THE CIRCULAR ECONOMY AS AN ELEMENT OF GREEN TRANSFORMATION IN BULGARIA

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ABSTRACT
In order to successfully meet the EU's resource efficiency targets by 2030, the transition to a circular economy model should become a state priority. This implies that the concept should be expanded not only to waste reduction and recycling, but also to the disruption of the dependence between economic growth and waste production. **The purpose** of this paper is to analyse how far in Bulgaria is done the transition to a circular model, while making a comparison with the EU and to prove the need for an accelerated implementation of adequate measures on the part of public authorities to promote such a change. Work is based on a descriptive analysis of secondary data on the performance of the selected indicators of circular economy and comparative analysis within the EU. The analysis shows the presence of a certain delay compared to the EU average indicators as well as unused opportunities not only related to more efficient use of resources, but also to a radical change in the business model. The conclusions reached indicate the existence of a number of obstacles that delay the transition. This calls for accelerating the reform of eco-fiscal and innovative government policies. The added value of the article is not only the analytical consideration of the problems, but mostly in drawing up recommendations for future measures.

Key words: circular economy; resource productivity; waste management; transition] Bulgaria; EU.

INTRODUCTION
In late 2019, the European Commission presented its new long-term vision for EU development. Growth, fair environmental transition, and resource-efficient and low-carbon economy are the key highlights of this ambitious strategy for the next decade.

Building on the Sustainable Development Goals (SDGs), this transformation becomes possible through a complete change in production and territorial infrastructure. It encompasses a whole set of activities, new practices and business models, interconnected and hierarchically structured according to their contribution to optimising the use of raw materials and energy. Dealing with the new challenges will require deep structural overhaul of the technologies so far used, development of new technologies relevant to the 21st century needs, innovation and the creation of new products and services ensuring sustainable growth.

Making such a transition is an opportunity to green the economy and create new competitive advantages. Therefore, actions in the field of circular economy are directly linked to key EU priorities, including jobs and growth, the investment, climate and energy programme, industrial innovation and a renewed EU industrial policy strategy (1). At the same time, the implementation of this strategy will contribute to the achievement of the 2030 Agenda for Sustainable Development Goals, in particular

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Objective 12 for the establishment of sustainable consumption and production patterns.

The political will for transformation, clearly expressed in the EU, is reflected in the launch of the circular economy model, based on a more efficient use of resources and on the concept of 'closing the loop' borrowed from natural circular schemes (2, 3), where the concept of waste does not exist. Circular economy implies the ability of an economy to grow while minimising the use of resource inputs.

Circular economy is also a means of creating future conditions for growth. (4) This is because the shift from extraction and consumption-based production to more complex development regimes will lead to long-term growth strategies. Future competitiveness will be a function of energy efficiency and resource management (5). And while to date Bulgarian companies are at a great risk of increasing costs and losing competitiveness vis-à-vis the rest of the world by making firm environmental commitments, this is nonetheless a serious investment in the future (6). In its development, the current linear model objectively limits the opportunities for economic growth. (7) Based on the extraction of more and more resources and their disposal at a later stage, such a model has exhausted its potential. This inevitably requires a reversal of perspective (8), adopting the principle of 'systemness' and inter-

connectivity of individual systems, which is at the core of the conceptual basis of the circular economy model. (9) The key feature of this model is reuse. Its essence goes far beyond just waste management or environmental protection. At the heart of this concept is the effort to maximise the benefit of an already created product throughout its life cycle. (10)

Circular economy provides key orientations for what needs to be done to significantly and lastingly reduce the resource dependency of the economy and to address the scarcity of non-renewable natural resources. It is a new way of perceiving the existing links between markets and businesses and redefines the perception of waste as an important resource. (11)

Circular economy is an economic system of exchange and production, in which the aim at every stage of the life cycle of the product (good or service) is to increase the efficiency in the use of resources and reduce the harmful effects on the environment, thus ensuring the well-being of individuals (12). This definition is also adopted for the purposes of this study.

The concept of a circular model is comprehensive. It encompasses both supply and demand. It is equally applicable to production and consumption (**Figure 1**).

Figure 1.

This transition is an opportunity to transform our economy so it can deal with a number of challenges, become more sustainable and able to address the challenges of climate change and

preserving natural resources. It enables the creation of new jobs and gives competitive advantages for Bulgaria.

In the transition to a more circular economy, monitoring key trends and patterns is an essential means of understanding how different elements of the circular economy evolve over time, identifying success factors and assessing whether sufficient action has been taken. The results of the monitoring should provide the basis for setting new priorities aimed at the long-term objective of a circular economy.

METHODOLOGY
The purpose of this article is to analyse the extent to which a transition from a linear to a circular economy model has been taking place in Bulgaria, while making a comparison with the EU (according to selected indicators).

The working hypothesis being tested states that the circular transformation of the Bulgarian economy is lagging behind that of the EU and that public authorities need take more active and adequate measures to promote such a change.

The research is based on a descriptive analysis of secondary data on the performance of circular economy indicators and their comparison with those for the EU (13). Based on a set of indicators and in the absence of a single composite indicator, the trends in the dynamics of each of the selected indicators for Bulgaria and the EU average are derived. The time period covers 2010-2018 as it draws on the available statistics allowing comparative analysis.

Eurostat's methodology for monitoring progress in transitioning to a circular economy model distinguishes four groups of indicators. They include a set of key indicators that cover each of the four phases – production, consumption, waste management, and the use of secondary materials. Economic aspects – investment and jobs, as well as value added created by industries directly linked to the circular economy (as a % of GDP) are also covered. There is currently no "universally recognized method for measuring the efficiency of a country or company in the transition to circular economy, nor holistic tools for monitoring and supporting this process"(14). In order to achieve the objectives of this study, it is important to fully capture many aspects of the circular economy. For this reason, a total of 6 indicators were selected to analyse the state and progress of the transformation:
Resource productivity +DMC
Generation of waste excluding major mineral wastes per GDP unit (in euro)
Generation of municipal waste per capita(kg per capita)
Circular material use rate (%)
Recycling rate of all waste(%)
Gross value added related to circular economy sectors (% GDP)

Resource productivity +DMC, which is part of the SDG 12 (Sustainable Production and Consumption) of the Sustainable Development Goals that are being monitored, has also been added to the EC indicators as it gives an idea of resource efficiency – one of the immediate tasks in a circular economy. The indicators have been selected according to the circular economy principles and objectives, on the one hand, and the framework of indicators adopted by the EC. As waste management and recovery is key, three of the 6 indicators selected relate to the total share of waste and the part being recycled. When selecting the indicators, data stocks were taken into account, building on the resource efficiency index. Other criteria for assessing indicators were their relevance, acceptability, reliability, ease of use and sustainability.

RESULTS
Over the past 10 years, resource productivity in the EU has increased by 28.1% to reach 2.32 euro/kg. (2019). At the same time, domestic material consumption (DMC) has decreased by 7.8%. Of course, this positive trend should be interpreted carefully and on a broad basis (complexly), since this change is hardly due solely to the successful eco-policies of the countries. It is very likely that the decline in DMC is due to the effects of the economic crisis (2008) and the slow recovery from it in a number of countries (also in Bulgaria). With declining economic activity, it makes sense to have a faster reduction in the production consumption of raw

materials. Unlike the EU-28 average indicator, which has shown a gradual, sustained upward trend in the period considered, there is virtually no serious growth in Bulgaria (12.9%). The absolute values of this indicator (measured as euro GDP per kilogram of domestic resource consumption) also point to an adverse trend and a serious delay in the change of the business model from resource-intensive to resource-saving

(Figure 2a). The steady trend of maintaining the gap between the EU and Bulgaria in the indicator for the entire study period, which has become even wider after 2017, is worrying. This can be attributed to ineffectiveness of the measures applied in our country and poor performance of innovative transformation in resource productivity.
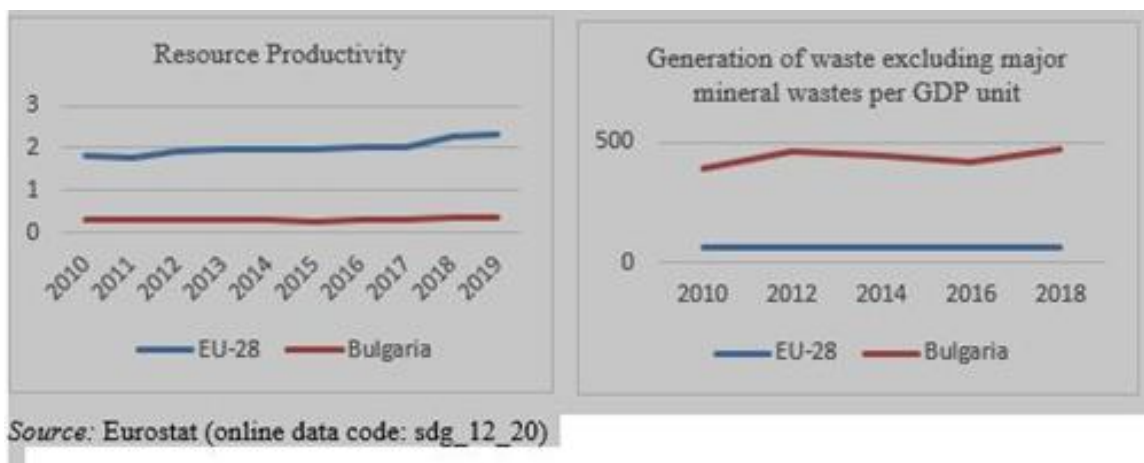

Source: Eurostat (online data code: sdg_12_20)

Figure 2a. Resource productivity +DMC   **Figure 2b.** Generation of waste per GDP unit (in euro)

Waste production is one of the main elements of the circular economy concept. It is part of the EU's zero waste policy (15). Ideally, circular economy is a completely waste-free system, as it allows the components of a product to be input into a new biological or technical cycle. However, this requires that they be designed so that they can be decomposed and reused. Eco-design makes it possible for individual parts to be reused quickly, at minimal energy costs while preserving their technical properties and characteristics. It is only at the last stage that recycling is reached, in which the original product becomes a secondary raw material and feeds into the production of new products.

Along with the purely economic benefits of reducing the share of waste (lower costs, greater raw material independence, more competitiveness), there are also a number of environmental benefits associated with pollution and greenhouse gas emissions that are conducive to climate change and disruption of eco-balances and ecosystem equilibrium.

Therefore, the focus of the transformation of business models into circular models is the serious reduction of the share of waste. Despite the EU's efforts in this direction and the numerous measures, especially after 2018, and the adoption of the plastics strategy, the total level of waste generated to produce a unit of GDP in Bulgaria remains unreasonably high **(Figure 2b)**. Compared to the European average, ours is 7.2 times larger, and without any distinct downward trend. Even after 2016, it rose by 13.1%, which is probably a consequence of the sustained recovery in economic growth after the global recession of 2008. This link of growth with increase in waste generation unequivocally suggests a lack of progress in the transition from line to circular model and poor performance of the technological and innovative transformation of the production processes in the country as a whole. This risks not only worsening the competitiveness of Bulgarian production, but also leaving the country behind in terms of ecological transition.

And while in the field of industrial waste the trends are highly negative, in terms of municipal

waste generation the indicator for Bulgaria is better than the European average, with a persistent downward trend emerging **(Figure 3).** Since 2011, generation of municipal waste per capita has fallen by 12%. However, it is very

unlikely that this is due to a change in the consumer model in Bulgaria and rather the explanation should be sought in the lower living standard and reduced consumption in response to the economic crisis.
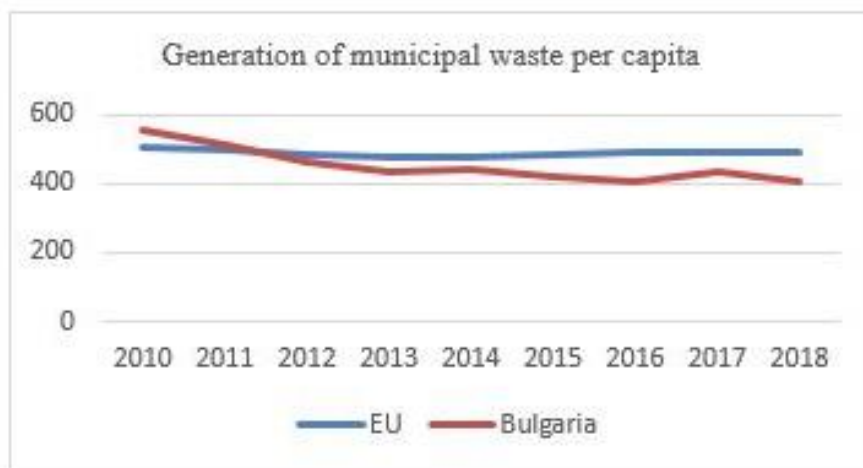
Source: Eurostat

Figure 3. Generation of municipal waste per capita

Recycling is the final phase in the circular economy, allowing waste (industrial or household) to be used again in the production as raw material. In a circular economy, recyclable materials are returned to the economy as new raw materials, thereby increasing security of supply. These 'secondary raw materials' can be marketed and transported just like primary raw materials derived from traditional resources. An important factor in creating a dynamic market for secondary raw materials is sufficient demand, which depends on the use of recycled materials in products and infrastructure. Secondary raw materials are still only a small proportion of the production materials used in the EU. Their use in the economy faces significant obstacles, for example due to uncertainty about their composition. Standards need to be put in place to build trust.

In Bulgaria, for the analysis period, the dynamics of the recycling rate are too volatile **(Figure 4b).** After adopting the European methodology of calculation and correction in the NSI data (2012), a very serious progress of 92.8% and a peak in 2016 emerged. This coincided with the start of operations of the waste plant in Sofia. A slight

decrease followed and in 2018 the recycling rate in Bulgaria was 23% compared to 56% on average in the EU. By this indicator, the country is last. Given the progress in this area, we cannot fail to note the more than twice lower recycling rates in Bulgaria. The reason should be sought in the absence of a serious market for secondary raw materials and the still very low waste disposal fees. Another major hurdle is the underdeveloped infrastructure related to the recycling process.

One of the most important indicators for measuring the degree of circularity of the economy is circular material use rate (CMR). It shows how much of the materials used come from secondary consumption. The EU average is 12.4% for 2019, which in itself suggests that the circular economy model is not prevailing yet. For Bulgaria, CMR is only 2.3% **(Figure 4a),** which indicator, together with those for Romania and Ireland, are the lowest in the EU. This clearly demonstrates our economy's attachment to the linear model, the lack of progress in breaking away from this dependency and the very serious backlog in terms of green transformation. The reasons are complex and correlated with the low recycling rate, the small market share of

secondary raw materials, the lack of traditions and knowledge in waste recovery on the part of the companies, the lack of capability and price incentive in repairing and reuse of products. In the absence of a well-developed network of services in the field of repair, purchase and decomposition for the reuse of individual

components, the majority of products in Bulgaria end their life cycle as waste.

Which leads to unreasonably high consumption of primary raw materials and slows down the process of environmental transformation of the economy.
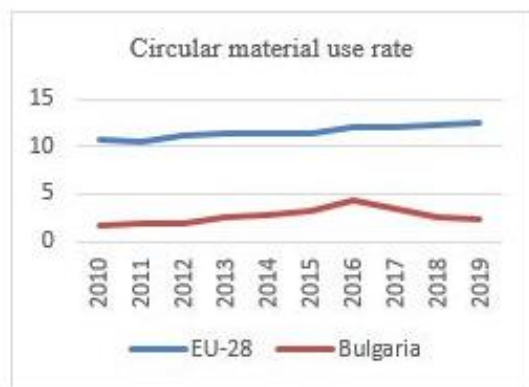
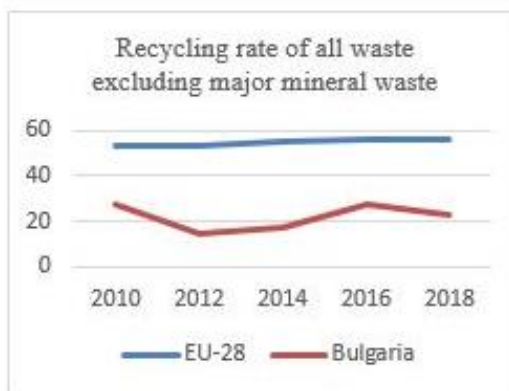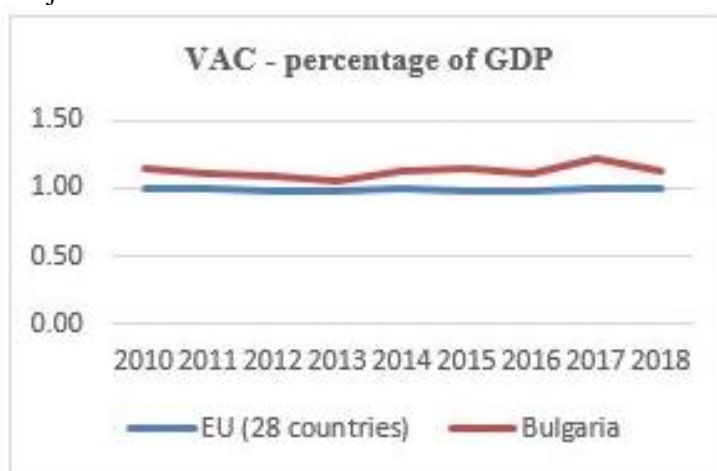Source: Eurostat

Figure 4a. Circular material use rate

Figure 4в. Recycling rate of all waste

The latest indicator examined is the value added of activities related to the circular economy (the recycling sector, repair and reuse sector, and rental and leasing sector). In both the EU and Bulgaria for the whole period analysed, the values move around 1%. For Bulgaria, they slightly exceed the EU average **(Figure 5).** The still small contribution of these sectors to GDP shows there is enormous untapped potential and opportunities for new jobs and value added

creation. Increasing the share of these activities in GDP also requires growth in investment for infrastructure, overcoming old stereotypes and, last but not least, a much broader campaign to promote awareness regarding the effects and benefits of the circular economy. There is also a serious growth potential in the shared and in the "dematerialised" economy (service consumption, rather than product consumption).

Source: Eurostat

Figure 5. Gross value added related to circular economy sectors (% GDP)

The table below is an attempt to summarise the trends in the development of key indicators for CE in Bulgaria. The presented indicators are leading for the individual pillars of the CE. The trend derived is based on their dynamics from 2010 to 2018, using Eurostat data. At the same time, the specific value for Bulgaria is compared to the EU average.

Table 1. *Trends in the development of key indicators for CE in Bulgaria (2018)*

Pillar of CE	Indicators	Year	Value		Trend
			Bulgaria	EU average	
Sustainable extraction and consumption of raw materials	Generation of waste excluding major mineral wastes per GDP unit(kg/thou. euro) (cei_pc032)	2018	473	65	↑
	Generation of waste excluding major mineral wastes per DMC (% of DMC) (cei_pc033)	2018	15,2	13,5	→
Production	Resource productivity +DMC (euro/kg)	2019	0,35	2,32	→
	Gross value added related to circular economy sectors (% GDP)(cei_cie010)	2018	1,12	0,99	↓
	Persons employed in E sectors(% of total employment)(cei_cie010)	2018	1,73	1,72	→
Consumption	Recycling rate of municipal waste(% of total municipal waste) (cei_wm011)	2018	31,5	46,6	→
	Generation of municipal waste per capita (kg) (cei_pc031)	2018	407	491	↓
рециклиране	Recycling rate of all waste (% of total waste) (cei_wm010)	2018	23	56	↑
	Circular material use rate (% of total material use) (cei_srm030)	2019	2,4	12,4	↓

Source: Eurostat and author's systematization   Legend: → unchanged   ↓ decline   ↑ increase

CONCLUSION

Such a transition cannot happen quickly, easily and automatically. EU countries have different traditions and implement different policies promoting environmental transition. They also have very dissimilar production structures that require diverse adaptation times. The lack of a single indicator for circularity of the economy does not allow to arrive at a more general assessment of the progress, all the more so because the analysed period (2010-2019) is relatively short. This rather serves as a tool to track key transition trends, to assess whether the measures put in place and the involvement of all actors have been sufficiently effective.

The analysis reveals that the country is significantly falling behind EU average indicators and shows there is an untapped potential related not only to a more efficient use of resources, but also to a wide scope for a radical change in the business model. The initial hypothesis of the study confirms and highlights the need for rapid measures to accelerate green transformation. Companies could seriously reduce costs, improve their competitiveness and export potential if they implement new business practices and new innovative technologies that are both resource-saving and environmentally friendly.

In so far as the circular economy is a strategy for regional territorial sustainable development, the role of local authorities and the cooperation between individual economic operators within a region play a primary role. In response to the EU's

large-scale and ambitious zero-emission and environmental transformation transition programme for member states' economies, which the European Green Pact envisages and in line with the 'Next Generation EU' objectives, in late 2020 the Bulgarian Government developed its National Recovery and Sustainability Plan. While it is formally aligned with the priorities and stylistics of the EU Green Deal, this document has quite a few gaps, asymmetry in the allocation of funds and continuation of the previous line of prioritising some of the areas of economic activity (energy efficiency, renovation, transport infrastructure). In parallel, underfunded or seriously neglected strands have been identified by the EU as top priorities. Regrettably, circular economy falls into this group.

The state should promote investment in circular economy innovations and their deployment by facilitating the mobilisation of more private funding in resource efficiency.

Eco-fiscal policy has an additional role to play in providing the right signals for investing in resource efficiency by eliminating environmentally harmful subsidies and shifting taxation from labour to pollution and resources. Setting specific numerical parameters to be achieved in the short term would provide more concreteness, security and safeguards for businesses and would overcome the perception of campaigning. Setting of concrete objectives for reducing the share of landfill waste (for instance by 50% by 2025), or 100% recycling of plastic waste and progressive replacement of plastic packaging (where possible) by organic packaging are steps that could lead to lots of business initiatives, including new jobs.

In order to realise a real environmental transformation of production models, companies need to be stimulated and co-financed in initiatives related to technological renewal, purchase of new resource-saving technologies that minimise waste production, and implementation of waste-free technologies. Only this can create the conditions for a truly successful model of an environmentally friendly economy. This is a new challenge, both for the implementation of the circular economy model

and for the need for a different type of macroeconomic policy and regulation.

The almost vertical structure of our industrial system, established over the years, in which the cross-sectoral links are either absent or scarcely developed, is a serious obstacle to the process of transforming the Bulgarian economy into a circular one. One of the main features of circular economy is cascading. Enhancing synergies between industries and sectors of the economy would allow the re-use of components, recycled materials, etc. as secondary raw materials in a next stage of the life cycle of the majority of products. Therefore, bringing to the fore the systemic approach and complexity of links is an important condition for the success of the circular economy.

Being aware that the change, which characterises the current stage of development, is much more an expression of slow, consistent but also imperative metamorphosis, and less so of a conjunctural disorder, it would be of great value to identify the barriers that hinder this change and the levers that could accelerate it. This presents a scientific challenge to the author for future research.

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