

STUDY ON CLIMATE CHANGE ISSUE AND ENVIRONMENTAL DEGRADATION IN ROMANIA

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Abstract: *Climate change and environmental degradation present two of the most severe threats of the current period globally and Romania. Thus, appropriate measures and policies are needed to ensure the sustainable development of the country's economic sectors, including production models, in order to reduce greenhouse gas (GHG) emissions. The paper's primary purpose is to highlight some of the issues that have a negative impact on environmental sustainability and climate change in our country. Industry, the energy sector, agriculture, illegal logging in Romania, or waste are just some of the sectors requiring urgent reform for a more sustainable and healthier environment. The authors analyzed "Romania's country report" 2020, where we discovered many issues related to pollution, and environment degradation, but the "National Recovery and Resilience Plan," 2021, comes to the rescue with 1.3 billion Euro investments in renewable energy and energy efficiency, 1.5 billion Euro investments for Romania's afforestation and biodiversity protection, 1.3 billion Euro for waste management. In this sense, the authors propose that investors consider the "National Recovery and Resilience Plan," 2021, which finances various activities to reduce the impact on environmental degradation and climate change.*

Key words: *reforms, emissions, energy, biodiversity, waste*

INTRODUCTION

Climate change and environmental degradation are two of the world's most serious threats, and the 2030 Agenda for Sustainable Development promotes a balance between the three dimensions of sustainable development - economic, social, and environmental. The 2030 Agenda linked to the European Green Deal, which will define the EU's development strategy as the first climate-neutral continent by 2050. Thus, the European Green Pact turns climate and environmental challenges into opportunities to reduce net greenhouse gas emissions to zero by 2050, to reduce pollution, and restore biodiversity. These challenges require coherent policies to ensure sustainable development at both the European and national levels. [10]

To this end, the measures supported by the mechanism and included in the recovery and resilience plans of each Member State should contribute to the green transition, including biodiversity, or address the challenges posed by this transition, and provide for an amount that represents at least 37% of the total allocation of the recovery and resilience plan. [14]

The transition is supported by reforms and investments in green technologies and capacities, including biodiversity, energy efficiency, building renovation, and the circular economy while contributing to the Union's climate goals, promoting sustainable growth, creating jobs, and maintaining energy security.[13]

MATERIALS AND METHODS

In achieving the objective of this scientific paper, the issue of climate change and environmental degradation in Romania was studied. The authors followed the last steps regarding the logistics of the work:

- data collection
- analysis and interpretation of collected data

The authors used a multicriteria analysis to track the paper's purpose, using various sources of information.

The main references consulted are the "Romania's country report" 2020, and the "National Recovery and Resilience Plan," 2021. The period of consultation was in April 2021.[10] [13]

RESEARCH RESULTS

Romania is among the countries with the lowest greenhouse gas (GHG) emissions per capita in the EU, but, compared to the tone emissions / EUR 10.000 GDP indicator, Romania ranks among the first places in the EU (Figure 1). If production patterns do not change, economic growth could lead to the maintenance or even increase of GHG emissions. [9,13]

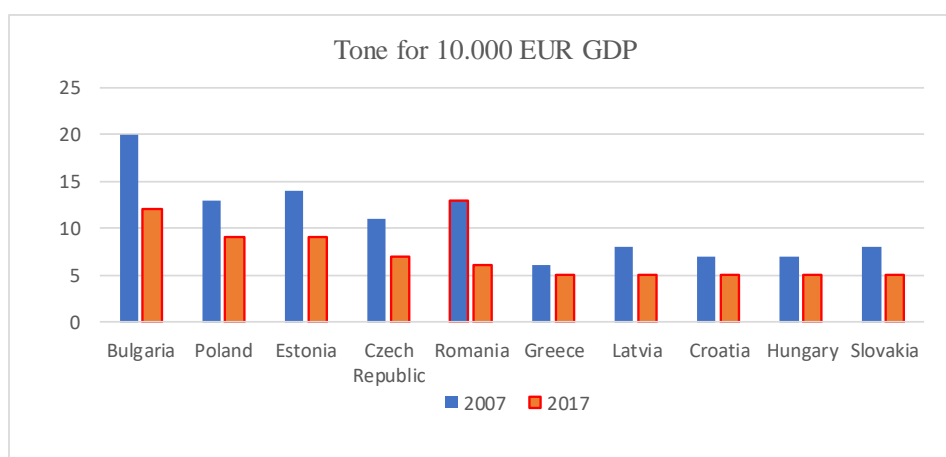


Figure 1. The highest GHG emissions in the EU on GDP in 2017
 Source: The European Commission, 2019

Despite the high share of energy from renewable sources, energy supply remains the most important source of GHG emissions. Installed capacity for renewable energy sources (RES) has increased significantly over the last ten years. In 2017, total energy consumption was 24.5%, above the EU average.[8] Although this led to a decrease in emissions from energy supply, the sector still accounted for 30% of total GHG emissions in 2017. (Figure 2).

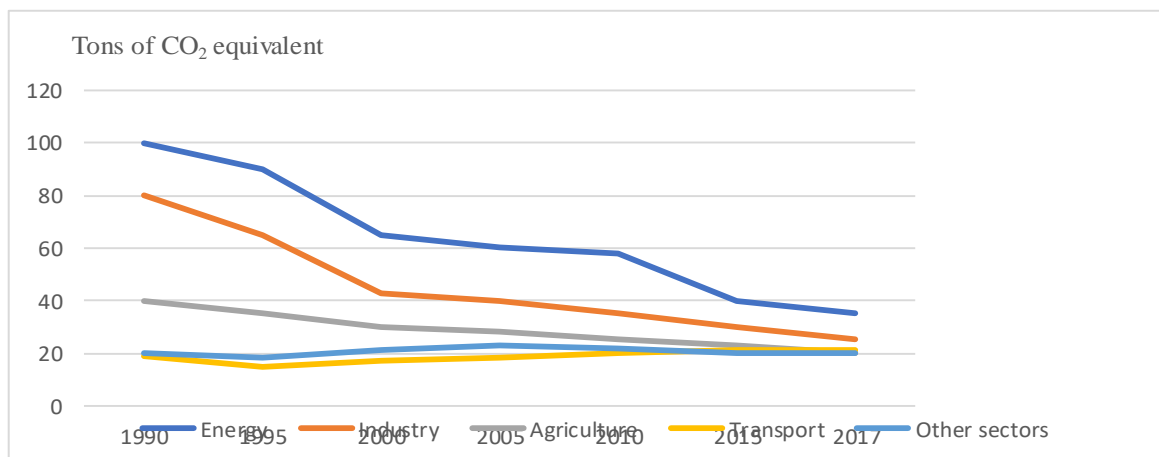


Figure 2. GHG emissions in Romania, by sectors
 Source: The European Commission, 2019

According to the latest country report, the leading sector causing air pollution remains the energy sector. Also, several industrial sectors contribute significantly to emissions. Transport, agriculture, and manufacturing show a slight upward trend (Figure 2). The agricultural sector accounts for 17% of total emissions. [10] The Romanian transport sector produced 24.7% of total CO₂ emissions and 16.6% of GHG emissions in 2017 (European Commission, 2019), well below the EU average. In particular, road transport accounted for over 90% of total CO₂ and GHG emissions in the transport sector nationwide. The industrial sector contributes, in addition to GHG emissions, to wastewater emissions and waste production. [6, 7, 10]

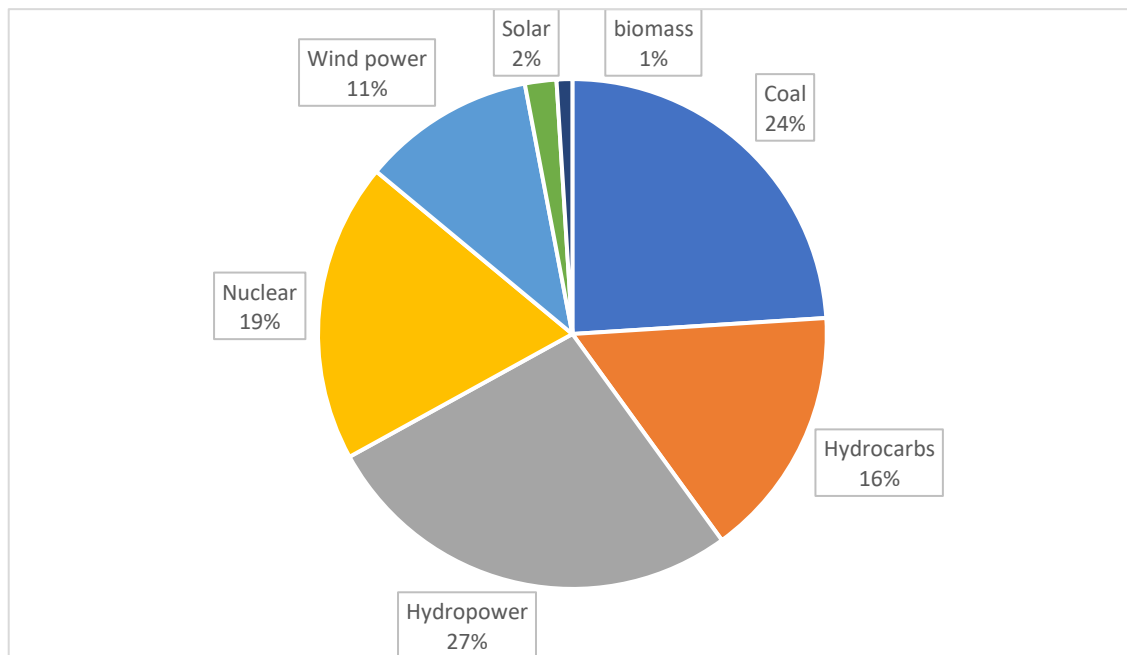


Figure 3. The electricity production mix in Romania, 2019

Source: National Institute of Statistics, 2019 [10]

The electricity transmission network (ETN) analysis showed a high degree of physical and moral wear of the equipment, having a negative impact on the security of energy supply of the population, on costs, energy efficiency, and the environment. [5]

The 2020 country report on Romania which was published on 02.26.2020,[8] shows that transport, energy, and water infrastructure remains precarious, which is an obstacle to territorial integration. It is also highlighted that a better infrastructure would allow Romania to capitalize on its potential to produce electricity from renewable sources. In this sense, to exploit this potential, a well-developed and well-interconnected electricity transmission network is essential. [10,13]

The leading sector causing air pollution and high greenhouse gas emissions remains the energy sector. Regarding the share of renewable energy, Romania has proposed through the Integrated National Plan in the field of Energy and Climate Change 2021-2030 that the share of energy from renewable sources to reach at least 30.7% in 2030, having as intermediate targets 25.2% (in 2022), 26.9% (in 2025) and 28.4% (in 2028), respectively. In order to achieve those objectives, the plan provides for the development of additional renewable energy capacity by 2030 of approximately 6.9 GW, compared to 2015, correlated with the decommissioning of coal capacities. Achieving this goal requires funding sources for the proper adaptation of electricity networks, the installation of natural gas backup capacities, storage capacities, and intelligent electricity management techniques. [15]

Thus, these investments will increase the flexibility and resilience of the National Power System (NPS) by increasing the percentage of renewable energy and reducing the share of coal-based electricity, taking into account the high degree of pollution and high compliance costs. environmental. [4]

The National Recovery and Resilience Plan 2021 describes the related reforms and investments, the horizontal implications, and the negotiation budget for renewable energy and energy efficiency. (Table 1.) [13]

Table 1.

Renewable energy and energy efficiency

Description of reforms and investments related to the component	Horizontal implications	Initial negotiating budget
Decarbonization of electricity production by restructuring large energy producers using solid fossil fuels and ensuring the use of natural gas along with other alternative fuels, e.g., hydrogen.	It partially contributes between 40-100% to the green transition by financing investments in energy from renewable sources, inefficient energy systems, and high-efficiency cogeneration.	1.3 billion Euro
Strengthen the legal framework to facilitate investment, ensuring sustainable decarbonization of the energy sector	Careful compliance with the principle of non-material injury and State aid implications will be closely monitored.	
Implementation of intelligent energy systems.		
Implementation of investments in solar energy, in the use of hydrogen, and high-efficiency cogeneration.		
Reform of the industrial sector, small and medium-sized enterprises, and large enterprises by increasing the energy efficiency indicator.		
It supports innovation by financing new technologies, digitizing green capacity, and demonstrating projects that impact increasing energy efficiency and reducing greenhouse gases.		
Acquisition of digital platforms for centralizing consumption data/reduction of consumption/monitoring of indicators for each equipment at the level of operators and branches of activity / digitization and remote data transfer.		

Source: National Recovery and Resilience Plan, 2021 [11, 6]

In addition to the production of significant amounts of CO₂ from energy, transport, agriculture, the natural carbon sequestration capacity is reduced due to the intensive exploitation of forests. This also has adverse effects on the capacity to mitigate climate change and air quality, increasing disaster risks and affecting ecosystems, habitat, and species conservation. [4]

According to the Country Report (2020), the intensive exploitation of Romanian forests has led to an economic loss of approximately six billion EUR / year, and the effect on the environment is also reflected at the European level, given that forest areas. Forested areas in Romania have a CO₂ absorption capacity of 6% of their total at the EU level. Currently, there is a significant discrepancy between the current degree of coverage of Romania with forests (29%) and the optimal percentage of afforestation (40%) established by the National Strategy for Sustainable Development (1999) and supported by the Romanian Academy in 2016. [10]

The volume of harvested timber increased by 6.3% in 2018 compared to the previous year, being cut 181,567 hectares of forest, of which 3,435 hectares cleared, but the national forest fund increased to 6.58 million hectares, shows the data centralized by the National Institute of Statistics - INS. Strictly speaking, the figures shown above show that every day of the 365 of 2018 was cut - on average - 497.4 hectares of forest, of which 9.4 hectares were cut down. (Table 2.) [15]

The national forest fund, on December 31, 2018, registered an increase of approximately 0.3%. This increase is mainly due to redevelopments of forested pastures and the introduction into the forest fund of degraded lands and non-forested lands, established under the conditions of the law to be afforested (Law no. 133/2015 amending and supplementing Law no. 46/2008 - Code Silvic) ", shows a communique of National Institute of Statistics. [12, 15]

Table 2.
The evolution of the main forestry indicators in 2018 compared to 2017

Name of indicators	Unit	2017	2018	Differences (±) in 2018 compared to 2017
National Forest Fund (end of the year)	ha	6.564.907	6.583.065	+18.158
from which:				
-The surface of the forests	ha	6.405.814	6.418.213	+12.399
Harvested wood	thousand m ³	18.315,8	19.461,5	+1.145,7
The area covered with forest regeneration cuttings-total	ha	177.296	181.561	+4.265
from which:				
-Shaved cuts	ha	3.713	3.435	-278
Regenerated surface - total	ha	28.032	270.43	-989

Source: National Institute of Statistics, 2019 [12]

Romania is lagging in terms of measures to adapt to climate change, and linking economic development with environmental protection is another major challenge.

Illegal deforestation is a significant recurring problem, leading to a decrease in the natural capacity of forests to capture carbon dioxide and a significant loss of biodiversity.

Romania has significant gaps in achieving Community objectives in maintaining biodiversity, restoring affected areas from an ecological point of view. [13]

The National Recovery and Resilience Plan 2021 describes the related reforms and investments, the horizontal implications, and the negotiation budget to afforest Romania and to protect biodiversity. (Table 3.) [13]

Table 3.

Romania's afforestation and biodiversity protection

Description of reforms and investments related to the component	Horizontal implications	Initial negotiating budget
Limitation of illegal logging through sustainable and transparent forest management and administrative reform of ROMSILVA.	It fully contributes 100% to the green transition by funding climate change adaptation measures and risk prevention and management.	1.5 billion Euro
Romanian forestation by planting new forests and agroforestry curtains; Improving logging practices by investing in environmentally friendly technologies;	It partially contributes 40% to the digital transition by funding measures that promote electronic solutions and services and government applications.	
Digital means of surveillance and control of illegal forest activities, in particular, illegal logging;	The principle of not harming the environment is respected.	
Increasing the accessibility of the national forest fund through the construction of new forest roads and the rehabilitation and modernization of the existing ones.		
Afforestation of suitable land and establishment of forest curtains (areas of ecological interest) and urban forests;		
Reconstruction of grassland habitats in protected natural areas;		

Source: National Recovery and Resilience Plan, 2021 [13]

Preventing and reducing waste generation, efficient use of resources, reuse, repair, and recycling are other priorities at the national level. The country report (2020) states that waste management continues to be a major challenge for Romania, given the low recycling rate of municipal waste (14%) and high waste disposal rates (70%). [11] In addition, recycling rates have stagnated since 2013, while the incineration rate has increased insignificantly to 4%. In 2017, the amount of municipal waste generated per capita in Romania continued to be well below the EU average of approximately 487 kg/inhabitant. There is also a risk that the targets for reuse/recycling of municipal waste will not be achieved. Stimulating the circular economy will also contribute to achieving the assumed goal that by 2035, the volume of municipal waste stored in landfills will be reduced to a maximum of 10% of the total volume of municipal waste generated. [3,4]

A substantial share of Romania’s municipal waste continues to be disposed of. Romania must reduce by at least 75% of the waste that ends up in landfills from the total waste generated by 2025. [11]

The infrastructure is insufficient, although, from 2021, the obligation of separate collection for bio-waste was introduced. From 2025 the separate collection of textiles is mandatory, and by 2030 landfilling must be reduced below 10% of the total municipal waste generated. The circular economy in Romania is still in its infancy. [13]

The National Recovery and Resilience Plan 2021 describes the related reforms and investments, the horizontal implications, and the negotiation budget to afforest Romania and to protect biodiversity. (Table 4.) [13]

Table 4.

Waste management

Description of reforms and investments related to the component	Horizontal implications	Initial negotiating budget
<i>Developing efficient waste management, including by:</i> <ul style="list-style-type: none"> ➤ Development, modernization, and completion of integrated municipal waste management systems ➤ Development of "ecological islands," digitized, for the selective collection of waste locally. ➤ Inclusion in the economic circuit of secondary raw materials derived from materials recovered from the population in the form of waste; ➤ Creation of two integrated programs, logistics, and communication, for waste management, one for economic operators and another for territorial administrative units; 	It partially contributes 40 - 100% to the green transition by financing investments that will manage the household, commercial and industrial waste through prevention, minimization, sorting, reuse, and recycling measures and will use recycled materials as raw materials that meet efficiency criteria.	1.3 billion Euro
Purchase of mobile scanners for trucks and waste containers.	The principle of not harming the environment is respected.	
Recovery of materials from industrial waste landfills.		
Investments in composting and biogas plants, packaging, and pelletizing		

Source: National Recovery and Resilience Plan, 2021 [13]

CONCLUSIONS

A healthy environment is indispensable for a sustainable economy and a fair society. If we pollute the environment and the air we breathe, we voluntarily destroy our health. However, no matter how logical the pollution equal problems equation may seem, modern society continues to pollute by inertia through intense human activity. The main “occupation” is the burning of fossil fuels: oil, coal, and natural gas. But also, the intensive exploitation of wood - given that forests are the primary source of oxygen production on the planet. [2]

The leading cause of climate change is the increase in greenhouse gas emissions. To combat this cause, reducing emissions has become a priority for all countries in the world. Romania, in turn, must act quickly to combat the causes (by reducing emissions) and reduce the effects (through adaptation actions).

In this sense, the authors propose that investors consider the "National Recovery and Resilience Plan," 2021, which finances renewable energy and energy efficiency, Romania's afforestation and biodiversity protection, waste management, to reduce the impact on environmental degradation and climate change.

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