



MINISTRY OF ENVIRONMENT

Romania's Third Biennial Report under the UNFCCC

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I. Introduction

This is the third Biennial Report (3BR) of Romania, as required under Article 18(1) of Regulation (EU) No 525/2013 and Decision 2/CP.17 of the Conference of the Parties under the United Nations Framework Convention on Climate Change (UNFCCC).

Tabular information as defined and required by the UNFCCC Biennial report guidelines are enclosed in the CTF annexes and submitted electronically through UNFCCC Application and Network Access Portal.

II. Information on GHG emissions and trends

This section summarizes information on the Romania historic greenhouse gas (GHG) emissions since 1989. The GHG emission data presented in this Biennial Report are consistent with the GHG emissions reported by Romania in 2017 under the Convention to the UNFCCC secretariat and correspond to the totals in the CRF tables under the Convention.

Indirect emissions of CO₂ are not included in the emission data quoted in this Report.

II.1. Summary information on GHG trend

The emission data presented here is based on national greenhouse gas inventory covering the period 1989 to 2015, submitted to the UNFCCC on 14th April, 2017¹. The inventory is in line with the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention (Decision 24/CP.19) and with Regulation (EU) No. 525/2013.

II.1.1. Trends in total GHG emissions

In 2015 total GHG emissions, excluding LULUCF, were estimated at 116,426.73 Gg CO₂ eq. The values for the Global Warming Potential (GWP) used to convert GHG emissions into the CO₂ eq are from the IPCC Fourth Assessment Report (AR4) and presented in Annex -Table 2 (c).

¹ http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/10116.php

For Romania, the base year is 1989 based on Decision 24/CP.19², II.D in accordance with the provisions of Article 4, paragraph 6 of the Convention and Decisions 9/CP.2, 11/CP.4 and 7/CP.12

Between 1989 and 2015, total GHG emissions (excluding LULUCF) decreased by 61.36% and net GHG emissions (including LULUCF) decreased by 65.55 % (Figure II.1).

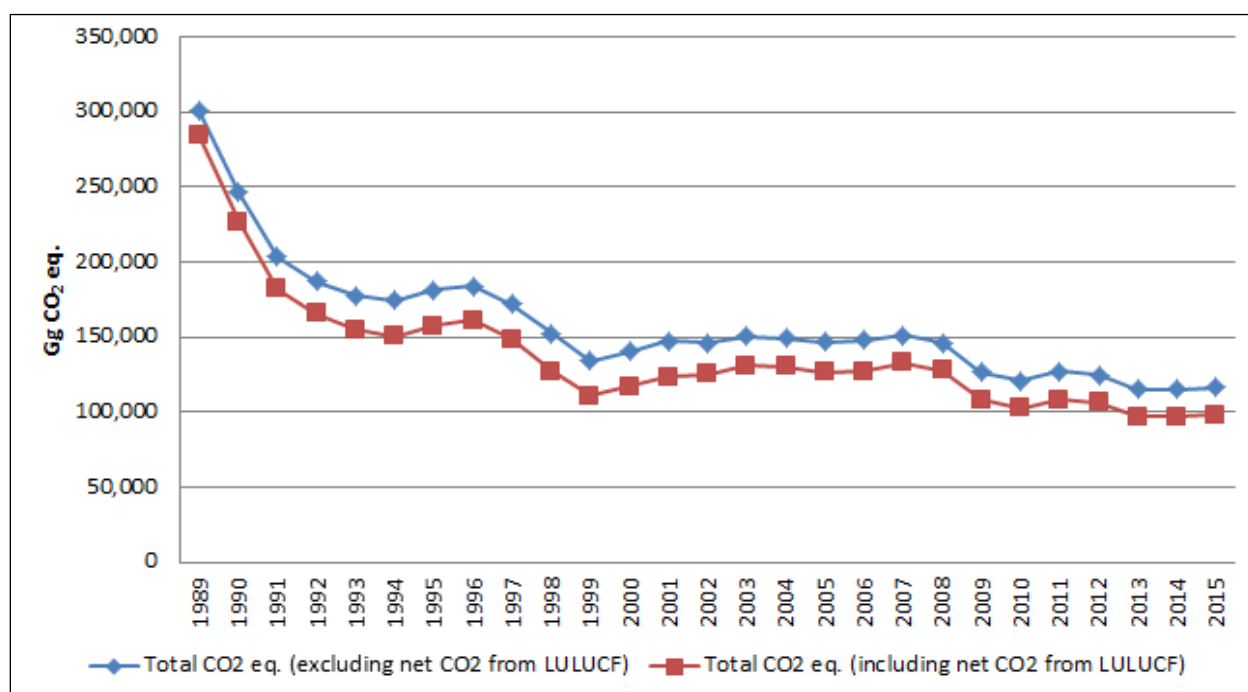


Figure II.1. Trends in total GHG emissions

The evolution of GHG emissions can be divided into three periods: 1989-1999, 2000-2007 and 2008-2015.

The 1989-1992 period was characterized by a decrease in total GHG emissions, a direct result of the decline in economic activities and, in consequence in energy demand. The transition period at the economic level, involved the reduction of activities carried out by certain energy-intensive industries, which led to the decrease of GHG emissions. GHG emissions have seen an upward trend until 1996 because of revitalizing economic activity. In 1997, GHG emissions declined again because of the commissioning of the first reactor at the Cernavoda nuclear power plant (1996); the decrease continued until 1999. After 1999, the GHG emissions trend reflects the

² Revision of the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention, Decision 24/CP.19, FCCC/CP/2013/10/Add.3, <http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf#page=2>

economic development registred in 2000-2007. The decrease of GHG emissions in 2005, compared to the levels recorded in 2004 and 2006, was caused by a significant contribution of hydropower (hydrological year records).

Because of the economic and financial crisis, GHG emissions decreased significantly in 2010 compared to 2008. In the period 2010-2015 the GHG emissions remained relatively constant.

II.1.2. Trends in emission by GHG

GHG emissions, excluding HFCs and SF₆, decreased compared to the base year. Regarding the contributions of different types of greenhouse gases to total GHG emissions, they did not registred significant change over the period considered. CO₂ has the largest share of total GHG emissions, followed by CH₄ and N₂O.

In the base year, the share from total GHG emissions (without LULUCF), were: 69.12 % for CO₂, 23.29% for CH₄, 6.11% for N₂O and 1.48% for PFC. HFC and SF₆ emissions are negligible (0.16 Gg CO₂ eq for HFC and 0.47 Gg CO₂ eq for SF₆).

In 2015, registered shares, relative to total GHG emissions (without LULUCF) were as follows: 67.00 % for CO₂, 25.42 % for CH₄, 6.12% for N₂O and 1.46% for HFC, PFC and SF₆.

Since 1995, F gases have started to be used as substitutes for ODS in air conditioning and refrigeration systems. In 2015, the contributions of these gases to total GHG emissions were small: 1.41% for HFCs, 0.01% for PFCs and 0.04% for SF₆.

Total GHG emissions trends per gas type (without / with LULUCF) are presented in the next figure (figure II.2).

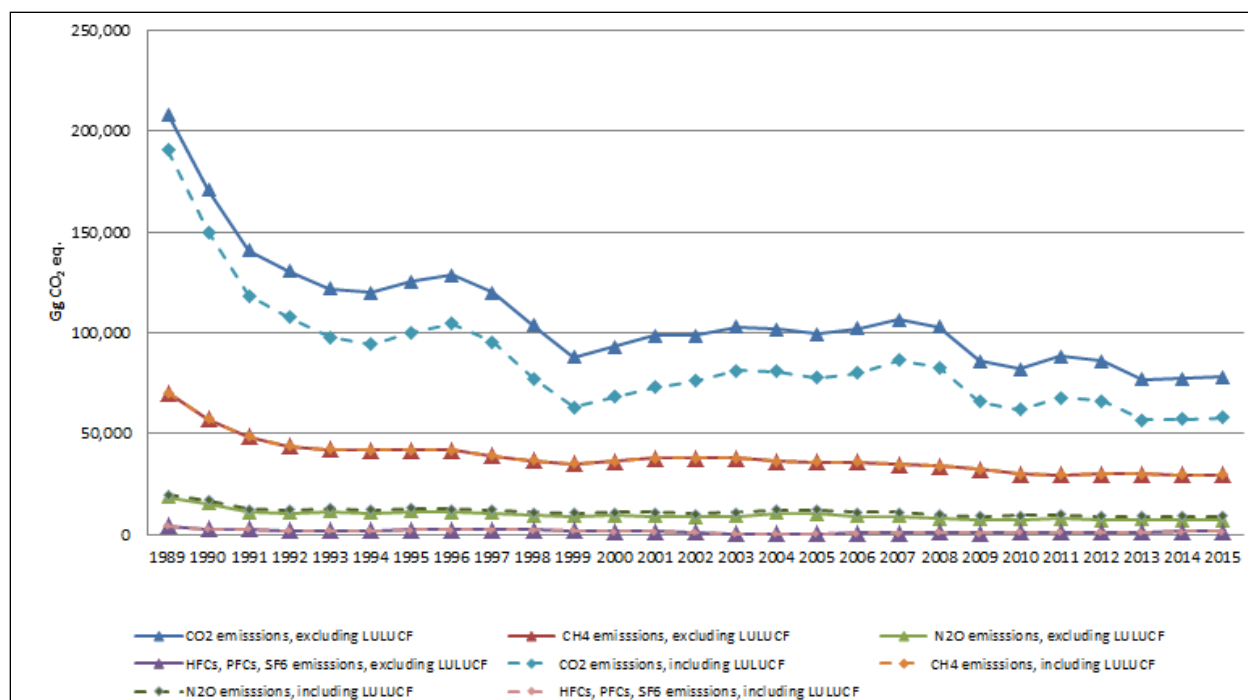


Figure II.2. GHG emissions (without/with LULUCF) trend per gas type

II.1.2.1. Carbon dioxide

Carbon dioxide (CO₂) is the most important anthropogenic greenhouse gas. The decrease in CO₂ emissions (from 208,314.33 Gg CO₂ eq. in 1989 to 78,013.49 Gg CO₂ eq. in 2015) is due to the decrease in the amount of conventional fossil fuels used in the energy sector (mainly in the *Public electricity and heat production* and *Manufacturing industries and construction*), a result of the decline in economic activities.

II.1.2.2. Methane

Methane (CH₄) – methane emissions, mainly generated by fugitive emissions from the extraction and distribution of fossil fuels and livestock, fell by 57.84 % in 2015 compared to 1989 levels (from 70,195.76 Gg CO₂ eq. in 1989 to 29,592.00 Gg CO₂ eq. in 2015). The decrease in CH₄ emissions in the *Agriculture* sector is due to the decrease in livestock.

II.1.2.3. Nitrous oxide

Nitrous oxide (N₂O) – N₂O emissions are mainly generated by the *Agriculture* sector (*Agricultural Soils* activities) and *Industrial Processes and Product Use* (*Chemicals*

Industry activities). The evolution of N₂O emissions reflects the downward trend of these activities due to the decrease in livestock, the amount of synthetic nitrogen fertilizer applied to soils and the levels of crop production. In 2015, N₂O emissions decreased by 61.28% compared to the emissions in the base year.

II.1.2.4. Fluorinated gases

Fluorinated gases - F gases have begun to be used as a substitute for ODS in refrigeration and air conditioning systems since 1995. PFC emissions generated in the primary aluminum production process declined significantly (by 99.85%) in 2015 compared to 1989.

II.1.3. Trends in GHG emissions from main source and sink categories

The emissions trends from main source and sink categories for the period 1989-2015 (Figure II.3) according to the latest National GHG Inventory transmitted to the UNFCCC in 2017 is presented in detail in Chapters III.B.3 and III.B.4 of the 7th National Communication.

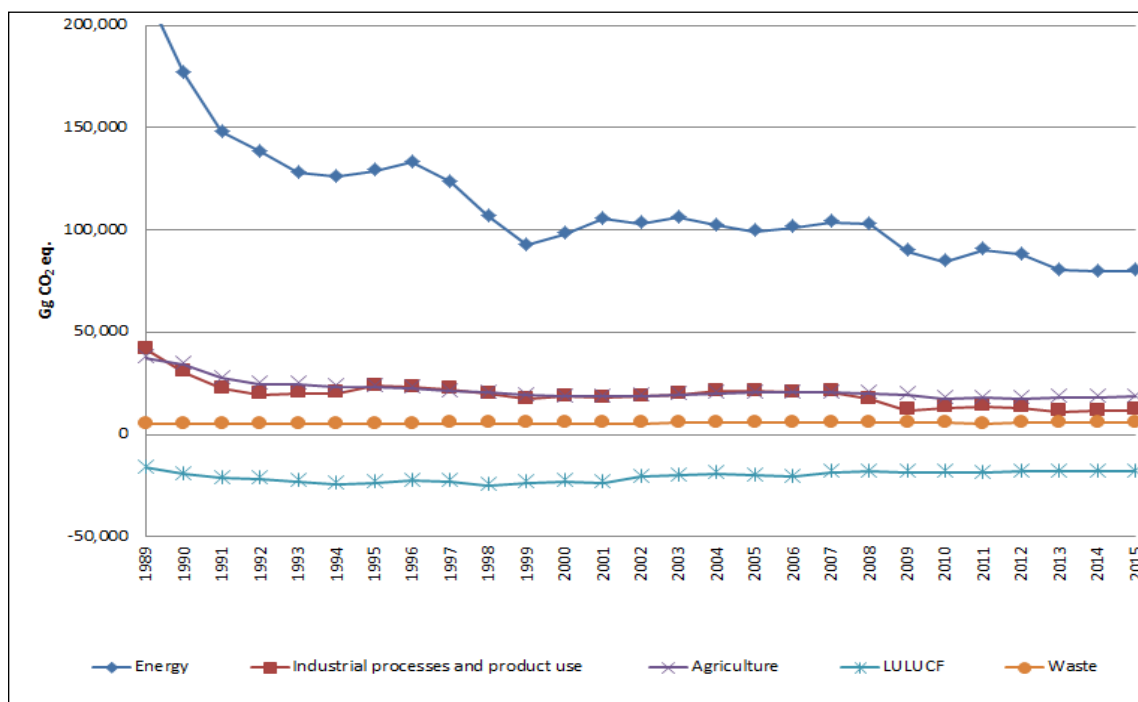


Figure II.3. GHG emissions trends from main source and sink categories

In 2015, total GHG emissions from the *Energy sector* accounted for the largest share (81.59%), followed by those from *Agriculture sector* with a share of 18.96 % and those from *Industrial Processes and Product Use sector* with a share of 12.09 %.

II.1.3.1. Energy Sector

Energy is the most important sector in Romania; in 2015, this sector had a share of approximately 81.59 % from total GHG emissions (without LULUCF), accounting for 80,098.16 Gg CO₂ eq. Compared to the base year, GHG emissions in 2015 decreased by 63.07%. The main reason for this trend is the process of transition to a market economy that has led to a sudden decrease in the demand for electricity produced by power plants.

In the period 1989-2015 the total GHG emission trends is characterized by substantially decreasing in emissions from the *Manufacturing industries and construction* category (81.72 %), *Other* (81.39 %) and *Fugitive emissions from fuels* category (71.60 %) and the significant increase in emissions related to *Transport* category (41.3 %) (Figure II.4).

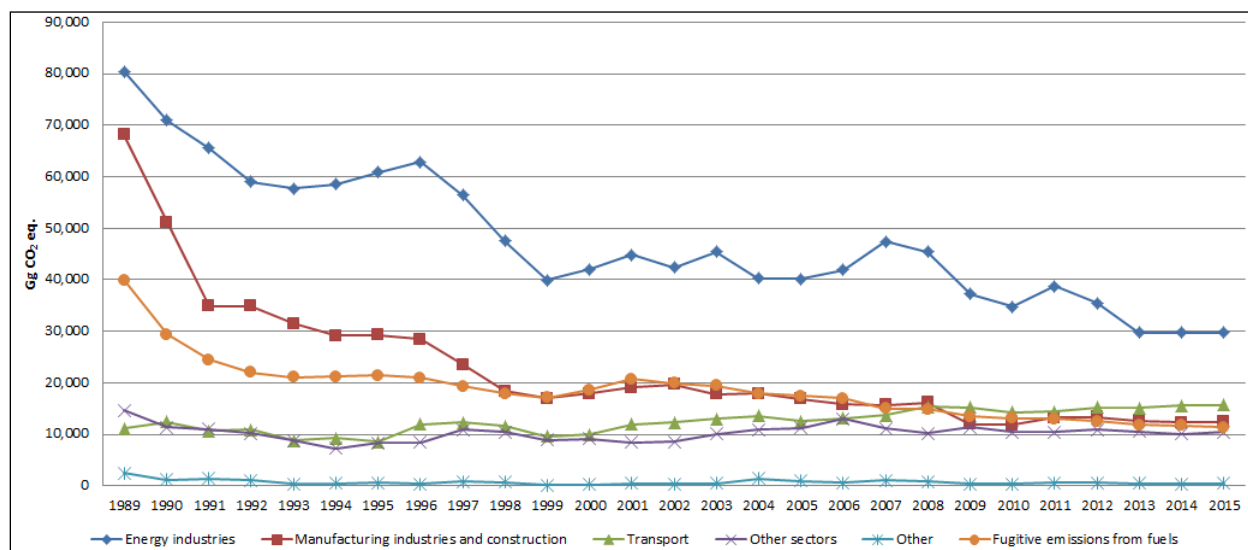


Figure II.4. Trends in GHG emissions from Energy sector, 1989-2015

In 2015, the total GHG emissions related to the *Energy Industries* category had the highest share (37.11%), followed by *Transport* category (19.64%) and *Manufacturing industries and construction* category (15.55%). Also, CO₂ emissions in the *Energy sector* accounted for 58.48% of total national GHG emissions (without LULUCF), CH₄ emissions (calculated as CO₂ eq) represent 9.88 % and N₂O (calculated as CO₂ eq) represent 0.44%. Compared to 2014, in 2015 GHG emissions from the Energy sector increased by 0.33%.

II.1.3.2. Industrial Processes and Product Use sector

In 2015, IPPU sector had a share of 12.09 % from total GHG emissions (without LULUCF), accounting for 11,872.22 Gg CO₂ eq. Compared to the base year, GHG emissions in 2015 decreased by 71.61 %.

Since 1989, total GHG emissions from the IPPU sector have registered a downward trend due to restructuring and privatization processes, the effects of the economic and financial crisis and the implementation of specific policies and measures (i.e. EU-ETS). These have resulted in a decrease in production levels and in emission factors.

The trend of total GHG emissions over the period 1989-2015 is characterized by a significant reduction in emissions for the following categories: *Chemical industry* (90.52 %), *Metal industry* (79.75 %) and *Non-Energy products from fuels and solvent use* (68.96 %) and the significant increase in emissions from the category *Products used as substitutes for ODS* (Figure II.5).

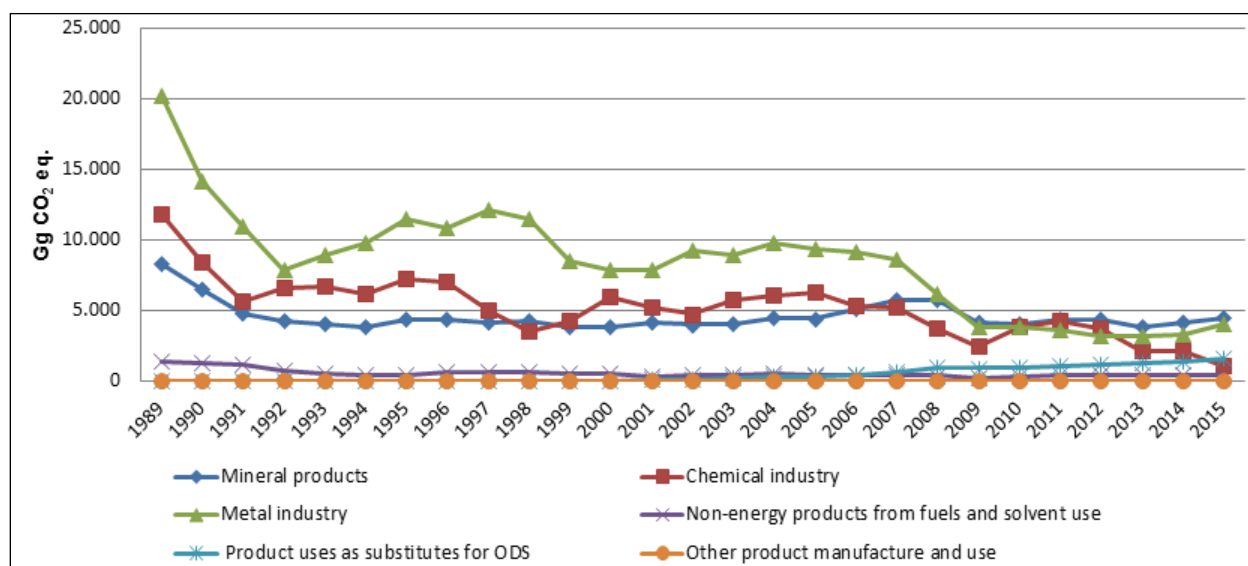


Figure II.5. Trends in GHG emissions from IPPU sector, 1989-2015

In 2015, total GHG emissions from *Mineral industry* category had the largest share (38.03 %), followed by those from *Metal industry* category (34.58 %) and those for the category *Products used as substitutes for ODS* (13.79 %). CO₂ emissions also account for 8.44 % of total GHG emissions (without LULUCF), HFC emissions (calculated as CO₂ eq) are 1.41% and N₂O (calculated as CO₂ equiv) accounted for 0.29%. Compared to 2014, in 2015, GHG emissions in this sector recorded an increase of 3.03%.

II.1.3.3. Agriculture sector

In 2015, total GHG emissions for the Agriculture sector accounted for 18.96 % of total GHG emissions (without LULUCF), amounting to 18,613.03 Gg CO₂ eq. Compared to the base year, GHG emissions in 2015 decreased by 50.38 %.

Since 1989, total GHG emissions in the Agriculture sector have seen a downward trend due to the decrease in livestock, rice cultivated areas, crop production levels and the amount of synthetic nitrogen fertilizer applied to soils.

The total GHG emissions trends between 1989 and 2015 was characterized by a significant decrease in emissions from the following categories: *Liming* (78.93 %), *Rice cultivation* (72.98 %), *Manure management* (61.86 %), *Enteric fermentation* (49.20 %), *Agricultural soils* (48.48 %), *Urea application* (46.34 %) and *Field burning of agricultural residues* (12.84 %) (Figure II.6).

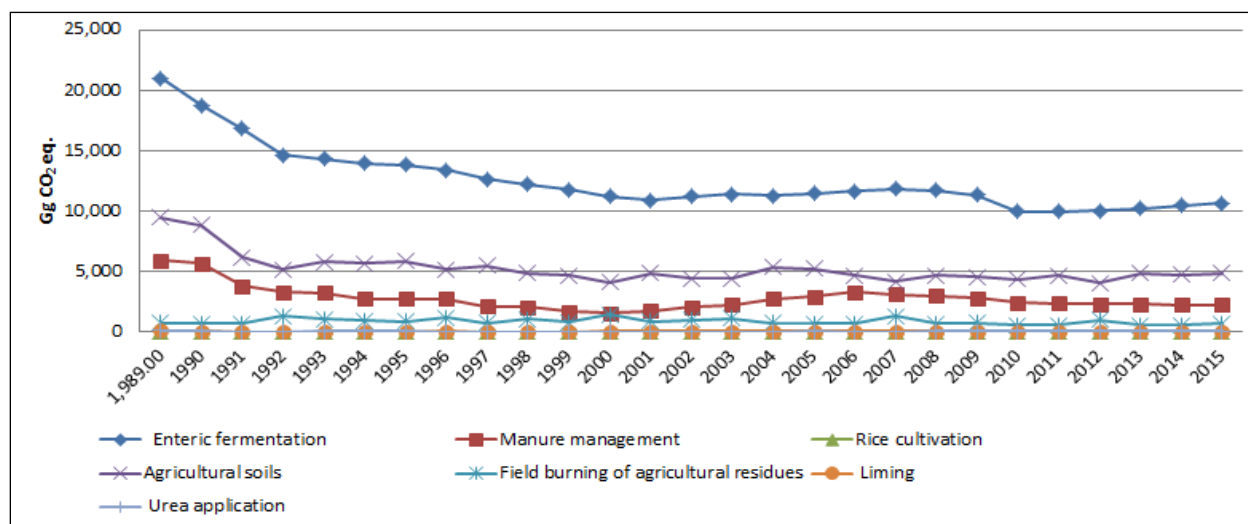


Figure II.6. Trends in GHG emissions from Agriculture sector, 1989-2015

In 2015, the total GHG emissions from *Enteric fermentation* category had the largest share (57.39 %), followed by the *Agricultural Soils* category (26.32 %) and the category of *Manure Management* (12.16 %). Also, CO₂ emissions in the *Agriculture sector* accounted for 0.08 % of total GHG emissions (without LULUCF), CH₄ emissions (calculated as CO₂ eq) accounted for 10.98 % and N₂O (calculated as CO₂ eq) for 4.93 %. Compared to 2014, in 2015, GHG emissions in this sector recorded an increase of 2.32%.

II.1.3.4. Land Use, Land-Use Change and Forestry

Agricultural lands, including arable, orchards, vineyards, pastures and hayfields makes up 61.3% of Romania's total national area. Forests cover 28.3% while constructed areas and road/railways, cover some 4.8%, humid areas, water and lakes some 3.5% and other land 2.1%.

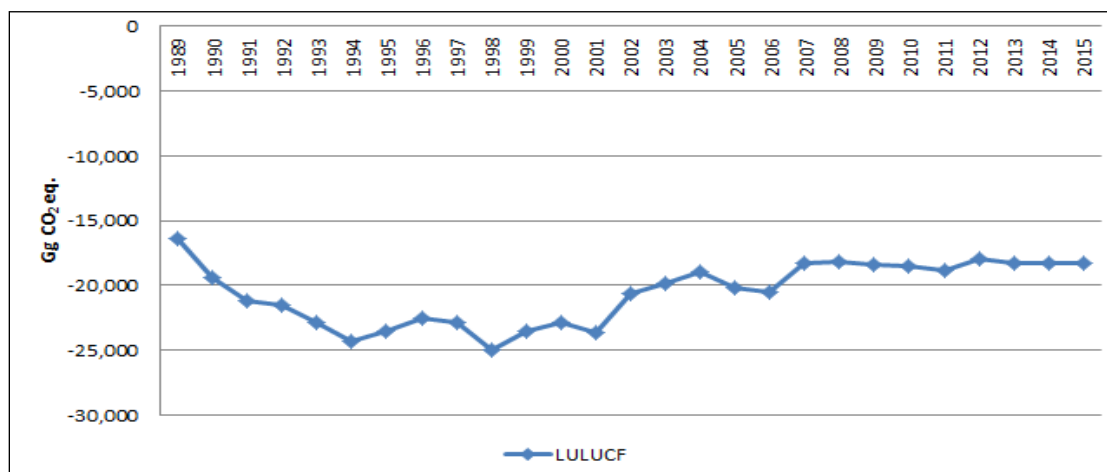


Figure II.7. Overall emissions trend for Land-Use, Land-Use Change and Forestry

Emissions from LULUCF comprise CO₂, CH₄ and N₂O emissions from biomass burning. The net GHG removals/emissions level is 11.83 % higher in 2015 in comparison with the base year level due to the decrease trend of emissions from all other sectors. The Romanian land use sector acts as a net sink, at an average uptake of 20,531.11 Gg CO₂/year, being relatively stable over the last 27 years.

II.1.3.5. Waste

In 2015, total GHG emissions for the Waste sector had a share of 5.95 % of total GHG emissions (without LULUCF), accounting for 5,843.31 Gg CO₂ eq. Compared to the base year, GHG emissions in 2015 increased by 13.78 %.

Between 1989 and 2015, total GHG emissions from the Waste sector increased because of increased population consumption, increased number of landfills and increased number of persons with access to sewage.

The total GHG emissions trends between 1989 and 2015 is characterized by a significant increase in emissions of the category *Solid waste disposal* (164.47 %) and

the decrease in emissions of category *Waste water treatment and discharge* (40.64 %) (Figure II.8)

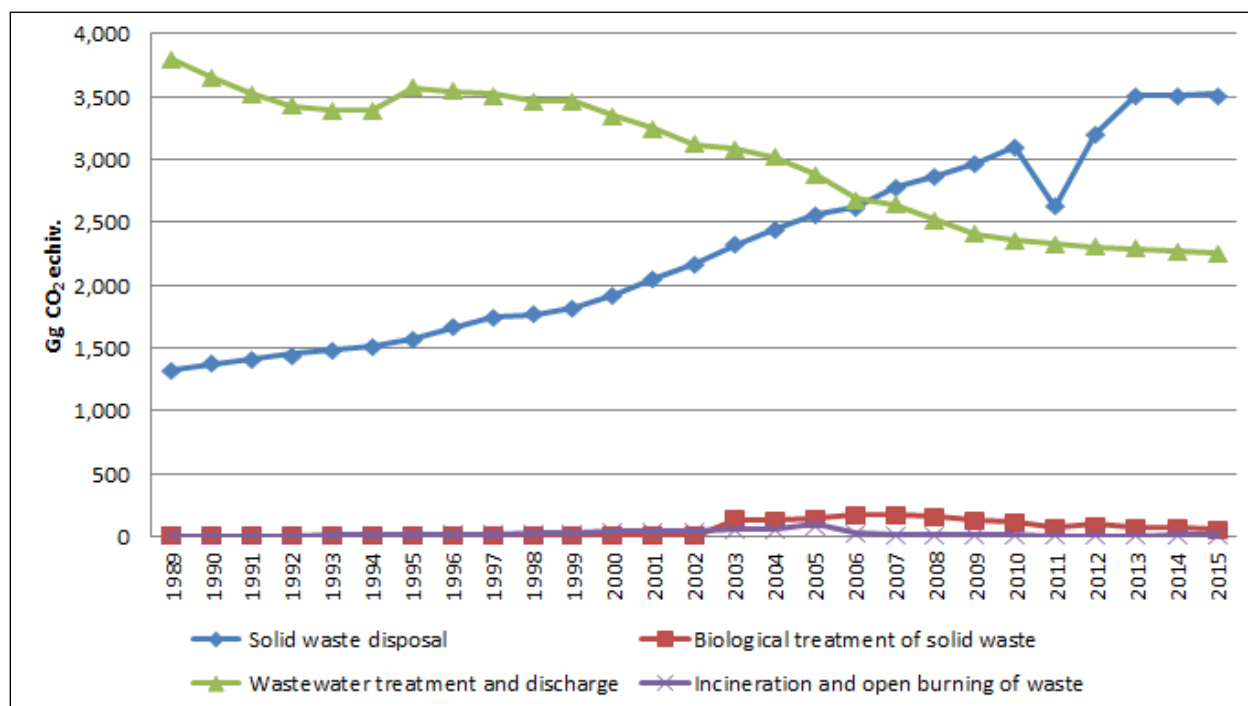


Figure II.8. Trends in GHG emissions from Waste sector, 1989-2015

In 2015, the total GHG emissions of the *Solid waste disposal* category had the highest share (60.24 %), followed by the *Waste water treatment and discharge* (38.65 %) category. Also, CO₂ emissions in the Waste sector represent 0.01% of total national GHG emissions (without LULUCF), CH₄ emissions (calculated as CO₂ eq) accounted for 4.55% and N₂O (calculated as CO₂ eq) represent 0.46%. Compared to 2014, in 2015 GHG emissions in this sector recorded a decrease of 0.03%.

II.1.4. Change in emissions from Key Categories

The sections below present information about changes in the key categories, grouped according to GHG. The analysis of the changes in the key categories are based on the key category analysis presented in the 2017 GHG inventory. The percentages are calculated from the total GHG emissions (without LULUCF) and expressed in CO₂ eq.

II.1.4.1. Carbon dioxide

The largest key category for CO₂ emissions is category 1.A.1.a. - *Public electricity and heat production* accounting for 23.1% of total GHG emissions (without LULUCF). Between 1989 and 2015, the CO₂ emissions in this category decreased by 63.4%.

The second largest key category for CO₂ emissions in 2015 is 1.A.3.b. - *Road transportation* and accounting for 12.8 % of total GHG emissions (without LULUCF). Between 1989 and 2015, the CO₂ emissions in this category increased by 70.6%.

The third largest key category for CO₂ emissions in 2015 is Category 1.A.2. - *Manufacturing industries and construction*, accounting for 10.6 % of total GHG emissions (without LULUCF). Between 1989 and 2015, the CO₂ emissions in this category decreased by 81.7 %.

The fourth largest key category for CO₂ emissions in 2015 is category 1.A.4.b. - *Residential* and accounting for 5.34 % of total GHG emissions (without LULUCF). Between 1989 and 2015, CO₂ emissions in this category declined by 26.7%.

The fifth largest key category for CO₂ emissions in 2015 is Category 2.C.1. - *Iron and steel production* and accounting for 3.23 % of total GHG emissions (without LULUCF). Between 1989 and 2015, the CO₂ emissions in this category decreased by 74.7 %.

II.1.4.2. Methane

The largest key category for CH₄ emissions is category 3.A. - *Enteric fermentation* accounting for 9.1 % of total GHG emissions (without LULUCF). Between 1989 and 2015, the CH₄ emissions in this category decreased by 49.2 %.

The second largest key category for CH₄ emissions in 2015 is 1.B. - *Fugitive emissions from fuels* accounting for 8.94 % of total GHG emissions (without LULUCF). Between 1989 and 2015, the CH₄ emissions in this category decreased by 73.0 %.

The third largest key category for CH₄ emissions in 2015 is Category 5.A. - *Solid waste disposal* accounting for 3.0 % of total GHG emissions (without LULUCF). Between 1989 and 2015, the CH₄ emissions in this category increased by 164.4 %.

II.1.4.3. Nitrous oxide

The most important key category for N₂O emissions is category 3.D. - *Agricultural soils* accounting for 4.2 % of total GHG emissions (without LULUCF). Between 1989 and 2015, N₂O emissions in this category decreased by 48.48 %.

II.1.4.4. Fluorinated gases

The most important key category (94.2% of total F-gases emissions) is category 2.F.1. - *Refrigeration and air conditioning* accounting for 1.3 % of total GHG emissions (without LULUCF).

II.1.5. Key drivers affecting emission trends

The main reasons for the changes during the period 1989 to 2015 are described in more detail in Section 2 “*National Circumstances*” of the 7NC.

II.1.6. Accuracy/ Uncertainty of the data

Romania carried out the uncertainty analysis based on Approach 1 according to the provisions in Ch. 3, Vol.1, IPCC 2006 GIs. Considering the 2017 NGHGI and the Tier 1 method:

- the total NGHGI uncertainty for 2015 excluding LULUCF was 11%, while including LULUCF was 17.5%;
- the uncertainty introduced into the trend in total national emissions, for 2015, was 1.5% when considering excluding LULUCF criteria and 5.9%, including LULUCF.

II.2. National Inventory

In the Chapter III.C of the 7th National Communication are presented in detail the institutional arrangements for the implementation of NGHGI.

Changes in national arrangements made after the submission of the second Biennial Report to the UNFCCC are represented by the change of the responsible authority for the administration of the National System. Since 4 July 2016 this is NEPA in accordance with the provisions of GEO no. 9/2016 and GD no. 284/2016.

III. Quantified economy-wide emission reduction target

In 2010, the EU and its member states submitted a pledge to reduce its GHG emissions by 2020 by 20 % compared to 1990 levels, in order to contribute to achieving the ultimate objective of the UNFCCC: 'to stabilise GHG concentrations at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate

system³, or, in other words, to limit the global temperature increase to less than 2°C compared to temperature levels before industrialization (FCCC/CP/2010/7/Add.1). The EU and its member states had also committed to raising this target to a 30 % emission reduction by 2020 compared with 1990 levels, provided that other developed countries also commit to achieving comparable emission reductions, and that developing countries contribute adequately, according to their responsibilities and respective capabilities. This offer was reiterated in the submission to the UNFCCC by the EU-28 and Iceland on 30 April 2014⁴.

The definition of the Convention target for 2020 is documented in the revised note provided by the UNFCCC Secretariat on the 'Compilation of economy-wide emission reduction targets to be implemented by Parties included in Annex I to the Convention' (FCCC/SB/2011/INF.1/Rev.1 of 7 June 2011). In addition, the EU provided additional information relating to its quantified economy wide emission reduction target in a submission as part of the process of clarifying the developed country Parties' targets in 2012 (FCCC/AWGLCA/2012/MISC.1)⁵. For Romania as a Party undergoing transition to a market-based economy, the base year under both the Convention and the Kyoto Protocol is set as 1989. The use of carbon credits from international market-based mechanisms is explained in the EU submission from 2012. The EU pledge does not include emissions/removals from LULUCF.

Romania's emission reduction target for the years 2013-2020 is part of the joint target of the European Union. The EU quantified economy-wide emission reduction target is implemented through the EU Climate and Energy Package. Key assumptions and conditions related to the EU's target are included in the document FCCC/AWGLCA/2012/MISC.1 and under the EU Third Biennial Report (ch. 3).

Under the Climate and Energy Package, the EU is committed to reducing its greenhouse gas emissions by 20 per cent by 2020 from the 1990 level. The majority of the reduction will be reached as part of Directive 2003/87/EU- EU emissions trading scheme (EU ETS): in 2020, emissions from sectors covered by the EU ETS will be 21 per cent lower than in 2005. The Decision no. 406/2009/EC-Effort Sharing Decision established binding annual greenhouse gas emission targets for Member States for the period 2013–2020. These targets concern emissions from sectors not included in the EU ETS such as transport, housing, agriculture and waste. The emissions will be cut by approximately 10 per cent from the 2005 level by 2020 within the EU as a whole. Romania's reduction obligation for the sectors not covered by the EU ETS is +19 per cent. It is up to each Member State to decide how these targets will be achieved, but domestic measures are needed to fulfil the targets. Certified emission reduction units

3 First steps to a safer future: Introducing the United Nations Framework Convention on Climate Change, http://unfccc.int/essential/_background/convention/items/6036.php

4 European Union, its Member States and Iceland submission pursuant to par 9 of decision 1/CMP.8',

http://ec.europa.eu/clima/policies/international/negotiations/docs/eu_submission_20140430_en.pdf

5 European Union, its member states submission by Denmark and European Commission, <http://unfccc.int/resource/docs/2012/awglca15/eng/mise01.pdf>

from the clean development mechanism and emission reduction units from joint implementation projects, as well as units transferred from other Member States, can be used to fulfil the targets.

A Member State that fails to meet its annual target will be penalised with an additional 8 per cent emission reduction obligation for the following year. The Climate and Energy Package⁶ also requires Romania to increase its use of renewable energy sources to 24 per cent of final energy consumption by 2020 and the share of biofuels in gasoline and diesel to 10 per cent by 2020.

Romania implemented the first commitment period (2008-2012) of the Kyoto Protocol to the UNFCCC, the emissions reduction commitment (8% in 2008-2012 compared to the base year emissions -1989) being fulfilled.

The description of the Romania's economy-wide emission reduction target is provided in the table III.1 and in the CTF tables 2 (a)-2 (f).

Table III.1 - Informations regarding Romania's economy-wide emission reduction target

Parameters	Informations
Base year	1989
Gases covered	CO ₂ ; CH ₄ ; N ₂ O; HFCs; PFCs; SF ₆
Sectors included	Energy; Transport; Industrial Processes and Product Use; Agriculture; Waste.
Global Warming Potential	AR4
Land Use, Land-Use Change, and Forests (LULUCF)	Emissions and removals from the Land Use, Land-Use Change and Forestry Sector are not included in the quantified economy-wide emission reduction target.
Use of international credits (JI and CDM)	Romania does not plan to use market-based mechanisms under the Convention to achieve the target.
Other informations	Not applicable

IV. Progress in achievement of QEWER targets and relevant information

IV.1. Introduction

This chapter of the third Biennial Report briefly outlines policies and measures to reduce GHG emissions and progress in meeting the QEWER targets, which are detailed in Chapter IV of the 7th National Communication.

Further information on mitigation actions and progress is provided in Annex 2 – CTF, namely:

⁶ EU's Climate and Energy Package, http://ec.europa.eu/clima/policies/package/index_en.html.

- Table 3: Progress in achievement of the quantified economy-wide emission reduction target: information on mitigation actions and their effects;
- Table 4: Report on progress;
- Table 4(a)I: Progress in achieving the quantified economy-wide emission reduction targets - further information on mitigation actions relevant to the contribution of the land use, land-use change and forestry sector.

IV.2. Policies and measures common to some sectors

The common policies and measures to reduce GHG emissions in some sectors are:

- GD no. 1460/2008 for the approval of the National Strategy for Sustainable Development - Horizons 2013-2020-2030
- Law no. 278/2013 on industrial emissions
- GD no. 780/2006 establishing the scheme for greenhouse gas emission allowance trading, amended by GD no. 133/2010, GD no. 399/2010, GD no. 1300/2010, GEO no. 115/2011 and GD no. 204/2013
- Law no. 121/2014 on energy efficiency modified and completed by Law no.121/2014
- Law no. 220/2008 on establishing the promotion system for the energy production from renewable energy sources, amended and completed by Law no. 139/2010
- Commitments up to 2020 for non-ETS sectors

IV.3 Sectoral policies and measures

For developing and operationalizing the National Climate Change Strategy 2013 - 2020, approved by GD no. 529/2013, the Government of Romania, through MWAP (currently ME), requested the World Bank to provide advisory services and signed in 2013 the consultancy services agreement for the “*Romania: Climate Change and Low Carbon Green Growth Program*“. The project was co-financed by the European Regional Development Fund, through the Technical Assistance Operational Program 2007 – 2013.

Based on the mentioned program, the *National Climate Change and Low Carbon Green Growth Strategy for period 2016 – 2020* and the *National Action Plan for implementation of the National Climate Change and Low Carbon Green Growth Strategy for period 2016 – 2020* had been developed, approved by the **Government of Romania on 05.10.2016, through GD no. 739/2016.**

Through the GD, the National Climate Change Strategy 2013 – 2020 is updated and extended on medium and long terms, in alignment with recent EU targets and with Operational Programs 2014 – 2020 that places the climate change among the priority environment objectives for economic growth development.

The National Climate Change and Low Carbon Green Growth Strategy for period 2016 – 2020 (*National CC/LCGG Strategy*) and the National Action Plan 2016 - 2020, as programmatic documents for the period 2016 - 2020 – 2030, including the roadmap for 2050, establish the Romania's operational actions for GHG emissions mitigation and climate change adaptation.

The main objective of the National CC/LCGG Strategy is to reduce the GHG emissions from economic activities in alignment with EU targets and to adapt to the effects of climate variability and change, both current and future.

The National CC/LCGG Strategy, covering the period up to 2030 and outlining the roadmap for 2050, includes the following additional information:

- Presents detailed information related to the climate change impact in different sectors of economy (energy, industrial processes, transport, LULUCF, agriculture, etc.), formulate a vision statement of national objectives on climate change policies and how they are related to green development strategy and, respectively, formulate a set of objectives on specific areas of policy;
- The section related to GHG emissions mitigation includes data on targets for 2030 and 2050 and their implications for economic growth and distribution in Romania; also, information on the associated costs for GHG emissions mitigation and mitigation potential on economic sectors are included;
- Two new sections on financing the development with low carbon green growth and, respectively, monitoring and reporting;
- The section related to adaptation to the effects of climate changes provides more quantitative information about the potential impacts of climate change for agriculture and rural development, water, industry, energy, tourism, biodiversity, public health, public education, awareness and insurance.

For GHG emissions mitigation, the National CC/LCGG Strategy adopts quantifiable targets in line with EU targets for 2030 (40 % reduction of GHG emissions compared to 1990 levels and improving the energy efficiency with 27 %), and, respectively, considers the Romania's commitments for 2020, as an EU member state (increasing the share of renewable energy by 24% in final energy consumption, reducing primary energy consumption by 19% comparing with the reference value, the annual emission allocations for ESD sectors, the ETS).

The strategic objectives of the National CC/LCGG Strategy for GHG emissions mitigation on economic sectors are the following:

- **Energy:**
 - ✓ Objective 1: Reducing the intensity of CO₂ emissions related to energy supply;
 - ✓ Objective 2: Improving end-user energy efficiency, particularly in buildings and industries;
 - ✓ Objective 3: Affordable energy for the economically vulnerable groups;
- **Transport:**
 - ✓ Objective 1: Introducing strong economic incentives for a climate friendly transport system through pricing instruments;
 - ✓ Objective 2: Increasing the efficiency of urban transport;
 - ✓ Objective 3: Reversing the long-term decline of passenger and freight rail transport and development projects for intermodal terminals;
- **Industry:**
 - ✓ Objective 1: Reducing the carbon intensity in industry;
 - ✓ Objective 2: Assessing the best available techniques (BAT) from the perspective of GHG emissions;
 - ✓ Objective 3: Exploring voluntary approaches, emissions trading, taxes;
- **Agriculture and Rural Development:**
 - ✓ Objective 1: Promoting climate change knowledge transfer and advisory services among farmers;
 - ✓ Objective 2: Investment support for farm modernization;
 - ✓ Objective 3: Promoting best practices in agriculture;
 - ✓ Objective 4: Promoting carbon sequestration in agriculture;
- **Urban development:**
 - ✓ Objective 1: Promote more compact, mixed use, and transit oriented development measures as a way of reducing vehicle miles travelled, to develop the infrastructure and reduce maintenance costs;
 - ✓ Objective 2: Promote energy efficiency improvements in buildings and major urban infrastructure systems;
- **Waste management:**
 - ✓ Objective 1: Promote waste prevention;
 - ✓ Objective 2: Increase the reuse or recycling of the materials included in the waste stream, reducing the amount of material that must be managed as waste by promotion of industrial synergy processes and application of the resource-efficient sustainable management of waste concept;
 - ✓ Objective 3: Separate collection and composting of biodegradable waste;

- ✓ Objective 4: Produce energy from waste;
- **Water:**
 - ✓ Objective 1: Reduce GHG emissions from water supply and waste water treatment;
 - ✓ Objective 2: Increase energy efficiency of pumping in large water delivery systems;
- **Forestry:**
 - ✓ Objective 1: Managing existing forests to sequester carbon in the context of sustainable forest management;
 - ✓ Objective 2: Expansion of afforested areas;
 - ✓ Objective 3: Promoting the sustainable management of private forest ownership;
 - ✓ Objective 4: Opportunities for carbon stock management in forests in protected areas.

The National Action Plan 2016 – 2020, developed for implementation of the National CC/LCGG Strategy, includes actions, timelines, specific responsibilities for each sector and institution, and criteria and indicators to assess the achievement of proposed objectives.

The main objective of the National Action Plan 2016 – 2020 is drawing up concrete measures for implementation of the National CC/LCGG Strategy starting with the priorities mentioned herein.

V. Projections

Romania's projections consider all policies and measures undertaken at the national level (the EU ETS, the renewable energy target, the energy efficiency target, the promotion of clean and energy efficient road transport, etc.) as well as the GHG emission evolution established for non-EU ETS sectors.

The GHG projections for 2020, 2025, 2030, 2035 considered different scenarios related to the economic-social, demographic and technological evolution, to allow the highlight of the measures undertaken by Romania for implementing the EU Directive on environmental protection, and respecting its commitments as part of Kyoto Protocol.

For defining the assumptions regarding the evolution of Romania within the 2016 - 2035 period, a SWOT analysis for the 1989 ÷ 2015 period was performed, according to the following:

- Economic development;
- Demographic development;

- Social development;
- Structural adjustment of the economy;
- Structural adjustment of the industry;
- Technologic upgrade and decrease of the energy intensity in industry, agriculture, constructions;
- Development and upgrade of the transport sector;
- Development and upgrade of the services sector;
- Development and upgrade of the habiting conditions.

The GHG emission projections are based on assumptions related to macroeconomic indicators with high uncertainty on horizon until 2035, because of the economic crisis at nationally and globally level and the lack of updated 2035 strategy on industry, agriculture, transport, etc. Thus, economic development is a dominant factor affecting the results projected.

For each sector, according to the National Inventory, the technological processes determining GHG emissions and options for their reduction have been identified.

The hierarchy of options within a sector is based on detailed analysis using different criteria, namely:

- the degree of reduction of CO₂ and other GHG emissions;
- cost benefit ratio of the GHG emission reduction option;
- indirect economic impact (new jobs, decrease in imports);
- easy implementation possibilities;
- long-term support for the reduction option, etc.

For each analyzed sector it is specified how the reference scenario and the two alternative scenarios were defined considering the sector specificity.

Taking GHG emissions forecasts and evaluating alternatives to reducing them is particularly difficult, and therefore calls for special programs to identify areas of activity that are important for GHG emissions in correlation with the country's economic and social development.

The GHG forecasts for the Energy sector were established considering the energy demand subsector (industry, transport, agriculture, household and commercial consumption) and the supplying sub-sector (primary energy resources extraction, conversion in refineries, thermo-electric power plants, thermal power plants, transport and distribution of energetic products to consumers).

The projections are based on calculations carried out using the ENPEP (Energy and Power Evaluation Program) programs package, developed by Argonne National laboratory of US Department of Energy (DOE) and distributed to Romania by the International Atomic Energy Agency (IAEA) to perform an integrated energy analysis, economic and environmental.

The software development ENPEP determine the total energy demand and energy types for the three scenarios without measures, with measures, and with additional measures as defined by IPCC sectors: electricity and heat production, refining, transport sector, industry, agriculture, construction, services, residential, etc., which allows the determination of GHG emission projections using emission factors defined by types of fuels.

Further information on projections, including the projections methodology, is provided NC7 (chapter V) and in Annex 2 – CTF, namely:

- Table 5: *Summary of key variables and assumptions used in the projections analysis;*
- Table 6: *Information on updated greenhouse gas projections.*

The contribution of PAMs reported in Annex 2-CTF to GHG emissions reduction has been assessed against targets assumed by Romania for 2020, as EU member state, namely:

- GHG emissions reduction for ETS sector (-21 % comparing with 2005 level);
- GHG emissions increase for non ETS sector (+19 % comparing with 2005 level).

The quantified contribution of implementation of the ETS and ESD provisions, estimated as difference between GHG emissions in WEM and WOM scenarios, are presented in the following table.

Table V.1 Policies and measures contribution per NGHGI sectors

Sector	GHG emissions reductions, kt CO ₂ eq			
	2020	2025	2030	2035
Energy	26,877.2	32,672.3	31,270.1	32,312.1
Transport	410.59	474.51	1,104.82	811.6
Industrial Processes and Product Use	9,609.78	9,537.02	9,219.73	8,790.82
Agriculture	3,676.56	3,733.56	4,866.82	5,272.84
LULUCF	-3,160.8	-1,093.56	-2,761.2	-2,394.9
Waste	2,583.45	3,812.07	4,952.32	5,941.03

GHG emissions projected in WEM scenario (kt CO₂eq) are shown in the table V.2, which highlight that until 2020, GHG emissions for ESD sector are under the annual adjusted allocated emissions levels.

Table V.2 GHG emissions projected in WEM scenario for ETS and ESD sectors

Sector	GHG emissions, kt CO ₂ eq							
	2016	2017	2018	2019	2020	2025	2030	2035
Total GHG emissions, from which:	116,524.82	116,946.38	117,374.48	117,793.38	118,209.70	119,000.13	126,330.06	130,857.42
ETS	41,884.12	41,839.20	41,795.64	41,738.99	41,675.81	39,129.13	42,939.73	44,254.43
ESD	74,640.70	75,107.18	75,578.84	76,054.39	76,533.88	79,871.00	83,390.33	86,603.00

VI. Provision of financial, technological and capacity building support consistent to developing country Parties

Romania is not a Party included in Annex II to the Convention and is therefore not obliged to adopt measures and fulfil the obligations defined in Article 4, paragraphs 3, 4 and 5, of the Convention.

However, Romania offer information on financial resources for the years 2015 and 2016 provided through multilateral and bilateral channels related to the implementation of the Convention.

Detailed information regarding financial support provided for the years 2015 and 2016 are included in the tables 7(a) and 7(b) of the Annex 2-CTF. Information on financial resources for the years 2013 and 2014 are provided in the Second Biennial Report of Romania.

In the years 2015 and 2016 were not developed technology support and transfer and capacity-building activities. Thus, the table 8 and 9 of the Annex 2-CTF were not provisioned for this years.

VII. Other reporting requirements

VII.1. Domestic arrangements established for the process of the self-assessment of compliance with emission reductions in comparison with emission reduction commitments or the level of emission reduction that is required by science

The Ministry of Environment has provided funding for relevant studies with the objective to identify the most efficient institutional arrangements for the implementation of the Decision nr. 406/ 2009/ EC on effort sharing.

Under this Decision, the coordination between the central and local authorities and the self-assessment of compliance to evaluate the effects of policies and measures and estimate the projections of emissions are very important. The conclusions of the studies promoted give solutions to the process of the self-assessment of compliance with emission reductions in comparison with emission reduction commitments or the level of emission reduction that is required by science.

The close links with research institutes and the advice from the National Commission on Climate Change enhance our capacity for self-assessment.

For the process of the self-assessment of compliance with emission reductions in comparison with emission reduction commitments Romania also uses:

- the National Greenhouse Gas Inventory;
- the data and information on policies and measures to mitigate GHG emissions and enhance removals and, respectively, on GHG emissions/removals projections, submitted every two years as part of the Biennial Reports;
- data and information is included every four years in the National Communication on Climate Change, officially submitted to the UNFCCC Secretariat.

VII.2. Progress made in the establishment of national rules for taking local action against domestic non-compliance with emission reduction targets

So far except for the economic operators under the EU ETS which have to comply with relevant legislation for non-compliance, there is not in place yet a system for taking local action against domestic non-compliance with emission reduction targets. The rules and procedures for noncompliance are being established following the conclusions included in the studies mentioned in the previous section.

VII.3. Any other information that the Party considers relevant to the achievement of the objective of the Convention

Not applicable