

Circular Economy Strategy for Romania

18 July 2022



This project is carried out with funding by the European Union via the Technical Support Instrument and in cooperation with the Directorate General for Structural Reform Support of the European Commission (DG REFORM)

Contract details

European Commission - DG Reform

Technical support for the development of the circular economy strategy and establishing a monitoring mechanism

Specific Request Nr 143 under Framework Service Contract No SRSS/2018/01/FWC/002

Presented by

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Date

Rotterdam, 18 July 2022

Acknowledgement

This study was carried out with funding by the European Union via the Technical Support Instrument and in cooperation with the Directorate General for Structural Reform Support of the European Commission.

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List of abbreviations

CDW	Construction and Demolition Waste
CE	Circular Economy
CEAP	Circular Economy Action Plan
CMUR	Circular material use rate
DG Reform	Directorate-General for Structural Reform Support
DMC	Domestic material consumption
EC	European Commission
EEE	Electrical and Electronic Equipment
EoW	End of Waste
EPR	Extended Producer Responsibility
GDP	Gross domestic product
GHG	Greenhouse gases
GVA	Gross value added
ICT	Information communications technology
LAU2	Local Administrative Units
LCA	Life-cycle assessment
MSW	Municipal solid waste
NACE	Statistical Classification of Economic Activities in the European Community
NGO	Non-governmental organisation
OECD	Organisation for Economic Co-operation and Development
PAYT	Pay as you throw
PNIESC	Planul Național Integrat în domeniul Energiei și Schimbărilor Climatice (Integrated National Plan for Energy and Climate Change)
PRO	Producer Responsibility Organisation
ROCES	ROMANIA'S STRATEGY FOR THE TRANSITION TO A CIRCULAR ECONOMY
RRP	Recovery and Resilience Plan
RMC	Raw Material Consumption
SDG	Sustainable Development Goals
SIATD	Sistem informatic de Asigurare a Trasabilitatii Deseurilor (Waste Traceability Information System)
SME	Small and medium-sized enterprises
UN	United Nations
WEI+	Water Exploitation Index Plus
WEEE	Waste electrical and electronic equipment

Executive Summary

The transition from a linear economic model to a circular one is a complex and lengthy process and Romania is yet at the beginning. For overcoming the challenges on the journey towards circular economy (CE), Romania needs a long-term vision and strategic direction, which is the main purpose of this Strategy. It presents the status quo of the economy and its sectors in relation to CE and outlines the way forward by defining the vision for Romania to become a leader in the Southeast European region in CE.

Despite some economic progress in the past decade, **Romania's economic growth is not yet decoupled from the generation of waste**. In addition, **waste management in Romania significantly lags behind**, as landfilling, and often illegal dumping, is still the dominant form of waste management. According to statistics from the Circular Economy Monitoring Framework, Romania ranks among the worst-performing EU countries in terms of resource productivity, waste generation per GDP, waste treatment and the use of recycled materials in the economy. On the contrary, Romania, with one of the lowest and declining waste generation per domestic material consumption among the EU countries, has favorable prospects for improving the country's performance in adopting CE practices. It can be concluded that Romania has significant potential for improvement across all stages of CE, from higher resource efficiency and use of secondary materials in production to waste prevention and better waste management.

This Strategy offers an overview of 14 economic sectors in Romania in terms of their circularity potential. The results of the sectoral assessment will serve as a basis for further elaboration of the Action Plan which will present in more detail and depth specific objectives and policy recommendations, as well as concrete actions. The energy, water and waste sectors are addressed throughout the sectors in a cross-cutting manner. Water and waste are also presented separately to highlight the challenges and their circularity potential, given the yet poorly developed infrastructure in Romania in these areas. Based on the preliminary analysis, it can be concluded that enhancing the CE has the highest potential in **agriculture and forestry, automotive sector, construction and consumer goods such as food and beverages, packaging, textiles and electrical and electronic equipment**.

The key objective of the Romanian National Circular Economy Strategy is to provide the framework guiding the country on its endeavours to transition towards CE by means of implementing the Action Plan. The success criterium for this transition is the **decoupling of economic development from environmental degradation**. The overarching objective of this strategy is closely tied to the global SDGs and climate targets as well as new EU CEAP targets, in line with the principles and actions promoted within the EU Green Deal. At the national level, elements of the transition to the circular economy in Romania are also foreseen by Romania's Sustainable Development Strategy 2030 and Romania's National Recovery and Resilience Plan.

The transition to a CE must take place in a way that does not affect quality, productivity, competitiveness and performance. This is even more important as the Romanian business profile is characterized by small and medium-sized companies (SMEs), with a significant presence of micro-companies, which have an important relative contribution in terms of added value and jobs.

Based on the high-level objectives, the following directions should be pursued through policy-making to advance CE in Romania:

- decrease consumption of virgin raw materials through more sustainable raw material extraction, recycling and recovery activities;
- decrease consumption of consumer goods by extending products' lifetime;
- decrease the negative impacts on ecosystem resulting from production activities;
- decrease the negative impacts on ecosystem caused through waste and water management and disposal activities;
- improve policy and governance coherence, communication and collaboration throughout local, regional and national levels.

A coherent governance structure that clearly defines the roles and responsibilities of key institutions involved, **is crucial for the successful implementation** of the Circular Economy Strategy and its subsequent actions. The current governance model is in transition, with new structures and dynamics being formed. In an effort to contribute to the current process, the following four options for governance reform that address circular economy issues have been developed and proposed:

- Option 1: One centralised department dedicated to CE under the Prime Minister
- Option 2: Directorates for CE under each relevant ministry
- Option 3: Creation of a CE Agency/Authority
- Option 4: Joint responsibility between Ministry of Economy and Ministry of Environment

Also to be considered is a combination of options (such as option 1 combined with option 2; option 1 combined with option 3 or option 2 combined with option 3). It is important that the chosen governance structure should have a decision-making structure and an executive one where the latter could be established within all the ministries dealing with CE activities. On the other hand, when considering option 4, which implies a shared ministerial responsibility, it was proposed by the Ministry of Environment that the leadership in circular economy should be held by the Ministry of Economy with well-defined support from the Ministry of Environment.

This comprehensive circular economy strategy for Romania will now go into public consultation. It will be further finetuned after having received feedback from the different public and private stakeholders. The next step is then to elaborate on the specific actions for the selected sectors in the Action Plan.

1 Introduction

1.1 Rationale for circular economy

1.1.1 *The concept of circular economy*

The concept of circular economy (CE) is very broad and overarches a range of related topics, in production and consumption, including resource efficiency, waste hierarchy, shift towards renewable resources, both for material and energy purposes, and more. This breadth is the strength of the circular economy.

The circular economy replaces the linear and exploiting approach of our current economy with a system of resilience and regeneration that benefits businesses, people and the planet. The desired system ultimately produces neither waste nor pollution by circulating resources, materials and products at their highest quality within the production system and, if possible, feeding materials back into the biosphere to restore natural capital (biodiversity and ecosystems) at their end of life. It reduces the use of natural resources and the generation of environmental impacts while contributing to improvements in human well-being. It also includes the replacement of hazardous chemicals with less dangerous ones. In short, the concept is based on the following three overarching principles:

1. Phasing out non-recoverable waste and reducing pollution.
2. Keeping products and materials at their highest value in use for as long as possible.
3. Regenerating natural systems (biodiversity and ecosystem).

The transition towards a circular economy challenges governments, businesses, and consumers to rethink production and consumption patterns and redefine the term “growth” into one that captures benefits beyond economic profit alone. The circular economy aims at decoupling economic activity from the consumption of natural resources by safely circulating materials through the technosphere and biosphere while designing negative externalities (waste and pollution) out of the system.

To achieve the transformation from a linear system to a circular one while reaping these benefits, a circular economy touches upon practices and solutions covering a wide range of strategies across different stages of the value chain. They can be clustered in the following way:

- Closing material loops: the substitution of raw materials or new products with secondary materials and second-hand, repaired or remanufactured products or parts;
- Slowing material flows: extending the lifetime of products through better design, maintenance and repair;
- Narrowing material flows: using less resources per product, or using fewer products to deliver the same service to society

A more concrete overview is provided by the 9 R-Strategies, ranging from refusing the disposal of products to recycling and recovery (see Figure A-1 in Annex A). Although circular economy policies are often associated with waste policies, it is important to realise that only two of the nine R-strategies apply to product end-of-life. The circular economy actions with the most economic environmental potential affect earlier stages of the lifecycle and are focused on waste prevention and the extension of product lifetime. Hence, the circular economy decouples the economic growth from resource use by reducing material input while maximizing the usability of products and minimizing the waste generation. This circular design

of closed loops tackles the problems of resource scarcity, bio-chemical flows and climate change while having a regenerative and restorative benefit for communities.¹

1.1.2 The urgency and potentials of the CE transition

The transition to a circular economy is an international challenge. At the global level, we face limited natural resources and a growing population. According to the United Nations (UN), global material use has tripled over the past four decades due to increasing consumption brought on by the rapid growth of the middle class around the world (United Nations, 2016). The demand for raw materials will further increase as a result of global population growth, the rapidly growing middle class in the least developed and developing countries, and the development of new technologies that require specific raw materials. This will exacerbate environmental, climate-related, and other sustainability issues.

Romania and Europe overall are highly dependent on imports of raw materials. This makes them vulnerable in the face of geopolitical tensions that impact prices and the supply of raw materials in the future. China is the main supplier in 15 out of 25 EU's critical raw materials, which means that EU heavily depends on China's exports². According to a Joint Research Center report,³ the trade balance of raw materials in Romania in 2018 was negative, including minerals, metals, stone and glass. In 2019, Romania imported 92% of its metal ores input and 54% of its fossil energy materials input from abroad⁴.

The extraction and use of raw materials also has a negative effect on climate change as it contributes to the consumption of energy and the GHG emission generation. Shifting to circularity is essential to achieve climate goals agreed under Paris Agreement, in which countries commit themselves to limiting global warming to less than 2°C and pursuing efforts to limit it to 1.5°C⁵.

Furthermore, transition towards circular economy offers many opportunities for economic and employment growth, innovation and emission reduction⁶. According to the new Circularity Gap Report from 2021⁷ circular economy strategies have the potential to reduce global greenhouse gas emissions by 39% and ease the pressure on virgin materials by 28%.

In addition, applying circular economy principles across the EU economy has the potential to increase EU GDP by an additional 0.5% by 2030 and create around 700 000 new jobs through additional labour demand from recycling plants and repair services.⁸

In the global context, the CE principles are closely linked to the UN Sustainable Development Goals and can directly contribute to achieving 21 of the targets and indirectly contribute to achieving an additional 28 targets⁹. The strongest relationships and synergies between CE practices and SDG targets lie within SDG 6 (Clean Water and Sanitation), SDG 7 (Affordable and Clean Energy), SDG 8 (Decent Work and Economic Growth), SDG 12 (Sustainable Consumption and Production), and SDG 15 (Life on Land) having

¹ <https://www.mdpi.com/2071-1050/13/14/7549/htm>

² https://recipp.ipp.pt/bitstream/10400.22/19466/1/ART_GRAQ_2020.pdf

³ <https://publications.jrc.ec.europa.eu/repository/handle/JRC123822>

⁴ https://ec.europa.eu/eurostat/databrowser/view/ENV_AC_RME_custom_2702198/default/table?lang=en

⁵ https://unfccc.int/sites/default/files/english_paris_agreement.pdf

⁶ <https://ellenmacarthurfoundation.org/growth-within-a-circular-economy-vision-for-a-competitive-europe>

⁷ <https://www.circularity-gap.world/2021#downloads>

⁸ https://circulareconomy.europa.eu/platform/sites/default/files/ec_2018_-_impacts_of_circular_economy_policies_on_the_labour_market.pdf

⁹ <https://onlinelibrary.wiley.com/doi/10.1111/jiec.12732>

high scores both for direct and indirect contributions. SDG 1 (No Poverty) and SDG 2 (Zero Hunger) and SDG 14 (Life Below Water) are impacted by CE practices mostly indirectly.

1.2 EU agenda in relation to CE

Under the Green Deal, in 2015, the European Commission adopted the first EU Circular Economy Action Plan (CEAP)¹⁰ aiming at increased self-sufficiency, new jobs and business opportunities, and achieving climate targets by reducing GHG emission generation through several initiatives. Building on the circular economy actions implemented since 2015, the European Commission adopted the new CEAP¹¹ in 2020 for achieving a cleaner and more competitive Europe in cooperation with economic actors, consumers, citizens and civil society organizations.

The new CEAP announces initiatives throughout the product life cycle – addressing both consumers and producers – that focus on **product’s design, production processes, consumption, waste and pollution prevention**, ensuring that the resources used remain in the EU economy for as long as possible. Key product value chains considered under the CEAP include electronics and ICT, batteries and vehicles, plastics, packaging, textiles, construction and buildings and food, water and nutrients. CE objectives are also included in the EU Zero Pollution Action plan, whereby waste generation should be significantly reduced, and municipal waste in particular should be reduced by 50% until 2030. These are part of a list of other objectives that contribute to the “zero pollution vision for 2050.”¹²

The new CEAP also announces and refers to a Circular Electronics Initiative, a comprehensive EU Strategy for Textiles and EU Plastics Strategy (2020). An overview of the most relevant initiatives from CEAP can be found in Annex B while the complete overview of all CEAP initiatives - both legislative and non-legislative - can be accessed on the European Commission’s website¹³. In the latest Circular Economy Package from 2022,¹⁴ the European Commission adopted the Sustainable Product Policy Initiative, including the proposal for the Ecodesign for Sustainable Products Regulation, and the EU Strategy for Sustainable and Circular Textiles.¹⁵ The Sustainable Product Policy Initiative will aim to ensure that products placed on the EU market become increasingly sustainable and stand the test of circularity, making both production and consumption more environment-friendly and minimizing waste and pollution.

Covering many economically important sectors in the EU, the new CEAP is central to the European Green Deal,¹⁶ Europe’s new agenda for sustainable growth, as scaling up the circular economy will contribute to achieve climate neutrality by 2050, meet SDGs and decouple economic growth from resource use.

To this date, up to 17 EU Member States have already developed (high level) Circular Economy Strategies, including Poland, Slovakia and Czechia as Eastern European countries. Circular economy Roadmap for Hungary is currently under preparation. To keep up with European trends and to use CE as means to establish a resilient and strong local economy, Romania joins these efforts in identifying circular

¹⁰ COM(2015) 614 final

¹¹ COM/2020/98 final

¹² https://environment.ec.europa.eu/strategy/zero-pollution-action-plan_en

¹³ <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583933814386&uri=COM:2020:98:FIN>

¹⁴ https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en

¹⁵ Press release, European Commission, March 2022,

https://ec.europa.eu/commission/presscorner/detail/en/ip_22_2013

¹⁶ COM(2019) 640 final

opportunities to strengthen economic competitiveness, employment and preserve or improve the quality of environment.

1.3 The context of Romania's ambitions to transition towards CE

The transition from a linear economic model to a circular one is a complex and lengthy process and Romania is yet at the beginning. The implementation of the circular economy strategy requires a systemic change. Actions which are needed must engage multiple areas and need to be supported by complementary actions and governmental structures.

According to statistics from the Circular Economy Monitoring Framework,¹⁷ Romania ranks among the worst-performing EU countries in terms of waste generation per GDP, waste treatment and the use of recycled materials in the economy. Moreover, surveys on EU citizen's attitudes show a low level of involvement of Romanian citizens in circular economy activities.^{18 19} On the contrary, Romania, with one of the lowest and declining waste generation per domestic material consumption among EU countries, has favorable prospects for improving the country's performance in adopting circular economy practices.²⁰

For overcoming the challenges on the journey towards circular economy, Romania needs a long-term vision and strategic direction, which is the main purpose of this Strategy. It presents the status quo of the economy and its sectors in relation to CE and the way forward by defining the vision for Romania to become a leader in the Southeast European region in the circular economy.

The overarching objective of this strategy is closely tied to the global SDGs and climate targets as well as new EU CEAP targets, in line with the principles and actions promoted within the EU Green Deal. At the national level, elements of the transition to the circular economy in Romania are also foreseen by Romania's Sustainable Development Strategy 2030 and Romania's National Recovery and Resilience Plan (RRP),²¹ in particular linked to Component 1 on water management, Component 3 on waste management and Component 5 on renovation wave under the Green Transition Pillar. The Romanian RRP also sets deadlines for adopting the Circular Economy Strategy by the third quarter of 2022 and its Action Plan by the third quarter of 2023.

However, the transition to a circular economy must take place in a way that does not affect quality, productivity and performance. This is even more important as the Romanian business profile is characterized by small and medium-sized companies (SMEs), with a significant presence of micro-companies, which have an important relative contribution in terms of added value and jobs. This type of business profile translates into limited investment capacity, especially in product design, research and development and great difficulties in carrying out projects to improve the use of production resources. All these elements are considered in the development of the Strategy.

1.4 What to expect from this Strategy

¹⁷ <https://ec.europa.eu/eurostat/web/circular-economy/indicators/monitoring-framework>

¹⁸ https://data.europa.eu/data/datasets/s2257_92_4_501_eng?locale=en

¹⁹ https://data.europa.eu/data/datasets/s1102_388?locale=en

²⁰ Dobre-Baron, Nitescu, Nita, & Mitran, 2022

²¹ https://gov.ro/fisiere/stiri_fisiere/Annex_to_the__Proposal_for_a_Council_Implementig_Decision.pdf

This Circular Economy Strategy for Romania provides a high-level overview of the CE potential in Romania, setting out a clear overall direction to accelerate the circular economy transition in Romania. The current situation of the CE in Romania is described through an analysis of relevant legislation, governance and environmental performance. Furthermore, through sector-specific analysis, the circularity potential across the economy is identified. To reach this potential, key objectives are set, and policy directions are provided to achieve these objectives. The directions and objectives formulated in this Strategy will provide the basis for an Action Plan that will contain in more detail concrete actions for unleashing the circularity potential in key economic sectors. High-level approach is used to develop a feasible governance structure and assign responsibilities for the implementation of the circular economy. Finally, a monitoring and evaluation framework is introduced, that ensures the timely and proper implementation.

1.5 Methodology

The Circular Economy Strategy presented in this document has been developed based on a three-step methodology. As a first step, the project team has reviewed the current situation in Romania based on comprehensive desk research and identified EU best practices for circular economy strategies and governance. Secondly, the draft of Romania's Circular Economy Strategy 2030 (ROCES) developed by the Romanian Institute for Research in Circular and Environment (IRCEM) has been examined as well as the findings from the inter-ministerial consultation organized by the Department of Sustainable Development within the Romanian Government in collaboration with IRCEM. As a last step, the draft strategy will be presented and discussed within an online workshop with experts and the final strategy will be adjusted based on the collected feedback.

2 State of play

2.1 Current state of CE in Romania

2.1.1 Romania's macro-economic overview

Over the past decade, Romania has achieved a remarkable track record of high economic growth, sustained poverty reduction, and rising household incomes. An EU member since 2007, the country's economic growth was one of the highest in the EU during the period 2010-2020 with an average annual gross domestic product (GDP) growth of 3.9%.²² In 2020, country's GDP achieved EUR 219 billion.²³ Between 2010 and 2019, **real GDP per capita** in Romania increased by 47.1% to EUR 9,120 per capita,²⁴ bringing the average Romanian living standard closer to that of the EU countries (UNECE, 2021). As a result, the World Bank ranked Romania for the first time as a **high-income country**.²⁵ This event was an important development for investment rating decisions and for negotiations to join the Organization for Economic Co-operation and Development.

In the last 10 years, final consumption expenditure of households per capita rose by 50% compared to almost no change in the EU average. At the same time, Romanian **imports and exports** of goods and services doubled, corresponding to 56% and 47% as a share of country's GDP, respectively.

Romania's economic growth is not yet decoupled from the generation of waste.²⁶ In terms of **waste generation**, trends were rather mixed and did not always reflect the GDP and consumption trends (see Figure A-2 and Figure A-3 in Annex A). While final consumption expenditure of households has grown steadily over the last 10 years, municipal waste production per capita declined between 2010 and 2015, but then began to grow slightly by an average of 3% per year till 2020. Nevertheless, Romania ranks among EU countries with the lowest municipal waste generation per capita. This could be linked to low consumption levels in the country compared to the EU average. Another explanation for the discrepancy between consumption and waste generation is the unreliable reported data on waste, which would require better data handling policies and control. Therefore, the conclusion on Romania's ranking regarding municipal waste must be regarded with caution as further analysis of the data accuracy might be required.

Similarly, total waste generation fell by more than half between 2004-2014 and did not start to increase until after 2014 during the period of economic growth in Romania. In addition, total waste generation per GDP and per domestic material consumption (DMC) has decreased every year between 2004 and 2018. As a result, Romania reached the lowest production of total waste per DMC in 2018 among EU countries. Despite a significant decline in total waste production per unit of GDP, this value is still the second highest among EU countries. In addition, **waste management** in Romania significantly lags behind, as landfilling, and often illegal dumping, is still the dominant form of waste management.

²² <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?end=2020&locations=RO&start=2010>

²³ Eurostat - Gross domestic product at market prices

²⁴ In chain linked volumes (2010)

²⁵ <https://www.worldbank.org/en/country/romania/overview#1>

²⁶ https://ec.europa.eu/info/publications/2022-european-semester-country-reports_en

Like the rest of the world, Romania has been profoundly impacted by the COVID-19 pandemic.²⁷ In 2020, the economy contracted by 3.7% and the unemployment rate reached 5.5% in July before dropping slightly to 5.3% in December. Trade and services decreased by 4.7%, while sectors such as tourism and hospitality were severely affected. At the same time, Romania was affected by the unfavorable climatic conditions that led to a reduction in gross value added in agriculture.

However, Romanian government acted swiftly in response to the crisis and the economy has proven resilient: after a deep contraction triggered by the COVID-19 pandemic, the economic activity has rebounded fast. In 2021, GDP increased by 5.8% compared to 2020 to EUR 199 billion.²⁸ In the upcoming years, Romanian economic growth is set to remain strong, although short- and medium-term challenges remain (OECD, 2022). Without a shift towards higher circularity, this could put even more pressure on the country's natural resources.

2.1.2 Romania's performance in environmental indicators

According to the Global Footprint Network,²⁹ Romania's **ecological footprint**³⁰ per person accounted for 3.5 global hectare in 2018 exceeding the biocapacity³¹ by 0.3 global hectare per person. This leads to national ecological deficit, meaning that Romania is importing biocapacity through trade, liquidating national ecological assets or emitting carbon dioxide waste into the atmosphere, ultimately leading to unsustainable development. On the positive side, Romania ranks among the EU countries with the lowest ecological deficit and has fewer effects on the environment than countries such as Sweden, Greece, Portugal or Austria. However, the society should still work actively to implement measures and actions towards improving the resource efficiency and the use of raw materials in order to achieve biocapacity reserve, i.e. exceeding ecological footprint.

2.1.3 Overview of the status quo of circularity in Romania

Despite the fact that there is no commonly applied approach of measuring circularity, due to a lack of data and appropriate indicators – however recognising that many promising initiatives suggesting ways to measure circularity are currently under development³² –, Eurostat indicators that are applicable and measurable with the data available at national level are presented in this section. It must be noted that the following metrics do not provide a complete picture of circularity, but they give an indication of the order of measure.

As shown in Figure 2-1 below, Romania's performance in circular economic indicators is below the average of EU Member States. In 2019, Romania had the lowest resource productivity³³ among the EU Member States, corresponding to only 0.7851 EUR (Purchasing Power Standard) per kilogram³⁴. **Resource productivity** is an important indicator of the sustainable development goal related to responsible

²⁷ <https://www.worldbank.org/en/news/opinion/2021/07/23/reforms-key-to-romania-s-resilient-recovery>

²⁸ Expressed in chain linked volumes 2015.

https://ec.europa.eu/eurostat/databrowser/view/NAMA_10_GDP_custom_2829063/default/table?lang=en

²⁹ https://data.footprintnetwork.org/#/??_ga=2.105054208.2081742270.1652195817-1027053736.1652195817

³⁰ The ecological footprint measures the productive biological surface of the sea and the land necessary for the regeneration of the resources consumed by a human population and the absorption of the waste produced.

³¹ Biocapacity is defined as the available productive area of a country.

³² See, for example, the Coalition for Circular economy in Romania (<https://www.economicirculara.eu/>), Sustainability Embassy in Romania (<https://ambadasustenabilitatii.ro/>), The Institute for circular economy and the Environment „Ernest Lupan“ (<https://ircem.ro/>), Romania Green Building Council (<http://rogbc.org/en/>) etc.

³³ Resource productivity is measured as the ratio of the gross domestic product to domestic material consumption.

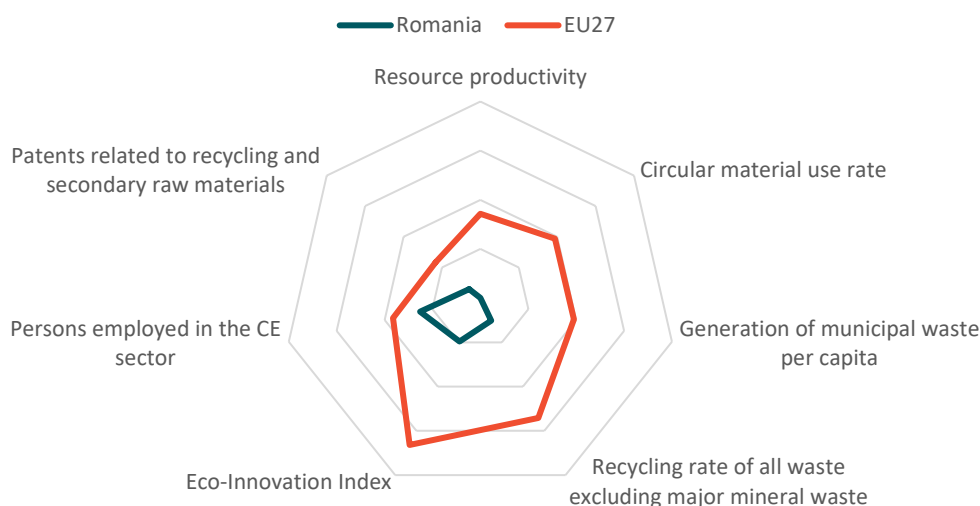
³⁴ Eurostat (2022)

https://ec.europa.eu/eurostat/databrowser/view/ENV_AC_CUR_custom_1598253/default/table?lang=en

consumption and production. In fact, the 2022 European Commission Country Report for Romania states that the country has not made progress in the circular secondary material usage in the last decade.³⁵

Generally, the need for materials, water and energy is increasing as a direct result of population and industry growth. The industry sector is especially dependent on mining materials and there is a need to increase the number of manufacturers who opt to use secondary raw materials, reuse materials and innovation in their sector. However, the **Circular Material Use Rate (CMUR)** in Romania, which measures the contribution of recycled materials to overall materials use reached only 1.3%, compared to the EU average of 12.8%³⁶. CMUR in Romania is declining while the EU as a whole has progressed substantially³⁷.

Figure 2-1: Circular economy indicators assessment in Romania



Source: own elaboration based on [Eurostat](#) (2022)

Note: rescaled values based on minimum and maximum observed values among EU27 countries.

According to Eurostat, the difference between Member States regarding CMUR depends on both structural factors of national economies and the percentage of recycled materials, which in Romania's case is very low. Increasing recycling rates thus plays a key role in the transition to a circular economy. Without incorporating recycled materials into production processes, the CMUR will remain at the same level, making it difficult to close the circle. However, it should be noted that recycling is not the most favored strategy for building a circular economy, but it is currently the most popular as it is successful at scale. Other strategies, such as repair and reuse, should complement the approach.

According to the **Eco-Innovation Scoreboard**, Romania continues to underperform, being ranked 23rd in the Eco-Innovation Index in 2021, with slightly worsening performance since 2017. Romania has a below average performance along all indicators of the Eco-Innovation Index, although the country fares better and is closer to the European average in terms of resource efficiency outcomes.

Related to the eco-innovation, Romania has also a low number of **patents related to recycling and secondary raw materials** per capita. This is related to political, financial and regulatory factors that seem to be one of the main challenges that companies and institutions face.³⁸ The lack of multidisciplinary

³⁵ https://ec.europa.eu/info/publications/2022-european-semester-country-reports_en

³⁶ https://ec.europa.eu/eurostat/databrowser/view/ENV_AC_CUR_custom_1598253/default/table?lang=en

³⁷ https://ec.europa.eu/info/publications/2022-european-semester-country-reports_en

³⁸ https://ec.europa.eu/environment/ecoap/romania_en

collaborations in the research phase, a lack of education regarding circular economy and the difficult organizational framework for research activities seem to be the main causes.

Moreover, while many small and medium-sized companies (SMEs) in Romania are driven by the need to comply with environmental obligations to avoid fines, they do not have an accurate image of their environmental impact. These companies, however, have started to audit their internal processes and take actions due to fines being introduced in the national legislation, as a result of a changed mindset influenced by best-practice examples, anticipating upcoming legislation or for optimizing costs.

In terms of waste management there are multiple investments in waste collection and recycling infrastructure at national level.³⁹

Furthermore, the level of **employment** in the sectors related to circular economy (the recycling sector and repair and reuse sector) in Romania is also lower compared to the EU average. According to the Eurostat data for the period of 2009-2018, the number of people employed in this sector was relatively stable, ranging from 129,000-135,000 people or 1.4-1.6% of total employment.⁴⁰ This number clearly mirrors the recycling rates which also stagnated in that period.

Investments also remained at a steady level, between EUR 308 million in 2010 and EUR 360 million in 2018,⁴¹ accounting for a maximum of 0.25% of GDP between 2010 and 2018. This is partially due to the fact that the majority of the Romanian production companies are small-sized and their investment capacity is limited, especially in product design, research needed to determine LCA and project implementation.

In terms of **waste generation**, Romania ranks among EU countries with the lowest municipal waste generation per capita, corresponding to only 287 kg compared to the EU27 average of 505 kg in 2020. Over the last 10 years, the trend has been rather mixed: municipal waste production per capita fell sharply by 21% between 2010 and 2015, but then began to grow slightly by an average of 3% per year. On the other hand, despite the significantly decreasing trend of total waste generation⁴² per GDP, this value is still twice as high compared to the EU average (see Figure A-3 in Annex A). However, as mentioned above, this data must be regarded with caution due to the informal market of waste management and illegal dumping in remote areas, disconnected from the municipal structure. Thus, significant amounts of waste ends up uncounted in the official statistics.

At the same time, the **material footprint**, measured as raw material consumption (RMC) per capita, of the Romanian economy has significantly increased (almost by a third) since 2015 while it remained stable in the EU.⁴³ In 2019, RMC reached 28 tonnes per capita compared to the EU average of only 15 tonnes per capita⁴⁴.

The amount of waste generated is closely related to the **material flow** and the efficiency of the waste transformation processes into raw materials and products, but also to the behavior of users in terms of

³⁹ The European Commission. Environmental Implementation Review 2019- Romania.

⁴⁰ EUROSTAT 2021, Private investments, jobs and gross value added related to circular economy sectors

⁴¹ EUROSTAT 2021, Private investments, jobs and gross value added related to circular economy sectors

⁴² Total waste generation refers to total waste excluding major mineral waste as per Eurostat definition.

⁴³ https://ec.europa.eu/info/publications/2022-european-semester-country-reports_en

⁴⁴ https://ec.europa.eu/eurostat/databrowser/view/ENV_AC_RME__custom_2990651/default/table?lang=en

maintaining the stock of objects in use. **Figure A-7 (Annex A)** shows the flows of materials as they pass through the economy. They are eventually discharged back into the environment or re-fed into the economic processing. In 2020, more than a third of material inputs in the Romanian economy was landfilled. Another 15% of inputs were discharged to the environment as emissions to air or water, which result mainly from the processing of raw materials and minerals⁴⁵. Reducing emissions in parallel with the continuous streamlining of goods production processes, is a key objective of the transition to a circular economy.

As a result, Romania has a huge potential in improving its **waste management**. The recycling rate of municipal waste is one of the lowest in the EU and landfilling is still the dominant form of waste management⁴⁶. In 2018, the recycling rate of all waste excluding major mineral waste amounted to only 29% compared to the EU average of 55%⁴⁷. Similarly, the recycling rate of municipal waste reached only 14% in 2020 compared to the EU average of 48%, ranking Romania among the lowest performing EU countries. As a result, the Commission had identified Romania as being among the countries at risk of missing the 2020 and 2025 EU targets of 50% and 55% respectively. The recent study on Romania environmental performance review by UNECE⁴⁸ shows that the separate collection of recyclables from MSW remains low, at only 12.9% of the total MSW generated in 2017.

Waste management, in the circular economy context, is only the final part of a supply chain that fuels the secondary materials market and the recycling industries. It is therefore necessary to implement appropriate measures to increase separate collection, recycling and recovery of waste. At the same time, the secondary materials market must be identified, and its development must be supported. It is important to analyze the efficient functioning of the waste market in Romania. This will reveal obstacles and regulatory deficiencies that affect the functioning of the waste market, recommending a set of possible solutions.

Eurobarometer surveys on attitudes of European citizens towards the Environment⁴⁹ and Waste Management and Resource Efficiency⁵⁰ show a **low level of involvement of the Romanian citizens in circular economy activities**. According to this survey (from 2018), 25% of the Romanian respondents bought a refurbished product instead of a new product, close to the EU average of 30%. However, only 13% of respondents confirmed that they used some form of a sharing scheme, which is the smallest share among EU countries. Similarly, only 9% of the Romanian respondents confirmed that they had rented or leased the product instead of buying it, which is the second smallest share after Malta.

A sharing scheme is a model of sustainable consumption in which two or more consumers co-own or rent a good and use it at alternate times, thus allowing temporary access to under-utilized or idle goods. The advantage of such schemes is that production and the use of resources is limited to the actual consumption, over-production and waste are thus avoided. Common examples include a system of car or bicycle sharing or carpooling in large cities. Currently, only a few such systems operate in Romania and their creation and use could be encouraged through simple regulations by the local municipalities. In the case of car sharing such regulations may include free or guaranteed parking for cars that belong to a

⁴⁵ <https://ec.europa.eu/eurostat/documents/3859598/5936709/KS-01-14-120-EN.PDF.pdf/334d5c04-b630-4395-8008-94f36712bf6b>

⁴⁶ https://ec.europa.eu/eurostat/databrowser/view/env_wasmun/default/table?lang=en

⁴⁷ https://ec.europa.eu/eurostat/databrowser/view/env_wastrt/default/table?lang=en

⁴⁸ https://unece.org/sites/default/files/2021-12/ECE_CEP_189_0.pdf

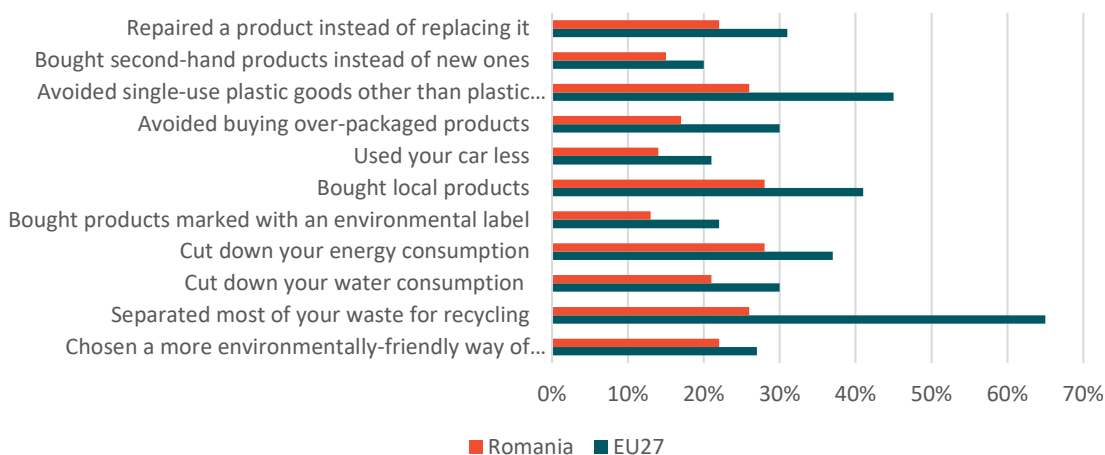
⁴⁹ https://data.europa.eu/data/datasets/s2257_92_4_501_eng?locale=en

⁵⁰ https://data.europa.eu/data/datasets/s1102_388?locale=en

sharing system, build-in car sharing to new residential quarters, car sharing lanes that give priority in congested areas to high-occupancy vehicles (this encourages people to travel together), park-and-ride areas at the borders of the cities etc.

According to the survey on attitudes of European citizens towards the environment from 2019, Romania also lags behind the EU average in other activities (see Figure 2-2), such as product repair, avoiding single-use plastics and packaging, lowering water and energy consumption or choosing products produced locally and/or with an environmental label. The biggest difference can be seen in the attitudes towards separate waste collection – only 26% of Romanian respondents agreed to separate most of their waste compared to the EU average of 65%.

Figure 2-2: Survey on attitudes towards CE activities - comparison of Romania and EU27 average (2019)



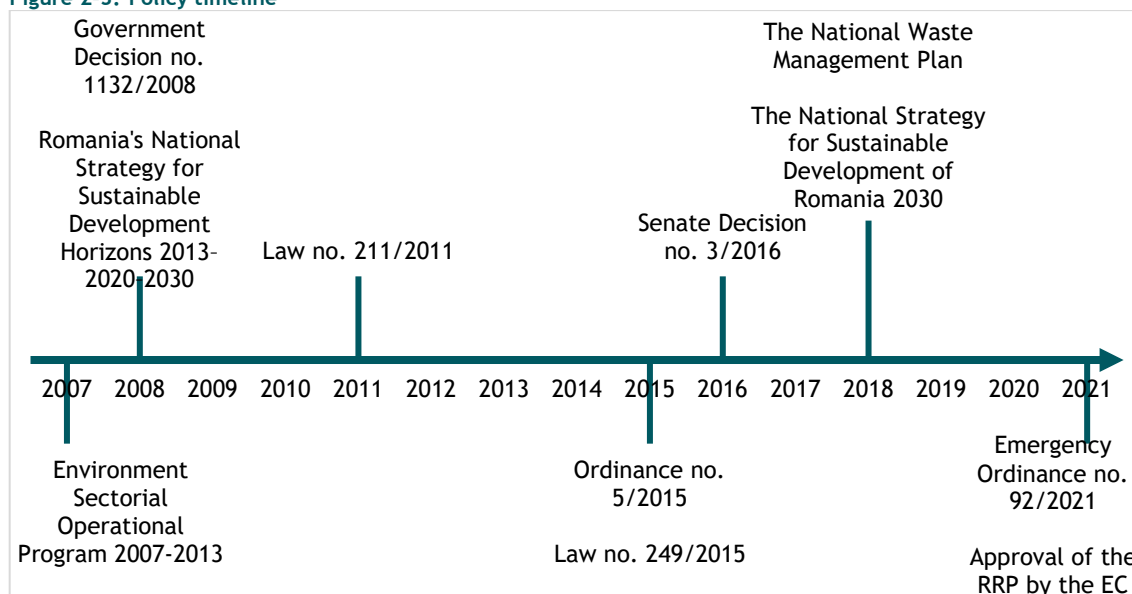
Source: Eurobarometer (2019)

Based on these indicators, it can be concluded that Romania has significant potential for improvement across all stages of circular economy, from higher resource efficiency and use of secondary materials in production to waste prevention and better waste management.

2.2 Current policies and legislation in Romania relevant to CE

This section shortly characterizes those policies in place supporting circular economy in Romania. Figure 2-3 provides an overview while each policy is introduced in the following.

Figure 2-3: Policy timeline



Source: own figure.

The National Strategy for Sustainable Development of Romania 2030⁵¹ (Romanian Government, 2018) aims to realize the transition to a circular economy, in line with the SDGs Goal 12: Responsible consumption and production. The strategy proposes the transition to a new development model by introducing elements of the circular economy, increasing resource productivity, reducing food waste, by reducing waste generation at all levels, increasing recycling and reuse, encouraging companies to adopt sustainable practices and to integrate information on the sustainability of their activities into the reporting cycle, and raising public awareness of what a lifestyle in harmony with nature means. By Government Decision no. 754/2022 for the amendment and completion of the Government Decision no. 877/2018 on the adoption of the National Strategy for Sustainable Development of Romania 2030, the National Action Plan, a key document guiding the implementation of SNDDR 2030 was approved. Integrated waste management systems at the county level, implemented on behalf of the Intercommunity Development Associations set up at the county level were promoted through the **Environment Sectorial Operational Program 2007-2013**⁵², although with long delays. The completion of these projects is now ensured through the Large Infrastructure Operational Program.

The **National Waste Management Plan**⁵³ has set the following targets until 2030:

- Step-wise transition to a new development model based on rational and responsible use of resources, with the introduction of elements of circular economy and the elaboration of a roadmap.
- Reduction of per capita food waste at retail and consumption level and reduction of food losses along production and supply chains, including post-harvest losses.
- Recycling 55% of municipal waste by 2025 and 60% by 2030.
- 65% recycling of packaging waste by 2025 (plastics 50%; wood 25%; ferrous metals 70%, aluminum 50%, glass 70%, paper and cardboard 75%) and 70% by 2030 (plastics 55%, wood 30%, ferrous metals 80%, aluminum 60%, glass 75%, paper and cardboard 85%).

⁵¹ <https://sdgtoolkit.org/tool/romania-sustainable-development-strategy-2030/>

⁵² https://www.adrvest.ro/attach_files/Programul%20Operational%20Regional%202007-%202013.pdf

⁵³ http://www.mmediu.ro/app/webroot/uploads/files/PNGD_vers5.pdf

- Separate collection of hazardous household waste by 2022, bio-waste by 2023 and textile by 2025.
- Establishment of a mandatory extended producer responsibility schemes for all packaging by 2024.
- Implementation of sustainable green public procurement practices, in line with national priorities and European policies.

The total value of investments included in the National Waste Management Plan is of 2.373 billion Euros, out of which⁵⁴:

- 42% (1.121 billion Euros) investments for separate waste collection, transfer stations, sorting facilities, composting and anaerobic digestion;
- 37% (889 million Euros) for integrated mechanobiological treatment facilities (which will treat both separately collected and recyclable waste);
- 4% (89 million Euros) for the modernization of the mechano-biological treatment facilities (without capacity increase);
- 1% (18 million Euros) for closing non-compliant deposits;
- 11% (256 million Euros) other costs.

In order to increase recycling rates in Romania, several instruments have been implemented,⁵⁵ such as:

- Economic instruments: taxes for non-biodegradable packaging materials, imports of industrial oil, imports of hazardous substances and landfill.
- Legislation/coercive instruments: higher fines for waste incineration and illegal waste disposal, the possibility for the authorities to confiscate the vehicle used for illegal waste disposal, new fines for companies that do not audit their internal processes for a waste management perspective and the Extended Producers Responsibility Scheme (EPR).
- Administrative instruments: new administrative structures and databases were introduced for waste management, such as Waste Transportation Registry and SIATD - Waste Traceability Information System. SIATD is an online application for monitoring and control of packaging waste traceability, which economic operators and local administrations must use to report packaging waste in the EPR scheme. This will complement other tools such as the new computer waste traceability system, introduced in 2022, where all companies that have recycling capacity must be registered. The system also contains information on waste shipment to Romania.

Regarding progress in the development of infrastructure for waste management, between 2013 and 2019, there were twenty projects at country level, financed through the Operational Plan for Large Infrastructure,⁵⁶ under Priority Axis 3 (Development of environmental infrastructure in conditions of efficient resource management), Specific Objective 3.1 (Reducing the number of non-compliant landfills and increasing the readiness for waste recycling in Romania). However, only six of these projects were finalized, others being in progress, on time or overdue.⁵⁷

Senate Decision no. 3/2016 was adopted expressing an opinion regarding the Circular Economy Package proposed by the European Commission and attesting Romania's opening to the circular economic model.

⁵⁴ <https://mfe.gov.ro/wp-content/uploads/2022/06/425394145037e12265f6e5ba96cfb08a.pdf>

⁵⁵ https://ec.europa.eu/environment/eir/pdf/report_ro_en.pdf

⁵⁶ <https://mfe.gov.ro/poim-ghidul-solicitantului-dezvoltarea-infrastructurii-de-management-integrat-al-deseurilor-proiecte-noi/>

⁵⁷ <https://mfe.gov.ro/wp-content/uploads/2021/03/33297f8fa58551a7006eaac1ed1e9337.pdf>

The above-mentioned decision expresses Romania's intent to build an auspicious framework to the implementation of the circular economy by the transposition of the EU legislation.

Thus, **Government Ordinance 92 from 2021** on the waste regime fully transposed the provisions found in Directive EU 2018/851/CE. The purpose of the Ordinance is to align national legislation with European objectives regarding waste management. In this respect, the Ordinance contributes to the transition to a circular economy. The Ordinance also establishes new increased municipal waste recycling rates and new rules for the calculation of municipal recycling rates, providing a framework for sustainable materials management and ensuring the protection, conservation and improvement for the quality of the environment, human life and ensures the use of prudent and rational management of natural resources.

The **National Recovery and Resilience Plan** was approved by the European Commission in September 2021 which allocates EUR 1.2 billion of the total of EUR 29,2 billion for the development of a modern infrastructure for waste management. The waste management projects foreseen in the plan must be completed by 2026. Until 2024, 565 collection centres for small- and medium-size communities should be built, alongside seven integrated centres of waste collection. Moreover, around residence buildings there will be established 14,000 digitalized "ecological islands" for selective collection of all types of waste.

2.3 Other Governmental initiatives relevant to CE (including work in progress)

Governmental initiatives related to the circular economy have been initiated in the fields of sustainable mining, waste management and sustainable development. Even though these topics are important for an effective and holistic transition, there is potential to expand ongoing and planned initiatives to tackle more circular economy principles. Additionally, existing initiatives can be tailored more closely to the concept of circular economy.

Sustainable mining

The Ministry of Economy initiated a consultation for the implementation of the *Mining Strategy of Romania 2017-2035* (Ministry of Economy, 2017), being focused on sustainable mining. The initiative is linked to the European Raw Materials Partnership and the Mineral Raw Materials Initiative.

Waste management

The proposal from 2018 of *Government Decision on the management of waste from construction and/or demolition activities*, was materialized three years later, in ORDINANCE no. 92 of August 19, 2021 on waste management, addressing new obligations for holders of construction/demolition permits, regarding new recycling rates and dedicated waste management plans. Within the LIFE10 project ENV / RO / 000727 „Recovery of construction and demolition waste from Buzau County⁵⁸” VAL-C&DW project team in Romania (coordinating beneficiary Buzau County Council and partner Natura Management SRL) is working on issuing a methodology regarding the termination of waste status (EoW) for certain types of construction waste.

The proposal on the Code for Spatial planning, Urban Planning and Construction, one of the RRP reforms included in Component 5: Renovation Wave, establishes specific rules for waste management generated from building and demolition of constructions and also from exploiting the constructions (among which is

⁵⁸ https://webgate.ec.europa.eu/life/publicWebsite/index.cfm?fuseaction=search.dspPage&n_proj_id=4009

the elaboration and implementation of a programme to reduce waste and a waste management plan, the obligation to reuse waste, recycle waste, obligation to safely eliminate waste etc.).

Methodological rules for the application of the *law on the management of compostable non-hazardous waste* have not yet been issued. The same applies for the *law on reducing food waste*, which includes the prevention of food waste generation in addition to the methodology or standard for defining the criteria for cessation of waste status and transformation into a by-product, which can be composted and used later in agriculture or biogas.

The *National Waste Management Plan* has been adopted, with the strategic objective of promoting the transition to a circular economy of the Development Strategy of Romania. The waste management plans at county-level and Bucharest municipality have been adopted in 2021, identifying the measures necessary to meet the objectives of the Package for the Circular Economy.

Sustainable Development

According to the 2022 European Semester's Country Report,⁵⁹ Romania is making progress on most of the SDGs, but challenges remain. Poverty and deprivation are decreasing and basic health outcomes improving. Still, poor quality and low expenditure in research, development and innovation affect industrial capabilities. Some concerns remain on the rule of law: the effectiveness of justice system is deteriorating and the perception of corruption remains high. Significant progress is needed on 3 SDGs: gender equality, quality of education and responsible consumption and production, as actions in these fields have been limited in recent years. On responsible consumption and production, Romania has been performing poorly. Its circular material use rate is declining while the EU as a whole has progressed substantially (1.3% vs 12.8% in 2020). The material footprint of the Romanian economy has also significantly increased (almost by a third) since 2015 while it remained stable in the EU. However, it is expected that the RRP will further help Romania address its current challenges notably with strong reforms to support the circular economy and improve waste management.

The Department for Sustainable Development (DSD) operational since 2017, is subordinated to the Prime Minister, within the working structure of the Government. It has a leading role in coordinating the implementation activities of the 2030 Agenda and the SNDDR 2030 - which they also revised in 2018. Subsequently, at the initiative of the DSD, two bodies were established: (1) the Interdepartmental Committee for Sustainable Development, which ensures the process of implementation, monitoring, evaluation and review of this National Strategy for Sustainable Development of Romania (NSSDR), and (2) Sustainable Development Hubs, at the level of central authorities / ministries. DSD is the beneficiary of the SIPOCA 613 project in which it developed the Action Plan for the implementation of the NSSDR, and in the following period, 2022 - 2023, DSD benefits from technical assistance from the OECD in the coordination and implementation of the action plan through a roadmap that ensures policy coherence for sustainable development. DSD also developed the national occupational category "Sustainable development Expert" and thus created the possibility for postgraduate courses related to this new occupation.

⁵⁹ https://ec.europa.eu/info/sites/default/files/2022-european-semester-country-report-romania_en.pdf

Finally, the *National Action Plan for the implementation of the National Strategy for Sustainable Development of Romania 2030* was finalized and—adopted through Governmental Decision nr. 754/8.06.2022.

2.4 Current governance structure

In this section, the current governance structure and regulatory process related to circular economy topics are presented.

In the current governance structure, circular economy does not have a distinct process and/or is not assigned to a responsible ministry/unit. Instead, it is managed alongside other related topics, such as climate change or sustainable development.

Following consultations with stakeholders and the beneficiary, it has become apparent that currently the responsibilities regarding circular economy in Romania are shared between the Ministry of Economy and the Ministry of Environment, Waters and Forests. Within its competencies, the Ministry of Environment, Waters and Forests, has the central role in issuing national policies, regulations, strategies and plans regarding the prevention of waste generation and the management of waste.⁶⁰ The Ministry of Economy, on the other hand, is in charge of elaborating medium and long-term strategies and reforms that support Romania's economy in its transition to the circular model.⁶¹

Responsibilities and mandates in circular economy topics (which aligns also with mandates for environmental topics) are shared among different ministries. The key ministries are the:

- Ministry of Environment, Waters and Forests;
- Ministry of Economy;
- Ministry of Development, Public Works and Administration.

Depending on the exact topic, responsibilities and mandates on environmental topics are also shared among the following ministries:

- Ministry of Energy, Ministry of Entrepreneurship and Tourism;
- Ministry of Foreign Affairs, Ministry of Internal Affairs;
- Ministry of Transport and Infrastructure;
- Ministry of Agriculture and Rural Development;
- Ministry of European Investments and Projects;
- Ministry of Finance;
- Ministry of Research, Innovation and Digitization;
- Ministry of Labour and Social Solidarity
- Ministry of Education;
- Ministry of Health.

⁶⁰ Governance Decision 43/2020 regarding the functioning of the Ministry of Environment, Waters and Forests.

⁶¹ Governance Decision 1326/2021 regarding the functioning of the Ministry of Economy.

Box 2-1 Other relevant governmental bodies supporting circular economy topics**Department of Sustainable Development**

Another body worth mentioning is the Department of Sustainable Development (DSD) being responsible with implementing and monitoring SDG's and elaborating sustainability strategies. It operates since 2019 within the Government's working apparatus, being placed under the subordination of the Prime Minister. They have joined as a partner for the first attempt of developing the Romania's Strategy for Circular Economy ROCES2030, as an initiative of the Institute for Research in Circular Economy and Environment "Ernest Lupan" together with the Ministry of Environment, Waters and Forests. Starting in March 2021, the DSD coordinated the consultations with the line ministries on the draft strategy and asked for technical assistance from DG REFORM to finalize the strategy and develop its action plan.

Interdepartmental Committee on Sustainable Development

The Interdepartmental Committee for Sustainable Development (ICSD), which has been established by Government Decision (272/2019) and by the DSD is chaired by the prime minister and includes all ministers as members. Among its responsibilities this body follows the process of implementation, monitoring, evaluation and revision of the National Strategy for Sustainable Development (NSSD). It has the responsibility for integrating requirements of the NSSD into sectoral policies and strategies, as well as the compliance with the reporting obligations assumed by Romania at international level and of the European Union in the field of sustainable development.

National Commission on Climate Change

The National Commission on Climate Change is an inter-ministerial body, with an advisory role, without legal personality, whose activity is coordinated by the Ministry of Environment. The National Commission on Climate Change is subordinated to the Inter-ministerial Council for Agriculture, Rural Development and Environment having as Presidents the Ministry of Environment. More information can be found in Annex C.

Inter-ministerial Committee on Climate Change

The Inter-ministerial Committee on Climate change is the youngest body which will be coordinated by the Prime Minister as President. Its main responsibility is to align policies in sectors that have an impact on climate change and monitor the implementation progress made by the Romanian institutions. Its main responsibility is to modify and complement national climate change related policies.

Table 2-1: Responsibilities of ministries by topic/sector

Sector	Responsible bodies, including related agencies and institutions in relation to CE
Tourism	<ul style="list-style-type: none"> Ministry of Entrepreneurship and Tourism: develops policies and legislation applicable for this sector, ensures implementation of strategy regarding ecotourism, sponsors development plans for touristic locations, incorporates European funds designated to its sector. Ministry of Economy: establishes and monitors norms regarding consumer protection for services provided by the sector.

Agriculture and forestry	<ul style="list-style-type: none"> • Ministry of Agriculture and Rural Development: develops policies and legislation applicable for this sector, adapting agriculture to climate change, oversees the development and protection of mountain areas, provides funding, leads education programs and research, regulates pesticide use. • Ministry of Environment, Waters and Forests: administers forests and protected areas, regulates water use, adopts and implements legislation regarding pesticide use.
Waste	<ul style="list-style-type: none"> • Ministry of Environment, Waters and Forests: develops policies and legislation in waste sector, inspects economic activities related to waste management compliance establishes norms for waste management, develops national waste management programs and strategies. • Ministry of Economy: monitors implementation of waste management programs, forecasts industrial waste generation. • Ministry of Development, Public Works and Administration via A.N.R.S.C.: provides licences for sanitation operators and establishes methodology for calculating the tariffs for municipal waste management. • Ministry of Education: implements education programs regarding environmental protection in schools. • Ministry of Health: elaborates norms and provisions for medical waste management, monitors the impact of waste on human population.
Water	<ul style="list-style-type: none"> • Ministry of Environment, Waters and Forests: develops policies and legislation regarding water use, performs inspections regarding water quality, water and groundwater use, wastewater treatment, establishes and promotes norms for wastewater treatment. • Ministry of Development, Public Works and Administration via A.N.R.S.C.: regulates management of water supply and sewerage via licensing and tariffs.
Energy	<ul style="list-style-type: none"> • Ministry of Energy: develops policies and legislation in this sector, elaborates strategies regarding the energy sector. • National Energy Regulatory Agency (under the Romanian Parliament): licenses and controls the energy production (electric and natural gas). • Ministry of Economy: monitors implementation of programs producing energy from sustainable sources. • Ministry of Development, Public Works and Administration via A.N.R.S.C.: licenses public illumination structures. • Ministry of Environment, Waters and Forests: provides funding in energy production programs from sustainable sources.
Industry	<ul style="list-style-type: none"> • Ministry of Economy: elaborates policies and legislation regarding economic activities, monitors programs to increase the competitiveness of industrial products, elaborates industrial development strategies, oversees industrial areas sustainable development. • Ministry of Development, Public Works and Administration through the Technical Council for Constructions approves the conditions under which the construction materials are introduced in the Romanian market, supervises experimental labs of construction materials

Consumer goods	<ul style="list-style-type: none"> • Ministry of Economy: elaborates policies and legislation regarding economic activities, elaborates consumer goods development strategies, develops norms for goods conformity, inspects economic activities on provisions regarding consumer protection
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The regulatory process in Romania can be shortly described as follows. Ministries or the members of Parliament have the right to legal initiatives. The initiator (Ministry or a member of the Parliament) must obtain opinions from Committees or other Ministries in case of normative regulations that are overarching. There are situations when the initiators are two Ministries with a common interest in a legal framework. In the case of laws and government emergency ordinances, these must be voted in the Parliament (laws) or in the Government (government emergency ordinance and Government Decisions). Ministerial orders are approved and issued only at ministerial level, without the approval of the Parliament or Government, these normative regulations having the role of technical guidelines or procedures for the implementation of a law and, thus, must be subscribed to a law and/or a government emergency ordinance. This process will become relevant at the stage in which this strategy will be transposed into law.

3 Circular potential in Romania's sectors

This section provides an overview of Romania's economic sectors from a macroeconomic point of view and a first assessment of the sectors in terms of their circularity potential.

The results of the sectoral assessment will serve as a basis for further elaboration of the Action Plan which will present in more detail and depth specific objectives and policy recommendations as well as concrete actions for the priority sectors which need to be implemented in order to enhance circularity in the Romanian economy.

The energy, water and waste sectors will be addressed throughout the sectors, thus in a cross-cutting manner. As the three sectors provide essential material flows to all other sectors, they will be tackled under each individual sector where a clear link and opportunity to enhance circularity have been identified. Examples are opportunities for reducing waste and ways to recycle and re-use the products at the end of their life or reducing energy consumption, increasing energy efficiency and using renewable energy sources during the lifetime of products or at their production phase. Similarly, water consumption and the possibility of water re-use is discussed across the analysed sectors. A dedicated section of the water and waste management in Romania can be found in Section 3.2.4.

3.1 Introduction of Romania's economic sectors

This Strategy offers an overview of 14 economic sectors in Romania. The following table presents Romania's economic sectors derived from NACE A*64 codes⁶² and their share in Romanian economy which provides the structure for distinguishing and presenting the different sectors in this Strategy.

⁶² http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a64&lang=en

Figure 3-1: Selected sectors in Romanian economy

Sector	GDP share in 2020	NACE classification
Agriculture and forestry	4%	Agriculture, forestry and fishing
Metallurgical industry	2%	Manufacture of basic metals and fabricated metal products, except machinery and equipment
Chemical industry	1%	Manufacture of chemicals and chemical products
Machine building industry	1%	Manufacture of machinery and equipment n.e.c.
Automotive sector	14%	Manufacture of motor vehicles, trailers, semi-trailers and of other transport equipment; Wholesale and retail trade, repair of motor vehicles and motorcycles
Construction	9%	Construction
Food, beverages and tobacco products	5%	Manufacture of food products; beverages and tobacco products
Textiles	2%	Manufacture of textiles, wearing apparel, leather and related products
Glass	1%	Manufacture of other non-metallic mineral products*
Paper	0.2%	Manufacture of paper and paper products
Plastics	1%	Manufacture of rubber and plastic products**
Electrical equipment and electronic products	2%	Manufacture of computer, electronic and optical products and electrical equipment
Furniture	1%	Manufacture of furniture; other manufacturing
Tourism	5.3%	Not included, information retrieved from Statista ⁶³

* Manufacture of glass and glass products is aggregated under Manufacture of other non-metallic mineral products, more detailed data are not publicly available.

**Manufacture of plastics is aggregated under Manufacture of rubber and plastic products, more detailed data are not publicly available.

Source: Eurostat and Statista

3.1.1 Economy

In the last 10 years, the share of services in the Romanian economy was rising steadily, from 54% to 63%. At the same time, **industry** and **construction** slightly declined, accounting for 26% and 6% of GDP in 2020 compared to 32% and 10% in 2010 (see Figure A-4 in Annex A). **Agriculture, forestry and fishing** accounted for a stable share of the economy, at around 5% in 2010-2020.

Manufacturing, representing 80% of the industry sector, corresponded to 18% of the economy in 2020 in terms of Gross Value Added (GVA). **Manufacturing of food, beverages and tobacco products** represents 24% of all manufacturing in Romania, followed by the manufacturing of motor vehicles (14%). The share of the latter doubled between 2010-2020, making Romania rank 8th in automobile production in Europe. The whole **automotive sector**, consisting of manufacturing but also wholesale, retail trade and repair, represented 14% of GDP in 2020. At the same time, **textile** manufacturing declined by more than half, from 15% to only 7%. Manufacturing of basic **metals** and fabricated metal products represents another 9% of manufacturing, corresponding to stable share from 2010. Each of the **chemical, machine building, plastic** and rubber, **furniture** manufacturing represents approximately 4-5% of manufacturing in Romania. Manufacture of **paper** and paper products represented only 0.2% of GDP share in 2020. In 2020, **travel and tourism** in Romania represented 5.3% as a share of GDP, slightly increased compared to 5% in 2010⁶⁴.

3.1.2 Employment

Trends in employment across sectors were slightly different compared to the share of gross value added. While employment in services has grown steadily in line with economic growth, the share of people

⁶³ <https://www.statista.com/statistics/1197648/romania-travel-and-tourism-as-a-share-of-gdp/>

⁶⁴ <https://www.statista.com/statistics/1197648/romania-travel-and-tourism-as-a-share-of-gdp/>

employed in industry and construction rose slightly from 27% in 2010 to 30% in 2020. Employment in agriculture, forestry and fishing fell sharply from 32% in 2010 to only 21% in 2020, despite a stable trend in the sector's economic share. This can be explained by the increased level of technological innovations and automation in this sector. In addition, low salaries offered by agricultural companies make the sector less attractive to potential employees and people emigrate to more developed countries⁶⁵. However, employment in the agricultural sector in Romania is still at one of the highest rates in Europe.

3.1.3 Imports and exports

In 2020, the most important contributions to the **increase of exports** were registered for: machinery, machinery and equipment, including electrical (EUR 13.8 billion, respectively 22.2% of total exports), road transport vehicles, trailers and semi-trailers (EUR 13.07 billion euros, respectively 21.0%), computers and electronic and optical products (4.2 billion euros, respectively 6.8%), products of agriculture and hunting (3.7 billion euros, respectively 6.0%), rubber products and plastics (3.2 billion euros, respectively 5.2%), products of the metallurgical industry (3.08 billion euros, respectively 5.0%)⁶⁶. The most important contributions to the **increase in imports** in 2020 were recorded in: machinery, machinery and equipment, including electrical (EUR 15.2 billion, respectively 18.9% of total imports), road transport vehicles, trailers and semi-trailers (7.9 billion 9.9% respectively), computers and electronic and optical products (EUR 7.7 billion, respectively 9.7%), substances and chemicals (EUR 7.2 billion, respectively 9.0%), food products (EUR 5.3 billion, respectively 6.7%), products of the metallurgical industry (4.4 billion euros, respectively 5.6%)⁶⁷.

⁶⁵ https://www.juridice.ro/wp-content/uploads/2017/03/Raport_PwC-agricultura.pdf

⁶⁶ The economic and social situation of Romania Report, National Institute of Statistics, 2022

⁶⁷ The economic and social situation of Romania Report, National Institute of Statistics, 2022

3.2 First analysis of the sectors

The following table provides a summary of the key categories that have been analysed. The elaboration can be found further below.

Table 3-1 Overview of sector analysis

Sector	GDP share	Impacts on the environment and human health	Problems	Opportunities/solutions
Agriculture and forestry	4%	GHG emissions, biodiversity loss, water pollution, water scarcity, soil quality degradation, land use	Low use of sewage sludge for agricultural use or composting (20%), illegal logging	Cascading use of biomass, increase use of bio-based fertilizers, compost, support initiatives in alternative protein sources, reglementation of water/wastewater reuse in agriculture, optimise water extraction and maximise their reuse.
Metallurgical industry	2%	GHG emissions, changes in terrestrial and aquatic systems, pollution of air, water and soil	Low level of recycling activities	Implement Eco-design criteria and requirements, improve technologies, enhance the recovery of materials
Chemical industry	1%	GHG emission, energy consumption, hazardous materials, microplastics	Low recycling of biowaste (37%) Low use of sewage sludge for agricultural use or composting (24%)	Increase separate collection of biowaste, increase connection to wastewater treatment and use of sewage sludge
Machine building industry	1%	GHG emissions, energy consumption	Low recycling rate	Design for disassembly, apply low-carbon technologies and fuels, encourage repair, remanufacture and recycling, increase share of recycled materials
Automotive sector	14%	GHG emission, energy consumption, hazardous chemicals, extraction of non-renewable materials	Missing infrastructure for complex recycling, low recycling of certain parts	Increase eco-design, increase use of recycled parts, investments in repair shops
Construction	9%	GHG emissions, energy consumption, land use, resource depletion, pollution of air and water, noise pollution	High landfilling rate, low recycling, low enforcement, lack of incentives for recycling	Design for disassembly, flexibility, modularity; utilization of sustainable materials, increase renovation programmes, develop EPR scheme, prioritize demolition over demolishing, invest into recycling capacity
Food, beverages and tobacco	5%	GHG emission, water and energy consumption	Low recycling of food waste, littering of cigarette buds, unsustainable use of packaging (and its low recycling)	Increase separate collection of food waste, increase waste prevention (food donations, GPP), sustainable production incl. packaging prevention
Textiles	2%	Water consumption and pollution, GHG emissions, non-renewable material use, gender equality dimension, microplastics	Low consumer awareness, low recycling and separate collection (1kg per capita)	Increase separate collection, promote repair/reuse, R&D support: waterless dyeing and water reuse in textile industry
Glass	1%	GHG emissions, air pollution from production, energy consumption, non-renewable material use	Low recycling (43%)	Increase separate collection, increase use of secondary material in production
Paper	0.2%	Deforestation, energy and water consumption, air pollution	Low recycling (68%), but highest among packaging	Increase separate collection, more sustainable harvesting, increase use of secondary material in production

Plastics	1%	GHG emissions, non-renewable material use, air pollution, marine pollution, microplastics	Low recycling (31%), low recycled content in new products, Low consumer awareness	Increase separate collection, increase use of secondary material in production, eco-design, increase consumption of more sustainable products, R&D support
Electrical equipment and electronic products	2%	GHG emissions, non-renewable material use, air pollution	Low recycling (27%)	Increase separate collection, reparability, durability, reuse
Furniture	1%	Intense wood harvesting, synthetic materials, pollution of soil	Low consumer awareness, a majority of waste is landfilled	Implement circular design principles, reduce the utilization of synthetic materials, increase separate collection, invest into reverse infrastructure and recycling technologies
Tourism	6.5%	Resource consumption, GHG emission, pressure on ecosystem, water pollution, marine pollution	Low consumer awareness in sustainable tourism	Sustainable infrastructure and building construction (considering cultural heritage, local labour), eco-tourism promotion, local production of food, transportation, waste prevention incentives

3.2.1 Agriculture and forestry

Overview

Agriculture, forestry and fishing accounts for a stable share of the economy, at around 5% of GDP in the period of 2010-2020. At the same time, employment in this sector fell sharply from 32% in 2010 to only 21% in 2020.

In Romania, over 16% of GHG emissions can be attributed to agriculture, although the net absorption of CO₂ by the forestry sector compensates for about 20% of the emissions from other sectors at national level⁶⁸. In addition, excessive use of pesticides, herbicides and chemical fertilizers and inefficiency of irrigation systems lead to biodiversity loss, water pollution and soil quality degradation. Another negative impact on the environment is unsustainable wood consumption⁶⁹. As a result, the breeding area and habitats for birds and small game have been lost.

Challenges and problems

Several problems of not following CE principles can be identified in the sector of agriculture and forestry in Romania:

- Low levels of application of sewage sludges, bio-based fertilizers or compost in agricultural fields;
- Deforestation and illegal tree logging and cutting;
- Lack of irrigation infrastructure;
- No legislation for enhancing circular economy activities in the agri-food supply chain (technologies and business models are much more advanced than national regulations, and legislative changes are not based on recent demands).

Solutions and opportunities

The circularity of this sector is represented by the possibility to use compost and biofertilizers to replace pesticides, and also use the biowaste being generated to produce biofuels, electrical and thermal energy.

At the **production phase**, a much greater emphasis is needed on careful soil management as soil plays a critical role in sustainable food production and circular bioeconomy. Natural bio-based solutions for improving soil resources can be offered, including use of secondary products from residues and waste, such as organic fertilisers or compost, soil conditioners, plant bio-stimulants and sewage sludge. The use of sludge and compost as fertilizers can be increased by implementing provisions in the Common Agricultural Policy (CAP) National Strategic Plan. Research, innovation and attracting funding will be needed to help farmers adopt production systems based on integrated soil and water management and the use of organic fertilizers with increased water retention capacity. The connection to wastewater treatment system must be increased and suitable infrastructure for collection of bio-waste provided in order to increase separate collection.

To be categorised at the use phase is the issue related to illegal cutting of trees. In order to identify and address such activities, stricter regulation must be introduced coupled with an introduction of strict traceability documentation for wood used in this sector⁷⁰. The number of field inspections performed by the Romanian Forestry Guard should be increased and corruption addressed. This should be done via

⁶⁸ https://energy.ec.europa.eu/system/files/2020-06/ro_final_necp_main_en_0.pdf

⁶⁹ Due to poverty and in the absence of sources of wood supply, the population used protective curtains such as trees and shrubs to extract firewood.

⁷⁰ Recomandări pentru îmbunătățirea aplicării legii împotriva infracțiunilor forestiere, WWF

appointing and/or strengthening current specialized personnel dedicated to the investigation of forest crimes, encouraging them to work closely with prosecutors and anti-corruption units.

The growing scarcity of freshwater resources is currently one of the most important limiting factors for crop production and food security. The new Water Reuse Regulation will encourage circular approaches to water reuse in agriculture by promoting ways of recovering nutrients from the reclaimed water and using them in different fertigation methods⁷¹. In the context of accentuating climate change and diminishing freshwater resources, treated wastewater can partially cover the need for water for irrigating. To ensure crop safety, the new rules provide for minimum water quality requirements, require frequent monitoring and oblige wastewater treatment plant operators to develop risk management plans⁷².

At the **end-of-life phase**, there is the opportunity to produce energy, according to the National Strategy on Energy Efficiency 2020-2030, which promotes energy production from renewable sources such as agriculture, encourages projects in the sector which use waste to produce energy (biomass, bioliquids, biogas, fermentation gases from waste and sludge)⁷³. Biowaste collection, however, must be increased in order to implement these changes. Yet, the number of operators that produce biogas in Romania remains low as a result of low supply of bio-waste. In the public sector the city of Oradea uses a biogas plant, with 85% efficiency of fuel conversion, which is then used to produce electric energy (30%) and thermal energy (55%)⁷⁴. Private operators in agriculture also implemented biogas production systems, however, production and usage remain low⁷⁵.

Furthermore, the cascading use of biomass can be promoted via regulatory instruments, such as ambitious recycling targets. In addition, support scheme for bio-based industrial processing plants, e.g. biorefineries, can be provided. Efficient allocation of biomass between bio-based material applications and energy use is needed to be defined also in policies.

3.2.2 Industry

Metallurgical industry

Overview

The gross value added produced by the metallurgical industry accounted for 0.6% of GDP in Romania in 2019, a level down from 1.7% in the mid-1990s. While both import and export of metallurgical products rose during the last 10 years, the employment and number of companies active in this sector declined. As the metallurgic industry relies heavily on resources that are scarce in Europe, circular economy principles could help pursue the decoupling between virgin materials extraction and economic growth and provide environmental benefits. The largest circularity potential has been observed in the design phase with regard to implementing Eco-design criteria and requirements, improving technologies at the production phase and in the end-of-life phase to enhance the recovery of materials.

Challenges

One of the challenges is that the industry is very **energy intensive** and lacks incentives to apply clean, material efficient processes and energy-efficient technologies. This intensifies the impacts on the

⁷¹ <https://www.mdpi.com/2071-1050/12/21/9055/pdf>

⁷² <https://agrointel.ro/130496/noi-norme-europene-privind-reutilizarea-apei-folosite-in-agricultura>

⁷³ http://economie.gov.ro/images/Energie/20200805_EA_SER_rev06_ROL.pdf

⁷⁴ <https://ecobihor.ro/sistem-captare-biogaz/>

⁷⁵ <https://www.agrana.com/nachhaltigkeit/oekologie/produktion/energie-emissionen>

ecosystem. However, the main challenge in making the metallurgical industry more circular is the low demand of low carbon material that limits the uptake of recycling. As a result, the **recovery rate remains very low** compared to the waste generation. In addition to this, of those materials that are recovered, most are not being recycled to their full potential due to several value-chain problems, such as imperfect collection and sorting systems that prevent end-of-life metals from reaching recyclers; or the growing product complexity, miniaturization, and metals mixing that leads to increased recycling complexity. This challenge becomes more pressing when considering that the chemical, metallurgical and steel waste make up for the second largest contribution to the total waste generated by the processing industry (about 39%). Approximately 25% of waste from the chemical, metallurgical, steel and printing industries is recovered,⁷⁶ but the **rest is deposited in excavated land-forming dumps** threatening the local ecosystem.

Solutions and opportunities

In the **design phase**, circularity could be increased by applying Eco-design criteria and requirements for reparability, recyclability and cost-effective dismantling of products. In the **production phase**, opportunities relate to increasing the material and resource efficiency, invest into cleaner technologies and replace virgin with secondary raw materials. The **end-of-life phase** bears potentials in increasing the recycling rates of materials – for instance, steel can be recycled again and again without the loss of key properties of steel scrap. This way, the production process would become less energy intense and more cost-effective. In addition to the mentioned elements, it is important to increase the demand for lower-carbon metals, through e.g. labelling, standardization or circular procurement.

Chemical industry

Overview

The sector of chemicals and chemical products lies at the basis of many industrial value chains, and is very diverse, including fertilisers, pesticides and other agrochemical products, plastics and synthetic rubber, soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations, explosives, glues or man-made fibres. In Romania, the chemical manufacturing represents approximately 1% of national GDP in 2020⁷⁷, while only 0.3% of the total employment in the country in 2019⁷⁸. The largest circularity potential lays in the production of biobased fertilisers.

Challenges

The main challenges to the manufacturing of biobased fertilisers are the availability of biowaste or of sewage sludge at a sufficient level of purity for composting or agricultural use. Low sewage sludge collection due to low connection of households to wastewater treatment system and low separate collection of biowaste in Romania hinders the use of secondary materials in chemical industry. In order to be usable in agriculture, biobased fertilisers (be it made from bio-waste, from animal manure or from human excreta) need to be very pure, and free from contaminants. This requirement places high demands on the management of material flows, so that they be pure at source, and kept pure along the logistic and processing chain. In addition, the investments to be made in composting or methanation installations for bio-waste need to be made to keep pace with the upcoming rise in separate collection of bio-waste from households.

⁷⁶ <http://www.anpm.ro/documents/16755/42624324/Planul+National+de+Gestionare+a+Deseurilor.pdf/49fb72f1-e2-4892-b0a9-669c74ce95e4>

⁸¹ e2-4892-b0a9-669c74ce95e4

⁷⁷ Eurostat data: National accounts aggregates by industry (up to NACE A*64)

⁷⁸ Eurostat data: Employment and activity by sex and age - annual data [lfsi_emp_a]

Solutions and opportunities

The production of biobased fertilisers can be supported by Romanian public policies in the following directions:

- the speedy transposition of the revised Waste Framework Directive in terms of separate collection of biowaste⁷⁹;
- increase connection of households to wastewater treatment in line with EU requirements;
- facilities which eliminate the contamination of human excreta with the chemicals that reduce their usability for agriculture;
- Supporting the proper management of animal manure in farms, so that it does not leak in an uncontrolled way into the environment, and is used optimally as fertiliser;
- Supporting the deployment of methanation or composting installations for the treatment of bio-waste from all sources.

Machine building industry

Overview

The machine building sector contributes with 1% to the national GDP. In terms of exports, the sector is the third strongest one. However, during the COVID 19 pandemic, the turnover of the sector dropped the first time since 2011 to EUR 4.3 billion. The largest circularity potential lays in the increased utilisation of recycled materials, increase the share of machines, machine components and materials being reused, repaired and recycled as well as using new and innovative technologies in the production process.

Challenges

One of the two primary challenges is the high energy consumption of the sector and the resulting GHG emissions. This is a result of traditional and conservative way of production, e.g. via mechanical drives powered by carbon-emitting diesel or gasoline. Similar to other countries in the EU, Romania has to face the challenge of defossilizing the energy system used in the industrial sector and accordingly the machine-building sector. This entails shifting towards renewable energy sources instead of fossil based energy sources. While this shift contributes to the advancements toward a more circular economy, the cost efficiency of renewable energy sources remains a hurdle to maintain profitability.

The other challenge is that the utilization of recycled materials is not advanced – only 14% of the raw materials used in the industry are of recycled origin⁸⁰.

Solutions and opportunities

To advance the circular economy in the machine building sector, in the **design phase**, machines and their components should be designed for disassembly. This way, faulty parts could be easily disassembled and demounted for replacements extending the machine life through easier repair. In the **production phase**, through the application of new technologies operating resource and material efficient (low carbon) as well as lower-carbon fuels, such as hydrogen or switching to electric drives powered by batteries or fuel cells⁸¹. Innovations supporting self-maintenance, disposal, and sorting processes promise additional opportunities. In the **end-of-life phase**, activities such as repair, reuse, remanufacturing as well as the recycling of machines, machine components and materials should be incentivized and promoted to the extent possible, taking into account suitable treatment of hazardous substances. In parallel, to stimulate

⁷⁹ Directive 2008/98/EC on waste, consolidated and updated version available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A02008L0098-20180705>

⁸⁰ VDMA (2019) [Ecological services 4.0 - a megatrend for the construction of machines and production units](#)

⁸¹ McKinsey & Company (2021). Implications of the energy transition across the machinery value chain

both supply and demand, requirements and economic incentives can be put in place that encourage the utilization of recycled materials in the production process.

Automotive sector

Overview

Automotive industry has become the most important industry of the country, with a share of 14% in the Romanian GDP, contributing 26% to the exports of the country and employing 200 thousand people. Many foreign investors have chosen Romania for this industry due to e.g. its comparatively cheaper labor, the high quality of the human capital or competitive tax system. The circularity potential in the automotive sector relates to the modular design with a view to dismantling, the reduction in energy consumption and increasing durability of products, as well as to the increasing reuse and recycling of products and materials.

Challenges and problems

One third of Romanians own a car and more than 45% of these cars are older than 16 years.⁸² This means that Romania ends up dealing with a considerable amount of the complex waste represented by an end-of-life vehicle, for which it currently does not have the appropriate, modern and automated recycling infrastructure. Moreover, currently, the inadequately technologized steel and aluminum industries do not have the capacity to absorb the recyclable material resulting from the mechanical spare parts.⁸³ Given the number of second-hand cars that end up in Romania, it would be warranted that the steel industry in the country updates to the latest technologies to take advantage of resulted scrap and increase its competitiveness. This could be achieved, for example, by moving away from the conventional Blast Furnace process to more energy-efficient, less-CO₂ intensive processes like the HIsarna process, which incorporates scrape metal into the process. Other examples include that of the Hirohata Ironworks of the Nippon Steel Corporation that uses technologies that recycle tires in the production of steel or that of the electric arc furnace technology that heavily relies on scrap.

Specific to Romania, the faulty communication between the dismantling companies, the manufacturers, the waste disposal companies, and the authorities is affecting the waste flow. Consequently, the dismantlers are mostly driven by the re-sale value of the parts, and therefore largely focus only on those parts that can be re-sold as such. This leads to little regard for those parts that can be reused with minor repairs or recycled. Thus, the parts with low demand or a low re-sale value end up in the landfill. In addition, due to the low volume of the recycled material, the price of recycled materials is higher than the price of some raw material, further discouraging recycling.⁸⁴ Furthermore, the illegal dismantling of the end-of-life vehicles contributes to tax fraud, pollution and the degradation of human and biodiversity health, especially through fire-based metal separation procedures.

Another challenge for recycling of the end-of-life vehicles in Romania is the lax legislation regarding the abandonment of old cars, which results in many cars abandoned in cities and at landfills. Abandoned vehicles lead to a lower quality of scrap metal, leakage of hazardous substances in the environment and a more expensive scrap process due to the bureaucratic steps that need to be followed.

⁸² Rovinaru, Rovinaru, & Rus, 2019 based on data from 2018.

⁸³ After the fall of the communism, the metallurgical industry has suffered a decline and, for a long time, it has seen underinvestment due to fraudulent privatization of the metallurgical plants (Metallurgy in Romania, South-East European INDUSTRIAL Market - issue 1/2021, <https://www.see-industry.com/en/metallurgy-in-romania/2/1991/>).

⁸⁴ Rovinaru, Rovinaru, & Rus, 2019

Moreover, Romania still lacks modern infrastructure such as highways⁸⁵ and robust, high quality national ways. This has a clear and direct effect on the condition of the Romanian vehicle fleet, ultimately shortening the life of each vehicle that frequently uses this infrastructure.

The electrification trend of the automotive sector is catching up also in Romania. This outlook opens new challenges for the circularity of the industry, whereby the production of the batteries and their reuse and recycling become a whole new problem at the EU level.

Solutions and opportunities

At the **design phase**, with a view towards repair, reuse and recycle, the design of the vehicle should allow for disassembly. A modular build of the components, in which individual spare parts can be repaired or replaced without affecting other well-functioning components that can and should be retained as such, is one way to ensure repair, remanufacturing and optimal use of materials. While the Romanian automotive industry is mainly foreign-owned and many design decisions are made in the headquarters of the main investor, this is not always the case. For example, Renault Group has one of its six design studios in Bucharest where, as of the beginning of this year, were employed 30 designers. This studio has designed important parts for Dacia and is in constant internal competition for projects within the Renault Group.⁸⁶ Therefore, there is room for Romania to influence the design options of the big car producers in the country along the lines describe above. For these design objectives to be reached and for the influence to be enlarged, the R&D sector of automotives in Romania must be strengthened and well financed, including at the level of university and vocational education. At the **production phase**, the key elements are the reduction of the energy consumption and waste (resulted from over-production, defects, unnecessary inventory, inappropriate processing, excessive transportation, waiting times, unnecessary motion or poor organization at the workplace), product durability improvement through higher quality of manufacturing, the use of recycled parts and raw materials, remanufacturing enhancement. At the **use and re-use phase** while electro-vehicles partially address the problem of energy consumption during the lifetime, some common issues of circularity remain between these types of vehicles and combustion-engine vehicles. In fact, decarbonization of the automotive industry goes beyond battery-vehicles. Proper and timely maintenance during the lifecycle of a vehicle can ensure fuel consumption conservation. Therefore, investments in repair shops and vocational schools to train mechanics workers at modern standards can greatly contribute to extending the life of the existing automotive fleet in good and sustainable operating conditions. At the **end-of-life phase**, more materials should be reused or recycled. The waste resulting from scrapped vehicles consists primarily of metals, rubber, wood, textile, glass or chemical and toxic fluids and up to 27 different types of plastics which all have the potential to be reused or recycled to some extent. This can further be stimulated with rules on mandatory recycled content for certain plastic components of new vehicles, which is in line with the EU End-of-life Vehicle Directive.

Construction

Overview

The construction sector contributes a significant share to the national GDP (9%) while the sector is expected to further increase in the coming years. In line with the urbanisation trend, more than half of the houses (54%) are located in urban areas. A current trend is the investment in new buildings while investments into renovations are declining. Investments in public building infrastructure such as the

⁸⁵ Despite being the eight-largest country of the European Union, Romania had only 931 kilometers of highway at the end of 2021, covering only 5.3% of the total road length of the country (National Institute of Statistics, “TRN139N - Length of public roads”).

⁸⁶ <https://economie.hotnews.ro/stiri-auto-25290149-miles-nrnberger-seful-design-dacia-care-lucrat-14-ani-aston-martin-imi-place-plasticul-poti-face-chiar-apreciez-aston-martin-plasticul-era-cuvant-evitat.htm>

construction of new social housing and retirement homes, hospitals and healthcare facilities, and pre-school programmes are also expected to grow significantly in the upcoming years as Romanian government allocated EUR 2.6 billion from RRP (Recovery and Resilience Plan) to this direction. In terms of the civil engineering market, 27 projects have been financed by the European Investment Bank (EIB) with EFSI backing. These projects amount to around EUR 823.0 million and are set to trigger EUR 2.7 million in total investments. Growth is also expected in the transport sector, where the government has allocated EUR 3.9 billion towards the modernisation of railway infrastructure, including electrification or zero emission railways and rolling stock. It will also invest EUR 1.8 billion on green and secure urban mobility transport⁸⁷.

All these ongoing and scheduled investments in private and public building infrastructure, civil engineering and transport infrastructure must also integrate circular economy solutions to ensure reduced carbon footprint and increase efficiency of material use.

Largest circularity potentials in the construction sector relate to designing buildings and their components for flexibility and disassembly, prioritising durable, environmentally-friendly and sustainable materials, increase the rate of renovations and improve energy efficiency in existing buildings as well as enhance proper management and treatment of construction and demolition waste (CDW). Similar to the building sector, civil engineering and transport infrastructure projects must also include sustainable sourcing, design for flexibility and disassembly, prioritising durable and environmentally-friendly materials.

The above mentioned practices in the construction sector should also be facilitated by Regulation (EU) No 305/2011, which is currently revised to integrate circular economy aspects.

Challenges

In the construction sector there are several interrelated challenges that hinder the uptake of circular economy. First of all, the lack of enforcement of existing legislation regarding CDW reporting and disposal, coupled with the lack of incentives from the CDW to properly separate the construction debris, leads to the fact that a large portion of CDW ends in the Municipal waste flows without being accounted for. Considering the rather low costs for landfilling, waste collection companies are also not incentivized to implement complex circular economy solutions for the collected waste. As a result, most CDW is transported to municipal landfills or illegally abandoned in the fields to avoid paying costs and fees for their storage. Connected to this, is the capacity to treat with only a few good practice examples which do not allow a high recovery rate⁸⁸.

The construction and building sector accounts for approximately 45% of the total energy consumption in Romania. In order to meet its energy efficiency goal targets building stocks need an increased energy performance⁸⁹. Unfortunately, the programs implemented so far yielded limited success in that direction. To improve the efficiency of renovation programs and ensure decreased resource consumption (both material and energy) CE measures must be included also into the construction and renovation sector.

Solutions and opportunities

⁸⁷ https://ec.europa.eu/growth/sectors/construction/observatory/country-fact-sheets/romania_en

⁸⁸ e.g. Bihor, Alba, Hunedoara, Buzău- Vernești

⁸⁹ https://www.enpg.ro/wp-content/uploads/2022/02/70-EPG_Romanias-Post-COVID-19-Recovery-Report.pdf

As a more overarching opportunity, it is recommended to improve the data collection of CDW generation and recovery as well as information on properties/characteristics of the CDW to enable the optimal waste treatment option.

The main opportunity on the **extraction phase** is to make sure that sourcing practices are more environmental-friendly and to reduce the amount of virgin raw materials being used through encouraging the use of secondary raw materials (recycled/reused CDW) in the production of new products.

At the **design phase**, construction products, components and buildings as a whole should be designed with the intention to minimise the material consumption, environmental impacts as well as waste generation. Key design criteria should be in favour of modularity, flexibility and disassembly. In order to increase low impact construction projects, simplified LCA assessments could be made mandatory to support more responsible choices. In this regard, LCA based criteria should be also implemented in the procurement process (especially for public tenders) to ensure that offers are evaluated on the total cost of ownership (taking into account also the disposal and environmental costs) instead of only considering capital investment costs (CAPEX).

As part of the design phase, circular design of urban development policies must also be considered. To prevent material loss in increase resource efficiency, in the development of urban policies we must consider the following elements:

- reduce urban sprawl and prioritise the usage of brownfield land as much as possible,
- support multi-modal mobility, thus prioritising public transport infrastructure to offer multiple travel options and decreasing the importance of individual cars in the urban context,
- support resource recovery and urban mining ensuring proper legal framework.

On the **use and reuse phase**, circularity can be increased through the development of EPR schemes for demolition and renovation waste materials. The certification for the usage of demolition and renovation waste materials should be coordinated by the National Institute for Research and Development in Construction, Urbanism and Sustainable Territorial Development (ro: INCERC). At the same time, take-back-systems should be in place to allow for high-dimensioned packaging being managed properly by the material suppliers.

The **end-of-life phase** hold potentials to harmonise the Integrated Waste Management System (that also includes CDW) that is currently only applied in some counties (Nuts 3 level units). Related to this, landfill prices should be increased in order make landfilling less attractive and to enhance treatment and recovery options that are higher up in the waste hierarchy. At the same time, there is a need to incentivise the use of refurbished and recovered construction materials, supported by legal, technological and logistical infrastructure. For instance, making selective demolition mandatory has the potential to increase the recycling of CDW as it will improve the separation and management of CDW on-site.

Finally, circular procurement can be a strong means to increase the demand for more circular constructions.

3.2.3 Consumer goods

Food, beverages and tobacco products

Overview

In 2020 Romania produced food, beverages and tobacco products accounted for 24%, being the largest manufacturing sector in country⁹⁰. The sector represents 5% of GDP while total employment in this sector corresponds to only 2.5%⁹¹. It is estimated that more than 4.5 million Romanians have difficulties in purchasing daily food, while food waste being 2.55 million tons every year. The largest circularity potential in the sector can be reached through reduction of food waste, eco-labelling, environmentally-friendly packaging and packaging EPR schemes as well as valorisation of food waste through composting.

Problems and challenges

At a national level, recycling rates remain low, further increasing the challenges faced when transitioning from a linear type of economy to a circular one. In Romania, recycling rates of packaging from plastic, paper or glass, which are widely used as packaging materials for food and beverage products, are one of the lowest among EU countries.⁹²

At the same time, food waste generation is high and separate collection and recycling of biowaste remains low. Based on the report from 2019 within the Bioregio project, the annual amount of food waste in Romania corresponds to 129 kg per capita. In comparison, the amount of food waste in France is only 29 kg per capita⁹³. According to an EEA study⁹⁴, kitchen and garden biowaste is the largest component of municipal waste in Europe, up to 34%. In 2020, only 18kg of biowaste per capita was recycled in Romania, corresponding to only 6% of municipal waste, compared to the EU average of 90kg per capita⁹⁵. As a result, most biowaste is disposed in landfills without material utilization and generation of high levels of GHG emissions.

Even where recycling and sorting technologies exist, the population's lack of environmental education leads to lower quantities of secondary raw materials being produced and, in some cases, lower quality materials due to contamination (for example PET bottles containing beverages). Communication on a national level regarding waste management is lacking, and the school curricula has been updated only in recent years to include education on environmental protection and this is mostly not comprehensive. Even though some environmental subjects have been longer in the school curricula, they were optional - see Query 12592M/29.07.2021 of the Ministry of Education to the Ministry of Environment, Waters and Forests . This still leaves a large share of the adult population with little awareness for environmental protection. However, as part of Ordinance no. 6/2021, the central authority in the field of education, through decentralized public services, carries out information activities on the prevention of waste generation in general and the prevention and reduction of the impact of single-use plastic products.

At the same time, the consumption of bottled water in Romania represented 106 liters per capita in 2019, only slightly below the EU average of 118 liters per capita.⁹⁶ In comparison, consumption of bottled water in Scandinavian countries such as Sweden, Finland and Denmark were below 20 liters per capita. This can be related to the low connection rate to potable water in Romania or lack of promotion of safe drinking water. According to OECD report from 2020, on average 96% of EU citizens are connected to potable

⁹⁰ <http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do>

⁹¹ <https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do>

⁹² https://ec.europa.eu/eurostat/databrowser/view/ENV_WASPACR__custom_2729239/default/table?lang=en

⁹³ Food Waste Behavior among Romanian Consumers: A Cluster Analysis.

⁹⁴ <https://www.eea.europa.eu/publications/bio-waste-in-europe>

⁹⁵ https://ec.europa.eu/eurostat/databrowser/view/env_wasmun/default/table?lang=en

⁹⁶ <https://www.statista.com/statistics/455422/bottled-water-consumption-in-europe-per-capita/>

water supplies, while only 57% in Romania⁹⁷. Despite this, about 50% of the respondents of an ad-hoc poll state that they do not trust that the tap water is suitable for drinking and about 60% of Romanians buy bottled drinking water.⁹⁸

Solutions and opportunities

At the stage of **production and distribution**, it is important to decrease use of packaging and move towards use of secondary materials. This can be supported by introducing mandatory eco-design requirements for packaging in the industry, coupled with ecolabeling of products that contain recycled materials. This should be done, however, taking into consideration the safety of the recycled materials used, so as to avoid contamination of products destined to be consumed.

At the **consumption phase**, food waste prevention must be enhanced by encouraging food donations via economic instruments. Policies targeting the reuse of surplus aim to either create incentives or remove the barriers to donations. Typical incentives include VAT exemptions for donated products, tax credits and deductions, and remodulation of waste fees to make donation more economically advantageous than disposal. At the same time, GPP criteria can be applied to shift towards more sustainable food consumption in the public sector. Bans on use of certain single-use plastic items, such as plates, straws, certain food containers or cutlery, represent the right incentives to increase circularity across the food value chain.

Reducing the consumption of beverage packaging, especially plastic bottles, and preventing waste generation can be further strengthened by increasing connection and promoting drinking water in Romania. The revised drinking water directive from 2021⁹⁹, which will have to be incorporated into Romanian regulations, envisages measures aimed at promoting tap water consumption, such as free provision of water in public administrations and public buildings or, for free or for a low service fee, for customers in restaurants, canteens and catering services.

Appropriate infrastructure for the separate collection and treatment of biowaste and packaging and the right incentives for citizens to engage in the separate collection are crucial to extract high-quality material, and thus promoting circularity at the **end-of-life stage**. Such incentives include financial instruments, such as deposit refund systems for bottles, pay-as-you-throw systems for waste collection, landfill taxes or bans. Another option to separate collection of biowaste is promoting home or communal composting. Furthermore, Romania is in need for awareness raising and information campaigns at national level on the importance of combating food waste and separate collection of waste¹⁰⁰. Awareness and education programs on waste management can be prepared at a national level by partnering with the private sector showcasing best practices in food, packaging and tobacco waste.

In addition, the investments to be made in composting or methanation installations for bio-waste need to be made to keep pace with the upcoming rise in separate collection of bio-waste from households. EPR scheme can be further enhanced by eco-modulation of fees for different packaging according to their recyclability, durability and other relevant properties. Also, the EPR scheme will be implemented for

⁹⁷ <https://www.oecd-ilibrary.org/sites/4624be86-en/index.html?itemId=/content/component/4624be86-en>

⁹⁸ <https://www.digi24.ro/stiri/economie/consumatori/romanii-se-tem-sa-bea-apa-de-la-robinet-activist-de-mediu-siguranta-alimentara-inseamna-in-primul-rand-sa-evitam-plasticul-1523219>

⁹⁹ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020L2184&from=EN>

¹⁰⁰ Information from the Ministry of Environment

manufacturers of tobacco products with filters and filters marketed for use in combination with tobacco products, according to Ordinance No. 6/2021, which transposes into national law Directive No. 904/2019 on reducing the impact of certain plastic products on the environment, starting 2025.

Textiles

Overview

Romania produces clothing, textile fibres and footwear contribute with 2% to the national GDP. At the same time, textile exports accounted for 6% of Romania's exports of goods in 2018². In 2020, almost 3% of employees work in this industry that uses labor heavily, most of them on minimum wages⁴. Women make up the majority of the low-wage and unskilled textile workforce, thus improving the sustainability of the sector has also an important gender equality dimension. Moreover, the growing demand for textiles is fuelling the inefficient use of non-renewable resources, generation of GHG emissions, high water consumption and pollution. Thus, highest circularity potentials relate to considering Eco-design criteria in design and production, new business models (e.g. service models), more transparency throughout the supply chain, less resource intense production processes, EPR schemes and fibre-to-fibre recycling.

Challenges

Current trends of fast fashion led to high volumes of low-quality fashion items that are difficult to recycle due to the use of blended materials, mixed fibers and trimmings. As a result, billions of products go to waste: unsold in warehouses or stores, left unused in wardrobes, or discarded while still in good condition. According to a projection by the Ministry of Environment for 2018-2025, 1% of the municipal waste in Romania consists of textiles.¹⁰ Given that regulations like ordinance 92/2021 and Government Emergency Ordinance no. 5/2015 are not put into practice yet on a scale that matters for the textile ecosystem and investments in recycling are modest compared to other European countries, most textile waste ends up either in landfills or is recovered by incineration in cement plants.. At the national level, there are only a few factories that choose to turn cotton waste into cloth and stuffing for various industries. Another problem arises from the inaccuracy of environmental claims and the risk of misleading consumers, such as the use of sorted PET bottles in the clothing industry. This practice is not in line with the circular model for PET bottles, which are suitable for a closed-loop system for food contact materials¹⁰¹. To create closed loops, recycled materials must re-enter the production line for the same product they came from in order to retain value.

Solutions and opportunities

The new EU Strategy for Sustainable and Circular Textiles¹⁰² aims to place long-lived and recyclable textiles on the EU market by 2030. The focus is also placed on consumers to provide high quality affordable textiles and increase the re-use and repair services.

At the design phase, mandatory Eco-design requirements need to be introduced to extend the life of textile products, by encouraging and stimulating mono-material textile fibres. Improved transparency along the value chain (such as publicly shared data on the percentage of recycled fibres in the product, the exact source of the materials used, the water and energy level consumption along the life cycle of a product, the social and economic conditions of the workers in the factory) and a robust evidence base (digital product passports) would facilitate the phase-out of hazardous substances. **Production of textiles** needs to ensure that the materials are made of recycled fibers, free of hazardous substances and

¹⁰¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A31994L0062>

¹⁰² https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12822-EU-strategy-for-sustainable-textiles_en

produced in respect of social rights and the environment. **Consumers** would benefit from new circular business models that shift away from a throwaway culture, such as product-as-service models, take-back services, secondhand collections and repair services. Mandatory criteria for green public procurement can support public organisations to procure textiles more sustainably, using circular economy business models such as increased percentage of recycled content.

At the end-of-life phase making producers responsible for the **waste** that their products create is essential to decouple textile waste generation from the growth of the sector. EPR requirements have proven to be effective in improving separate collection and can incentivise (via eco-modulation) product design that promotes circularity throughout the material life cycle¹⁰³. Furthermore, fibre-to-fibre recycling needs to be upscaled by promoting technologies that are currently available at a small scale, testing phase, like chemical textile to textile recycling technology.

Plastics, paper, glass (including packaging)

Overview

The output from the manufacturing of plastic¹⁰⁴, glass or paper products represents less than 2.5% share of GDP in Romania. However, circular economy in these sectors could help pursue the decoupling between virgin materials and economic growth and provide environmental benefits by increasing the share of recycled or more sustainable materials. The circularity potential is particularly high in the case of plastic products. Reducing the negative impact on the environment is particularly important, as plastics production is highly dependent on fossil fuels, which leads to GHG emissions.

Challenges

The main challenge occurring during the **production phase**, namely there is the lack of incentives to increase the use of secondary and alternative materials instead of primary resources and, therefore, increase the recycled content in products. At the **use and reuse phase**, consumers are not sufficiently incentivized to use plastic products with enhanced circularity features.

Furthermore, Romania has a huge potential in improving its **municipal waste management**. The recent study by UNECE¹⁰⁵ shows that the separate collection of recyclables from MSW remains low, at only 12.9% of the total MSW generated in 2017. As a result, Romania recycled 31% of plastic packaging, 43% of glass packaging and 68% of paper packaging in 2019, all below the average of EU countries.¹⁰⁶ Moreover, the recycling rate of municipal waste reached only 14% compared to the EU average of 48%, ranking Romania among the lowest performing EU countries. As a result, consumer goods such as plastics, paper, glass and packaging from these materials are still part of residual waste, which is mostly landfilled.

Solutions and opportunities

At the **design phase**, the emphasis is placed on the setting of eco-design requirements on products and materials, including durability, maintainability, recyclability. This can be enhanced by introducing mandatory minimum content requirements, such as use of secondary or bio-based materials in the case of plastic products.

¹⁰³ EU Member States are obliged to implement separate collection for textiles until January 1, 2025.

¹⁰⁴ According to NACE classification this includes manufacturing of plastic products, such as plastic plates, sheets, tubes and profiles, plastic packing goods, builders' ware of plastic and other plastics.

¹⁰⁵ https://unece.org/sites/default/files/2021-12/ECE_CEP_189_0.pdf

¹⁰⁶ https://ec.europa.eu/eurostat/databrowser/view/ENV_WASPACR__custom_2729239/default/table?lang=en

At the **production phase**, the aim is to incorporate recycled or sustainably-sourced biobased materials in the manufacturing of new products, while ensuring product quality. Tax on virgin plastics or bans on certain plastic materials can help reduce their unsustainable extraction and result in substitution to secondary or alternative, more sustainable materials. An initiative regarding this subject is already implemented with the transposition of Directive 904/2019 (SUP) by Ordinance no. 6/2021, that states that by 2025 PET bottles (<=3l) must have 25% recycled plastic in the plastic bottles, and 30% by 2030. Furthermore, the Ordinance no. 6/2021 bans the placing on the market of some single-use plastic products (listed in Part B of the Annex to this Ordinance) and of products made of oxo-degradable plastics from the date of its entry into force. At the **use and re-use phase**, strategies focus on supporting the consumer and the public procurer towards more circular choices, by expanding Green Public Procurement (GPP) criteria or introducing mandatory criteria on plastic products.

At the **end-of-life phase**, low separate collection by households must be enhanced by an appropriate collection infrastructure for citizens, such as door-to-door collection of separated waste, and providing necessary information before the introduction of the system. Furthermore, a higher rate of separate collection can be promoted by providing financial motivation via economic instruments, such as deposit refund systems, introduction of pay-as-you-throw system in a combination with high landfill taxes or landfill bans. EGO 92/2021 regarding waste regime and GD 1074/2021 regarding guarantee-return system for unusable primary packaging come to support this initiative. Proper set up of Extended Producer Responsibility (EPR) system, including eco-modulation of producer's fees is also important to enhance eco-design and proper waste treatment.

In case of waste from plastics, further support of research and development of waste sorting and recycling facilities is needed, including chemical recycling.

Electrical equipment and electronic products

Overview

Manufacture of computer, electronic and optical products and electrical equipment (EEE) represents 2% of GDP share in Romania. Some analysts¹⁰⁷ estimate that this industry is on an ascending trend and that the manufacturing of household appliances and other electro-IT products could become the second largest export of the Romanian economy, after the auto industry. The EEE industry has serious environmental impacts, from the necessary resource extraction, such as minerals and precious metals, air and noise pollution, GHG emission production, high energy consumption, chemicals use and waste.

Challenges and problems

The national issue is related with waste separate collection infrastructure. In 2019 only 27% of EEE put on the market was collected in Romania, lowest rate among EU Member States¹⁰⁸. As a result, Romania didn't achieve the target of 65% collection rate established in the WEEE Directive. According to a study¹⁰⁹, 20-25% of the EEE is discarded in the municipal waste and not in a correct way (collection points, retailers or in the municipality campaigns). The reason, apart from education and awareness, is the insufficient municipality collection points for this type of waste. According to the survey on WEEE recycling in Romania,¹¹⁰ 44% of the respondents stated that they lack infrastructure for separate collection of WEEE,

¹⁰⁷ <https://www.zf.ro/companii/productia-de-electronice-si-electrocasnice-se-contureaza-ca-al-20721258>

¹⁰⁸ https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Waste_statistics_-_electrical_and_electronic_equipment&oldid=556612#Electronic_equipment_.28EEE.29_put_on_the_market_and_WE_processed_in_the_EU

¹⁰⁹ <https://www.ecotic.ro/wp-content/uploads/2015/07/Report-2019-eng-compressed-1-min.pdf>

¹¹⁰ <https://environ.ro/2022/01/27/4-din-10-romani-nu-recicleaza-aparatele-electrice-vechi/>

18% of the respondents lack enough information and 14% of the respondents stated that they should be rewarded for the separate collection of this type of waste.

Another issue is related to the lack of integrated data (for example regarding the available infrastructure for collection, quantities collected from different sources) and also reporting differences. For instance, according to published data by the National Agency of Environmental Protection, in 2019 the rate for WEEE collection was 37%.

Solutions and opportunities

Most important changes are required on the **design and use phase** through the application of Eco-design and sustainable manufacturing of EEE as well as sustainable consumption through the reduction of the volume of electronic waste generated by reusing and repairing. This should be supported by improved customer information and awareness, by raising:

- **Producer's involvement:** The producers have to be more engaged and incentivized by policies, such as reduced VAT for repaired products, modulated fees under EPR scheme and accessing funding support for investments in innovation. New EU CEAP will be followed by 'Circular Electronics Initiative' that will promote longer product lifetimes by clear actions for this sector. In the same direction, CEAP is introducing Sustainable Product Policy Initiative for completing the Eco design Directive and EU Ecolabel.
- **Customer's information and education:** Customers should be educated in terms of negative impact of WEEE on their health and the environment and should be informed about available infrastructure for WEEE disposal. Consumers should have easy access to renting and leasing services, take-back and buy-back systems, and providing availability of spare parts.

At the **end-of-life phase**, local authorities in partnership with NGOs should create and support repairing systems and create a platform for reutilized products for companies. Local authorities can facilitate technical schools to learn the profession of electromechanic, electrician and related (according to Romanian classification of occupations) . Moreover, they should perform regular collecting campaigns for big appliances waste, implement the optimal collection infrastructure for WEEE, and to conduct information campaigns for the citizen about the benefits and the risks for not collecting and properly disposing WEEE. Not least, local authorities should also apply EU green public procurement (GPP).

Furniture

Overview

Throughout the last two decades the contribution to the national GDP coming from the furniture sector has been relatively stable with a share of 1.4%. The employment figures and the number of enterprises active in the sector have been increasing with a light trend. Remarkable in this sector is that 80% of the production/export ratio is exported at a value of EUR2.21 billion. The circularity potential in this sector mainly relates to utilising more sustainable materials and applying circular design principles in the production phase as well as improving the waste management of furniture waste and specifically related wood waste.

Challenges

Furniture manufacturing is limited by the utilization of finite natural resources. Wood is one of the most commonly utilized raw materials, that largely comes from the local forests. Wood harvesting done too

intensively can threaten the local ecosystem, its biodiversity and ecosystem services¹¹¹. At the same time, the furniture industry utilises a variety of harmful synthetic materials and plastics to improve the properties of the products. There is no effort being taken that would prevent these substances to enter the biological cycle.

Another challenge relates to consumers, i.e. the lack of consumer information on (1) how to maintain and repair furniture in order to extend the product's lifespan, (2) how to make the best choice for the least environmentally-harmful products, (3) the availability and advantages of sustainable furniture solutions for both residential and business use (4) how to best dispose the furniture at the end of its life. On top of this, the low demand for second-hand furniture from consumers – caused by the nearly non-existent price difference between new and second-hand furniture – is not strong enough to encourage more sustainable purchase behaviour.

Solutions and opportunities

In the **design phase** specifically, furniture should be designed favouring sustainable materials and properties that may extend the products' lifetime, e.g. design for disassembly and modularity. This may be supported by mandatory Ecodesign requirements that also include a five-year warranty period.

In the **production phase**, there is the potential to use less synthetic materials (detergents and plastics) where possible. Where they cannot be reduced to a tolerable value, product information should include a remark on safe and proper disposal.

In the **use phase** it is key to increase consumer awareness through campaigns, disclosing material and product sustainability information and economics incentive driving the demand to more environmental-friendly products.

For the **end-of-life phase**, there is an opportunity to valorise the significant amounts of furniture waste through repair, refurbishment or remanufacturing. Yet, the majority of the waste is landfilled. The few recycling activities, mainly done through charity organisation or individuals¹¹², could be upscaled. This should be supported by the provision into reverse logistic infrastructure and schemes (EPR) as well as the development of incentives for consumers and producers to manage the furniture waste according to their remaining potentials (being reused, refurbished or recycled). As the majority of furniture waste is made of wood, another opportunities is to increase the separate collection of wood to help the re-circulation of wood. While legal entities already have the obligation to collect separately the wood waste generated, the provision of infrastructure to separate wood from MSW could be a next step. In parallel, it needs more investments into technologies for complete wood waste recovery.

In addition, the mentioned elements, circular procurement represents another strong element. As public authorities purchase a significant amount of furniture, basing the choice on circular principles can also drive the demand.

¹¹¹ Chakravarty, S., Ghosh, S. K., Suresh, C. P., Dey, A. N., & Shukla, G. (2012). Deforestation: causes, effects and control strategies. *Global perspectives on sustainable forest management*, 1, 1-26.

¹¹² Silas (2019)

Tourism

Overview

Romania, given its geographical position has a wide variety of natural resources and favorable climate, which offer opportunities for tourism activities throughout of the year. In Romania, tourism contributes by 6.5% to national GDP ². Tourism contributes to a number of negative impacts on the environment and society – tourism activities were identified as one of the main anthropogenic pressures along the Romanian coast. These may cause a severe degradation of the local environment, which in its turn affects the tourist interest of these places. In addition, tourism is considered to be one of the drivers of plastic marine pollution in the Black Sea region. Therefore, highest circularity potentials are to promote sustainable and eco-tourism that takes into account circular principles ranging from transport, to accommodation, recreational activities, food provision and waste reduction/prevention.

Challenges

The main barrier in applying CE principles in Romanian tourism is the lack of awareness and the lack of interest for the people in such a concept. The lack of cooperation at the local level and poor public transportation blocks a smooth conversion from linear to circular.

Solutions and opportunities

It must be taken into account that it is linked to a number of other key industries, from agriculture to the built environment and transport industries. Thus, the players in this industry have an important role to play as facilitators in the circular transition – in large part by the way they supply, use or consume products, materials and resources and the way they support and allow end-use recovery of products, materials and resources. At the stage of **infrastructure building and construction**, the materials should be from renewable and sustainable sources to the extent possible. A sensitive consideration should be shown to cultural heritage and to local labour. Developers need to keep in mind that the tourism should contribute to the conservation and sustainable use of biological and landscape diversity, to sustainable agriculture and be careful and manage the environmental and socio-economic and cultural impacts, then the circular economy has a good foundation. The sustainable tourism may be a good start for improving public **transportation** in Romania. This cannot be possible without the involvement of all public authorities for re-creating the public transportation in Romania, includes bus and train connections and enhance cycling infrastructure. **Local production of food** represents a great opportunity also supporting local economy, job creation and reducing emissions. In order to increase **waste prevention** and enhance waste management, awareness raising, campaigns and proper infrastructure are important to direct tourists towards more sustainable behaviour. As part of sustainable tourism, the **eco-tourism** is the most appropriate way for circular economy, which represents responsible travel to natural areas that conserves the environment, sustains the wellbeing of the local people, and creates knowledge and understanding through interpretation and education of all involved (visitors, staff and the visited)¹¹³.

3.2.4 Cross cutting sectors

Overview of the waste management in Romania

Following the performance in environmental indicators discussed in chapter 2.1.2, Romania has a significant potential in improving its waste management. The recycling rate of municipal waste is one of the lowest in the EU and landfilling is still a dominant form of waste management. In 2018, the recycling rate of all waste excluding major mineral waste amounted only for 29% compared to the EU average of 55%. Similarly, the recycling rate of municipal waste reached only 14% in 2020 compared to the EU average of 48%, ranking Romania among the lowest performing EU countries. The recent study on Romania

¹¹³ <https://www.globalecotourismnetwork.org/definition-and-key-concepts/>

environmental performance review by UNECE¹¹⁴ shows that the separate collection of recyclables from MSW remains low, at only 12.9% of the total MSW generated in 2017.

Several factors have been identified that hinder municipal waste management in Romania, including^{115,116}:

- PAYT system not implemented at national level, hence insufficient separate collection at source, both in urban and rural areas¹¹⁷
- minimal infrastructure for separate collection of recyclables from domestic sources, with a significant share of ‘bring to site’ approach;
- 32 (out of 41) integrated waste management systems (IWMS = SMID) financed from EU funds and operated by collective associations of municipalities (ADIs) semi-implemented - not completely functional yet being in different stages of organization and operation hand-out¹¹⁸;
- limited WIMS capacity to treat the collected waste before landfilling
- limited waste collection coverage in some rural regions of Romania;
- insufficient awareness programs and penalties to separate their household waste;
- informal waste collection, a phenomenon which, however, is declining due to the 2018 legislative regulations in waste management and the intervention of local police authorities;
- illegal dumping, and open burning practices associated with poor enforcement of existing anti-abandonment legislation;
- informal and illegal recycling/recovering activities (e.g. metal waste) from open burning of e-waste items/end-of-life vehicles and/ or manual dismantling activities;
- lack of reliable waste statistics data, lack of interoperability at local administrative units level (LAU2) including urban and rural municipalities;
- dispersed enforcement of public sanitation operator’s obligation for separate waste collection;
- lack of stability in legal framework (enforcement problems and a multitude of overcomplicated legislative acts);
- the absence of a clearinghouse overseeing EPR schemes for packaging, checking that recycling and recovery requirements are met and uniformly financed within the territory checking producer compliance (identifying free riders), assuring national coverage of packaging waste management, cost optimization, predictability and national awareness campaigns for population.

The phenomenon of informal waste collection is prominent in urban areas where poor people take the recyclable waste (mainly packaging made from PET, glass, aluminium recipients) from the municipality bins and from landfills in order to gain money from waste collectors to whom they are delivering. This practice is encouraged by the lack of safe infrastructure and inadequate police control. There are no statics available for accountability of the impact in total recyclable waste, but it is a visible phenomenon. Starting 2019, this informal market decreased due to the obligation introduced in the legislation that

¹¹⁴ https://unece.org/sites/default/files/2021-12/ECE_CEP_189_0.pdf

¹¹⁵ https://www.academia.edu/49031737/Waste_management_challenges_in_Romania_during_the_COVID_19_pandemic

¹¹⁶ <https://journals.vilniustech.lt/index.php/TEDE/article/view/10295/8890>

¹¹⁷ Despite this, there are some best practices at local level. For instance, the local public administration bodies have included the PAYT system in their contracts with the sanitation operators at local level. One such example is the one from the city of Bacău: <https://adisbacau.ro/wp-content/uploads/2021/06/1.-CONTRACT-SOMA-06.05.2021.pdf>

¹¹⁸ <https://mfe.gov.ro/wp-content/uploads/2022/06/425394145037e12265f6e5ba96cfb08a.pdf>

producer responsibility organisations (PROs) should finance the packaging waste from municipal waste through local public authorities.

In relation to illegal dumping, there are 2 main flows of waste being illegally dumped: imports from developed countries are landfilled in illegal landfills and illegal dumping from internal producers (rural households where public sanitation is not operating or citizens are not willing to pay for the generated waste, waste from construction, waste from automotive black market). In Romania, illegal waste imports pose significant challenge, in particular after China implemented ban on imports of plastic waste in 2017¹¹⁹. Only fraction of imported waste is recyclable, rest ends up buried in fields or simply burned, which can further decrease waste management performance of the country. There are no statistics available for accountability of the impact on total recyclable waste, but it is a visible phenomenon. The illegal dumping is sometimes followed by illegal waste burning causing air pollution.¹²⁰ This practice is encouraged by the lack of intensive control from authorities and application of fines and the lack of proper waste management in rural areas.

The correction of identified weaknesses could lead to an improved waste management system, feasible only through an active involvement of stakeholders (Nastase, Chasovschi, State, & Scutariu, 2019).

However, since 2018, some articles were transposed from the Directive 2018/851/EU to promote recycling in the national legislation, namely the economic instruments of pay as you throw, landfill tax and the new requirements for the extended producer responsibility systems. In 2019 GEO No. 74/2018 established a dual landfill tax (one of the components being also called “contribution to the circular economy”), after several years of postponement¹²¹. Starting from 2020, this tax rate is 17 euros (80 RON) per ton of landfilled municipal waste or CDW¹²²

In addition, ordinance No.48/2017¹²³ sets tax of approximately 10 euros (50 RON) per ton for not reaching the agreed municipal waste recovery target. From 2020, the waste recovery target corresponds to 60%: 50% recycling and 10% other methods of waste recovery. If the waste recovery target is not met, the tax is paid by the administrative-territorial units or the administrative-territorial subdivisions of the municipalities. The calculation corresponds to method 2 as stated in the Commission Decision 2011/753/EU¹²⁴, where the rate of preparation for reuse and recycling is calculated by reference to the amount of waste paper, metal, plastic, glass and wood from household and similar waste, including from public services and not to the total amount of waste.

In addition, Romania adopted a packaging tax¹²⁵, as a financial component of the extended producer responsibility, for the first time in 2000 as an obligation for packaged goods producers, included in the

¹¹⁹ <https://waste-management-world.com/collection-and-handling/romania-to-face-up-to-illegal-waste-trafficking-problem/>

¹²⁰ Legislation in this area has been recently tightened through the Government Ordinance 38/2022, which modifies Government Ordinance 92/2021 to forbid abandonment (Art. 20(3)), burning (Art. 20 (5)) and burying (Art. 20 (6)) of any type of waste.

¹²¹ https://eeb.org/wp-content/uploads/2020/11/Member-States-delay-meeting-inevitable-targets_report.pdf?utm_campaign=AktuellH%C3%A5llbarhet-Direkten_201105_Username&utm_medium=email&utm_source=Eloqua&elqTrackId=2aad05b265ab4386adf82ca5fcfdb55d&elq=d5f3be20c02d420eb7173a7e556d7d05&elqaid=36750&elqat=1&elqCampaignId=26867

¹²² <https://www.cewep.eu/wp-content/uploads/2021/10/Landfill-taxes-and-restrictions-overview.pdf>

¹²³ <https://legislatie.just.ro/Public/DetaliuDocument/190675>

¹²⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011D0753&from=EN>

¹²⁵ <https://ieep.eu/uploads/articles/attachments/6444156a-fe6f-4cb3-b9d4-a6f636b5b616/RO%20Packaging%20Tax%20final.pdf?v=63680923242>

law on the Environmental Fund (first Law 73/2000, then Emergency Government Ordinance 196/2005). The aim of this tax is to make producers responsible for the packaging waste they generate and fail to recover. The rate of this tax corresponds to EUR 0.45 per kilogram since 2009. This financial obligation must be paid if the national recovery target set by law and cascaded upon each producer is not met. The financial obligation is payable on the amount of packaging between the target laid down in law and the achieved recovery rate per year. The same tax rate applies to all packaging materials. In addition, an ecotax of €0.03 equivalent per piece is applied on plastic shopping bags.

Besides these taxes, the substantial revenues contributing to the Environment Fund come from the penalties or charges, promoting recovery and recycling, that are applicable on the following items only if the legal targets are not met: packaging, EEE, portable batteries and accumulators, hazardous substances, emissions, waste commerce, tires and mineral oils. The full list of revenue sources for the Environmental Fund can be found in Article 9 of the Government Ordinance 196/2005.¹²⁶

Operators of waste management facilities for other than municipal waste are not motivated to invest in new waste management technologies or outsource waste management services via progressive and specialized waste management companies, as the economic reasoning is hindered by the lack of predictability of the waste streams. Similarly, industries are not incentivized to invest in new technologies and operations that would result in lower quantities of waste or more environmentally friendly materials and operations.

Citizens do not bear all the costs of the municipal solid waste management system, as various subsidies are provided from public local budgets, thereby jeopardizing the infrastructure refurbishment, replacement, renewal and extension. In addition, in Romania, most households pay a flat fee for municipal waste collection and management regardless the amount of waste they produced or the separate collection rate they achieved. In October 2016, following the 2008/98/EC Directive, Romania included in the waste framework legislation the “Pay as you Throw” (PAYT) instrument to be implemented at national level, obligation weakened by the disclaimer that it has to be applied only “whenever it is technically and economically viable”, without further clarifications. As a result, up to date, only a few municipalities implemented some elementary PAYT systems, where households pay for waste collection and management based approximately on the separate collection performance.

According to the 2022 European Semester’s Country Report,¹²⁷ irregular and substandard landfills still operate in Romania presenting serious risks for human health and the environment. The report cites: ‘Landfills also lack infrastructure capacities, as do the counties where they are located’. The current situation in Romania is characterised by the absence of comprehensive and decisive enforcement action against illegal landfilling¹²⁸. In addition, Romania had failed to comply with the obligation to close and rehabilitate all landfills that did not obtain a permit to operate¹²⁹. In 2021, 42 landfills were still not closed and for many of them the necessary works for their rehabilitation are not yet planned. To comply with the European Court judgment, Romania is expected to take all the necessary measures in order to ensure that these landfills are closed, sealed and rehabilitated as soon as possible due to the health and environmental risks they entail.

¹²⁶ <https://legislatie.just.ro/Public/DetaliuDocument/67529?isFormaDeBaza=True&rep=True>

¹²⁷ https://ec.europa.eu/info/sites/default/files/2022-european-semester-country-report-romania_en.pdf

¹²⁸ https://ec.europa.eu/environment/eir/pdf/report_ro_en.pdf

¹²⁹ https://ec.europa.eu/commission/presscorner/detail/en/ip_21_5354

Solutions and opportunities

Following the overarching problems in waste management in Romania and also problems per sectors described above, several recommendations can be presented to increase the percentage of recyclable waste from municipal waste, focusing on:

- Accelerate the process for having at country level all integrated waste management systems (IWMS = SMID) completely functional;
- **provide optimal infrastructure for waste collection** in order to increase separate collection of municipal waste, including door-to-door collection of separated waste;
- **provide financial motivation for separate collection via economic instruments** by increasing landfill taxes, introducing PAYT or deposit refund systems of waste collection, eco-modulation of fees under EPR schemes and ensure that citizens bear full costs of waste management of residual municipal waste;
- Enforce of composting legislation;
- **provide R&D and investments** on waste sorting and treatment facilities, including automatic waste sorting facilities, possible chemical recycling of plastics or textiles, biogas and composting plants;
- **promote education, awareness raising and information to citizens** regarding the benefits and importance of separate collection, waste prevention and reuse;
- Creating EPR schemes for: furniture, spare parts, construction materials, textiles, etc.

Overview of the water management in Romania

Water is an essential resource for human, animal and plant life as well as for the economy, notably for agriculture and energy production, but more broadly for all economic sectors. Freshwater is therefore a very important resource that we need to preserve, as it is one of the key biogenic resources within a circular economy. As stated by the EC, while Europe is largely considered as having adequate water resources, water scarcity and drought is an increasingly frequent and widespread phenomenon also as a result of climate change.

Total gross water abstraction in Romania reached almost 7 billion cubic meters in 2019, corresponding to 360 cubic meters per inhabitant.¹³⁰ During the past 10 years, the water abstraction slightly increased. Industry is the largest user of freshwater resources, accounting for around 67% of total use, with agriculture (mostly irrigation) and domestic users accounting for the rest. The total amount used in industry has reduced significantly since the 1990s through a combination of falling economic output and adoption of water-saving technologies.

The Water Exploitation Index (WEI+) illustrates the percentage of water use against renewable freshwater resources. It gives an indication of the pressure on renewable freshwater resources due to water demand. In the absence of Europe-wide agreed formal targets, values above 20% are generally considered as an indication of water scarcity. According to the last available data from 2017, water exploitation index in Romania reached 4.4% compared to EU27 average of 8.4%.¹³¹

Water supply, sanitation and treatment

¹³⁰ http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_wat_abs

¹³¹ https://ec.europa.eu/eurostat/databrowser/view/sdg_06_60/default/table?lang=en

Romania's water sector is characterized by low level of expenditure per capita, resulting in poor connection and poor performance of the existing infrastructures.¹³² Water management policy still has shortcomings, especially in terms of access to water and sanitation in rural areas, as well as the quantity and quality of drinking water. According to the Country Report prepared by the European Commission in 2020 for Romania, wastewater collection and connection to public sanitation infrastructure are still incomplete.

According to OECD report from 2020, on average 96% of EU citizens are connected to potable water supplies, while only 57% in Romania¹³³. As a result, Romania is not on track for complying with Target 6 under the SDGs, which requires access to both safe and affordable drinking water and adequate sanitation for all to be achieved by 2030.

Only 54.9% of the Romanian population is connected to wastewater treatment, which is the lowest reported figure among the EU Member States.¹³⁴ In other EU countries, connection to wastewater treatment systems ranged from 80% to 100% of population in 2019. In 2019, sewage sludge production in Romania reached 231,000 tones, corresponding to 11.9 kg per capita.¹³⁵ In terms of wastewater treatment, more than half (56%) was disposed on landfills. Only 24% of the sewage sludge was made available for agricultural use or for composting. This relatively low rate of sewage sludge collection per capita in Romania can be related to the correspondingly low rate of connection of the population to wastewater treatment facilities. As a result, compliance with the Urban Wastewater Treatment Directive (UWWTD) has been by far the most difficult task - Romania is today the worst performer amongst the EU countries for compliance with the UWWTD.

It is therefore not by chance that "Water management" is the first component in the Romanian National Recovery and Resilience Plan, having as single objective the sustainable provision of water, to ensure a "safe future for the population, environment and the economy." As much as 1.462 million euro will be invested, among other things, for the provision of canal water system, the collection of wastewater and for supporting the connection of the low-income population to existing water supply and sewage networks.

Hydropower

Due to its importance in the share of energy production in Romania, hydropower generation as a consumer of water merits a separate discussion.

Endowed by nature with many lakes and rivers, Romania has a large potential for renewable energy through hydropower. Indeed, about 250 large dams and other 300 smaller ones are active in Romania,¹³⁶ out of which the two biggest hydropower plants, Iron Gate I and II, are placed on the Danube River. The hydropower constitutes more than 36% of the electricity production in Romania¹³⁷ and this is despite many of the dams being not properly maintained and rehabilitated, making them operate below their installed capacity, for safety reasons.

¹³² <https://ec.europa.eu/environment/water/water-framework/economics/pdf/Country%20fact%20sheet%20-%20ROMANIA.pdf>

¹³³ <https://www.oecd-ilibrary.org/sites/4624be86-en/index.html?itemId=/content/component/4624be86-en>

¹³⁴ http://appsso.eurostat.ec.europa.eu/nui/show.do?lang=en&dataset=env_ww_con

¹³⁵ <http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do>

¹³⁶ https://unece.org/sites/default/files/2021-12/ECE_CEP_189_0.pdf

¹³⁷ <https://www.anre.ro/ro/energie-electrica/rapoarte/puterea-instalata-in-capacitatiile-de-productie-energie-electrica>

Hydropower is a valuable way of producing renewable energy and it should not be abandoned, though it comes with costs for nature and biodiversity. Moreover, the hydropower plants use fresh flowing water, alter the natural flow of a river or body of water and produce water pollution.¹³⁸ However, the production of electricity using water from natural water bodies can be made “circular” by using the so-called “pumped storage hydropower” (PSH) method. Unlike conventional hydropower facilities, PSH stores above the powerplant the water that has already flowed through the turbines at times of low electricity demand. The stored water can then flow back in the turbine-generator when the electricity demand is high, thus acting like a giant battery that stores energy in the form of water.^{139,140} The PSH method, not only leads to less polluted water in the process of power generation, but it also ensures that more renewable energy is provided when the demand peaks.

Currently, Romania has an installed capacity of only 91.5 Megawatt electrical power produced through the PSH method.¹⁴¹ However, at the moment, this capacity is not operational.¹⁴² Since many of the hydro plants need upgrades, the owners, which in many cases is the Romanian Government itself, should consider adding the necessary reservoirs and transform the existing hydro-power plants in PSH plants.

Opportunities and gaps

The water sector is strongly interrelated with the other sectors and holds large potential to improve towards circular economy. According to the EC Environmental Implementation Review 2019 - Country Report for Romania, the main pressures on surface waters are diffuse pressures from discharges not connected to the sewerage network and pollution from agricultural and urban wastewater discharges. For groundwater bodies, the main pressure is the diffuse pollution from agriculture and discharges that are not connected to sewerage networks, both affecting 10% of groundwater bodies.

There are several opportunities for the Romanian water sector to make a valuable contribution to promoting circular economy.¹⁴³ A crucial element is to improve management of sludge from wastewater treatment plants, gradually increasing the amount that is recycled in agriculture. This also includes promoting biogas production from wastewater treatment plants.

The consumption of drinking water “from the tap” should be promoted, compared to bottled water. The use of water for urban consumption today offers a high degree of safety for human health. Given the regulatory provisions, tap water offers safety guarantees virtually throughout the whole country in public places, and where it is not safe, measures will have to be taken for the existence of drinking water, thus reducing the use of plastic bottles. The new drinking water directive, which will have to be incorporated into Romanian regulations, envisages measures aimed at promoting tap water consumption. Romania is also a country of many mineral water springs. Moreover, several municipalities across the country (e.g. Timisoara) have already built springs of fresh treated water. This good practice should be replicated wherever possible and encourage the use of refillable bottles for drinking and cooking water.

3.2.5 Conclusion - suggestions for setting priorities

Based on our preliminary analysis, that considers the economic contribution, environmental impacts as well as challenges and opportunities in each sector, it can be concluded that enhancing the circular economy has the highest potential in the following sectors:

¹³⁸ https://energyeducation.ca/encyclopedia/Water_quality_degradation_from_hydropower

¹³⁹ <https://www.usgs.gov/media/images/water-can-be-reused-produce-hydroelectric-power>

¹⁴⁰ <https://www.energy.gov/eere/water/pumped-storage-hydropower>

¹⁴¹ Eurostat, Electricity production capacity for renewables [nrg_inf_epcrw], last update: 20-04-2022

¹⁴² <https://cms.law/en/int/expert-guides/cms-expert-guide-to-energy-storage/romania>

¹⁴³ <https://documents1.worldbank.org/curated/en/114311530025860150/pdf/127630-REVISED-W18010.pdf>

- Agriculture and forestry;
- Automotive sector;
- Construction ;
- Food and beverages;
- Packaging (combining glass, paper and plastics);
- Textiles;
- EEE.

Accordingly, these sectors are recommended to be dealt with in detail in the Action Plan, together with waste and water as horizontal sectors.

A few points are provided below that justify why certain sectors have not been chosen:

- The metallurgy and machine building sector have not been chosen as the circularity potential is relatively limited compared to other sectors, i.e. to applying Eco-design requirements that will be provided by the revised EU Ecodesign Directive, the application of low-carbon technologies and fuels as well as increasing recycling and remanufacturing of products.
- The chemical industry is not prioritised as its circularity potential mainly relies on the transition to biobased fertilisers which can be covered under the agriculture, forestry and food sectors.
- Even though the economic contribution of the tourism sector is relatively high, the circularity of the sector is restricted by the level sustainability and circularity of those sectors that tourism is connected with, of which the most important ones are already prioritised, i.e. agriculture, construction and packaging.
- The furniture sector holds many circular economy opportunities; however, it is a relatively small sector in Romania. At the same time, the pressing issue of intensified wood harvesting can be covered under agriculture and forestry.

4 The way forward towards a CE in Romania

4.1 Key objectives for a Romanian CE transition

The key objectives of the national Circular Economy Strategy provide the framework guiding the country on its endeavours to transition towards the circular economy in Romania by means of implementing the Action Plan. They also serve to define the most important elements and areas under the circular economy applied to Romania, thereby aligning expectations and visions of all stakeholders involved.

The circular economy promises to build a resilient system that benefits business, people and environment and withstands effects of climate change or global supply chain interruptions. The highest objective for the transition is the *decoupling of economic development from environmental degradation*. This requires exploiting the maximum circular economy potential under each economic sector.

In alignment with several relevant national strategies tackling a more sustainable, green and just Romania,¹⁴⁴ the following objectives can be derived:

1. Prioritise local production over imported products and materials;
2. Strengthen economic competitiveness and labour;
3. Responsible and sustainable sourcing of raw materials;
4. Enhance innovation and research;
5. Practice resource retention and valorisation;
6. Reduce the generation of waste;
7. Promote responsible consumption;
8. Protection of the ecosystem and health of citizens.

4.2 Policy directions

Based on the high-level objectives, the following directions should be pursued through policy-making to advance the circular economy in Romania. They should be tackled through regulation, economic incentives and soft measures that will be introduced in detail in the Action Plan.

- Decrease consumption of virgin raw materials through more sustainable raw material extraction and recycling and recovery activities.
- Decrease consumption of consumer goods by extending the products' lifetime:
 - o Applying circular design and material efficiency;
 - o Promoting dematerialisation;
- Decrease the negative impacts on the ecosystem resulting from production activities by:
 - o applying more innovative environmentally-friendly technologies and processes;
 - o promoting digitalisation;
 - o favouring renewable energies over fossil fuels;
 - o exploiting potentials for industrial symbiosis;
- Decrease the negative impacts on the ecosystem caused through waste and water management and disposal activities by:
 - o Promoting waste prevention;
 - o Improving the waste management system and infrastructure;

¹⁴⁴ National Sustainable Development Strategy 2013-2020-2030, Romania's Sustainable Development Strategy 2030, National Waste Management Plan (2018) as well as the draft Circular Economy Strategy (2020).

- Advancing waste sorting and treatment activities;
- Limit landfilling to a minimum extent.
- Improve policy and governance coherence, communication and collaboration throughout local, regional and national levels.

4.3 Potential governance structure

A coherent governance structure that clearly defines the roles and responsibilities of key institutions involved, is crucial for the successful implementation of the Circular Economy Strategy and its subsequent actions. The current governance model is in transition with new structures and dynamics being formed. This makes it rather difficult to comprehend the original governance structure and its functioning in the first place. However, an attempt to contribute to the current process, the following four options have been developed to reform the governance dealing with circular economy related issues.

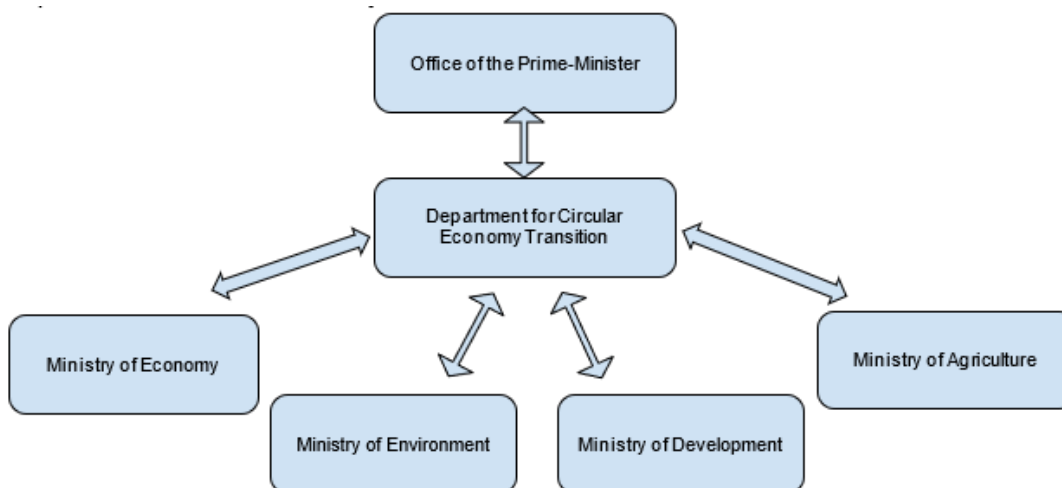
Also to be considered is a combination of options (such as option 1 with option 2 or option 1 or to 2 combined with option 3). It is important that the chosen governance structure should have a decision-making structure and an executive one where the later could be established within all the ministries dealing with Circular Economy activities.

These options will be further refined throughout the further course of this project.

4.3.1 Option 1: One centralised department dedicated to CE under the Prime Minister

The first option to embed circular economy as priority area into the governance structure in Romania is to establish one centralised department or unit directly under the Prime Minister, being on one level with the Secretariat General.

Table 4-1 Illustration of governance structure, option 1



Source: own figure.

Box 4-1 Alternative set up

Alternative set up

An alternative approach to the set-up of this option could be to establish the department under the State Council, coordinated by the Department of Sustainable Development (DSD). This would have the advantage that the department could rely on support of the Secretariat of the DSD.

The core group of the CE department would be composed of permanent representatives from all four relevant ministries, including their subordinated institutions¹⁴⁵. Considering the important roles played by the Ministries of Economy and Ministry of Environment, their representatives could have a permanent seat within the department and a veto right.

To support efficient coordination, each ministry should establish a CE team with a representative as liaison person that mediates between the CE department and the respective ministry when it comes to the implementation of the Action Plan. Within weekly meetings, the CE teams would briefly discuss ongoing issues. Besides members of the respective ministry, the teams can be complemented on an ad-hoc basis by specialists from different agencies subordinated to the specific ministry as well as representatives from other relevant ministries, depend on the topic and sector of interest.

In order to prevent conflicting interest in their workload, the representatives should officially be mandated to spend 20% (one day per week) of his/her working time on the work related to the CE department.

To benefit from valuable inputs resulting from diversity and inclusivity as well as feedback from other stakeholders being part of the implementation, also actors from the private sector and civil society should participate in the work and meetings of the CE department. They should participate in the weekly meetings.

Practically, the necessary changes can be made based on and in accordance with Emergency ordinance no.57/2019¹⁴⁶ on the Cabinet Structure, Article 23. Through a government decision initiated by the Prime Minister, a department within the government structure can be established, directly sub-ordinated to the Prime Minister's office. According to existing legislation¹⁴⁷, such a department would have the role of "coordination and general consultancy for domains of general interest aligned with the Government's attributions".

4.3.2 Option 2: Directorates for CE under each relevant ministry

The second option suggest the establishment of CE Directorates (Task Force) under each relevant ministries, i.e. Ministry of Environment, Ministry of Economy, Ministry of Agriculture and Ministry of Development, Public Works and Administration. This option has already been applied in the fields of climate change and sustainable development under the Ministry of Environment.¹⁴⁸

Within each of CE Directorates, circular economy actions specific to the ministries' responsibilities will be dealt with and coordinated. Steering the Directorate would require one person of the respective ministry to take ownership. The Directorate team would be composed of circular economy and sector

¹⁴⁵ The Ministry of Development includes also the regulator A.N.R.S.C.

¹⁴⁶ <https://lege5.ro/Gratuit/gm2dcnrygm4a/ordonanta-de-urgenta-nr-57-2019-privind-codul-administrativ>

¹⁴⁷ <https://lege5.ro/Gratuit/gm2dcnrygm3q/departamentul-codul-administrativ?dp=gi4tcojwhaydkna>

¹⁴⁸ If structures already exist within each ministry that could take the responsibilities of the Task Force, that should happen. However, each of the ministries mentioned should reflect on the areas under their responsibilities which could contribute to the CE and ensure that each of these areas are represented in the Task Force.

specialists to provide consultancy to the Minister and the ministry as well as to enhance the communication flow among them.

The coordination between the different CE Directorates per ministry will be done on the level of the Prime Minister or the Secretariat General. In comparison to option 1, the implementation power resides primarily with the ministries which might imply more autonomy.

4.3.3 Option 3: Creation of a Circular Economy Agency/Authority

The aim is to develop a national registered agency/authority acting as an independent coordination and implementation body of CE activities. It ultimately shall oversee all CE activities in Romania in a centralised way. As a key horizontal element, it will take further the actions proposed under the Action Plan by providing assistance and steering collaboration among stakeholders to create capacity and a functioning ecosystem enabling for CE in the long-term.

In order to take advantage of shared resources and making sure that each mandate is balanced, it is suggested to set up and run the Agency (potentially) as a public-private-partnership (PPP). The PPP model aims to establish a long-term cooperation between the private and public sector. A partial inclusion of academia aims to strengthen the public-private collaboration from a scientific angle, especially when it comes to validating innovations, data collection or skills development.

The four key responsibilities of the CE Agency/Authority are to:

- coordinate and oversee the development and implementation of CE activities;
- develop and provide materials, e.g. business support or CE knowledge resources (one-stop-shop);
- facilitate engagement: business platform, multi-stakeholder dialogue and private sector engagement;
- collaborate with other CE Agencies in region.

Finally, a Circular Economy Authority should have the responsibility to control the overall implementation of CE activities across all sectors. The CE Authority will act as a decision-making structure. It will act as a steering committee bringing together representatives of the government, industry, education, research and civil society. The structure can also have an advisory role, but the board of this authority should have decision making power.

4.3.4 Option 4: Joint responsibility between Ministry of Economy and Ministry of Environment

According to the existing responsibilities in terms of circular economy shared among the two Ministries, the leadership in circular economy can be held by both ministries. This option includes distinct and shared mandates.

It is suggested to assign the following responsibilities to the Ministry of Economy in charge of resources and national market products:

- Measures to extend the lifetime of products and reduce their environmental impacts;
- Consumer information, education and awareness;
- Supporting the improvement of production practices.

The Ministry of Environment is suggested to oversee:

- Waste management;
- Water and wastewater management;
- Consumer information, education and awareness.

For the realization in practice, the dedicated departments have to be formed in each ministry, with dedicated staff, a clear roadmap and task division. They should also have a regular and common working agenda. Among other, their roles should include:

- Facilitation of the working groups and consultations per sectors for contributing and defining the Action Plan for each sector (objectives, actions and indicators);
- Development of new policies and harmonizing the legislation;
- Coordination of the Action Plan's implementation;
- Monitoring progress;
- Updating the roadmap.

The Government Sustainable Development Department and Presidency Clime and Sustainability Department will be involved with the role of consultancy, representation and promoting.

4.4 Monitoring and evaluation framework

The monitoring and evaluation framework aims to track and assess the implementation and impact of the Circular Economy Strategy and Action Plan as well as measure progress-making against the objectives and goals formulated.

Under each key objective, indicators will be developed or will be sourced from Eurostat, National Institute of Statistics or indicators used in existing regulation, such as the National Waste Management Plan, National Sustainable Development Indicators, that cover the social, economic and environmental dimension will be utilized.¹⁴⁹ The same exercise will be done for each sector in the Action Plan (see Table 4-2).

Table 4-2 Monitoring indicators for high-level objectives

Objective	Indicators (expected result)	Method/Source
Prioritise local production over imported products and materials	Local production per sectors (number of local producers; volume of local production)	To be developed
	Ratio between consumption of imported products and locally produced products/materials (percentage per type of material and/or product)	To be developed
	Total exports (volume of exports by product/material category)	Eurostat
	Import and export of raw materials	National Institute of Statistics
	Total imports (volume of imports by product/material category)	Eurostat
	Import and export of raw materials	National Institute of Statistics
Strengthen economic competitiveness and labour	Real GDP per capita	National Institute of Statistics
	People employed in the CE/environmental sector (percentage of people employed in circular economy related sector compared to total work force) Number of employees in the environmental goods and services	Eurostat National Institute of Statistics

¹⁴⁹ Most of the indicators chosen are quantitative. A very few ones - mainly social indicators - are qualitative and have to be gathered through surveys or interviews.

	Unemployment rate (percentage of people being unemployed)	National Institute of Statistics
	Number of economic incentives to boost circular entrepreneurship (e.g. lower tax for repaired and reused products)	To be developed (based on EEA Dashboard)
Responsible and sustainable sourcing of raw materials	Number of companies obtaining a sustainable sourcing label or certification (number of companies)	To be developed
	Material footprint (raw material consumption per capita)	Eurostat
	Productivity of material resources	National Institute of Statistics
	Material intensity	National Institute of Statistics
	Independence from raw materials (self-sufficiency)	Eurostat
	Material dependency	National Institute of Statistics
	Import and export of raw materials	National Institute of Statistics
	Green Public Procurement (share of products and materials purchase through GPP)	Eurostat
	Promotion of renewable energies in total final energy consumed (share of energy sources based on renewable energies)	PNIESC 2030
	Share of renewable energy in the gross consumption of energy by sector	National Institute of Statistics
	Contribution of recycled materials to raw materials demand (share of recycled "old scrap" in the material inputs into the production system)	To be developed (based on EEA Dashboard)
	Enhance innovation and research	Patents related to recycling and secondary materials (number of patents)
The share of Gross Value added of environmental technologies in GDP		National Institute of Statistics
Eco-innovation index		Eurostat
CDP105A - Projects for research and development actions and the other one		National Institute of Statistics
CDP101B - Organizations with RD activities		National Institute of Statistics
Number of scientific articles concerning CE		To be developed (based on EEA Dashboard)
Implemented digital solutions using cloud and ScS technology (number of organisations compared to total number of companies)		Was planned to be launched in 2021 by IRCEM as part of ROCES2030; to be developed and complement the Eurostat data on cloud computing services
Practice resource retention and valorisation	Decrease in waste being landfilled (percentage of waste being landfilled per year)	To be developed
	Recycling rate of all waste excluding major mineral waste (percentage of waste being recycled)	Eurostat
	Municipal waste recycling rate	National Institute of Statistics
	Recycling rate of package waste by the type of material in total packaging waste generated	National Institute of Statistics
	Products on the market complying with the French reparability label	To be developed (based on EEA Dashboard)
	Circular material use rate	Eurostat
	Nutrient recovery from solid waste and wastewater reused in agriculture (share of sewage sludge from urban wastewater plants composted or used for agriculture from the total sludge disposal)	To be developed (based on EEA Dashboard)
	The share of sludge recovered in total sludge resulting from the wastewater treatment process	National Institute of Statistics
	Quantity of waste generated	National Institute of Statistics

Reduce waste generation	Food waste reduction: Number of firms that act against food waste	National Institute of Statistics
	Waste production per waste stream (volume of waste generated per waste stream and/or sector)	National Institute of Statistics
Promote conscious consumption	Domestic material consumption	Eurostat
	Consumption expenditure of households on repair, hire and maintenance, disaggregated by product groups	Eurostat
	Purchase of local products	Eurobarometer survey
	Purchase of products obtaining a sustainability label or classified as more sustainable options	Eurobarometer survey
	Purchase of second-hand products (percentage of products purchased)	Eurobarometer survey
	Share of people utilising sharing schemes (percentage of people)	Eurobarometer survey
	Resource productivity (ratio between economic activity and consumption of material resources)	Eurostat
Protection of the ecosystem and health of citizens	Number of renaturation and nature restoration projects (number of projects)	To be developed
	Share of natural areas being protected (share of land to total area)	To be developed
	Ecological footprint (global hectare per person)	Eurostat
	Emissions generated to air and water related to industrial and production activities (Tonnes of emissions generated per year by activity)	Eurostat

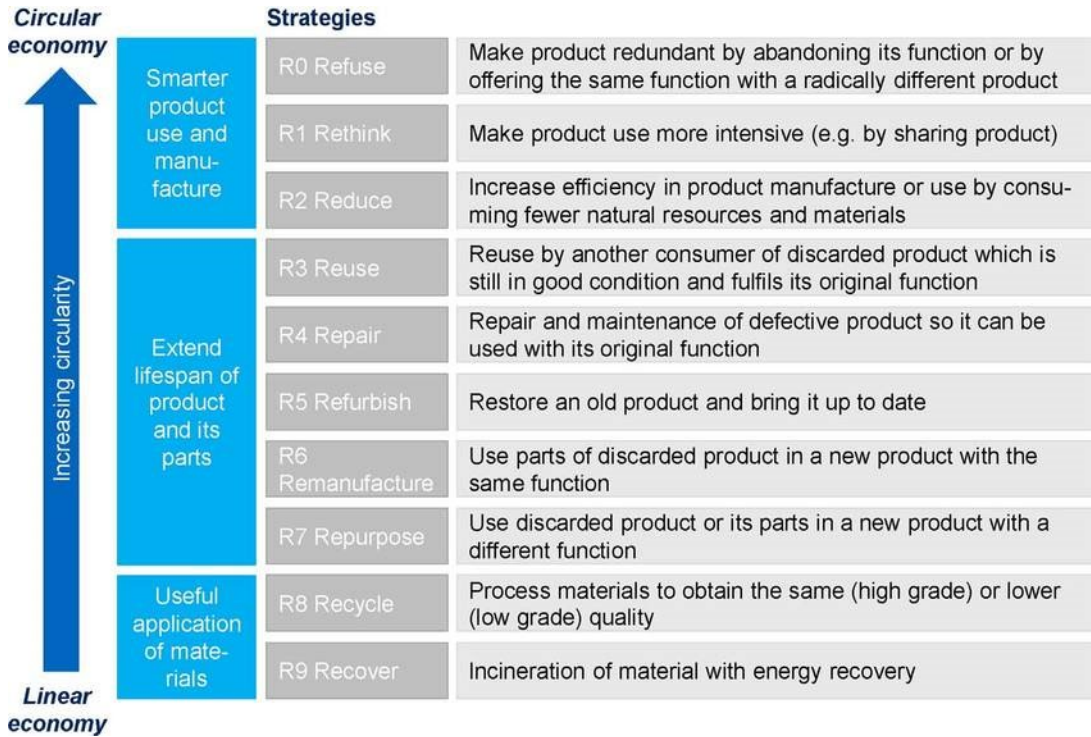
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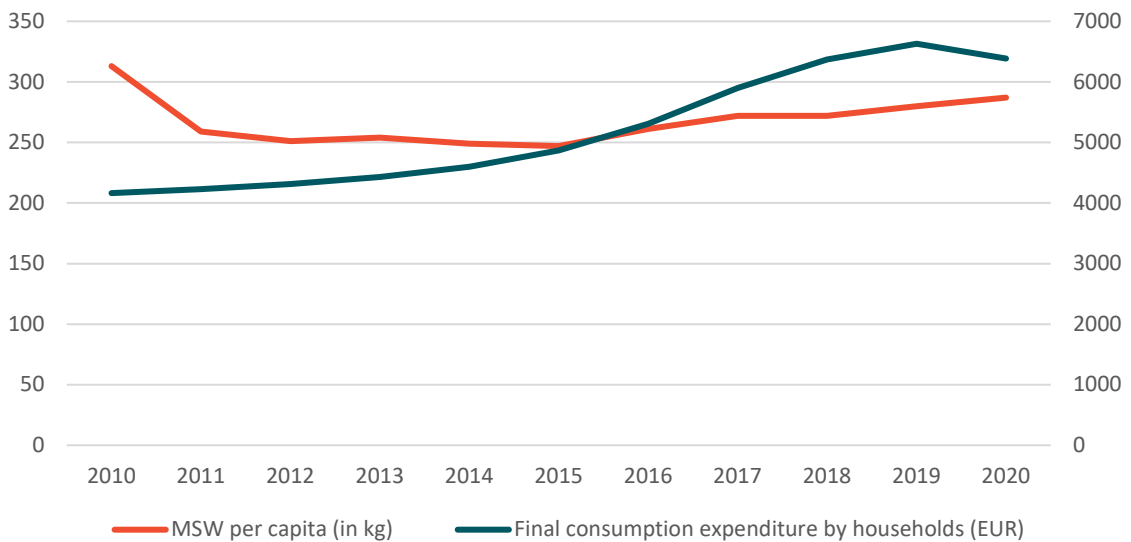
Annex A - Supporting figures and tables (Chapter 1 and 2)

Figure A-1: The 9R Framework



Source: Potting et al. (2017)¹⁵⁰

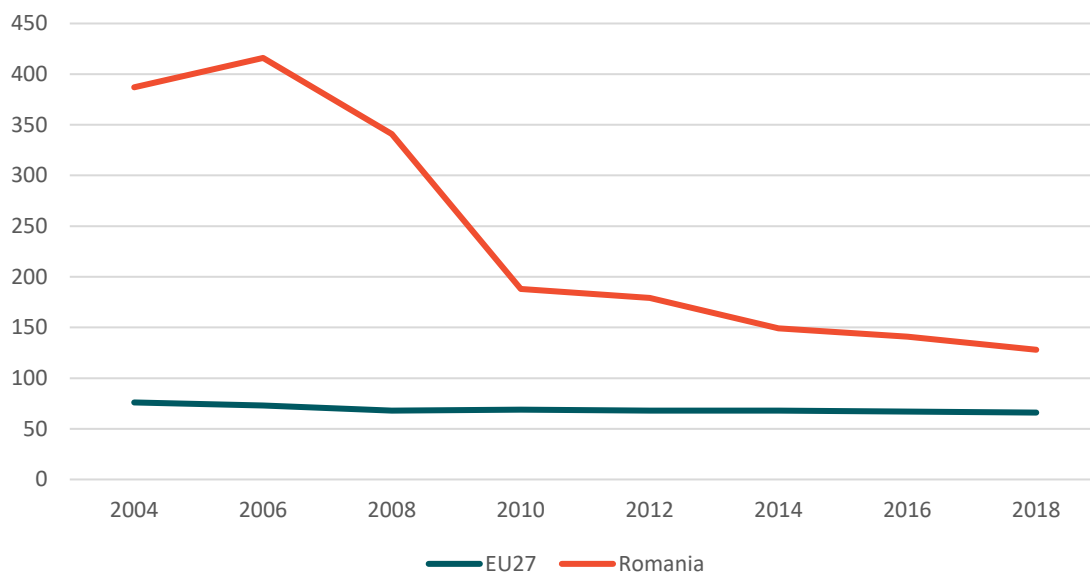
Figure A-2: Municipal waste generation and final consumption expenditure in Romania, 2010-2020



Source: Eurostat [env_wasmun] and Eurostat [nama_10_co3_p3]

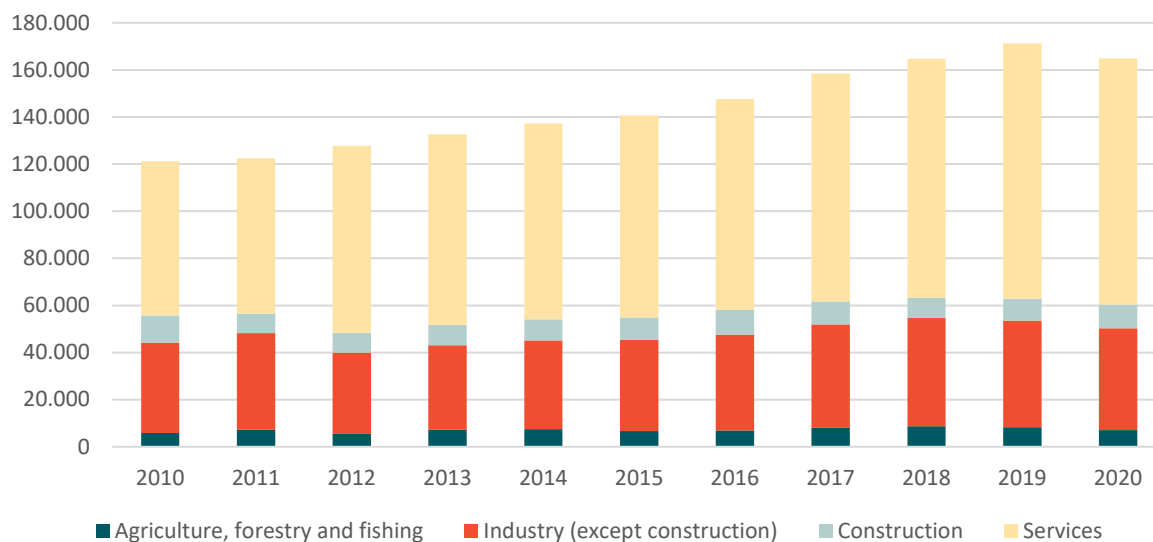
¹⁵⁰ <https://www.pbl.nl/sites/default/files/downloads/pbl-2016-circular-economy-measuring-innovation-in-product-chains-2544.pdf>

Figure A-3: Generation of waste excluding major mineral wastes per GDP unit (in kg per thousand EUR), 2004-2018



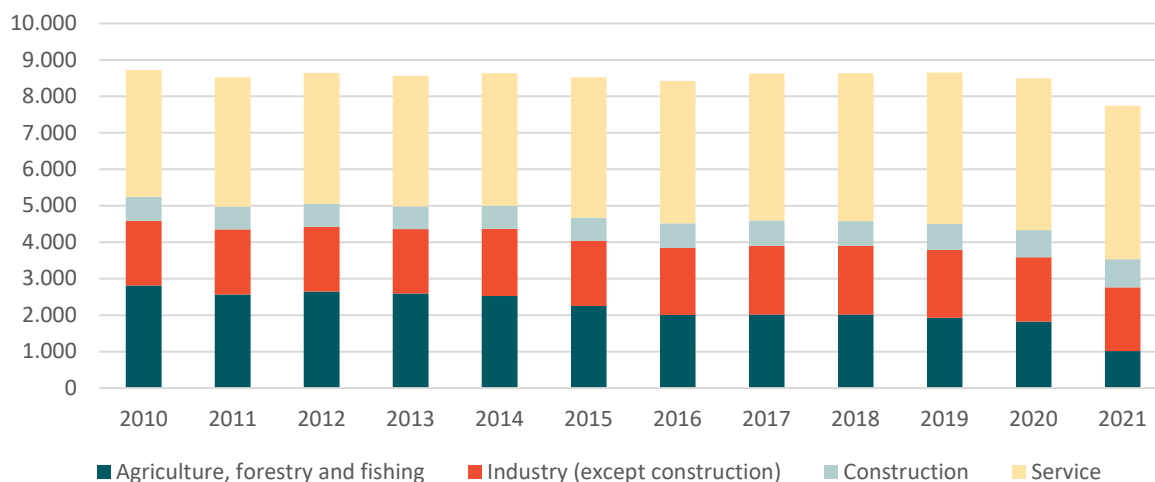
Source: [Eurostat](#)

Figure A-4: Composition of Romanian economy (gross value added in chain linked volumes (2015, million euro))



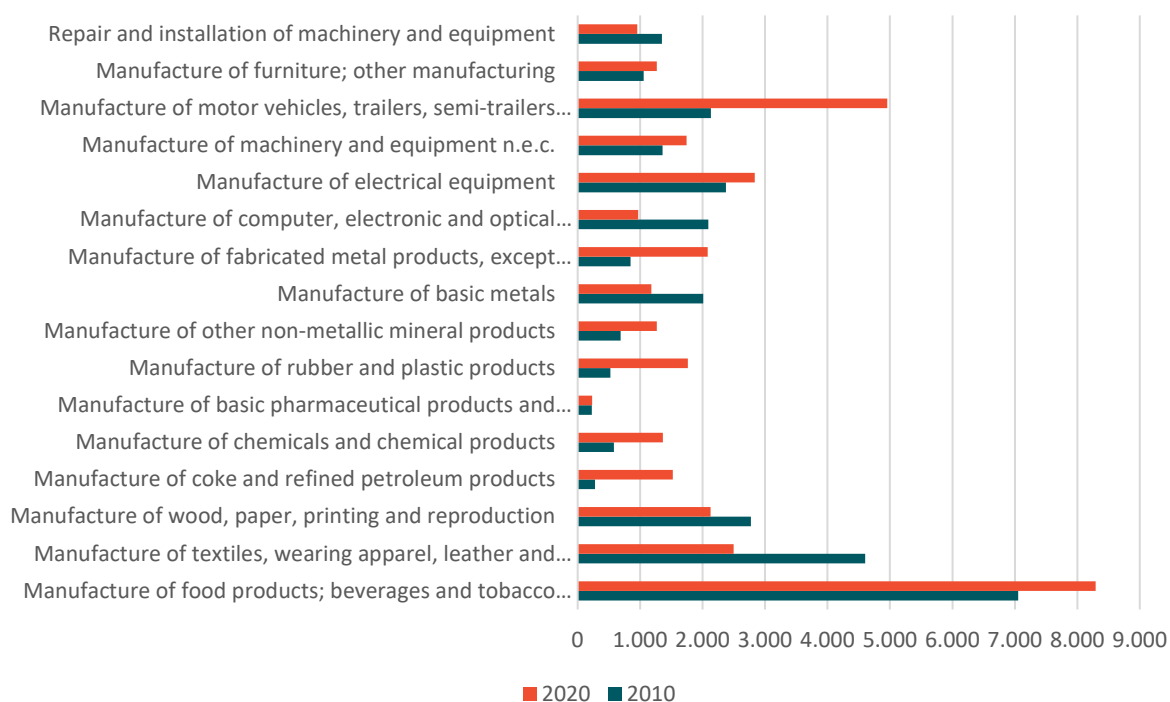
Source: [Eurostat](#)

Figure A-5: Employment in Romanian economy (thousand persons)



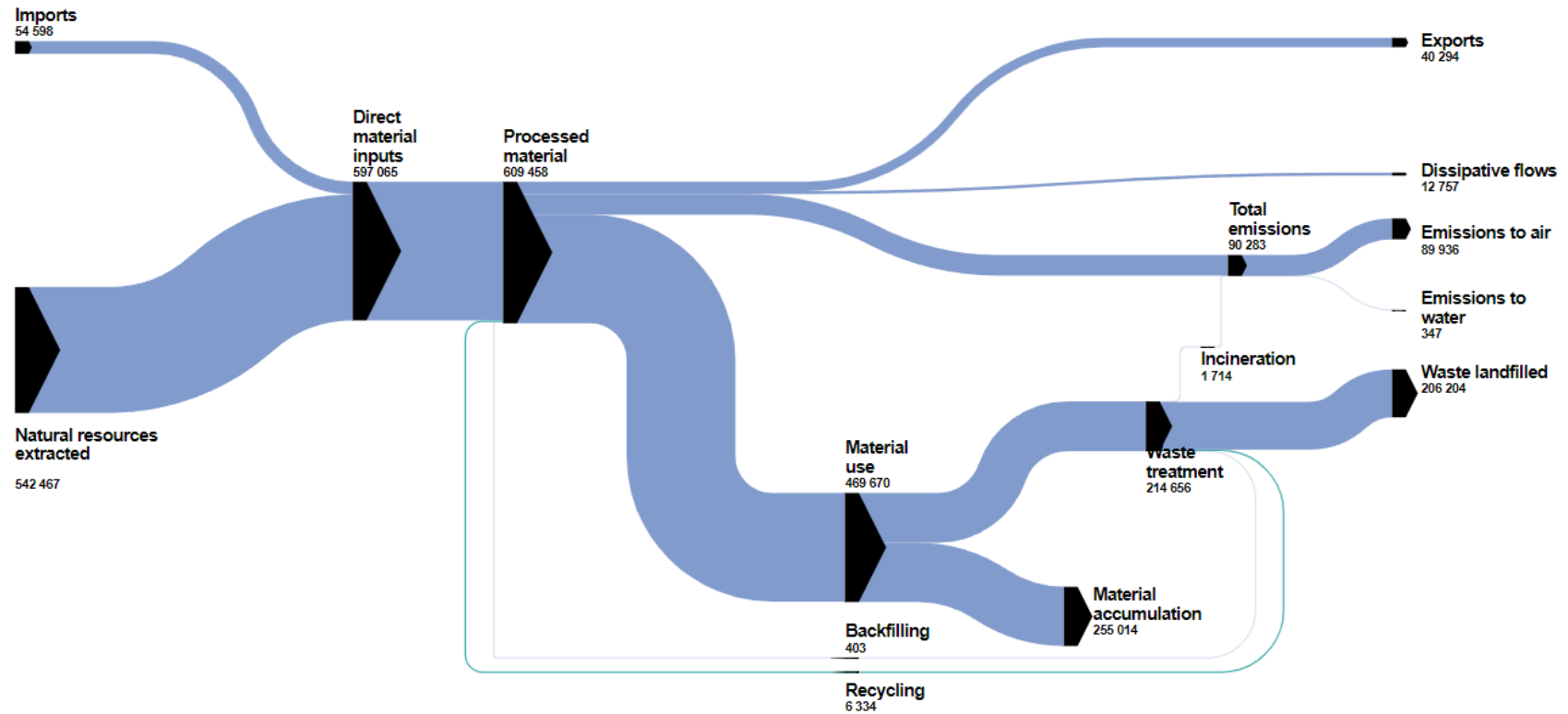
Source: Eurostat

Figure A-6: Manufacturing industries in Romania in 2010 and 2020 (gross value added in chain linked volumes) (2015, million euro)



Source: Eurostat

Figure A-7: Material flow in Romania, 2020 (thousand tonnes)



Source: Eurostat - Material Flows in the circular economy (<https://ec.europa.eu/eurostat/web/circular-economy/material-flow-diagram>, accessed 28.06.2022)

Annex B - Details on EU initiatives on CE

The new CEAP details a number of policy initiatives to be undertaken by the European Commission, addressing all stages of the life cycle of goods and services related to the EU's economy:

- The **Sustainable Product Policy Initiative**, of which the legislative proposal has been published this year (2022), aims at setting out a coherent EU policy framework whereby sustainable goods, services and business models become the norm and consumption pattern more sustainable. It addresses issues, such as the internalisation of product-related externalities, eco-design requirements placed on a broader range of products than energy-related ones and including material efficiency aspects (longevity, reparability, re-usability), as well as the provision of information on sustainability along the value chain in a “digital product passport”.
- This initiative goes in close coordination with two other projects initiatives addressing specifically consumers and aiming at enhancing their capacity to make informed, environmentally friendly purchasing decisions: the **initiative on empowering consumers** for the green transition and the **one on environmental claims**.¹⁵¹
- The ongoing revision of the **Eco-design Directive** and the **Regulation on the EU Ecolabel** (Regulation (EC) No 66/2010) have a view, among others, to increase the circularity and sustainability of consumption patterns. The EU Ecolabel promotes the circular economy by encouraging producers to generate less waste and CO2 during the manufacturing process and to develop products that are durable, easy to repair and recycle. The transparency through the label helps consumers to make a more informed and sustainable choice. Once the Eco-design Directive will be widened beyond energy-related products and made applicable to a broader range of products, it will set minimum standards for products' energy and material efficiency, thereby enhancing their environmental performance¹⁵².

¹⁵¹ European Commission (2021) [Inception Impact Assessment - Sustainable Product Initiative](#)

Annex C - Detailed description of Governmental bodies supporting CE

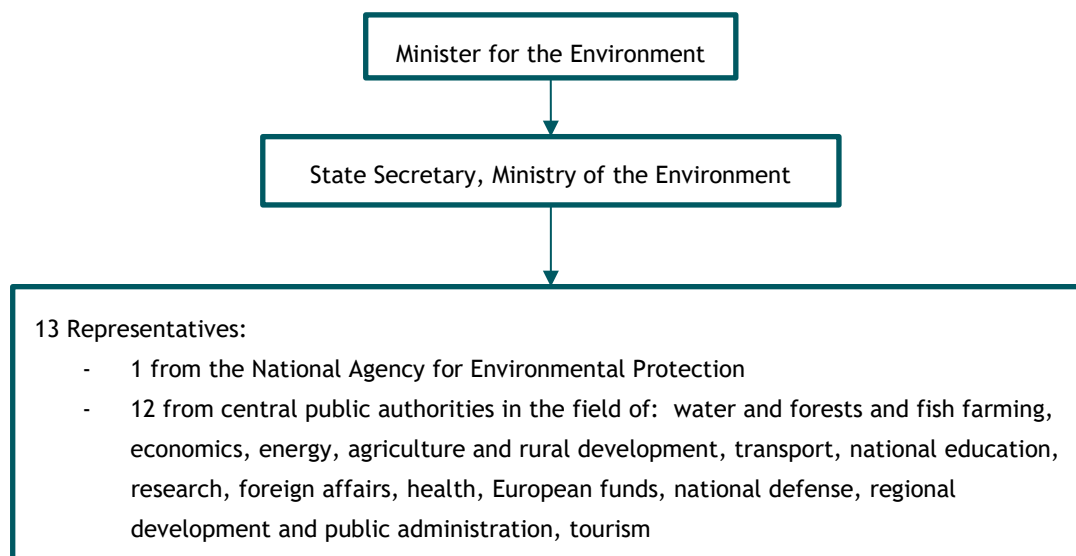
National Commission on Climate Change

On the 20th of November 2014, the Decision no. 1026/2014 for the reorganization of the National Commission on Climate Change was enacted, recognizing the need for a Governmental Center for coordinating policies in the field. The **National Commission on Climate Change** is an inter-ministerial body, with an advisory role, without legal personality, whose activity is coordinated by the Ministry of Environment. The National Commission on Climate Change is subordinated to the Inter-ministerial Council for Agriculture, Rural Development and Environment having as Presidents the Ministry of Environment. The Vice President of the National Commission on Climate Change is the Secretary of State in the Ministry of Environment. The Commission has a Secretariat acting under the Directorate of Climate Change Responsibilities of Ministry of Environment. The Vice President of the National Commission on Climate Change is the Secretary of State in the Ministry of Environment. The Commission has a Secretariat acting under the Directorate of Climate Change Responsibilities of Ministry of Environment.

A technical working group on climate change is set up under the auspices of the Commission. It is composed of experts of governmental and non-governmental authorities, institutions and organizations.

The National Commission on Climate Change has the following main competences:

- to propose the modification and completion of the National Strategy of Romania on Climate Change and of the Subsequent Action Plan, elaborated by Ministry of Environment.
- to analyse the reports elaborated within the technical group, in order to inform the Romanian Government;
- to inform the central public authorities about the sectors with high potential for reducing greenhouse gas emissions and about the tasks of reducing emissions of these institutions;
- following the proposal of the technical group, to recommend to the central public authorities the performance of specialized studies necessary for the implementation of the European policy in the field of climate change;
- to propose to the central public authorities the initiation of external collaboration actions or the participation in actions initiated by other Member States in the field of climate change in order to reduce the greenhouse gas emissions;
- to contribute to raising public awareness of the effects of climate change on the environment, daily life and the need to support public policies and measures adopted at national and European level to slow down these changes and reduce the number of anthropogenic actions that favour negative environmental changes and life, through public information, whenever appropriate.

Structure of the National Commission on Climate Change:**Figure C-1: Structure of the National Commission on Climate Change**

Source: own figure.

Interdepartmental Committee for Sustainable Development

The Committee has been established through the GD 272/2019¹⁵³ which entered into force in May 2019. According to the GD, the Committee is an inter-ministerial body with a consulting role and is operating under the Office of the Prim-minister. The main goals of the Committee are to monitor, evaluate and revise the implementation of the National Strategy for Sustainable Development 2030, its integration into the national programs and policies, as well as to ensure Romania's reporting obligations to the EU in the field of sustainability. Thus, the Committee provides coherence in the process of elaboration and promotion of sustainable development policies.

The Department of Sustainable Development serves as the permanent secretariat of the Committee, which ensures that any decisions taken by the Committee are communicated within 5 days to the Government.

Inter-ministerial Committee on Climate Change

On 29th of April 2022 through the Decision no. 563/2022, the Romanian Government approved the establishment, organization and operation of an **Inter-ministerial Committee on Climate Change** which will be coordinated by the **Prime Minister, as President**.

The Committee has three vice-presidents, the head of the Chancellery of the Prime Minister, the dignitary who heads the Department of Climate and Sustainability within the Presidential Administration and the Minister of Environment.

The work of the Committee is assisted by the technical secretariat which consists of staff from the General Secretariat of the Government, through the Directorate for Policy Coordination and Priorities, and from the Department for Sustainable Development.

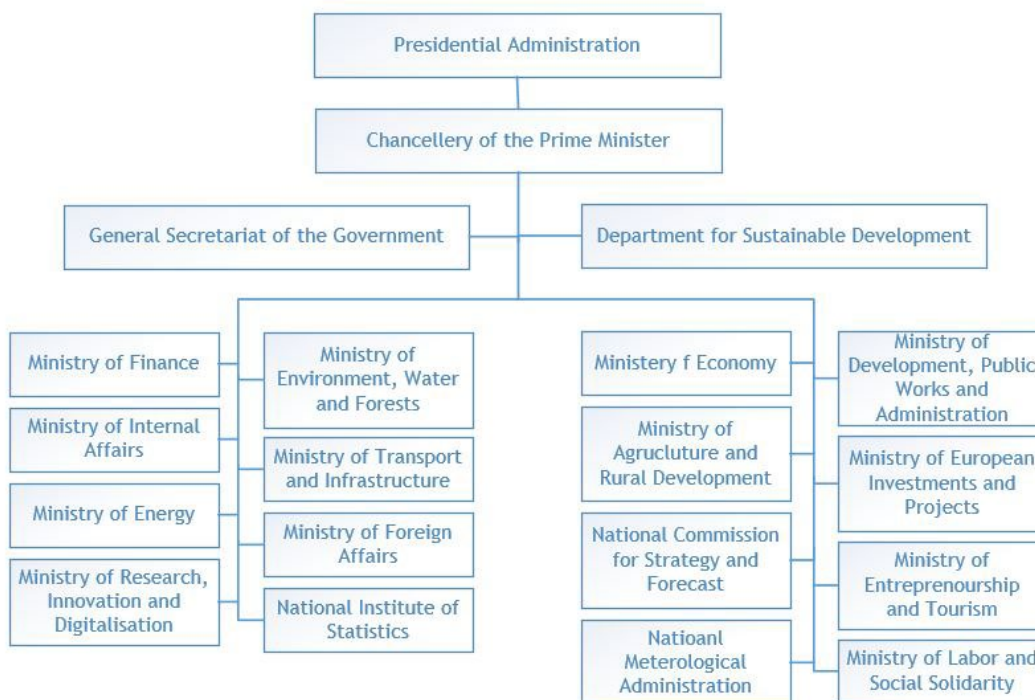
¹⁵³ <https://legislatie.just.ro/Public/DetaliiDocument/213810>

The main competencies of the committee are:

- Propose the communication of a unified and coherent message on climate change based on scientific data by Romanian public institutions that develop policies with an impact on combating climate change.
- Ensure the alignment of policies in sectors that have an impact on climate change and monitor the implementation progress made by the Romanian institutions;
- Analyse, monitor and propose annual priority climate change policies in line with national commitments, approved by the Government;
- Analyse, monitor and evaluate the degree of fulfilment of the measures taken by the authorities and institutions responsible for the implementation of the **policies provided in the Integrated National Plan for Energy and Climate Change**, hereinafter referred to as PNIESC;
- Analyse, monitor and evaluate the degree of fulfilment of the objectives of the **National Long-Term Strategy on Reducing Greenhouse Gas Emissions** and to propose solutions to achieve these objectives;
- Analyse and monitor the application of the methodology for **budgeting climate change initiatives, according to the obligations assumed in Romania's National Recovery and Resilience Plan** and other international agreements;
- Analyse and propose indicators for measuring Romania's climate commitments, in relation to the requirements of the **United Nations Framework Convention on Climate Change and the Paris Agreement, as well as other initiatives in the field such as the UN Agenda 2030 for Sustainable Development and the Sendai Framework for Disaster Risk Reduction.**

Structure of Inter-ministerial Committee on Climate Change:

Figure C-2: STRUCTURE of Inter-ministerial Committee on Climate Change



Source: own figure.

Other important key stakeholders from private sectors include:

1. Trade Chambers;
2. Professional Associations;
3. Others: Coalition for Romanian Development, Circular Economy Romania Coalition, Romanian Business Association, CONCORDIA Confederation, National Council of Small and Medium Private Enterprises in Romania CNPIMMR, Green Report, Romanian Environmental Associations, Association of Romanian Corn Producers (APPR), Association of PROs for Packaging, PRO DEEE, the Romanian Circular Economy Stakeholder Platform (ROCESP);
4. NGO's (e.g. Romania Green Building Council, Foundation Conservation Carpathia).

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