



**SHORT COMMUNICATION**

**Country in transition (Serbia) case: Circular economy starts from waste management**

Andjelka Mihajlov<sup>1,\*</sup> , Aleksandra Mladenovic<sup>1</sup> , Filip Jovanovic<sup>1</sup> 

<sup>1</sup>Environmental Ambassadors for Sustainable Development, Belgrade, SERBIA

**ABSTRACT**

This paper presents research on the circular economy performance in Serbia. The introduction of a circular economy in the field of waste management is only the first step; the concept of circular economy goes beyond waste management in scope and content. In this paper, the authors emphasize this complexity, starting from the set of available definitions, encompassing the global level, the EU level, as well as the level of Serbia, as a representative country with an economy in transition. An analysis is provided of the concept of circular economy with the targets of the Sustainable Development Goals.

**Keywords:** Case Study, circular economy, participant science, policy, production and consumption, waste management, sustainable development goals

**1. INTRODUCTION**

Circular economy is a scenario for societies to transition away from unsustainable linear economies that ultimately deplete finite resources [1, 2]; it is a continual, long-term transition process. There are three key approaches to promoting resource efficiency: 1) extended producer responsibility systems; 2) green public procurement and 3) business partnerships along the value chain.

The methodology used for this analysis is desk review (it is conducted as a compilation of available information with some data availability limitations in practice).

**2. THE DEFINITION AND UNDERSTANDING OF THE CIRCULAR ECONOMY CONCEPT**

There are more than 100 [3] possible definitions of the circular economy and many different understandings of the concept persist [4,5,6]. The authors' compilation of the meaning of circular economy is presented in Table 1. In addition, numerous consultancy reports have been published.

**Table 1.** – Circular economy meaning; authors' compilation table

Action areas	Circular economy		
	Priority sectors	Some enablers	Key drivers
production	plastics	innovative	legislation
consumption	food waste	business models	green taxation
waste management	critical raw materials	eco-design	business drivers
secondary raw materials	construction and demolition	extending the product lifetime through reuse and repair	commodity prices raw material shocks
innovation, investigation and monitoring	biomass bio-based products	waste management	

**2.1. Circular economy processes**

The circular economy is a concept and a process [7]; it is a long-term undertaking that benefits future generations: economic growth with environmental quality and social equity [8].

Corresponding Author: [office@ambassadors-env.com](mailto:office@ambassadors-env.com) (Andjelka Mihajlov)  
Received 4 January 2021; Received in revised form 4 March 2021; Accepted 5 March 2021  
Available Online 23 March 2021

**Doi:** <https://doi.org/10.35208/ert.853792>

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This paper has been presented at EurAsia Waste Management Symposium 2020, Istanbul, Turkey

### ***The global level and the sustainable development goals***

At the global level, the circular economy is increasingly being seen as a shift to a more resource-efficient system [9]. In 2019, the final UNEP [10] resolution invites Member States to achieve sustainable consumption and production, including circular economy, and to consider the outcomes of the GEO-6 report [11] and the Global Resources Outlook 2019 [12]. The 2019 World Resources Forum was centered on the transition to the circular economy, among other perspectives through the lenses of cities and regions, food and bio-based materials and the industry 4.0 [13].

In terms of direction, the links between the Circular Economy and Sustainable Development Goals [14] agendas are obvious. However, the term “circular economy” does not appear in the 2030 Agenda for Sustainable Development, where the Sustainable Development Goals (SDG) and associated targets are set forth. Of course, this does not mean that there is no concept of circular economy in the content of SDGs targets [16], and the quantitative presentation is given in Table 2.

The outcome of the analysis is that as much as the circular economy can help in achieving many SDG targets, the Sustainable Development Goals can also help to promote circular economy practices.

### ***2.2. The European Union level***

According to the European Environment Agency report [17] published in October 2019, circular economy initiatives in Europe are still at early stages and they would benefit from more investments in upscaling promising innovations and monitoring progress towards circularity. In 2015, the European Commission [18] presented its Circular Economy Package, which strived for improved cost-efficiency, better balance of current accounts, increased self-sufficiency, new jobs and climate targets. The number of initiatives to implement the concept of circular economy is growing over time [19]. In May 2018, the new EU-wide rules became: 1) adopted for waste management and recycling, 2) proposed for single-use plastic products and 3) proposed for water reuse. The European Commission’s new Circular Economy Action Plan was adopted in 2020 [20, 21]. It introduces legislative and non-legislative measures targeting areas where action at the EU level brings real added value.

### ***2.3. The Country-in-transition level: waste management – the Serbian case***

The majority of the generated municipal waste is placed into landfills (about 2 mil. tons in 2019). According to the National Waste Management Strategy from 2003 and 2010, the closure and reclamation of landfills is envisaged, along with the construction of 29 regional sanitary landfills with recyclable waste separation centers and transfer stations. So far, nine regional sanitary landfills are in

place (plus two regional landfills which are under construction), as well as the City of Belgrade “Vinca” landfill with a waste-to-energy facility (construction started in 2020). Centers for separate collection of waste exist in several towns. Also, in certain towns there are facilities for the separation of recyclable waste. There exist 137 non-compliant municipal landfills (operated by public utility companies), a number of illegal (non-controlled) dumpsites (for about 20% of the generated municipal waste). It is noted that there are more than 2000 such sites of different sizes. There is no waste incineration plant. There are no facilities for the treatment of organic municipal waste. Two out of three cement plants substitute fossil fuels with some specific waste streams (at an average rate of about 20%) to recover energy and to obtain raw materials for the production of cement. Waste separation at the municipal level is not sufficiently developed; only certain towns and cities possess infrastructure and some facilities for the separation of recyclable waste. As far as recycling is concerned, there are some registered facilities for the recycling of metal, plastic, PET, etc. The potential for material recycling is 72% for paper and cardboard, 35% for metal, 25% for plastic, 22% for glass and 20% for wood. Also, there are options for some specific waste recycling [30]. The main challenges of an integrated waste management system in the Republic of Serbia include: - appropriate infrastructure for municipal and hazardous waste, - capacities and coverage for basic services, like collection, transport and appropriate waste disposal. It should be noted that an improvement of the data collection system is needed and foreseen.

### ***2.4. The Country-in-transition level: circular economy – the Serbian case***

Circular economy in Serbia is in an early stage. This conclusion is based on separate research within the ENV.net project in developing a qualitative citizen science tool; this citizen science tool is developed by the Environmental Ambassadors for Sustainable Development and Ebart media archive, Belgrade (Table 3). Citizen science [21] (or participative science) is public participation and collaboration in scientific research to increase scientific knowledge; the authors developed this citizen, participant science tool considering that journalists/the media represent citizens (with common interests) and also that surveys are crowdsourcing tools (the core power of citizen science).

As a UN member state and EU membership candidate, Serbia is already committed to the circular economy concept [22]. However, no integrated approach is in place yet and the environmental policy framework needs to be reinforced in key economic and sectoral policies. Valuable data are available in the EU Serbia Progress/Annual Reports [23]. In addition, some relevant data are available in the OECD report on Environmental Policy in South East Europe [24-26]. The mapping of the “state of the art” of the Circular Economy in Serbia [27] entails the identification of what is present.

**Table 2.** Relationship between the circular economy concept and the 169 Sustainable Development Goals targets

<b>Overall relationship of circular economy practices and the 169 targets of the SDGs (between brackets is the number of relevant SDG targets)</b>	
Direct contribution of circular economy practices to achieve target (21)	SDG 6 – Clean Water and Sanitation (4) SDG 7 – Affordable and Clean Energy (3) SDG 12 – Sustainable Consumption and Production (3) SDG 15 – Life on Land (3) SDG 8 – Economic Growth and Decent Work (2) SDG 9 – Industry, Innovation and Infrastructure (2) SDG 2 – Zero Hunger (1) SDG 3 – Good Health and Well-being (1) SDG 11 – Sustainable Cities and Communities (1) SDG 14 – Life below Water (1)
Indirect contribution of circular economy practices to achieve target, e.g. via other SDGs (28)	SDG 12 – Sustainable Consumption and Production (5) SDG 1 – No Poverty (4) SDG 2 – Zero Hunger (3) SDG 8 – Economic Growth and Decent Work (3) SDG 11 – Sustainable Cities and Communities (3) SDG 15 – Life on Land (3) SDG 14 – Life below Water (2) SDG 6 – Clean Water and Sanitation (1) SDG 7 – Affordable and Clean Energy (1) SDG 10 – Reduced Inequalities (1) SDG 13 – Climate Action (1) SDG 16 – Peace and Justice, Institutions (1)
Achieving target will contribute toward circular economy (52)	SDG 17 – Partnership for the Goals (9) SDG 9 – Industry, Innovation and Infrastructure (6) SDG 16 – Peace and Justice, Institutions (6) SDG 4 – Quality Education (5) SDG 8 – Economic Growth and Decent Work (4) SDG 10 – Reduced Inequalities (4) SDG 2 – Zero Hunger (3) SDG 11 – Sustainable Cities and Communities (3) SDG 13 – Climate Action (3) SDG 14 – Life below Water (3) SDG 5 – Gender Equality (2) SDG 12 – Sustainable Consumption and Production (2) SDG 1 – No Poverty (1) SDG 15 – Life on Land (1)
No link or weak link (35)	SDG 3 – Good Health and Well-being (11) SDG 5 – Gender Equality (6) SDG 16 – Peace, Justice and Institutions (5) SDG 10 – Reduced Inequalities (4) SDG 4 – Quality Education (3) SDG 11 – Sustainable Cities and Communities (2) SDG 1 – No Poverty (1) SDG 8 – Economic Growth and Decent Work (1) SDG 14 – Life below Water (1) SDG 15 – Life on Land (1)

In 2020, an Ex-ante analysis of the effects of (future) circular economy policy was finished, and the Serbian Ministry of Environmental Protection, supported by UNDP, published “A Roadmap for circular economy in Serbia” [29].

In 2020, Serbia adopted the New Industrial Policy Strategy 2021-2030; as a horizontal industrial policy, this strategy addresses, among others, the issue of the circular economy [29].

**Table 3.** Journalists/the media representing citizens' interests in circular economy and waste

Number of articles with the terms "circular economy" and "waste" in written media in Serbia									
2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
0	2	3	5	18	20	21	40	80	80
3169	2648	2040	1878	1673	1243	1421	1416	1559	1258

Although Serbia has possessed Waste Management Strategies since 2003, in line with the EU acquis, an updated/new public policy document for waste management is expected in 2020/2021, as well as a new/updated Law on Waste Management, in line with the EU acquis regarding circular economy and waste.

### 3. DISCUSSION

The concept of circular economy goes beyond policy for waste management in scope and in content. In Serbia, as presented in Table 3, citizens are much more concerned and informed about waste issues than about the possibilities and meaning of circular economy.

In practice, waste management contributes to circular economy through its elements: overall recycling rates, recycling rates for specific waste streams, as well as waste generation [28]. However, in order to come closer to the real meaning of circular economy (Table 1), it is also important to consider other elements of circular economy: production and consumption (self-sufficiency for raw materials, green public procurement), secondary raw materials (contribution of recycled materials to raw material demand, trade in recyclable raw materials) and competitiveness and innovation (private investments, jobs and gross value added, patents).

To understand circular economy beyond waste management, in countries with economies in transition it is particularly important to know how to bridge identified gaps [1, 31] and not believe that circular economy can be accomplished with interventions only in the waste sector. Waste management should be taken only as an important, possibly first step in building the circular economy process (what should be considered as the initial important step is the planned updated/new public policy document for waste management, as well as a new/updated Law on Waste Management, in line with the EU acquis regarding circular economy and waste in Serbia).

### 4. CONCLUDING REMARKS

Addressing the circular economy only through waste management issues shows that the circular economy concept is still at an early stage. It should also be noted that circular economy issues in the accession process to the EU are not only a subject of the Chapter on Environment and Climate Change; the circular economy is relevant to all sectors of the economy.

Sustainability in risk management needs to be mainstreamed and long-term thinking fostered (environmental and climate risks are not always adequately considered by the financial sector; social factors can also have concrete consequences for financial institutions, including legal risks etc.).

Some possible ways forward, through the exercising of legally prescribed procedures (in Serbia, but also applicable to other countries with transitional economies/developing countries) include:

- Prepare the appropriate public policy paper for the circular economy which provides guidelines for action; apply an integrated approach

- Foster the circular economy process by strengthening and monitoring the effectiveness of multi-stakeholder coalitions

- Update/adapt the adequate waste management policy paper

- Adapt Agenda 2030 to the implementation of the circular economy concept

- Prepare new appropriate legislation in all sectors of the economy

- Assure stricter enforcement of the environmental policy framework in key economic and sectoral policies (such as a proper implementation of the strategic impact assessment, environmental impact assessment, industrial directives, investment tools)

- Accelerate awareness raising and dissemination of knowledge around circular economy topics, including focusing on educating young people

- Assure means of financing from all sources (often financing unsustainable resource management models).

### ACKNOWLEDGMENTS

This research analysis was supported by the EU-funded project ENV.Net Factoring the Environmental Portfolio for WB and Turkey in the EU Policy Agenda, as well as the Serbian Ministry of Environmental Protection.

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