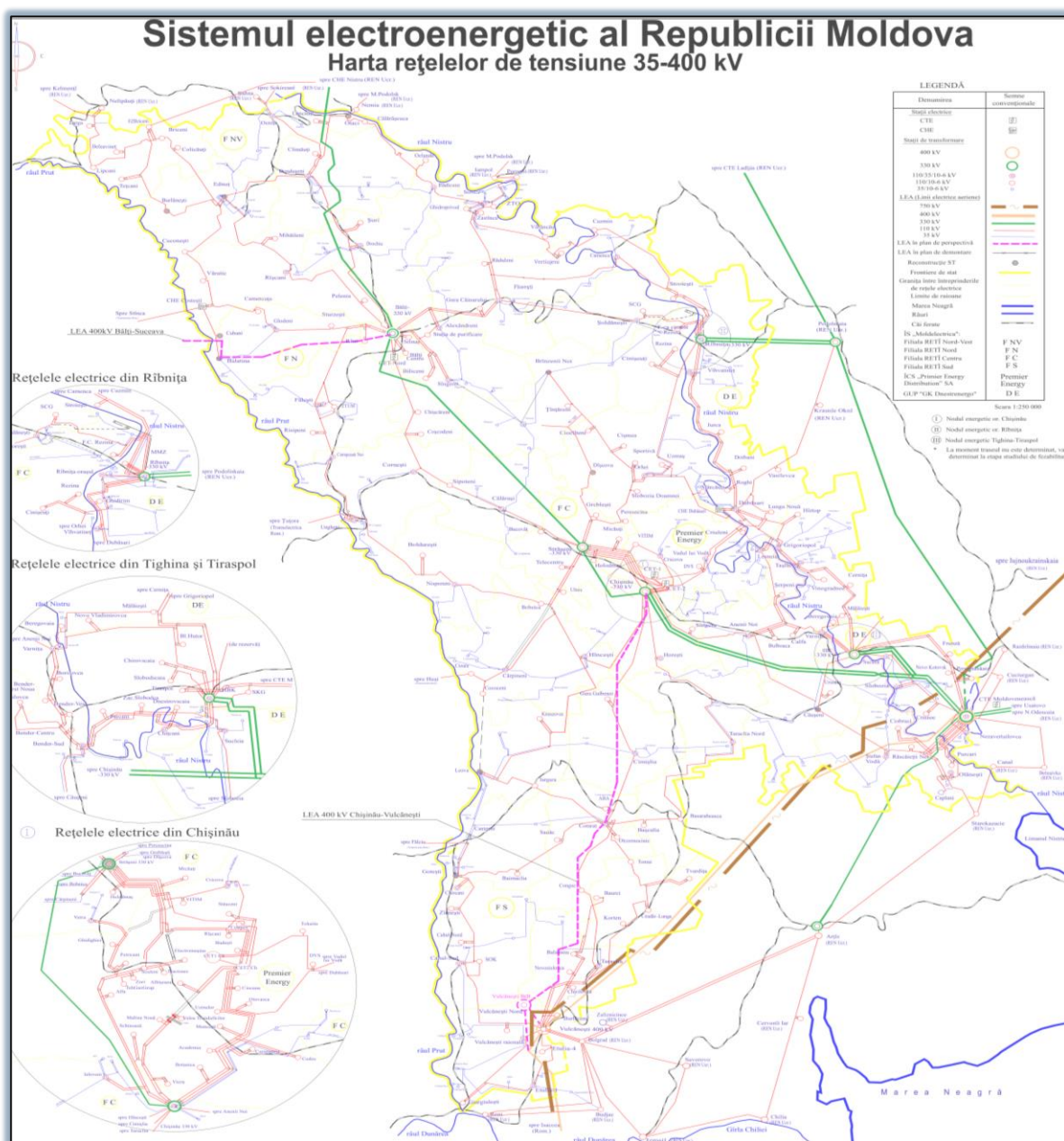


Government of the Republic of Moldova
Ministry of Energy of the Republic of Moldova

ACTION PLAN
FOR EMERGENCY SITUATIONS
IN THE ELECTRICITY SECTOR



MINISTRY OF ENERGY



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Action plan for emergency situations in the electricity sector

I. GENERAL PROVISIONS

1. The Action Plan for emergency situations in the electricity sector (hereafter - the Plan) aims to establish preventive measures with a view to ensure the security of electricity supply by creating the necessary conditions for the reliable and continuous operation of the electricity system under optimal and market conditions of electricity; to establish emergency measures to be implemented in the event that the necessary quantities of electricity are not available on the electricity market to cover the needs of final consumers, as well as to establish clear and unequivocal responsibilities and coordination of the activities of the electricity undertakings both in terms of preventive actions and in the event of crisis situations in the electricity sector.

2. In general terms, the complex crisis management cycle in the electricity sector entails the implementation, at different stages of the electricity crisis, of the specific regulations for that stage. Therefore, the applicable procedures for the protection and restoration of the electricity system in emergency situations are regulated by the Electricity Grid Code concerning the state of emergency and restoration of the electricity system, which also establishes the possible states of the electricity system (state of collapse, state of emergency, state of restoration). Subsequently, this network code provides for the development of the Plan for the defence of the electricity system and the Plan for the restoration of the electricity system.

3. Overcoming a crisis involves analysing the actions taken and setting objectives to avoid the recurrence of similar situations, and in this regard the Regulation on emergency situations in the electricity sector establishes procedures for monitoring and evaluation of the actions taken.

4. This Plan represents the first stage of the crisis management cycle in the electricity sector and is the document that establishes the necessary procedures and measures for planning, organisation, coordination and implementation in order to prevent and reduce the risks of electricity crises, to prepare the response mode and to limit the effects of the crises, as well as the intervention and restoration measures.

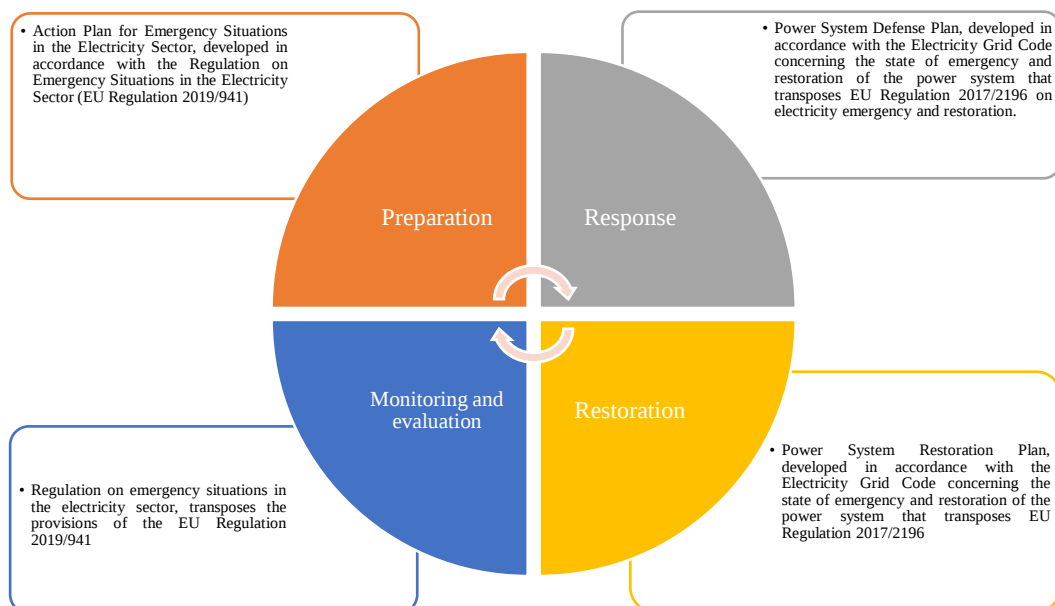


Figure 1. Regulations related to the crisis management cycle in the electricity sector

5. The risks associated with the security of electricity supply and the major problems of the national electricity sector have been assessed in the preparation of the Plan. The purpose of this Plan is:

- 1) Analysis of the existing situation in the electricity sector, as well as of the major problems of the electricity system in the Republic of Moldova;
- 2) Identification and assessment of risks associated with the security of electricity supply (hereinafter – risks);
- 3) Establishing preventive measures necessary for eliminating or reducing risks, including in relation to the secure operation of electricity transmission and distribution networks;
- 4) Establishing other preventive measures, such as the need to develop the existing and future interconnections, the physical capacities of electricity transmission in both directions (import/export), necessary for the diversification of routes and sources of electricity supply, including in relation to the interconnection with the European Network of Transmission System Operators for Electricity (hereinafter - ENTSO-E) through the existing interconnection with the Romanian electricity system, in order to manage the identified risks;
- 5) Establishing the necessary measures to be taken depending on the crisis scenario that has arisen, including those relating to the exchange of information;
- 6) Establishing the market-based measures to be taken in the event of a crisis situation, as well as non-market-based measures to be taken in the event of an emergency situation in the electricity sector, where market-based measures are no longer sufficient in order to ensure the supply of electricity to customers;
- 7) Establishing the tasks and responsibilities of the transmission system operator, distribution system operators, producers, suppliers and final consumers of electricity, including in relation to reporting in the event of an emergency situation in the electricity sector, as well as the manner of their interaction with the central specialised body of the public administration in the field of energy, with the Commission for Emergency Situations of the Republic of Moldova, as well as with other bodies and authorities of the central public administration, with other public authorities involved in the implementation of the Plan;
- 8) Establishing the duties and responsibilities of the CES, the central specialised body of the public administration in the field of energy, other bodies and authorities of the central public administration, other public authorities involved in the implementation of the Plan, including in relation to reporting in the event of the outbreak of an emergency situation;
- 9) Establishing the mechanisms to be applied in the framework of cooperation with neighbouring countries, including for the prevention of crisis situations and/or for recovery in the event of an electricity crisis situation.

6. In drafting this Plan, account was taken primarily of the measures based on market mechanisms and the possible effects of the measures to be taken in the event of an electricity crisis on the functioning of the electricity market, on final electricity consumers, as well as on the national economy as a whole.

7. The Plan shall be updated by the Ministry of Energy every four years, unless circumstances warrant a more frequent update, so as to reflect the updated version of the assessment of possible risks in the electricity sector.

8. Considering the fact that the Republic of Moldova is a contracting party of the Energy Community, along with other European states: Albania, Bosnia and Herzegovina, Georgia, the Republic of North Macedonia, Kosovo*, Montenegro, Serbia, and Ukraine, the Plan is elaborated according to the minimum content set out in the Annex to the Regulation on emergency situations in the electricity sector transposing EU Regulation 2019/941, adapted and approved by Ministerial Council Decisions 2021/13/MC-EnC and 2022/03/MC-EnC. Within the Energy Community, the Security of Supply Coordination Group of the Energy Community is hereby established in accordance with the Procedural Act 2008/02/MC-EnC of 11 December 2008, as amended by Procedural Act 2021/03/MC-EnC of 30 November 2021.

9. The Action Plan for emergency situations in the electricity sector shall be drawn up taking into account the crisis scenarios in the region in which the relevant country is located. System

Operating Regions (SORs) include Transmission System Operators (TSOs) that have been designated or assigned with responsibilities that are relevant to the operation of the electricity system, such as, but not limited to: capacity calculation, assessment of remedial actions necessary to ensure the security of the entire electricity system, coordination of all outages to ensure security and efficiency, adequacy assessment, and tasks related to ensuring the balancing of the electricity system.

10. TSOs within the SOR of the Energy Community shall cooperate with TSOs in the region and consult in particular with those TSOs where the regions of operation of the electricity system overlap with the capacity calculation regions.

11. The Republic of Moldova and Ukraine are part of the Eastern Europe System Operation Region (EE SOR). With the agreement of the Parties of the respective Regional Coordination Centers, the Regional Coordination Centers for the Eastern European System Operation Region (EE SOR) will be the Regional Coordination Center for the Central European SOR. Romania, bordering the Republic of Moldova, is part of the ROS Central Europe (SOR CE), which is called TSCNET Services (Munich, Germany).¹² In other words, the Republic of Moldova is part of the same Regional Coordination Center as Romania.

12. The TSO of the Republic of Moldova is part of two electricity-tendering areas, one with Ukraine under the SOR EE, and another with Romania, which is part of the SOR CE. According to the Decision of the Agency for the Cooperation of Energy Regulators (ACER) No 10/2020, all TSOs of the ROS, i.e. TSOs neighbouring a third country, shall endeavour to conclude agreements with TSOs of third countries that establish the basis for their cooperation in relation to the secure operation of the electricity system and the establishment of compliance arrangements by TSOs of third countries.

¹ https://www.acer.europa.eu/sites/default/files/documents/Individual%20Decisions_annex/ACER%20Decision%2005-2022%20-%20Annex%20I%20-%20Definition%20of%20SORs_0.pdf

² <https://www.tscnet.eu/>

II. THE EXISTING SITUATION AND CHARACTERISTICS OF THE ELECTRICITY SECTOR

2.1. GENERAL INFORMATION

13. In order to identify possible risks in the electricity sector, it is necessary to analyse the current situation in the electricity sector and the prospects for the development of the electricity sector.

The total electricity consumption in the Republic of Moldova in 2023 was about 4,333 million kWh.³ The peak load of the electricity system exceeds 1,000 MW in the winter and the maximum electrical load in the summer can exceed 1,000 MW, as recorded in the summer of 2024. The peak load recorded in 2023 on the right bank of the Dniester River was 760 MW in winter and 700 MW in summer. The electrical load during peak load for the Transnistrian region in winter was 250 MW and in summer 260 MW. The consumption of electricity by final consumers on the right bank in 2023 amounted to about 3,889 million kWh, and in 2022 it accounted for 4,051 million kWh.

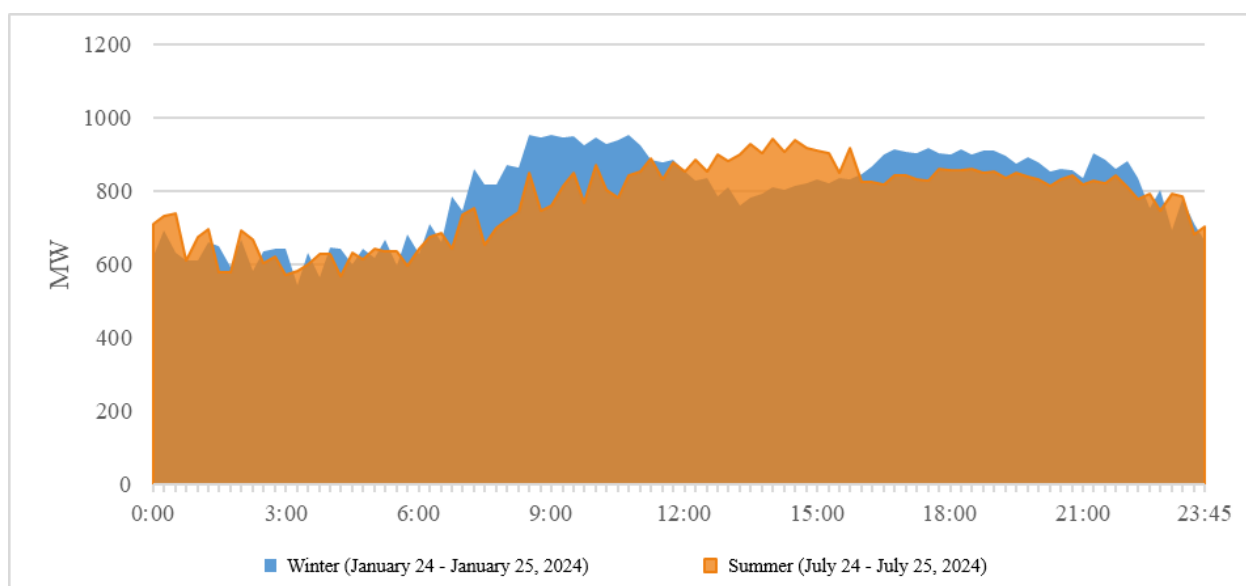


Figure. 2 Gross electricity consumption load curve for the days in winter/summer season

The internal sources of electricity production are represented by the urban district heating power plants of Termoelectrica JSC and CET Nord JSC, which supplied 59.7% (603.4 million kWh) of the total amount of domestically produced electricity, wind power plants, which supplied 18.9% (191.3 million kWh), photovoltaic power plants, which supplied 13.1% (132.3 million kWh), biogas power plants, which supplied 1.4% (13.8 million kWh), and sugar factory district heating power plants, which supplied 0.1% of the amount of locally produced electricity. Costesti hydroelectric power plant with a share of 6.8% of domestic production, cumulatively with the other renewable energy sources, provided about 10.4% of the final electricity consumption during 2023.

The amount of imported electricity decreased by 497.8 million kWh and was replaced by electricity generated by local producers, including electricity delivered to the electricity grids by power plants of final consumers. The amount of electricity purchased from the thermoelectric power plant of the Republic of Moldova in 2023 amounted to about 3,278.5 million kWh, or 572.2 million kWh more than in 2022.⁴

At the same time, it should be noted that the Government Decision No 125/2024 designated Operatorul Pietei de Energie M Limited Liability Company as the operator of the electricity market, responsible for the creation and operation of the organised electricity markets.

³ Only the right bank of the Dniester river, reports of the National Agency for Energy Regulation (ANRE).

⁴ [Report on National Agency for Energy Regulation \(ANRE\) activity](#)

Table 1. Quantities of electricity produced, imported and delivered to final consumers in 2023,
million kWh

No	Indicator	Quantity
1	Electricity purchased, total, including:	4333.1
2	Termoelectrica JSC	524.6
3	CET Nord JSC	78.9
4	SE NHE Costesti	68.8
5	Renewable producers	337.4
6	Other local producers	1.4
7	MGRES	3,278.5
8	Import from Ukraine	10.1
9	Import from Romania	240.4
10	Electricity transmission network losses	196.6
11	Electricity distribution network losses FOE Premier Energy Distribution JSC	223.9
12	Electricity distribution network losses RED Nord JSC	69.1
13	Delivered to end consumers, total, including:	3,889.0
14	FOE Premier Energy JSC	2,870.8
15	. FEE Nord JSC	1,006.2
16	Other suppliers	12.0
17	Electricity consumption by final consumers:	3,889.0
	➤ Household consumers	1,613.7
	➤ Non-household consumers	2,275.2

2.2.DESCRPTION OF THE ELECTRICITY SYSTEM OF THE REPUBLIC OF MOLDOVA

14. Electricity accounts for about 14% of final energy consumption by type of product, representing the fourth largest energy source after oil products, biofuels and natural gas.⁵ Electricity plays a fundamental role in the modern functioning of the national economy, affecting almost every aspect of human life and activity. The reliability, affordability and sustainability of electricity sources thus become key priorities for the economy.

The electricity system in the Republic of Moldova is divided between the right and left banks of the Dniester River, which is not fully controlled by the constitutional authorities of the country and where the largest thermoelectric power plant Moldavskaya GRES (MGRES) is located, which supplies about 80% of the electricity used on the right bank of the Dniester River, while also providing the left bank with electricity. At the same time, there are interactions between State Enterprise Moldelectrica (SE Moldelectrica) and enterprises in the Transnistrian region of the Republic of Moldova, which are essential for the management of the electricity system. This cooperation involves coordination between dispatchers, the exchange of operational information in real time, as well as cooperation in emergency situations or for the maintenance and modernisation of infrastructure. These activities are important to ensure the continuity of the electricity supply and to prevent possible disruptions in the electricity system.

Electricity generation is also carried out from domestic sources, which are composed of Combined Heat and Power plants (CHP) and power plants that use renewable energy sources (wind, solar, hydropower and others).

In addition to electricity generation, the following activities are carried out and regulated in the electricity sector:

- Operation of the electricity market;
- Electricity transmission;
- Centralised management of the electricity system;
- Electricity distribution;
- Electricity supply.

Activities to be carried out and regulated following the transposition of The Electricity Integration Package, by amending the Law on Electricity:

- Energy storage;
- Aggregation.

⁵ [Energy balance 2023](#)

2.3.ELECTRICITY GENERATION

15. Currently, the power plants located on the right bank of the Dniester River are able to cover the maximum consumption load of the Republic of Moldova at an annual average level of about 20%.

In 2022, the internal sources of electricity production are represented by the urban district heating power plants of Termoelectrica JSC and CET Nord JSC, which supplied about 71.8% (or about 611.6 million kWh) of the total amount of electricity generated by domestic producers, wind power plants, which supplied 16.8% (143 million kWh), photovoltaic power plants, which supplied 3.6% (30.3 million kWh), biogas power plants, which supplied 2.8% (23.6 million kWh), and sugar factory district heating power plants, which supplied 0.2% of the amount of locally produced electricity.

SE Nodul Hidroenergetic Costesti with a share of 6.8% of the amount of electricity produced internally, cumulatively with the other producers that generate electricity from renewable sources provides about 10.4% of the final electricity consumption.⁶

As of 24 April 2024, the total installed capacity of electricity generation in the Republic of Moldova (excluding the Transnistrian region) amounted to about 727 MW, of which:

1) 324 MW - installed electrical capacity of the district heating power plants of Termoelectrica JSC in the municipality of Chisinau, including:

- CHP - Source 1, built in 1976-1980, with an installed electrical capacity of 258 MW, using natural gas and fuel oil;⁷
- CHP - Source 2, built between 1951-1961, with an installed electrical capacity of 66 MW, using natural gas;

2) 37 MW - installed capacity of CET Nord in municipality of⁸ Balti, built in 1956-1970, using natural gas and fuel oil;

3) 16 MW - installed capacity of the Costesti-Stanca hydroelectric power plant (Costesti-Stanca HPP), built in 1978;

350.31 MW - the installed capacity of power plants using renewable energy sources, excluding power plants of electricity prosumers, built in the period from 2010 to 2024, of which:

- (a) Biogas power plants with a total capacity of 6.86 MW;
- (b) Wind power plants, with a total capacity of 122.50 MW;
- (c) Photovoltaic power plants, with a total capacity of 220.95 MW;

⁶ [Report on National Agency for Energy Regulation \(ANRE\) activity](#)

⁷ <https://termoelectrica.md/informatii-generale/informatii-tehnice/>

⁸ <https://www.cet-nord.md/ro/station/power>



Figure 3. Power grids and power plants in the Republic of Moldova

(5) 87 MW - electrical capacity of other power plants, including sugar factories built in the years 1956 - 1981.

The electricity generation capacity of power plants located in the Transnistrian region amounts to 2,600 MW, including:

- 1) 2,520 MW - the installed capacity of the thermoelectric power plant of the Republic of Moldova, built in 1964-1982, which uses natural gas, but can use fuel oil and/or coal as alternative fuels;

At the current stage, the source of natural gas supply of MGRES is Gazprom PJSC, as of December 2022, the entire volume of natural gas of 5.7 million m³/day delivered to the Republic of Moldova by Gazprom PJSC was allocated by Moldovagaz JSC to cover the consumption of the left bank and for the generation of electricity by MGRES for the right bank of the Dniester River.

At the same time, at the moment there is an uncertain situation with regard to the organisation of natural gas transmission services of Gazprom PJSC through the territory of Ukraine as of 1 January 2025 and the extension of the reservations of natural gas transmission capacity by Gazprom PJSC for natural gas to be delivered to the Republic of Moldova under the existing Contract on the supply of natural gas concluded with Moldovagaz JSC, and respectively there is an uncertain situation with regard to the route of supply of natural gas of Gazprom PJSC to the consumers of the Transnistrian region as of 1 January 2025 in case of the cessation of the transit of natural gas through the territory of Ukraine.

In the event of the cessation of deliveries of natural gas supplied by Gazprom PJSC on the basis of the existing contract on the supply of natural gas, concluded between Moldovagaz JSC and Gazprom PJSC, basically all the amount of electricity needed in addition to the locally produced electricity for the right bank, shall be supplied from sources other than MGRES, which could pose certain risks for ensuring the stability of the electricity system of the Republic of Moldova, as well as risks with regard to the capacity of import routes, given the situation in November 2022, when as a result of the bombardments of the Russian Federation, the energy infrastructure of Ukraine was significantly affected. In this context, it is also worth mentioning that, as a result of the bombardment of Ukrainian energy facilities by the Russian Federation, the

energy infrastructure of Ukraine is in a critical state, with Ukraine also requiring significant imports of electricity.

- (2) 48 MW - the installed capacity of the Dubasari Hydroelectric Power Plant (Dubasari HPP), built in 1954-1966;
- (3) CHP Tirotex – 31 MW.

The electricity generation capacity (excluding the Transnistrian region) depends to a large extent on the thermal load and is used at a relatively satisfactory level in the cold season, while in other periods of the year this generation capacity is used at a very low level.

The disruption of the electricity generation activity may lead to a shortage of electricity in the national power system, resulting in increased imports from neighbouring countries and fluctuation of electricity prices on the domestic market.

2.4.ELECTRICITY TRANSMISSION

16. In accordance with the Law No 107/2016 on electricity, the system of high-voltage power lines, with transformer and switching equipment and machinery, as well as with auxiliary installations, which serves for the transmission of electricity, shall be considered as electricity transmission networks. The operator of the electricity transmission system, SE Moldelectrica, performs the function of centralised management of the electricity system of the Republic of Moldova. The electricity grid of the Republic of Moldova includes 6,228.6 km of 400 kV, 330 kV, 110 kV, 35 kV, transmission lines (Table 2).⁹

Table 2. Key elements of the electricity transmission network

Voltage level (kV)	Lines			Transformers	
	Length (km)	Number	Capacity (MW)	Number (unit)	Capacity (MW)
In the transmission system					
400	203.0	1	500.0	650	4,641.5
330	377.34	3	1,525.0		
110	3,337.04	131	2,365.7		
35	807.59	-	-		
Transmission – total	4,724.97				

Note: Under the administration of SE Moldelectrica.

The electricity installations of 105 final consumers (non-household consumers) are connected to the electricity transmission grids, as well as 20 power plants, of which 5 belong to sugar factories, and 9 are power plants that use renewable energy sources.

The operation, maintenance, modernisation and development of the electricity transmission networks, as well as the management of issues related to granting access to the electricity grid, including connection to the electricity transmission networks, is the obligation of SE Moldelectrica, the sole operator of the transmission system in the Republic of Moldova. The electricity transmission activity is carried out on the basis of the license for the transmission of electricity. At the same time, in accordance with Law No 107/2016 on electricity, the transmission system operator that holds the license for centralised management of the electricity system is responsible for the single operational-technological management of the electricity system, as well as for its balancing.

⁹ SE Moldelectrica

Table 3. Transfer capacities of interconnections with electricity systems of neighbouring countries

Direction of electricity flow	Until the allocation of cross-border capacity at the Ukraine-Hungary border, MW	After the allocation of cross-border capacity at the Ukraine-Hungary border, MW
UA > MD	0	0
MD > UA	800	800
RO > MD	600	260
RO > MD	200	82

Currently, the management of access to the interconnections between the Republic of Moldova and Ukraine, in connection with the import of electricity from Ukraine, is carried out by NEK Ukrenergo (the transmission system operator of Ukraine), while those related to access to the interconnections between the Republic of Moldova and Romania, in connection with the import from Romania, are managed by the National Company for Electricity Transmission Transelectrica (the transmission system operator of Romania).

From the point of view of the safety of the equipment operated, the electricity transmission networks are in a satisfactory technical state of operation and allow a continuous and reliable supply of electricity to consumers. At the same time, there is a need to modernise the electricity networks, which are stagnating due to the lack of the necessary sources of funding.

As a result of the war in Ukraine, starting from October 2022, the energy shortage has increased significantly, due to which, for short periods of time, there have been interruptions in the supply of electricity to the final consumers during the peak consumption period, and electricity prices have increased substantially (almost 4 times during 2022), causing a chain increase in prices in all areas. The situation was overcome by the activation of the breakdown contract concluded between SE Moldelectrica and the National Company for Electricity Transmission Transelectrica JSC, and later - by the registration of the state-owned enterprise Energocom JSC with the market operator OPCOM and the purchase of electricity from the Romanian electricity exchange.

Despite the synchronous operation of the electricity system of the Republic of Moldova with the ENTSO-E system, the existing interconnection with the European system is not sufficient for the stability and security of the system, for balancing the demand and supply of electricity. A fully functional interconnection between the Republic of Moldova - ENTSO-E - Ukraine requires the strengthening of the electricity transmission network. This, in turn, requires the construction of additional overhead power lines inside the Republic of Moldova and to better connect the electricity system of the Republic of Moldova with the electricity systems of Romania and Ukraine.

In order to strengthen the network infrastructure with Romania, the construction of three 400 kV interconnections with the electricity system of Romania is foreseen:

1. Isaccea (Romania) – Vulcanesti – Chisinau (Republic of Moldova);
2. Suceava (Romania) – Balti (Republic of Moldova);
3. Gutinas (Romania) – Strasenii (Republic of Moldova);

The first project is on going and is expected to be completed in 2025, and for the second, the OPL 400 kV Balti-Suceava, the feasibility study has been completed, the environmental and social impact has been assessed, and the necessary financial resources have been allocated.

In order to strengthen the electricity connections with Ukraine, the capacity of the 330 kV Balti (Republic of Moldova) - Dnestrovsc (Ukraine) interconnection is to be increased.

2.5.ELECTRICITY DISTRIBUTION

17. The electricity distribution networks located on the right bank of the Dniester River have a total length of 56.993 thousand km, of which: 1.8 thousand km of high voltage power lines (35-110 kV), 21.414 thousand km of medium voltage power lines (6-10 kV) and 33.3 thousand km of

low voltage power lines (0.4 kV), and include 15,288 electric transformers with a total capacity of 4,712.88 MVA.

There are 85 power plants connected to the electricity distribution networks, 83 of which use renewable energy sources, as well as 1,432 thousand electrical installations of final consumers, all of which are equipped with metering equipment. Therefore, 1,284.8 thousand final consumers are supplied with electricity through the electricity distribution networks, and 1,226.4 thousand (95.45%) of them are household consumers.

The operation, maintenance, modernisation and development of the electricity distribution networks is carried out by 2 distribution system operators operating under electricity distribution licenses:

1) FOE Premier Energy Distribution JSC - serves $\approx$ 939.4 thousand places of consumption/generation, or 65% of the total number in the country, covering about 70% of the territory of the Republic of Moldova (excluding the Transnistrian region);¹²

2) . RED Nord JSC - serves $\approx$ 492.6 thousand consumption/generation sites, or 35% of the total number in the country.

Regarding the crises encountered in the process of administering distribution networks, it should be noted that compared to the previous year, in 2023 the electricity distribution networks under the management of both system operators were more affected by special weather conditions.

If in 2022, RED Nord JSC reported the SAIDI value, calculated for interruptions caused by special weather conditions, of 26.07 minutes, in 2023 this value increased 11 times and reached 294.1 minutes.

At the DSO FOE Premier Energy Distribution JSC the situation is similar, the share of outages caused by special weather conditions increased from 34.09 minutes in 2022 to 207.7 minutes in 2023. At the same time the SAIDI value, reported by RED Nord JSC for outages caused by third parties or system user's installations, decreased considerably from 249.6 minutes in 2022 to 59.4 minutes in 2023.

At the DSO FOE Premier Energy Distribution JSC the outages noted with SAIDIAT (third party shares) increased from 95.07 minutes in 2022 to 101.6 minutes in 2023.

Information on the electricity networks managed by each of the operators is reflected in Table 4.

Table 4. Electricity distribution networks in 2022

	Unit of measure ment	Premier Energy Distribution¹³	RED Nord¹⁴	Total
1. Electrical distribution lines in operation - TOTAL	km	35,677.2	21,316.29	56,993.49
Including:				
110 kV	km	510.1	0	510.1
35 kV	km	1,292.6	0	1,292.6
6-10 kV	km	14,556.6	7,381.35	21,937.95
0,4 kV	km	19,317.9	13,934.94	33,252.84
2. Electrical transformers in operation	units	9,563	5,725	15,288
3. Total capacity of transformers	MVA	3,690.9	1,021.98	4,712.88
4. Number of power plants connected to the electricity distribution networks	units	80	5	85
including generation of electricity from renewable sources	units	78	5	83

¹² [Raport privind monitorizarea securității aprovizionării cu energie electrică și gaze naturale a Republicii Moldova pentru perioada 2020-2021](#), p.11 license

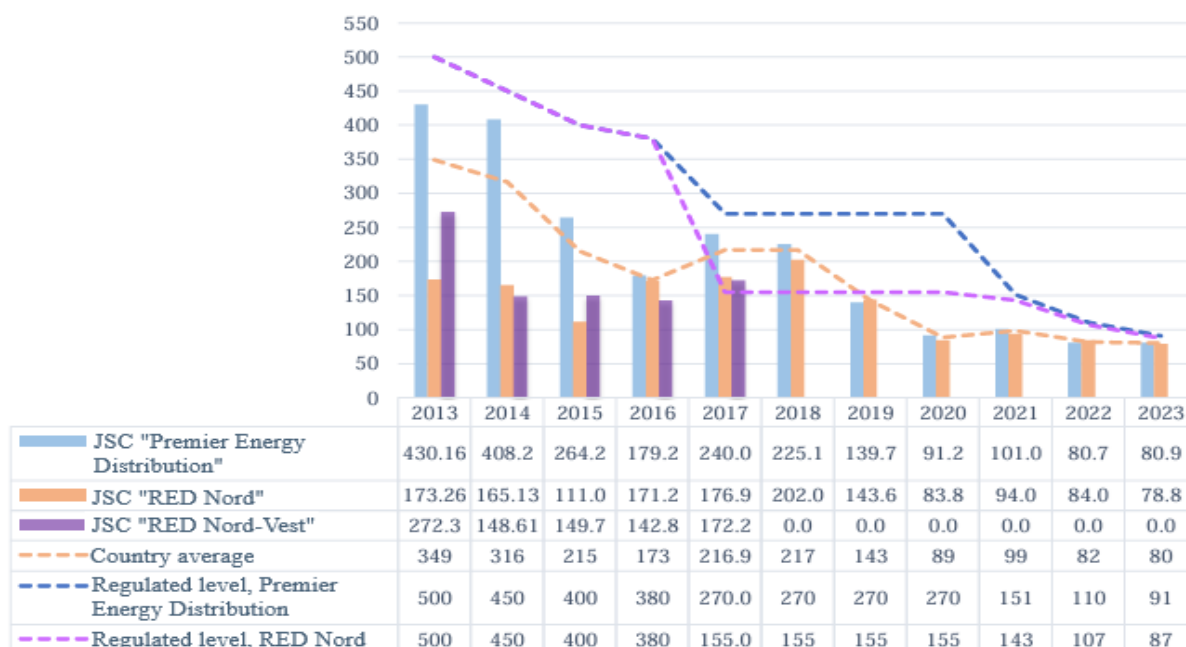
¹³ <https://premierenergydistribution.md/sites/default/files/2024-02/Indicatorii-tehnico-economici-privind-activitatea-operatorilor-retelelor-de-distributie-2023.pdf>

¹⁴ <https://rednord.md/doc/dezvinfo/Rapoarte%20privind%20activitatea/2023/Raportul%20conducerii%20a.2023.signed.pdf>

5. Electrical installations of final consumers connected to the electricity distribution networks - TOTAL	units	939,422	492,586	1,432,008
Including to electricity grids:				
35-110 kV	units	44	0	44
6-10 kV	units	5,839	1,742	7,581
0,4 kV	units	933,528	482,537	1,416,065
6. Number of consumers whose electrical installations are connected to the EDN - TOTAL	consumer s	843,211	478,300	1,284,836
including household consumers	consumer s	811,986	461,221	1,226,425
	% of total	96.3	93.63	95.45

Source: technical-economic indicators of distribution system operators, RED Nord JSC and Premier Energy Distribution JSC

One of the basic obligations of the DSO is to ensure the continuity of the electricity distribution service to system users. In this respect, the level of the SAIDI continuity indicator per country, calculated for interruptions caused by DSOs (excluding interruptions caused by third parties and those caused in complicated weather conditions), has improved significantly over the last 10 years, from a value of around 349 minutes in 2013 to 80 minutes in 2023.



Mediul pe tara – average value in the country

Nivelul relementat – regulated level

Figure 5. Evolution of the SAIDI indicator, min. (2013-2023)¹⁵

Such a result is driven by the continuous flow of investment in the renovation and rehabilitation of the electricity distribution networks. Therefore, despite the existing problems in the electricity system, the electricity distribution networks are in a satisfactory technical condition and allow a continuous and reliable supply of electricity to final consumers.

At the same time, electricity distribution networks are severely affected by adverse weather conditions as well as third party actions. According to ANRE data, in 2022, the average SAIDI indicator for the country, calculated for all outages in 6-10 kV electricity networks, was 266 minutes, and the share of outages caused by unfavourable weather conditions and third-party actions is 68% of the total. Therefore, the extreme weather conditions as well as the intentional or

¹⁵ ANRE Annual Activity Report 2023 - p.29

<https://www.anre.md/storage/upload/administration/reports/1319/Raportul%20de%20activitate%202023.pdf>

unintentional actions of third parties constitute a major risk for the reliable delivery of electricity to final consumers whose facilities are connected to the electricity distribution networks.

2.6. PROVISION OF LAST RESORT AND UNIVERSAL SERVICE

18. There are currently two electricity suppliers operating in the Republic of Moldova, which have the status of a supplier of last resort and universal service: the FOE Premier Energy LLC, which provides electricity to final consumers in the authorised territory of the distribution system operator FOE Premier Energy Distribution JSC, and the Furnizare Energie Electrica Nord JSC, which serves final consumers in the authorised territory of the DSO EDN Nord JSC. These obligations are laid down in the Law on electricity no. 107/2016 and are valid until 2026.

The respective suppliers operate under regulated conditions and at regulated prices: the FOE Premier Energy Distribution JSC, which supplies about 73.4% of the total amount of electricity delivered on the domestic market at regulated tariffs to about 846 thousand final consumers or about 65% of all consumers in the country, and the Furnizarea Energiei Electrice Nord JSC, which supplies the remaining around 26.3% of the total amount of electricity delivered on the domestic market at regulated tariffs to about 492 thousand final consumers or about 34% of the total consumers in the country¹⁵.

Table 5. Amount of electricity supplied to final consumers during the period 2018-2023¹⁶

Indicators	2018	2019	2020	2021	2022	2023
Supplied to final consumers (electricity consumption) - total, mil. kWh	3,862.7	3,875.1	3,866.2	4,155.8	4,050.5	3,889.0
FOE Premier Energy JSC	2,767.6	2,621.5	2,543.9	2,728.4	2,973.6	2,870.8
FEE Nord JSC	970.0	972.7	949.0	1,046.1	1,067.0	1,006.2

According to the data for 2023 the electricity consumption of household consumers amounted to 1,613.76 million kWh, or 41.5% of the total 3,889.0 million kWh of electricity supplied.

It should be noted that the energy crisis faced by the Republic of Moldova since 2022 has substantially affected the activity of universal service and last resort service providers and, implicitly, the final consumers who benefit from the universal service, manifesting itself through significant fluctuations in electricity prices on the retail market.

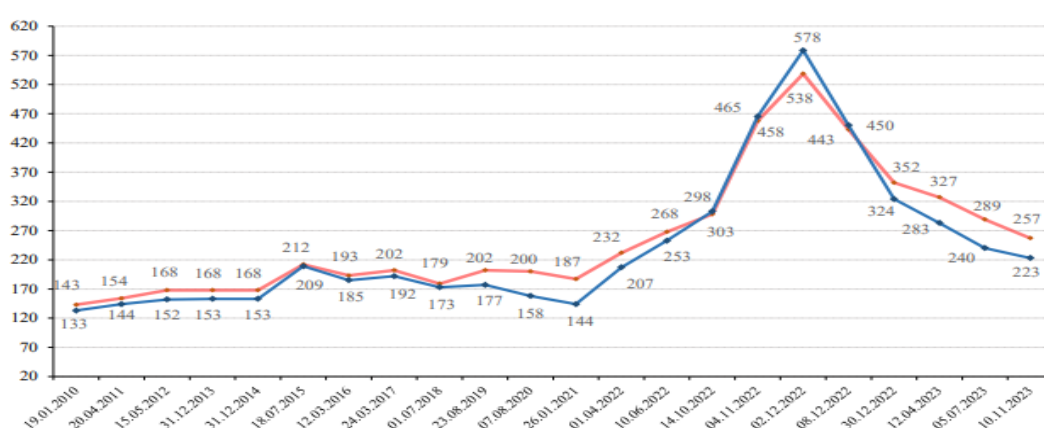


Figure 6. Evolution of regulated prices for the supply of electricity to final customers over the period 2010-2023, MDA bani/kWh¹⁶

2.7. ELECTRICITY PROCUREMENT, ACCESS TO THE REGIONAL ELECTRICITY MARKET

19. In 2022, amendments were made to the Law No 107/2016 on electricity in order to introduce a mechanism for diversification and ensuring the purchase of electricity from at least two sources, as a measure to increase the security of electricity supply.

¹⁶ [Annual activity report ANRE 2023](#)

Therefore, following the policy of diversification of electricity sources adopted by the Parliament of the Republic of Moldova at the beginning of 2022, commercial imports from Ukraine based on direct contracts between the state-owned producers from Ukraine (Ukrhydroenergo and Energoatom) and Energocom JSC (state-owned enterprise) started in May 2022 and continued until October. Following the significant damage to its critical infrastructure caused by multiple armed attacks, Ukraine has halted electricity exports to the Republic of Moldova as of 11 October 2022, which has created an even greater dependence of the right bank on the electricity produced by the Cuciurgan Thermoelectric Power Plant (MGRES).

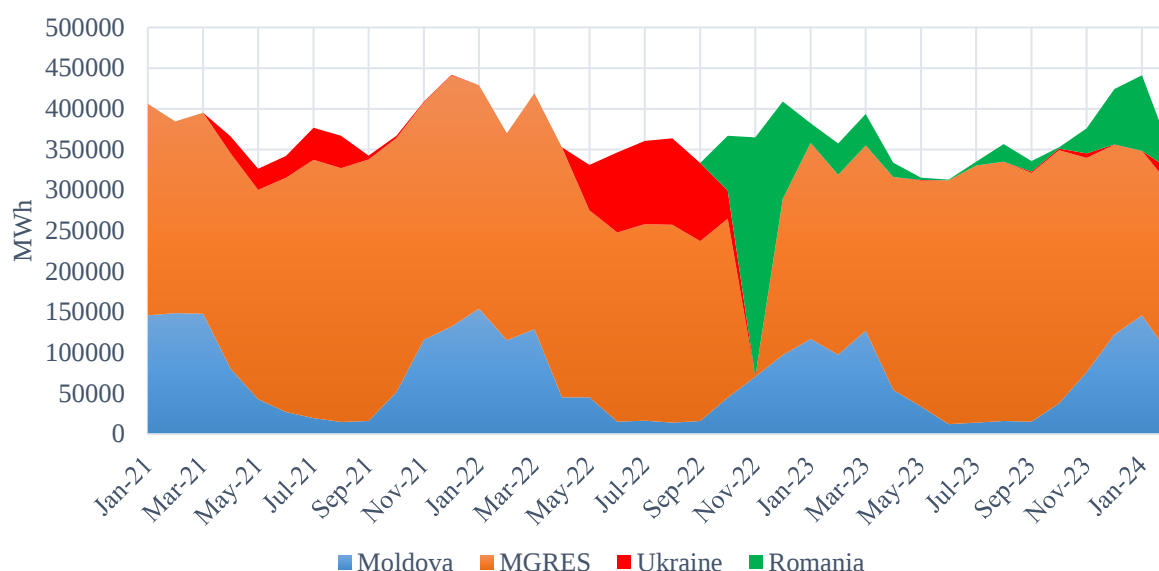


Figure 7. Electricity consumption between January 2021 and February 2024¹⁷

According to the Decision of the Commission for Emergency Situations of the Republic of Moldova, during the state of emergency Energocom JSC had the obligation to purchase electricity on the basis of direct negotiations, in order to cover the quantities of electricity needed by system operators, universal service providers / last resort.

On 1 June 2022, the Electricity Market Rules, approved by ANRE Decision No 283/2020, entered into force. Among the main regulations introduced, it should be mentioned that at the initial stage, the balancing responsibility for the electricity market participants is ensured and the preconditions are created for the launch of all organised electricity markets (the day-ahead market, during-day market, the balancing electricity market and the system services market).

Respectively, the Republic of Moldova has launched a time balancing mechanism administered by the TSO. The mechanism shall operate at imbalance prices established in accordance with the provisions of the Electricity Market Rules for a transitional period, until the launch of the balancing electricity market. The electricity system of the Republic of Moldova is also integrated in the European system of financial settlement of unintentional deviations between TSOs applied in Europe (FSkar mechanism) through NEK Ukrenenergo. A bilateral agreement between the SE Moldelectrica and NEK Ukrenenergo subjects the former to the conditions and prices of the FSkar mechanism.

Government Decision No 401/2021 approved the capacity limits, maximum quotas and capacity categories in the field of electricity from renewable energy sources valid until 31 December 2025, which will be able to benefit from the support schemes provided for in Article 34 of Law No 10/2016 on the promotion of the use of energy from renewable sources (fixed prices or fixed tariffs). In accordance with the provisions of Government Decision No 401/2021, the respective support schemes shall be offered for the following capacity categories in the field of electricity from renewable sources: solar PV (photovoltaic) - 200 MW, wind installations - 120 MW, biogas based cogeneration installations - 65 MW, syngas based cogeneration installations -

¹⁷ Report of the CES on actions taken during the state of emergency [raport cse pe starea de urgenta 2.pdf\(gov.md\)](#)

10 MW, cogeneration installations using direct combustion (biomass) - 10 MW, hydro installations - 5 MW.

The potential large-scale integration of intermittent renewable energy generation in the Republic of Moldova will require significant changes in the operational practices of utilities. Improving the flexibility of conventional production by adding faster and more flexible generating units, as well as reducing the minimum load on steam turbines could be a potential solution. Additional methods may include integrating wind and solar generation forecasts into the day-ahead electricity load demand planning process. Other means of absorbing the variability of renewable energy, such as electricity demand control and energy storage, can also be used.

The diversification of electricity sources in the Republic of Moldova could only be achieved in coordination with the development of the electricity transmission network. Projects to interconnect the electricity system of the Republic of Moldova with the electricity system of the EU through new power lines, as well as the strengthening of the internal electricity transmission networks are essential, both for the security of electricity supply and for social welfare in the Republic of Moldova.

Joining a larger energy market, which has been achieved, could only ensure the ultimate benefit of development and increased competition. From 16 March 2022, the electricity system of the Republic of Moldova and Ukraine operates synchronously with the ENTSO-E Continental Europe grid. Therefore, the energy system of the Republic of Moldova has the technical capacity to import/export electricity from both Ukraine and Romania, as well as other European countries. The operation of the electricity system of the Republic of Moldova and Ukraine in synchronisation with the ENTSO-E grid ensures a higher degree of energy security and safe operation, while also representing an opportunity for investment in energy generation in the Republic of Moldova and in strengthening the electricity transmission network to the Energy Community and the EU.

In the current context, the following specific risks/uncertainties in the energy sector should be mentioned:

1) As a result of the war situation in Ukraine, there is a risk of affecting certain segments of the electricity transmission infrastructure of Ukraine, which would create considerable problems/risks in ensuring the continuous supply of electricity to the Republic of Moldova.

2) High dependence on the electricity supplied by the Cuciurgan Thermoelectric Power Plant (MGRES) - located in the Transnistrian region and controlled by the Russian company Inter RAO PJSC, which produces the electricity for the right bank on the basis of natural gas delivered by Gazprom PJSC, MGRES having an important role in ensuring the stable functioning of the electricity system of the Republic of Moldova.

3) The technical aspect of the electric transmission lines and in particular the fact that the single overhead high voltage line connecting the Republic of Moldova directly to an EU Member State is the 400 kV Vulcanesti-MGRES line, which is linked to the MGRES power node/station.

4) Limited reliable and competitive (alternative) sources of import for the purchase of electricity at reasonable prices and its transmission to the Republic of Moldova, given that imports from Ukraine have been suspended, following the Russian bombardment of its energy infrastructure, and the import of electricity from Romania (electricity market operator or direct contracts with certain producers) does not guarantee affordable prices, Romania being also an importer of electricity during the cold season. There are both technical and commercial risks because of insufficient interconnection with the electricity system of Romania.

5) The commercial capacity of only 1,700 MW allowed by ENTSO-E for the import of electricity at the Romania - Republic of Moldova border for the Ukraine - Republic of Moldova bloc (of which only 260 MW exclusively for the Republic of Moldova), does not further guarantee the purchase of electricity to cover 100% of the import needs to cover the electricity consumption of the right bank of the Dniester River in Romania or other EU countries, and it is necessary to increase the commercial capacity to at least 600 MW, exclusively for the Republic of Moldova, in order to ensure the coverage of electricity consumption during peak hours.

III. SUMMARY OF CRISIS SCENARIOS

3.1. CRISIS SCENARIOS IDENTIFICATION

20. In order to determine the probability of the occurrence of crises and as a result of the impact on the electricity supply, the energy crisis of October 2021 - December 2023 was analysed, during which the Republic of Moldova was subject to multiple challenges including in the energy sector, manifested in multiple episodes that required a series of interventions by state institutions, the Commission for exceptional situations, the National Agency for Energy Regulation and the electricity market participants of the Republic of Moldova.

On 24 February 2022, in accordance with the previous plans stemming from the Energy Strategy of the Republic of Moldova, the transmission system operators of Ukraine NEK Ukrenego and the Republic of Moldova SE Moldelectrica were conducting tests of the operation of the electricity system in isolation from the IPS/UPS system of the Russian Federation and Belarus. The testing of isolated operation was planned in the context of the future synchronisation to the European energy system ENTSO-E, which was scheduled for 2024. On this day, the electricity systems of the Republic of Moldova and Ukraine were physically disconnected from the IPS/UPS power system, which represented a vulnerability of the civil critical infrastructure.

On the same day, on 24 February 2022, the Russian Federation began its military invasion of Ukraine.

On 16 March 2022, the transmission system operators of the synchronous area of Continental Europe ENTSO-E performed the emergency synchronisation of the electricity systems of Ukraine and the Republic of Moldova. This action was a turning point in terms of ensuring the security and stability of the electricity system of the Republic of Moldova.

The synchronisation of the electricity systems took place under the circumstances when as of 3 March 2022, Zaporizhzhia nuclear power plant, the largest in Europe, was occupied by the military forces of the Russian Federation.

On 31 March 2022, the contract for the purchase of electricity by suppliers and system operators on the right bank of the Dniester River from MGRES has expired. In order to contract the necessary quantities of electricity, at the beginning of 2022, suppliers and system operators launched tenders for the purchase of electricity. Previously, the Republic of Moldova had only two sources of electricity supply - either MGRES or suppliers from Ukraine. As a result of the war in Ukraine, the only source of electricity remained MGRES.

In order to ensure the supply of electricity, the Commission for emergency situations ordered the extension of electricity purchase contracts for April 2022, and for the months of May and June 2022 the purchase of electricity from Energocom JSC, which organised a competitive tender, was arranged.

As a result of the tender organised by Energocom JSC, the bids received from private Ukrainian companies, in small volumes, insufficient to cover the entire consumption needs, amounted to prices above USD 100/MWh; MGRES also submitted offer prices close to market values, fictitiously increased prices which cannot be covered by Moldovan consumers.

In this context, the tender procedure was cancelled and starting with May 2022, a public service obligation was imposed on Energocom JSC for the procurement of electricity required by universal service providers, suppliers of last resort and system operators, based on direct negotiations or using stock exchange instruments, but energy suppliers and system operators were obliged to purchase electricity from Energocom JSC, thus ensuring security of supply and an affordable price for final consumers.

An unprecedented situation that occurred in November 2022, through the overlapping of several conjunctures, the electricity sector was subjected to a stress test under extremely complicated operating conditions in conditions of energy crisis, characterised by a total lack of electricity supplies from MGRES and suppliers from Ukraine, the highest prices for the purchase of electricity in the region, electricity was purchased from Romanian suppliers and transmitted to the Republic of Moldova through a single power line, while the energy infrastructure of Ukraine was subject to permanent military attacks, which also resulted in two total disconnections of the electricity system (blackouts) on 15 and 23 November 2022, respectively, under these conditions,

reliable supply of electricity to final consumers was achieved. An important element to be highlighted here is the implementation, as of 1 June 2022, of the Electricity Market Rules (rules similar to those in the EU) that allowed the purchase and import of electricity from a member country of the European Union, respectively, about 80% of the electricity needs were purchased from Romania, with several supply contracts being concluded with Hidroelectrica JSC, Nuclearelectrica JSC, the Energy Complex Oltenia, the Energy Complex Craiova and OMV Petrom JSC.

By definition, an electricity crisis is a momentary or imminent situation where there is a significant shortage of electricity or where it is impossible to supply electricity to consumers.

The identification of electricity crisis scenarios shall be carried out in accordance with the provisions of Annex I to the ENTSO-E ACER Methodology for the identification of regional electricity crisis scenarios.¹⁸ According to the provisions of the methodology, 31 regional electricity crisis scenarios have been identified by ENTSO-E, reflected in Table 6.

Table 6. Regional electricity crisis scenarios in accordance with Article 6 paragraph (1) of Regulation (EU) 2019/941¹⁹

Scenario number	Regional electricity crisis scenario
1.	Cyber attack – entities connected to the electricity grid
2.	Cyber attack – entities not connected to the electricity grid
3.	Physical attack on energy infrastructure
4.	Physical attack on dispatch centers
5.	Threat to key employees
6.	Attack from the inside – sabotage actions of employees internally
7.	Solar storm
8.	Volcanic eruptions
9.	Storm
10.	Cold Spell
11.	Precipitation and Flooding
12.	Winter Incident
13.	Fossil fuel and imported electricity supply crisis
14.	Nuclear fuel shortage
15.	Local technical failure with regional importance
16.	Multiple failures caused by extreme weather
17.	Loss of IT connectivity for real-time operation
18.	Simultaneous multiple failures
19.	Power system control mechanism complexity
20.	Human error
21.	Unwanted power flows
22.	Serial equipment failure
23.	Strike, riots, industrial action
24.	Industrial/nuclear accident
25.	Unforeseen interaction of energy market rules
26.	Unusually large errors in the forecast of electricity produced in power plants using renewable energy sources
27.	Pandemic
28.	Heat wave
29.	Dry period

¹⁸ Methodology to Identify Regional Electricity Crisis Scenarios in accordance with Article 5 of the REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on risk preparedness in the electricity sector and repealing Directive 2005/89/EC. ACER-ENTSO-E, 27 pages.

¹⁹ [Risk-preparedness Regulation Implementation \(2020 and 2021\)](#).

30.	Earthquakes
31.	Forest fire

21. Out of the 31 regional scenarios identified by ENTSO-E, three scenarios are considered irrelevant to the conditions of the Republic of Moldova. These are:

- No 8 - there are no volcanic eruptions in the Republic of Moldova;
- No 14 - lack of nuclear fuel, the Republic of Moldova has no nuclear power plants;
- No 24 - industrial/nuclear accident, the Republic of Moldova does not have nuclear power plants and important chemical enterprises where the occurrence of an accident would cause major disruption, with evacuation of the population from the respective region.

22. At the same time, in the context of the analysis of the impact of the energy crisis in 2022, an additional national crisis scenario was identified, which consists in the overloading of low-voltage electricity networks (especially in cities) due to the shortage or interruption of natural gas supply to final consumers during the winter period, through the use of electric heating appliances.

23. During the emergency situation in the electricity sector, the electricity undertakings/authorities are obliged to undertake crisis mitigation and restoration measures set out in the Action Plan according to the electricity crisis scenario.

Table 7. National electricity crisis scenarios

No national scenario	Name national scenario / regional scenario	No regional scenario
<u>Fuel shortage</u>		
1	Fossil fuel and imported electricity supply crisis	13
	<i>Fossil fuel shortage (incl. Natural gas)</i>	
2	Overload of low-voltage electricity networks due to natural gas supply disruption	-
	-	
<u>Electricity market failure</u>		
3	Unforeseen interaction of energy market rules	25
	<i>Unforeseen interaction of energy market rules</i>	
4	Unwanted power flows	21
	Unwanted power flows	
5	Unusually large errors in the forecast of electricity produced in power plants using renewable energy sources	26
	<i>Unusually big RES forecast errors</i>	
<u>Malicious attack</u>		
6	Cyber attack - entities connected to power grid and loss of ICT systems for real-time operation	1, 17
	<i>Cyber-attack - entities connected to power grid</i>	
	<i>Loss of ICT systems for real-time operation</i>	
7	Cyber attack - entities not connected to power grid	2
	<i>Cyber-attack - entities not connected to power grid</i>	
8	Physical attack - critical assets	3
	<i>Physical attack - critical assets</i>	
9	Physical attack - control centres	4
	<i>Physical attack - control centres</i>	
10	Attack from the inside – sabotage actions of employees internally	6
	<i>Insider attack</i>	
11	Threat to key employees	5
	<i>Threat to key employees</i>	
<u>Extreme weather</u>		
12	Solar storm	7

	Solar Storm	
13	Storm	9
	Storm	
14	Cold Spell	10
	Cold Spell	
15	Precipitation and Flooding	11
	Precipitation and Flooding	
16	Winter Incident	12
	Winter Incident	
17	Multiple failures caused by extreme weather	16
	Multiple failures caused by extreme weather	
18	Heat wave	28
	Heat wave	
19	Dry period	29
	Dry period	
Technical failure		
20	Local technical failure with regional importance	15
	Local technical failure with regional importance	
21	Simultaneous multiple failures	18
	Simultaneous multiple failures	
22	Serial equipment failure	22
	Serial equipment failure	
Natural disasters		
23	Earthquake	30
	Earthquake	
24	Forest fire	31
	Forest fire	
25	Pandemic	27
	Pandemic	
Human factor		
26	Human error	20
	Human error	
27	Strike, riots, industrial action	23
	Strike, riots, industrial action	
Other		
28	Power system control mechanism complexity	19
	Power system control mechanism complexity	
29	Armed military conflict, war	-
	-	

24. In accordance with this Plan, the probability of identified crises and the possible impact on electricity supply should they occur have been taken into account in the development of the scenarios:

1) *Probability of the occurrence of identified crises:*

- a) Very Unlikely – it is very unlikely that the incident will occur over the next 10 years;
- b) Unlikely – the risk is unlikely to occur over the next 5 years;
- c) Possible – the risk is likely to occur over the next 5 years;
- d) Likely – the risk is likely to occur over the next 3 years;
- e) Very likely - the risk is certain to occur in the near future;

2) *The impact on electricity supply in case of the occurrence of the identified crisis scenarios:*

a) Insignificant - when the risk that has occurred leads to a small disturbance, which could be easily managed by the electricity undertakings through operational measures and the supply of electricity to consumers is not affected;

b) Minor – when the crisis affects the electricity supply, but the situation could be solved by applying measures based on market mechanisms, and the final consumers not being significantly affected;

c) Major - when the crisis significantly affects the electricity supply and market-based measures are no longer sufficient and emergency measures need to be applied in order to ensure the electricity supply to the affected final customers;

d) Critical - when the crisis causes serious disruption in the supply of electricity to a significant number of final customers and it is necessary to apply emergency measures to ensure the supply of electricity within a short period of time to as many affected final customers as possible;

e) Disastrous - when, as a result of the crisis, the supply of electricity is seriously affected for a large number of final consumers or for all final consumers of electricity, and it is necessary to apply emergency measures in order to restore the supply of electricity to all affected final consumers within the shortest possible time.

3.2. CRISIS SCENARIO GROUPS

3.2.1. Fuel shortage

Scenario 1 - Fossil fuel and imported electricity supply crisis

Regional scenario	Probability	Impact	Implementers
13	Very likely	Critical	TSO, DSO, producers

Trigger event:

The fossil fuel supply crisis may occur during the year, with high consumption and low stocks of fuels available in the country. The supply of fossil fuels to power plants for meteorological, technical, economic reasons or as a result of political events is interrupted for a long period of time, or imports of fossil fuels are affected for technical, meteorological or political reasons. This period coincides with a period when it is not possible to supplement the national production of electricity from other sources.

Effects of the crisis	Crisis mitigation and recovery measures
• The power plants affected by the fuel shortage are being maintained at a technical level of failure. • The prolongation of the crisis leads to total shutdown of some generating units. As a result, there are difficulties in ensuring the adequacy of the national electricity system (SEN). • There are disruptions in the electricity market, because of the high variations in electricity trading prices or insufficient supply. • Limit energy exports and prioritise coverage of local consumption. • The reduced generation capacity of local power plants leads to the redistribution of	• The TSO shall apply the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid Codes concerning the state of emergency and restoration of the power system. • Producers at the request of the TSO will mobilize the entire available production capacity of the generating units (including the starting of reserve groups), both declared and undeclared on the balancing electricity market. The dispatchable load declared on the balancing electricity market will be reduced.

power flows to deficient areas and as a result overloads may occur in elements of the electricity network. • For certain time frames, there are problems in ensuring the safety criterion N-1. Also, low generation level and overloading of certain power lines can affect the static and dynamic stability of the NES. • The crisis could affect the entire region, leading to the inability to receive or provide support to other countries in the region. Also, the low level of electricity generation as well as the large flows of electricity to deficit areas may lead to congestion in interconnections and even to the impossibility of securing electricity exports/imports. • Under conditions of low electricity generation in power plants and high power flows to deficit areas, there is a risk of extensive damage to the NES that could lead to non-supply of electricity to a large number of consumers.	• It will be requested to increase the available power of the NES, by making available the production units, declared on the balancing electricity market, which are under repair (early restart of the units under repair). • Measures shall be applied in order to extend the availability of equipment in the electricity transmission network (ETN) and electricity distribution network (EDN), by cancelling equipment withdrawals for maintenance or investment reasons. • Urgent measures are taken to repair, return to service, the spare equipment of the ETN and/or EDN in order to ensure their availability. • Producers that can run on alternative fuels shall apply the measure of increasing the technological reserves of the electricity system, in order to use them as appropriate. • In order to combat the shortage of production, the TSO will request emergency aid from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine). • The measure of reduction/cancellation of the tendered commercial interconnection capacity as well as reduction/cancellation of notified export transactions shall be ordered.
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Scenario 2 - Overloading of low voltage electricity networks

Regional scenario	Probability	Impact	Implementers
-	Likely	Major	Ministry of Energy, ANRE, system operators, suppliers and final consumers

Trigger event:

Considering the dependence of the Republic of Moldova on the import of energy resources, the real example being the energy crisis of 2021-2023, it should be noted that the limitation of natural gas supply may occur throughout the year, but mainly during the cold period, when the demand for natural gas increases, which, as a rule, leads to the substitution of natural gas consumption with electricity intended for the receivers for heating the living space and food preparation. The crisis may occur for a longer period of time and coincide with a period in which it is not possible to import natural gas from other sources.

There may also be situations when during the summer, because of the use of air conditioners; the electrical load at certain periods of time and portions of the low-voltage electricity distribution network may exceed the capacity of the electricity distribution network.

Effects of the crisis	Crisis mitigation and recovery measures
• It is considered that final consumers who do not have installations for the use of thermal energy connected to the centralised heat supply systems, including those disconnected from the centralised heat supply system, will use the electricity for heating the rooms and preparing food, with possible overloads in the electricity distribution networks. The overload will increase significantly if centralised heat supply systems are not operable, including due to lack of fuel. • The electrical load during some periods of time and portions of the low-voltage electrical distribution network, during the summer, because of high temperatures and the use of air conditioning equipment, exceed the capacity of the electrical distribution network. • The overload at some final consumers could lead to the automatic interruption of the supply of electricity at the place of consumption or to the failure of some elements of the electricity distribution network. • The overload on the feeders could lead to the disconnection of the feeders because of the exceeding of the admissible current in the respective electrical network. • The overloads could damage the elements of the electricity distribution network, including the power transformers that power the feeders, with possible fires and explosions.	• The DSOs shall examine the possible scenarios of overloads in the electricity distribution networks caused by the substitution of thermal energy, supplied through the centralised supply system to consumers - with electricity. • DSOs will develop their own plans for prevention and mitigation of the impact of such scenarios, estimating, under different assumptions, the impact on the electricity distribution networks during peak consumption periods with concrete mitigation measures. • The DSO shall analyse the degree of load of the network elements, at the level of power transformers in 6-10/0.4 kV transformer substations, 6-10 kV overhead lines or cables, transformer, with the identification of critical points and the proposal of strengthening measures. • The DSO will ensure the replenishment of the stocks of additional equipment necessary for interventions in situations of electricity crisis. • The DSO, for low voltage networks, shall apply crisis measures depending on the degree of load and the state of the respective electricity networks, with possible limitations or interruptions in the electricity supply. • Limitation/disconnection of consumers other than those declared on the balancing electricity market.

3.2.2. Scenario Group – Electricity market failure

Scenario 3 – Unforeseen interaction of energy market rules

Regional scenario	Probability	Impact	Implementers
25	High	Major	ANRE, Electricity Market Operator, TSO, DSO, producers, suppliers

Trigger event:

There may be inappropriate actions of the electricity market participants as a result of unforeseen situations (creating market distortion/participant disruption). They may be caused either by some events produced on the domestic energy market or on an energy market in another country, that result in unforeseen effects that may also have an impact on the electricity market in the Republic of Moldova.

Considering the concentration of infrastructure elements in the Transnistrian region and the high dependence in electricity supply from the thermoelectric power plant of the Republic of Moldova (MGRES), this makes the market vulnerable to even the slightest disruptions. Among other incidents that may arise are difficulties in the process of procurement of electricity by universal and last resort service providers, characterised by the lack of participants in the tenders

and/or submission of non-compliant bids; the distortion of the electricity market induced by MGRES due to the price of electricity below the price of the national and regional market, due to the subsidised price of natural gas delivered to consumers on the left bank of the Dniester River; the exit of some participants from the market and other similar elements.

Another significant event that may jeopardize the supply of electricity is the occurrence of a major breakdown in the electricity transmission networks or electricity distribution networks (e.g. breakdown, fire, natural disaster, extreme weather conditions, terrorist attack), reason why the electricity could not be taken from the producers / import suppliers and transmitted / distributed to final consumers in the affected areas.

Effects of the crisis	Crisis mitigation and recovery measures
• Insufficient quantities of electricity necessary to cover the entire consumption of the Republic of Moldova. • Accelerated increase in the price of electricity supplied to final consumers which would have a direct impact on the economy. • Increased risk of overloading network elements (power lines, power transformers, etc.). • Poor operation of the electricity system, forecast errors, loss of control over an area of the electricity network. • The emergence of disturbances that may affect the functioning of electricity markets in the region. • Forecast errors/imbalances in different control blocks can lead to frequency incidents/deviations in the synchronous network area. • There may be limitations on electricity imports/exports. • There may be manual disconnections of some final consumers or extensive damage that can lead to the interruption of the electricity supply of a large number of final consumers. • Some electricity market participants may suffer financial losses due to incorrect decisions or trading mistakes.	• The market operator/ TSO shall take measures to cyber-secure the trading software that operates on the basis of the algorithms for the realisation, in order to reduce the risk of disruption of trading activity. • The TSO shall apply the measures provided for in the Electricity Grid Codes, including the Power System Defense Plan developed in accordance with the Electricity Grid Codes on emergency and restoration of the power system. • Producers at the request of the TSO will mobilize the entire available production capacity of the generating units (including the starting of reserve groups), both declared and undeclared on the balancing electricity market. • The TSO, jointly with the DSO, shall, to the extent possible, apply measures to reduce the dispatchable load declared on the balancing electricity market in order to avoid a potential impact on the prices for the supply of electricity. • Measures shall be applied in order to extend the availability of equipment in the ETN and EDN, by cancelling equipment withdrawals for maintenance or investment reasons. • In order to combat the shortage of production, the TSO will request emergency aid from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine). • ANRE / the Government, in accordance with the legal provisions, shall order measures aimed at stabilising and restoring the functionality of the electricity market; - To establish additional public service obligations with regard to the sale of electricity in quantities and at regulated

	prices; - to establish public service obligations for the centralised purchase of electricity, through tendering or direct negotiation, necessary for universal service providers, suppliers of last resort and system operators; - To establish public service obligations for one or more electricity producers participating in the balancing electricity market and the system services market or to provide balancing services and system services in quantities limited by technical possibilities and at regulated prices. • The suppliers shall take the necessary measures to procure and supply the additional quantities of electricity necessary to cover demand or in the event of a curtailment or interruption of the supply of electricity from a particular source. • The suppliers shall apply the clauses with regard to the interruption of electricity supply laid down in the contracts on interruptible electricity supply, concluded with large customers. • The suppliers shall inform the final consumers served about the electricity crisis situation created and the approximate recovery deadlines.
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Scenario 4 - Unwanted power flows

Regional scenario	Probability	Impact	Implementers
21	Likely	Major	TSO,

Trigger event:

The existence of major differences between the planned power flows and those recorded in the NES. The event is favoured either by forecast errors with regard to the production of wind and photovoltaic power plants, or by some external conditions (re-dispatching of energy transit between different European regions).

Effects of the crisis	Crisis mitigation and recovery measures
• The occurrence of large power flows in the NES, which are completely different from the normally planned system flows previously notified by the TSO and which cannot be compensated by the application of market mechanisms and emergency aid arrangements. • Endangering the proper functioning of the electricity system, increasing the risk of overload on various elements of the	• The TSO shall apply the measures provided for in electricity grid codes and in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system. • Producers at the request of the TSO will mobilize the entire available production capacity of the generating units (including the starting of reserve groups), both

electricity network (transmission power lines, transformers, etc.). • Poor operation of the electricity system, forecast errors, loss of control over an area of the electricity networks. • The emergence of disturbances that may also affect the energy markets in the region and the functioning of the interconnected systems of ENTSO-E members. • Forecast errors/imbalances in different control blocks can lead to frequency incidents/deviations in the synchronous network area. • The emergence of limitations on electricity imports/exports. • The existence of risks of extensive damage to the NES that could lead to the non-supply of electricity to a large number of consumers.	declared and undeclared on the balancing electricity market. • The TSO will request to increase the available power of the NES, by making available the production units under repair (early restart of the units under repair). • Measures shall be applied in order to extend the availability of equipment in the ETN and EDN, by cancelling equipment withdrawals for maintenance or investment reasons. • In order to combat the shortage of production, emergency aid from neighbouring TSOs, according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine) will be requested. • On the basis of the decision of ANRE, the TSO will order the measure to reduce/cancel the notified export transactions. • Limitation/disconnection of use installations of final consumers other than those declared on the balancing market.
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Scenario 5 - Unusually large errors in the forecast of electricity produced in power plants using renewable energy sources

Regional scenario	Probability	Impact	Implementers
26	Unlikely	Major	ANRE, TSO, DSO, producers/suppliers

Trigger event:

There are big errors in the forecasting of production by power plants that use renewable energy sources (photovoltaic, wind), errors caused by the way the forecast is made or by sudden changes in weather conditions. There are major differences between the planned power flows and those recorded in the NES. Events may be aggravated by low NES consumption.

Effects of the crisis	Crisis mitigation and recovery measures
• The existence of a major imbalance (positive or negative) between the amount of electricity that is forecast and the amount that can be produced by power plants that use renewable energy sources. • The distortion of the electricity market, in case the electricity shortage or surplus quantities will not be purchased / sold on the market, but will be traded on the balancing electricity market managed by the TSO, which could have a considerable impact on prices.	• The TSO shall apply the measures provided for in electricity grid codes and in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system. • The dispatch consumption declared on the balancing electricity market will be reduced. • Producers at the request of the TSO will mobilize the entire available production capacity of the generating units (including the starting of reserve groups), both

• The existence of disturbances in the electricity market due to large fluctuations in the trading price of electricity or due to an insufficient level of supply. • The reduced generation by some power plants may lead to the redirection of power flows to deficient areas, which could also result in voltage deviations and difficulties in compensating reactive power. • During some time intervals there are problems in ensuring the N-1 security criterion. Also, low generation level and overloading of certain electric lines can affect the static and dynamic stability of the NES. • Under conditions of low electricity generation in power plants and reorientation of high power flows towards deficit areas, there is a risk of extensive damage to the NES that could lead to non-supply of electricity to a large number of consumers.	declared and undeclared on the balancing electricity market. • In order to combat the shortage of production, the TSO will request emergency aid from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine). • The TSO, together with the electricity market operator, shall order measures on the suspension of electricity market activities in accordance with the provisions of the Electricity Grid Code concerning the state of emergency and restoration of the power system. • ANRE will set the conditions for the export of electricity in case it is necessary to ensure the security of electricity supply. • The suppliers shall adjust the forecasts provided in order to mitigate the impact on final consumers and shall consider the option of emergency purchases or sales of additional amount of electricity, so that it does not become imbalance electricity as this implies an impact on the prices for electricity supply.
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3.2.3. Scenario Group - Malicious attack

Scenario 6 - Cyber attack on infrastructure that is part of the electricity grid

Regional scenario	Probability	Impact	Implementers
1.17	Possible	Major	Ministry of Energy, ANRE, system operators, electricity market participants

Trigger event:

Attack on the communication and data transmission infrastructure of the dispatching center, on power plants and substations or on important consumers for the disruption of the proper functioning of the NES.

The targets of the attack are SCADA - EMS, SCADA - DMS, f - P controller, central control systems, planning and operation systems, IT centers, data storage systems, control systems of large power stations / power plants and remote control centers.

Effects of the crisis	Crisis mitigation and recovery measures
• The hacker acts as an employee and disconnects through remote switching elements some elements of the electricity network, power lines, transforms or modifies the operating regimes of some generating units, changes the power reserves, modifies the operating schedule of dispatch units, which endangers the operation of the NES.	• The TSO/DSO will intervene to block the functionality of the systems that has been taken over by the hacker, by temporarily turning off the SCADA systems. The operation of the NES will be done in accordance with the Procedures developed by the TSO and DSOs related to the information systems used..

• During the attack, computer systems can be taken over and blocked for use by other personnel. This affects the control and good management of the NES. • The occurrence of disruptions in the electricity market. • The disconnection of generation units and equipment from the electricity transmission and distribution networks leads to the redirection of large power flows to deficient areas and results in overloading of equipment and voltage deviations and difficulties in compensating reactive power, including an outage. • For certain time frames, there are problems in ensuring the safety criterion N-1. Also, the low level of production and the load of certain lines can affect the static and dynamic stability of the NES. • Taking into account the low production of power plants and the large flows of energy to deficit areas, there is a risk of extensive damage to the NES which could lead to a lack of electricity supply to a large number of final consumers. • The attack could spread to other information systems belonging to other TSOs in the region and could lead to the inability to receive or provide support from other countries in the region.	• The DSO shall take urgent measures to restore the equipment triggered in the ETN and/or EDN and to ensure the availability of the equipment. • The Ministry of Energy shall ensure the assistance of specialist departments, either within the respective entity or from specialised governmental structures for the elimination of the cause of the attack as well as the establishment of the necessary actions for the safe restoration of the affected systems. For this purpose, internal procedures for combating cyber-attacks shall be followed. • TSOs/DSOs will have protocols and will identify ways to ensure the safe operation of the NES (manual control of the equipment, operating from the protection cabinet/control desks). • The system operators will order the mobilisation of the maximum number of personnel necessary for the restoration and normal operation of power stations and electricity networks. • In the event that the cyber-attack has led to power cuts for some final consumers, TSOs/DSOs shall take urgent measures to replenish them, including through interventions at the installation level as the case may be. • In case a production shortage has been reached, the measures provided for in the Power System Defence Plan developed in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the electricity system shall be applied. • Producers at the request of the TSO will mobilize the entire available production capacity of the generating units (including the starting of reserve groups), both declared and undeclared on the balancing electricity market. • It will be requested to increase the available power of the NES, by making available the production units under repair (early restart of the units under repair). • Measures shall be applied in order to extend the availability of equipment in the ETN and EDN, by cancelling equipment withdrawals for maintenance or investment reasons. • In order to combat the shortage of production, the TSO will request emergency aid from neighbouring TSOs according to
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	bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine). • The TSO, together with the electricity market operator, shall order measures on the suspension of electricity market activities in accordance with the provisions of the Electricity Grid Code on the state of emergency and restoration of the power system. • ANRE will set the conditions for the export of electricity in case it is necessary to ensure the security of electricity supply.
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Scenario 7 - Cyber attack - entities not connected to power grid

Regional scenario	Probability	Impact	Implementers
2	Unlikely	Critical	Ministry of Energy, ANRE, electricity market participants

Trigger event:

Cyber attack on the communication and data transmission infrastructure of electricity market participants.

Effects of the crisis	Crisis mitigation and recovery measures
• The hacker penetrates the computer systems for communication and data transmission of electricity market participants and acts as an employee working with these systems and manipulates the operating conditions of the electricity market (requests and offers on trading platforms, operating programmes of generating units), which affects the proper functioning of the electricity market. • During the attack, personnel other than the hacker may block computer systems for use - this may cause disconnection of portions of the electricity grid, damage to generating units, as well as damage to some consumers. • There will be some disruptions in the functioning of the electricity market. • Due to the non-delivery of electricity quantities, the technological processes of some important enterprises for the country's economy may be affected. • Changing the operating schedule may lead to the shutdown of generating units and the production of imbalances which may further lead to frequency deviations or large power flows to the deficient areas, deviations in the	• The TSO/DSO in cooperation with the Ministry of Energy and the authorities responsible for ensuring cyber security will intervene to block the functionality of the systems that have been taken over by the hacker and set up new communication channels. • The assistance of specialist departments will be mobilised, either within the respective entity or from specialised governmental structures (the Ministry of Energy) for the elimination of the hacker, as well as the establishment of the necessary actions for the safe restoration of the affected systems. • The TSO will take the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system. • Producers at the request of the TSO will mobilize the entire available production capacity of the generating units (including the starting of reserve groups), both

voltage level and difficulties in compensating the reactive power. • For certain time frames, there are problems in ensuring the safety criterion N-1. Also, the low level of production and the load of certain lines can affect the static and dynamic stability of the NES. • Taking into account the low production of power plants and the large flows of energy to deficit areas, there is a risk of extensive damage to the NES which could lead to a lack of electricity supply to a large number of final consumers. • The attack can have serious consequences in the context of high electricity consumption within the NES, such as periods of extremely high temperatures or heavy precipitation.	declared and undeclared on the balancing electricity market. • In order to combat the shortage of production, the TSO will request emergency aid from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine). • The TSO, together with the electricity market operator, shall order measures on the suspension of electricity market activities in accordance with the provisions of the Electricity Grid Code concerning the state of emergency and restoration of the power system. • ANRE will set the conditions for the export of electricity in case it is necessary to ensure the security of electricity supply.
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Scenario 8 - Physical attack - energy infrastructure

Regional scenario	Probability	Impact	Implementers
3	Possible	Critical	Ministry of Energy, TSO, DSO, producers/suppliers

Trigger event:

There is a physical attack on infrastructure objects, power lines, power stations or power plants, or on dispatchers and IT or telecommunication centers.

Effects of the crisis	Crisis mitigation and recovery measures
• There is evidence of destruction of the NES component parts (power lines, transformers, generators, electrical equipment in substations or power plants, servers of the central control system, central telecommunication installations). • In the event of a physical attack on power lines, substations or power plants, equipment is damaged and some equipment becomes unavailable for a very long time. • In the event of a physical attack on the servers of the central control systems, central telecommunication installations, the medium-term operation and control capacity of the NES is affected. • There are difficulties in ensuring that the N-1 safety criterion is met. • The tripping of production units and equipment in the ETN and EDN leads to high power flows to the deficient areas and	• The TSO will take the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system. • The TSOs/DSOs will activate the alternative supply schemes to restore the supply and will initiate activities to restore the triggered equipment either by repairing/replacing the damaged/destroyed equipment using the equipment from the security stock. • In case of unavailability of the IT or communication systems, the management of the NES functioning shall be done according with the Procedures developed by the TSO and DSOs related to the information systems used. • Producers at the request of the TSO will mobilize the entire available production capacity of the generating units (including the starting of reserve groups), both declared

results in voltage deviations and difficulties in compensating the reactive power. • Problems arise in powering network areas over a very long period of time, related to the time required to repair / replace destroyed / damaged network assets. • Under conditions of low electricity generation in power plants and high power flows to deficit areas, there is a risk of extensive damage to the NES that could lead to non-supply of electricity to a large number of consumers.	and undeclared on the balancing electricity market. • It will be requested to increase the available power of the NES, by making available the production units under repair (early restart of the units under repair). • Measures shall be applied in order to extend the availability of equipment in the ETN and EDN, by canceling equipment withdrawals for maintenance or investment reasons. • In order to combat the shortage of production, there will be requested emergency aid from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with Romania and Ukraine). • The measure of reduction/cancellation of available interconnection capacity as well as reduction/cancellation of notified export transactions should be ordered on the basis of the decision of ANRE. • The TSOs/DSOs, as applicable, shall apply the Regulation on manual disconnection of installations for the use of certain categories of final consumers of electricity, in order to reduce the electrical load.
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Scenario 9 - Physical attack - control centres

Regional scenario	Probability	Impact	Implementers
4	Very low	Major	Ministry of Energy, electricity market participants

Trigger event:

Physical attack - coordination centers, remote control centers or power plant control centers.

Effects of the crisis	Crisis mitigation and recovery measures
• Sabotage action by the party acting as an employee, disconnects lines, transforms or changes the operating instructions of generating units, changes power reserves, changes the operating schedule of dispatch units. • The occurrence of large power flows to deficient areas that lead to voltage deviations and difficulties in compensating the reactive power. • Decommissioning of SCADA - EMS, SCADA - DMS, f-P controller, central control systems, planning and operating systems, IT centers, data storage systems, station control systems, and large power plants or remote control centers.	• The TSO/DSO in cooperation with the Ministry of Energy and the authorities responsible for ensuring state security will intervene to block the functionality of the systems that have been taken over by the hacker and set up new communication channels. • In cooperation with other authorities responsible for public order, measures will be taken to secure the affected objectives. • The TSOs/DSOs shall take urgent measures to restore and return to service the equipment triggered in the ETN and/or EDN and to ensure the availability of the equipment.

• Inability of control centers to manage, operate or monitor the functioning of the equipment. • Affecting the possibilities to take measures to control and restore the NES. There are disturbances on the electricity market. • Congestion of the capacities of the interconnection lines that leads to difficulties in managing flows and even to the impossibility of securing exports / imports of electricity. The existence of risks of extensive damage to the NES that could lead to the non-supply of electricity to a large number of consumers.	• TSOs/DSOs will identify ways to ensure the safe operation of the NES (manual control of the equipment, operating from the protection cabinet/control desks). • The system operators will order the mobilisation of the maximum number of personnel necessary for the restoration and normal operation of power stations and power plants. • Measures shall be applied in order to extend the availability of equipment in the ETN and EDN, by cancelling equipment withdrawals for maintenance or investment reasons. • In order to combat the shortage of production, the TSO will request emergency aid from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine).
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Scenario 10 - Attack from the inside – sabotage actions of employees internally

Regional scenario	Probability	Impact	Implementers
6	Unlikely	Critical	Ministry of Energy, TSO, DSO, producers

Trigger event:

Acts of sabotage by an internal employee or a group of employees (of the TSO/DSO, or of a subsidiary of a TSO/DSO, of a manufacturer or employee of a company that provides services or works for the TSO/DSO on a contract basis) directly on the TSO/DSO's installations, generating units or indirectly on the NES, by taking control of the dispatching center, remote control center, or command and control rooms.

Effects of the crisis	Crisis mitigation and recovery measures
• Change of the operating regimes or even destruction of infrastructure equipment (lines, transformers, generators, electrical equipment in substations or power plants) or other actions that lead to the disconnection or tripping of lines or transformer units, accidental shutdown of the generation of groups in the power plants. • Unavailability of some equipment for a very long period of time. • Difficulties in ensuring that the N-1 safety criterion is met. • The tripping of production units and equipment in the ETN and EDN leads to high power flows to the deficient areas and results in voltage deviations and difficulties in compensating the reactive power.	• The assistance of specialised protection and prevention departments, either within the entity in question or from specialised governmental structures (the Ministry of Internal Affairs) is required in order to neutralize the attack action. • The TSO will take the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system. • The TSO/DSO, producers shall take urgent measures to restore and return to service the equipment triggered in the ETN and/or EDN, or in the generating units, in order to ensure the availability of the equipment.

• The emergence of constraints regarding the supply of the network areas over a very long period of time, related to the time needed to repair/replace the destroyed/damaged goods. • Under conditions of low electricity generation in power plants and high power flows to deficit areas, there is a risk of extensive damage to the NES that could lead to non-supply of electricity to a large number of consumers.	• TSOs/DSOs will identify ways to ensure the safe operation of the NES (manual control of the equipment, operating from the protection cabinet/control desks). • Measures shall be applied in order to extend the availability of equipment in the ETN and EDN, and of the generating units by cancelling equipment withdrawals for maintenance or investment reasons.
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Scenario 11 - Threat to key employees

Regional scenario	Probability	Impact	Implementers
5	Very low	Major	Supreme Security Council (SSC), Commission for emergency situations, Ministry of Energy, ANRE, General Inspectorate for Emergency Situations, Intelligence and Security Service (ISS), electricity market participants

Trigger event:

A threat to key employees may originate from different causes and manifest itself in different ways. These can include direct threats received through communications such as emails, phone calls or through social media, where specific threats of harm are made against specific employees. Another form of threat is workplace violence, which involves physical assaults or acts of workplace violence that jeopardize the safety of key employees.

For example, a senior manager may receive an e-mail containing explicit threats and sensitive personal information, with demands for confidential data of the company and threats of harm to the manager's family if the demands are not met. Alternatively, a person who has a claim against the company may enter the office and confront or physically assault a key employee, creating an immediate danger and disrupting the work.

Effects of the crisis	Crisis mitigation and recovery measures
• Direct threats and acts of violence may cause high levels of anxiety impacting on the physical and emotional safety of key employees, which can lead to a decrease in morale and productivity, thereby affecting their ability to perform their professional duties effectively. • Threats or threat incidents may severely disrupt the work of the organisation. These disruptions may include the temporary evacuation of employees, the initiation of internal investigations by competent authorities, as well as the disruption of on-going operations, all of which have a negative impact on the performance of the entity. • Security incidents could compromise the public image of the organisation, especially if they become known outside the internal	• The affected entities ensure that the law enforcement agencies (Police Inspectorate, the ISS, the Ministry of Internal Affairs, as appropriate) are promptly informed of any threat or incident of violence in order to trigger a rapid and appropriate intervention. It is important to provide all relevant details, including data on the individuals involved and the nature of the threat. • Entities in the electricity sector shall take additional physical and digital security measures in order to protect key employees, such as installing access control systems, video surveillance and private security services. • Entities in the electricity sector shall provide psychological counselling and support to affected employees in order to help them manage stress and anxiety.

environment. A security crisis may erode the confidence of customers, business partners and employees in the stability and security provided by the organisation. •The entity may be exposed to legal risks, particularly if it is found that adequate measures have not been implemented to protect employees. Affected employees could seek compensation or additional protection, which could lead to costly and complex legal processes. •Dealing with such a crisis involves significant costs, including for additional security measures, counselling for employees, possible legal disputes, as well as economic losses resulting from the disruption of the business activity. •The severity of such an incident can have long-term effects, such as difficulties in attracting and retaining specialists, a deterioration of the organisational climate and a decrease of trust in the management of the entity.	•Entities in the electricity sector shall establish a rapid response protocol to minimise operational disruptions in the event of similar incidents, including employee training and regular simulations. •Entities in the electricity sector shall develop a communication strategy to ensure transparency and maintain public trust. The communiqués shall be clear, swift and convey the concrete measures taken to address the crisis. •Entities in the electricity sector shall collaborate with public relations experts in order to manage public perception and protect the reputation of the entity. This may include information campaigns and involvement in community activities designed to rebuild the image of the organisation. •Entities in the electricity sector shall cooperate with specialists in labour law and safety, in order to review and update employee protection policies and manage any potential processes that may be triggered. •Entities in the electricity sector shall update internal procedures and implement a number of compliance measures in order to ensure that the entity complies with all relevant regulations and that employees are adequately protected. •Entities in the electricity sector will implement some programmes to retain key employees and attract new professionals, which will include attractive benefit packages, professional development opportunities and a safe working environment.
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3.2.4. Scenario Group - extreme weather

Scenario 12 - Solar storm

Regional scenario	Probability	Impact	Implementers
7	Very low	Major	State Hydro meteorological Service, Ministry of Energy, TSO, DSO, producers, General Inspectorate for Emergency Situations

Trigger event:

A solar storm (coronal mass circulation) is being witnessed, severely affecting northern and central Europe as well as the rest of Europe.

Effects of the crisis	Crisis mitigation and recovery measures
• The solar storm leads to the Carrington effect, which causes widespread damage to transformer units and power line insulators. • There are malfunctions of protections. • All information systems are affected. Major and long-lasting disruptions occur in communication systems, which significantly hinder the response in a crisis situation. • There are equipment trips and some equipment becomes unavailable for a very long time. • Controlled disconnections take place to prevent overload operation of the transformer units. • There are problems in supplying certain network areas over a very long period of time, correlated with the time needed to repair / replace destroyed / damaged assets.	• The State Hydro meteorological Service shall inform the authorities and entities in the energy sector with regard to the following unfavourable weather conditions. • The TSO will take the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system. • The TSOs/DSOs will activate the alternative supply schemes to restore the supply and will initiate activities to restore the triggered equipment either by repairing/replacing the damaged/destroyed equipment using the equipment from the security stock. • Upon need, the General Inspectorate for Emergency Situations shall activate the crisis situation impact management/mitigation cell, which will consist of delegating representatives of all parties involved, in order to have coordinated actions and centralising information at the country level. • The TSOs/DSOs shall take urgent measures to restore and return to service the equipment damaged in the ETN, EDN and the power plants, in order to ensure the availability of the equipment. • The DSO will include in their own plans measures to prevent and mitigate the impact of such a scenario, estimating, under different assumptions, the impact on the electricity distribution networks in the respective periods with concrete mitigation measures. • The system operators and the producers will order the mobilisation of the maximum number of personnel necessary for the restoration and normal operation of power stations and power plants. • If necessary, there will be requested emergency aid from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine).

Scenario 13 – Storm

Regional scenario	Probability	Impact	Implementers
9	Possible	Major	State Hydro meteorological Service, Ministry of Energy, TSO, DSO, producers, General Inspectorate for Emergency Situations

Trigger event:

There is an intensification of the wind that exceeds the speed of the gust up to and more than 150 km/h. Tornado outbreaks and more thunderstorms. The storm can last several hours or even days and affect a large area. Very large amounts of precipitation can occur, which can cause flooding, landslides, falling poles, broken conductors, endangering human lives and impacting the proper functioning of the undertakings.

Effects of the crisis	Crisis mitigation and recovery measures
• There are falling trees, network damages, galloping conductors, conductor breaks. • Damage to insulators, conductors or falling trees could lead to interruptions in the power supply to certain sectors of the electricity network, groups of final consumers. • Human lives may be endangered because of the possibility of electrocution due to the fall of sections of live lines. • The presence of disruptions in the communication and road transportation networks that lead to delays in carrying out the repair works of the fault and restoring the lines and the supply of electricity to consumers. • There are problems in ensuring that the N-1 safety criterion is met. • Damage to IT elements, the existence of interruptions in the supply of electricity, of medium and long-term duration, to final consumers. • Impediments in ensuring logistic chains in the supply of products to the population and the economic entities.	• The State Hydro meteorological Service shall inform the authorities and entities in the energy sector with regard to the following unfavourable weather conditions. • At ENTSO-E level, given that the situation could be anticipated, some organisational measures will be taken for TSOs to respond in case of crisis. • The TSO will take the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system. • The TSOs/DSOs will activate the alternative supply schemes to restore the supply and will initiate activities to restore the triggered equipment either by repairing/replacing the damaged/destroyed equipment using the equipment from the security stock. • Upon need, the General Inspectorate for Emergency Situations shall activate the crisis situation impact management/mitigation cell, which will consist of delegating representatives of all parties involved, in order to have coordinated actions and centralising information at the country level. • The TSOs/DSOs shall take urgent measures to restore and return to service the equipment triggered in the ETN, EDN and power plants to ensure the availability of the equipment. • The DSOs will develop their own plans for prevention and mitigation of the impact of

	such scenarios, estimating, under different assumptions, the impact on the electricity distribution networks in the respective periods with concrete mitigation measures. • The system operators and the producers will order the mobilisation of the maximum number of personnel necessary for the restoration and normal operation of power stations and power plants. • If necessary, there will be requested emergency aid from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine).
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Scenario 14 - Cold Spell

Regional scenario	Probability	Impact	Implementers
10	Likely	Critical	State Hydro meteorological Service, Ministry of Energy, ANRE, TSO, DSO, General Inspectorate for Emergency Situations

Trigger event:

A cyclone comes over the territory of the Republic of Moldova and a cold wave with negative temperatures from -10°C to -20°C and lower occurs. Water freezes in reservoirs, rivers and streams, electricity production at hydroelectric power plants decreases. Electricity consumption is increasing significantly due to the increased need to ensure heating from electricity sources, especially in urban areas. The phenomenon can be accentuated in cities and municipalities due to the lack of access to centralised heat supply for heating the space. The consumption of natural gas and other fossil fuels is high, for which reasons there is a probability that there will not be sufficient quantities for the production of electricity by MGRES, to cover the electricity consumption for the right bank of the Dniester River.

The cold spell may lead to difficulties in the logistic chains of fuel supply to several targets, as well as difficulties in operational interventions in installations and the entire national economic activity.

Effects of the crisis	Crisis mitigation and recovery measures
• These weather conditions last a minimum of 7 days. • There are difficulties in ensuring the adequacy of the NES due to the low level of production in power plants. • In conditions of very low temperatures, network incidents may occur, affecting the reliable supply of electricity to final consumers. • Due to the increase in electricity consumption, network elements that can	• The State Hydro meteorological Service shall inform the authorities and entities in the energy sector with regard to the following unfavourable weather conditions. • At ENTSO-E level, given that the situation could be anticipated, the organisational measures will be taken for TSOs to respond in case of the energy crisis. • The TSO will take the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system.

influence the reliability of the power supply will also be required. • The existence of disturbances in the electricity market due to large fluctuations in the trading price of electricity, or an insufficient level of supply. • Low generation in some power plants leads to high power flows to deficient areas, overloading of electricity network elements and results in voltage deviations and difficulties in compensating the reactive power. • For certain time frames, there are problems in ensuring the safety criterion N-1. • Also, the low level of production and the load of certain lines can affect the static and dynamic stability of the NES. • Difficulties to intervene in some areas for remediation. • The risk of the impossibility of the operation of some switching equipment, in case of interventions or manoeuvres necessary to maintain the safe operation of the electricity network. • There is a lot of pressure from the media, from the public, as well as from the political environment, to solve the crisis situation quickly, in order to ensure the energy consumption needs of the population.	• The TSOs/DSOs will activate the alternative supply schemes to restore the supply and will initiate activities to restore the triggered equipment either by repairing/replacing the damaged/destroyed equipment using the equipment from the security stock. • Upon need, the General Inspectorate for Emergency Situations shall activate the crisis situation impact management/mitigation cell, which will consist of delegating representatives of all parties involved, in order to have coordinated actions and centralising information at the country level. • The TSOs/DSOs shall take urgent measures to restore and return to service the equipment triggered in the ETN and/or EDN and to ensure the availability of the equipment. • The DSOs will develop their own plans for prevention and mitigation of the impact of such scenarios, estimating, under different assumptions, the impact on the electricity distribution networks in the respective periods with concrete mitigation measures. • The system operators will order the mobilisation of the maximum number of personnel necessary for the restoration and normal operation of power stations and electricity networks. • If necessary, there will be requested emergency aid from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine). • Producers at the request of the TSO will mobilize the entire available production capacity of the generating units (including the starting of reserve groups), both declared and undeclared on the balancing electricity market. • The TSOs/DSOs will take the necessary measures to remove the hoarfrost. • With the support of the Ministry of Energy and the General Inspectorate for Emergency Situations, through the mass media, the population will be asked to reduce electricity consumption during peak hours, as well as to use home heating equipment with caution. • The generation units that can run on alternative fuel, as the case may be, will switch to its use to increase the technological reserves of the electricity system.
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	• If necessary, in case the domestic consumption of electricity will not be covered, in order to combat the shortage of production, emergency aid will be requested from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine). • The TSO, together with the electricity market operator, shall order measures on the suspension of electricity market activities in accordance with the provisions of the Electricity Grid Code concerning the state of emergency and restoration of the power system. • ANRE will set the conditions for the export of electricity in case it is necessary to ensure the security of electricity supply. • The TSOs/DSOs, as applicable, shall apply the Regulation on manual disconnection of installations for the use of certain categories of final consumers of electricity, in order to reduce the electrical load.
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Scenario 15 - Precipitation and Flooding

Regional scenario	Probability	Impact	Implementers
11	Likely	Major	State Hydro meteorological Service, Ministry of Energy, ANRE, TSO, DSO, General Inspectorate for Emergency Situations

Trigger event:

There are large amounts of precipitation that lead to the flooding of the localities in the basins of large rivers, by affecting the surrounding localities, including the electricity networks located in the area. Overflow of reservoirs affecting power stations and equipment of hydroelectric power plants. Landslides are possible which also lead to the damage of infrastructure elements.

Effects of the crisis	Crisis mitigation and recovery measures
• The equipment trips are caused by flooded power plants. • Landslides or floods affect the stability of the poles causing the lines to become unavailable/trigger. • There is a reduction in production capacity in the affected hydroelectric power plants. • There are disturbances in the road transport network, leading to delays in carrying out repair work on the affected lines.	• The State Hydro meteorological Service shall inform the authorities and entities in the energy sector with regard to the following unfavourable weather conditions. • At ENTSO-E level, given that the situation has been anticipated, some organisational measures will be taken for TSOs to respond in case of crisis. • The TSO will take the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid

• There are problems in the powering network areas over a very long period of time, related to the time required to repair / replace damaged network assets. • There may be congestion on interconnection lines and even the inability to secure electricity exports/imports. • There is a risk of extensive damage to the NES that could lead to the non-supply of electricity to a large number of consumers.	Code concerning the state of emergency and restoration of the power system. • The TSOs/DSOs will activate the alternative supply schemes to restore the supply and will initiate activities to restore the triggered equipment either by repairing/replacing the damaged/destroyed equipment using the equipment from the security stock. • Upon need, the General Inspectorate for Emergency Situations will activate the Emergency Management Center in emergency situations, in order to have coordinated actions and centralise information at the country level. • The TSOs/DSOs shall take urgent measures to restore and return to service the equipment triggered in the ETN and/or EDN and to ensure the availability of the equipment. • The DSOs will develop their own plans for prevention and mitigation of the impact of such scenarios, estimating, under different assumptions, the impact on the electricity distribution networks in the respective periods with concrete mitigation measures. • The system operators will order the mobilisation of the maximum number of personnel necessary for the restoration and normal operation of power stations and electricity networks. • Producers at the request of the TSO will mobilize the entire available production capacity of the generating units (including the starting of reserve groups), both declared and undeclared on the balancing electricity market. • With the support of the Ministry of Energy and the General Inspectorate for Emergency Situations, through the mass media, the population will be asked to reduce electricity consumption during peak hours, as well as to use home heating equipment with caution. • The generation units that can run on alternative fuel, as the case may be, will switch to its use to increase the technological reserves of the system. • If necessary, in case the domestic consumption of electricity will not be covered, in order to combat the shortage of production, emergency aid will be requested from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid
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	Agreements signed with the transmission system operators of Romania and Ukraine). • The TSO, together with the electricity market operator, shall order measures on the suspension of electricity market activities in accordance with the provisions of the Electricity Grid Code concerning the state of emergency and restoration of the power system. • ANRE will set the conditions for the export of electricity in case it is necessary to ensure the security of electricity supply. • The TSOs/DSOs, as applicable, shall apply the Regulation on manual disconnection of installations for the use of certain categories of final consumers of electricity, in order to reduce the electrical load.
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Scenario 16 - Winter Incident

Regional scenario	Probability	Impact	Implementers
12	Likely	Critical	State Hydro meteorological Service, Ministry of Energy, ANRE, TSO, DSO, producers, General Inspectorate for Emergency Situations

Trigger event:

The temperatures are below average for the winter periods and are characterised by significant amounts of precipitation in the form of snow, or sleet and hoarfrost conditions in some areas, and frost in others. Local wind intensities lead to galloping and falling trees on power lines.

Effects of the crisis	Crisis mitigation and recovery measures
• There are several line tripping caused by snow, ice or hoarfrost or trees falling on power lines. • Damage to insulators, damaged conductors and falling trees may lead to long-lasting unavailability of power lines. • Some poles are falling due to the galloping phenomenon. • There are disturbances in the road transmission network, which leads to delays in carrying out remedial works / repair of power lines. • There are problems in ensuring that the N-1 safety criterion is met. • There are problems in supplying certain network areas over a very long period of time, correlated with the time needed to repair / replace destroyed / damaged assets.	• The TSO will take the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system. • The TSOs/DSOs will activate the alternative supply schemes to restore the supply and will initiate activities to restore the triggered equipment either by repairing/replacing the damaged/destroyed equipment using the equipment from the security stock. • Upon need, the General Inspectorate for Emergency Situations will activate the Emergency Management Center in emergency situations, in order to have coordinated actions and centralise information at the country level. • The TSOs/DSOs shall take urgent measures to restore and return to service the equipment

• Large power flows to deficient areas may lead to congestion on the interconnection lines and even the inability to ensure the export of electricity. • There is a risk for the production of an extensive damage in the electricity system that would lead to the non-supply of electricity to a large number of consumers.	triggered in the ETN and/or EDN and to ensure the availability of the equipment. • The system operators will order the mobilisation of the maximum number of personnel necessary for the restoration and normal operation of power stations and electricity networks. • If necessary, there will be requested emergency aid from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine). • Producers at the request of the TSO will mobilize the entire available production capacity of the generating units (including the starting of reserve groups), both declared and undeclared on the balancing electricity market. • The TSOs/DSOs will take the necessary measures to remove the hoarfrost.
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Scenario 17 - Multiple failures caused by extreme weather

Regional scenario	Probability	Impact	Implementers
16	High	Major	State Hydrometeorological Service, Ministry of Energy, ANRE, TSO, DSO, producers, General Inspectorate for Emergency Situations

Trigger event:

Extreme adverse weather conditions affect large areas (extreme wind, hail, heavy precipitation, ice accretion, hoarfrost, temperatures well above normal limits). At the same time, it is difficult to access the affected electricity grids in order to restore the reliable electricity supply to the affected final consumers.

Effects of the crisis	Crisis mitigation and recovery measures
• Extreme weather leads to the accidental outage of several pieces of equipment (possibly of the same type of construction) in a very short period of time. • There are disturbances in the road transmission network, which leads to delays in carrying out remedial works / repair of power lines. • Difficulties may arise in carrying out the works to remedy faults in substations, caused by a large number of equipment of the same type affected, and by the insufficiency of equipment in the safety stocks.	• The TSO will take the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system. • The TSOs/DSOs will activate the alternative supply schemes to restore the supply and will initiate activities to restore the triggered equipment either by repairing/replacing the damaged/destroyed equipment using the equipment from the security stock. • Upon need, the General Inspectorate for Emergency Situations shall activate the crisis situation impact management/mitigation cell,

• There are problems in ensuring that the N-1 safety criterion is met. • There are problems in supplying certain network areas over a very long period of time, correlated with the time needed to repair / replace destroyed / damaged assets. • There is a risk for the production of an extensive damage in the electricity system that would lead to the non-supply of electricity to a large number of consumers.	which will consist of delegating representatives of all parties involved, in order to have coordinated actions and centralising information at the country level. • The TSOs/DSOs shall take urgent measures to restore and return to service the equipment triggered in the ETN and/or EDN and to ensure the availability of the equipment. • The system operators will order the mobilisation of the maximum number of personnel necessary for the restoration and normal operation of power stations and electricity networks.
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Scenario 18 - Heat wave

Regional scenario	Probability	Impact	Implementers
28	Likely	Major	State Hydro meteorological Service, Ministry of Energy, ANRE, TSO, DSO, producers, General Inspectorate for Emergency Situations

Trigger event:

A heat wave is expected to cover a large part of Europe over a long period of time, with extremely high temperatures. There is a low water level in the reservoirs, which results in reduced production in hydroelectric power plants. Electricity consumption in the residential sector may increase due to the need for air conditioning (July 2024 experience). Local equipment failures may occur due to very high outdoor air temperatures.

Effects of the crisis	Crisis mitigation and recovery measures
• Under conditions of very high outdoor air temperatures, network incidents may occur, affecting the reliable supply of electricity to the final consumers, the tripping of equipment due to sealing faults (oil/gas leaks SF6), the incorrect operation of remote digital signal transmission devices due to excessive heating of control panels. • Due to the increase in electricity consumption, the electricity network elements that can influence the reliability of the power supply will also be required. • In electrical substations, transformer substations, vegetation fires can occur, correlated with the production of short circuits in the electrical network and melting of some materials due to imperfect contacts. • Vegetation fires can also occur in the power line protection zone. • Due to the major drought in the region and the low level of electricity production, the import prices of electricity may increase	• The State Hydro meteorological Service shall inform the authorities and entities in the energy sector with regard to the following unfavourable weather conditions. • The TSO will take the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system. • The TSOs/DSOs will activate the alternative supply schemes to restore the supply and will initiate activities to restore the triggered equipment either by repairing/replacing the damaged/destroyed equipment using the equipment from the security stock. • The TSOs/DSOs shall take urgent measures to restore and return to service the equipment triggered in the ETN and/or EDN and to ensure the availability of the equipment. • The DSOs will develop their own plans for prevention and mitigation of the impact of

considerably which could have an impact on final consumers.	such scenarios, estimating, under different assumptions, the impact on the electricity distribution networks in the respective periods with concrete mitigation measures. • The system operators will order the mobilisation of the sufficient number of personnel necessary for the restoration and normal operation of power stations and electricity networks. • With the support of the Ministry of Energy and the General Inspectorate for Emergency Situations, through the mass media, the population will be asked to reduce electricity consumption during peak hours, as well as to use home cooling equipment with caution. • If necessary, in case the domestic consumption of electricity will not be covered, in order to combat the shortage of production, emergency aid will be requested from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine).
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Scenario 19 - Dry period

Regional scenario	Probability	Impact	Implementers
29	Unlikely	Major	State Hydro meteorological Service, Ministry of Energy, TSO, DSO, General Inspectorate for Emergency Situations

Trigger event:

Low rainfall leads to low water levels in reservoirs, which results in reduced production in hydroelectric power plants, affects the cooling process of machinery at power plants that operate on the basis of the steam cycle, and also leads to a decrease in electricity production by wind farms because of the lack of wind. Vegetation fires may occur in the areas of protection of electricity networks, which will have an impact on their proper functioning and reliable supply of electricity to consumers.

Effects of the crisis	Crisis mitigation and recovery measures
• Under conditions of very high outdoor temperatures, network incidents may occur, affecting the reliable supply of electricity to the final consumers, the tripping of equipment due to sealing faults (oil/gas leaks SF6), the incorrect operation of remote digital signal transmission devices due to excessive heating of control panels. • Due to the increase in electricity consumption, network elements that can	• The State Hydro meteorological Service shall inform the authorities and entities in the energy sector with regard to the following unfavourable weather conditions. • At ENTSO-E level, given that the situation has been anticipated, some organisational measures will be taken for TSOs to respond in case of crisis. • The TSO will take the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid

influence the reliability of the power supply will also be required. • In electrical substations, transformer substations, vegetation fires can occur, correlated with the production of short circuits in the electrical network and melting of some materials due to imperfect contacts. • Vegetation fires can also occur in the power line protection zone. • Due to the major drought in the region and the low level of electricity production, the import prices of electricity may increase considerably which could have an impact on final consumers.	Code concerning the state of emergency and restoration of the power system. • The TSOs/DSOs will activate the alternative supply schemes to restore the supply and will initiate activities to restore the triggered equipment either by repairing/replacing the damaged/destroyed equipment using the equipment from the security stock. • Upon need, the General Inspectorate for Emergency Situations shall activate the crisis situation impact management/mitigation cell, which will consist of delegating representatives of all parties involved, in order to have coordinated actions and centralising information at the country level. • The TSOs/DSOs shall take urgent measures to restore and return to service the equipment triggered in the ETN and/or EDN and to ensure the availability of the equipment. • The DSOs will develop their own plans for prevention and mitigation of the impact of such scenarios, estimating, under different assumptions, the impact on the electricity distribution networks in the respective periods with concrete mitigation measures. • The producers will optimise their operating regime so that water reservoirs remain at a sufficient level to reliably supply water to residents. • The system operators will order the mobilisation of the personnel necessary for the restoration and normal operation of power stations and electricity networks. • Producers at the request of the TSO will mobilize the entire available production capacity of the generating units (including the starting of reserve groups), both declared and undeclared on the balancing electricity market. • With the support of the Ministry of Energy and the General Inspectorate for Emergency Situations, through the mass media, the population will be asked to reduce electricity consumption during peak hours, as well as to use home cooling equipment with caution. • If necessary, in case the domestic consumption of electricity will not be covered, in order to combat the shortage of production, emergency aid will be requested from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with Romania and Ukraine).
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3.2.5. Scenario Group - Technical failure

Scenario 20 - Local technical failure with regional importance

Regional scenario	Probability	Impact	Implementers
15	Likely	Minor	Ministry of Energy, ANRE, TSO, DSO, General Inspectorate for Emergency Situations

Trigger event:

There is a failure in a segment of transmission or distribution of electricity network (part of an overhead power line or a component of an electrical substation that is important for the normal operation of the NES (power transformer explosion, fall of a portion of the line, defects in a switchgear element, failure of the busbars of an electrical substation that is component part of the electricity network), which leads to non-compliance with the N-1 criterion taken into account when planning the functioning of the NES.

Effects of the crisis	Crisis mitigation and recovery measures
• There are equipment trips and some equipment becomes unavailable for a very long time. • The risk of overloads on important transformer lines and units including interconnecting lines is increasing, and then cascading faults occur. • There may be a separation of the system and some areas may operate insularised. • Difficulties arise in ensuring the adequacy of NES as a result of a low level of production in power plants. This causes a limitation or total loss of reserves. • There are major deviations of the operating parameters of the NES. • Compliance with safety criterion N-1 is no longer ensured. • Also, the low level of production and the load of certain lines can lead to the impairment of the static and dynamic stability of the NES. There is a major risk for the production of an extensive damage in the NES that would lead to the non-supply of electricity to a large number of consumers.	• The TSO shall apply the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system. • The generating groups will be loaded to the maximum available power (including starting of back-up groups). • The dispatchable consumption declared on the balancing electricity market will be reduced. • It will be requested to increase the available power of the NES, by making available the production units under repair (early restart of the units under repair). • In order to combat the shortage of production, the TSO will request emergency aid from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine). • The TSO, together with the electricity market operator, shall order measures on the suspension of electricity market activities in accordance with the provisions of the Electricity Grid Code concerning the state of emergency and restoration of the power system.

Scenario 21 - Simultaneous multiple failures

Regional scenario	Probability	Impact	Implementers
18	Very low	Major	Ministry of Energy, ANRE, TSO, DSO, producers, suppliers, General Inspectorate for Emergency Situations

Trigger event:

Simultaneous tripping of equipment due to failures in electrical substations or multiple failures in the protection of overhead power transmission or distribution lines. This can occur on interconnection lines, which may jeopardize the functioning of the entire electricity system and its stability, which could have an impact on both the activity of electricity markets and the economic activity at the country level.

Effects of the crisis	Crisis mitigation and recovery measures
• Deficient coverage of electricity consumption in certain areas of the Republic of Moldova. • Possible increase in the risk of overload of electricity network elements (lines, transformers, etc.). • Poor operation of the electricity system, forecast errors, loss of control over one or more areas of the electricity networks. • Affecting the balanced functioning of electricity markets. • The emergence of potential limitations on electricity imports/exports. • The disconnection of the user installations of some final consumers or extensive damage that can lead to the interruption of the electricity supply of a large number of final consumers. • Some electricity market participants may suffer financial losses or revenue shortfalls. • If this happens during the cold time of the year, it could cause great discomfort to final consumers who use electricity for heating or natural gas boilers, due to the impossibility of running them without electricity. • Major imbalance between electricity consumption and generation could create problems in the management of the electricity system by the central dispatcher. • Safety criterion N-1 is no longer ensured. • Difficulties may arise when carrying out repair work due to the large number of affected equipment (eventually equipment of the same type) and insufficient equipment in the stocks available at the electricity undertakings. • There are problems in supplying the electricity network areas for a long period of time related to the time needed to	• The TSO will take the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system to balance the SEN. • The TSOs/DSOs will activate the alternative supply schemes to restore the supply and will initiate activities to restore the triggered equipment either by repairing/replacing the damaged/destroyed equipment using the equipment from the security stock. • The TSO will coordinate with the adjacent system operators and ENTSO-E some organisational response measures in case of electricity crisis. • The system operators will order the mobilisation of the maximum number of personnel necessary for the restoration and normal operation of power stations and electricity networks. • Producers at the request of the TSO will mobilize the entire available production capacity of the generating units (including the starting of reserve groups), both declared and undeclared on the balancing electricity market. • With the support of the Ministry of Energy and the General Inspectorate for Emergency Situations, as well as with the involvement of suppliers through the mass media, the population, as the case may be, will be informed about the situation and will be asked to reduce electricity consumption during peak hours. • The generation units that can run on alternative fuel, as the case may be, will switch to its use to increase the technological reserves of the electricity system.

repair/replace damaged equipment, which has an impact on the economic activity of the entities.	• If necessary, in case the domestic consumption of electricity will not be covered, in order to combat the shortage of production, emergency aid will be requested from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine). • The TSO, together with the electricity market operator, shall order measures on the suspension of electricity market activities in accordance with the provisions of the Electricity Grid Code concerning the state of emergency and restoration of the power system. • ANRE will set the conditions for the export of electricity in case it is necessary to ensure the security of electricity supply. • The TSOs/DSOs, as applicable, shall apply the Regulation on manual disconnection of installations for the use of certain categories of final consumers of electricity, in order to reduce the electrical load.
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Scenario 22 - Serial equipment failure

Regional scenario	Probability	Impact	Implementers
22	Very low	Major	Ministry of Energy, ANRE, TSO, DSO, producers, General Inspectorate for Emergency Situations

Trigger event:

Abnormal operating behavior of equipment of the same construction type (caused by deficiencies in design, maintenance, material defects, poor quality of the insulating medium), causing series failure and deficiencies in the supply of electricity to all final consumers.

Effects of the crisis	Crisis mitigation and recovery measures
• Deficient coverage of electricity consumption in certain areas of the Republic of Moldova. • Possible increase in the risk of overload of other electricity network elements (lines, transformers, etc.). • Poor operation of the electricity system, forecast errors, loss of control over one or more areas of the electricity networks. • Affecting the balanced functioning of electricity markets. • The emergence of potential limitations on electricity imports/exports.	• The TSO will take the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system to balance the SEN. • The TSOs/DSOs will activate the alternative supply schemes to restore the supply and will initiate activities to restore the triggered equipment either by repairing/replacing the damaged/destroyed equipment using the equipment from the security stock. • The TSO will coordinate with the adjacent operators and ENTSO-E some

• The disconnection of the user installations of some final consumers or extensive damage that can lead to the interruption of the electricity supply of a large number of final consumers. • Some electricity market participants may suffer financial losses or revenue shortfalls. • If this happens during the cold time of the year, it could cause great discomfort to final consumers who use electricity for heating or natural gas boilers, due to the impossibility of running them without electricity. • Major imbalance between electricity consumption and generation could create problems in the management of the electricity system by the central dispatcher. • Safety criterion N-1 is no longer ensured. • Difficulties may arise when carrying out repair work due to the large number of affected equipment (eventually equipment of the same type) and insufficient equipment in the stocks available at the electricity undertakings. • There are problems in supplying the electricity network areas for a long period of time related to the time needed to repair/replace damaged equipment, which has an impact on the economic activity of the entities. • Improper behaviour in the operation of several pieces of equipment leads to equipment tripping or damage.	organisational response measures in case of electricity crisis. • The system operators will order the mobilisation of the maximum number of personnel necessary for the restoration and normal operation of power stations and electricity networks. • Producers at the request of the TSO will mobilize the entire available production capacity of the generating units (including the starting of reserve groups), both declared and undeclared on the balancing electricity market. • With the support of the Ministry of Energy and the General Inspectorate for Emergency Situations, as well as with the involvement of suppliers through the mass media, the population, as the case may be, will be informed about the situation and will be asked to reduce electricity consumption during peak hours. • The generation units that can run on alternative fuel, as the case may be, will switch to its use to increase the technological reserves of the electricity system. • If necessary, in case the domestic consumption of electricity will not be covered, in order to combat the shortage of production, emergency aid will be requested from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine). • The TSO, together with the electricity market operator, shall order measures on the suspension of electricity market activities in accordance with the provisions of the Electricity Grid Code concerning the state of emergency and restoration of the power system. • ANRE will set the conditions for the export of electricity in case it is necessary to ensure the security of electricity supply. • The TSOs/DSOs, as applicable, shall apply the Regulation on manual disconnection of installations for the use of certain categories of final consumers of electricity, in order to reduce the electrical load.
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3.2.6. Scenario Group - Natural disasters

Scenario 23 - Earthquake

Regional scenario	Probability	Impact	Implementers
30	Possible	Major	TSO, DSO, producers

Trigger event:

There has been a large-magnitude earthquake affecting a larger area. The alerts were issued seconds before the earthquake and the preparatory measures to respond to such situations could not be taken. There is a possibility of damage to equipment of the electricity networks, which would cause interruptions in the supply of electricity to some final consumers. At the same time, these overlapping factors could create panic among the population in the areas affected by the earthquake. In general, electricity networks/substation equipment is designed to withstand certain levels of stress and to recover quickly after a seismic event. However, strong earthquakes can exceed their resilience capacity, leading to significant interruptions in electricity supply.

Effects of the crisis	Crisis mitigation and recovery measures
• Due to the failure of some elements of the electricity network, there may be an interruption in the supply of electricity to some final consumers or widespread damage that may lead to the interruption of electricity supply to a large number of final consumers. • Difficulties may arise when carrying out repair work due to the large number of affected equipment (eventually equipment of the same type) and insufficient equipment in the stocks available at the electricity undertakings. • There may be accidental shutdowns of generating units at power plants in the earthquake-affected area. • There could be industrial accidents with fires, production stoppages, gas emissions or the spread of hazardous substances. • Damage may occur to buildings in electrical substations, foundations of electrical equipment or power transformers. • There are disturbances in the road transport network leading to delays in carrying out repair works on faults/repairs of power lines and power transformers. • Rescue or fire fighting teams may be required.	• The TSO will take the measures provided for in the Power System Defense Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system to balance the SEN. • The TSOs/DSOs will activate the alternative supply schemes to restore the supply and will initiate activities to restore the triggered equipment either by repairing/replacing the damaged/destroyed equipment using the equipment from the security stock. • The TSO will coordinate with adjacent operators and ENTSO-E some organisational response measures in case of electricity crisis. • The system operators will order the mobilisation of the maximum number of personnel necessary for the restoration and normal operation of power stations and electricity networks. • The General Inspectorate for Emergency Situations with the involvement of other authorities through the mass media will inform the population about the situation and will ask them to calmly deal with the situation and cooperate with the authorities. • The TSO, together with the electricity market operator, shall order measures on the suspension of electricity market activities in accordance with the provisions of the Electricity Grid Code concerning the state of emergency and restoration of the power system. • ANRE will set the conditions for the export of electricity in case it is necessary to ensure the security of electricity supply. • The repair/replacement of the affected poles and the recommissioning of the

	unavailable power lines will be initiated immediately. • Repair/replacement of defective transformers will be initiated immediately. • Buildings related to power lines, power plants and substations, and dispatch centres in the seismic zone will be inspected immediately to assess their safe operation.
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Scenario 24 - Wildfire

Regional scenario	Probability	Impact	Implementers
31	Possible	Major	TSO, DSO, General Inspectorate for Emergency Situations

Trigger event:

Forest/vegetation fires occur, whose rapid spread is favoured by dry weather. This can happen due to malicious people or due to negligence and accident cases/inattention. A catalysing factor could be wind intensification leading to the rapid and uncontrolled spread of fires.

Effects of the crisis	Crisis mitigation and recovery measures
• Wildfires can cause the destruction of electricity poles, cables and other components of the electrical infrastructure that pass through the affected areas, which could result in some difficulties in electricity supply. • During the wildfires, the trees could be affected and fall over the power lines, causing damage and disruptions in electricity supply. • The flames and heat generated by a wildfire can cause short circuits in power grids by melting cable insulation or damaging other components of the electrical infrastructure. • Ash and smoke pollution: Dense smoke and ash from wildfires can affect the operation of electrical equipment such as transformers and control equipment, reducing their efficiency and reliability. • In addition, in the event of a major wildfire, there is a risk that the authorities may cut off the electricity supply to avoid accidents or to facilitate fire-fighting operations.	• The TSO will take the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system to balance the SEN. • The TSOs/DSOs will include in their activity plans regular inspections of infrastructure and, within available sources, measures to replace obsolete equipment to increase reliability. • The TSOs/DSOs will activate the alternative supply schemes to restore the supply and will initiate activities to restore the triggered equipment either by repairing/replacing the damaged/destroyed equipment using the equipment from the security stock. • The system operators will order the mobilisation of the maximum number of personnel necessary for the restoration and normal operation of power stations and electricity networks. • The General Inspectorate for Emergency Situations with the involvement of other authorities through the mass media will inform the population about the situation and will ask them to calmly deal with the situation and cooperate with the authorities. • The repair/replacement of the affected poles and the recommissioning of the

	unavailable power lines will be initiated immediately. • Repair/replacement of defective transformers will be initiated immediately.
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Scenario 25 - Pandemic

Regional scenario	Probability	Impact	Implementers
27	Likely	Major	ANRE, TSO, DSO

Trigger event:

An epidemic/ pandemic affects countries in Europe and the region.

Effects of the crisis	Crisis mitigation and recovery measures
• The pandemic may cause a decrease in the number of workers available to maintain and repair the electrical infrastructure due to layoffs, illness or lockdowns imposed to prevent the spread of the virus. This can lead to delays in emergency interventions and in carrying out planned repairs. • The pandemic may affect the supply chains for equipment and materials needed to maintain and repair the electricity networks. Factory closures or global transportation problems can lead to delays in obtaining spare parts and other resources needed for the operation of electricity networks. • The pandemic may change the patterns of electricity use, which can lead to fluctuations in demand and the load capacity of electricity networks. For example, lockdown and social distancing measures may lead to an increase in the use of electricity by household consumers; while in the commercial and industrial sectors there may be a decrease in demand. • Staff working on the maintenance and repair of electricity networks may be at risk of becoming infected with the virus during interactions with co-workers or with the public during emergency interventions. This may affect the availability of staff and may require the implementation of additional protection and hygiene measures in order to prevent the spread of the virus.	• The TSO will take the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system to balance the SEN. • The TSOs/DSOs will prioritise the staffing of key NES positions (dispatch centres, operational staff at power stations, repair and maintenance staff, etc.), as well as establish a special work regime to ensure a coherent rotation of available staff. • The TSOs/DSOs will take the necessary measures to isolate and sanitise the workplace, in order to provide staff with the necessary materials to prevent infection at the workplace. • The TSO will coordinate with adjacent operators and ENTSO-E some organisational response measures in case of electricity crisis. • In the event of a change in the behaviour of final consumers and an increase in electricity consumption, the suppliers shall identify available sources and make additional purchases. • During peak hours, if the consumption demand is not covered, at the request of the TSO, the generators shall load the generating sets to the maximum available power. • With the support of the Ministry of Energy and the General Inspectorate for Emergency Situations, as well as with the involvement of suppliers through the mass media, the population, as the case may be, will be informed about the situation and will be asked to reduce electricity consumption during peak hours.

	• If necessary, in case the domestic consumption of electricity will not be covered, in order to combat the shortage of production, emergency aid will be requested from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine). • The TSO, together with the electricity market operator, shall order measures on the suspension of electricity market activities in accordance with the provisions of the Electricity Grid Code concerning the state of emergency and restoration of the power system. • ANRE will set the conditions for the export of electricity in case it is necessary to ensure the security of electricity supply. • The TSOs/DSOs, as applicable, shall apply the Regulation on manual disconnection of installations for the use of certain categories of final consumers of electricity, in order to reduce the electrical load.
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3.2.7. Scenario Group - The Human Factor

Scenario 26 – Human error

Regional scenario	Probability	Impact	Implementers
20	Likely	Critical	TSO, DSO, Ministry of Energy

Trigger event:

Any activity in which the staff participates or is involved is subject to the risk of being affected or compromised by human error, particularly in the case of undertakings operating critical infrastructure, and on which the security of energy supply to an area or region depends.

Effects of the crisis	Crisis mitigation and recovery measures
• Disconnection of a transmission power line, which would affect the operation of the electricity system in terms of stability of NES functioning. • Interruption of electricity supply to some areas of the Republic of Moldova. Damage to important components that may affect the normal functioning of the energy infrastructure. • Challenge at the system level of major imbalances between production and consumption, which will affect both electricity market participants and final consumers, in particular industrial consumers, the entire economy.	• The TSO will take the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system to balance the SEN. • The TSOs/DSOs will activate the alternative supply schemes to restore the supply and will initiate activities to restore the triggered equipment either by repairing/replacing the damaged/destroyed equipment using the equipment from the security stock.

• The challenge of material losses for both household and non-household consumers, due to non-delivery of electricity. • Endangering human life.	• The TSO will coordinate with adjacent operators and ENTSO-E some organisational response measures in case of electricity crisis. • The system operators will order the mobilisation of the maximum number of personnel necessary for the restoration and normal operation of power stations and electricity networks. • The General Inspectorate for Emergency Situations with the involvement of other authorities through the mass media will inform the population about the situation and will ask them to calmly deal with the situation and cooperate with the authorities. • The TSOs/DSOs will immediately initiate actions to liquidate the consequences of the incident.
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Scenario 27 - Strikes, riots, industrial action of employees of electricity undertakings

Regional scenario	Probability	Impact	Implementers
23	Unlikely	Critical	Ministry of Energy, ANRE, electricity market participants, founders of electricity undertakings, other authorities as the case may be

Trigger event:

There is evidence of strikes, riots or other protests affecting staff availability at several SEN entities.

Effects of the crisis	Crisis mitigation and recovery measures
• Strikes or protests by energy employees could lead to disruptions in the supply of electricity to final consumers, affecting both household and non-household consumers (the business environment). These disruptions can cause significant inconvenience and financial losses for companies. • Impact on industrial production, the industrial sector is highly energy-dependent and interruptions in electricity supply could affect technological processes and cause financial losses. • Disruptions in the electricity supply and possible increases in the cost of electricity caused by instability in the energy sector could lead to higher bills for household's consumers and companies. This could affect family budgets and put additional pressure on businesses. • Strikes, mass protests are based on a concrete set of demands to be met by the	• The management of the company where the mass dissatisfaction broke out with the participation of representatives of the Ministry of Energy, ANRE shall analyse and identify the main issues that led to the protests or strikes, such as working conditions, wages, benefits or other concerns related to the environment and safety, and propose potential solutions. • The management of the company where the mass discontent broke out with the participation of representatives of the Ministry of Energy, ANRE, and the founder shall initiate an open and constructive dialog with employees, trade union representatives in order to identify and address the concerns and claims of employees. • In case a solution has been identified in the negotiations between the parties, the involvement of a mediator, such as Government representatives, shall be

authorities, i.e. if they come at the expense of a market economy and are accepted by the authorities, this could be a deterrent for investors, sending a signal of instability and non-competitiveness. • Strikes and protests in the energy sector could fuel social discontent and lead to political demonstrations. If the demands of employees are not met and the situation persists, this could lead to mass demonstrations and a wider political crisis.	proposed in order to assist in finding a solution acceptable to all parties involved. • The Ministry of Internal Affairs shall provide support in guaranteeing security and public order during protests or strikes, through law enforcement and other relevant agencies, in order to prevent the situation from escalating into violence or serious disturbances. • The Ministry of Energy in cooperation with the electricity undertakings shall provide clear and transparent information to the public and employees on the status of the negotiations and the measures taken to resolve the issue, in order to avoid misinformation and escalation of tensions. • The involvement of other stakeholders, such as non-governmental organisations, international organisations and civil society, shall be ensured, where necessary, in order to ensure that the decisions taken are fair and that the proposed solutions successfully address the existing problems.
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3.2.8. Scenario Group - Other

Scenario 28 – Power system control mechanism complexity

Regional scenario	Probability	Impact	Implementers
19	Likely	Critical	Ministry of Energy, ANRE, market participants, General Inspectorate for Emergency Situations

Trigger event:

There is an overlap of independent events (the occurrence of a technical failure on a portion of the electricity transmission network important for the operation of the NES with the lack of fuel at one or more power plants, reduced generation on the right bank, which against the background of limitations in the supply of electricity is causing a wave of dissatisfaction among the population. The practice shows that it is possible that such situations may arise (the experience of 2022), during which electricity purchase contracts are concluded for a short period of one month. Other alternative scenarios could be, the occurrence of a technical failure in the electricity transmission network caused by unfavourable weather conditions overlapped with a sudden increase in the electrical load in the Ukrainian power system. Another example of overlapping events could be the lack of adequate domestic generation of electricity, with insufficient cross-border transmission capacity to import the electricity needed to cover all consumption.

Effects of the crisis	Crisis mitigation and recovery measures
• Deficient coverage of electricity consumption in certain areas of the Republic of Moldova.	• The TSO will take the measures provided for in the Power System Defence Plan drawn up in accordance with the Electricity Grid Code concerning the state of emergency and

• Possible increase in the risk of overload of electricity network elements (lines, transformers, etc.). • Poor operation of the electricity system, forecast errors, loss of control over one area of the electricity network. • Affecting the balanced functioning of electricity markets. • The emergence of potential limitations on electricity imports/exports. • The interruption of electricity supply to some final consumers or extensive damage that can lead to the interruption of the electricity supply of a large number of final consumers. • Some electricity market participants may suffer financial losses or revenue shortfalls. • If this happens during the cold time of the year, it could cause great discomfort to final consumers who use electricity for heating or natural gas boilers, due to the impossibility of running them without electricity. • Major imbalance between electricity consumption and generation could create problems in the management of the electricity system by the central dispatcher. • Safety criterion N-1 is no longer ensured. • Difficulties may arise when carrying out repair work due to the large number of affected equipment (eventually equipment of the same type) and insufficient equipment in the stocks available at the electricity undertakings. • There are problems in supplying the electricity network areas for a long period of time related to the time needed to repair/replace damaged equipment, which has an impact on the economic activity of the entities.	restoration of the power system to balance the SEN. • The TSOs/DSOs will activate the alternative supply schemes to restore the supply and will initiate activities to restore the triggered equipment either by repairing/replacing the damaged/destroyed equipment using the equipment from the security stock. • The TSO will coordinate with adjacent operators and ENTSO-E some organisational response measures in case of electricity crisis. • The system operators will order the mobilisation of the maximum number of personnel necessary for the restoration and normal operation of power stations and electricity networks. • Producers at the request of the TSO will mobilize the entire available production capacity of the generating units (including the starting of reserve groups), both declared and undeclared on the balancing electricity market. • • With the support of the Ministry of Energy and the General Inspectorate for Emergency Situations, as well as with the involvement of suppliers through the mass media, the population, as the case may be, will be informed about the situation and will be asked to reduce electricity consumption during peak hours. • The generation units that can run on alternative fuel, as the case may be, will switch to its use to increase the technological reserves of the system. • If necessary, in case the domestic consumption of electricity will not be covered, in order to combat the shortage of production, emergency aid will be requested from neighbouring TSOs according to bilateral agreements (Operational Agreements and Mutual Aid Agreements signed with the transmission system operators of Romania and Ukraine). • The TSO, together with the electricity market operator, shall order measures on the suspension of electricity market activities in accordance with the provisions of the Electricity Grid Code concerning the state of emergency and restoration of the power system.
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	• ANRE will set the conditions for the export of electricity in case it is necessary to ensure the security of electricity supply. • The TSOs/DSOs, as applicable, shall apply the Regulation on manual disconnection of installations for the use of certain categories of final consumers of electricity, in order to reduce the electrical load.
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Scenario 29 - Armed military conflict, war

Regional scenario	Probability	Impact	Implementers
-	Very low	Disastrous	Supreme Security Council (SSC), Commission for emergency situations, Ministry of Energy, ANRE, General Inspectorate for Emergency Situations, NCSE, electricity market participants

Trigger event:

An armed military conflict, war, is a violent conflict between two or more groups, states or organisations, involving the use of armed force to achieve political, territorial, economic or ideological objectives. It is characterised by strategic organisation and planning, having clear political goals and involving armed forces and military equipment. The duration of war can vary from short-term conflicts to protracted wars lasting several years, and it has a significant impact on the societies involved, causing human casualties and substantial material damage. In the context of international law, war is defined as a conflict involving hostilities between states or equivalent entities, in which the rules of war apply.

In the event of war, the electricity system can be significantly affected by the destruction of power plants, transmission/distribution electricity networks and power stations, complicating the operation and maintenance of the electricity network, limiting access to fuel and repair materials, causing instability and black-outs, having a major economic impact through financial losses and disruption of essential services to the population. The war started by Russia against Ukraine on 24 February 2022 and the bombardment of civilian energy infrastructure since 10 October 2022 has resulted in massive destruction and damage to energy infrastructure with long-lasting cross-border impact.

Effects of the crisis	Crisis mitigation and recovery measures
• Damaged power plants, electricity transmission/distribution networks and substations, which lead to short, medium and long-lasting interruptions in the supply of electricity. • Security risks and limited access for technical staff, making it difficult to carry out repairs and maintenance work. • Difficulties in accessing fuels and materials needed for repairs and running. • Voltage drops and frequent fluctuations, affecting the stability and continuity of supply of electricity. • Significant financial losses and high costs to repair and maintain the infrastructure.	• The Ministry of Energy in cooperation with ANRE, system operators, producers and other stakeholders shall develop Action Plans for such electricity crisis situations, at the various levels of crisis management. • The Ministry of Energy in cooperation with ANRE, system operators, producers and other stakeholders shall conduct crisis simulation exercises to train staff and test the operational readiness of the electricity system. • The TSOs/DSOs/producers will harden and secure power plants, electricity networks and power stations. • The TSOs/DSOs/producers will implement physical and cyber security measures in order

• Lack of access to the electricity needed to provide essential services such as drinking water, heating and healthcare.	to protect the infrastructure against attacks and sabotage. • TSOs/DSOs will develop and maintain back-up power grids in order to ensure continuity of electricity supply in the event of a breakdown. • Providing alternative sources of electricity generation such as back-up generating units and renewable energy sources. • The TSOs/DSOs/producers will establish rapid response teams to repair damaged infrastructure within tight deadlines. • The TSOs/DSOs/producers shall maintain a stock of spare parts and materials essential for quick repairs. • The Ministry of Energy, TSOs will cooperate with international organisations and other countries in order to receive technical and financial help. • The Ministry of Energy, ANRE, TSOs/DSOs/producers will participate in international programmes and initiatives in order to improve the resilience of energy infrastructure. • Investments in renewable energy sources and advanced technologies to reduce dependence on traditional energy sources. • The Ministry of Energy, NCSE shall promote energy efficiency in order to decrease electricity demand and reduce the vulnerability of the electricity system. • The Ministry of Energy, NCSE will organise awareness raising campaigns to inform the population about energy saving measures and safe behaviours in case of crisis. • The General Inspectorate for Emergency Situations will train local communities on preparedness and response measures in case of energy emergencies. • The Ministry of Energy, TSOs/DSOs/producers will continuously monitor and evaluate: Implementation of monitoring systems to detect and respond quickly to problems occurring in the power grid. • The Ministry of Energy, TSOs/DSOs/producers will periodically assess the infrastructure and update response plans based on new threats and vulnerabilities.
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IV. DUTIES AND RESPONSIBILITIES

25. In accordance with the provisions of Law on electricity, the electricity undertakings shall fulfil their obligations, including with regard to ensuring the safe, reliable and efficient operation of the electricity system, in order to ensure the supply of electricity to consumers under conditions of accessibility, availability, reliability, continuity, quality and transparency.

At the same time, the Law on electricity establishes that ensuring the security of electricity supply is the responsibility of the Government and ANRE and some mechanisms applicable in the event of electricity crises.

Therefore, in the event of an electricity crisis, ANRE is entitled to take the necessary measures to overcome the crisis and to intervene, in a non-discriminatory, proportionate and time-limited manner, in the operation of the electricity market, only as a last resort if all options provided by the market have been exhausted or where it is evident that market-based measures alone are not sufficient to prevent a further deterioration of the electricity supply situation. . These measures relate to:

(a) The establishment of additional public service obligations regarding the sale of electricity in quantities and at regulated prices;

(b) The establishment of the public service obligation regarding the centralised purchase of electricity, by open / limited tendering or negotiation without prior publication of a contract notice, necessary for universal service providers, suppliers of last resort and system operators;

(c) The establishment of the public service obligations for one or more electricity producers participating in the balancing electricity market and the system services market or to provide balancing services and system services in quantities limited by technical possibilities and at regulated prices.

In case the measures ordered by ANRE are not fulfilled by the electricity market participants, ANRE shall apply to them the financial sanction provided for by Law on electricity and shall refer the matter to the Commission for exceptional situations of the Republic of Moldova in accordance with the Regulation on emergency situations in the electricity sector.

26. In the event of an emergency situation in the electricity sector, electricity undertakings shall be obliged to mobilise all available electricity generation capacity, depending on the scenario, and to take all available measures to balance and bring the electricity system back to normal operation within the shortest possible time and to implement, where appropriate, the measures for the restore of damaged electricity networks.

27. During the existence of the emergency situation, within the limits of technical possibilities, producers, system operators and suppliers shall, as a matter of priority, ensure the supply of electricity to vital consumers and household consumers who are not obliged by Law to have their own sources of electricity supply.

28. In the event of an emergency situation, system operators are entitled to limit or interrupt the supply of electricity to certain categories of final consumers, but only under the conditions and in compliance with the procedure laid down in this Plan, in the Regulation on manual disconnections of installations for the use of certain categories of final consumers of electricity and in the Regulation on limitation of electricity consumption in emergency situations in the electricity sector.

29. The Regulation on manual disconnection of installations for the use of certain categories of final consumers of electricity shall be developed by the transmission system operator holding the license for the centralised management of the electricity system, in collaboration with other system operators, within six months after approval of the Plan. System operators and universal and last resort service providers shall, within six months, jointly examine the technical and organizational measures necessary for the development and implementation of the Regulation on limitation of electricity consumption in emergency situations in the electricity sector.

30. Restrictions on the supply of electricity in emergency situations shall be applied only in accordance with the principles set out in this Plan. Any safeguard measure established in accordance with this Plan shall be applied on a temporary basis so as to cause the least possible

disruption to the functioning of the electricity market and shall be limited to what is strictly necessary to remove the threat to safety, restore the physical integrity of persons or networks and installations of the electricity system.

31. Any safeguard measure shall be taken by the transmission system operator holding the license for the centralised management of the electricity system after consultation with other system operators involved or affected, as well as with the transmission system operators of neighbouring countries with which the electricity system of the Republic of Moldova is interconnected in conditions where they are affected or involved, in compliance with the bilateral agreements concluded, including agreements on the exchange of information.

4.1. DUTIES AND RESPONSIBILITIES OF THE CENTRAL SPECIALISED BODY OF THE PUBLIC ADMINISTRATION IN THE FIELD OF ENERGY

32. The Ministry of Energy is responsible for ensuring the implementation of the Action Plan for emergency situations in the electricity sector.

33. The Ministry of Energy has the following specific responsibilities:

a) Centralises the information received by the electricity undertakings on the situation created in the electricity system, and carries out a joint analysis with the electricity undertakings and ANRE;

b) Identifies and assesses the security risks in the electricity sector, in accordance with the methodology and regulations in force;

c) Informs the CES, through the General Inspectorate for Emergency Situations, of the situation created and the consequences that could arise in the electricity system in connection with the occurrence of events that could trigger an early warning situation or an electricity crisis situation, as well as of the measures to be taken to remedy the situation created. In order to identify the measures to be taken, the Ministry of Energy may request the support of ANRE;

d) Ensures cooperation with TSOs, DSOs, electricity producers and suppliers, ANRE, the Security of Supply Coordination Group of the Energy Community, ENTSO-E, regional coordination centres and other relevant stakeholders/interested parties as appropriate;

e) Draws up and periodically updates the Action Plan for emergency situations in the electricity sector based on regional and national crisis scenarios in the electricity sector, in cooperation with the relevant entities in the sector;

f) Ensures the fulfilment of the measures set out in the Action Plan for emergency situations in the electricity sector, in order to prevent the occurrence of electricity crisis situations;

g) Carries out the necessary formalities for the adoption of the Action Plan for emergency situations in the electricity sector and for the organisation of tests / simulations of electricity crises in cooperation with the TSO and other relevant parties;

h) Develops and establishes procedures for implementation and monitoring of operational procedures in the field of risk prevention and risk management in the electricity sector.

4.2. DUTIES AND RESPONSIBILITIES OF SYSTEM OPERATORS IN THE EVENT OF AN EMERGENCY SITUATION IN THE ELECTRICITY SECTOR

34. In accordance with the Law on electricity, during crisis situations on the electricity market, the measures taken by the TSOs, as well as by the other participants in the electricity market in accordance with the CES decisions, are mandatory and prevail over the contractual provisions and the normative acts in the field.

4.2.1. Duties and responsibilities of the TSO

35. The duties and responsibilities of TSOs are set out as follows:

a) Together with the electricity market operator shall monitor the functioning of the electricity market and, as the case may be, shall order measures on the suspension of electricity market activities in accordance with the provisions of the regulatory normative acts approved by ANRE.

b) Assessment of the possibility of an electricity crisis through the analysis of the NES in the short and medium term, for all risk scenarios;

c) Informs the CES, the Ministry of Energy and ANRE about the occurrence of any concrete and certain event that triggered the early warning situation or the electricity crisis situation, an exceptional contingency has occurred and the available remedial actions are not sufficient to maintain the normal functioning of the electricity system; the supply of electricity from outside is limited or stopped; the supply of electricity from local producers is limited or stopped, and the available supply is not able to entirely cover the electricity demand. At the same time, the transmission system operator shall submit all relevant information in this respect, as well as communicate the measures that have been and will be taken in the situation created, including measures that are not based on market mechanisms;

d) In the event of confirmation by the CES of an electricity crisis situation, shall fulfil its obligations, taking into account the need to respect the principles of not taking measures endangering human life or property, and not restricting, to the extent technically possible, cross-border flows of electricity;

e) Where necessary, applies the procedure for suspension of market activities;

f) Applies technical and commercial safety measures in the event of a crisis affecting the functioning of the electricity market;

g) Ensures the adequacy of the NES, within the limits of available measures;

h) Ensures that safety criterion N-1 is met;

i) Ensures the static and dynamic stability of the NES;

j) Contracts electrical power reserves;

k) Ensures the restoration of the functioning of the NES;

l) Ensures the repair of defects/damages produced in the ETN;

m) Ensure communication channels in order to implement control and actions to restore the functioning of the NES;

n) Implements the measures ordered by the higher decision-making structures;

o) Shall submit daily to the CES, through the General Inspectorate for Emergency Situations, information on the obligations fulfilled and the measures taken to remedy the situation created, during the early warning situation or the electricity crisis situation, in compliance with the requirements set out in Section 5 of the Regulation on emergency situations in the electricity sector;

p) Shall cooperate with the transmission system operators of neighbouring countries, including through the application of a mechanism for continuous exchange of information, in order to ensure the secure and reliable operation of the electricity transmission networks in the context of congestion management.

36. Other duties and responsibilities of the TSOs are regulated in Chapters V and VI of the Law on electricity, as well as in the regulatory normative acts approved by ANRE..

4.2.2. Duties and responsibilities of the DSOs

37. The duties and responsibilities of DSOs are set out as follows:

a) Participates in the restoration of the NES;

b) Implements the measures ordered by the higher decision-making structures;

c) Ensures compliance with the N-1 criterion at the request of the TSO;

d) Ensures interventions to remedy faults/damage in the EDN;

e) Provides communication channels in order to implement control and actions to restore the functioning of the EDN;

f) Shall immediately inform the TSO, the Ministry of Energy and ANRE, providing factual and reliable information, on the occurrence of an event affecting the delivery of electricity through the electricity distribution networks and on the measures to be taken or already taken to prevent or minimise the impact on the electricity supply to consumers in its area of activity;

g) in the event of confirmation by the CES of an electricity crisis situation, to undertake the measures set out in this Action Plan, as directed by the TSO, as well as to comply with the decisions of the CES;

h) At the initiative of suppliers, to interrupt the supply of electricity to large consumers, who have concluded interruptible electricity supply contracts;

i) to comply with the decisions of the CES as well as with the instructions of the TSOs, including with regard to the limitation of electricity supply or partial disconnection of installations of final consumers in accordance with the regulatory normative acts approved by ANRE, or, in their absence, in accordance with the staggered disconnection schedules. coordinated with other system operators (staggered disconnection schedules);

j) To take the necessary actions to partially re-supply the affected consumers through other functional electricity networks, as far as technically possible;

k) To take over and safely distribute the additional amounts of electricity made available by suppliers and producers;

l) To take the necessary measures to remove the frost covering.

m) To take the necessary steps to remove, as soon as possible, any technical faults occurring in the electricity distribution networks and to restore them to normal operating conditions;

n) At the request of the suppliers, to interrupt the supply of electricity to final consumers who have concluded contracts with the suppliers for the voluntary disconnection of electricity supply in the event of emergency situations;

o) To inform on a daily basis the transmission system operator holding the license for centralised management of the electricity system (hereinafter - the responsible transmission system operator) about the obligations fulfilled and the measures taken to remedy the situation created, during the alert or emergency situation;

p) Upon the disappearance of the causes that triggered the alert situation or emergency situation, immediately notify the responsible transmission system operator;

q) Submit, without delay, in full and qualitative volume, all the information requested by the responsible transmission system operator, the CES and the Ministry of Energy;

r) Immediately resume the activity under normal conditions, as instructed by the transmission system operator, in connection with the disappearance of the causes that triggered the early warning situation or the electricity crisis situation.

38. Law on electricity regulates other obligations and responsibilities of the DSO.

4.2.3. Duties and responsibilities of electricity producers

39. Duties and responsibilities of electricity producers are set out as follows:

a) To immediately inform the transmission system operator, the electricity suppliers, the Ministry of Energy and ANRE, presenting concrete and reliable information, on the occurrence of a concrete event leading to the essential limitation or even stoppage of electricity production at the power plant it operates;

b) In the event of confirmation by the CES of an electricity crisis situation, to undertake the measures set out in this Plan, as directed by the responsible transmission system operator, as well as to comply with the decisions of the CES;

c) In the context of interruption or limitation of the supply of natural gas, producers generating electricity at CHPs are to take the necessary measures in relation to the switch to alternative fuels for electricity production, using for this purpose their own reserves or, at the decision of the CES, and/or from state reserves;

d) As instructed by the system operator and to the extent technically possible, provide the full available electrical capacity of its power plant and/or increase/decrease electricity generation;

e) Maintain in working order, within the limits of technical possibilities maintain, at least one generator set per plant;

f) Take the necessary measures to remedy the situation at its power plant and to ensure the immediate resumption of electricity production under normal operating conditions;

g) Inform the responsible transmission system operator of the obligations fulfilled and measures taken to remedy the situation created during the electricity crisis;

h) Submit, without delay, in full and qualitative volume, all the information requested by the responsible transmission system operator, the CES and the specialised central body;

- i) Upon the disappearance of the causes that triggered the early warning situation or the electricity crisis situation, immediately notify the responsible transmission system operator;
- j) Immediately resume the activity under normal conditions, as instructed by the transmission system operator, in connection with the disappearance of the causes that triggered the onset of the electricity crisis;
- k) Participates in the restoration of the NES;
- l) Implements the measures ordered by the higher decision-making structures;
- m) Ensures the maintenance of the production units at the level notified on the electricity market, or, as the case may be, at the level established by the order of the dispatcher;
- n) Provides system services necessary to maintain the operational security of the NES;
- o) Ensures fuel reserves necessary to maintain the production units in operation;
- p) Ensures the intervention to remedy the malfunctions/damages occurred at the production units;
- q) Provides communication channels for the implementation of control and restoration actions.

4.2.4. Duties and responsibilities of system service providers

40. At least the following duties and responsibilities shall be established for system service providers:

- a) Ensures the power reserves and other necessary services according to the level notified on the electricity market, established by the order of the dispatcher.
- b) Provides communication channels for the implementation of control and restoration actions.

V. PROCEDURES AND MEASURES IN CASE OF EMERGENCY SITUATIONS IN THE ELECTRICITY SECTOR. DECLARING THE ELECTRICITY CRISIS SITUATION

5.1. Entity responsible for declaring an electricity crisis situation

41. Electricity undertakings shall be obliged to inform the TSO when they experience any event that may affect the security of electricity supply. In case the TSO identifies elements that may trigger a potential emergency situation in the electricity sector, it shall immediately notify the CES and the Ministry of Energy.

42. The existence of an electricity crisis shall be also ascertained by the CES at the request of the Ministry of Energy or ANRE. In order to establish the crisis scenario, the Ministry of Energy may convene for consultation the Commission for emergency situations of the Ministry of Energy (hereinafter referred to as the CESME).

43. The CESME shall have an advisory role in assessing the conditions for the existence of an electricity crisis situation, the prevention of an electricity crisis situation, the determination of possible associated consequences, as well as the proposal of necessary measures for the management of each electricity crisis scenario, if have not been already defined by this plan. The composition and Regulation of the CESME shall be approved by Order of the Ministry of Energy. The composition of the CESME includes representatives of ANRE, TSO, DSOs and other companies in the electricity, natural gas and thermal energy sectors. Independent experts with relevant experience in the situations under consideration may be invited to the meetings of the CESME.

44. In the event of an electricity crisis situation or the liquidation of its consequences, the CES's activity is supported by the Operational Center for Emergency Situations, created by the General Inspectorate for Emergency Situations.

45. Within 12 hours of the referral, the CES shall verify whether the conditions for establishing the existence of an electricity crisis situation and the corresponding crisis scenario are met.

46. In the event that, after verification, the CES finds no signs of an electricity crisis, the electricity undertakings shall immediately resume their activity under normal operating conditions.

47. In case the conditions of the electricity crisis scenarios are met, the CES shall ascertain the existence of the electricity crisis situation and the corresponding electricity crisis scenario.

48. The TSO shall notify DSOs, electricity suppliers, as well as adjacent TSOs in neighboring countries about the CES's ascertaining of the electricity crisis situation and, depending on the situation, shall apply measures set out in this Plan.

49. In case the CES identifies one of the crisis scenarios associated with electricity crisis situations, the Ministry of Energy shall immediately notify the Energy Community Secretariat as well as the competent authorities of the neighbouring countries and shall provide them with all necessary information, in particular information on the actions the CES intends to take.

50. Upon the disappearance of the causes that led to the crisis situation, the TSO immediately notifies the Ministry of Energy and the CES through the General Inspectorate for Emergency Situations.

51. Within 12 hours at the latest, the CES shall ascertain the end of the electricity crisis situation and notify the TSO and the Ministry of Energy.

52. Following the end of the electricity crisis situation, the system operators, as well as other electricity market participants, shall be obliged to immediately return to normal operating conditions.

53. In case the CES finds that the electricity crisis situation has ended, the Ministry of Energy shall immediately notify the Energy Community Secretariat as well as the competent authorities of neighbouring countries.

54. After the end of the crisis situation, the Ministry of Energy shall submit to the Energy Community Secretariat, as soon as possible but no later than six weeks after the end of the electricity crisis situation, a detailed assessment of the crisis situation and the effectiveness of the measures implemented, including the assessment of the economic impact of the crisis situation, the impact on the energy sector and the assessment of the assistance provided or received from the countries that are part of the Energy Community. This assessment shall be made available to the Security of Supply Coordination Group of the Energy Community, and shall be reflected in the update of the Action Plan for emergency situations in the electricity sector.

5.2. The stages of action in the event of an electricity crisis situation

55. The main stages of action in the event of an electricity crisis situation are as follows:

- Declaring an electricity crisis situation;
- Informing / communicating about the electricity crisis situation;
- Assessing the situation and risks, taking into account the provisions of the Regulation and the crisis scenarios set out in the Action Plan;
- Identifying the necessary resources (human, material and equipment) in accordance with the Action Plan;
- Field analysis of the effects of the crisis;
- Choosing the response strategy, implementing the response strategy;
- Termination of the electricity crisis situation;
- Post-incident analysis and establishing measures for the future prevention.

5.3. Appropriate mechanisms for information flows

56. The management of the crisis situation depends directly on the quality of the information provided to decision-makers.

57. The relevant information shall be immediately reported to the CES.

58. Depending on the crisis situation, the CES shall take the following measures:

- Will issue Pre-Alert information providing information on the possible occurrence of an electricity crisis situation;
- Will issue an Alert notification, informing that, although the crisis situation is not imminent, worsening/aggravating elements have emerged;
- Will issue a Danger Warning, informing that a crisis situation is imminent and those responsible shall take the necessary measures to minimize the damage/loss that will be caused by the crisis situation.
- Declaring a crisis situation

59. The following command centres will be used to inform and coordinate the actions:

- Central Dispatch Service (CDS);
- Local dispatching centres within SE Moldelectrica;
- Branches of the high voltage electricity networks (HVPN) of the SE Moldelectrica JSC;
- Dispatchers of the distribution system operators;
- Dispatchers at the level of electricity producers;
- Dispatchers at the level of large electricity consumers;

60. These centres shall transmit all relevant information regarding:

- The status and functioning of the NES;
- The measures ordered by the CES;
- The manner of implementation of actions/measures ordered by the CES;
- The issues related to the evolving crisis situation.

61. All information available in the territory is centralised at the Central Dispatching Service, which provides information to the CES. Information to the public and the media will be centralised

through a press officer appointed by the CES. In the process of the implementation of the provisions of this Plan, the heads of each organisational unit within the SEN entities shall identify and appoint the essential crisis management personnel.

62. The following categories of essential personnel will be identified:

- Technical and non-technical management staff;
- Operational staff (operational management, operational maintenance);
- Communications staff;
- Maintenance staff;
- Procurement staff;
- Staff for transportation of materials;
- Emergency staff;
- Staff in charge of labour protection;
- Staff in charge of occupational medicine and occupational health;
- Staff for external communication.

63. At the beginning of the crisis, the TSO shall organise the intervention teams that will act in the following directions:

Operational

- Identifies potential hazards that may arise and takes steps to eliminate them;
- Takes measures to disconnect/withdraw from service the damaged equipment;
- Takes measures for the safe closure of production units (where appropriate);
- Takes other measures depending on the evolution of events and the specificities of the crisis situation.

Maintenance

- Intervenes to repair faulty equipment;
- Identifies potential hazards that may arise and takes steps to eliminate them;
- Takes other measures depending on the evolution of events and the specificities of the crisis situation.

Security

- Restricts access to non-essential personnel;
- Provides access to essential personnel;
- Provides access for evacuation vehicles or ambulances.

Administrative

- Provides assistance for rescue operations and transportation to medical centres;
- Ensures the record of the staff actively participating in the crisis situation;
- Other measures arranged depending on the evolution of events and the specificities of the crisis situation.

Labour protection

- Ensures the necessary measures in terms of labour protection;
- Assists in the measurement of emissions / concentrations of harmful gases;
- Identifies and collects evidence, information related to labour protection aspects necessary for post-incident analysis / investigation;
- Other measures arranged depending on the evolution of events and the specificities of the crisis situation.

Occupational medicine

- Ensures the access and rapid intervention of medical personnel for first aid;
- Ensures the provision of medical care; requests specialist medical care;
- Other measures arranged depending on the evolution of events and the specificities of the crisis situation.

Fire fighting

- Intervenes quickly to identify and extinguish fires;
- Requests the intervention of fire-fighters of the General Inspectorate for Emergency Situations
- Evacuation of personnel from fire areas;

- Other measures arranged depending on the evolution of events and the specificities of the crisis situation.

Transport

- Ensures the availability of the entire vehicle fleet for intervention and evacuation actions;
- Ensures the presence of specialized personnel at the scene of the incident to ensure intervention in case of minor breakdowns of intervention vehicles, ambulances, etc.;
- Ensures the refuelling of vehicles, equipment, backup generators;
- Assists in organising transport conditions;
- Other measures arranged depending on the evolution of events and the specificities of the crisis situation.

Communication

- Ensures the functionality of the communication network;
- Intervenes to repair faulty communication equipment;
- Other measures arranged depending on the evolution of events and the specificities of the crisis situation.

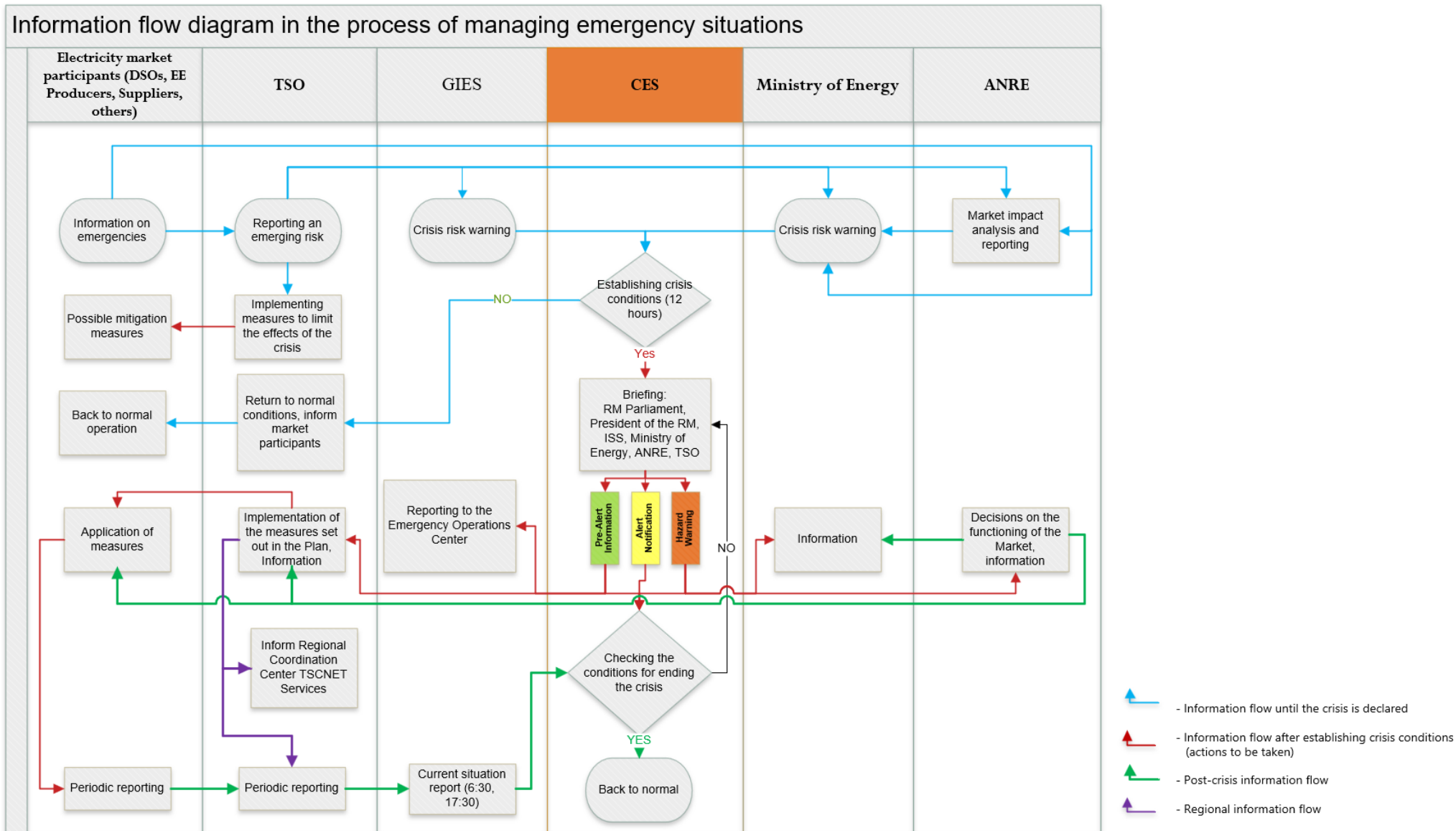


Figure 8. Diagram of information flows in the conditions of prevention, launch and management of the electricity crisis

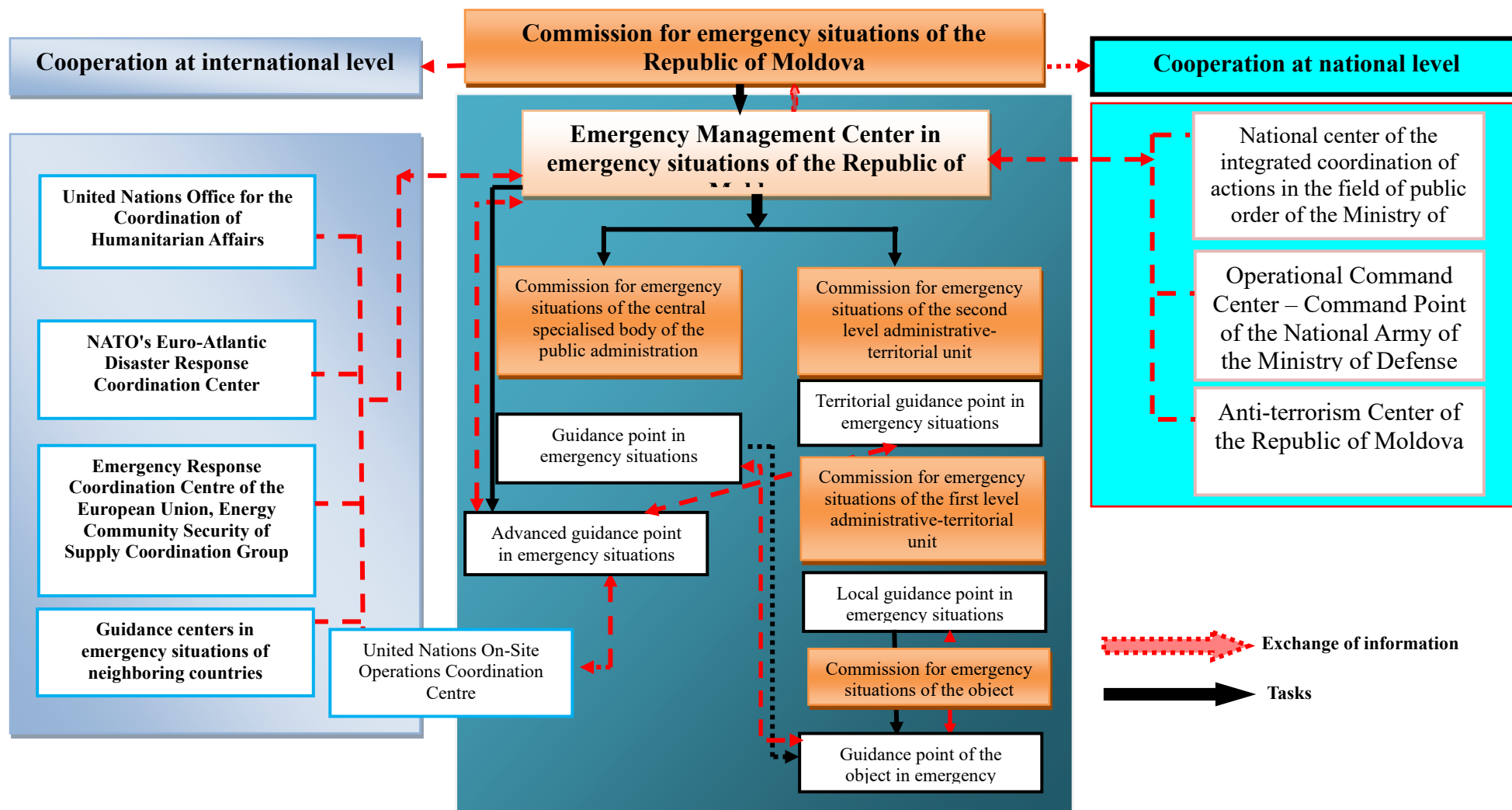


Figure 9. Information flow within the Guidance centre in emergency situations of the Commission for emergency situations of the Republic of Moldova (According to Annex No 2 of the Regulation of the Guidance centre in emergency situations of the Commission for emergency situations of the Republic of Moldova)

5.4. National procedures and measures

64. In accordance with the requirements of the Law on electricity, and those of the Electricity Networks Code on the state of emergency and restoration of the power system, approved by ANRE Decision, a set of safety measures are established to be applied in order to prevent or limit the effects of emergency situations that may occur in the operation of the NES.

5.5. Measures on the functioning of the energy market

65. The basic principle of crisis action is to allow the electricity market to function even in situations where both supply and demand are limited and the price of electricity fluctuates sharply.

66. The Defence Plan of the electricity system, developed in accordance with the Electricity Networks Code on the state of emergency and restoration of the electricity system, provides for two categories of defence measures, which are applied by both the Transmission System Operator (TSO) and the Distribution System Operator (DSO). The first category includes technical measures with no impact on the electricity market, the second category consists of technical and commercial measures, and the last category is the limitation of electricity consumption.

67. Limitation/reduction of consumption shall be applied as a measure of last resort, taking into account the vital importance of consumers, in the first place industrial consumers who have the technical possibility to reduce consumption by appropriate adaptation of the technological process. The contracts for the supply of electricity will provide for the possibility of disconnection of electricity supply under the conditions of implementation of the Defence Plan for the electricity system and the Action Plan for emergency situations in the electricity sector.

68. In accordance with item 9.3 of Annex No 2 of the Regulation on the supply of electricity approved by ANRE Decision No 169/2019 on the approval of the Regulation on the supply of electricity in situations not covered by the Contract, the parties are guided by the provisions of the legislation in force and the decisions of the National Agency for Energy Regulation.

69. Chapter III of the Electricity Market Rules regulates the activities in crisis situations on the electricity market, referring to the compliance with the Action Plan for emergency situations in the electricity sector, approved by the Government.

70. According to the Electricity Grid Code, item 658, the TSO shall establish a list of contingencies that includes internal and external contingencies within its observability area, assessing whether these contingencies jeopardize the operational security of the national electricity system. The contingency list shall include both ordinary and exceptional contingencies.

5.6. Measures with no impact on the electricity market

71. The safeguards measures that shall be applied to prevent a crisis in the functioning of the NES shall include the maximum use of the balancing market and as a result shall not affect the functioning of the electricity market, ensuring the following:

- The generating units will be loaded to the maximum available power (including starting of back-up groups).
- It will be requested to increase the available power of the NES, by making available the production units under repair (early restart of the units under repair).
- Reduction of the dispatchable load declared as a load offer on the electricity balancing market;
- Requesting emergency assistance from neighbouring TSOs.

5.7. Technical measures according to the NES Defence Plan

72. The technical measures provided for by the NES Defence Plan consist of the transposition of the following NES protection schemes:

- Automatic frequency control scheme at negative frequency deviation;

- Automatic frequency control scheme at positive frequency deviation;
- Automatic scheme against voltage collapse.

73. The automatic under-frequency and over-frequency control scheme is a mechanism to prevent interruption of the power system in the event of major disturbances in the system.

5.8.Organisational measures according to the NES Defence Plan

74. The organisational measures of the NES Defence Plan include the following procedures applicable in order to defend the electricity system:

- Frequency deviation management procedure;
- Voltage deviation management procedure;
- Energy flow management procedure;
- Support for the active power procedure;

5.9.Technical and commercial measures with an impact on the electricity market

75. The technical and commercial defence measures, which shall be applied to prevent a crisis in the operation of the NES and which may affect the functioning of the electricity market, are as follows:

- In production units that can run on alternative fuels, the measure will be applied to increase the technological reserves of the system, with a view to use them as the case may be;
- Reduction/cancellation of available interconnection capacity;
- Reduction/cancellation of notified export transactions;
- Cessation of the allocation of interconnection capacities or allocation of capacities to a supplier;
- The gradual limitation of electricity consumption, under the conditions established by Government Decision and in accordance with the Regulation on manual disconnection of the installations of certain categories of final consumers of electricity and/or the Regulation on limitation of power and energy to consumers developed by the TSO and approved by ANRE.

76. At the onset of a crisis, the TSO may apply technical and commercial defence/safeguard measures to prevent crisis situations affecting the functioning of the electricity market, namely:

- In production units that can run on alternative fuels, the measure will be applied to increase the technological reserves of the system, with a view to use them as the case may be;
- Reduction and/or cancellation of available interconnection capacity;
- Reduction and/or cancellation of notified export transactions;

5.10. Measures regarding manual disconnection

77. In unforeseen situations, which jeopardise the functioning of the NES, there is also the possibility of manually disconnecting certain categories of industrial consumers. Under the conditions of ensuring the technical and organizational requirements, these consumers can be resupplied at a minimum level of technological power, so that the security of both the installations and the personnel is not endangered. If the respective consumers do not comply with the technological limit, their user installations will be disconnected from the electricity network.

78. The manual disconnection of consumption shall be carried out only in emergency situations occurring in the operation of the NES in accordance with the Regulation on manual disconnection of installations for the use of certain categories of final consumers of electricity. At the moment the procedure (Schedule of emergency shutdowns 6-10 kV and 110 kV networks) is applied.

79. The Regulation on manual disconnection shall be applied as a last resort, in situations, which could not be anticipated in the operation of the NES, and which jeopardise the operation of the NES or of an area. The given solution is applied to prevent the spread or aggravation of this situation.

80. Disconnection of consumer installations and the Regulation on manual disconnection shall apply in the following emergency situations of operation of the NES:

- During operation in isolated mode (due to the system split, MD system or entire UA-MD block) and impossibility to keep the system balance and maintain the frequency, after activation of the automated under frequency load shedding (AFLS), if the frequency cannot be restored and maintained at values > 49 Hz, in the isolated region due to lack of available active power;
- Isolating an area of the NES, if the frequency and/or voltage cannot be restored to values allowing synchronisation of the power generating units or synchronisation of that area of the NES, because of the lack of available active power in the area;
- Through the supply network of an area of the NES (lines, transformers, autotransformers), loads exceeding the permissible limit values in terms of equipment (thermal limit) occur, which cannot be removed by other measures during overload;
- In an area of the NES, or in most of it, after all control measures have been taken, the voltages remain at most equal to the disconnection voltage of the final consumers' installations, and this situation may jeopardise the stability of operation;
- The decrease below the normal limits of the reserve in relation to the static stability limit of the power flows by a characteristic section, through which a deficit area is supplied, until the beginning of the slow tertiary reserve in that area or, when it is missing, until the application of the Regulation on limitation of power and energy to consumers, applied gradually, in crisis situations in the operation of the NES;
- When there is a lack of power during a short period of time of $4 \div 48$ hours, which leads to an hourly deviation from the programmed balance that is inadmissible according to ENTSO-E rules and agreements with system operators in the synchronous area, until the mobilisation of the slow tertiary reserve or, when it is missing, until the application of the Regulation on limitation of power and energy to consumers, in instalments, in crisis situations in the operation of the NES;
- Any other situation of imbalance in the electricity system which cannot be compensated for by other means of increasing electricity production or limiting electricity consumption.

5.11. Special protection against disconnection

81. The Regulation on manual disconnection shall be developed taking into account the Criteria for drawing up the lists of final consumers whose installations may be disconnected from the electricity grid, as presented in Annex 1 to this Plan. It applies only to final consumers included in the respective Regulation. Industrial consumers, who through the technological process used, have the ability to be disconnected for a predetermined period, will be disconnected and then supplied at the minimum technical power.

82. The Regulation on manual disconnection shall be applied until the previously established conditions disappear, as a result of the changed situation in the SEN, or until the successful implementation of recovery measures (mobilisation of control energy, commissioning of network elements) or, when this is not possible, until the application of the Regulation on power and energy limitations to consumers.

83. The regulation of power and energy limitations to consumers shall be applied in the following crisis situations in the functioning of the NES:

- National fuel shortages;
- Energy shortages, driven by the external factors;
- Energy shortages, driven by the defence needs of the country;
- Energy shortage in a deficient area of the NES, as a result of the unavailability of production sources in the area and the limited capacity of the network to ensure the transmission of energy needs from other areas, in a safe way.

84. The determination of the probability of the occurrence of a crisis in the functioning of the NES shall be made by the TSO on the basis of the ENTSO-E methodology, considering:

- The available capacity of the generation sources, declared by the producers, which will take into account:

- (a) The fuel stocks and the conditions for carrying out the economic activities which provide them;

- (b) The state of the National Natural Gas Transmission System;

- (c) The volume of water reserves in the reservoirs;

- (d) The availability of electricity generating units;

- Electricity consumption in the NES, or in an area of the NES;
- Availability of ETN and EDN.

85. Also, at regional and European level, the process of Short Term Adequacy forecasts (STA) is carried out daily by the Regional Security Coordinator (RSC), based on the daily analysis for the next seven days.²⁰²¹ The TSO is at the early stage of affiliation to the RSC. It is one of the processes according to the catalogue of measures in the framework of the interconnection to the synchronous area of continental Europe. First of all, the certification by the RSC of the TSO SE Moldelectrica is requested. Secondly, - to include as eligible costs the costs related to joining one or more regional centres (RSC/RCC), most probably TSCNET or partly SELENE for different processes. In the short term, in the event of the emergence of crisis situations in the functioning of the NES provided for in item 113 and the immediate intervention of the TSO is necessary, the TSO shall take all necessary measures to limit or eliminate the crisis situations without waiting for the decision of the Commission for emergency situations, including the application of the regulations for disconnection or limitation of electricity consumption.

86. Regulation on limitation of power and energy to final consumers shall apply only following the adoption of a provision of the Commission for emergency situations, as a last safeguard measure taken in crisis situations in the operation of the NES, which can be foreseen in the medium and long term, which jeopardises the functioning of the NES or an area of the NES.

87. In critical situations in the NES, the non-household consumers included in the above-mentioned regulation shall be notified in written form by the the system operators to which they are connected about the provision of application of the Regulation on power and energy limitations to final consumers. If the system operator did not have sufficient time to notify the consumers in written form in advance, it shall notify them after the start of the application of the Regulation.

5.12. Prevention and preparedness measures

88. Prevention and preparedness measures at the planning stage:

- Analysis of the in-service behaviour of electrical equipment (determining equipment with a high failure rate and eliminating non-conformities).
- Analysis of in-service behaviour of lines (detecting areas of frequent tripping caused by extreme weather phenomena).

²⁰ RSCs are companies owned by its TSO members. They provide services to TSOs, such as the provision of a regional electricity system model or advanced computing services for the TSOs, that determine the most cost-effective remedial actions, without constraining the TSOs to the national borders.

²¹ On 1 July 2022, the Regional Security Coordinators (RSCs) evolved into Regional Coordination Centers (RCCs). The major objective of RCCs is to implement and execute new tasks (services) in addition to the 5 historical tasks.

These regular tasks (such as Common Network Model (CNM), Coordinated Security Analysis (CSA), Coordinated Capacity Calculation (CCC), Pan-European Short-Term Adequacy (STA) and Pan-European Outage Planning Coordination (OPC)) and the new RCCs tasks are all listed in EU Regulation 2019/943.

The requirements for the continued implementation of the 5 historical tasks and the implementation of new tasks are entirely included in this Regulation. <https://www.coreso.eu/regional-security-coordinators-evolve-into-regional-coordination-centres/>

- Imposing specifications for the purchase of electrical equipment in order to ensure its proper functioning in case of low temperatures.
- Imposition through design regulations of enhanced earthquake safety conditions for the most important lines for the NES, for the buildings of substations and control centres, for the foundations of electrical equipment and transformer units.
- Imposition through design regulations of increased safety conditions for the most important lines for NES (use of active conductors with low coefficient of expansion, use of conductors with high mechanical resistance).
- Using electrical equipment with composite insulators instead of porcelain in areas with high seismic activity.
- Testing of old generation equipment.

89. Prevention and preparedness measures within development and investment works:

- Initiation of major investment/maintenance works to reduce the effects of line galloping, improve the level of line insulation, etc.
- Replacement of concrete poles with steel poles.
- Realization of the ETN development plan.
- Realization of the EDN development plan.
- Installing line-monitoring systems.
- Regular audit and updating/ upgrading the security of information systems.
- The use of modern and high-performance forecasting techniques based on multi-criteria analysis, leading to a robust dimensioning of the NES power reserves.

90. Preventive and preparatory measures when performing maintenance works:

- Realization of the ETN development plan.
- Realization of the EDN development plan.
- Implementation of the maintenance plan for electricity generating companies.
- Maintenance of control systems.
- Maintenance of system automations.
- Maintenance of automations in power plants.
- Maintenance of AUFLS and UVLS.
- Maintenance of heating systems.
- Elimination of weaknesses and deficiencies in transmission and distribution networks.
- Oil filling, SF6 gas.
- Elimination of "hot" spots.
- Checking the functioning of equipment.
- Checking backup generators.
- Checking the rechargeable batteries.
- Regular checks on the condition of the foundations of poles in areas adjacent to rivers and lakes.
- Checks on the route of the lines where there is a risk of landslides.
- Checking the operation of the tap-regulating switches on transformers.
- Carry out maintenance of the safety corridors of the lines and clearing vegetation inside the safety strips.
- Mowing vegetation inside stations.
- Maintenance of switching equipment (separators) in proper condition to allow ice-free handling on contacts.
- Maintenance of station constructions (concrete poles and bars, machine foundations) and foundations and foundations for line poles.
- Maintenance in good working condition the installations in relay cabins, batteries and telecommunication cameras.

- Maintenance in good working conditions the cooling systems of power transformers.
- Snow removal on roads and access roads to power stations.

91. Prevention and preparedness measures on facilities::

- Provision of fuel for back-up generators.
- Provision of back-up generators, uninterruptible power supplies (UPS) and rechargeable batteries.
- Appropriate equipment with fire extinguishers in stations.
- Provision of disinfectants, masks and gloves for employees.

92. Prevention and preparedness measures as well as training and education:

- Training staff in fire prevention and fire extinguishing in electrical installations.
- Training staff on the risks of breaches of cyber security systems.
- Professional training of operational staff.

93. Other prevention and preparedness measures:

- Information and education programmes for staff on pandemic control at national programme level.
- Measuring the temperature of employees.
- Individualisation of the working hours of employees (shift work or staggered working hours, etc.).
- Regular ventilation, sanitation and disinfection of workspaces.
- Restrictions on access to control rooms of the dispatcher control centres and remote control centres and control rooms of the respective ETN stations.

5.13. Mitigation and recovery measures

94. Mitigation and recovery measures for staff:

- Consignment schemes;
- Provision of technical intervention personnel;
- Provision of auxiliary intervention personnel (financial, commercial, logistics, of the General Inspectorate for Emergency Situations;
- Provision of reservations for operational and technical staff for intervention and operation (use of managerial, or semi-skilled, or similarly qualified personnel to ensure continuity, reduce the number of shifts, extend the working hours, etc.).

95. Mitigation and recovery measures concerning necessary materials and equipment:

- Provision of intervention with back-up poles and line accessories (insulators, clamps, conductors);
- Provision of electrical wiring stock;
- Provision of mobile cells;
- Provision of stock of electrical equipment;
- Elaboration of standard tenders for intervention works (replacement of equipment, poles, transformer units) and assessment of average time for replacement/remediation.
- Provision of backup generators;
- Provision of rechargeable batteries;
- Provision of fuel reserve supply for back-up generators;
- Provision of oil and gas SF 6 reserves;
- Provision of winter supplies (clothes, food, etc);
- Provision of car fleet availability.

96. Other mitigation and recovery measures:

- Provision of independent (back-up) means of communication;

- Provision of spaces with special facilities (accommodation, food, sanitation, medical and psychological services) to protect the personnel with essential responsibilities for the functioning of the NES;
- Conclusion of contracts with companies specialised in construction and assembly work in the electrical field;
- Conclusion of agreements with companies that have equipment for intervention.

5.14. Operating procedures (OP)

97. The TSO shall establish and implement the necessary operating procedures taking into account the provisions of:

- (a) Electricity Grid Code concerning the state of emergency and restoration of the electricity system;
- (b) The Power System Defence Plan and the Power System Restoration Plan, developed in accordance with the Electricity Grid Code concerning the state of emergency and the restoration of the power system;
- (c) The rules for the resolution of imbalances, balancing capacity and balancing electricity in the Republic of Moldova in case of suspension of market activities in accordance with the Electricity Grid Code concerning the state of emergency and restoration of the power system;
- (d) Principles of Fault Elimination in the 110 kV - 400 kV power grids;
- (e) Instruction for the elimination of faults in the absence of telecommunications connections in the 110 kV - 400 kV power grids;
- (f) Regulation on manual disconnection;
- (g) Regulation on the dispatch management of the electricity system;
- (h) Regulation on connection to electricity grids and provision of electricity transmission and distribution services;
- (i) Electricity Grid Code concerning the operation of the electricity system.

98. In the event of extensive damage in the NES, intervention shall be carried out pursuant to the instructions for damage limitation/elimination in accordance with the following Operating Procedures:

- Principles of fault elimination in the 110 kV - 400 kV electricity transmission and distribution network;
- The Power System Defence Plan and the Power System Restoration Plan, developed in accordance with the Electricity Grid Code concerning the state of emergency and the restoration of the power system;

5.15. Regional and bilateral procedures and measures;

5.15.1. Agreed cooperation mechanisms in the region. Provision of coordination before and during the electricity crisis

99. The Regional Security Coordinators (RSCs) currently provide a set of mandatory services to all TSOs with which they are affiliated, in accordance with legislation of the EU, such as:

- Establishing common network models;
- Coordinated security analysis;
- Coordinated capacity calculation;
- Coordination of the withdrawal programme;
- Short-term forecast of adequacy;

- Support for the coordination of defence and restoration plans.

In addition to the services mentioned above, the RSC TSCNET (to which the TSO SE Moldelectrica is in the process of affiliating, according to Regulation 2019/943) is working with the TSO and other RSCs on an early warning system, in order to identify and mitigate potential Critical Grid Situations (CGS).

Since 2010, the IT platform EAS (ENTSO-E Awareness System) has been developed at the level of ENTSO-E. This IT platform provides all partner TSOs with a real-time overview of the European power transmission network, a better understanding of the problem in case of an emergency or disruption. The EAS platform provides the TSO with the opportunity to:

- Develop skills to assess the type and size of a disturbance;
- Decide whether to intervene or not, without worsening the state of the system;
- Coordinate measures to solve problems related to the restoration/recovery of consumption, production, electricity network and system;
- Get options for cooperation with other TSOs.

Throughout the electricity crisis, the European IT platform EAS shall be used and ENTSO-E and the Regional Coordination Centers shall be informed about the measures taken. The coordinated measures established by them shall be taken in accordance with the procedures, regulations and international agreements in force.

In this way, the crisis situation is managed in collaboration and coordination with all TSOs in the region, through the entities within ENTSO-E and the Regional Coordination Centres, applying the dedicated procedures in place, coordination on Short-Term Adequacy, frequency monitoring and cross-border exchanges by the Regional Coordination Centres.

5.15.2. Regional and bilateral crisis actions

100. The regional and bilateral crisis actions are the following:

- Urgent communication and consultation with similar institutions at regional and/or bilateral level with a view to analyse the effects caused by the electricity crisis situation;
- The announcement of the electricity crisis situation at the level of ENTSO-E;
- Synchronisation at bilateral/regional level in order to implement the response strategy;
- Acting towards the crisis management and crisis exit strategy.

Other measures:

- Improving the indicators on adequacy of the electricity systems in the region with the help of the common power reserve and the additional reserve available at the interface with neighbouring regions, as well as setting the maximum quantities of electricity to be delivered at regional or bilateral level;
- Improving security of supply (SS) by eliminating congestion;
- Substantial increase in net interconnection capacity;
- Post-incident analysis and future prevention measures.

101. Triggers for support/assistance.

Among the triggers that require support and assistance for the TSO are:

- Major disruptions in the NES in a certain part of the country, and the Transmission System does not have the capacity to sustain the deficit from one area to another;
- Difficulties arise in ensuring the adequacy of the NES as a result of unscheduled tripping of production capacity;
- The triggers specific to risk scenarios with effects at regional level emerge;
- The restoration of the neighbouring power system requires this

5.15.3. Mutual assistance agreements for cooperation and coordination of actions before and during the electricity crisis

102. In the region to which the Republic of Moldova belongs, the following bilateral operational agreements are in force:

- Agreement on the provision of mutual emergency energy assistance to ensure the reliable operation of the energy systems of the Republic of Moldova and Romania, signed between SE Moldelectrica and the National Company for Electricity Transmission Transelectrica JSC, which provides for the supply of a quantity of electricity between the two countries in order to assist one of the countries facing a crisis;

- Agreement on the provision of mutual emergency energy assistance to ensure the reliable operation of the energy systems of the Republic of Moldova and Ukraine, signed between SE Moldelectrica and Ukrenergo, which provides for the supply of a quantity of electricity between the two countries in order to assist one of the countries facing a crisis;

- The Operational Agreement between the TSOs of the Republic of Moldova and Romania, which provides, where appropriate, for the granting of aid for the restoration of the NES through interconnection lines;

- The Operational Agreement between the TSOs of the Republic of Moldova and Ukraine which provides support, as much as possible, to the restoration of the neighbouring system by maintaining the voltage on the interconnection lines, and the supply of a quantity of electricity through the interconnection lines between the two electricity systems. This agreement is part of the bilateral operational agreement (Operational agreement on establishment of a regulation unit within the energy systems of Ukraine and the Republic of Moldova), which includes an Annex on joint action in the event of a breakdown.

103. Within the Energy Community, the Security of Supply Coordination Group of the Energy Community, established by Procedural Act 2008/02/MC-EnC of 11 December 2008, amended by Procedural Act 2021/03/MC-EnC of 30 November 2021, is hereby set up. In the event of an existing, imminent threat to security of supply or in case of a disruption of supply affecting one part of the Energy Community and involving another party or a third country, the Group shall coordinate, where appropriate, the measures taken at the national level.

VI. CRISIS COORDINATOR AND STAKEHOLDER CONSULTATIONS

104. The crisis coordinator in the Republic of Moldova is the Commission for Emergency Situations, having the attributions and responsibilities specified in section 5.1.

105. The declaration of the electricity crisis situation shall be made in accordance with section 5.1.1. The convening of the Commission for Emergency Situations is organised at the request of the TSO through the General Inspectorate for Emergency Situations. The Commission may also be called upon by the regulatory authority or the Ministry of Energy to ascertain the emergence of electricity crisis.

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Tel: + 373 (22) 250 131;

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National Agency for Energy Regulation:

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Web: <https://anre.md>

General Inspectorate for Emergency Situations:

MD-2012, municipality of Chisinau, 75 Stefan cel Mare Boulevard

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Web: <https://www.dse.md/>

TSO, SE Moldelectrica:

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Network Management Department, SE Moldelectrica:

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104. In order to develop the Plan concerned, public consultations were held with the specialised central authorities in accordance with the provisions of Article 32 of Law No 100/2017 on normative acts, and with the following relevant entities/participants in the electricity sector:

- National Agency for Energy Regulation;
- Intelligence and Security Service;
- Electricity producers, Associations of Renewable Energy Producers ;
- Congress of Local Authorities from the Republic of Moldova
- Transmission System Operator;
- Distribution System Operator;
- Electricity suppliers;
- Business Associations, Investor Associations etc.

VII. ELECTRICITY CRISIS PREPAREDNESS TESTS

No	ELECTRICITY CRISIS PREPAREDNESS TESTS	OBJECTIVES OF THE TEST	DATE
1.	Testing and training of the Central Dispatcher Directorate	<i>(Information to be communicated after completion of consultations with the entities concerned)</i>	To be determined (TBD)
2.	Testing and verifying the functioning of the power supply systems of the internal services of the ETN and EDN power stations (back-up generators, storage batteries)	<i>(Information to be communicated after completion of consultations with the entities concerned)</i>	TBD
3.	Testing the functioning of communication systems at national level, with monitoring of information flow	National testing exercise: - Testing information flow at national level - Testing the decision-making process <i>(Information to be communicated after completion of consultations with the entities concerned)</i>	TBD
4.	Testing of generators with the capability of starting without a voltage source in the system and of generating units with the possibility of isolated operation or isolated on own services	<i>(Information to be communicated after completion of consultations with the entities concerned)</i>	TBD
5.	Cyber security testing (Cyber attack simulation)	<i>(Information to be communicated after completion of consultations with the entities concerned)</i>	TBD
6.	Earthquake crisis scenario testing exercise	<i>(Information to be communicated after completion of consultations with the entities concerned)</i>	TBD
7.	Fire extinguishing tests (Fire simulation and evacuation)	<i>(Information to be communicated after completion of consultations with the entities concerned)</i>	TBD
8.	Staff Table Top Exercise with the support of the International Organization for Migration (IOM) and the United Nations High Commissioner for Refugees (UNHCR).	Enhancing the level of preparedness of the Commission for Emergency Situations of the Republic of	19-20 December 2023

		Moldova for action in emergency situations	
9.	Staff Table Top Exercise	Strengthening the prevention, preparedness and response capacities of the central and local public administration at levels I and II, as well as public entities responsible for managing emergency and exceptional situations in case of floods on the Dniester River	30 April 2024
10.	Crisis cell for operative decision-making and centralisation of incoming information	Planning prevention and intervention measures in the context of complicated weather conditions	07-10 January 2024
11.	Table Top Exercise (TTX) for coherent resilience 2024 Moldova (CORE 24-M TTX) co-organized by the NATO Centre of Excellence for Energy Security, the Ministry of Energy of the Republic of Moldova and the NATO Office.	The objective of the exercise was to Strengthen the state's resilience against hybrid threats targeting the energy infrastructure and the ability to detect, isolate and mitigate the effects of technical and cyber incidents on the energy infrastructure, support the capacity of the authorities to respond to situations caused by hybrid attacks on the energy sector, exercise cooperation and coordination of strategic communication between key actors in the energy and cyber sector of the Republic of Moldova.	12-14 March 2024
12.	The Ministry of Energy in partnership with the Council of European Energy Regulators (CEER), through the EU4Energy Programme "Promoting the transition to clean energy in the Eastern Partnership countries" organised the	Improving cyber security practices and tools in the energy sector and strengthening the knowledge and capacity of beneficiaries to	19-20 June 2024

	regional training on cyber security "Improving cyber security in the Eastern Partnership countries"	improve cyber resilience.	
13.	Cross-sectoral workshop "Countering Hybrid Threats"	Building a realistic and shared understanding of the hybrid threat environment facing the nation. Identifying additional national capabilities, interoperability and capacities that are required to counter effective hybrid threats (gaps and vulnerabilities). Enabling the development or proposals to improve national methods and approaches to counter hybrid threats.	24-26 July 2024

to the Action plan for emergency situations in the electricity sector

Criteria for drawing up the lists of final consumers whose utility installations may be disconnected from the electricity grid in accordance with the Regulation on manual disconnection of utility installations of certain categories of final consumers of electricity

1. Consumers of vital importance are consumers who need to be supplied with electricity as a matter of priority, depending on the technical possibilities available. At the same time, the consumers not included in the list of consumers of vital importance shall be treated equally and non-discriminatorily, to the extent of the technical possibilities of the system operators to supply them, as consumers whose electricity installations may be disconnected in emergency situations in the electricity sector.

2. In preparing the list of consumers of vital importance, the provisions of the Rules for the development of electrical installations, the Action Plan for emergency situations in the electricity sector, the experience of previous periods of establishing the measures for preparing the national economy and the social sphere for the autumn-winter period will be taken into account.

3. The following groups of electricity consumers will be included in the list of consumers of vital importance by system operators:

1) Public Medical-Health Institutions - Republican, Regional, District, Municipal Hospitals, Public Medical-Health Institution - National Center for Pre-hospital Emergency Medical Assistance, National Blood Transfusion Center and National Public Health Agency, nursing homes and orphanages;

2) The natural gas compression and metering stations, the thermal power plants of the centralised heat supply systems connected to the voltage level 6-10 kV, the pumping stations that ensure the operation of the public utilities in municipalities and cities, depending on the technical possibility of the system operators;

3) Dispatch centers of electricity, natural gas, water and heat supply services;

4) Headquarters of central public authorities (Government, Presidency, Parliament), institutions for defence (headquarters of the Ministry of Defense), security and public order (Intelligence and Security Service, General Inspectorate for Emergency Situations, Ministry of Internal Affairs, Customs Service);

5) The airport, power supply stations for urban electric transportation, the electrical installations of the SE Calea Ferata din Moldova, which ensure the security of railway traffic, including the dispatchers;

6) State television and radio broadcasting service (SE Radiocomunicatii, PI Teleradio-Moldova);

7) Power plants with a capacity exceeding 1000 kW, connected to medium-voltage electricity grids;

8) Other consumers not falling into the types specified in paragraphs (1-7), but who have electrical receivers that are assigned to category I of reliability in the electricity supply and are thus classified by the system operators in accordance with the provisions of the Rules for the arrangement of electrical installations, including those with autonomous sources.

4. The criteria for drawing up the lists of consumers whose installations may be disconnected from the electricity grid in emergency situations in the electricity sector, as established below, shall refer exclusively to the possibility of full disconnection of the medium-voltage electricity grid, the 6/10 kV feeder from the substations of the electricity transmission system operator or the electricity distribution system operators.

5. The system operators shall respect the principle of equity and proportionality in terms of the number of consumers/amount of load disconnected per different administrative-territorial units (districts/municipalities, etc.) when drawing up the list of feeders that can be disconnected.

6. The total number of feeders that can be disconnected will be grouped into an "N" number of blocks of approximately equal electrical power (based on historical consumption). The transmission system operator at the suggestion of the distribution system operators shall carry out the identification of the blocks.

7. The system operators shall establish the hourly load profile of each of the identified blocks of feeders in their management area, for each day of the week and on a seasonal basis;

8. The transmission system operator shall distribute the deficit profile proportionally per system operator. Each system operator shall ensure the activation of the blocks in its management area by determining the tranches of disconnection of the blocks in such a way as to ensure that the power deficit profile attributed to its management area is compensated, and establishing the amount of load to be disconnected in each tranche.

9. Depending on the value of the load disconnected in each disconnection tranche, the load value of a block of loads (feeders) and the specific time frame (season, day of the week, hourly time frame), the number of blocks to be disconnected in each hourly time frame of the day shall be determined.

10. In establishing the disconnection schedule of the load blocks for each tranche and each time frame, the disconnected feeders shall be alternated in such a way as to avoid disproportion in the part related to the number and duration of the interruption of the same consumers.

Example system operator chart:

- Total load that can be disconnected per system – 120 MW;
- Number of load blocks - 12, respectively, the disconnectable load of each block - 10 MW, marked as follows: A, B, C, D, E, F, G, H, I, J, K, L;
- For simplicity, a linear profile of loads that can be disconnected will be considered and no seasonal division will be done;
- Time periods considered - 3 periods of 8 hours each: (1) 00:00 a.m.- 8:00 a.m.; (2) 8:00 - 4:00 p.m.; (3) 4:00 p.m. - 0:00 a.m.

This results in the following charts for different tranches:

Tranche 1 - 30 MW deficit, 3 load blocks have to be disconnected in each time interval

	Monday			Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
A																					
B																					
C																					
D																					
E																					
F																					
G																					
H																					
I																					
J																					
K																					
L																					

Tranche 2 - 60 MW deficit, 6 load blocks have to be disconnected in each time interval

	Monday			Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
A																					
B																					
C																					
D																					
E																					
F																					
G																					
H																					
I																					
J																					
K																					
L																					

Tranche 3 - 90 MW deficit, 9 load blocks have to be disconnected in each time interval

	Monday			Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
A																					
B																					
C																					
D																					
E																					
F																					
G																					
H																					
I																					
J																					
K																					
L																					

Tranche 4 - 120 MW deficit - all blocks will be disconnected

	Monday			Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
A																					
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ABBREVIATIONS

ACER	Agency for the Cooperation of Energy Regulators
SSC	Supreme Security Council
CES	Commission for Emergency Situations
ANRE	National Agency for Energy Regulation of the Republic of Moldova
AUFLS	Automatic load shedding by frequency
UVLS	Automatic load relief after voltage
CESME	Commission for Emergency Situations of the Ministry of Energy
DEC, DCD	Central Energy Dispatching, Central Dispatching Directorate
GIES	General Inspectorate for Emergency Situations
EAS	ENTSO-E Awareness System
EENS	Unsupplied electricity
GCI	Global Cyber security Index
OPL	Overhead power line
LOLE	Expected loss of electrical power
MC	Ministerial Council
ME	Ministry of Energy
MGRES	Thermoelectric power plant of the Republic of Moldova
N-1	A safety criterion, which means that the electricity network must remain in operation even during the unplanned loss of an important component, generating unit or connection.
DSO	Distribution System Operator
TSO	Transmission System Operator
OP	Operating procedures
RCC	Regional Coordination Centre
EDN	Electricity Distribution Network
ETN	Electricity Transmission Network
SOR	System Operating Regions
SOR CE	SOR Central Europe
SOR EE	Eastern Europe system operating region
RSC	Regional Security Coordinator
SAIDI	Average duration of interruption in the electricity distribution network
SCADA	Supervisory Control and Data Acquisition System
NES	National Electricity System. It includes all the installations for the production, transmission, distribution and use of electricity in the Republic of Moldova, which, regardless of the operator of the respective installation, are interconnected with each other and have a common and continuous regime of production and consumption of electricity.
ISS	Intelligence and Security Service
STA	Short-term adequacy forecast
EU	European Union
TBD	To be determined