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ENVIRONMENTAL REPORT

for the objective

Updated Integrated National Energy and Climate Plan 2021-2030

BENEFICIARY:

MINISTRY OF ENERGY

DEVELOPER:

"DANUBE DELTA" NATIONAL RESEARCH AND DEVELOPMENT INSTITUTE

May
2025

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May
202

CONTENT

List of abbreviations

AHE	Hydropower development
ANPM	National Environmental Protection Agency
BRUA	The Development of the Romanian Gas Transmission System along Bulgaria – Romania – Hungary – Austria Route project
CANDU	Canada Deuterium Uranium
CCGT	Combined Cycle Gas Turbine
CCUS	Carbon Capture Utilisation and Storage
PV	Photovoltaic power plants
CESEC	Central and South Eastern Europe Energy Connectivity initiative
CHEAP	Pumped Storage Hydroelectric Power Plant
CHP	Cogeneration plant (Combined Heat and Power)
NPP	Nuclear Power Plant
CET	Thermoelectric Power Plant
SEA	Strategic Environmental Assessment
EIS	European Innovation Scoreboard
ENTSO-E	European Network of Transmission System Operators for Electricity
ESCO	Energy Service Company
EU ETS	European Union Emission Trading System
GHG	Greenhouse Gases
GIS	Geographic Information System
GD	Government Decision
HU-RO	Hungary – Romania cross-border AC transmission interconnection grid project (TR 259 in ENTSO-E TYNDP 2022)
ICPA	National Research and Development Institute for Pedology, Agrochemistry and Environmental Protection
INEGES	National Greenhouse Gas Emissions Inventory
INGHA	National Institute of Hydrology and Water Management
IUCN	International Union for Conservation of Nature
OHL	Overhead Power Line
LEAP_RO	The energy and climate predictions model specifically elaborated for the Romanian LTS and also employed for the updated NECP
LULUCF	Land Use, Land-Use Change and Forestry
MAB	Man and the Biosphere Programme
GTMP	General Transport Master Plan of Romania
NIR	National Inventory Report
OJSPA	County Offices for Pedological and Agrochemical Studies
PAM	Policy and Measure
NWMP	National Waste Management Plan
NECP	National Energy and Climate Plan
PNRR	National Recovery and Resilience Plan

REF	Reference Scenario
RET	Power Transmission Network
RFNBO	Renewable fuels of non-biological origin
RM	Environmental Report
SAC	Special Conservation Area
SCI	Site of Community Importance
SEA	Strategic Environmental Assessment
SEN	National Power System
SER	Romania's Energy Strategy
SSG	Underground gas storage system
SMG	Gas measuring station
SMR	Small Modular Reactor
SNASC	National Strategy on Adaptation to Climate Change for 2024-2030, with a perspective towards 2050
SNT	Natural Gas National Transmission System
SPA	Special bird protection area
RES	Renewable Energy Sources
LTS	Long-Term Strategy of Romania
TYNDP	Ten–Year Network Development Plan
EU	European Union
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change

1. Introduction

This study represents the Environmental Report for the Strategic Environmental Assessment of the updated Integrated National Plan for Energy and Climate Change 2021-2030, hereinafter referred to as the updated NECP 2021-2030.

This Environmental Report (ER) was prepared in accordance with Annex 2 of Government Decision no.1076/2004 on establishing the procedure for carrying out the environmental assessment for plans and programs.

The updated NECP 2021-2030 is promoted by the Ministry of Energy, as the owner. The purpose of the updated NECP 2021-2030 reflects Romania's commitment to align with the European Union (EU) objectives of the for a sustainable, low-carbon energy future. The updated NECP 2021-2030 aims not only at the technical aspects of developing and integrating of renewable energy sources (RES) and the reducing greenhouse gas (GHG) emissions, but also at the social and economic dimensions, ensuring that the energy transition will be beneficial for both the environment and the citizens.

The NECP was developed for the 2021-2030 timeframe, taking into account Romania's needs and international obligations, as well as achieving the optimal development scenario of the national energy system at this time.

The Strategic Environmental Assessment (SEA) procedure began at the end of 2023, with the current Environmental Report being prepared based on the updated NECP 2021-2030, the 2024 version also submitted to the European Commission.

Upon completion of the SEA procedure for the updated NECP 2021-2030, the Environmental Approval will be issued, based on the ER and the Environmental Assessment (EA).

2. Methodology for developing the SEA for the updated NECP 2021-2030

The Strategic Environmental Assessment is carried out in accordance with European Council Directive 2001/42/EC on the assessment of certain plans and programmes on the environment and GD no. 1076/2004 on establishing the procedure for carrying out the environmental assessment for plans and programmes, which transposes the provisions of the Directive into national legislation.

According to GD no. 1076/2004, the SEA procedure involves the following steps:

- Preparation by the owner of the first version of the plan/program;
- Notification of the competent environmental protection authority for by the owner and informing the public about the first version of the plan/programme;
- The stage of establishing the working group;
- The stage of finalizing the plan/program and preparing the Environmental Report;
- Submission the plan/program and the Environmental Report to consultations and public debate;

- Elaboration of the final version of the plan/program and the Environmental Report based on the opinions of the competent environmental authorities and other authorities during the Environmental Report analysis stage and based on public comments;
- Notification of the relevant authorities and interested public regarding the final form of the plan/program;
- Decision to issue the environmental approval.

The preparation of this Environmental Report involved the following stages:

- Analysis of the current state of the environment, taking into account existing data and information;
- Identification of a set of environmental aspects, respectively relevant environmental problems in connection to the updated NECP 2021-2030;
- Formulation, for the identified environmental aspects and environmental problems, of the relevant environmental objectives that the updated NECP 2021-2030 must address;
- Analysis of the likely evolution of the state of the environment in the event of non-implementation of the provisions of the updated NECP 2021-2030 (Alternative 0);
- Assessing the environmental effects generated by the implementation of the updated NECP 2021-2030, by analysing how the objectives of the Plan and the proposed measures contribute to achieving the relevant environmental objectives;
- Identification of environmental indicators for monitoring the effects of the updated NECP 2021-2030.

3. Brief presentation of the updated NECP 2021-2030

The updated NECP 2021-2030 will be adopted by Government Decision after the SEA procedure and the issuance of the environmental approval by the Ministry of Environment, Waters and Forests.

The updated NECP 2021-2030 is a strategic document that aligns national energy and climate priorities with EU objectives, confirming Romania's firm contribution to achieving community objectives and targets, while addressing specific national challenges. The updated NECP 2021-2030 is promoted by the Ministry of Energy, as the owner of the plan, and has been developed to meet Romania's development needs in both a national and international context.
At the European Union level, energy and climate objectives for 2030 have been established as follows:

- The objective of reducing greenhouse gas emissions by at least 55% by 2030, compared to 1990;
- The objective of increasing the share of energy from RES in gross final energy consumption to at least 42.5% by 2030;
- The objective of improving energy efficiency by 38% in 2030;
- The objective of interconnecting the electricity market at a level of 15% by 2030.

Consequently, to achieve these objectives in accordance with the provisions of Regulation (EU) 2018/1999 of the European Parliament and of the Council on the Governance of the Energy

Union and Climate Action, each Member State must develop a NECP document for the period 2021-2030, in accordance with the pre-established calendar.

The NECP programming documents set the national objectives and contributions to the achievement of EU's energy and climate objectives. Accordingly, Romania has updated and submitted its own NECP.

Purpose: The updated NECP 2021-2030 reflects Romania's commitment to align with EU's objectives for a sustainable energy future with reduced carbon emissions.

The updated NECP 2021-2030 addresses not only the technical aspects of developing and integrating RES and reducing GHG emissions, but also the social and economic dimensions, ensuring that the energy transition will be beneficial for both the environment and the citizens.

The national targets assumed for the year 2030 for the energy sector are:

- The overall share of energy from renewable energy sources in gross final energy consumption is 38.3%;
- The share of RES in the electricity sector will increase to 57.8%;
- The share of RES in the transport sector will reach 29.4%;
- The share of RES in the heating and cooling sector will increase to 41.4%.

3.1 Current context

Romania's energy situation is at the crossroads of tradition and transformation, reflecting both its historical dependence on conventional energy sources and its commitment to transitioning to a sustainable, low-carbon future. As an EU member state, Romania aligns its energy system and policies with the overall European energy framework, while also considering its specific energy challenges and opportunities.

Romania's energy mix: Romania's energy mix is characterized by diversity, ensured by fossil fuels, renewable energy sources and nuclear energy. Over time, Romania has relied heavily on fossil fuels, especially coal and natural gas, to meet its energy consumption needs. The country's extensive coal reserves have played a crucial role in ensuring energy security. Additionally, natural gas has served as a vital energy source, both for electricity production and heating, being a cleaner option in terms of emissions compared to coal.

In recent years, EU legislation and the need for sustainability have driven to the diversification of Romania's energy sources. Renewable energy has become a key element in this transformation. Romania has seen a substantial increase in wind and solar energy production. Romania's topography favours the formation and maintenance of high-intensity winds, particularly in the Dobrogea region, where significant wind energy projects have been developed. Also, the high values of solar radiation intensity recorded over almost the entire territory of the country have stimulated the development of photovoltaic power plants (PV) installed either on the roofs of commercial or residential buildings or on the ground.

In the context of the energy transition, the Cernavoda Nuclear Power Plant (NPP) has maintained its central role. With two operational reactors (Units 1 and 2), both operating on Canadian technology of the Canadian Deuterium Uranium (CANDU) type, the Cernavoda NPP substantially contributes to Romania's electricity production. Nuclear energy is recognized for not contributing to GHG emissions and for its exceptional reliability, significantly contributing to the diversification of Romania's energy sources portfolio.

By continuously evolving its energy mix, Romania confirms its commitment to transitioning towards cleaner and more sustainable energy sources. This transition aligns not only with EU legislation, but also with global efforts to reduce GHG emissions and combat climate change. Romania's diversified energy portfolio reflects a pragmatic approach that successfully balances energy needs with environmental responsibility and the imperative of energy security.

EU Policy Context: Romania's energy ambitions are closely tied to the overall objectives of the EU's energy and climate policy. The European Green Deal, a cornerstone of EU policy, commits the European Union to achieving climate neutrality by 2050. This ambitious goal requires a profound transformation of the energy sectors of the Member States (MS).

The European legislative framework in the field of energy and climate has created the context for Member States to make commitments that will lead to the achievement of Community objectives.

With the adoption of the Paris Agreement in 2015 and the commitments made by the signatory MS, the fourth EU energy package - Clean Energy for All Europeans - came into force in 2019, laying the foundations for the European Green Deal in 2020.

The legislative package reflected the long-term strategy adopted at EU level, aiming for a substantial reform of the legislative framework in the energy field that would enable the completion of the implementation of the Third Energy Package, which aimed to redesign the energy market by facilitating the transition from a fossil fuel-based energy sector to a decarbonized one. It also represented an important step in the implementation of the Energy Union Strategy. The package consisted of eight legislative acts covering energy efficiency and performance, renewable energy, electricity market design and the energy system and the governance system for the energy union and climate action.

The EU's fifth and final energy package, Fit for 55, published in 2021, updated European climate ambition by, setting a target to reduce greenhouse gas emissions by 55% in 2030 compared to 1990 levels. By 2050, the goal is to achieve climate neutrality at the European level, making Europe the first climate-neutral continent.

3.2 Updated NECP 2021-2030 structure

The updated NECP 2021-2030 is structured into 2 sections. The first section consists of 3 chapters and focuses on the general presentation and the process plan development, national objectives and the policies and measures proposed to achieve these objectives. The second section includes 2 chapters that present the current situation and forecasts in the context of existing policies and measures, as well as the impact assessment of planned policies and measures. In brief, the structure of the updated NECP 2021-2030 is as follows:

SECTION A: NATIONAL PLAN
1. Overview and process for establishing the plan
2. National objectives
3. Policies and measures

SECTION B: ANALYTICAL BASIS
4. Current situation and projections with existing policies and measures
5. Assessment of impacts of planned policies and measures

The structure of the updated NECP 2021-2030 complies with the general framework outlined in Annex 1 of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action.

3.3 The main objectives proposed by the updated NECP 2021-2030

The updated NECP 2021-2030 prioritizes the objectives and directions established through specific strategies in the energy and climate sector. The national objectives outlined in the NECP have been set in accordance with the following five main dimensions:

1. **Dimension decarbonisation**

- *GHG emissions and removals*

Romania aims to reduce net GHG emissions (also taking into account the Land Use, Land Use Change and Forestry sector – LULUCF) by 85% by 2030, compared to 1990 level.
The long-term objective is to achieve a 96% reduction in GHG emissions by 2040 and a complete reduction in GHG emissions by 2050: a 105% reduction in net GHG emissions in 2050 compared to 1990 level.

- Energy sector: A reduction of 87% in GHG emissions by is targeted in 2030 compared to 1990, primarily achieved through decommissioning coal and lignite production capacities and the expansion of renewable energy production capacities.
- Transport Sector: the sectoral target indicates a limited increase in GHG emissions to at most 40% by 2030 compared to 1990, the limitation being primarily achievable through supporting the development of road transport with hybrid and electric vehicles, rail transport by expanding electrification and infrastructure modernization, the expansion of the public passenger transport network with the metro and last but not least, multimodal transport in Romania, especially through the development of RO - LA (Rollende Landstrassen/rolling road) services.
- Buildings sector: a reduction of 19% in GHG emissions by 2030 compared to 1990 is targeted, achieved through improving the energy performance of buildings and increasing the use of heat pumps and solar thermal collectors.
- Industry Sector: the sectoral target aims for a 77% reduction in GHG emissions by 2030 compared to 1990, primarily achieved through replacing fossil fuels with electricity from RES and increasing the efficiency of the technologies used.
- Agriculture Sector: GHG emissions will decrease by 44% by 2030 compared to 1990, through the adoption of measures regarding proper animal feeding and forage management.
- LULUCF sector: an 87% increase in GHG absorptions by 2030 compared to 1990 is targeted, primarily achieved through improved forest fire management.
- Waste Sector: GHG emissions will be reduced by 25% by 2030 compared to 1990 through proper reduction, reuse and recycling of waste.

Source: Updated NECP 2021-2030, October 2024 version.

- *Renewable energy*

Romania's target for the share of energy from RES in gross final energy consumption for the year 2030 is 38.3%. According to the estimated trajectory, the share will reach 31.0% in 2025. The targets will be met mainly by increasing the installed capacity for energy production from wind and solar sources and using heat pump-based technologies for the heating and cooling process.

2. Dimension energy efficiency

Energy consumption forecasts for 2050 are based on the principle of prioritizing energy efficiency.

Romania’s target for primary energy consumption in 2030 is set at 30.2 Mtoe, according to the Energy Efficiency Directive (recast). The forecasts assumed in this document for primary energy consumption indicate a target of 28.7 Mtoe in 2030, below the target set by the Energy Efficiency Directive (recast) of 2023. The target of 28.7 Mtoe in 2030 will mark a 9% decrease in primary energy consumption compared to 2022. Additionally, gross final energy consumption is expected to record a slight decrease, of 6%, in 2030 compared to 2022, without affecting productivity, while also implementing measures to increase in the share of energy produced from RES, reaching an absolute value of 22.5 Mtoe in 2030. This means that Romania will also meet its target for gross final energy consumption set by the Energy Efficiency Directive (recast) of 2023, which is 22.47 Mtoe in 2030.

Compared to the reference projections for 2030 established by the Primes model, Romania's energy efficiency targets for 2030 are to achieve a 51% reduction in primary energy consumption and a 47% reduction in gross final energy consumption, without affecting productivity, a target complementary to taking measures to increase the share of energy produced from RES in gross final energy consumption. By 2050, Romania aims to reduce primary energy consumption by 22% and gross final energy consumption by 28% compared to 2022 levels. These targets reflect Romania's strong commitment to a green and sustainable future.

3. Dimension energy security

Key areas include increasing domestic energy production and diversifying import sources for various fuels.

Electricity production: The objective for 2030 is to achieve an installed electricity production capacity of 32.3 GW, marking a 68.2% increase compared to 2022. Of this capacity projected for 2030, approximately 75% will come from RES, thus ensuring the use of domestic resources for electricity production.

Additionally, the construction of new electricity production capacities from nuclear and natural gas sources is planned, as well as the completion of investments in hydropower plants, which will transform Romania into an electricity exporting country, with an annual export level of approximately 4.4 TWh.

Natural gas supply: Romania is continuously improving its natural gas transmission network, including interconnections with neighbouring countries, to diversify its natural gas supply sources and reduce dependence on Russia. This involves Romania's participation in various cross-border projects, ongoing or planned, such as the development of the National Natural

Gas Transmission System on the Bulgaria–Romania–Hungary–Austria Corridor (BRUA - phase I, II and III), the development of the natural gas transmission pipeline for the takeover of natural gas from the Black Sea coast (Black Sea – Podișor), as well as the activities within the Central and South-Eastern Europe Energy Connectivity (CESEC) initiative - Vertical Corridor.

Romania aims to reduce its dependence on imports of crude oil, solid fossil fuels and natural gas by 2030 through intensifying electrification processes, decommissioning coal-fired power plants and diversifying supply sources, which will allow the achievement of objectives regarding minimizing import shares. All these measures emphasize the importance of diversifying import sources, especially in the natural gas sector.

Romania identifies and eliminates barriers to responding to variations in electricity demand during peak hours as an effective way to benefit from demand flexibility and meet system adequacy and flexibility objectives. The implementation of energy storage solutions in battery, particularly through the development of battery storage, planning the commissioning of a total electricity storage capacity of 1,200 MW or 2,400 MWh by 2030 and 2,000 MW by 2035. The use of batteries and hydrogen-based storage technologies, as well as the construction of pumped-storage hydropower plants (CHEAP) with a total capacity of approximately 800 MW by 2030, is expected to enhance grid stability and support RES integration.

4. Dimension internal energy market

Romania's approach to its internal energy market, in the context of the Energy Union Strategy, emphasizes interconnection, aiming to exceed the 15% interconnection target by 2030 through expanding cross-border transmission capacity and increasing installed production capacity, as well as addressing price differences issues.

Cross-border transfer capacity is one of the factors used to calculate the level of interconnection. Another essential factor is the total installed electricity generation capacity. Based on the analyses conducted and the forecasts presented in previous sections, the anticipated electricity generation capacity for 2030 is estimated at approximately 31.3 GW. Calculating the ratio between cross-border capacity and total installed capacity for 2030 yields a value of 21% for the interconnection level, exceeding the established target of 15%. Therefore, the increase in installed capacity must be carried out in parallel with the increase in cross-border capacity.

At the same time, Romania places great importance on the flexibility of its energy system, emphasizing energy storage, particularly battery-based, and aims to increase the competitiveness of its retail energy sector, protect energy consumers, stimulate prosumers, and address energy poverty issues.

The production of electricity for own consumption has seen notable growth recently, especially in 2022 and 2023. The total installed capacity of prosumers at the end of 2023 was 1.4 GW, with approximately 107,000 prosumers. This remarkable growth marks the commitment of residential consumers and commercial entities to control their energy consumption and reduce their carbon footprint.

The main objective is to further stimulate the development of this trend by encouraging the adoption of prosumer technologies and increasing the installed capacity of decentralized energy production. The ambitious goal is to reach a target of 2.5 GW of total installed capacity of

prosumers by 2030. This transition to a distributed energy system will allow consumers to reduce their energy costs and produce clean and sustainable energy.
The main objective is to create a resilient, sustainable and highly interconnected energy system in Romania.

5. Dimension research, innovation and competitiveness

The National Strategy for Research, Innovation and Smart Specialization 2022-2027 (SNCISI 2022-2027) implements Romania's Vision 2030, built on four (interconnected) pillars, each with its own indicators and targets, corresponding to the four general objectives (GO) of the strategy:

GO1. Development of the research, development and innovation system;
GO2. Supporting innovation ecosystems associated with smart specializations;
GO3. Mobilization towards innovation;
GO4. Increasing European and international collaboration.

Considering its innovation performance (as reflected in the European Innovation Scoreboard (EIS), Romania's objective is to become a moderately innovative country (i.e. to have an innovation performance between 70% and 100% of the EU average).

The policies and measures of the updated NECP 2021-2030 are designed to align with the established national targets and objectives and will also contribute to achieving EU objectives (Table 1).

Table 1. Interactions between policies and measures

	Decarbonisation	Efficiency	Security	Internal	R&I&C
PAM 1 Phase out coal-fired power plants	√				
PAM 2 Introducing renewable hydrogen into the energy system	√				√
PAM 3 Hydrogen production	√				√
PAM 4 Development of new CCGT capacities	√		√		
PAM 5 Promotion high-efficiency cogeneration capacities	√		√		
PAM 6 Use of CCUS technologies	√			√	√
PAM 7 Implementation of the Kigali Amendment to the Montreal Protocol on the Phase-out of Products Used as Substitutes for Ozone-Depleting Substances	√				√
PAM 8 Improvement and efficiency in the industrial processes	√			√	√
PAM 9 Setting a national obligation for CO2 injecting and storing for the oil and gas industry	√			√	√
PAM 10 Reducing emissions from enteric fermentation	√				√
PAM 11 Improving agricultural residues management	√	√			√
PAM 12 Reducing methane emissions from manure management and biogas production	√	√			√
PAM 13 Increasing energy production in the agrisolar field	√	√			√
PAM 14 Establishing integrated management of forest fires	√				
PAM 15 PV systems in agriculture for irrigation	√	√			√
PAM 16 Renewal of the agricultural machinery and equipment	√	√			

	Decarbonisation	Efficiency	Security	Internal	R&I&C
PAM 17 Reduction of the municipal waste per capita	√				
PAM 18 Increased recycling and biodegradable waste section for composting	√				
PAM 19 Optimization of incineration/co-incineration processes	√	√			√
PAM 20 Landfill gas flaring	√	√			
PAM 21 Improving wastewater treatment	√				
PAM 22 Increase of the domestic generation capacity from PV power plants	√		√		
PAM 23 Increase of the domestic generation capacity from wind	√		√		
PAM 24 Construction/completion of hydropower facilities	√		√		
PAM 25 Pumped storage	√		√		
PAM 26 Construction of photovoltaic power plants on rooftops	√	√	√		
PAM 27 Installation of solar thermal collectors in the residential sector	√	√	√		
PAM 28 Facilitating the establishment of energy communities					
PAM 29 Increasing the installed capacity for energy production from biomass and biogas by building new power plants and cogeneration plants	√	√	√		
PAM 30 Biogas and biomethane	√	√	√		
PAM 31 Advanced biofuels market development	√	√	√		√
PAM 32 Biofuels for aviation and shipping	√	√			
PAM 33 RFNBO	√	√	√		√
PAM 34 Development of the use of biomass, bioliquids and biogas within the EU-ETS installations based on energy-intensive thermal processes	√	√	√		√
PAM 35 Improve the energy performance of public buildings at central level	√	√			
PAM 36 Improve the energy performance of public buildings at local level	√	√			
PAM 37 Renovation of residential buildings	√	√			
PAM 38 Renovation of commercial buildings	√	√			
PAM 39 Rehabilitation of public lighting	√	√			
PAM 40 Development of the energy services market and ESCO companies		√		√	
PAM 41 Green Procurement	√	√		√	
PAM 42 Energy audit and energy management	√	√		√	
PAM 43 Increased share of heat pumps	√	√			
PAM 44 Increased use of efficient technologies in the residential sector	√	√			
PAM 45 Replacement of conventional fuels with RES in manufacturing industries	√	√			√
PAM 46 Increase technology efficiency in the industrial sector	√	√			√
PAM 47 Increased share alternative fuelled cars	√	√			
PAM 48 Increased share of passenger transport vehicles powered by alternative fuels	√	√			
PAM 49 Modernization of urban public transport	√	√			
PAM 50 Development of the underground transport infrastructure e	√	√			
PAM 51 Increased share of alternative fuelled trucks	√	√			
PAM 52 Modernization of naval transport	√	√			
PAM 53 Modernization of air transport	√	√			
PAM 54 Modernization and renewal of railway transport	√	√			

	Decarbonisation	Efficiency	Security	Internal	R&I&C
PAM 55 Railway rolling stock	√	√			
PAM 56 Alternative mobility	√	√			
PAM 57 Increasing energy efficiency for the buildings in the transport sector	√	√			
PAM 58 Modernization of road transport infrastructure	√	√			
PAM 59 Support for the expansion and modernization of the electricity distribution network	√	√	√		
PAM 60 Increased use of nuclear energy	√	√	√	√	√
PAM 61 Cross-border project for the development of the Black Sea Corridor electricity transmission network (ID 138 of the ENTSO-E TYNDP)	√		√	√	
PAM 62 Mid Continental East Corridor Cross-border Electricity Transmission Network Development Project (ENTSO-E TYNDP ID 144)	√		√	√	
PAM 63 Cross-border project for the development of the HU-RO electricity transmission network (ID 259 of the ENTSO-E TYNDP)	√		√	√	
PAM 64 North CSE Corridor cross-border electricity transmission network development project (ENTSO-E TYNDP ID 341)	√		√	√	
PAM 65 Georgia-Romania Black Sea Interconnection Submarine Cable Project (ENTSO-E TYNDP ID 1105)	√		√	√	
PAM 66 Increasing interconnectivity between the Eastern regions of Romania and the rest of SEN	√		√	√	
PAM 67 Integrating the output generated by powerplants in the South and South-West of Romania	√		√	√	
PAM 68 400kV OHL Suceava-Balti	√		√	√	
PAM 69 Refurbishment and modernization of the existing substations	√		√	√	
PAM 70 Refurbishment and development of the underground natural gas storage depot Depomureș - Târgu Mureș			√	√	
PAM 71 Increasing the daily extraction capacity in the underground gas storage system (SISG) Bilciurești			√	√	
PAM 72 Modernization of the natural gas storage system infrastructure — Bălăceanca			√	√	
PAM 73 Increasing the underground natural gas storage capacity of the Ghercești deposit			√	√	
PAM 74 Increasing the underground natural gas storage capacity at the Sărmășel deposit (Transylvania)			√	√	
PAM 75 New underground natural gas storage facility Fălticeni (Moldova)			√	√	
PAM 76 Modernization of natural gas infrastructure for enabling the transportat of hydrogen	√		√	√	
PAM 77 Creation of new infrastructure for the transport of hydrogen	√		√	√	
PAM 78 Increasing the transport capacity of SNT and ensuring the security in natural gas supply	√		√	√	
PAM 79 Increasing the transport capacity of the SNT and ensuring the security of natural gas supply throughout the region	√		√	√	
PAM 80 LNG Terminal located on the Black Sea coast, interconnection of the SNT to the LNG Terminal and the development of the natural gas transport pipeline on Romanian territory for taking over natural gas from the Black Sea shore			√	√	
PAM 81 Development on the Romanian territory of SNT on the Bulgaria–Romania–Hungary–Austria Corridor (BRUA) - Phase II and Phase III			√	√	

	Decarbonisation	Efficiency	Security	Internal	R&I&C
PAM 82 Development/Modernization of the natural gas transmission infrastructure and interconnections			√	√	
PAM 83 Development of SMG in order to achieve bidirectional flow on the T2 and T3 pipelines			√	√	
PAM 84 Rehabilitation, modernization and expansion of the SNT	√		√	√	
PAM 85 Increasing electricity storage capacity	√		√	√	
PAM 86 Creating an enabling environment for production and trading of green gases.	√		√	√	
PAM 87 Development and use of a fully-fledged national social assistance IT system				√	
PAM 88 Ensuring the implementation of the just transition process				√	
PAM 89 Ensure the access of energy consumers to diversified, sustainable and accessible sources of energy for lighting, heating and cooling	√	√			
PAM 90 Develop one-stop shops	√	√			
PAM 91 Establishment of an interministerial committee for protecting vulnerable consumers and reducing energy poverty.	√	√			

Within the policies and measures of the updated NECP 2021-2030, a series of projects are proposed that allow the achievement of the plan's objectives.

Table 2 contains the list of projects identifiable by name or characteristics.

Table 2. Projects proposed through the updated NECP 2021-2030

Policies and Measures	Name/characteristics of the proposed projects
PAM 4 Development of new CCGT capacities	• Completion of the Iernut gas power plant - 430 MW, starting from 01.01.2025 • MASS Mintia power plant - at least 860 MW, starting from 01.01.2026, with the possibility of expansion up to 1,700 MW • Işalnița & Turceni thermal power plants - 1,325 MW, starting from 01.07.2026
PAM 5 Promotion high-efficiency cogeneration capacities	• CHP Rompetrol Năvodari - 80 MW, starting in 2024 • CET (Temonelectric powr plant) Constanța - 52 MW, starting from 2025 • CET Craiova - 295 MW, starting in 2026 • Others - 70 MW, starting in 2026 • CET Progresu - 50 MW, starting in 2028 • CET Grozăvești - 34 MW, starting in 2029 • CET Sud Vitan - 300 MW, starting in 2030
PAM 24 Construction/ completion of hydropower facilities	• Hydropower Development of the Jiu River on the Livezeni – Bumbeşti sector - 65 MW, starting with 2026 • Paşcani Hydropower Development on the Siret River - 9.4 MW, starting in 2026 • Hydropower Development of the Olt River Gorge on the Cornetu-Avrig sector - 40.5 MW, starting in 2029 • Surduc-Siriu Hydropower Development - 55 MW, starting in 2026 • Hydropower Development of the Siret River on the Cosmești-Movileni sector - 38 MW, starting with 2026

	• Răstolița Hydropower Development - 35 MW, starting with 2026 • Cerna-Belareca Hydropower Development - 15 MW, starting with 2029 • Izbiceni Danube Hydropower Development, Islaz - 29 MW, starting with 2030 • Cerna Motru-Tismana Stage II Hydropower Development -13 MW starting with 2029
PAM 60 Increased use of nuclear energy	• Construction of Unit 3 of the Cernavoda NPP (CANDU) – 700 MW, in 2031 • Construction of Unit 4 of the Cernavoda NPP (CANDU) – 700 MW, in 2032 • Doicești Nuclear Power Plant (SMR) - 462 MW in 2030 Additionally, the following are considered: • Refurbishment of Unit 1 of Cernavodă NPP in the period 2027-2029 • Refurbishment of Unit U2 of the Cernavodă NPP in the period 2036-2038
PAM 61 Cross-border project for the development of the Black Sea Corridor electricity transmission network (ID 138 of the ENTSO-E TYNDP)	Four separate investments grouped within the project: ID 275 (400kV Smârdan – Gutinaș OTL), ID 273 (400kV Cernavodă – Gura Ialomiței – Stâlpu OTL), ID 715 (400/110kV Stâlpu Substation) and ID 800 (400kV Varna – Burgas OTL). All are under implementation.
PAM 62 Mid Continental East Corridor Cross-border Electricity Transmission Network Development Project (ENTSO-E TYNDP ID 144)	Six separate investments are grouped within the project: ID 238 (400kV OHL Reșița – Pancevo), ID 269 (400kV OHL Portile de Fier – Reșița), ID 270 (400kV OHL Reșița – Săcălaz and 400 kV OHL Reșița - Timișoara), ID 701 (400 kV Reșița Station), ID 705 (400 kV Timișoara Station) and ID 1827 (400 kV OHL Timișoara – Arad and 400 kV OHL Săcălaz – Arad), according to ENTSO-E
PAM 63 Cross-border project for the development of the HU-RO electricity transmission network (ID 259 of the ENTSO-E TYNDP)	Six separate investments are grouped within the project ID: 1205 (400 kV OHL Oradea Sud - Debrecen), ID 1832 (400/220 kV autotransformer in Roșiori station), ID 1833 (re-conductoring of the 220 kV Urechești-Tg. Jiu Nord axis), ID 1834 (re-conductoring of the 220 kV OHL Tg. Jiu Nord - Paroșeni), ID 1835 (re-conductoring of the 220 kV OHL Paroșeni - Baru Mare), ID 1836 (re-conductoring of the 220 kV OHL Baru Mare - Hășdat) and ID 1865 (construction of the second circuit of the 400 kV OHL Nădab - Bekescsaba), according to ENTSO-E
PAM 64 North CSE Corridor cross-border electricity transmission network development project (ENTSO-E TYNDP ID 341)	Four separate investments are grouped within the project: ID 1536 (400 kV OHL Portile de Fier – Djerdap circ. 2), ID 1537 (400/110 kV Belgrad 50 Station), ID 1538 400 kV OHL CEE Cibuk - SS Belgrad 50) and ID 1864 (Reconductoring of 220 kV OHL Porțile de Fier – Reșița circ. 1 and circ. 2), according to ENTSO-E
PAM 65 Georgia-Romania Black Sea Interconnection Submarine Cable Project (ENTSO-E TYNDP ID 1105)	An investment is included in this project: ID 1782 (Georgia-Romania Interconnection Submarine Direct Current Cable Project), according to ENTSO-E.
PAM 79 Increasing transmission capacity and ensuring security of	The EASTRING project, promoted by EUSREAM, is a bidirectional pipeline for Central and South-Eastern Europe, which aims to connect the natural gas transmission systems of Slovakia, Hungary, Romania and

natural gas supply throughout the region	Bulgaria to access natural gas reserves in the Caspian Sea region and the Middle East.
PAM 80 LNG Terminal located on the Black Sea coast, the interconnection of the SNT to the LNG Terminal and the development on the territory of Romania of the natural gas transmission pipeline for the takeover of natural gas from the Black Sea coast	The implementation of the project results in the diversification of natural gas supply resources through the construction of an LNG terminal located on the Black Sea coast.
PAM 81 Development on the territory of Romania of the NTS on the Bulgaria–Romania–Hungary–Austria Corridor (BRUA) - Phase II and Phase III	The implementation of the BRUA Phase II Project results in ensuring the physical possibility of permanent bidirectional flow between the interconnections with Bulgaria and Hungary, ensuring the following natural gas transport capacities: transport capacity to Hungary of 4.4 billion cubic meters/year, respectively of 1.5 billion cubic meters/year to Bulgaria. In the event that the transport capacities necessary to exploit natural gas from the Black Sea on the Central-Western European markets exceed the transport potential of the BRUA Phase II corridor, TRANSGAZ planned the development of the central corridor on the Oneşti–Coroi–Haţeg–Nădlac corridor (BRUA Phase III).

3.4 Relationship with other plans and programs

Table 3 presents strategies/plans/programs relevant to the field of energy and climate change with the identification of correlation elements between them and the updated NECP 2021-2030.

Table 3. Relationship of the updated NECP 2021-2030 with other strategies, plans and programs

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
1	EU Energy Policy	2020 - 2030	The EU Energy Policy stipulates: i) a reduction of at least 40% in greenhouse gas emissions compared to 1990 levels; ii) an increase of 27% in the share of renewable energy sources in energy consumption; iii) an improvement in energy efficiency by 20% with the aim of reaching 30%; iv) the development of the interconnection of electricity networks by at least 15%.	After the EU became part of the Paris Agreement, the Union assumed a prominent position in combating climate change through five key dimensions: energy security, reduction of GHG emissions, increase in energy efficiency, strengthening the internal energy market and promoting research, innovation and competitiveness. As an EU member state, Romania follows the policies established at the community level, adapting them to its local specificities.
2	Romania's Long-Term Strategy for Reducing Greenhouse Gas Emissions – Romania Neutral in 2050	2050	Within Romania's Long-Term Strategy (LTS), three scenarios were developed and analysed: the Reference Scenario (REF), the Mid-Term Scenario (Medium) and the Neutral Romania Scenario (Neutral Romania). The Neutral Romania Scenario aims to achieve climate neutrality for Romania in 2050, by reducing net emissions by 99% compared to 1990 levels. The Medium Scenario was conducted as a middle ground solution between the REF Scenario and the Neutral Romania Scenario. The Neutral Romania Scenario was the one selected by the Romanian authorities to be implemented by 2050.	The reference scenario of the Strategy was built based on the NECP 2021-2030 targets, taking into account a significant increase in the global share of RES in gross final energy consumption: from 30.7%, as indicated in the first version of the NECP, to 34.3%, in the case of the REF Scenario of the STL.

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
3	National Strategy for Sustainable Development of Romania 2030	2030	The National Strategy for Sustainable Development of Romania 2030 establishes the national framework for supporting the 2030 Agenda and implementing a set of 17 sustainable development goals. It supports Romania's development on three main pillars: economic, social and environmental. Objective 7 "Clean and Affordable Energy" of the Strategy refers to the Energy Sector. These objective mentions ensuring access for all to affordable energy in a safe, sustainable and modern way; energy infrastructure; energy security; access to energy; renewable energy sources and energy efficiency.	Romania's objective is to achieve a share of RES in gross final consumption of at least 36.2% by 2030. Projections indicate that the share will reach 32.3% by 2025. The targets will be met mainly by increasing the installed capacity for energy production from wind and solar sources and by using heat pump – based technologies for heating and cooling processes. The share of RES in the electricity sector will increase to 55.8% by 2030, as a result of the construction and commissioning of new electricity production capacities from RES (mainly wind and solar).
4	Romania's Energy Strategy 2025-2035 with a view to 2050	2025-2035 with a view to 2050	The Energy Strategy of Romania (ESR) was developed in accordance with the EU legislative framework in the field of energy and climate change, as well as with the programmatic documents in the field adopted at national level, such as the Long-term Strategy of Romania for the Reduction of Greenhouse Gas Emissions - Romania Neutral in 2050 (LTS), or those currently under review and adoption, such as the NECP, which outlines the trajectory for the development of the energy sector by 2030, with a view to 2050.	The main targets for RES refer to: i) developing production capacities from renewable energy sources and improving energy efficiency, in line with the LTS and NECP; ii) Setting ambitious objectives to increase the share of renewable energy sources in the energy mix, which is essential for achieving decarbonization targets and reducing GHG emissions; iii) providing for the integration of innovative technologies, such as carbon capture and storage (CCS), as well as the use of green hydrogen as a source of clean energy; iv) emphasizing increasing energy efficiency in the energy sector, as the first

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
				means of reducing energy consumption and, implicitly, GHG emissions.
5	National Waste Management Plan (NWMP)	2018-2035	The national waste policy is consistent with European policies on waste prevention and management and aims to reduce resource consumption and the practical application of the waste hierarchy.	Waste Sector: GHG emissions will be reduced by 30% in 2030 compared to 1990 through the reduction, reuse and appropriate recycling of waste.
6	National Recovery and Resilience Plan (NRRP)	2021-2026	The Recovery and Resilience Plan represents a Strategic Document that underpins the reforms and investments necessary for the real development of a European country in the green and digital era, with direct and indirect implications in almost all areas of activity, on whose success depend on the recovery and development of the national economy, the stability and sustainability of the budget, as well as the performance of the administrative process. Through NRRP, reform priorities and investment areas are established, addressing a significant part of the structural challenges that have remained unresolved, by implementing important reforms with significant impact on the economy and long-term socio-economic benefits.	The NRRP ensures an optimal balance between EU priorities and Romania's development needs, in the context of the recovery after the COVID-19 crisis, and includes interventions aimed at supporting the implementation of the updated NECP 2021-2030. Thus, through the measures and investments financed by the NRRP, it helps achieve the NECP targets regarding energy efficiency, decarbonization of the energy system, development of technologies for electricity production, production of electricity from renewable sources (solar), minimization of municipal waste, improvement of recycling and composting of biodegradable waste, increase of the national capacity for energy production from RES, etc. At the same time, the NRRP supports investments in afforestation and reforestation, improvement and establishment of new nurseries, updated

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
				management plans for strictly protected habitats, forest restoration and species conservation, as well as the protection of watersheds. The NRRP supports the implementation of the Long-Term National Renovation Strategy through component C5 – Renovation Wave, which adopts the European strategy for the renovation wave of building at the national level, also supporting the integrated approach to renovation. Through the associated package of reforms and investments, Component 5 ensures the green and digital transition of the national built environment. Also, through Component 10 – Local Fund, it provides legislative and spatial planning tools to support climate resilience.
7	National Strategy on Climate Change Adaptation	2024 – 2030 with a view to 2050	The SNASC aims to improve the adaptive capacity of Romania's socio-economic and ecological systems, with the aim of reducing the impact of climate change on the population and the environment. The strategy provides a coherent and sustainable framework for society and the national economy to dynamically adapt to climate challenges, ensuring sustainable development and the protection of citizens.	Romania aims to reduce net GHG emissions by 78% by 2030, compared to 1990 levels. In this area, Romania has already made significant progress, achieving 79% of the 2030 net GHG emissions reduction target by 2019. The long-term objective is to achieve a near-total reduction in net GHG emissions by 2050: a 99% reduction in net GHG emissions in 2050 compared to 1990 levels.

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
			SNASC promotes nature-based solutions and ecosystem adaptation, emphasizing the importance of conserving biodiversity and ecosystem services for sustainable development.	
8	National Action Plan for the implementation of the National Strategy on Climate Change Adaptation	2023-2030	The major objective of the National Action Plan for the period 2023-2030 is to propose concrete measures that will lead to the real and efficient implementation of the objectives and programs / action directions formulated in the National Strategy on Adaptation to Climate Change for the period 2023-2030 with a view to 2050, ensuring continuity in the implementation of the measures provided for in the previous Action Plan.	The National Action Plan for the implementation of the National Strategy on Adaptation to Climate Change prioritizes measures for the use of renewable energy sources to increase the resilience of the energy system using energy storage systems, increasing energy efficiency and diversifying energy sources.
9	Romania's Mining Strategy	2017-2035	As of February 2019, the general objective of the mining sector strategy is to continue the exploitation of existing deposits and derived secondary resources, as well as the exploration and exploitation activities and the opening of new deposits, only under conditions where economic efficiency can be ensured. An important aspect addressed in the Strategy is the activity related to the closure and greening of mines.	The updated NECP 2021-2030 foresees the gradual elimination of all coal and lignite-fired power plants, aiming to achieve decarbonization and promote renewable energy sources. This measure stipulates that all coal-fired power plants, with a total installed capacity of 4920 MW, will be gradually decommissioned by the end of 2031.
10	National Forestry Strategy	2018-2027	The National Forest Strategy is a strategic document that has as general objectives: ensuring the balanced integration of social,	The updated NECP 2021-2030 aims to reduce the average annual area of forests destroyed as a result of fires. This measure contributes to

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
			ecological and economic functions in forest management and the provision of ecosystem services, obtaining a social agreement on the harmonization of the rights, interests and obligations of stakeholders and those affected by forest management, allowing the adaptation of regulatory and control instruments, financial support instruments and those affected by forest management.	the protection of forest areas by preventing forest fires and the damage resulting from them.
11	Electricity Transmission Network Development Plan	2024-2033	The main objectives of the Electricity Transmission Network (RET) Development Plan are: - Information on the current and prospective capability of the transmission network to meet user requirements and public interest, taking into account the Objectives of the National Energy Strategy and Policy and the legislation in force; - Correlation of the conditions for the relationship between the TSO (transmission and system operator) and market participants, in the medium and long term, of actions/investments that may have an impact on the safety performance of the National Energy System; - Information on regional opportunities for connection to the RET and use of the RET	The level of electricity grid interconnection in 2030 towards which the Member State aims, taking into account the 2030 electricity grid interconnection target of at least 15%, with a strategy for the level starting from 2021, defined in close cooperation with the affected Member States, taking into account the 10% interconnection target set for 2020 and the following indicators of the degree of urgency of the measures. Romania is also making efforts to improve its energy infrastructure. These include modernizing the electricity grid and building new interconnections with neighbouring countries, investments that will help Romania better integrate into the European energy market and import and export energy more easily.

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
			based on forecasts of consumption and production capacity evolution; - Information on the evolution of energy exchange capacities with neighbouring systems in the context of the European internal electricity market; - The reserve level in the SEN to ensure demand coverage with electricity production and transport at peak consumption; - The need for resources for the development of RET and their source.	
12	National Strategy for Development of the Nuclear field in Romania	2021-2030, with a view to 2050	The long-term strategic objectives of the National Nuclear System are: i) operating nuclear units in safe and secure conditions for personnel, population, environment and production assets; ii) maintaining the electricity production capacity for the current average level in the industry (refurbishment of Unit 1); iii) achieving the Major Investment Objectives; iv) improving the company's financial performance indicators; v) ensuring security in the supply of raw materials; v) diversifying the portfolio of activities; vi) using assets that currently do not generate income (completion of Units 3 and 4 at the Cernavodă NPP); vii) the opportunity to introduce SMR reactors into the national decarbonized energy production, followed by	Increased use of nuclear energy by building additional capacity (in CANDU and SMR technology) and retrofitting existing CANDU units. In total, 2.8 MW in CANDU technology and 462 MW in SMR technology (total: 3,262 MW) of nuclear power capacity will be available in 2032-2036 and 2038-2050.

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
			the introduction of generation IV reactors, starting with the end of this decade.	
13	National Water Management Strategy	2023-2035	The National Water Management Strategy aims to establish a new relationship between the economy, the environment and the Romanian society from the point of view of water management, so that within a reasonable time the European standards are achieved and maintained. The strategy targets both government policy and economic and social activities with an impact on water and its management: water services for the population, industry, agriculture, public works, transport, tourism, leisure, landscape. The strategy aims to develop an integrated management of water resources, in order to increase resilience to climate change, environmental degradation, achieving and maintaining good water status in accordance with the Water Framework Directive (Directive 2000/60/EC) and the updated National Management Plan, approved by Government Decision no. 392/2023, the effective management of flood risk according to the Floods Directive (Directive 2007/60/EC) and the Flood Risk Management Plan (cycle 2), approved by Government Decision no. 886/2023 and the National Flood	The updated NECP 2021-2030 provides for the installation and commissioning, by 2050, of an additional capacity for electricity production from hydropower sources of over 300 MW.

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
			Risk Management Strategy, but also to stimulate the improvement of the quality of life and the functioning of an economy based on the principles of sustainable development.	
14	National Investment and Economic Recovery Plan	2021-2027	The National Investment and Economic Recovery Plan includes a broad program that underpins the economic and administrative policy that aims to change the consumption-based development model into an economic growth model based on investment, digitalization and the stimulation of domestic capital.	Supporting investments in the development of the national energy system, starting with energy production from renewable sources and continuing with investments in smart transmission and distribution networks, natural gas and electricity.
15	National Strategy for Research, Innovation and Smart Specialization (SNCISI)	2022-2027	The strategy, developed by the Ministry of Research, Innovation and Digitalization, sets the vision for the Romanian research and innovation system in the 2030 horizon and expresses the firm option to recognize and support excellence, to reward performance, to stimulate the development of collaboration between the public and private sectors. Science, innovation and innovation entrepreneurship will constitute successful models for the sustainable development of Romania in a local, national and international context.	Romania has promoted research and innovation in the energy sector. Research initiatives focused on advanced energy technologies, smart grids, energy storage and digitalization play a crucial role in promoting the objectives of the Energy Union and improving the EU energy landscape.
16	Just Transition Program and Territorial Plans for Just Transition	2021-2027	The Just Transition Programme is based on objectives aimed at supporting the economic diversification of the most affected territories,	The Just Transition Program responds to the investment needs defined at the level of the territorial plans for a just transition, developed

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
			together with measures for the retraining and active inclusion of workers and job seekers, while supporting the transformation of industrial processes, necessary for a transition towards a neutral economy while maintaining or increasing the number of jobs in these sectors.	for the counties of Gorj, Hunedoara, Dolj, Galați, Prahova and Mureș, territories identified in Annex D of the 2020 Country Report to be supported from the Just Transition Fund in the period 2021 - 2027. The territorial plans describe the impact of the transition to climate neutrality of the targeted territories in the context of the objectives, policies and measures provided for in the updated NECP 2021 - 2030, which ensures the national contribution to achieving the EU energy and climate targets for 2030 and for the climate neutrality of the economy by 2050. Through the investments provided for financing under the Just Transition Program (PTJ) 2021-2027, Romania aims to contribute equitably to achieving the common European targets for 2030, respectively the achievement of the RES targets assumed through the NECP. Thus, for the counties of Dolj, Gorj, Hunedoara, Mureș, Prahova and Galați, interventions are foreseen to increase the degree of energy resilience of communities through investments in the development of small-scale capacities for the production, transport and storage of renewable energy (photovoltaic, wind or geothermal, including heat pumps) necessary for public buildings

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
				where schools, hospitals, homes for the elderly, nurseries, social services, vocational training centres, etc. operate, without affecting the principle of promoting community care services.
17.	Sustainable Development Program (SDP)	2021-2027	The Sustainable Development Programme (PDD) 2021-2027 contributes to transforming the EU economy into a modern, competitive and efficient economy, decoupled from resource use, in line with the objectives of the European Green Deal (EGD) and the EU Action Plan on net zero pollution, as an integral part of the EGD. The SDS also contributes to the objectives of the EGD, so that Europe becomes the first climate-neutral continent and economic growth is sustainable and not based on resource use.	The promotion of energy efficiency investments is envisaged within the PDD to reduce carbon emissions and better cope with a changing climate and improve air quality. Thus, the investments will contribute to the national target of increasing energy efficiency per year, established in accordance with the Energy Efficiency Directive (2012/27/EU), transposed into national legislation by Law 121/2014, as subsequently amended and supplemented, thus contributing to achieving the target of a net reduction of at least 55% of greenhouse gas emissions by 2030, compared to 1990, under the Paris Agreement on Climate Change. Regarding energy efficiency, the PDD supports the achievement of the NECP targets through measures regarding: increasing energy efficiency in SMEs and large enterprises, including through the production of energy from renewable sources exclusively for own consumption; interventions regarding increasing the energy efficiency of the public

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
				building stock; investments regarding the reduction of GHG emissions and increasing energy efficiency in the systems of production, distribution and transport of thermal energy. *Promoting the use of renewable energy sources* Through the investments provided for financing under the PDD 2021-2027, Romania aims to contribute equitably to achieving the common European targets for 2030, respectively the achievement of the RES targets assumed through the NECP. Thus, investments for the creation and/or modernization of electricity and/or thermal energy production capacities from RES (/e.g. biomass/biogas, geothermal and the use of solar energy) are targeted for financing. *Promoting smart systems and networks* through interventions in the electricity transmission and distribution networks are considered for financing within the PDD and which will contribute to achieving the objectives of the NECP, including that of achieving a degree of interconnection of electricity transmission systems of 15% by

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
				2030, as well as the targets assumed in the NECP.
18	Regional Programs	2021-2027	The general objective of the 2021-2027 regional programs is to increase regional economic competitiveness and improve the living conditions of local communities by supporting the development of the business environment, infrastructure and services, in order to reduce intra-regional disparities and sustainable development, through efficient resource management, capitalizing on demographic and innovation potential, as well as by assimilating technological progress.	The 2021-2027 Regional Programs support the achievement of the NECP targets through measures to improve energy efficiency and increase energy performance, including structural reinforcement measures, of residential and public buildings, including cultural heritage buildings, as well as the installation of alternative systems for producing energy from renewable sources for own consumption (e.g. photovoltaic panels, solar panels, heat pumps), which will lead to significant energy savings and a visible reduction in greenhouse gas emissions and air pollution. Also, the North-West Regional Program 2021-2027 contributes to increasing the RES target in the NECP through strategic investments in promoting renewable energy in rural communities by applying centralized, highly efficient solutions in terms of thermal energy supply, which use fuels from locally available renewable resources (solar, wind, geothermal, etc.)
19	National Circular Economy Strategy	2023-2030	The document provides an overview of 14 economic sectors in Romania in terms of their circularity potential, establishing a clear	The circular economy strategy promotes the use of renewable energy sources over fossil fuels. The Strategy mentions the need to move

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
			general direction to accelerate the transition from a linear to a circular economic model. The national strategy on the circular economy identifies seven economic sectors for which the maximum potential of the circular economy is aimed, namely: agriculture and forestry; automotive industry; construction; food and beverages; packaging (glass, paper and plastics, etc.); textiles; electrical and electronic equipment, batteries and accumulators. These economic sectors are added to those of waste and water, as well as a cross-cutting area dedicated to activities supporting measures in the field of circular economy, natural resources and environmental degradation.	to a circular economy as essential for achieving national climate change objectives. By reducing the use of fossil fuels in energy production, fewer greenhouse gas emissions are generated, allowing Romania to achieve the targets assumed by the Paris Agreement. The extraction and use of raw materials also has a negative impact on climate change, as it contributes to energy consumption and greenhouse gas emissions. The transition to circularity is essential to achieve the climate goals agreed under the Paris Agreement, which commits countries to keeping the increase in global average temperature to well below 2°C and to pursue efforts to limit the temperature increase to 1.5°C 8.
20	Circular Economy Action Plan	2023-2032	The Action Plan for the National Circular Economy Strategy presents the vision and concrete actions in the short, medium and long term, the role of public, private entities and the general public as well as the degree of their involvement during implementation and allows the Government of Romania, through the Coordination Committee for the Circular Economy of Romania, to initiate coherent measures over time to develop good governance and strengthen the foundations of the circular economy.	The Circular Economy Action Plan provides for priority and specific actions to contribute to increasing the degree of circularity in each sector, including in agriculture by increasing the use of biomass from agricultural and forestry activities for the production of energy and biofertilizers. The Action Plan for the National Circular Economy Strategy is part of the government's recent efforts to accelerate the transition to a circular economy in Romania.

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
21	Romania's industrial strategy	2023-2027	Romania's industrial strategy was developed to define a new industrial policy adapted to the national and European context. The document proposes an analysis of the current situation, of the main problems/risks impacting the national industry, proposing measures that fall within the two types of public intervention, namely providing financial support for industrial entities and strict regulation of the industrial sector.	The European process of achieving climate neutrality has led to the emergence or acceleration of phenomena that will have a major impact on the national industry over a long-time horizon: the expansion of renewable energy sources, the emergence of prosumers, gas storage measures, industrial decarbonization measures, measures for the capture, use and storage of CO2. Carbon capture, transport, use and storage (CCUS) – essential technologies for Romania's climate neutrality. Carbon capture, transport, use and storage, technologies of utmost importance for decarbonization efforts, agreed at global level at COP28. Aligned with the EU objectives, the European cement industry is ready to accelerate the path towards climate neutrality, so as to reduce carbon emissions by 30% by 2030, and to achieve net zero carbon in the entire cement and concrete value chain in 2050. It is a commitment that contributes to achieving the targets assumed by the EU, in which companies from the Romanian cement sector also actively participate. The implementation of CCUS projects is mandatory for Romania to maintain its

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
				production of cement, lime, chemicals, etc. in the country and to achieve its objective of "Neutral Romania", as defined in the "Long-term Strategy of Romania for Reducing Greenhouse Gas Emissions - Neutral Romania in 2050", approved by Government Decision no. 1.215/2023. Among the key actions necessary to achieve this objective are the development of the National Strategy on CCUS and an adequate legislative and regulatory framework to ensure equitable access to transport and storage infrastructure for industrial operators. It is also essential to support co-financing through European (Innovation Fund) and national (Modernization Fund) funds. It is imperative to open a call for projects from the Modernization Fund to support investments in carbon capture, transport, use and storage. Funding sources: Innovation Fund: cirom.ro mentioned that the Innovation Fund finances CCUS projects, including those for cement and lime. Research and innovation programs: Projects such as STRATEGY CCUS are financed through the European Union's Horizon 2020 research and innovation program.

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
				Other sources: Other sources of financing, including public and private, can be found for CCUS projects. Four CCUS projects for cement and one for lime have already been financed from the Innovation Fund with a total value of over 800 million euros, and another six projects pre-selected in the July 2023 call are in the process of signing financing contracts. It is estimated that more than 15 CO2 capture and storage projects in the cement sector will be operational by 2030. Romania is focusing on the capture, storage and use of carbon dioxide (CO2) to reduce its environmental impact. OMV Petrom has been involved since May 2021 in ConsenCUS, an ambitious European project that aims to assess the technical and economic feasibility of innovative technologies for capturing exhaust gases containing carbon dioxide (CO2) and converting them into a commercially valuable chemical product. In June 2024, OMV Petrom started testing an innovative installation for carbon capture and use at the Petrobrazi refinery for 4 months. The installation consists of three units. The first captures CO2 using a more efficient

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
				technology than traditional methods. The second unit produces high-purity CO2, and finally, the third unit converts the CO2 into a chemical product, potassium formate, with multiple uses, such as the production of synthetic fuels. By capturing the CO2-containing gases discharged by the Cogeneration plant and their electrochemical conversion, it is estimated that the technology tested in real time at Petrobrazi can retain approximately 100 kg of CO2/hour, with an efficiency of over 90%. Around 70% of the estimated costs of the project are borne by the European Commission through Horizon 2020, the European Union's largest research and innovation program.
22	National Integrated Urban Development Strategy for Resilient, Green, Inclusive and Competitive Cities - Romania's Urban Policy	2022-2035	The National Integrated Urban Development Strategy for Resilient, Green, Inclusive and Competitive Cities 2022-2035 - Romania's Urban Policy - represents a vision of sustainable, inclusive and resilient urban development in Romania for the period 2022-2035. The strategy creates a framework for substantiating urban policies and local strategies, respecting the principle of local autonomy and subsidiarity, and represents the first national strategic document dedicated to urban development.	Romania's urban policy addresses the main contemporary challenges for urban areas, such as the impact and effects of climate change; urbanization; the impact and effects of technological evolution; and social inequalities.

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
23	General Transport Master Plan	2014-2030	The General Transport Master Plan of Romania (MPGT) is the document that establishes the increase of national and trans-European connectivity for society and the business environment. At the same time, the MPGT aims to expand and implement an economically efficient, sustainable, safe transport system with reduced environmental impact.	Sustainable transport planning is aligned with national environmental and energy objectives. By promoting efficient transport modes, reducing GHG emissions and improving connectivity, the MPGT indirectly contributes to increasing energy efficiency and climate resilience.
24	EU Biodiversity Strategy for 2030	2030	The 2030 Biodiversity Strategy aims to ensure that Europe's biodiversity is on a recovery path by 2030, setting out new ways to implement existing legislation more effectively, new commitments, measures, targets and governance mechanisms, including converting at least 30% of Europe's land and seas into effectively managed protected areas, fostering transformative change.	By developing renewable energy sources, the updated NECP 2021-2030 supports increasing the share of renewable energy in the national energy system, which will contribute to achieving climate and environmental objectives, including protecting biodiversity.
25	National long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, and its gradual transformation into a highly energy-efficient and decarbonized	2030, 2040, 2050	Developed under the Energy Performance of Buildings Directive, the National Long-Term Renovation Strategy, approved by Government Decision 1034/2020, addresses the energy renovation of the built stock. In accordance with the provisions of Article 2 of Directive 2010/31/EU on the energy performance of buildings, as amended by	The draft NECP integrates indicative milestones for 2030, 2040 and 2050, internally established measurable progress indicators, an evidence-based estimate of expected energy savings and other benefits, as well as their contributions to the Union's energy efficiency objectives, in accordance with Article 2a of Directive 2010/31/EU

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
	building stock by 2050 (SNRTL) (approved by Government Decision 1034/2020, with subsequent amendments and supplements)		Directive 2018/844/EU of the European Parliament and of the Council of 30 May 2018, each Member State must develop a Long-Term Renovation Strategy to support the renovation of the national stock of residential and non-residential, public and private buildings and their gradual transformation into a highly energy-efficient and decarbonised building stock by 2050, facilitating the cost-effective transformation of existing buildings into nearly zero-energy buildings. This strategy shall include a roadmap with measurable and nationally determined measures and indicators of progress, including indicative milestones for the years 2030, 2040 and 2050, and specifying how they contribute to the achievement of the Union's energy efficiency objectives in accordance with Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC. Through Directive 2018/2002/EU amending Directive 2012/27/EU on energy efficiency, the EU increased its overall energy saving	The annual savings in final energy consumption projected for the period 2021 – 2030 are presented in the NECP draft. By 2030, they are estimated to reach 10,116.5 ktoe. According to the scenario chosen within the SNRTL, it is estimated that annual renovation rates will gradually increase from 0.69% to 3.39% between 2021 and 2030, then to 3.79% between 2031-2040, finally reaching 4.33% between 2041-2050. Achieving these annual renovation rates will lead to a 9% (0.83 Mtoe) reduction in gross final energy consumption by 2030 and a 24% reduction in cumulative GHG emissions in 2021-2030, as well as a 65% (6.14 Mtoe) reduction in gross final energy consumption by 2050 and an 80% reduction in cumulative GHG emissions in 2021-2050. Long-term sectoral projections on final energy consumption illustrate that policies and initiatives aimed at improving the energy efficiency of buildings and promoting the use of more efficient technologies will have a significant impact on the residential sector. Their implementation will lead to a decrease in the share of the residential sector in gross final energy consumption at the national level from

No.	Name of the strategy, plan, program	Horizon of time	Document summary	Relationship with the updated NECP 2021-2030
			target for 2030 to 32.5%, which means a higher level of ambition compared to the efforts needed to reach the 20% target for 2020. The new target is part of the so-called "Clean Energy Package" of the European Commission, which focuses on the buildings sector and in particular on existing buildings. Law no. 101/2020 amending and supplementing Law no. 372/2005 on the energy performance of buildings transposed the provisions of Directive 2018/844/EU, so the obligation to develop this strategy is provided for in Chapter III - Long-term renovation strategy.	33% in 2022 to 29% in 2030 and to 16% in 2050.

4. Relevant aspects of the current state of the environment and its probable evolution in the event of non-implementation of the updated NECP 2021-2030

4.1. Current state of the environment

The characterization of the current state of the environment was carried out based on the data and information related to the national territory available at the time of the Environmental Report. The analysis of the current state of the environment was carried out for each relevant environmental aspect.

The relevant environmental aspects are as follows: air, water, soil, climate change, biodiversity, landscape, cultural aspects, conservation and use of natural resources, waste, population and human health.

4.1.1. Air

The energy sector is one of the sectors with the greatest influence on air quality through greenhouse gas emissions, acidifying gas emissions from the extraction, burning of fossil fuels and mining operations.

The continuously increasing demands for electricity and heat in both the industrial and residential sectors are one of the main causes of declining air quality by increasing the concentration of pollutants in the atmosphere (SO_2, NO_x, O_3, fine particle emissions etc.). Air pollution has negative effects on human health and the environment, hindering vegetation growth, increasing the incidence of respiratory diseases and accelerating environmental degradation through acid rain.

Air quality is constantly monitored to record data on the annual average concentrations of air pollutants (NO_2, SO_2, PM_{10}, C_6H_6, Pb, Cd, Ni, As) in relation to the annual limit value using analysers from monitoring stations across Romania. Trends in annual average concentrations of air pollutants from 2018-2023 recorded at different types of air quality monitoring stations in the National Air Quality Monitoring Network are presented in Figures 1-8 (Annual Report on the State of the Environment in Romania, 2023).

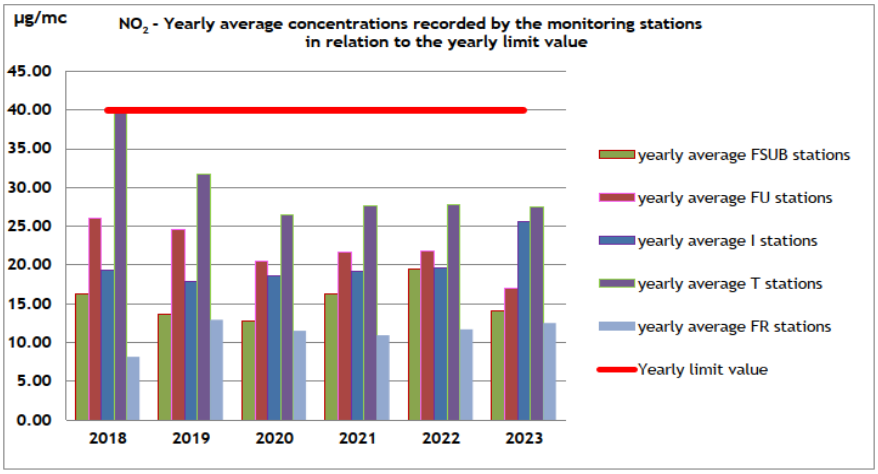


Figure 1. The evolution of annual average NO_2 concentrations from 2018 to 2023, recorded at monitoring stations in relation to the annual limit value (Source: ANPM, 2023)

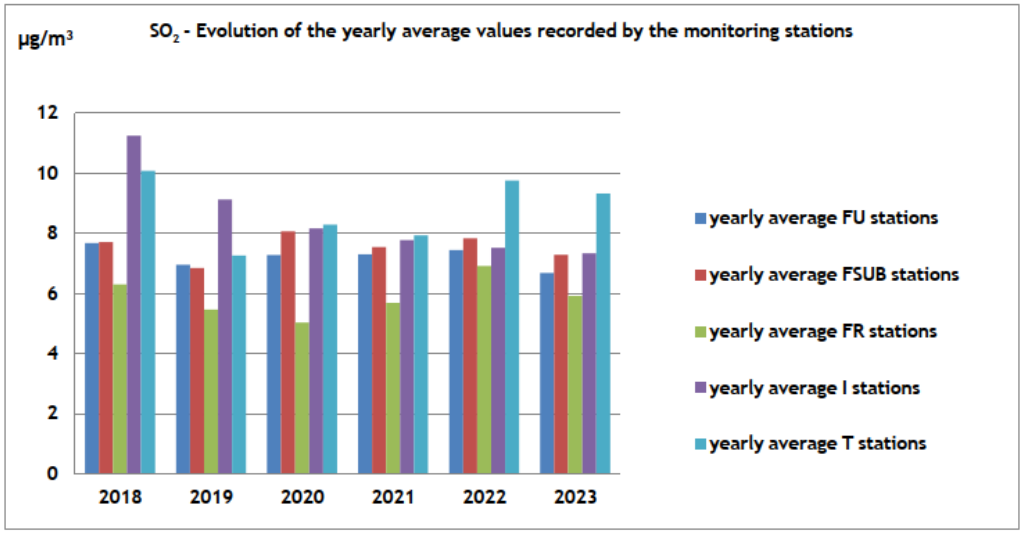


Figure 2. The evolution of average SO_2 annual concentrations from 2018 to 2023, recorded at monitoring stations (Source: ANPM, 2023)

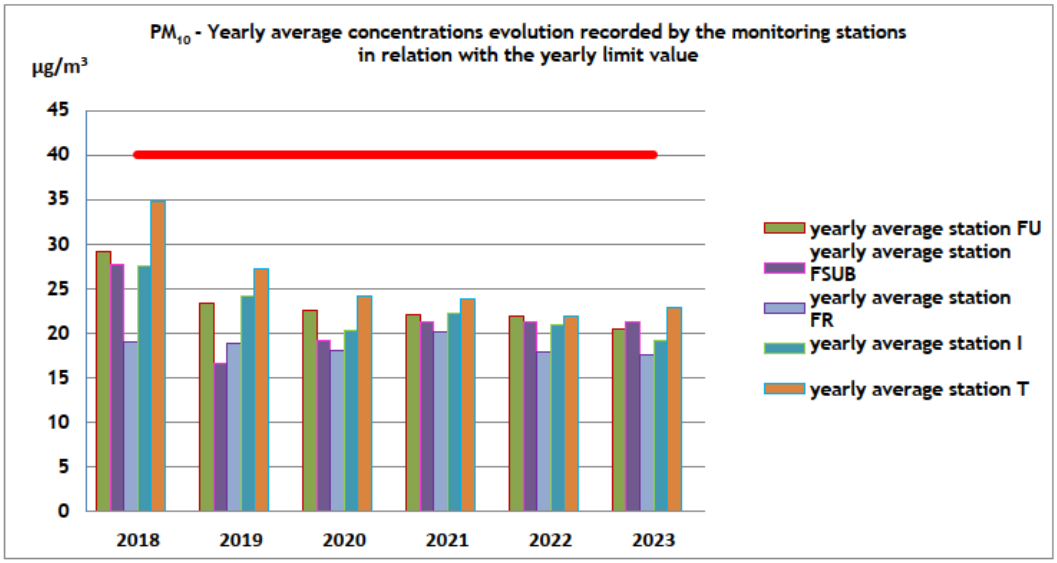


Figure 3. The evolution of average PM_{10} annual concentrations from 2018 to 2023, recorded at monitoring stations in relation to the annual limit value (Source: ANPM, 2023)

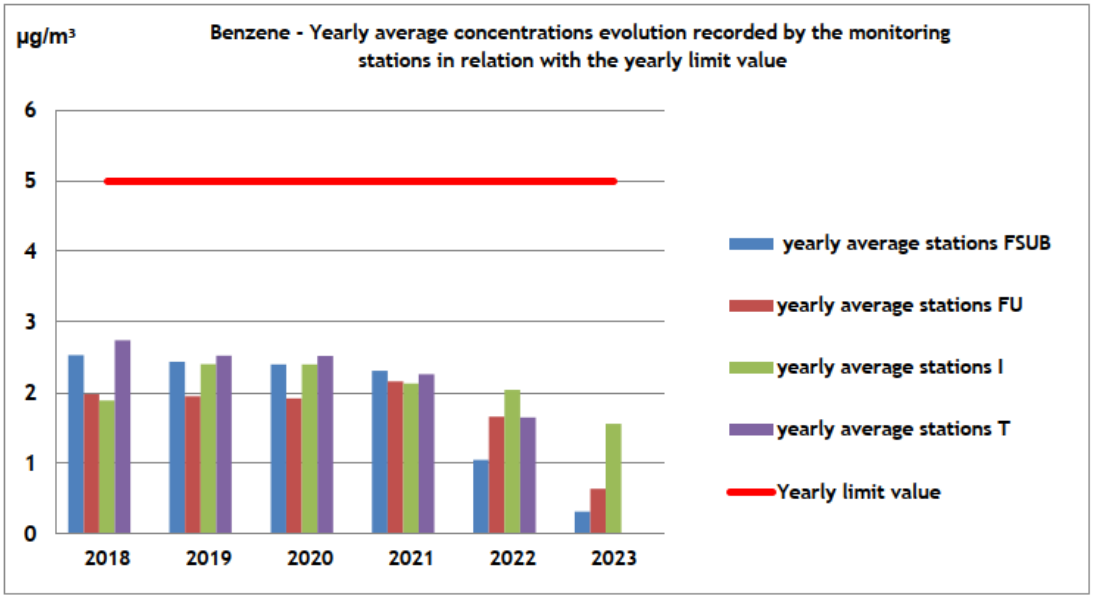


Figure 4. The evolution of annual average concentrations of C_6H6 during the period 2018-2023, recorded at monitoring stations in relation to the annual limit value (Source: ANPM, 2023)

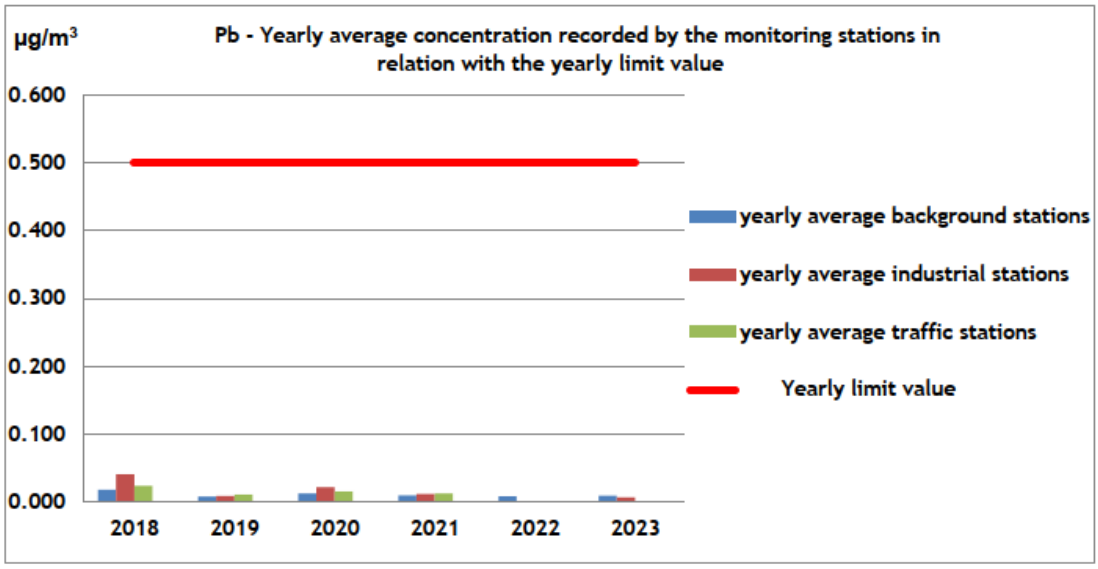


Figure 5. The evolution of annual average concentrations of Pb during the period 2018-2023, recorded at monitoring stations in relation to the annual limit value (Source: ANPM, 2023)

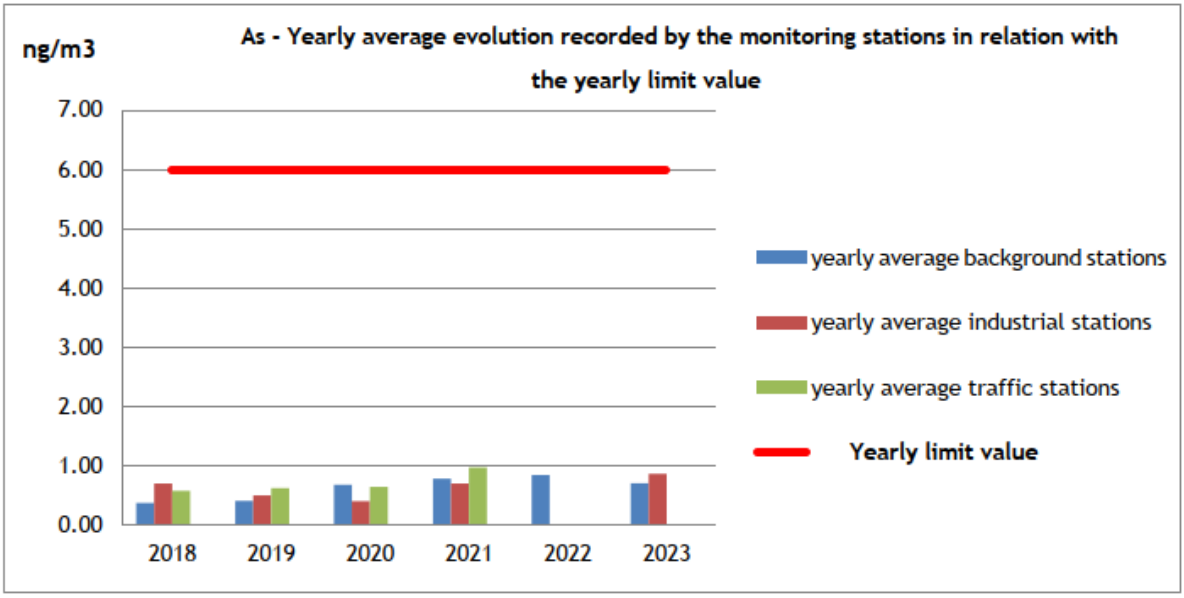


Figure 6. The evolution of annual average concentrations of As during the period 2018-2023, recorded at monitoring stations in relation to the annual limit value (Source: ANPM, 2023)

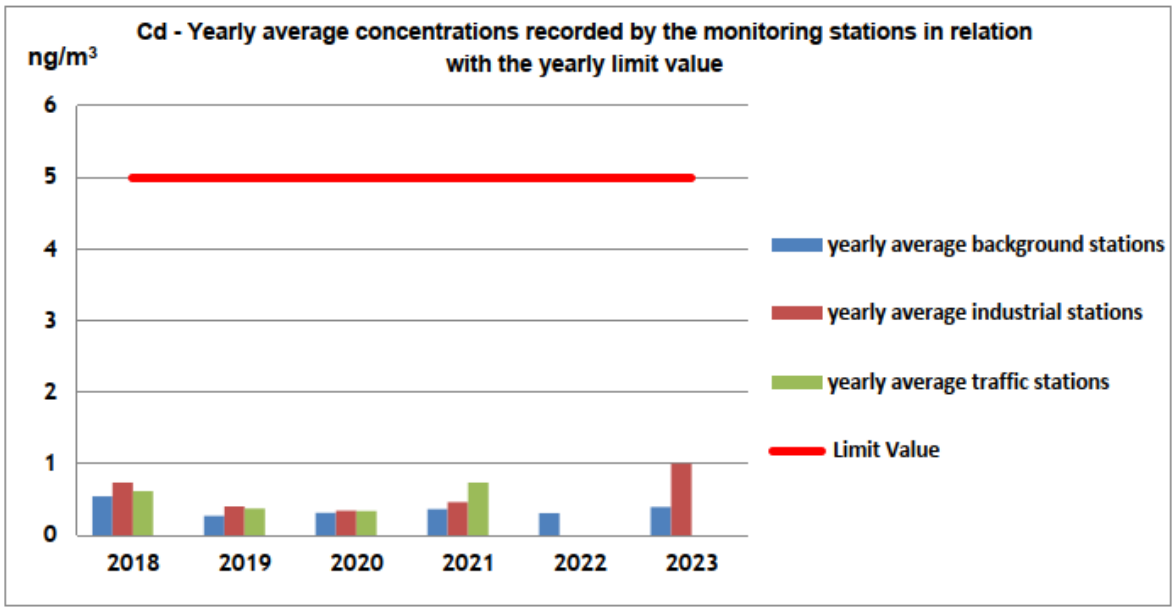


Figure 7. The evolution of annual average concentrations of Cd during the period 2018-2023, recorded at monitoring stations in relation to the annual limit value (Source: ANPM, 2023)

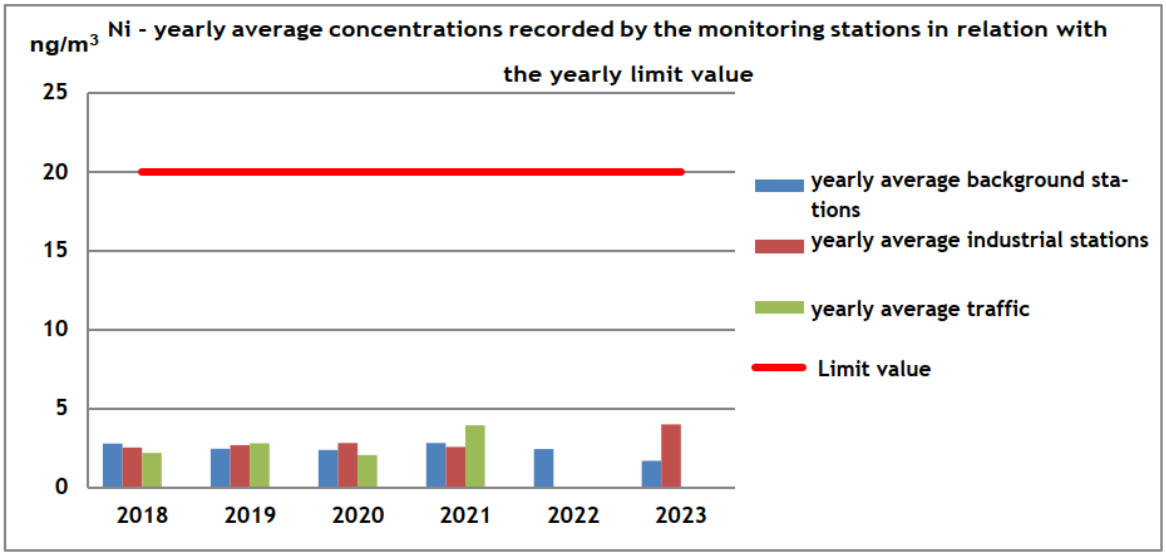


Figure 8. The evolution of annual average concentrations of Ni during the period 2018-2023, recorded at monitoring stations in relation to the annual limit value (Source: ANPM, 2023)

Legend:
FU = urban background
FSUB = suburban background
RF = rural fund/regional background
I = industrial
T = transportation

From the analysis of the data presented in Figures 1-8, it is observed that starting with 2018 at all types of stations, for most monitored pollutants, there is a general trend of decreasing annual average concentrations, especially for NO_2, PM_{10}, C_6H_6, SO_2 and Pb. A slight increase was recorded in the period 2021 - 2023.

According to the Annual Report on the State of the Environment in Romania, 2023, the main emissions from the combustion of fossil fuels are represented by SO_2, NOX, suspended particles and heavy metals. Emissions of SO_2, NOX and NH_3 are generically called emissions of acidifying substances, because they form acid rain when combined with water vapor.

Energy production contributes over 50% of methane and carbon monoxide emissions, approximately 70% of sulfur dioxide emissions, approximately 50% of nitrogen oxide emissions, approximately 80% of suspended particulate released into the atmosphere, and approximately 80% of carbon dioxide emissions.

Sulfur oxides (especially SO_2 – sulfur dioxide) come from stationary and mobile sources, through the combustion of fossil fuels. Sulfur dioxide is a colourless gas with a suffocating and pungent odor, which is transported over long distances because it easily attaches to dust particles, and in reaction with water vapor forms sulfuric or sulfurous acid, leading to the appearance of acid rain.

Nitrogen oxides (NO_x) mainly came from the combustion processes of fuels in stationary and mobile sources or from biological processes. The main sources of NO_x emissions are the energy industry and transportation.

According to the Annual Report on the State of the Environment in Romania, 2023, relative to the national total, the share of emissions from the energy sector is 36.3% for NO_x, 97.9% for SO_x and 5.97% for NH3.

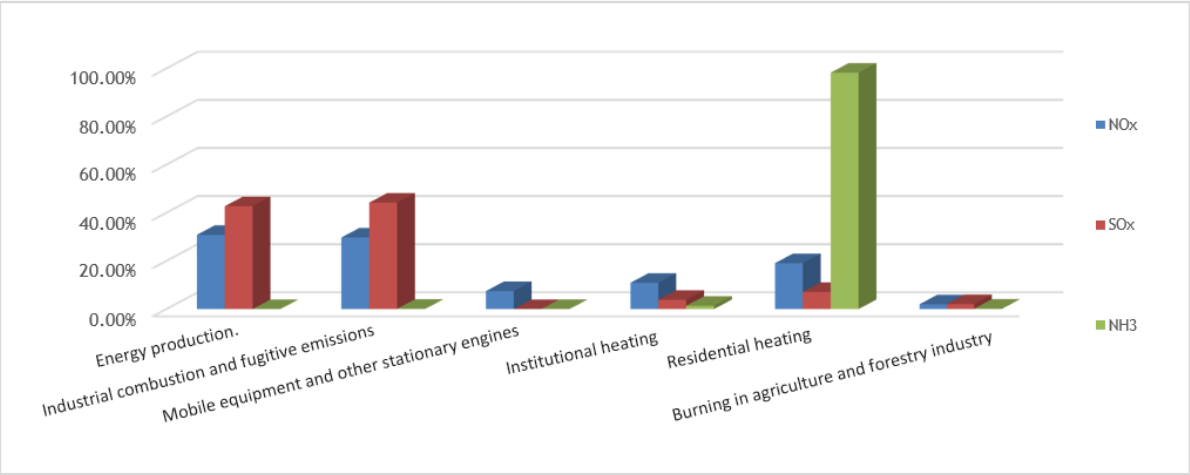


Figure 9. Contributions of activity subsectors to emissions of acidifying polutants (%, NO_x, SO_x and NH_3) from the Energy sector, in 2022, (%) (Source: Romania's Informative Inventory Report 2024)

Sources of pollutants such as nitrogen oxides (NO_x), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), $PM_{2.5}$ and PM_{10} particles, volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) can come from the combustion of solid fossil fuels (coal, biodegradable waste or biomass), liquid fuels (fuel oil), or gaseous fuels (natural gas).

The sources are diverse: industrial activity, heating the population with wood and fossil fuels, thermal power plants, road traffic which generates emissions both through incomplete combustion in vehicle engines and through tires wear and road surface wear from rolling or braking. Other sources of pollutants include industrial activities, energy production activities, the chemical industry, etc. (Figure 9).

From the analysis of Figure 9, an increasing trend of ammonia by 98.26% is observed, due to the use of solid biofuels as raw material for energy and heat production. The row materials used for the production of solid biofuels is very varied and has a dominant influence on the quality of the final product. Higher concentrations of N can be caused by the presence of additives and other synthetic constituents.

Additionally, the Energy sector results in emissions of compounds considered ozone precursors. According to the Annual Report on the State of the Environment in Romania, 2023, the share of NMVOC emissions from the Energy sector is 41.6% of the national total NMVOC emissions, and CO emissions are 84.1%. (Fig. 10).

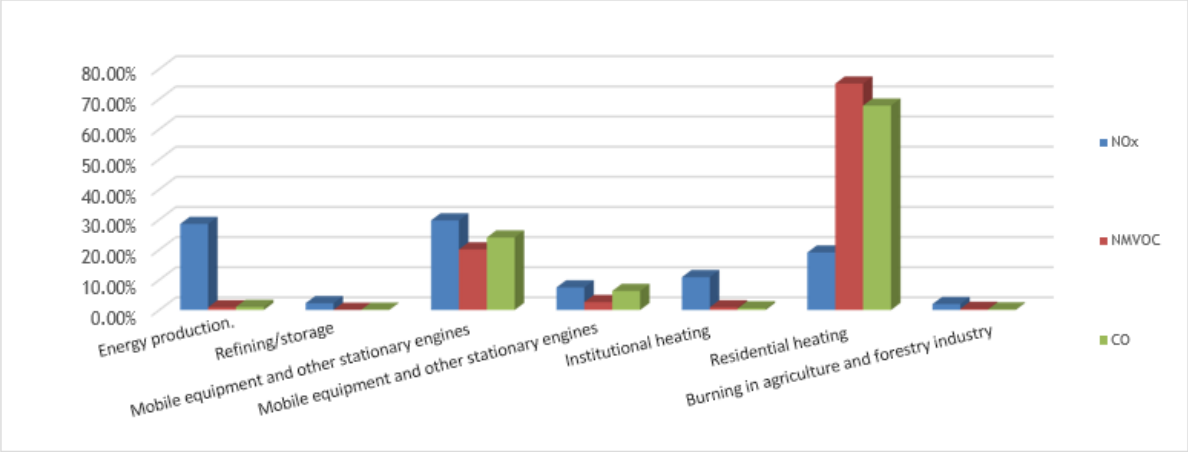


Figure 10. Contributions of activity subsectors to emissions of pollutants released into the atmosphere and considered ozone precursors, from the Energy sector, in 2022, (%) (Source: Romania's Informative Inventory Report 2024)

From Figure 10 it is observed that the maximum share of NMVOC and CO pollutants (75.12%, 67.81%) result from residential heating activities and the NO_x pollutant (29.73%) from combustion activities in industry and fugitive emissions.

Another type of emissions from the Energy sector are anthropogenic emissions of primary particles with a diameter smaller than 2.5µm ($PM_{2.5}$) and 10µm (PM_{10}) respectively (Fig. 11).

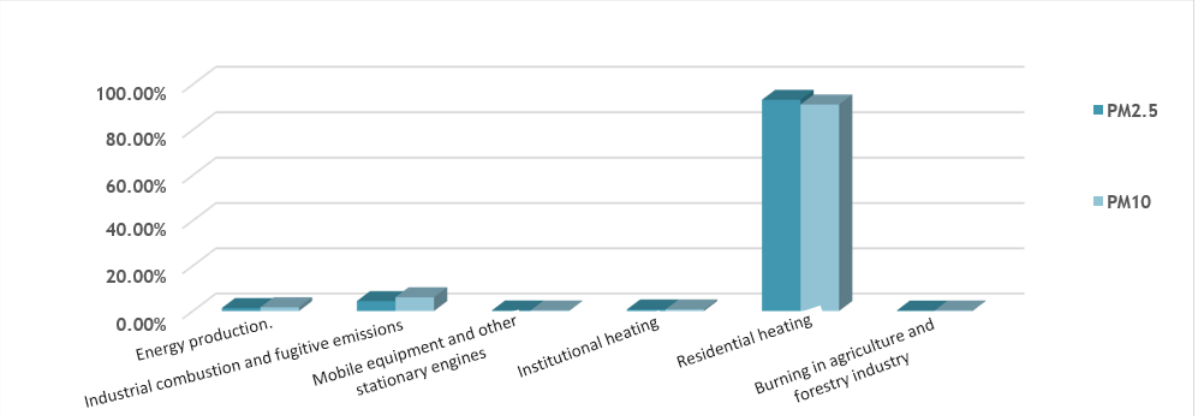


Figure 11. Contributions of activity subsectors to emissions of primary suspended particles $PM_{2.5}$ and PM_{10}, in 2022, (%) within the Energy sector (Source: Romania's Informative Inventory Report 2024)

From the analysis of Figure 11, it is found that the maximum share of primary suspended particle emissions $PM_{2.5}$ and PM_{10} in the energy sector is represented by residential heating, with over 90% of the total. Relative to the national total of particulate emissions, the share of $PM_{2.5}$ emissions from the energy sector is 90.6%, and of PM_{10} emissions is 71.4%.

Heavy metals (mercury, lead, cadmium, etc.) are compounds that cannot be naturally degraded, have a long persistence in the environment, and in the long term, they are dangerous because they can accumulate in the food chain. Heavy metals can come from stationary and mobile sources: combustion processes of fuels and waste, technological processes in the metallurgy of

heavy non-ferrous metal and road traffic. The largest share of emissions comes from combustion in the energy, metallurgy and non-metallic minerals industries. Added to these are sectors such as: production processes, waste treatment and storage and, to a very small extent, other activities, namely: non-industrial combustion installations and road transport.

The contribution of different subsectors in the Energy sector to heavy metal emissions is presented in Figure 12.

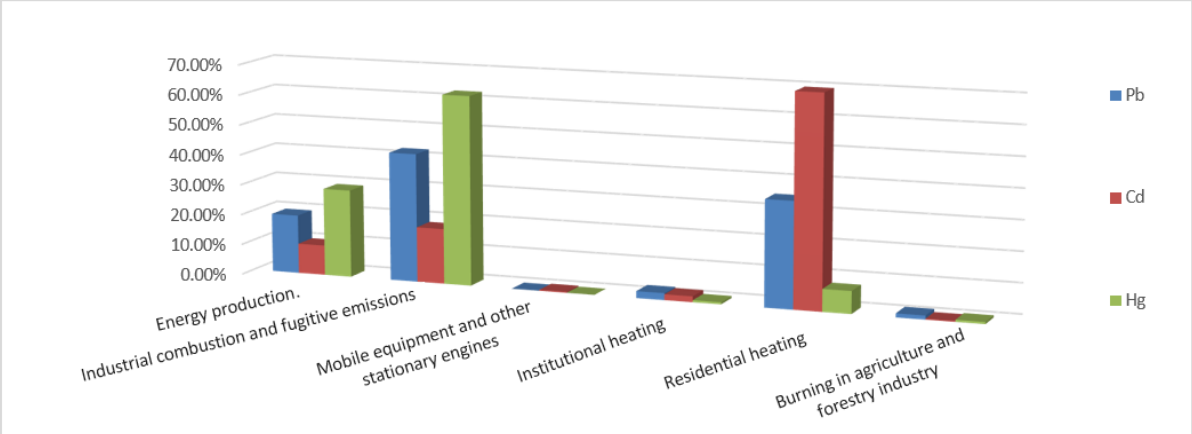


Figure 12. Contributions of activity subsectors to the emissions of heavy metal from the Energy sector, in 2022, (Source: Romania's Informative Inventory Report 2024)

From the analysis of the situation regarding the contribution of activity subsectors to heavy metal emissions, a significant share of lead and mercury emissions from industrial activities and energy production is observed. Relative to the national total, the shares of emissions from the Energy sector are 26.3% for Pb, 81.2% for Cd and 83.6% for Hg (Fig. 12).

The projects proposed through the updated NECP 2021-2030 represent new electricity production capacities with reduced air pollutant emissions. Reducing emissions from the energy sector, specifically reducing carbon emissions at the national level, is a major objective of the updated NECP 2021-2030.

4.1.2 Water

At the European level, environmental objectives for water bodies are provided in the Water Framework Directive 2000/60/EC. The purpose of this Directive is the long-term protection, use and sustainable management of water.

Overall, the environmental objectives include the following elements:

- For surface water bodies: achieving good ecological status and good chemical status, or good ecological potential and good chemical status for heavily modified and artificial water bodies;
- For groundwater bodies: achieving good chemical status and good quantitative status;
- Progressive reduction of pollution with priority substances and cessation or phasing out of emissions, discharges and losses of hazardous priority substances from surface waters, through implementation of necessary measures;

- "Prevention or limitation" of pollutant discharges into groundwater, through the implementation of measures;
- Reversing significant and sustained upward trends in pollutant concentrations in groundwater;
- Preventing the deterioration of the status of surface and groundwater;
- For protected areas: achieving the objectives set out in specific legislation.

At the national level, the characterization of the status of surface water bodies is done at the level of river basins by evaluating the ecological status/ecological potential and chemical status, based on the analytical results periodically provided by the National Water Monitoring System, within sampling campaigns, in accordance with the established monitoring program, as well as by applying the principle of grouping water bodies and analysing pressures and impacts for those not monitored.

Romania's surface water resources come from two major categories: the Danube River and inland rivers, including natural lakes.

For users in Romania, the main share in ensuring the necessary resource is held by inland rivers. Natural lakes have reduced volumes of water, except for the coastal lakes in the Razelm – Sinoe lagoon system which, although they have appreciable volumes, have brackish water due to connections with the waters of the Black Sea.

The Danube River, although it holds the lead in terms of the total volume of the resource, being eccentrically located relative to the national territory, is less used as a usable water source. So far, the use of the water resource provided by the Danube is in the field of water supply for the population, agriculture (for irrigation) and hydropower production (Iron Gates I and II).

The theoretical resource represents the average annual stock constituted from the total natural surface and groundwater resources, while the technically usable resource is the share of the theoretical resource that can be extracted to meet the water requirements of the economy. The situation for the period 2018-2023 is presented in Figure 13.

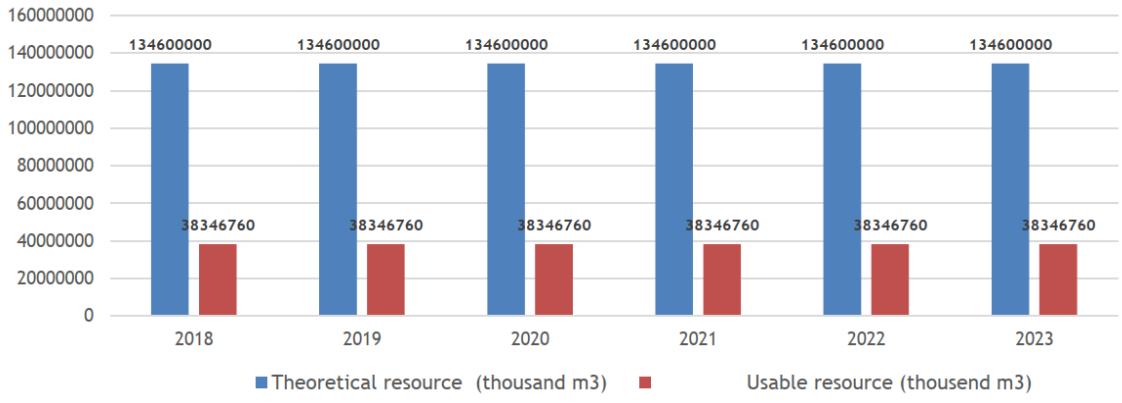


Figure 13. The evolution of water resources (theoretical and usable), 2018 – 2023, in thousand m^3
(Source: National Administration "Romanian Waters", INHGA)

The natural water resource of 2023 from inland rivers represented a runoff volume of 38,227*$10^6 m^3$, which is 4.24% below the average multiannual volume calculated for a long

period, namely 39,920*$10^6$$m^3$. In this context, 2023 can be considered a normal year. Compared to the last 5 years (2018 – 2022), the volume of water flow in 2023 is higher than the multiannual average of the annual stock (35,241 * $10^6$$m^3$) flowed in the aforementioned interval (Table 4 and Figure 14).

Table 4. Water resources of 2023, compared to the period 2018–2022, by hydrographic basins

Hydrographic basin	Parameter	F (km^2)	$Q_{med\ anual}$ (m^3/s)							Q_{2023}/Q_{med} (%)
			2018	2019	2020*	2021	2022	MED 2018-2022	2023	
TISA*	Q	4540	74.57	70.7	65.87	62.1	73.8	69.4	80.72	116
	V		2352	2230	2077	1964	2327	2190	2546	
SOMEȘ	Q	17840	95.21	93.21	109.38	80.3	136.1	103	147.4	143
	V		3003	2939	3450	2539	4290	3244	4649	
CRIȘURI	Q	14860	64.92	81.48	79.88	52.1	87.6	73.2	104.2	142
	V		2047	2569	2519	1648	2762	2309	3286	
MUREȘ	Q	29390	116.1	159.4	139.2	135.2	161.4	142	193.7	136
	V		3661	5027	4391	4275	5090	4489	6109	
BEGA - TIMIȘ - CARAȘ	Q	13060	46.61	66.3	80.86	65.9	98.4	71.6	96.3	134
	V		1470	2091	2550	2084	3103	2260	3038	
NERA - CERNA	Q	2740	19.38	33.01	32.4	31.1	35.4	30.3	49.5	164
	V		611	1041	1022	983	1115	954	1562	
JIU	Q	10080	70.8	111	92.7	79	123.7	95.4	129	135
	V		2233	3500	2923	2498	3901	3011	4068	
OLT	Q	24050	134	205	156	135	189	164	163	99.5
	V		4226	6465	4920	4269	5960	5168	5140	
VEDEA	Q	5430	7.15	25.1	10.28	4.81	9.72	11.4	4.6	40.3
	V		225	791	324	152	307	360	145	
ARGEȘ	Q	12550	57.68	74.85	89.27	48.8	70.4	68.2	54.3	79.6
	V		1819	2361	2815	1543	2221	2152	1713	
IALOMITA	Q	10350	40.2	45	33	28.8	45.4	38.5	24.9	64.7
	V		1268	1419	1041	911	1432	1214	785	
DUNĂREA	Q	34141	23.55	35.17	32.09	21.1	29.9	28.4	28.1	99.4
	V		743	1109	1012	667	943	895	889	
SIRET	Q	42890	160.3	272.57	241.45	187.2	176.2	208	124.1	59.7
	V		5055	8596	7614	5920	5560	6549	3913	
PRUT**	Q	10990	13.72	15.16	15.363	6.86	9.55	12.1	10.9	89.7
	V		433	478	484	217	301	383	343	
DOBROGEA	Q	5480	2.63	3.34	1.67	1.12	1.33	2.0	1.31	64.8
	V		82.8	105	53	35	42	63.6	41.2	
Total Romania without Dunăre	Q	238391	926.83	1291.29	1179.45	939.39	1247.9	1117	1212	108
	V		29228	40722	37195	29705	39354	35241	38227	

Source: National Administration "Romanian Waters", INHGA

Note: Q - Flow rate Q (m3/s), V - total volume ($10^6$$m^3$)

** - does not include the flow rate and volume of the Tisa River*

*** does not include the flow rate and volume of the Prut River, as it is a border watercourse*

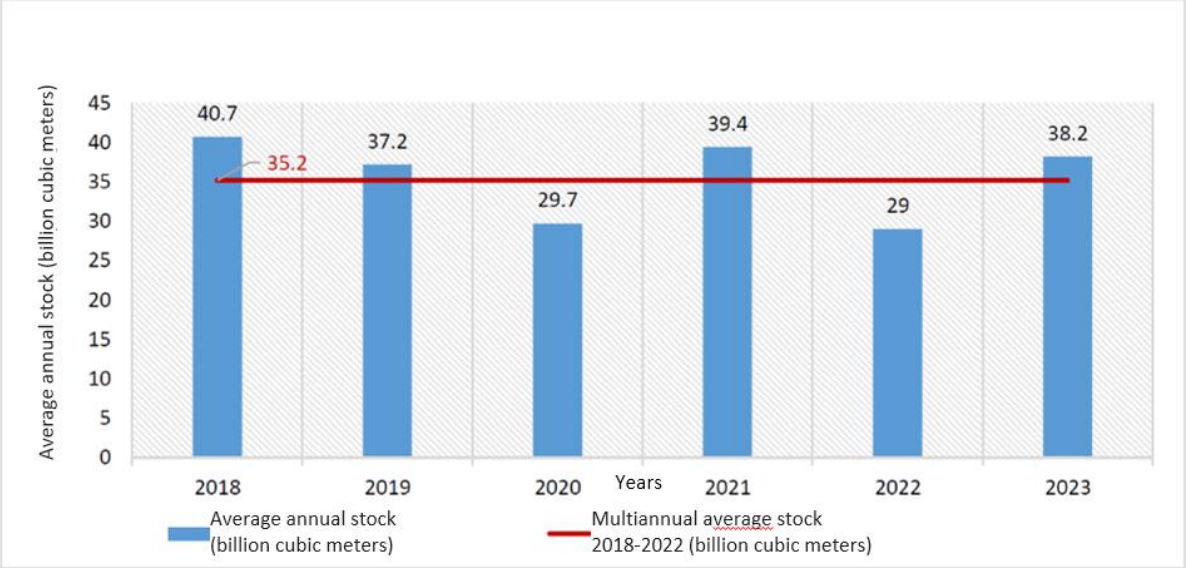
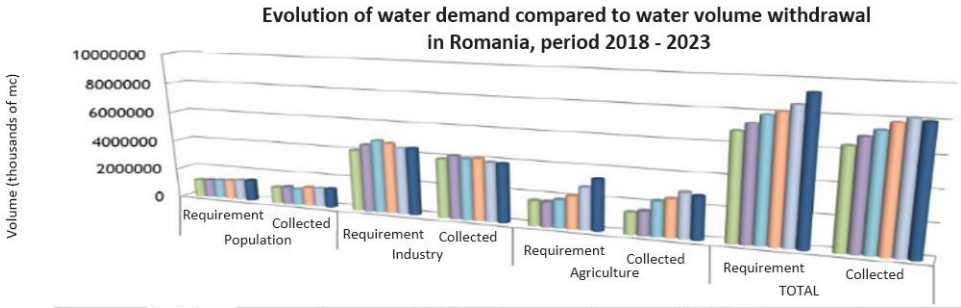


Figure 14. Water resources (volume 109 m^3) in 2023, compared to the period 2018-2022 (Source: National Administration "Romanian Waters")

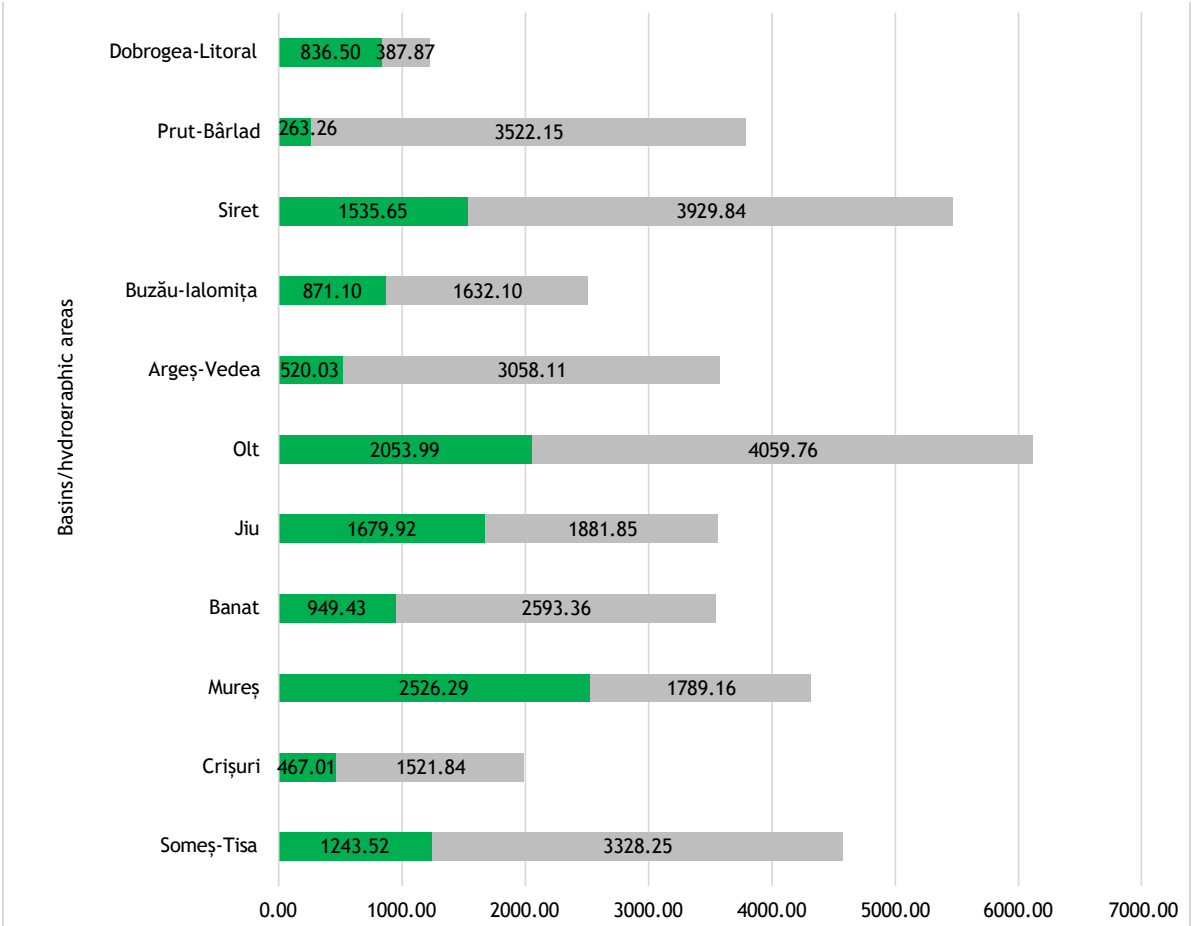
Water is an important resource for the population as well as for industrial sectors. The largest quantities of water withdrawn and used are for supplying the population, followed by industry and agriculture (Figure 15).



	Population		Industry		Agriculture		TOTAL	
	Requirement	Collected	Requirement	Collected	Requirement	Collected	Requirement	Collected
TOTAL 2018	1160613	1084996	4078172	3904334	1657977	1426835	6896762	6416165
TOTAL 2019	1204288	1176540	4516858	4207395	1649114	1590922	7370260	6974857
TOTAL 2020	1234833	1077779	4835196	4038315	1838464	2280089	7908493	7396183
TOTAL 2021	1286171	1269490	4696917	4113729	2160930	2480378	8144018	7863597
TOTAL 2022	1353527	1255945	4448837	3939984	2800669	2954801	8603033	8150730
TOTAL 2023	1410130	1295191	4501790	3917724	3381622	2788673	9293542	8001588

Figure 15. Evolution of water demand compared to water withdrawal volumes in Romania, during the period 2018 - 2023 (Source: National Administration "Romanian Waters")

From the perspective of water quality, surface water bodies (rivers) are characterized by the assessment of ecological status/ecological potential, their situation by areas/river basins being presented in Figure 16.



	Someș-Tisa	Crișuri	Mureș	Banat	Jiu	Olt	Argeș-Vedea	Buzău-Ialomița	Siret	Prut-Bârlad	Dobrogea-Litoral
Ecological Status (ES) good (km)	1243.52	467.01	2526.29	949.43	1679.92	2053.99	520.03	871.10	1535.65	263.26	836.50
Ecological Status (ES) less good (km)	3328.25	1521.84	1789.16	2593.36	1881.85	4059.76	3058.11	1632.10	3929.84	3522.15	387.87

Figure 16. Ecological status/ecological potential of monitored water bodies (natural, heavily modified, artificial water bodies - rivers) across areas/hydrographic basins in 2022 (km)
Source: National Administration "Romanian Waters", Synthesis of water quality in Romania in 2023

Groundwater

Groundwater resources represent the volume of water that can be extracted from an aquifer, thus the volume of exploitable water. This concept is complex, because the amount of water that can be supplied by an aquifer depends on the volume of reserves and is limited by the technical and economic possibilities of resource conservation and protection of resources.

According to the updated National Management Plan 2021-2027, the total groundwater resources in Romania were estimated at 9.68 billion m^3/year, of which 4.74 billion m^3/year representing phreatic water and 4.94 billion m^3/year being deep groundwater, which represents about 25% of surface water. In Romania, 143 groundwater bodies have been identified, delimited and characterized by INHGA. Of these, 115 are phreatic groundwater bodies, and 28 are deep groundwater bodies. Generally, groundwater from the first aquifer horizon encountered at depth is used for irrigation and industry, while water captured from springs and deep wells is used for supplying the population.

Water quality is determined by the mineralogical and chemical composition of the rock in which the groundwater is located, as well as regional and/or local tectonic evolution. Thus, there are deep groundwaters with a high degree of mineralization, such as those in the northern part of Moldova (where the deposits are predominantly composed of sandy clays and fine sands, the aquifers having low discharge capacity and small thickness), the central-northern part of the Transylvanian Depression or in the Carpathian curvature area (due to open or shallow diapirs). These qualitative aspects make that groundwater unsuitable for supply the population. In the Transylvanian Depression, the Western Plain and western Oltenia, deep waters naturally have high ammonium contents, which determines their non-potable nature and the application of treatment measures.

To determine the chemical risk for groundwater bodies, the following were considered:

- the groundwater body is considered at risk if it exceeds the threshold values on at least 20% of the surface of the water body, provided that the minimum representativeness index is respected;
- the groundwater body is not at qualitative risk if it is completely unpolluted, or if the surface of the water body is affected by less than 20% of the total surface of the water body.

As a result of the qualitative analysis, it was found that 8.39% of the groundwater bodies were identified as being at risk of not achieving good chemical status (by 2027), compared to 13.38% determined in the first National Management Plan 2009 and 10.49% in the second updated National Management Plan. All groundwater bodies are not at risk of not achieving good quantitative status in 2027.

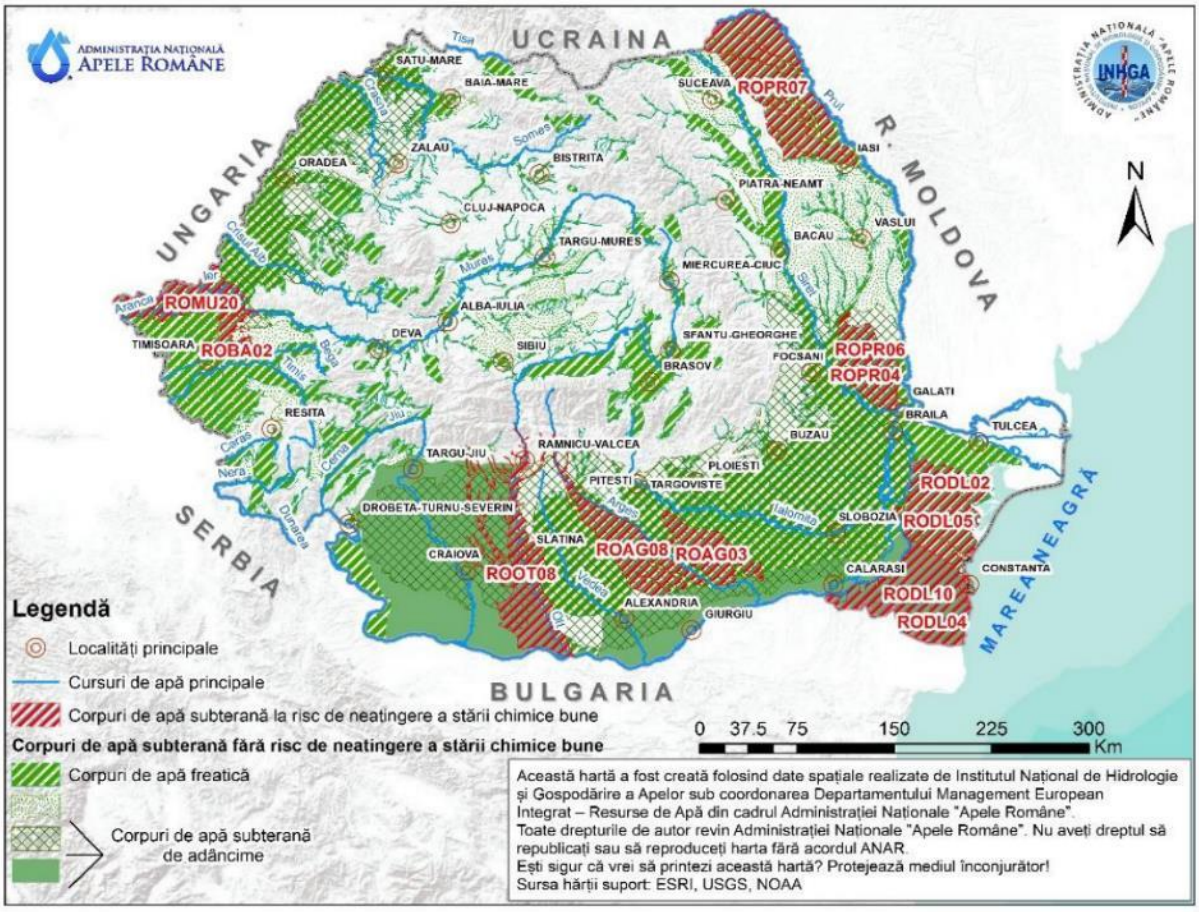


Figure 17. Groundwater bodies at chemical risk (Source: Updated National Management Plan 2021-2027, National Administration "Romanian Waters")

The updated NECP 2021-2030 considers a series of new capacities for energy production from hydro sources, specifically the completion of hydroelectric facilities/power plants (AHE/CHE). These projects involve interventions on surface watercourses that may impact or even deteriorate the ecological status/ecological potential of surface water bodies and influence the hydrological cycle in the affected hydrographic basins.

The implementation of the proposed projects requires appropriate assessment studies and impact assessments on water bodies, and the environment, which should consider the economic benefits in relation to the potentially significant harm to the environment.

Additionally, the impact mitigation measures on water bodies proposed in these studies (especially ensuring the ecological flow downstream of the watercourse barrier, ensuring the fish migration of and sediment management) must be implemented. Also, if the analysis shows a significant impact on the ecological status/ecological potential of the surface water bodies with possible deterioration of this environmental objective, the conditions for the application of art. 4.7 of the Water Framework Directive (Art. 2.7 of the Water Law 107/1996 with subsequent amendments and completions) must be analysed, justified and taken into account.

4.1.3 Soil

The main economic sectors with significant impact on soil come from the mining and metallurgical industry (through processing and waste and storage, decantation ponds and

tailings dumps), the chemical industry (through waste storage from chemical, petrochemical and pharmaceutical plants, abandoned sites), the oil industry (through soil pollution with hydrocarbons and heavy metals), old pesticide deposits and other large-scale activities (metal processing, non-compliant household waste landfills, military sites, wood processing industry, coal-fired power plants, transport activities, service activities, etc.).

The results of the re-inventory of lands affected by various processes, during the period 2002-2008, are presented in Table 5 (Annual Report on the State of the Environment in Romania, 2023).

Table 5. The general situation of soils in Romania affected by various processes

General name of processes	Code	Area (ha) and degree of damage					
		weak	**moderate**	**heavy**	**very**	**excessive**	**Total**
I. Diverse soil pollution processes caused by industrial and agricultural activities	**1.** Pollution from open-pit excavation works (open-pit mining, ballast pits, quarries, etc.)	2	16	255	519	23640	**24432**
	2. Landfills, dumps, tailings ponds, flotation tailings dumps, waste dumps, etc.	247	63	236	320	5773	**6639**
	3. Inorganic waste and residues (minerals, inorganic materials, including metals, salts, acids, bases) from industry (including the extractive industry)	10	217	207	50	360	**844**
	5. Radioactive materials	-	500	-	-	66	**566**
	6. Organic waste and residues from the food and light industries and other industries	13	19	12	17	287	**348**
	7. Waste, agricultural and forestry residues	37	65	90	642	306	**1140**
	8. Animal manure	2883	993	363	265	469	**4973**
	9. Human manure		689	11		33	**733**
	17. Pesticides	1058	650	224	77	67	**2076**
	18. Contaminant pathogens	-	505	-	-	117	**617**
	19. Salt water (from oil extraction)	952	497	408	205	592	**2654**
	20. Petroleum products	-	473	248	5	25	**751**
	TOTAL I	**5.202**	**4.687**	**2.054**	**2.100**	**31.735**	**45.773**
II. Soils affected by slope and other processes	**10.** Surface erosion, deep erosion, landslides	944.763	1.013.854	749420	454150	210729	**3372916**
	15. Primary and/or secondary compaction	543371	544556	251268	125555	88526	**1553276**
	16. Pollution by sediments produced by erosion (clogging)	4088	2389	4808	1178	836	**13299**
	TOTAL II	**1492222**	**1560799**	**1005496**	**580883**	**300091**	**4939491**
III. Soils affected by natural and/or anthropogenic processes	**11.** Salty soils (saline and/or alkaline)	264163	80639	52488	36867	50678	**484835**
	12. Acid soils	1766295	1926886	716794	186023	18132	**4614130**
	13. Water excess	640738	1075063	420208	199479	185785	**2521273**
	14. Excess or deficiency of nutrients and organic matter	8358147	11604450	7549319	3306533	1373196	**32191645**
	TOTAL III	**11029343**	**14687038**	**8738809**	**3728902**	**1627791**	**39811883**

Source: National Research and Development Institute for Pedology, Agrochemistry and Environmental Protection (ICPA) and County Offices for Pedological and Agrochemical Studies (OJSPA)

A preliminary national inventory of sites that might be contaminated was compiled in 2008 based on the responses to the questionnaires provided for in Annexes 1 and 2 of GD 1408/2007 regarding methods for investigating and evaluating soil and subsoil pollution. According to this inventory, there were 1,628 sites that might be contaminated in Romania, distributed across economic sectors, as follows:

- 151 sites from the mining and metallurgical industry;
- 834 sites from oil industry;
- 85 sites from the chemical industry;
- 558 sites from other activities (including energy, electronics, glass, ceramics, textiles, leather, pulp and paper, wood, cement, machine construction, food, military activities, land transport, airports, agriculture and zootechnical activities).

In 2015, Government Decision No. 683/2015 was published in the Official Gazette, approving the National Strategy and the National Plan for the Management of Contaminated Sites in Romania, based on the updated national inventory by the National Environmental Protection Agency.

The synthetic situation at the level in 2022 of the sites where anthropogenic activities with an impact on the soil have been or are carried out, based on the information communicated by the subordinate institutions and centralized at national level, is graphically represented in Figure 18. According to this re-inventory, a number of 2,394 potentially contaminated sites were identified, distributed by economic sectors as follows:

- 1,493 potentially contaminated sites from the oil industry;
- 44 potentially contaminated sites in the metallurgical industry;
- 95 potentially contaminated sites from the chemical industry;
- 762 sites potentially contaminated from other activities (specific activities of industries: energy, textile, wood, glass, cement and construction materials, food, road transport, CFR, air and naval, zootechnical activities, wastewater treatment plants, etc.).

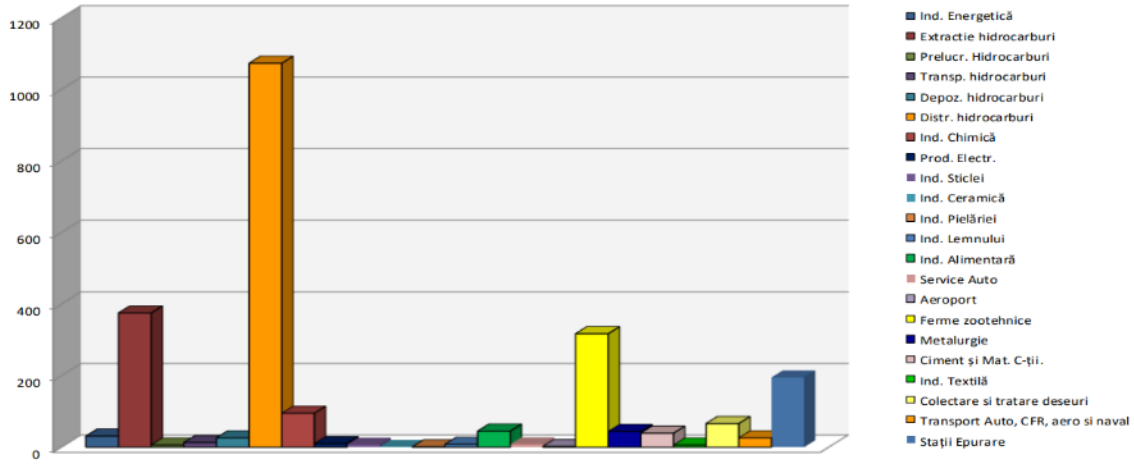


Figure 18. Distribution potentially by economic sectors of contaminated sites by Economic Sectors at the National Level in 2022 (Source: ANPM)

It is observed the main sources of soil contamination from the industrial sector are mining, ballast pits and quarry, as well as tailings dumps and industrial waste deposits.

The projects proposed in the updated NECP 2021-2030 include new energy capacities with reduced soil pollutants emissions.

4.1.4 Climate change

According to the European Environment Agency, climate change is the greatest threat to the environment and, implicitly, to the socio-economic framework. Over the last 150 years, global average temperature has increased by approximately 0.8°C, and at the European level by approximately 1°C.
Climate change causes an increase in average temperature with significant variations at regional and local level, a decrease in water resources, a reduction in the volume of ice caps and a rise in ocean levels, changes in the hydrological cycle, an increase in arid areas, changes in the course of the seasons, an increase in the frequency and intensity of extreme climatic phenomena, a reduction in biodiversity, an impact on the health of the population, etc.

Greenhouse gas emissions that are driving climate change come mainly from anthropogenic activities such as fossil fuel burning, transportation, intensive agriculture, and landfills. Global atmospheric concentrations of greenhouse gases (mainly carbon dioxide, methane, and nitrous oxide) have increased significantly since 1750. The period 1995–2006 was the warmest since global temperature records began in 1850. The linear warming trend over the last 50 years (0.13 °C [0.10 °C - 0.16 °C] per decade) is almost double of the last 100 years. The total temperature increase from 2001 to 2005 is 0.76 °C [0.57 °C - 0.95 °C] compared to the period 1850–1899.

In Romania, the analysis of historical data shows that the average annual air temperature has increased by 0.5 °C in the last 33 years, according to the AR 5 Report (IPCC, 2013).Although Romania's contribution to global emissions is insignificant (only 0.3% of the world's greenhouse gas emissions and less than 3% of the total emissions of EU countries), Romania was the first country in Annex 1 to ratify the Kyoto Protocol and reduced its GHG emissions by approximately 50% by the end of the first commitment period under the KP (2008-2012). Romania's efforts have intensified to achieve a "green" economy, with low carbon dioxide emissions, resilient to climate change, especially in terms of improving energy efficiency and implementing renewable energy sources, as well as integrating climate change adaptation measures within the targeted sectors, by 2030. By 2050, Romania aims to transition to a climate-resilient and greener economy, where social, economic and environmental policies and actions are interconnected and designed to ensure sustainable development, with high living standards for all citizens, as well as a high quality of the environment.

The GHG emissions and removals that Romania reports to the UNFCCC in the National Greenhouse Gas Emissions Inventory (INEGES) are divided into the following main sectors: energy (including transport), industrial processes and product use, agriculture, land use, land use change and forestry (LULUCF), and waste.

As stated in the National Inventory Report (NIR), included in the INEGES, from 2024, aggregate GHG emissions and removals (net emissions, including the LULUCF sector) amounted to 63.25 Mt CO2-eq in 2021 (Figure 19). This represents a substantial reduction of 78% in net GHG emissions at the national level compared to the emission levels documented in 1989.

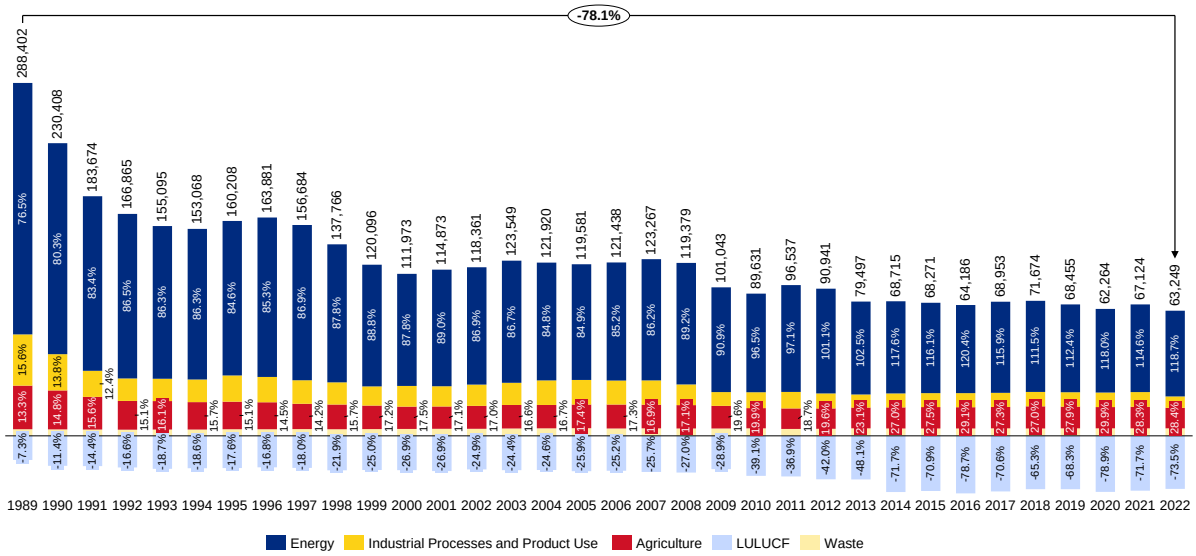


Figure 19. GHG emissions and removals (net emissions) by sector (in kt CO2-eq), 1989-2022

Source: Romania's Greenhouse Gas Inventory 1989 – 2022 (National Inventory Report - NIR and Common Reporting Format – CRF tables, submitted in March 2024)

The predominant share of emissions comes from the Energy sector (throughout the entire period analysed, 1989-2022), representing 68.4% of total emissions in 2022, followed by Agriculture with almost 16.4%, the IPPU sector with approximately 9.2% and the Waste sector with a share of 6% (Figure 20).

The trend in GHG emissions has reflected the country's economic development. During 1989–2000, Romania's transition from a centralized economy to a free market economy, coupled with the reorganization of all economic sectors, the closure of inefficient industries, and the commissioning of the first reactor at the Cernavoda nuclear power plant, collectively led to a substantial reduction of over 50% in GHG emissions. In the subsequent period, between 2000 and 2008, GHG emissions slightly increased and eventually stabilized due to economic revitalization. Another decrease in GHG emissions occurred between 2009 and 2012, attributed to the global financial and economic crisis. Since 2013, GHG emissions have remained relatively constant.

In the Energy sector, the main sources of emissions are energy industries (electricity and/or heat production capacities) and transportation, each contributing approximately 24% and 28% to total emissions in 2022 (as shown in Figure 21). For comparison, in 1989, the manufacturing industry and construction sector ranked second in terms of contribution to the global level of GHG emissions. Notably, the transport sector recorded the largest increase in its share of emissions during the analysed period, from 5% in 1989 to 28% in 2022. During the period 2010 - 2022, GHG emissions from the Energy sector decreased by approximately 13%.

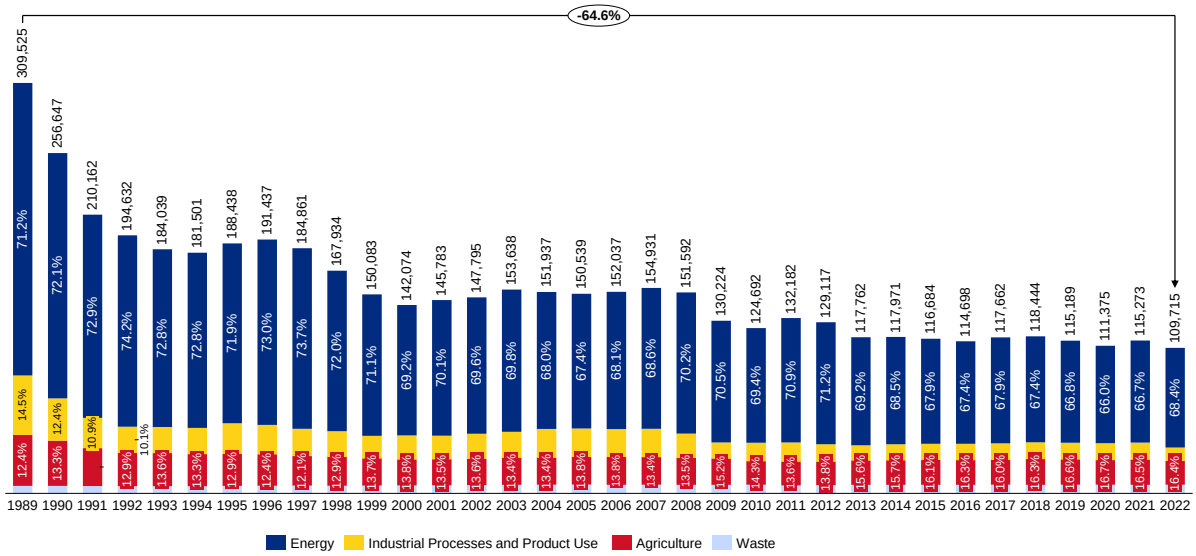


Figure 20. GHG emissions by sector (in kt CO2-eq), 1989-2022
Source: Romania's Greenhouse Gas Inventory 1989 – 2022 (National Inventory Report - NIR and Common Reporting Format – CRF tables, submitted in March 2024)

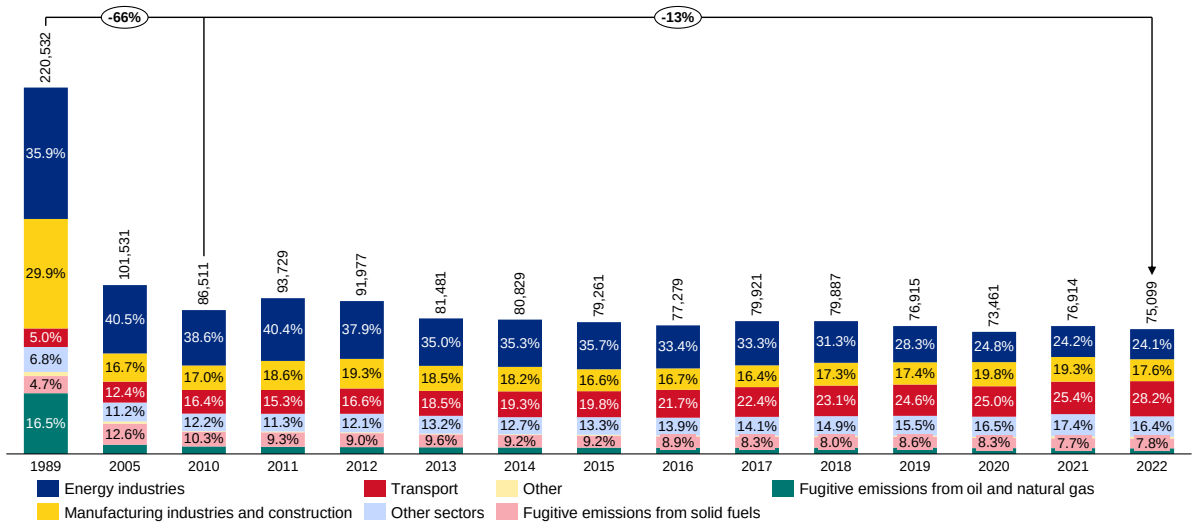


Figure 21. GHG emissions trajectory in the Energy sector, by areas (in kt CO2-eq), 1989-2022
Source: Romania's Greenhouse Gas Inventory 1989 – 2022 (National Inventory Report - NIR and Common Reporting Format – CRF tables, submitted in March 2024)

Based on current measures, Romania is projected to achieve a substantial reduction in its net GHG emissions, with an 83% decrease by 2030 compared to 1990 levels (Figure 22). Additionally, emissions excluding LULUCF are anticipated to decrease by 65% compared to 1990 (Figure 23). Significant emission reductions are also expected between 2031 and 2040. By the end of this decade net emissions are projected to decrease to 89% compared to 1990 and emissions excluding LULUCF by 71%. By 2050, the projected reductions in the WEM scenario will reach 92% for net emissions and 73% for emissions excluding LULUCF compared to 1990. The energy sector is expected to have the most significant impact on reducing national emission levels, although measures targeting the Industry and Buildings sectors will also contribute to emission reductions.

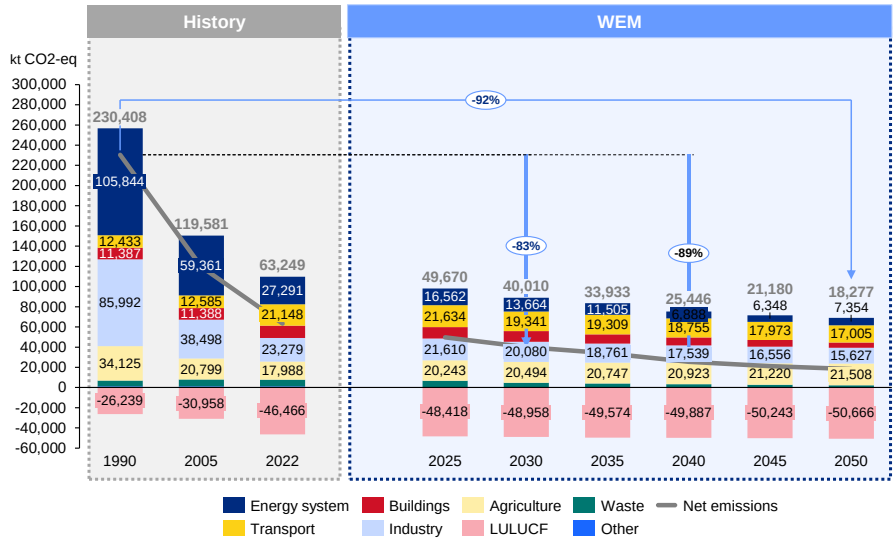


Figure 22. Decarbonization pathways until 2050 by sectors (WEM)
Source: 1990, 2005, 2022 Greenhouse Gas Inventory (March 2024), 2025-2050 LEAP-RO model

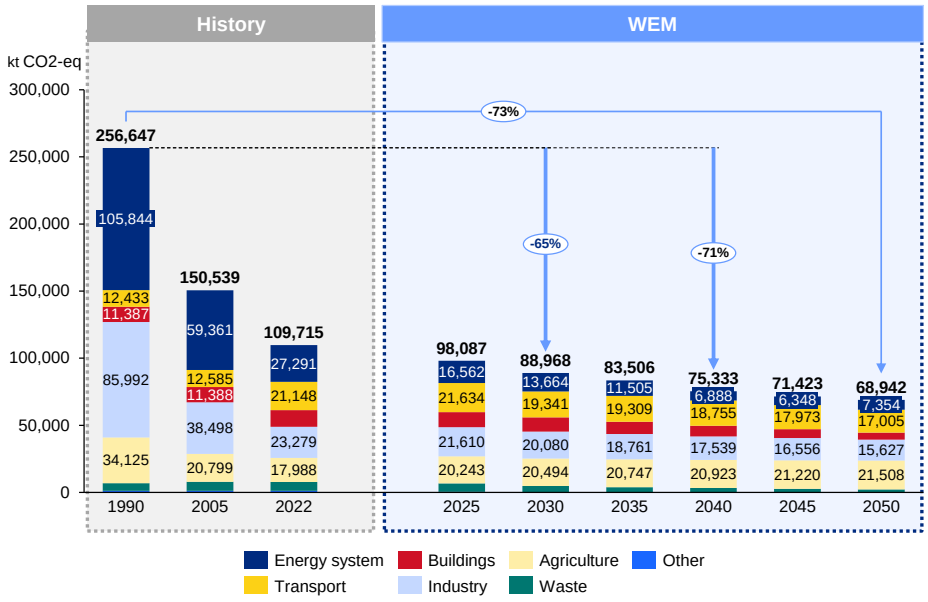


Figure 23. Decarbonization pathways until 2050 without LULUCF by sectors (WEM)
Source: 1990, 2005, 2022 Greenhouse Gas Inventory (March 2024), 2025-2050 LEAP-RO model

Through NECP investments are proposed for the development of new energy production capacities with low GHG emissions, increasing the share of renewable energy sources, enhancing energy efficiency in all sectors, developing national energy infrastructure and reducing energy poverty.

4.1.5 Biodiversity

The geographical position of Romania, along with the physical-geographical complexity, lithology and the radial distribution of the altitudinal gradients of landforms create a great diversity of meso-, microclimatic as well as pedological conditions. This variability in the

composition and structure of the substrate and abiotic conditions determines the richness, distribution and representation level of ecosystem types and natural habitats across Romania. Natural and semi-natural ecosystems cover approximately 47% of the country's surface, agricultural ecosystems account for 45%, and remaining 8% is represented by constructions and infrastructure.

At the national level, biodiversity conservation is achieved through a network of protected natural areas designated for their exceptional ecological, scientific or cultural value. The area of protected natural areas is 55,890 km^2 terrestrial and 6,358 km^2 marine, representing 23.4% of Romania's terrestrial surface, and 21.4% of its marine surface (Source: Biodiversity Information System for Europe https://biodiversity.europa.eu/countries/romania#:~:text=Protected%20areas%20in%20Romania%20cover,6%2C358km2%20at%20sea)

To ensure special measures for the "in situ" protection and conservation of natural heritage assets, a differentiated regime of protection, conservation and use of protected natural areas has been established. These areas are part of the National Network of Protected Natural Areas of Romania and are classified as follows (Annual Report on the State of the Environment in Romania, 2023):

- Protected natural areas of national interest - categories designated based on IUCN criteria
  - 915 Scientific reserves, natural monuments, nature reserves
  - 13 National Parks
  - 16 Natural parks
- Protected natural areas of international interest
  - 1 World Heritage Site – Paris Convention
  - 2 Biosphere Reserves – MAB/UNESCO Committee
  - 20 Wetlands of International Importance – Ramsar Convention
  - 2 Geoparks
- Protected natural areas of community interest - Natura 2000 sites
  - 224 Sites of Community Importance (SCI)
  - 211 Special Areas of Conservation (SAC)
  - 171 Special Bird Protection Areas (SPA)

Protected natural areas are the most important means of conserving biodiversity, as they include the most representative areas in terms of natural and cultural capital. They are the best method to save degraded or endangered species and habitats.
For these protected areas to fulfil their role of protecting and conserving species and natural habitats, management measures are developed and implemented to maintain or even restore, where necessary, natural ecosystems and wild species populations, seeking solutions for the sustainable use of natural resources.
Habitats in Romania evaluated and reported to the European Commission are in a favourable conservation status for over 68.2% and approximately 3.4% have been assessed as having a

"totally unfavourable status". The distribution of conservation status by habitat type of European interest in Romania is presented in Figure 24.

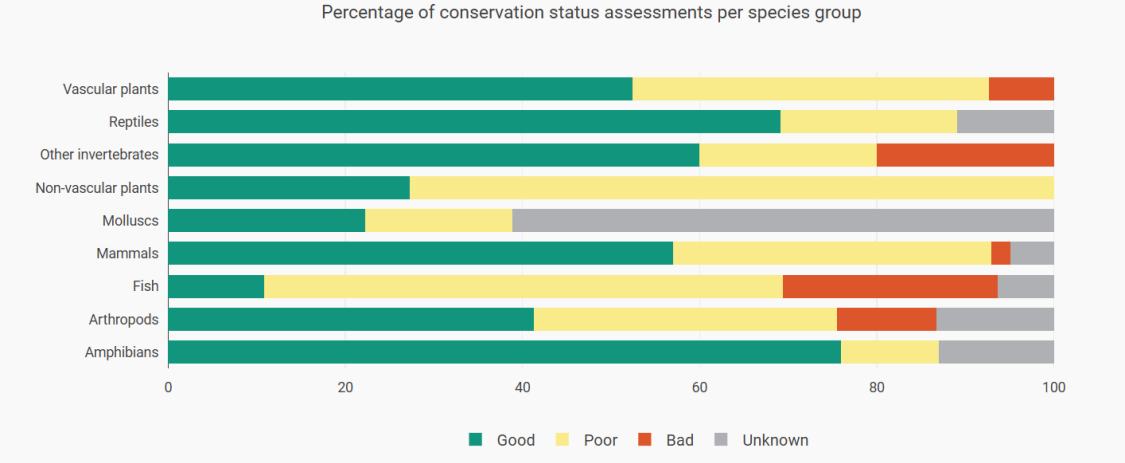


Figure 24. The conservation status of European interest habitats in Romania by habitat types (%)
Source: https://biodiversity.europa.eu/countries/romania?activeTab=6d9cb468-92a0-4fe8-95da-b75a94aa91b4

According to data reported to the European Commission, pastures have the highest percentage of favourable conservation status, followed by rocky habitats and aquatic habitats.
The class of marshes and peatlands has been evaluated with an unfavourable conservation status in over 80% of cases.
The conservation status of species of Community interest reported to the European Commission shows that 45.7% of the evaluated species have a favourable conservation status, placing Romania well above the European average of 27.5%. 8.5% of the evaluated species have an unfavourable conservation status, which is significantly below the European average of 20.6%.
Among the evaluated species, fish have the poorest favourable conservation status, followed by molluscs and non-vascular plants (Figure 25).

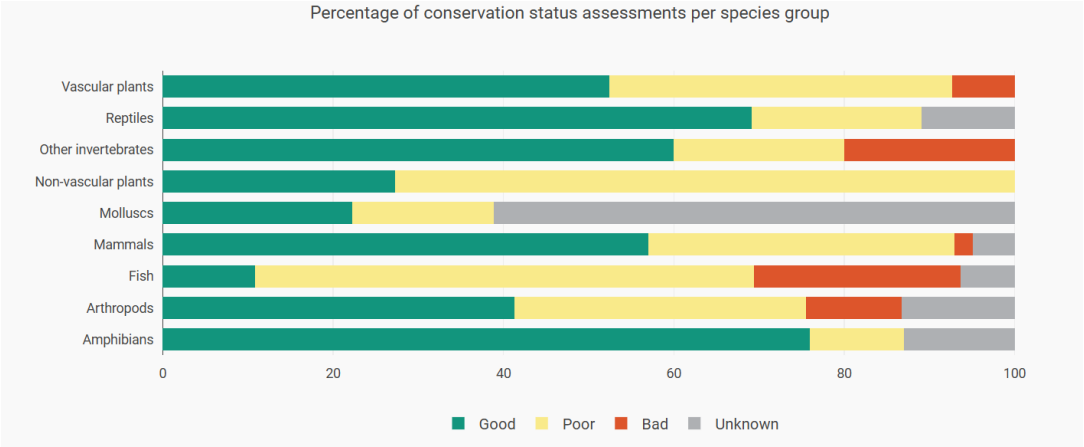


Figure 25. The conservation status of European interest species in Romania by taxonomic groups (%)
Source: https://biodiversity.europa.eu/countries/romania?activeTab=97fdb996-56f0-4cae-8998-95f8f5fa4514

At the national level, the updated NECP 2021-2030 projects may impact the entire territory of a protected natural area or partially affect one or more protected natural areas of community interest.

The protected natural areas that could be affected by the proposed projects were identified by overlapping the projects with the surface of the natural areas or by locating the projects in the vicinity of the protected natural areas. The identification was carried out through cartographic localization (on maps) of the projects in relation to the protected natural areas (Figures 26-29). The maps were created at the national level based on the Stereo 1970 coordinates of each project. The potentially affected protected natural areas potentially were identified by considering the maximum influence zone of 20 km for each project.

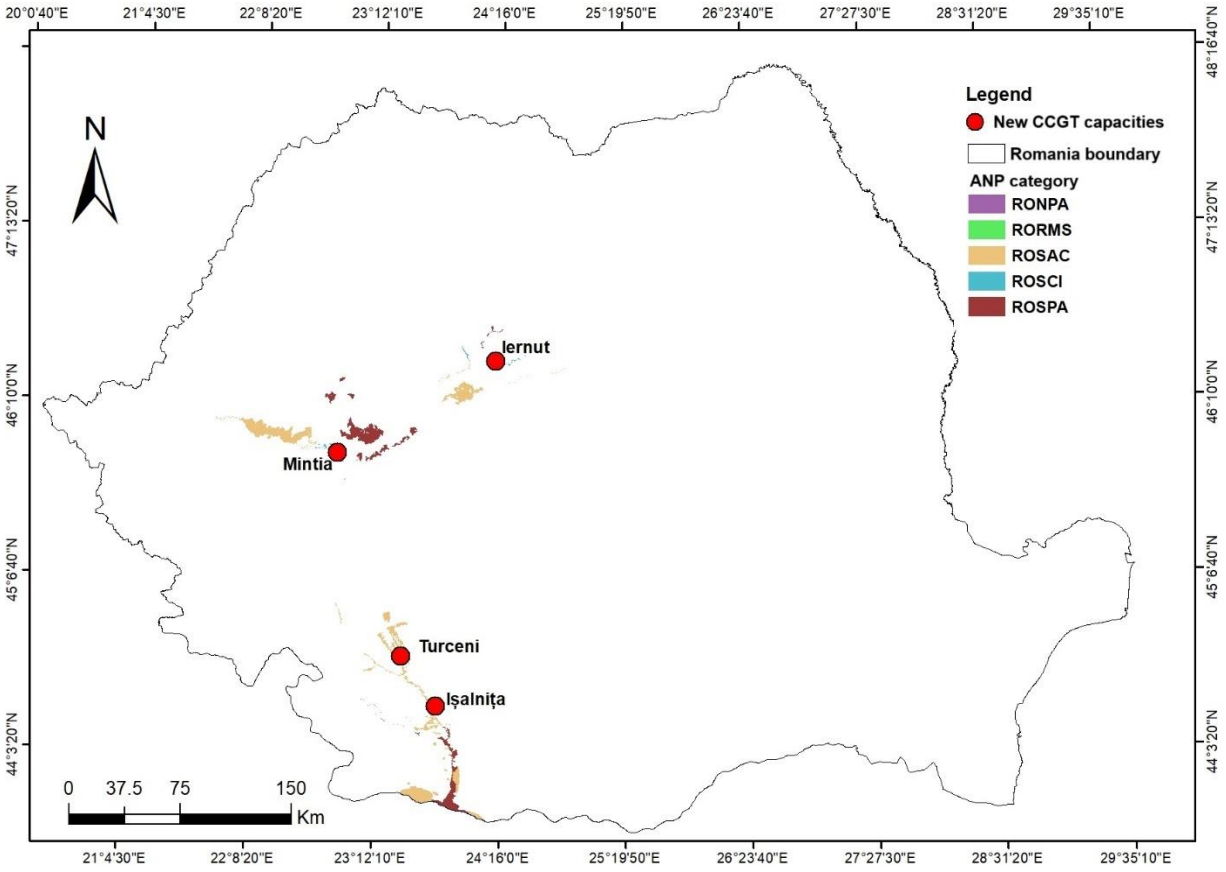


Figure 26. Location of new CCGT power generation capacities

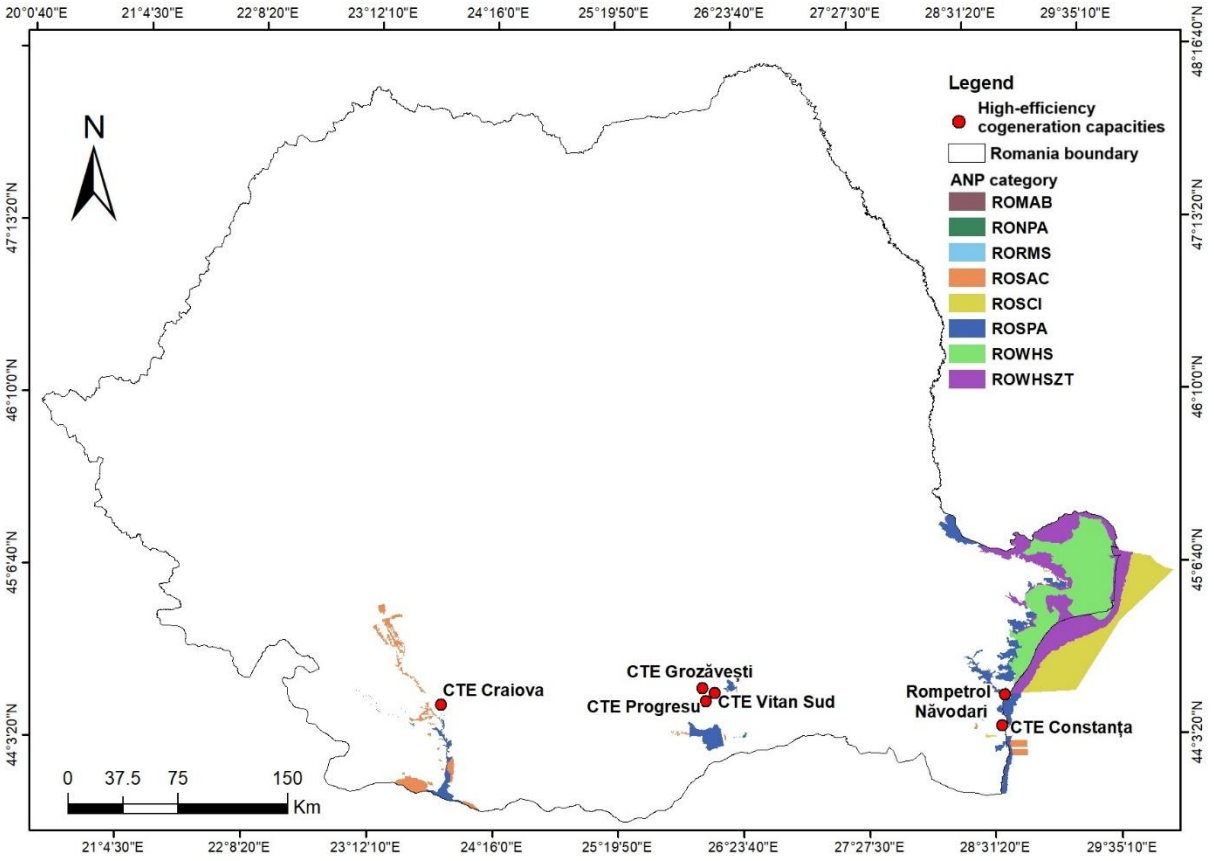


Figure 27. Location of high-efficiency cogeneration capacities

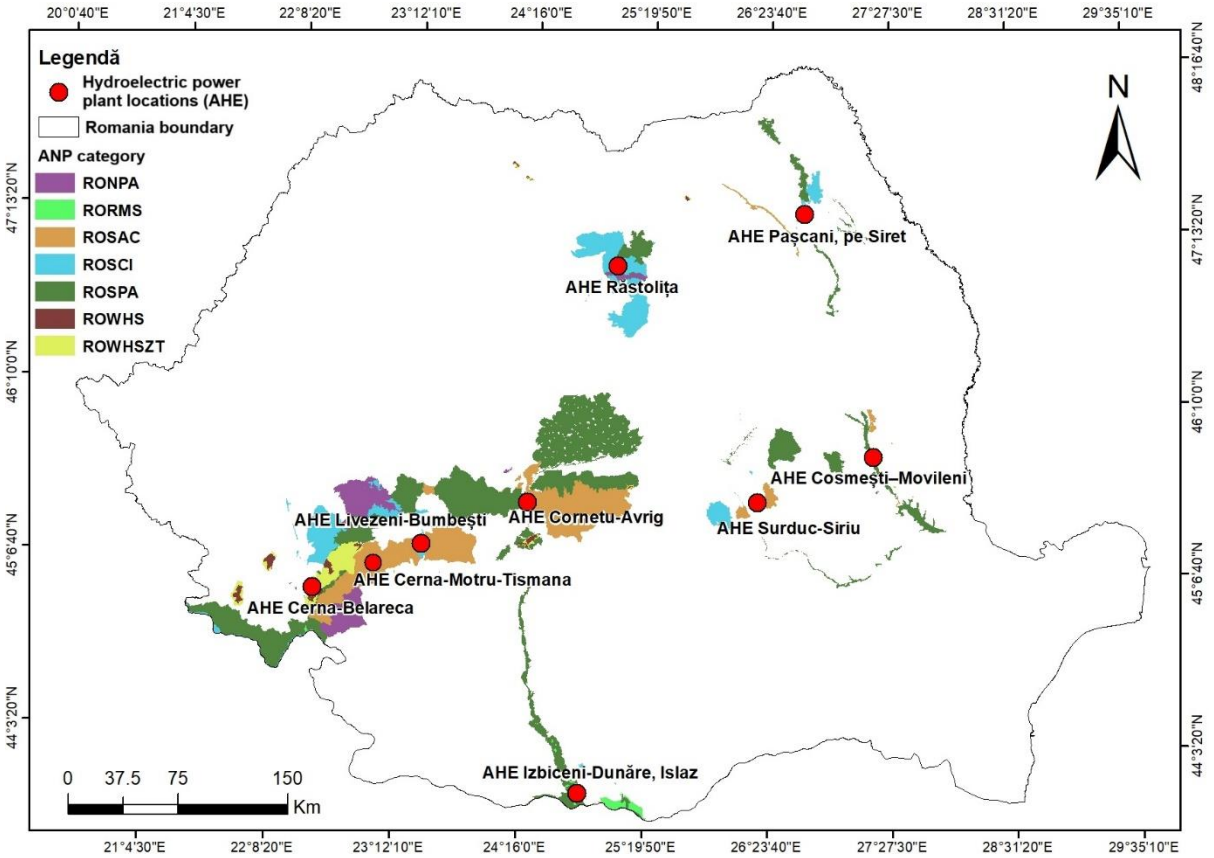


Figure 28. Location of new hydropower generation capacities

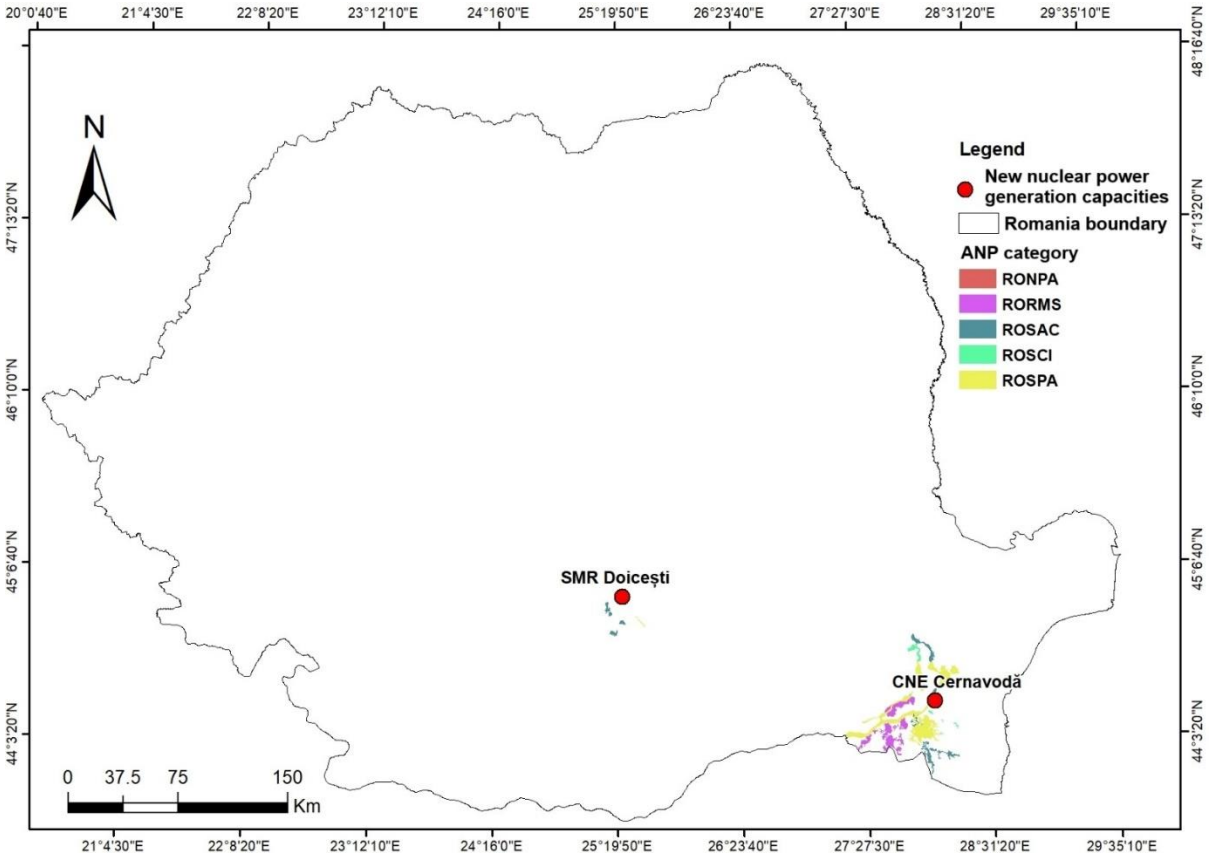


Figure 29. Location of nuclear power generation capacities

To identify the protected natural areas of community interest that could be potentially to be affected, the GIS coordinates of the projects provided by the Beneficiary were overlaid with the boundaries of the protected natural areas within the indirect maximum influence zone of 20 km of the proposed projects (Figures 30-49). Thus, the projects were mapped in relation to the protected natural areas within the 20 km indirect influence zone (established according to Order no. 1679/2023 for the approval of the specific methodological Guide regarding the adequate assessment of the potential effects of plans/projects in areas of interest).

The closest protected natural areas to the proposed projects by the updated NECP 2021-2030 are considered those within a distance of 6 km from the project's location. This distance was established considering the lower limit of the influence zone set by Order 1679/2023, for energy production projects in relation to protected natural areas of community interest that include flying invertebrates, birds, bats and large carnivores. This lower limit increases to 20 km for wind farms as this is considered a precautionary distance in Order 1679/2023 when protected natural areas of community interest include bird species of community interest, such as raptors or geese. Identifying the protected natural areas of community interest for wind and solar projects was not possible, because the Stereo 1970 coordinates of the potential projects under measures *PAM 22 Increase of the domestic generation capacity from PV power plants* and *PAM 23 Increase of the domestic generation capacity from wind are unknown*.

PAM 4 Development of new CCGT capacities

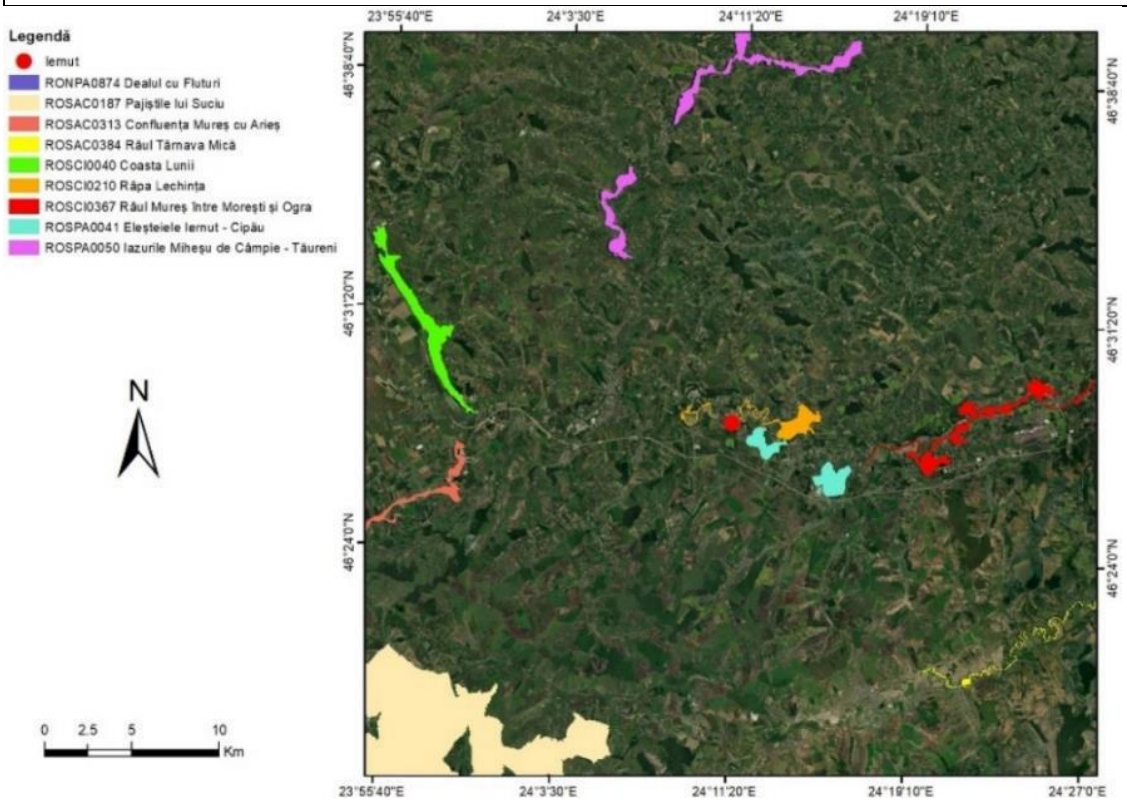


Figure 30. Location the Iernut objective in relation to protected natural areas

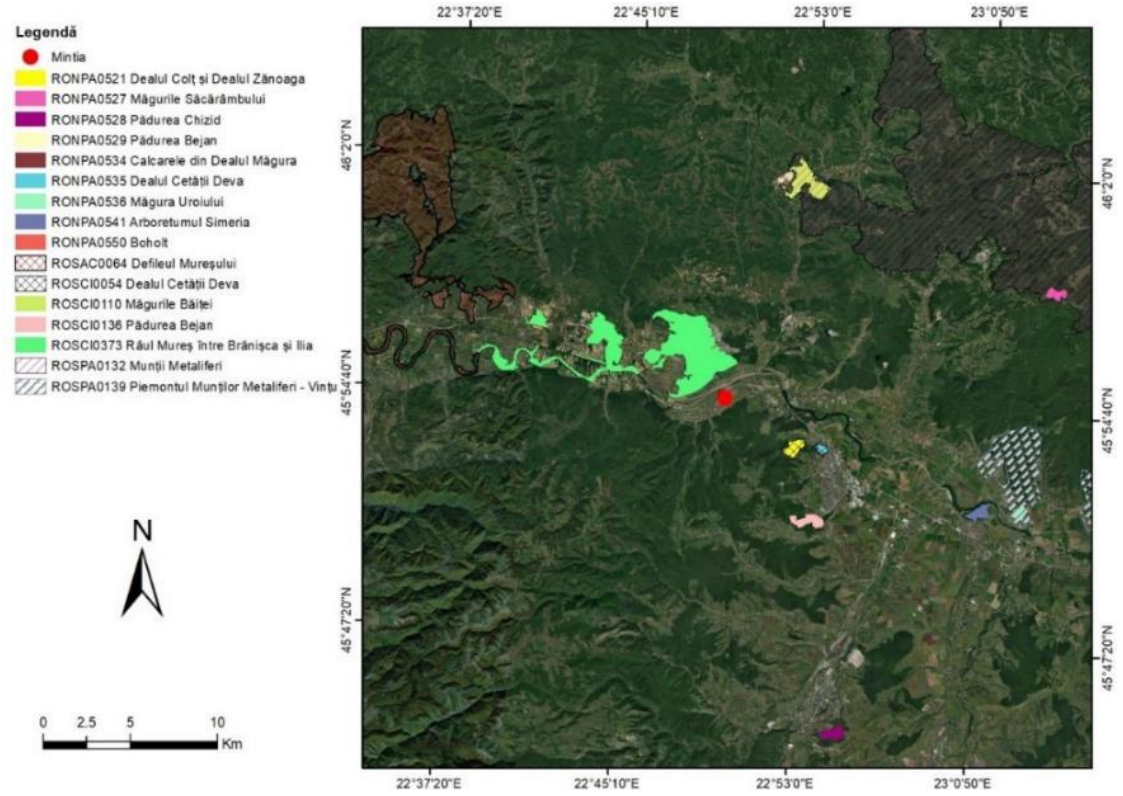


Figure 31. Location of the Mintia objective in relation to protected natural areas

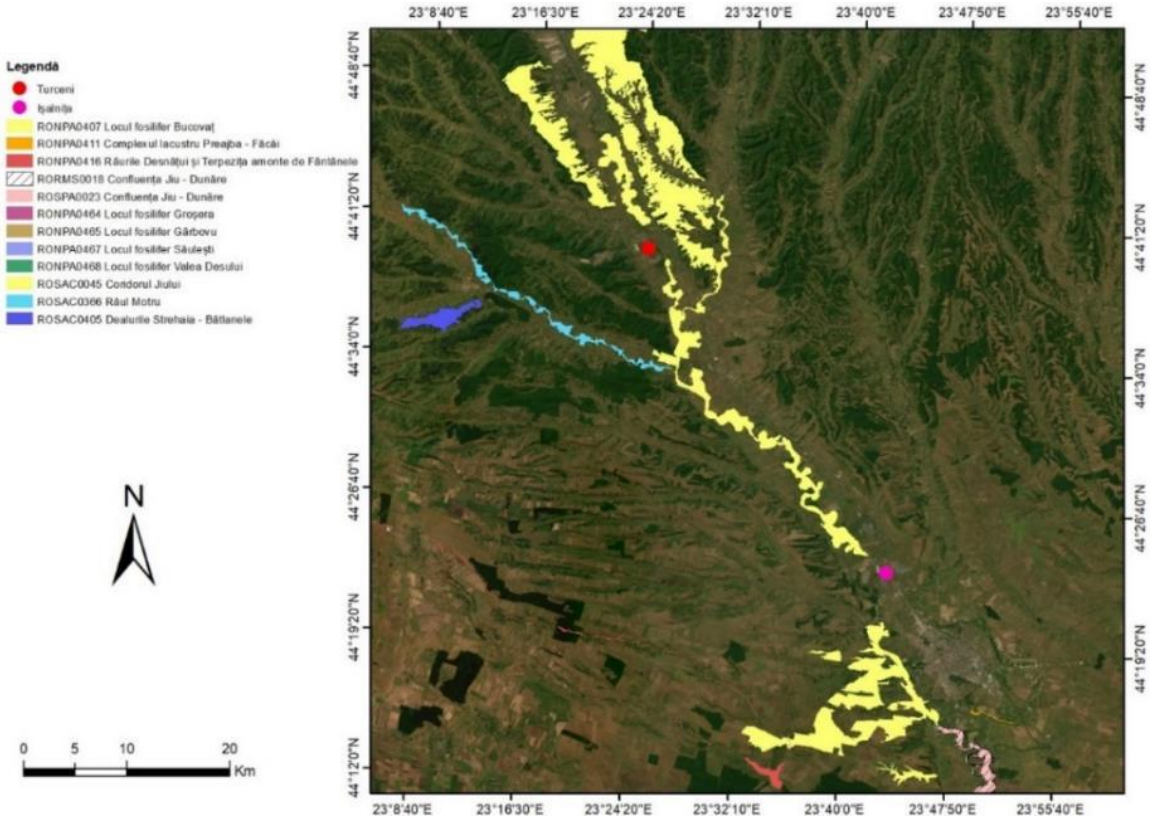


Figure 32. Location of Işalnița & Turceni objectives in relation to protected natural areas

PAM 5 Promotion of high-efficiency cogeneration capacities

- 80 MW (Rompetrol Năvodari) starting with 2024

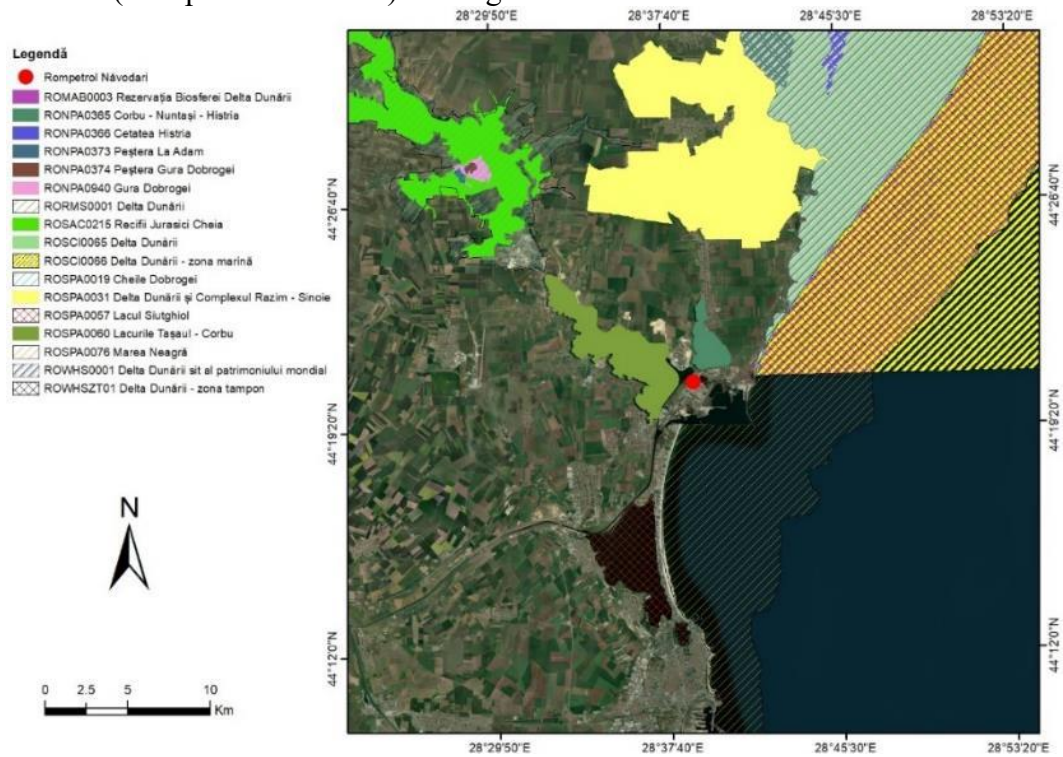


Figure 33. Location of the Rompetrol Năvodari facility in relation to natural areas protect

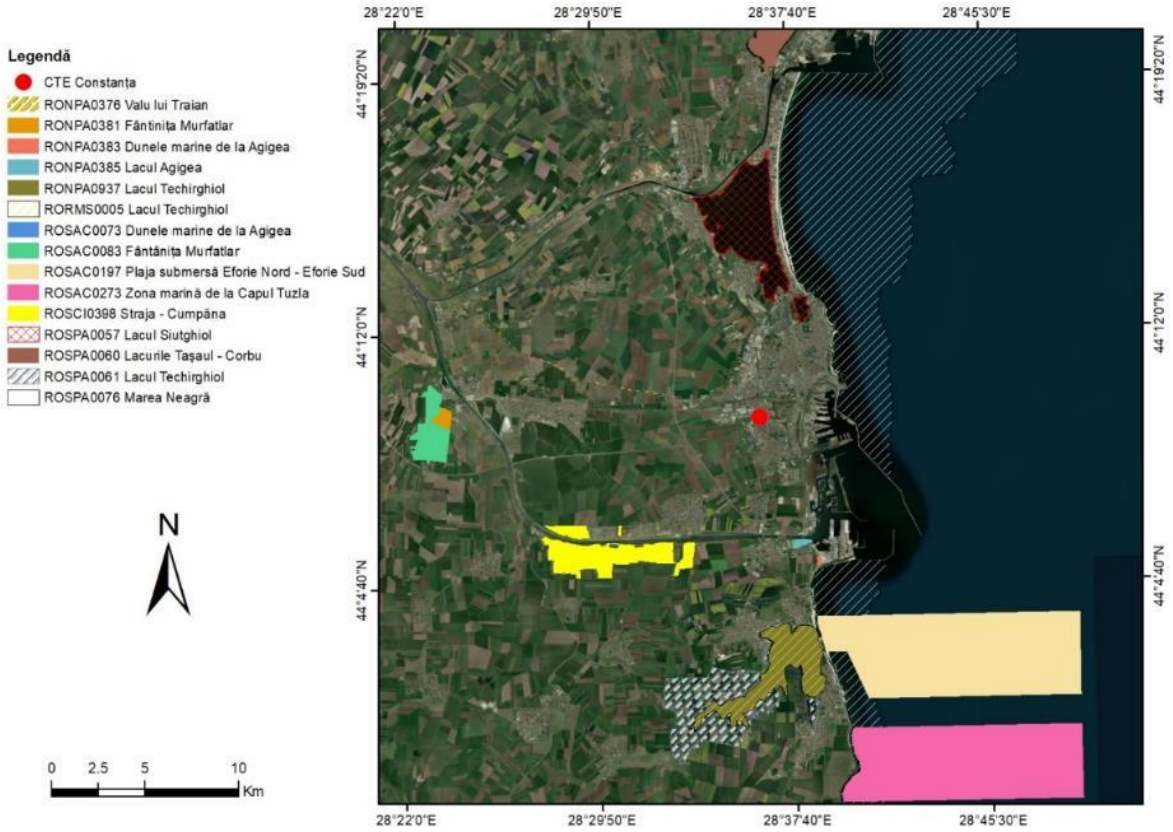


Figure 34. Location of the CET Constanța in relation to protected natural areas

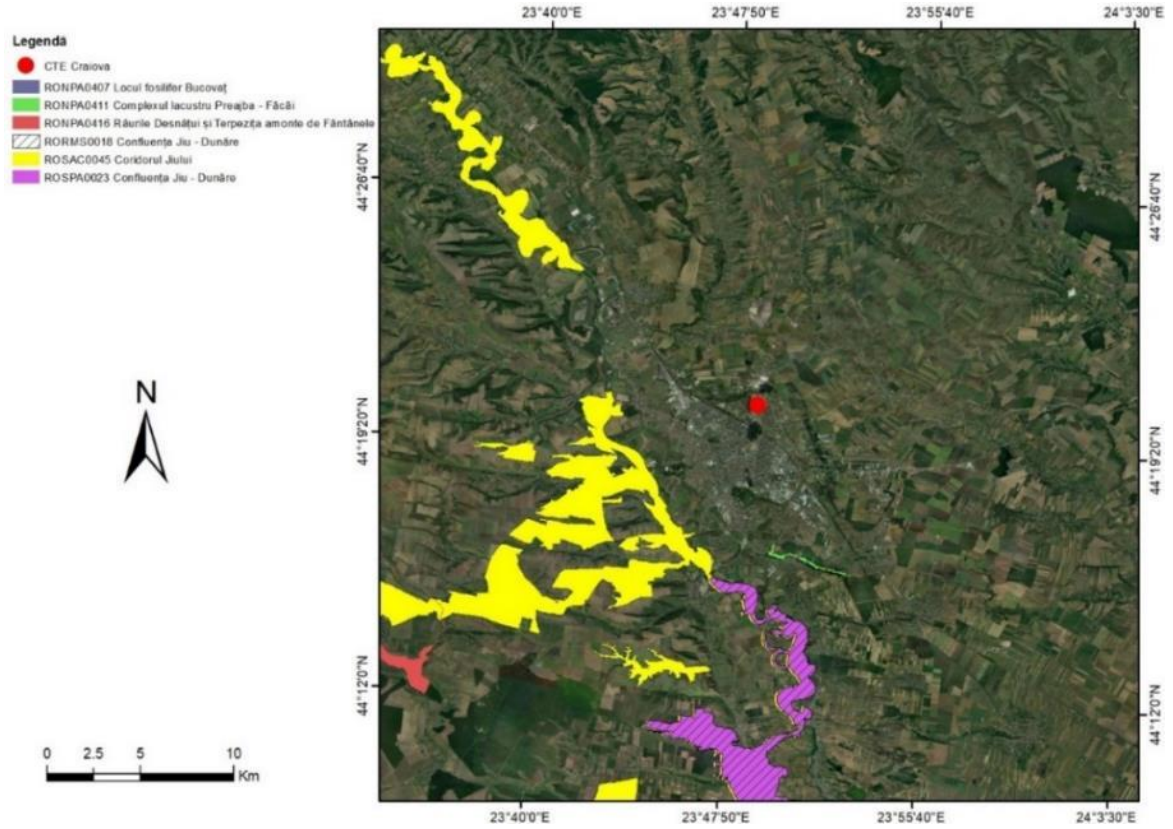


Figure 35. Location of the CTE Craiova facility in relation to protected natural areas

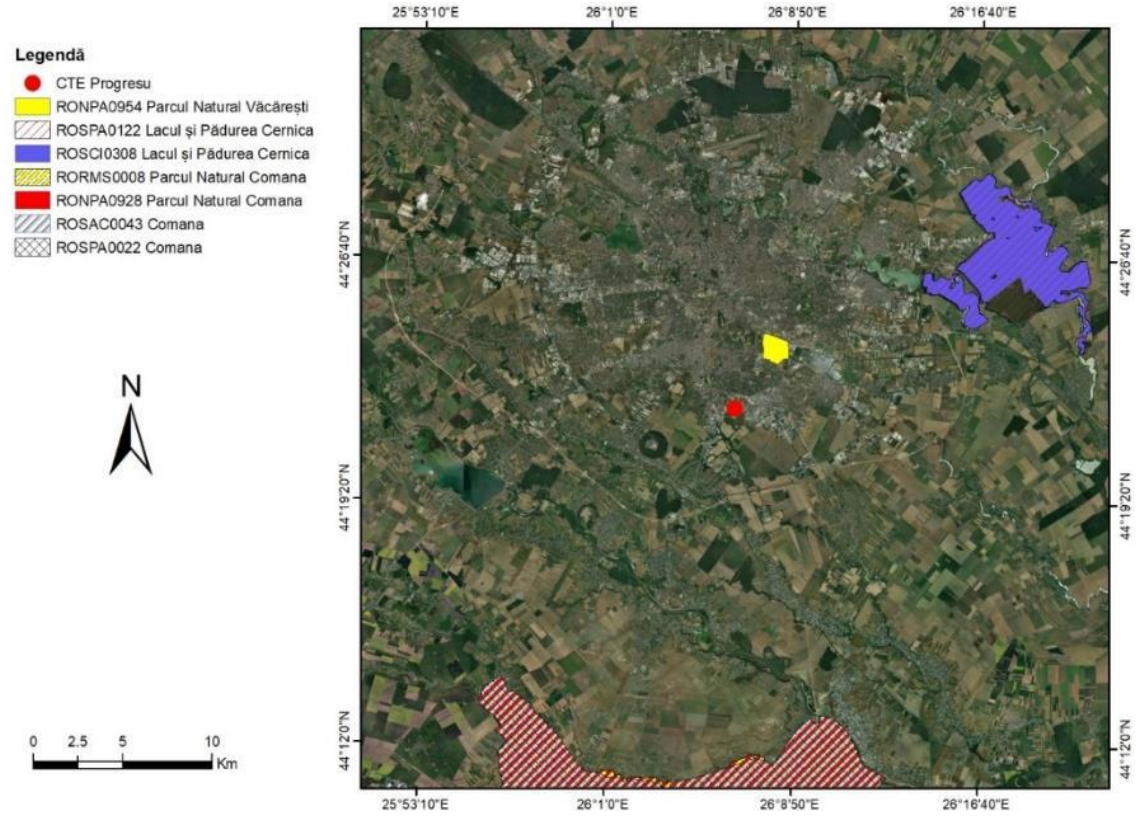


Figure 36. Location of the CET Progresu objective in relation to protected natural areas

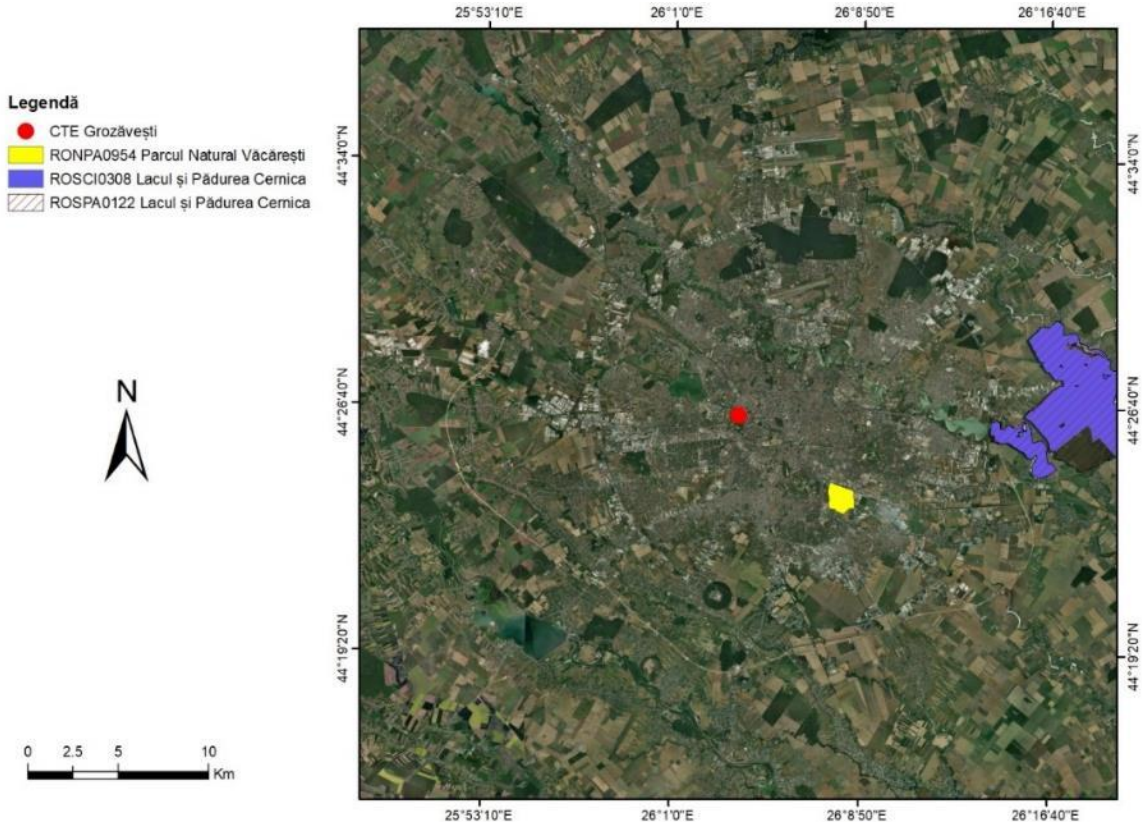


Figure 37. Location of the CTE Grozăvești objective in relation to protected natural areas

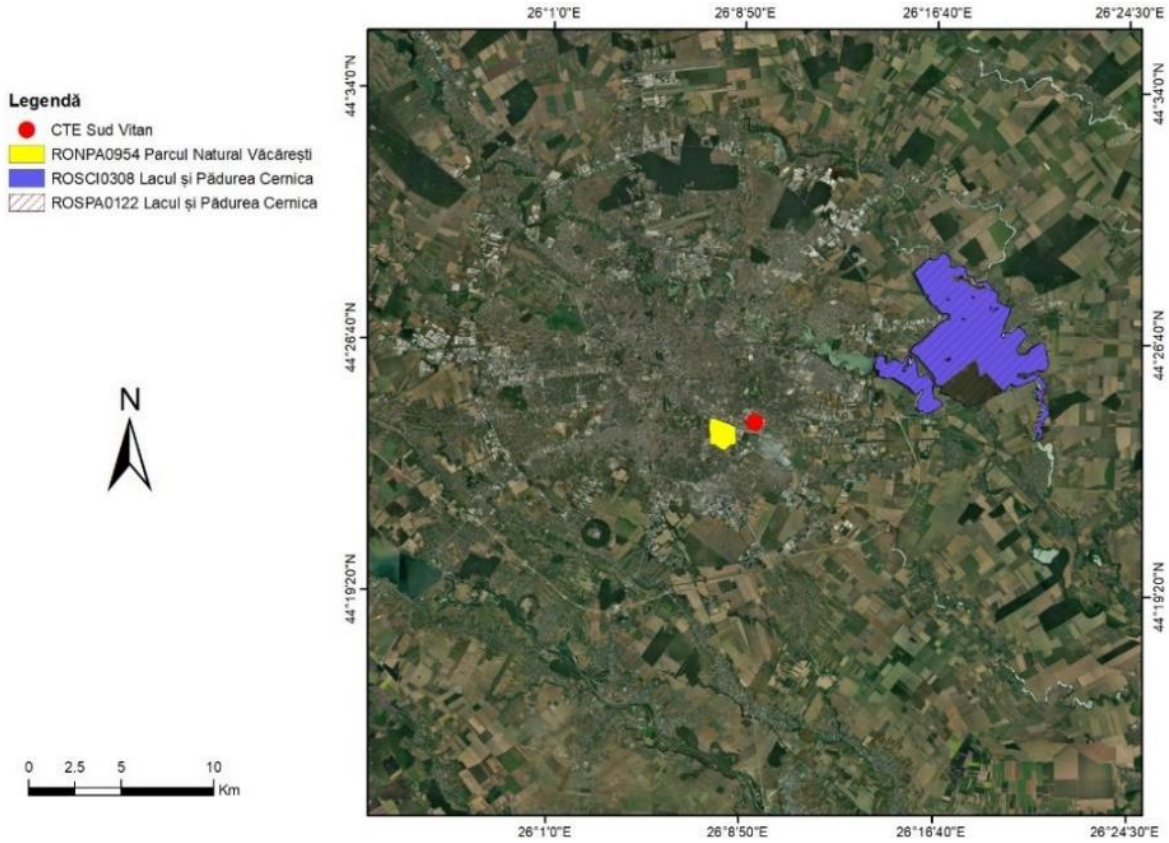


Figure 38. Location of the CET Sud Vitan objective in relation to protected natural areas

PAM 24 Construction/completion of hydropower facilities

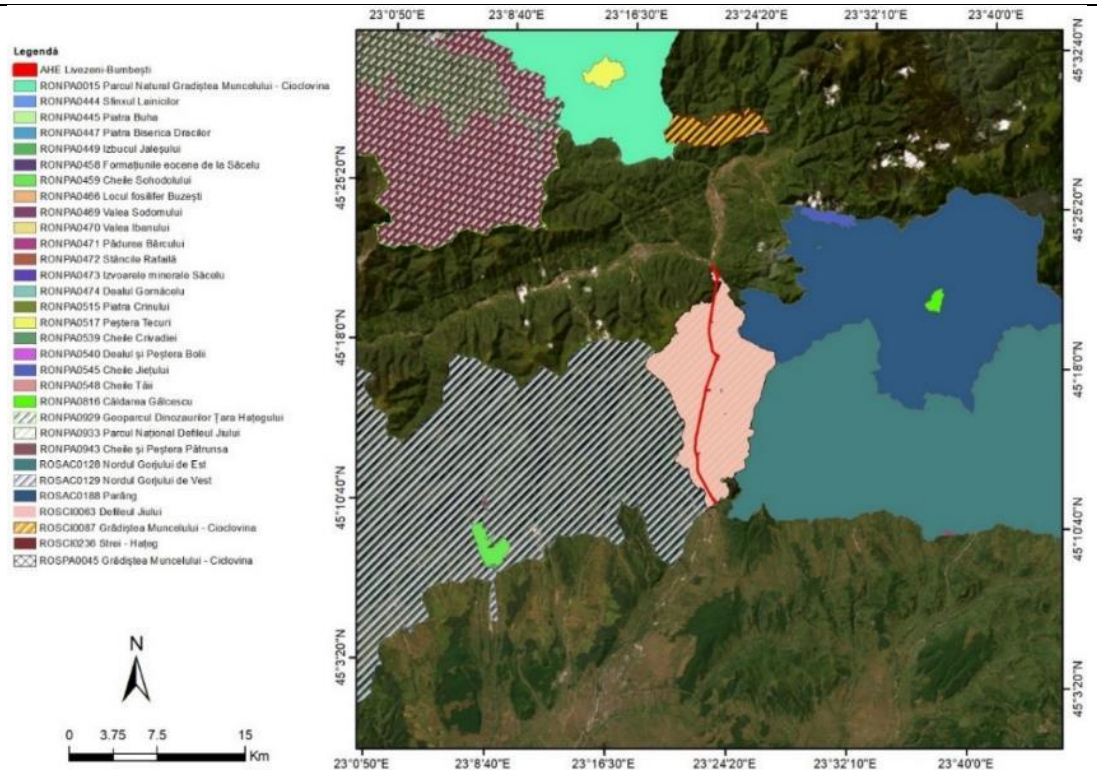


Figure 39. Location of the AHE Livezeni-Bumbești AHEobjective in relation to protected natural areas

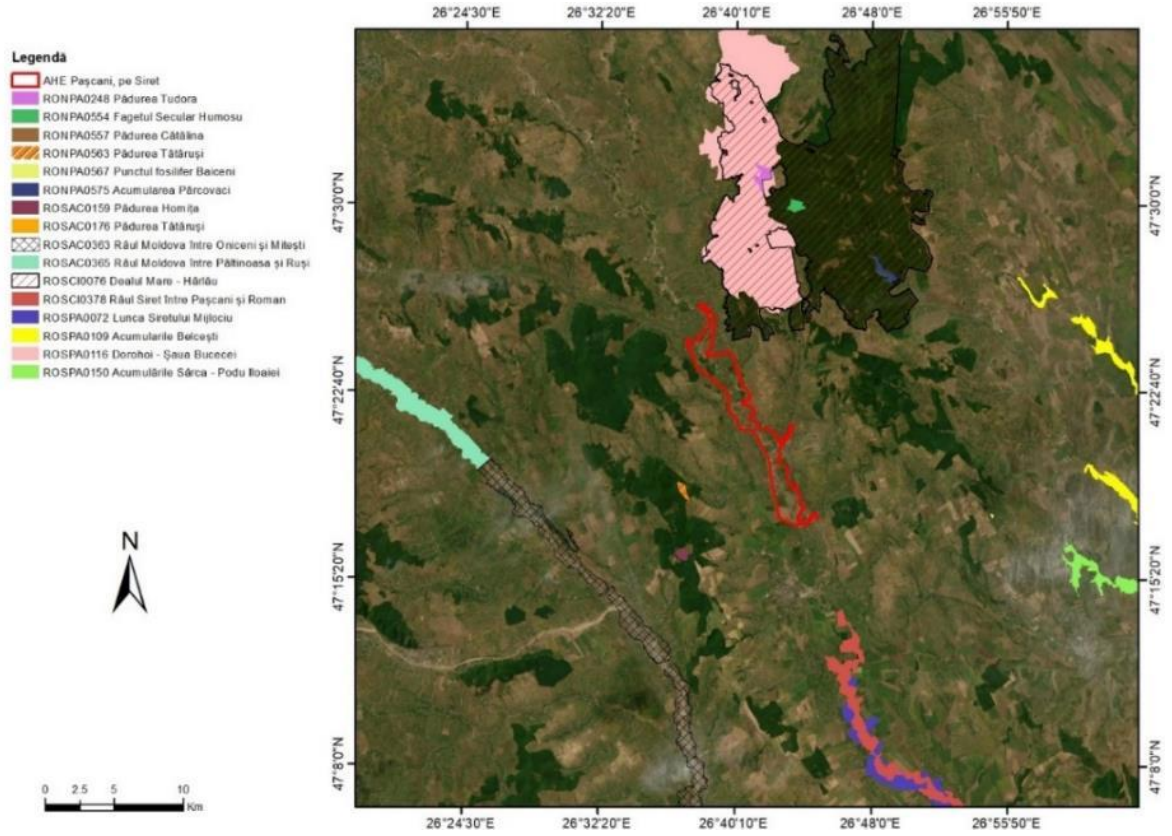


Figure 40. Location of the AHE Pașcani objective, on the Siret in relation to protected natural areas

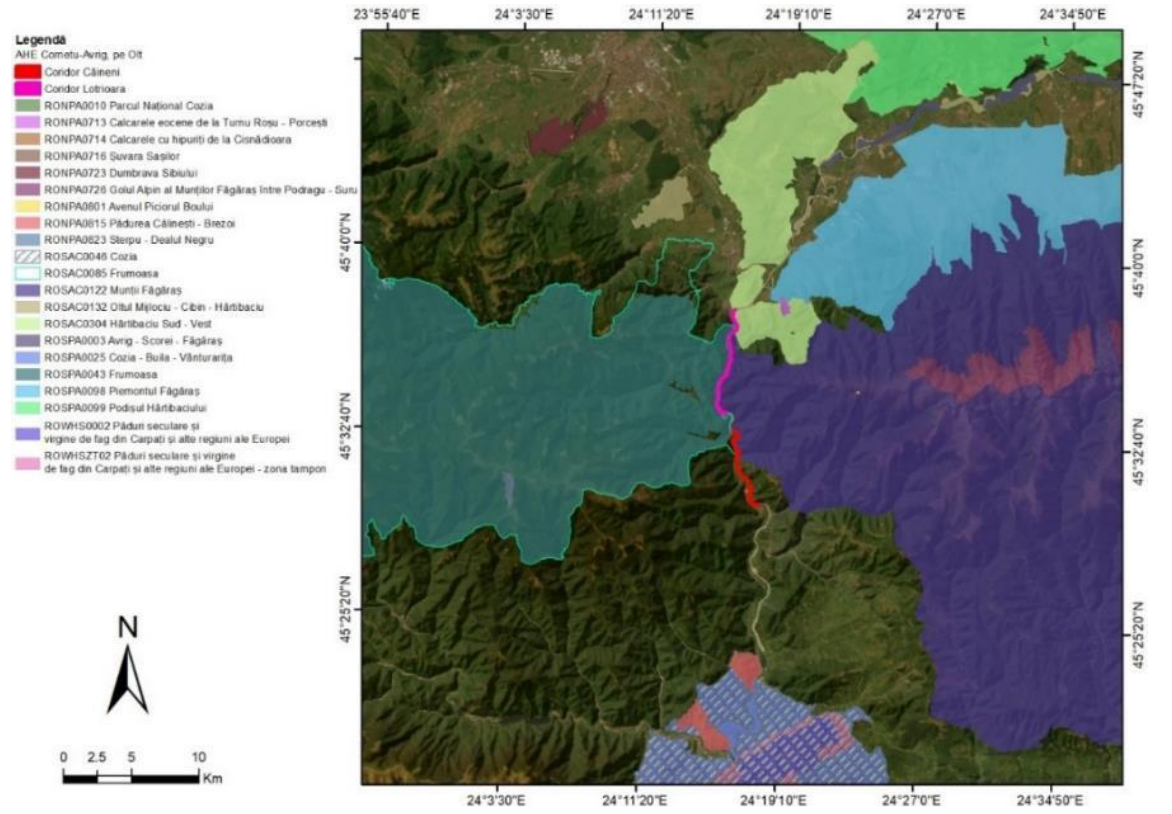


Figure 41. Location of the AHE Cornetu – Avrig AHEobjective, on the Olt River in relation to protected natural areas

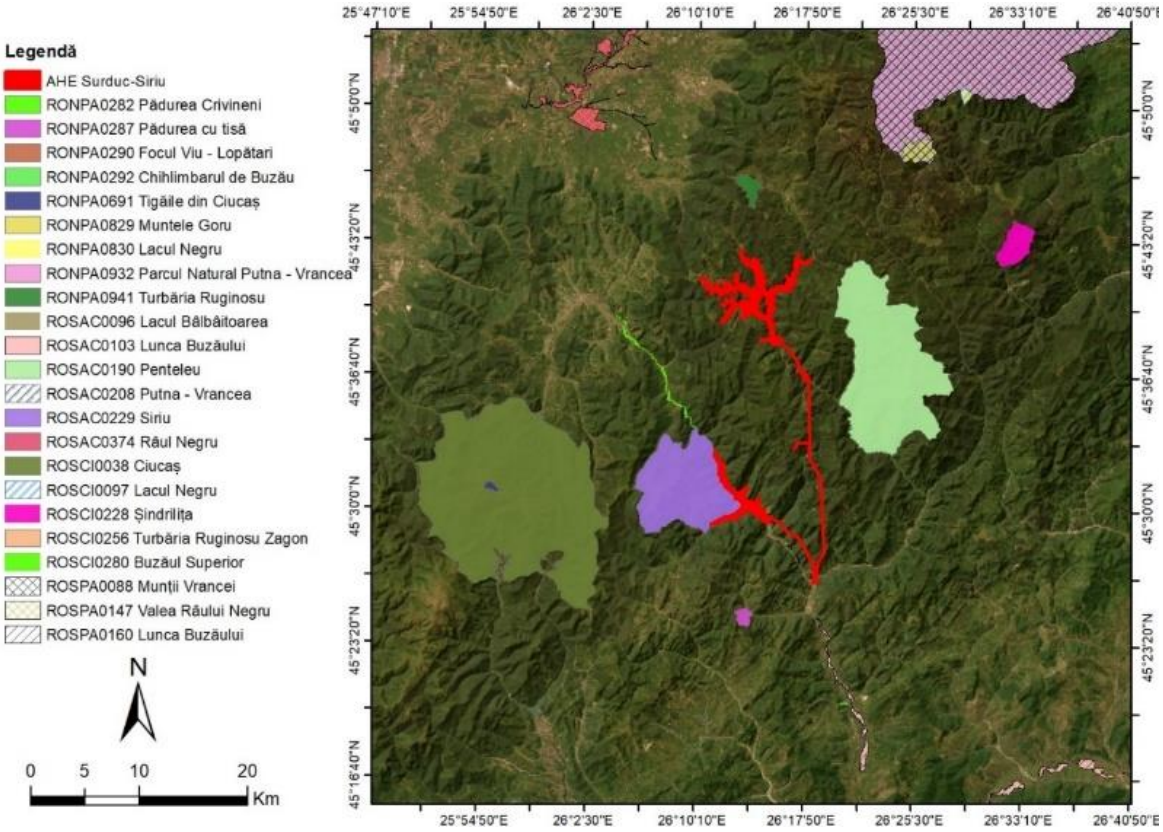


Figure 42. Location of the AHE Surduc-Siriu AHEobjective in relation to protected natural areas

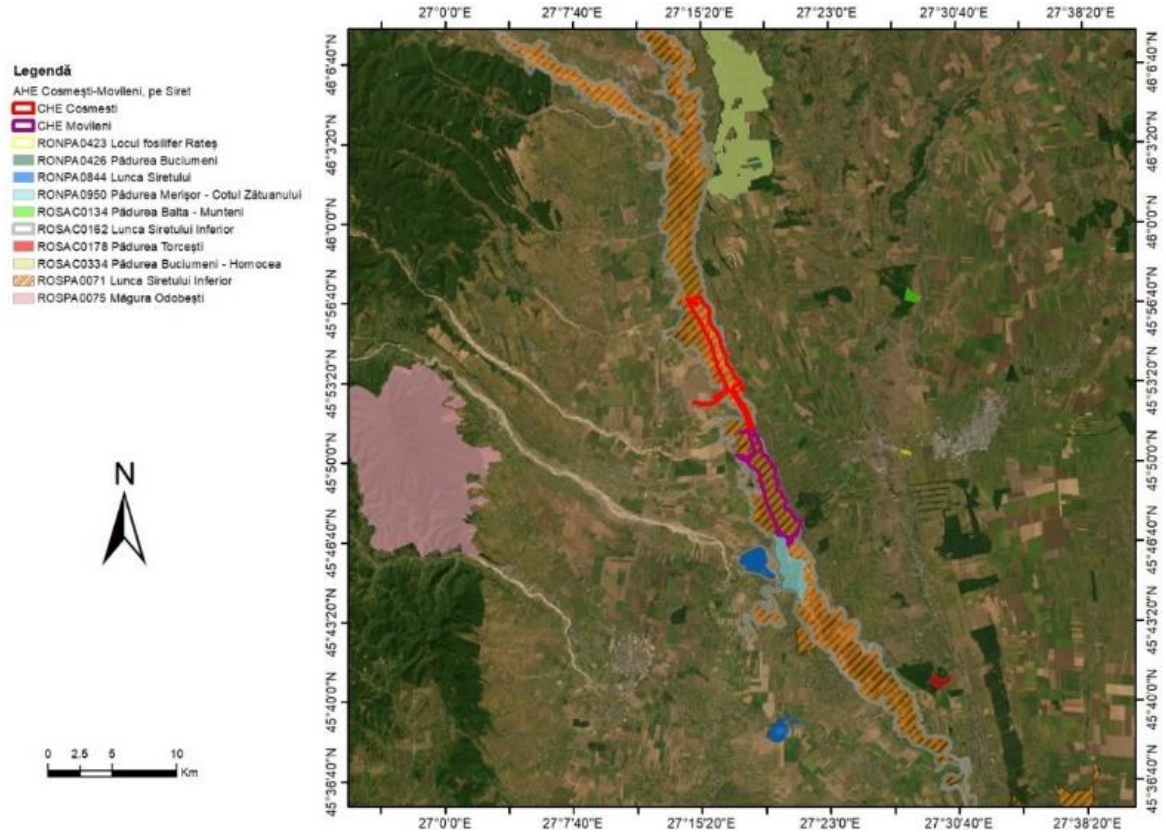


Figure 43. Location of the AHE Cosmești – Movileni AHEobjective, on the Siret in relation to protected natural areas

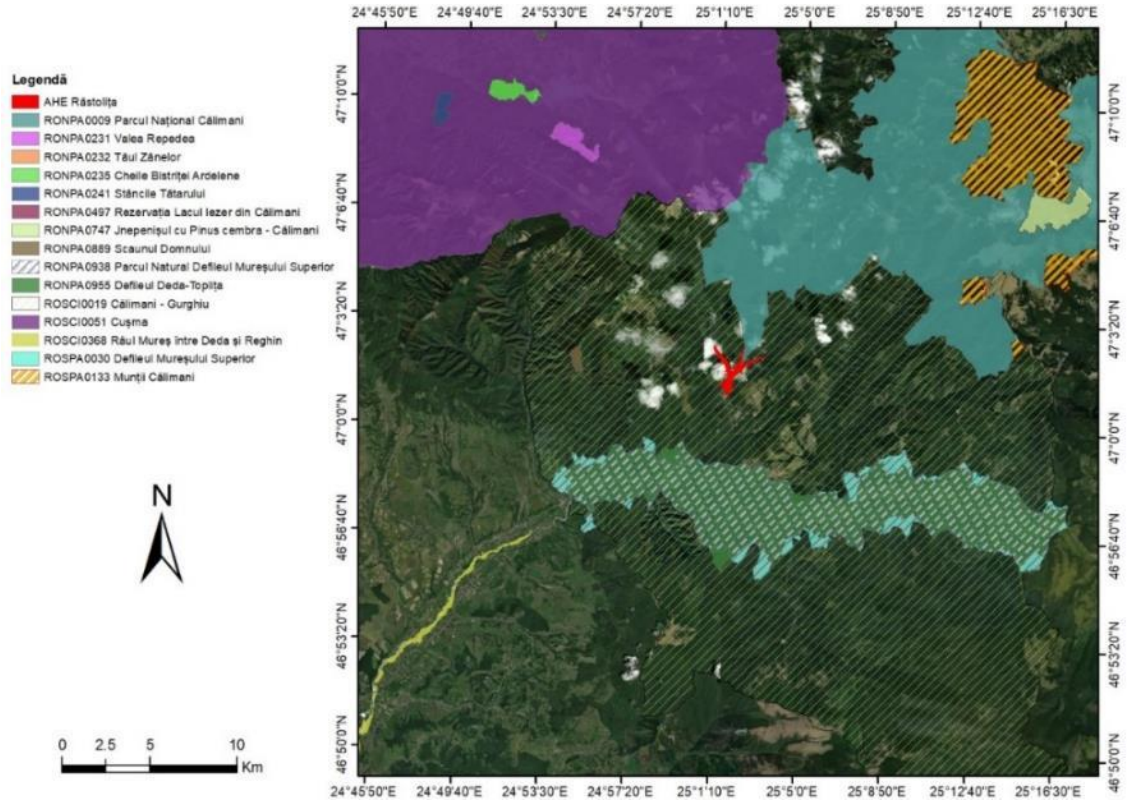


Figure 44. Location of the AHE Răstolița AHE objective in relation to protected natural areas

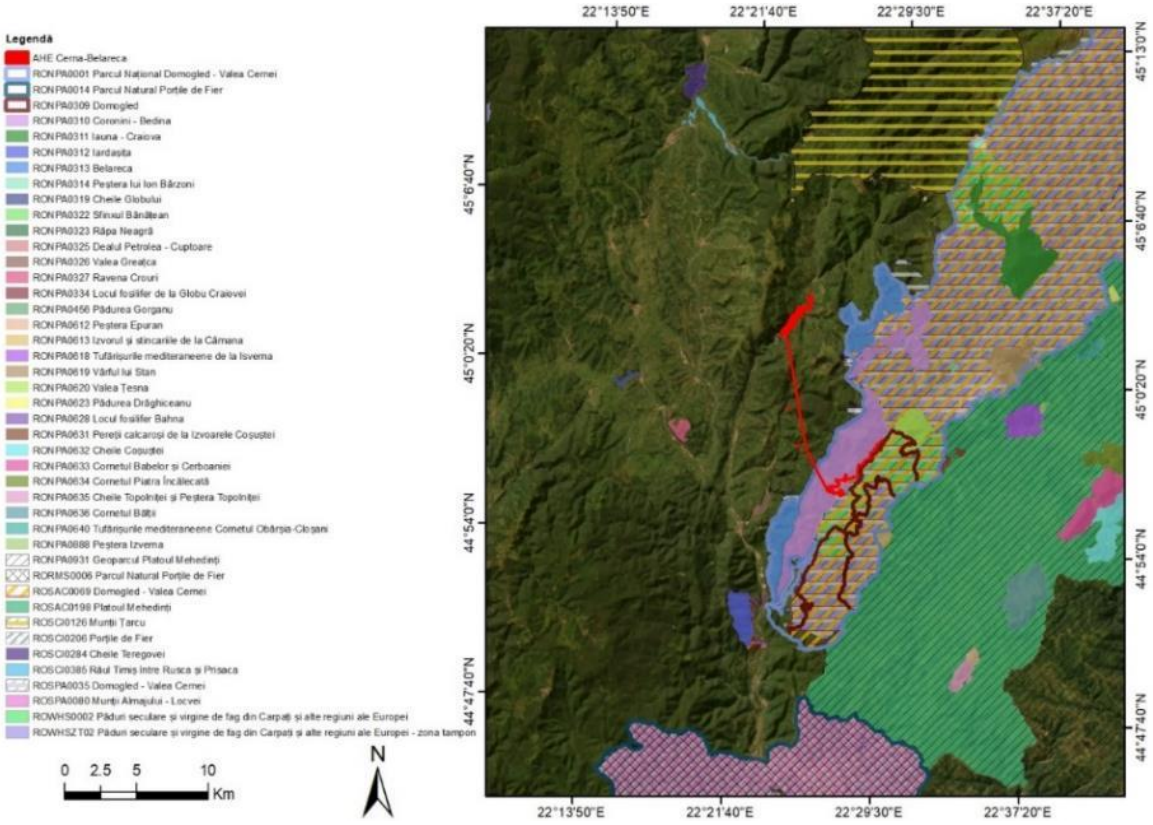


Figure 45. Location of the AHE Cerna-Belareca AHEobjective in relation to protected natural areas

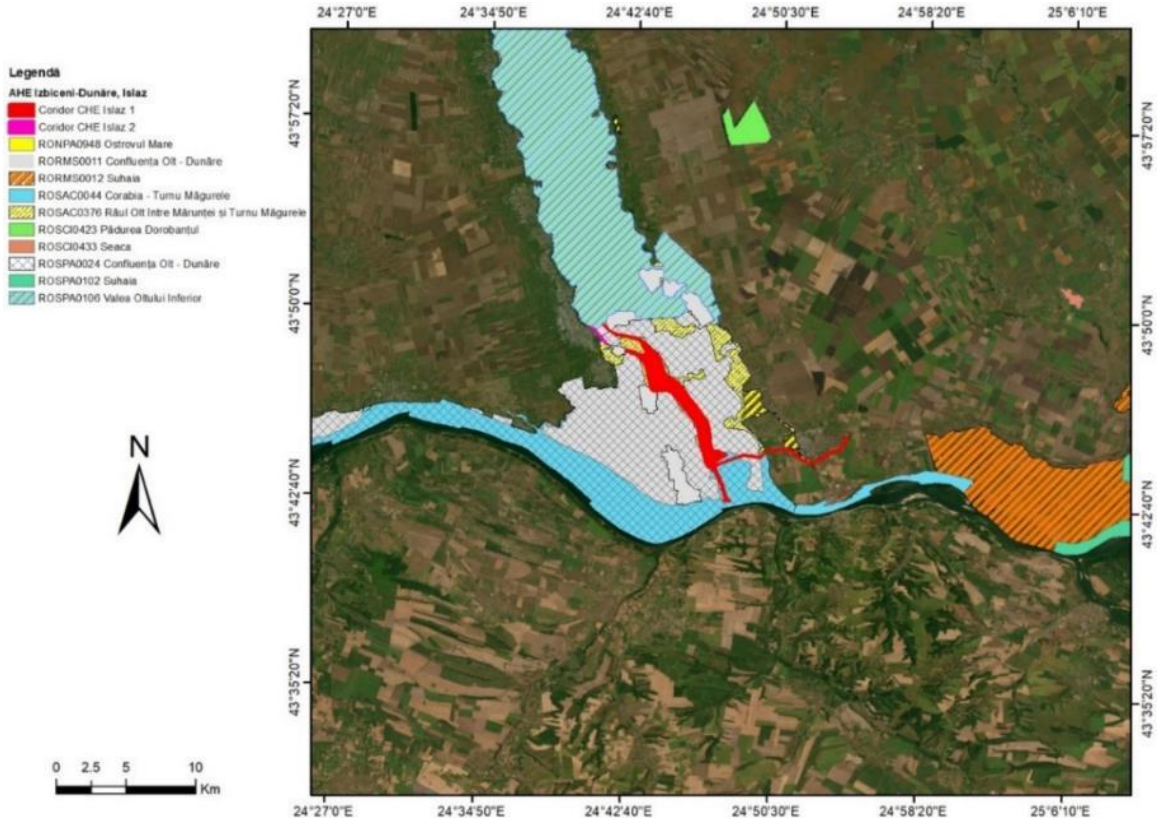


Figure 46. Location of the AHE Izbiceni-Dunăre AHE objective, Islaz in relation to protected natural areas

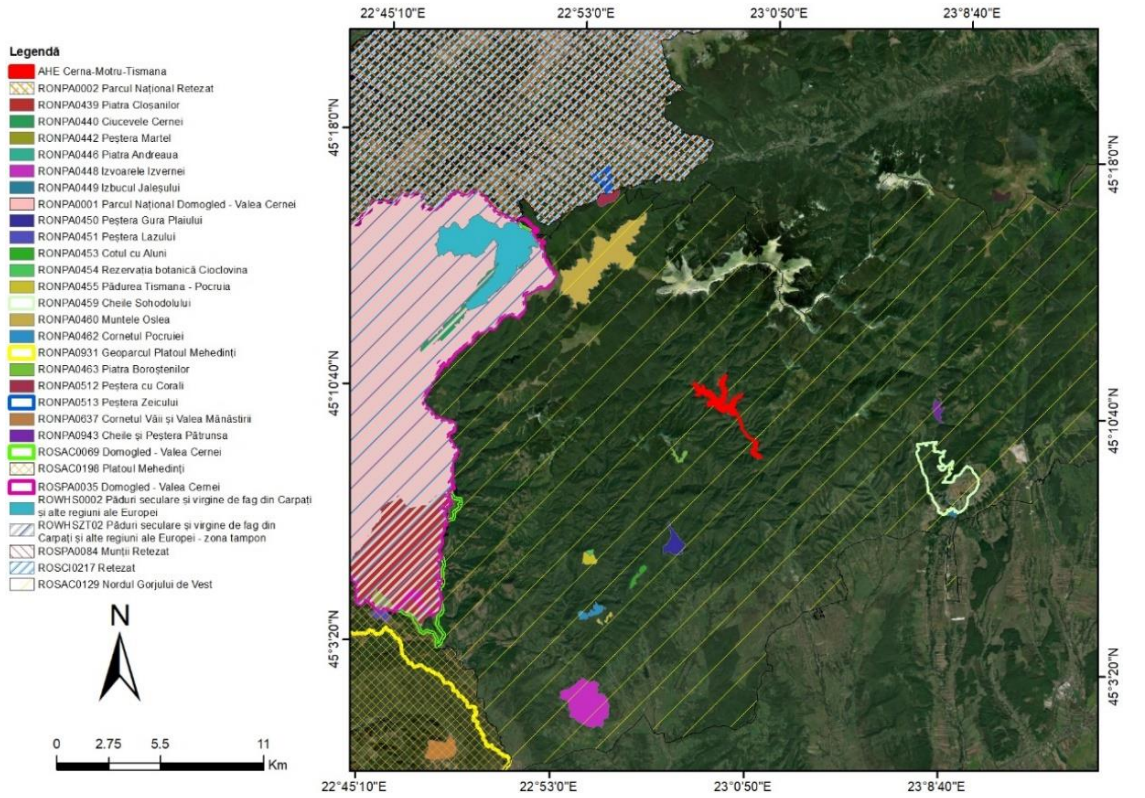


Figure 47. Location of the AHE Cerna-Motru-Tismana Stage II project in relation to protected natural areas

PAM 60 Increased use of nuclear energy

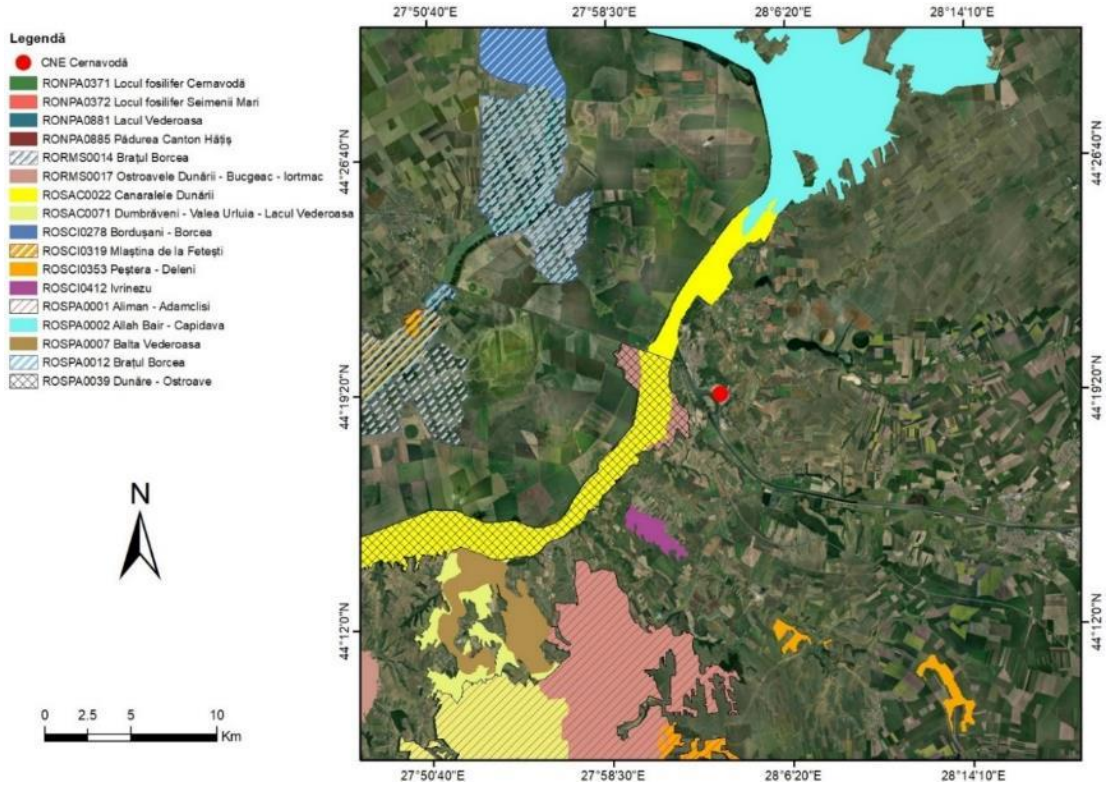


Figure 48. Location of the Cernavodă NPP objective in relation to protected natural areas

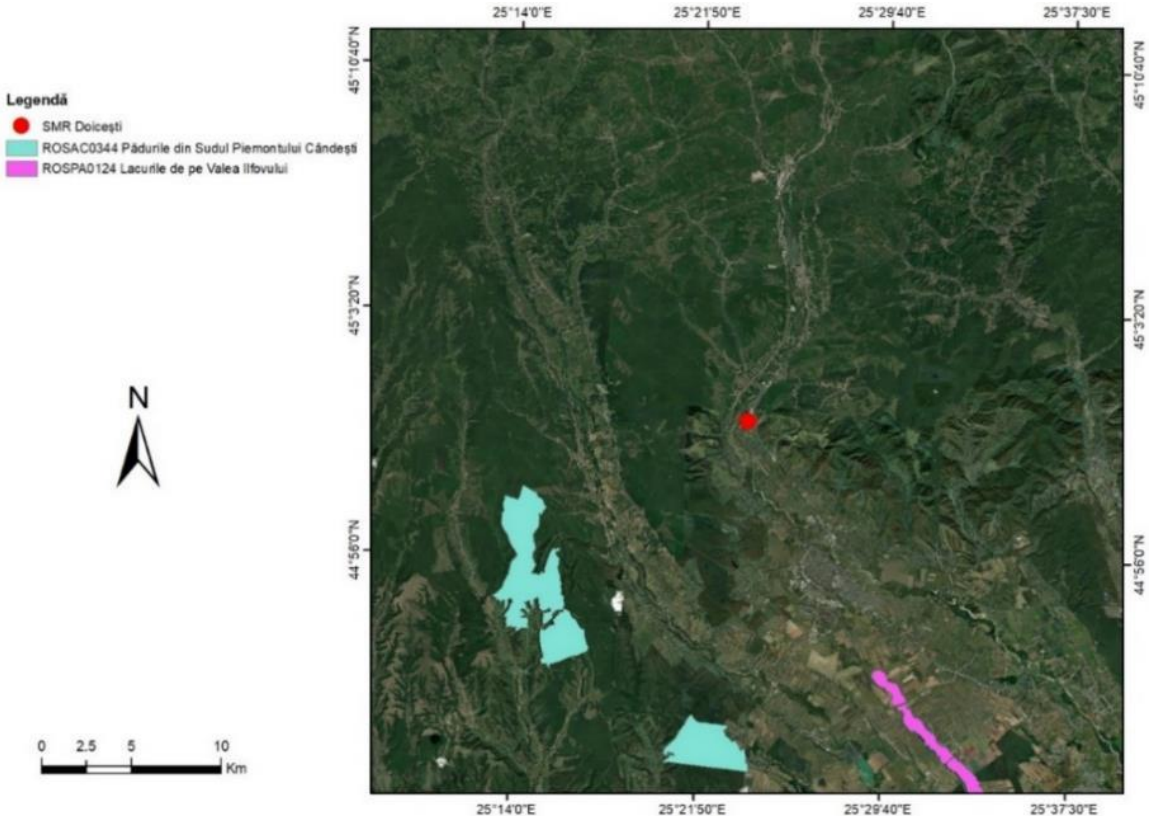


Figure 49. Location of the SMR objective in relation to protected natural areas

Table 6 presents a summary of the projects within the updated NECP 2021-2030 that overlap with protected natural areas, and table 7 presents the distances of the projects from the protected natural areas located in the maximum influence area of 20 km.

Table 6. List of projects within the updated NECP 2021-2030 that overlap with protected natural areas

PAM 24 Construction/completion of hydropower facilities	**Code**	**Name**	**Category**	**Overlap percentage (%)**
• AHE Livezeni-Bumbești - 65 MW	ROSCI0063	Jiu Gorge	Site of Community Importance	86.08
	RONPA0933	Jiu Gorge National Park	National Park	88.51
• AHE Cornetu – Avrig, on the Olt River - 40.5 MW	ROSPA0043	Beautiful	Special bird protection area	2.04
	ROSAC0122	Fagaras Mountains	Special protection area	9.43
	ROSAC0132	Middle Olt - Cibin - Hârtibaciu	Special protection area	71.75
	ROSAC0304	Hârtibaciu South - West	Special protection area	0.01
	ROSAC0085	Beautiful	Special protection area	2.24
• AHE Surduc-Siriu - 55 MW	ROSAC0229	Sirius	Special protection area	11.24
• AHE Cosmești – Movileni, on the Siret - 38 MW	ROSPA0071	Lower Siret Meadow	Special bird protection area	99.75
	ROSAC0162	Lower Siret Meadow	Special protection area	99.75
	RONPA0950	The Merișor Forest - The Zătuan Bend	Nature reserve	0.11
• AHE Rastolița - 35 MW	ROSCI0019	Calimani - Gurghiu	Site of Community Importance	100
	ROSPA0133	Calimani Mountains	Special bird protection area	3.75
	RONPA0009	Calimani National Park	National Park	3.75
• AHE Cerna-Belareca - 15 MW	ROSPA0035	Domogled - Cerna Valley	Special bird protection area	11.71
	RONPA0001	Domogled National Park - Cerna Valley	National Park	11.71
	RONPA0310	Coronini - Bedina	Nature reserve	6.67
	ROSAC0069	Domogled - Cerna Valley	Special protection area	11.71
	ROWHSZT02	Old and virgin beech forests of the Carpathians and other regions of Europe - buffer zone	Natural World Heritage Site	6.44
	ROWHS0002	Old and virgin beech forests in the Carpathians and other regions of Europe	Natural World Heritage Site	5.25
• AHE Izbiceni-Danube, Islaz - 29 MW	ROSPA0024	Olt - Danube confluence	Special bird protection area	97.21

PAM 24 Construction/completion of hydropower facilities	Code	Name	Category	Overlap percentage (%)
	RORMS0011	Olt - Danube confluence	Wetland of international importance	98.87
	ROSCI0044	The Ship - Turnu Magurele	Site of Community Importance	12.95
	ROSAC0376	Olt River between Mărunței and Turnu Măgurele	Special protection area	76.76
13 MW (AHE Cerna Motru-Tismana Stage II)	ROSAC0129	Nordul Gorjului de Vest	Special Protection Area	100

Table 7. List of projects within the updated NECP 2021-2030 and the distance to protected natural areas

project	Code	Name	Category	Distance (km)
• AHE Pașcani, on the Siret - 9.4 MW	ROSCI0076	Dealul Mare – Harlau	Site of Community Importance	0.79
	ROSPA0116	Dorohoi - Buceca Saddle	Special bird protection area	2.32
	RONPA0563	TătărușІ Forest	Nature reserve	5.75
	ROSAC0176	TătărușІ Forest	Special protection area	6.12
	ROSCI0378	Siret River between Pașcani and Roman	Site of Community Importance	6.82
	ROSAC0159	Homita Forest	Special protection area	7.12
	RONPA0554	The Secular Beech Tree Humusu	Scientific reserve, natural monument and nature reserve	9.12
	RONPA0248	Tudora Forest	Scientific reserve, natural monument and nature reserve	9.18
	ROSPA0072	Middle Siret Meadow	Special bird protection area	11.69
	RONPA0575	Pârcovaci accumulation	Scientific reserve, natural monument and nature reserve	12.27
	RONPA0567	Baiceni fossil point	Scientific reserve, natural monument and nature reserve	12.57
	ROSAC0363	Moldova River between Oniceni and Mitești	Special protection area	12.62
	RONPA0557	Catalina Forest	Scientific reserve, natural monument and nature reserve	14.26
	ROSAC0365	Moldova River between Păltinoasa and Rușі	Special protection area	16.07
	ROSPA0150	The accumulations of Sârca - Podu Iloaiei	Special bird protection area	18.21
	ROSPA0109	Belcești accumulations	Special bird protection area	19.76
• AHE Livezeni-Bumbești - 65 MW	ROSAC0129	North of the West Gorge	Special protection area	0.27

project	Code	Name	Category	Distance (km)
	RONPA0444	The Lainites' Sphinx	Scientific reserve, natural monument and nature reserve	0.93
	ROSAC0128	North of the East Gorge	Special protection area	1.37
	RONPA0472	Rafaila Rocks	Scientific reserve, natural monument and nature reserve	2.11
	ROSAC0188	Parang	Special protection area	2.49
	RONPA0474	Gornăcelu Hill	Natural monument	3.77
	RONPA0515	Lily Stone	Natural monument	8.57
	RONPA0545	The Jiet Gorges	Nature reserve	9.18
	RONPA0015	Gradiștea Muncelului Natural Park - Cioclovina	Nature Park	9.56
	ROSCI0087	Muncelului Kindergarten - Cioclovina	Site of Community Importance	9.88
	ROSPA0045	Muncelului Kindergarten - Ciclovina	Special bird protection area	9.88
	RONPA0540	The Hill and the Cave of Disease	Scientific reserve, natural monument and nature reserve	10.46
	RONPA0548	Your Keys	Scientific reserve, natural monument and nature reserve	11.51
	RONPA0466	Buzești fossil site	Scientific reserve, natural monument and nature reserve	11.91
	ROSCI0236	Strei – Hațeg	Site of Community Importance	14.4
	RONPA0929	The Dinosaur Geopark of Țara Hațegului	Nature Park	14.62
	RONPA0473	Săcelu mineral springs	Scientific reserve, natural monument and nature reserve	15.37
	RONPA0447	Stone Church of the Devils	Scientific reserve, natural monument and nature reserve	14.53
	RONPA0539	The Crivadia Gorge	Scientific reserve, natural monument and nature reserve	15.55
	RONPA0458	The Eocene formations at Săcelu	Scientific reserve, natural monument and nature reserve	15.63
	RONPA0445	The Bull Stone	Scientific reserve, natural monument and nature reserve	15.78
	RONPA0469	Sodom Valley	Scientific reserve, natural monument and nature reserve	16.71
	RONPA0459	Sohodol Gorge	Nature reserve	17.34

project	Code	Name	Category	Distance (km)
	RONPA0517	Teak Cave	Scientific reserve, natural monument and nature reserve	18.06
	RONPA081	The Galcescu Boiler	Nature reserve	18.23
	RONPA0943	The Gorges and the Pătrunsa Cave	Nature reserve	18.43
	RONPA0449	The Jaleș River Eruption	Natural monument	18.88
	RONPA0470	Iban Valley	Scientific reserve, natural monument and nature reserve	19.21
	RONPA0471	The Boat Forest	Nature reserve	19.95
• AHE Izbiceni-Danube , Islaz - 29 MW	ROSPA0106	Lower Olt Valley	Special bird protection area	0.64
	RONPA0948	The Big Island	Nature reserve	0.72
	RORMS0012	Suha	Wetland of international importance	3.25
	ROSCI0423	Dorobantul Forest	Site of Community Importance	15.37
	ROSPA0102	Suha	Special bird protection area	17.12
	ROSCI0433	dry	Site of Community Importance	18.99
• AHE Cerna-Belareca - 15 MW	RONPA0309	Domogled	Nature reserve	0.13
	RONPA0620	Tesna Valley	Nature reserve	1.02
	RONPA0313	Belareca	Nature reserve	2.12
	RONPA0613	The spring and the rocks at Câmana	Nature reserve	3.47
	RONPA0326	Greața Valley	Scientific reserve, natural monument and nature reserve	3.63
	RONPA0931	Mehedinți Plateau Geopark	Nature Park	3.85
	ROSAC0198	Mehedinti Plateau	Special protection area	3.85
	RONPA0631	The limestone walls at Izvoarele Coșustei	Nature reserve	4.44
	ROSCI0126	Tarcu Mountains	Site of Community Importance	5.99
	RONPA0325	Petrolea Hill – Ovens	Scientific reserve, natural monument and nature reserve	6.28
	RONPA0314	Ion Bârzoni's Cave	Nature reserve	6.83
	RONPA0327	Ravena Crouri	Scientific reserve, natural monument and nature reserve	6.83
	RONPA0323	Black Ravine	Scientific reserve, natural monument and nature reserve	6.93
	RONPA0312	Iardașița	Nature reserve	8.34
	RONPA0618	The Mediterranean scrublands at Isverna	Nature reserve	8.46
	RONPA0619	Stan's Peak	Nature reserve	8.59

project	Code	Name	Category	Distance (km)
	RONPA0334	The fossil site at Globu Craiovei	Scientific reserve, natural monument and nature reserve	9.74
	ROSCI0385	Timiș River between Rusca and Prisaca	Site of Community Importance	9.85
	RONPA0888	Izverna Cave	Nature reserve	10.11
	RONPA0319	The Keys of the Globe	Scientific reserve, natural monument and nature reserve	10.41
	RONPA0322	The Banat Sphinx	Scientific reserve, natural monument and nature reserve	11.05
	RONPA0636	The Cornet of Balti	Nature reserve	12.99
	RONPA0311	Iauna - Craiova	Nature reserve	13.61
	RONPA0612	Epuran Cave	Natural monument	13.94
	RONPA0634	The Cornet of the Stone Mounted	Nature reserve	14.06
	RONPA0633	The Babes and the Cerboania's Cornet	Nature reserve	14.15
	RONPA0014	Iron Gates Natural Park	Nature Park	14.3
	ROSCI0206	The Iron Gates	Site of Community Importance	14.41
	ROSPA0080	Almaj Mountains - Locvei	Special bird protection area	14.41
	RORMS0006	Iron Gates Natural Park	Wetland of international importance	14.41
	RONPA0635	Topolnița Gorge and Topolnița Cave	Natural monument	14.44
	RONPA0640	Mediterranean scrublands Obârșia-Cloșani Cornet	Nature reserve	14.57
	RONPA0632	Coșuște Gorges	Nature reserve	15.62
	ROSCI0284	Teregova Gorge	Site of Community Importance	16.02
	RONPA0628	Bahna fossil site	Natural monument	16.77
	RONPA0456	Gorganu Forest	Scientific reserve, natural monument and nature reserve	18.41
	RONPA0623	Draghiceanu Forest	Nature reserve	18.42
• AHE Surduc-Siriu – 55 MW	ROSAC0103	Buzau Meadow	Special protection area	0.88
	ROSPA0160	Buzau Meadow	Special bird protection area	0.88
	ROSAC0190	Penteleu	Special protection area	2.71
	ROSCI0280	Buzau Upper	Site of Community Importance	3.11
	ROSCI0256	Ruginosu Zagon Peatland	Site of Community Importance	3.99
	RONPA0941	Ruginosu Peatland	Nature reserve	3.99

project	Code	Name	Category	Distance (km)
	RONPA0287	Yew forest	Scientific reserve, natural monument and nature reserve	6.27
	RONPA0292	Buzau Amber	Scientific reserve, natural monument and nature reserve	9.57
	RONPA0282	Crivineni Forest	Scientific reserve, natural monument and nature reserve	11.2
	ROSAC0374	Black River	Special protection area	11.27
	ROSPA0147	Black River Valley	Special bird protection area	11.27
	ROSAC0208	Putna – Vrancea	Special protection area	12.37
	ROSPA0088	Vrancea Mountains	Special bird protection area	12.37
	RONPA0829	Mount Goru	Scientific reserve, natural monument and nature reserve	12.37
	RONPA0932	Putna-Vrancea Natural Park	Nature Park	12.37
	ROSAC0096	Lake Bâlbâitoarea	Special protection area	16.65
	ROSCI0038	Ciucaș	Site of Community Importance	16.66
	ROSCI0228	shingle	Site of Community Importance	17.04
	RONPA0290	Living Fire – Lopătari	Scientific reserve, natural monument and nature reserve	18.36
	ROSCI0097	Black Lake	Site of Community Importance	19.94
	RONPA0830	Black Lake	Nature reserve	19.94
	RONPA0691	The pans from Ciucaș	Scientific reserve, natural monument and nature reserve	19.98
• AHE Cosmești – Movileni , on the Siret River - 38 MW	RONPA0844	Siret Meadow	Nature reserve	1.47
	ROSAC0334	Buciumeni Forest - Homocea	Special protection area	7.57
	RONPA0423	Ratesh fossil site	Scientific reserve, natural monument and nature reserve	9.87
	RONPA0426	Buciumeni Forest	Nature reserve	10.92
	ROSAC0134	Balta Forest - Munteni	Special protection area	14.48
	ROSAC0178	Torcesti Forest	Special protection area	14.82
	ROSPA0075	Odobești Mountain	Special bird protection area	15.35
• AHE Cornetu – Avrig , on the Olt – 40.5 MW	ROSPA0098	Fagaras Piedmont	Special bird protection area	2.74
	RONPA0713	The Eocene limestones from Turnu Roșu - Porcești	Nature reserve	3.35

project	Code	Name	Category	Distance (km)
	RONPA0716	The Saxons' Şuvara	Nature reserve	5.12
	RONPA0801	The Ox's Foot Aven	Natural monument	9.27
	ROSAC0046	tails	Special protection area	10.83
	RONPA0010	Cozia National Park	National Park	10.83
	RONPA0815	Călinești Forest - Brezoi	Nature reserve	10.98
	ROSPA0025	Cozia - Buila - Vânturarița	Special bird protection area	11
	ROSPA0003	Avrig - Scorei – Fagaras	Special bird protection area	12.06
	RONPA0726	The Alpine Pass of the Fagaras Mountains between Podragu - Suru	Nature reserve	12.75
	RONPA0714	Limestones with hippurites from Cisnădioara	Scientific reserve, natural monument and nature reserve	15.1
	ROWHSZT02	Old and virgin beech forests of the Carpathians and other regions of Europe - buffer zone	Natural World Heritage Site	15.67
	ROWHS0002	Old and virgin beech forests in the Carpathians and other regions of Europe	Natural World Heritage Site	16.54
	RONPA0723	Sibiu Grove	Scientific reserve, natural monument and nature reserve	16.81
	RONPA0823	Sterpu - Black Hill	Nature reserve	17.27
	ROSPA0099	Hârtibaciu Plateau	Special bird protection area	17.56
• AHE Răstolița - 35 MW	ROSPA0030	The Upper Mureș Gorge	Special bird protection area	3.55
	RONPA0955	Deda-Toplița Gorge	Nature reserve	3.55
	RONPA0938	Upper Mureș Gorge Natural Park	Nature Park	3.55
	ROSCI0051	Cuşma	Site of Community Importance	7.22
	RONPA0889	The Lord's Seat	Nature reserve	7.52
	RONPA0232	Fairy Tale	Nature reserve	8.75
	RONPA0231	Rapid Valley	Nature reserve	12.5
	ROSCI0368	Mureș River between Deda and Reghin	Site of Community Importance	13.63

project	Code	Name	Category	Distance (km)
	RONPA0497	Iezer Lake Reserve in Călimani	Nature reserve	15.65
	RONPA0747	Junipeniș with Pinus cembra - Călimani	Scientific reservation	15.99
	RONPA0235	The Transylvanian Bistrita Gorges	Nature reserve	17.2
	RONPA0241	The Tatar Rocks	Nature reserve	19.91
AHE Cerna-Motru-Tismana Stage II – 13 MW	RONPA0001	Domogled - Valea Cernei National Park	Nature reserve	9.28
	RONPA0002	Retezat National Park	Nature reserve	10.78
	RONPA0439	Piatra Cloșanilor	Nature reserve	14.33
	RONPA0440	Ciucevele Cernei	Nature reserve	10.76
	RONPA0442	Martel Cave	Nature reserve	19.75
	RONPA0446	Piatra Andreaua	Nature reserve	14.86
	RONPA0448	Izvoarele Izvernei	Nature reserve	14.69
	RONPA0449	Izbucul Jaleșului	Nature reserve	10.29
	RONPA0450	Gura Plaiului Cave	Nature reserve	5.66
	RONPA0451	Lazului Cave	Nature reserve	21.12
	RONPA0453	Cotul cu Aluni	Nature reserve	8.19
	RONPA0454	Cioclovina Botanical Reserve	Nature reserve	9.87
	RONPA0455	Tismana - Pocruia Forest	Nature reserve	10.13
	RONPA0459	Cheile Sohodolului	Nature reserve	8.74
	RONPA0460	Oslea Mountain	Nature reserve	7.02
	RONPA0462	Cornetul Pocruiei	Nature reserve	11.4
	RONPA0463	Piatra Boroștenilor	Nature reserve	2.69
	RONPA0512	The Coral Cave	Nature reserve	10.34
	RONPA0513	Zeicu's Cave	Nature reserve	10.78
	RONPA0931	Mehedinți Plateau Geopark	Nature reserve	20.81
	RONPA0943	Pătrunsa Gorge and Cave	Nature reserve	9.94
	ROSAC0069	Domogled - Valea Cernei	Special Protection Area	9.4
	ROSAC0198	Mehedinți Plateau	Special Protection Area	19.22
	ROSCI0217	Retezat	Site of Community Importance	9.78
	ROSPA0035	Domogled - Valea Cernei	Special Protection Area for Birds	9.78
	ROSPA0084	Retezat Mountains	Special Protection Area for Birds	9.78
	ROWHSZT02	Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe – Buffer Zone	Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe – Buffer Zone	9.78
	ROWHS0002	Ancient and Primeval Beech Forests of the	Ancient and Primeval Beech Forests of the	11.06

project	Code	Name	Category	Distance (km)
		Carpathians and Other Regions of Europe	Carpathians and Other Regions of Europe	
Iernut – 430 MW	ROSCI0210	Lechința Ravine	Site of Community Importance	0.22
	ROSPA0041	Iernut Ponds - Cipau	Special bird protection area	1.18
	ROSCI0367	Mureș River between Moreşti and Ogra	Site of Community Importance	7.91
	ROSPA0050	Miheșu de Câmpie Ponds - Tăureni	Special bird protection area	11.04
	ROSCI0040	Moon Coast	Site of Community Importance	14.67
	ROSAC0313	Confluence of the Mureș and Arieș rivers	Special protection area	15.29
	ROSAC0384	The Little Târnava River	Special protection area	17.75
	ROSAC0187	Suciu's Meadows	Special protection area	18.65
	RONPA0874	Butterfly Hill	Nature reserve	19.24
Mintia - At least 860 MW, with the possibility of expansion up to 1,700 MW	RONPA0521	Colț Hill and Zănoaga Hill	Scientific reserve, natural monument and nature reserve	3.85
	RONPA0527	The Sácárâmbul Meadows	Scientific reserve, natural monument and nature reserve	18.87
	RONPA0528	Chizid Forest	Scientific reserve, natural monument and nature reserve	19.29
	RONPA0529	Bejan Forest	Scientific reserve, natural monument and nature reserve	7.19
	RONPA0534	The limestones of Magura Hill	Scientific reserve, natural monument and nature reserve	12.01
	RONPA0535	Deva Fortress Hill	Scientific reserve, natural monument and nature reserve	5.21
	RONPA0536	Uroi Hill	Nature reserve	17.07
	RONPA0541	Simeria Arboretum	Scientific reserve, natural monument and nature reserve	14.64
	RONPA0550	Boholt	Scientific reserve, natural monument and nature reserve	8.62
	ROSCI0054	Deva Fortress Hill	Site of Community Importance	3.75
	ROSAC0064	Mureș Gorge	Special protection area	14.02
	ROSCI0110	The Baita Mountains	Site of Community Importance	12.1
	ROSCI0136	Bejan Forest	Site of Community Importance	7.19
	ROSCI0373	Mureș River between Brănișca and Ilia	Site of Community Importance	0.64

project	Code	Name	Category	Distance (km)
	ROSPA0132	Ore Mountains	Special bird protection area	10.16
	ROSPA0139	Piedmont of the Ore Mountains - Vinţu	Special bird protection area	15.45
Işalniţa	ROSAC0045	Jiu Corridor	Special protection area	2.03
	RONPA0407	Bucovaţ fossil site	Nature reserve	10.63
	RONPA0411	Preajba - Făcăi lake complex	Scientific reserve, natural monument and nature reserve	15.39
	ROSPA0023	Jiu - Danube confluence	Special bird protection area	15.66
	RORMS0018	Jiu - Danube confluence	Wetland of international importance	15.66
	RONPA0416	The Desnăţui and Terpezita rivers upstream of Fântânele	Scientific reserve, natural monument and nature reserve	18.21
Turks	ROSAC0045	Jiu Corridor	Special protection area	0.37
	RONPA0464	Groşera fossil site	Scientific reserve, natural monument and nature reserve	7.94
	ROSAC0366	Motru River	Special protection area	8.62
	RONPA0465	Gârbovu fossil site	Nature reserve	9.49
	RONPA0467	Săuleşti fossil site	Scientific reserve, natural monument and nature reserve	16.38
	ROSAC0405	Strehaia Hills - Batlanele	Special protection area	16.61
Rompetrol Navodari - 80 MW	RONPA0365	Corbu - Weddings – Histria	Scientific reserve, natural monument and nature reserve	0.67
	ROSPA0060	Taşaul - Corbu Lakes	Special bird protection area	0.85
	ROSPA0076	Black Sea	Special bird protection area	2.63
	ROSCI0065	Danube Delta	Site of Community Importance	3.59
	ROSPA0031	The Danube Delta and the Razim - Sinoie Complex	Special bird protection area	3.59
	ROSCI0066	Danube Delta - marine area	Site of Community Importance	3.59
	ROMAB0003	Danube Delta Biosphere Reserve	Biosphere reserve	3.59
	RORMS0001	Danube Delta	Wetland of international importance	3.59
	ROWHS0001	Danube Delta World Heritage Site	Natural World Heritage Site	3.59

project	Code	Name	Category	Distance (km)
	ROWHSZT01	Danube Delta - buffer zone	Natural World Heritage Site	3.59
	ROSPA0057	Lake Siutghiol	Special bird protection area	7.81
	ROSAC0215	Jurassic Reefs Key	Special protection area	10.31
	ROSPA0019	Dobrogea Gorges	Special bird protection area	11.66
	RONPA0940	Mouth of Dobrogea	Nature reserve	17.41
	RONPA0366	Histria Fortress	Scientific reserve, natural monument and nature reserve	18.96
	RONPA0373	Adam's Cave	Nature reserve	18.42
	RONPA0374	Gura Dobrogei Cave	Nature reserve	18.63
CET Constanta - 52 MW	RONPA0376	Trajan's Wave	Scientific reserve, natural monument and nature reserve	3.88
	ROSPA0076	Black Sea	Special bird protection area	4.16
	ROSPA0057	Lake Siutghiol	Special bird protection area	5.61
	RONPA0385	Lake Agigea	Scientific reserve, natural monument and nature reserve	7.12
	ROSCI0398	Straja – Cumpana	Site of Community Importance	7.63
	ROSAC0073	The sea dunes of Agigea	Special protection area	8.02
	RONPA0383	The sea dunes of Agigea	Nature reserve	8.02
	ROSPA0061	Lake Techirghiol	Special bird protection area	11.23
	RONPA0937	Lake Techirghiol	Scientific reserve, natural monument and nature reserve	11.23
	RORMS0005	Lake Techirghiol	Wetland of international importance	11.23
	ROSAC0197	Eforie Nord - Eforie Sud submerged beach	Special protection area	11.32
	ROSAC0083	Murfatlar Fountain	Special protection area	16.51
	RONPA0381	Murfatlar Fountain	Nature reserve	16.51
	ROSAC0273	Marine area at Cape Tuzla	Special protection area	17.44
	ROSPA0060	Tașaul – Corbu Lakes	Special bird protection area	18.55
CET Grozăvești - 34 MW	RONPA0954	Vacaresti Natural Park	Nature Park	6.08
	ROSCI0308	Cernica Lake and Forest	Site of Community Importance	13.87

project	Code	Name	Category	Distance (km)
	ROSPA0122	Cernica Lake and Forest	Special bird protection area	13.87
CET Craiova - 295 MW	ROSAC0045	Jiu Corridor	Special protection area	6.87
	RONPA0407	Bucovaț fossil site	Nature reserve	7.84
	RONPA0411	Preajba - Făcăi lake complex	Scientific reserve, natural monument and nature reserve	7.48
	ROSPA0023	Jiu - Danube confluence	Special bird protection area	9.56
	RORMS0018	Jiu – Danube confluence	Wetland of international importance	9.56
	RONPA0416	The Desnățui and Terpezița rivers upstream of Fântânele	Scientific reserve, natural monument and nature reserve	19.87
CET South Vitan - 300 MW	RONPA0954	Vacaresti Natural Park	Nature Park	0.66
	ROSCI0308	Cernica Lake and Forest	Site of Community Importance	6.64
	ROSPA0122	Cernica Lake and Forest	Special bird protection area	6.64
CET Progresu - 50 MW	RONPA0954	Vacaresti Natural Park	Nature Park	3.26
	ROSCI0308	Cernica Lake and Forest	Site of Community Importance	12.49
	ROSPA0122	Cernica Lake and Forest	Special bird protection area	12.49
	RONPA0928	Comana Natural Park	Nature Park	17.82
	RORMS0008	Comana Natural Park	Wetland of international importance	17.82
	ROSAC0043	Comana	Special protection area	17.82
	ROSPA0022	Comana	Special bird protection area	17.82
SMR - 462 MW	ROSAC0344	The forests of the Southern Piedmont of Cândești	Site of Community Importance/Special Area of Conservation	11.71
	ROSPA0124	The lakes of the Ilfov Valley	Special bird protection area	15.21
Cernavoda NPP U3 - 700MW and U4 - 700MW	ROSPA0039	Danube - Ostroave	Special bird protection area	1.69
	RORMS0017	The Danube Islands - Bucgeac - Iortmac	Wetland of international importance	1.69
	ROSAC0022	The Danube Canals	Site of Community Importance/Special Area of Conservation	2.14
	RONPA0371	Cernavoda fossil site	Natural monument	2.44
	ROSCI0412	Ivrinezu	Site of Community Importance	8.09

project	Code	Name	Category	Distance (km)
	RONPA0372	Seimenii Mari fossil site	Nature reserve	9.14
	ROSPA0002	Allah Bair – Capidava	Special bird protection area	9.22
	ROSPA0012	Borcea Arm	Special bird protection area	10.72
	RORMS0014	Borcea Arm	Wetland of international importance	10.72
	ROSPA0001	Aliman – Adamclisi	Special bird protection area	12
	ROSCI0353	Cave - Deleni	Site of Community Importance	13.41
	RONPA0885	Canton Hățiș Forest	Nature reserve	15.35
	ROSAC0071	Dumbraveni - Urluia Valley - Vederoasa Lake	Special protection area	15.57
	ROSPA0007	The Vederosa Pond	Special bird protection area	15.74
	ROSCI0319	The Fetești Swamp	Site of Community Importance	16.66
	RONPA0881	Lake Vederoasa	Nature reserve	17.08
	ROSCI0278	Bordusani - Borcea	Site of Community Importance	19.34

The updated NECP 2021-2030 proposes a series of new energy production capacities that could significantly affect protected natural areas.
Implementing these proposed projects requires appropriate assessment and environmental impact assessment studies that consider the economic benefits in relation to the potentially significant environmental harms.

4.1.6 Landscape

Landscape degradation is closely linked to the degradation of biodiversity conservation.
The anthropogenic activities that contribute to landscape degradation include:

- Conversion of natural and semi-natural ecological systems into cultivated lands, residential complexes, etc.
- Mining operations, associated wastes dumps;
- Overexploitation of forests;
- Carrying out hydrotechnical works;
- Direct impacts from the energy sector through the expansion of power lines, wind farms, large thermal power plants, and indirect impacts through greenhouse gas emissions and acidifying emissions;
- Uncontrolled waste disposal and discharge of untreated wastewater;
- Development of transport infrastructure leading to fragmentation of natural habitats and landscapes.

4.1.7 Cultural aspects

National cultural heritage consists of "the entirety of assets that represent a testimony and expression of national values, beliefs, knowledge, and traditions, regardless of their ownership status" (Law no. 182/2000 on the protection of national mobile cultural heritage, republished 2008).

The main categories of national cultural heritage are:

- built heritage;
- archaeological heritage;
- movable cultural heritage;
- intangible cultural heritage

The built heritage includes buildings, land, or complexes of buildings and land classified as historical monuments, archaeological sites and areas or protected as cultural landscapes within protected areas. Historical monuments are immovable assets, constructions and land located in Romania, significant for national and universal history, culture and civilization. The historical monument status is conferred through the classification of these immovable assets according to the procedure stipulated in Law no. 422 of July18, 2001 on the protection of historical monuments, republished, with subsequent amendments and completions.

Archaeological heritage comprises archaeological assets including: 1) archaeological sites listed in the National Archaeological Repertory, except those destroyed or disappeared, and sites classified in the List of Historical Monuments, located above ground, underground or underwater, containing archaeological remains such as settlements, necropolises, structures, constructions, groups of buildings, and land with identified archaeological potential, as defined by law; and 2) movable assets, objects or traces of human activities along with the land where they were discovered.

Movable cultural heritage includes assets with historical, archaeological, documentary, ethnographic, artistic, scientific and technical value, as well as literary, cinematographic, numismatic, philatelic, heraldic, bibliophile, cartographic and epigraphic items, representing material testimonies of the evolution of the natural environment and human interactions with it, human creative potential and Romanian contributions, as well as those of national minorities to universal civilization.

Intangible heritage consists of traditions and oral expressions, including language as a vector of intangible cultural heritage, literature, culinary art, music, song, dance, sounds, games, mythology, rituals, customs, ancestral skills and crafts, as well as instruments, objects, artifacts and cultural spaces associated with them, allowing the perpetuation of oral and popular cultural identity, witnessing the affiliation to national or universal civilization currents.

Heritage elements are found throughout Romania, with the highest density recorded in the central and northwestern regions (Figure 49).

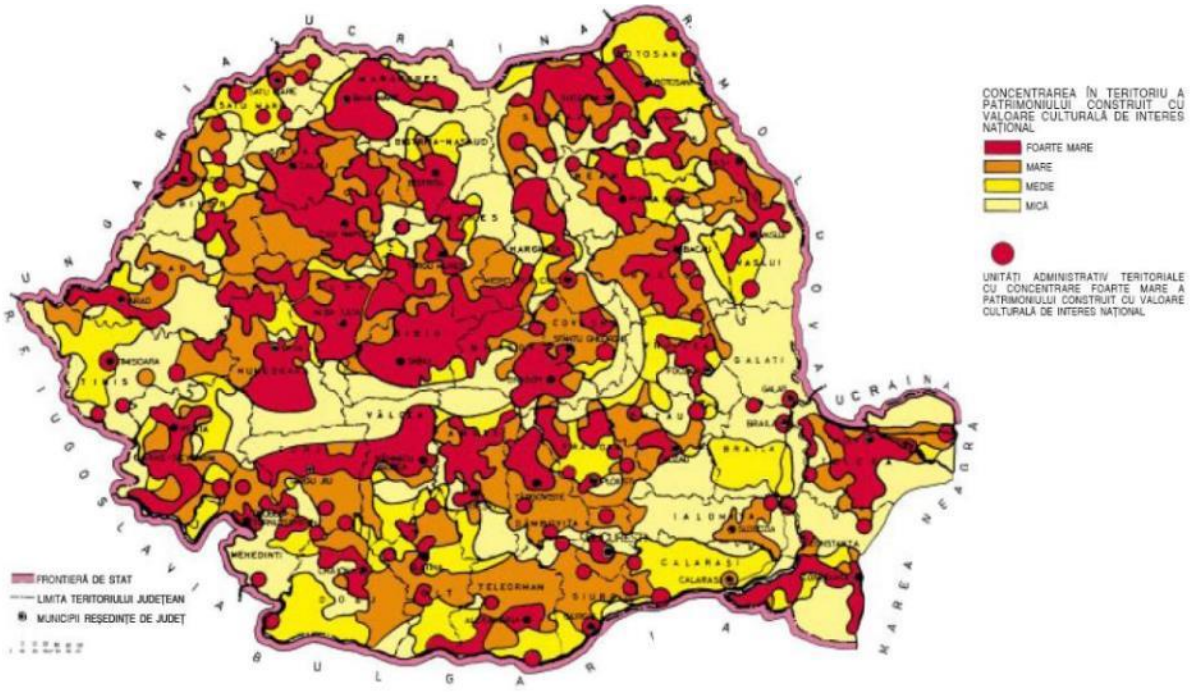


Figure 49. The concentration of built heritage with cultural value of national interest (Source: Law no. 5/2000 on the approval of the National Spatial Planning Plan Section III – protected areas)

4.1.8 Conservation and use of natural resources

Electricity from non-renewable sources includes energy generated by burning fossil fuels (oil, coal and natural gas). These resources are limited but currently account for approximately 80% of the energy produced and consumed. Renewable energy comes from sources that regenerate quickly (regenerative braking) or from inexhaustible sources (wind, solar, hydro, etc.).

Romania places great importance on developing domestic energy production sources. In the electricity production sector, to the focus is on diversifying production sources and reduce GHG emissions. The target for 2030 is to achieve an installed capacity of 32.3 GW, with approximately 76% of this coming from renewable sources. Additionally, new capacities for electricity production from nuclear and natural gas sources are planned, while maintaining net electricity imports at an annual average level below 5%.

Nationaly, renewable energy currently represents 49.83% of energy production, excluding the nuclear sector (Figure 50). The remaining energy is produced from non-renewable resources (coal and hydrocarbons).

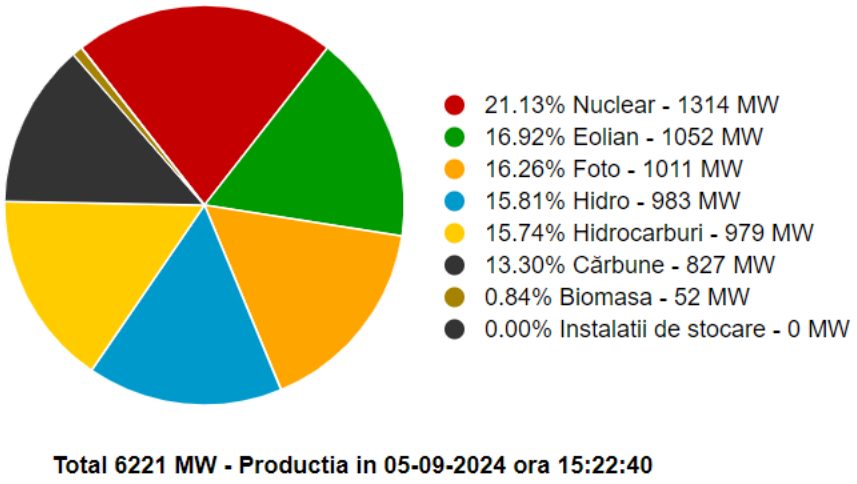


Figure 50. Energy production in MW by generation sources (Source: Transelectrica, 2024)

Romania aims to achieve a share of at least 38.3% of RES in its gross final energy consumption by 2030. Projections indicate that, by 2025, the share of RES will reach 31.0%. These targets will be met primarily by increasing the installed capacity for wind and solar energy production and by using heat pump technologies for the heating and cooling process.

4.1.9 Waste

At the national level, the largest quantities of non-hazardous waste primarily result from the manufacturing industry and the production, transport and distribution sector of electricity and heat, natural gas and water.
Table 8 shows that between 2017 and 2020, the amount of waste generated by the energy sector decreased due to the implementation of national policies for selective collection and waste reduction, as well as new investments in the energy production subsector. However, starting in 2021, there has been a trend of increasing waste quantities from the energy sector, indicating the need for further investments to modernize this sector.

Table 8. Non-hazardous waste generated by the main economic activities excluding the extractive industry from 2017 to 2022 (thousand tons)

Economic activity	2017	2018	2019	2020	2021	2022
Manufacturing industry (NACE Sections: C10-C33)	6,303.41	6,767.62	6,560.92	5496.67	5388.69	6339.19
Production, transport and distribution of electricity, heat, gas and water (NACE: D)	7,638.69	6,820.78	5,948.65	4278.36	5285.02	5503.62
Water collection, treatment and distribution (NACE Sections: E36, E37, E39), except urban wastewater treatment plants	41.02	54.31	66.54	47,214	36.83	49,576
Other activities (NACE Sections: E38, F, GU)	774.77	940.43	1,718.09	1433.66	806.88	1306.58

Source: Annual Report on the State of the Environment in Romania, 2023

Unlike non-hazardous waste, the energy sector generates relatively small quantities of hazardous waste, making it one of the smallest contributors at the national level.

Table 9 shows a reduction in waste hazardous quantities in 2020, followed by an increase in 2022. This increase is partly due to the decommissioning/modernization of some thermal power plants, where coal was replaced with natural gas.

Table 9. Hazardous waste generated by the main economic activities excluding the extractive industry in the period 2017 – 2022 (thousand tons)

Economic activity	2017	2018	2019	2020	2021	2022
Manufacturing industry (NACE Sections: C10-C33)	213.16	197.92	206.42	168.70	183.61	253.23
Production, transport and distribution of electricity, heat, gas and water (NACE D)	4.08	1.95	2.57	0.995	2.29	1.85
Water collection, treatment and distribution (NACE E36, E37, E39), except urban wastewater treatment plants	2.88	5.34	4.37	1.10	0.7	1.87
Other activities (CAEN Sections: E38, F, GU and G4677)	28.33	112.95	52.76	184,054	242.24	271.99

Source: Annual Report on the State of the Environment in Romania, 2023

The EU's waste management policies aim to reduce the environmental and health impacts of waste and improve the EU's energy efficiency. The long-term goal is to minimize waste generation and, where waste generation cannot be avoided, to promote its use as a resource and achieve higher levels of recycling and safe disposal.

European waste legislation has established key directions, considering extended producer responsibility and the product life cycle. Member States are encouraged to adopt legislative and non-legislative measures to strengthen reuse, prevention, recycling and other waste recovery operations.

At the national level, efficient waste management, promotion of waste prevention and reduction, and increased selective waste collection are the main objectives of policies and strategies.
In Romania, waste management responsibility lies with the waste generator. In the Industrial sector, waste management is primarily done through recovery (recycling and co-incineration) and secondarily through disposal (landfilling and incineration).

Romania operates 265 co-incineration facilities, including 258 thermal plants for wood waste and seven industrial waste co-incinerators (cement factories). Additionally, there are 22 incinerators for hazardous and non-hazardous industrial waste.

According to the Annual Report on the State of the Environment in Romania, 2023, current hazardous and non-hazardous waste landfills are compliant, while non-compliant landfills have ceased waste disposal in accordance with legal provisions.

The types of waste resulting from the implementation of projects under the updated NECP 2021-2030 include construction waste, municipal and industrial waste during the operational phase, and demolition waste during the decommissioning phase. These projects will utilise the best available techniques at that time, with one of the main objectives being the efficient use of resources and the reduction of waste generated and disposed of in landfills.

The updated NECP 2021-2030 also sets targets for reducing the amount of waste finally deposited and increasing the recycling and reuse rates.

4.1.10 Population and human health

As of January 1, 2024, the resident population of Romania was 19,064,409, while the population based on domicile was 21,833,227. Between 2011 and 2024, Romania's population (both resident and domicile-based) followed a consistent downward trend (Figure 51). The resident population decreased by 1,134,650 people, from 20,199,059 in 2011 to 19,064,409 in 2024, representing a 6% reduction. This decline is largely due to emigration and a decrease in birth rates, coupled with a persistently high general mortality rate.

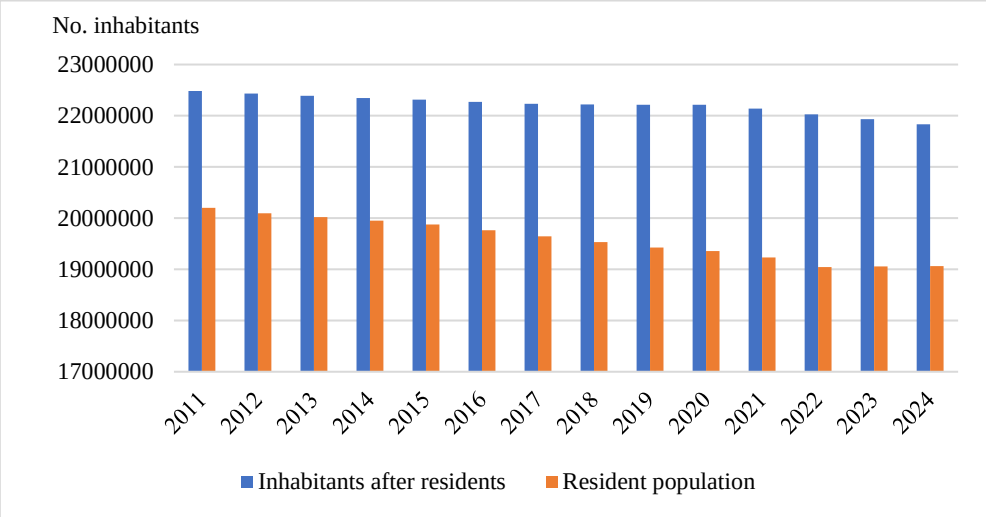


Figure 51. Population of Romania both by domicile and residence (Source: National Institute of Statistics, TEMPO online database)

Between 2011 and 2024, the population based on domicile decreased by 647,372 people, from 22,480,599 in 2011 to 21,833,227 in 2024, representing a 2.96% decline. The population structure by area has remained consistent each year, with a higher population in urban areas compared to rural areas, making demographic changes during the studied period insignificant. For the resident population, there is a slight trend of increasing urban population, which is now larger than the rural population. In 2024, 44.18% of the total population lives in rural areas, a decrease of 1.82% from 2011 (46.0%). Consequently, the urban-rural percentage gap increased from 8.0% in 2011 to 11.64% in 2024.

The health of the population in both urban and rural areas is affected by declining air quality due to emissions generated by human activities.

The impact of atmospheric pollutants varies depending on their nature, concentration, and duration of exposure to the human body. Medical and ecological experts have established a direct link between environmental degradation and the increase in the number of people suffering from allergies, asthma, cancer, and other diseases. The main pollutants that negatively affect human health include nitrogen oxides, sulfur dioxide, tropospheric ozone, carbon monoxide, formaldehyde, phenols, and particulate matter (PM_{10} and $PM_{2.5}$). Nitrogen oxides are formed during the combustion process when fuels are burned at high temperatures, but they are most commonly the result of road traffic, industrial activities, electricity production. Nitrogen oxides are responsible for smog formation, acid rain, water quality deterioration, the

greenhouse effect, and reduced visibility in urban areas. Nitrogen dioxide is known to be highly toxic to both humans and animals (its toxicity is 4 times greater than that of nitrogen monoxide). High concentrations can be fatal, while lower concentrations can damage lung tissue. Exposure to these pollutants can cause respiratory difficulties, airway irritation, and lung dysfunction. Long-term exposure to low concentrations can destroy lung tissues, leading to emphysema. Children are the most affected by exposure to this pollutant. Sulfur oxides result from heating systems that do not use methane gas, thermal power plants, industrial processes (steelmaking, refining, sulfuric acid production), the pulp and paper industry, and, to a lesser extent, from emissions from Diesel engines.

Depending on the concentration and exposure duration, sulfur dioxide has various effects on human health. High concentrations over short periods can cause severe respiratory difficulties particularly affecting people with asthma, children, the elderly, and those with chronic respiratory diseases. Long-term exposure to low concentrations can increase susceptibility to respiratory tract infections.

Carbon monoxide is primarily formed through the incomplete combustion of fossil fuels, but can also come from other anthropogenic sources: steel and iron production, oil refining, road, air and rail traffic.

It is a toxic gas, lethal at high concentrations (around 100 mg/m^3) by reducing the oxygen-carrying capacity of the blood, affecting the respiratory and cardiovascular systems.

Sulfur oxides, along with nitrogen oxides, oxidizing substances, and particulates, etc. are part of the group of irritating pollutants and are among the most widespread atmospheric pollutants. The predominant action affects the respiratory system, causing functional and/or morphological changes in the airways or pulmonary alveoli. These effects vary depending on the duration of exposure and the concentration of irritants in the inhaled air.

Exposure to this category of pollutants clinically manifests in various pathological changes:

- immediate effects - Conjunctival and corneal lesions, characteristic tracheo-bronchial syndrome, increased mortality and morbidity due to respiratory and cardiovascular diseases, exacerbation of chronic bronchitis and the onset of acute episodes;
- chronic effects – increased frequency and severity of acute respiratory infections and worsening of chronic nonspecific bronchopulmonary disease. Particulates can originate from industrial activity, heating system and thermal power plants. Road traffic also contributes to particulate pollution from tire wear and incomplete combustion.

The toxic potential of suspended particles depends primarily on their chemical and physical characteristics. Particles size, composition, and the distribution of chemical constituents within the particles play a significant role in their impact on the health of exposed population.

The aggressiveness of particles depends not only on their concentration, but also on size. The most aggressive respirable particles (below 10µm) are those with a diameter of approximately 2.5µm and specific toxicity due to their chemical composition.

Suspended particles can become hazardous not just due to their concentration in the ambient air, but also because they can adsorb various other toxic or allergenic pollutants their surface, affecting public health.

Health effects vary with particle size and concentration and can fluctuate with daily variations in PM_{10} and $PM_{2.5}$ levels (PM-Particulate Matter).

The health impacts include:

- acute effects (Increased daily mortality, higher hospital admission rates due to exacerbated respiratory diseases, and increased use of bronchodilators and antibiotics);
- long-term effects refer to mortality and morbidity from chronic respiratory diseases.

The projects proposed under the updated NECP 2021-2030 aim to reduce atmospheric pollutant emissions and mitigate their effects on public health.

4.2 Aspects of the state of the environment in the event of non-implementation of the updated NECP 2021-2030

The updated NECP 2021-2030 ensures the promotion of new projects using state-of-the-art technologies for energy production, sourced renewable energy and natural gas; failure to implement the Plan will hinder Romania's progress in achieving its decarbonization targets and reducing GHG emission as committed to the European Union.
If the updated NECP 2021-2030 is not implemented, no new investments will be proposed in the energy sector and current conditions regarding GHG emissions, particulate matter, nitrogen oxides and sulfur will persist. Consequently, the environmental state may deteriorate due to the continued exploitation and use of outdated coal-based technologies for energy production (Table 10).

Table 10. The evolution of the state of the environment in the event of non-implementation of the updated NECP 2021-2030

Relevant environmental aspects	Possible evolution of the state of the environment in the event of non-implementation of the updated NECP 2021-2030
Air	By not implementing the updated NECP 2021-2030, the energy sector will remain one of the main economic sectors generating atmospheric pollutants.
Water	A possible unfavourable evolution regarding the quality of surface waters in areas where fossil fuels are extracted and used.
Ground	Due to the lack of investment in coal-using facilities, the areas of land degraded by mining and contaminated by the use of fossil fuels will increase.
Climate change	The lack of investments outlined in the updated NECP 2021-2030 will lead to an increase in greenhouse gas emissions, and thus

	Romania will not be able to meet its committed objectives, risking infringement procedure.
Biodiversity	The impact on habitats and species through alteration, fragmentation, and loss due to the opening of new coal and natural gas extraction sites.
Landscape	The retention of old energy production facilities that burn fossil fuels and the deposition of particulates in inhabited areas.
Cultural aspects	The degradation of cultural monuments due to the deposition of particulates and acid rain produced by old fossil fuel-burning facilities.
Conservation of natural resources	The expansion of coal-based energy sub-sectors (non-renewable resources) and the non-implementation of policies regarding the exploitation of sustainable renewable resources.
Waste	The practical non-application of the waste hierarchy and the increase in the quantities of waste being deposited. *The waste hierarchy also broadly reflects the preferred environmental option from the perspective of climate change*: disposal, through landfill or incineration with low energy recovery or without energy recovery, is usually the least favourable option for reducing greenhouse gas (GHG) emissions; instead, waste prevention, reuse, and recycling have the greatest potential for reducing GHG emissions.
Population and human health	The increase in particulate matter and acid rain can lead to higher incidences of respiratory and cardiovascular diseases.

5. Environmental characteristics of areas likely to be significantly affected by the implementation of the updated NECP 2021-2030

The plan emphasizes Romania's commitment to aligning with the EU's objectives for a sustainable, low-carbon energy future. Thus, the updated NECP 2021-2030 targets not only the technical aspects of developing and integrating RES and reducing GHG emissions, but also the social and economic dimensions, ensuring that the energy transition will be beneficial for both the environment and citizens.

The new production capacities proposed by the updated NECP 2021-2030 include: development of new CCGT capacities, promotion of high-efficiency cogeneration capacities, completion of hydropower projects, increased use of nuclear energy, installation and commissioning, by 2050, of additional electricity production capacity from solar and wind sources, implementation of energy recovery from braking following the acquisition of new metro electric trains and the expansion of the metro transport network.
In the analysis of the environmental characteristics of areas that may be significantly affected, only those new production capacities that may have a potential negative impact on the environment and for which Stereo 1970 geographical coordinates are known were considered.

Table 11. Environmental characteristics of areas likely to be significantly affected in relation to the types of projects within the updated NECP 2021-2030

No.	Policies and Measures (PAM)	Types of proposed projects	Environmental characteristics of areas likely to be significantly affected
1	PAM 4 Development of new CCGT capacities	CCGT type power plants: • 430 MW (Winter) starting from 01.01.2025 • At least 860 MW (Mintia) starting from 01.01.2026, with the possibility of expansion up to 1,700 MW • 1,325 MW (Ișalnița & Turceni) starting from 01.07.2026.	Air, water and soil quality may be affected during construction. For the operating period, the project implementation will result in the reduction of GHG emissions; The sources of impact with effects on the environment, for the operating phase of CCGT power plants, are represented by combustion gas emissions, wastewater discharge and waste.
2	PAM 5 Promoting high-efficiency cogeneration capacities	CHP type power plants: • 80 MW (Rompetrol Năvodari) starting in 2024 • 52 MW (CTE Constanța) starting from 2025 • 295 MW (CTE Craiova) starting from 2026 • 70 MW (other) starting in 2026 • 50 MW (CTE Progresu) starting in 2028 • 34 MW (CTE Grozăvești) starting from 2029 • 300 MW (CTE Sud Vitan) starting in 2030	Air and soil quality may be affected during construction; For the operating period, the implementation of the project will result in reduced GHG emissions and reduced fuel consumption; The sources of impact with effects on the environment, for the operation stage of CHP plants, are represented by emissions of combustion gases and waste.
3	PAM 24 Construction/ completion of hydropower facilities	Hydroelectric sources of: • 65 MW (Livezeni-Bumbești AHE) starting with 2026 • 9.4 MW (Pașcani AHE, on the Siret) starting with 2026 • 40.5 MW (Cornetu – Avrig AHE, on the Olt River) starting in 2029 • 55 MW (Surduc-Siriu AHE) starting in 2026 • 38 MW (Cosmești – Movileni AHE, on the Siret) starting with 2026 • 35 MW (Răstolița AHE) starting with 2026	Water, air and soil quality may be affected during construction work. At the same time, biodiversity may be affected during the construction period through the fragmentation and alteration of habitats in the medium and long term. Ecological status (the ecological potential of surface water bodies) can be affected from from a hydro morphological and biological point of view during the construction and operation of hydropower plants. During the operation period, the potential impact is determined by the

No.	Policies and Measures (PAM)	Types of proposed projects	Environmental characteristics of areas likely to be significantly affected
		• 15 MW (Cerna-Belareca AHE) starting with 2029 • 29 MW (Izbiceni-Dunăre AHE, Islaz) starting with 2030 • 13 MW (AHE Cerna Motru-Tismana Stage II) starting with 2029	modification of the structure and functions of hydro geomorphological units with consequences on biodiversity.
4	PAM 50 Expansion of metro transport infrastructure	• Expansion of the metro transport network by 1.66 km (double line), starting November 2023 • Expansion of metro transport infrastructure in Bucharest Municipality with 14.2 km (double line), starting with 2029	Air, water and soil quality may be affected during construction. For the operating period, the project implementation will result in the reduction of GHG emissions. The sources of impact with effects on the environment, for the operating stage of public passenger transport, are represented by the reduction of CO_2 emissions (carbon dioxide-GHG).
5	PAM 60 Increased use of nuclear energy	Additional nuclear power generation capacities: • U3 (CANDU) – 700 MW in 2031 • U4 (CANDU) – 700 MW in 2032 • SMR - 462 MW in 2030 In addition, it is taken into account that: • U1 in the period 2027-2029 • U2 in the period 2036-2038 will be refurbished	Air, water and soil quality may be affected during construction; For the operating period, the project implementation will result in the reduction of GHG emissions; The sources of environmental impact for the operational phase of nuclear power plants are represented by non-radioactive and radioactive waste. The projects may also have an impact on the quantitative state of the water body, by capturing a large volume of water from the natural resource, as well as a possible thermal impact on the waters.

6. Existing environmental issues relevant to the updated NECP 2021-2030

Following the analysis of the current state of the environment and its evolution in the absence of the updated NECP 2021-2030, the main environmental issues relevant to the Plan were identified. These issues were grouped according to the affected environmental component (Table 12).

Table 12. Existing environmental issues relevant to the updated NECP 2021-2030

Environmental aspects	Environmental issues relevant to the updated NECP 2021-2030
Air	Poor air quality caused by the burning of fossil fuels in the energy sector (sulfur oxides, nitrogen oxides); Burning fossil fuels in power plants that serve the population with outdated technology and without emission reduction installation.
Water	Surface water bodies with moderate, poor and bad ecological status/ecological potential and groundwater bodies with poor chemical status caused by pollution from anthropogenic sources. Hydro morphological alteration of surface water bodies and water pollution. Reduction in groundwater quality caused by anthropogenic sources.
Ground	Areas contaminated by the energy industry and related activities (coal mining, oil exploitation, etc.).
Climate change	Greenhouse gas emissions resulting from electricity and/or thermal energy production capacities and transport (combustion of fossil fuels).
Biodiversity	Fragmentation and alteration of habitats through hydropower works; Damage to flora and fauna species through acid rain and decreased water quality; Modifications of surface water courses for hydropower developments; Reduced access to food sources due to the expansion of mining and quarrying.
Landscape	Modification of the natural landscape as a result of the construction of new energy facilities.
Cultural aspects	Degradation of areas of cultural interest as a result of the construction of new energy capacities.
Conservation of natural resources	Exploitation and depletion of non-renewable resources.
Waste	Increasing amount of waste finally deposited and low recycling/reuse/recovery rate of waste
Population and human health	Air quality impact; Affecting biodiversity; Increased incidence of respiratory diseases and cardiovascular diseases.

7. Environmental protection objectives, established at National, Community or International level, which are relevant for the updated NECP 2021-2030

To formulate relevant and specific environmental objectives, the National Strategy for Sustainable Development of Romania 2030, the EU Biodiversity Strategy for 2030 and the particularities of the updated NECP 2021-2030 were analysed (Table 13).

Table 13. Environmental aspects and relevant environmental objectives for the updated NECP 2021-2030

Environmental aspects	Relevant Environmental Objectives (REOs)	Specific environmental objectives (SEO)
Air	REO 1 Improving air quality by reducing emissions of pollutants into the air.	SEO 1.1 Reduce GHG emissions by: - increasing the consumption of energy from renewable sources; - improving energy efficiency in industrial sectors and improving energy

Environmental aspects	Relevant Environmental Objectives (REOs)	Specific environmental objectives (SEO)
		efficiency at the level of end users (buildings).
		SEO 1.2 Reduce emissions of acidifying pollutants by reducing/eliminating coal and hydrocarbon-fired power generation capacities.
Water	REO 2 Improving water quality.	SEO 2.1 Treatment of liquid effluents from human activities; SEO 2.2 Closure and ecological reconstruction of fossil fuel mines and quarries.
	REO 3 Achieving and maintaining the environmental objectives of water bodies (DCA).	SEO 3.1 Reduce anthropogenic interventions on water bodies.
Ground	REO 4 Limitation and reduction of point-source soil pollution.	SEO 4.1 Closure and environmentally sound reconstruction of fossil fuel mines and quarries.
	REO 5 Maintaining the pedological condition of the soil.	SEO 5.1 Ecological reconstruction of contaminated sites; SEO 5.2 Proper management of waste and chemicals
Climate change	REO 6 Reduce greenhouse gas emissions generated from the energy sector to achieve the targets imposed by the EU.	SEO 6.1 Reduce greenhouse gas emissions by: - increasing the consumption of energy from renewable sources; - improving energy efficiency in the industrial and transport sectors, respectively improving energy efficiency at the level of end users (buildings); - supporting research in the field of green technology.
Biodiversity	REO 7 Conservation of habitats and species of flora and fauna of community importance.	SEO 7.1 Reduce environmental pollution resulting from anthropogenic activities.
		SEO 7.2 Preserve the integrity of protected natural areas.
Landscape	REO 8 Protection and conservation of the natural landscape.	SEO 8.1 Valuing ecosystem services, also taking into account their non-monetary values.
Cultural aspects	REO 9 Preservation and conservation of cultural heritage elements.	SEO 9.1 Avoid the destruction of cultural and historical heritage by reducing emissions of acidic pollutants.
Conservation of natural resources	REO 10 Reducing the exploitation of non-renewable resources.	SEO 10.1 Develop the use of renewable energy sources.
Waste	REO 11 Sustainable waste management.	SEO 11.1 Reduce the amount of municipal waste per capita.
		SEO 11.2 Reduce the amount of waste disposed of.
		SEO 11.3 Reduce avoided methane emissions from waste management.

Environmental aspects	Relevant Environmental Objectives (REOs)	Specific environmental objectives (SEO)
Population and human health	REO 12 Improving the health of the human population	SEO 12.1 Reduce emissions of pollutants from the environment, which could lead to improved health and quality of life.

8. Potential significant environmental effects

8.1 Evaluation methodology

The updated NECP 2021-2030 includes policies and measures for reducing greenhouse gas emissions, increasing the share of renewable energy sources, energy efficiency, energy security and the development of energy transport infrastructure, market integration and support for research, innovation and competitiveness. These can range from investments in projects, the development of economic and legal instruments and research activities, etc.

The assessment of the potential effects generated by the implementation of the NECP was carried out in relation to the relevant environmental objectives, identified in this Environmental Report.

The actions proposed by the updated NECP 2021-2030 can have positive/significantly positive or negative/significantly negative effects on the environment.

In the case of policies and measures related to economic, legal instruments and research and innovation activities, they have indirect positive effects on the environment through the development and support of projects for reducing greenhouse gas emissions and decarbonize, increase energy efficiency, developing energy transport networks, etc.

Policies and measures that involve investments in new energy production capacities can have direct and indirect effects on the environment. The potential environmental effects of these projects were evaluated considering the operational phase of these objectives.
The construction period of new energy production capacities can have negative effects on the environment, but these are short-term, limited to the duration of the execution of the works. Additionally, these effects can be mitigated through preventive and reduction measures applied during construction/modernization works.

The assessment of the potential effects generated by the implementation of the updated NECP 2021-2030 was carried out by assigning appropriate score to the potential effect of policies and measures on each relevant environmental objective (Table 14).

Table 14. Quantification of the effects generated by the implementation of the updated NECP 2021-2030 measures on relevant environmental objectives

Value	Rationale
+3	Significant positive effect on the relevant environmental objective
+2	Direct positive effect on the relevant environmental objective
+1	Indirect/small positive effect on the relevant environmental objective
0	No effect/effect cannot be assessed

Value	Rationale
-1	Indirect/small negative effect on the relevant environmental objective
-2	Direct negative effect on the relevant environmental objective
-3	Significant negative effect on the relevant environmental objective

8.2 Environmental effects generated by the implementation of the updated NECP 2021-2030

The evaluation of policies and measures allowed the identification of negative, respectively significant negative effects of the implementation of the updated NECP 2021-2030.

The measure PAM 24 Construction/completion of hydropower developments may have significant potential negative effects on the water environmental components (REO2 and REO3) and biodiversity (REO7). For some of the projects included in PAM 24, impact assessment studies on water bodies have been completed, the conclusions of which show that by applying impact mitigation and prevention measures, the completion of the hydropower developments proposed in the plan does not affect the chemical status of water bodies nor their ecological potential.

For these projects, the conclusions of the SEICA studies are briefly presented below. Also, the specific mitigation/reduction measures identified in these studies complete Chapter 10. The measures proposed to prevent, reduce and compensate as completely as possible any adverse effects on the environment of the present study.

SEICA conclusions for the Cerna-Belareca AHE are the following:

The SEICA study aimed to analyse the potential impacts on the ecological status/ecological potential and chemical status of surface water bodies (rivers), the quantitative and qualitative status of groundwater bodies, and the status of protected areas because of the project implementation.

Regarding the cumulative impact, in the case of some quality elements ("longitudinal connectivity" and "fish fauna"), possible permanent and significant effects were identified in the case of the water body Bela Reca – spring – Mehadica confluence + tributaries. It is mentioned that in the case of the body Cerna watershed - Herculane accumulation - Bela Reca confluence, the possible permanent and significant effects were identified in the case of substrate, phytobenthos and benthic invertebrates; in the case of flow, depth and width and macrophytes, permanent and uncertain effects were identified that can be mainly associated with upstream users (AHE Cerna-Motru-Tismana).

The SEICA conclusions for the Livezeni – Bumbești AHE are as follows:

The SEICA study aimed to analyse potential impacts on ecological status/potential ecological and chemical status of surface water bodies (rivers) and the status of protected areas because of the project implementation.

All water bodies analysed for which possible effects (impact/impact cumulative) currently meet the environmental objectives (good ecological status and good chemical status) and, therefore, may present a risk of deterioration in some quality elements.

Regarding the cumulative impact, possible permanent and significant effects were identified in the case of the water body Jiu - confl. Jiu de Est - Acum. Vădeni for the quality elements "depth and width of the river", "structure and substrate of the riverbed", "phytobenthos",

"macrophytes" and "benthic invertebrates" as well as possible permanent and significant effects in the case of the water body Bratcu - spring - Jiu confluence for the quality elements "longitudinal continuity" and "fish fauna".

The SEICA conclusions for the Surduc-Siriu AHE are as follows:

The hydro morphological response assessment was carried out for the following water bodies:

- RORW12-1.82-15_B1 Bâsca and its tributaries.
- RORW12-1-82_B2 Buzău – Siriu Accumulation – Bâsca conflict.

Conclusions of the hydro morphological response assessment for the Bâsca River

- Considering the works proposed by the project, but also the existing works, the analysis indicates a potential significant impact in relation to the hydro morphological quality elements of the hydrological regime, the structure and substrate of the riverbed and the structure of the riparian zone at the water body level;
- A change in the grain size composition of the riverbed is estimated due primarily to the construction of the Surduc dam and the change in the flow regime along the length of approx. 34 km (downstream of the dam). Both upstream and downstream of the dam through sedimentation and erosion processes, respectively, the degree of uncertainty is a result of the variability of the length over which these processes will manifest.
- For the hydro morphological elements: "Morphological conditions, riparian zone structure", the length of the impact produced by the project could not be accurately assessed. It is estimated that the maximum impact will extend to the area located downstream of the dam (approx. 35 km). The impact at the water body level was considered "uncertain". Despite the uncertainties, the existing observations and conditions provide a basis for establishing premises that suggest that a significant impact is plausible, for the hydro morphological element longitudinal continuity of the river: The proposed works create a reservoir of 1.6 km in length (approx. 2% of the length of the water body) with an area of less than 10 ha, which does not meet the criteria for a water body, therefore it does not imply a change in the typology at the water body scale. The project provides for the construction of a fish ladder in the Surduc dam area to ensure the migration of ichthyofauna in the area. By constructing the fish ladder, the impact of the dam construction will be insignificant on the continuity longitudinal of the water body;
- For the hydro morphological quality element lateral continuity of the river, the impact is considered to be insignificant at the water body scale;
- There is a potential for the proposed works for the construction of the Surduc AHE to lead to deterioration of hydro morphological quality elements, thus affecting the overall condition of the water body.

Conclusions of the assessment of the hydro morphological response for the Buzău River:

- For the hydro morphological element "Hydrological regime": the quantity and dynamics of the flow will be modified because the flows derived from the Bâsca River will be processed in the Nehoiașu 2 HPP. Also, on this water body is located the Nehoiașu 1 HPP, which processes water from the Siriu reservoir;
- The hydrological regime of the water body will be modified as follows:

- during the exploitation of the two HPPs, the discharged flows will be higher than the natural flows on the Buzău River;
- during the period when no processing is carried out, the outflow flows are the ecological/servitude flows discharged from the Siriu reservoir.

The impact of the project and the existing works on the water body will be **insignificant** from the point of view of the hydrological regime indicator.

- For the hydro morphological elements: Morphological conditions: structure and substratum of the riverbed and structure of the riparian zone'' no major changes were assessed compared to the existing situation of the water body. The effect at the water body level was considered insignificant;
- For the other hydro morphological elements, the impact is insignificant at the water body level;
- The works proposed for the implementation of the Surduc WFD do not cause deterioration of the hydro morphological quality elements and do not affect the general condition of the water body.

The SEICA conclusions for the Pașcani AHE, on the Siret River, are as follows:

Conclusions of the assessment of the hydro morphological response for the Siret River, the works being located on the water body RORW12-1_B4 Siret (Bucecea dam - cf Moldova):

- considering the works proposed by the project, but also the existing works, the analysis indicates a potential significant impact in relation to hydro morphological quality elements "Longitudinal connectivity";
- a significant effect is also estimated in terms of morphological conditions: the structure and substratum of the riverbed. A change in the granulometric composition of the riverbed is thus estimated, primarily due to the change in the flow regime, both upstream and downstream.
downstream of the dam through sedimentation and erosion processes, but also a negative effect on riparian/border vegetation, the degree of uncertainty being the result of the variability of the distance over which these processes will manifest.
- the impact is considered to be insignificant at the water body scale for the hydro morphological quality element "Lateral continuity of the river";
- the impact on quantitative and qualitative parameters is insignificant, except for the fish fauna for which the implementation of the project would lead to stress; by building a fish ladder it is estimated that the impact will be reduced.
- a significant impact will be recorded by changing the typology of the water body (from river to lake) which will lead to its designation as a heavily modified or artificial water body;
- there is a potential for the proposed works for the construction of the Pașcani AHE to lead to the deterioration of hydro morphological quality elements, thus affecting the general condition of the water body.

For the Răstolița Hydropower Development, a study was conducted to assess the impact on water bodies for the "Definitive removal from the forest fund and land clearing in order to complete the Răstolița Hydropower Development".

SEICA's conclusions for the Răstolița AHE are as follows:
SEICA followed the analysis of potential impacts on the ecological status/ecological potential and chemical status of surface water bodies (rivers), the quantitative and qualitative status of groundwater bodies, and the status of protected areas because of the project implementation.
In all situations where longitudinal connectivity is interrupted by the dam works related to the Răstolița AHE for more than 30% of the length of the water body (see the approach from the longitudinal connectivity element - spatial extension from a local analysis scale to the analysis at the level of the entire water body), it was considered that this fragmentation of the aquatic habitat has an effect on the fish fauna.
Regarding the cumulative impact, possible permanent and significant effects were identified only in the case of two water bodies (Bistra and tributaries and Ilva and tributaries) for the quality elements "longitudinal connectivity" and "fish fauna".
All water bodies analysed for which possible effects (impact/cumulative impact) were identified currently meet the environmental objectives (good ecological status/good ecological potential and good chemical status) and, therefore, may present a risk of deterioration in some quality elements.

SEICA Conclusions for AHE Cerna-Motru-Tismana Stage II are as follows:

The project titled "Increasing the share of electricity production from renewable sources by completing the works and ensuring continuous environmental impact monitoring at the Cerna-Motru-Tismana Hydrotechnical and Energy Complex, Stage II" – continuation of the remaining works at the investment objective AHE Cerna-Motru-Tismana Stage II- partially overlaps with the Natura 2000 site ROSAC0129 Nordul Gorjului de Vest, with the following works:

- The Vâja Dam and implicitly the Vâja reservoir fully overlap with ROSAC0129 Nordul Gorjului de Vest;
- The area of the regulation works and thresholds on the Tismana River, resulting from the appropriate assessment study overlaps with ROSAC0129 Nordul Gorjului de Vest.

Due to its spatial extension, the project intersects with the Jiu River basin and directly influences the surface water bodies: RORW7.1.31.6b_B47a – Bistrița – source – including Bistricioara and its tributaries Lespezel, Vâja, and Bistricioara, and RORW7.1.31_B37 – Tismana – downstream of Tismana reservoir – including Jiu.

For groundwater, the project may cause local changes to the phreatic elements and potentially influence three water bodies, namely: ROJI03 Tismana – Dobrița (Vâlcan Mountains), ROJI05 Jiu floodplain and terraces and its tributaries, and ROJI07 Oltenia.

Conclusions of the Hydro morphological Response Assessment for the Bistrița River
The proposed works on the Bistrița River are located on the water body RORW7-1-31-6B_B47A – Bistrița – source – confluence with Bistricioara and tributaries Lespezel, Vâja, and Bistricioara.

- Considering the proposed works and the existing ones, the analysis indicates an insignificant impact on hydromorphological quality elements;

- The effects of the Vâja and Clocotiș dams (from Stage I) on the longitudinal continuity of the river have already occurred, given that these have been operational since the 1980s;
- For the 2.31 km river section that becomes a reservoir, a probable effect is estimated on morphological conditions,particularly the structure and substrate of the riverbed. A change in the granulometric composition of the riverbed is expected, primarily due to the altered flow regime, along with a negative effect on riparian/adjacent vegetation. However, the impact is localized and insignificant;
- Regarding the lateral continuity of the river, the impact is considered insignificant at the scale of the water body.

Conclusions of the Physico-Chemical and Biotic Factors Assessment for the Bistrița River

- By implementing the safety variant of the dam (at 572 masl.), the project is expected to affect a smaller area of the water body. Additionally, the magnitude of the impact on the physico-chemical elements such as oxygenation and temperature conditions is reduced due to the shallower water layers. In this variant, the impact on these elements is considered insignificant at the water body level.
- The analysis of the impact on biotic factors for Project Variant B shows that reducing the affected sector to 8.9% of the water body, of which only 3.52% will be permanently transformed into a reservoir, limits the impact on aquatic communities, keeping it insignificant. For phytobenthos, increased light and oxygen availability will support natural adaptation and recolonization. Macrophytes will continue to develop in unaffected sectors, and improved hydrological conditions will aid their recovery over time. Benthic invertebrate fauna, although influenced by sedimentation and substrate changes, will benefit from refuge habitats and a high regeneration capacity. Thus, given the small proportion of the water body permanently affected and the ecosystem's recovery capacity, the impact on these parameters is insignificant.
- From the analysis of the proposed and cumulative projects, no mechanisms were identified that would cause a significant impact on the ROSAC0129 Nordul Gorjului de Vest site, which overlaps with the affected water body. The identified effects are spatially and temporally limited, without long-term influence on the structure and functionality of the ecosystem, insignificant.

Conclusions of the Hydro morphological Response Assessment for the Tismana River
The proposed works on the Tismana River are located on the water body **RORW7-1-31_B37 – Tismana – Tismana Downstream Reservoir – to Jiu**.

- Considering the proposed works in the project, as well as the existing ones, the analysis does not indicate a potential significant impact on any of the hydro morphological quality elements;
- For the quality elements to the hydrological regime - flow quantity and dynamics, and connectivity with groundwater - no cause-effect mechanisms were identified in the analysis;

- For the other analyzed hydro morphological elements, the works may produce a local impact that does not alter the classification of the indicators according to the Jiu River Basin Management Plan (RBMP) 2022–2027.

Conclusions of the Physic-Chemical and Biotic Factors Assessment for the Tismana River

- A significant physic-chemical impact at the water body level was anticipated for oxygenation conditions elements. This significant impact was assessed only in the case of a cumulative effect with the desilting works proposed to be carried out on this water body. Essentially, this would result in increased turbidity, which could significantly affect oxygenation conditions.
- The cumulative effect of the regulation works proposed in the project with the desilting and bank protection works carried out by **SGA Gorj** leads to a significant impact on **phytobenthos, macrophytes, benthic invertebrate fauna, and ichthyofauna**. Substrate and sediment transport changes will affect algal and macrophyte communities, prolonging their recovery period. Benthic fauna will be impacted by the loss of hard habitats, and fish populations will experience the cumulative effects of increased turbidity, reduced oxygen levels, and loss of microhabitats. Therefore, the impact on these parameters remains significant.
- From the analysis of the proposed project and of the cumulative effects, no mechanisms were identified that would cause a significant impact on the **ROSAC0129 Nordul Gorjului de Vest** site, which overlaps with the affected water body. The identified effects are spatially and temporally limited, without long-term influence on the structure and functionality of the ecosystem, remaining insignificant.

The Cernavoda Unit U1 Refurbishment Project has completed the environmental impact assessment procedure and is in the process of issuing the Environmental Agreement. The conclusions of the Environmental Impact Report show that the project's impact is insignificant for both the radiological and non-radiological components. At the same time, the project does not have a significant impact on the health of the population in the vicinity of Cernavoda NPP. For units U3 and U4 of the Cernavodă NPP, the Environmental Agreement was issued by Government Decision no. 737/2013.
The temperature of the technological waters discharged by the Cernavodă NPP in branch 2 of the Danube-Black Sea Canal must be no more than 7℃ higher than the water temperature in branch 1 and the water temperature downstream of the discharge point must not exceed 25℃. Thus, by complying with the regulations in force, the impact of cooling waters is insignificant. The potential impact of the SMR is expected to be below the current level of the Cernavoda NPP considering the small size of the reactor, as well as the technology used. The potential impact of the SMR will be analysed within the framework of the environmental impact assessment procedure, with the forms of impact and the appropriate measures to reduce them being identified and assessed.

Potentially negative effects on the water environmental component (REO 2 and REO 3) may be caused by measures and policies that provide for investments in the modernization of naval transport, road infrastructure and in new energy production capacities from nuclear sources and heat pumps and the development of the LNG terminal located on the Black Sea coast.

Potentially negative effects on the soil environmental component (REO 4 and REO 5) may be caused by measures and policies that provide for investments in the closure of coal-fired power plants, the use of geological carbon deposits, new energy production capacities through heat pumps, the implementation of integrated forest fire management, the modernization of metro and road transport infrastructure, the development of the natural gas transport network and the increase in natural gas extraction capacity.

Potentially negative effects on the biodiversity environmental component (REO 7) may be caused by measures and policies that provide for investments in wind energy sources, electricity and natural gas transmission and distribution infrastructure:

- PAM 23 Increase of the domestic generation capacity from wind;
- PAM 59 Support for the expansion and modernization of the electricity distribution network;
- PAM 61 Cross-border project for the development of the Black Sea Corridor electricity transmission network (ID 138 of the ENTSO-E TYNDP);
- PAM 62 Mid Continental East Corridor cross-border electricity transmission network development project (ID 144 of ENTSO-E TYNDP);
- PAM 63 Cross-border project for the development of the HU-RO electricity transmission network (ID 259 of the ENTSO-E TYNDP);
- PAM 64 Cross-border project for the development of the North CSE Corridor electricity transmission network (ID 341 of the ENTSO-E TYNDP);
- PAM 65 Georgia-Romania Black Sea Interconnection Submarine Power Cable Project (ENTSO-E TYNDP ID 1105);
- PAM 66 Increasing interconnectivity between the eastern areas of Romania and the rest of the NES;
- PAM 67 Integrating the output generated by powerplants in the South and the South-West of Romania;
- PAM 68 400kV OHL Suceava-Balti;
- PAM 75 New underground natural gas storage facility Fălticeni (Moldova);
- PAM 76 Modernization of natural gas infrastructure for enabling the transport of hydrogen;
- PAM 77 Creating a new infrastructure for hydrogen transportation;
- PAM 78 Increasing the transmission capacity of the SNT and the security of natural gas supply;
- PAM 79 Increasing the transmission capacity of the SNT and ensuring the security of natural gas supply throughout the region;
- PAM 80 LNG Terminal located on the Black Sea coast, the interconnection of the SNT to the LNG Terminal and the development on the territory of Romania of the natural gas transport pipeline for taking over the natural gas from the Black Sea coast;
- PAM 81 Development on the Romanian territory of SNT on the Bulgaria-Romania-Hungary-Austria Corridor (BRUA) – Phase II and Phase III;
- PAM 82 Development/Modernization of natural gas transmission infrastructure and interconnections;
- PAM 83 Development of SMG to achieve bidirectional flow on the T2 and T3 pipelines;
- PAM 84 Rehabilitation, modernization and expansion of the SNT.

The potentially negative effects of these policies and measures can become significant when projects overlap with or are located in the vicinity of protected natural areas.

Potentially negative effects on the landscape environmental component (REO 8) may be caused by policies and measures that provide for the construction/completion of hydropower facilities, the rehabilitation/modernization and expansion of the natural gas transportation system.

Measures and policies that provide for investments in the development of new CCGT capacities and high-efficiency cogeneration capacities may have potentially negative effects on the natural resources environmental component (REO 10).

Measures and policies that provide for investments in the use of alternative fuel vehicles and the improvement and efficiency of industrial processes may have potentially negative effects on the waste environmental component (REO 11).

The assessment of the effects of policies and measures allowed the identification of negative and significantly negative effects of the implementation of the updated NECP 2021-2030 on relevant environmental objectives. The share of negative and significantly negative effects represents about 7% of the total effects analysed. The share of positive and significantly positive effects of the implementation of the NECP on relevant environmental objectives represents about 93% of the total effects analysed.

Projects envisaged under policies and measures with potentially negative or significantly negative effects are recommended to be subject to appropriate assessment and environmental impact assessment to identify measures to reduce and prevent potentially negative effects.

The implementation of the investments proposed by the updated NECP 2021-2030 have in most cases positive and significantly positive effects. These investments will contribute not only to achieving the national objectives for reducing greenhouse gas emissions and decarbonization, but also to the development and implementation of measures with positive effects from an economic and social point of view.

- reducing economic losses by improving energy efficiency;
- increasing efficiency and reducing operating costs of energy and heat supply systems;
- reducing maintenance costs for residential buildings;
- reducing the consumption of natural resources by increasing the share of renewable resources;
- improving the health of the population, for example by increasing air quality and reducing the quantities of waste ultimately disposed of.

The cumulative effects of implementing the updated NECP 2021-2030 are positive, in the long term, in terms of reduction of greenhouse gas emissions at the national level, increasing the share of renewable energy in the national energy mix, the expansion of transport capacity and installed energy production capacity, the enhancement of national energy security and development of research, development and innovation system.

Table 15 presents the evaluation matrix in which the positive/negative, direct/indirect, significant/insignificant effects of the policies and measures in the updated NECP 2021-2030 have been identified.

Table 15. Assessment of the potential effects of the updated NECP 2021-2030 policies and measures on relevant environmental objectives

Policies and Measures (PAM)	**Relevant Environmental Objectives (REOs)**											
	REO 1	**REO 2**	**REO 3**	**REO 4**	**REO 5**	**REO 6**	**REO 7**	**REO 8**	**REO 9**	**REO 10**	**REO 11**	**REO 12**
PAM 1 Phase out coal-fired power plants	+2	+1	+1	+2	-1	+3	+1	+1	+1	+3	+2	+3
PAM 2 Introducing renewable hydrogen into the energy system	+3	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 3 Hydrogen production	+3	+1	0	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 4 Development of new CCGT capacities	+1	+1	+1	+1	+1	+3	+1	+1	+1	-1	+1	+2
PAM 5 Promoting high-efficiency cogeneration capacities	+1	+1	+1	+1	+1	+3	+1	+1	+1	-1	+1	+2
PAM 6 Use of CCUS technologies	+3	+1	+2	+1	-1	+3	-1	+1	+1	+2	+1	+3
PAM 7 Implementation of the Kigali Amendment to the Montreal Protocol on the Phase-out of Products Used as Substitutes for Ozone-Depleting Substances	+3	+1	+2	+1	+1	+3	+3	+1	+1	+2	+1	+3
PAM 8 Improving and streamlining industrial processes	+1	+2	+2	+2	+1	+3	+2	+1	+1	+2	+1/ -1	+3
PAM 9 Establish a binding national target for CO2 injection and storage for the oil and gas industry	+3	+1	+2	+1	-1	+3	+3	+1	+1	0	+1	+3
PAM 10 Reducing emissions from enteric fermentation	+3	+1	+1	+1	+1	+3	+1	+1	+1	0	+1	+2
PAM 11 Improving agricultural residue management	+3	+2	+2	+2	+1	+3	+2	+1	+1	0	+2	+3
PAM 12Reducing methane emissions from manure and producing biogas	+3	+1	+1	+1	+1	+3	+1	+1	+1	0	+1	+2
PAM 13 Increasing energy production in the agrosolar field	+3	+1	+1	+1	+1	+3	+1/ -1	+1	+1	+2	+1	+2
PAM 14 Achieving integrated forest fire management	+3	+1	+1	+1	+1/ -1	+3	+1/ -1	+1	+1	0	+1	+2
PAM 15 Photovoltaic systems in agriculturefor irrigation	+3	+1	+1	+1	+1	+3	+1	+1	+1	+2	+1	+2

Policies and Measures (PAM)	Relevant Environmental Objectives (REOs)											
	REO 1	REO 2	REO 3	REO 4	REO 5	REO 6	REO 7	REO 8	REO 9	REO 10	REO 11	REO 12
PAM 16 Renewal of the agricultural machinery and equipment	+2	+1	+1	+1	+1	+3	+1	+1	+1	+1	+1	+2
PAM 17 Reduction of municipal waste per capita	+2	+3	+3	+3	+3	+2	+2	+1	+1	+1	+3	+3
PAM 18 Increased recycling and biodegradable waste selection for composting	+2	+3	+3	+3	+3	+2	+2	+1	+1	+1	+3	+2
PAM 19 Optimization of incineration/co-incineration processes	+1/ -1	+3	+3	+3	+3	+2	+2	+1	+1	0	+3	+2
PAM 20 Landfill gas flaring	+1/ -1	+1	+1	+1	+1	+2	+1	+1	+1	0	+3	+2
PAM 21 Improved wastewater treatment	+1	+3	+3	+3	+3	+1	+3	+1	+1	0	+1	+2
PAM 22 Increase of the domestic generation capacity from PV power plants	+2	+1	+1	+1	+1	+1	+2	+1	+1	+3	+1	+2
PAM 23 Increase of the domestic generation capacity from wind	+2	+1	+1	+1	+1	+3	+1/ -1	+1	+1	+3	+1	+2
PAM 24 Building/ completion of hydropower facilities	+2	+2	-3	+2	+2	+3	-3	-1	+1	+3	+1	+2
PAM 25 Pumped storage	+2	+1	+1	+1	+1	+3	-1	+1	+1	+2	+1	+2
PAM 26 Construction of photovoltaic power plants on rooftops	+2	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 27Installation of solar thermal collectors in the residential sector	+2	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 28 Facilitating the establishment of energy communities	+2	+1	+1	+1	+1	+2	+1	+1	+1	+3	+1	+2
PAM 29 Increase of the domestic generation capacity from biomass and biogas CHP and PP	+2	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 30 Biogas and biomethane	+2	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 31 Development of the advanced biofuels market	+1	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 32 Biofuels in aviation and marine transport	+2	+1	+1	+1	+1	+3	+1	+1	+1	+2	+1	+2
PAM 33 RFNBO	+3	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 34 Development of the use of biomass, bioliquids	+2	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2

Policies and Measures (PAM)	Relevant Environmental Objectives (REOs)											
	REO 1	REO 2	REO 3	REO 4	REO 5	REO 6	REO 7	REO 8	REO 9	REO 10	REO 11	REO 12
and biogas within the EU-ETS installations based on energy-intensive thermal processes												
PAM 35 Improve energy performance of public buildings at central level	+1	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 36 Improve energy performance of public buildings at local level	+1	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 37 Renovation of residential buildings	+1	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 38 Renovation of commercial buildings	+1	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 39 Rehabilitation of public lighting	+1	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+1
PAM 40 Development of the energy services market, ESCO	+1	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+1
PAM 41 Green Procurement	+1	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+1
PAM 42 Energy audit and energy management	+1	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+1
PAM 43 Increasing the share of heat pumps	+2	+1/-1	+1	+1	+1/-1	+3	+1	+1	+1	+3	+1	+2
PAM 44 Increasing the use of efficient technologies in the residential sector	+2	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 45 Replacing conventional fuels with RES in manufacturing industries	+2	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 46 Increasing the efficiency of technologies used in the industrial sector	+2	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 47 Increasedshare of alternative fueled cars	+2	+1	+1	+1	+1	+3	+1	+1	+1	+1	+1/-1	+2
PAM 48 Increased share of alternative fueled buses	+2	+1	+1	+1	+1	+3	+1	+1	+1	+1	+1/-1	+2
PAM 49 Modernization of the urban public transport	+2	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 50 Expansion of metro transport infrastructure	+2	+1	+1	+1	-1	+3	+1	+1	+1	+3	+1	+2
PAM 51 Increased share of alternative fueled trucks	+2	+1	+1	+1	+1	+3	+1	+1	+1	+1	+1/-1	+2
PAM 52 Modernization of naval transport	+2	+1/-1	+1/-1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 53 Modernization of air transport	+2	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2

Policies and Measures (PAM)	Relevant Environmental Objectives (REOs)											
	REO 1	REO 2	REO 3	REO 4	REO 5	REO 6	REO 7	REO 8	REO 9	REO 10	REO 11	REO 12
PAM 54 Modernization and renewal of railway transport	+2	+2	+1	+1	+1	+3	+1	+2	+2	+3	+1	+2
PAM 55 Railway rolling stock	+2	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 56 Alternative mobility	+2	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 57 Increasing the energy efficiency for the buildings in the transport sector	+2	+1	+1	+1	+1	+3	+1	+1	+1	+3	+1	+2
PAM 58 Modernization of road transport infrastructure	+2	+1/ -1	+1/ -1	+1/ -1	+1/ -1	+3	+1	+1	+1	+1	+1	+3
PAM 59 Support for the expansion and modernization of the electricity distribution network	+2	+1	+1	+1	+1	+1	+1/ -1	+1	+1	+3	+1	+2
PAM 60 Increased use of nuclear energy	+2	+1/ -1	+1/ -1	+1	+1	+3	+1/ -1	+1	+1	+3	+1	+2
PAM 61Cross-border project for the development of the Black Sea Corridor electricity transmission network (ENTSO-E TYNDP ID 138)	+1	+1	+1	+1	+1	+1	+1/ -1	+1	+1	+3	+1	+2
PAM 62 Cross-border Mid Continental East Corridor electricity transmission network development project (ENTSO-E TYNDP ID 144)	+1	+1	+1	+1	+1	+1	+1/ -1	+1	+1	+3	+1	+2
PAM 63 Cross-border project for the development of the HU-RO electricity transmission network (ENTSO-E TYNDP ID 259)	+1	+1	+1	+1	+1	+1	+1/ -1	+1	+1	+3	+1	+2
PAM 64 Cross-border electricity transmission network development project North CSE Corridor (ENTSO-E TYNDP ID 341)	+1	+1	+1	+1	+1	+1	+1/ -1	+1	+1	+3	+1	+2
PAM 65 Georgia-Romania Black Sea Interconnection Submarine Power Cable Project (ENTSO-E TYNDP ID 1105)	+1	+1	+1	+1	+1	+1	+1/ -1	+1	+1	+3	+1	+2
PAM 66 Increasing the interconnectivity between	+1	+1	+1	+1	+1	+1	+1/ -1	+1	+1	+3	+1	+2

Policies and Measures (PAM)	Relevant Environmental Objectives (REOs)											
	REO 1	REO 2	REO 3	REO 4	REO 5	REO 6	REO 7	REO 8	REO 9	REO 10	REO 11	REO 12
the Eastern regions of Romania and the rest of the rest of SEN												
PAM 67 Integrating the output generated by powerplants in the South and the South-West of Romania	+1	+1	+1	+1	+1	+1	+1/ -1	+1	+1	+3	+1	+2
PAM 68 400kV OHL Suceava-Balti	+1	+1	+1	+1 /-1	+1/ -1	+1	+1/ -1	+1	+1	+3	+1	+2
PAM 69 Refurbishment and modernization of the existing substations s	+2	+1	+1	+1	+1	+1	+1	+1	+1	+3	+1	+1
PAM 70 Refurbishment and development of the underground natural gas storage depot Depomureș - Târgu Mureș	+1	+1	+1	-1	-1	+1	+1	+1	+1	+2	+1	+1
PAM 71Increasing daily extraction capacity in the underground gas storage system (SISG) Bilciurești	+1	+1	+1	-1	-1	+1	+1	+1	+1	+2	+1	+1
PAM 72 Modernization of the natural gas storage system infrastructure — Bălăceanca	+1	+1	+1	-1	-1	+1	+1	+1	+1	+2	+1	+1
PAM 73 Increasing the underground natural gas storage capacity of the Ghercești repository	+1	+1	+1	-1	-1	+1	+1	+1	+1	+2	+1	+1
PAM 74 Increasing underground natural gas storage capacity at the Sărmășel deposit (Transylvania)	+1	+1	+1	-1	-1	+1	+1	+1	+1	+2	+1	+1
PAM 75 New underground natural gas storage facility in Fălticeni (Moldova)	+1	+1	+1	-1	-1	+1	+1/ -1	+1	+1	+2	-1	+1
PAM 76 Modernization of natural gas infrastructure for hydrogen transportation	+1	+1	+1	+1	+1	+1	+1/ -1	+1	+1	+2	+1	+1
PAM 77 Creating a new infrastructure for hydrogen transportation	+1	+1	+1	+1	+1	+2	+1/ -1	+1	+1	+3	+1	+1
PAM 78 Increasing the transmission capacity of the NTS and the security of natural gas supply	+1	+1	+1	+1	+1	+1	+1/ -1	+1/ -1	+1	+2	+1	+1

Policies and Measures (PAM)	Relevant Environmental Objectives (REOs)											
	REO 1	REO 2	REO 3	REO 4	REO 5	REO 6	REO 7	REO 8	REO 9	REO 10	REO 11	REO 12
PAM 79 Increasing the transmission capacity of the NTS and ensuring the security of natural gas supply throughout the region	+1	+1	+1	+1	+1	+1	+1/ -1	+1	+1	+2	+1	+1
PAM 80 LNG Terminal located on the Black Sea coast, the interconnection of the SNT to the LNG Terminal and the development on the territory of Romania of the natural gas transmission pipeline for the takeover of natural gas from the Black Sea coast	+1	+1/ -1	-1	+1	+1	+1	-1	+1	+1	+2	+1	+1
PAM 81 Development on the territory of Romania of the NTS on the Bulgaria–Romania–Hungary–Austria Corridor (BRUA) - Phase II and Phase III	+1	+1	+1	-1	-1	+1	+1/ -1	+1	+1	+2	+1	+1
PAM 82 Development/Modernization of natural gas transmission infrastructure and interconnections	+1	+1	+1	+1	+1	+1	+1/ -1	+1	+1	+2	+1	+1
PAM 83 Development of SMG to achieve bidirectional flow on T2 and T3 pipelines	+1	+1	+1	+1	+1	+1	+1/ -1	+1	+1	+2	+1	+1
PAM 84 Rehabilitation, modernization and expansion of the SNT	+1	+1	+1	-1	-1	+1	+1/ -1	+1/ -1	+1	+2	+1	+1
PAM 85 Increasing electricity storage capacity	+1	+1	+1	+1	+1	+1	+1	+1	+1	+3	+1	+1
PAM 86 Creating a favourable environment for the production and marketing of greenhouse gases	+2	+1	+1	+1	+1	+2	0	+1	+1	+3	+1	+1
PAM 87 Development and use of a national, comprehensive social assistance information system	+1	+1	+1	+1	+1	+1	0	+1	+1	0	+1	+1
PAM 88 Ensuring the implementation of the just transition process	+1	+1	+1	+1	+1	+1	0	+1	+1	0	+1	+1

Policies and Measures (PAM)	Relevant Environmental Objectives (REOs)											
	REO 1	REO 2	REO 3	REO 4	REO 5	REO 6	REO 7	REO 8	REO 9	REO 10	REO 11	REO 12
PAM 89 Ensuring energy consumers' access to diversified, sustainable and affordable energy sources for lighting, heating and cooling	+2	+1	+1	+1	+1	+2	+1	+1	+1	+3	+1	+2
PAM 90 Establishment of one-stop shops	+1	+1	+1	+1	+1	+1	0	+1	+1	0	+1	+1
PAM 91 Establishment of an inter-ministerial committee to protect vulnerable consumers and reduce energy poverty	+1	+1	+1	+1	+1	+1	0	+1	+1	0	+1	+1

9. Possible significant environmental, including health, effects in a transboundary context

The implementation of the updated NECP 2021-2030 will have positive overall effects by reducing greenhouse gases and other air pollutants by retrofitting and eliminating fossil fuel energy production capacities. The plan proposes a series of investments in projects to increase energy efficiency, stimulate the use of renewable energy, retrofit coal-fired power plants and modernize the transport sector. Thus, through the updated NECP 2021-2030, Romania contributes to reducing greenhouse gas emissions at the regional level and will have a significant contribution to achieving European climate change targets.

The projects proposed by the updated NECP 2021-2030 that may have cross-border effects are mainly found within PAM 24 Construction/completion of hydropower facilities, PAM 60 Increased use of nuclear energy, PAM 61 Cross-border project for the development of the Black Sea Corridor electricity transmission network (ID 138 of the ENTSO-E TYNDP), PAM 62 Cross-border project for the development of the Mid Continental East Corridor electricity transmission network (ID 144 of the ENTSO-E TYNDP), PAM 63 Cross-border project for the development of the HU-RO electricity transmission network (ID 259 of the ENTSO-E TYNDP), PAM 64 Cross-border project for the development of the North CSE Corridor electricity transmission network (ID 341 of the ENTSO-E TYNDP), PAM 65 Georgia-Romania submarine power cable interconnection project in the Great Neagră (ID 1105 from ENTSO-E's TYNDP), PAM 68 400kV Suceava-Bălți OHL, PAM 80 LNG Terminal located on the Black Sea coast, SNT interconnection to the LNG Terminal and development on the territory of Romania of the natural gas transmission pipeline for the takeover of natural gas from the Black Sea coast and PAM 81 Development on the territory of Romania of the NTS on the Bulgaria–Romania–Hungary–Austria (BRUA) Corridor - Phase II and Phase III.

For the projects regarding hydropower developments, transboundary consultation procedures were initiated within the framework of the environmental impact assessment procedure,

notifying the neighbouring countries that may be affected by the implementation of these projects, namely Bulgaria, Serbia, and Hungary. A possible negative transboundary impact was identified for these projects because they may influence the flow of the Danube River, being located mainly on tributaries of the Danube.

For the project "Refurbishment of Unit 1 of the Cernavoda NPP", the environmental impact assessment procedure was carried out and transboundary consultations were initiated and completed with Bulgaria, Hungary, Ukraine and Austria. This project may have a potential transboundary impact on environmental components (air, water, soil and biodiversity) and on human health.

The project to build Units 3 and 4 at the Cernavoda NPP obtained environmental consent in 2013. As part of this procedure, consultations were held with the states potentially affected by the project, namely Bulgaria, Ukraine, the Republic of Moldova, Hungary and Austria. This project may have a potential transboundary impact on environmental components (air, water, soil and biodiversity) and on human health.

For projects under the updated NECP 2021-2030 regarding the development of energy and natural gas transmission infrastructure, the potential transboundary impact on environmental components (air, water, soil and biodiversity) will be established and assessed for each project separately within the environmental impact assessment procedure.

10. Proposed measures to prevent, reduce and compensate as completely as possible any adverse environmental effects of the implementation of the updated NECP 2021-2030

The projects proposed within the updated NECP 2021-2030 will have different planning, design and implementation stages, which allow for the establishment of sets of complementary measures to avoid and reduce the potential impact on the national network of Natura 2000 sites.

These measures represent a set of general measures applicable to the implementation of all projects for which a potential impact has been identified in the Environmental Report. The set of proposed measures is:

- Projects located in the same area or in adjacent areas will be built in phases, and the specific prevention, reduction, compensation measures (if applicable) of each project will be correlated to reduce the potential impact of each project, but also the cumulative impact on the entire area;
- For projects located in the same area or in adjacent areas, common access roads and utilities will be designed for all projects (where possible) and the same sources of raw materials will be used. It is also recommended to use the same site organization for these projects;
- One of the criteria for selecting raw material supply sources will be the shortest route to the project (where possible);
- One of the selection criteria for implementation should be the ratio between the economic benefit of the project and the negative effects on protected natural areas;
- Avoiding the location of projects within or in the immediate vicinity of protected natural areas; if this cannot be achieved, establishing appropriate measures according

to the management plans of the protected areas or by applying measures to avoid, reduce, compensate for significant effects on the protected natural area established within the appropriate assessment study;

- Developing monitoring plans for projects throughout their duration (design, construction and operation stages).

At the same time, it is recommended to implement specific types of measures to prevent and reduce negative effects on the environment (Table 16).

Table 16. Specific measures to prevent and reduce negative environmental effects

No.	Environmental component	Specific measures
1	Air	Choosing locations so that transportation distances for raw materials, employees and waste are minimal.
		Avoiding areas where air quality is poor when selecting the location of projects involving high emissions of air pollutants, during construction or in the operational phase.
		Selecting the best available technologies for project implementation.
2	Water	Selecting the best available technologies for achieving projects and the implementation of measures to mitigate the impact on water bodies.
		Implementation of projects and measures that do not lead to deterioration of the chemical status of water bodies and the ecological potential/status of surface water bodies. Where this cannot be avoided, the conditions for the application of Article 4.7 of the Water Framework Directive (WFD) must be justified and taken into account.
		Selecting a project site taking into account all water uses downstream of the project, existing, under construction or included in some plans or programs (e.g. drinking water sources, food industry, energy, protected natural areas, irrigation).
		Ensuring the ecological/servitude flow downstream of the damming and water capture works, taking into account the provisions of Government Decision no. 148/2020 on the approval of the method of determining and calculating the ecological flow.
3	Soil	Limiting the land areas temporarily occupied during the construction phase.
		Development and implementation of a program to prevent and reduce the quantities of waste generated and to manage substances and chemicals throughout the project's life cycle.
		Restoring the locations of work points immediately after the completion of construction works.
4	Climate change	Carrying out greenhouse gas emission inventories and assessing the climate impact of projects; Priority selection of renewable energy sources to power projects; Use of techniques and technologies with a low carbon footprint.

No.	Environmental component	Specific measures
5	Biodiversity	Establishing the implementation calendar of projects so as to avoid nesting and breeding periods of species.
		Ensuring ecological corridors/passages for wildlife movement.
		Elimination of invasive species identified on the project site.
		All biodiversity elements will be monitored during the construction period and for a minimum of 3 years (except for ichthyofauna which is recommended for a minimum of 5 years) during the operation period.
		Implementation of monitoring programs for the mortality of vulnerable species in the project area.
		A prevention and intervention plan in case of accidental pollution will be implemented, which will provide concrete measures to prevent accidental leaks of diesel, oil or other hazardous/polluting substances in water or soil.
		Throughout the construction period, allochthonous tree and shrub species, uncharacteristic of the habitat types, ruderal or nitrophilous identified on the project site will be carefully monitored, so as to prevent their spread. If necessary, their elimination will be carried out, including the shoots/roots originating from them.
		The storage of construction materials will be carried out as close as possible to the work areas (in areas already affected by the works).
		Selective collection, recovery and periodic disposal of waste will be carried out in order to avoid attracting animals, causing them illness or injury.
6	Landscape	Choosing locations for projects so that the visual impact from natural, recreational, tourist, and residential areas is minimal.
7	Cultural aspects	Including in projects measures to protect objectives with cultural and architectural value.
8	Conservation of natural resources	Using recycled materials to implement projects where possible; For new capacities, requirements regarding energy efficiency and the possibility of powering from renewable energy sources should be introduced from the design phase; Rational use of natural resources.
9	Waste	Increasing the recycling rate of municipal waste through selective collection; Transformation of non-recycled waste into usable energy (incineration, co-incineration with energy recovery, etc.).
10	Population and human health	Implementing air quality, water quality and noise monitoring programs for projects located near residential areas.
		Reducing noise levels in residential areas near future objectives that would generate potential discomfort for the population.
		Reducing risks to workers' health through various measures (use of new, efficient and reliable machinery/equipment).

11. Explanation of the reasons that led to the selection of the chosen options

In the case of this study, the zero alternative is presented (without updated NECP 2021-2030), alternative 1 (updated NECP 2021-2030, first version, 2023) and alternative 2 (updated NECP 2021-2030, current version, 2024).
In the case of Alternative 0, the failure to implement the updated NECP 2021-2030 will have effects both at the national level through Romania's failure to comply with the targets and objectives regarding the increase in the use of energy from renewable sources and the reduction of greenhouse gas emissions assumed at the European Union level, and at the regional level through the lack of investments in energy transport and production infrastructure and the increase in greenhouse gas emissions, particulate matter, nitrogen and sulfur oxides, etc. Thus, Romania risks entering an infringement procedure for failure to fulfil the commitments assumed before the European Union, in accordance with the provisions of Regulation 2018/1999 on the governance of the energy union and climate action.

Alternative 1 - NECP 2021-2030 updated, first version, 2023
In 2023, the first version of the updated NECP 2021-2030 was communicated to the European Commission and published as part of the public consultation procedure. Between December 2023 and March 2024, the public consultation procedure for the updated NECP draft was carried out, which included 3 public debates during which stakeholders could express comments and observations.
The updated NECP 2021-2030 document has undergone an extensive evaluation and review process, based on the observations received in the public consultation process and the recommendations of the European Commission, which involved adjusting the level of ambition regarding national and sectoral targets.
Part of the European Commission's recommendations provide for the completion of the updated NECP 2021-2030 with:

- Information on policies and measures, clearly specifying the scope, timing and expected impact of greenhouse gas emission reductions, including for measures under Union funding programmes such as the common agricultural policy.
- Identify the amount of CO_2 emissions that could be captured annually by 2030, including sources.
- Providing a long-term plan for the implementation of renewable energy technologies over the next 10 years, with a view to 2040.
- Further develop detailed and quantified policies and measures in a way that allows for the timely and cost-effective achievement of Romania's national contribution to the Union's binding renewable energy target of at least 42.5% in 2030, with a collective effort to increase it to 45%.
- Including the amount of energy consumption reduction to be achieved by all public bodies, disaggregated by sector and the total area of heated and/or cooled buildings owned by public bodies to be renovated annually or the corresponding annual energy savings to be achieved.

- Including the value of cumulative energy savings to be achieved between 1 January 2021 and 2031 December 2030 and an explanation of how the annual savings rate and calculation level were determined.
- Establish comprehensive policies and measures to achieve national energy efficiency contributions and quantify energy savings generated by reported energy efficiency measures to ensure the achievement of the necessary amount of cumulative energy savings at end-use level by 2030 and establish measures to promote energy audits and energy management systems.
- Supporting the decarbonisation objectives of buildings by including additional information on policies, measures and their expected impact on energy savings for the implementation of a coherent long-term renovation strategy
- Defining clear objectives to encourage gas demand reduction, as well as developing detailed policies and measures to achieve these objectives by 2030. Further assessing the compatibility of its gas infrastructure with decarbonisation objectives.
- Specify appropriate measures for the diversification and long-term supply of nuclear materials, fuel, spare parts and services, including for planned new nuclear units, as well as the long-term management of nuclear waste. Provide more details on announced plans to develop small modular reactor (SMR) designs.
- Provide further details on existing and potential measures to combat energy poverty, as well as on the financial resources dedicated from both a social policy (affordability) and structural energy measures perspective, in particular regarding access to energy efficiency, building renovation and renewable energy.
- Further clarify national research, innovation and competitiveness objectives to deploy clean technologies, setting a path for 2030 and 2050 to support the decarbonisation of industry and promote the transition of enterprises to a circular and net-zero emissions economy. Present policies and measures to promote the development of net-zero projects, including those relevant to energy-intensive industries.
- Provide detailed information on the social, employment and skills consequences or any other distributional effects of the climate and energy transition, as well as on the objectives, policies and measures planned to support a just transition. Specify the form of support, the impact of the initiatives, the groups targeted, and the resources allocated, considering the Council Recommendation on ensuring a just transition towards climate neutrality.
- Ensure that adaptation priorities, strategies, policies, plans and efforts are proportionate to expected future climate vulnerabilities and risks, based on the best available scientific evidence and available climate prediction and early warning tools. Ensure systematic and periodic monitoring and evaluation of adaptation policies, and the results reflected in the design and implementation of subsequent revised policies.
- Promote nature-based solutions and ecosystem adaptation at national level strategies, policies and plans and provide investments for their implementation.

Alternative 2 - NECP 2021-2030 updated, current version, 2024

In October 2024, the updated NECP 2021-2030 document, which integrates both the response to the European Commission's observations on the first notified draft of the plan, as well as the observations received in the public consultation process, by increasing the level of ambition of the assumed objectives and targets, was notified to the European Commission and subsequently published on the European Commission's website.

The environmental assessment of the two alternatives shows that there are no significant differences between them in terms of potential environmental impact, as presented in Table 17.

Table 17. Impact of the updated NECP 2021-2030 alternatives on environmental factors likely to be affected

Relevant environmental aspects	Comments – Alternative 1 compared to Alternative 2
Air	Through more ambitious targets for reducing greenhouse gas emissions, Alternative 2 has positive effects on the air environment component. Also, through concrete steps to reduce GHG emissions and eliminate fossil fuel energy production capacities has positive long-term effects by reducing pollutant emissions into the air. Alternative 2 includes new measures and policies regarding the replacement of gas stoves in households with heat pumps, leading to a reduction in air pollutant emissions from the residential sector.
Water	Alternative 2 provides for new measures and policies regarding the transition from road passenger and freight transport to rail transport. These measures, correlated with those regarding the modernization of the railway infrastructure, have positive effects on the water environmental component by renewing/expanding water supply networks in stations/moving stops/stopping points that contribute to rationalizing consumption and avoiding water losses; renewing/expanding sewage networks in stations/moving stops/stopping points with wastewater treatment systems before their discharge into outfalls or connecting to local networks in order to reduce surface water pollution; collecting rainwater from the embankment of the current line and directing it to hydrocarbon separators and retention basins before discharge into outfalls; collecting rainwater from stations and moving stops and directing it to sewers, decanters, hydrocarbon separators, etc.
Soil	Alternative 2 includes new targets and concrete steps regarding the closure of energy production capacities by burning fossil fuels, as well as increasing targets for transforming non-recycled waste into usable energy, having positive effects on soil quality and reducing sources of soil pollution. Also, Alternative 2 includes 2 new policies and measures that provide for the increase of forested area at national level and the increase of forested area in urban areas with positive effects on soil quality.
Climate change	Alternative 2 includes more ambitious targets for reducing greenhouse gas emissions, namely an 87% reduction in net GHG emissions in 2030 compared to 1990, while the same parameter was 78% in Alternative 1.

Relevant environmental aspects	Comments – Alternative 1 compared to Alternative 2
	Also, Alternative 2 provides for an increase in the share of electricity from renewable sources to 58.4% compared to 55.8% in Alternative 1. At the same time, Alternative 2 includes concrete steps to reduce GHG emissions by improving energy efficiency in industrial and residential sectors, developing new renewable energy production capacities, and eliminating fossil fuel energy production capacities, thus reducing the effects of climate change.
Biodiversity	NECP proposes projects to complete hydropower developments, re-engineer and build new nuclear energy production capacities, as well as develop the gas transport network, which have significant effects on biodiversity. Alternative 2, the October 2024 version, through ambitious targets for reducing greenhouse gas emissions, reusing waste through energy production and developing new energy storage capacities, has more positive effects than Alternative 1. Alternative 2 includes 2 new policies and measures that provide for the increase in forested area at national level and the increase in forested area in urban areas with positive effects on soil quality.
Conservation of natural resources	Alternative 2 includes more ambitious targets for the use of renewable energy and the closure of fossil fuel energy production capacities. In addition, Alternative 2 includes measures and policies for replacing natural gas stoves in households with heat pumps, which will lead to a 15% decrease in natural gas consumption in the residential sector and increasing the production of biomethane from waste and the agricultural sector, and increasing the share of biomethane transported through the national gas transmission network to up to 10% by 2050.
Waste	Alternative 2 includes more ambitious targets for waste collection, recycling, transformation of non-recycled waste into usable energy, transformation of methane emissions from non-recycled waste into energy production. Alternative 2 also includes measures and policies to increase biomethane production from waste and the agricultural sector and increase the share of biomethane transported through the national gas transmission network to 10% by 2050.
Population and human health	Alternative 2, through more ambitious targets for reducing greenhouse gas emissions and new policies and measures regarding the increase in forested areas, the shift from road to rail transport, as well as the reduction of gas consumption in the residential sector through the use of heat pumps and the elimination of fossil fuel energy production capacities, has positive effects on human health by reducing sources of pollutant emissions in air, water and soil.

Thus, Alternative 2 of the updated NECP 2021-2030 has positive effects on environmental components through the ambitious targets for reducing greenhouse gas emissions and through the new policies and measures proposed in addition to Alternative 1. All these new policies and measures support the positive effects of implementing the updated NECP 2021-2030.

At this stage of development of the updated NECP 2021-2030, alternative solutions for each project cannot be analysed, given that the proposed investment projects are at different stages of development, and they will be analysed and evaluated within the environmental impact assessment procedure for each of them.

The updated NECP 2021-2030 does not present the analysed variants for the proposed projects, but the selection of the projects included in each policy and measure sheet was based on criteria that target the respective project's capacity to contribute to the ambitious targets and objectives of the plan, their capacity to comply with policies on reducing greenhouse gas emissions, their capacity to be financed through national, private and/or European, international financing mechanisms/sources, but also their capacity to be achieved within the time horizon targeted by the implementation of the plan, namely by 2030.

12. Measures envisaged to monitor the significant effects of the implementation of the updated NECP 2021-2030

Reporting process

Pursuant to Article 17(1) of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, each Member State must report to the European Commission every two years on the state of implementation of the NECPs, through an integrated national energy and climate progress report covering all five dimensions of the Energy Union. These biennial progress reports are a key source for the assessment by the European Commission, pursuant to Article 29 of Regulation (EU) 2018/1999, of progress made both at the European Union level towards achieving the Energy Union objectives and at the level of each Member State towards achieving its own targets and contributions and towards implementing the policies and measures set out in their integrated national energy and climate plans.

Implementing Regulation (EU) 2022/2299 laying down detailed rules for the application of Regulation (EU) 2018/1999 of the European Parliament and of the Council with regard to the structure, format, technical details and procedures for the integrated national energy and climate progress reports provides the necessary framework for the reporting process by including the format of the 23 annexes to be completed by the Member State and covering the 5 dimensions of the Energy Union: Decarbonisation, Energy Efficiency, Energy Security, Internal Energy Market and Research, Innovation and Competitiveness.

The biennial progress reports are an essential source for the assessment of the NECP, carried out by the European Commission, pursuant to Article 29 of Regulation (EU) 2018/1999, of the progress made both at the level of the European Union towards achieving the objectives of the Energy Union, and at the level of each Member State towards achieving its own objectives and contributions and towards implementing the policies and measures set out in the NECP.

In the context of the above, the reporting related to the NECP document was finalized by Romania in November 2023, by completing the annexes related to the reporting, with the second reporting process to take place in 2025, in accordance with the legal provisions stated above.

Romania submitted the following to the European Commission as part of the reporting related to the NECP 2021-2030 document updated in 2023:

Reporting on progress on the "decarbonisation" dimension

- information on progress towards the greenhouse gas emissions and removals targets referred to in Article 4(a)(1) of Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action and amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council, including progress towards the Union's climate-neutrality objective set out in Article 2(1) of Regulation (EU) 2021/1119 of the European Parliament and of the Council in accordance with the reporting formats set out in Annex I.
- information on progress towards the achievement of the targets and contributions for energy from renewable sources referred to in Article 4(a)(2) and Article 20(a) of Regulation (EU) 2018/1999 in accordance with the reporting formats set out in Annex II.
- the information on adaptation referred to in Article 4(a)(1) of Regulation (EU) 2018/1999 in accordance with the formats set out in Annex III to the report.

Reporting on progress made in the "energy efficiency" dimension

- information on progress towards the achievement of the objectives and contributions relating to the ‘energy efficiency’ dimension referred to in Article 4(b) and Article 21(a) of Regulation (EU) 2018/1999 in accordance with the reporting formats set out in Annex IV.

Reporting on progress made on the "energy security" dimension

- information on progress towards the objectives and contributions relating to the energy security dimension referred to in Article 4(c) and Article 22(a)-(d) of Regulation (EU) 2018/1999 in accordance with the reporting formats set out in Annex V.

Reporting on progress on the "internal energy market" dimension

- information on progress towards the objectives and contributions relating to the ‘internal energy market’ dimension referred to in Article 4(d) and Article 23(1)(a) to (g) of Regulation (EU) 2018/1999 in accordance with the reporting formats set out in Annex VI.

Reporting on progress made in the "research, innovation and competitiveness" dimension

- information on progress towards the objectives and contributions relating to the ‘research, innovation and competitiveness’ dimension referred to in Article 4(e) and Article 25(a)-(c) of Regulation (EU) 2018/1999 in accordance with the reporting formats set out in Annex VII.
- information on progress towards the national targets for the phasing out of energy subsidies, in particular for fossil fuels, referred to in Article 25(d) of Regulation (EU) 2018/1999 in accordance with the reporting formats set out in Annex VIII.

Reporting on national policies and measures

- information on progress towards the implementation of national policies and measures and, where applicable, updated or new policies and measures or groups of policies and measures referred to in points (a) and (c) of Article 17(2) and Articles 20 to 25 of Regulation (EU) 2018/1999 in accordance with the reporting formats set out in Annex IX.
- When reporting on the new policies and measures referred to in Article 21(b)(3) of Regulation (EU) 2018/1999, Member States shall submit the information in accordance with the reporting formats set out in Annex X.

Reporting on the amount of energy savings achieved pursuant to Article 7 of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC

- the information referred to in points (b) to (d) of Part 2 of Annex IX to Regulation (EU) 2018/1999 in accordance with the reporting formats set out in Annex XI.

Reporting in accordance with Article 5 of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC

- report the total renovated floor area of heated and cooled buildings owned and occupied by their central government, referred to in point (g) of Part 2 of Annex IX to Regulation (EU) 2018/1999, in accordance with the formats set out in Table 1 of Annex XII to the reporting.
- The amount of energy savings in eligible buildings owned and occupied by their central government, referred to in point (g) of Part 2 of Annex IX to Regulation (EU) 2018/1999, shall be reported in accordance with the formats set out in Table 2 of Annex XII to the reporting.

Reporting on progress towards funding

- information on progress towards financing the policies and measures or groups of policies and measures referred to in Article 17(2)(a), Article 20(b)(3), Article 21(b)(7), Article 22(g), Article 23(1)(j) and Article 25(g) of Regulation (EU) 2018/1999, including an analysis of actual investments against initial investment assumptions, in accordance with the formats set out in Annex XIII of the report.

Reporting the impact on air quality and air pollutant emissions

- quantifying the impact of policies and measures or groups of policies and measures on air quality and emissions of air pollutants, Member States shall do so in accordance with the reporting formats set out in Annex XIV.

Reporting on policies and measures to phase out energy subsidies, in particular for fossil fuels

- on the policies and measures referred to in Article 17(2)(a) and (c) of Regulation (EU) 2018/1999 relating to the phasing out of energy subsidies, in particular for fossil fuels, in accordance with the reporting formats set out in Annex XV.

Additional reporting obligations in the field of renewable energy

- the additional information in the field of energy from renewable sources referred to in Part 1 of Annex IX to Regulation (EU) 2018/1999 in accordance with the reporting formats set out in Annex XVI.

Additional reporting obligations in the field of energy efficiency

- the additional information referred to in points (e), (f) and (h)-(k) of Part 2 of Annex IX to Regulation (EU) 2018/1999 in accordance with the formats set out in Annex XVII to the reporting.

Reporting on energy poverty and just transition

- Article 3(3)(d), second subparagraph of Regulation (EU) 2018/1999, Member States shall report:

  (a) information on progress towards achieving the national indicative targets for reducing the number of households in energy poverty referred to in Article 24(a) of Regulation (EU) 2018/1999, in accordance with the reporting formats set out in Annex XVIII;

  (b) quantitative information on the number of households affected by energy poverty, referred to in Article 24(b) of Regulation (EU) 2018/1999, in accordance with the formats set out in Table 1 of Annex XIX to the report.

- Member States may report on energy poverty indicators in accordance with the formats set out in Tables 2 and 3 of Annex XIX to the report.

- Member States may report information on the national definition of energy poverty in accordance with the formats set out in Table 4 of Annex XIX to the report.

- Member States may report information on how the implementation of the integrated national energy and climate plans contributes to the just transition, including by promoting both human rights and gender equality, and addresses energy poverty inequalities in accordance with the formats set out in Annex XX of the report.

Reporting on the implementation of regional cooperation

- information on the implementation of regional cooperation referred to in Article 12, Article 20(b)(2), Article 21(b)(6), Article 22(f), Article 23(1)(i) and Article 25(f) of Regulation (EU) 2018/1999 in the context of the implementation of the objectives and contributions in accordance with the reporting formats set out in Annex XXI.

Reporting on the implementation of the recommendations referred to in Article 32(1) or (2) of Regulation (EU) 2018/1999

- information on the policies and measures adopted or planned to be adopted and implemented to address those recommendations, referred to in Article 17(6) of Regulation (EU) 2018/1999, in accordance with the reporting formats set out in Annex XXII.

Reporting on the multilevel dialogue on energy and climate referred to in Article 11 of Regulation (EU) 2018/1999

- information on progress towards establishing the dialogue referred to in Article 11 of Regulation (EU) 2018/1999 in accordance with the reporting formats set out in Annex XXIII.

For the projects proposed under the updated NECP 2021-2030, the monitoring program must begin with their implementation, aiming to assess the effectiveness of the measures to avoid, reduce and compensate for the impact identified in the appropriate assessment study, the environmental impact report and the impact assessment study on water bodies.

The monitoring program must: i) have established clear, comparable and feasible monitoring methods adapted to the project schedule to allow for appropriate observation of the project's effects on biodiversity, as well as the effectiveness of measures to avoid, reduce and compensate for impacts; ii) include procedures to allow for the implementation of corrective or adaptive measures to respond to unforeseen problems.

The scope, objectives, calendar and monitoring program depend on the type and complexity of the project, as well as the characteristics of the areas affected by the project implementation and should be established from the project planning phase and re-evaluated based on field results.

Given the level of detail of the NECP 2021-2030updated, the fact that it includes a series of projects that will be implemented throughout the national territory, the location of some of which is not known at this time and a detailed program for monitoring the effects of all projects on the natural environment cannot be proposed, but in the following a relevant set of monitoring indicators of the updated NECP 2021-2030 is proposed, which will be quantified based on the results of the individual monitoring programs at the level of each project (Table 18).

Table 18. Indicators for monitoring environmental effects in the context of the updated NECP 2021-2030

Environmental aspects	**Relevant environmental objectives for the updated NECP 2021-2030**	**Monitoring indicators**	**Frequency**	**Description**	**Responsible**
Air	REO 1 Improving air quality by reducing emissions of air pollutants	Emissions of pollutants into the atmosphere (CO_x, NO_x, SO_2, suspended particles, heavy metals, VOCs, PAHs) resulting from the construction and operation phase of projects within the updated NECP 2021-2030.	Quarterly measurements during the construction phase; Semi-annual measurements during the operation phase.	By implementing projects, during the construction phase, it is possible that pollutant emissions may have values that exceed the admissible limits established by the legislation on ambient air quality, but during the operation phase they may have a significant decrease compared to the current situation, through the implementation of non-polluting technologies (supercritical and ultra supercritical parameters in the case of thermal power plants).	The plan/project owner
Water	REO 2 Improving water quality	Volume of wastewater discharged; STRENGTHS pollutants discharged into natural receptors;	Quarterly, during the works execution phase, for the projects proposed by the updated NECP 2021-	Maintaining the permitted limit values for the discharge of wastewater through natural outfalls - NTPA001/ /water	The plan/project owner

Environmental aspects	Relevant environmental objectives for the updated NECP 2021-2030	Monitoring indicators	Frequency	Description	Responsible
		Changes in the hydro-geomorphological regime associated with the energy sector – • ecological status / ecological potential of surface water bodies (rivers/lakes) on which hydropower developments are being carried out; • number of water bodies potentially impacted. • number of barriers (dams and weirs) constructed that affect the longitudinal connectivity of surface water bodies; • monitoring of hydro morphological, biological and physic-chemical elements of water bodies, according to the Water Framework Directive (WFD). Monitoring indicators will be provided by ANAR.	2030, by taking water samples from the wastewater/possibly thermally polluted water discharge points; Semi-annually, during the operation phase, for projects within the NECP 2021-2030, by taking water samples from wastewater discharge points. Specific frequencies of assessment requirements according to the DCA, during the execution and operation period.	management authorizations;	
	REO 3 Achieving and maintaining the environmental objectives of water bodies (WMD)			Changes may occur in the morphology of the minor riverbed, in the flow dynamics as a result of works for the construction of hydropower facilities and as a result of the operation/ their operation.	

Environmental aspects	Relevant environmental objectives for the updated NECP 2021-2030	Monitoring indicators	Frequency	Description	Responsible
Soil	REO 4 Limitation and reduction of point-source soil pollution REO 5 Maintaining the pedological condition of the soil	Emissions of pollutants into the soil resulting from the construction and operation phases of projects within the updated NECP 2021-2030; Number of accidental pollutions recorded and the affected areas; Quantity and type of substances that caused the accidental pollution.	Quarterly measurements in the execution phase; Semi-annual measurements in the operation phase; Annually, both in the execution phase and in the operation phase.	The evolution of pollutant emissions into the atmosphere can lead to an estimate of the evolution of soil quality; This indicator is relative, the number of accidental pollutions does not entirely depend on the characteristics of the projects proposed by the updated NECP 2021-2030, as they can also be caused by human errors, means of transport, etc.	The plan/project owner
Climate change	REO 6 Reducing greenhouse gas emissions from the energy sector to achieve EU targets	Greenhouse gas emissions (CH_4, N_2O, NOX, CO, CO_2, NMVOC) related to targets using coal as raw material; Number of incidents resulting from extreme weather conditions.	Quarterly measurements during the execution phase; Semi-annual measurements in the operating phase; Annual.	Achieving this objective depends more on facilitating the market launch of alternative fuels, developing infrastructure for alternative fuels, and improving the operating	The plan/project owner

Environmental aspects	Relevant environmental objectives for the updated NECP 2021-2030	Monitoring indicators	Frequency	Description	Responsible
				technology of thermal power plants; It will be compared with the situation before the project implementation.	
Biodiversity	REO 7 Conservation of habitats and species of flora and fauna of community importance.	Natura 2000 habitats within sites of community interest lost/altered as a result of the implementation of projects from the updated NECP 2021-2030; Natura 2000 habitat areas (ha) within sites of community interest reversibly affected by construction works related to projects in the updated NECP 2021-2030; Mortality of fauna species of community interest within Natura 2000 sites resulting from the operation of projects in the updated NECP 2021-2030; Number of protected areas intersected	In the execution phase and in the operation phase through monitoring programs, which target different stages of the biological cycle, depending on each class of organism.	The location of the projects (those for which the location has not yet been established) will avoid crossing protected natural areas as much as possible or where this is not possible, the occupancy percentage must be minimal and not affect habitats; In the case of those located in protected natural areas, compensation measures will be proposed depending on the occupied area and the species of flora and fauna found in the respective areas; In case of presence	The plan/project owner

Environmental aspects	Relevant environmental objectives for the updated NECP 2021-2030	Monitoring indicators	Frequency	Description	Responsible
		by projects proposed through the updated NECP 2021-2030; Surface area (ha) of protected natural areas permanently affected by new projects and/or projects that involve the continuation of discontinued investments.		bats or nesting birds, monitoring the mortality of specimens within and near protected natural areas to reduce the impact on protected species.	
Landscape	REO 8 Protection and conservation of the natural landscape	Surfaces of protected natural areas affected (ha) by the projects proposed through the updated NECP 2021-2030 compared to the total area of the Natura 2000 network; Total landscape transformations that could occur as a result of the implementation of the projects proposed through the updated NECP 2021-2030; Number of archaeological sites opened on various sections of the proposed	In the execution phase and in the operation phase through specific annual measurements; During the design phase, measures will be taken to limit the negative effects on Natura 2000 habitats, which will be implemented both during the execution phase and during the operation phase. If the implementation of the measures does not have the expected	Land areas permanently occupied by the projects proposed through the updated NECP 2021-2030; In the execution phase and in the operation phase through specific annual measurements. In the design phase, measures will be taken to limit the negative effects on Natura 2000 habitats, which will be implemented both in the execution phase and in the operation phase. If the implementation of the	The plan/project owner
Cultural aspects	REO 9 Preservation and conservation of cultural heritage elements				

Environmental aspects	Relevant environmental objectives for the updated NECP 2021-2030	Monitoring indicators	Frequency	Description	Responsible
		projects following the discovery of archaeological sites, etc.	results, they will be permanently adapted depending on the situation on the ground. Upon completion of the execution, the habitats will be restored including through compensatory measures. During the construction works.	measures does not have the expected results, they will be permanently adapted depending on the situation on the ground. Upon completion of the execution, the habitats will be restored including through compensatory measures.	
Conservation of natural resources	REO 10 Reducing the exploitation of non-renewable resources	Quantity of alternative fuels used (tons of petroleum equivalent).	Annual	During the design phase, measures may be imposed to equip facilities that use exhaustible sources with technologies/facilities that can also use alternative fuels; The data will be compared with those from the period prior to the implementation of the projects.	The plan/project owner
Waste	REO 11 Sustainable waste management.	The amount of waste generated for the projects proposed by the updated	Quarterly, during the execution period and	Reports will be made on the amount of waste generated both during the	The plan/project owner

Environmental aspects	Relevant environmental objectives for the updated NECP 2021-2030	Monitoring indicators	Frequency	Description	Responsible
		NECP 2021-2030 calculated per built area; The amount of waste reused or recovered through recycling for the projects proposed by the updated NECP 2021-2030 calculated per built area.	annually during the operation period.	execution period and during the operation period.	
Population and human health	REO 12 Improving the health of the human population	The number of people affected and the number of accidents caused by the implementation of the projects proposed through the updated NECP 2021-2030; The number of people potentially exposed to elevated concentrations of pollutants in the atmosphere in the project implementation area; The number of occupational and work-related diseases that could result from the implementation of the projects.	Annual	During the design phase, measures will also be taken to protect the population against the risks associated with thermal energy facilities, measures that will be implemented by contractors. It is estimated that the number of accidents in the energy sector will be reduced; The data will be compared with the reference scenario.	The plan/project owner

13. Non-technical summary

The updated NECP 2021-2030 was developed for the 2021–2030 time horizon, considering Romania's needs and international obligations, but also the achievement of the optimal development scenario of the national energy system for this moment.
The updated NECP 2021-2030 represents a strategic document that aligns national energy and climate priorities with EU objectives, confirming Romania's firm commitment to achieving community objectives and targets, while addressing specific national challenges. NECP 2021-2030. The updated plan is promoted by the Ministry of Energy, as the owner of the plan, and was developed to meet Romania's development needs both in a national and international context.

The updated NECP 2021-2030 projects set out national objectives and contributions to achieving the EU climate change objectives. The updated NECP 2021-2030 targets not only the technical aspects of developing and integrating RES and reducing GHG emissions, but also the social and economic dimensions, ensuring that the energy transition will be beneficial for both the environment and citizens.

The updated NECP 2021-2030 does not present several alternatives that can be considered for the assessment of the effects on human health and the environment. Thus, within the framework of this Environmental Report, three alternatives were taken into account: non-implementation of the updated NECP 2021-2030, which would lead to failure to achieve the environmental targets imposed by the community legislation on environmental protection, Alternative 1 represented by the NECP 2021-2030, version 2023 and Alternative 2 represented by the Plan in its current version, which involves respecting commitments and meeting targets established by the community legislation, making new investments or modernizing existing ones in the field of electricity production.

The implementation of the investments proposed by the updated NECP 2021-2030 have in most cases positive and significantly positive effects. These investments will contribute not only to achieving the national objectives for reducing greenhouse gas emissions and decarbonization, but also to the development and implementation of measures with positive effects from an economic and social point of view.

The cumulative effects of implementing the updated NECP 2021-2030 are positive, in the long term, in terms of reducing greenhouse gas emissions at the national level, increasing the share of renewable energy in the national energy mix, expanding transmission capacity and installed energy production capacity, increasing national energy security and developing the research, development and innovation system.

The negative effects are mainly associated with the proposed measures to expand and build electricity and natural gas transmission networks and build new wind energy production capacities, heat pumps, expand transport infrastructure and use alternative fuel means of transport.
Significant negative effects are associated with the completion/construction and operation of hydropower facilities. In this context, particularly important are the measures to mitigate the

impact on water bodies (e.g. ensuring ecological flow, ensuring the passage of fish fauna, sediment management, etc.) in accordance with European and national legislation in the field of water. The environmental component for which most potential negative effects have been identified is represented by biodiversity (mainly the conservation of natural habitats and species of flora and fauna).

The updated NECP 2021-2030 has positive effects on the environment, mainly associated with measures aimed at reducing/eliminating environmental problems in the energy sector. Most positive effects are associated with measures to reduce air pollutant emissions, mitigating the impact on water bodies (e.g. ensuring ecological flow, ensuring the passage of fish fauna, sediment management, etc.) and increasing energy efficiency.

The energy sector is currently based on the exploitation of natural resources (exhaustible or renewable), the projects proposed through the updated NECP 2021-2030, having the direct effect of reducing their use by promoting renewable energy sources.

For projects within the updated NECP 2021-2030 that may have a cross-border effect, namely projects regarding the development of energy and natural gas transport infrastructure, projects regarding the production of energy from nuclear sources (SMR) and projects regarding the construction of new power plants with CCGT and CHP technology within the environmental impact assessment procedure, these effects will be established for each project and consultation procedures with neighbouring countries that may be affected will be initiated.

For the project "Refurbishment of Unit 1 of the Cernavoda NPP", the environmental impact assessment procedure was carried out, and cross-border consultations were initiated and completed with Bulgaria, Hungary, Ukraine and Austria.

The project to build Units 3 and 4 at Cernavoda NPP obtained environmental approval in 2013. As part of this procedure, consultations were held with the states potentially affected by the project's implementation, namely Bulgaria, Ukraine, the Republic of Moldova, Hungary and Austria.

For projects regarding hydropower developments, transboundary consultation procedures were initiated within the framework of the environmental impact assessment procedure, notifying neighbouring countries that may be affected by the implementation of these projects, namely Bulgaria, Serbia, and Hungary.

The prevention and mitigation of potential negative environmental effects of project-related actions depends on the way these projects will be implemented and, on the prevention/reduction measures that will be adopted, starting from the design stage and up to the operation stage. In this regard, the Environmental Report proposes a series of general measures, applicable to the implementation of all projects for which a potential impact has been identified in the Environmental Report. At the same time, a series of impact reduction measures are also proposed in this Environmental Report for each potentially affected environmental component.

To monitor the effects of the implementation of the NECP 2021-2030 updated within the framework of this Environmental Report, a monitoring program was proposed that includes

environmental indicators, the frequency and the monitoring person corresponding to each relevant environmental objective identified. The monitoring program will track significant effects on the environment, the efficiency of protection measures and the identification of potential negative effects on the environment.

An appropriate assessment study was conducted to identify and assess the potential impact of the updated NECP 2021-2030 on the Natura 2000 network of protected natural areas in Romania. The conclusions of the appropriate assessment study are as follows:

Adequate Assessment Study Conclusions

The potential impact associated with the implementation of the NECP 2021-2030 objectives on the Natura 2000 network of protected natural areas in Romania was carried out based on GIS analysis, the Management Plans of protected natural areas, the Natura 2000 Standard Forms and specialized works on protected species and habitats.

The potential impact of all projects proposed by the policies and measures in the updated NECP 2021-2030 could not be assessed in detail because the technical projects and the alternatives considered for them are not known. For projects identified by geographical coordinates, the degree of overlap and distances to protected natural areas likely to be affected by their implementation were determined. These projects were indicated on maps in relation to the protected natural areas.

The main positive impact of the projects proposed through the updated NECP 2021-2030 is manifested in the reduction of fossil fuel consumption and reduced greenhouse gas emissions.

Some of the projects proposed through the updated NECP 2021-2030 are in various phases of project approval.
For the Cerna-Belareca, Livezeni-Bumbești, Surduc-Siriu, Răstolița and Pașcani hydroelectric power plants on the Siret River and Cerna-Motru-Tismana Stage II, the Strategic Environmental Assessment, the impact assessment study on water bodies and the environmental impact report were completed.

For these projects, the conclusions of the appropriate assessment studies and the impact assessment studies on water bodies are briefly presented in chapter *e).1. Identification and quantification of the impact*. Also, the specific impact mitigation/reduction measures identified in these studies complement chapter I.f). Impact avoidance and reduction measures of this study.

For the proposed projects under the updated NECP 2021–2030 for which the potentially affected Sites of Community Importance (ANPIC) could not be identified , it is necessary to determine these sites once the location (geographical coordinates) and technical details of the project are established.

In general, the identification of potentially affected ANPICs by an energy production project is carried out using four criteria: i) intersection (including full overlap of the project with the ANPIC); ii) proximity (influence zone); iii) species mobility; and iv) ecological connectivity.

In the case of ANPICs that host high-mobility species, such as bird of pray or geese, it is recommended that renewable energy projects (e.g., wind farms) be located at a precautionary distance of at least 20 km from the ANPIC boundary.

The identification of ANPICs whose connectivity (within the site or with the rest of the Natura 2000 network) could be disrupted by the emergence of barriers along ecological corridors should include all ANPICs connected along the corridor and these should be added to the list of potentially affected sites.

It is also recommended that this identification process consider possible structural or functional changes in terrestrial or aquatic ecological corridors caused by an energy production project, in order to correctly identify and select all ANPICs connected through the ecological corridor.

The identification of ANPICs that are part of ecological corridors in the project area should be carried out by analyzing a wider territory, relevant to the project being assessed (e.g., within a minimum distance of 30 km from the site boundaries in the case of watercourses).

The analysis for identifying potentially affected ANPICs is conducted through spatial (GIS) analysis, based on information such as: project location, ANPIC boundaries, water body boundaries, and the location of ecological corridors and areas with ecological connectivity/continuity.

For projects with a potentially significant impact on protected natural areas, appropriate assessment studies are recommended, taking into account possible alternatives and compensation measures that allow for the reduction of the negative impact on protected habitats and species.

In the case of projects located within protected natural areas with potentially significant impact, alternative locations outside the boundaries of protected natural areas or outside sensitive areas for habitats and species of conservation interest may be identified.

In the case of projects where relocation of projects is not technically and economically feasible, compensation measures specific to the type of habitats and species affected must be identified and applied. The completion of this strategic environmental assessment was limited by the availability of data on the projects proposed through the updated NECP 2021-2030, as well as by the availability of information on the location of protected species and habitats on the surface of potentially affected protected natural areas.

Measures to reduce negative impacts can be specific measures to protect natural areas by avoiding habitat loss and fragmentation, creating ecological corridors, preventing the mortality of fauna species, avoiding disturbance of nesting and feeding areas, etc.

The management plans of the ANPIC include specific restrictions aligned with conservation objectives, targeting projects in the energy production sector. For these projects, which are generally complex, it is recommended to identify both the restrictive measures that directly target these types of projects (for example, banning the construction of small hydropower plants on certain rivers or on all rivers within an ANPIC; banning the construction of wind farms within an ANPIC or at a certain distance from its boundaries), as well as restrictive

measures that could be related to any of the components/interventions proposed by the project (for example, the placement of overhead and underground power lines).

The implementation of restrictive measures can influence the siting and development solutions of renewable energy projects (for example, in the case of wind farms, an exclusion zone with a radius of 3 km may be applied around ANPICs where highly mobile species such as birds and bats are found).

The construction of wind farms can negatively affect, both directly and indirectly, flight routes, feeding habitats and food availability, hibernation and breeding areas, potentially causing both the degradation or destruction of these areas and an increase in accidental mortality of bat species.

For wind farms of over 50 MW, it is recommended to delineate areas where wind turbines are prohibited within a radius of at least 10 km from the turbine location, or more, if colonies of long distances traveling species are present in the area (for example, near resting, nesting, or feeding areas; areas designated for bat protection, near coniferous or deciduous forests, within 200 m from the forest edge, tree alignments; wetlands and watercourses, etc). To delineate these areas, it is recommended to study the behavior of the species throughout their entire phenological cycle.

In the case of photovoltaic parks, exclusion zones include areas within ANPICs where habitats of community interest are found (semi-natural and natural grasslands, such as semi-dry grasslands, mountain and lowland hay meadows, secondary saline and silvosteppe grasslands). Exclusion zones should be established based on the ecological requirements and behavior of species of community interest, with exclusion limits potentially ranging from 500 m to 6 km from the project area.

The construction/installation of photovoltaic parks on grassland and/or arable land directly affects the feeding habitat of species, by removing these areas from their hunting territory. Therefore, it is recommended to avoid placing photovoltaic parks within or near protected natural areas designated for bird species protection or located along their migration corridors.

Energy production projects that include the placement of medium-voltage power lines within ANPICs or crossing the surface of an ANPIC must be insulated to prevent high mortality of bird species, such as diurnal raptors and storks.

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