

**Romania's
First Biennial Transparency Report (BTR1)
to the
United Nations Framework
Convention on Climate Change under the
Enhanced Transparency Framework**

Bucharest, January 2026

Romania's First Biennial Report has been prepared in collaboration with representatives from the following institutions:

Beia Consult International

- Dr. Mihaela BĂLĂNESCU (coordinator); ▪ Dr. George SUCIU; ▪ Dr. Cristina DOBRE; ▪ Drd. Andreea BĂDICU; ▪ Cătălin SURU; ▪ Lucian NECULA; ▪ Mădălin SILION; ▪ Constanța ALEXANDRU; ▪ Bogdan PĂDEANU; ▪ Lucian LUMÂNĂROIU; ▪ Cristian BECEANU; ▪ Angela IONIȚĂ; ▪ Andreea GEORGESCU.

Energy and Environment Consulting Company

- Dr. Claudia Eudora TOMESCU; ▪ Dipl. Eng. Irene Roxana SAMOILĂ ▪ Dr. Anca Eufrosina POPESCU; ▪ Dipl. Eng. Camelia VASILE; ▪ Dr. Marian DOBRIN; ▪ Dipl. Eng. Gloria POPESCU ▪ Dipl. Eng. Ana BAIAS ▪ Dipl. Ec. Bianca LEPADATU ▪ Dipl. Ec. Ileana Constantinescu ▪ Dr. Valentin RUSU;

University of Agronomic Sciences and Veterinary Medicine of Bucharest

- Dr. Dana-Cătălina POPA; ▪ Dr. Răzvan POPA.

National University of Science and Technology POLITEHNICA Bucharest

- Dr. Florin Codruț NEMȚANU;

National Research and Development Institute for Cryogenic and Isotopic Technologies

- Dr. Marius CONSTANTINESCU ▪ Dipl. Ch. Felicia BUCURA; ▪ Drd. Antoaneta ROMAN;

National Institute for Research and Development in Forestry "Marin Drăcea"

- Dr. Raul-Gheorghe RADU; ▪ Dr. Ștefan PETREA.

National Research and Development Institute for Soil Science, Agrochemistry and Environmental Protection – ICPA Bucharest

- Dr. Olga VIZITIU; ▪ Dr. Irina CALCIU.

Ministry of Environment, Waters and Forests

- Gherghița NICODIM – Coordinator, ETF Focal Point; ▪ Ioana SAVA - Principal Counsellor; ▪ Valentina VIȘAN – Senior Counsellor; ▪ Sergiu-Gabriel CRUCEANU - Senior Counsellor;

Title: "Romania's First Biennial Transparency Report to the United Nations Framework *Convention on Climate Change under the Enhanced Transparency Framework*"

- Edition closed (month/year): January 2026
- Cover Photo: *Landscape from Parâng Mount - Transalpina*

Distributed by/Available from:

- Distributed by Ministry of Environment, Waters and Forests
- Available in electronic form only
- Can be downloaded from: <https://unfccc.int/first-biennial-transparency-reports> -> Party: Romania
- Reproduction is authorized provided the source is acknowledged.



MINISTRY OF ENVIRONMENT,
WATERS AND FORESTS

Romanian Ministry of Environment, Waters and Forests
Libertății Boulevard 12, District 5, Bucharest, Romania
E-mail: schimbari_climatice@mmediu.ro
Internet: www.mmediu.ro
Phone: +4021 408 9542

LIST OF FIGURES

Figure I-1 GHG emissions/removals in Romania by sector, 1989 to 2023	11
Figure I-2 Share of the economic sectors in the GHG Inventory Total – 2023 year	12
Figure III-1 Administrative map of Romania	17
Figure III-2 Development regions map of Romania	18
Figure III-3 GDP growth rate during the period 2000-2023	21
Figure III-4 Evolution of GHG emissions relative to GDP	22
Figure III-5 Political map of Europe	23
Figure III-6 Physical map of Romania showing the Carpathian Mountains	23
Figure III-7 The main relief units of Romania	24
Figure III-8 Multiannual average of air temperature (in ° C) for the interval 1961-2021.	26
Figure III-9 Multiannual average of the amount of precipitation (in mm) for the interval 1961-2021.	27
Figure III-10 Evolutions of annual temperatures (in °C, top) and amounts of precipitation (in mm, bottom) for the interval 1901-2021.	27
Figure III-11 Average annual number of hot days (Tmax > 35 °C; A) and tropical nights (Tmin < 20 °C; B) for the period 1961-2020.	28
Figure III-12 Evolution of scorching heat intensity ($\sum T_{max \geq 32^{\circ}C}$, VI-VIII) in Romania in the period 1961-2020.	28
Figure III-13 Agricultural areas in Romania affected by drought	29
Figure III-14 Crude oil national pipeline system	33
Figure III-15 National Gas Transportation System	34
Figure III-16 Romanian electricity Transmission Network	36
Figure III-17 Total traffic in Constanta Port, 2018-2023 (thousand tons)	38
Figure III-18 Operating airports Romania, in 2024	40
Figure III-19 Dwellings stock by type of ownership and type of residence, in 2023	44
Figure III-20 The evolution of the number of localities with drinking water installations	46
Figure III-21 Evolution of the number of localities with sewerage facilities	46
Figure III-22 The evolution of the number of localities with a natural gas distribution network	47
Figure III-23 LULUCF Sector structure (%)	50
Figure III-24 Current national inventory system description	55
Figure III-25 BTR, National Communication, PaMs and Projections data and information flow	57
Figure III-26 Information flow for LULUCF sector according to GD 1415/2024 and Governance Regulation (EU) 2018/1999 ..	58
Figure III-27 Progress towards achieving climate targets in the EU-27	63
Figure III-28 Trends in GHG emissions and removals (including LULUCF) by sector, 1990–2023	108
Figure III-29 Structure of GHG emissions by gas type, 1990 vs. 2023	108
Figure III-30 Annual variation of GHG emissions compared to the previous inventory year and to the base year	109
Figure III-31 Trends in GHG emissions (including LULUCF) by sector, 1990–2023	112
Figure III-32 Structure of GHG emissions by sector (excluding LULUCF), 1990 vs. 2023	112
Figure III-33 Trends in GHG emissions for the Energy sector, 1990–2023	113
Figure III-34 Structure of GHG emissions by gas type for the Energy sector, 1990 vs 2023	113
Figure III-35 Trends in GHG emissions for the IPPU sector, 1990–2023	114
Figure III-36 Structure of GHG emissions by gas type for the IPPU sector, 1990 vs 2023	114
Figure III-37 Trends in GHG emissions for the Agriculture sector, 1990–2023	115
Figure III-38 Structure of GHG emissions by gas type for the Agriculture sector, 1990 vs 2023	115
Figure III-39 Trends in GHG emissions and removals for the LULUCF sector, 1990–2023	116
Figure III-40 Trends in GHG emissions for the Waste sector, 1990–2023	117
Figure III-41 Structure of GHG emissions by gas type for the Waste sector, 1990 vs 2023	117
Figure III-42 Total GHG emissions (including LULUCF) in the analysed scenarios, 2025-2050	139
Figure III-43 Total GHG emissions (excluding LULUCF) in the analysed scenarios, 2025-2050	140

Figure III-44 Historical (1989-2023) and projected (2024-2055) emissions and removals from the Cropland category broken down by pool under the "with existing measures" (WEM) scenario.....	146
Figure III-45 Historical (1989-2023) and projected (2024-2055) emissions and removals from the SOC pool in Cropland category under the "with existing measures" (WEM) scenario and with a 10% decrease in area affected by the policy	147
Figure III-46 Projected (2024-2038) areas of Cropland arable remaining Cropland under the "with existing measures" (WEM) scenario and with a 10% decrease in area affected by the policy	147
Figure IV-1 Trends (°C/decade) in the evolution of the average annual temperature in Romania (1961-2020):average temperature (top), minimum temperature (bottom left), maximum temperature (bottom right).....	150
Figure IV-2 Air temperature evolution at UAT level in the periods: 2021-2030 (top), 2031-2050 (middle) and 2071-2100 (bottom), according to climatic scenarios RCP 4.5 and RCP 8.5	151
Figure IV-3 Representation of future climate risk and its reduction for climate change adaptation	161

LIST OF TABLES

Table III-1 Counties grouping, by macroregion and development region	18
Table III-2 Population growth in Romania on July 1 of each year, 1990 -2023.....	19
Table III-3 Extreme dry/rainy years in Romania, in the period 1901-2022.....	29
Table III-4 Domestic Primary Energy Production (thou toe).....	32
Table III-5 Domestic primary energy consumption (thou toe)	33
Table III-6 Structure of electricity resources.....	36
Table III-7 Changes in the structure of Gross Value Added over the period 2000-2023 [%].....	41
Table III-8 Evolution of municipal waste generated between 2015 and 2022, tons	42
Table III-9 Composition of municipal solid waste, %	42
Table III-10 Number of warehouses in Romania in the period 2010-2023.....	42
Table III-11 Evolution of recycled and recovered waste quantities in Romania 2015-2021	43
Table III-12 Quantities of biodegradable waste from municipal landfills stored in 2018-2022.....	43
Table III-13 Evolution of the quantities composted between 2010-2023	43
Table III-14 Completed homes, according to the type of equipment and financing funds, in 2020	44
Table III-15 Number of dwellings, by type of facilities provided, in 2021	45
Table III-16 Number of animals reported in 2005-2021-2023.....	49
Table III-17 Livestock production, by product type, reported in 2005, 2021, 2022 and 2023	50
Table III-18 Land use in Romania	51
Table III-19 Description of the NDC of the EU	64
Table III-20 Indicator to track progress.....	66
Table III-21 Summary of progress towards implementing and achieving the NDC (see note 49)	67
Table III-22 Romania's annual emissions allocations for the effort sharing sector for 2021–2025, 2026-2030, corresponding emissions for 2021 to 2023 and their difference to emissions allocations	68
Table III-23 Summary of GHG emission reduction targets of Romania and the EU for the period 2021–2030.....	68
Table III-24 Evolution of GHG emissions and removals by gas type (kt CO ₂ e), 1989-2000.....	104
Table III-25 Evolution of GHG emissions and removals by gas type (kt CO ₂ e), 2001-2010.....	105
Table III-26 Evolution of GHG emissions and removals by gas type (kt CO ₂ e), 2011-2020.....	106
Table III-27 Evolution of GHG emissions and removals by gas type (kt CO ₂ e), 2021-2023.....	107
Table III-28 Evolution of GHG emissions and removals by sector (kt CO ₂ e), 1989-1999	109
Table III-29 Evolution of GHG emissions and removals by sector (kt CO ₂ e), 2000-2010	110
Table III-30 Evolution of GHG emissions and removals by sector (kt CO ₂ e), 2011-2020	110
Table III-31 Evolution of GHG emissions and removals by sector (kt CO ₂ e), 2021-2023	111
Table III-32 IPCC reporting categories and national classifications	124
Table III-33 Basis for projections and assumptions for all land use conversions and activity data in the LULUCF inventories	124
Table III-34 Annual land use category projections for all land use conversions, in kha. This table only shows annual land use conversions and not land remaining in a land use category as assumptions were applied at this level to create the projections in all scenarios	127
Table III-35 Evolution of GDP and GVA during 2020–2055 (billion Euro ₂₀₂₃).....	131
Table III-36 Structure of GVA by economic sectors, during 2020–2055 (%).....	131
Table III-37 Evolution of population, GDP per capita, and GVA in the period 2020–2055.....	132
Table III-38 Forecast of domestic primary energy consumption and final energy consumption [thousand toe]	133
Table III-39 Forecast of primary energy resources [thousand toe]	134
Table III-40 Tabular report of projected greenhouse gas emissions in the WEM scenario	135
Table III-41 Tabular report of projected greenhouse gas emissions in the WAM scenario.....	135
Table III-42 Greenhouse gas emissions (kt CO ₂ eq) in the WEM scenario, 2025-2050	136
Table III-43 Greenhouse gas emissions (kt CO ₂ eq) in the WAM scenario, 2025-2050.....	137

Table III-44 Greenhouse gas emissions (kt CO _{2eq}) in the WOM scenario, 2025-2050	138
Table III-45 Total GHG emissions (including LULUCF) in the analysed scenarios, 2025-2050	139
Table III-46 Total GHG emissions (excluding LULUCF) in the analysed scenarios, 2025-2050.....	140
Table III-47 Contribution of implemented PAMs, WEM scenario.....	141
Table III-48 Contribution of implemented PAMs, WAM scenario	141
Table III-49 Evolution of macroeconomic and energy indicators in the period 2023–2050.....	143
Table III-50 Evolution of the Gross Value-Added structure during 2023–2050.....	143
Table III-51 Evolution of GHG emissions in the period 2023 – 2050 (CO _{2eq})	144
Table IV-1 The ten warmest years between 1900 and 2019	149

LIST OF ABBREVIATIONS

ANMAP	National Agency for Environment and Protected Areas
ANRE	National Electricity and Heat Regulatory Authority
BTR	Biennial Transparency Report
CC	Climate Change
CISC	Inter-Ministerial Committee on Climate Change
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
CNR-CME	Romanian National Committee of the World Energy Council
CRF	Common Reporting Format
CRT	Common Reporting Table
CTF	Common Tabular Format
DAC	The OECD Development Assistance Committee
DG	Directorate General
EF	Emission Factor
EGO	Emergency Governmental Ordinance
ETF	Enhanced Transparency Framework
EU-ETS	Emission Trading Scheme
GCOS	Global Climate Observing System
GD	Governmental Degree
GDP	Gross Domestic Product
GEO	Government Emergency Ordinance
GEOSS	Global Earth Observation System of Systems
GHG	Green House Gas
GVA	Gross Value Added
IEE	Intelligent Energy Europe programme
IPCC	Intergovernmental Panel on Climate Change
IPCC 2006	IPCC Guidelines for National Greenhouse Gas Inventories
ISPE	Institute for Studies and Power Engineering
IVET	Initial Vocational Education and Training
JPI	Joint Program Initiative
KCA	Key Category Analysis
KP	Kyoto Protocol
LULUCF	Land Use, Land Use Change and Forestry
M/A	Mitigation/Adaptation
MADR	Ministry of Agriculture and Rural Development
MAE	Ministry of Foreign Affairs
MDLPA	Ministry of Development, Public Works and Administration
ME	Ministry of Energy
MEC	Ministry of Education and Research
MF	Ministry of Finance
MIPE	Ministry of Investments and European Projects
MMAP	Ministry of Environment Waters and Forestry

MPG	Modalities, Procedures and Guidelines
NDC	Nationally Determined Contribution
MS	Member States
NAQ	National Authority for Qualifications
NAPCC	National Action Plan for Climate Change
NCCC	National Commission on Climate Change
NECP	National Integrated Energy and Climate Changes
NEPA	National Environmental Protection Agency
NGHGI	National Greenhouse Gas Inventory
NGO	Non-Governmental Organization
NIR	National Inventory Report
NIS	National Institute for Statistics
NMA	National Meteorological Administration
NPS	National Power System
NSCC	National Strategy for Climate Change
NTS	National Transmission System
ODA	Official Development Assistance
OECD	The Organisation for Economic Co-operation and Development
OOF	Other Official Flows
PaM	Policies and Measures
PCF	Prototype Carbon Fund
PMU	Project Management Unit
PNAEE	National Action Plan on Energy Efficiency
PNRR	National Recovery and Resilience Plan
PTG	Power Transmission Grid
QA	Quality Assurance
QC	Quality Control
RCP	Representative Concentration Pathways (concentration scenario for GHG concentrations in future)
RES	Renewable Energy Sources
SIMIN	National Meteorological Integrated System
SME	Small and Medium Enterprises
UEFISCDI	Executive Unit for the Financing of Higher Education, Research, Development and Innovation (UEFISCDI)
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNECE	United Nations Economic Commission for Europe
WAM	with Additional Measures
WEM	with Measures
WOM	without Measures

TABLE OF CONTENTS

I.	EXECUTIVE SUMMARY.....	10
II.	National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases 15	
III.	Information necessary to track progress made in implementing and achieving nationally determined contributions under Article 4 of the Paris Agreement	16
A.	National circumstances and institutional arrangements	16
B.	Description of a Party's nationally determined contribution under Article 4 of the Paris Agreement, including updates	60
C.	Information necessary to track progress made in implementing and achieving nationally determined contributions under Article 4 of the Paris Agreement	62
D.	Mitigation policies and measures, actions and plans, including those with mitigation co-benefits resulting from adaptation actions and economic diversification plans, related to implementing and achieving a nationally determined contribution under Article 4 of the Paris Agreement.....	70
E.	Summary of greenhouse gas emissions and removals.....	103
F.	Projections of greenhouse gas emissions and removals.....	118
IV.	Information related to climate change impacts and adaptation under Article 7 of the Paris Agreement ...	148
	Introduction.....	148
A.	National circumstances, institutional arrangements and legal frameworks	152
B.	Impacts, risks and vulnerabilities	157
C.	Adaptation priorities and barriers.....	162
D.	Adaptation strategies, policies, plans, goals and actions to integrate adaptation into.....	163
E.	Progress on implementation adaptation	166
F.	Monitoring and evaluation of adaptation actions and processes.....	166
G.	Information related to averting, minimizing and addressing loss and damage associated with climate change impacts.....	168
H.	Cooperation, good practice, experience and lessons learned	169
V.	Information on financial, technology development and transfer and capacity building support provided and mobilized under Articles 9–11 of the Paris Agreement	170
A.	National circumstances and institutional arrangements	171
B.	Assumptions, definitions and methodologies	173
C.	Information on financial support provided and mobilized	174
D.	Information on support provided for technology development and transfer	174
E.	Information on support provided for the development of the capacity-building	175
VI.	Annex to the Biennial Transparency Report.....	175

I. EXECUTIVE SUMMARY

As well as the entire continent, Romania is equally impacted by the global warming. Climate change has caused widespread adverse impacts. Europe is facing the risk of more intense and frequent heatwaves, prolonged droughts, more intensive precipitation, lower average wind speeds and less snow.

Romania submits its First Biennial Report from Romania to the United Nations Framework Convention on Climate Change under the Enhanced Transparency Framework with a significant delay. Due to lack of financial resources, as well as a corresponding expertise capacity we succeed to initiate a technical cooperation with a team of experts only in August 2025 to elaborate the BTR1 of Romania.

The report is prepared based on the guidelines adopted by the United Nations Framework Convention on Climate Change (UNFCCC), the Paris Agreement, and Article 29.5(a) of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action. The National Inventory Report (NIR) – the national Inventory Document (NID) and the common reporting tables (CRTs) - associated with the Romanian First BTR is that submitted in April 2025¹ as a stand-alone document.

In Chapter II the document presents the national mitigation policies and measures, including the actual in force legislation adopted until 2025 which strengthens policies and measures to allow Romania to contribute to EU to meet the updated 2030 target and shows projections of greenhouse gas emissions and removals.

In Chapter III, the report describes the national efforts to adapt to the impacts of climate change and building resilience.

The Chapter IV presents the support provided by Romania to developing countries.

In the end Chapter V of the report includes the Annexes that provide information regarding the CRTs (Annex I) and CTFs (Annex II).

The European Union (EU) and its Member States are committed to achieving a climate- neutral EU by 2050, in line with the Paris Agreement. The EU Member States ratified the Paris Agreement with a joint and binding target of an economy-wide reduction of greenhouse gas (GHG emissions) by at least 40% by 2030, compared to 1990 levels.

In March 2020, the Council of the European Union adopted a long-term low GHG emission development strategy of the EU and its Member States reflecting this climate neutrality objective and submitted it to the UNFCCC Secretariat. Following the guidance by the European Council, in December 2020 the EU submitted a new and more ambitious climate target for the EU and its 27 Member States of a net domestic reduction of at least 55% in greenhouse gas emissions by 2030 compared to 1990.

On 30 June 2021, the EU adopted a regulation setting out a binding objective of climate neutrality in the EU by 2050 at the latest, aiming to achieve negative emissions thereafter, and establishing the legal framework for achieving climate neutrality - European Climate Law² and submitted its updated NDC of at least 55% net GHG emissions reductions by 2030, compared to 1990 levels, with the complete ICTU information, including information on the policy frameworks - “Fit for 55” package (FF55).

¹ <https://unfccc.int/ghg-inventories-annex-i-parties/2025>

² Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality.

The EU, in light of the first Global Stocktake (GST), submitted an updated Nationally Determined Contribution (NDC) ahead of COP30. The EU and its Member States, acting jointly, aim for an indicative GHG emissions reduction of 66.25–72.5% by 2035 compared to 1990 levels. This target is based on linear trajectories derived from the EU's climate goals for 2030 and 2050, as well as the 2030 target and the 2040 climate target set by the Council of the European Union.

Progress towards the target of the EU nationally determined contribution (NDC)

In this first Biennial Transparency Report (BTR), Romania reports on its progress towards achieving its contribution to the EU NDC target. Considering the EU NDC's scope, emissions have decreased by in 2023 being 37.2% lower than in 1990 (or 39% when only domestic net emissions are considered), while GDP was 71% higher, meaning that economic growth continues to decouple from emissions³.

Emissions and removals of greenhouse gases

The latest inventory figures show that the Romania's GHG emissions have continued to fall, with a reduction of -66.5% by 2023 compared to 1989, excluding the LULUCF sector, demonstrating a significant progress. This report provides detailed information on the emissions and removals of greenhouse gases in 2023 and shows the country's contribution in implementing and achieving the EU Nationally Determined Contribution (NDC) under the Paris Agreement.

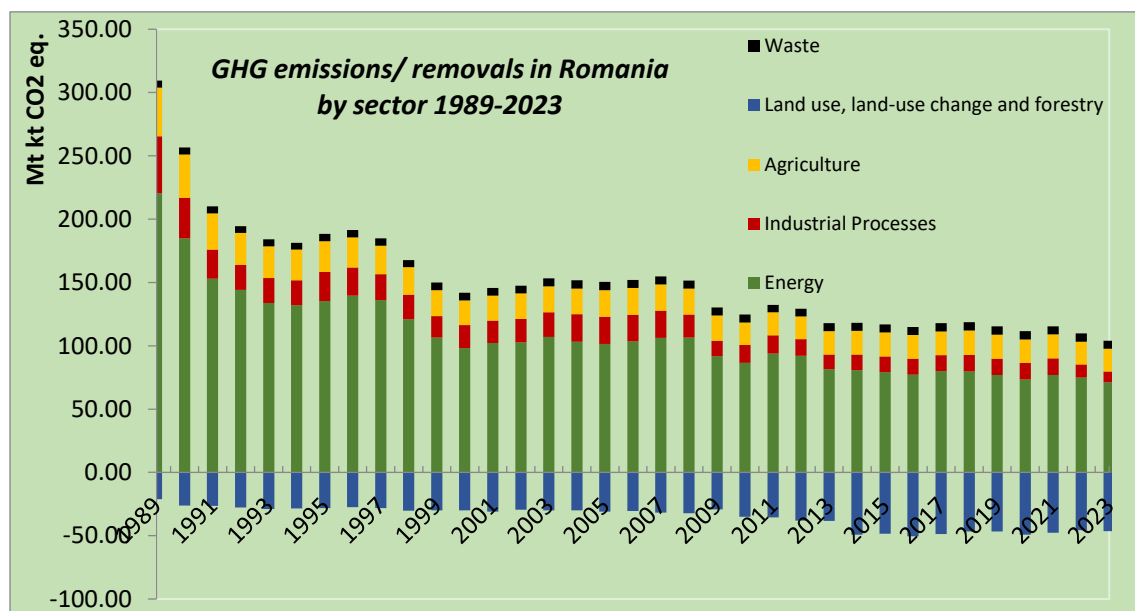


Figure I-1 GHG emissions/removals in Romania by sector, 1989 to 2023

Source: National GHG Inventory 15 April 2025 submission

Total GHG emissions in Romania decreased on the time series period due to the decrease in the use of coal, the increasing decarbonisation of the economy through the expansion of renewable energy, progress on energy efficiency and ambitious climate change mitigation policies. Between 1989 and 2023, net greenhouse gas emissions decreased by 80.1%. These net emissions exclude emissions from international aviation and navigation

³ <https://op.europa.eu/en/publication-detail/-/publication/2d756cf5-c4f4-11f0-8da2-01aa75ed71a1/language-en>

('international bunkers') and include emissions and removals from the Land Use, Land-use Change and Forestry (LULUCF) sector, which comprises a net sink as indicated by the above graph.

In 2023, without LULUCF, the energy sector accounted for 68.6% of GHG emissions, followed by agriculture (17.2%), industrial processes and product use (8.1%) and the waste sector (6.1%). Carbon dioxide is the principal GHG, contributing 65.3% of emissions. Methane accounts for 23.8%, nitrous oxide for 8.9% and fluorinated gases for 2.0% of emissions.

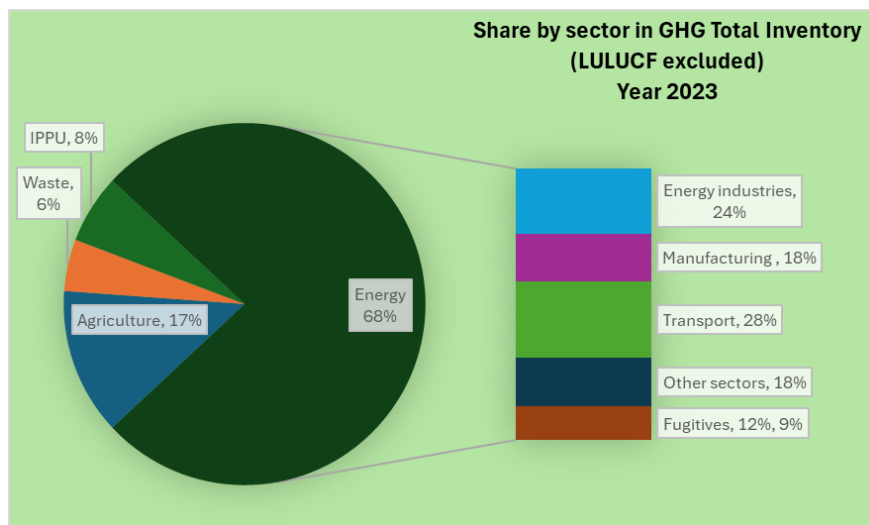


Figure I-2 Share of the economic sectors in the GHG Inventory Total – 2023 year

Mitigation policies and measures

The European Union's 2030 climate and energy framework is a set of policies to ensure that the EU and its Member States fulfil their climate change mitigation commitments under the Paris Agreement. This framework is governed by the European Climate Law, which includes the more ambitious 2030 climate target, provisions for developing a 2040 climate target, and the target of climate neutrality by 2050.

The EU emissions trading system (EU ETS) is a cornerstone of the 2030 climate and energy framework. It puts a price on carbon by setting a cap on the maximum number of emissions allowances in the energy and industrial sectors, and for specific flights and voyages in aviation and maritime transport. GHG emissions from these sectors must be reduced by 62% by 2030 compared to 2005 levels. Furthermore, emissions trading in the EU will be extended to cover emissions from fuel combustion in buildings, road transport and additional sectors (mainly small industry not covered by the existing EU ETS) as from 2027 with the creation of a Social Climate Fund, financed from the auction of emissions allowances to support the most vulnerable households and micro-enterprises. The cap will be set to bring emissions from those sectors down by 42% by 2030 compared to 2005 levels.

The Effort-sharing Regulation sets individual, binding reduction targets for EU Member States for emissions in sectors outside the EU ETS and the LULUCF sector, namely domestic transport (except aviation), buildings, agriculture, waste and small industries. In these sectors, GHG emissions must be reduced by 40% by 2030 compared to 2005 levels at EU level, with targets for individual Member States of reductions ranging from 10% to 50%. Its fair share target of Romania is to reduce the GHG emissions in the ESR sector **with 12.7% in comparison with 2005 level**.

The achievement of these targets is supported by several sector-specific policies and measures, including the Energy Efficiency Directive, the Renewable Energy Directive, and CO₂ emissions standards in road transport as well as supported through EU funding, including the Recovery and Resilience Facility, Cohesion Funds, Common Agricultural Policy, Modernisation Fund or Innovation Fund.

In the LULUCF sector, the LULUCF Regulation introduced an EU-wide net carbon removal target of 310 million tonnes of CO₂ equivalent by 2030. Each Member State has an individual binding target, ranging from -47 to +5 million tonnes of CO₂ equivalent, which taken together will achieve the EU's collective target. The average yearly net removals for the years 2016, 2017 and 2018, as reported in the 2020 greenhouse gas inventory submission, plus the additional -42 MtCO₂-eq net removals result in total net removals of -310 MtCO₂-eq at the EU level. Any methodological adjustments in the inventory data reporting will be taken into account in the compliance check against the 2030 target.

The LULUCF Regulation (EU) 2018/841 sets net emission removal targets for 2030 and net emission budgets in the period 2026 to 2029. **Romania must achieve the value of the greenhouse gas net removals in 2030 of - 25 665 kt of CO₂ equivalent.**

Projections of greenhouse gas emissions and removals

At EU level the latest projections of GHG emissions and removals show that net emissions in 2030 could be 47% below 1990 levels, in a scenario that includes the 'with additional measures' and when emissions from international aviation and navigation are considered. They could be 51% below 1990 levels if emissions from international aviation and navigation are excluded. Additional efforts, therefore, will be needed to achieve the - 55% emission reduction target of the EU NDC.

Romania's latest projections of GHG emissions and removals are based on the EU-level 2025 Comprehensive Review of the national GHG inventory, conducted pursuant to Article 38(1a) of Regulation (EU) No 2018/1999 and Articles 4(3) and 4(4) of Regulations (EU) No 2018/842 and No 2018/841, respectively; the review reports are available upon request. This approach was adopted to ensure consistent and highly accurate projections and a robust assessment of Romania's potential to achieve its GHG emission targets across ESR sectors. Due to time constraints, updates were limited to the reference and base years (1989, 1990, 2005, 2013, 2023), and CRT tables were generated for the projection scenario scope.

In the scenario with existing measures, the ESR sectors are projected to reach a level of 68,688 kt CO₂eq in 2030. This means that Romania is not on track to achieve its 2030 target of 68,299.811 kt CO₂eq (corresponding to a 12.7% reduction in GHG emissions compared to the 2005 base year, in accordance with ESR provisions). In the scenario with additional measures, the ESR sectors are projected to reach 60,197 kt CO₂eq in 2030, which means that Romania would, in this scenario, be on track to meet its 2030 target.

Preparedness for and resilience to climate change impacts

Under the European Climate Law, the European Union and Member States are required to ensure continuous progress in improving adaptive capacity, strengthening resilience and reducing vulnerability to climate change in accordance with Article 7 of the Paris Agreement.

As a result, the 2021 EU Strategy on Adaptation to Climate Change contains a wide range of initiatives and actions. EU Adaptation to Climate Change strategy paves the way for the EU to step up its international action for climate resilience.

Following the EU Adaptation Strategy, Romania adopted in 2024 its National Strategy on Adaptation to Climate Change (NAACC) for the period 2024–2030, with a vision to 2050, approved through Government Decision No. 1010/2024. The strategy sets out the general directions for reducing the vulnerability of natural and socio-economic systems and for increasing resilience to the impacts of climate change, aligning with the objectives of the Paris Agreement and the EU Strategy on Adaptation to Climate Change.

The NSACC has an extended perspective to 2050 and includes a National Action Plan on Adaptation to Climate Change (NAPACC), which details concrete measures, responsible institutions, implementation deadlines, and funding sources. The strategy targets sectors such as: water resources, forests and biodiversity, public health, energy, transport, agriculture, tourism, education, and cultural heritage, while also promoting nature-based solutions and an ecosystem-based approach to adaptation.

Support to developing countries

The Chapter on support contains information on financial support, technology development and transfer and capacity building provided by Romania in line with Articles 9-11 of the Paris Agreement. According to the UNFCCC, developed countries (listed in Annex II to the Convention) are obliged to finance measures related to combating climate change and to support developing countries in adapting to these changes. Romania is part of Annex I and not included in Annex II of the Convention and therefore is not subject to the obligations under Articles 4.3, 4.4 and 4.5. Romania implements aid programmes on a voluntary basis, contributing to the provisions of Article 9.2 of the Paris Agreement. Financial support is provided both through bilateral, regional and other channels, as well as through multilateral channels. Detailed information on Romania's financial support in 2021 and 2022 can be found in Table 1 and Table 2 of Annex III.

II. National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases

Romania, as a party to the United Nations Framework Convention on Climate Change (UNFCCC) and to the Paris Agreement, reports annually on GHG inventories for the years from 1989 to the current calendar year (t) minus two (t-2), for emissions and removals within its territory.

The GHG inventory data presented in this chapter of the Biennial Transparency Report (BTR1) is consistent with the GHG inventory of Romania submitted in its 2025 annual submission of the National Inventory Report. Further details are given in the common reporting tables and the National Inventory Document, a stand-alone document⁴.

Instead, the projections are calculated having the reference the revised figures of the Romania's National Inventory resulted from the comprehensive review at EU level under the Effort Sharing Regulation provisions. The reports of the TERT review are annexed to this report.

⁴ <https://unfccc.int/ghg-inventories-annex-i-parties/2025>

III. Information necessary to track progress made in implementing and achieving nationally determined contributions under Article 4 of the Paris Agreement

A. National circumstances and institutional arrangements

1. National circumstances

Governmental and administrative structure

Romania is a presidential Republic based on the principle of separation and balance of powers in the state - legislative, executive, and judicial - under the rules of constitutional democracy.

“Legislative power is exercised by the Parliament, which consists of the Chamber of Deputies and the Senate. The Chamber of Deputies and the Senate are elected for a four-year term and have as their main responsibilities the adoption of laws and the state budget. Legislative initiative (i.e., the submission of draft laws) may come from members of Parliament, members of the Government, or from citizens, provided that a draft law is supported by at least 100,000 citizens with voting rights from at least a quarter of the country's counties.

The executive power is exercised by the Government, which is responsible for enforcing laws. The Government is composed of the Prime Minister, ministers, and other members appointed by organic law. The Prime Minister is nominated by the President, following consultations with the party or parties holding the parliamentary majority. The Prime Minister then proposes a list of ministers for parliamentary approval. The Government is politically accountable solely to Parliament for its entire activity.

The President of Romania is elected by universal, equal, direct, secret, and freely expressed vote. The President's term of office is five years, and no individual may serve more than two consecutive terms. The President's fundamental role is to act as a mediator between the powers of the state and between the state and society. The President's duties include: appointing the Prime Minister; promulgating laws (by countersigning them to allow their entry into force); dissolving Parliament once per year, if Parliament has twice rejected a proposed government; serving as the Commander-in-Chief of the armed forces; concluding international treaties and submitting them to Parliament for approval; issuing decrees; conferring decorations and honorary titles; and granting pardons.

Judicial power is exercised by the High Court of Cassation and Justice, which ensures the consistent interpretation and application of the law by all other courts. Judges are independent from political power and are irremovable (they may not be transferred, suspended, or dismissed except by the Superior Council of Magistracy).

The Superior Council of Magistracy, composed of 19 members serving six-year terms⁵, guarantees the independence of the judiciary. It also acts as a disciplinary body for judges and prosecutors.

The Public Ministry represents the general interests of society, defends the rule of law, and protects citizens' rights and freedoms. It exercises its authority through public prosecutors, organized within public prosecutor's offices.

⁵ Romanian Senate; Romanian Constitution: <https://www.senat.ro>

Administrative institutions at territorial level

According to the Constitution, in terms of administration, Romania's territory is organized in counties, towns and communes, some towns being declared municipalities. Romania has 41 counties and the capital city of Bucharest, which has a similar status to that of the county (Figure III-1). The 41 counties are structured in 2,861 communes (for rural areas) and 320 cities (for urban areas), out of which 103 are municipalities. Communes are divided into villages (which lack individual administration and therefore cannot be considered administrative divisions). Bucharest capital has an official division into six sectors, each sector having a sectoral town hall and a council⁶.

The Prefect, appointed by the Government for each county, as well as for Bucharest, is the representative of the Government at local level and directs the decentralized public services of ministries and other central public administration bodies in the territorial - administrative units.

The public administration authorities through which local autonomy is achieved in communes, towns and municipalities are the local, communal, town and municipal councils, which have deliberative authority, and the mayors, who are executive authorities. The mayor's term of office is 4 years⁷.

The county council coordinates the activities of the communal and town councils to provide public services for the county.



Figure III-1 Administrative map of Romania

According to the law no. 315/2004 on regional development in Romania, 8 development regions have been established on the territory of Romania because of a free agreement between the county and local councils, corresponding to the level NUTS-2 (Nomenclature of Territorial Units of Statistics) of EU divisions but without regional administrative capacities (Figure III-2). They were grouped into four development macroregions.

⁶ Ministry of Regional Development, Public Administration and European funds: http://www.dpfbl.mdrap.ro/nr_uat-uri.html (accessed in October 2017)

⁷ Law no. 215/2001 – Local public administration law

Macroregions are not administrative and territorial units and do not have legal personality, they are set up to ensure the collection, compilation, and transmission of harmonized regional statistics at EU level. The development regions refer to the regional subdivisions of Romania, created in 1998, and operate, mostly, for the coordination of regional development projects.

The development regions are presented in Table III-1 Counties grouping, by macroregion and development region:

Table III-1 Counties grouping, by macroregion and development region

Macroregion	Development region
MACROREGION 1	North - West
	Centre
MACROREGION 2	North - East
	South - East
MACROREGION 3	South - Muntenia
	Bucharest - Ilfov
MACROREGION 4	South - West Oltenia
	West



Figure III-2 Development regions map of Romania

*source: cursdeguvernare.ro*⁸

The eight territorial development regions have been created by gathering several counties and have the following structure⁹:

⁸<https://cursdeguvernare.ro/proгноza-cnp-romania-celor-2-viteze-trei-regiuni-se-vor-apropia-in-2018-de-nivelul-mediunational-de-dezvoltare-iar-alte-trei-se-vor-indeparta.html> (accessed in November 2025)

⁹ National Institute of Statistics, Final results of the 2021 Population and Housing Census

1. **The North-East Development Region** includes the counties Bacău, Botoșani, Iași, Neamț, Suceava, Vaslui, and has 3,226,436 inhabitants in 2021 and an area of 36853 km², the headquarter of Regional Development Agency at Piatra Neamț, density 100 inhabitants /km², the biggest city Iași.
2. **The South-East Development Region** includes the counties Brăila, Buzău, Constanța, Galați, Tulcea, Vrancea, and has 2,367,987 inhabitants in 2020 and an area of 35,762 km², the headquarter of Regional Development Agency at Braila, density 66 inhabitants/km², the biggest city Constanta.
3. **The South-Muntenia Development Region** includes the counties Prahova, Dâmbovița, Argeș, Ialomița, Călărași, Giurgiu, Teleorman, and has 2,864,339 inhabitants in 2021 and an area of 34,489 km² the headquarter of Regional Development Agency at Călărași, density 83 inhabitants/ km², the biggest city Ploiesti.
4. **South-West Development Region Oltenia** includes the counties Mehedinți, Gorj, Vâlcea, Olt, Dolj and has 1,873,607 inhabitants in 2021 and an area of 29,212 km² the headquarter of Regional Development Agency at Craiova, density 64 inhabitants /km², the biggest city Craiova.
5. **The West Development Region** includes the counties Arad, Caraș-Severin, Timiș and Hunedoara and has a population of 1,668,921 inhabitants in 2021 and an area of 32,028 km² the headquarter of Regional Development Agency at Timisoara, density 52 inhabitants /km², the biggest city Timisoara.
6. **The North-West Development Region** includes the counties Bihor, Bistrița-Năsăud, Cluj, Maramureș, Satu-Mare and Sălaj and has 2,521,793 inhabitants in 2021 and an area of 34,159 km² the headquarter of Regional Development Agency at Cluj Napoca, density 73 inhabitants /km², the biggest city Cluj- Napoca.
7. **The Centre Development Region** includes the counties Alba, Sibiu, Mureș, Harghita, Covasna, and Brașov and has 2,271,067 inhabitants in 2021 and an area of 34,100 km² the headquarter of Regional Development Agency at Alba Iulia, density 66 inhabitants / km² the biggest city Brasov.
8. **The Bucharest-Ilfov Development Region** includes the Municipality of Bucharest and Ilfov County and has 2,259,665 inhabitants in 2021 and an area of 1,811 km², the headquarter of Regional Development Agency at Bucharest, density 1247 inhabitants /km², the biggest city Bucharest (the capital of Romania).

Population profile

According to the results of the 2021 Population and Housing Census, carried out according to the provisions of Regulation (EC) no. 763/2008 of the European Parliament and of the Council on the Population and Housing Census, Romania had a population of 19,140,432 inhabitants in 2021, out of which 9,808,275 were women (51.2%). From the 2011 census until now, Romania's population has continued to decrease constantly. The evolution of the Romanian population shows a decrease of approximately 5.3% between 2011 and 2023 (Table III-2).

Table III-2 Population growth in Romania on July 1 of each year, 1990 -2023

Year	1990	2005	2010	2011	2020	2021*	2022	2023
Population (mill. inhabitants)	23.207	21.320	20.247	20.122	19.262	19.140	19.053	19.065

Source: National Institute of Statistics-Statistical Yearbook-2024, * Final results of the 2021 Population and Housing Census

Based on the number of residents, the top 7 counties in 2021, not counting Bucharest (1,716,961 people), are: Iași (760,774 people), Prahova (695,119 inhabitants), Cluj (679,141 inhabitants), Constanța (655,997 inhabitants), Timiș (650,533 inhabitants), Suceava (642,551 inhabitants), and Dolj (599,442 inhabitants).

In terms of resident population, the counties with the smallest number in 2021 are: Tulcea (193,355 inhabitants), Covasna (200,042 inhabitants), Sălaj (212,224 inhabitants), Mehedinți (234,339 inhabitants), Ialomița (250,816 inhabitants) and Giurgiu (262,066 inhabitants).

The main causes that led to the decrease of Romania's population by 18% in the period 1990-2021 were migration abroad (labour migration, in particular), rising mortality rates and declining birth rates during this period.

In 2021, 21.6% of Romania's population consisted of Romanians under the age of 20, while 58.9% of the population was between the ages of 20 and 64 years old, 11.8% of the population was between 65 and 74 years old, 7.7% of the population was over 75 years old¹⁰.

Life expectancy in 2020 was 79.75 years for women and 72.54 years for men. The average life expectancy in 2020 was 77.44 years in urban areas (74.09 years for men, 80.6 years for women) and 74.41 years in rural areas (70.69 years for men, 78.60 years for women).

The number of Romanians who emigrated abroad in 2018, 2019 and 2020 varied between 192,631 and 233,736 people, which represented approximately 1% of Romania's population. Population migration has a negative influence on the development of economic activity in Romania, because the largest part of the people who go abroad for a job are young and active people.

Economic profile

Romania joined the European Union in January 2007. The Romanian economy is a market-based economy, promoting freedom of trade, protection against unfair competition, stimulation of domestic and foreign investments and protection of private property.

Romania's economic development is closely linked to global economic development and that of the European Union, taking place in a particularly complex international environment affected by economic problems at national and global level as a result of the war in Ukraine and international conflicts.

The analysis of the Gross Domestic Product (GDP) evolution during 2000 – 2012, revealed that the Romania economy experienced three separate periods and respectively: the period 2000 – 2008 of development when the annual average percentage of growth of the GDP was 6.27%, the period 2009 - 2010 of recession and the period 2011 – 2012 of coming out from recession (Figure III-3). After 2012, there was a period of strong and stable economic growth until 2017. In 2020, there was another significant decline, to –3.7%, caused by the effects of the COVID-19 pandemic. Starting in 2021, with the resumption of economic activity, a solid recovery is observed, which, however, slows down towards 2023, reflecting inflationary pressures, a decline in aggregate demand in the economy, and the unstable global economic context.

¹⁰ National Institute of Statistics; Final results of the 2021 Population and Housing Census

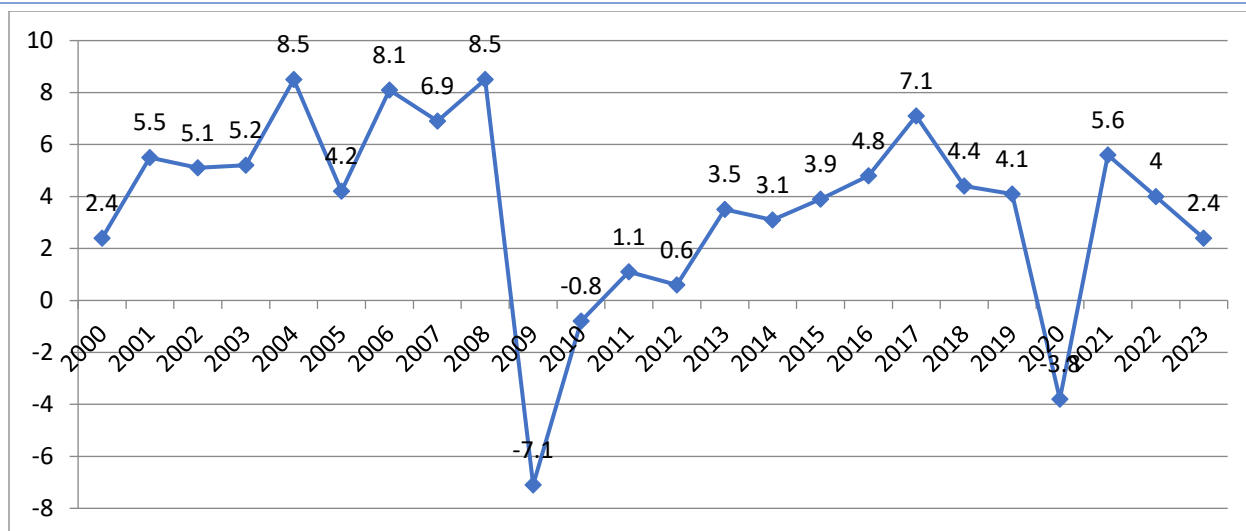


Figure III-3 GDP growth rate during the period 2000-2023

Source: National Institute of Statistics - Statistical Yearbook of Romania - collection

Romania's main export products are machinery and equipment, metals and metal products, chemicals, agricultural products, and minerals. In terms of export structure, the main categories in 2023 include: machinery, electrical appliances and equipment, sound and image recording or reproduction devices (28.2%); means of transport and transport equipment (16.6%); base metals and articles thereof (8.8%); vegetable products (7.1%); plastics, rubber, and articles thereof (6.2%); mineral products (5.5%)¹¹.

The sectors representing 72.9% of total imports are: machinery, electrical appliances and equipment, sound and image recording or reproduction devices (26.3%); transportation equipment and materials (10.8%); chemical products (10.4%); base metals and articles thereof (10.1%); mineral products (8.8%); plastics, rubber, and articles thereof (6.5%)¹². Compared to 2022, in 2023 Romania's imports increased by 2.1% for means and materials of transport and by 1.9% for machinery, electrical appliances and equipment, sound and image recording or reproduction devices, but decreased by 3.9% for mineral products.

The official currency in Romania is "LEU" (plural lei). 1 leu (RON)=100bani (ban)

According to data provided by the National Agency for Employment, the number of registered unemployed in 2023 was 455,600, down from 464,400 in 2022 and 459,200 in 2019. The unemployment rate remained constant at 5.6% in both 2022 and 2023.

Figure III-4 shows the evolution of GHG emissions and GDP in Euro between 2015 and 2023. GHG emissions per unit of GDP continue to decrease due to technical improvements, the implementation of reduction policies and the structural change in GDP.

¹¹ National Institute of Statistics – Romanian Statistical Yearbook 2024

¹² National Institute of Statistics – Romanian Statistical Yearbook 2024

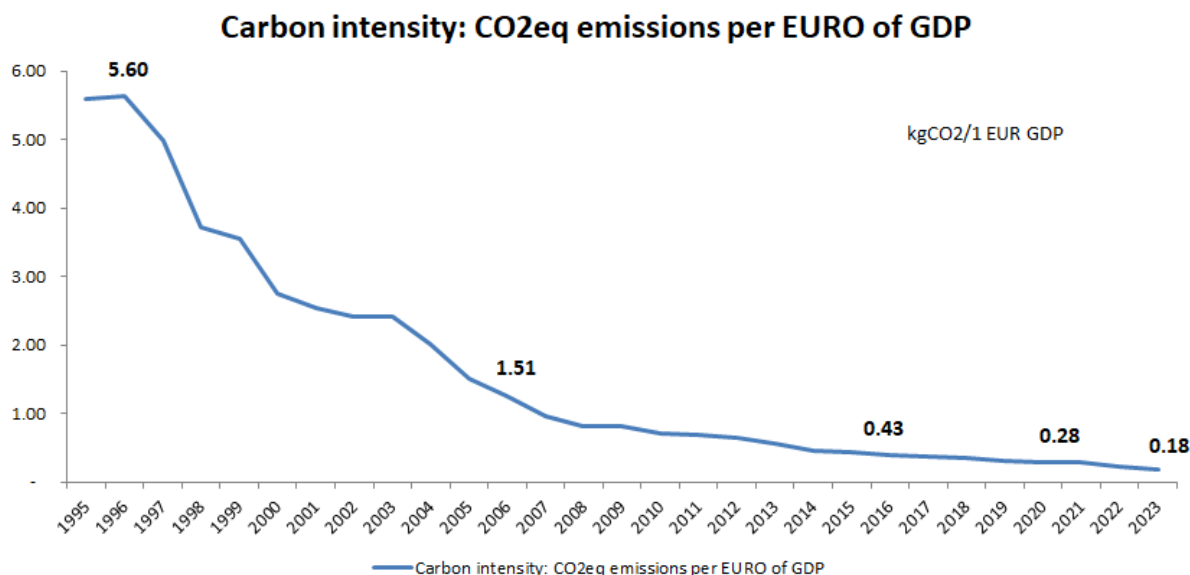


Figure III-4 Evolution of GHG emissions relative to GDP

Sources: Eurostat - Gross domestic product (GDP/PIB) and main components (output, expenditure and income), INEGES

Geographic profile

D.1. Geographical position

Romania is situated in the northern hemisphere; at the intersection of 45° parallel Northern latitude with the 25° meridian Eastern longitude.

In Europe, Romania is situated in the South-Eastern Central Europe, half the distance between the coast of the Atlantic Ocean and the Ural Mountains, inside and outside the Carpathians arch, within the lower basin of the Danube, having a gateway to the Black Sea.

The Romanian territory is between parallels 43°37'07" and 48°15'06" Northern latitude and between meridians 20°15'44" and 29°41'24" Eastern longitude. Having an area of 238,391 km², plus 23,700 km² represented by the Black Sea platform, it is the 13th largest country in Europe.

Romania's neighbours are Ukraine to the North, Republic of Moldova to the East (the complete border being represented by the Prut River), Bulgaria to the South (mainly being a fluvial border, the Danube River), Serbia to the South-West, and Hungary to the West.

The Romanian borders stretch on a distance of 3,149.9 km, out of which, in 2007, 1,876 km became EU borders (towards Serbia, Moldova and Ukraine).

The Black Sea border measures 194 km along the continental platform and 245 km on shore, the Romanian Black Sea coast stretching out between the border with Ukraine (Musura) and the border with Bulgaria (Vama Veche). The exit to the sea enables waterway connections with the countries in the Black Sea basin and the rest of the world. Figure III-5 presents the political map of Romania.



Figure III-5 Political map of Europe

The total length of Romania's frontiers is 3,149.9km, out of which 1,085.5 km land and 2,064.3 km rivers and sea.

D.2. Relief

The relief of Romania has three major morphologic steps, proportionately distributed in the form of an amphitheatre. The high step, of the Carpathians (the highest peak Moldoveanu 2,544 m), the medium step, corresponding to the Sub-Carpathians, hills and plateaus and the low step, of the plains, river meadows and Danube Delta (the youngest relief unit, continuously developing and with an average altitude of 0.52 m). The main characteristic of these relief components is their proportional distribution in form of an amphitheatre, characterized by four elements: variety, proportionality, complementary and symmetrical layout, with approximately equal distribution of the main relief units (35% mountains, 35% hills and plateaus and 30% plains) (Figure III-6).

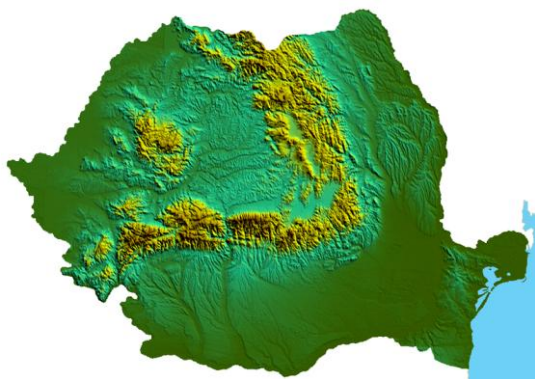


Figure III-6 Physical map of Romania showing the Carpathian Mountains

source: https://en.wikipedia.org/wiki/Geography_of_Romania

The Carpathians have an area of 66,303 km², which represents approx. 27.9% of the total area of the country, on a length of 910 km.

In eastern and southern regions there are three large plateaus (Moldova, Dobrogea and Getic) and Mehedinți Plateau, while two great plains lay in the south and west, the Romanian Plain (narrowed towards East) and the Western Plain (Figure III-7).

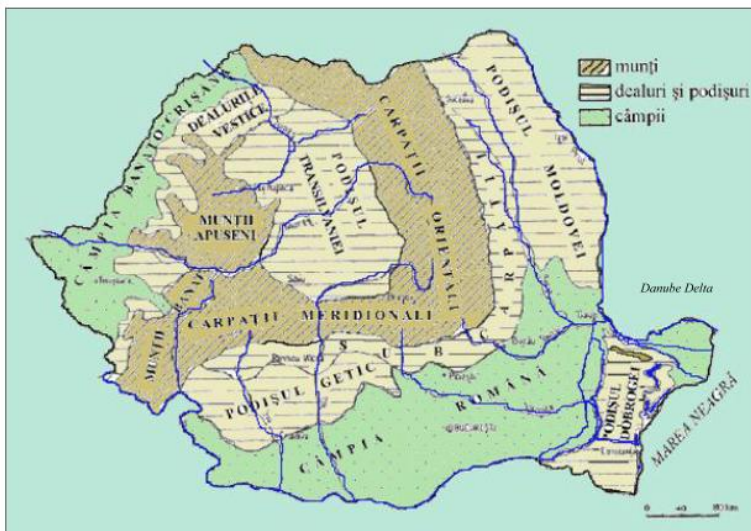


Figure III-7 The main relief units of Romania

D.3. Black Sea

The Black Sea is Romania's gate towards seas and oceans, and Black Sea seaside and coast area offers a variety of conditions for harnessing the underground (petroleum, natural gas), aquatic (the fish fauna) and land riches (tourism and leisure). The Black Sea exit gives Romania the possibility of developing the waterways transport.

D.4. Danube and Danube Delta

The Danube, the second longest river in the European Union after the Volga, flows into the Black Sea within Romania's territory forming the Danube Delta, a region with a medium-low altitude (31 cm), the biggest part of this area being under water.

The Danube Delta is the second largest (total surface of 4,178 km²) and best-preserved delta in Europe. The Danube delta hosts over 300 species of birds as well as 45 freshwater fish species in its numerous lakes and marshes.

Lakes are interconnected by narrow channels featuring huge expanses of aquatic vegetation. This is the largest continuous marshland in Europe and the second-largest delta (the Volga being the largest), which includes the greatest stretch of reedbeds in the world. The marsh vegetation is dominated by reeds which form floating or fixed islands of decaying vegetation. Reeds cover some 1,700 km² and the floating reed islands (plaur) 1,000 km², whereas the total area not inundated is only 148 km².

The Danube Delta has been included in the UNESCO World Heritage List in 1991 as a natural reserve of the biosphere.

D.5. Rivers

Romania benefits from all types of aquatic facilities: rivers and streams, lakes, groundwaters, marine waters. Romania's hydrographical and hydrological peculiarities are determined mainly by its geographic position within the temperate continental climate and the presence of the Carpathian arch.

A large part of Romania's border with Serbia and Bulgaria is formed by the Danube. The Prut River, one of its major tributaries, forms the border with the Republic of Moldova. Other major rivers are the Siret (596 km), the Olt (614 km), the Someş (388 km), and the Mureş (761 km).

D.6. Natural mineral resources

Given the variety and complexity of the geologic structures, the Romanian territory has optimum conditions to accumulate useful mineral substances: gold and silver deposits, bauxite ore deposits, mineral combustible deposits, salt deposits and salts, useful rocks, mineral waters, geothermal waters, etc. Important reserves of hydrocarbons, gases and coals are quartered within the platform areas and in the intermountain depressions (Transylvania, Pannonian).

A special category of subsoil riches consists of more than 2,000 mineral water springs, with consumption and medical treatment characteristics.

The mineral water is a renewable resource, but insufficiently capitalized, even though some of the mineral water springs received world appreciation for their quality. From the total mineral water reserve of 122,000 m³/day, which can be bottled, about 40% is capitalized.

D.7. Biodiversity

The vegetation varies, with a high tendency of diversity. The following three areas of vegetation may be distinguished: alpine, forest and steppe. The alpine vegetation from mountain areas is very vulnerable to environmental factors and anthropogenesis ones, as they regenerate in an extremely difficult manner. Therefore, some species are only a few left and are easily disappearing as a result of the activity of the interfering factors. The main dangers are uncontrolled pasturage and tourism.

The steppe and silvo-steppe vegetation spreading in areas short on humidity on Dobrogea's Plateau, the Romanian Plain, Moldova's Plateau and West Plain, were mostly replaced by agricultural cultures.

The significant variety of the flora and fauna in Romania derives from the complexity of the relief. Romania's flora and fauna are harmoniously divided and form a highly valuable wealth, based on controlled and rational exploitation. Romania is a country with a great biological variety and a high percentage of natural ecosystems. The fauna is rich in species, some protected, as the black goat, bear, rock aquila, lynx, blackcock, birch cock and other species that present hunting interest.

Romanian forests preserve a genetic fund of great diversity. To preserve this valuable natural capital and to ensure a favourable conservation status for natural habitats of great natural and community importance, Romania has taken important steps, by implementing the legislative elements specific to the European Union, as well as of some programs and projects dedicated to preserving the biodiversity.

In Romania there are protected areas comprising of 79 scientific reservations, 13 national parks, with the largest one named Domogled - Valea Cernei, 190 natural monuments, 671 natural reservations, 15 natural parks

(including Danube Delta) 3 biosphere reservations (Danube Delta, Retezat and Rodna) and 273 sites of communitarian importance.

Climatic profile

Romania's climate is transitional temperate continental, with oceanic influences from the west, Mediterranean influences from the southwest and strong continental effects from the northeast. Climatic variations are modulated by geographical characteristics: the position of the Carpathians, the altitude, the proximity of the Black Sea (figure 2-9 and 2-10).

E.1. Temperature

The average annual temperature varies by latitude and altitude, from 8 °C in the north to 11 °C in the south, and from about 2.6 °C in the mountains to 11.7 °C in the plains (see Figure III-8). In the last 121 years, the warmest year was 2019 (with an average temperature of 12.1 °C) and the coldest one was 1940 (with an average temperature of 8.1 °C). The absolute minimum temperature of - 38.5 °C was recorded in Bod, Braşov on 25th of January 1942. The absolute maximum temperature of 44.5 °C was recorded in Ion Sion village (Bărăgan plain) on 10th of August 1951. During the period 1901-2021, the annual average air temperature increased by more than 1 °C (see Figure III-10). The upward trend has been stronger, especially since the 1980s.

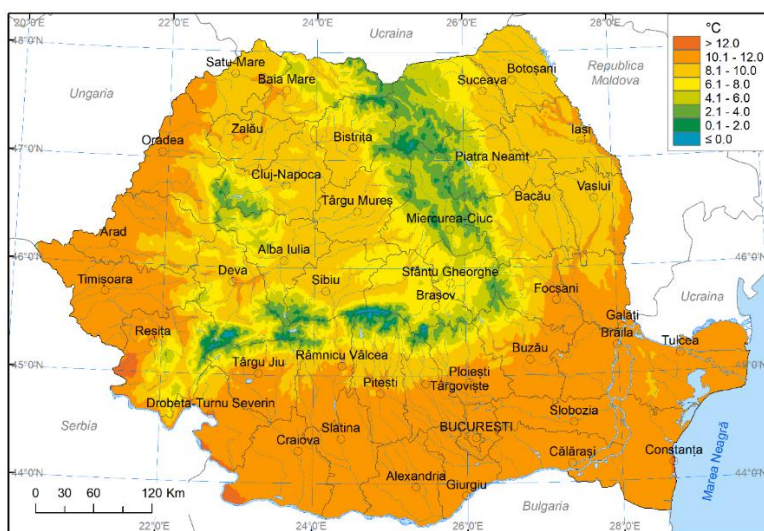


Figure III-8 Multiannual average of air temperature (in °C) for the interval 1961-2021.

E.2. Precipitations

Average annual precipitation amounts generally vary between values below 400 mm and above 1200 mm (see Figure III-9).

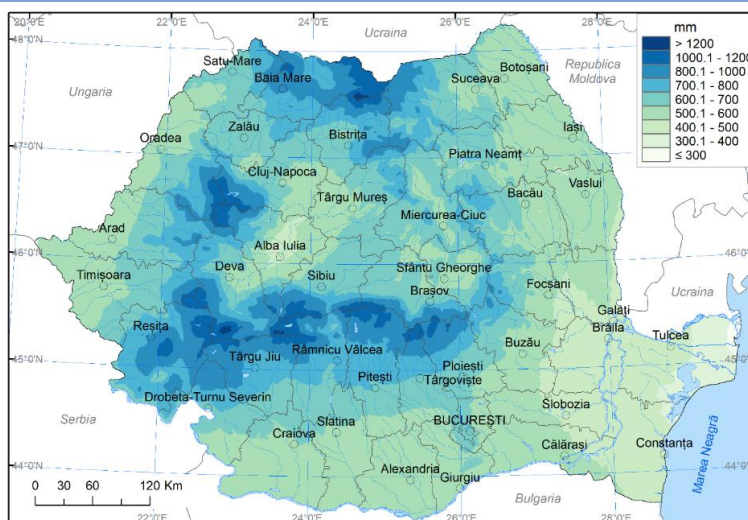


Figure III-9 Multiannual average of the amount of precipitation (in mm) for the interval 1961-2021.

The highest annual amount of precipitation recorded in Romania was 2401.5 mm in 1941, at the mountain station Vîrful Omu. The highest monthly amount of precipitation - 588.4 mm - was recorded in June 2011 at the mountain station Bâlea Lac. The absolute maximum value of the amount of precipitation in 24 hours was recorded at the meteorological station Deva, on 19.07.1934. In the context of precipitation variability, the year 2015 is one with the most abundant precipitation amount. The convective season of the year 2005 recorded several unusual meteorological events in Romania: flash floods, hail, intense lightning and many severe events with wind intensifications, such as tornadoes, downdrafts, waterspouts and funnel clouds. The annual amount of precipitation does not show a significant trend in the period 1901-2021 (see Figure III-10).

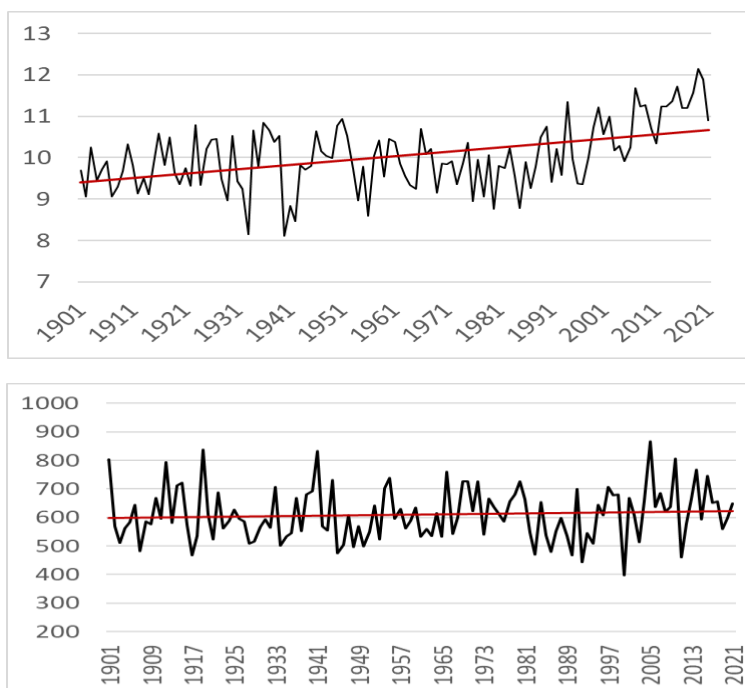


Figure III-10 Evolutions of annual temperatures (in °C, top) and amounts of precipitation (in mm, bottom) for the interval 1901-2021.

E.3. Other observed phenomena

The annual number of hot days and tropical nights increased in the period 1991-2020 compared to 1961-1990, and their evolution in Romania shows a significant change in the years 1987-1988 (Figure III-11). The increases in the number of hot days and tropical nights are higher in the southern, western, and south-eastern plain regions of the country. The number of frost days has decreased, especially in the north, east and southeast of the country, but also in some areas in the south and in the Apuseni Mountains (Bojariu et al. 2021).

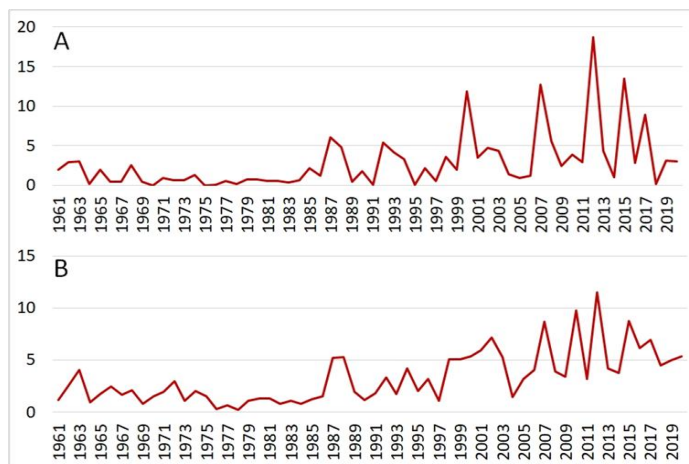


Figure III-11 Average annual number of hot days ($T_{max} > 35^{\circ}\text{C}$; A) and tropical nights ($T_{min} < 20^{\circ}\text{C}$; B) for the period 1961-2020.

Average annual number of hot days ($T_{max} > 35^{\circ}\text{C}$; A) and tropical nights ($T_{min} < 20^{\circ}\text{C}$; B) for the period 1961-2020. For the number of hot (tropical) days, the data from 61 (70) stations with a complete string, covering the territory of Romania, were used (according to Bojariu et al., 2021).

The evolution of the scorching heat intensity in Romania between 1961 and 2021 indicates an increasing trend, especially after 1981. Considering the multi-year averages of the scorching heat intensity, a phenomenon quantified by the sums of air temperatures equal to or greater than 32°C recorded in the summer, a significantly higher thermal stress was found in the critical interval for crops (June-August) in more recent years. Thus, there is an increase in the multiannual average of scorching heat intensity from 13 units in the interval 1961-1990 to 44 units, in the interval 2011-2020 (Figure III-12). From 1901 to the present, Romania had in each decade from one to four extreme dry/rainy years, with an increasing number of droughts being identified after 1981 (Table III-3).

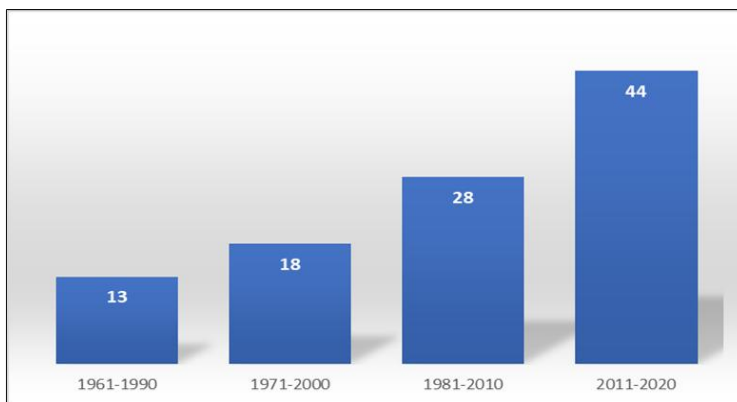


Figure III-12 Evolution of scorching heat intensity ($\sum T_{max} \geq 32^{\circ}\text{C}$, VI-VIII) in Romania in the period 1961-2020.

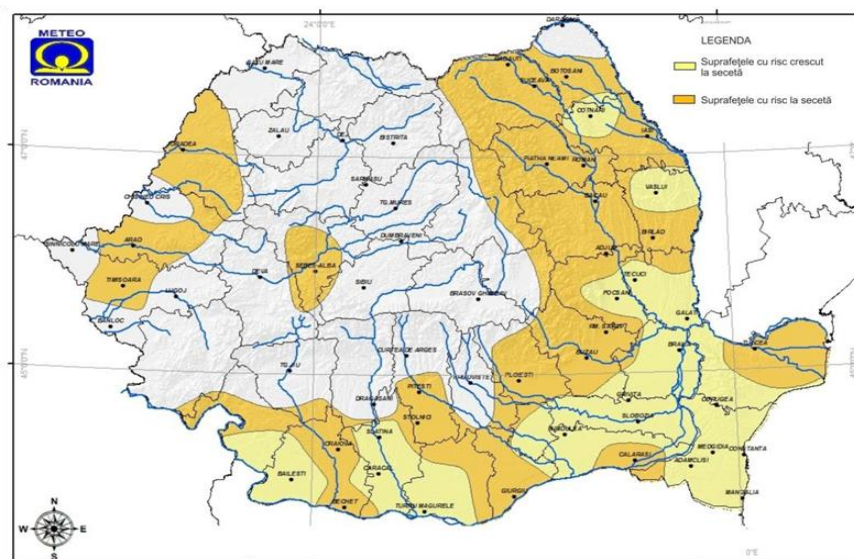


Figure III-13 Agricultural areas in Romania affected by drought

The analysis of the annual amounts of precipitation showed that the multi-annual average at the level of agricultural areas in Romania is 583.0 mm in the period 1961-1990, 569.8 mm in the period 1971-2000, and 575.1 mm in the period 1981-2010, which makes the rainfall regime in Romania moderately dry (less than 600 mm / year) from the point of view of farmers. The region of Dobrogea (south-eastern Romania) is the driest

region from the agricultural point of view, with the following multiannual averages of precipitation amounts recorded between 1 September and 31 August of the next year (agricultural year): 400.9 mm for 1961-1990, 397.7 mm for 1971-2000 and 410.2 mm for 1981-2010. In each agricultural region, the frequency of years with low annual precipitation varies from 37.4% in Banat - Crișana (western Romania) to 91.2% in Dobrogea (south-eastern Romania). The 2021-2022 agricultural year recorded an average annual amount at the country level of less than 400 mm.

Table III-3 Extreme dry/rainy years in Romania, in the period 1901-2022

DECADE	EXTREME DROUGHTY YEARS	YEARS WITH EXTREME PRECIPITATION
XX CENTURY		
1901-1910	1907-1908	1910
1911-1920	1917-1918	1911, 1912, 1915, 1919
1921-1930	1923-1924, 1927-1928	1929
1931-1940	1934-1935	1937, 1939, 1940
1941-1950	1945-1946, 1947-1948, 1949-1950	1941, 1944, 1947
1951-1960	1952-1953	1954, 1955, 1957, 1960
1961-1970	1962-1963, 1964-1965	1969, 1970
1971-1980	1973-1974, 1975-1976	1972, 1974, 1975, 1976
1981-1990	1982-1983, 1985-1986, 1987-1988, 1989-1990	1981, 1990
1991-2000	1992-1993, 1999-2000	1991, 1997
XXI CENTURY		
2001-2010	2000-2001, 2001-2002, 2002-2003, 2006-2007, 2008-2009	2005, 2006, 2008, 2010
2011-2020	2011-2012, 2014-2015, 2015-2016, 2016-2017, 2017-2018, 2019-2020, 2021-2022	2013

Areas characterized by arid, semi-arid or sub-humid climate cover about 30% of the total surface of Romania, and they are situated in Dobrogea, Moldova, southern Romanian Plain and Western Plain (Figure III-13). These areas are mainly used for agriculture (about 80% of the total, 60% of which are arable lands), forestry (about 8%) and water resources (Ministry of Agriculture and Rural Development, 2008).

Energy

In the more than 35 years since 1990, the Romanian energy industry has been put in a position to face the economic changes that have marked Romania, most of them being characterized by the general restriction of energy-consuming economic activities.

Through Romania's accession to the European Union, the concept of energy independence was supplemented and gradually replaced by that of energy security. The main challenge for the energy sector consists in reconfiguring the energy system and reforming the energy market to face market competition.

An additional long-term challenge for the Romanian energy sector will be to contribute to the achievement of the European Union's objective of becoming the first neutral continent with "net zero" emissions.

From 1990 until now, the Romanian energy sector has continuously transformed, with several capacities for the exploitation of primary energy resources, as well as to produce electricity and thermal energy, being closed. The main reasons for these closures were related to the general reduction of economic activities, the low degree of profitability or the failure to adapt to the new environmental conditions.

Although part of the activities in the field have been privatized or concessioned to private investors, a significant part is still under state control.

Although some of the activities in the field have been privatized or concessioned to private investors, a significant part is still under state control.

The electricity sector in Romania consists of the following operators and companies:

- the transport network and the system operator (CN Transelectrica SA)
- the electricity market operator (OPCOM is a subsidiary of Transelectrica)
- electricity producers in dispatchable units (16)
- electricity producers in non-dispatchable units but who also participate as suppliers on the competitive market (10)
- prosumers (267,000 existing in November 2025 with an installed capacity of 3,128 MW)
- distribution network operators (8)
- traditional suppliers (5)
- electricity suppliers acting exclusively on the wholesale market (37)
- electricity suppliers (40)

Romania's Energy Strategy 2025-2035, with a view to 2050, approved by Government Decision No. 1491/2024, is a programmatic document that defines the vision and sets the fundamental objectives of the energy sector development process. The vision of Romania's Energy Strategy is to grow the energy sector in conditions of security, sustainability, economic growth, and accessibility. The energy sector must ensure the uninterrupted physical availability of energy products and services at an affordable price for consumers. Given the imperative of energy security, in which the energy sector faces significant challenges arising from market fluctuations and

regional vulnerabilities caused by the war triggered by the Russian Federation's invasion of Ukraine and, implicitly, by Romania's geostrategic position on the eastern border of the European Union, it is necessary to build a resilient energy sector capable of responding promptly and effectively in the context of any type of crisis in order to guarantee a continuous and secure energy supply. Furthermore, Romania's energy security is inextricably linked to that of the Republic of Moldova. The national energy sector must have the capacity to meet the entire needs of the Republic of Moldova, for an indefinite period, under any circumstances.

In this context, Romania aspires to consolidate its profile as a regional pillar of energy security. Romania has the advantage of a diversified energy mix, and maintaining this mix plays an important role in ensuring the secure and stable operation of the National Power System, particularly in ensuring resilience in the face of energy crises. In this context, Romania has the natural, financial, and human resources necessary to modernize the energy sector, in line with the EU's objectives of achieving climate neutrality by 2050, and it must be prepared to support the transformation of the economy as a whole, as well as improving the quality of life.

As a member state of the European Union, Romania is committed to meeting targets for reducing greenhouse gas emissions, increasing the share of renewable energy sources, and improving energy efficiency in all sectors. Prioritizing objectives in a particular context such as that of the energy crisis, combined with the energy transition process, in order to achieve ambitious greenhouse gas emission reduction targets, requires identifying the best solutions to ensure complementarity between:

- ensuring affordable energy prices and economic competitiveness
- gradually transitioning from fossil fuels to renewable and/or low-carbon energy sources, using natural gas as a transition fuel
- developing storage capacities
- improving energy efficiency
- extending the life of mature oil and gas fields or exploiting new fields in order to diversify indigenous energy sources
- strengthening energy transmission and distribution networks, including through interconnections with neighbouring countries
- encouraging growth in domestic consumption under conditions of energy efficiency
- creating a competitive and efficient market that gives consumers a central role
- making networks more flexible and increasing the number of participants, including prosumers.

The Energy Strategy is developed in accordance with the EU legislative framework in the field of energy and climate change presented above, as well as with the relevant policy documents adopted at national level, such as Romania's Long-Term Strategy for Reducing Greenhouse Gas Emissions - Romania Neutral in 2050, approved by Government Decision No. 1215/2023, hereinafter referred to as STL, or those in the Integrated National Plan for Energy and Climate Change 2025-2030 (PNIESC) updated in October 2024, available at the link below¹³.

By exploiting the potential of hydrocarbons and offshore renewable sources in the Black Sea, Romania can become a regional supplier of energy security.

Strengthening and modernizing networks, digitization, diversification of sources and supply routes, increasing and modernizing storage capacities, compatible with the use of new gases and hydrogen, as well as increasing

¹³https://energie.gov.ro/wp-content/uploads/2025/10/PNIESC-2021-2030-actualizat_14.10.2025.pdf

interconnection capacities with neighbouring states, are factors that will primarily contribute to ensuring national energy security, but also to Romania's objective of having the status of a regional supplier of energy security.

In this context, there are premises that, through the development of the energy sector, considering the availability of resources and the stability given by the effective transition to decarbonization and the maturity of new technologies, Romania will consolidate its status as a regional supplier of energy security.

Increasing Romania's energy contribution to regional and European markets is an important objective that expresses its desire to be a key player in the EU in this field.

Romania participates in an extensive process of energy market integration at the EU level, resulting in increasingly open competition on the energy markets.

Romania has the necessary primary energy resources, they must be harnessed coherently, in profitable conditions, respecting the environmental conditions, with beneficial effects for the country's economy, simultaneously with the increase in the degree of interconnectivity.

F.1 Energy resources

Romania has a wide but quantitatively reduced range of fossil and mineral energy resources as: oil, natural gas, coal, uranium ore, and a great potential of renewable energy resources.

A fair assessment of the possibilities for covering the primary energy needs in the future should start from the current situation of proven reserves combined with realistic estimates of potential resources in close correlation with resource consumption forecasts determined by the final energy demand.

In Table III-4 and Table III-5 the evolution of primary energy production and of the primary energy consumption in the period 2005 - 2023 are presented.

Table III-4 Domestic Primary Energy Production (thou toe)

Year	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023
Primary energy production, out of which:	27,090	27428	26387	24798	25417	24979	24535	22351	22999	22262	21919
Total coal, out of which:	5793	6795	4711	4233	4466	4868	4790	3304	3006	2775	2245
- other hard coals	1082	821	443	367	277	603	149	156	90	66	44
- lignite	4698	5946	4268	3865	4189	3846	3778	2435	2916	2709	2201
- brown coal	13	28	0	0	0	0	0	0	0	0	0
Firewood and agricultural wastes	3229	3900	3521	3579	3564	3646	3456	3401	3625	3471	3165
Crude oil	5326	4186	3906	3713	3548	3952	3490	3381	3232	3049	2908
Natural gas	9536	8705	8873	7862	8607	8854	8273	7391	7425	7523	7652
Other fuels	87	88	232	269	272	171	368	558	554	559	590
Energy from unconventional sources	18	26	48	54	60	48	59	40	51	54	44
Hydroelectric	1739	1769	2242	2319	2075	2332	2113	2098	2240	2009	2446
Nuclear energy	1362	2841	2854	2766	2821	2862	2846	2887	2866	2822	2867

Source: National Institute of Statistics – Energy Balance – collections – 2005–2023

Table III-5 Domestic primary energy consumption (thou toe)

Year	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023
Primary energy internal consumption, out of which:	37868	34817	31844	31638	33,391	33,510	33,015	32,171	34101	31461	30351
Coal	8742	6911	5858	5434	5821	5079	4925	3505	4600	3968	2827
Crude oil and crude oil products	9163	7855	8600	8217	8015	8624	8519	8247	8860	9754	10043
Natural gas	13820	10897	9015	9098	9716	9942	9229	9682	9952	8354	7841
Firewood and agricultural wastes	3185	3982	3514	3606	3639	3462	3458	3394	3638	3419	3183
Hydroelectric	1489	1573	1663	1875	1826	2035	2244	2338	1526	1235	1603
Nuclear energy	1362	2850	2853	2766	2821	2789	2846	2887	2866	2822	2867
Other fuels	88	723	293	360	418	498	597	783	847	921	899
Energy from unconventional sources	18	26	48	54	60	61	59	40	51	54	44
Non-energy	2231	1511	1299	1149	1075	1020	1138	1295	1212	665	706

Source: National Institute of Statistics – Energy Balance – collections – 2005–2023

F.2 Energy transmission infrastructure

National crude oil network

The National Crude Oil Transmission System (SNTT) in Romania is 3800 km long and is operated by CONPET a natural monopoly on the national crude oil transport market, being the only company that carries out such activities in Romania (Figure III-14).

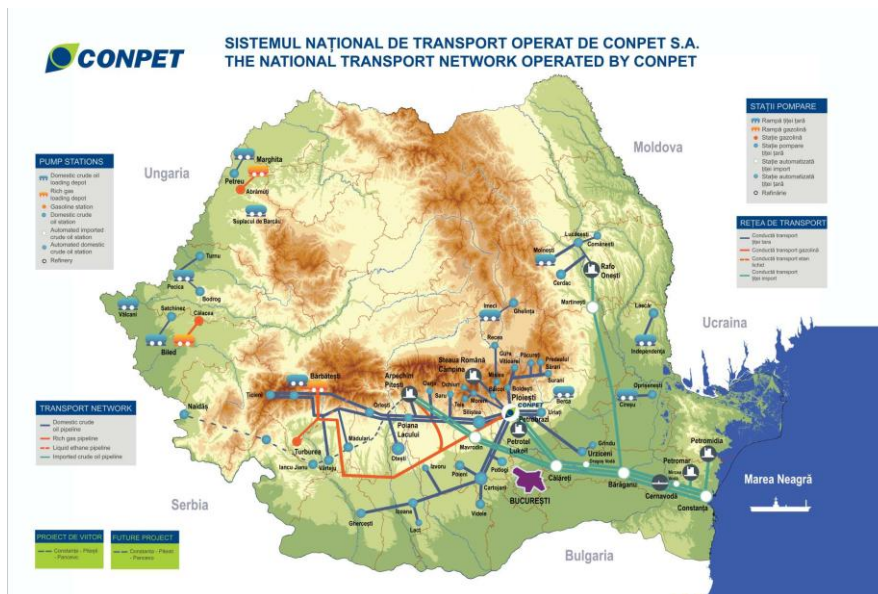


Figure III-14 Crude oil national pipeline system

source: CONPET, 2022

The National Pipeline Transportation System has a transportation capacity of about 30 million tons/year. The transport capacity was used to a maximum of 60%.

The national natural gas transport and distribution network

The National Natural Gas Transport Company, CN Transgaz SA is the technical operator of the national natural gas transport system and is responsible for its operation in conditions of quality, safety, efficiency, and compliance with environmental protection measures.

Established based on HG no. 334/April 28, 2000, CN Transgaz SA is a Romanian legal entity operating as a joint-stock company, in accordance with Romanian legislation. To support the main object of activity, CN Transgaz SA can also carry out other related activities, in accordance with the legislation in force and its own regulations, except for the purchase and sale of natural gas from domestic production or from import.

The National Transmission System consists of a network of main pipelines, as well as related facilities, equipment, and installations, operating at pressures between 6 bar and 63 bar, which ensure the collection of natural gas extracted from production areas or imported gas and its transport for delivery to participants in the domestic natural gas market, export, international transport, etc.

The National Natural Gas Transmission System (SNT) is illustrated in Figure III-15.

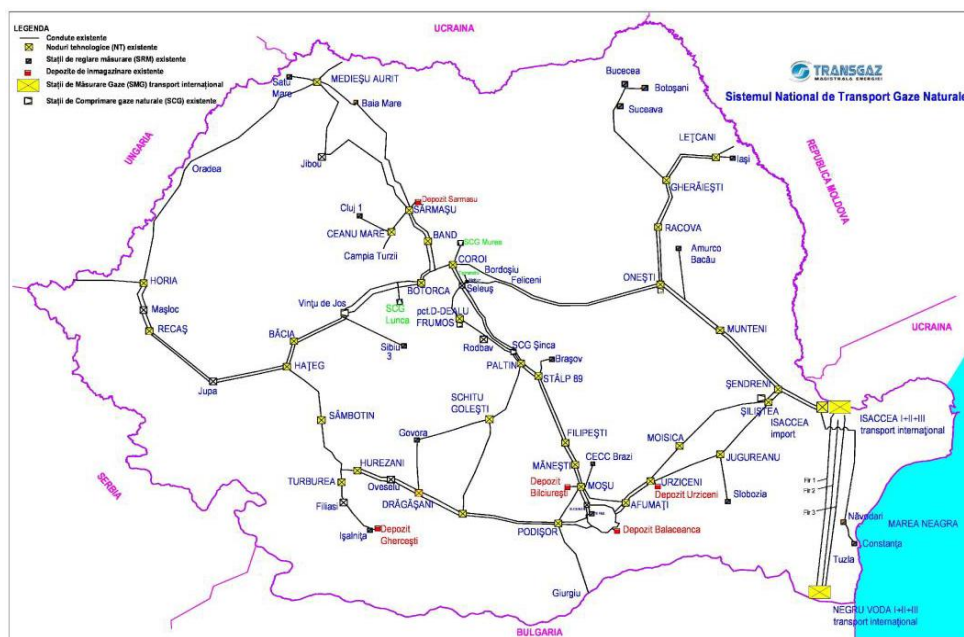


Figure III-15 National Gas Transportation System

source TRANSGAZ 2020¹⁴

¹⁴ Transgaz, Planul de dezvoltare a sistemului național de transport gaze naturale 2020-2029, available at <https://www.transgaz.ro/sites/default/files/Planul%20de%20Dezvoltare%20a%20Sistemului%20Na%C8%9Bional%20de%20Transport%20gaze%20naturale%20pentru%20perioada%202020-2029.pdf> (accessed November 2022)

SNT has a maximum technical capacity of 51,316.80 MWh/day and a reserve capacity of 27,060.41 MWh/day, which is much more than the current consumption, therefore, there has been no grid congestion so far.

In terms of access to natural gas, less than half of households in Romania are connected to the natural gas network (approximately 44%), one third of Romania's homes being heated directly with natural gas. Also, the average natural gas consumption of a household consumer is lower than the EU average.

The natural gas distribution system consists of approximately 43,000 km of pipelines - of which 39,000 km are operated by the two large distributors, Delgaz Grid (20,000 km) and Distrigaz Sud Rețele (19,000 km) - which supply approximately 3.5 million consumers.

On the natural gas market in Romania, another 35 local distribution system operators are active, operating approx. 4000 km of network.

Electricity network and interconnections

CNTEE "Transelectrica" - SA carries out the activity of electricity transmission through the Electricity Transmission Network (RET), consisting of electric stations and lines. RET is the national and strategic electricity network with nominal voltage higher than 110 kV.

The number of installations managed by CN "Transelectrica" SA consists of:

- 81 electric substations, of which:
 - One 750 kV substations
 - 38 substations at 400 kV
 - 42 substations at 220 kV
- 8759.4 km overhead electric lines (OHL), of which:
 - 155.62 km at 750 kV
 - 4706.8 km at 400 kV
 - 3059.4 km at 220 kV
 - 38 km at 110 kV

of which interconnection lines: 425.8 km

- 216 main transformer units amounting to 37,794 MVA.

At present the Romanian Power System is interconnected to the neighbouring power system by means of the following lines (Figure III-16):

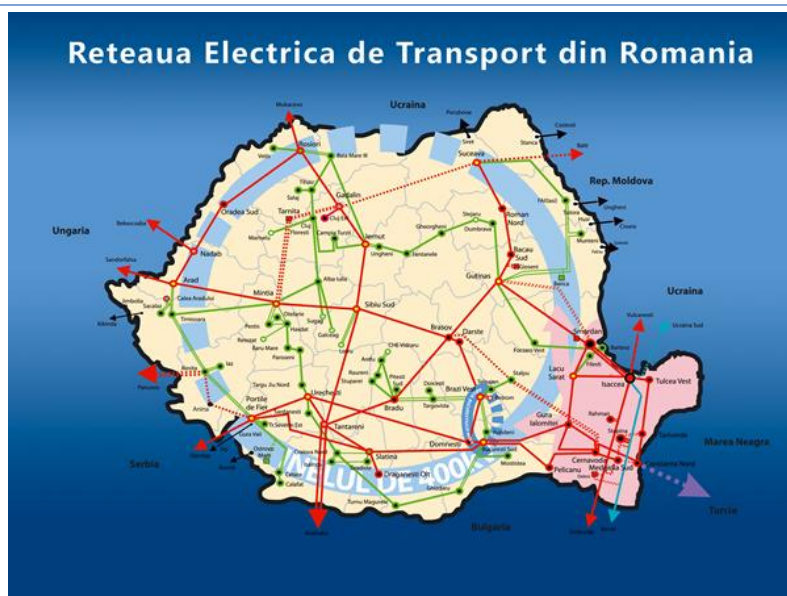


Figure III-16 Romanian electricity Transmission Network

Source: Transelectrica 2022¹⁵

F.3. Electricity, generation and consumption

The Romanian Power Grid (SEN) had an installed capacity of 19,845 MW in 2023.

The structure of electricity resources in the period 2010-2023 is presented in Table III-6. It should be noted that in 2020, 21% of electricity production will be generated at the Cernavodă Nuclear Power Plant, and in 2023, approximately 16%. The share of electricity produced by hydroelectric power plants ranges between 21% and 27%, depending on hydrological conditions.

Table III-6 Structure of electricity resources

Type of plant	Gross production, TWh									
	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023
Thermal power plant	28.83	28.545	26.458	28.581	26.986	23.366	19.955	33.446	32.658	29.558
Nuclear power plant	11.6	11.7	11.7	11.6	11.7	11.7	11.6	11.3	10.5	11.2
Hydro power plant	20.243	17.007	18.536	14.853	18,097	16.006	15.701	17.745	14.360	18.649
Wind power plant	0.306	7.062	6.590	7.406	6,322	6,772	6,946	6.576	6.997	7.547
Solar power plant	-	1.982	1.820	1.856	1.771	1.778	1.733	1.703	1.988	2.227
Total	60.979	66.296	65.104	64.296	64.876	59.623	55.935	70.771	66.503	69.181

Source: National Institute of Statistics – Energy balance – collection

The entire economic and technical development operation of the electricity sector is regulated, supervised, and monitored by the National Energy Regulatory Authority (ANRE), established in October 1998 as a public, independent and autonomous institution.

The GHG emissions related to the electricity sector might vary broadly, depending on the intensity of hydro power use, fossil fuels prices, availability factors etc. From National GHG Inventory data it is obvious that in 2020, there

¹⁵ Transelectrica, <https://www.transelectrica.ro/ro/web/tel/transport-detalii>, (accessed November 2022)

was a decrease in GHG emissions, due to decrease of electricity consumption and also due to the increasing share of the renewable electricity generation.

Transport

Romania has a national transportation system (infrastructure, transport equipment, etc.) largely at the same level with the average standards of conventional transport systems in Europe from the point of view of both the functional structure and services rendered.

Strategic framework for sustainable transport policy in Romania has aligned European policy defined in the White Paper of transport.

In the Transport sector, Romania holds a key position at the eastern border of the EU as a transit area both on the east-west direction (link to Asia via the Black Sea) and north-south (from the Baltic Sea to the Mediterranean Sea). Three of the TEN-T priority axes cross Romania.

Road transport

The public roads network in Romania is classified into five categories:

- Motorways - A
- Express Roads – E
- National Roads – DN
- County Roads – DJ
- Communal Roads – DC.

At the end of October 2025, Romania had approximately 1,358 km of motorways and express roads, with 853 km under construction. This length was achieved through increases, especially in recent years, although the country ranked second to last in the EU in terms of motorway network density, according to data from October 2024, as reported by the National Union of Road Transporters in Romania (UNTRR).

Road freight transport grew by 18% between 2020 and 2023, from 55,026 million tonne-km to 65,248 million tonne-km.

The National Road Infrastructure Administration Company (CNAIR) manages all national roads and highways in Romania. There are no private operators and/or concessionaires involved in this activity.

Rail transport

According to INS, in 2020 the Romanian network of rail lines open to commercial traffic was 10,7590 km long ¹⁶ (the eighth largest in the EU), out of which the length of electrified rail lines was 4,030 km, which represents 37.4% of the rail network in operation. Between 1990 and 2020, the length of electrified lines increased by about 10%.

Rail freight transport grew by 5% between 2020 and 2023, from 12,291 million tonne-km to 12,848 million tonne-km.

¹⁶ National Institute of Statistics, Romanian Statistical Yearbook: <https://insse.ro/cms/ro/tags/anuarul-statistic-al-romaniei> (accessed in November 2022)

The network is maintained by the state-owned infrastructure company CFR-SA (Compania Națională de Căi Ferate). Since 1998, the Railway Regulatory Authority (Autoritatea Feroviară Română - AFER) monitors the rail sector, including the infrastructure.

Water transport

The Romanian water transport network includes seaports, river ports, and inland waterways. Constanta is the major seaport and the largest on the Black Sea. It is linked via the Danube to Serbia, Hungary, and Austria, and then via the Rhine-Main-Danube Canal to the Rhine as far as Rotterdam on the North Sea. The seaports of Constanta, Mangalia and Midia are on the Black Sea, while Braila, Galati, Tulcea and Sulina on the Danube operate as river/seaports. The maritime section of the Danube consists of 170 km length from Sulina to Braila.

Constanta has a strategic geographic location that has the potential to provide access to Europe from the Black Sea and a transshipment point between the maritime network and the road, rail and inland waterway networks. It is located at the crossing of TEN-T priority axes 7 (Road), 18 (Rhine/Meuse-Main-Danube inland waterway), and 22 (Rail) and thus has the potential to become an alternative gateway for the Central/East Europe – Asia corridor. Its two satellite ports, Midia and Mangalia, are located nearby, and share functions with the main port. The direct access to TEN-T priority axis 18 is done via the Danube Black Sea Canal, potentially offering lower cost waterway transport links with Central Europe. It has good links to rail, road, river, air transport and pipeline modes. Its container capacity has grown with the development of a new Container Terminal on Pier II South, and it has Ro-Ro terminals allowing development of short sea shipping serving the Black Sea and Danube riverside countries.

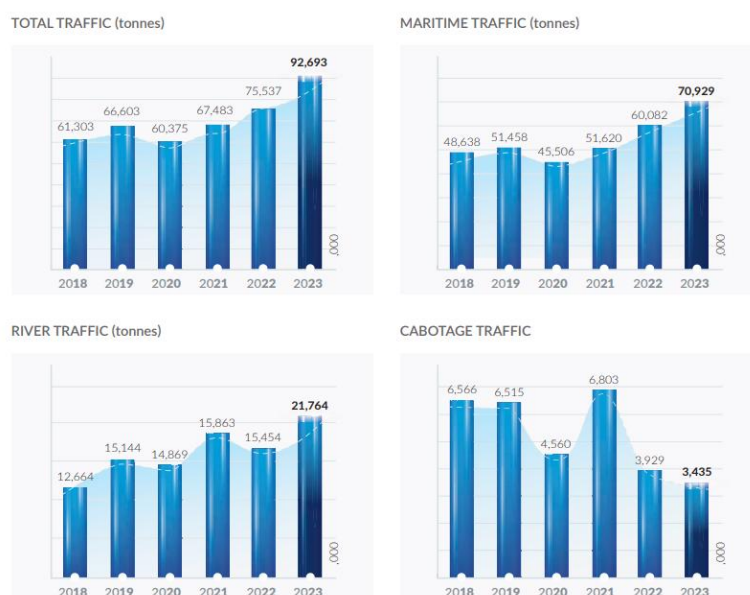


Figure III-17 Total traffic in Constanta Port, 2018-2023 (thousand tons)

Source: Constanta Port Annual Report 2023

Traffic through the Port of Constanța (Figure III-17) increased from 61 to 92 million tons between 2018 and 2023, with a decline in 2020, the first year of the pandemic, to 60 million tons. Accordingly, maritime traffic increased

from 48 to 70 million tons between 2018 and 2023, with a decline to 45 million tons in 2020, while river traffic increased between 2018 and 2023 by 75% to 21 million tons¹⁷.

The Romanian sector of the Danube, between Baziaş and Sulina, has a total length of 1,075 km, of which 320 km are entirely on Romanian territory. The rest is a shared state border with Ukraine (55 km), Moldova (0.97 km), Bulgaria (470 km), Serbia and Montenegro (230 km).

The Romanian inland waterway system is focused on the Danube in the south of the country. It also includes the secondary navigable branches of the Danube and the Danube - Black Sea and Poarta Albă - Midia Năvodari canals between the Danube and the coast in the vicinity of Constanta. In addition, there are various small branches, including in the Danube Delta, mostly used for leisure and local (low volume) freight traffic. The branches of the Danube offer an additional 530 km of navigable waterway.

In Romania, a section of 170 km between Braila and the Black Sea can handle maritime shipping. The remainder, also called fluvial Danube, can handle ships, and barges up to 2,000 dwt. The whole Romanian section of the Danube is navigable, but transport is hindered by seasonal low water levels and in 2003 traffic volumes declined sharply due to an unusually long low-water period in the summer.

The Danube is part of the TEN-T Priority axis no. 18: Rhine/Meuse-Main-Danube inland waterway axis and it provides Romania and the other countries through which it passes with major new opportunities for the development of water transport.

Freight transport by inland waterways decreased by 12% between 2020 and 2023, from 13,638 million tonne-km to 11,947 million tonne-km.

Air transport

In terms of air transport, The Aeronautical Information Publication (AIP) lists a total of 21 aerodromes on the territory of Romania. Fifteen of these airports currently carry out scheduled flight operations:

- Bucharest – Henri Coandă – classified as major international airport
- Constanța/Mihail Kogălniceanu - classified as strategic international airport due to its use by NATO
- Craiova, Timișoara, Iași, Cluj-Napoca – classified as international hubs
- Sibiu, Bacău, Târgu Mureș, Suceava, Tulcea, Baia Mare, Oradea - classified as regional airports
- Satu Mare, Arad - classified as small regional airports
- Brașov

In some cases, these planned services cannot be provided throughout the year, but only in certain seasons.

Four airports operate under the authority of the Ministry of Transport (Henri Coandă - the main airport in Bucharest, Băneasa - Bucharest, Traian Vuia from Timisoara, and Mihail Kogălniceanu in Constanta), the other airports being subordinated to the local authorities. (Figure III-18).

The location of the key Romanian airports is shown on the following map.

¹⁷ Constanta Harbour, Annual Report 2020

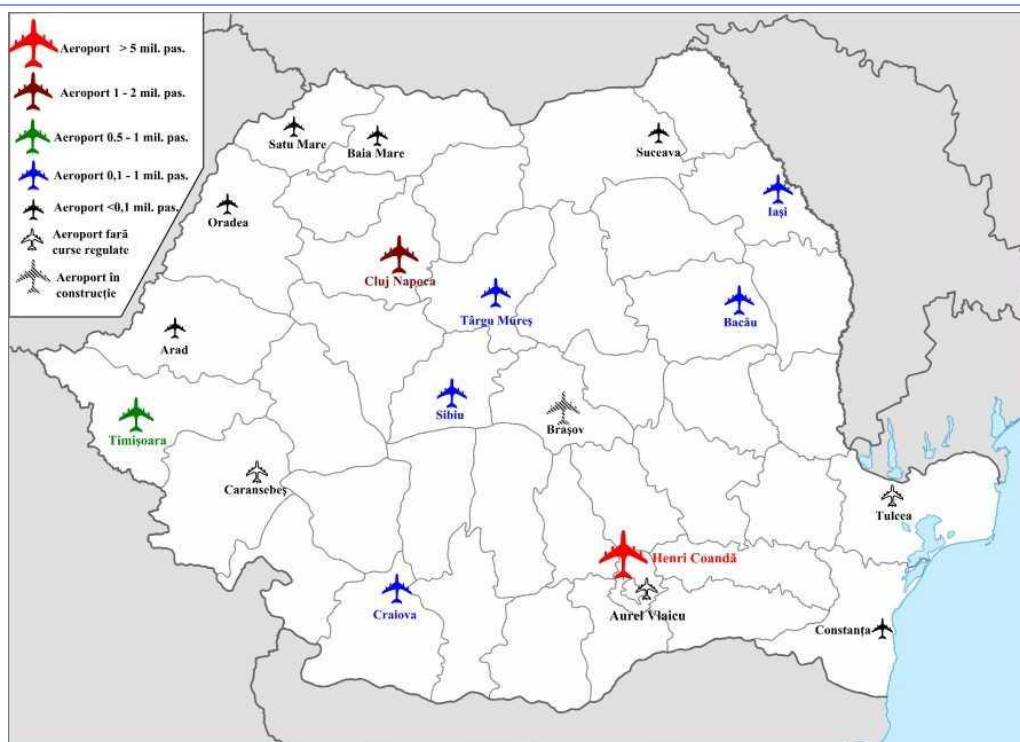


Figure III-18 Operating airports Romania, in 2024

Source: <https://airlinetravel.ro/aeroporturi-din-romania>

The number of passengers in Romania transported by air increased steadily from 4.3 million to 23.2 million between 2005 and 2019, then fell sharply in 2020 to 7.2 million due to the Covid-19 pandemic. In 2024, 15.9 million passengers passed through Henri Coandă International Airport in Bucharest, 9% more than in 2023.

The transport sector is one of the most important sectors both from the point of view of energy consumption and environmental implications. Transport sector development is done in tightly correlation with socio-economic development of Romania.

Industry

Romania's industry has been severely affected by the transition from a planned to a market economy and the collapse of the existing market within the CAER (Mutual Economic Assistance Council). Between 1990 and 2005, some industrial enterprises were restructured and privatized, and those that had no market or could not cope with the competition ceased their activities. After 2008, because of the global economic crisis, enterprises that had no market (metallurgical enterprises, heavy machinery enterprises, etc.) ceased operations.

After 1989 Romania suffered a structural adjustment of the economy. Thus, in 2000, industry, agriculture and construction contributed 46.43% of GVA (Gross Value Added) compared to 67.8% in 1990. There was a relatively continuous upward trend until 2005 in the contribution of the services sector to the detriment of the other economic branches.

Table III-7 shows the evolution of GVA by sector over the period 2000-2023. It shows that industry and agriculture have reduced their contribution to GVA at the detriment of construction and services.

Table III-7 Changes in the structure of Gross Value Added over the period 2000-2023 [%]

Indicator	2000	2005	2010	2020	2021	2022	2023
TOTAL GVA of which:	100	100	100	100	100	100	100
Industry	29.02	28.10	31.85	24.5	23.5	20.0	19.1
Agriculture	12.06	9.52	6.4	4.0	4.4	3.6	3.9
Construction	5.35	7.39	10.24	7.5	7.3	6.9	7.6
Services	53.57	54.99	51.51	57.5	57.8	61.0	60.7

The main sectors of the Romanian economy are industry, energy, construction, agriculture, tourism, communications (internet, mobile and fixed telephony), finance-banking, trade and the budget sector.

Romania's main industrial sectors are textiles and footwear, metallurgy, light machinery and machine assembly, mining, wood processing, construction materials, chemicals, food processing and oil extraction and refining. Pharmaceuticals, heavy machinery and household appliances, and IT show steady annual growth. Today, the machine-building industry is very large and market-oriented.

Romania's economic strength is primarily concentrated on the production of goods by small and medium-sized enterprises in industries such as precision machinery, motor vehicles, chemicals, pharmaceuticals, household appliances and clothing.

The evolution of Romania's various industrial branches depends on the economic development of the country, as well as on the policies adopted in this field within the EU, but also on the global social and economic context.

Waste management

Waste management is one of Romania's current problems. The integrated approach to waste management, which covers the collection, transport, treatment, recovery and disposal of waste, includes the construction of waste disposal sub-systems, together with measures to prevent waste generation and recycling, in accordance with the hierarchy of principles: prevention of waste generation and its negative impact, recovery of waste through recycling, re-use and safe disposal of waste when recovery is no longer possible.

Responsibility for waste management activities will fall on producers, in line with the „polluter pays”, „pay-as-you-throw” principle or, where appropriate, with producers, in line with producer responsibility.

Each type of waste generated in the country is officially classified in one of the following categories:

- municipal waste
- industrial waste
- medical waste.

Municipal waste is all waste generated in urban and rural areas from households, institutions, commercial establishments, economic establishments (household and similar waste), street waste collected from public spaces, streets, parks, green spaces, as well as construction and demolition waste collected by sanitation operators and sludge from wastewater treatment.

The evolution of the quantities of municipal waste generated between 2015 and 2022 and their composition are presented in Table III-8 and Table III-9 respectively.

Table III-8 Evolution of municipal waste generated between 2015 and 2022, tons

	2015	2019	2020	2021	2022
Total municipal waste generated, of which:	4,903,535	5,296,239	5,619,216	5,777,045	5,767,456
- waste generated and not collected	600,345	178,470	146,873	109,962	58,401
- household waste collected from the general public and similar waste from economic operators	3,685,250	4,632,802	4,764,923	4,945,622	4,920,533
- other municipal waste	429,286	419,429	499,450	438,152	495,434
- recyclable waste from the population, collected by authorised economic operators other than sanitation operators	188,654	199,640	207,970	283,309	293,068

Source: NIR 2025

Table III-9 Composition of municipal solid waste, %

Type of waste	2005	2010	2015	2019	2020	2021	2022	2023*
Paper and textiles	12.76	9.88	10.17	10.59	9.93	9.22	8.63	8.63
Waste from parks and gardens	14.50	20.31	18.25	14.84	12.95	13.72	11.38	11.38
Food waste	38.6	32.19	34.45	36.62	37.53	33.75	33.09	33.09
Wood waste	1	2.11	1.71	1.81	1.74	1.71	1.66	1.66

Source: NIR 2025, *preliminary data

Municipal waste management involves the collection, transport, recovery, and disposal, including the monitoring of landfills after closure.

Municipal waste collection is the responsibility of municipalities, either directly (through the specialized services of local councils) or indirectly (by contracting out this responsibility to specialized sanitation companies).

In Romania, landfill is the main disposal option for municipal waste. In 2023, there were 47 compliant landfills in operation nationwide. Table III-10 shows the evolution of landfills in Romania.

Table III-10 Number of warehouses in Romania in the period 2010-2023

Warehouses/Year	2010	2018	2019	2020	2021	2022	2023
Compliant warehouses	27	43	44	46	48	47	47
Non-conforming deep storage	40	-	-	-	-	-	-
Non-compliant surface storage	35	-	-	-	-	-	-

Source: NIR 2025

Compliant waste disposal sites are constructed and operated based on the requirements and operational and technical measures for waste disposal in order to prevent or reduce as much as possible the negative effects on the environment (surface water, groundwater, soil, and air) and on the health of the population generated by waste disposal, based on Government Ordinance No. 2/2021 on waste storage, Order of the Ministry of Environment and Water Management No. 757/2004 approving the Technical Standard on waste storage, and Government Emergency Ordinance No. 92/2021 on waste management, as subsequently amended and supplemented.

According to preliminary data reported by ANMAP, the amount of waste deposited in landfills in 2023 was approximately 4,377,843 tons.

The evolution of the quantities of waste recycled and recovered in Romania in the period 2015-2021 is shown in Table III-11.

Table III-11 Evolution of recycled and recovered waste quantities in Romania 2015-2021

	2015	2018	2019	2020	2021
Amount of municipal waste collected separately (tonnes)	430,305	576,816	716,415	890,707	872,867
Amount of waste recycled from municipal waste (tonnes)	649,591	623,214	683,178	710,389	711,659
Recycling rate of municipal waste (%)	13.25	11.48	12.16	12.3	12.34

Source: NIR 2025

Biodegradable waste

Of the total amount of municipal waste, most of it is household and household-like waste (about 72%) and about 45% is biodegradable waste. This comes from households as well as from economic operators, commercial premises, offices, public institutions, health facilities and public spaces (parks, public gardens, squares, streets).

Table III-12 presents data on biodegradable waste generated between 2018 and 2022.

Table III-12 Quantities of biodegradable waste from municipal landfills stored in 2018-2022

Waste categories	Amount of waste - mil. tons/year				
	2018	2019	2020	2021	2022
Biodegradable waste from landfilled municipal waste	2.068	2.120	2.077	2.038	1.891

Source: NIR 2025

An analysis of the data presented in Table III-12 shows a 9% decrease in the amount of biodegradable waste landfilled in 2022 compared to 2020.

Biological treatment of waste

In 2023, there were 38 composting plants nationwide. The evolution of the quantities composted in the period 2010-2023 is shown in Table III-13.

Table III-13 Evolution of the quantities composted between 2010-2023

	2010	2018	2019	2020	2021	2022	2023
Amount of composted waste (tons)	259.82	135.09	131.44	175.54	143.00	129.70	123.62

Source: NIR 2025

Analysing the data presented shows a decrease in the total amount of composted waste in 2023 compared to 2020, by about 30%.

Waste incineration

In Romania, waste incineration is not a common practice for the treatment/disposal of municipal and similar waste. So far, no municipal waste incineration plants have been put into operation in Romania.

The amount of medical waste generated in 2022 was 18.70 kt, of which 3.95 kt was incinerated, and in 2023, 19.11 kt was generated, of which 3.94 kt was incinerated.

The amount of hazardous industrial waste incinerated in 2022 was 3.20 kt, and in 2023 it was 3.43 kt.

Housing stock and urban structure

Construction was the economic sector that suffered the most during the economic crisis. If in 2008 the construction sector represented 11% of GDP, in 2014 it reached 6.3% of GDP. However, in the last years 2017, 2018, 2019, this sector shows signs of recovery. During the period 2020–2023, the recovery trend has strengthened: the share of construction in GDP has gradually increased from around 6.8% in 2020 to around 7.2% in 2022 and 7.5-7.6% in 2023, a sign that the sector is regaining its role as an engine of the economy.

According to the National Institute of Statistics (INS), in 2023 the following figures were recorded:

- number of households: 7.69 million
- number of dwellings: 9.722 million
- habitable surface: 474,517,000 m²

Figure III-19 shows the housing stock, by property types and residence environments, in 2023.

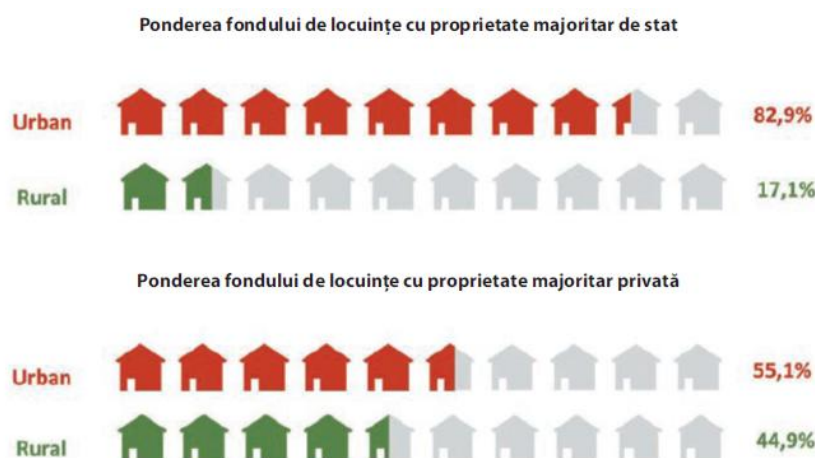


Figure III-19 Dwellings stock by type of ownership and type of residence, in 2023

Table III-14 shows the finished houses, according to the types of installations with which they are equipped, and the financing funds in the period 2018-2020.

Table III-14 Completed homes, according to the type of equipment and financing funds, in 2020

Type of installation	Year			Of these from private funds
	2018	2019	2020	
TOTAL	59713	67486	67816	57.709
Electric	59646	67386	67490	57.642
Water supply	55808	63526	63653	53805
Sewerage	49664	57358	58093	47661
Heat plant (including district heating)	54246	62498	63621	52274
Natural gas stoves	168	125	153	168
Stoves with solid fuel and wood	4950	4473	3501	4926
Urban	34896	40564	42238	32906
Electric	34887	40553	41960	32897
Water supply	33416	38685	40302	31426
Sewerage	32791	37911	39671	30804

Heat plant (including district heating)	33912	39630	41568	31953
Natural gas stoves	41	30	48	41
Stoves with solid fuel and wood	786	773	522	763
Rural	24817	26924	25578	24803
Electric	24759	26835	25530	24745
Water supply	22392	24841	23351	22375
Sewerage	16870	19447	18422	16857
Heat plant (including district heating)	20334	22868	22253	20321
Natural gas stoves	127	95	105	127
Stoves with solid fuel and wood	4164	3700	2979	4163

In 2021, the Romanian Population and Housing Census was conducted, with the aim of collecting updated data on the number of inhabitants, demographic structure, and housing characteristics, in order to inform public policy and development planning. The table below shows the situation regarding the provision of utilities to dwellings according to this census.

Table III-15 Number of dwellings, by type of facilities provided, in 2021

Type of facility	Year 2021
TOTAL	9914511
Electricity	9791220
Drinking water supply	6674578
Sewage	8541890
Heating system (including district heating)	5829142
Natural gas stoves	120285
Solid fuel and wood stoves	3329537
Urban	5345357
Electricity	5308718
Drinking water supply	3881433
Sewage	5099199
Heating system (including district heating)	3555777
Natural gas stoves	30071
Solid fuel and wood stoves	509419
Rural	4569154
Electricity	4482502
Drinking water supply	2793145
Sewage	3442691
Heating system (including district heating)	2273365
Natural gas stoves	90214
Solid fuel and wood stoves	2820118

Source: National Institute of Statistics – 2021 Population and Housing Census

The degree of utility provision in dwellings completed in 2023 compared to 2022 is as follows:

- the number of dwellings with electrical installations out of the total number of dwellings is 99.9% (99.8% in 2022),
- 97.3% have running water (96.3% in 2022), 90.1% have sewerage (87.9% in 2022), 99.4% have a bathroom (99.2% in 2022), and
- 95.0% are connected to the district heating system and have central heating (94.7% in 2022).

Figure III-20, Figure III-21 and Figure III-22 show the evolution of the number of localities with drinking water supply facilities, with sewage facilities and with the natural gas distribution network in the period 2010-2023. The investments made in these types of utilities have increased due to the increase in the standard of living.

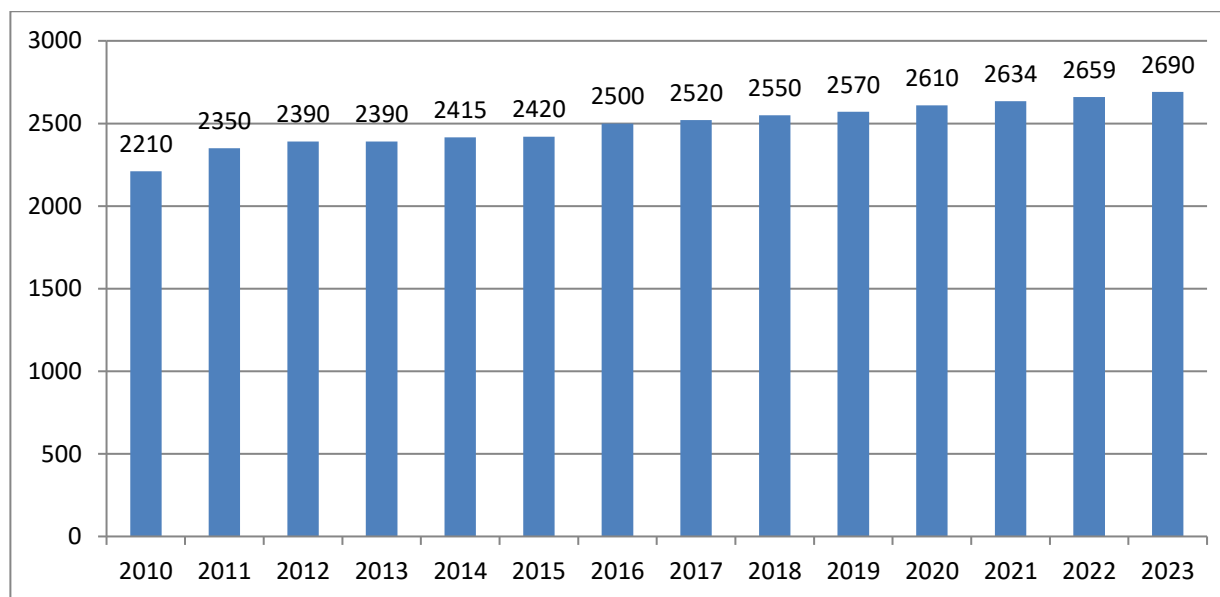


Figure III-20 The evolution of the number of localities with drinking water installations

Source: National Institute of Statistics – Romanian Statistical Yearbook 2024

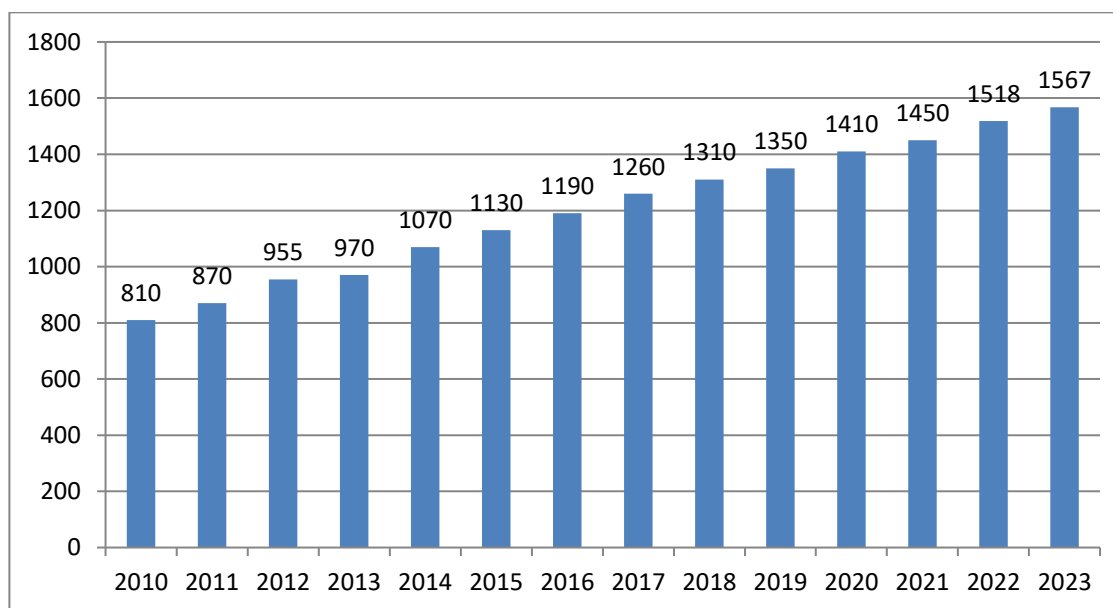


Figure III-21 Evolution of the number of localities with sewerage facilities

Source: National Institute of Statistics – Romanian Statistical Yearbook 2024

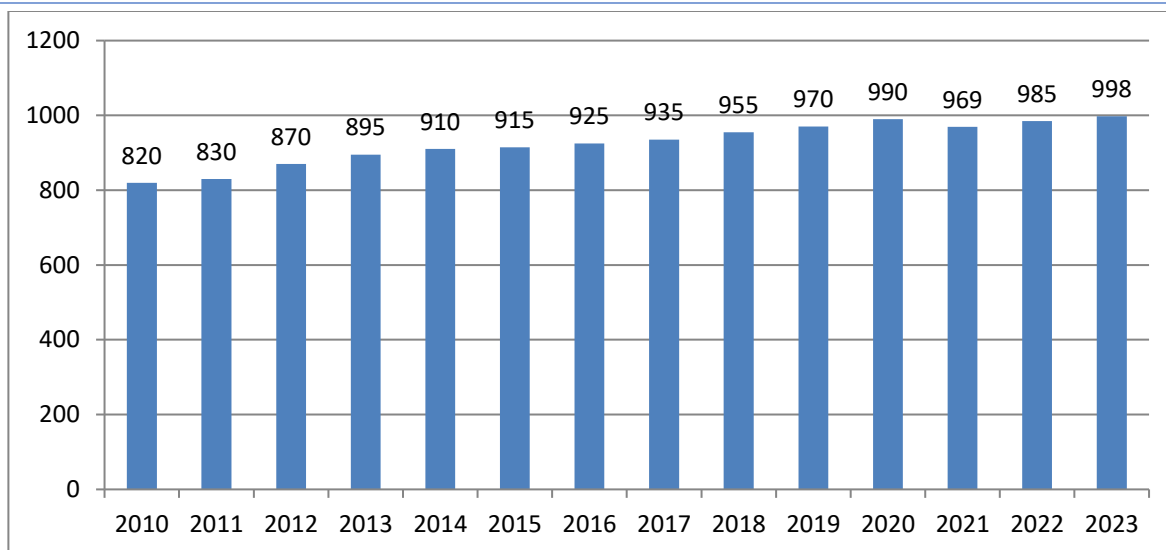


Figure III-22 The evolution of the number of localities with a natural gas distribution network

Source: National Institute of Statistics – Romanian Statistical Yearbook 2024

Romania has an important heritage of buildings built, predominantly, in the period 1960-1990, with a low degree of thermal insulation, a consequence of the fact that, before the energy crisis of 1973, there were no regulations regarding the thermal protection of buildings and perimeter elements of closure, and which are no longer suitable for the purpose for which they were built. The final energy consumption of these buildings varies between 150 and 400 kWh/m² per year.

After Romania's accession to the European Union, the first National Action Plan in the field of Energy Efficiency (PNAEE, 2007 - 2010) was approved.

During the preparation of the second PNAEE, it was highlighted that the total value of the final energy savings achieved in 2010 was 2223 thousand toe, far exceeding the assumed target of 2800 thousand toe for the year 2016. Within the second PNAEE, the national target for primary energy savings in 2020 was established.

In accordance with the 3rd and 4th National Energy Efficiency Action Plan, the thermal rehabilitation of the buildings was carried out in accordance with the "Strategy regarding the mobilization of investments in the renovation of the stock of residential and commercial buildings, both public and private, existing at the national level.

Agriculture

GHG emissions from the agricultural sector result from:

- fuel combustion (CO₂)
- enteric fermentation (CH₄)
- manure management (CH₄ and N₂O)
- rice cultivation (CH₄)
- agricultural soils (N₂O)
- burning of agricultural residues (CH₄, N₂O, NO_x, and CO)
- application of urea
- application of lime.

Livestock dynamics from the data provided by the INS (National Institute of Statistics), press release no. 74 of March 24, 2022, shows that in 2020 pig and cattle herds decreased by 33.1% and 9.8%, respectively, and sheep and goats increased by 15.8% and 3.5%, respectively of those recorded in 2010. In addition, the Work Volume in agricultural holdings, expressed in annual work units (UAM), in 2020, recorded a decrease of approx. 39% compared to that recorded in the General Agricultural Census of 2010¹⁸.

Based on the report of the National Institute of Statistics on the Structural Investigation in Agriculture (2016) and the Agricultural Census (2020 – provisional data), the structure and legal status of farms, respectively the percentage of animals in households (entities without legal personality) or in industrial system is known. For pig herds, in the data request address of the Ministry of the Environment to the Ministry of Agriculture and Rural Development, it was established that 50% of the herd is in an industrial exploitation system, with a system for collecting manure on grates and a water cushion.

According to the data published by the INS in 2017, regarding the Structural Investigation in Agriculture (2016), the structure of farms is as follows:

- for dairy herds, 82.25% were in holdings without legal personality, which can be assimilated to individual households or subsistence farms (with 1-2 heads or 3-9 heads)
- for the total herds of cattle, 95.74% are in holdings without legal personality
- 67.86% of the poultry flocks are in holdings without legal personality, as well as 98.73% of the horse flocks
- 45.84% of the total herds of pigs are found in the industrial system.

These data regarding the structure of animal husbandry in 2016, in the opinion of the expert, have not changed significantly in 2022, but other factors intervene that can change these weights, such as:

- The COVID 19 pandemic, which caused a numerical decrease in the population employed in animal husbandry, either because of contacting the disease or death (2019-2021)
- The aging of the population in this agricultural sector and not replacing it with younger people
- The increase in the price of energy, which determined the closure of some large farms (especially of dairy cows), in whose cost structure, energy occupied the largest percentage
- Bird flu from 2021
- Swine fever (2020-2021).

Regarding poultry flocks: the statistical data shows a polarization of farms according to technology and, implicitly, from the point of view of capital, i.e., very rich farms and very poor farms, the latter being predominant, with a percentage of over 55 %.

At the level of 2017, the birds exploited in the intensive system represented 44.15% of the total flock of birds, and in the household system, 55.85% of the total. If an average is made per household, compared to the more than 1,800,000 peasant households in the ANSVSA (National Sanitary, Veterinary and Food Safety Agency) records, the result is an average livestock per household of approximately 24 birds, which have a low genetic potential, unbalanced fodder recipes and small productions.

¹⁸ https://insse.ro/cms/sites/default/files/com_presa/com_pdf/rga_2020r.pdf

By type of production: laying hens represents 40.90% of the total flock, and in the broiler sector the percentage is 59.10%¹⁹.

The breakdown of GHG emissions by animal breeding systems is particularly important, because many parameters differ in the two systems (the level of ingested energy – GE and excreted nitrogen - Nex, the number of days of housing, or the number of days of life in fattening animals – broiler pigs for fattening).

Regarding the manure management system, based on the data provided by the Animal Husbandry Policy Directorate (MADR - Ministry of Agriculture and Rural Development), the liquid storage (sludge) is found in pigs, in a proportion of 50% (industrial system), the rest of the categories using solid storage, 100%.

Although the number of farms in the household system (subsistence farms) is high, due to the implementation of the regulations related to the Nitrates Directive and the Code of Good Agricultural Practices, the farmers who receive subsidies from APIA (Agency for Payments and Interventions in Agriculture) respect the eco-conditionality and environmental protection rules.

In 2023, methane emissions from enteric fermentation accounted for 87.84% of total methane emissions from agriculture and 8.07% of total national greenhouse gas emissions. In terms of waste management, methane emissions accounted for 6.99% and nitrous oxide emissions for 9.53%, together contributing 0.63% to total national greenhouse gas emissions.

The number of animals and animal production from 2005-2021-2023 are presented in Table III-16 and Table III-17.

Table III-16 Number of animals reported in 2005-2021-2023

NFR Category	Category	Year			
		2005	2021	2022	2023
3B1a	Dairy cows	1626000	1067758	1062444	1067758
3B1b	Non-dairy cows	1191000	740759	753456	740759
3B2	Sheep	7611000	10087439	10247383	10087439
3B3	Fattening pigs	6128000	3281150	3017497	2859149
3B3	Sows for reproduction	494000	338431	311237	294904
3B4a	Buffalo	45000	18328	17818	16948
3B4d	Goats	687000	1492544	1483161	1421695
3B4e	Horses	834000	374471	323362	290246
3B4gi	Laying hens	49725000	41891566	42473860	44102181
3B4gii	Broilers	36827000	35256806	35746876	33647416
3B4h	Rabbits	570000	236554	201269	200402

Data presented regarding the number of animals reveal a drastic decrease in the herds of bulls, pigs, buffaloes, horses, and rabbits, in 2023, compared to the reference year, 2005. Birds also decreased as a herd, but the decrease is not significant. The flocks of sheep and goats register increases in the number of animals.

¹⁹ <https://www.revista-ferma.ro/articole/zootehnie/gaina-multimilionara-avicultura-intre-statistici-si-proiecte-tip>

Table III-17 Livestock production, by product type, reported in 2005, 2021, 2022 and 2023

Production	Year			
	2005	2021	2022	2023
Cow and buffalo milk (thousands hl)	60614	39214	39164	39006
Sheep and goat milk (thousands hl)	5280	6094	6407	6455
Wool (tons)	18390	23453	24191	25618
Eggs (million pieces)	7310	5937	6005	5869
Extracted honey (tons)	17703	30831	31541	31541

Regarding animal productions during the analysed period, there are decreases in the milk production of cows and buffaloes and increases for the milk of sheep and goats, which follows the dynamics of the herds of these species. Egg production decreased in 2023 compared to 2005, although flocks did not show significant decreases, which means that the share of laying hens in the total number of birds was lower than that of broilers.

LULUCF

The LULUCF sector is a major component of natural resource management in Romania and contributes both to the functioning of ecosystems and to the national greenhouse gas balance. According to the classification in the IPCC guidelines, the sector is structured into the following main land use categories: (i) FL-forests, (ii) CL-cropland, (iii) GL-grassland, (iv) WL-wetlands, (v) SL-settlements and roads/railways, (vi) OL-other land. These categories cover the entire national territory and are reported in accordance with the IPCC principles of completeness, consistency, and transparency.

Figure III-23 shows the structure of the LULUCF sector at national level, namely the percentage distribution of subcategories, determined based on activity data (kha). The representation highlights the relative share of each category and subcategory in the total reported areas.



Figure III-23 LULUCF Sector structure (%)

Carbon sequestration in the LULUCF sector comes mainly from biomass accumulation in Romania's mature forests, forest management practices, increased tree cover in urban areas, and carbon storage in harvested wood

products (HWP) and managed agricultural soils. Natural disturbances, such as vegetation fires, prolonged droughts, pest outbreaks, or windfalls, can significantly alter the annual balance by temporarily reducing carbon stocks and increasing associated emissions. The net impact on GHG fluxes varies depending on the type of event and the response measures implemented in its aftermath (e.g., regeneration, sanitary harvesting, prevention). A significant portion of national grasslands is used for grazing or has been converted to agricultural land or built-up areas. However, unconverted areas maintain essential ecological functions, including biodiversity conservation, soil resource protection, and carbon storage in soil and perennial biomass.

Table III-18 Land use in Romania

LU	1989 (kha)	2000 (kha)	2010 (kha)	2020 (kha)	2023 (kha)
Forests	6864.23	6919.32	6969.40	6989.47	6993.22
Arable land	8509.20	7759.98	6946.04	6145.80	6111.80
Vineyards	489.23	661.72	765.97	707.91	691.89
Orchards	395.40	480.60	581.34	602.62	594.26
Grassland woody	311.61	429.53	500.38	517.62	533.00
Grassland grassy	4678.22	4658.56	4775.96	5330.81	5374.24
Settlement	1281.85	1409.31	1449.02	1547.03	1542.62
Wet areas with vegetation	423.57	449.66	520.72	558.28	552.35
Waters/ponds	335.67	410.40	465.77	466.35	465.19
Other lands	413.50	446.49	468.80	472.18	470.62

2. Institutional arrangements

Institutional arrangements for tracking progress

The EU and its Member States have specific arrangements in place to track progress in implementing and achieving the EU NDC. These arrangements include the tracking of GHG emissions and removals, the reporting of policies and measures, and projections of GHG emissions and removals. These processes are specified in the Regulation on the Governance of the Energy Union and Climate Action (the Governance Regulation)²⁰ and in the Directive setting up a system for greenhouse gas emission allowance trading (the ETS Directive)²¹.

Under the Governance Regulation, the EU has created an EU inventory system to ensure the timeliness, transparency, accuracy, consistency, comparability and completeness of the data reported by the EU and its Member States. This inventory system includes a quality assurance and quality control programme, procedures for setting emission estimates, and comprehensive reviews of national inventory data.

Each EU Member State compiles its GHG inventory in accordance with the requirements of the Paris Agreement²² and the relevant Intergovernmental Panel on Climate Change (IPCC) guidelines²³. Inventory data on GHG emissions and removals, including information on methods, are submitted electronically using a reporting system managed by the European Environment Agency (EEA). The submitted data are subject to quality control procedures and feed into the compilation of the GHG inventory of the EU. Net GHG emissions, calculated from emissions and removals reported in the GHG inventory of the EU, are the key information used to track progress towards the EU's NDC target to reduce net emissions by 2030 by 55% compared to 1990.

The 17 October 2023 updated NDC scope is supplemented by additional information to clarify the precise amount of international aviation and maritime emissions which are covered under the EU NDC. In addition, the updated NDC communicated by the EU and its Member States in 5 November 2025 includes an indicative trajectory of 66.25–72.5% by 2035 considering the set target for 2030 and the proposed target for 2040 and agreed at the Council level.

These emissions are calculated based on the Joint Research Centre's Integrated Database of the European Energy System (JRC-IDEES)²⁴. Details of the methodology used to identify GHG emissions from international aviation and navigation in the scope of the EU NDC, which are added to the national totals from the EU GHG inventory, are

²⁰ Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, <http://data.europa.eu/eli/reg/2018/1999/oj>.

²¹ Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union, as amended, <http://data.europa.eu/eli/dir/2003/87/2024-03-01>.

²² Chapter II of the annex to decision 18/CMA.1, <https://unfccc.int/documents/193408>; and decision 5/CMA.3, <https://unfccc.int/documents/460951>.

²³ 2006 IPCC Guidelines for National Greenhouse Gas Inventories, <https://www.ipcc-nggip.iges.or.jp/public/2006gl/>; and on a voluntary basis: 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, <https://www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/>.

²⁴ European Commission, Joint Research Centre, Rózsai, M., Jaxa-Rozen, M., Salvucci, R., Sikora, P., Tattini, J. and Neuwahl, F., JRC-IDEES-2021: the Integrated Database of the European Energy System – Data update and technical documentation, Publications Office of the European Union, Luxembourg, 2024, <https://publications.jrc.ec.europa.eu/repository/handle/JRC137809>.

given in the Climate Action Progress Report, November 2025 Commission Staff Working Document - Technical Information (see note 43).

Under the Governance Regulation each Member State must report to the Commission biennially on the status of implementation of its integrated national energy and climate plans (NECP²⁵s). This process allows the Commission to ensure that the EU and the Member States remain on track to achieve the climate-neutrality objective and progress on adaptation.

Under the Governance Regulation, Member States operate national systems for policies, measures and projections and submit standardised information, which is subject to quality assurance and quality control. Based on the data submitted, the EEA compiles projections of GHG emissions and removals for the EU. This EU-wide information is summarised annually in the Commission's Climate Action Progress Report and in the EEA's Trends and Projections Report based on approximated inventories data of the previous year (n-1)²⁶.

Institutional arrangements for implementation of the NDC

The EU and its Member States have set up a comprehensive system for the implementation of the EU climate change mitigation targets. The European Climate Law²⁷ sets the goal of climate neutrality by 2050 and the intermediate target of reducing net greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels. These targets cover emissions and removals that are regulated in the Union law.

The 2030 climate and energy framework were put in place through the Fit for 55 package to ensure that the EU and its Member States achieve their target. The main elements of this framework are:

- (i) the EU Emissions Trading System (EU ETS)²⁸, which caps GHG emissions in energy, industry, aviation and maritime transport;
- (ii) the LULUCF Regulation, which includes national net removal targets for the LULUCF sector; and
- (iii) the Effort-Sharing Regulation (ESR) which sets national reduction targets for GHG emissions not covered by the EU ETS or the LULUCF Regulation. The implementation of the ESR is supported by additional sectoral policies and measures (details can be found in this report in the chapter on mitigation policies and measures). The legislative acts under the 2030 climate and energy framework require the European Commission and the EU Member States to set up the institutional arrangements for implementing the specific policies and measures under the framework.

²⁵ Progress in implementing these policies and measures is monitored under the Governance Regulation. Relevant information, which is reported regularly and archived by the EEA, includes GHG inventories, approximated GHG inventories for the previous year, information on policies and measures, projections, and progress in implementing the integrated national energy and climate plans

²⁶ <https://www.eea.europa.eu/en/analysis/publications/trends-and-projections-in-europe-2025>

²⁷ Regulation (EU) 2021/1119 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'), <http://data.europa.eu/eli/reg/2021/1119/oj>.

²⁸ This refers to ETS1, i.e. the Emission Trading System for stationary sources (Chapter III of the ETS Directive) and for aviation and maritime transport (chapter II of the ETS Directive). Note that the 'Emissions trading system for buildings, road transport and additional sectors' (ETS2), added in 2023 as Chapter IVa of the ETS Directive, forms an instrument under the Effort Sharing Regulation (ESR).

Established under the Regulation on the Governance of the Energy Union and Climate Action (Governance Regulation)²⁹, the NECPs³⁰ are central strategic planning tools that outline how EU Member States will reach the climate and energy objectives for 2030. They outline how the EU Member States intend to address decarbonization, energy efficiency, energy security, internal energy market, research, innovation and competitiveness, following consultations with citizens, businesses and regional authorities. This information helps the EU and its Member States to correct their course if progress towards the targets of the 2030 Climate and Energy Framework is behind schedule. For example, the European Commission assesses the drafts of new or updated NECPs and provides recommendations on improving planning and implementation. In addition, the reported information is subject to quality checks, and the GHG inventories reported by EU Member States will be subject to comprehensive reviews in 2025, 2027 and 2032³¹.

Member States submitted the NECPs in 2019 for the period 2021-2030 and updated ones in 2024. The European Commission's assessment (May 2025) shows that the EU is currently on course to reduce net GHG emissions by around 54% by 2030, compared to 1990 levels.

Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union, as amended, <http://data.europa.eu/eli/dir/2003/87/2024-03-01>. All EU legislation, including the legislation under the 2030 climate and energy framework, is subject to a stakeholder engagement process. 'Better regulation tools' ensure that policy is based on evidence and the best available practice³². During the preparation of a legislative proposal, the European Commission invites individuals, businesses and stakeholder organisations to provide their views on the subject dealt with by the new legislation. These comments are documented in a dedicated portal³³, and the European Commission reports on how it takes these comments into account in the development of its legislative proposal.

Information on legal, institutional, administrative and procedural arrangements for domestic implementation, monitoring, reporting, archiving of information and stakeholder engagement related to the implementation and achievement of the NDC under Article 4 at national level.

The arrangements established at national level to comply with the EU framework and to implement the Paris Agreement's Enhanced Transparency Framework (ETF), enabling the tracking of GHG emissions and removals, the reporting of policies and measures, projections of GHG emissions and removals, as well as the biennial reporting on the implementation of the NECP, involve the participation of a range of relevant institutions acting as data providers or data collectors, climate policy developers with responsibilities for implementation, monitoring and reporting, including ministries, agencies, institutes, committees, other stakeholders.

The National System for the estimation of anthropogenic greenhouse gas emissions levels from sources and removals by sinks of all GHGs is functioning as indicated in the below figure.

²⁹ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1999>

³⁰ https://commission.europa.eu/publications/romania-final-updated-necp-2021-2030-submitted-2024_en

³¹ Consolidated text (2023) of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, <https://eur-lex.europa.eu/eli/reg/2018/1999/2023-11-20>.

³² Decision-making process, https://ec.europa.eu/info/strategy/decision-making-process/how-decisions-are-made_en

³³ Have your say – public consultation and feedback, https://ec.europa.eu/info/law/better-regulation/have-your-say_en

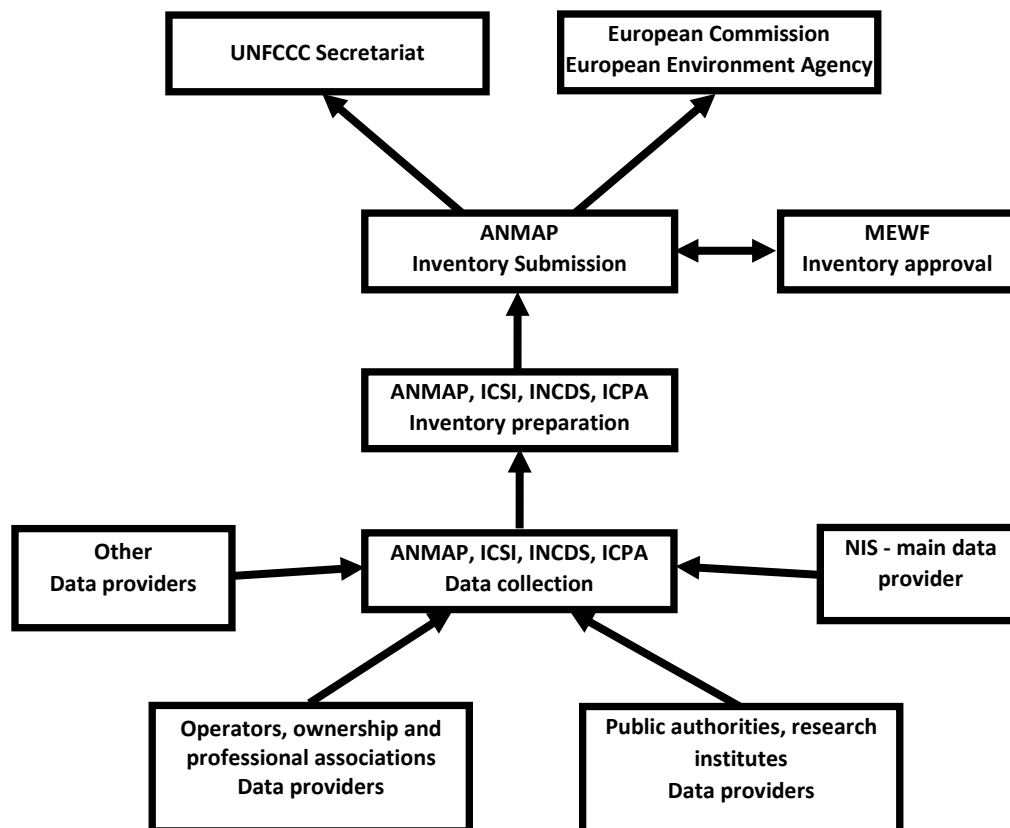


Figure III-24 Current national inventory system description

The main legal and procedural arrangements specific to National Inventory Arrangements include:

- The Government Decision (GD) no. 311 of 3 April 2025 that established the fusion of the National Environmental Protection Agency with the National Agency for Natural Protected Areas, as well as with the local environmental protection agencies in a new institution, the National Agency for Environment and Protected Areas (ANMAP) having competences in implementation of policies and legislation in the field of environmental protection and protected natural areas. ANMAP is a specialised body of the central public administration, funded from the state budget, operating under the authority of the central public authority for environmental protection.

- Governmental Decision no. 1415/2024 for defining the obligations on the administration of the Agriculture and LULUCF sectors; based on the mentioned decision, responsibilities of administrating the Agriculture and LULUCF Sector of the National GHG inventory were allocated as follows:

- the National Research and Development Institute for Cryogenic and Isotopic Technologies Rm. Vâlcea:
 - Agriculture Sector: administrates directly and/or through collaboration with other organizations a series of technical parameters;
 - LULUCF Sector: is monitoring and estimating/reporting the GHG emissions/removals associated to the Cropland, Grassland, Wetlands, Settlements and Other Land categories, excepting the emissions/removals in soils; the institute is also the technical coordinator of the LULUCF Sector activities.

- National Institute for Research and Development in Forestry “Marin Drăcea” is monitoring and estimating/reporting the GHG emissions/removals associated to the Forest Land category;
- National Research and Development Institute for Soil Science, Agrochemistry and Environment Bucharest is monitoring and estimating/reporting the GHG emissions/removals associated to the soils in Cropland, Grassland, Wetlands, Settlements and Other Land categories;
- National Agency for Environment and Protected Areas is implementing a series of technical activities following the receipt of the deliverables from the institutes and administrative activities to allow for a continuous implementation of specific activities;
- Ministry of Environment, Waters and Forests is analysing and approving the consolidated version of the LULUCF inventory and is ensuring, depending on needs, the Romania's representation in the associated inventory review, together with ANMAP and institutes.

Implementation of activities by the three institutes previously mentioned, is based also on the allocation of adequate financial resources through the Environment Fund Administration and on individual contracts with the Environment Fund Administration.

- The Government Decision (GD) no. 1570/2007 establishing the National System for estimation of anthropogenic greenhouse gas emissions levels from sources and removals by sinks of all GHGs, regulated through the Kyoto protocol (KP), as it has been modified by the G.D. no. 1022/2016, GD no. 120/2014, GD no. 668/2012,

- GD no. 600/2022 on establishing some measures for implementing the provisions in Art. 26.2 in the Regulation (EU) no. 1999/2018 of the European Parliament and of the Council on the Governance of the Energy Union and Climate Action,

- Government Urgency Ordinance no. 195/2005 on the environment protection, with its ulterior modifications,

- Ministry of Environment Order (MoEO) no. 1376/2008 for approving the Procedure on NGHGI reporting and the modality for answering to the observations and questions raised following the NGHGI review;

- MoEO no. 1474/2008 for approving the Procedure on processing, archiving and storage of data specific to the NGHGI;

- MoEO no. 1442/2014 on approving the Procedure on selection of the estimation methods and of the emission factors needed for the estimation of the GHG levels;

- MoEO no. 1602/2014 on approving the Quality Assurance and Quality Control Plan associated to the National Greenhouse Gas Inventory;

- Protocol of collaboration no. 3136/MMP/9.07.2012 between Ministry of Environment and Forests, ANMAP, Romanian Automobile Register and Directorate on Driving Licenses and Vehicles Registration in the Ministry of Internal Affairs, on the preparation of Road transport category estimates based on COPERT 4 model.

Institutional arrangements for monitoring over time the policies and measures and evaluating the progress for GHG emissions mitigation

In Romania, the Ministry of Environment, Waters and Forests (MEWF) is the national entity responsible for administering the National System for Policies and Measures and Projections of GHG Emissions, as provided by Government Decision (GD) No 267/2019 on the establishment of the National System for Reporting on Policies and Measures and Projections of anthropogenic GHG emissions by sources and removals by sinks (NSPMPGHG). This GD establishes the legal, institutional and procedural framework for collecting the data necessary to fulfil the reporting obligations assumed by Romania at European and international level, as follows:

- MEWF, as the competent authority, is responsible for the development and submission of the Reports on Policies and Measures and Projections of anthropogenic GHG emissions by sources and removals by sinks at the European level as well as for the development and submission of the Biennial Report and the National Communication.
- Central public authorities and public institutions provide the data and information necessary for the preparation of reports, including macro-economic parameters.
- MEWF ensures the completeness of data and information related to policies and measures and projections, which must include all GHG emissions and removals for all years, all gases and all projection scenarios considered.
- MEWF ensures the implementation of quality assurance and quality control (QA/QC) for the data and information developed and/or processed, as well as the archiving and storage of all specific documentation related to PaMs and Projections, Biennial Transparency Reports and National Communications.
- The central public authorities and public institutions responsible for providing the data and information necessary for the preparation of the reports implement quality control procedures for the data provided, in accordance with their competences.

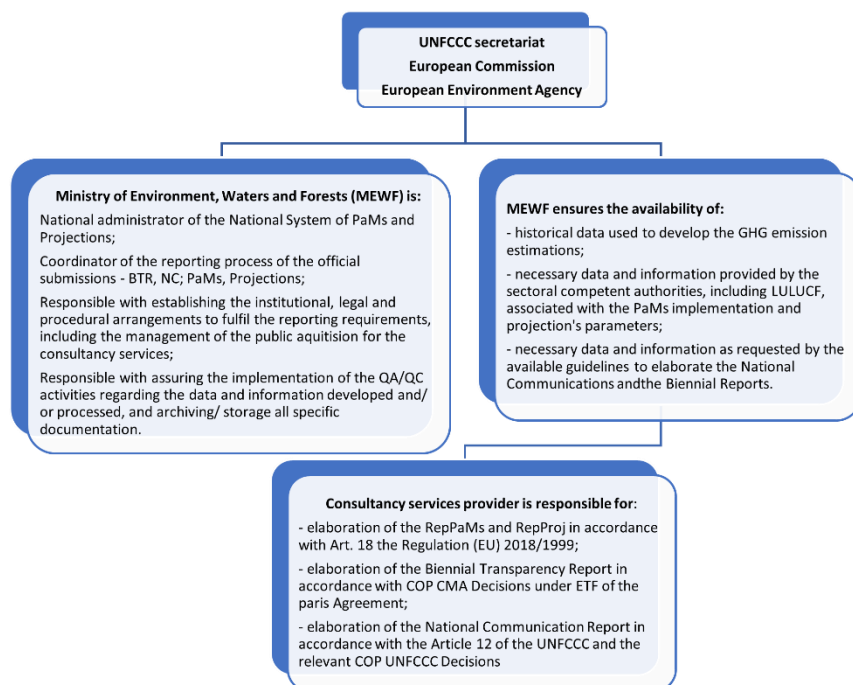


Figure III-25 BTR, National Communication, PaMs and Projections data and information flow

LULUCF Sector

According to GD No 1415/2024 and Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, the reports on policies and measures and on projections for the LULUCF sector are managed as shown in the figure below:

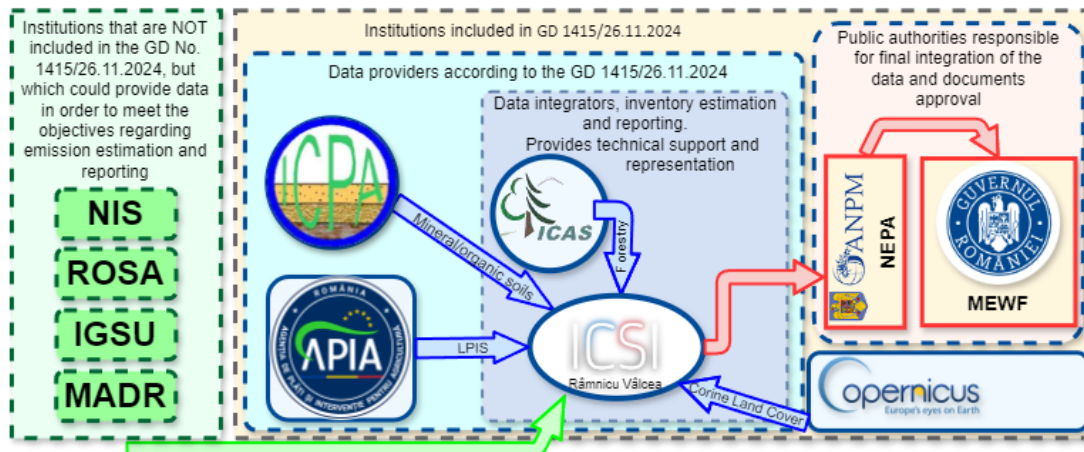


Figure III-26 Information flow for LULUCF sector according to GD 1415/2024 and Governance Regulation (EU) 2018/1999

General coordination: MEWF, the central entity responsible for submitting the Report to the EC/COM and the UNFCCC.

Institutions with direct responsibility

ICSI Râmnicu Vâlcea - National Institute for Research and Development for Cryogenic and Isotopic Technologies Râmnicu Vâlcea, responsible for the land use categories: Cropland (CL); Grassland (GL); Wetlands (WL); Settlements (SL); and Other land (OL).

Methodology - application of the IPCC Guidelines 2006 and 2019 Refinement for estimating carbon fluxes; the use of specific national emission factors (Tier 1 and Tier 2); data collection by satellite monitoring (LPIS/IACS, LiDAR, CLC) and field studies.

INCDS "Marin Drăcea" - National Institute for Research and Development in Forestry, responsible for the land use categories: Forest Land (FL) - remaining Forest lands.

Methodology - application of the IPCC Guidelines 2006 and 2019 Refinement for estimating carbon fluxes; the use of specific national emission factors (Tier 1 and Tier 2); data collection through satellite monitoring (LPIS/IACS, LiDAR, CLC), field studies and monitoring of land use changes through the National Forest Inventory (NFI).

ICPA - National Institute for Research and Development for Pedology, Agrochemistry and Environmental Protection Bucharest, responsible for soil assessment and soil carbon fluxes across all land use categories in the LULUCF sector.

Methodology – application of the IPCC Guidelines 2006 and 2019 Refinement for estimating soil carbon fluxes; use of specific Tier 2 factors for soil organic carbon (SOC); correlation with data on agricultural land and pasture management practices.

Primary data sources, institutions involved

NIS - National Institute of Statistics, provides data on agricultural areas and land-use changes

APIA - Agency for Payments and Intervention for Agriculture, provides information on agricultural areas and grasslands (LPIS/IACS)

ICPA - National Institute for Research and Development for Pedology, Agrochemistry and Environmental Protection, provides information on soil carbon fluxes on all land use categories in the LULUCF subdomain.

NECP biennial progress report

Biennial progress reports prepared pursuant to Article 17 of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action (the Governance Regulation) provide a regular assessment of the implementation of the National Energy and Climate Plans (NECPs).

In Romania, the Ministry of Energy is responsible for coordinating the reports pursuant to Article 17 of the Governance Regulation, supported by the other ministries responsible for coordinating and monitoring the implementation of sectoral policies and measures. The efficiency of this activity is ensured by a joint ministerial order of the Ministry of Energy and the Ministry of Environment, Waters and Forests, which establishes a working group composed of representatives of all ministries that provide the data and information required by the reporting format.

B. Description of a Party's nationally determined contribution under Article 4 of the Paris Agreement, including updates

As provided by the European Climate Law Regulation, the EU aims to become climate neutral by 2050 meaning that the emissions will either be reduced to zero or balanced out by removals.

Informed by the outcomes of the first Global Stocktake (GST), the EU communicated in advance of COP30 a successive NDC representing a progression beyond the NDC communicated in 2023 and that it was included in the current NDC Synthesis Report.

In response to decision 6/CMA.3 on common time frames for NDCs and decision 1/CMA.5 on the GST, the EU and its Member States, acting jointly, aim to achieve an indicative contribution of reducing net GHG emissions by **66.25–72.5% by 2035**³⁴, compared to 1990 levels. This range is based on indicative linear trajectories derived, on the one hand, from the EU's climate targets for 2030 and 2050, and, on the other hand, from the EU's 2030 climate target and the 2040 climate target agreed by the Council of the European Union.

To achieve its objective of climate neutrality, the EU has set an intermediate 2030 target and the Commission has proposed an additional target for 2040 to be enshrined in the Climate Law. The 2030 target requires reducing total net greenhouse gas emissions in the EU by **at least 55% below 1990 levels**. For 2040, the European Commission has proposed a target of **cutting net greenhouse gas emissions by 90%**, which is currently under consideration by the European Parliament and the Council (the Council reached a General Approach on 5 November 2025).

The three main policies ensuring the achieving of the EU 2030 target of reducing emissions by 55% are:

- The revised EU ETS Directive increases the level of ambition in the existing system from **43% to 62%** emissions reductions by 2030, compared to 2005 (by 2023, the EU ETS1 has helped drive down emissions from electricity and heat generation and industrial production by 47.6% compared to 2005 levels³⁵);
- The amended Effort Sharing Regulation (ESR) increased, for the sectors that it covers, the EU-level GHG emission reduction target from **29% to 40%** by 2030, compared to 2005 levels;
- The FF55 reinforced the Land Use, Land Use Change and Forestry (LULUCF) sector, notably by setting the carbon sinks target to -310 Mt CO₂-eq by 2030, i.e. increasing net removals in the land sector by an additional 42 Mt of CO₂-eq compared to the average of 2016-2018, with specific targets to different Member States

The FF55 policy framework underpinning the implementation of European Union 2030 target is in place except the Revision of the Energy Taxation Directive which is underway. These policies include the EU ETS Directive, a new ETS for buildings, road transport and additional sectors (ETS2), the Effort Sharing Regulation, CO₂ standards for cars and vans, the LULUCF Regulation, the Carbon Removals and Carbon Farming Certification Framework

³⁴ <https://unfccc.int/sites/default/files/2025-11/DK-2025-11-05%20EU%20NDC.pdf>

³⁵ https://climate.ec.europa.eu/document/download/7bd19c68-b179-4f3f-af75-4e309ec0646f_en?filename=CAPR-report2024-web.pdf

Regulation, the Carbon Border Adjustment Mechanism (CBAM), the Social Climate Fund, FuelEU Maritime, the Alternative Fuel Infrastructure Regulation, ReFuelEU Aviation, the Energy Efficiency Directive, the Renewable Energy Directive, the Energy Performance of Buildings Directive, the Updated rules to decarbonise gas markets and promote hydrogen as well as the EU Methane Regulation for the energy sector.

The linear reduction factor of the EU ETS1 will be 4.4% from 2028. The cap on emissions, in connection with the corresponding linear reduction factor, have been tightened to bring emissions down by 62% below 2005 levels by 2030. Since 1 January 2024, the EU ETS1 covers maritime transport. Emissions from all large ships entering EU ports are included, regardless of the flag they fly, in respect of 100% of emissions that occur between two EU ports and when ships are in EU ports and 50% of emissions from voyages starting or ending outside the EU.

The EU ETS1 system's scope has also been expanded to emissions from non-domestic intraEU flights to and from the EU's nine outermost regions as well as departing flights from these outermost regions to Switzerland and the UK. This represents an extension of carbon pricing coverage of 7%.

The EU ETS2 covers emissions upstream - fuel suppliers are required to monitor and report the quantities of fuels that they release for consumption in the sectors that fall under the scope of EU ETS2, and will be required to buy and surrender the allowances for the corresponding emissions. All allowances under the EU ETS2 will be auctioned, with the revenue going to the newly established Social Climate Fund and the EU Member States towards supporting climate action in these sectors.

The EU emission reductions in 2023 are clearly linked to the acceleration of the energy transition, providing a solid basis for the future and increasing confidence that the EU can meet its climate targets in a fair and competitive manner. The EU's emission reductions are compatible with science and the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report pathways and the call for deep, rapid and sustained reductions in global GHG emissions of 43% by 2030 from 2019 levels.

The NDC consists of a single-year target, and the target type is 'economy-wide absolute emission reduction'. The scope of the NDC covers the 27 Member States of the EU. Details of the EU NDC can be found in Table III-19.

C. Information necessary to track progress made in implementing and achieving nationally determined contributions under Article 4 of the Paris Agreement³⁶

Progress in implementation of the EU's 2030 NDC³⁷

Established under the Regulation on the Governance of the Energy Union and Climate Action (Governance Regulation)³⁸, the NECPs³⁹ are central strategic planning tools that outline how EU Member States will reach the climate and energy objectives for 2030. They outline how the EU Member States intend to address decarbonisation, energy efficiency, energy security, internal energy market, research, innovation and competitiveness, following consultations with citizens, businesses and regional authorities. Member States submitted the NECPs in 2019 for the period 2021-2030 and updated ones in 2024. The European Commission's assessment (May 2025) shows that the EU is currently on course to reduce net GHG emissions by around 54% by 2030, compared to 1990 levels.

According to the *Climate action progress report 2025 – Strengthening competitiveness on the road to climate neutrality, European Commission, 2025*⁴⁰, emissions at Union level continue on the downward trajectory that has been observed in recent years. The emissions were 37.2% lower in 2023 than in 1990 (or 39% when only domestic net emissions are considered), while GDP was 71% higher, meaning that economic growth continues to decouple from emissions. The EU revised ETS Directive in 2023 that is now in force and align the system with the EU's 2030 climate target.

The same EU document indicates the following results at EU level:

- Emissions trading system: in 2024, emissions from the power and manufacturing plants down by 50% compared to 2005 levels; in 2024, renewables and biofuels were the leading source of electricity in the EU, capturing 47.2% of the share, with the overall renewable electricity output having increased by 7.6% in 2024.
- Effort sharing regulation - in 2024, emissions were 20% lower than in 2005 and almost unchanged compared to 2023; 2024 the first year when emissions were above the limit. ESR provides flexibilities to ensure that the target can be met cost effectively.
- Carbon removals are on decline - projections show a gap of 40-55 MtCO₂-eq from the EU 2030 target.

Relevant data regarding the GHG emissions evolution at EU level and the EU Member States are reported by the *European Environment Agency Trends and projections in Europe 2025 Report*⁴¹. According to this document, the

³⁶ Pursuant to para. 77(d) of the annex to decision 18/CMA.1, such information is subject to relevant decisions adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on Article 6 of the Paris Agreement.

³⁷ <https://unfccc.int/sites/default/files/2025-11/DK-2025-11-05%20EU%20NDC.pdf>

³⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1999>

³⁹ https://commission.europa.eu/publications/romania-final-updated-necp-2021-2030-submitted-2024_en

⁴⁰ Directorate-General for Climate Action, Climate action progress report 2025 – Strengthening competitiveness on the road to climate neutrality, European Commission, 2025, <https://op.europa.eu/en/publication-detail/-/publication/2d756cf5-c4f4-11f0-8da2-01aa75ed71a1/language-en>

⁴¹ <https://www.eea.europa.eu/en/analysis/publications/trends-and-projections-in-europe-2025>;

net greenhouse gas (GHG) emissions in the European Union fell by 36% between 1990 and 2023, including international transport as regulated by EU Climate law. Preliminary estimates indicate a year-on-year drop of 2.5% between 2023 and 2024. Projections based on current policies and measures reported by Member States suggest that a 47% reduction in net emissions will be reached by 2030 compared to 1990 levels. Integrating countries' additionally planned policies and measures closes most of the ambition gap - putting the EU at a projected 54% reduction by 2030 compared to 1990 levels.

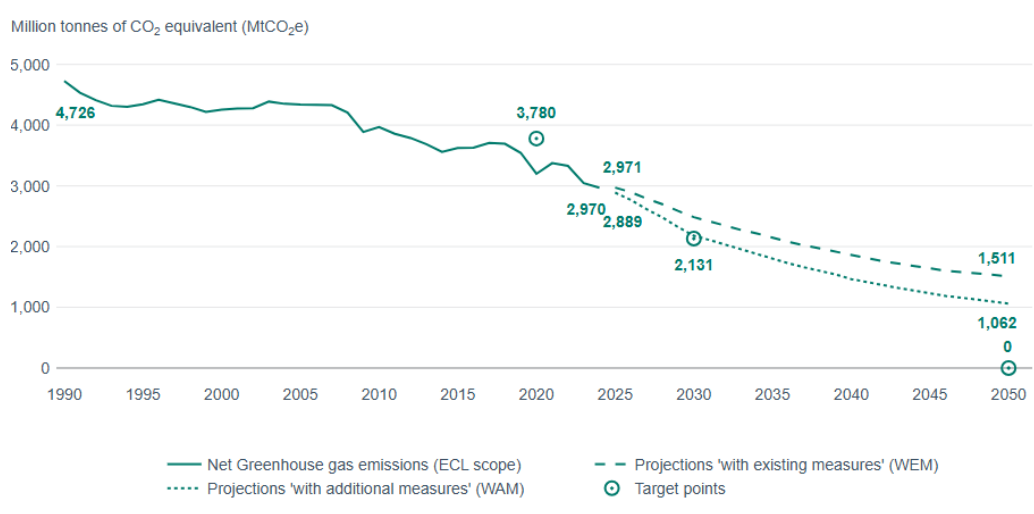


Figure III-27 Progress towards achieving climate targets in the EU-27

Source: European Environment Agency, Trends and projections in Europe 2025 Report (see note 43)

Action on climate resilience and adaptation

2024 was the warmest year on record globally. Across European continent, this resulted in record heatwaves, droughts, wildfires, and floods that took lives and caused severe economic losses. Being resilient to climate change is essential for our safety and competitiveness. To address its own impacts, the European Commission's Communication on the European Green Deal indicated a more ambitious EU Strategy on Adaptation to Climate Change, adopted in February 2021⁴².

At national level Romania has in force its National Adaptation to Climate Change Strategy and its Action Plan approved through the Government Decision no. 1010/2024.

NDC Scope

The scope of the EU NDC updated on 05 November 2025 NDC scope includes a specific share of CO₂ emissions from flights subject to effective carbon pricing through the EU ETS and carbon dioxide, methane and nitrous oxide emissions for waterborne navigation voyages within the EU.

This section provides further details on the inclusion of these emissions in the EU's NDC.

⁴² https://ec.europa.eu/commission/presscorner/detail/en/ip_21_663

Table III-19 Description of the NDC of the EU

Information	Description
Target and description	Economy-wide net domestic reduction of at least 55% in greenhouse gas emissions by 2030 compared to 1990. The EU has submitted its NDC ahead of the COP in Belem, an economy-wide net emissions reduction target by 2040 compared to 1990, including an adequate contribution of high-quality international credits under Article 6 of the Paris Agreement in a way that is both ambitious and cost-efficient, leading to an indicative contribution of an economy wide net reduction of between 66.25- 72.5% in GHG emissions by 2035 compared to 1990. The range for the indicative target in 2035 is based on indicative linear trajectories from, on the one hand, the EU's climate targets for 2030 and 2050, and, on the other hand, the EU's climate target for 2030 and the 2040 climate target from the position of the Council of the European Union.
Target type	Economy-wide absolute emission reduction.
Target year	2030 (single-year target); 2040 (single-year target) leading to an indicative contribution of a reduction of net GHG emissions of between 66.25-72.5% compared to 1990 by 2035.
Base year	1990
Base year value	Net greenhouse gas emissions level in 1990: 4 689 Mt CO ₂ eq ⁴³ (NDC scope, Climate Action Progress Report 2025, Commission SWD – pg. 14, Table 5: <i>Net GHG emissions in 1990, 2023 and 2024</i> (MtCO ₂ -eq)).
Implementation period	The range for the indicative target in 2035 is based on indicative linear trajectories from, on the one hand, the EU's climate targets for 2030 and 2050, and, on the other hand, the EU's climate target for 2030 and the 2040 climate target from the position of the EU's Council.
Geographical scope	EU Member States (Belgium, Bulgaria, Czechia, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden) including EU outermost regions (Guadeloupe, French Guiana, Martinique, Mayotte, Reunion, Saint-Martin (France), Canary Islands (Spain), Azores and Madeira (Portugal)).
Sectors	Sectors as contained in Annex I to decision 5/CMA.3: • Energy ○ International Aviation: Emissions from civil aviation are included in respect of CO₂ emissions from flights subject to effective carbon pricing through the EU ETS: (which, up to 31 December 2026, comprises flights within the European Economic Area, departing flights to Switzerland and departing flights to the United Kingdom). [Placeholder: any broader scope would result from the amendment of the EU ETS Directive by the Council and the European Parliament, based on the legislative proposal due to be adopted by July 2026⁴⁴.] ○ International maritime navigation: Maritime navigation is included in respect of emissions from domestic navigation activities and emissions subject to effective carbon pricing through the EU ETS. The extension of the EU ETS to maritime emissions covers CO₂ emissions, from ships above 5000 gross tonnage, as well as methane and nitrous oxide emissions as from 1 January 2026. It applies to 50% of emissions from voyages starting or ending outside the EU, and all emissions from voyages within the

⁴³ Climate Action Progress Report 2025, Commission Staff Working Document Technical Information https://climate.ec.europa.eu/document/download/35f83a2d-f77d-4895-b616-d579069b23d3_en?filename=capr2025_swd_en.pdf

⁴⁴ https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/14549-EU-emissions-trading-system-for-maritime-aviation-and-stationary-installations-and-market-stability-reserve-review_en.

	EU and emissions from ships within EU ports. • Industrial processes and product use • Agriculture • Land Use, Land Use Change and Forestry (LULUCF) • Waste
Gases	Carbon dioxide (CO ₂), methane (CH ₄), nitrous oxide (N ₂ O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF ₆), nitrogen trifluoride (NF ₃)
LULUCF categories and pools	The included LULUCF categories and pools are as defined in decision 5/CMA.3.
Intention to use cooperative approaches	The EU's net reduction target of at least 55% by 2030 is to be achieved through domestic measures only, without contribution from international credits. The EU will account for its cooperation through the EU ETS with other Parties in a manner consistent with the guidance adopted by CMA1 and any further guidance agreed by the CMA. In order to facilitate the achievement of the EU 2040 target an adequate contribution towards the 2040 target of high quality international credits under Article 6 of the Paris Agreement in a way that is both ambitious and cost-efficient, supporting the EU and third countries in achieving net GHG reduction trajectories compatible with the Paris Agreement objective to hold the increase in the global average temperature to well below 2 °C and pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels - the origin, quality criteria and other conditions concerning the acquisition and use of any such credits shall be regulated in EU law.
Any updates or clarifications of previously reported information, as applicable	The information on the scope of the NDC includes additional clarifications compared to the EU's updated NDC as of 5 November 2025.

Note: This table is identical to the table 'Description of a Party's nationally determined contribution under Article 4 of the Paris Agreement, including updates', which has been submitted electronically together with this BTR.

Source: Updated NDC of the EU⁴⁵

As specified above, the NDC covers the emissions and removals from all sectors of the EU GHG inventory. In addition, CO₂ emissions from specific international flights and GHG emissions from maritime voyages (covered by the EU Emissions Trading System).

Indicator, definitions, methodologies and progress

Indicator

To track progress in implementing and achieving the NDC of the EU, an indicator is used which has the same unit and metric as the NDC base year and target values. The chosen indicator is 'annual total net GHG emissions consistent with the scope of the NDC in CO₂eq. Table III-20 provides more information on this indicator.

⁴⁵ <https://unfccc.int/sites/default/files/2025-11/DK-2025-11-05%20EU%20NDC.pdf>

Table III-20 Indicator to track progress

Information	Description
Selected indicator	Annual total net GHG emissions (in CO ₂ eq) consistent with the scope of the NDC. Quantification of the reference indicator will be based on national totals reported in the National Inventory Report by the EU and may be updated due to methodological improvements to the GHG inventory.
Reference level and base year	Values may be updated due to methodological improvements to the GHG inventory. The reference level is the total net GHG emissions of the EU in the base year (1990). The current value of the base year considering the NDC scope is indicated by the Commission Staff Working Document, November 2025 ⁴⁶ and is 4 689 Mt CO ₂ eq.
Updates	This is the first time the reference level has been reported, hence there are no updates. The value of the reference level may be updated in the future because of methodological improvements to the EU GHG inventory and to the determination of international aviation and navigation emissions within the scope of the NDC.
Relation to the NDC	The indicator is defined in the same unit and metric as the target of the NDC. Hence it can be used directly to track progress in implementing and achieving the NDC target.
Definitions	Definition of the indicator 'annual total net GHG emissions in CO ₂ eq': total net GHG emissions correspond to the annual total of emissions and removals reported in CO ₂ equivalents in the latest GHG inventory of the EU. The totals comprise all sectors and gases listed in the table entitled 'Reporting format for the description of a Party's nationally determined contribution under Article 4 of the Paris Agreement, including updates.'

Note: The information in this table is identical to the information in common tabular format (CTF) Tables 1 ('Description of selected indicators') and 2 ('Definitions needed to understand the NDC'), which were submitted electronically together with this BTR.

Source: The reference level above (base year) represents an indicative figure based on the Annual European Union GHG inventory 1990-2023, included in the Climate Action Progress Report 2025, Commission Staff Working Document, referenced above. It can be changed as result of the methodological changes and different results that will be collected for the next EU NIR submission and the 2nd EU BTR.

Methodologies and accounting approach

The EU and its Member States use the following accounting approach for tracking progress towards the EU NDC: annual GHG data from the national GHG inventory of the EU, complemented for international aviation and navigation by estimates from the Joint Research Centre's Integrated Database of the European Energy System⁴⁷. The total net GHG emissions are provided in the scope of the EU NDC and are compared to the economy-wide absolute emission reduction target as defined in the NDC. The EU will account for its cooperation with other parties in a manner consistent with guidance adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA).

⁴⁶ Climate Action Progress Report 2025, Commission Staff Working Document, Technical Information https://climate.ec.europa.eu/document/download/35f83a2d-f77d-4895-b616-d579069b23d3_en?filename=capr2025_swd_en.pdf

⁴⁷ European Commission, Joint Research Centre, Rózsai, M., Jaxa-Rozen, M., Salvucci, R., Sikora, P., Tattini, J. and Neuwahl, F., JRC-IDEES-2021: the Integrated Database of the European Energy System – Data update and technical documentation, Publications Office of the European Union, Luxembourg, 2024, <https://publications.jrc.ec.europa.eu/repository/handle/JRC137809>.

For emissions and removals from the LULUCF sector, net emissions are used for tracking progress towards the 2030 target of the NDC based on all reported emissions and removals.

Details on methodologies and accounting approaches consistent with the accounting guidance⁴⁸ under the Paris Agreement can be found in CTF Table 3 ('Methodologies and accounting approaches'), which was submitted electronically together with this BTR.

Structured summary – status of progress

An important purpose of the BTR is to demonstrate where the EU and its Member States stand in implementing their NDC, and what progress they have made towards achieving it. The most recent data on GHG emissions and removals in the scope of the NDC constitute the key information for tracking this progress. Table III-21 summarises the current status of progress.

Table III-21 Summary of progress towards implementing and achieving the NDC (see note 49)

Indicator	Unit	Base year value	Values in the implementation period				Target level	Target year	Progress made towards the NDC
		1990	2021	2022	2023	2030			
Indicator: total net GHG emissions consistent with the scope of the EU NDC	MtCO ₂ eq	4689	3329	3281	3001	NA	At least 55% below base year level	2030	The most recent level of the indicator is 36% below the base year level.

NA: not applicable.

Source: the indicator values are indicative and based on the Table 4: EU-27 GHG emissions under the EU target scope (1990-2024), Commission's estimates – Net GHG emissions (NDC scope) published in the Climate Action Progress Report 2025, Commission Staff Working Document (see note 48).

Note: more detailed information can be found in CTF Table 4 ('Structured summary: tracking progress made in implementing and achieving the NDC under Article 4 of the Paris Agreement'), which is submitted electronically together with this BTR. Based on these GHG inventory data and data on international aviation and maritime navigation in the scope of the NDC for 2023, the EU and its Member States have reduced net GHG emissions by 36 % compared to 1990. This demonstrates that the EU and its Member States have made progress in implementing and achieving their NDC. The legal and institutional framework is in place to make further progress in the years ahead and to achieve the NDC target by 2030.

Romania's contribution to the progress towards achieving the joint EU NDC can be illustrated in part by the evolution of the emissions under the EU Effort Sharing Regulation (ESR) compared to the annual emission allocation that are presented below:

In addition, Romania takes part in the EU Emissions Trading System. Romania also contributes to the overall EU-level objective of 310 million tonnes CO₂ equivalent of net removals in the LULUCF sector in 2030 defined by the LULUCF Regulation.

⁴⁸ Decision 4/CMA.1, Further guidance in relation to the mitigation section of decision 1/CP21, <https://unfccc.int/documents/193407>.

Table III-22 Romania's annual emissions allocations for the effort sharing sector for 2021–2025, 2026–2030, corresponding emissions for 2021 to 2023 and their difference to emissions allocations

	Base year value	Values in the implementation period ktCO ₂ eq									
	2005	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Annual emissions allocation	78,235.7	87,878.0	76,914.8	75,837.9	74,761.1	73,684.2	72,578.6	71,508.9	70,439.2	69,369.5	68,299.8
Efforts sharing sectors in Romania		76,474.7	74,536.5	73,945.3							
Difference AEA allocation and reported total ESR emissions		11,425.3	2,363.4	1,854.7							

Table III-23 Summary of GHG emission reduction targets of Romania and the EU for the period 2021—2030

EU Climate law		
Fit for 55 package, for 2030 EU target		
Commitment period and target year 2021—2030		
Emission reduction target: at least -55% in 2030 in comparison with the base year level (1990)		
EU ETS	ESR (non-ETS)	LULUCF
-62% (target settled at EU level for the whole EU ETS)	-40% distributed individually among the MS; individual target for Romania: -12.7% compared to 2005	no debit rule in the period 2021-2025 and an overall EU net removals target in 2030 (-310 Mt CO ₂) with an allocation mechanism to national targets during the period 2026—2030
Other commitments - Renewable energy target for the EU by 2030. New binding target of at least 42.5%, but aiming for 45%. - Energy efficiency target. 36—39% to be achieved collectively by the EU by 2030 compared to PRIMES Reference Scenario 2007 – which equates to 11.7% compared to PRIMES Reference Scenario 2020. - New reduction target for ETS2 (BRT), covering buildings, road transport and fuels for other sectors, of 43% in 2030 compared to 2005 - LULUCF: 2021—2025, subject to settlement rules; 2026—2030: average 2016—2018		

	International commitments (UNFCCC) Paris Agreement	EU law		
		Fit for 55 package 2030		
		EU ETS	ESR (non-ETS)	LULUCF
Aviation and shipping	EU ETS aviation included	Included - flights from the EU; - maritime transport to and from the EU	Excluded	Not applicable
Use of international credits	Excluded	Excluded		
Carry-forward of units from previous periods	Not used	Not used		
Gases covered	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ , NF ₃	CO ₂ , N ₂ O, CF ₄ , C ₂ F ₆	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆	CO ₂ , CH ₄ , N ₂ O
Sectors	Energy, IPPU, Agriculture, Waste, LULUCF	Electricity and heat production and industry (e.g., cement, chemical, coke, refineries), aviation (according to Annex I to the ETS Directive), after updating the target also maritime transport to and from the EU	Transport (excluding domestic aviation), municipal and household sector, other industry, agriculture and waste	LULUCF
GWP warming factors used	IPCC AR5			

D. Mitigation policies and measures, actions and plans, including those with mitigation co-benefits resulting from adaptation actions and economic diversification plans, related to implementing and achieving a nationally determined contribution under Article 4 of the Paris Agreement

Romania, as an EU Member State, has implemented policies and measures that have already successfully contributed to reducing greenhouse gas (GHG) emissions in recent years, including the European Union Emissions Trading System (EU ETS), the Effort Sharing Decision for Member States, and a wide range of policies and measures addressing all sectors of the economy.

At EU level, climate policies have been further strengthened through Regulation (EU) 2021/1119 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ("the European Climate Law"), which sets a legally binding EU-wide target of climate neutrality by 2050, including a binding intermediate target (reducing net GHG emissions, after deducting removals, by at least 55% by 2030 compared to 1990 levels). The relevant EU institutions and the Member States adopt the necessary measures at EU and national level to enable the collective achievement of the climate neutrality objective.

Romania's commitments to reduce GHG emissions by 2030 and to reach climate neutrality by 2050 involve the implementation of concrete actions across all sectors of activity.

The main policies and measures, actions and plans with significant effects on GHG emission reduction potential are the following:

WEM scenario

• Cross-Sectoral Policies

- Romania's Long-Term Strategy for reducing greenhouse gas emissions – Romania Climate Neutral by 2050
- Implementation of the EU Emissions Trading System (ETS1)
- Reduction of GHG emissions in non-ETS sectors (ESR)
- Reduction of industrial emissions in line with BAT Conclusions
- Integrated National Energy and Climate Plan (NECP)
- Romania's Industrial Strategy 2024–2030
- Integration of renewable hydrogen into the industry and transport sectors
- Geological storage of carbon dioxide
- Promotion of energy efficiency
- Promotion of renewable energy sources
- Romania's National Recovery and Resilience Plan (NRRP)
- National programmes supporting local and regional development
- Programmes financed under the 2021–2027 Cohesion Funds and the Modernisation Fund

- National Strategy for Research, Innovation and Smart Specialisation 2022–2027
- **Energy Sector**
 - Romania's Energy Strategy 2025–2035, with a 2050 outlook
 - National Long-Term Renovation Strategy (SNRTL) to support the renovation of the national stock of residential and non-residential buildings, public and private, towards a highly energy-efficient and decarbonised building stock by 2050
 - Support for the electricity and natural gas markets
 - Promotion of decarbonisation in the energy sector
 - Promotion of heat-based cogeneration according to useful heat demand
 - Multiannual programme 2019–2027 for financing investments in the modernisation, rehabilitation, refurbishment, extension or establishment of district heating systems
 - Promotion buildings' energy performance
- **Transport Sector**
 - Romania General Transport Master Plan, updated by GD no. 1312/2021 approving the Investment Programme for the development of transport infrastructure for the period 2021–2030
 - Railway Infrastructure Development Strategy 2021–2025, and the Action Programme for the Development of Railway Infrastructure and the Modal Shift of Passenger and Freight Transport Flows to Rail
 - Promoting the Sustainable Urban Mobility
 - Programmes financed from the 2021–2027 Cohesion and Modernisation Funds
- **Industrial Processes and Product Use Sector**
 - Reducing emissions of fluorinated greenhouse gases (F-gases)
- **Waste Sector**
 - Completion/modernization of county municipal waste management systems
 - Reduction of quantities produced per capita
 - Construction of voluntary collection centres (CAV)
 - Composters for green waste and other biological waste provided free of charge to households
 - Reduction of waste paper and other office supplies through the implementation of national and sectoral e-government programming documents
 - Construction of factory recycling facilities

WAM Scenario

- **Cross-Sectoral Policies**

- Extension of the EU Emissions Trading System (ETS 2);
- Social Climate Fund;

- **Waste Sector**

Reducing municipal waste disposal by:

- Prohibition on the landfilling of any waste that can be recycled or recovered in another way
- Prohibition on the landfilling of separately collected municipal waste
- Landfilling only of waste that has undergone prior treatment
- Ensuring the capacity to treat residual waste at national level
- Ensuring the treatment of street waste (waste from street bins) in IITD
- Ensuring the capacity for energy recovery from residual waste at national level
- Operationalization of the economic instrument "Pay as you throw"
- Increasing the energy recovery rate of municipal waste
- Ensuring municipal waste storage capacity with a view to storing waste only in compliant landfills
- Separate collection and appropriate treatment of hazardous household waste
- Separate collection and proper treatment of bulky waste
- Separate collection and proper treatment of textile waste
- Increase in tariffs and contribution to the circular economy for landfill disposal
- Implementation of extended producer responsibility for textile waste

Cross-Sectoral (CS) Policies

- **CS. 1 Romania's Long-Term Strategy for Reducing Greenhouse Gas Emissions – Romania Climate Neutral by 2050**

Affected sectors: Energy; Transport; Industrial Processes and Product Use; Agriculture; Waste Management
Projection scenario: WEM

As part of Romania's Long-Term Strategy for reducing greenhouse gas emissions – Romania Climate Neutral by 2050 – Romania has committed to achieving climate neutrality by 2050, specifically by decarbonising economic sectors by 99% compared to 1990 levels, and meeting the 2030 milestone of a 78% reduction in net emissions compared to 1990. According to the selected scenario – Climate Neutral Romania – the national targets to be achieved are:

- share of renewable energy in gross final energy consumption: • 36,2% in 2030; • 86,1% in 2050;
- energy efficiency: • 2030: reduction of 48% in primary energy consumption and 45% in final energy consumption relative to the 2030 Primes baseline; • 2050: additional reductions of 13% in primary energy consumption and 26% in final energy consumption compared to 2030 levels.

- **CS. 2 Implementation of the EU Emissions Trading System (ETS 1)**

Affected sectors: Energy; Transport; Industrial Processes and Product Use;

Projection scenario: WEM

Romania has implemented the EU Emissions Trading System (ETS1) since 2007, a market-based mechanism designed to encourage GHG emission reductions and, implicitly, reductions in fuel and raw material consumption in a technically and economically efficient manner.

For 2021–2030, Romania's national ETS sector commitment forms part of the EU-wide target to reduce ETS emissions by 62% by 2030 compared to 2005).

- **CS. 3 Extension of the EU Emissions Trading System (ETS 2)**

Affected sectors: Energy; Transport;

Projection scenario: WAM

The extension of the EU Emissions Trading System (ETS2) aims to ensure the efficient reduction of CO₂ emissions from the Buildings and Transport sectors, which are not covered under ETS1.

Under ETS2, fuel suppliers must monitor, and report emissions associated with the fuels they supply and purchase GHG emission allowances at auction to cover these emissions.

Part of the revenues will support the Social Climate Fund.

- **CS. 4 Reduction of GHG Emissions from Non-ETS Sectors (ESR)**

Affected sectors: Energy; Transport; Industrial Processes and Product Use; Agriculture; Waste Management

Projection scenario: WEM

The ESR covers GHG emissions from non-ETS sectors, including transport (excluding aviation CO₂), buildings, agriculture, small industry, and waste.

For non-ETS sectors, Romania will contribute to the overall EU target of reducing GHG emissions by 40% by 2030 compared to 2005, with a national target set at -12,7%.

- **CS. 5 Reduction of Industrial Emissions in Line with BAT Conclusions**

Affected sectors: Energy; Transport; Industrial Processes and Product Use; Agriculture; Waste Management

Projection scenario: WEM

National regulations establish legal requirements for reducing industrial emissions as part of the permitting of industrial installations. This permitting requires strict emission limit values based on BAT Conclusions (Best Available Techniques) and continuous monitoring to ensure compliance with environmental protection standards.

- **CS. 6 Integrated National Energy and Climate Plan (NECP)**

Affected sectors: Energy; Transport; Industrial Processes and Product Use; Agriculture; Waste Management
Projection scenario: WEM

The Integrated National Energy and Climate Plan (NECP) 2021–2030 defines Romania's role and contribution to achieving the EU 2030 targets.

To ensure convergence between Romania's commitments and the EU's 2050 climate neutrality goals, the NECP was updated in 2024 (NECP Update 2021–2030).

Under the updated NECP 2021–2030, Romania has committed to the following national targets:

- net GHG emission reductions vs. 1990 levels: • 85% by 2030; • 96% by 2040; • complete reduction (105%) by 2050;
- non-ETS (ESR) emissions: reduction of 12,7% by 2030, compared to 2005;
- overall share of renewable energy in gross final energy consumption: • 38,3% in 2030 (including: RES-E: 57,8%; RES-T: 29,4%; RES-H&C: 41,1%);
- energy efficiency targets: • primary energy consumption: from 28,7 Mtoe in 2030 to 23,9 Mtoe in 2050; • final energy consumption: from 22,5 Mtoe in 2030 to 17,2 Mtoe in 2050.

- **CS. 7 Romania's Industrial Strategy 2024-2030**

Affected sectors: Energy; Industrial Processes and Product Use
Projection scenario: WEM

Romania's Industrial Strategy 2024–2030 aims to modernize industry through advanced technologies, strengthen international competitiveness by increasing exports and resilience, create high-quality jobs, facilitate access to financing, and support energy-intensive industrial sectors.

- **CS. 8 Integration of Renewable Hydrogen into the Industry and Transport Sectors**

Affected sectors: Energy; Transport; Industrial Processes and Product Use
Projection scenario: WEM

This measure accelerates the transition towards a hydrogen-based economy by strategically integrating renewable and low-carbon hydrogen into the industry and transport sectors.

By introducing concrete obligations for fuel suppliers and large industrial consumers, it directly supports and accelerates the development of emerging hydrogen value chains, with major impacts on the Energy, Transport, and Industrial Processes sectors.

- **CS. 9 Geological Storage of Carbon Dioxide**

Affected sectors: Energy; Industrial Processes and Product Use

Projection scenario: WEM

Establishes the legal framework for the capture, transport and geological storage of carbon dioxide in Romania.

- **CS. 10 Promotion of Energy Efficiency**

Affected sectors: Energy; Transport;

Projection scenario: WEM

Promotes the implementation of energy efficiency measures across all economic and social sectors.

Measures include strengthened obligations targeting the energy supply side through: • higher annual energy savings quotas for suppliers; • mandatory energy audits; • promotion of high-efficiency cogeneration; • reduction of electricity and gas losses in transmission and distribution networks.

Measures directly targeting final energy consumption include: • increased energy efficiency targets for final consumers; • mandatory energy audits for public authorities and large enterprises; • deep energy renovation of public buildings (annual target: 3% of total useful floor area); • promoting the uptake of energy-efficient equipment and appliances and renewable energy sources for final consumers; • smart metering for electricity, individual heat metering in horizontal distribution systems, and heat cost allocators in buildings with vertical heat distribution.

- **CS. 11 Promotion of Renewable Energy Sources**

Affected sectors: Energy; Transport; Agriculture; Waste Management;

Projection scenario: WEM

Establishes the national legislative framework for promoting electricity generation from renewable sources (wind, solar, geothermal, hydropower, biomass, bio-liquids, biogas, landfill gas, sewage sludge gas from wastewater treatment plants).

The measure aims both to facilitate the transition to a low-carbon energy system through Contracts for Difference (CfD) schemes for large-capacity projects, and to encourage renewable electricity production for self-consumption, including the regulation of the prosumer status and renewable energy communities in Romania.

- **CS. 12 Romania's National Recovery and Resilience Plan (PNRR)**

Affected sectors: Energy; Transport; Waste Management

Projection scenario: WEM

PNRR ensures an optimal balance between EU priorities and Romania's development needs in the context of post-COVID-19 recovery and includes interventions supporting the implementation of the 2021–2030 NECP, updated.

PNRR was revised to include Component 16 – REPowerEU, which aims to increase the share of electricity generation from renewable sources (mainly solar and wind) for both households and economic operators,

decarbonise the residential sector through improved energy efficiency in buildings, and modernise and digitalise transport capacities.

- **CS. 13 National Programmes for Local and Regional Development**

Affected sectors: Energy; Transport; Waste Management

Projection scenario: WEM

Financing programmes managed by the Environmental Fund Administration (AFM) and the Ministry of Development (MDLPA) under the *Anghel Saligny Programme*, supporting sustainable infrastructure and balanced regional growth. They fund renewable energy and energy efficiency measures, low-emission transport, waste and wastewater management, and the modernisation of local infrastructure (roads, bridges) and gas/water networks.

- **CS. 14 Sustainable Development Programme (PDD) 2021 -2027**

Affected sectors: Energy; Waste Management

Projection scenario: WEM

PDD 2021-2027 finances investments launched under the previous programming period through the Large Infrastructure Operational Programme 2014–2020, contributing to the transformation of the Romanian economy into a modern, competitive, and efficient one.

The programme includes priorities aimed at promoting energy efficiency, increasing the use of renewable energy sources, improving urban wastewater collection and treatment, and supporting efficient waste management to accelerate the transition towards a circular economy.

- **CS. 15 Just Transition Programme (PTJ) 2021-2027**

Affected sectors: Energy; Transport

Projection scenario: WEM

PTJ 2021-2027 is a key EU financing instrument supporting regions facing significant socio-economic challenges during the transition to climate neutrality. It aims to transform areas affected by the green transition by facilitating investments in new and sustainable sectors.

It addresses the investment needs identified in the territorial just transition plans for six counties affected by coal phase-out and polluting industries (Gorj, Hunedoara, Dolj, Galați, Prahova, and Mureș) and finances a just transition through investments in clean technologies, low-emission energy infrastructure, pollution reduction, and strengthening the circular economy.

- **CS. 16 Regional Programme (PR) 2021-2027**

Affected sectors: Energy; Transport

Projection scenario: WEM

PR 2021-2027 is the main EU financing instrument for Romania's eight development regions, aimed at supporting economic growth and improving quality of life.

Its objectives include: • improving energy performance in the building sector; • increasing regional connectivity and ensuring access to mobility, including in rural areas; • constructing/expanding/modernising urban public transport networks and electric urban/suburban transport routes, developing cycling infrastructure, and investing in rolling stock (trams) to reduce private car use.

- **CS. 17 Programmes financed through the Modernisation Fund**

Affected sectors: Energy; Transport; Industrial Processes and Product Use

Projection scenario: WEM

These programmes are financed from Romania's allocation under the Modernisation Fund and contribute to achieving the objectives set out in the NECP.

Funded sectors and key implementation programmes include: 1. Renewable energy sources and energy storage; 2. Coal replacement and grid balancing; 3. Modernisation and construction of new energy infrastructure; 4. Hydrogen; 5. High-efficiency cogeneration and district heating modernisation; 6. Nuclear energy; 7. Energy efficiency in industrial installations under the EU ETS; 8. Alternative fuels (biofuels).

- **CS. 18 National Strategy for Research, Innovation and Smart Specialisation 2022-2027**

Affected sectors: Energy; Transport; Industrial Processes and Product Use; Agriculture; Waste Management

Projection scenario: WEM

The National Strategy for Research, Innovation and Smart Specialisation 2022–2027 focuses on strengthening the national research and innovation system, supporting smart specialisation ecosystems, mobilising innovation, and intensifying European and international cooperation.

- **CS. 19 National Social Climate Plan**

Affected sectors: Energy; Transport

Projection scenario: WAM

To access EU financing available through the Social Climate Fund, designed to ensure a socially fair transition to climate neutrality, Romania has developed a draft National Social Climate Plan (NSCP) for 2026–2032, currently under public consultation.

PNSC 2026–2032 details the proposed investments and measures eligible for financing under the Social Climate Fund. It will finance long-lasting, concrete actions targeting primarily vulnerable households and vulnerable micro-enterprises affected by the inclusion of GHG emissions from the Buildings and Transport sectors under ETS 2.

Policies and measures for reducing GHG emissions – Energy Sector (E- Energy)

The evolution of the Energy sector depends on economic, social, and demographic development in order to meet medium- and long-term energy demand at the lowest possible cost, suitable for a modern market economy and a civilised standard of living, while ensuring quality, security of supply, compliance with the principles of sustainable development, and alignment with EU policy.

WEM Projection Scenario

The Energy sector is regulated by a complex framework of policies, measures, actions, and plans aimed at reducing GHG emissions by increasing the share of renewable energy and improving energy efficiency.

Due to the interdependence of these measures, the contribution of policies/measures/actions/plans targeting GHG emission reduction has been calculated at group level, as the difference between GHG emissions in the WOM scenario and the WEM scenario.

Therefore, the estimated contribution in the WEM scenario is presented at sector level under the generic name: ***"Policies, measures, actions and plans supporting the decarbonisation of the Energy sector – WEM."***

In addition to multisectoral policies, the main policies, measures, actions and plans supporting the decarbonisation of the Energy sector in the WEM projection scenario are the following:

- ***E.1 Romania's Energy Strategy 2025–2035, with a 2050 outlook***

Affected sectors: Energy

Projection scenario: WEM

Romania's Energy Strategy 2025–2035, with a 2050 perspective, is developed in line with the EU legislative framework on energy and climate change, as well as national strategic documents such as Romania's Long-Term Strategy for reducing GHG emissions – Romania Climate Neutral by 2050 and the updated NECP 2021–2030.

The Strategy, which sets the development pathway of the Energy sector to 2030 with a 2050 outlook, aims to: • develop renewable energy generation capacities and improve energy efficiency, in line with the Long-Term Strategy and the updated NECP 2021–2030 (2025 version); • increase the share of renewable energy in the national energy mix; • integrate innovative technologies (CCS and the use of green hydrogen); • enhance energy efficiency within the Energy sector.

- ***E.2 National Long-term Renovation Strategy to 2050***

Affected sectors: Energy

Projection scenario: WEM

The National Long-Term Renovation Strategy (***SNRTL***) ***regarding the renovation of the national stock of residential and non-residential buildings, both public and private, into a highly energy-efficient and decarbonised building stock by 2050*** supports the gradual transformation of Romania's building stock—residential and non-residential, public and private—into a highly energy-efficient and decarbonised building stock by 2050.

The Strategy also promotes cost-effective renovation towards nearly zero-energy buildings (NZEB), sets indicative milestones for 2030, 2040 and 2050, includes measurable indicators to monitor progress, promotes innovative financing mechanisms, and contributes to meeting EU energy efficiency and decarbonisation targets.

The Action Plan operationalises the LTRS objectives by defining detailed measures, funding sources, and responsibilities, ensuring the effective implementation of the required renovation works for Stage 1– 2022-2030.

- ***E.3 Supporting the electricity and natural gas markets***

Affected sectors: Energy

Projection scenario: WEM

Regulates electricity and natural gas markets, enabling renewable energy integration, grid expansion, market liberalisation, and sector efficiency.

Strengthened measures directly support the Energy sector, focusing on: • priority dispatch for electricity from renewable sources and high-efficiency cogeneration; • development of energy storage capacities; • implementation of the Contracts for Difference (CfD) support mechanism; • development of electricity and gas transmission and distribution infrastructure; • efficiency requirements for electricity and gas networks to reduce losses; • promoting prosumers to reduce net grid demand and increase on-site renewable energy use; • enabling renewable energy citizen communities as active customers; • reducing final consumption through smart metering.).

- ***E.4 Promoting decarbonisation of the Energy sector***

Affected sectors: Energy

Projection scenario: WEM

Promotes the decarbonisation of the Energy sector by phasing out coal-based electricity generation and replacing it with new natural-gas-based capacities (hydrogen-ready combined cycle gas turbines) and renewable energy sources.

It also sets: • the deadline for ending electricity generation from lignite and hard coal; • the schedule for decommissioning the total installed lignite and hard coal capacities; • the closure timeline for lignite quarries and hard coal mines.

The entire installed lignite and hard coal electricity generation capacity will be phased out by 31 December 2032 at the latest.

- ***E.5 Promotion of heat-demand-based high-efficiency cogeneration***

Affected sectors: Energy

Projection scenario: WEM

Establishes the legal framework and support scheme for high-efficiency cogeneration of electricity and useful heat, based on real heat demand, including guarantees of origin and bonus payments for electricity generated through cogeneration. It promotes improved energy efficiency, reduced primary energy consumption, and enhanced energy security in Romania.

- ***E.6 Multiannual program 2019-2027: investments in modernization, rehabilitation, refurbishment and extension of DHS, WEM***

Affected sectors: Energy

Projection scenario: WEM

A multiannual financing programme supporting the modernisation, rehabilitation, refurbishment, extension and—where necessary—the establishment of district heating systems (DHS).

The Programme, targeting local public authorities and system operators, covers: • production units, • primary transport networks, • building heat modules, and • hot water and heating distribution networks.

- ***E.7 Promotion of Buildings' Energy Performance***

Affected sectors: Energy

Projection scenario: WEM

Promotes the design, construction, and renovation of buildings with high energy performance, the use of renewable energy sources, and the certification of buildings' energy performance.

It also aims to increase the energy performance of buildings by introducing the nZEB standard (new buildings with almost zero conventional energy consumption and at least 30% of energy from renewable sources) and by promoting deep energy renovation of existing buildings.

WAM Projection Scenario

In the WAM scenario, the contribution of policies/measures/actions/plans targeting GHG emission reductions was calculated at group level, as the difference between GHG emissions in the WEM scenario and the WAM scenario.

Therefore, the estimated contribution in the WAM scenario is presented at sector level under the generic name: ***"Additional measures supporting the decarbonisation of the Energy sector – WAM."***

The main policies, measures, actions and plans supporting decarbonisation of the Energy sector in the WAM projection scenario focus on improving energy performance in the Residential and Services sectors.

These additional measures—based on the extension of the EU Emissions Trading System to fuels used in the buildings sector (ETS 2)—are aligned with Romania's proposed National Social Climate Plan (NSCP) for 2026–2032, currently under public consultation, which details the investments and measures eligible for financing under the Social Climate Fund.

The Social Climate Fund will finance concrete, long-lasting measures, provided that they primarily target vulnerable households and vulnerable micro-enterprises affected by the inclusion of GHG emissions from the buildings sector under ETS 2.

The measures and proposed investments included in the draft NSCP for the Buildings – Energy Consumption sector are as follows:

- increasing the energy performance of multi-family buildings in urban areas through thermal renovation measures and energy audits;
- financial support for installing heat pumps, photovoltaic panels, and storage capacities in multi-family residential buildings;

- increasing energy performance and decarbonising single-family homes of vulnerable households in rural areas through: • moderate energy renovation (reducing primary energy consumption by at least 30%); • decarbonisation systems (photovoltaic panels and battery storage); • energy audits;
- financial support for increasing energy efficiency and decarbonising buildings of vulnerable micro-enterprises through energy renovation.

Policies and measures for reducing GHG emissions – Transport Sector

The transport sector plays an important role in supporting Romania's economic and social development and is closely linked to energy/fuel consumption and GHG emissions. The evolution of this economic sector shows a significant increase in the number of vehicles registered in Romania. Consequently, it is necessary to adopt appropriate measures that will decouple GHG emissions from economic growth in the transport sector, with the aim of ensuring sustainable development.

Reducing CO₂ emissions from transport must be achieved through an integrated, cost-effective approach that combines innovation in vehicle propulsion technologies and the use of biofuels with efforts by policymakers and consumers to adopt new attitudes towards the development of this economic sector.

To achieve a balance between mobility needs and environmental protection requirements, technical and financial feasibility, competitiveness, and social impacts must be considered.

WEM Projection Scenario

The Transport sector is regulated by a complex framework of policies, measures, actions, and plans aimed at reducing GHG emissions by increasing the share of biofuels and improving transport networks.

Due to the interdependence of these measures, the contribution of policies/measures/actions/plans targeting GHG emission reduction has been calculated at group level, as the difference between GHG emissions in the WOM scenario and the WEM scenario.

Therefore, the estimated contribution in the WEM scenario is presented at sector level under the generic name: ***"Policies, measures, actions and plans supporting the decarbonisation of the Transport sector – WEM."***

In addition to multisectoral policies, the main policies, measures, actions and plans supporting the decarbonisation of the Transport sector in the WEM projection scenario are the following:

- ***T.1 Establishing the conditions for placing petrol and diesel on the market (GEO no. 80/2018)***

Affected sectors: Transport

Projection scenario: WEM

The emergency ordinance establishes minimum biofuel contents for gasoline and diesel that fuel suppliers who sell products to the end consumer are obliged to ensure. According to the provisions of GEO No. 80/2018, the use of biofuels must result in a reduction of greenhouse gas emissions of at least 60% for biofuels produced in installations commissioned after 5 October 2015, and at least 50% for biofuels produced in installations operational on or before 5 October 2015.

- ***T.2 The General Transport Master Plan -MPGT, (GD nr. 666/2016)***

Affected sectors: Transport

Projection scenario: WEM

Represents a strategic planning instrument for major interventions in the transport sector, aiming at the development of a modern transport infrastructure while considering environmental impacts. The document defines a series of specific environmental objectives, such as promoting transport investment projects that support the development of a sustainable system and reduce negative environmental impacts, including reducing air pollutant emissions, decreasing noise pollution in urban areas or on heavily trafficked routes, reducing water and soil pollution caused by diffuse sources, as well as limiting impacts on the landscape and cultural heritage.

The MPGT also includes objectives aimed at reducing GHG emissions from the transport sector, improving public health through enhanced environmental conditions and safety, and mitigating impacts on biodiversity through measures to protect natural protected areas.

- ***T.3 The Investment Programme for the Development of Transport Infrastructure 2021–2030 (GD 1312/2021)***

Affected sectors: Transport

Projection scenario: WEM

Represents an updated implementation strategy of the GTMP and specifies the development needs of Romania's transport infrastructure (road and rail networks). The programme provides for the development of a 6,624.1 km road network, including motorways, expressways, trans-regional roads and bypasses, of which 2,900.5 km constitute the primary network and 3,723.6 km the secondary network.

For railway infrastructure, the document sets out the development of 3,274.8 km of primary network and 1,228 km of secondary network.

The Investment Programme also details the mechanism for securing the necessary funding for the ten-year implementation period, through the utilisation of available resources from the PNRR, Transport Programme 2021–2027, the Connecting Europe Facility (CEF 2.0) and the national budget.

- ***T.4 The Railway Infrastructure Development Strategy 2021–2025 (GD no. 985/2020)***

Affected sectors: Transport

Projection scenario: WEM

Provides a detailed framework for the rail sector within the broader transport strategy outlined by the GTMP. The Strategy identifies strategic actions and priority measures necessary to achieve modal shift and reduce total national economic costs associated with mobility of passengers and goods.

- ***T.5 Development of Railway Infrastructure and Modal Shift of Passenger and Freight Flows Rail Action Plan (GD no. 1302/2021)***

Affected sectors: Transport

Projection scenario: WEM

Includes for the 2021–2026 period: • measures to increase rail freight traffic; • specific measures to increase the number of rail passengers; • measures to increase the utilisation of newly acquired rolling stock; • measures to shift passengers from bus/minibus transport to rail transport.

- ***T.6 National programs aimed at local and regional development***

Affected sectors: Transport

Projection scenario: WEM

Includes the programme for scrapping end-of-life vehicles, managed by the Ministry of Environment, Water and Forests (MMAP) through the Environmental Fund Administration (AFM). Launched in 2023, the programme provides individuals with a RON 3,000 incentive for scrapping a vehicle older than 15 years. The amount allocated to the annual funding sessions is determined based on budgetary priorities.

- ***T.7 Regulation (EU) 2024/1257 on the type-approval of motor vehicles and engines***

Affected sectors: Transport

Projection scenario: WEM

Regulation (EU) 2024/1257 on the type-approval of motor vehicles and engines, as well as systems, components and separate technical units intended for such vehicles, with regard to emissions and battery durability (Euro 7).

- ***T.8 CO₂ emission performance standards (Regulation (UE) 2019/1242)***

Affected sectors: Transport

Projection scenario: WEM

Regulation (EU) 2019/1242 setting CO₂ emission performance standards for new heavy-duty vehicles and aiming to reduce specific CO₂ emissions from the EU fleet of new heavy-duty vehicles by 15% by 2025 and by 30% by 2030, compared to the reference emissions recorded between 1 July 2019 and 30 June 2020. At the same time, Regulation (EC) No. 715/2007, on type-approval of light-duty vehicles, remains applicable, as it establishes the Euro 5 and Euro 6 standards.

- ***T.9 The Transport Programme 2021–2027***

Affected sectors: Transport

Projection scenario: WEM

The Transport Programme 2021–2027 (PT), which aims to improve primary road connectivity, enhance secondary connectivity, increase the efficiency of the Romanian railway system, boost the attractiveness of passenger rail transport, develop sustainable mobility in urban nodes, and advance inland waterway and multimodal transport.

- ***T.10 The Regional Programmes 2021–2027, Priority: An Accessible Region***

Affected sectors: Transport

Projection scenario: WEM

The Regional Programmes 2021–2027, Priority: An Accessible Region which promotes enhanced regional connectivity and ensures access to mobility, including in rural areas, through investments in the modernisation of regional road infrastructure to connect with the TEN-T network, as well as solutions for reducing congestion and improving traffic flow in county capitals.

- ***T.11 The Regional Programmes 2021–2027, Priority: A region with sustainable multimodal urban mobility***

Affected sectors: Transport

Projection scenario: WEM

The Regional Programmes 2021–2027, Priority: A region with sustainable multimodal urban mobility promoting the construction, expansion and modernisation of urban public transport, the development of routes for urban and suburban electric public transport, the development of cycling infrastructure, and the acquisition of rolling stock such as trams, with the aim of reducing the use of private vehicles. This is aligned with Law No. 155/2023 on sustainable urban mobility, which introduces the obligation for municipalities to prepare Sustainable Urban Mobility Plans (SUMPs).

- ***T.12 Sustainable Urban Mobility Law no. 155/2023***

Affected sectors: Transport

Projection scenario: WEM

Sustainable Urban Mobility Law no. 155/2023, which aims to establish the necessary conditions for a sustainable, equitable, efficient and inclusive mobility system in urban and rural areas, reduce transport-related GHG emissions and improve road safety in urban zones through green and digital solutions. The law requires the implementation of zero-emission zones in urban areas and mandates that at least 50% of the public transport vehicle fleet consist of zero-emission vehicles.

Sustainable Urban Mobility Plans (SUMPs), which aim to develop sustainable mobility in cities, functional urban areas and metropolitan zones, by reducing urban emissions and shifting from private car use to active mobility (walking and cycling) and public transport.

WAM Projection Scenario

Due to the interdependence of these measures, the contribution of policies/measures/actions/plans targeting GHG emission reduction has been calculated at group level, as the difference between GHG emissions in the WEM scenario and the WAM scenario.

Therefore, the estimated contribution in the WAM scenario is presented at sector level under the generic name: ***"Policies, measures, actions and plans supporting the decarbonisation of the Transport sector – WAM."***

In the transport sector, the WAM projection scenario has considered a set of additional policies and measures with an impact on reducing GHG emissions, aimed at accelerating decarbonisation, improving energy efficiency, modernising infrastructure, and facilitating modal shift toward low-emission transport modes.

The additional policies and measures include targeted interventions for each mode of transport — road, rail, air, maritime, and urban — ensuring that the transport sector's contribution to climate objectives is coherent, integrated, and measurable.

The planned additional policies and measures foresee the modernisation of the transport system, driven by the extension of the EU Emissions Trading Scheme for fuels used in road transport (ETS 2), as well as upcoming legislative initiatives at the European level aimed at drastically reducing carbon emissions.

Industrial Process and Product Use Sector

The evolution of the Industrial Processes and Product Use sector depends on economic and social development in order to meet the demand for industrial products and the way in which various products are used in the medium and long term, at the lowest possible price, in line with a modern market economy and a civilized standard of living, under quality conditions, in compliance with the principles of sustainable development and in line with European Union policy.

The Industrial Processes and Product Use sector is regulated by a complex framework of policies and measures, actions, and plans aimed at reducing GHG emissions by streamlining and modernizing technological processes, increasing the recirculation of raw materials, promoting CCUS, increasing hydrogen production and its use in technological processes, and reducing fluorinated gas emissions.

Due to the interdependence of these measures and interactions with the Energy sector, the contribution of policies/measures/actions/plans aimed at reducing GHG emissions was calculated at group level as the difference between GHG emissions in the WOM scenario and the WEM scenario. Thus, a first group includes the effect of multisectoral policies (CS1, CS2, CS4, CS5, CS6, CS7, CS8, CS9, CS17, CS18) on the IPPU sector, and the second includes the effect of specific measures to reduce fluorinated greenhouse gas emissions.

Therefore, the estimated contribution in the WEM scenario is presented at sector level under the generic names:

- **"Policies, measures, actions, and plans that support the decarbonization of the Industrial Processes and Product Use sector, WEM"** which includes the effects of multisectoral policies
- **"Policies, measures, actions, and plans supporting the reduction of F-gas emissions in the Industrial Processes and Product Use sector, WEM"** includes the effect of specific measures to reduce fluorinated greenhouse gas emissions

Apart from multisectoral policies (CS1, CS2, CS4, CS5, CS6, CS7, CS8, CS9, CS17, CS18), the main policies supporting the reduction of F-gas emissions in the WEM forecast scenario are as follows.

- **IPPU.1 EU Regulation 2024/573 on fluorinated greenhouse gases (F-gases)**

Affected sectors: Industrial processes and product use

Forecast scenario: WEM

-
- EU Regulation 2024/573 on fluorinated greenhouse gases (F-gases) amends Directive (EU) 2019/1937 and repeals EU Regulation No. 517/2014
 - lays down rules on the containment, use, recovery, recycling, reclamation, and destruction of fluorinated greenhouse gases and on related ancillary measures, such as certification and training, which include the safe handling of fluorinated greenhouse gases and non-fluorinated alternative substances;
 - imposes conditions on the production, import, export, placing on the market, further supply, and use of fluorinated greenhouse gases and certain products and equipment containing fluorinated greenhouse gases or whose functioning relies on these gases;
 - imposes conditions on specific uses of fluorinated greenhouse gases;
 - sets quantitative limits for the placing on the market of hydrofluorocarbons;
 - lays down reporting requirements.

- **IPPU.2 Directive 40/2006/EC (MAC Directive) on emissions from air conditioning systems in motor vehicles**

Affected sectors: Industrial processes and product use

Forecast scenario: WEM

-
- Directive 40/2006/EC on emissions from air conditioning systems in motor vehicles, which provides for the gradual replacement of air conditioning systems in motor vehicles that use HFC-134a. It also provides for limiting the possibility of retrofitting motor vehicles with air conditioning systems designed to contain fluorinated greenhouse gases with a global warming potential greater than 150 and prohibiting the charging of air conditioning systems with such gases.
 - Vehicle manufacturers shall make available to the competent authority all relevant technical information on the air conditioning systems installed and the gases used in those systems. In the case of air conditioning systems designed to contain fluorinated greenhouse gases with a global warming potential higher than 150, the manufacturer must also provide the authority with the leakage rate of those systems. The measures provided for in this directive are expected to take effect from 2011.

- **IPPU.3 Amendment to the Montreal Protocol (Kigali Amendment, 2016)**

Affected sectors: Industrial processes and product use

Forecast scenario: WEM

-
- Romania adopted the Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer (Kigali Amendment, 2016) through Law 30/2020 published in the Official Gazette no. 275/2 Apr. 2020.

The Kigali Amendment sets emission limits for substances in the F-gas category (HFCs and HCFCs) until 2045.

The estimated contribution in the WEM scenario for the two policy groups for 2030 is as follows:

- **"Policies, measures, actions, and plans that support the decarbonization of the Industrial Processes and Product Use sector, WEM,"** which includes the effects of multisectoral policies – GHG reduction: 2472 kt CO_{2e}
- **"Policies, measures, actions, and plans that support the reduction of F-gas emissions in the Industrial Processes and Product Use sector, WEM"** includes the effect of specific measures to reduce F-gas emissions - GHG reduction: 1946 kt CO_{2e}

Agriculture Sector

Instruments at EU Level – The Common Agricultural Policy (CAP)

On 16 December 2013, the Council of EU Agriculture Ministers formally adopted the four Basic Regulations for the reformed CAP, along with Transition Rules for 2014. Farmers are expected to be rewarded for the public goods they provide, such as maintaining landscapes, farmland biodiversity, and climate stability, even though these have no direct market value. Within the CAP's second pillar—rural development—Member States are both encouraged and required to implement measures addressing climate mitigation and adaptation.

The CAP affects agriculture and forestry, the preservation of the environment across approximately 70% of EU territory, and the quality of life for nearly 50% of the EU population. It also contributes to the objectives of the Cohesion Policy by promoting balanced territorial development and ensuring the safety and quality of food in the Common Market.

National instruments

In Romania, support for farmers and measures to reduce greenhouse gas emissions in agriculture are organized around the National Strategic Plan for the CAP 2023–2027. This plan integrates direct payments and eco-schemes that reward farmers for adopting sustainable practices, such as crop rotation, maintaining soil cover, organic farming, and optimizing feed and manure management in the livestock sector. These measures encourage farmers to reduce CO₂, CH₄, and N₂O emissions, increase resource efficiency, and preserve biodiversity.

Additionally, rural development components support investments in modern agricultural infrastructure, efficient technologies, and manure management systems, all contributing to emission reductions and the protection of soil and water. National support schemes provide further incentives for farmers in disadvantaged or protected areas, such as Natura 2000 sites, promoting the adoption of low-emission practices and environmentally friendly technologies.

Overall, the national framework combines European policies and domestic measures to promote more sustainable agriculture with lower greenhouse gas emissions while supporting farmer competitiveness and natural resource conservation.

Within Romania's National Strategic Plan for the CAP 2023–2027, a series of eco-schemes have been developed and implemented to reward farmers for adopting sustainable agricultural practices, with a direct impact on reducing greenhouse gas emissions (CO₂, CH₄, and N₂O).

The older eco-schemes, implemented during 2014–2020, primarily focused on maintaining permanent grasslands, organic farming, green cover crops and crop rotation, and conservation of landscape features, all of which significantly contributed to carbon sequestration in soils and indirectly reduced N₂O emissions through optimized fertilization.

In the 2023–2027 period, eco-schemes have been expanded and diversified to include more sophisticated and quantifiable GHG reduction practices.

These include optimized livestock feeding to reduce enteric methane in cattle, efficient manure management through storage and treatment techniques that lower methane and nitrous oxide emissions, sustainable grasslands and extensive grazing that enhance soil carbon storage and biodiversity, as well as organic and diversified crop rotations, which minimize the need for synthetic fertilizers and the associated emissions.

Concrete measures through which these eco-schemes reduce emissions include:

- **A1. Crop rotation and soil cover** – increasing soil organic matter and reducing CO₂ and N₂O emissions.

Crop rotation involves the scientifically planned sequence of growing different crops over time and across specific areas of arable land. The time it takes for all crops to cycle through every field according to the established rotation plan is known as the rotation period. Implementing sustainable crop rotation systems that incorporate winter cover crops and leguminous species (such as beans, soybeans, alfalfa, and clover) helps protect the soil from erosion. It enhances carbon sequestration, which can contribute to lowering greenhouse gas emissions. Additionally, organic farming and the reduction of chemical inputs help lower greenhouse gas emissions by minimizing the use of synthetic fertilizers and pesticides, which are energy-intensive to produce and contribute to nitrous oxide (N₂O) emissions when applied to soils. By relying on organic fertilizers, crop rotations, cover crops, and integrated nutrient management, organic systems enhance soil health, increase carbon sequestration, and reduce nitrous oxide emissions from excess nitrogen. Additionally, organic practices often improve soil structure and water retention, which further supports long-term mitigation of CO₂ emissions and enhances overall sustainability. Also, maintaining permanent grasslands and practicing extensive grazing helps reduce greenhouse gas emissions by promoting carbon sequestration in soils and minimizing the need for synthetic fertilizers and energy-intensive feed crops. Well-managed pastures store significant amounts of organic carbon, while extensive grazing encourages natural nutrient cycling and reduces methane emissions per unit of animal product by optimizing forage quality and intake. These practices also enhance biodiversity, improve soil structure and water retention, and contribute to long-term resilience of agricultural ecosystems, making them an effective strategy for mitigating GHG emissions in livestock systems

Directly affected greenhouse gases: N₂O

Implementation period: 2013-2030

Scenario in which the measure is included: WEM

- **A2. Manure management** – proper storage, composting, or anaerobic digestion (biogas), reducing CH₄ and N₂O emissions. Processing and management of manure are among the primary contributors to methane (CH₄) emissions in the agricultural sector. Effective manure storage and treatment practices must account for the manure's physical form, whether solid or liquid, and the specific technologies applied for its collection and processing. In Romania, improved manure management is a key strategy to reduce greenhouse gas emissions from agriculture while supporting nutrient recycling in both the livestock and crop sectors. In the animal sector, measures focus on optimizing housing, manure collection, and storage systems—such as covered slurry tanks, frequent removal from barns, and anaerobic digestion—to capture methane and reduce ammonia and nitrous

oxide emissions. Livestock feeding practices are also optimized to lower nitrogen excretion, further mitigating emissions from manure. In the crop sector, the use of processed manure as fertilizer through precision application techniques—such as injection or trailing hose systems—ensures that nutrients are efficiently absorbed by plants, minimizing nitrogen losses and nitrous oxide emissions. Integration of manure management with soil testing, crop rotation, and organic amendments enhances soil fertility, improves carbon sequestration, and reduces reliance on synthetic fertilizers. Together, these measures create a circular nutrient system, linking animal and plant production, reducing environmental impact, and contributing to a more sustainable and low-emission agricultural system in Romania. Optimized livestock feeding reduces greenhouse gas emissions by improving the efficiency of digestion in ruminants, which lowers methane produced during enteric fermentation. By carefully balancing protein and energy in the diet, excess nitrogen excretion is minimized, reducing nitrous oxide emissions from manure. Additionally, higher-quality and more digestible feeds allow animals to convert feed into milk or meat more efficiently, decreasing the overall feed requirements and the emissions associated with feed production. Together, these measures reduce CH₄ and N₂O emissions while enhancing productivity and resource efficiency in livestock systems. These practices align with BAT-EL recommendations, which promote feed management strategies as one of the best available techniques to mitigate environmental impacts in livestock operations. Together, these measures reduce CH₄ and N₂O emissions while enhancing productivity, animal welfare, and resource efficiency in livestock systems, supporting a sustainable and climate-friendly approach in the agricultural sector.

Directly affected greenhouse gases: CH₄, N₂O

Implementation period: 2013-2030

Scenario in which the measure is included: WEM

• **A3. Crop diversification** - promotes a greater variety of crops and improved rotations to enhance soil health, maintain year-round soil cover, optimize nutrient management, and reduce CO₂, CH₄, and N₂O emissions, thereby contributing to climate change mitigation and farm resilience. The Romanian eco-scheme for crop diversification encourages farmers to cultivate a wider variety of crops and implement structured crop rotations. By promoting cereals, legumes, oilseeds, and cover crops, the scheme improves soil health, enhances organic matter, and maintains permanent soil cover to prevent erosion and nutrient loss. These practices increase the resilience of farms to climate change while reducing greenhouse gas emissions, particularly CO₂ and N₂O, through better nutrient management and carbon sequestration. Participation is voluntary under Romania's National Strategic Plan PAC 2023–2027, with compliance monitored through farm records and inspections, and financial support provided to farmers who adopt these sustainable practices.

Directly affected greenhouse gases: N₂O

Implementation period: 2013-2030

Scenario in which the measure is included: WEM

• **A4. Animal welfare** through better housing, nutrition, and pasture management, including measures for dairy cows, young stock, and extensive grazing systems. Welfare promotes improved housing, optimized nutrition, and sustainable pasture management to enhance the well-being of dairy cows, young stock, and extensively grazed cattle. By supporting better animal care and feeding practices, the scheme not only improves livestock productivity and health but also contributes to climate mitigation by reducing methane and nitrous oxide emissions and promoting sustainable land use. Participation is voluntary under the National Strategic Plan

PAC 2023–2027, with financial incentives provided to farmers who adopt these environmentally and animal-friendly practices.

Directly affected greenhouse gases: CH₄, N₂O

Implementation period: 2013-2030

Scenario in which the measure is included: WEM

• **A5. Methane emission reductions in agriculture.** Methane emissions from livestock, particularly ruminants, and their manure are a significant contributor to greenhouse gases. A comprehensive *methane action plan* focuses on reducing emissions at the source, enhancing management practices, and capitalizing on renewable energy opportunities. Reducing methane from livestock begins with optimizing animal diets and incorporating feed additives like nitrates, 3-NOP (an additive used in the feed of ruminants, especially dairy cows and beef cattle, to reduce methane production during ruminal fermentation), or seaweed supplements, which directly reduce methane production in the rumen. High-quality, digestible forages and precision feeding strategies further enhance efficiency and reduce emissions per unit of meat or milk. Selective breeding of low-methane animals can also contribute to long-term reductions in emissions. Manure management is another key area. Methane is produced when manure decomposes anaerobically. Strategies such as frequent removal, aerobic composting, and anaerobic digestion not only reduce emissions but also create valuable biogas for renewable energy. Covering manure storage systems further limits methane release. Sustainable grazing practices, including rotational grazing, silvopasture, and the incorporation of legumes, improve forage quality, enhance soil health, and reduce methane intensity per unit of livestock product. Enhancing soil carbon through cover crops, reduced tillage, and proper manure application provides additional greenhouse gas offsets while improving long-term soil fertility. Promoting biogas production from manure and crop residues captures methane that would otherwise be emitted, providing clean energy and contributing to a circular economy. Supporting policies, such as subsidies for feed additives and digesters, carbon credits for emission reductions, and education programs for farmers, are essential to accelerate the adoption of these practices.

Directly affected greenhouse gases: CH₄

Implementation period: 2024-2030

Scenario in which the measure is included: WAM

• **A6. Sustainable, low-emission agricultural practices.** IED 2.0 is the European Union's updated Industrial and Livestock Emissions Directive, designed to extend environmental regulation to large-scale livestock farms, particularly intensive pig and poultry operations. By treating these farms similarly to industrial facilities, the directive ensures that emissions to air, water, and soil are strictly managed. Under IED 2.0, large farms must obtain environmental permits based on the application of Best Available Techniques (BAT), which promote cleaner, more resource-efficient operations, including improved manure management, emissions reduction, and waste-to-energy solutions such as biogas production. The directive encourages sustainable farming practices by enforcing regular inspections, requiring efficient use of water, energy, and materials, and harmonizing environmental standards across EU member states. While it currently focuses on pigs and poultry, the framework may expand to include cattle in the future, which would significantly impact methane emissions. IED 2.0 thereby provides a legal backbone for low-emission agriculture, incentivizing farmers to adopt environmentally responsible practices, reduce pollutants, and contribute to broader EU climate and sustainability goals.

Directly affected greenhouse gases: CH₄, N₂O

Implementation period: 2025-2030

Scenario in which the measure is included: WAM

• **A7. Safe use of recovered nitrogen fertilizers. *RENURE*** (REcovered Nitrogen from ManURE) is a strategy that transforms livestock manure into processed fertilisers that behave like mineral fertilisers. Through treatments such as concentration, scrubbing, or chemical recovery, nitrogen is converted into a form that can be safely applied to crops without exceeding environmental limits, while retaining essential nutrients. By enabling farmers to replace energy-intensive synthetic nitrogen fertilisers with manure-derived *RENURE* products, the approach reduces fossil fuel use and associated CO₂ emissions. Beyond lowering the carbon footprint of fertilisation, *RENURE* improves nutrient circularity, turning waste into a resource, reducing ammonia and nitrous oxide emissions from manure, and supporting renewable energy production when combined with anaerobic digestion. Properly implemented, *RENURE* enhances resource efficiency, promotes sustainable agriculture, and helps the EU meet climate and environmental targets, making livestock farming more climate-friendly and resilient.

Directly affected greenhouse gases: CH₄, N₂O

Implementation period: 2025-2030

Scenario in which the measure is included: WAM

• **A8. Farm-to-consumer sustainability.** The *Farm to Fork* (F2F) Strategy is a cornerstone of the European Union's Green Deal, aimed at creating a sustainable, resilient, and climate-friendly food system. It focuses on reducing the environmental and climate impact of food production while ensuring food security, nutrition, and economic viability for farmers. The strategy addresses the entire food value chain, from agricultural inputs and production practices to processing, distribution, consumption, and waste management. In the animal sector, Farm to Fork promotes practices that reduce greenhouse gas emissions from livestock. This includes optimizing animal diets to lower enteric methane emissions, improving manure management through storage and treatment technologies, and encouraging the adoption of renewable energy solutions such as biogas production. Sustainable grazing practices and selective breeding for lower-emission animals also contribute to reducing methane and nitrous oxide emissions. In the plant sector, Farm to Fork emphasizes sustainable crop production by encouraging precision agriculture, reduced use of synthetic fertilizers and pesticides, crop diversification, cover cropping, and soil health improvement. These practices lower nitrous oxide emissions from soils, enhance carbon sequestration, and improve nutrient-use efficiency. By integrating sustainable practices across both animal and vegetal sectors, the strategy not only mitigates emissions of methane (CH₄), nitrous oxide (N₂O), and carbon dioxide (CO₂) but also promotes circularity, reduces pollution, and enhances the resilience of the food system against climate change. In essence, Farm to Fork provides a comprehensive framework to transition agriculture toward a low-emission, resource-efficient, and climate-smart system.

Together, these strategies form an integrated approach that reduces methane emissions, improves farm productivity, strengthens resilience, and contributes meaningfully to climate mitigation efforts. Through these instruments, Romania integrates both climate adaptation and GHG mitigation measures, encouraging farmers to adopt sustainable practices that deliver long-term benefits for the environment and agricultural productivity.

Potential emission reductions, WEM scenario: the GHG emission reductions for 2030 represent the difference between WOM and WEM projection scenarios.

Potential emission reductions, WAM scenario: the GHG emission reductions for 2030 represent the difference between WEM and WAM projection scenarios.

LULUCF Sector

The LULUCF Regulation (EU) 2018/841, as amended in 2023, establishes the EU-wide framework for accounting greenhouse gas emissions and removals from land use, land-use change and forestry. For the period 2021 - 2025, Romania, like all Member States, operates under the no debit rule, whereby accounted emissions from each reported land accounting category must be entirely compensated by at least an equivalent quantity of accounted removals. Romania's national system ensures the application of this principle across all land categories included in the LULUCF pillar, with a particular focus on maintaining the long-term stability of forest carbon sinks and improving data quality for agricultural land and grassland.

Starting in 2026, Romania will move to the second compliance phase of the revised LULUCF Regulation, which introduces binding national contributions to the EU-wide net removal target of 310 million tonnes CO₂eq by 2030. Romania's indicative contribution reflects both the historical performance of its LULUCF sector and the potential for enhancing removals through sustainable forest management, improved cropland and grassland practices, and restoration measures in line with the EU Biodiversity Strategy. The binding target for 2030 is based on the average net emissions/removals for 2016 - 2018, adjusted with a national specific target, contributing to the collective EU effort.

To meet these requirements, Romania implements a series of mitigation policies and measures which address key land categories, including forestlands, croplands, grasslands and wetlands. National measures focus on increasing the resilience of forest ecosystems, expanding afforestation and reforestation activities under national programmes, improving soil carbon stocks on agricultural land, and supporting the transition to sustainable land management systems. Romania's current policy framework integrates LULUCF actions within the national climate and energy strategy, the CAP Strategic Plan 2023 - 2027, and the provisions of national forestry legislation.

The revised LULUCF Regulation will further strengthen Romania's monitoring, reporting and verification (MRV) capacity, enabling more accurate land representation, enhanced geospatial datasets and improved consistency between land sectors. Synergies between climate mitigation, biodiversity conservation and soil protection continue to be reinforced through cross-sectoral initiatives, ensuring a more coherent approach to national implementation and long-term compliance with EU climate objectives.

Measures contributing to the reduction of greenhouse gas emissions are:

- ***LULUCF CS.1. - Long-Term Strategy for GHG Emission Reduction – Climate Neutral Romania 2050, WEM (GD 1215/2023)***

Scope: The Long-Term Strategy (LTS) of Romania sets a strategic vision to 2050 for deep greenhouse gas emission reductions and increased carbon sinks, in line with the Paris Agreement and EU climate neutrality objectives. It defines decarbonisation pathways across all sectors, including energy, industry, buildings, transport, agriculture and LULUCF, and emphasises enhancing the contribution of forests, soils and other land-based sinks to the

national climate target. The LTS provides the long-term reference for updating the NECP and sectoral strategies, and for aligning investment and R&I policies with climate neutrality.

Directly affected greenhouse gases: CO₂, CH₄, N₂O

Implementation period: 2023–2050

Scenario in which the measure is included: WEM

Potential emission reductions: Not quantified (strategic framework; provides long-term pathways and targets rather than explicit annual reductions per sector)

- **LULUCF CS.12. Romania's National Recovery and Resilience Plan (NRRP / PNRR) 2021–2030**

Scope: The NRRP finances investments and reforms across multiple components, including green transition, energy, sustainable transport, building renovation and forest management. In the forest component, the Plan supports afforestation and reforestation (including the national afforestation campaign), improved forest management and biodiversity-friendly practices, contributing to increased carbon sequestration and resilience. The Plan also supports renewable energy, energy efficiency and sustainable mobility, which reduce fossil-fuel-related emissions.

Directly affected greenhouse gases: CO₂, CH₄, N₂O

Implementation period: 2021–2026

Scenario in which the measure is included: WEM

Potential emission reductions: Not presented as a single figure; multiple components contribute to substantial GHG reductions and increased sinks.

- **LULUCF 1. National Support Program for the Wine Sector (NSPWS)**

Scope: The measure supports the restructuring, replanting and modernization of existing vineyards in Romania, ensuring the long-term maintenance of vineyard areas within the Cropland remaining Cropland category. According to the national viticulture zoning and the planting rights system established under Regulation (EU) 1308/2013, Romania applies a controlled quota for new vine plantings and prioritises the re-establishment and improvement of existing vineyards rather than expanding vineyard surfaces. By maintaining the current spatial distribution of vineyards and avoiding conversion from other land uses into vineyards, the measure contributes to preventing additional land-use change emissions. The modernisation of vineyard management practices, including improved soil management, reduced erosion, and enhanced biomass productivity, also supports the gradual increase of soil carbon stocks, contributing to higher long-term removals in the LULUCF sector.

Directly affected greenhouse gases: CO₂

Implementation period: 2019–2023

Scenario in which the measure is included: WEM

Potential emission reductions: - 38/ -15 kt CO₂ eq.

- ***LULUCF 2. Law no. 254 of 20 July 2022 amending and supplementing the Land Fund Law no. 18/1991 and other normative acts***

Scope: The Romanian Land Fund Law seeks to protect agricultural land by safeguarding its productive capacity, preventing its unjustified conversion to non-agricultural uses, and ensuring the soil quality and agricultural potential. The law establishes rules for sustainable land use, restricts fragmentation and degradation, and promotes the responsible management of farmland as a strategic national resource essential for food security and rural development.

Directly affected greenhouse gases: CO₂; N₂O; CH₄

Implementation period: 2022-2023

Scenario in which the measure is included: WEM

Potential emission reductions: - 25/ -10 kt CO₂ eq.

- ***LULUCF 3. Order no. 352/636/54/2015 on cross-compliance in support schemes and measures for farmers in Romania, with amendments***

Scope: The Joint Order establishes the national rules on cross-compliance (eco-conditionality) applicable to support schemes and rural development measures granted to farmers in Romania. Its scope is to define the statutory management requirements and good agricultural and environmental conditions that beneficiaries must respect in order to receive full EU and national payments, covering areas such as environmental protection, climate and soil conservation, plant and animal health, and animal welfare. By linking financial support to compliance with these standards, the Order aims to promote sustainable farming practices and ensure responsible use of agricultural land and natural resources.

Directly affected greenhouse gases: CO₂; N₂O; CH₄

Implementation period: 2015-2023

Scenario in which the measure is included: WEM

Potential emission reductions: - 252/ -101 kt CO₂ eq.

- ***LULUCF 4. Romania's National Strategy for Sustainable Development 2030 - GD 877/2018, implemented by GD 754/2022***

Scope: Romania's Sustainable Development Strategy 2030 translates the UN 2030 Agenda and SDGs into national objectives, integrating economic, social and environmental pillars. It sets targets related to climate action, sustainable land use, biodiversity conservation, sustainable forestry and rural development, which frame sectoral policies in agriculture, forestry and land management. GD 754/2022 approves the National Action Plan for implementing the Strategy 2030, strengthening institutional arrangements and monitoring for SDG delivery.

Directly affected greenhouse gases: CO₂, CH₄, N₂O

Implementation period: 2018–2030

Scenario in which the measure is included: WEM

Potential emission reductions: Not quantified (enabling framework for sectoral mitigation policies)

- ***LULUCF 5. National Strategy for the Circular Economy 2030 - Government Decision no. 1172/2022 (NSCE / Strategy for the transition to a circular economy)***

Scope: The National Strategy for the Circular Economy sets a roadmap to move from a linear to a circular economic model, identifying priority sectors (including agriculture, forestry, food, construction, plastics, textiles and waste management) and measures to increase resource efficiency, recycling and reuse. It aims to raise the circularity rate of material use, reduce waste generation and avoid landfilling, thereby lowering upstream and downstream emissions and pressure on land and biomass resources. The strategy is closely linked to the EU Circular Economy Action Plan and the Green Deal and complements Romania's Sustainable Development Strategy 2030 and long-term climate strategy.

Directly affected greenhouse gases: Mainly CO₂ with indirect effects on CH₄ and N₂O

Implementation period: Approx. 2022–2030

Scenario in which the measure is included: WEM

Potential emission reductions: Not quantified (framework measure; reductions result from sectoral circularity actions)

- ***LULUCF 6. EU Common Agricultural Policy 2023–2027 and Romania's CAP Strategic Plan 2023–2027***

Scope: The reformed CAP for 2023–2027 introduces national CAP Strategic Plans, eco-schemes and reinforced conditionality to better integrate climate and environmental objectives. Romania's CAP Strategic Plan sets national interventions for income support, sectoral programmes and rural development, including eco-schemes, agri-environment-climate commitments, and investments that influence land management and emissions/removals in agriculture and LULUCF. The Plan aims to support sustainable productivity, protect soil and water, increase carbon sequestration in soils and biomass, and maintain permanent grasslands and landscape features.

Directly affected greenhouse gases: CO₂, N₂O, CH₄

Implementation period: 2023–2027

Scenario in which the measure is included: WEM

Potential emission reductions: Not quantified in a single figure; mitigation is embedded across conditionality, eco-schemes and rural development interventions.

- ***LULUCF 7. GD 1064/2013 - Organisation, administration and use of permanent pastures, and amending the Land Fund Law no. 18/1991***

Scope: ***Government Decision no. 1064/2013 - Methodological Norms for implementing Government Emergency Ordinance no. 34/2013 on the organisation, administration and use of permanent pastures, and amending the Land Fund Law no. 18/1991*** establishes detailed rules for the management of permanent pastures, including the preparation and implementation of pasture management plans, stocking rates, grazing periods, maintenance works and improvement measures. By regulating pasture use and preventing overgrazing, land degradation and conversion of permanent grasslands, the measure supports conservation of soil carbon stocks and biodiversity, and limits emissions associated with land-use change.

Directly affected greenhouse gases: CO₂, N₂O, CH₄

Implementation period: From 2013, ongoing

Scenario in which the measure is included: WEM

Potential emission reductions: Not quantified; primary impact is the protection and enhancement of carbon stocks in permanent grasslands and improved livestock-related emissions.

- ***LULUCF 8. EU Biodiversity Strategy for 2030 – “Bringing nature back into our lives” (COM(2020) 380 final)***

Scope: The EU Biodiversity Strategy for 2030 sets an agenda to halt and reverse biodiversity loss, expanding protected areas, restoring degraded ecosystems, planting at least 3 billion trees by 2030 and improving the condition and connectivity of forests, wetlands, peatlands and agricultural landscapes. By protecting and restoring carbon-rich ecosystems and promoting closer-to-nature forestry, agroforestry and nature-based solutions, the Strategy significantly contributes to increasing EU-wide carbon sinks and enhancing resilience to climate change.

Directly affected greenhouse gases: CO₂

Implementation period: 2020–2030

Scenario in which the measure is included: WEM

Potential emission reductions: Not quantified; main effect is strengthening sinks and avoided emissions via ecosystem protection and restoration.

- ***LULUCF 9. Law no. 254 of 20 July 2022 for the amendment and completion of the Land Fund Law no. 18/1991 and other normative acts***

Scope: Law 254/2022 modifies the Land Fund Law to strengthen the protection of agricultural land, clarify procedures for removing land from agricultural use and align land-use decisions with strategic public interest and sustainable development objectives. Among others, the law specifies that taking land out of agricultural use is done at the time the construction is authorised, thereby limiting speculative and premature land conversion. This contributes to reducing land-take, soil sealing and loss of soil carbon, and increases the predictability of land-use governance.

Directly affected greenhouse gases: CO₂

Implementation period: In force since 2022

Scenario in which the measure is included: WEM

Potential emission reductions: Not quantified; main effect is the protection of agricultural land and associated carbon stocks.

- ***LULUCF 10. Government Decision no. 1227/2022 approving the National Strategy for Forests 2030***

Scope: The National Strategy for Forests 2030 sets long-term objectives for sustainable forest management, increased forest area, improved forest health and resilience, and enhanced economic, social and ecological functions of forests. It aligns with EU forest- and climate-related policies and emphasises the role of forests in carbon sequestration, biodiversity conservation and adaptation to climate change. The strategy provides the

framework for afforestation, reforestation, restoration of degraded forests and closer-to-nature forestry practices.

Directly affected greenhouse gases: CO₂

Implementation period: 2022–2030

Scenario in which the measure is included: WEM

Potential emission reductions: Not quantified; the Strategy aims to strengthen forest sinks and resilience.

- **LULUCF 11. GEO no. 35 of April 6, 2022 - Approval of afforestation and reforestation campaign provided by the NRRP**

Scope: *Government Emergency Ordinance (GEO) No. 35 of 6 April 2022 on the measures necessary for the implementation of the national afforestation and reforestation campaign under the National Recovery and Resilience Plan* establishes the legal framework and instruments for implementing the national afforestation and reforestation campaign financed under the NRRP. It addresses procedures, eligibility, support schemes and institutional responsibilities to achieve the PNRR targets of afforesting and reforesting tens of thousands of hectares by 2026, with emphasis on degraded agricultural land and protective forest belts. The measure explicitly recognises the role of increased forest cover in carbon sequestration, erosion control, combating desertification and adapting to climate change.

Directly affected greenhouse gases: CO₂

Implementation period: 2022–2026

Scenario in which the measure is included: WEM

Potential emission reductions: Not quantified in the ordinance; significant long-term removals expected from new forest areas.

- **LULUCF 12. Order 68/2022 - Approval of the state aid scheme „Support for first afforestation and creation of forested areas“**

Scope: Order no. 68 of 22 March 2022 for the amendment of the annex to the Order of the Minister of Agriculture and Rural Development no. 857/2016 on the approval of the state aid scheme "Support for the first afforestation and creation of forested areas" updates the implementation rules for the state aid scheme supporting first afforestation and creation of forested areas under PNDR 2014–2020. It adjusts technical and financial conditions in line with amendments notified to the European Commission and ensures continued uptake of afforestation measures by landowners. The scheme encourages conversion of agricultural and degraded land to forest, increasing carbon stocks and improving resilience.

Directly affected greenhouse gases: CO₂

Implementation period: From 2022

Scenario in which the measure is included: WEM

Potential emission reductions: Not quantified; long-term removals depend on areas afforested.

- **LULUCF 13. Forestry Code of Romania – Law no. 331/2024**

Scope: Law 331/2024 adopts the new Forestry Code, updating and consolidating Romania's legal framework for forest management, protection, harvesting, ownership and forest services. It sets rules for sustainable forest management, conservation of protective forests, control of illegal logging, provision of ecosystem services and public functions of forests. The Code strengthens the legal basis for maintaining and enhancing forest carbon sinks, protecting vulnerable forest types and integrating climate and biodiversity objectives in forest management.

Directly affected greenhouse gases: CO₂

Implementation period: In force from 2025

Scenario in which the measure is included: WEM

Potential emission reductions: Not quantified; key role is ensuring a strong and resilient forest sink.

- **LULUCF - National Programme for the Increase of Forested Area 2015–2021 (Expired PaM)** (based on national afforestation and regeneration programmes implemented primarily by Romsilva and the Ministry of Environment, Waters and Forests)

Scope: During 2015–2021 Romania implemented multi-annual programmes to regenerate forests and increase forested area, including large-scale natural and artificial regeneration and afforestation of degraded lands and protective belts. State forest administration data indicate over 120,000 ha regenerated in the previous 8-year period, with tens of millions of seedlings planted annually, contributing to the expansion and restoration of forest ecosystems. These programmes supported carbon sequestration, erosion control and biodiversity conservation, particularly on degraded agricultural land and vulnerable areas.

Directly affected greenhouse gases: CO₂

Implementation period: Approx. 2015–2021

Scenario in which the measure is included: WEM

Potential emission reductions: Not quantified centrally; effects captured in the observed forest sink.

- **LULUCF - Common Agriculture Policy Strategic Plan 2023–2027, starting with 2024 (Expired PaM)**

Scope: Starting with **National Rural Development Programme (NRDP / PNDR) 2014–2020, including transitional implementation 2021–2022, and Ministerial Order no. 107/2024 on environmental and climate compensatory measures and interventions**, the PNDR 2014–2020, co-financed by the EAFRD, supports sustainable rural development across Romania and includes specific agri-environment-climate measures, organic farming, payments for areas facing natural constraints, and forestry measures (e.g. first afforestation). These measures promote climate-friendly land management, maintenance of permanent grasslands, reduced soil erosion, increased carbon sequestration and biodiversity conservation. Order no. 107/2024 updates and consolidates the rules for implementing environmental and climate compensatory measures and interventions financed under PNDR 2014–2020 and the CAP Strategic Plan 2023–2027, starting with 2024. It defines eligibility, payment rules and conditions for beneficiaries of agri-environment-climate and other compensatory schemes, ensuring continuity of climate-relevant land management commitments.

Directly affected greenhouse gases: CO₂, N₂O, CH₄

Implementation period: PNDR 2014–2020 with transitional implementation in 2021–2022; Order 107/2024 applicable from 2024 onward

Scenario in which the measure is included: WEM

Potential emission reductions: Not fully quantified at national level in public sources; significant mitigation effects are expected from agri-environment-climate, organic farming and forestry-related measures.

Waste Sector

The main policies and measures (PaMs) in the WEM scenario that have significant effects in terms of GHG emission reduction potential are as follows:

- Government Decision No. 1076/2021 approving the National Integrated Energy and Climate Change Plan 2021-2030 (PNIESC);
- Government Decision No. 1215/2023 approving Romania's long-term strategy for reducing greenhouse gas emissions - Romania Neutral in 2050;
- Romania's National Recovery and Resilience Plan (PNRR);
- Sustainable Development Program (PDD) 2021-2027;
- Proposed measures updated PNIESC 2025-2030 - Waste sector

Given the continuous decline and alteration of natural resources, as well as the need to conserve them (mainly biological resources), it is necessary to reassess the options for managing anthropogenic waste, with a view to increasing its recovery rate and drastically reducing the quantities that need to be disposed of.

Judicious waste management is a means of identifying, quantifying, and evaluating ecosystem services in order to make the best decisions regarding environmental preservation, conservation, and management, and implicitly a means of reducing GHG emissions.

Policies and measures adopted

Romania's Sustainable Development Strategy 2030, approved by Government Decision No. 877/2018, under Objective 12 Responsible consumption and production, sets the following national targets for 2030 that directly influence GHG emissions for this sector:

- 50% reduction of per capita food waste at the retail and consumer levels and reducing food waste throughout the production and supply chain, including post-harvest losses;
- Recycle 55% of municipal waste by 2025 and 60% by 2030;
- Recycling 65% of packaging waste by 2025 (plastics 50%, wood 25%, ferrous metals 70%, aluminium 50%, glass 70%, paper and cardboard 75%) and 70% by 2030 (plastics 55%, wood 30%, ferrous metals 80%, aluminium 60%, glass 75%, paper and cardboard 85%);
- Implementation of separate collection of hazardous household waste by 2022, bio-waste by 2023, and textile waste by 2025; o Establishment of extended producer responsibility schemes for all types of packaging by 2024.

Key measures and directions for waste

- Increasing waste collection and recovery rates, reducing waste generation, and moving towards a circular economy—with a view to reducing GHG emissions (methane, CO₂) from inadequate waste management.
- Expanding sewerage networks and wastewater treatment systems, connecting the rural population to these systems – to reduce emissions from the treatment/disposal of water and sludge.
- Use of sludge from wastewater treatment either in agriculture or through drying and energy recovery, to reduce emissions associated with its treatment and storage.
- **Law No. 220/2008 establishing the system for promoting energy production from renewable energy sources, as amended and supplemented (including Government Emergency Ordinance No. 163/2022)**

The law provides for the following:

- encourages energy recovery only from non-recyclable fractions;
 - prohibits support for the incineration of improperly collected waste;
 - reinforces the principle of waste hierarchy and circular economy;
 - defines "recycled carbon fuels" as part of the transition to clean energy.
- **The National Waste Management Plan**, approved by Government Decision No. 942/2017 (in force since January 5, 2018), includes clear and coherent measures to achieve the targets for preparing waste for reuse and recycling by 2020, in accordance with Article 11(2) of Directive 2008/98/EC. The measures considered are mainly based on the existence and use of key economic instruments such as:
 - appropriate landfill fees (and/or bans on the landfill of recyclable waste);
 - incineration pricing policy that encourages recycling/reuse;
 - any other economic instruments identified during the preparation of the plan, in accordance with the specific national situation;
 - additional collection, treatment, and recycling capacities, if necessary;
 - in 2025 - 50% calculated using Method 4 in Annex I to Decision 2011/753/EU, in line with the provisions of the proposed amendment to the Framework Directive in the Circular Economy Package, published in December 2015.
- **PNRR - Component 1 Water management**, which aims to increase the population's access, especially in rural areas, to a public water and sanitation service in accordance with the requirements of European directives and accessible to all social categories;
- **PNRR - Component C3 Waste Management** aims to accelerate the process of expanding and modernizing waste management systems in Romania with a focus on separate collection, prevention, reduction, reuse, and recovery measures in order to comply with applicable directives and transition to a circular economy. This component includes the adoption of the National Circular Economy Strategy and Action Plan.
- **PDD 2021÷2027**, which under Priority 1 Development of water and wastewater infrastructure and transition to a circular economy, Action 1.2 Efficient waste management to accelerate the transition to a circular economy, in order to meet the requirements of environmental directives, aims to: expanding the separate collection system for recyclable waste; implementing/expanding the separate collection of bio-waste; implementing/expanding the separate collection of bulky, hazardous, and textile waste by 2025; preparation centres for reuse; new transfer stations and the modernization/expansion of existing

ones; integrated facilities/installations for the treatment of separately collected waste and residual waste; modernization of existing facilities (sorting facilities, composting facilities, and mechanical-biological treatment facilities); closure of non-compliant landfills and provision of the necessary storage capacity.

Expected results in the target year 2029: additional waste recycling capacity: 370,000 t/year; investments in separate waste collection facilities: €73,312,500; investments for the closure of non-compliant landfills: €11,250,000; recycled waste: 290,000 t/year, compared to the 2021 baseline (value '0'); separately collected waste: 330,000 t/year, compared to the 2020 baseline (value '0'); waste recycled from residual waste: 30,000 t/year, compared to the reference value (value "0"); closed non-compliant landfills: 6 landfills, compared to the 2020 reference value (value "0").

The total budget required for this action is EUR 480,000,000 (CF and national co-financing).

- **Proposed measures in the updated PNIESC 2025-2030 – Waste sector**

With regard to the waste sector, the same key macroeconomic factors are used in the modelling process as in the energy sector: GDP growth and population growth. Under the updated PNIESC, the following policies and measures will be implemented to achieve the objectives in the waste sector, based on Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (EU Waste Framework Directive):

- Residual waste - 10% of municipal waste will be disposed of in landfills by 2035
- Reduction - minimising the amount of waste produced. By 2030, the amount of municipal waste per capita will be reduced by 10% compared to 2017 (e.g., the amount of municipal solid waste (MSW) will be reduced from 228 kg per capita in 2017 to 204 kg per capita in 2030). This assumption is in line with the document "Overview of National waste prevention programmes in Europe – Country
- Reuse – reuse, repair and refurbishment of products to avoid their disposal.

The EU's 2020 Circular Economy Action Plan aims to halve the amount of municipal waste that is not recycled or prepared for reuse by 2030, while all EU Member States must recycle or prepare for reuse at least 60% of municipal waste by 2030.

- Recycling – turning waste into raw materials (such as paper, glass, metal, plastic, etc.) and compost, which is a way of recycling food and garden waste, which is then used as fertilizer. In this regard, the following minimum requirements for material recovery are envisaged:
 - Wood – Recycling rate for wood packaging waste – 25% in 2025, 30% in 2030, and 50% in 2050
 - Paper and textiles – Recycling rate for all categories of paper and textile waste – 80% in 2050 (the value for textile waste is in line with the EU Strategy for Sustainable and Circular Textiles)
 - Food and garden waste – Recycling rate for food and garden waste will be 50% in 2030 and 60% in 2050. Food and garden waste will be recycled through composting. The emission factor for composting will be reduced to 3 kt CH₄/ton and 0.24 kt N₂O/ton in 2050, which is in line with the GHG Emission Factors Review document developed by the Environmental Services Association (ESA) in 2020.
- Energy recovery – converting non-recyclable waste into usable energy. Although the amount of waste stored in landfills will be significantly reduced, there will still be a significant amount of

emissions produced by the accumulated waste. It is therefore important to further reduce these emissions by using two techniques:

- Energy production – By 2050, in the WAM scenario, 60% of methane emissions produced by non-recyclable waste, together with historical emissions, will be used for energy production (the same parameter will be 30% in 2030). For the WEM scenario, the targets will be 20% in 2030 and 40% in 2050.
- Flaring of methane emissions - Part of the non-recyclable waste plus historical emissions, excluding waste used for energy production, will be flared, in which case biogas cannot be captured and used for energy production. In the WAM scenario, by 2030, 40% of methane emissions from non-recyclable waste, together with historical emissions, will be flared, and by 2050 the percentage will rise to 60%. In the WEM scenario, the targets will be 35% in 2030 and 50% in 2050.
- Incineration/Co-incineration – In both scenarios, the volume of municipal waste incinerated/co-incinerated annually will increase to 500,000 tons per year in 2030 (which is in line with BR4) and to 900,000 tons per year in 2050, with the option of using this waste for energy recovery in recovery facilities and/or cement factories

For wastewater treatment, it is assumed that:

55% of the rural population will be connected to sewerage systems by 2030 according to the WEM scenario and 90% according to the WAM scenario.

- In both scenarios, all sewerage systems in urban areas will be connected to wastewater treatment plants by 2030. 5% of rural areas connected to sewerage systems will be connected to treatment plants by 2030 and 70% by 2050.

Information on the WAM forecast scenario

To minimize landfilled waste, the draft version of the PNGD 2025 provides for the following:

Reducing municipal waste sent to landfill by:

- Prohibiting the landfilling of any waste that can be recycled or recovered in other ways
- Prohibiting the landfilling of separately collected municipal waste
- Only landfilling waste that has undergone prior treatment
- Ensuring the capacity to treat residual waste at national level
- Ensuring the treatment of street waste (waste from street bins) in IITD
- Ensuring the capacity for energy recovery from residual waste at national level
- Operationalizing the economic instrument "Pay as you throw"
- Increasing the energy recovery rate of municipal waste
- Ensuring municipal waste storage capacity with a view to storing waste only in compliant landfills
- Separate collection and proper treatment of hazardous household waste
- Separate collection and proper treatment of bulky waste
- Separate collection and proper treatment of textile waste
- Increase in tariffs and contribution to the circular economy for landfill disposal
- Implementation of extended producer responsibility for textile waste

E. Summary of greenhouse gas emissions and removals

Romania has submitted a National Inventory Report on anthropogenic greenhouse gas emissions and removals for the period 1989-2023. The document was accompanied by a set of tables in the common reporting template (CRT) format.

Below is a summary of greenhouse gas emissions for the relevant years from 1989 to 2023 from the latest national inventory, submitted by Romania on 15 April 2025, grouped by gas and IPCC sector.

GHG emissions (excluding LULUCF) in 2023 reached 103,862.45kt CO₂e, representing a reduction of 59.53% compared to 1990 and a reduction of 30.93% compared to 2005.

Net GHG emissions (including LULUCF) in 2023 reached 57,437.67kt CO₂e, representing a reduction of 75.07% compared to 1990 and a reduction of 51.90% compared to 2005.

In 2023, the aggregate sector with the highest level of emissions, excluding LULUCF, was Energy (68.6%), followed by Agriculture (17.2%), IPPU (8.1%) and Waste (6.1%). By gas, carbon dioxide (CO₂) accounted for 65.34% of total greenhouse gas emissions, followed by methane (23.80%), nitrous oxide (8.90%) and fluorinated gases (1.96%).

The main sectors that experienced an increase in emissions compared with 2022 were related to sub-sectors 2G - Other product manufacture and use (12.0%), 1.A.3 - Transport (5%) and the 3.D - Agricultural soils (1%).

The main reductions compared with 2022 were recorded in the industrial sector, especially in the IPPU sector with 2.C – Metal industry which decreases the emissions with 55.2% (mainly due to production of iron and steel reduction), 3.C - Rice cultivation (27.1%), 5.B - Biological treatment of solid waste (14.0%), 1.A.1. - Energy industries (13.7%) and 1.A.2 - Manufacturing and construction industry (12.8 %) and 2.D - Non-energy products from fuels and solvent use (13.6%).

Table III-24 Evolution of GHG emissions and removals by gas type (kt CO₂e), 1989-2000

GREENHOUSE GAS EMISSIONS AND REMOVALS	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
CO ₂ (without LULUCF)	208,986.76	176,535.11	142,258.09	132,002.82	122,709.18	120,868.47	125,675.39	129,117.05	118,114.57	104,783.42	88,898.60	93,206.26
CO ₂ (with LULUCF)	187,676.87	150,099.79	115,575.72	104,041.19	93,590.78	92,239.16	97,251.89	101,369.41	89,748.28	74,427.29	58,724.34	62,911.13
CH ₄ (without LULUCF)	74,067.02	59,041.71	51,198.53	47,341.47	45,610.74	45,614.18	46,798.59	46,807.60	51,815.85	49,173.03	47,867.86	35,901.07
CH ₄ (with LULUCF)	74,067.18	59,042.50	51,199.02	47,342.76	45,611.66	45,614.73	46,798.96	46,808.01	51,815.97	49,173.27	47,868.53	35,907.47
N ₂ O (without LULUCF)	22,504.23	18,529.34	14,374.53	13,594.73	13,976.38	13,130.10	13,717.05	13,311.64	12,743.88	11,718.56	11,179.22	11,151.34
N ₂ O (with LULUCF)	22,690.12	18,724.49	14,568.46	13,788.02	14,168.41	13,320.88	13,906.67	13,500.21	12,931.23	11,904.92	11,364.74	11,338.80
HFCs	0.14	0.16	0.26	0.41	0.69	1.16	2.47	4.65	10.06	22.76	37.65	66.79
PFCs	4,005.32	2,530.06	2,322.30	1,616.85	1,685.36	1,782.87	2,120.74	2,115.16	2,108.60	2,058.59	1,875.28	1,507.48
Unspecified mix of HFCs and PFCs	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
SF ₆	0.49	0.48	0.51	0.46	0.49	0.69	0.92	1.46	1.30	1.37	1.53	8.55
NF ₃	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Total (without LULUCF)	309,563.96	256,636.86	210,154.23	194,556.74	183,982.84	181,397.47	188,315.16	191,357.57	184,794.26	167,757.75	149,860.14	141,841.50
Total (with LULUCF)	288,440.13	230,397.48	183,666.28	166,789.69	155,057.39	152,959.49	160,081.64	163,798.90	156,615.45	137,588.22	119,872.08	111,740.22

Table III-25

GHG emissions and removals by gas type (kt CO₂e), 2001-2010

GREENHOUSE GAS EMISSIONS AND REMOVALS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
CO ₂ (without LULUCF)	98,928.07	99,068.89	103,707.36	103,232.63	101,336.60	104,290.00	108,496.60	106,997.32	87,805.75	84,487.91
CO ₂ (with LULUCF)	67,831.68	69,443.11	73,434.69	73,035.28	70,199.28	73,509.10	76,648.47	74,606.72	58,421.20	49,177.15
CH ₄ (without LULUCF)	34,364.94	36,681.33	37,951.05	36,352.80	36,720.38	35,925.61	34,808.60	33,624.73	32,012.59	29,695.29
CH ₄ (with LULUCF)	34,366.72	36,687.61	37,952.40	36,353.02	36,720.67	35,927.29	34,813.10	33,625.40	32,014.32	29,695.66
N ₂ O (without LULUCF)	10,974.56	10,574.02	11,157.27	11,648.53	11,870.77	11,126.97	10,916.91	10,024.99	9,511.40	9,667.23
N ₂ O (with LULUCF)	11,158.52	10,759.27	11,338.87	11,828.47	12,049.70	11,306.89	11,096.47	10,201.18	9,713.02	9,916.13
HFCs	106.12	158.48	216.04	277.60	348.70	452.47	617.51	873.67	850.39	899.30
PFCs	1,230.28	886.47	273.86	138.36	85.68	57.61	25.34	16.07	7.34	8.21
Unspecified mix of HFCs and PFCs	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
SF ₆	14.07	11.50	9.66	13.00	13.71	21.44	26.59	29.71	42.13	54.93
NF ₃	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Total (without LULUCF)	145,618.04	147,380.68	153,315.24	151,662.92	150,375.83	151,874.09	154,891.56	151,566.48	130,229.60	124,812.87
Total (with LULUCF)	114,707.39	117,946.44	123,225.53	121,645.74	119,417.74	121,274.79	123,227.48	119,352.74	101,048.39	89,751.38

Table III-26 Evolution of GHG emissions and removals by gas type (kt CO₂e), 2011-2020

GREENHOUSE GAS EMISSIONS AND REMOVALS	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
CO ₂ (without LULUCF)	92,390.71	89,847.71	78,795.47	79,335.35	78,045.99	76,586.92	79,432.34	79,874.42	76,690.36	73,946.38
CO ₂ (with LULUCF)	56,453.82	51,333.17	40,144.39	30,017.76	29,566.52	26,009.93	30,653.31	33,035.79	29,850.00	24,736.25
CH ₄ (without LULUCF)	28,864.90	29,045.51	28,323.55	28,093.70	27,911.21	27,264.41	26,792.17	26,325.11	26,577.12	26,068.13
CH ₄ (with LULUCF)	28,868.80	29,057.27	28,324.30	28,094.07	27,914.04	27,265.57	26,796.35	26,327.41	26,600.02	26,088.11
N ₂ O (without LULUCF)	9,944.07	9,205.62	9,512.01	9,375.12	9,417.89	9,408.41	9,838.72	10,534.07	10,200.74	9,593.62
N ₂ O (with LULUCF)	10,232.23	9,532.73	9,897.51	9,436.99	9,482.26	9,472.40	9,904.76	10,599.96	10,284.40	9,673.44
HFCs	999.14	1,091.89	1,181.21	1,260.07	1,381.34	1,538.35	1,696.40	1,761.12	1,780.66	1,847.44
PFCs	11.43	6.68	5.53	5.71	5.91	4.89	5.02	4.47	3.45	3.19
Unspecified mix of HFCs and PFCs	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
SF ₆	40.31	42.01	47.43	40.62	39.76	36.11	39.40	45.90	59.61	62.45
NF ₃	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Total (without LULUCF)	132,250.56	129,239.42	117,865.19	118,110.56	116,802.10	114,839.10	117,804.06	118,545.09	115,311.93	111,521.22
Total (with LULUCF)	96,605.73	91,063.74	79,600.35	68,855.21	68,389.82	64,327.26	69,095.25	71,774.65	68,578.14	62,410.88

Table III-27 Evolution of GHG emissions and removals by gas type (kt CO₂e), 2021-2023

GREENHOUSE GAS EMISSIONS AND REMOVALS	2021	2022	2023	Change from base year to latest reported year, %
CO ₂ (without LULUCF)	77,501.27	73,186.03	67,866.02	-67.53
CO ₂ (with LULUCF)	29,634.63	27,350.49	21,307.31	-88.65
CH ₄ (without LULUCF)	25,573.59	25,258.46	24,715.80	-66.63
CH ₄ (with LULUCF)	25,578.85	25,305.70	24,730.81	-66.61
N ₂ O (without LULUCF)	10,338.32	9,198.68	9,243.15	-58.93
N ₂ O (with LULUCF)	10,407.81	9,300.86	9,362.07	-58.74
HFCs	1,908.25	1,972.13	1,980.23	1,394,959.29
PFCs	3.40	1.28	0.83	-99.98
Unspecified mix of HFCs and PFCs	NO	NO	NO	–
SF ₆	50.17	50.68	56.42	11,424.40
NF ₃	NO	NO	NO	–
Total (without LULUCF)	115,375.00	109,667.26	103,862.45	-66.45
Total (with LULUCF)	67,583.11	63,981.14	57,437.67	-80.09

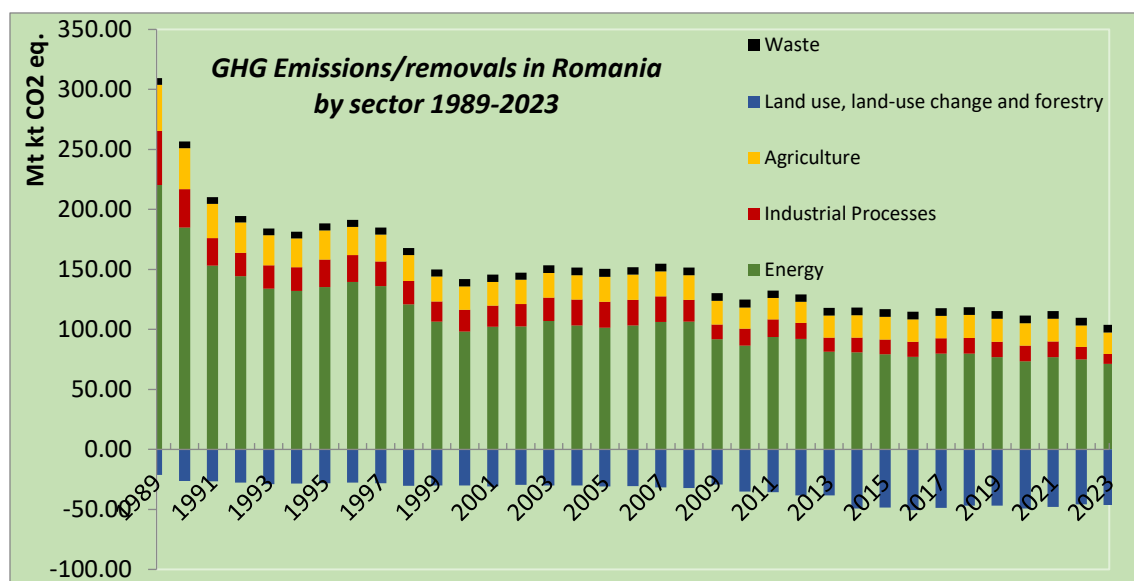


Figure III-28 Trends in GHG emissions and removals (including LULUCF) by sector, 1990–2023

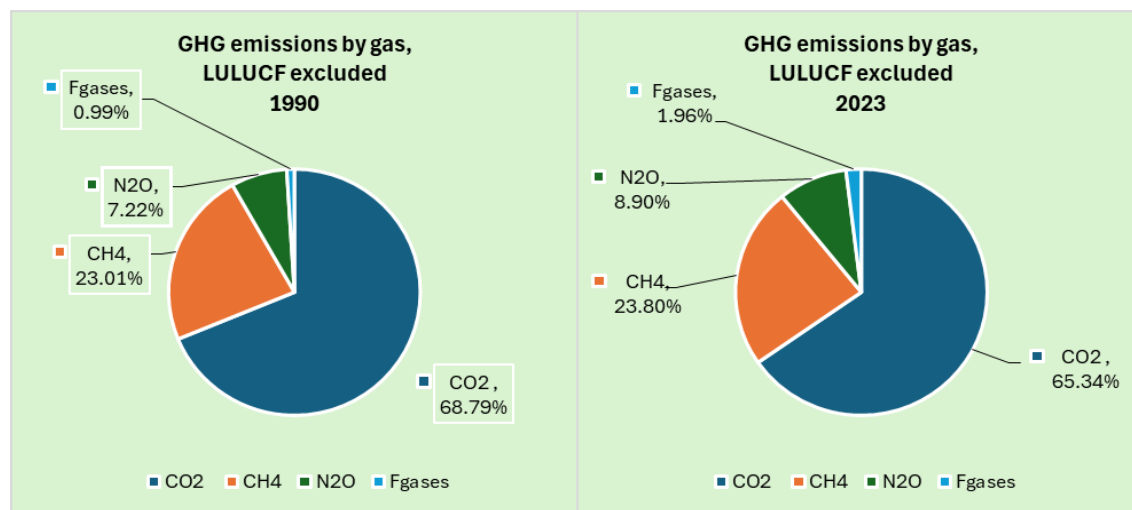


Figure III-29 Structure of GHG emissions by gas type, 1990 vs. 2023

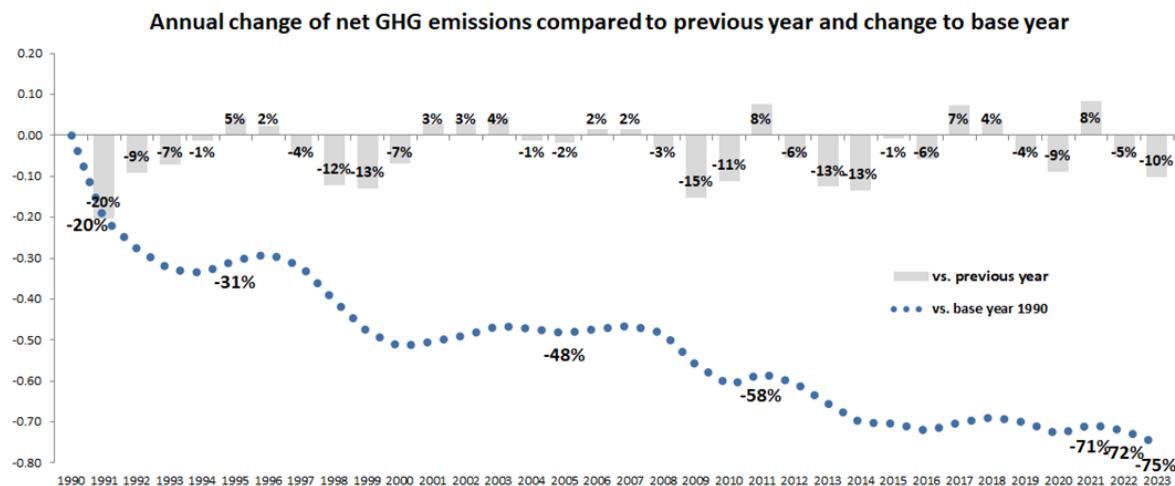


Figure III-30 Annual variation of GHG emissions compared to the previous inventory year and to the base year

Table III-28 Evolution of GHG emissions and removals by sector (kt CO₂e), 1989-1999

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1. Energy	220,493.44	184,958.87	153,117.93	144,243.60	133,843.62	131,989.08	135,429.64	139,697.55	136,078.11	120,853.16	106,515.97
2. IPPU	45,024.30	31,917.52	22,856.19	19,712.43	19,652.88	19,808.08	22,932.13	22,172.26	20,548.07	19,458.22	16,887.79
3. Agriculture	38,316.17	34,124.55	28,659.49	25,160.73	25,016.48	24,096.93	24,235.64	23,684.26	22,280.85	21,677.68	20,617.37
4. LULUCF	-21,123.83	-26,239.38	-26,487.94	-27,767.05	-28,925.45	-28,437.98	-28,233.52	-27,558.66	-28,178.81	-30,169.53	-29,988.06
5. Waste	5,730.05	5,635.91	5,520.61	5,439.97	5,469.87	5,503.39	5,717.74	5,803.49	5,887.22	5,768.69	5,839.02
Total (with LULUCF)	288,440.13	230,397.48	183,666.28	166,789.69	155,057.39	152,959.49	160,081.64	163,798.90	156,615.45	137,588.22	119,872.08
Total (without LULUCF)	309,563.96	256,636.86	210,154.23	194,556.74	183,982.84	181,397.47	188,315.16	191,357.57	184,794.26	167,757.75	149,860.14

Table III-29 Evolution of GHG emissions and removals by sector (kt CO₂e), 2000-2010

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1. Energy	98,164.97	102,137.81	102,584.76	107,019.84	103,205.55	101,413.61	103,355.85	106,211.04	106,406.48	91,741.36	86,589.39
2. IPPU	18,108.44	17,805.23	18,683.10	19,461.01	21,625.25	21,629.12	21,192.03	21,434.53	18,323.92	12,250.09	13,966.90
3. Agriculture	19,620.99	19,632.49	20,080.32	20,534.78	20,413.75	20,799.00	21,027.47	20,821.75	20,433.67	19,838.44	17,799.14
4. LULUCF	-30,101.27	-30,910.65	-29,434.25	-30,089.71	-30,017.18	-30,958.09	-30,599.31	-31,664.08	-32,213.74	-29,181.20	-35,061.49
5. Waste	5,947.09	6,042.51	6,032.51	6,299.61	6,418.38	6,534.10	6,298.75	6,424.23	6,402.42	6,399.70	6,457.44
Total (with LULUCF)	111,740.22	114,707.39	117,946.44	123,225.53	121,645.74	119,417.74	121,274.79	123,227.48	119,352.74	101,048.39	89,751.38
Total (without LULUCF)	141,841.50	145,618.04	147,380.68	153,315.24	151,662.92	150,375.83	151,874.09	154,891.56	151,566.48	130,229.60	124,812.87

Table III-30 Evolution of GHG emissions and removals by sector (kt CO₂e), 2011-2020

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1. Energy	93,783.85	92,006.75	81,443.29	80,788.79	79,215.47	77,233.02	79,884.13	79,818.46	76,836.03	73,371.42
2. IPPU	14,540.12	13,297.38	11,644.70	12,423.07	12,465.60	12,591.44	12,712.13	12,996.61	12,940.18	13,069.19
3. Agriculture	18,020.16	17,797.16	18,365.52	18,519.28	18,765.37	18,648.20	18,792.72	19,361.72	19,088.86	18,630.40
4. LULUCF	-35,644.83	-38,175.68	-38,264.84	-49,255.35	-48,412.27	-50,511.84	-48,708.81	-46,770.44	-46,733.80	-49,110.34
5. Waste	5,906.43	6,138.13	6,411.68	6,379.43	6,355.66	6,366.44	6,415.08	6,368.29	6,446.87	6,450.21
Total (with LULUCF)	96,605.73	91,063.74	79,600.35	68,855.21	68,389.82	64,327.26	69,095.25	71,774.65	68,578.14	62,410.88
Total (without LULUCF)	132,250.56	129,239.42	117,865.19	118,110.56	116,802.10	114,839.10	117,804.06	118,545.09	115,311.93	111,521.22

Table III-31 Evolution of GHG emissions and removals by sector (kt CO₂e), 2021-2023

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2021	2022	2023	Change from base year to latest reported year, %
1. Energy	76,865.38	74,945.33	71,232.52	-67.69
2. IPPU	13,122.39	10,380.75	8,419.14	-81.30
3. Agriculture	18,985.32	18,000.82	17,891.23	-53.31
4. LULUCF	-47,791.89	-45,686.12	-46,424.79	119.77
5. Waste	6,401.91	6,340.35	6,319.56	10.29
Total (with LULUCF)	67,583.11	63,981.14	57,437.67	-80.09
Total (without LULUCF)	115,375.00	109,667.26	103,862.45	-66.45

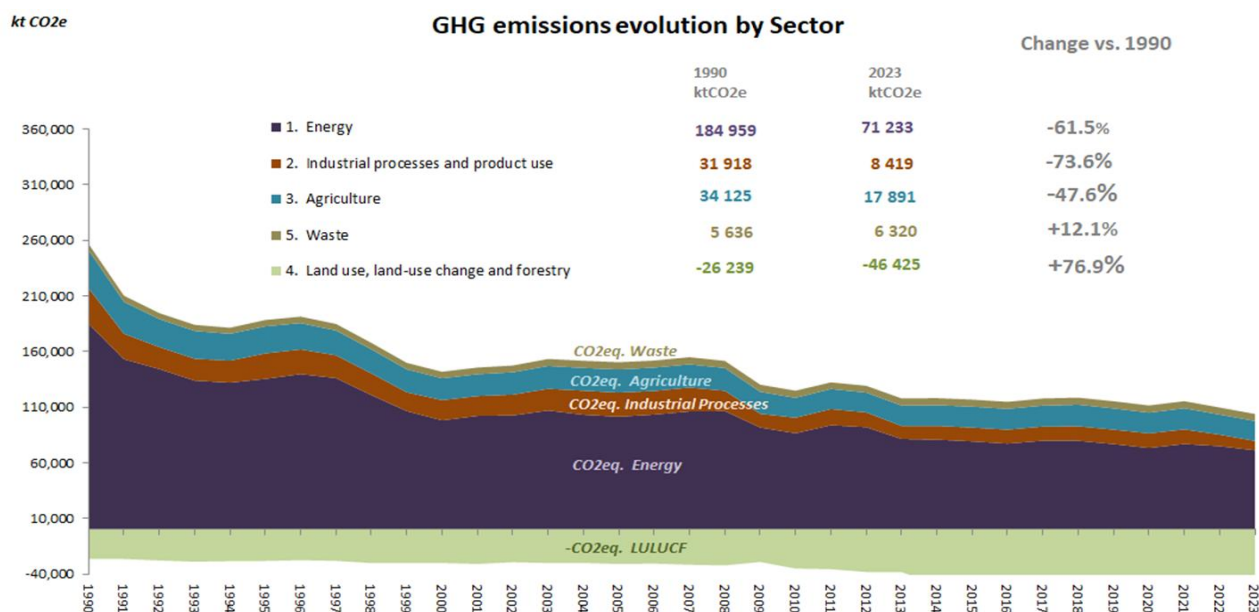


Figure III-31 Trends in GHG emissions (including LULUCF) by sector, 1990–2023

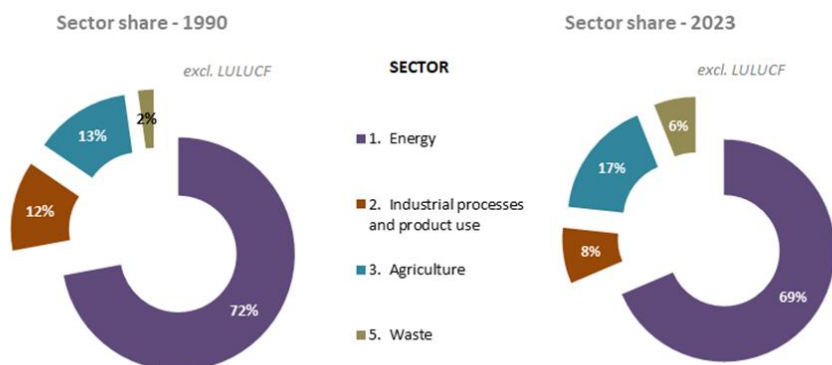


Figure III-32 Structure of GHG emissions by sector (excluding LULUCF), 1990 vs. 2023

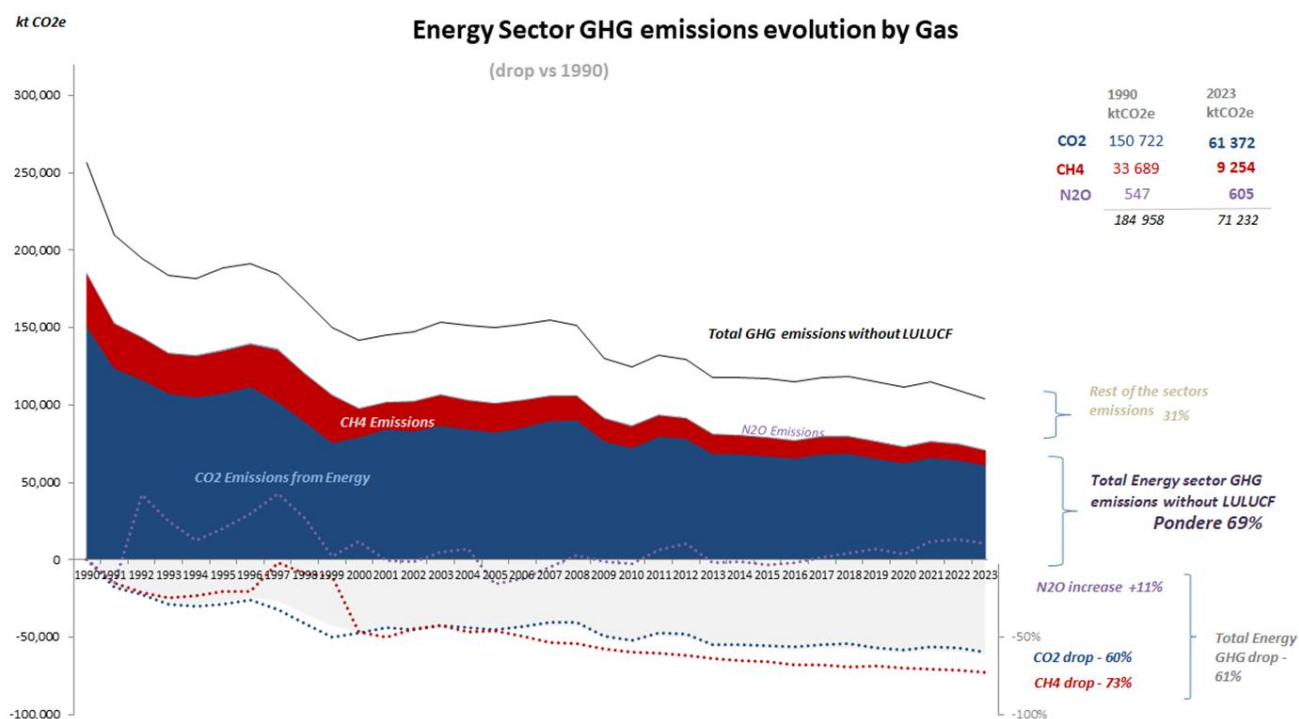


Figure III-33 Trends in GHG emissions for the Energy sector, 1990–2023

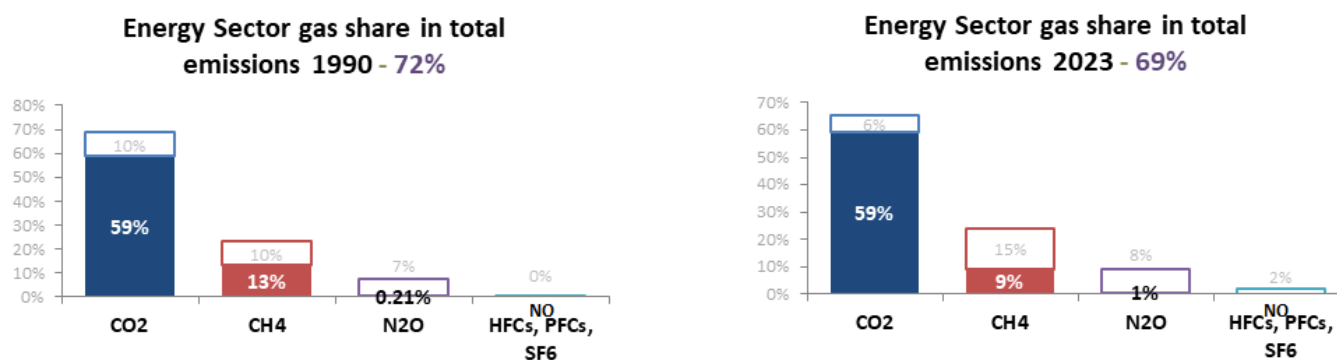


Figure III-34 Structure of GHG emissions by gas type for the Energy sector, 1990 vs 2023

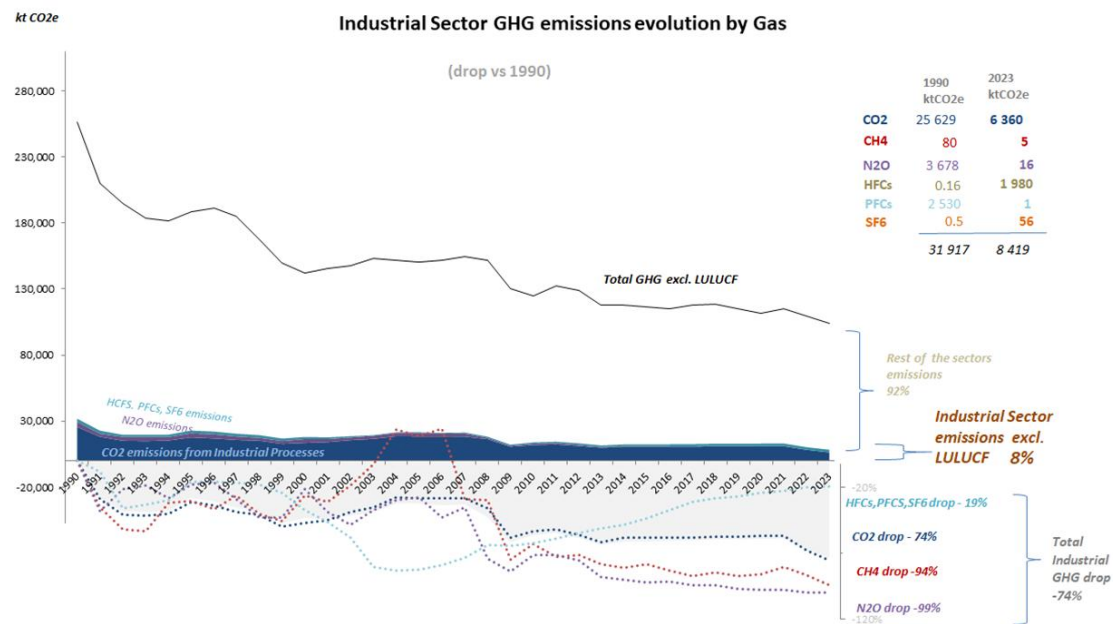


Figure III-35 Trends in GHG emissions for the IPPU sector, 1990–2023

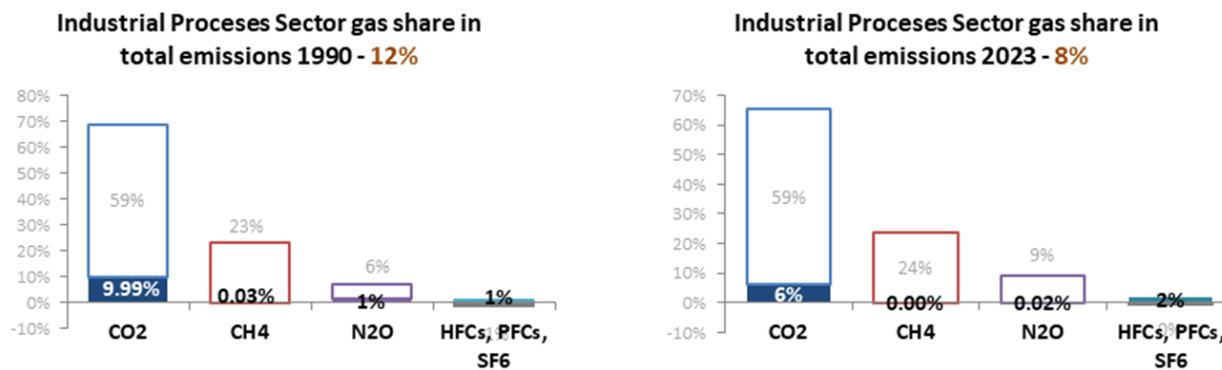


Figure III-36 Structure of GHG emissions by gas type for the IPPU sector, 1990 vs 2023

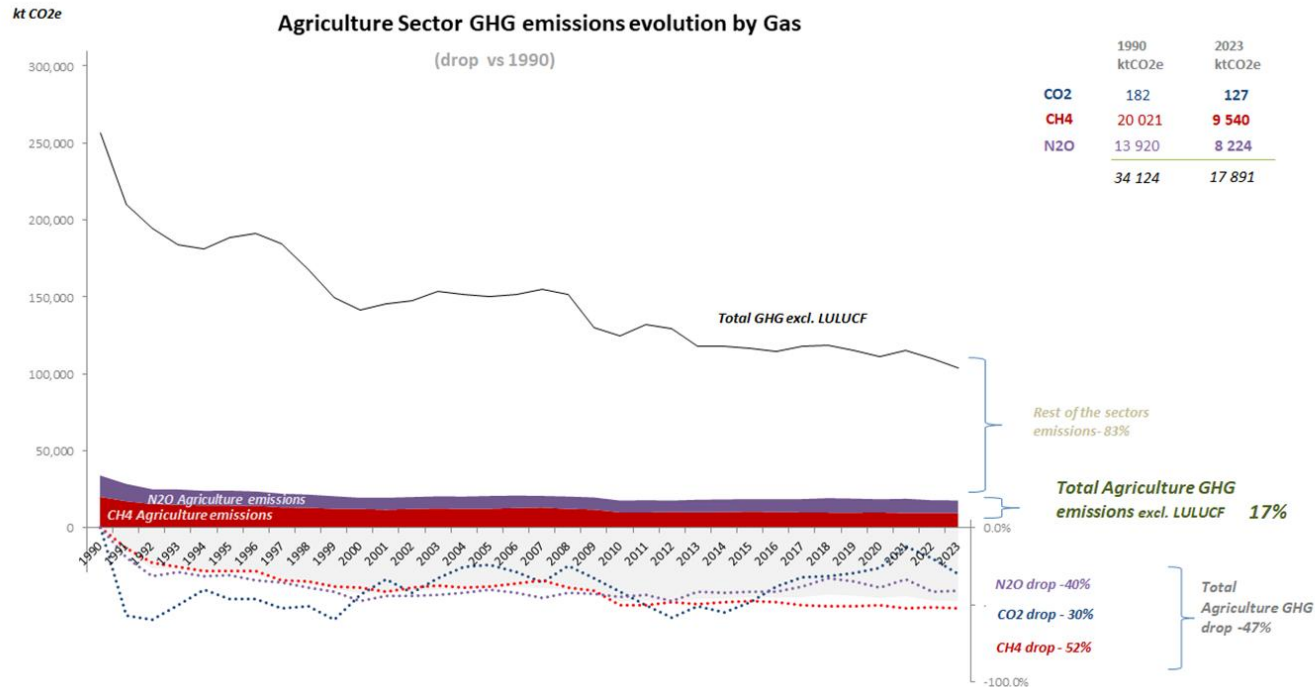


Figure III-37 Trends in GHG emissions for the Agriculture sector, 1990–2023

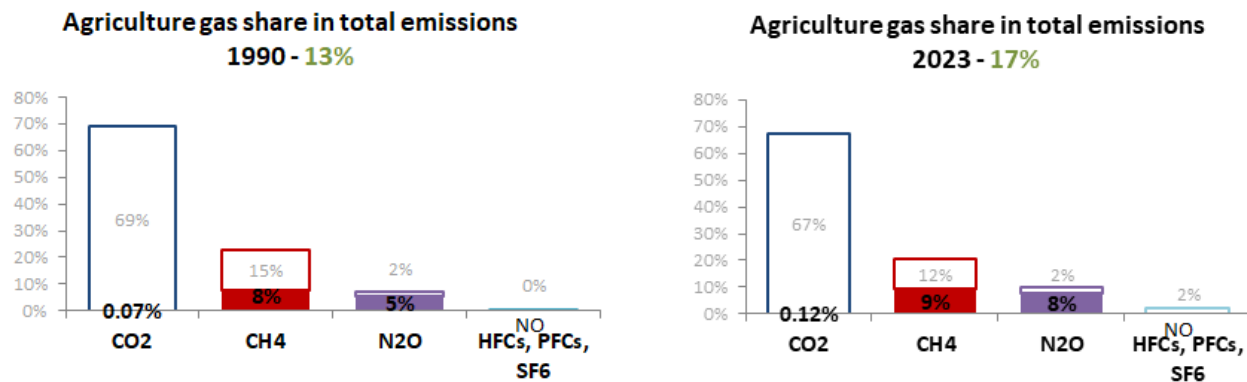


Figure III-38 Structure of GHG emissions by gas type for the Agriculture sector, 1990 vs 2023

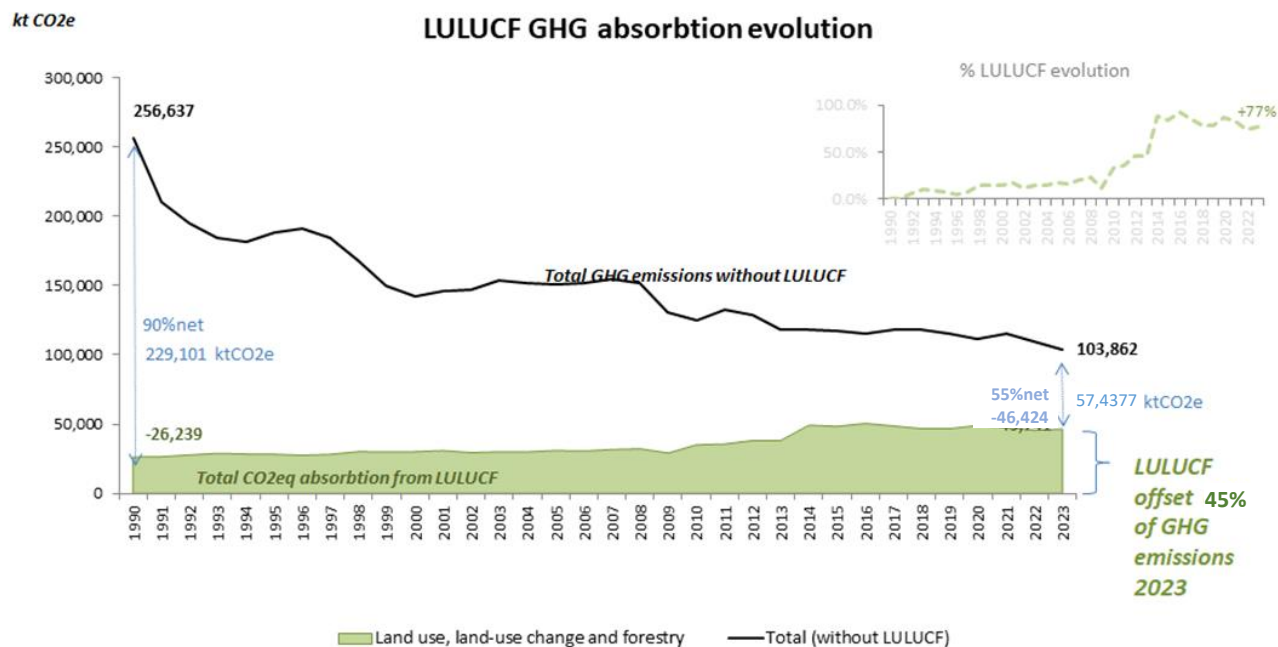


Figure III-39 Trends in GHG emissions and removals for the LULUCF sector, 1990–2023

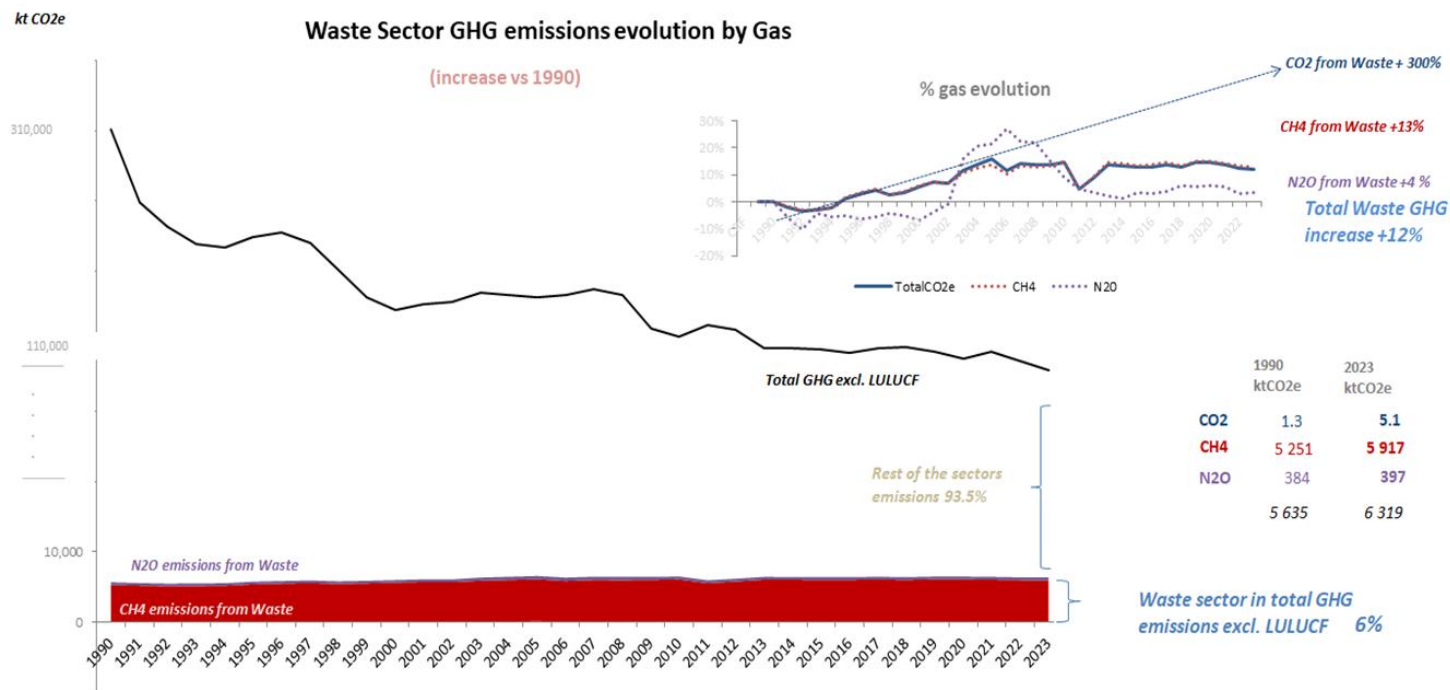


Figure III-40 Trends in GHG emissions for the Waste sector, 1990–2023

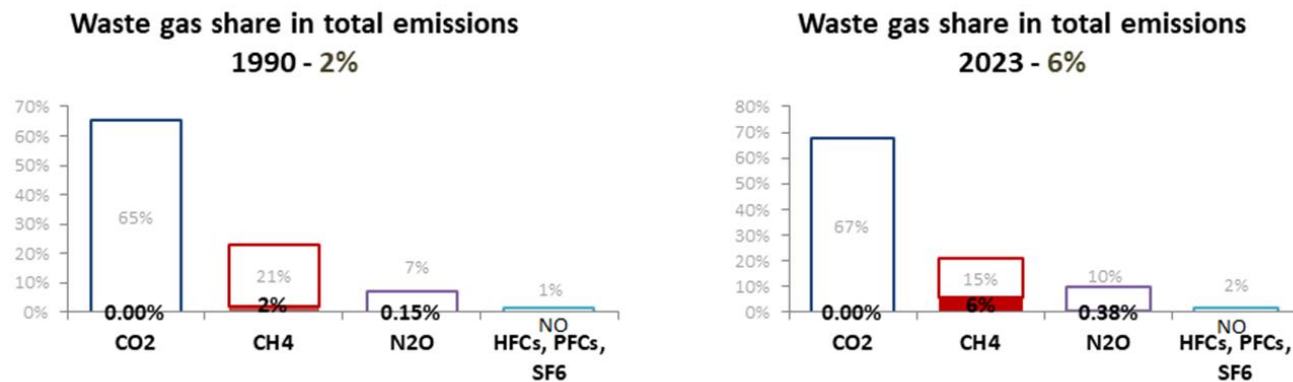


Figure III-41 Structure of GHG emissions by gas type for the Waste sector, 1990 vs 2023

F. Projections of greenhouse gas emissions and removals

METHODOLOGY FOR NIGHGE SECTORAL GREENHOUSE GAS (GHG) EMISSIONS FORECASTING

The methodology for producing forecasts of greenhouse gas (GHG) emissions is based both on historical data resulting from the National Inventory of Greenhouse Gas Emissions (NIGHGE) for the period 1989–2023, as well as on forecasts of macroeconomic indicators considered in the strategies of the Government of Romania and in the policies adopted for the socio-economic development of the country, in correlation with European Union Directives.

Romania's latest projections of GHG emissions and removals are based on the EU-level 2025 Comprehensive Review of the national GHG inventory, conducted pursuant to Article 38(1a) of Regulation (EU) No 2018/1999 and Articles 4(3) and 4(4) of Regulations (EU) No 2018/842 and No 2018/841, respectively; the review reports are available upon request. This approach was adopted to ensure consistent and highly accurate projections and a robust assessment of Romania's potential to achieve its GHG emission targets across ESR sectors. Due to time constraints, updates were limited to the reference and base years (1989, 1990, 2005, 2013, 2023), and CRT tables were generated for the projection scenario scope.

GREENHOUSE GAS EMISSIONS AND REMOVALS	1989	1990	2005	2013	2021	2022	2023	Change from base year to latest reported year, %
CO ₂ (without LULUCF)	208,986.76	176,535.11	101,336.60	77,361.41	75,535.86	70,804.65	66,143.70	-68.35
CO ₂ (with LULUCF)	187,676.87	150,099.79	70,199.28	41,191.28	30,231.84	26,590.27	20,268.90	-89.20
CH ₄ (without LULUCF)	72,857.38	57,943.59	28,619.12	23,158.28	21,134.93	20,914.85	20,455.89	-71.92
CH ₄ (with LULUCF)	72,857.55	57,944.38	28,619.41	23,159.03	21,140.19	20,962.09	20,470.89	-71.90
N ₂ O (without LULUCF)	22,262.05	18,331.75	11,820.82	9,457.56	10,284.46	9,142.49	9,185.76	-58.74
N ₂ O (with LULUCF)	22,447.95	18,526.90	11,999.76	9,843.06	10,361.60	9,248.60	9,304.68	-58.55
HFCs	NO	NO	348.70	1,181.21	1,908.29	1,993.34	2,022.57	–
PFCs	4,005.32	2,530.06	85.68	5.53	3.40	1.28	0.83	-99.98
Unspecified mix of HFCs and PFCs	NO	NO	NO	NO	NO	NO	NO	–
SF ₆	0.49	0.48	13.71	47.43	50.17	50.68	56.42	11,424.40
NF ₃	NO	NO	NO	NO	NO	NO	NO	–
1. Energy	219,781.24	184,269.11	93,405.08	74,942.61	70,558.54	68,320.46	65,354.40	-70.26
2. IPPU	45,024.16	31,917.36	21,629.12	11,644.70	13,122.43	10,401.96	8,461.48	-81.21
3. Agriculture	37,576.56	33,518.61	20,656.32	18,212.44	18,834.23	17,844.52	17,729.72	-52.82
4. LULUCF	-21,123.83	-26,239.38	-30,958.09	-35,783.89	-45,221.62	-44,061.03	-45,740.87	116.54
5. Waste	5,730.05	5,635.91	6,534.10	6,411.68	6,401.91	6,340.35	6,319.56	10.29
Total (without LULUCF)	308,112.01	255,340.99	142,224.62	111,211.42	108,917.11	102,907.28	97,865.16	-68.24
Total (with LULUCF)	286,988.18	229,101.61	111,266.53	75,427.53	63,695.49	58,846.26	52,124.29	-81.84

The relevant years as revised further to the EU-level 2025 Comprehensive Review of the national GHG inventory for the scope of GHG projections (1989 – national base year; 1990 – EU base year; 2005 – start year for WOM scenario and non-LULUCF sectors; 2013 – start year for WOM scenario and LULUCF sector; 2023 – start year for WEM, WAM scenarios and all sectors)

According to the National GHG Emissions Inventory, the energy sector is the main source of greenhouse gases (approximately 70% of total emissions), GHG emission forecasts are determined for the energy sector and for the non-energy sectors of the national economy.

The non-energy sectors of the national economy that contribute to GHG emissions are:

- Forestry – regarding options for the sequestration of atmospheric carbon;
- Agriculture – for assessing CH₄ emissions from animal digestion and manure fermentation and N₂O emissions from the application of nitrogen fertilizers;
- Industry - for assessing emissions from industrial processes;
- Solvents and other products;
- Management of liquid and solid waste – for assessing CH₄, N₂O, and CO₂ emissions.

GHG emissions forecasts are produced for three scenarios:

- A **reference “business as usual” scenario** (without-measures scenario – WOM), considered achievable in the future, which does not include special activities for reducing GHG emissions;
- A **reduction scenario**, similar to the reference scenario from the perspective of socio-economic indicators, but which includes policies and measures for reducing GHG emissions (with-existing-measures scenario – WEM);
- A **reduction scenario with additional measures**, similar to the reduction scenario but containing additional measures for reducing GHG emissions (scenario with additional measures – WAM).

For each sector, in accordance with the National Inventory, the technological processes that cause GHG emissions and the options for reducing them were identified.

The ranking of reduction options within a sector is based on detailed analyses using various criteria, namely:

- the degree of reduction of CO₂ and other GHG emissions;
- the cost-benefit ratio of the GHG reduction option;
- indirect economic impacts (new jobs, reduced imports);
- ease of implementation;
- long-term support for the reduction option, etc.

For each analysed sector, the manner in which the reference scenario and the two alternative scenarios were defined is specified, taking into account the sector's specific characteristics.

Producing GHG emission forecasts, as well as evaluating reduction alternatives, is particularly difficult; therefore, specialized software programs are used to identify the activity sectors that are significant contributors to GHG emissions, in correlation with the country's socio-economic development.

Methodology for GHG projection estimations in the Energy sector

The forecasts of GHG emissions in the energy sector are established by considering the energy demand sub-sector (industry, transport, agriculture, residential and commercial consumers) and the supply sub-sector (extraction of primary energy resources, their conversion in refineries, thermoelectric power plants, heating plants and the transport and distribution of energy products to consumers).

The National Commission for Strategy and Forecasting (CNSP) determined the evolution of total energy demand and of demand by type of energy resource for the sectors defined according to IPCC: electricity and heat production, transport, industry, agriculture, construction, services and households, using the methodology for preparing the energy balance forecast.

The determination of energy consumption and resources is carried out separately for each energy carrier listed in the annex of the National Institute of Statistics (INS) publication "Energy Balance and Energy Equipment Structure". However, in the final stage, to obtain the energy balance forecast, part of the results (consumption and exports) are aggregated, resulting in total energy quantities, not broken down by carriers. In this case, the indicators are extracted from the energy balances prepared for each energy carrier separately, during the stage before the aggregation of results, for which the following steps are undertaken:

Determining energy consumption

A given energy carrier may be used in final consumption as such or may require conversion into another energy carrier. Final consumption is calculated separately, at least for the following economic sectors (and also for exports, where applicable):

- Industry
- Non-energy use
- Agriculture
- Construction
- Transport
- Services (excluding transport)
- Residential sector
- Consumption in the energy sector, which is treated similarly to final consumption, although it does not represent final consumption

Final consumption is determined as the product between a macroeconomic indicator of activity in the given economic sector (gross value added, production of goods and services, etc.) and the energy consumption intensity of that sector, calculated for the energy carrier in question. Consumption intensity (or its growth) is generally determined using econometric equations.

The quantities of energy used in transformation are determined so as to cover the required amount for the energy carrier resulting from the conversion process (electricity, thermal energy, petroleum products, etc.), for a given transformation efficiency.

Determining resources

The production and import of a given energy carrier are determined so as to balance consumption (final consumption and consumption for transformation). In establishing production, the following elements are taken into account:

- Historical production values
- Opening of new deposits
- Evolution of the energy equipment structure
- Information regarding the hierarchy of production costs
- Restrictions on the use of fossil fuels imposed by international commitments, etc.

Imports result either as a quantity required to cover the remaining demand, or as a substitute for part of domestic production due to, for example, changes in international resource prices, changes in production costs, etc.

The methodology explicitly accounts for how substitutions between different resources occur, contributing either to balancing final consumption or to balancing consumption for transformation.

Scenarios for the evolution of consumption and how it is balanced with different resources

The implementation of a given scenario in the calculation used to determine energy consumption and resources can be carried out through elements such as:

- The evolution of macroeconomic indicators, which directly influence final energy consumption and indirectly influence consumption for transformation;
- Final consumption values obtained under a “business as usual” scenario may be adjusted with “energy savings” such as those included in the Integrated National Energy and Climate Plan (INECP), described for a scenario involving measures to increase consumption efficiency;
- Changes in the stock of energy-producing equipment - for example, as a result of implementing a plan of measures to reduce emissions in the energy sector. This leads to changes in production structure, increased transformation efficiency, modification of the energy mix, and the emergence of substitution between import and export, etc.;
- Imposing resource substitution based on the provisions of a strategy, international commitment, etc.

Assumed hypotheses

- a) The production of crude oil and natural gas does not undergo any significant increase (caused, for example, by the opening of new deposits).
- b) Energy consumption efficiency at the level of economic sectors improves at a steady rate.
- c) Significant substitutions do/do not occur in the resources used by households, for example due to the expansion of gas supply, increased electrification of household consumption, etc.
- d) The growth of electricity production from renewable sources accompanies the increase in renewable generation capacity described in the Adopted Plans.
- e) Nuclear energy production corresponds to the adopted plans.
- f) Coal is to be gradually substituted with natural gas, both in electricity generation and in heat production.
- g) The efficiency of converting various resources into electricity remains constant and is equal to that of the agreed reference period.

To determine the GHG emissions forecasts, the following equation is used in accordance with the provisions of INEGES 2023:

$$GHG\ Emissions = AD \times EF$$

where:

AD – quantity of fuel used;

EF – emission factor by category according to NIGHGE 2023.

Methodology for GHG projection estimations in the Industrial Processes and Product Use sector

According to the 2006 IPCC guidelines, this sector includes GHG emissions from activities related to the production process in the industry and emissions associated with the use of the products.

GHG emissions for non-energy sectors were calculated using spreadsheet models. Activity data are correlated with various parameters such as gross value added in industry, production structure by types of industrial processes. The emission factors used are either category-specific (determined based on the analysis of historical data) or in accordance with the IPCC 2006 guidelines. The sub-sector-specific assumptions were also considered.

The following calculation formula was used to estimate emissions:

$$E_g(t) = \sum_{i=1}^n \sum_{j=1}^m \sum_{k=1}^p A_j(t-1) \cdot p_k \cdot (1 + r_j(t)) \cdot EF_{g,k}(t)$$

where:

- Eg(t) – projected greenhouse gas emissions g in year t
- i – sector of activity, which is a source of GHG emissions
- j – sub-sector of activity, which is a source of GHG emissions
- k – product or material used for the production or use of which GHG emissions result
- pk – the share of the product / quantity of material used in the activity data of the sub-sector
- rj(t) – factor of increase or decrease of activity data at the level of the activity sub-sector
- EFg,k(t) – emission factor for the greenhouse gas g for the product or material used, in year t.

For categories 2.D, 2.F and 2.G, considering the difficulty to estimate in the long run the way of carrying out the activities that have an influence on the amount of GHG emissions, were used the extrapolation method (based on historical data).

Methodology for GHG projection estimations in the Agriculture sector

The following direct GHG emissions occur in the Agricultural sector:

- CH₄ from enteric fermentation
- CH₄ and N₂O from manure management
- CH₄ from rice cultivation
- N₂O from use of fertilizers
- CH₄ and N₂O from agricultural residue burning in the field.

To establish the GHG emission projections, the following equation is used in accordance with NIGHGE 2022:

$$GHG_{Emissions} = AD \times EF$$

where:

- AD = the projected activity date
- EF = forecast emission factor

The activity data were taken from the National Institute of Statistics, from the Ministry of Environment, Waters and Forests and the Ministry of Agriculture and Rural Development.

To establish the emission factors for the forecast, the equations specific to the animal husbandry sector and manure management from chapter 10, respectively those for plant production, related to chapter 11 of the IPCC guide, 2006, were used. For the livestock and manure management category, method 2 was used for all categories of animals (except rabbits) and for all greenhouse gases, and for the plant sector the implicit emission factors related to calculation method 1 were used.

Methodology for GHG projection estimations in Land Use, Land Use Change and Forestry sector

Projections of Romania greenhouse gas emissions and removals from Land Use, Land Use Change and Forestry (LULUCF) activities in the period from 2013 to 2055 are presented for the “without measures” (WOM), “with existing measures” (WEM) and “with additional measures” (WAM) scenarios. The reference year 2013 was chosen due to several reasons outlined below:

- (i) Forest subcategory:
 - National Forest Inventory (NFI): 2013 marks the start of the 2nd NFI cycle (2013-2018), whose data are used in NGHGI as a method to control and correct the time series.
 - Kyoto CP2: 2013 coincides with the beginning of the second Kyoto commitment period (2013-2020), making it a robust reference point for emission accounting.
 - Harvest traceability: by 2013, SUMAL 1.0 (implemented in 2008) was already operational, providing improved traceability of reported harvests; transparency was further strengthened by the launch of “Radarul Pădurilor” (Forest Radar) in 2014.
- (ii) Non-forest subcategories:
 - Grasslands: 2013 marks the adoption of Emergency Ordinance no. 34/2013 on the organization, management and use of permanent grasslands, an essential legal act for establishing the institutional and functional framework of this subcategory.
 - Cropland & Grassland (annual/perennial): in the period 2012-2013, the cross-compliance schemes linked to APIA payments started to take effect, with direct impact on management practices.

The following scenarios have been developed based on the existing National Greenhouse Gas Inventory (1989-2023)⁴⁹:

- The scenario “without measures” (WOM) is based on the projection of the data according to the evolution trends of GHG emissions and removals from LULUCF between 2013 and 2023. This also involves removing the impact of implemented policies and measures where possible.
- The scenario “with existing measures” (WEM) is based on the existing EU and national policy and considerations on the impact of these policies on management and conversions between land use categories.
- The scenario “with additional measures” (WAM) is similar to the WEM scenario but takes into account additional ambition and policy implementation between 2024 and 2055.

⁴⁹ Note that the historical greenhouse gas emissions inventory used in the projections include the EU Comprehensive review revised estimates to the 2025 submission

Projections are made for carbon stock changes and carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) emissions arising from LULUCF categories reported in the latest Romania Greenhouse Gas Inventory, for the period 1989-2023. The LULUCF projections are based on a series of assumptions driven by key policies and measures at an EU and national level considered in the “with existing measures” (WEM) and “with additional measures” (WAM). All the scenarios also consider the historical emission trends between 2013 and 2023. The projection assumptions have been applied at the country-specific land use sub-category level (see Table III-32). Note that in many cases, the same assumption applies across all sub-categories within a land use category.

Table III-32 IPCC reporting categories and national classifications

LU CRT code	LU IPCC name	LU Romania code	LU category name
4A	Forestland	Pd	FL - forests (type 1)
4B	Cropland	Ag	CL – arable
4B	Cropland	Vv	CL – vineyards
4B	Cropland	Lv	CL – orchards
4B	Cropland	Ata	CL - shrub crops
4C	Grassland	Pp	GL – pastures
4C	Grassland	Pf	GL - pasture with spare trees
4C	Grassland	Pa	GL – hayfields
4C	Grassland	AtVF	GL - forests (type 2)
4C	Grassland	Ioan	GL - pinus migho scrubs (juniper trees)
4C	Grassland	Tf	GL – shrubs
4D	Wetlands	ZuV	WL - wet areas with vegetation
4D	Wetlands	ZuA	WL - waters/ponds
4E	Settlements	AU	SL - construction + roads
4F	Other land	LA	OL - other lands

Table III-33 outlines the basis for projections for all land use conversions and Table III-34 presents the projected land use activity data in kha for the WEM, WAM and WOM scenarios.

Table III-33 Basis for projections and assumptions for all land use conversions and activity data in the LULUCF inventories

Land use category	Land use conversion	WEM	WAM	WOM
Forest land	Cropland converted to Forest land	Conversions are assumed to have annual values equal to the average of the reference period 2013–2023.	Increased annual conversion values are assumed due to afforestation programs (i.e., 9 kha annually for 2024, 2025, and 2026). After 2026, annual values are assumed to follow those of the WEM scenario.	It is assumed that conversions to and from forest are equal, resulting in a net annual forest area change of zero.
	Grassland converted to Forest land			
	Wetlands converted to Forest land			
	Settlements converted to Forest land			
	Other land converted to Forest land			
	Biomass burning	It is assumed to follow a moving average trend based on the	Same pattern as the WEM scenario is assumed.	A linear trend is assumed for the reference period

		reference period 2013–2023. This trend reflects the recent increase observed in the phenomenon but does not assume values higher than the period average.		1990–2013, representing a constant increase in biomass burning in forest areas.
	Harvested wood products	The annual inflow is assumed to remain equal to the average of the reference period.	A gradual increase of 30% in the annual inflow of wood into the HWP pool by 2030 is assumed.	An average inflow based on the 1990–2013 period is assumed, which does not reflect the recent growth observed in HWP.
Cropland	Forest land converted to Cropland	Conversions are assumed to have annual values equal to the average of the reference period 2013–2023.	The WAM scenario assumes the same pattern as the WEM scenario	It is assumed that conversions to and from forest are equal, resulting in a net annual forest area change of zero.
	Grassland converted to Cropland	Conversions assumed to be the same as the historical average annual area conversion between 2013 and 2023.	Fruit tree/orchard (Lv) areas are assumed to moderately increase by 2% between 2023 and 2055 through reconversion of degraded cropland. All other conversions are estimated using the WEM assumptions.	See WEM assumptions
	Wetlands converted to Cropland	Conversions are assumed to be the same as the historical average annual area conversions between 2013 and 2023.		
	Settlements converted to Cropland			
	Other land converted to Cropland			
Grassland	Forest land converted to Grassland	Conversions are assumed to have annual values equal to the average of the reference period 2013–2023.	The WAM scenario assumes the same pattern as the WEM scenario	It is assumed that conversions to and from forest are equal, resulting in a net annual forest area change of zero.
	Cropland converted to Grassland	Conversions are assumed to be the same as the historical average annual area conversions between 2013 and 2023.		
	Wetlands converted to Grassland	Conversions are assumed to be the same as the historical average annual area conversions between 2013 and 2023.		

	Settlements converted to Grassland			
	Other land converted to Grassland	Conversions are assumed to be the same as the historical average annual area conversions between 2013 and 2023.	Conversions are assumed to increase by 2% between 2023 and 2055 due to enhanced policy implementation.	See WEM assumptions
	Biomass burning	The average of 50,000 ha/year based on data for 2019 – 2023		
Wetlands	Forest land converted to Wetlands	Conversions are assumed to have annual values equal to the average of the reference period 2013–2023.	The WAM scenario assumes the same pattern as the WEM scenario	It is assumed that conversions to and from forest are equal, resulting in a net annual forest area change of zero.
	Cropland converted to Wetlands	No conversions are assumed to occur from cropland or grassland to wetlands.		Conversions are assumed to be the same as the historical average annual area conversions between 2013 and 2023.
	Grassland converted to Wetlands			
	Settlements converted to Wetlands	There are assumed to be no conversions from settlements or other land being to wetlands.		
	Other land converted to Wetlands			
Settlements	Forest land converted to Settlements	Conversions are assumed to have annual values equal to the average of the reference period 2013–2023.	The WAM scenario assumes the same pattern as the WEM scenario	It is assumed that conversions to and from forest are equal, resulting in a net annual forest area change of zero.
	Cropland converted to Settlements	Conversions are assumed to remain similar to the average between 2013-2023.	Annual conversion rates of cropland to settlements of around 40 ha/year and grassland to settlements of around 30 ha/year by 2030.	See WEM assumptions
	Grassland converted to Settlements			
	Wetlands converted to Settlements	There are assumed to be no conversions of wetlands or other land to settlements.		
	Other land converted to Settlements			
Other land	Forest land converted to Other land	Conversions are assumed to have annual values equal to the average of the reference period 2013–2023.	The WAM scenario assumes the same pattern as the WEM scenario	In this scenario, it is assumed that conversions to and from forest are equal, resulting in a net annual forest area change of zero.
	Cropland converted to Other land	Average of 7,500 ha of annual and perennial	Average of 7500 ha of annual and perennial	Average of 7,500 ha of annual and

		cropland is deserted each year. This is maintained until 2050.	cropland is deserted each year. Decreasing to 5,000 ha by 2050.	perennial cropland is deserted each year. Increasing to 10,000 ha by 2050.
	Grassland converted to Other land	There is assumed to be no additional conversion of grassland to other land.		Conversions are assumed to be the same as the historical average annual area conversions between 2013 and 2023.
	Wetlands converted to Other land	There are assumed to be no conversions from wetlands to other land.		
	Settlements converted to Other land	Assumed no conversions across all scenarios.		

Table III-34 Annual land use category projections for all land use conversions, in kha. This table only shows annual land use conversions and not land remaining in a land use category as assumptions were applied at this level to create the projections in all scenarios

Land use category	Land use conversion	Scenario	2013	2023	2025	2035	2045	2055
Forest land	Cropland converted to Forest land	WEM	0.46	0.51	0.51	0.51	0.51	0.51
		WAM	0.46	0.51	1.35	0.52	0.52	0.52
		WOM	0.46	0.41	0.41	0.40	0.40	0.40
	Grassland converted to Forest land	WEM	2.44	2.74	2.75	2.75	2.75	2.75
		WAM	2.44	2.74	7.20	2.75	2.75	2.75
		WOM	2.44	2.18	2.20	2.12	2.16	2.15
	Settlements converted to Forest land	WEM	0.15	0.17	0.17	0.17	0.17	0.17
		WAM	0.15	0.17	0.45	0.17	0.17	0.17
		WOM	0.15	0.14	0.14	0.13	0.13	0.13
Cropland	Forest land converted to Cropland	WEM	0.14	0.18	0.17	0.17	0.17	0.17
		WAM	0.14	0.18	0.17	0.17	0.17	0.17
		WOM	0.14	0.22	0.22	0.21	0.22	0.22
	Grassland converted to Cropland	WEM	356.05	212.12	247.59	247.59	247.59	247.59
		WAM	356.05	212.12	247.59	247.63	247.67	247.71
		WOM	356.05	212.12	247.59	247.59	247.59	247.59
	Wetlands converted to Cropland	WEM	8.89	0.73	2.06	2.06	2.06	2.06
		WAM	8.89	0.73	2.06	2.06	2.06	2.06
		WOM	8.89	0.73	2.06	2.06	2.06	2.06
	Settlements converted to Cropland	WEM	8.57	2.65	4.55	4.55	4.55	4.55
		WAM	8.57	2.65	4.55	4.55	4.55	4.55
		WOM	8.57	2.65	4.55	4.55	4.55	4.55
	Other land converted to Cropland	WEM	0.08	0.00	0.01	0.01	0.01	0.01
		WAM	0.08	0.00	0.01	0.01	0.01	0.01
		WOM	0.08	0.00	0.01	0.01	0.01	0.01

Grassland	Forest land converted to Grassland	WEM	1.12	1.35	1.35	1.35	1.35	1.35
		WAM	1.12	1.35	1.35	1.35	1.35	1.35
		WOM	1.12	1.69	1.71	1.64	1.67	1.66
	Cropland converted to Grassland	WEM	490.81	230.57	290.00	290.00	290.00	290.00
		WAM	490.81	230.57	290.00	290.00	290.00	290.00
		WOM	490.81	230.57	290.00	290.00	290.00	290.00
	Wetlands converted to Grassland	WEM	27.81	3.27	4.57	4.57	4.57	4.57
		WAM	27.81	3.27	4.57	4.57	4.57	4.57
		WOM	27.81	3.27	4.57	4.57	4.57	4.57
	Settlements converted to Grassland	WEM	33.12	0.78	4.15	4.15	4.15	4.15
		WAM	33.12	0.78	4.15	4.15	4.15	4.15
		WOM	33.12	0.78	4.15	4.15	4.15	4.15
	Other land converted to Grassland	WEM	1.31	0.55	0.32	0.32	0.32	0.32
		WAM	1.31	0.55	0.32	0.33	0.33	0.33
		WOM	1.31	0.55	0.32	0.32	0.32	0.32
Wetlands	Cropland converted to Wetlands	WEM	1.19	0.28	0.00	0.00	0.00	0.00
		WAM	1.19	0.28	0.00	0.00	0.00	0.00
		WOM	1.19	0.28	1.50	1.50	1.50	1.50
	Grassland converted to Wetlands	WEM	7.60	1.36	0.00	0.00	0.00	0.00
		WAM	7.60	1.36	0.00	0.00	0.00	0.00
		WOM	7.60	1.36	6.74	6.74	6.74	6.74
	Settlements converted to Wetlands	WEM	0.00	0.00	0.00	0.00	0.00	0.00
		WAM	0.00	0.00	0.00	0.00	0.00	0.00
		WOM	0.00	0.00	0.00	0.00	0.00	0.00
	Other land converted to Wetlands	WEM	0.00	0.00	0.00	0.00	0.00	0.00
		WAM	0.00	0.00	0.00	0.00	0.00	0.00
		WOM	0.00	0.00	0.00	0.00	0.00	0.00
Settlements	Forest land converted to Settlements	WEM	0.54	0.65	0.65	0.65	0.65	0.65
		WAM	0.54	0.65	0.65	0.65	0.65	0.65
		WOM	0.54	0.82	0.83	0.80	0.81	0.81
	Cropland converted to Settlements	WEM	16.36	0.81	0.81	0.81	0.81	0.81
		WAM	16.36	0.81	0.69	0.40	0.40	0.40
		WOM	16.36	0.81	0.81	0.81	0.81	0.81
	Grassland converted to Settlements	WEM	5.28	0.67	0.67	0.67	0.67	0.67
		WAM	5.28	0.67	0.56	0.30	0.30	0.30
		WOM	5.28	0.67	0.67	0.67	0.67	0.67
	Wetlands converted to Settlements	WEM	0.00	0.00	0.00	0.00	0.00	0.00
		WAM	0.00	0.00	0.00	0.00	0.00	0.00
		WOM	0.00	0.00	0.00	0.00	0.00	0.00
	Other land converted to Settlements	WEM	0.00	0.00	0.00	0.00	0.00	0.00
		WAM	0.00	0.00	0.00	0.00	0.00	0.00

		WOM	0.00	0.00	0.00	0.00	0.00	0.00
Other land	Cropland converted to Other land	WEM	0.04	0.00	7.50	7.50	7.50	7.50
		WAM	0.04	0.00	7.40	6.44	5.48	5.00
		WOM	0.04	0.00	7.50	7.50	7.50	12.50
	Grassland converted to Other land	WEM	0.15	0.03	0.00	0.00	0.00	0.00
		WAM	0.15	0.03	0.00	0.00	0.00	0.00
		WOM	0.15	0.03	0.23	0.23	0.23	0.23
	Wetlands converted to Other land	WEM	0.00	0.00	0.00	0.00	0.00	0.00
		WAM	0.00	0.00	0.00	0.00	0.00	0.00
		WOM	0.00	0.00	0.00	0.00	0.00	0.00

Methodology for GHG projection estimations in the Waste sector

Waste disposal in landfills has a direct impact on the environment, including by generation of GHG emissions.

Waste degradation is a complex of chemical and biological reactions, whose result is the generation of biogas with the basic composition: CH₄ and CO₂. The biogas decomposition and removal continue over 10 to 30 years. A 50% of degradable organic waste is decomposed during the last 10 years, 12.5% of the remaining decompose over 30 years.

Projections of GHG emissions are made in accordance with the IPCC 2006 Guidelines.

To achieve emission projections, we started from the basic parameters on which base emissions from the waste sector are estimated in the National Greenhouse Gases Inventory.

Methodology for projecting GHG emissions resulting from wastewater treatment

CH₄ emissions from domestic and commercial wastewater treatment and sludge

The IPCC 2006 documentation applied to Romania's conditions highlights the existence of the following possible sources of methane emissions:

- Household wastewater collected in sewerage networks and discharged into a collector without treatment. These waters undergo an aerobic self-purification process with minor methane emissions
- Household wastewater collected in sewerage networks and treated in city treatment plants using aerobic and anaerobic biological processes
- Household wastewater from non-sewer areas is collected in septic tanks or cesspools, where aerobic and anaerobic processes are carried out, and that cannot be controlled. The sources of methane as result of the anaerobic processes are more developed in high temperature areas and when the interval between vacuums is high.

The large wastewater treatment plants are equipped with active sludge basins containing aerobic, anoxic and oxic areas. The oxic areas can become anoxic and even anaerobic if the treatment process is not properly driven. In this case, methane emissions may occur.

The sludge from the treatment plants is subjected to stabilization processes that can be anaerobic or aerobic. Biogas with a high methane content is produced in the case of anaerobic treatment of sludge. Typically, biogas is

used in electricity or heat generation facilities. In case of malfunctions, methane can be released in the atmosphere.

The above-mentioned household wastewater can be a significant source of methane emissions that are coming from:

- Population not connected to sewerage system
- Population connected to sewerage system, with treatment.

The CH₄ emissions from the treatment of domestic wastewater depend directly on the population, biochemical oxygen consumption, methane emission factor (kg CH₄/kg BOD), the use of wastewater treatment plants, the organic component removed by sludge and the amount of CH₄ recovered from wastewater.

CH₄ Emissions from Industrial Wastewater Treatment

The estimation of methane production potential from industrial wastewater treatment was based on the concentration of organic components in wastewater, the volume of wastewater and the treatment of industrial wastewater in anaerobic systems.

The sectors with the highest potential methane emissions from wastewater treatment are Pulp and paper manufacturing, Food (dairy products, beer, alcohol) and Crude oil refining.

The CH₄ emissions from industrial wastewater treatment depend directly on specific industrial production, the amount of wastewater generated, chemical oxygen consumption, methane emission factor (CH₄/kg COD kg), the organic component removed by sludge and the amount of CH₄ recovered.

N₂O emissions from wastewater treatment

N₂O emissions from human waste are related to the presence of nitrogen from proteins consumed. According to IPCC 2006, N₂O emissions are:

- Direct emissions in the case of modern wastewater treatment plants equipped with nitrification and denitrification technology
- Indirect wastewater emissions after their discharge into the receptors.

Considering the small share of modern wastewater treatment plants, only indirect N₂O emissions are reported in NGHGI.

Indirect N₂O emissions depend directly on population, annual protein consumption per capita and on protein factors and emission factors for N₂O emissions.

ASSUMPTIONS CONSIDERED FOR DETERMINING GHG EMISSION PROJECTIONS IN THE THREE SCENARIOS

Macroeconomic indicators

For producing forecasts for the period 2024–2055, the following were taken into account:

- Economic growth
- Demographic development
- Social development
- Structural adjustment of the economy
- Structural adjustment of industry
- Technological modernization and reduction of energy intensity in industry, agriculture, and construction
- Development and modernization of the transport sector
- Development and modernization of the services sector
- Development and modernization of housing conditions.

In defining the scenarios, it was considered that Romania's economic development for the period 2025–2055 is closely linked to both global economic development and the economic development of the European Union, taking place in an exceptionally complex international context.

Table III-35 presents the evolution of Gross Domestic Product (GDP) and Gross Value Added (GVA) for the period 2020–2055, provided by the National Commission for Strategy and Forecasting (CNSP), expressed in Euro₂₀₂₃, which were taken into account in preparing the greenhouse gas emission forecasts.

Table III-35 Evolution of GDP and GVA during 2020–2055 (billion Euro₂₀₂₃)

Year	2020	2021	2022	2023	2024	2025	2030	2035	2040	2045	2050
	Achieved					Forecast					
GDP	288.7	304.7	316.8	324.4	327.0	329.1	363.7	399.8	433.9	466.2	498.7
GVA	269.9	283.1	289.9	296.2	296.4	297.2	327.1	359.3	389.8	418.3	447.0

In Table III-36, the structure of Gross Value Added (GVA) - both total and by economic sectors (industry, agriculture, construction, services) - is presented for the period 2020–2055, as provided by the National Commission for Strategy and Forecasting.

Table III-36 Structure of GVA by economic sectors, during 2020–2055 (%)

Year	2020	2021	2022	2023	2024	2025	2030	2035	2040	2045	2050
	Achieved					Forecast					
TOTAL GVA, Of which	100	100	100	100	100	100	100	100	100	100	100
Industry	24.5	23.5	20.0	19.1	18.9	18.7	18.5	18.6	18.6	18.5	18.4

Year	2020	2021	2022	2023	2024	2025	2030	2035	2040	2045	2050
	Achieved					Forecast					
Agriculture	4.0	4.4	3.6	3.9	3.6	3.8	3.7	3.5	3.3	3.1	2.9
Construction	7.5	7.3	6.9	7.6	7.3	7.6	8.1	8.3	8.2	8.1	8.0
Services	57.5	57.8	61.0	60.7	60.8	60.3	59.6	59.6	59.7	60.1	60.4

The data in Table III-36 reflect a continuous trend of structural adjustment of the economy, through the increasing share of activities in the services sector in the formation of GVA, to the detriment of the other branches of the economy.

In Table III-37, the evolution of the main macroeconomic indicators used in determining the GHG emission forecasts is presented. The evolution of GDP per capita for the period 2020–2055 is expressed in Euro₂₀₂₃. Considering the population forecast for the period 2020–2055, an increase is observed in the GDP per capita indicator, from 14,960 Euro₂₀₂₃ in 2020 to 19,356 Euro₂₀₂₃ in 2030, with an average annual growth rate of 2.61%. For the year 2055, the value is projected to double compared to 2021 (31,879 Euro₂₀₂₃).

Table III-37 Evolution of population, GDP per capita, and GVA in the period 2020–2055

Year	2020	2021	2022	2023	2024	2025	2030	2035	2040	2045	2050
	Achieved					Forecast					
Population (million inhabitants)	19.296	19.140	19.053	19.065	19.056	19.033	18.790	18.451	18.081	17.657	17.194
GDP per capita (Euro ₂₀₂₃ /inhabitant)	14960	15918	16625	17014	17161	17290	19356	21666	23999	26402	29004
GVA total (billion Euro ₂₀₂₃), of which:	269.9	283.1	289.9	296.2	296.4	297.2	327.1	359.3	389.8	418.3	447.0
Industry	70.7	71.5	63.4	61.9	61.8	61.6	67.4	74.2	80.6	86.1	91.6
Agriculture	11.5	13.4	11.5	12.6	11.8	12.4	13.5	14.0	14.3	14.3	14.3
Constructions	21.6	22.1	22.0	24.6	24.0	24.9	29.5	33.0	35.7	37.8	39.8
Services	166.1	176.1	193.1	197.0	198.7	198.3	216.7	238.1	259.2	280.0	301.2

Assumptions Considered for the Energy Sector

The National Commission for Strategy and Forecasting (CNSP), in correlation with the projection of macroeconomic indicators and taking into account Romania's national targets regarding increasing energy efficiency, reducing greenhouse gas emissions and using renewable energy sources, in accordance with the Integrated National Energy and Climate Plan (NECP), revised in October 2024, has prepared Romania's Energy Balance for the period 2025–2055.

Table III-38 presents both the energy consumption values for the years 2021, 2022 and 2023, as well as the forecasts for the period 2023–2055. Romania's domestic primary energy consumption was approximately 34,101 thousand toe in 2021 and is expected to reach 30,738 thousand toe in 2050, in line with NECP requirements.

Table III-38 Forecast of domestic primary energy consumption and final energy consumption [thousand toe]

Specification / Year	2021	2022	2023	2025	2030	2035	2040	2045	2050
	Achieved			Forecast					
Domestic primary energy consumption	34101	31461	30351	30811	30446	30599	30717	30729	30728
Consumption in the energy sector	3013	2421	2866	2610	2652	2651	2650	2648	2640
Losses	867	781	798	766	683	677	674	672	667
Available for final consumption	26911	24880	24185	24357	25721	25797	25921	25972	26016
Non-energy consumption	1212	665	706	741	782	779	776	773	769
Final energy consumption, of which:	23370	24031	23266	23616	24939	24512	24508	24503	24453
Household consumption	8766	7896	7553	7530	7514	7486	7459	7424	7380
Consumption in the economy, of which:	16604	16135	15712	16086	17425	17025	17048	17079	17073
- Industry	6422	5249	4427	4377	4531	4638	4717	4799	4872
- Constructions	427	486	519	538	583	597	610	619	624
- Agriculture, forestry and fishing	567	555	540	564	572	574	575	576	577
- Transport and Telecommunications	6976	7555	7849	8174	8668	8636	8598	8553	8496
- Other economy sectors	2213	2290	2378	2433	2575	2580	2548	2531	2504

Source: National Commission for Strategy and Forecasting for the period 2025–2055, National Institute of Statistics for the period 2021–2023

The forecasts of the energy resources (production and imports) required by Romania, prepared by the National Commission for Strategy and Forecasting, are presented in Table III-39.

Table III-39 Forecast of primary energy resources [thousand toe]

Specification / Year	2021	2022	2023	2025	2030	2035	2040	2045	2050
	Achieved			Forecast					
Energy resources, of which:	43192	42479	41992	42405	44729	44994	45192	45264	45306
Production of coal	3006	2775	2245	1856	885	0	0	0	0
Production of usable natural gas	7425	7523	7652	7608	14039	14222	14177	14067	14025
Crude oil extracted	3232	3049	2908	2677	2219	2222	2253	2224	2134
Firewood (including biomass)	3625	3471	3165	3152	3037	3025	3016	3010	3004
Source: National Commission for Strategy and Forecasting for the period 2025–2055, National Institute of Statistics for the period 2021–2023									

From the analysis of the forecasts for primary energy resources, the following conclusions can be drawn:

- Crude oil production is declining, a trend explained, among other factors, by the absence of new deposits being developed
- Natural gas production is increasing, as a result of new investments in the exploitation of Black Sea deposits
- Firewood production shows a decrease of approximately 100 thousand toe over the analysed period.

The GHG emission projection report prepared as part of the EU reporting details the assumptions for all sectors, as well as the GHG emission projections for all INEGES sectors, categories and subcategories.

Reporting tables for GHG emission projections

Below is a summary of greenhouse gas projections, disaggregated both by greenhouse gas—including and excluding LULUCF—and by sector of activity.

Table III-40 Tabular report of projected greenhouse gas emissions in the WEM scenario

With measures scenario	Most recent year in the Party's NIR	Projections of GHG emissions and removals					
	(kt CO ₂ eq)	(kt CO ₂ eq)					
	2023	2025	2030	2035	2040	2045	2050
CO ₂ emissions including net CO ₂ from LULUCF	20,268.90	20,149.79	24,930.58	31,273.05	27,315.77	25,862.31	23,555.49
CO ₂ emissions excluding net CO ₂ from LULUCF	66,143.70	66,205.74	63,587.66	60,155.06	54,962.88	53,380.80	50,912.76
CH ₄ emissions including CH ₄ from LULUCF	20,470.89	17,471.16	15,186.67	13,016.64	12,576.77	12,313.83	12,095.60
CH ₄ emissions excluding CH ₄ from LULUCF	20,455.89	17,452.85	15,166.71	12,997.34	12,557.10	12,294.32	12,075.99
N ₂ O emissions including N ₂ O from LULUCF	9,304.68	9,106.22	9,285.10	8,570.16	8,384.63	8,378.71	8,096.65
N ₂ O emissions excluding N ₂ O from LULUCF	9,185.76	8,886.71	8,703.75	8,357.33	8,076.43	8,060.66	7,778.54
HFCs	2,022.57	1,891.43	1,760.80	1,708.85	1,655.86	1,603.37	1,550.87
PFCs	0.83	0.76	0.70	0.67	0.65	0.01	0.01
SF ₆	56.42	59.43	39.81	27.50	26.32	25.38	24.21
NF ₃	NO	NO	NO	NO	NO	NO	NO
Total with LULUCF	52,124.29	48,678.78	51,203.66	54,596.86	49,960.01	48,183.61	45,322.82
Total without LULUCF	97,865.16	94,496.92	89,259.43	83,246.75	77,279.24	75,364.54	72,342.38

Table III-41 Tabular report of projected greenhouse gas emissions in the WAM scenario

With additional measures scenario	Most recent year in the Party's NIR	Projections of GHG emissions and removals					
	(kt CO ₂ eq)	(kt CO ₂ eq)					
	2023	2025	2030	2035	2040	2045	2050
CO ₂ emissions including net CO ₂ from LULUCF	20,268.90	19,288.60	15,999.42	22,369.39	18,825.51	17,123.39	13,986.84
CO ₂ emissions excluding net CO ₂ from LULUCF	66,143.70	66,205.01	56,617.69	54,103.26	50,061.56	48,715.29	46,087.46
CH ₄ emissions including CH ₄ from LULUCF	20,470.89	16,951.03	13,893.12	11,951.30	11,566.91	11,300.96	11,063.38
CH ₄ emissions excluding CH ₄ from LULUCF	20,455.89	16,932.72	13,873.16	11,932.00	11,547.24	11,281.45	11,043.78
N ₂ O emissions including N ₂ O from LULUCF	9,304.68	9,011.79	8,997.92	8,266.00	7,917.04	7,840.14	7,548.27
N ₂ O emissions excluding N ₂ O from LULUCF	9,185.76	8,790.41	8,414.70	8,053.17	7,608.83	7,522.09	7,230.17
HFCs	2,022.57	1,891.43	1,760.80	1,708.85	1,655.86	1,603.37	1,550.87
PFCs	0.83	0.76	0.70	0.67	0.65	0.01	0.01
SF ₆	56.42	59.43	39.81	27.57	26.48	25.43	24.37
NF ₃	NO	NO	NO	NO	NO	NO	NO
Total with LULUCF	52,124.29	47,203.03	40,691.77	44,323.78	39,992.46	37,893.30	34,173.75
Total without LULUCF	97,865.16	93,879.75	80,706.86	75,825.52	70,900.64	69,147.64	65,936.65

Table III-42 Greenhouse gas emissions (kt CO_{2eq}) in the WEM scenario, 2025-2050

Category	2023	2025	2030	2035	2040	2045	2050
	Inventory	Projections					
Total excluding LULUCF	97865.16	94496.92	89259.43	83246.75	77279.24	75364.54	72342.38
Total including LULUCF	52124.29	48678.78	51203.66	54596.86	49960.01	48183.61	45322.82
1. Energy	65354.60	66120.71	62624.68	59502.09	54684.49	53265.61	51849.64
1.A. Fuel combustion	60651.35	61685.06	58636.15	56170.94	51308.59	49861.21	48426.74
1.A.1. Energy industries	16805.29	17905.16	12974.16	11779.56	8033.00	7851.14	7676.14
1.A.1.a. Public electricity and heat prod	13715.44	14791.30	10373.68	9727.46	6001.48	5840.00	5685.11
1.A.1.b. Petroleum refining	1731.42	1991.16	2072.82	2052.09	2031.52	2011.14	1991.04
1.A.1.c. Manufacture of solid fuels and	1358.44	1122.70	527.66	0.00	0.00	0.00	0.00
1.A.2. Manufacturing industries and cons	8380.94	8068.31	7335.09	7536.51	7748.87	8044.94	8078.91
1.A.3. Transport	22124.86	22451.28	25133.75	24279.68	23425.71	22682.62	21939.58
1.A.3.a. Domestic aviation	118.01	198.02	220.13	211.35	202.60	194.99	187.35
1.A.3.b. Road transportation	21490.97	21657.92	22667.07	20767.02	18867.02	17323.75	15780.52
1.A.3.c. Railways	345.39	429.04	1404.65	2249.37	3094.08	3908.55	4723.02
1.A.3.d. Domestic navigation	151.19	153.15	827.28	1037.92	1248.58	1242.40	1236.25
1.A.3.e. Other transportation	19.29	13.15	14.61	14.02	13.44	12.94	12.44
1.A.4. Other sectors	12153.19	12114.01	12142.77	11612.73	11219.06	10474.32	9991.53
1.A.4.a. Commercial/Institutional	2310.70	2398.08	2641.37	2534.15	2569.84	2499.48	2393.13
1.A.4.b. Residential	8170.98	7978.70	7785.39	7398.38	7007.10	6370.79	6032.37
1.A.4.c. Agriculture/Forestry/Fishing	1671.49	1737.23	1716.01	1680.19	1642.12	1604.04	1566.03
1.A.5. Other	1187.08	1146.30	1050.37	962.47	881.96	808.19	740.59
1.B. Fugitive emissions from fuels	4703.24	4435.65	3988.53	3331.15	3375.90	3404.40	3422.90
1.B.1. Solid fuels	1466.77	1187.73	700.01	0.00	0.00	0.00	0.00
1.B.2. Oil and natural gas and other emiss	3236.47	3247.92	3288.52	3331.15	3375.90	3404.40	3422.90
1.C. CO ₂ transport and storage	NO	0.00	0.00	0.00	0.00	0.00	0.00
2. Industrial processes	8461.48	7371.99	7623.12	6595.74	6211.78	6041.09	4981.00
2.A. Mineral Industry	4305.42	4300.96	4397.39	3422.10	3424.21	3392.66	2400.02
2.A.1. Cement production	3721.39	3718.00	3787.50	2880.00	2875.00	2910.00	1950.00
2.B. Chemical industry	390.05	393.85	414.67	417.11	401.92	397.97	393.95
2.C. Metal industry	1359.99	459.44	780.88	812.37	505.56	433.19	432.33
2.C.1. Iron and steel production	1244.59	360.75	691.29	728.62	427.47	427.04	426.45
2.D. Non-energy products from fuels and so	325.41	265.21	227.82	205.95	195.86	186.26	177.13
2.E. Electronics industry	NO	0.00	0.00	0.00	0.00	0.00	0.00
2.F. Product uses as substitutes for ODS (8)	2022.59	1891.45	1760.81	1708.86	1655.87	1603.38	1550.88
2.G. Other product manufacture and use	58.04	61.08	41.55	29.35	28.36	27.63	26.69
2.H. Other	NA,NO	0.00	0.00	0.00	0.00	0.00	0.00
3. Agriculture	17729.72	15782.65	15023.10	14252.14	13774.64	13627.35	13213.49
3.A. Enteric fermentation	8288.27	7337.96	6857.76	6531.28	6403.04	6339.76	6277.04
3.B. Manure management	1440.24	1467.92	1329.40	1165.93	1086.82	1031.56	984.53
3.C. Rice cultivation	10.41	10.36	10.36	10.36	10.36	10.36	10.36
3.D. Agricultural soils	7249.89	6847.60	6712.45	6436.85	6171.85	6148.00	5848.55
3.E. Prescribed burning of savannahs	NO	0.00	0.00	0.00	0.00	0.00	0.00
3.F. Field burning of agricultural residues	613.58	0.00	0.00	0.00	0.00	0.00	0.00
3.G. Liming	45.57	44.66	42.51	40.46	38.52	36.67	34.91
3.H. Urea application	81.75	74.15	70.62	67.26	64.05	61.00	58.10
3.I. Other carbon-containing fertilizers	NO	0.00		0.00	0.00	0.00	0.00
3.J. Other (please specify)	NO	0.00		0.00	0.00	0.00	0.00
4. Land Use, Land-Use Change and Forestry (LULUCF)	-45740.87	-45818.14	-38055.77	-28649.88	-27319.23	-27180.94	-27019.55
4.A. Forest land	-28861.91	-28251.43	-27277.37	-26992.31	-26635.91	-26478.76	-26339.26
4.B. Cropland	-14830.53	-15460.16	-15082.75	-4435.28	-4380.25	-4510.11	-4510.11
4.C. Grassland	-1340.23	-278.41	6106.76	4587.44	5527.54	5635.50	5635.48
4.D. Wetlands	-248.30	-211.32	-95.27	-39.61	-3.55	0.23	0.23
4.E. Settlements	660.40	639.75	528.38	469.87	426.10	426.14	426.13
4.F. Other Land	-26.79	100.93	72.52	35.14	-5.55	-30.70	-30.70
4.G. Harvested wood products	-1093.50	-2357.51	-2308.04	-2275.13	-2247.61	-2223.23	-2201.33
4.H. Other	NO	NO	NO	NO	NO	NO	NO
4.I. Atmospheric deposition							
4.J. Nitrogen leaching and run-off							
5. Waste	6319.56	5221.57	3988.53	2896.78	2608.33	2430.50	2298.25
5.A. Solid Waste Disposal	4406.62	3308.22	2070.07	983.65	699.20	524.40	393.30
5.B. Biological treatment of solid waste	76.65	84.34	105.42	115.95	127.62	140.12	154.36
5.C. Incineration and open burning of waste	6.46	6.45	6.45	6.43	6.43	6.43	6.43
5.D. Wastewater treatment and discharge	1829.83	1822.57	1806.59	1790.75	1775.08	1759.55	1744.16
5.E. Other (please specify)	NA	NA	NA	NA	NA	NA	NA

Table III-43 Greenhouse gas emissions (kt CO_{2eq}) in the WAM scenario, 2025-2050

Category	2023	2025	2030	2035	2040	2045	2050
	Inventory	Projections					
Total excluding LULUCF	97865.16	93879.75	80706.86	75825.52	70900.64	69147.64	65936.65
Total including LULUCF	52124.29	47203.03	40691.77	44323.78	39992.46	37893.30	34173.75
1. Energy	65354.60	66120.58	55314.36	52936.52	49095.83	47821.18	46155.87
1.A. Fuel combustion	60651.35	61684.94	51325.83	49605.37	45719.93	44416.78	42732.97
1.A.1. Energy industries	16805.29	17905.16	12974.14	11779.56	8033.00	7851.14	7676.14
1.A.1.a. Public electricity and heat prod	13715.44	14791.30	10373.68	9727.46	6001.48	5840.00	5685.11
1.A.1.b. Petroleum refining	1731.42	1991.16	2072.82	2052.09	2031.52	2011.14	1991.04
1.A.1.c. Manufacture of solid fuels and	1358.44	1122.70	527.64	0.00	0.00	0.00	0.00
1.A.2. Manufacturing industries and cons	8380.94	8068.31	7335.09	7536.51	7748.87	8044.94	8078.91
1.A.3. Transport	22124.86	22451.20	18076.23	18836.65	19597.06	19027.23	18457.47
1.A.3.a. Domestic aviation	118.01	198.00	158.31	163.90	169.47	163.53	157.62
1.A.3.b. Road transportation	21490.97	21657.90	16302.12	16042.71	15783.33	14529.57	13275.84
1.A.3.c. Railways	345.39	429.02	1010.34	1799.42	2588.50	3281.01	3973.51
1.A.3.d. Domestic navigation	151.19	153.13	594.96	819.73	1044.51	1042.26	1040.03
1.A.3.e. Other transportation	19.29	13.14	10.51	10.88	11.25	10.86	10.46
1.A.4. Other sectors	12153.19	12113.97	11890.01	10490.19	9459.04	8685.28	7779.87
1.A.4.a. Commercial/Institutional	2310.70	2398.08	2613.45	2430.31	2311.41	2276.21	2094.25
1.A.4.b. Residential	8170.98	7978.67	7560.58	6379.68	5505.51	4805.02	4119.60
1.A.4.c. Agriculture/Forestry/Fishing	1671.49	1737.22	1715.98	1680.19	1642.12	1604.04	1566.03
1.A.5. Other	1187.08	1146.29	1050.36	962.47	881.96	808.19	740.59
1.B. Fugitive emissions from fuels	4703.24	4435.65	3988.53	3331.15	3375.90	3404.40	3422.90
1.B.1. Solid fuels	1466.77	1187.73	700.01	0.00	0.00	0.00	0.00
1.B.2. Oil and natural gas and other emiss	3236.47	3247.92	3288.52	3331.15	3375.90	3404.40	3422.90
1.C. CO ₂ transport and storage	NO	0.00	0.00	0.00	0.00	0.00	0.00
2. Industrial processes	8461.48	7371.99	7623.12	6595.82	6211.94	6041.13	4981.16
2.A. Mineral industry	4305.42	4300.96	4397.39	3422.10	3424.21	3392.66	2400.02
2.A.1. Cement production	3721.39	3718.00	3787.50	2880.00	2875.00	2910.00	1950.00
2.B. Chemical industry	390.05	393.85	414.67	417.11	401.92	397.97	393.95
2.C. Metal industry	1359.99	459.44	780.88	812.37	505.56	433.19	432.33
2.C.1. Iron and steel production	1244.59	360.75	691.29	728.62	427.47	427.04	426.45
2.D. Non-energy products from fuels and so	325.41	265.21	227.82	205.95	195.86	186.26	177.13
2.E. Electronics industry	NO	0.00	0.00	0.00	0.00	0.00	0.00
2.F. Product uses as substitutes for ODS (8)	2022.59	1891.45	1760.81	1708.86	1655.87	1603.38	1550.88
2.G. Other product manufacture and use	58.04	61.08	41.55	29.43	28.52	27.67	26.85
2.H. Other	NA,NO	0.00	0.00	0.00	0.00	0.00	0.00
3. Agriculture	17729.72	15438.87	14531.34	13759.20	13249.71	13045.68	12636.02
3.A. Enteric fermentation	8288.27	7095.20	6534.64	6223.28	6222.72	6161.12	6100.08
3.B. Manure management	1440.24	1420.63	1214.46	1034.66	930.99	872.93	820.45
3.C. Rice cultivation	10.41	10.36	10.36	10.36	10.36	10.36	10.36
3.D. Agricultural soils	7249.89	6794.60	6659.45	6383.85	5983.70	5904.20	5612.70
3.E. Prescribed burning of savannahs	NO	0.00	0.00	0.00	0.00	0.00	0.00
3.F. Field burning of agricultural residues	613.58	0.00	0.00	0.00	0.00	0.00	0.00
3.G. Liming	45.57	44.66	42.51	40.46	38.52	36.67	34.91
3.H. Urea application	81.75	73.42	69.92	66.59	63.42	60.40	57.52
3.I. Other carbon-containing fertilizers	NO	0.00	0.00	0.00	0.00	0.00	0.00
3.J. Other (please specify)	NO	0.00	0.00	0.00	0.00	0.00	0.00
4. Land Use, Land-Use Change and Forestry (LULUCF)	-45740.87	-46676.72	-40015.08	-31501.74	-30908.17	-31254.34	-31762.90
4.A. Forest land	-28861.91	-28503.56	-28246.08	-28470.78	-28529.52	-28566.48	-28839.52
4.B. Cropland	-14830.53	-15506.40	-15088.13	-4441.34	-4380.25	-4510.11	-4510.11
4.C. Grassland	-1340.23	-267.87	6117.30	4587.44	5527.54	5635.50	5635.48
4.D. Wetlands	-248.30	-211.32	-95.27	-39.61	-3.55	0.23	0.23
4.E. Settlements	660.40	639.75	528.38	469.87	426.10	426.14	426.13
4.F. Other Land	-26.79	100.93	72.52	35.14	-5.55	-30.70	-30.70
4.G. Harvested wood products	-1093.50	-2928.26	-3303.80	-3642.46	-3942.94	-4208.91	-4444.41
4.H. Other	NO	NO	NO	NO	NO	NO	NO
4.I. Atmospheric deposition							
4.J. Nitrogen leaching and run-off							
5. Waste	6319.56	4948.31	3238.04	2533.98	2343.15	2239.64	2163.59
5.A. Solid Waste Disposal	4406.62	3031.99	1310.45	603.84	414.34	310.75	233.06
5.B. Biological treatment of solid waste	76.65	85.82	111.57	128.45	141.32	155.44	170.99
5.C. Incineration and open burning of waste	6.46	6.43	6.43	6.43	6.43	6.43	6.43
5.D. Wastewater treatment and discharge	1829.83	1824.07	1809.59	1795.26	1781.07	1767.02	1753.12
5.E. Other (please specify)	NA	0.00	0.00	0.00	0.00	0.00	0.00

Table III-44 Greenhouse gas emissions (kt CO_{2eq}) in the WOM scenario, 2025-2050

Category	2023	2025	2030	2035	2040	2045	2050
	Inventory	Projections					
Total excluding LULUCF	97865.16	141763.70	148248.41	156042.41	163602.92	166735.22	169783.30
Total including LULUCF	52124.29	114245.17	123790.85	133979.35	143253.65	147901.32	152299.82
1. Energy	65354.60	107199.23	111826.65	117410.46	123592.69	125139.96	126893.83
1.A. Fuel combustion	60651.35	96971.63	101599.05	107182.86	113365.10	114912.36	116666.23
1.A.1. Energy industries	16805.29	41022.72	41022.72	41022.72	41022.72	41022.72	41022.72
1.A.1.a. Public electricity and heat prod	13715.44	33579.05	33579.05	33579.05	33579.05	33579.05	33579.05
1.A.1.b. Petroleum refining	1731.42	3878.70	3878.70	3878.70	3878.70	3878.70	3878.70
1.A.1.c. Manufacture of solid fuels and	1358.44	3564.97	3564.97	3564.97	3564.97	3564.97	3564.97
1.A.2. Manufacturing industries and cons	8380.94	16952.76	16952.76	16952.76	16952.76	16952.76	16952.76
1.A.3. Transport	22124.86	22963.39	26557.00	31019.29	35983.03	36204.37	36513.13
1.A.3.a. Domestic aviation	118.01	342.58	393.96	460.04	533.18	533.82	534.13
1.A.3.b. Road transportation	21490.97	21488.19	24711.65	28851.92	33436.27	33485.46	33508.98
1.A.3.c. Railways	345.39	692.17	944.82	1115.72	1327.89	1498.77	1683.40
1.A.3.d. Domestic navigation	151.19	234.20	269.34	314.53	364.53	364.95	465.14
1.A.3.e. Other transportation	19.29	206.26	237.23	277.08	321.16	321.38	321.48
1.A.4. Other sectors	12153.19	14790.57	15824.38	16945.90	18164.40	19490.32	20935.43
1.A.4.a. Commercial/Institutional	2310.70	2775.63	2951.87	3139.32	3338.67	3550.70	3776.20
1.A.4.b. Residential	8170.98	10185.38	10764.82	11378.42	12028.29	12716.68	13445.98
1.A.4.c. Agriculture/Forestry/Fishing	1671.49	1829.56	2107.69	2428.17	2797.43	3222.94	3713.25
1.A.5. Other	1187.08	1242.19	1242.19	1242.19	1242.19	1242.19	1242.19
1.B. Fugitive emissions from fuels	4703.24	10227.60	10227.60	10227.60	10227.60	10227.60	10227.60
1.B.1. Solid fuels	1466.77	4779.06	4779.06	4779.06	4779.06	4779.06	4779.06
1.B.2. Oil and natural gas and other emiss	3236.47	5448.54	5448.54	5448.54	5448.54	5448.54	5448.54
1.C. CO2 transport and storage	NO	NO	NO	NO	NO	NO	NO
2. Industrial processes	8461.48	10931.91	11841.12	12383.92	12491.06	12526.93	12562.50
2.A. Mineral Industry	4305.42	4810.47	5095.40	5154.16	5214.12	5262.75	5315.86
2.A.1. Cement production	3721.39	3782.35	4007.18	4052.14	4099.75	4136.78	4179.10
2.B. Chemical industry	390.05	624.37	640.79	647.72	624.97	616.43	605.49
2.C. Metal industry	1359.99	649.65	1014.47	1386.04	1380.60	1377.40	1371.81
2.C.1. Iron and steel production	1244.59	424.36	796.91	1172.31	1170.71	1169.43	1167.67
2.D. Non-energy products from fuels and so	325.41	1480.22	1540.39	1602.99	1668.14	1668.14	1668.14
2.E. Electronics industry	NO	NO	NO	NO	NO	NO	NO
2.F. Product uses as substitutes for ODS (8)	2022.59	3303.99	3506.96	3562.34	3573.42	3573.42	3573.42
2.G. Other product manufacture and use	58.04	63.21	43.12	30.69	29.81	28.80	27.79
2.H. Other	NA,NO	NO	NO	NO	NO	NO	NO
3. Agriculture	17729.72	16198.61	16934.22	18376.18	19407.92	20702.84	21691.28
3.A. Enteric fermentation	8288.27	7411.32	7914.76	8782.20	9400.16	10120.32	10862.60
3.B. Manure management	1440.24	1495.71	1598.19	1788.63	1916.38	2096.46	2257.99
3.C. Rice cultivation	10.41	10.36	10.36	10.36	10.36	10.36	10.36
3.D. Agricultural soils	7249.89	7136.45	7263.65	7645.25	7928.80	8321.00	8403.15
3.E. Prescribed burning of savannahs	NO	NO	NO	NO	NO	NO	NO
3.F. Field burning of agricultural residues	613.58	NO	NO	NO	NO	NO	NO
3.G. Liming	45.57	58.89	58.44	57.99	57.54	57.08	56.63
3.H. Urea application	81.75	85.88	88.82	91.75	94.68	97.62	100.55
3.I. Other carbon-containing fertilizers	NO	NO	NO	NO	NO	NO	NO
3.J. Other (please specify)	NO	NO	NO	NO	NO	NO	NO
4. Land Use, Land-Use Change and Forestry (LULUCF)	-45740.87	-27518.52	-24457.56	-22063.06	-20349.28	-18833.91	-17483.48
4.A. Forest land	-28861.91	-27272.74	-25770.14	-24489.02	-23370.58	-22343.00	-21371.72
4.B. Cropland	-14830.53	-8101.31	-7719.75	-6348.39	-6402.35	-6547.73	-6548.04
4.C. Grassland	-1340.23	9199.44	9786.64	9053.15	9292.71	9535.47	9533.27
4.D. Wetlands	-248.30	-272.97	-188.88	-165.17	-161.07	-176.47	-176.47
4.E. Settlements	660.40	720.91	613.33	550.81	510.96	510.87	509.57
4.F. Other Land	-26.79	102.89	73.42	34.98	-6.77	-32.55	-32.55
4.G. Harvested wood products	-1093.50	-1894.75	-1252.18	-699.43	-212.20	219.50	602.46
4.H. Other	NO	NO	NO	NO	NO	NO	NO
4.I. Atmospheric deposition							
4.J. Nitrogen leaching and run-off							
5. Waste	6319.56	7433.95	7646.43	7871.85	8111.25	8365.49	8635.69
5.A. Solid Waste Disposal	4406.62	3771.34	3983.81	4209.24	4448.64	4702.88	4973.08
5.B. Biological treatment of solid waste	76.65	142.18	142.18	142.18	142.18	142.18	142.18
5.C. Incineration and open burning of waste	6.46	97.57	97.57	97.57	97.57	97.57	97.57
5.D. Wastewater treatment and discharge	1829.83	3422.86	3422.86	3422.86	3422.86	3422.86	3422.86
5.E. Other (please specify)	NA	NA	NA	NA	NA	NA	NA

The total GHG emissions (including LULUCF) in the analysed scenarios are presented in the following table. In 2030, in the WEM scenario, the estimated reductions compared to the WOM scenario are 72587 kt CO_{2e}, and the difference between emissions in the WEM scenario and the WAM scenario is 10511 kt CO_{2e}.

In 2040, in the WEM scenario, the estimated reductions compared to the WOM scenario are 93293 kt CO_{2e}, and the difference between emissions in the WEM scenario and the WAM scenario is 9967 kt CO_{2e}.

In 2050, in the WEM scenario, the estimated reductions compared to the WOM scenario are 106977 kt CO_{2e}, and the difference between emissions in the WEM scenario and the WAM scenario is 11149 kt CO_{2e}.

Table III-45 Total GHG emissions (including LULUCF) in the analysed scenarios, 2025-2050

	2005	2025	2030	2035	2040	2045	2050
WOM	111266.53	114245.17	123790.85	133979.35	143253.65	147901.32	152299.82
WEM	111266.53	48678.78	51203.66	54596.86	49960.01	48183.61	45322.82
WAM	111266.53	47203.03	40691.77	44323.78	39992.46	37893.30	34173.75
Difference WOM vs WEM	0.00	65566.40	72587.19	79382.49	93293.64	99717.71	106977.00
Difference WEM vs WAM	0.00	1475.75	10511.88	10273.08	9967.54	10290.31	11149.07

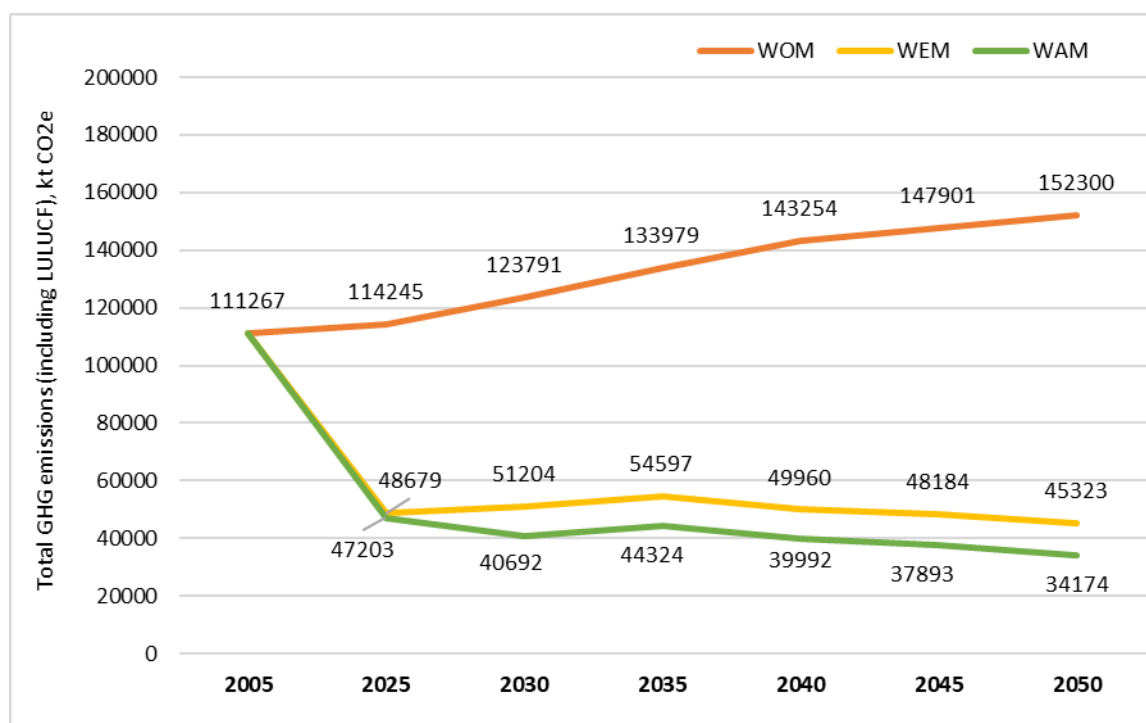


Figure III-42 Total GHG emissions (including LULUCF) in the analysed scenarios, 2025-2050

The total GHG emissions (excluding LULUCF) in the scenarios analysed are presented in the following table. In 2030, in the WEM scenario, the estimated reductions compared to the WOM scenario are 58988 kt CO_{2e}, and the difference between emissions in the WEM scenario and the WAM scenario is 8552 kt CO_{2e}.

In 2040, in the WEM scenario, the estimated reductions compared to the WOM scenario are 86323 kt CO_{2e}, and the difference between emissions in the WEM scenario and the WAM scenario is 6378 kt CO_{2e}.

In 2050, in the WEM scenario, the estimated reductions compared to the WOM scenario are 97440 kt CO_{2e}, and the difference between emissions in the WEM scenario and the WAM scenario is 6405 kt CO_{2e}.

Table III-46 Total GHG emissions (excluding LULUCF) in the analysed scenarios, 2025-2050

	2005	2025	2030	2035	2040	2045	2050
WOM	142224.62	141763.70	148248.41	156042.41	163602.92	166735.22	169783.30
WEM	142224.62	94496.91	89259.42	83246.74	77279.24	75364.54	72342.37
WAM	142224.62	93879.75	80706.85	75825.52	70900.63	69147.64	65936.65
Difference WOM vs WEM	0.00	47266.78	58988.98	72795.67	86323.68	91370.68	97440.92
Difference WEM vs WAM	0.00	617.16	8552.57	7421.22	6378.60	6216.90	6405.72

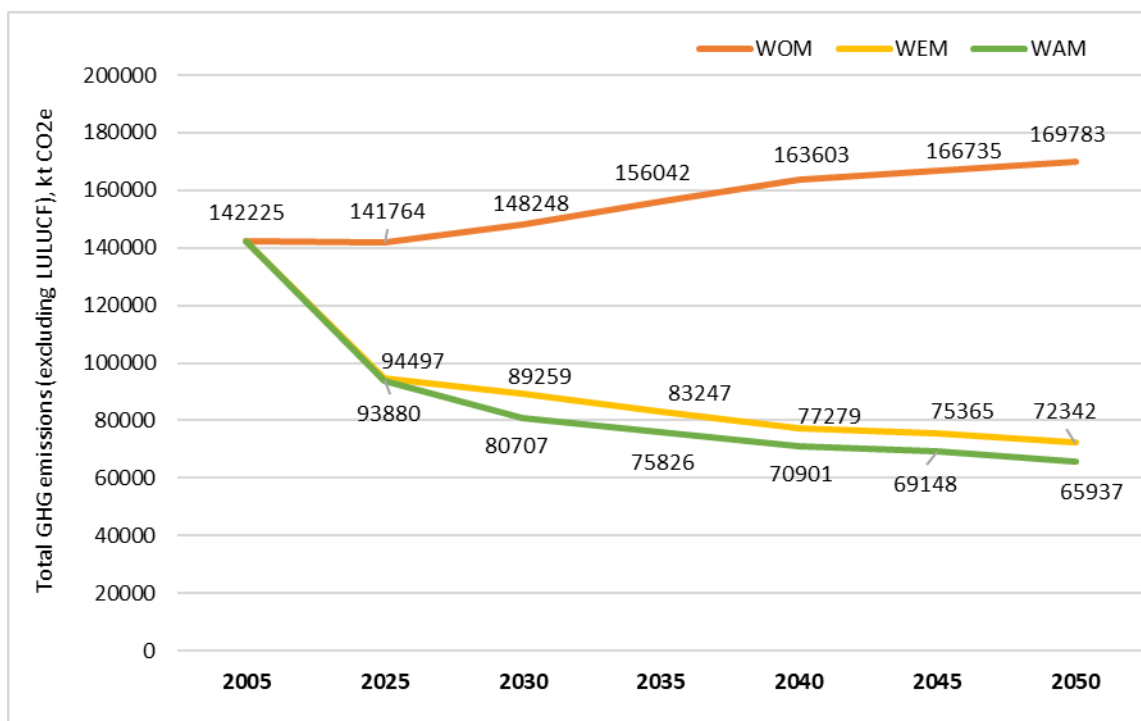


Figure III-43 Total GHG emissions (excluding LULUCF) in the analysed scenarios, 2025-2050

GREENHOUSE GAS EMISSIONS DISAGGREGATED BY ETS AND ESR SECTORS

The projected GHG emissions were calculated taking into account the data reported in the latest National Greenhouse Gas Inventory (2025), applying the global warming potential defined in the IPCC Fifth Assessment Report (AR5).

The contribution of PAMs reported in the WEM and WAM projection scenarios is presented in the following tables.

Table III-47 Contribution of implemented PAMs, WEM scenario

Category	2023	2025	2030	2035	2040	2045	2050
Total (without LULUCF)	97865	94497	89259	83247	77279	75365	72342
ETS	23803	24272	20353	18830	15115	14961	13819
Domestic aviation	117	196	218	210	201	193	186
ESR	73945	70029	68688	64207	61963	60210	58338
LULUCF	-45741	-45818	-38056	-28650	-27319	-27181	-27020

Table III-48 Contribution of implemented PAMs, WAM scenario

Category	2023	2025	2030	2035	2040	2045	2050
Total (without LULUCF)	97865	93880	80707	75826	70901	69148	65937
ETS	23803	24272	20353	18830	15115	14961	13819
Domestic aviation	117	196	157	163	168	162	156
ESR	73945	69412	60197	56833	55618	54025	51961
LULUCF	-45741	-46677	-40015	-31502	-30908	-31254	-31763

In the WEM scenario, it is estimated that the ESR sectors will reach a level of 68 688 kt CO₂eq in 2030. This means that Romania is not on track to achieve its 2030 target of 68 299.811 kt CO₂eq (corresponding to a 12.7% reduction in GHG emissions compared to the 2005 reference year, in accordance with the provisions of the ESR). In the WAM scenario with additional measures, the ESR sectors are projected to reach 60197 kt CO₂eq in 2030, which means that in this scenario, Romania would be on track to meet its 2030 target.

SENSITIVITY ANALYSIS OF GHG EMISSION PROJECTIONS TO CHANGES IN ROMANIA'S ECONOMIC AND SOCIAL DEVELOPMENT

The development of GHG emission forecasts is based on assumptions regarding macroeconomic indicators that carry a high degree of uncertainty over the projection horizon up to the year 2055, due to national and global economic challenges resulting from the war in Ukraine, international conflicts, and the absence of long-term strategies for the 2030–2055 period regarding industry, agriculture, transport, etc.

Romania's National Recovery and Resilience Plan (PNRR), a strategic national document, has established the investment areas and priorities, as well as the reforms developed for each investment sector, in line with the Council Implementing Decision of 17 November 2025 amending the Decision of 29 October 2021 approving the assessment of Romania's Recovery and Resilience Plan and with the European Commission Regulations that provide financing for the general objective of improving Romania's economic condition and ensuring long-term economic growth. Economic development is a dominant factor affecting forecast results.

From the PNRR's general objective stem a series of specific objectives concerning:

- Investments in infrastructure aimed at developing sector-specific infrastructure in areas considered strategic for Romania, such as transport, climate change, energy and renewable energy, environment, energy efficiency, modernisation of local public services, health, and education;
- Investments in digitalisation and the green transition, intended to align Romania with the objectives set by the European Union;
- Investments in business competitiveness and access to research and innovation aimed at strengthening the economic competitiveness of SMEs on the European market, increasing added value, improving the quality of products and services, upgrading technology, robotisation and automation of industrial processes, digitalisation of SMEs' activities, as well as developing research, innovation and smart specialisation activities by national research and development institutes and SMEs, with the ultimate goal of bringing competitive products and services to market that meet consumers' quality and price requirements.

The sensitivity analysis of GHG emission forecasts to changes in Romania's economic and social development was carried out by considering three scenarios: the baseline scenario, for which the National Commission for Strategy and Forecasting provided data on economic indicators and the energy balance for the period 2025–2055, and the minimum and maximum scenarios regarding Romania's economic development.

The sensitivity analysis focuses on economic development as the impact of other factors is substantially smaller.

Considering that approximately 67% of total GHG emissions in Romania result from fuel combustion, the sensitivity analysis concentrates on GHG emissions from the energy sector.

Table III-49 presents the main macroeconomic and energy indicators considered in the sensitivity analysis for the alternative scenarios compared to the baseline scenario. Population trends are assumed to remain the same across all three scenarios. The evolution of macroeconomic indicators determines changes in energy and electricity consumption, with significant impacts on GHG emissions.

Table III-49 Evolution of macroeconomic and energy indicators in the period 2023–2050

Scenario	Indicator	U.M	Year						
			2023	2025	2030	2035	2040	2045	2050
			Achieved	Forecast					
MINIMUM	Gross Domestic Product	10 ⁹ Euro ₂₀₂₃	288.7	312.6	345.5	379.8	412.2	442.9	473.8
	Primary energy consumption	10 ⁶ toe	32.171	29.579	29.228	29.069	29.181	29.499	29.199
	Final energy consumption	10 ⁶ toe	23.513	22.432	23.682	23.409	23.412	23.522	23.230
	Gross electricity consumption	TWh	54.68	56.17	60.03	66.75	69.75	72.75	74.65
MEDIUM	Gross Domestic Product	10 ⁹ Euro ₂₀₂₃	288.7	329.1	363.7	399.8	433.9	466.2	498.7
	Primary energy consumption	10 ⁶ toe	32.171	30.811	30.446	30.599	30.717	30.729	30.728
	Final energy consumption	10 ⁶ toe	23.513	23.616	24.939	24.512	24.508	24.503	24.453
	Gross electricity consumption	TWh	54.68	57.25	66.70	70.09	73.60	79.50	81.50
MAXIMUM	Gross Domestic Product	10 ⁹ Euro ₂₀₂₃	288.7	345.6	381.9	419.8	455.5	489.5	523.6
	Primary energy consumption	10 ⁶ toe	32.171	31.925	30.989	31.212	31.431	31.787	31.989
	Final energy consumption	10 ⁶ toe	23.513	23.701	24.519	24.782	24.821	24.898	24.965
	Gross electricity consumption	TWh	54.68	59.75	69.85	73.65	77.85	80.45	84.22

The assumptions regarding macroeconomic restructuring in the period 2023–2050 for the alternative scenarios considered in the sensitivity analyses are presented in Table III-50.

Table III-50 Evolution of the Gross Value-Added structure during 2023–2050

Scenario	Gross Value Added	Year						
		2023	2025	2030	2035	2040	2045	2050
		Achieved	Forecast					
MINIMUM	TOTAL GDP	100%	100%	100%	100%	100%	100%	100%
	Industry	20.0	20.5	20.1	19.5	19.0	18.8	18.5
	Agriculture	4.1	5.5	5.0	4.5	4.0	3.5	3.0
	Construction	6.5	7.0	7.5	7.75	8.0	8.1	8.2
	Services	60.1	60.4	62.1	60.9	60.1	59.9	60.0

MEDIUM	TOTAL GDP	100%	100%	100%	100%	100%	100%	100%
	Industry	20.0	18.7	18.5	18.6	18.6	18.5	18.4
	Agriculture	4.1	3.8	3.7	3.5	3.3	3.1	2.9
	Construction	6.5	7.6	8.1	8.3	8.2	8.1	8.3
	Services	60.1	60.3	59.6	59.6	59.7	60.1	60.4
MAXIMUM	TOTAL GDP	100%	100%	100%	100%	100%	100%	100%
	Industry	20.0	20.5	19.5	19.0	19.0	18.8	18.5
	Agriculture	4.1	4.2	3.9	3.7	3.5	3.3	3.1
	Construction	6.5	8.0	8.3	8.3	8.3	8.4	8.5
	Services	60.1	59.9	59.8	59.7	60.1	60.8	60.9

Table III-51 presents the evolution of GHG emissions in the period 2023 - 2050 for the three analysed scenarios (the reference scenario and the minimum and maximum scenarios).

Table III-51 Evolution of GHG emissions in the period 2023 – 2050 (CO₂eq)

Scenario	Indicator	Year						
		2023	2025	2030	2035	2040	2045	2050
		Achieved	Forecast					
MINIMUM	A. Fuel Combustion	60651.16	56053.18	56742.38	51704.01	50371.85	49008.59	47717.90
	A1 Energy Industry	16805.45	12584.17	11509.57	7994.24	7785.24	7557.15	7594.34
	A2 Manufacturing Industry and Construction	8380.94	8028.21	7155.20	7236.28	7449.31	7756.45	7879.31
	A3 Transport	22124.86	22200.56	24933.27	23989.15	23215.50	22482.55	21639.63
	A4 Other sectors	12153.19	12094.14	12095.22	11539.12	11043.25	10407.22	9899.12
	A5 Others	1187.08	1146.10	1049.12	945.22	878.55	805.22	735.50
	A. Fuel Combustion	60651.16	61685.13	58636.22	55994.44	51308.76	49861.41	48426.89
MEDIUM	A1 Energy Industry	16805.45	12974.21	11779.57	8033.03	78851.19	7676.18	7489.65
	A2 Manufacturing Industry and Construction	8380.94	8068.34	7335.11	7536.53	7744.87	8044.94	8078.91
	A3 Transport	22124.86	22451.28	25133.73	24103.08	23425.77	22682.70	21939.63
	A4 Other sectors	12153.19	12114.01	12142.78	11612.77	11219.12	10474.38	9991.58
	A5 Others	1187.08	1146.30	1050.38	962.49	881.97	808.19	740.60
	A. Fuel Combustion	60651.16	57035.04	58096.54	52635.88	51766.28	50383.84	48775.56
	A1 Energy Industry	16805.45	12999.21	11499.24	8012.37	7978.15	8001.2	7678.23
MAXIMUM	A2 Manufacturing Industry and Construction	8380.94	8080.34	7460.55	7739.87	7998.28	8197.34	8211.85
	A3 Transport	22124.86	22654.24	25989.12	24095.15	23475.25	22878.50	22139.90
	A4 Other sectors	12153.19	12154.35	12192.45	11789.25	11413.25	10494.45	9999.68
	A5 Others	1187.08	1146.90	1055.18	999.24	901.35	812.35	745.90

The sensitivity analysis for fuel combustion in the energy sector (energy industry, manufacturing and construction, transport and other sectors) in relation to national economic development allows the following conclusions:

- CO₂ emissions increase with GDP growth and decrease with GDP decline. However, the increase in emissions in the maximum scenario is smaller than the decrease in the minimum scenario, considering that higher GDP allows for more funds available for new technologies
- In the manufacturing and construction sectors, emissions also increase with GDP, but the increase is smaller than the decrease in the minimum scenario, demonstrating the availability of funds for environmental protection and energy efficiency improvements
- In the transport sector, in the maximum scenario, the increase in emissions with GDP growth is smaller than the decrease in the minimum scenario. Although higher living standards lead to increased mobility, funds are available for fleet renewal with high-performance vehicles (low-emission vehicles, electric cars);
- The structure of the electricity generation fleet does not differ significantly across scenarios. Emission differences in this sector mainly depend on the demand for electricity and thermal energy that must be met
- The impact on emissions in other sectors, such as residential, agriculture and services, is not significant.

Sensitivity analysis of GHG emission projections of the Land Use, Land Use Change and Forestry sector

Sensitivity analysis is a methodological tool used to assess how changes in input parameters influence the output of a model. In the context of GHG emissions projections, it helps identify which assumptions or variables most significantly impact the results, thereby guiding data collection priorities, policy focus, and uncertainty communication.

The sensitivity analysis applies a one-at-a-time approach, i.e. varying one parameter while holding others constant, and it is provided for WEM scenario.

For this submission of projections of the LULUCF sector, the impact of different assumptions with regards to the agriculture policies affecting soil organic carbon in cropland have been assessed.

The focus on soil organic carbon is due to the significance of this pool for cropland, Figure III-44.

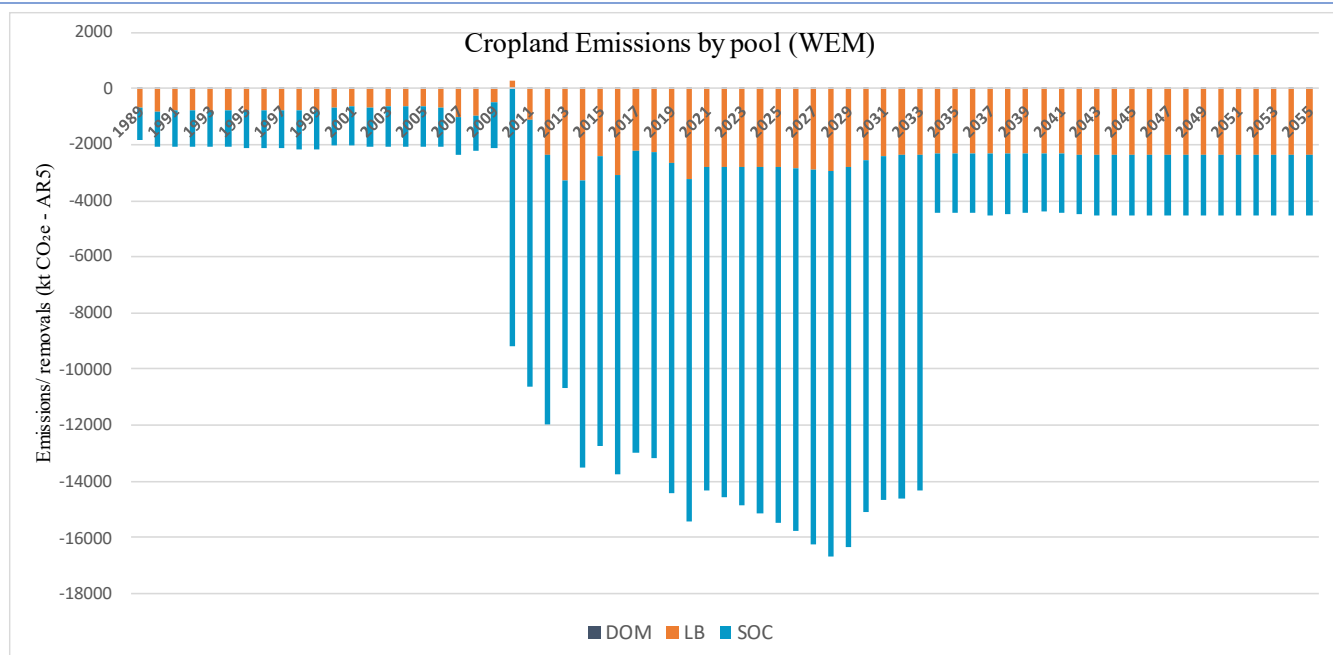


Figure III-44 Historical (1989-2023) and projected (2024-2055) emissions and removals from the Cropland category broken down by pool under the "with existing measures" (WEM) scenario

The impact of the APIA payments on SOC was assessed by decreasing the area of cropland that is affected by the policy since year 2024 by 10%. This results in a decrease in net SOC removals in cropland in the period 2024-2038 compared to the WEM scenario, i.e. 20 years after the APIA payment measures are considered more widely adopted in 2019, Figure III-45. The impact decreases across the period, from 1.6% to 0.16% decrease of removals between 2024-2038. This is driven by the decreasing difference between the areas of arable cropland remaining arable cropland in the WEM and WEM sensitivity scenarios from 2024-2038, Figure III-46.

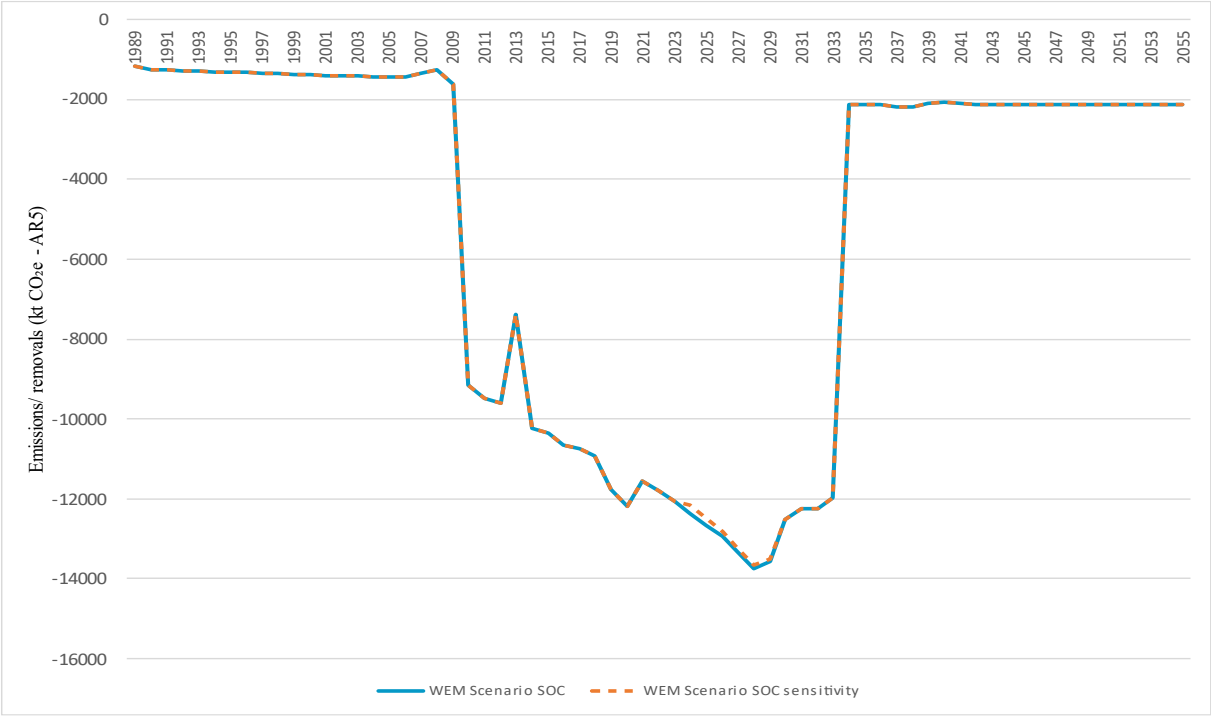


Figure III-45 Historical (1989-2023) and projected (2024-2055) emissions and removals from the SOC pool in Cropland category under the "with existing measures" (WEM) scenario and with a 10% decrease in area affected by the policy

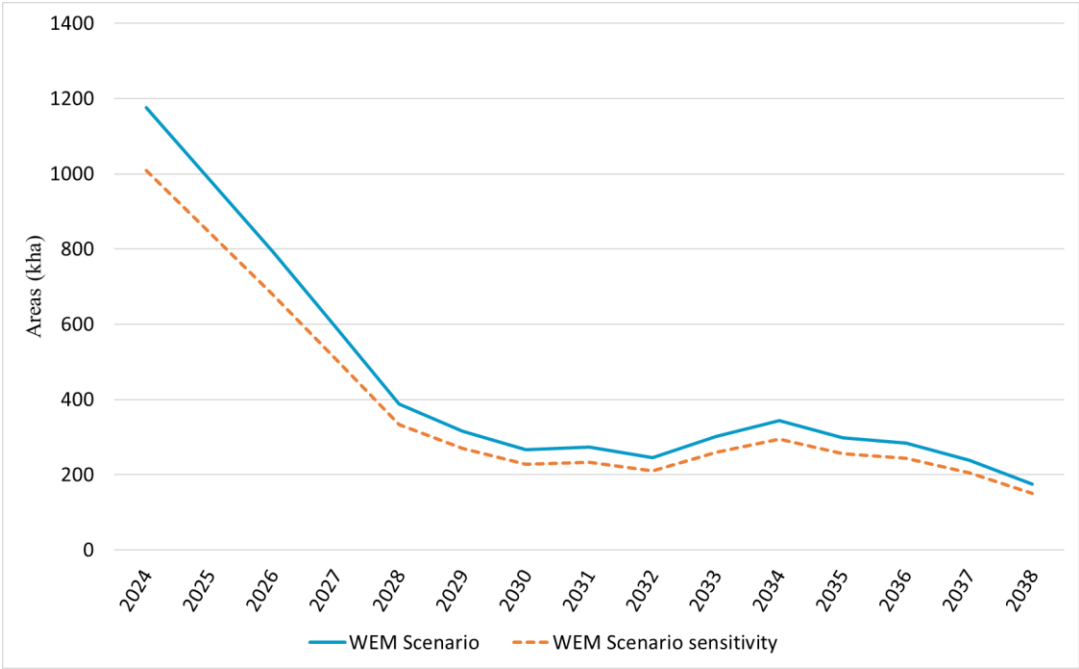


Figure III-46 Projected (2024-2038) areas of Cropland arable remaining Cropland under the "with existing measures" (WEM) scenario and with a 10% decrease in area affected by the policy

IV. Information related to climate change impacts and adaptation under Article 7 of the Paris Agreement

Introduction⁵⁰

Romania's climate is temperate-continental transitional, marked by some oceanic, continental, Scandinavian-Baltic, sub-Mediterranean, and Pontic climatic influences. Thus, in Banat and Oltenia, the Mediterranean influence is noticeable, characterized by mild winters and higher rainfall (especially in autumn). In Dobrogea, the Pontic influence is evident, with rare but torrential rains.

In the eastern regions of the country, the continental character is more pronounced. In the northern part of the country (Maramureş and Bucovina), the effects of the Scandinavian-Baltic influence are evident, resulting in a wetter and colder climate with frosty winters. In the west of the country, the influence of low-pressure systems generated over the Atlantic is more pronounced, resulting in more moderate temperatures and higher precipitation.

Climatic nuances are also evident at different altitudes, with the Carpathian mountain ranges experiencing a cool mountain climate with high humidity throughout the year.

Climate change is already evident at the global and European levels, including in Romania, and adapting to the effects of climate change to reduce its impact on the economy, the environment, and the population has become as important as reducing greenhouse gas emissions.

According to the National Meteorological Administration (www.meteoromania.ro), 2025 was the fourth warmest year in Romania since 1901, with an annual average temperature of 12.0 °C, representing a +1.2 °C anomaly compared to the 1991–2020 reference period. The years 2012–2025 form the warmest 14-year period on record, confirming a persistent warming trend. In 2025, nine months recorded positive temperature anomalies, with winter months exceeding +3 °C and a peak of +3.9 °C in January. July 2025 was marked by extreme heat, with six red-code warnings issued and a maximum temperature of 43.4 °C recorded on July 26 in Calafat, in the southern part of the country.

From a precipitation perspective, seven months were dry, and June was the driest month on record, with a 78% rainfall deficit. The summer of 2025 ranked as the fourth driest, and by the end of August, severe to extreme soil drought affected almost the entire country.

Conversely, five months recorded above-average rainfall, with May having the highest monthly precipitation and October setting new records for that time of year.

Overall, 2025 saw a high number of meteorological warnings, reflecting an increase in the intensity, frequency, and impact of hazardous weather events in Romania.

Temperature increases are not uniform; depending on local factors, they vary by region and season. For example, since 1961, average air temperatures have risen by 2-3 degrees Celsius in summer in southern regions of the

⁵⁰ The information provided in this chapter is largely based on the RO-Adapt Project Reports, which formed the basis for the development of the National Strategy on Adaptation to Climate Change for the period 2024-2030 with a perspective to 2050 (SNASC) and the National Action Plan for the Implementation of the Strategy (PNASC): <https://mmediu.ro/en/programe-de-finantare/poca/sipoca-610-ro-adapt/mmap-in-calitate-de-lider-in-parteneriat-cu-anpm-gnm-anap-si-universitatea-bucuresti-implementeaza-proiectul-consolidarea-capacitatii-institutionale-pentru-imbunatatirea-politicilor-din-domeniul-schi/>

country. Data analysis also indicates that 9 of the 10 warmest years between 1900 and 2019 were recorded between 2000 and 2019, except 1994 (see table below). The period 2015-2019 recorded the five hottest consecutive years, and the decade 2010-2019 is the hottest decade in the history of meteorological measurements.

Table IV-1 The ten warmest years between 1900 and 2019⁵¹

No	Year	Average annual air temperature (°C)	Deviation
1	2019	12.1	1.9207
2	2015	11.7	1.7087
3	2007	11.7	1.6637
4	2018	11.6	1.5655
5	2014	11.4	1.3524
6	1994	11.4	1.3464
7	2009	11.3	1.2688
8	2013	11.2	1.2262
9	2012	11.2	1.2254
10	2008	11.2	1.2182

Studies to date clearly show that: Romania is undergoing a process of warming that is underway; changes are occurring in the distribution and quantity of precipitation, varying according to season and region; extreme events (heat waves, intense precipitation, droughts, etc.) are becoming more frequent, longer, and more severe, causing significant material damage and loss of life.

Following a detailed analysis of historical data and observations (covering at least 60 years) from the national climate monitoring network, carried out as part of the RO-Adapt project, which formed the basis for the development of the National Strategy on Adaptation to Climate Change and the National Action Plan for its implementation, it was possible to:

- describe climate change at the national, regional, and local levels;
- highlight trends for each climate parameter (temperature, precipitation, etc.).

Between 1961 and 2020, Romania experienced a statistically significant warming trend, which was generally more pronounced during the day and affected all development regions.

The average annual air temperature has increased by 0.21-0.44°C/decade, corresponding to a warming rate of between 1.3°C and 2.6°C over the entire period. This warming signal is robust at all spatial scales (national, regional, and local - UAT), with a statistical significance of at least 95%.

The maximum air temperature shows statistically significant increases across the country, ranging from 0.18 to 0.51°C/decade, corresponding to a warming of 1.1-3.1°C for the entire period analysed. The climate signal emerging from the analysis of **minimum air temperature** data also reveals an ongoing warming process, widespread across all regions and statistically significant, but less pronounced in magnitude than that estimated

⁵¹ Report A2.5 - RO-Adapt: https://mmediu.ro/app/webroot/uploads/files/A2.5_RaportIntegrat.pdf

for maximum temperature. The north of the country, comprising the Maramureş region and the north of the Transylvanian and Moldavian Plateaus, stands out from other regions with the most intense increases in minimum air temperature (see Figure below).

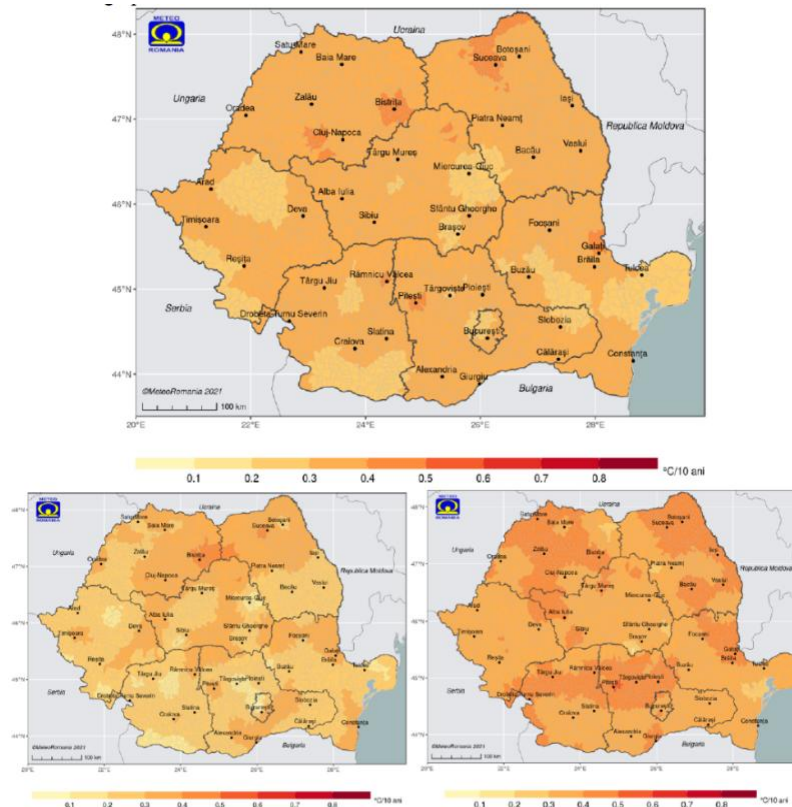


Figure IV-1 Trends ($^{\circ}\text{C}/\text{decade}$) in the evolution of the average annual temperature in Romania (1961-2020): average temperature (top), minimum temperature (bottom left), maximum temperature (bottom right).⁵²

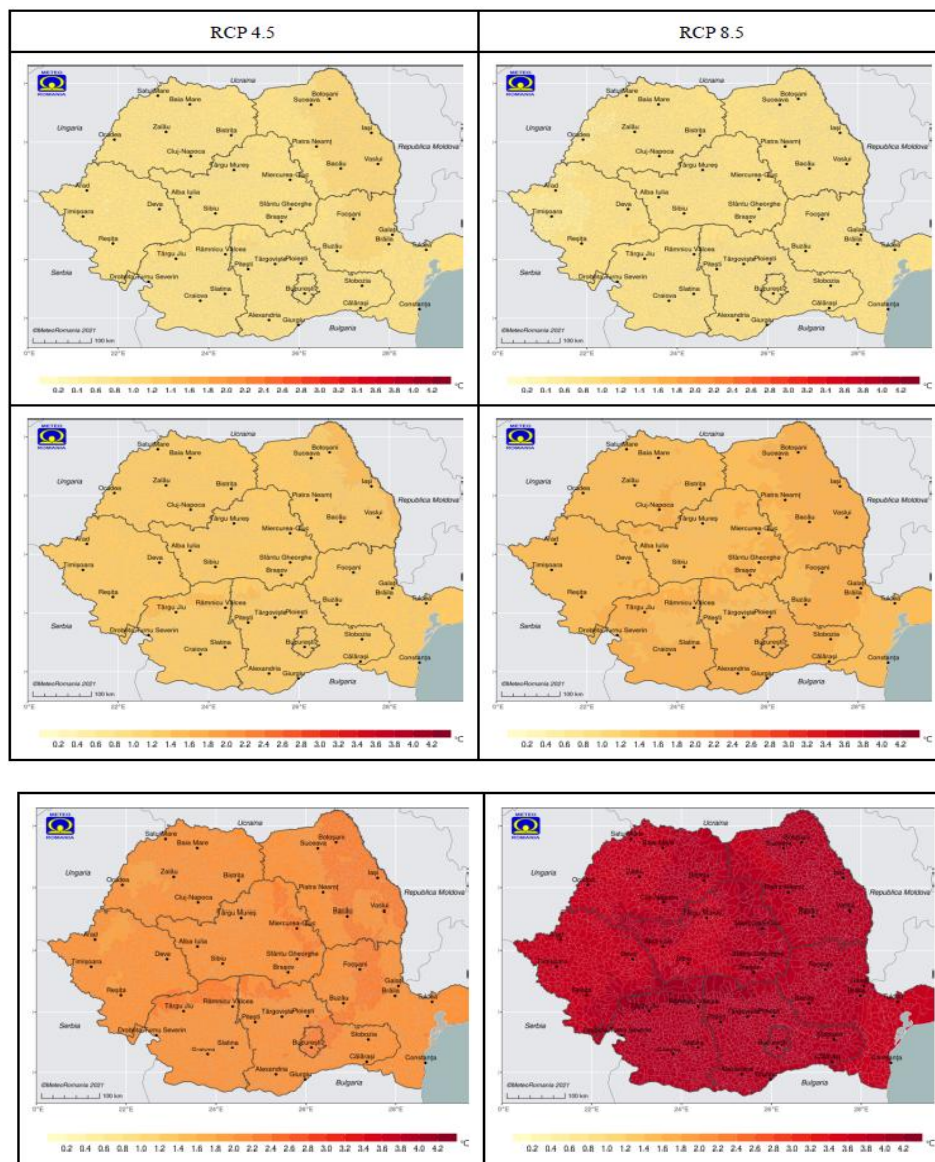
Between 1961 and 2020, Romania experienced a clear and statistically significant warming trend, present in all development regions and more pronounced during the day. The average annual temperature increased by approximately $1.3\text{--}2.6^{\circ}\text{C}$ over the entire period, with stronger warming trends at maximum temperatures than at minimum temperatures, indicating more intense warming during the day than at night. At the local level (UAT), most areas show increases of more than $0.40^{\circ}\text{C}/\text{decade}$, while areas with weak warming (below $0.25^{\circ}\text{C}/\text{decade}$) represent less than 1% of the territory. The year 2019 was the warmest in the interval, and most of the very warm years are found after 2000, while the coldest years are concentrated in the first half of the analysed period, confirming the recent acceleration of warming.

In addition to field observations, climate projections (regional and global climate models, RCP scenarios from EURO-CORDEX) were also used. These facilitated:

- estimating possible changes by the end of the 21st century
- assessing expected economic and environmental losses
- identifying the most exposed regions.

⁵² Report A2.4 – Project RO-Adapt: https://mmediu.ro/app/webroot/uploads/files/A2.4_RaportFinal.pdf

In Romania, climate models (EURO-CORDEX, RCP4.5 and RCP8.5 scenarios) show that warming will continue and intensify until the end of the century. For the period 2021–2100, all scenarios indicate increases in average annual temperatures in all development regions, with values of approximately +2°C in the RCP4.5 scenario and up to +4°C in the RCP8.5 scenario towards 2071–2100, compared to 1971–2000. In the southern regions (Bucharest-Ilfov, South, Southeast, Southwest), temperature deviations are generally higher than in the western and northern regions.



Evoluția temperaturii aerului la nivel de UAT în perioadele 2021-2030 (sus), 2031-2050 (mijloc) și 2071-2100 (jos), conform scenariilor climatice RCP 4.5 și RCP 8.5.

Figure IV-2 Air temperature evolution at UAT level in the periods: 2021-2030 (top), 2031-2050 (middle) and 2071-2100 (bottom), according to climatic scenarios RCP 4.5 and RCP 8.5⁵³

⁵³ Report A.2.4. - Project RO-Adapt - Study of climate parameters and indicators, classification of the country's regions according to their risk thresholds, as well as significant trends in climate parameters:

https://mmediu.ro/app/webroot/uploads/files/A2.4_RaportFinal.pdf

For precipitation, the pattern is less clear: slight increases or decreases are expected, depending on the region, scenario, and time horizon, but without dramatic changes in the annual total. However, models converge towards an increase in the frequency of days with heavy precipitation (>20 mm/day) and greater variability, which means potentially more episodes of intense rain and local flooding, even if the annual total does not change much.

Relative air humidity shows no major changes, with anomalies generally below 1%, but in the RCP8.5 scenario there is a downward trend of 1–2% towards the end of the century, especially in southern regions.

For wind, the projections suggest differences between scenarios: in some time horizons, wind speed remains the same or even decreases, but in the RCP8.5, for 2071–2100, an increase in maximum wind speed of more than 0.1–0.2 m/s is possible in many regions of the country, especially in the northeast, which could influence the risk of severe phenomena and wind power potential.

Overall, the report shows that Romania is heading towards a warmer climate, with more extreme temperatures and precipitation and significant regional differences – essential information for risk assessment and adaptation planning.

A. National circumstances, institutional arrangements and legal frameworks

(a) National circumstances and institutional arrangements

With a surface area of $\approx 238,398 \text{ km}^2$, Romania is among the mid-sized EU countries by area. Due to its position in Southeastern Europe, its relief (mountains, hills, plains) and its outlet to the Black Sea, Romania displays notable climatic heterogeneity — from humid mountainous regions to more continental plains and relatively drier zones (e.g. parts of Dobrogea). Romania faces increasing frequency of extreme events such as heat waves, droughts and heavy rainfall leading to floods, which contribute to large hydrological contrasts and necessitate strong river basin regulation and adaptation planning. Romania also retains significant biodiversity, with nearly half its land area under forest, natural or semi-natural ecosystems, and significant species richness especially in the Carpathians and Danube Delta.

The population in 2024 is estimated at $\approx 19,069,409$. The country continues a trend of gradual demographic decline and aging. Population distribution is uneven: most people live in urban centres, while small towns and rural areas continue to see depopulation and ageing. Seasonal migration and return migration have some influence but do not reverse the long-term concentration in cities.

Concerning the economic situation in 2024, growth slowed: Romania's real GDP growth in 2024 is reported at 0.9 %, reflecting weak private investment and a negative trade balance. Inflation remains elevated, and fiscal and macro-stability pressures are significant. The services sector continues to dominate value added, though industry and agriculture still contribute meaningfully. In the labour market, tensions have begun easing, though high nominal wage growth persists, raising concerns about cost competitiveness. Decarbonization and energy transition remain priorities, as Romania seeks to shift toward more renewable generation, energy efficiency, and reduced dependence on fossil fuels.

(b) Institutional arrangements and governance

Romania is a unitary state with administrative tiers (national, county, local) and responsibilities for disaster risk management and climate change adaptation distributed across these levels. The governance framework involves multiple institutions, coordination bodies and working groups for climate and environmental policy. According to the Organization for Economic Cooperation and Development (OECD), the institutional architecture includes the Ministry of Environment, Water and Forests, the Presidential Administration's Department of Climate and Sustainability, the General Secretariat of the Government's Directorate for Policy Co-ordination and Implementation of Projects, plus line ministries such as the Ministry of Agriculture and Rural Development, the Ministry of Regional Development, Public Works and Administration and the Ministry of Investment and European Projects.

To ensure coordination in the field of climate change mitigation, Romania established the Interministerial Committee on Climate Change (CISC) through Government Decision No. 563/2022, with the support of the Presidential Administration, to promote cooperation between ministries in the field of climate policy. One of the main objectives of the CISC is to analyse and propose solutions "to ensure the consistency of policies in sectors that have an impact on climate change, proposed by the relevant ministries, with the commitments made at national level to the European Union, the United Nations, and other international organizations to which Romania is a party, and to monitor the progress made by Romanian institutions in implementing them.

The Presidential Administration, through the Climate and Sustainability Department, supports the Romanian President's commitment to climate action at national and international level, including by mediating between central public institutions on climate change and related issues.

The General Secretariat of the Government (SGG) monitors and evaluates the implementation of measures incumbent upon national authorities and institutions responsible for climate change in order to ensure consistency with the climate neutrality objective set at European Union level, in accordance with the provisions of Regulation (EU) 1119/2021 of the European Parliament and of the Council.

Through the Department for Sustainable Development, the SGG coordinates the implementation of Romania's National Strategy for Sustainable Development 2030. SGG is responsible for ensuring and supporting, through the Policy and Priorities Coordination Directorate and through the DDD, the work of the Technical Secretariat of the Interministerial Committee on Climate Change, established by Government Decision No. 563/2022 on the establishment, organization, and functioning of the Interministerial Committee on Climate Change.

The Ministry of Environment, Water, and Forestry is the central public authority responsible for climate change. They develop and update, in accordance with European principles, the national policy for adaptation to the effects of climate change and ensures the coordination of its implementation at the national level, as well as reporting the results in accordance with European and international requirements, in accordance with Government Decision No. 43/2020 on the organization and functioning of the Ministry of Environment, Water and Forests, as subsequently amended and supplemented.

Government Decision No. 205/2022 established a department for the integrated evaluation and monitoring of programs financed with public and European funds, within the working apparatus of the Government and operating under the authority of the Prime Minister. The department has a coordinating and supporting role for the efficient use of public and European funds, as follows:

- ensures an integrated approach to projects and investments financed with public and European funds, in order to achieve national and European development objectives;
- monitors the implementation of investment projects, in collaboration with the responsible institutions, for projects financed with cohesion funds and PNRR, without affecting the specific responsibilities of the ministries;
- facilitates dialogue between institutions and ministries to increase the absorption of European funds;
- supports ministries in identifying and implementing solutions to increase the absorption rate;
- supports ministries in participating in community programs and using the financial resources of the EIB and EBRD.

Other institutions carry out substantial activities that contribute to achieving the Strategy's objectives in various sectors of activity in Romania, and their specific role is described in Chapter 10 of the Strategy - Responsible Institutions.

The National Platform for Disaster Risk Reduction, established by Government Decision No. 768/2016, functions as a multisectoral and interdisciplinary national body with an advisory role in establishing strategies and programs for disaster risk reduction. The platform brings together public authorities, technical and scientific experts, NGOs, academia, trade unions, religious groups, and the media, and works towards:

- increasing knowledge and awareness of risk types and their impact;
- strengthening the risk management capacity of public authorities through inter-institutional collaboration;
- an integrated approach to risk management at the national level;
- developing strategies and policies that encourage investment in risk reduction measures and increase resilience;
- improving the preparedness of emergency response forces for an effective response;
- integrating the concept of "sustainable reconstruction" into the restoration of disaster-affected areas.

(c) Legal and policy frameworks and regulations

National legal and policy frameworks

In Romania, the legislative framework on climate change and energy transition is in the process of being consolidated. Although there is not yet a single framework law dedicated to climate change, the main policies are brought together in the **National Strategy on Adaptation to Climate Change for the period 2024-2030 with a perspective of 2050, approved by Government Decision No. 1010/2024**. The strategy sets out the general directions for reducing the vulnerability of natural and socio-economic systems and increasing resilience to the impact of climate change, in line with the objectives of the Paris Agreement and the EU Strategy on Adaptation to Climate Change. SNASC has a broad perspective until 2050 and includes a National Action Plan (PNASC), which details concrete measures, responsible institutions, implementation deadlines, and funding sources. The strategy covers areas such as water resources, forests and biodiversity, public health, energy, transport, agriculture, tourism, education, and cultural heritage, while promoting nature-based solutions and an ecosystem approach to adaptation.

Climate data and information, as well as the results of scientific, technical, and policy research that formed the basis of SNASC and PNASC, are centralized and continuously updated through the **National Platform for Adaptation to Climate Change – Ro-ADAPT** (<http://www.roadapt.ro/despre-platforma.php>). The platform provides society with scientifically based data on climate variability (1961–2020) and relevant scientific and legislative trends, bringing Romania into line with European and international standards. It includes specialized information on the impact of climate change on the environment, biodiversity, and vulnerable sectors, such as water resources, forests, biodiversity, population and public health, education, cultural heritage, localities, agriculture, energy, transport, tourism, industry, and insurance. The data is available at the national, regional, and local (UAT) levels.

The implementation of SNASC is coordinated by the Ministry of Environment, Water, and Forests, in collaboration with other line ministries, local authorities, and research institutions, and progress is reported periodically, once every two years. SNASC is correlated with other major strategic documents, such as the National Integrated Energy-Climate Plan (PNIESC) 2021-2030, the Long-Term Strategy for Greenhouse Gas Emissions Reduction by 2050, and the National Strategy on Climate Change and Green Economic Growth, ensuring a coherent approach between adaptation and mitigation.

Romania has recently adopted a series of integrated national strategies and plans that underpin the strategic framework on climate change, economic growth and emissions control, hazard management and sustainable development, the provisions of which have been taken into account in the SNASC.

Romania's National Strategy for Sustainable Development 2030 (SNDDR), adopted in 2018 and accompanied by the National Action Plan (2022), is the framework through which Romania implements Agenda 2030 and the 17 SDGs. In the field of climate (SDG 13), the strategy aims to increase the capacity for adaptation and resilience to climate change and natural disasters by integrating mitigation and adaptation measures into all policies and through education and awareness-raising.

The Long-Term Strategy for reducing greenhouse gas emissions (STL, 2023) sets the goal for Romania to become climate neutral by 2050, with a 99% reduction in net emissions compared to 1990. In addition, there are numerous sectoral strategies relevant to adaptation and resilience (water, forests, biodiversity, tourism, agriculture, research and innovation, environmental education, energy, disaster risk management, competitiveness, green jobs, circular economy, air quality).

The National Recovery and Resilience Plan (PNRR, 2021) supports reforms and investments for post-COVID-19 recovery and the green and digital transition, targeting sectors such as water, transport, energy, forests and biodiversity, waste, buildings, health, education, and governance.

The National Disaster Risk Management Plan (2020) provides an integrated framework for disaster prevention, preparedness, and response, promoting measures to build resilience to natural hazards, climate change, and anthropogenic risks.

The Circular Economy Strategy (2022) aims to decouple economic growth from environmental degradation and is accompanied by an action plan monitored by a national committee.

The National Integrated Energy and Climate Change Plan (PNIESC 2021–2030), updated in 2024, focuses on energy security, decarbonization, energy efficiency, the energy market, and innovation, with the goal of reducing GHG emissions by ~85% by 2030 compared to 1990, and integrates the objectives of the long-term strategy.

The National Long-Term Renovation Strategy (2020) aims to transform the building stock into an energy-efficient and green one by 2050, contributing to the resilience of the built environment.

The National Integrated Urban Development Strategy 2022–2035, undertaken through the PNRR, defines Romania's urban policy and aims, for the "green and resilient city" dimension, to ensure access to green spaces, regenerate urban ecosystems, and integrate nature-based solutions for mitigating and adapting to urban risks, including through the development of a guide dedicated to nature-based solutions.

European legal and policy frameworks

The European Green Deal proposes a roadmap that includes the goal of achieving climate neutrality in all relevant European policies and strategies, across all sectors of activity. In this regard, a number of new sectoral or integrated strategies and legislative documents can be mentioned, the provisions of which were taken into account in the development of the adaptation measures in the SNASC - PNASC:

a) **The new EU Strategy on Adaptation to Climate Change**, adopted in 2021, has as its main objectives improving knowledge on the impact of climate change, stepping up adaptation planning and climate risk assessment, accelerating adaptation measures, and increasing resilience to climate change on the European continent.

b) Progress in implementing adaptation actions is mainly reported and monitored in accordance with the **Regulation on the Governance of the Energy Union and Climate Action**, which requires Member States to integrate adaptation objectives into their national energy and climate plans (NECPs). Every two years, EU Member States report to the Commission on their national climate change adaptation planning and strategies, presenting the actions implemented and planned to facilitate adaptation to climate change.

c) **The European Climate Pact (2020)** aims to encourage people, communities, and organizations to participate in climate-related actions and build a greener Europe, to facilitate networking and knowledge sharing, learning about climate change, and the development and implementation of solutions that contribute to climate change adaptation, the dissemination of knowledge related to climate action, and awareness of climate change.

d) Several EU sectoral legislation strengthens resilience to climate change:

- The EU Nature Restoration Regulation includes specific provisions on adaptation and sets targets for urban, coastal, wetland, and riparian habitats, which contribute to disaster risk reduction and support adaptation.
- The EU Forest Strategy for 2030 sets targets and measures for adapting forests to climate change, including (re)afforestation and climate-resilient forest management.
- The Energy Performance of Buildings Directive introduces risk and resilience indicators into national renovation plans for the building stock.
- The Floods Directive requires flood risk assessments, hazard and risk maps that take into account the future impacts of climate change, and the development of flood risk management plans.
- The Critical Infrastructure Resilience Directive (in force since January 2023) requires Member States to better protect services and infrastructure that are essential for the vital functions of society and economic activities against a wide range of hazards, including natural disasters and climate change-related phenomena.

B. Impacts, risks and vulnerabilities

Climate change in Romania manifests in a general trend of rising temperatures, observed in all regions of the country. The phenomenon is more pronounced during the day and has intensified in recent decades. At the same time, the annual duration of sunshine is steadily increasing, confirming the warming trend. Climate projections indicate that the warming process will continue in the coming years, with differences depending on the region and the climate scenario analysed. Significant temperature increases are anticipated in the summer months, especially in scenarios characterized by high greenhouse gas emissions.

Romania is a country with a high vulnerability to natural and technological disasters, which requires a systemic, coherent, and coordinated approach to the national emergency management system in all its phases, as well as an adequate and well-supported legislative framework. In terms of the current disaster risk context in Romania, geophysical and climate-related disasters pose a considerable threat to the country's efforts to alleviate poverty and achieve sustainable economic growth, with disaster losses increasing as climate change and urbanization take hold. Romania is prone to a range of natural disasters, particularly earthquakes, floods, droughts, and extreme weather, but also technological disasters such as chemical and nuclear accidents or accidental pollution, which have had significant physical, social, and financial effects in recent decades. Since 1990, Romania has experienced more than 70 serious disasters, including 44 floods, 15 extreme temperature events, 7 storms, 2 earthquakes, several droughts, and 5 landslides, resulting in more than \$3.5 billion in direct damage. Between 1901 and 2019, the average annual air temperature in Romania increased by more than 1°C. (IGSU, 2020, National Disaster Risk Management Plan).

In Romania, the warmest year was 2019, followed in descending order by 2015, 2007, 2018, 2014, 1994, 2009, 2013, 2012, and 2008.

(a) Current and projected climate trends and hazards

The climate variability observed and analysed refers to the period 1961-2020, and the forecasts developed within the RO-Adapt project refer to the time horizons 2030 and 2050 for Romania. For future time horizons, the results of regional climate models are used, under scenarios with moderate (RCP 4.5; Thomson et al., 2011) and strong (RCP 8.5; Riahi et al., 2011) global greenhouse gas (GHG) emissions and atmospheric concentrations, until the end of this century.

Climate change in Romania manifests through:

- **Temperature.** Romania is experiencing significant climate warming in all regions, which is more pronounced during the day. The average annual temperature increased by 1.3–2.6°C during the period analysed, and the trend has intensified in the last two decades. Climate models show that warming will continue, with differences between regions and scenarios. By 2050, in the most pessimistic scenario, an increase of over 3°C is expected in August.
- **Precipitation:** Annual precipitation amounts do not show clear trends, but significant decreases are expected in summer, especially in Dobrogea, Bărăgan, and the west of the country. In winter, precipitation may increase, especially in western and central Romania. Precipitation intensity is estimated to increase nationwide. Snow cover will continue to decrease, especially in low-lying areas, while in mountainous areas the decrease will be less pronounced.
- **Wind:** there is a slight decrease in average and maximum wind speeds, especially in the extra-Carpathian regions, with uncertain future projections. The average annual wind speed decreased

significantly between 1961 and 2020, more pronounced in the northeast and southeast. The maximum annual speed is decreasing even more sharply, including in mountainous areas. Future projections are mixed, suggesting that natural variability dominates the trends associated with global warming.

- **Relative air humidity** does not show a clear trend in the past, and no significant change is anticipated in the future, regardless of the scenario.

These changes have major implications for:

- **Water resources:** seasonal variations in flow rates, reduced water availability in summer, more flash floods and flooding due to torrential rainfall, more frequent droughts, declining groundwater levels, and risks in coastal areas.
- **Forests and biodiversity:** forest drying, reduced productivity, increased vulnerability to diseases and pests, reduced carbon storage capacity, damage to alpine, forest, and marine habitats and sensitive species.
- **Public health:** more intense heat and cold waves, increased mortality and morbidity, spread of vector-borne diseases, worsening respiratory problems and heat stress, especially in cities and among vulnerable people.
- **Urban areas:** increased vulnerability of the population and infrastructure due to heat waves, extreme precipitation, and flooding; the urban heat island effect and impervious surfaces amplify the risks.
- **Agriculture:** increased heat and water stress, more frequent droughts, intense rainfall events, reduced crop productivity and quality, changing vegetation cycles, and increased desertification and soil degradation in the south and east, impacting agricultural sustainability.

(b) Observed and potential impacts of climate change, including sectoral, economic, social and/or environmental vulnerabilities

Key elements regarding observed climate variability, future projections, and the impact of climate risk phenomena on key vulnerable sectors, with several elements presented in tabular format for each sector. The types of impact of climate risk phenomena on key sectors in Romania are highlighted below:

Field	Impacts / Key findings
Water resources	- Flows increase in winter and decrease in other seasons; major decreases in April–May and August–November; - Multi-year average flows may decrease by up to 40% in southern basins; - Increased likelihood of flash floods after 2030; - Urban flooding is amplified due to impervious surfaces; - Groundwater resources are vulnerable to slow degradation and loss of quality; - Possible saline intrusion in coastal areas; - Energy sector (hydro, nuclear) affected by high water temperatures, drought, and reduced flows.
Forests	- Increased stress due to warming and drought; risk of disease and pests; - Growing season increases by 25–30 days by 2050;

Field	Impacts / Key findings
Biodiversity and ecosystems	- Reduction in cold spells continues; risks of frost, snowfall, and strong winds remain stable; - Increased risks of flooding and flash floods affecting forest ecosystems. - Alpine habitats are the most vulnerable; - Heat waves affect sensitive species; increased evapotranspiration; - The growing season increases by 10–55 days, depending on the scenario; - Increased risks of snow cover loss, flooding, heat stress; - Black Sea: temperature increases above the basin average.
Population, health, and air	- Heat stress increases mortality, especially among vulnerable individuals. - Heat waves will outweigh the positive effects of milder winters. - Air quality intensifies the effects of heat stress. - The risks of vector-borne diseases (e.g., West Nile) are expanding.
Education and awareness	- Climate education is crucial for adaptation. - Climate impacts affect health, energy, cities – a cross-cutting issue. - Early education for sustainable behaviours is becoming essential.
Cultural heritage	- Affected by drought, flooding, erosion, storms, salinization, and rapid changes in temperature/humidity (Dobrogea, Oltenia, and Bărăgan are the most exposed); - Monuments in floodplains and archaeological sites vulnerable to flooding and desertification. - Climate variations accelerate the degradation of materials and Favor harmful microorganisms.
Municipalities	- Cities are most exposed to climate change; - Heat waves are amplified by urban heat islands; - Energy infrastructure, transportation, and buildings are vulnerable; - Urban flooding is worsening due to impervious surfaces; - Changes in wind speed by 2050 are not clearly defined.
Agriculture	- Heat stress (>32°C) severely affects crops, especially in the south and southeast; - The intensity and duration of heat stress increase in all scenarios until 2050; - Low-lying regions in the south will suffer the most; - Thermal and water stress reduces yields and alters crop phenology.
Energy	- All levels of the energy system are affected. - Cooling degree-days increase; heating degree-days decrease. - Bucharest–Ilfov will see the largest increases in cooling demand. - Heavy rainfall increases risks to infrastructure. - Solar and wind energy benefit from increased sunshine duration and wind changes.
Transport	- All modes of transport are vulnerable: road, rail, air, sea, and port. - Heavy rainfall leads to structural damage and collapse. - High temperatures cause asphalt to melt, deformation and risks to bridges. - Extreme winds affect navigation equipment and terminals. - Fluctuating water levels affect navigation (sills, limited access, interruptions).
Tourism	- The summer season is getting longer; the winter season is getting shorter; - Snow cover >30 cm is decreasing in the Carpathians; - The ski season starts 5–23 days later by 2030;

Field	Impacts / Key findings
Industry	- The end of the season comes 1–11 days (RCP4.5) or >10 days (RCP8.5) earlier; - The sea warms by 1.8–2°C (RCP4.5) and 3.0–3.5°C (RCP8.5) by 2050; - Operating costs and accessibility risks increase; - Indirect impact on landscapes, biodiversity, and infrastructure.
	- Direct impacts: process interruptions, damage to facilities, disruption of supply chains; - Indirect impacts: reduced water availability, technological changes, changes to working schedules; - The manufacturing industry is the most active and exposed.
	- Most exposed: agriculture, housing, health, SMEs; - Frequency and intensity of risks are increasing;
Insurance	- Losses are difficult to estimate due to uncertainties; - The insured assets/losses ratio is good for hail and storms, poor for drought and floods; - There are PADs and schemes for farmers (PNDR, CAP); - The sector needs to integrate climate risks into strategies and products.

(c) Approaches, methodologies and tools, and associated uncertainties and challenges, in relation to paragraph 107(a) and (b) above

The approaches, methodology, and tools used to analyse current and projected climate trends and hazards, and to determine sectoral, economic, social, and/or environmental vulnerabilities, on the basis of which Romania's National Strategy and Adaptation Plan was developed, are described in detail in the RO-Adapt Project – Report A2.3 (https://mmediu.ro/app/webroot/uploads/files/A2.3_RaportFinal.pdf), which shows how climate information (historical and future) is obtained, refined, and interpreted so that it can be used to assess the impact on key sectors and to inform adaptation measures. These methods mainly consist of:

- **Analysis of historical climate data series (1901–2020)**
 - Long series of temperature, precipitation, and other climate parameters are used.
 - Basic statistical indicators (mean, median, standard deviation, amplitude, maxima/minima, percentile, anomaly) are used to describe variability and trends in the data.
 - Data regionalization methods (global and regional climate models, downscaling) are applied to obtain finer-scale information for Romania.
 - Methods of continuous, real-time monitoring of climate extremes are used, employing networks of stations, radars, and satellites for diagnosis and warning.
- **Analysis of future climate scenarios (2021–2030, 2031–2050, 2071–2100)**
 - The starting point was socio-economic and emissions scenarios (GHG, aerosols), which were entered into global and regional climate models.
 - The scenario analysis methods consist of multiple/multi-model simulations, parameterization of uncertainties, use of stochastic physical parameterizations, etc., as well as interpretation of results at regional scale.

- Scenario regionalization methods were used for Romania (regional climate models run at very fine resolution, model ensembles for uncertainty estimation).

➤ **Extended-range climate prediction**

- Deterministic methods (based on numerical models and coupled atmosphere–ocean–land–ice systems) were used, and these were initialized by data assimilation, reanalysis, OI methods, 3D/4D-Var, Kalman Filter, etc.
- Non-deterministic/statistical and analytical methods (analogue method, EOF/SVD, climate mode and "tele-connection" analysis) were also used for seasonal/extended forecasts and to reduce the size of the problem.

➤ **Exploitation of climate information – risks and types of events**

- Methods were implemented to identify regional differences in climate risks (heat waves, cold spells, extreme precipitation causing floods, blizzards), as well as to define risk levels (moderate, severe, extreme) based on statistical thresholds (percentiles, extreme distributions, etc.).

Impacts are an essential part of climate risks, and risk arises from the combination of climate hazards (dangerous events) with the vulnerability of society and ecosystems. To manage these risks, it is necessary to:

- assess them based on historical and present data, as well as on future projections regarding the frequency and intensity of hazards and socio-economic developments;
- use RCP (Representative Concentration Pathways - for the evolution of greenhouse gas and aerosol concentrations) climate scenarios and SSP (Shared Socioeconomic Pathways - for possible developments in society, demographics, and the economy) socio-economic scenarios.

Combined, these scenarios allow for the estimation of future climate impacts, adaptation costs, and mitigation costs.

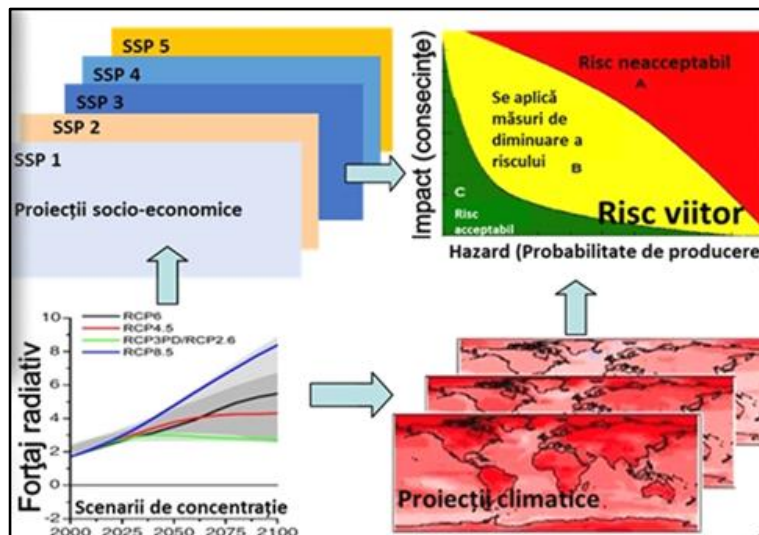


Figure IV-3 Representation of future climate risk and its reduction for climate change adaptation⁵⁴

⁵⁴ Source: SNASC_HG1010/2024:

<https://mmediu.ro/en/app/webroot/uploads/files/Monitorul%20Oficial%20Partea%20I%20nr.%20823Bis.pdf>

SSP scenarios offer five trajectories for the evolution of socio-economic systems. They allow for a better assessment of adaptation and mitigation efforts, starting from a baseline where no specific measures are taken. The impact analysis used the RCP8.5 reference scenario, which is the basis for the SSP5 socio-economic trajectory (with minimal adaptation efforts), illustrating rapid economic growth based on fossil fuel combustion. The RCP4.5 scenario, which is the basis for the SSP2 "middle path" socio-economic trajectory, assumes more consistent adaptation efforts and is therefore considered the scenario with measures. In addition, the RCP4.5 scenario is not incompatible with achieving the Paris Agreement target.

In the case of Romania, for the 2021–2050 time horizon, the socio-economic costs associated with climate impacts such as warming (with associated sectoral indicators) and increased precipitation intensity (with associated sectoral indicators) are significantly higher in the SSP5 reference scenario than in the SSP2 scenario. On the other hand, the costs of adaptation measures increase compared to the SSP5 reference scenario but are lower than those of the impacts.

C. Adaptation priorities and barriers

(a) Domestic priorities and progress towards those priorities

SNASC is aligned with and complies with the provisions of the international (UNFCCC, Paris Agreement) and European legislative and policy framework, namely the European Green Deal, the instrument for implementing the EU's Long-Term Strategy (2050) on climate change. Romania's long-term strategy for reducing greenhouse gas emissions - Romania Neutral in 2050, approved by Government Decision No. 1215/2023, takes up, in subchapter 3.2. on Adaptation Policies and Measures, the vision and measures proposed by SNASC and PNASC.

At the same time, the European objectives for responding to global threats related to the effects of climate change contribute to the achievement of the objectives agreed upon in the United Nations 2030 Agenda for Sustainable Development, as well as to the achievement of some of the objectives of the Sendai Framework for Disaster Risk Reduction 2015-2030.

The overall objective of Romania's national climate change adaptation plan is to improve the capacity of socio-economic and ecological systems, and society as a whole, to adapt to the effects of climate change in Romania by 2030 and with a view to 2050. Given the available climate change scenarios, the aim is to ensure the dynamic, integrated, and sustainable adaptation of society, the national economy, and the environment to the predicted climate context by adopting specific sectoral objectives/programs/measures. The development of sectoral action guidelines and the indication of guidelines for each economic sector enable the responsible institutions to develop and implement specific action plans in accordance with **the national strategic principles and measures included in the SNASC&PNASC.**

Inter- and trans-sectoral lines of action have been identified, such as: understanding climate change and adaptation needs, both at the level of decision-makers at all levels (national, regional/county, and local) and the general public; strengthening governance on climate change adaptation and promoting investments to increase resilience to climate change, both in the public and private sectors, and the need for interregional cooperation.

With regard to local action in the field of adaptation to the effects of climate change, the SNASC and PNASC encourage local public authorities to contribute to the implementation of the proposed objectives and measures, including through plans, strategies, and programs developed in the context of the Covenant of Mayors.

(b) Adaptation challenges and gaps, and barriers to adaptation

It is crucial to raise awareness and inform citizens, stakeholders, and decision-makers about climate change issues and to ensure transparency in decision-making processes in this area. It is also necessary to identify existing gaps, risks, and obstacles.

The main barriers to addressing adaptation priorities include governance barriers, lack of inter-institutional cooperation and coordination that hinders effective coordination, insufficient administrative capacity and limited budgets, as well as a lack of accessible tools. Holistic and integrated analyses, which take into account the socio-economic costs of climate change impacts, the benefits of adaptation actions, and the risks of inaction, should not be missing from the current work on addressing adaptation at the national level.

The implementation of the measures in the National Adaptation Plan will address some of these gaps and barriers, such as the integrated sectoral analyses provided for in the legislation for the various economic, social, and environmental sectors, which will facilitate informed decisions on adaptation, both at the level of central public institutions and at the local level.

D. Adaptation strategies, policies, plans, goals and actions to integrate adaptation into

Implementation of adaptation actions in accordance with the global goal on adaptation as set out in Article 7, paragraph 1, of the Paris Agreement

Since climate change has a systemic impact on all sectors of activity, an appropriate response to increase the resilience of society and the environment to these changes requires a consistent legislative framework with specific measures that contribute both to reducing greenhouse gas emissions and to adaptation. The new European legislative framework, developed around the main objective of the European Green Deal to achieve climate neutrality by 2050 and meet the Sustainable Development Goals of the 2030 Agenda, has required a rethinking of the national public policy framework in order to align the actions and measures included in the normative acts with the global goal on adaptation, as set out in Article 7(1) of the Paris Agreement.

Adaptation goals, actions, objectives, undertakings, efforts, plans, strategies, policies, priorities, programmes and efforts to build resilience

The National Strategy on Adaptation to Climate Change aims to improve the capacity for adaptation and increase the resilience of socio-economic and natural systems to the impact of climate variability and change in different areas and time frames, facilitating Romania's transition to a sustainable, low-carbon economy in line with the objective of Romania's Long-Term Strategy for reducing greenhouse gas emissions.

At the same time, SNASC aims at sectoral development in line with the principles of the EU Strategy on Adaptation to Climate Change, namely smart, rapid, systemic, and globally connected adaptation. The strategy stems from the need to ensure an adequate level of resilience of Romanian society, the economy, and the environment to the impact of climate change and the risks associated with it, in the time frame 2024-2030-2050, by accelerating the introduction of adaptation measures in all sectors of activity.

Development priorities related to climate change adaptation and impacts

The implementation of the National Strategy for Adaptation to Climate Change (SNASC) and the National Plan (PNASC) involves the continuous development of the legal and strategic framework, aiming to achieve Romania's sustainable development goals. The strategy aims to achieve concrete results at the economic, social, cultural, and environmental levels, highlighting the positive impact of sectoral measures on national sustainable development goals. Among the main expected results are:

- ✓ **Forestry and biodiversity:**
 - technological and logistical development of the forestry sector; increasing forested areas and diversifying wood biomass sources;
 - modern monitoring of forest ecosystems to reduce costs and increase added value;
 - conservation of biological diversity and ecosystem services, with indirect economic benefits (agriculture, fish farming, tourism, health).
- ✓ **Risk management and infrastructure:**
 - creating jobs in water resource management and flood-resistant construction;
 - protecting economic and residential infrastructure through monitoring and warning systems;
 - reducing economic losses caused by disruptions in supply and production chains.
- ✓ **Agriculture and energy:**
 - promoting energy-efficient agricultural practices and the use of renewable energy (wind, solar, biogas);
 - reducing operational costs and carbon footprint;
 - diversifying energy production and storage technologies.
- ✓ **Industry and transport:**
 - creating industrial value chains and green employment;
 - digitizing and optimizing transportation;
 - adapting transportation infrastructure and promoting alternative transportation (public, rail, water, air);
 - aligning with EU standards for efficiency and sustainability.
- ✓ **Tourism and heritage:**
 - sustainable development of tourist destinations, adaptation of tourist packages and infrastructure;
 - increasing the resilience of the sector and capitalizing on cultural heritage.
- ✓ **Municipalities and circular economy:**
 - increasing local resilience through alternative transport, energy efficiency, waste recovery, and the development of the circular economy;
 - developing Local Action Plans on Adaptation to Climate Change.

✓ **Workforce and education:**

- Increasing employment in green infrastructure projects and nature-based solutions.
- Developing professional skills, partnerships between academia and business, improving quality of life and productivity.

✓ **Insurance:** diversification of insurance products to cover climate risks.

Any adaptation actions and/or economic diversification plans leading to mitigation co-benefits

The involvement of institutions at all levels in the process of adaptation to climate change, as well as raising awareness of the effects of climate change and their responsibility in promoting adaptation to climate change, are also of great importance. It is also necessary to encourage the involvement of the private sector in climate adaptation actions, to ensure cohesion and achieve synergy in building society's response to the effects of climate change. Only a collective effort by the government and private sector can ensure an integrated/holistic approach, including from a social, economic, and environmental perspective, both in terms of the measures needed to achieve the objectives set for strengthening the resilience of Romanian society to climate change and in the broader context of achieving sustainable development goals and targets. The process of adaptation to climate change takes place in the sectors identified at different levels (national, regional, and local), through approaches specific to each sector or geographical area. Given that climate change has a specific sectoral impact, adaptation measures will also differ, taking into account local conditions, and adaptation measures must be synchronized and combined as efficiently as possible with measures to reduce GHG emissions.

Efforts to integrate climate change into development efforts, plans, policies and programming, including related capacity-building activities

SNASC is in synergy with other government strategies and programs. These include, for example, the National Strategy for Disaster Risk Reduction, the National Disaster Risk Management Plan (2021), the National Strategy for Sustainable Development of Romania (2018), the National Strategy for Green Jobs 2018-2025 (2018), the National Strategy for Medium and Long-Term Flood Risk Management (under development), the National Strategy on Desertification, the National Strategy for Biodiversity, the National Forestry Strategy 2030, and the National Strategy for Research, Innovation, and Smart Specialization 2021-2027. Nature-based solutions are widely integrated into adaptation measures.

The implementation of SNASC and PNASC requires that both the legal and strategic frameworks continue to evolve in line with the proposed objectives and actions.

The implementation of the Strategy will lead to concrete results at the economic, social, environmental, and cultural levels, in line with Romania's sustainable development objectives. To highlight the link between the measures included in the PNASC, with a view to achieving the SNASC objectives, and the targets of Romania's National Strategy for Sustainable Development 2030 (SNDD), there is a correspondence between the impact of the implementation of sectoral adaptation objectives on the national sustainable development objectives set out in Romania's National Strategy for Sustainable Development 2030, which highlights the positive impact of adaptation measures at sectoral level for most of the objectives included in the SNDD.

E. Progress on implementation adaptation

The National Action Plan (PNASC) for the implementation of the National Strategy on Adaptation to Climate Change for the period 2024–2030, perspective until 2050, aims at permanent alignment with EU legislation, international guidelines, and societal developments. It details specific programs, projects, and activities, indicating sources of funding, deadlines, and institutional responsibilities, as well as adaptation actions correlated with the objectives of the National Adaptation Strategy.

Main benefits:

- **Environmental:** reducing soil, water, and air pollution, limiting greenhouse gas emissions, and protecting biodiversity.
- **Social:** increasing population resilience, improving health and quality of life, strengthening education and awareness about climate change and associated risks.

The structure of the PNASC complies with EU and international requirements, including: Regulation (EU) 2018/1999 on energy and climate governance, Implementing Regulation (EU) 2022/2299, European Commission Guidance on adaptation strategies and plans (2023), Government Decision No. 379/2022, and reporting requirements to the UNFCCC, the European Commission, and the EEA.

F. Monitoring and evaluation of adaptation actions and processes

Enhancing adaptation actions and facilitating reporting by establishing and using domestic systems to monitor and evaluate the implementation of adaptation actions

The PNASC takes into account the need for ongoing reporting to EU legislation, international guidelines, and overall societal developments. The detailed plan presents specific programs, projects, and activities, specifying budgets or sources of funding, deadlines, and institutional responsibilities assumed for the implementation of the strategy, including proposals for adaptation actions correlated with the objectives and action programs included in the National Adaptation Strategy, in accordance with the Methodology for the development, implementation, monitoring, evaluation, and updating of government strategies, approved by Government Decision No. 379/2022.

The plan also ensures the continuity and/or updating of the institutional arrangements necessary for implementation, sectoral adaptation actions, and the monitoring and reporting measures provided for in the plan for the period 2016-2020. The plan is designed at sectoral level and considers the latest strategic documents from Romania and the EU.

Information on monitoring and evaluation – approaches and systems

The main objective of the National Action Plan for the period 2024-2030 is to propose concrete measures that will lead to the effective and efficient implementation of the objectives and programs/action lines set out in the National Strategy on Adaptation to Climate Change for the period 2024 -2030 with a view to 2050, ensuring continuity in the implementation of the measures set out in the previous Action Plan. To this end, the Plan includes

details on the implementation period, the responsible bodies, the result indicators, the sources of funding, and the estimated amounts needed to implement the objectives set out in the Strategy.

The Plan is based on a series of principles that ensure continuity with previous documents:

- **Sustainability** – decisions take into account the impact of climate change and its effects on all sectors and social groups.
- **Participation** – stakeholders are consulted to leverage their expertise and increase ownership of measures.
- **Integration** – cross-sectoral approach to avoid conflicts and create synergies with other policies and strategies.
- **Flexibility** – the plan is a dynamic document, adaptable to new knowledge, policies, and needs, supported by monitoring and evaluation.
- **Evidence-based decisions** – policies and actions are based on the latest research and practical experience.
- **Prioritization** – the aim is to maximize economic and social benefits, cost efficiency, and equity for vulnerable groups.
- **Responsibilities and international targets** – the plan must contribute to the achievement of EU and international commitments (e.g., the EU 2030 targets).
- **Communication and awareness** – broad communication of the strategy and plan supports their implementation.
- **Definition of responsibilities** – the institutions responsible for actions and sources of funding are clearly established.

Information on the effectiveness and sustainability of adaptation actions

The system for monitoring, evaluating, and reporting on the implementation of the SNASC and PNASC. An effective and efficient monitoring, evaluation (M&E), and reporting system is an essential component of any climate change (CC) strategy and is particularly important when policymakers are still in the early stages of understanding the elements that contribute to a good climate change strategy. important when policymakers are still in the early stages of understanding the elements that contribute to a good climate change strategy.

In the EU, under the European Climate Law, the European Commission regularly assesses progress in adapting to climate change based on reports submitted by Member States. These reports must be submitted every two years under the Governance Regulation. Article 19 of this Regulation requires Member States to report information on their national climate change adaptation planning and strategies, presenting the actions implemented and planned for climate change adaptation. The EEA has created a platform to facilitate the fulfilment of these reporting requirements, called Reportnet.

Article 17 of the Governance Regulation requires Member States to report, through their National Energy and Climate Plans, on how they are contributing to the achievement of the Energy Union and Paris Agreement objectives. EU Member States submitted their final updated versions of the NECPs in 2024, and the European Commission assessed the information contained therein, in particular regarding national adaptation objectives.

Overall responsibility for monitoring, evaluating, and reporting on the SNASC&PNASC lies with the Ministry of Environment, Water and Forests (MMAP). The structure within the MMAP responsible for managing climate change will interact with other specialized units within the MMAP to aggregate the necessary information from

the responsible institutions, in accordance with a monitoring plan. The MMAP must ensure that the main results of the assessments are directed to the higher levels of public administration, including the Prime Minister of Romania, as well as to civil society and the public, as appropriate. To this end, it will establish and maintain channels of communication and information exchange (including a clear and efficient data sharing process) between all government entities associated with the M&E system.

This approach will enable the system to function and proactively address any weaknesses.

Evaluation and monitoring framework

European legislation on impact assessment provides a solid basis for identifying relevant indicators for climate change. By transposing the provisions of Directive 2014/52/EU on EIM, the impact of climate change is one of the factors that need to be monitored.

The assessment process helps to identify answers regarding Romania's progress in relation to:

- a) reducing the impacts of climate change, vulnerabilities, and risks;
- b) increasing adaptive capacity;
- c) meeting priority adaptation objectives;
- d) addressing barriers to adaptation.

Monitoring and evaluating the adaptation components of SNASC and PNASC involves close collaboration with the ministries responsible for monitoring investments in adaptation under the operational programs financed by European funds 2021-2027 and/or PNRR.

Reporting on the implementation of the objectives and measures set out in the SNASC and PNASC

The assessment reports are also sent to the General Secretariat of the Government and the Interministerial Committee on Climate Change for formal approval and follow-up on policy implementation. The results and recommendations of the reports must also be communicated to all stakeholders involved in the implementation and monitoring of the SNASC and PNASC, requesting feedback and the implementation of corrections/corrective measures, if necessary.

G. Information related to averting, minimizing and addressing loss and damage associated with climate change impacts

The impact of climate change can be diverse (drought, coastal erosion, flooding, etc.), devastating, and long-lasting, affecting not only the environment but also human health, livelihoods, and well-being.

Romania participates in EU initiatives, programs, strategies, and projects to prevent, minimize, and address losses and damage. These range from early warning systems to supporting communities, livelihoods, and ecosystems to be resilient:

- **Disaster management and civil protection** through the Civil Protection Mechanism and the Emergency Response and Coordination Centre;
- **EU Mission in Europe:** Adapting to Climate Change and Smart and Climate-Neutral Cities;
- **The LIFE program** includes the Nature Restoration Regulation, the Habitats Directive and Natura 2000;
- **Information and Early Warning:** Global Disaster Alert and Coordination System; European Flood Warning System and Global Flood Warning System; European Forest Fire Information System and Global Wildfire Information System; European and Global Drought Observatories
- **Earth observation** - Research and knowledge sharing: Copernicus Climate Change Service; Galileo Satellite Emergency Alert Service.

H. Cooperation, good practice, experience and lessons learned

At EU level, Member States are strengthening their cooperation and tools to better manage increasing climate risks. Romania is part of these actions and participates in:

- The EU Mission on Adaptation to Climate Change supports regions and local authorities in becoming climate resilient by 2030, providing tools, examples of good practice, and a large learning community.
- Other important European initiatives for information, exchange of good practices, and financing of adaptation actions include:
 - **Horizon Europe** – the EU's main research and innovation program, with a significant part of its budget dedicated to climate action.
 - **Climate-ADAPT** – a platform of the European Commission and the EEA that centralizes data, information, strategies, case studies and adaptation options.
 - **Interreg** – a territorial cooperation program through cross-border projects that supports joint solutions to challenges such as the environment, sustainable energy, transport, etc.
 - **LIFE program** – the EU's funding instrument for the environment and climate, which co-finances projects on biodiversity, the circular economy, climate change mitigation and adaptation, and clean energy.

At EU level, there is a strong focus on **scientific research and climate data infrastructure**, including:

- **The European Climate and Health Observatory** – for information and cooperation on the impact of climate change on health.
- **Copernicus Climate Change Services** – providing free climate data and services based on satellite observations and ground measurements.
- **Digital Twin for Climate** – a 'digital twin' of the Earth, enabling the simulation of climate impacts and adaptation strategies at local and regional scale in the long term.
- **European Climate Data Explorer** – interactive access to key climate indicators for policy and planning.
- **The European Climate Risk Assessment Report (EUCRA)** contributes to European cooperation by:
 - systematically assessing the main current and future climate risks;
 - analysing compound hazards, cross-border and systemic risks;
 - linking risks to existing policies, responsibilities, and the urgency for action;
 - developing interactive tools for understanding hazards and risks.

V. Information on financial, technology development and transfer and capacity building support provided and mobilized under Articles 9–11 of the Paris Agreement

According to Article 4.3 of the Climate Convention, developed country Parties listed in Annex II “shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their obligations under Article 12, paragraph 1”. Romania is not a Party listed in Annex II to the Climate Convention and is therefore not obliged to fulfil the obligations under Articles 4.3, 4.4, and 4.5 of the Convention. However, Romania implements assistance programmes and activities on a voluntary basis, contributing in line with Article 9.2 of the Paris Agreement, which encourages other Parties to provide or continue to provide such support voluntarily.

Romania's assistance is provided in line with Law no. 213/2016⁵⁵, which regulates international development co-operation and humanitarian aid. The law sets out the strategic objectives, the programmatic and institutional framework, as well as the financing and implementation modalities of Romania's development co-operation. In terms of international development co-operation and humanitarian assistance, Romania's global strategic objective is to contribute to the eradication of extreme poverty through effective partnerships with partner countries to achieve their sustainable development objectives.

In the analysed period, 2021-2022, RoAID (Romanian Agency for International Development) is mentioning that through the Multiannual Strategic Program on the International Development Cooperation and Humanitarian Assistance for the period 2020-2023⁵⁶, Romania continues to promote actions targeting the consolidation of democracy and the rule of law, the observance of human rights, peace and security, sustainable economic development, the fight against the effects of climate change and the strengthening of resilience in the least developed countries, in order to consolidate Romania's contribution to the international efforts to fight extreme poverty and increase security in the world.

The Program is also connected to Romania's National Sustainable Development Strategy 2030, approved by GD no. 877/2018⁵⁷ and whose implementation is coordinated by the Department of Sustainable Development from the Government of Romania.

The vulnerabilities from which the priorities of the 2030 Agenda derived were further exacerbated in the context of the COVID-19 pandemic, threatening the progress achieved until now in implementing the SDGs. The international development cooperation was focused on its neighbouring regions, the Western Balkans, Eastern Partnership countries, and Africa. RoAID is the main institution managing ODA grants and reporting to OECD-DAC.

Climate change is associated with the increase of the frequency of natural disasters of the past years; the fight against the effects of climate change and of the crisis situations are methods to prevent disasters. Romania support to developing countries in the field of climate change is structured in three key areas: financing, technology development and transfer, and capacity building.

⁵⁵ <https://legislatie.just.ro/Public/DetaliuDocument/183528>

⁵⁶ <https://roaid.ro/en/the-multiannual-strategic-program-on-the-international-development-cooperation-and-humanitarian-assistance-for-the-period-2020-2023/>

⁵⁷ <https://legislatie.just.ro/Public/DetaliuDocumentAfis/208312>

A. National circumstances and institutional arrangements

Romania provides support to developing countries in line with Articles 9–11 of the Paris Agreement, the Modalities, Procedures and Guidelines (MPGs) adopted through Decision 18/CMA.1, and the operational clarifications under Decision 5/CMA.3. The reporting covers Official Development Assistance (ODA) and Other Official Flows (OOF) confirmed through the OECD-DAC reporting system.

In response to the effects of the pandemic, in 2021 Romania reconfigured its development assistance projects by strengthening the institutional capacities of health systems, ensuring food security, sustainable management of water resources and combating fake news. In addition, Romania responded to the call of the Global Humanitarian Response Plan, by adjusting the Romanian Agency for International Development (RoAID) Agency annual approach to allocating voluntary contributions to international organisations able to respond to the urgent situations caused by the pandemic.

In 2022, Romania joined two regional TEIs and is considering joining more. These are the Green Team Europe Initiative (ASEAN)/South East Asia corresponding to UN SDGs on Zero Hunger, Affordable and Clean Energy, Decent Work and Economic Growth, Sustainable Cities and Communities, Responsible Consumption and Production, Climate Action, Life Below Water, Life on Land; and Water-Energy-Climate Change in Central Asia, corresponding to UN SDGs on Clean Water and Sanitation and Affordable and Clean Energy⁵⁸.

Romania's institutional framework for identifying, coordinating, and reporting ODA is coordinated by the MAE - Ministry of Foreign Affairs through RoAID, with the support of MF - Ministry of Finance (MF), MMAP – Ministry of Environment, Waters and Forestry in climate-related matters, and other line ministries, depending on project relevance. To this aim an Advisory Committee was established in order to ensure the coherence of action in the field of international development cooperation and humanitarian assistance, according to GD no. 678/2017⁵⁹.

The BTR1 presents detailed financial support for 2021 and 2022, fully aligned with the Common Tabular Formats (CTF) adopted at CMA3.

Institutional arrangements in terms of financial support provided and mobilized

Romania reports climate-related ODA and OOF based on the annual OECD-DAC reporting exercise, coordinated by RoAid, are the basis for this first Biennial Transparency Report, which presents data on financial contributions for the years 2021 and 2022, consistent with 18/CMA.1.

For 2021–2022, all Romanian contributions were grants, representing either:

- bilateral support to specific developing countries (e.g., Serbia), or
- core contributions to multilateral international organizations active in environmental protection, climate action or sustainable development

Romania uses a clearly defined institutional process:

⁵⁸ AidWatch 2022 <https://aidwatch.concordeurope.org/2022-report/>

⁵⁹ <https://legislatie.just.ro/public/DetaliiDocument/193370>

1. Data collection from all ministries through MAE and RoAid (ODA and OOF).
2. Verification of eligibility following OECD-DAC and UNFCCC MPGs.
3. Classification by type of support (mitigation/adaptation/cross-cutting), sector, subsector and Rio Markers.
4. Consolidation by MMAP for the BTR submission.

a) Systems and processes used to identify, track and report support

- ODA and OOF flows are extracted from the operational Reportnet 3.0 platform of the European Environment Agency (EEA): <https://reportnet.europa.eu/> - including data from RoAid's annual reporting to the OECD (CRS); data are validated through inter-ministerial consultation.
- The exchange rate used is the annual average RON/USD published by the National Bank of Romania (BNR) (2021: 4.1604 RON/USD; 2022: 4.6885 RON/USD).
- All contributions included in BTR1 were provided/disbursed, not only committed.
- Climate relevance is identified using Rio Markers, following the OECD Rio Marker Handbook and MPGs (18/CMA.1).

Examples from Romania's 2021–2022 contributions (taken from the excel tables ROU-CTF-FTC-2024-V0.1):

- Voluntary contribution to UNDP Serbia – “Climate Smart Urban Development” (mitigation; ODA grant; mobilized private co-financing reported separately).
- Financial support mobilised through public contribution for Georgia – “Expansion of the Qartili Wind Farm” (adaptation; Technology development and transfer).
- Contribution to the Minamata Convention Trust Fund (UNEP) – cross-cutting sector “Other – hazardous chemicals” (ODA grant).
- Contribution to Stockholm Convention Trust Fund (UNEP) – cross-cutting (chemicals & waste).
- Contribution to the Vienna Convention Trust Fund (Ozone Layer Protection) – cross-cutting (ozone-depleting substances).
- Core contributions to international organizations active in environmental protection and sustainable development (reported as general/core multilateral).

b) Difficulties and limitations

Romania faces the following challenges:

- Multilateral institutions do not always provide climate-specific imputed shares.
- Limited availability of systematic data on capacity-building and technology transfer elements in ODA projects.
- Ensuring consistent application of Rio Markers across all line ministries.
- Alignment of national ODA reporting systems with UNFCCC CTF structures (consistent with 18/CMA.1).

c) Experiences and best practices

Romania encourages mobilisation of private finance in co-financed ODA projects through RoAid, which reports mobilized private contributions following OECD's methodology for measuring private climate finance (DAC Working Party on Development Finance Statistics), consistent with 5/CMA.3 guidance on mobilized finance. Additionally, Romania aims to stimulate a growing involvement of the various development cooperation stakeholders, such as non-governmental organizations (NGOs), media, academia, and social partners.

d) Efforts to improve comparability and accuracy

Romania applies:

- OECD-DAC standards for ODA/OOF.
- UNEP, UNDP, and other multilateral reporting templates.
- Consistency checks with Rio Markers and sector/subsector classifications (DAC5).
- Use of BNR official exchange rates for full transparency.

Institutional arrangements in the area of support for technology development and transfer and for capacity building

Romania's support in technology development, transfer and capacity-building is coordinated by MMAP with contributions from:

- RoAid (MAE).
- MEC (Ministry of Education and Research) and other line ministries (MMAP, MDLPA etc.).
- national research institutes and universities participating in EU/UN programs.

Examples of support actions (2021–2022):

- Environmental governance capacity-building for partner countries through RoAid projects.
- Technology development and transfer in fields like wastes management, renewable energy.
- Support to regional climate and environment training initiatives involving Romanian experts.
- Knowledge-exchange workshops on adaptation planning and disaster risk reduction.

These actions are aligned with Article 10 (Technology) and Article 11 (Capacity-building) of the Paris Agreement and with the MPGs (18/CMA.1).

B. Assumptions, definitions and methodologies

Financial support

Romania applies the following assumptions and methodologies:

- Reporting year: calendar year.
- Currency conversion: BNR annual average RON/USD (4.1604 for 2021; 4.6885 for 2022).

- Status: all contributions were provided/disbursed.
- Funding source: ODA and OOF, confirmed by OECD.
- Financial instruments: all Romanian contributions are grants.
- Sector/subsector: based on OECD-DAC CRS purpose codes (DAC5) (<https://iatistandard.org/en/iati-standard/203/codelists/sector/>).
- Rio Markers: applied as per OECD methodology (significant/primary), consistent with 18/CMA.1.

Romania avoids double counting by:

- reporting only the Romanian share of contributions,
- excluding any contributions potentially associated with Article 6 mechanisms (Romania does not use Article 6 finance),
- reporting mobilized private finance only when directly attributable to Romanian public intervention.

Support for technology development and transfer and capacity building

- Activities were classified as mitigation, adaptation or cross-cutting based on descriptions in the project documentation.
- Only completed or ongoing actions were included, not planned ones.
- Additional web references or institutional links are provided when available.
- Sector classification follows OECD-DAC sectors where applicable.

C. Information on financial support provided and mobilized

Detailed quantitative information for 2021–2022 is presented in Table III.1, 2 and 3 (CTF Annex: Support Provided and Mobilized).

All values represent public grants, disbursed, expressed in constant USD using the BNR annual average exchange rates.

D. Information on support provided for technology development and transfer

Romania supports technology development and transfer primarily through:

- Bilateral ODA projects focusing on environmental management - waste (infectious medical wastes), renewable energy and wastes recovery.
- Contribution to adaptation and cross-cutting activities.

These activities follow Article 10 of the Paris Agreement and are included in Table III.4 (technology)

E. Information on support provided for the development of the capacity-building

Romania engages in capacity-building support through:

- ODA projects implemented via RoAid, focusing on environmental governance, local climate action, alternative energy, biodiversity conservation and water-sanitation.
- Training activities, expert missions and institutional strengthening in partner countries.
- Contributions to bilateral organizations active in capacity-building for climate action.

These efforts follow Article 11 of the Paris Agreement, and the MPGs (18/CMA.1, Chapter VI).

Details are presented in Table III.5 (Capacity-building support).

VI. Annex to the Biennial Transparency Report

The following annexes are available as separate submissions on the UNFCCC website:

- Common reporting tables for GHG emissions and removals;
- Common tabular formats for information necessary to track progress;
- Common tabular formats for information on support provided and mobilised,
- The National Inventory Document is submitted as a stand-alone document.