by the NRA ³⁰ .	yes
Greece	The TSO procures the energy on the short-term market.	<p>Power exchange market</p> <p><u>Long-term market data</u></p> <p>The annual baseload forward product price (as observed in relevant markets at the time of the submission of the value) is used as a best estimate for the market prices and the cost of losses in the next year.</p>	The NRA approves the basis for the calculation of the value of losses for the purpose of the ITC mechanism which is the weighted average day-ahead market price and imbalance settlement.	yes

³⁰ The German NRA provides the link to the respective publications:

https://www.bundesnetzagentur.de/DE/Beschlusskammern/BK08/BK8_05_EOG/52_Kostenpruefung/522_Verlustenergie/BK8-18-0009-A/BK8-18-0009-A.html

	How are losses procured?	What is the basis for the calculation of losses and how is the value of losses determined (for the purpose of the ITC mechanism)?	How is the basis for the valuation of losses defined?	Is the value of losses used for the ITC mechanism calculated on the same basis/criteria as for national purposes?
Hungary	The TSO procures the energy on the short-term and long-term market and organizes tenders.	Power exchange market <u>Long-term market data and short-term market data</u> For year Y, the average of HUDEX Future Baseload prices of the first 9 months of year Y-1 and HUPX DAM prices continuously are taken into account. The prices of tenders substitute the prices on HUDEX, if they are lower, however, there has been no successful tender in years.	The method of determination of the value of losses as well as the criteria used for the valuation of losses is set in the tariff methodology issued by the NRA. ³¹	yes
Ireland	The Transmission Loss Adjustment Factors (TLAFs) are applied to generators to ensure that the costs of transmission losses are borne by market participants who cause them. TLAFs are applied to generators' outputs so that their contribution to the market is adjusted. The value of TLAFs depends on the generator point of connection to the grid. ³²	Direct contracts Losses' values are calculated based on the average Directed Contracts (DC) price for the same period. DC contracts are set by the NRAs quarterly for both Ireland and Northern Ireland. The DC prices are calculated using a formula which takes as inputs the prices of gas, coal and CO2.	The basis is set by the NRA for the ITC mechanism purposes only.	not applicable (no value is calculated for national purposes)
Italy	Suppliers procure the energy by buying additional energy for their consumers from the short-term market.	Power exchange market <u>Short-term market data</u> The volume-weighted average clearing price which resulted from the Italian Power exchange (day-ahead market) was used. For ITC mechanism in 2021, market data until October 2020 were used.	The basis is set by the TSO using the basis defined by the NRA for the procurement of losses ³³ .	yes
Latvia	The TSO procures the energy on the short-term market.	Power exchange market <u>Short-term market data</u> Day-ahead market price forecast provided by an external party (SKM Market predictor) for the Latvian area was used.	The basis is set when the NRA approves network tariffs.	yes

³¹ The Hungarian NRA provides the link to the respective publication:

http://www.mekh.hu/download/f/a5/11000/MU_2_masodik_modositott_honlapra.pdf

³² Cf. ACER transmission tariff report (2019).

³³ The Italian NRA explains that the regulation sets out that the values of national losses depend on market outcomes, because losses are procured directly in the market. The TSO takes into account that the losses are paid directly in the market as extra-energy to be bought by supplier and eventually implicitly charged to consumers at the market price.



	How are losses procured?	What is the basis for the calculation of losses and how is the value of losses determined (for the purpose of the ITC mechanism)?	How is the basis for the valuation of losses defined?	Is the value of losses used for the ITC mechanism calculated on the same basis/criteria as for national purposes?
Lithuania	The TSO procures the energy on the short-term market.	Power exchange market <u>Long-term market data</u> Electricity future prices on Nasdaq exchange are used.	The NRA approves the cost of losses on the national system. The same value is used for the ITC mechanism, although the TSO is not obliged by the NRA to use the same value.	yes
Luxembourg	The TSO organizes tenders. Differences between real and ex-ante estimated volumes are sold or bought from the spot market.	Tenders 3 tenders are organised each year by the TSO to cover the losses of the coming year and the winning prices are used. Quantities are estimated based on past experience.	The legal framework in Luxembourg obliges the TSO to organise the procurement of losses through transparent and non-discriminatory market-based procedures.	yes
the Netherlands	The TSO procures the energy through tenders. The settlement is based on a fixed price agreed through the tender (half of the estimated tender) and the day-ahead price (the other half of the estimated volume). The TSO performs this settlement with the supplying party from the tender and is therefore not active on the day-ahead market itself.	Power exchange market and tenders <u>Long-term market data and Tenders</u> The value of losses is determined based on the procurement costs in the reference year. The TSO procures 50% of the estimated via tenders and the remaining part at EPEX Spot DA price, but as the actual future price should reflect the average spot price, the calculation of the value is only based on the result of the hedging at ICE Endex Baseload Cal-21 futures. The result of the tender which is performed once a year for the next year is a mark-up for the hedged capacity and EPEX Spot DA price, both to be paid to the BRP/supplier of grid losses compensation. For 2021, this mark-up represented about 1.5% of the estimated price.	The method for the valuation of losses is set by the TSO without NRA approval.	yes
Norway	The TSO procures the energy on the short-term market.	Power exchange market <u>Long-term market data</u> Nasdaq quarterly forward price is used with some adjustments. It is gathered around 1 November each year, depending on the deadline set by the ENTSO-E. A volume-weighted average day-ahead price for previous years is calculated and compared to the NO1 area price. The calculated difference for the last 4 years is added to the forward price as a risk premium which can also be negative. In addition, 11 Nok is added to the price in order to cover risk and expenses related to losses.	The NRA sets a method for calculating losses for network tariff purposes. The TSO applies the same method for the ITC mechanism. ³⁴	yes

³⁴ The Norwegian NRA explains that due to the reconciliation of the estimation of losses in the revenue cap with actual spot prices at the end of the year, there may be a considerable difference in the respective values depending on the situation in the power markets.

	How are losses procured?	What is the basis for the calculation of losses and how is the value of losses determined (for the purpose of the ITC mechanism)?	How is the basis for the valuation of losses defined?	Is the value of losses used for the ITC mechanism calculated on the same basis/criteria as for national purposes?
Poland	The TSO procures the energy on the short-term and long-term market and it can also organize tenders.	<p>Power exchange market <u>Long-term market data</u></p> <p>The value of losses for 2021 was calculated on the basis of future contracts for year 2021 traded from January 2018 to October 2020 (BASE_Y and PEAK_Y) at the Polish Power Exchange. The value of losses is determined as a volume-weighted average of traded volumes since beginning of contract trading for the given year, applying BASE/PEAK share weight of 89% and 11%.</p>	<p>The basis of calculation of the value of losses is approved during the process of approving the network tariffs.</p> <p>There is no separate approval of the value of losses used for the ITC mechanism, but the unit price of losses included in the calculation of national tariff is used for the ITC purpose of the ITC mechanism.</p>	yes
Portugal	Suppliers procure the energy by buying additional energy for their consumers from the short-term market.	<p>Power exchange market <u>Short-term market data</u></p> <p>Values of losses are calculated based on the weighted-average hourly price for day-ahead energy market MIBEL for the whole year for the Portuguese area.</p>	<p>Rules and principles for the procurement of energy and for losses compensation are set by the 'Access to Networks and Interconnections Code' approved by the NRA.</p>	not applicable (no value of losses is used for national purposes)
Romania	The TSO and DSOs procure the energy directly from producers, from the power exchange (long-term and short term market) or through suppliers.	<p>Power exchange market and Bilateral contracts <u>Long-term, short-term market data and bilateral contracts</u></p> <p>The price is estimated in the reference year of the regulatory period and is established based on historical data available at that time. The calculation is based on the average price achieved by the DSOs and the TSO. The recognized purchase price of electricity to cover losses is the minimum between the price realized by the TSO and a reference price (which is calculated as an average between the prices achieved by DSOs and TSO, limiting the imbalances to 5% and eliminating extreme values).</p> <p>The estimated price is corrected annually, so that the costs of losses covered by tariffs are the costs effectively realized by the TSO (in efficient conditions). The value of losses used for the ITC mechanism in 2021 is the approved price available on the date of is communication to the TSO (November 2020) and estimated in the reference year of the regulatory period (2019). Every November, NRA provides to the TSO the value of losses used in the tariff calculation for the next year for the purpose of the ITC mechanism.</p>	<p>The basis is set by the NRA in Methodology for setting transmission tariffs.</p>	yes



	How are losses procured?	What is the basis for the calculation of losses and how is the value of losses determined (for the purpose of the ITC mechanism)?	How is the basis for the valuation of losses defined?	Is the value of losses used for the ITC mechanism calculated on the same basis/criteria as for national purposes?
Slovakia	The TSO procures via long-term markets and additionally (if needed) on short-term market.	<p><u>Power exchange market</u></p> <p><u>Long-term market data</u></p> <p>Daily average price of futures contracts traded at Slovakian Power Futures Cal-t (from 1 April of Y-1 to 30 June of Y-1) are used for year Y.</p> $PLE(y) = CEPXE(y) \times (1 + 0.01 k(y)) + Q(y),$ <p>where:</p> <ul style="list-style-type: none"> - <i>PLE</i>... price of electricity covering electricity losses during transmission in year y, - <i>CEPXE</i>(y)... average value of the daily prices of the official forward exchange rate list published by the PXE exchange (product Futures PXE SK BL Cal-t) for year y, - <i>k</i>(y)... coefficient for year y determined by the price decision, ranging up to 10 %, - <i>Q</i>(y)... the planned costs of the regulated entity for year y to cover deviation related to planned losses in year y; 	Methodology to determine the value of losses is defined in the Slovak NRA decree No. 18/2017.	yes
Slovenia	The TSO procures the energy on the short-term and long-term market and organizes tenders.	<p><u>Power exchange market and tenders</u></p> <p><u>Long-term market data and tenders</u></p> <p>The final price for losses is a combination of the volumes already purchased in advance on a long-term basis through tenders (only for 'base load' product) and of mix of 'base load' (70%) and 'peak load' (30%) futures products on Hungarian Power Exchange. For 2021, tenders were conducted in 2018, 2019 and 2021 with a yearly delivery period.</p>	Methodology set by the NRA is determined in Legal Act on the methodology for determining the regulatory framework and network charges for the electricity distribution system ³⁵ .	yes

³⁵ The Slovenian NRA provides the link to the respective publication:
http://www.pisrs.si/Pis.web/pregledPredpisa?id=AKT_1050

	How are losses procured?	What is the basis for the calculation of losses and how is the value of losses determined (for the purpose of the ITC mechanism)?	How is the basis for the valuation of losses defined?	Is the value of losses used for the ITC mechanism calculated on the same basis/criteria as for national purposes?
Spain	Suppliers procure the energy by buying additional energy for their consumers from the short-term market.	<p>Power exchange market <u>Short-term market data</u></p> <p>Hourly Power Exchange market prices are directly applied to national demand to obtain weighted estimation of the value. The computation for year Y is based on data from the rolling year at the time it must be reported (September to October of Y-1).</p> <p>The ITC value calculated by the TSO is typically based on the final electricity prices for the last 12 available months.</p>	The calculation of the final electricity price for the demand (same value as losses) is designed and approved by the NRA after each month. The NRA also approved that any supplier or consumer must buy losses as any other part of their energy consumption. ³⁶	yes ³⁷
Sweden	The TSO procures the energy on the short-term market.	<p>Power exchange market <u>Long-term market data</u></p> <p>The value is based on the average price of purchased futures during the year prior the year of delivery. There is a mark-up on the ITC price based on volume and profile risk, price area risk, imbalance risk, cost for financial hedging and cost for physical trading. All risks are calculated based on outcome from the last three years.</p>	The method for the valuation of losses is set by the TSO without NRA approval ³⁸ .	yes ³⁹

³⁶ The Spanish NRA provides the links to the relevant publications:

https://www.ree.es/sites/default/files/01_ACTIVIDADES/Documentos/ProcedimientosOperacion/BOE-A-2022-4969.pdf

https://www.cnmc.es/sites/default/files/2022-05/ComposicionPrecios_desde_abril2022_web.pdf

https://www.cnmc.es/sites/default/files/2023-02/Provisionales_2022.zip

³⁷ The Spanish NRA explains losses' price estimation is also used in incentives schemes for minimising losses for distribution.

³⁸ The Swedish NRA explains the NRA approved the total income, but not specifically the value of losses and that there are regulations and incentives in place to streamline the costs of losses.

³⁹ The Swedish NRA explains the only difference is that for internal losses, the TSO uses a price based on actual short-term market price per bidding zone with an additional supplement to cover risks.