

## CHALLENGES IN THE CIRCULAR ECONOMY OF BULGARIA

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### ABSTRACT

The transition towards a circular economy presents a transformative challenge with the potential to yield extensive economic, environmental, and societal benefits. In Bulgaria, the shift from a traditional linear economy to a circular one is fraught with a unique set of challenges, which this paper meticulously examines. Through qualitative and quantitative analysis, the paper identifies the primary barriers impeding the adoption of circular economy practices, including inadequate regulatory frameworks, insufficient technological infrastructure, and the entrenched habits of consumption and production that resist change. It explores the role of government policy, business innovation, and consumer engagement in fostering a conducive environment for the circular economy. The paper also discusses the potential for economic growth and sustainability that a circular economy can offer within the Bulgarian context, suggesting strategic approaches to leverage indigenous resources, and encouraging collaboration between sectors. Through this exploration, the paper provides valuable insights and proposes actionable recommendations that aim to guide policymakers, business leaders, and civil society in overcoming these challenges and achieving a sustainable circular transition in Bulgaria.

**Key words:** circular economy, challenges, success factors.

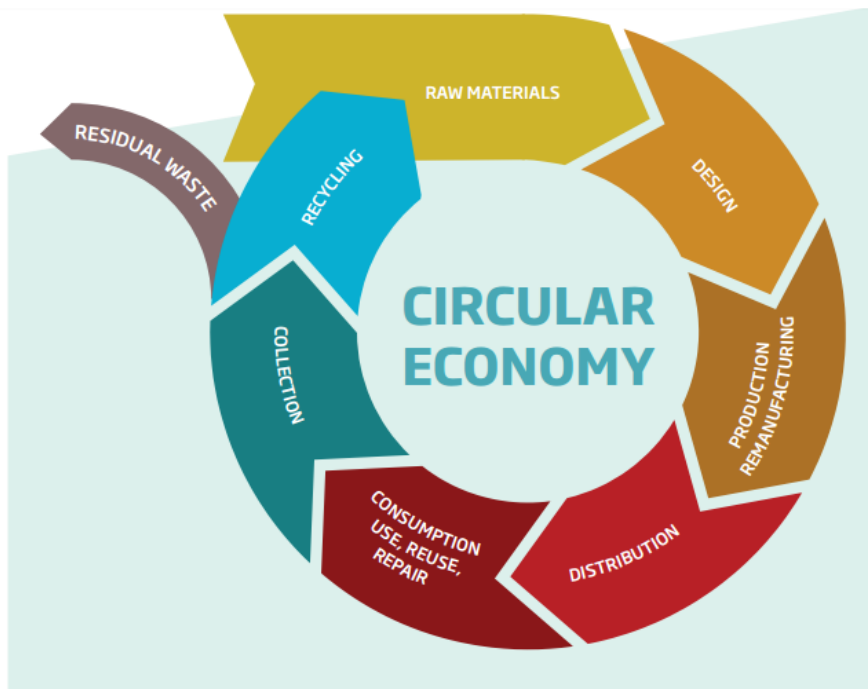
### INTRODUCTION

Innovative solutions are key to advancing the circular economy as they address both environmental and social challenges. These approaches help to minimize waste, conserve resources, create economic value and promote community well-being, paving the way for a more sustainable and equitable future (Zahariev A., *et al.* 2024).

A circular economy is a production and consumption model that minimizes the amount of waste. This benefits the environment, the economy and all of us. It aims to extend the life cycle of products. In practice, this means sharing, borrowing, reusing, repairing and recycling existing materials and products for as long as possible.

When a product has reached the end of its life, the materials from which it was made can be reused in other ways. This can be done repeatedly, minimizing waste disposal.

The concept of the circular economy contrasts with the traditional linear model, where raw materials are used, things are made from them, they are consumed, and the rest is thrown away. This model relies on large quantities of cheap and accessible materials and energy sources (<https://europarl.eu>).



*The circular economy involves intrinsic recycling and feedback loops and applies to the whole economy. source diagram: European Commission*

**Figure 1: The circular economy model, Source: EP Research Service**

The concept of the circular economy (CE) is that products do not quickly become waste but are reused to retain their maximum value before being safely and productively returned to the biosphere (Ellen MacArthur Foundation, 2013). The circular economy turns away from waste as the end state of consumption and focuses on business practices where waste is recycled and products are reused (Gregson et al., 2015), i.e. goods become resources (Valavanidis, 2018).

The circular economy is based on closed loops (Jawahir & Bradley, 2016) and relies on the following: Reducing the consumption of natural resources; Increasing the use of renewable, recyclable resources; Reducing carbon emissions; Reducing material waste and minimizing losses; Preserving the economic value of goods, materials and components (European Environment Agency, 2016). All these elements or principles can be implemented in the so-called business models (Ionescu et al., 2017). The principles underlying the circular economy already emphasize process and product design. This has introduced several visionary concepts, e.g. the bioeconomy, the bio-based society and the green economy, which are now reorienting the strategic planning of many industrial companies (McCormick & Kautto, 2013).

The transition to a circular economy is a transformative challenge that has the potential to bring significant economic, environmental and societal benefits. In Bulgaria, the transition from a traditional linear economy to a circular economy is associated with a number of unique challenges, which are carefully examined in this article.

## METHODOLOGY

Based on qualitative and quantitative analysis, the main barriers to the adoption of circular economic practices are identified. These include inadequate legal frameworks, insufficient technological infrastructure and entrenched consumption and production habits that resist change. It examines the role of government policy, business innovation and consumer engagement in fostering a favorable environment for the circular economy. The paper also discusses the potential for economic growth and sustainability that a circular economy can offer in the Bulgarian context and suggests strategic approaches to mobilize local resources and foster cross-sector collaboration. The study provides valuable insights and offers actionable recommendations to help policy makers, business leaders and civil society address these challenges and realize a sustainable circular economy in Bulgaria.

The evidence and information presented in this study comes mainly from desk research, a review of relevant scientific literature and the authors' knowledge on the subject.

Additional information was obtained from European and national legislation.

Data was extracted from national and European statistics. Statistical methods and monitoring and evaluation systems were used. This includes the analysis of production processes, resource consumption and some social and economic indicators.

## RESULTS AND DISCUSSION

According to Shterev and Ivanova (2021), the challenges of the circular economy start at the general EU level and are broken down into challenges at the national level. They concluded that the EU needs new regulations for those economies in the Union that need support in transforming from a linear to a circular economy. Škrinjarič (2020) identifies the key drivers for the EU and its members to address the challenges of the circular economy as follows. The most general challenge is to define the concept of circular economy. As a result, EU policies are not always sustainable in the long term. The study also identifies education as crucial to accelerating the transition to a circular economy. Dimova et al. (2022) see legislation as a key challenge for the circular economy at national level, particularly in relation to wastewater management.

### *External variables influencing the circular economy in Bulgaria*

The European Green Deal (2019) emphasises the need to take action to address environmental and climate issues and ensure a sustainable future for future generations. Achieving climate neutrality by 2050 is one of the top priorities. The transition to a circular economy, one of the main priorities of the Deal, aims to improve the competitiveness of the economy and increase the Community's GDP by 0.5% by 2030.

As part of the European Green Deal, the European Commission published a new Circular Economy Action Plan in March 2020. This plan includes measures to accelerate the transition to a sustainable model and restore natural resources, thereby reducing the impact on the environment and society. The new action plan focuses on creating a policy framework for sustainable products, key value chains in product sectors, a more effective waste policy with a focus on prevention, reuse and recycling, and the development of circular models that benefit people, regions and cities. The Strategy for Plastics in a Circular Economy (2018) sets out guidelines for the use of plastics and aims to increase the recycling and recovery of plastics. By 2030, all plastic packaging should be recyclable or reusable. The member states have also set

themselves the target of achieving a recycling rate of 25% for plastic bottles by 2025. By 2030, all bottles must consist of at least 30% recycled material.

### *Bulgaria's national legal framework*

With Decision No. 700 of 7 October 2021, the Council of Ministers of the Republic of Bulgaria adopted the National Program for the Prevention and Reduction of Food Losses (2021-2026). This program covers all stages of the food chain, including primary production, processing and manufacturing, retail and distribution of alternative foods as well as restaurants and catering services and households.

The National Development Program Bulgaria 2030 is a strategic framework document of the country that sets out the vision and objectives of the development policy in all sectors of the state administration. The document sets out three strategic goals and identifies 13 national priorities. This strategy supports the implementation of Priority 4: Circular and low-carbon economy of the National Development Program: Bulgaria 2030, which aims to transform the country's linear economy into a circular economy.

The Action Plan for the transition to a circular economy in the Republic of Bulgaria for the period 2022–2027 was adopted by Decision No. 832 of the Council of Ministers on October 26, 2022. The plan aims to implement the principles of circular public procurement in the policies of Bulgaria through the National Waste Management Plan for the period of 2021-2028 as well as the use of circular criteria in procurement practice. It mentions the significance of the move towards a circular economy due to environmental concerns in other words the need to support a sustainable development. Core activities encompass interacting with stakeholders, policy making, and piloting circular procurement solutions. The plan stresses the need for closing resource loops, efficient use of resources and the collaboration among public, private entity and educational and research institutions. Evaluation and adjustment are key components for the implementation stage 2021–2023.

### *Authorities and stakeholders of the circular economy in Bulgaria*

**Council of Ministers of the Republic of Bulgaria** – Advisory body for the European Green Deal. One of the main tasks of the Advisory body is to advise and support the Council of Ministers in order to achieve a balance and coordination of national priorities in the field of energy security, accelerated economic development, social justice and environmental protection.

**Ministry of Environment and Water** – To implement its policy, the structure of the Ministry provides for general and specialised administrations, including the Executive Agency for Environment, 4 Directorates for River Basins, 16 Regional Inspectorates for Environment and Water, 3 Directorates for National Parks, the Enterprise for the Management of Environmental Protection Activities, the Managing Authority of the Operational Program "Environment", which manages the environmental funds in Bulgaria.

**The challenges facing the circular economy in Bulgaria** are related to several groups of factors.

The challenges at the operational level that the implementation of circular economy principles may face are presented in the context of the case of Bulgaria. Indeed, the problems are typical for countries that have not yet sufficiently completed the transition to a circular economy. They are as follows:

**Infrastructural constraints:** The infrastructure for recycling and waste management in Bulgaria is not as developed as in some other European countries. This makes it difficult to

collect, sort and recycle materials effectively. In addition, there is a need for more modern facilities that can handle complex recycling processes.

**Economic constraints:** As one of the economically weaker members of the European Union, Bulgaria faces financial constraints that can limit investment in new technologies and business models required for a circular economy. This applies both to the financing of research and development and to the expansion of innovative processes.

**Regulatory framework:** While the EU provides a broad regulatory framework to promote circular economic practices, national implementation can be inconsistent. Bulgaria needs more robust and clearer regulations that incentivize recycling, reuse and sustainable production practices at the local level.

**Market development for recycled materials:** There is no developed market for secondary raw materials in Bulgaria. The demand for recycled materials is relatively low, which discourages companies from investing in circular processes. Building this market requires both policy initiatives and business innovation.

**Education and awareness:** Awareness of the benefits of the circular economy is still growing in Bulgaria. Both consumers and businesses may not fully understand the economic and environmental benefits of the circular economy. Awareness campaigns and training programs are needed to change mindsets and promote sustainable consumption and production patterns.

**Technology and innovation gaps:** There are a need for more local innovation in technologies that promote the circular economy, such as better recycling technologies, sustainable packaging solutions and product lifespan extension systems. Support for innovation can come from both government funding and collaboration with universities and research institutions.

**Incentives and financial support:** Companies often need incentives to switch to circular models. These can include tax breaks, subsidies or funding for pilot projects. Designing these incentives in a way that is sustainable for the government and effective for businesses is a complex challenge.

### *Specific characteristics of the circular economy process in Bulgaria*

The circular economy in Bulgaria is constantly developing in one direction or another, albeit very slowly. The total consumption of basic materials in the country is about 169,000 tons per year. Of this, 16% is imported and the remaining 84% is obtained from natural resources. Only 2.6% of waste materials are used in the economy and 52% are landfilled, although the recycling rate is 22%. Recent research by the authors of this report has shown that in Bulgaria, where the efficiency of waste management is extremely low, factors such as patents offer prospects for future improvement. Unfortunately, in contrast to other European countries, factors such as investment and value creation do not play a role in the circular economy. Taking into account some sources such as ESG news, a very fast improving culture to implement the ESG standard, the main pillars of the Bulgarian circular economy that need to be improved can be summarized as follows:

**Transforming waste management in Bulgaria** – Bulgaria is in the process of revolutionizing its approach to waste management. Sofia, for example, has introduced decentralized composting projects that turn organic waste into fertile soil for urban planting. This method reduces dependence on landfills and increases community participation and adaptability.

Promoting the circular agriculture – Bulgaria’s rich farmland is experiencing a revival of old farming methods combined with modern ideals of sustainability. Farmers are adopting regenerative techniques such as crop rotation and agroforestry to improve soil vitality and diversify biological habitats. Bulgarian organic certification encourages consumers to choose locally produced, environmentally friendly food.

**Green technology innovation** – Bulgaria’s vibrant startup scene is driving eco-innovation and creating advanced solutions to environmental problems. Innovations range from solar-powered irrigation systems to blockchain for transparent supply chains. The support of organizations like Cleantech Bulgaria is crucial as they provide advice and resources to emerging green businesses.

**Circular education initiatives** – It is important to educate Bulgarian youth to maintain the momentum of the circular economy. Environmental education is becoming part of curricula across the country, with lessons focusing on resource conservation, waste minimization and sustainable living. Hands-on projects such as school gardens and recycling activities teach children the importance of protecting the environment.

Bulgaria’s commitment to a circular economy is an example of the power of collective effort and innovation. By adopting sustainable practices in all sectors, including waste management and tourism, Bulgaria is not only protecting its environmental heritage, but also building a stable and prosperous future for generations to come. According to Petrova (2020), mining is one of the pioneers in the field of circular economy.

*Possible steps to overcome the challenges*

Regulatory and policy gaps can be overcome through some measures, such as:

- Updating legislation, including the development of a clear and integrated regulatory framework that is in line with EU sustainable development goals;
- Introducing incentives for companies, such as financial and tax relief for companies investing in innovation and circular solutions;
- Increasing investment in education and awareness by organizing national campaigns to raise awareness of AI;
- Improving coordination and better interaction between institutions;
- Creating easier access to funding by removing administrative barriers to obtaining European and national funding.

Addressing these regulatory and policy gaps will allow Bulgaria to accelerate its transition to a circular economy and achieve a more sustainable future.

Another important part of the factor group is infrastructure deficits – The transition to a circular economy (CE) in Bulgaria requires significant infrastructure improvements. It currently suffers from a number of deficiencies that hinder sustainable resource and waste management.

*To improve it, investments need to be made in the recycling infrastructure, such as:*

- Creating more centers for separate collection and recycling, especially in rural areas;
- Building facilities for specific waste streams such as electronic waste and plastics;
- Developing infrastructure for biodegradable waste by promoting composting and building facilities for organic waste processing;
- Introducing reverse logistics systems: building networks for the return and recycling of packaging, batteries and textiles;

- Improving regional development by implementing special programs for infrastructure investments in lagging regions.

The use of digital solutions requires the introduction of waste traceability platforms and better resource management.

***Overcoming economic barriers requires measures such as:***

- Tax breaks for companies investing in circular models;
- Subsidies for research and development and innovation in sustainable technologies;
- Introducing higher fees for waste disposal to encourage companies to look for alternatives such as recycling;
- Facilitating procedures to obtain funding from European programs; encouraging banks and financial institutions to offer loans for sustainable projects;
- Creating quality standards and certifying recycled products; encouraging the public sector to buy goods made from recycled materials;
- Improving regional waste management infrastructure;
- Promoting collaboration between businesses and universities to develop new solutions;
- Running campaigns to promote the economic benefits of the circular economy to businesses and consumers.

Overcoming these economic barriers requires coordinated efforts from government, business and society. Only through systematic investment and incentives can Bulgaria achieve an effective transition to a circular economy.

***To overcome the challenges in education and awareness, can be organized:***

- National information campaigns to raise awareness of the circular economy and its benefits, highlight examples of successful local initiatives and encourage replication.
- Introducing the topics of sustainable development and circular economy into the education system by organizing workshops and training for citizens and businesses.
- Creating financial incentives for citizens who actively participate in separate collection or use recycled products.
- Support local businesses that offer repair and reuse services.
- Promote the benefits of reuse and recycling through social media, influential personalities and public events to create a new cultural value for sustainable consumption.
- Facilitate access to separate collection and reuse systems by developing networks for the repair and exchange of goods.
- Promote local initiatives such as 'green' markets where citizens can swap or sell goods for reuse.

Overcoming behavioral and cultural challenges is key to the successful implementation of the circular economy in Bulgaria. This transition requires a combination of education, incentives and a change in public attitudes.

There are also technological limitations due to limited research and development for AI solutions such as material recovery, product life extension or biodegradable materials and minimal use of advanced technologies such as AI, IoT or blockchain for resource optimization.

Improve coordination between sectors by promoting industrial symbiosis and collaboration between different sectors.

Systematic investment and a strategic approach to circular economy infrastructure will ensure more efficient use of resources and less waste in Bulgaria.

## CONCLUSION

The transition to a circular economy in Bulgaria requires addressing these complex challenges through coordinated efforts by government, business and society.

Bulgaria has developed a comprehensive legal and policy framework to facilitate the transition to a circular economy by integrating EU directives into national legislation to promote sustainable resource and waste management.

The country's circular economic efforts are supported by a robust waste management infrastructure that has evolved significantly over the past decades, especially since the alignment with EU directives in the early 2000s. The diverse structure of waste management in Bulgaria underlines the crucial role that specialized companies play in the management of different types of waste, especially packaging waste.

Social entrepreneurship in Bulgaria plays a key role in promoting the circular economy by addressing the complex challenges of waste management, especially in the municipal sector. Through innovative business models and community-driven initiatives, organizations are not only tackling environmental problems but also creating significant social benefits.

The ongoing development of these models gives us clues as to how business efforts can be aligned with environmental goals to contribute to a more sustainable future for Bulgaria. (Zahariev A., *et al.* 2024)

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