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Societate Administrată în Sistem Dualist

Compania Națională de Transport al Energiei Electrice
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Directorate

No. 35981/23.07.2024

NOTE

on the approval by The General Meeting of Shareholders of "ETG Development Plan 2024 - 2033"

I. General information

The "ETG Development Plan for the period 2024-2033" (hereinafter referred to as PDRET) was prepared by NPG CO. Transelectrica S.A. in accordance with the provisions of Art. (1) and para. (2) of the Law on Electricity and Natural Gas No 123/2012, as amended and supplemented, according to which:

"(1) At least every two years, the transmission system operator shall prepare and submit to ANRE the 10-year transmission network investment and development plan, in line with the current status and future evolution of energy consumption and sources, including imports and exports of energy, after prior consultation with all stakeholders. The network development plan shall contain effective measures to guarantee the adequacy of the system and the security of electricity supply. The transmission system operator shall publish the 10-year network development plan on its website.

(2) The development plan referred to in para. (1) shall in particular:

a) contain, in particular, the arrangements for the financing and implementation of investments in transport networks, taking account also of plans for the development and systematization of the territory they may cross, subject to compliance with environmental protection rules;

b) indicate to market participants the main transport infrastructures to be built or upgraded over the next 10 years;

c) contain all investments already established and will identify new investments to be undertaken in the next ten years;

d) provide a timeframe for the implementation of investment projects.

(2[^]1) When elaborating the 10-year network development plan, the transmission system operator shall take fully into account the potential use of dispatchable consumption, energy storage facilities or other resources as an alternative to system expansion, as well as the expected consumption, trade with other countries and investment plans on European Union level and regional networks, and the targets undertaken by Romania for the achievement of the European Union's overall objective.

(3) The plans referred to in para. (1) shall be approved by ANRE."

II. Substantiation

According to the powers and duties established by the Law on Electricity and Natural Gas no. 123/2012 with subsequent amendments and completions, according to the Technical Code of the Transmission Grid and the Conditions associated with Licence no. 161 for the provision of the electricity transmission service, for the provision of the system service and for the management of the balancing market, with subsequent amendments and completions, NPG CO. Transelectrica S.A. carries out the planning activity regarding the development of the Electricity Transmission Grid (ETG).

For this purpose, NPG CO. Transelectrica S.A. elaborates every 2 years an ETG Development Plan for the next 10 successive years, a document that is submitted to ANRE for approval. In accordance with art. 37, para. (1), let. b) of the Law on Electricity and Natural Gas No 123/2012, as amended and supplemented, the transmission system owner "shall finance and/or agree on the method of financing investments in the electricity transmission network, established by the transmission and system operator and approved in advance by ANRE, which has the obligation to carry out consultations with the transmission and system operator and other stakeholders".

ETGDP is a comprehensive overview of the issues related to the operation of the electricity transmission network, integrated in the context of the National Energy System and the electricity market, intended for electricity market participants, regulators and decision-makers in the electricity sector. It includes information on the electricity generation and consumption sectors, the characteristics and performance of the electricity transmission system, as well as other information useful for assessing existing and potential market opportunities.

ETGDP includes projects for the refurbishment, modernisation of transmission stations, development projects consisting of new transmission lines, new transformer units, new stations, new stations, IT platforms, data acquisition systems, monitoring, EMS SCADA command and control, etc.

The ETGDP is based on the analyses carried out in accordance with the Procedure regarding the substantiation and criteria for the approval of investment plans of the transmission and system operator and electricity distribution operators approved by Ord. ANRE no.204/2019 with subsequent amendments and completions.

Also, the elaboration every two years of the ETG Development Plan is in line with the obligation of NPG CO. Transelectrica S.A. to participate, as a member of the European TSO association ENTSO-E, in the elaboration of the European development plan (*Ten Year Network Development Plan - TYNDP*).

The ETG Development Plan for the period 2024-2033 was internally endorsed in CTES Transelectrica on 29 March 2024 and has to be submitted to ANRE for approval by July 1, 2024.

The ETG Development Plan for the period 2024-2033 was submitted for public consultation from 1st to 30th April 2024 by posting it on the website www.transelectrica.ro in the News section.

In the Annex to the DECISION no. 1947 of November 2, 2022 on the approval of the Development Plan for the Electric Transmission Grid for the period 2022-2031 it was requested that "the next revision of the ETG Development Plan shall be submitted for approval to the National Energy Regulatory Authority by July 1, 2024".



III. Proposals

In view of the foregoing, pursuant to item 4. of the Annex to ANRE Decision no. 1947/02.11.2022, as well as to art.14, paragraph 2, letter n) of the Company's Articles of Association, the proposal is submitted for approval to the Extraordinary General Meeting of the Company's Shareholders:

- "The ETG Development Plan 2024-2033 - main coordinates" which contains the presentation of the necessary ETG development projects and their implementation over time.

Directorate

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"RET Development Plan for the period 2024 - 2033 - main coordinates"

1. Introduction

In accordance with the powers and duties established by the Law on Electricity and Natural Gas no. 123/2012 with subsequent amendments and completions and the Conditions associated with Licence no. 161 for the provision of electricity transmission service, for the provision of system service and for the management of the balancing market, with subsequent amendments and completions, NPG CO. Transelectrica S.A. carries out the planning activity regarding the development of the Electricity Transmission Grid (ETG).

The NPG CO. Transelectrica S.A. elaborates every two years an ETG Development Plan for the next ten successive years, a document that is submitted to ANRE for approval.

The elaboration every two years of the ETG Development Plan is in line with the obligation of NPG CO. Transelectrica S.A. to participate, as a member of the European TSO association ENTSO-E, in the elaboration of the European *Ten Years Network Development Plan* (TYNDP) every two years.

According to Article 10 of the Procedure on the substantiation and criteria for approving the investment plans of the transmission and system operator and electricity distribution operators approved by ANRE's President Order no. 204/2019:

(1) The TSOs shall carry out the following short term - for the next 5 years - and long term - for the next 10 years - perspective analyses of the ETG, which shall form the basis for the development plan:

- the current state and future evolution of electricity consumption, structure and capacity of generation sources, including imports and exports of electricity, taking into account forecasts for the development of cross-border exchange capacities - Chapter 5, Annex 1*
- analysis of the ETG according to the age and technical condition of its elements, with breakdown by geographical areas, voltage levels and network elements - Annex 6, Annex E3;*
- verification of the ETG under static and transient stability conditions, in order to identify the critical areas of the network and the works needed to increase operational safety, optimise and make it more efficient - Annex 3;*
- analysis of the level of power losses at the characteristic load curve levels, identification of critical areas and elements and establishment of the necessary measures to reduce these losses - Annex 3, Chapter 6.3.2;*
- assessment of the potential for increasing the energy efficiency of the ETG, identification of measures to improve its energy efficiency, establishment of the timetable for implementation of measures - Annex 4;*



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- *analysis of the service performance level according to the indicators laid down in the specific regulations in force, identification of significant influencing factors, establishment of necessary measures to improve service performance, and control of main influencing factors - Annex 6, Annex 7, Chapter 6;*
- *analysis of the short, medium and long term peak load system adequacy through methods taking into account the structure of generation capacities and the degree of uncertainty induced by the share of available power of renewable generation capacities in the total available power at the level of the NES - Annex 2;*
- *analysis on the assessment of the flexibility of the ETG - Annex 3 ;*
- *identification of areas and ETG elements for which investments in modernisation or retrofitting are required - Annex 6, Annex 7, Chapter 6;*
- *identification of network areas where development and extension works are needed - Annex 3, Chapter 6;*
- *prioritisation of investments by detailing the prioritisation criteria and the type of analyses that formed the basis for the preparation of the timeline for the implementation of the planned investment works - Annex 3, Annex 6, Chapter 6;*
- *assessment of the total value of the investment works and the level of annual investment expenditure, as well as identification of the sources of financing (from own funds, borrowed sources, financial contributions, revenues from the allocation of cross-border interconnection capacities) - Chapters 7, 8, 9;*
- *identification, substantiation and value estimation of the benefits pursued by the realisation of the investments included in the plan (e.g. improvement of the ETG's operational safety indicators, performance indicators, reduction of operation and maintenance costs, reduction of CPT, connection of new users, fulfilment of legal obligations, etc.) - Chapter 2, Annex F4, feasibility studies;*
- *updating the status of interconnection projects in correlation with the European list of projects of common interest and with the national targets assumed at national level regarding the degree of interconnection at EU level - Chapters 2, 6, Annex F3;*
- *assessment of the impact on regulated tariffs of expenditure on the realisation of investments included in the plan - Chapter 9.3;*
- *correlation of the 10-year electricity transmission network development plan with similar electricity transmission network plans of neighbouring countries, resulting from the collaboration with neighbouring TSOs, highlighting obligations of the TSOs and the positions in the 10-year electricity transmission network development plan involved in these correlations/collaborations - Chapters 2, 6;*
- *comparative analysis of the investment projects showing the modifications compared to the previous edition of the plan approved by ANRE, with documented justification of each modified objective - Chapter 7, Annex F3;*
- *analysis of the realisation of the investments included in the 10-year transmission grid development plan approved by ANRE, presenting a value estimate of the impact*



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of delays or non-implementation of the investments included in the previous edition of the development plan (where applicable, the technical implications that may significantly affect the ETG's operating parameters and/or influence the realisation of ongoing or planned investment projects shall be detailed - Annex F3, Annex 3,

- the plan of maintenance works necessary to ensure the safe operation of the ETG or compliance with legal obligations (laws, licence conditions, technical standards), detailing the method of implementation (with own forces or with third parties), the estimated cost of maintenance works and the schedule for ensuring the maintenance of the network, drawn up in accordance with the provisions of the maintenance regulation - Annex 7;*
- analysis of measures and programmes aiming to ensure cyber security of information systems - Chapter 6.3.3.*

(2) The 10-year ETG development plan includes:

- brief presentation of the national and European context in the field of electricity transmission, ongoing strategies and policies, objectives and targets contributing to the achievement of the investment projects in the development plan, as well as the principles and methodologies used in the elaboration of the development plan, the assumptions and scenarios developed, the directions of action - Chapters 4, 5, 2;*
- the investment works identified as necessary in the ETG during the 10-year perspective period, following the analyses referred to in paragraph (1), the phasing over time of the investment projects, the total amount and the estimated annual investment expenditure for each investment project, indicating the sources of financing (own funds, borrowed sources, financial contributions, revenues from the allocation of cross-border interconnection capacities) - Chapters 6, 7, 8, 9;*
- presentation of the changes in the list of investment projects compared to the previous edition of the 10-year development plan approved by ANRE, with documented justification of each modified/eliminated objective - Chapter 7.1;*
- presentation of the stage of implementation of the investments included in the previous edition of the 10-year ETG development plan approved by ANRE, including the estimated values of the impact of delays or non-realisation of the investments included in the previous edition of the development plan - Chapter 7.1, Annex F3, Annex 3;*
- investment needs identified during the consultation process carried out by the STO;*
- presentation and argumentation of the correlation and compliance of the Plan with Romania's medium and long term Energy Strategy, with the non-binding 10-year network development plan at Union level referred to in Art. 30, para. (1) let. (b) of Regulation (EU) 2019/943 and with the National Energy and Climate Plan submitted in accordance with Regulation (EU) 2018/1999, editions in force - Chapter 5.*

For each analysis requested in accordance with the Procedure on the substationation and criteria for the approval of the investment plans of the transmission and system operator and



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electricity distribution operators approved by ANRE's Presidential Order no. 204/2019, the chapter or annex of the Development Plan in which the results of the respective analysis were presented was mentioned above.

All these analyses resulted in the projects included in the ETG Development Plan. Many of these projects have been included in previous, approved editions of the Development Plan, and the current edition presents the status of the projects and reconfirms the need for them.

2. Comparative analysis of investment projects included in this edition of the Development Plan 2024 compared to the previous edition 2022

In the period since the approval of the previous Development Plan, the following projects have been finalised:

❖ *Refurbishment /modernisation ETG:*

- Refurbishment of the 400/110/20 kV Domnesti station;
- Refurbishment of the 220 kV Oțelărie Hunedoara station
- Refurbishment of the 220/110/ kV Raureni station
- AT and T replacements in stations - stage 2 - phase 2:
 - Replacement of AT - 200 MVA at 220/110/20 kV Vetis station
 - Replacement of AT2 - 200 MVA at 220/110/20 kV Cluj Floresti station
 - Replacement of AT - 200 MVA at 220/110/20 kV Ghizdaru station
 - Replacement of AT1 - 200 MVA at 400/220/110/20 kV Urechesi station
 - Replacement of AT2 - 200 MVA at 220/110/20 kV Turnu Magurele station
 - Modernisation of the 110 kV Bacau South and Roman North stations on the 400 kV Moldova axis
 - 110 kV, 220 kV and 400 kV mobile cells;
 - Replacement of 3 BC 100MVA/400 kV units at Arad, Smârdan, Bucharest South stations.

❖ *Security of consumption supply:*

- Installation of T3-250 MVA (400/110 kV) Trafo T3-250 MVA (400/110 kV) at 400/110 kV Sibiu South station
- Replacement of AT3-ATUS FS 400/400/160 MVA 400/231/22 kV at 400/220 kV Portile de Fier station
- Installation of the second 400/220 kV, 400 MVA, 400 MVA HV at Iernut station;

❖ *Intergration of production from new power plants - Dobrogea and Moldova*

- Connection of the 400 kV Isaccea - Varna and 400 kV Isaccea - Dobrudja OHL to the 400 kV Medgidia Sud station. Stage I - Expansion of the 400 kV Medgidia Sud station

❖ **Increase of the interconnection capacity and integration of production from SRE:**

- 400kV Oradea-Nădab OHL

The following new investment projects have been introduced in the current edition of the Development Plan:

A. Retrofitting/modernisation ETG:

- Modernisation of the 400/110/20kV Drăgănești Olt station;
- Modernisation of the 220/110/20kV Grădiște station;

C. Security of consumption supply: 400/110kV Botoșani station

D. Intergration of production from new power plants - Dobrogea and Moldova

- Installation of the second 400/110kV transformer in Suceava station
- the reconductoring of the 400kV Brașov-Gutinaș OHL.
- the reconductoring of the 220kV Bucharest South-Fundeni OHL.
- **Power flow control devices to avoid overloads on the 220kV Bucuresti Sud-Fundeni 220kV Bucuresti Sud-Fundeni OHL before the reconductoring. Such devices were included in the ETG Development Plan 2022-2031 but the location was not specified.**
- Modern means of voltage regulation (SVC) in the stations: 400kV Gura Ialomiței, 400kV Arad, 220kV Brazi Vest. Such devices were included in the ETG Development Plan 2022-2031 but the location was not specified.

The sizing of SVC equipment and power flow control devices will be determined by dedicated studies.

E. Integration of production from power plants-other areas:

- **Power flow control devices to avoid overloads on the 220 kV Urechești - Târgu Jiu Nord - Pârșeni - Baru Mare - Hășdat OHL before the reconductoring is carried out**

F. Increase of the interconnection capacity and integrating production from SRE

- Equipping circuit 2 of the 400kV Nădab-Bekescaba 400kV OHL under project 259.
- 400kV Gutinaș (RO) - Strășeni (MD) 400kV OHL according to the memorandum signed in December 2023

Compared to the approved edition of the Plan, the following investment projects have been excluded in the current edition:

- Installation of fibre optics on the 400 kV Isaccea - Vulcanesti OHL. This project will be reintroduced in the Development Plan at a time agreed with Moldelectrica
- Modernisation of the protection control and control command system and integration in the CTSI of the Drăgănești Olt station (it was integrated in the station modernisation project);
- Modernisation of the protection control command and control system and integration in the CTSI of the Grădiște station (it was integrated in the station modernisation project);

In the category of projects that are not included in the Development Plan but could be included depending on the confirmation that the necessary decision steps have been taken by the stakeholders, have been introduced:

- Romania-Georgia submarine cable project
- HVDC underground DC cable project Constanța Sud (RO) - Arad (RO) - Albertirsa (HU) 525kV
- upgrading to 400kV of the 750kV Isaccea-Ukraine South (via Primorska) - installation of a 400kV cell in Isaccea station.

Annex F-2 presents a comparative analysis of the projects in the ETG Development Plan - 2024-2033 edition with respect to the previous edition of the approved Plan, presenting specific information for each project on the following aspects: the stage of implementation, the stage of completion of each project, the reasons for possible delays in commissioning compared to the planned period.

3. Presentation of ETG development projects included in the ETG Development Plan for 2024-2033

In order to maintain the adequacy of the network so that it is appropriately sized for the transmission of electricity forecast to be produced, imported, exported and transited under the changes, two categories of investments have been included in the 10-year ETG Development Plan and will be carried out:

- Refurbishment of the existing stations;
- Expanding ETG by building new lines, increasing the transport capacity of existing lines, extending existing stations and increasing the transformation capacity in stations.

A. Refurbishment and modernization of existing stations

Most of the power lines and stations that make up the national transmission system were built in the 1960s-1980s, at the technological level of that period.



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The actual technical condition of the installations has so far been maintained at an adequate level, both through the maintenance program carried out and through a sustained program of upgrading and modernization of installations and equipment.

The analysis of the technical status of the Transmission Electricity Networks is presented in Annex 6.

Over the next ten years, ongoing refurbishment projects will be completed and new projects will be started, prioritised according to the technical condition and importance of the stations:

- AT and T replacements in stations - stage 3:
 - AT 220/110 kV 200 MVA: Tg.Jiu Nord, Sărdănești, Suceava, Dumbrava, Grădiște (HV2); FAI (HV 2).
 - HV 220/110 kV 100 MVA Tihău;
 - Trafo2 110/20 kV 40 MVA in Tg.Jiu Nord station and Trafo2 110/10 kV 40 MVA in Cluj Est station, Trafo 110/20 kV 40 MVA: T1 and T2 in Cluj Florești station;
 - T2 110/20 kV 25 MVA in Sălaj station, T2 110/20 kV 25 MVA in Câmpia Turzii station, T2 110/20 kV 25 MVA in Turnu Severin Est station; Trafo T1 110/20 kV 20 MVA in Turnu Severin Est station;
- AT replacement 220/110kV 200MVA Stupărei

- Refurbishment of the 400/110 kV/m.t. Smârdan station;
- Refurbishment of the 220/110 kV/MT Baru Mare station;
- Refurbishment of the 220/110 kV Filești station;
- Pilot Project - Refurbishment of the 220/110/20 kV Alba Iulia station into a digital station concept (DigiTEL Alba Iulia pilot project);
- Refurbishment of the 110/20 kV Medgidia Sud 110/20 kV Medgidia Sud station;
- Refurbishment of the Isaccea 400 kV station (Phase II) ;
- Refurbishment of the 400/110 kV Pelicanu station;
- Modernization of the 110 and 400 (220) kV installations in Focșani Vest station;
- Refurbishment of the 400/110 kV Darste station
- Modernization of the 220 kV, 110 kV command-control-protection-metering system in the 220/110/20 kV station and modernization of the medium voltage and internal DC and AC services in the 220/110/20 kV Ghizdaru station;
- Modernization of the 400/110/20kV Drăgănești Olt station;
- Modernization of the 220/110/20kV Grădiște station;
- Modernization of the 220/110/20kV Fântânele station;
- Modernization of the 220/110 kV Calafat station;
- SCADA modernization in the 400/110/20 kV Oradea Sud station;



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- Modernization/replacement of the protection control system in the following stations: 400/220/220 kV Roșiori, 220/110/20 kV Sălaj, 220/110 kV Baia Mare 3, 220/110 kV Cluj Florești, 400 kV Țânțăreni, 220/110 kV Paroșeni, 220/110 kV Pestiș, 400 kV Calea Aradului, 400/220/110 kV Mintia, 220/110/20 kV Târgoviște, 400 kV Cernavodă, 400/110/20kV Sibiu Sud, 220/110/20 kV Gheorgheni, 400kV Gădălin.
- Installation of two modern means of reactive power compensation at 400/220/110/20 kV Sibiu Sud and 400/220/110/20/20 kV Bradu stations;
- Procurement and installation of 21 monitoring systems for transformer units in Transelectrica stations (DigiTEL Trafo Expert Project)
- Modernisation of the 400/220/110 kV Urechești station
- Replacement of Transformer no. 4 - 250 MVA, 400/110 kV in 400/110 KV Draganesti Olt station
- Replacement of Trafo 1 and Trafo 7 Cluj Est station
- Replacement of Trafo 2 400/110kV Smardan station
- Replacement of Trafo T1 and T2 400/110kV 400/110kV Constanta Nord
- Procurement and installation of a 100MVar compensation coil in 400kV Portile de Fier station
- Optimisation of voltage regulation and power quality parameters by installing FACTS equipment in Gutinaș, Suceava and Roșiori stations
- Optimisation of the operation of the existing 400 kV NES OHL used in interconnection, for power evacuation from Cernavodă NPP and renewable energy plants in Dobrogea, by installing on-line monitoring systems (DigiTEL Smart Lines Project)
- Increasing safety in operation and maintenance activities in Domnești station through the use of digital technologies (DigiTEL Smart Vision pilot project)
- "Pilot project - Refurbishment of the 220/110/20 kV Mostistea station in the concept of a digital station with reduced environmental impact" - DigiTEL Green

❖ **Increase of cross-border interconnection capacity**

- The following network developments are planned to *increase the exchange capacity on the western interface of Romania*:

In view of its contribution to the implementation of the European Union's strategic priorities for trans-European energy infrastructure, the European Commission has included the following group of projects in the fifth list of Projects of Common Interest (PCIs):

- "Romania-Serbia Cluster, between Resita and Pancevo" PCI, known as "Mid Continental East corridor", which includes the following projects of common interest:
 - 400 kV d.c. Reșița (RO)-Pancevo (Serbia) 400 kV d.c. OHL - finalised ;
 - 400 kV Porțile de Fier-Reșița 400 kV OHL and the extension of the 220/110 kV Reșița station through the construction of the new 400 kV station;
 - Upgrade to 400 kV of the 220 kV d.c. Reșița-Timișoara-Săcălaz-Arad OHL, including the construction of the 400 kV stations Timișoara, Arad and Săcălaz.

The following projects are also included:



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- Retrofitting of circuit 2 of the 400 kV Nădab-Bekescsaba 400 kV OHL;
 - 400 kV Portile de Fier - Djerdap OHL circuit 2 - result of ENTSO-E long-term analyses
 - Reconductoring of the 220kV Porțile de Fier-Reșița OHL;
 - RO-HU interconnection (new 400 kV OHL Oradea - Jozsa (Debrecen Del) station, new 400/220 kV Roșiori AT, 220 kV axis reconductoring Urechești-Tg. Jiu Nord-Paroșeni- Baru Mare-Hășdat)- resulting from the long-term analyses within ENTSO-E.
- *The following grid developments are planned to increase the exchange capacity on the southern interface of Romania (border with Bulgaria) for the transmission of power from intermittent renewable sources installed on the Black Sea coast to consumption and storage centers:*
- Black Sea corridor cluster, which includes the following projects:
 - 400 kV d.c. (1 c.e.) Smârdan-Gutinaș OHL;
 - 400 kV d.c. Cernavodă-Stâlpul OHL, with an input/output circuit in Gura Ialomiței.
- *To increase trade capacity at the interface with the Republic of Moldova:*
- 400 kV Suceava (RO)-Balti (RM) single circuit OHL
 - 400 kV s.c. Gădălin – Suceava OHL (new OHL)
 - 400kV Gutinaș - Strășeni OHL (new OHL)

Increasing transmission capacity between the eastern area (especially Dobrogea) and the rest of the interconnected power system and integrating the power generated from RES and other sources in Dobrogea into the system

In order to strengthen the transmission capacity from Dobrogea to the rest of the system, several projects have been planned to reinforce the transmission network.

- Connection between 400 kV Stupina-Varna OHL and 400 kV Rahman-Dobrudja OHL in 400 kV Medgidia Sud station (phase I Extension of 400 kV Medgidia Sud station and phase II execution of the connections);
- 400 kV s.c. Gădălin-Suceava OHL;
- 400 kV d.c. (1 w.c.) Stâlpul-Brașov;
- Transition to 400 kV Brazi Vest - Teleajen - Stâlpul LEA, including: purchase of 400 MVA, 400/220/20 kV Brazi Vest AT4, and related 400 kV and 220 kV station extension works, 400/220/110 kV Brazi Vest station, construction of 400 kV Teleajen station and refurbishment of 110 kV station 400 kV d.c. (1 e.c.) Medgidia Sud-Constanța OHL;
- Reconductoring of the 220 kV Stejaru-Gheorghieni-Fântânele OHL;
- Increasing the transmission capacity on the 8 km shorter section of the 400 kV South Bucharest - Pelicanu OHL;



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- Increasing the transmission capacity on the 53 km shorter section of the 400 kV Cernavodă - Pelicanu OHL.
- Transition of the 400 kV Isaccea-Tulcea Vest OHL from single circuit to double circuit.
- Increase of the transmission capacity of the 220kV Gutinas-Dumbrava OHL
- Increase of the transmission capacity of the 220kV Dumbrava-Stejaru OHL
- Increase of the transmission capacity of the 220kV Fantanele-Ungheni 220kV OHL
- Increase of the transmission capacity of the 400 kV Bucuresti Sud-Gura Ialomitei 400 kV OHL
- Increase of the transmission capacity of the 400 kV Brasov-Gutinaș OHL
- Reconductoring of the 220kV Bucharest South-Fundeni OHL
- installation of new trafo 3 400/110 kV Medgidia South
- installation of new trafo 3 400/110 kV Smardan
- Equipping of circuit 2 for the new 400 kV Smardan-Gutinas OHL
- **Power flow control devices to avoid overloads on the 220kV Bucharest South-Fundeni 220kV OHL.**
- Modern means of voltage regulation (SVC) in the stations: 400kV Gura Ialomiței, 400kV Arad, 220kV Brazi Vest.

E. Integration of power generated from other power plants into NES

The following works are scheduled:

- In order to safely discharge the power from CHE Porțile de Fier II, it was agreed with S.C. Hidroelectrica SA to discharge at 220 kV, through the construction of the 220 kV Ostrovul Mare station and the 220 kV Ostrovul Mare OHL connection to the 220 kV Porțile de Fier - Cetate OHL.

The following projects were introduced to evacuate power from the PPP in the south of the country:

- Reconductoring of the 220 kV Turnu-Magurele- Ghizdaru OHL
- Reconductoring of the 220 kV Turnu-Magurele-Craiova Nord OHL
- Reconductoring of the 220kV d.c. Bucharest South-Ghizdaru OHL
- Installation of an additional 220/110kV AT switchgear in the Stupărei station
- **Power flow control devices to avoid overloads on the 220kV Urechești - Târgu Jiu Nord - Paroșeni - Baru Mare - Hășdat OHL, until the reconductoring is carried out.**

C. Security of consumption supply

- Increased operational reliability of the Argeș-Vâlcea network area - through the execution of a new 400 kV Arefu station, 1AT 400/220 kV 400 MVA and connection to the 400 kV Țânțăreni-Sibiu Sud OHL through a 400 kV d.c. OHL of approximately 0.05 km.
- installation of a new 220/110 kV 400MVA autotransformer in the 220/110 kV Fundeni station, increasing the degree of security of supply to consumers in the north-eastern part of Bucharest connected to the 220/110/10 kV Fundeni station;



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- installation of a new 400/110 kV 250MVA transformer in the 400/220/110 kV Bucuresti Sud station, increasing the degree of security in the supply to consumers in the southern area of Bucharest connected to the 400/220/110/10 kV Bucuresti Sud station.
- 400/110 kV station at Grozăvești connected via 400 kV UGL with 400 kV stations Bucuresti Sud and Domnești and two 100MVar compensation coils installed at 400 kV in the 400 kV Grozăvești station,
- 400/110 kV station at Fundeni connected also through the new 400 kV Fundeni-Brazi Vest OHL and input-output to the 400 kV Bucuresti Sud-Gura Ialomiței OHL through the 400 kV d.c. OHL and installation of a 100MVar compensation coil in the new 400 kV station.
- 220/110kV injection station from 220kV Baia Mare Iernut OHL in RED
- 400/110kV Bistrita injection station from 400kV Suceava - Gadalin OHL in RED
- 400/110kV Calea Aradului Transformer

The projects in the ETG Development Plan for the period 2024-2033 and the time schedule for their realisation are presented in Table 1:

Table 1

No	Project name	ANR E Crit.	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
A	REFURBISHMENT OF THE EXISTING ETG											
1	AT and Trafo replacements in electric stations (<i>stage 3</i>) 7 AT & 8 T	N										
1,1	7 220/110 kV AT in stations: Gradiste, Suceava, FAI, Dumbrava, Tg. Jiu Nord, Sardanesti, Tihau.	N										
1,2	8 110/20 kV transformer in : Tn. Severin Est (2 pcs.) , Cluj Floresti (2 pcs.), Salaj, Campia Turzii, Cluj Est, Tg. Jiu Nord.	N										
2	Refurbishment of the 400 / 110 / 20 kV Smârdan station	N										
3	Refurbishment of the 220 / 110 / MV kV station Baru Mare	N										



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4	Refurbishment of the 220/110 kV station Filești	N											
5	Pilot Project - Refurbishment of the 220/110/20 kV Alba Iulia station to a digital station concept	N											
6	Refurbishment of the Medgidia Sud 110 kV station	N											
7	Refurbishment of the 400 kV Isaccea station (<i>phase II - 400 kV station refurbishment</i>)	N											
8	Refurbishment of the 400/110 kV Pelicanu transformer station	N											
9	Modernisation of the 110 and 400 (220) kV installations in Focșani Vest station	N											
10	Refurbishment of the 400/110 kV Dârste station												
11	Modernisation of the 220 kV, 110 kV command-control-protection-metering system in the 220/110/20 kV station and modernisation of the medium voltage and internal DC and AC services in the 220/110/20 kV Ghizdaru station	N											
12	Modernisation of the command-control-protection system and integration in CTSI of Drăganesti-Olt station	N											
13	Modernisation of the 220/110/20 kV Gradiste station	N											
14	Modernisation of the 220/110/20 kV Fântânele station	N											
15	Modernisation of the 220/110 kV Calafat station	N											



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16	SCADA modernisation in 400/110/20 kV station Oradea Sud	N										
17	Modernisation of the protection control and control system in the 220/110/20 kV Salaj station	N										
18	Modernisation of the command control and protection control system in 220/110 kV Baia Mare 3 station	N										
19	Modernisation of the command control and protection control system in 220/110 kV Cluj Floresti station	N										
20	Modernisation of the protection control command control system in 400 kV Tantareni station	N										
21	Modernisation of the command control and protection system in 220/110 kV Paroseni station	N										
22	Modernisation of the protection control and control system in 220/110 kV Pestis station	N										
23	Modernisation of the protection control system in 400/220/110 kV Mintia station	N										
24	Modernisation of the command control and protection control system in 220/110/20kV Targoviste station	N										
25	Modernisation of the command control and protection control system in 400 kV Cernavoda station	N										
26	Modernisation of the control and protection system in 400/110/20 kV Sibiu Sud station	N										

[illegible]



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38	Replacement of Trafo 2 400/110kV Smardan station	N										
39	Replacement of transformer T1 and T2 400/110kV 400/110kV Constanta Nord	N										
40	Purchase and installation of 100 MVar compensation coil in Portile de Fier 400kV station	N										
41	Optimisation of voltage regulation and power quality parameters by installing FACTS equipment in Gutinaș, Suceava and Roșiori stations	N										
42	Optimisation of the operation of the existing 400 kV OHL in the NES used in interconnection, for power evacuation from Cernavodă NPP and renewable energy plants in Dobrogea, by installing on-line monitoring systems	N										
43	DigiTEL Green pilot project - Refurbishment of the 220/110/20 kV Mostistea station into a digital station with reduced environmental impact	N										
44	Replacement of the 220/110kV HV 220/110kV Stupărei	N										
45	Reconductoring of the 220kV Lacu Sărat-Filești-Barboși-Focșani Vest-Gutinaș OHL	N										
46	Installation of an embedded fibre optic protective conductor on the 400 kV Roșiori - Mukacevo OHL	N										
B	OTHER INVESTMENTS AT BRANCH AND EXECUTIVE LEVEL (planned annually)	N										



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1	Centre for research and development of live working technologies (LST) and rapid intervention in NES - phase II	N										
2	Other expenses at branch level	N										
3	Photovoltaic power plants (PPPs) and energy storage facilities, intended for supplying internal services from NPG CO. 'Transelectrica' - SA stations	N										
C	SECURITY OF CONSUMPTION SUPPLY											
1	Increasing the operational reliability of the Argeș-Vâlcea network area, execution of the 400 kV Arefu station and installation of a 400 MVA, 400/220 kV AT.	E										
2	Increasing security of supply to consumers in the north-eastern part of Bucharest connected to the 220/110/10 kV Fundeni station	E										
3	Execution of new 400/110kV Grozavesti station and two 100MVar compensation coils +LEC 400 kV Domnesti - Grozavesti +LEC 400 kV Bucuresti Sud-Grozavesti station	E										
4	Execution of a new 400/110kV Fundeni station and a 100MVar compensation coil + 400kV Fundeni-Brazi Vest OHL + 400kV Bucuresti Sud-Gura Ialomitei OHL connection input-output to the 400kV Fundeni station	E										
5	Increasing the security of supply to consumers in the southern area of Bucharest Municipality connected to the	E										



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	400/220/110/10 kV Bucuresti Sud station											
6	220/110kV injection station from 220kV Baia Mare Iernut OHL in RED (Dej or Cuzdrioara)	E										
7	400/110kV Bistrita injection station from 400kV Suceava - Gadalin OHL in RED	E										
8	400/110kV Calea Aradului Transformer											
9	400/110kV Botosani injection station from the 400kV Suceava - Balti OHL in RED	E										
D	INTEGRATION OF PRODUCTION FROM SRE AND NEW POWER PLANTS - DOBROGEA AND MOLDOVA											
1	Connection of 400 kV Stupina-Varna OHL and 400 kV Rahman - Dobrudja OHL in Medgidia Sud 400 kV station. Stage II - 400 kV d.c. OHL Connections to Medgidia Sud station	E										
2	Upgrade to 400 kV Brazi Vest - Teleajen - Stalpu OHL, including: 400 MVA, 400/220/20 kV AT, and related 400 kV and 220 kV station extension works in 400/220/110 kV Brazi Vest station	E										
2.1	400 kV Brazi West - Teleajen - Stalpu OHL	E										
2.2	Brazi West station extension (including AT4)	E										
2.3	400 kV Teleajen station and 110 kV station refurbishment	E										
3	400 kV d.c. (1c.e) Constanta Nord - Medgidia Sud OHL	E										



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4	DigiTEL Power Lines of the Future Pilot Project - Transition of the 400 kV Isaccea - Tulcea West OHL from single circuit to double circuit	E										
5	Increasing the transmission capacity of the 220 kV Stejaru - Gheorgheni - Fantanele OHL	N										
6	400 kV Stalpu - Brasov OHL, including interconnection to NES (new line)	N										
7	Increasing the transmission capacity of the 400 kV Bucuresti Sud - Pelicanu OHL (8 km)	N										
8	Increasing the transmission capacity of the 400 kV Cernavoda - Pelicanu OHL (53 km)	N										
9	Increasing the transmission capacity of the 220 kV Gutinas-Dumbrava OHL	N										
10	Increasing the transmission capacity of the 220 kV Dumbrava-Stejaru OHL	N										
11	Increasing the transmission capacity of the 220 kV Fantanele-Ungheni OHL	N										
12	Increasing the transmission capacity of the 400 kV Bucuresti Sud-Gura Ialomitei OHL	N										
13	installation of new transformer 3 400/110kV Medgidia South	N										
14	installation of new transformer 3 400/110kV Smardan	N										
15	Equipping circuit 2 of the 400kV d.c. Gutinas -Smardan OHL	N										



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16	Power flow control devices for the 220kV Bucuresti Sud-Fundeni OHL, 220kV Urechești - Tg. Jiu Nord - Paroșeni - Baru Mare – Hășdat OHL	N										
17	Modern means of voltage regulation (SVC) in the stations: 400kV Gura Ialomiței, 400kV Arad, 220kV Brazi Vest.	N										
17, 1	Modern means of voltage regulation (SVC) in the 400kV Gura Ialomiței station											
17, 2	Modern means of voltage regulation (SVC) in station: 400kV Arad											
17, 3	Modern means of voltage regulation (SVC) in 220kV Brazi Vest station.											
18	Increasing the transmission capacity of the 400 kV Brașov-Gutinas OHL	N										
19	Increasing the transmission capacity of the 220 kV Bucharest South-Fundeni OHL	N										
20	400/110kV Suceava transformer and 2 related 400 kV and 110 kV cells	N										
21	Optimisation of the operation of the existing 400 kV OHL in NES used in interconnection, for power evacuation from Cernavodă NPP and renewable energy plants in Dobrogea, by installing on-line monitoring systems											
E	INTEGRATION OF PRODUCTION FROM POWER STATIONS - OTHER AREAS											
1	Ostrovu Mare 220 kV station (new station)	N										
2	220 kV Ostrovu Mare OHL - ETG (new line)	N										



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3	reconductoring of the 220kV Turnu Magurele-Ghizdaru OHL											
4	reconductoring of the 220kV Turnu Magurele-Craiova Nord OHL											
5	reconductoring of the 220kV Bucuresti Sud-Ghizdaru OHL (without Mostiștea connection)											
F	INCREASING INTERCONNECTION CAPACITY											
1	Transition to 400 kV of the Portile de Fier - Resita - Timisoara - Sacalaz - Arad axis. Stage I: Extension of the 400 kV Portile de Fier station; 400 kV Portile de Fier – Resita OHL; 400 kV Resita station	E										
1.1	400 kV Portile de Fier – Resita OHL	E										
1.2	400 kV Resita station	E										
2	Transition to 400 kV of the Portile de Fier - Resita - Timisoara - Sacalaz - Arad axis. Stage II : 400 kV d.c. Resita - Timisoara - Sacalaz + 400 kV Timisoara + 110 kV Timisoara station	E										
2.1	Refurbishment of the 110 kV Timișoara 110 kV station and 400 kV voltage upgrade of the Portile de Fier - Anina - Reșița - Timișoara - Săcălăz - Arad axis, phase II: 400 kV Timișoara station	E										
2.2	400 kV d.c. Resita - Timisoara – Sacalaz OHL	E										
3	Transition to 400 kV of the Portile de Fier - Resita - Timisoara - Sacalaz - Arad axis. Stage III: 400 kV d.c. Timisoara - Sacalaz – Arad OHL + 400/110 kV Sacalaz	E										



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	station + extension of 400 Arad station											
3.1	400 kV d.c. Timisoara – Arad OHL	E										
3.2	400 kV Sacalaz station and 110 kV Sacalaz station refurbishment	E										
3.3	400 kV Arad station extension and 110 kV Arad station refurbishment	E										
4	400 kV d.c. (1c.e) Gutinas – Smardan OHL	E										
5	Extension of the 400 kV Gura Ialomiței station with two cells: 400 kV Cernavodă 3 OHL and 400 kV Stâlpu OHL	E										
6	400 kV Stalpu station (new station)+ Modernisation of 110 kV and medium voltage cells	E										
7	400 kV s.c. Gădălin - Suceava OHL (new OHL)	E										
8	400 kV S.c. Suceava - Balti OHL (new - for the part on Romanian territory)*	E										
9	400kV Portile de Fier - Djerdap OHL circuit 2	E										
10	Execution of 400kV Nadab-Bekescaba OHL circ. 2 and related works in the 400kV Nadab station	E										
11	RO-HU interconnection (400kV Oradea-Jozsa OHL (Debrecen Del), new Rosiori AT, reconductoring of the 220 kV Urechesi-Tg. Jiu Nord-Paroseni- Baru Mare-Hasdat) axis	E										



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11.1	400kV Oradea-Jozsa (Debrecen Del) OHL	E											
11.2	Installation of new 400/220 kV AT in Rosiori station + Modernisation of the protection control command system in 400/220 kV Rosiori station	E											
11.3	Reconductoring the 220 kV Urechesi-Tg. Jiu Nord-Paroseni- Baru Mare-Hasdat axis	E											
12	Reconductoring the 220kV Portile de Fier - Resita OHL												
14	400kV Gutinas - Strasenii OHL (new 400kV line on Romanian territory)	E											
G	CONTROL, COMMAND, PROTECTION, MEASUREMENT, COMMUNICATION SYSTEMS												
1	Implementation of new functions and software modifications in the EMS - SCADA computer system for the implementation of European and national legislative requirements												
2	National Synchrophasor Platform, connected to the International Platform for Synchrophasor Data Exchange (IPDE)												
H	Development of dedicated software to determine reserve quantities using the probabilistic method												
I	Wholesale electricity metering and metering data management system	N											
J	Power Quality Monitoring System (PQMS)	N											



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K	INFORMATION SYSTEMS AND TELECOMS MANAGEMENT	N										
K	CRITICAL INFRASTRUCTURE	N										
L	OTHER INVESTMENT EXPENSES											
1	DET Craiova Operational headquarters	N										
2	DigiTEL Next-Gen Power Grid - Optimisation of operating activities in NPG CO. Transelectrica SA stations using Digital Twin technology and autonomous robotic systems											
3	Pilot Project "DigiTEL-Smart Vision" - Increasing safety in operation and maintenance activities in Domnești station by using digital technologies											
TOTAL SECTION I												



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