Pursuant to Article 38, paragraph 1 of the Law on the Planning System of the Republic of Serbia (*The Official Gazette of the Republic of Serbia*,, No. 30/18),

the Government hereby adopts the following

CIRCULAR ECONOMY DEVELOPMENT PROGRAMME

IN THE REPUBLIC OF SERBIA 2022-2024

Circular economy is recognised as an important strategic concept for green transition of the Republic of Serbia, which in the recent years has been placed high on the list of priorities for the development of our society. Green transition is a process that includes economic, energy and investment transition based on sustainable use of resources and energy, reduction of negative environmental impacts, application of innovation and digital tools, knowledge, added value and greater competitiveness of the economy.

Production-consumer relations that are dominant in today's economic systems imply unsustainable use of resources and energy. In the coming decades, the need for resources will be greater than at any time in human history so far, and it is becoming obvious that linear economic model (take-make-use-dispose), which is based on the assumption that natural resources are unlimited and readily available, must be radically transformed. In the next 40 years, global consumption of materials such as biomass, fossil fuels, metals and minerals is expected to double, and annual waste production will increase by 70% by 2050.

At the global level, with the adoption of the United Nations 2030 Agenda and the Paris Climate Agreement (ratified through the Law on the ratification of the Paris Agreement, *The Official Gazette of the Republic of Serbia - International Agreements*, No. 4/2017-91), the world opted for sustainable development and mitigation of climate change. Implementation of circular economy saves resources and energy, preserving the value of materials and products. It strives for their maximum utilisation and keeping them in the economy as long as possible, so that the set goals can be reached. This is a multi-sectoral topic covering a number of fields: waste management, water and waste water management, extended producer responsibility, green public procurement, voluntary instruments, eco-design, innovation and technology development, finance and investment, use of renewable energy sources and energy efficiency, chemicals management, new production and consumption patterns, and the like.

Over the past few years, strategic documents and directives have been intensively adopted in the European Union, which direct and encourage the processes towards circular economy. The Green Deal was presented in December 2019 as a new development strategy that seeks to transform the EU into a fair and prosperous society with a modern, competitive economy, based on efficient resource consumption and preservation of environment and human health. This strategy aims to make Europe the first climate-neutral continent by 2050. In order to establish a framework for growth and sustainable production, two very important documents were adopted in March 2020: *New Circular*

Economy Action Plan for a cleaner and more competitive Europe, and *New Industrial Strategy for Europe*.

As part of the Green Deal, the Sofia Declaration on the Green Agenda for the Western Balkans was signed in November 2020. It consists of five pillars, one of which is circular economy. In October 2021, the Action Plan for the Green Agenda was adopted, containing the preparation of a strategic document for circular economy as one of the planned activities.

A strategic framework for circular economy in the Republic of Serbia started to be defined in 2019 with the creation of the *Ex-ante analysis of the effects of circular economy*, which indicated that a separate policy document was needed for the field of circular economy. In accordance with the results of the analysis and the Law on the Planning System of the Republic of Serbia, the Ministry of Environmental Protection initiated the development of the **Circular Economy Development Programme in the Republic of Serbia 2022-2024**. The document was prepared in compliance with the Regulation on the methodology of public policy management, impact analysis of public policies and regulations, and the content of individual public policy documents (*The Official Gazette of the Republic of Serbia*, No. 8/19). The document covers most important fields of relevance for circular economy: waste management; water management; renewable energy sources and energy efficiency; chemicals management; green public procurement and voluntary instruments; economy policy; innovation and public awareness. These fields were discussed in the context of current situation and potential for the application of circular economy. The Programme contains a three-year action plan wherein general and specific objectives are defined. The overall objective of this document is to create a stimulating environment for the development of circular economy in order to support green transition in the Republic of Serbia. In order to fulfil the overall objective, five specific objectives are envisaged, with measures and activities that will be implemented in the period 2022-2024. One of the priorities is to support companies with the aim of improving the efficiency of production and removing waste from supply chains, keeping components and materials in a closed cycle through reprocessing and recycling, applying new technologies and replacing old materials with advanced and renewable ones, switching to the use of renewable energy sources and materials, extending products life cycle through design and maintenance, and virtual delivery of goods and services. It is also necessary to support local self-governments in the development of local road maps for circular economy, which will contribute to the creation of sustainable communities. It is also necessary to educate relevant stakeholders (media, schools, universities, consumers), strengthen cooperation between the business and academic sectors for innovations that contribute to circular economy, and encourage the application of green public procurements and voluntary instruments in the field of environmental protection. Circular economy should serve citizens, regions and cities, to contribute to sustainable development and climate neutrality, as well as to the maintenance of human health and well-being. The process of transition to circular economy requires a systemic approach, use of research potential, innovation and digitalisation, as well as connecting all stakeholders and their long-term cooperation. Complete transition to circular economy exceeds the three-year duration of this Programme, so this document starts the process and lays the foundations for further development and application of this concept.

During the preparation of this document, consultations were held with stakeholders in order to collect information on the current state of circular economy, existing problems and changes that need to be achieved. A range of meetings were also held with institutions that gave opinions from the scope of their competence. Consultations were also held through focus groups with members of the Working Group for Circular Economy, established by the Ministry of Environmental Protection, consisting of

representatives of seven ministries and eleven institutions relevant to circular economy. Public consultations were held on 26 October 2021, and the comments received contributed to the quality of the document.
The public hearing was held between 23 December 2021 and 14 January 2022.

2. PLANNING DOCUMENTS AND LEGAL FRAMEWORK

2.1. International and EU policy framework

Two very important documents were adopted at the global level in 2015, with the aim of further encouraging sustainable development and mitigating climate change. The United Nations presented the **2030 Agenda for Sustainable Development** with 17 goals, which envisages that signatory countries mobilise all resources to eradicate poverty, fight inequality and find response to climate change by 2030. Another important document was the **Paris Agreement**, which seeks to strengthen the global response to the threats posed by climate change, including limiting the increase in the average global temperature to well below 2°C compared to pre-industrial levels, and continuing efforts to limit temperature increase to 1.5°C compared to the pre-industrial level.

The Republic of Serbia, as a UN member, took on the obligations from the 2030 Agenda, and also obligations from the Paris Agreement as a signatory to the Kyoto Protocol.

The 7th EU Environment Action Programme by 2020 (Decision 1386/2013/EU), adopted in 2013, contains nine priority goals, one of which is transition to a raw material-efficient, green and competitive low-carbon economy. This goal lays the foundations for the further development of policies in the field of circular economy.

In 2015, the European Commission adopted its first circular economy action plan, **Closing the Loop – an EU Action Plan for Circular Economy** (COM/2015/614). The plan included measures to encourage the EU transition to circular economy, increase global competitiveness, encourage sustainable economic growth and create new jobs. Specific measures foreseen in the action plan related to the improvement of production, consumption, waste management, raw material markets, reduction of food wastage, reduction of plastic waste generation, innovation and investments, and the like. One of the activities related to waste management envisaged the revision of the existing legislative framework. Accordingly, in 2018, a package of circular economy directives was adopted, which prescribe new goals until 2035 in the field of waste management. This package consists of the following directives:

- Directive (EU) 2018/851 amending Directive 2008/98/EC on waste;
- Directive (EU) 2018/852 amending Directive 94/62/EC on packaging and packaging waste;
- Directive (EU) 2018/850 amending Directive 1993/31/EC on landfills;
- Directive (EU) 2018/849 amending Directive 2000/53/EC on end-of-life vehicles, Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators and Directive 2012/19/EU on waste electrical and electronic equipment.

Through the provisions of these directives, concrete measures are defined to promote reuse and encourage industrial symbiosis; promotion of economic instruments; calculation methods for recycling rates; economic incentives for placing “green” products on sale and others. In addition, the obligation is prescribed to establish an extended producer responsibility scheme for all types of packaging by 31 December 2024.

Special attention is paid to waste prevention, including the prevention of food waste. Important provisions regarding the improvement of quality of secondary raw materials and their use, separate collection of hazardous waste from households, collection of biological and textile waste, as well as reuse of construction and demolition waste are introduced. In order to effectively implement the principles of circular economy, new legislation foresees a wider use of economic instruments and other measures to support waste management hierarchy. The key elements adopted by the amendments to the directives pertain to determination of specific objectives to be achieved at the European Union level (hereinafter referred to as: EU):

- Common EU goal for preparation for reuse and recycling of municipal waste is 65% of the waste mass by 2035;
- Establishment of separate collection of at least paper, metal, plastic and glass, and for textile no later than 1 January 2025;
- Establishing a separation system for construction waste, at least for wood, mineral fractions (concrete, brick, tiles and ceramics, stone), metal, glass, plastic and plaster. Directive 2008/98/EC prescribed targets for the preparation for reuse and recycling of non-hazardous construction waste of a minimum of 70% of the mass of waste, which was to be reached by 2020. These targets are still in place and will be reviewed until the end of 2024, and it is possible there will be a new proposal regarding targets for non-hazardous construction waste;
- The common EU goal for packaging waste recycling is at least 70% mass share in total packaging waste by the end of 2030;
- Minimum targets by mass fraction for recycling for the following materials contained in packaging waste by the end of 2030 are: 55% plastic, 30% wood, 80% non-ferrous metals, 75% glass, 85% paper and cardboard;
- The common goal of the EU is to reduce the amount of municipal waste disposed of at landfills to 10% or less, of the total amount (by mass) of generated municipal waste, until 2035.

With the **European Green Deal** (COM/2019/640), the EU committed itself to meeting the goals of the 2030 Agenda and the Paris Agreement. The Green Deal was announced as the most ambitious package of measures to make Europe the first climate-neutral continent by 2050. Achieving the goals of this Agreement implies a new industrial policy based on circular economy. It is envisaged that industry will be modernised and new markets for climate neutral and circular products will be developed. The framework plan of the Green Deal provided for the adoption of several important strategic documents in 2020.

The new **Industrial Strategy for Europe** (COM/2020/102) provides guidance for the development of industry as a key sector for Europe's future development and prosperity. The new **Circular Economy Action Plan for a cleaner and more competitive Europe** (COM/2020/98) contains a set of interrelated initiatives to establish a strong and coherent policy framework wherein sustainable products, services and business models will become the standard, and consumption patterns will transform in such a manner that no waste will be generated. The plan encourages reduction and reuse of materials rather than recycling, proposes measures to ensure that all packaging in the EU can be reused or recycled by 2030, and provides a framework for limiting or preventing the placement of certain circular economy undesirable materials and products on the EU market.

The **Chemicals Strategy for Sustainability** (COM/2020/667) further addresses the link between EU regulations on chemicals, products and waste, and strengthens synergies with circular economy. The Strategy is aimed at achieving the ambition of zero pollution of the environment without toxic

substances, which is established in the European Green Deal. The Strategy fully recognises the fundamental role of chemicals for human well-being and for green and digital transition of the European economy and society, but at the same time, it emphasises the urgent need to resolve health and environmental challenges caused by most dangerous chemicals and proposes activities that will ensure better protection of human health and environment and encourage innovation in terms of safe and sustainable chemicals.

The **European Strategy for Plastics in a Circular Economy** (COM/2018/028) encourages a circular approach that prioritizes the recycling of plastic packaging under the programme until 2030.

The **Farm to Fork Strategy** (COM/2020/381) comprehensively addresses the challenges of a sustainable food system and recognises the inextricable links between healthy people, healthy societies and a healthy planet. The Strategy deals with sustainable agriculture and food production, reducing food waste, creating a favourable food environment that facilitates healthy food choices in order to improve health and quality of life of consumers, and helps society reduce health-related costs.

With the **Directive (EU) 2019/904 on the reduction of the impact of certain plastic products on the environment**, the EU has shown its determination to encourage a circular approach and prioritise the use of sustainable and non-toxic reusable products over single-use plastic products. Different obligations are stipulated for 12 types of plastic products: for some there is a complete ban on production and placing on the market and the obligation to find more sustainable alternatives, while for others the obligation is stipulated for producers to contribute to public awareness raising and to the collection of waste generated from these products.

By signing the **Declaration on the Green Agenda for the Western Balkans** at the Summit in Sofia on 10 November 2020, Serbia undertook to implement the recommended measures in five fields, including circular economy, with a special focus on waste, recycling, sustainable production and efficient use of resources. This Declaration, as well as the Guidelines for the implementation of the Green Agenda for the Western Balkans (SWD/2020/223), should encourage the transition from the traditional model to a sustainable economy in the Western Balkans countries, while the implementation of measures will be supported by the EU in accordance with the Economic and Investment plan for the Western Balkans (COM/2020/641).

In October 2021, the **Action Plan for the implementation of the Green Agenda for the Western Balkans** was adopted, which also included activities in the field of circular economy.

2.2. National policy framework

The Republic of Serbia is in the process of joining the European Union and, to that end, the country is obliged to harmonise national strategic documents and legislation with European ones.

The **Industrial Policy Strategy of the Republic of Serbia 2021-2030** (*The Official Gazette of the Republic of Serbia*, No. 35/20) aims to increase competitiveness of the industry. The Strategy, *inter alia*, states that due to the application of the linear economic model in the Republic of Serbia, there are significant losses in the flow of raw and other materials and products, resulting in irrational use of resources. One of the specific objectives (goal 5) refers to transformation of industry from a linear to a circular model. Manufacturing industry (especially food processing industry), construction, and primary agriculture have been identified as the sectors that have the greatest potential for applying the circular economy concept in the Republic of Serbia. In the Action Plan for the Implementation of the Strategy (*The Official Gazette of the Republic of Serbia*, No. 37/21), three measures (7 activities)

are defined within the framework of specific objective 5, which will be implemented in the next three years: 1. Promotion of circular economy and education of companies; 2. Encouraging investments in circular and low-carbon economy solutions as growth generators; 3. Encouraging more efficient use of material resources and energy efficiency in industrial processes.

The **Smart Specialisation Strategy of the Republic of Serbia 2020-2027** (*The Official Gazette of the Republic of Serbia*, No. 21/20) is a document created with the aim of further social and economic development by increasing the competitiveness of the economy, economic growth and progress of society through the connection of research, industrial and innovative forces and resources. This document identifies priority areas where further investment is needed: information and communication technologies; food for the future; machines and production processes of the future and creative industries. Within the creative industries, one of the priorities that will be supported is the development of smart packaging, which implies the development of green materials (degradable, from renewable resources); the development of new paints and pigments that will enable transition to smart types of packaging and development of information technologies to be applied in all parts of a production process. Innovations in this field are crucial for the development of circular economy. When it comes to food production, the emphasis is on the complete utilisation of agricultural products so that all nutrients are used in an optimal way, waste is reduced to a minimum through valorisation and is used to obtain different products. This Strategy includes digitalisation as an important tool for circular economy.

The principles of circular economy are also recognized in the **Strategy of Sustainable Urban Development until 2030** (*The Official Gazette of the Republic of Serbia*, No. 47/19). Measures to achieve the goals of urban development include measures to mitigate climate change by improving the quality of all environmental parameters, waste management systems and measures to improve energy efficiency. Within the Package of measures 1.1: Improvement of conditions for local sustainable economic and urban development, this Strategy defines measure 1.1.1. Innovations and development of a low-carbon, resource-efficient "green" economy, which is in accordance with the principles of circular economy.

The **Strategy for the Development of Education and Upbringing in the Republic of Serbia until 2030** (*The Official Gazette of the Republic of Serbia*, No. 63/21) laid the foundations for the development of education related to increasing the quality, scope, relevance and efficiency of education with the aim of creating conditions for personal and professional development of each individual, as well as for the development of a knowledge-based society and knowledge-based state.

Adoption of Circular Economy Development Programme **in the Republic of Serbia 2022-2024** is in accordance with the **Economic Reform Programme 2021-2023**, which is one of the key documents in the economic dialogue between the Republic of Serbia and the European Union. This document describes Structural Reform 8: Introduction of the circular economy concept, within which one of the planned activities is the preparation and adoption of a policy document for circular economy. Other planned activities include introduction of the circular economy concept in local governments and companies, as well as cooperation between the business sector and the academic sector.

The **Public Procurement Development Programme in the Republic of Serbia 2019-2023** (*The Official Gazette of the Republic of Serbia*, No. 82/19) defines a goal of improving the public procurement system to promote and encourage environmental and social aspects of public procurement, which can also contribute to the development of circular economy.

The **Strategy for Agriculture and Rural Development of the Republic of Serbia 2014-2024** (*The Official Gazette of the Republic of Serbia*, No. 85/14) defines objectives for: achieving technological development and modernisation of agricultural production and processing through the improvement of technology and a more efficient system of transferring experience and innovations; increasing productivity and efficiency in production at all levels in the food production chain; strengthening the ability of food industry to create more value-added products with the use of domestic raw materials. In addition, the field of environmental protection and improvement and preservation of natural resources defines operational goals: raising awareness of the importance of using renewable energy sources and the production of energy crops; controlled waste management from primary agricultural production; development and improvement of the management system of secondary products of the food industry.

Other strategic documents adopted earlier, whose period of validity has expired, but the principles and goals determined by those documents are important for achieving continuity in planning when creating and determining circular economy Development Programme, are the **National Environmental Protection Programme** (*The Official Gazette of the Republic of Serbia*, No. 12/10), **National Environmental Approximation Strategy for the Republic of Serbia** (*The Official Gazette of the Republic of Serbia*, No. 80/11) and the **National Programme for the Adoption of the Acquis**. Also, with regard to sustainable development and cleaner production, inseparably linked with the circular economy concept, recommendations were analysed within the **Strategy for Introduction of Cleaner Production in the Republic of Serbia** (*The Official Gazette of the Republic of Serbia*, No. 17/09) and the draft **Programme for the Introduction of Cleaner Production in the Republic of Serbia**, as well as the **National Sustainable Development Strategy** (*The Official Gazette of the Republic of Serbia*, No. 57/08).

Waste Management Programme in the Republic of Serbia 2022-2031 (*The Official Gazette of the Republic of Serbia*, No. 12/22) defines strategic goals for the improvement of the waste management system and the basic principles that should guide all stakeholders in waste management to achieve those goals in the Republic of Serbia in the period 2022-2031. The implementation of this Programme, in addition to reducing harmful environmental impacts and climate change, should enable implementation of prerequisites for the use of waste in circular economy. The Waste Management Programme was preceded by the Waste Management Strategy 2010–2019 (*The Official Gazette of the Republic of Serbia*, No. 29/10), on the basis of which the conditions for the establishment and development of an integrated waste management system in the Republic of Serbia were set. Progress in the previous period was achieved in harmonising regulations in the field of waste management with the EU legislation, in institutional strengthening and reaching regional agreements for the establishment of joint waste management, as well as in the construction of a number of sanitary landfills. The goals set by the Strategy have not been fully achieved, primarily in the scope of organised waste collection, level of primary waste separation and recycling, construction of infrastructure and the cessation of waste landfilling in dumpsites and other unsanitary landfills, application of economic instruments and the establishment of a sustainable waste management financing system. As the planned goals of the previous planning document were not fully achieved and as new EU goals in the field of waste management were set in the meantime as part of the "green transition" for the transition to a circular economy in the EU, new goals were set in the field of waste management in the Republic of Serbia.

Given that the Republic of Serbia is determined to join the EU, the new document will include the directives from circular economy package adopted in 2018, which prescribe new goals when it comes to disposal of waste in landfills, packaging waste, electrical and electronic waste, batteries and end-of-life vehicles.

The **Water Management Strategy of the Republic of Serbia until 2034** (*The Official Gazette of the Republic of Serbia*, No. 3/17) is a planning document that defines the long-term directions of water management in the territory of the Republic of Serbia. From the aspect of circular economy, the fields of water supply to population and industry, as well as waste water management, are particularly important. In the field of water supply, the objectives of the Strategy are mainly aimed at expanding the water supply system and improving it in terms of water availability and quality, achieving rational water consumption by educating the population and applying best available techniques in industry, as well as achieving more efficient collection of bills, all of which contribute to the development of circular economy. In the field of waste water management, *inter alia*, the Strategy envisages further construction of sewage systems, adoption of necessary planning documents and bylaws for the protection of water against pollution, as well as implementation of administrative measures to stimulate recirculation and reuse of water.

The **Energy Sector Development Strategy of the Republic of Serbia until 2025, with projections until 2030** (*The Official Gazette of the Republic of Serbia*, No. 101/15) and the **Regulation on establishing the Programme for the Implementation of the Strategy** (*The Official Gazette of the Republic of Serbia*, No. 104/17) provide basic guidelines and directions for applying the principles of efficient energy use.

The **Negotiating Position for Chapter 27 "Environment and climate change",** cluster 4, prepared for the process of negotiations on the accession of the Republic of Serbia to the European Union, provides the basis for the preparation and adoption of policy documents in the field of environment. Among other things, it also defines necessary steps for harmonising national policy and legislation with the new requirements introduced by the EU Circular Economy Package.

In order to prepare strategic framework for circular economy in 2019, an **Ex-ante Impact Assessment for Circular Economy** was prepared, pursuant to the Law on the Planning System of the Republic of Serbia and its bylaws. The analysis of the current situation, carried out using the provided methodology, revealed a number of difficulties for the full implementation of the circular economy concept, despite the clearly expressed interest of industry and the general public in establishing such a model of economic organisation. Based on the conducted assessment, the conclusion was that it was justified for the Republic of Serbia to draft a policy document for circular economy, i.e., Circular Economy Development Programme in the Republic of Serbia. The results of the assessment also demonstrated that the expected effects from the application of appropriate measures in the field of circular economy are primarily with positive impacts on the environment, economy, industry and society as a whole.

Although not a policy document, the **Roadmap for Circular Economy in Serbia** is an important document for the promotion of the circular economy concept, which was presented in May 2020. The idea is for the Roadmap to initiate a dialogue between decision-makers, industry representatives, academic sector and civil society, as well as to encourage the entire society to make systemic changes in the treatment of resources. Selected sectors analysed and presented in the document include: manufacturing industry; agriculture and food – surplus food and food waste; plastics and packaging;

construction sector – construction waste. Of particular importance are the recommendations given for each of the mentioned sectors, as well as examples of good practice that can provide support to companies in the application of the circular economy concept. This document is the first of its kind in the region, and it was modelled after similar documents of EU Member States (Slovenia, Finland, the Netherlands and others).

2.3. National legal framework

Certain number of regulations from different fields are related to the elements and principles of circular economy, creating in this way they an environment in which resources will be used efficiently, and the pressure on the environment will be reduced with the simultaneous development of the economy.

The **Law on Waste Management** (*The Official Gazette of the Republic of Serbia*, Nos. 36/09, 88/10, 14/16 and 95/18 – as amended) regulates the field of waste management, by providing conditions for: waste prevention, especially development of cleaner technologies and rational use of natural resources, as well as eliminating the hazards of its harmful effects on human health and the environment; waste reuse and recycling, extraction of secondary raw materials from waste and use of waste as energy source; development of procedures and methods for waste disposal; rehabilitation of unorganised waste disposal sites; monitoring the condition of existing and newly formed waste disposal sites; developing awareness about waste management. This Law was amended in the previous years in order to partially harmonise it with the provisions of European directives, so in 2016 a legal basis was created for defining the fulfilment of conditions for a by-product and the end-of-waste status (the register of by-products and the register of waste that has ceased to be waste). These provisions are of great importance for circular economy because they create the basis to declare waste as a by-product and to trade with this material, which can have the effect of increasing the separate collection of many fractions of waste that can be reused. Article 38 of the aforementioned Law, which refers to waste reuse and recovery, is also important for the application of the circular economy concept. It is prescribed that competent authority for waste management shall take appropriate measures to encourage reuse and preparation for reuse of products, where possible, and especially by developing a system for reparation and reuse of products, applying economic instruments, criteria in the implementation of the public procurement procedure and determining other goals and measures, as well as taking measures to ensure and promote or improve the recovery of waste.

These articles show that there is a legal basis for the application of circular economy principles, and to that end, only their consistent application is required. Transposing other provisions of the EU directives from circular economy package into the national legislation will create additional incentives for the transition to circular economy.

The **Law on Packaging and Packaging Waste** (*The Official Gazette of the Republic of Serbia*, Nos. 36/09 and 95/18 – as amended) regulates the conditions for placing packaging on the market of the Republic of Serbia, the manner of managing packaging waste and the obligation to adopt national goals, defines all subjects in the management of packaging and packaging waste and is based on the division of responsibilities of producers, importers, packers/fillers, distributors, collectors, carriers, end suppliers and end users, and defines reporting obligations, financial and economic instruments, supervision and penalty policy. Provisions related to specific requirements for the reuse of packaging are important for circular economy; specific requirements for packaging that is reusable through recycling; specific requirements for packaging that can be reused through composting and

biodegradation, and specific requirements for packaging that can be reused for energy generation. There is also an obligation to design the packaging so that it can be reused after its use. Circular design is necessary for the implementation of the circular economy concept, and in this sense it is necessary to further apply innovations in the design of appropriate packaging, as well as in the types of materials used for packaging.

Bylaws in place that regulate the mentioned fields in more detail, and which are important in the context of circular economy include:

- Regulation on criteria for determining by-products and on the form of reports on by-products, manner and deadlines for their submission (*The Official Gazette of the Republic of Serbia*, No. 76/19);
- Regulation on contents of the request for entry in the Register of by-products and Register of waste that has ceased to be waste (*The Official Gazette of the Republic of Serbia*, No. 76/19);
- Regulation on technical requirements and other special criteria for certain types of waste that cease to be waste (*The Official Gazette of the Republic of Serbia*, No. 78/19).

The concept of circular economy in the field of water management is based on efficient use of water, purification of waste streams, recycling and reuse of water. The legal basis for water management and protection in the Republic of Serbia is the **Water Law** (*The Official Gazette of the Republic of Serbia*, Nos. 30/10, 93/12, 101/16, 95/18 and 95/18 – as amended) and a set of bylaws defining certain specific requirements. The provisions of this Law refer to all surface and ground water on the territory of the Republic of Serbia, including thermal and mineral water, except for ground water from which useful mineral raw materials and geothermal energy can be obtained. The Law prescribes rational use of surface and ground waters, monitoring the status of watercourses, and imposes restrictions on emissions of pollutants into water. The most important provisions of this Law are reflected in the obligations of waste water treatment, measurement of the quantity of intake water, measurement of the quantity and quality testing of waste water, as well as obligations regarding the control of the well-functioning of facilities and devices. Integral water management defined by this Law is based, *inter alia*, on the principle of sustainable development, according to which the use of water must be based on the long-term protection of available water resources, in terms of quantity and quality, and the principle of respecting best available techniques, which includes techniques for efficient use of water. Both principles are complementary to the concept of circular economy and serve as the basis for its development, so from that aspect, this Law is crucial for the introduction of circular economy in the field of water management.

The **Law on Chemicals** (*The Official Gazette of the Republic of Serbia*, Nos. 36/09, 88/10, 92/11, 93/12 and 25/15) is the umbrella act that governs the management of chemicals in the Republic of Serbia, and is based on the precautionary principle and the principle that manufacturer, importer or downstream user produces, puts into circulation and uses chemicals in such manner so that there are no undesirable effects on human health and the environment. This Law, together with related bylaws, is harmonised with REACH (Regulation 1907/2006/EC) and other EU regulations in the field of chemicals, including provisions related to the classification and communication of chemical hazards. Regarding the provisions related to the most dangerous chemicals, there are restrictions and prohibitions related to their production, marketing and use, including the list of prohibited and restricted POPs substances covered by the Stockholm Convention. Also, the list of **Substances of Very High Concern (SVHC)** was transposed, as well as the **list of candidate substances for the SVHC list**, and everyone in the supply chain, including end users, was given the right to information

about the potential presence of such substances in products. Also, in accordance with this Law, the Ministry of Environmental Protection maintains the Register of chemicals that are produced or imported to the market of the Republic of Serbia, and implements procedures related to the import and export of certain hazardous chemicals covered by the Rotterdam Convention.

When it comes to recognising the idea of a circular economy in energy, the concept is based on the arrangement of the field of energy management, increasing energy efficiency and using renewable energy sources for energy and non-energy purposes.

The **Energy Law** (*The Official Gazette of the Republic of Serbia*, Nos. 145/14, 95/18 – as amended and 40/21) defines long-term goals in the field of energy, ensuring conditions for improving energy efficiency and increasing the use of renewable sources of energy in energy activities and energy consumption. This Law recognizes the main players in the field of energy, as well as the established principles that define their duties, which are prescribed in more detail in the laws regulating renewable energy sources, as well as energy efficiency. The Law enables the creation of conditions for reliable and safe operation and sustainable development of energy systems.

The **Law on the Use of Renewable Energy Sources** (*The Official Gazette of the Republic of Serbia*, No. 40/21) regulates the use of energy and defines the goals from renewable sources, the method of determining the share of renewable energy sources of the Republic of Serbia in the gross final energy consumption, integration of energy from renewable sources on market, incentive systems for electricity production from renewable sources, and so on. Some of the most important goals of this Law are fully in line with the principles of circular economy, such as reducing the use of fossil fuels and increasing the use of renewable energy sources in order to protect the environment and encourage research, innovation and competitiveness in the field of using renewable energy sources.

The **Law on Energy Efficiency and Rational Use of Energy** (*The Official Gazette of the Republic of Serbia*, No. 40/21) regulates the conditions and methods of efficient use of energy and energy sources, the policy of efficient use of energy; energy management system; energy efficiency policy measures; energy labelling and eco-design requirements; financing, incentives and other measures, as well as other important issues related to the efficient use of energy.

Below is an overview of the most important bylaws that more closely regulate the field of energy efficiency, which are also important in the context of circular economy:

- Regulation on eco-design of products that affect energy consumption (*The Official Gazette of the Republic of Serbia*, No. 132/21);
- Rulebook on labelling the energy efficiency of water heaters, hot water tanks and sets of water heaters and solar devices (*The Official Gazette of the Republic of Serbia*, No. 67/18);
- Rulebook on labelling the energy efficiency of space heaters, combined heaters, sets of space heaters, equipment for temperature regulation and solar devices and sets of combined heaters, equipment for temperature regulation and solar devices (*The Official Gazette of the Republic of Serbia*, No. 17/18);
- Rulebook on energy efficiency labelling of tumble dryers for households (*The Official Gazette of the Republic of Serbia*, No. 24/17);
- Rulebook on labelling energy efficiency of household ovens and hoods (*The Official Gazette of the Republic of Serbia*, No. 19/17);
- Rulebook on labelling energy efficiency of air conditioning devices (*The Official Gazette of the Republic of Serbia*, No. 24/14);

- Rulebook on labelling energy efficiency of electric light sources (*The Official Gazette of the Republic of Serbia*, No. 30/22);
- Rulebook on labelling energy efficiency of household washing machines and household washing and drying machines (*The Official Gazette of the Republic of Serbia*, No. 43/21);
- Rulebook on labelling energy efficiency of household dishwashers (*The Official Gazette of the Republic of Serbia*, No. 43/21);
- Rulebook on labelling energy efficiency of cooling devices (*The Official Gazette of the Republic of Serbia*, No. 43/21);
- Rulebook on labelling energy efficiency of electronic screens (*The Official Gazette of the Republic of Serbia*, No. 92/21);
- Rulebook on the layout of annual report on the achievement of energy saving goals (*The Official Gazette of the Republic of Serbia*, Nos. 32/16 and 65/18);
- Rulebook on the conditions for the appointment of energy managers in local self-government units (*The Official Gazette of the Republic of Serbia*, No. 31/16);
- Rulebook on the conditions for the appointment of energy managers in companies whose main activity is in the production sector and companies as public services (*The Official Gazette of the Republic of Serbia*, No. 98/16).

The **Law on Climate Change** (*The Official Gazette of the Republic of Serbia*, No. 26/21) provides the basis for an efficient and transparent system for monitoring, reporting and verification (MRV system), which will provide detailed information on progress in fulfilling domestic and international obligations and will ensure monitoring the achievement of the nationally determined contribution. The aim of this Law is to establish a system to reduce emissions of greenhouse gases (GHG gases) in a cost-effective and economically efficient way and thereby avoid dangerous climate changes at the global level and adverse impacts of climate change. Also, the goal of this Law is to reduce GHG emissions and adapt to changed climate conditions by adopting and implementing policy documents.

The **Air Protection Law** (*The Official Gazette of the Republic of Serbia*, Nos. 36/09, 10/2013, 26/21) regulates the management of air quality and determines the measures, the way of organising and controlling the implementation of the protection and improvement of air quality as a natural value of common interest under special protection. The provisions of this Law do not apply to pollution caused by radioactive materials, industrial accidents and natural disasters.

The **Law on Integrated Prevention and Pollution Control** (*The Official Gazette of the Republic of Serbia*, Nos. 135/04, 25/15 and 109/21), regulates the conditions and procedure for issuing integrated permits for facilities and activities that may have negative effects on health people, environment or material assets, types of activities and facilities, enforcement and other issues. In the process of issuing a permit, the operator is obliged to provide detailed information about the installation and the activities that take place there, sources of emissions, the nature and quantities of projected emissions, as well as measures to reduce the generation and removal of waste, measures for efficient use of energy and other measures they are expected to undertake in order to meet the requirements regarding environmental protection. Also, the operator is obliged to carry out a detailed review of the installation compliance with best available techniques (BAT), as well as a plan of measures for compliance with these techniques and reaching the emission limit values associated with them.

The **Law on Environmental Protection** (*The Official Gazette of the Republic of Serbia*, Nos. 135/04, 36/09, 36/09, 72/09, 43/11, 14/16, 76/18, 95/18 and 95/18 – as amended) regulates the integral system of environmental protection, which ensures the fulfilment of human right to life and development in

a healthy environment and a balanced relationship between economic development and the environment in the Republic of Serbia. As basic principles of environmental protection, this Law defines, *inter alia*, the principle of integrity, the principle of prevention and precaution, the principle of preservation of natural values, the principle of sustainable development, the polluter pays principle and others. The Law and corresponding bylaws define all the necessary conditions for awarding and withdrawing the Eco-label, which can be awarded for products that meet the criteria for environmental protection and are produced in the territory of the Republic of Serbia. The Law states that Serbian standards for the environmental management system (SRPS ISO 14001) shall be applied in the Republic of Serbia, as well as that legal entities, entrepreneurs and organisations that have an established environmental management system can join the EMAS system. The Law also provides the basis for a bylaw for EMAS, which has not yet been adopted.

The **Regulation on detailed conditions, criteria and procedure for obtaining the right to use the eco-label, elements, appearance and manner of using the eco-label for products and services** (*The Official Gazette of the Republic of Serbia*, No. 49/16) was prepared according to the model of the Regulation of the European Commission 66/2010 on the EU Eco-label. The Regulation currently contains specific criteria for the Eco-label of the Republic of Serbia for 26 different groups of products and services. The criteria were created based on the corresponding criteria for the EU Eco-label that were valid at the time the Rulebook was created.

The **Law on Public Procurement** (*The Official Gazette of the Republic of Serbia*, No. 91/19) envisages the possibility of procuring goods, services and works with better environmental performance (including taking into account appropriate labelling and the established environmental management system), through the inclusion of appropriate requirements in the technical specifications, criteria for the award of contracts, which refer to environmental advantages and total costs of the life cycle of the public procurement subject. Special attention is paid to life cycle costs, which are of great importance for understanding the concept of green public procurement and for its application in practice.

The **Law on Public-Private Partnerships and Concessions** (*The Official Gazette of the Republic of Serbia*, Nos. 88/11, 15/16 and 104/16) regulates, *inter alia*: conditions and method of drafting, proposing and approving public-private partnership projects; rights and obligations of public and private partners; conditions and method of granting the concession. Elements relevant to green public procurement are also included through the corresponding articles of the Law (principle of environmental protection, requirements in the field of environmental protection in connection with public-private partnerships and concession activities).

The **Law on Innovation Activity** (*The Official Gazette of the Republic of Serbia*, No. 129/21) regulates the basic principles, goals and organisation of the application of scientific knowledge, technical and technological knowledge, inventiveness and innovation, for the purpose of creation and realisation, in relation to the existing technical the technological base, new and improved products, processes and services, as the driving force for the development of the Republic of Serbia. Although it does not directly prescribe the development and application of circular economy, the application of this Law enables support in the development of innovations. Therefore, it represents the basis for incentive measures in the field of circular economy.

The **Law on Planning and Construction** (*The Official Gazette of the Republic of Serbia*, Nos. 72/09, 81/09-correction, 64/10-CC, 24/11, 121/12, 42/13-CC and 50/13-CC , 98/13-CC, 132/14, 145/14,

83/18, 31/19, 37/19, 09/20 and 52/21) regulates the conditions and manner of spatial arrangement, disposition and use of construction land and construction of buildings; supervision over the implementation of the provisions of this Law and enforcement; other issues of importance for spatial arrangement, disposition and use of construction land and for the construction of buildings.

The **Law on Communal Services** (*The Official Gazette of the Republic of Serbia*, Nos. 88/11, 104/16 and 95/18) establishes communal services and regulates the general conditions and manner of providing them, enables the organisation and provision of communal services for two or more municipalities and/or cities, under conditions stipulated by Law and agreements between municipal assemblies.

The **Law on Local Self-Government** (*The Official Gazette of the Republic of Serbia*, Nos. 129/07, 83/14 – as amended, 101/16 – as amended, 47/18 and 111/21 – as amended) prescribes the rights and responsibilities of local self-government units established by the Constitution, law, other regulations and statutes (key and entrusted tasks), possibility of cooperation and association of local self-government units with the aim of achieving common goals, plans and development programmes, as well as other tasks of common interest.

3. CURRENT STATE – OVERVIEW AND ANALYSIS

3.1. Overview of the current state

Transition to a circular economy requires fundamental changes in the way production activities are planned and implemented, i.e., the way products are planned, designed, made and used. Also, it requires a change in the way society relates to needs and emphasises new values of products and services, such as resource conservation and environmental protection.

To achieve circularity in the economy, it is necessary to develop adequate business models based on innovations, which will meet future demands of consumers and users of services on the domestic and international market, such as the application of circular product design, extended product life, product reuse and repair, the possibility of material recycling, etc. Such business models must primarily enable companies to achieve their primary goal – profit generation and increased competitiveness. On the other hand, further development of infrastructure and the functioning of local communities should be harmonised with the principles of circular economy. Something like this requires a multidisciplinary approach and cooperation of decision-makers, companies, scientific research organisations and civil society organisations at a new, higher level, as well as the exchange of reliable information, in order to better identify the potential and challenges along the way and find adequate solutions.

It is accordingly necessary to look at the current state of the economy and society in the Republic of Serbia in order to define priority measures and activities that will pave the way for the adoption of circular economy principles, and lay the foundations for the development of a sustainable and competitive national economy based on that concept.

3.1.1. Natural resources

The most important natural resources of the Republic of Serbia are water, forests and agricultural land. Serbia also has a raw material base of metallic and non-metallic mineral raw materials, as well as energy mineral raw materials (coal, oil, natural gas).

Regarding the availability of **water resources**, macroscopically, the Republic of Serbia still has a sufficient amounts of water. The average value of the water exploitation index (WEI) at the national level for the period 2008-2017 is low and amounts to 2.69%[1], which indicates that as a country we are still far from the state of water stress (20%) and extreme water stress (40%). However, the territory of the Republic of Serbia is characterised by exceptional spatial and temporal unevenness of the water regime, so the actual availability of water and the state of water stress at the local level can be significantly different from the state at the national level. Also, the amount of surface water formed in the national territory is small (about 1,500 m^3 per inhabitant per year[2]) and decreases over time, which is why the availability of water in the country partly depends on transit waters. It is estimated that due to climate change, this trend will become more and more pronounced, which is why availability of water in the Republic of Serbia will depend more and more on the water that comes from the surrounding area. This is supported by the fact that the available ground water capacities are limited, unevenly distributed and they decrease with time[3]. Hence, all activities related to the preservation of water resources are of great importance, especially at the local level.

In terms of water use, the most significant consumer is the economy, within which industry accounts for about 79%, agriculture, forestry and fishing sector about 13%, as well as the service sector about 2%, while about 6% of total water used annually is consumed for sanitary needs of households[4].

About 96% of the total amount of captured water is used, while about 4% on average is lost in distribution. A large share of used water consists of water from own and other water intakes, while water from the public supply system makes up only about 8% of the total water intake. Data on the amount of recycled water and collected rainwater are not available.

According to the results of surface water quality monitoring, carried out by the Environmental Protection Agency of the Republic of Serbia, summarised in the Serbian Water Quality Index (SWQI), in the period 1998-2017, 15% of watercourses had excellent, 25% very good, 46% good, 13% poor and 1% very poor status. The cleanest ones are small watercourses in hilly and mountainous areas, while the most polluted watercourses are located near larger urban and industrial centres, which is a consequence of the discharge of untreated urban and industrial wastewater. This situation indicates the necessity of further improvement of the waste water management system at the level of local self-governments and companies, as well as the application of appropriate treatment thereof.

According to available data from the Forestry Administration, state forests cover an area of 1,194,000 ha or 53.0%, while private forests cover 1,058,400 ha or 47%. Preparation of the Second National Forest Inventory is in progress, which should be completed in the last quarter of 2022 or first quarter of 2023, and will provide more recent data on forest cover and the share of state and private forests. In relation to the total covered area in the forest fund in Serbia, coppice forests dominate with 64.7%, natural stands of high origin cover 27.5%, and artificial stands (with crops) cover 7.8%. Overall, the

[1] Environment in Serbia 2004-2019, Environmental Protection Agency, Belgrade, 2019.

[2] Waste water management status, 360º analysis, NALED, Belgrade, 2020.

[3] Second Report of the Republic of Serbia towards the UNFCCC, Ministry of Environmental Protection, Belgrade, 2017.

[4] Statistical Yearbook of the Republic of Serbia 2020, Statistical Office of the Republic of Serbia, Belgrade, 2020.

status of state forests can be characterised as satisfactory, while privately owned forests are quantitatively worse. Bearing in mind that wood represents the largest natural renewable resource, but also a resource that takes a long time to renew, adequate forest management and rational consumption of wood are necessary prerequisites for the sustainable development of this segment of the economy.

At the same time, according to data of the Statistical Office of the Republic of Serbia for 2019, **agricultural land** in the Republic of Serbia covers 3,481,567 ha, which is 44.87% of the country's territory. According to the volume and structure of available agricultural land, the Republic of Serbia belongs to the ranks of European countries with favourable land resources.

Local reserves of **crude oil** and **natural gas** are limited, indicating a significant dependence of the Republic of Serbia on the import. Domestic **production of primary energy** is based on the exploitation of limited domestic resources (coal, crude oil, natural gas) and renewable energy sources, and the largest share in its structure belongs to **coal** (Figure 3.1). The total energy consumption at the level of the Republic of Serbia is significantly higher than the available capacities (15.4 Mton), so about a third (35.9%) of the required energy is provided from import of energy sources. Crude oil and oil derivatives (60%) and natural gas (25%) have the largest share in the net import of primary energy[5].

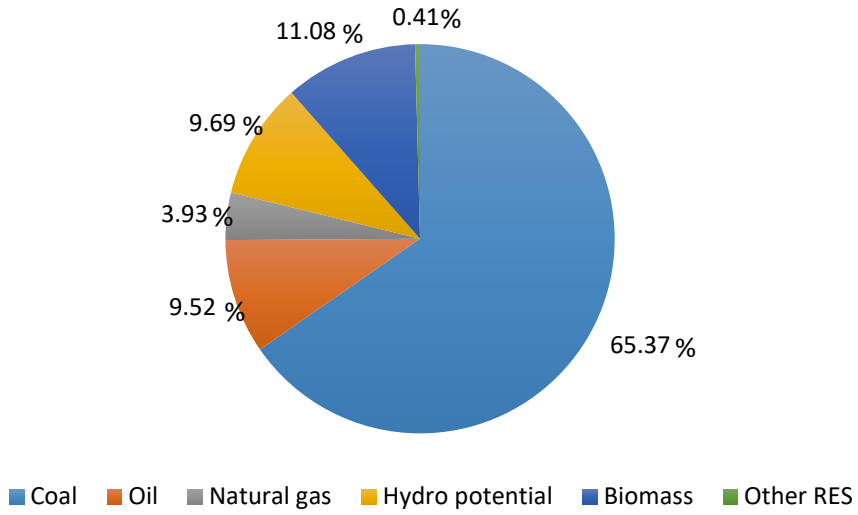

Figure 3.1 Structure of the production of primary energy as per fuel for 2018

In terms of **final energy consumption**, the most demanding sectors are household (34%), transport (27%) and industry (26%), while other sectors together (agriculture and public and commercial activities) participate with 13.5%[6]. The most used energy sources in final energy consumption are oil derivatives (32.0%) and electricity (29%), and bearing in mind that around 70% of electricity is obtained from coal, it is clear that the Republic of Serbia is largely dependent on fossil fuels. Such a structure of energy consumption results in higher emissions of greenhouse gases with and greater air pollution.

[5] Decision on determining energy balance of the Republic of Serbia for 2021, *The Official Gazette of the Republic of Serbia*, No. 156/2020.

[6] Energy Agency of the Republic of Serbia, Report on the work of the Energy Agency for 2020.

In general, the economy of the Republic of Serbia is characterised by high energy intensity (ratio of used primary energy and gross domestic product), which indicates an energy-intensive industry, which is partly a consequence of the manufacture of products with a low finalisation degree and little added value. Similarly, greenhouse gases emission expressed per unit of gross domestic product is four times higher than the European average[7].

The Republic of Serbia has great investment potential in the sector of **renewable energy sources**, especially in solar and wind energy, and it is estimated that, in addition to wind and solar energy, the biggest reserves lie in the potential of biomass and hydropower.

The bases for systematic development of **energy production from renewable sources** in the Republic of Serbia were laid in 2009. Although it is estimated to have great investment potential, this field is still under development, and traditional fuels, such as non-commercial biomass, currently have a large share in meeting the daily energy needs of rural and urban households with low incomes. Production of energy from renewable energy sources in the Republic of Serbia includes production and consumption of electricity from large and small water streams, wind and solar energy, biogas, as well as the production and consumption of thermal energy from geothermal energy and biomass (firewood, pellets and briquettes)[8]. The estimated technically usable potential of available renewable energy sources (RES) is about 5.64 Mtoe per year[9], of which 35% is currently used. Out of available RES, the greatest potential for further development is biomass with around 3.4 Mtoe, and hydro potential with 1.7 Mtoe per year (Figure 3.2).

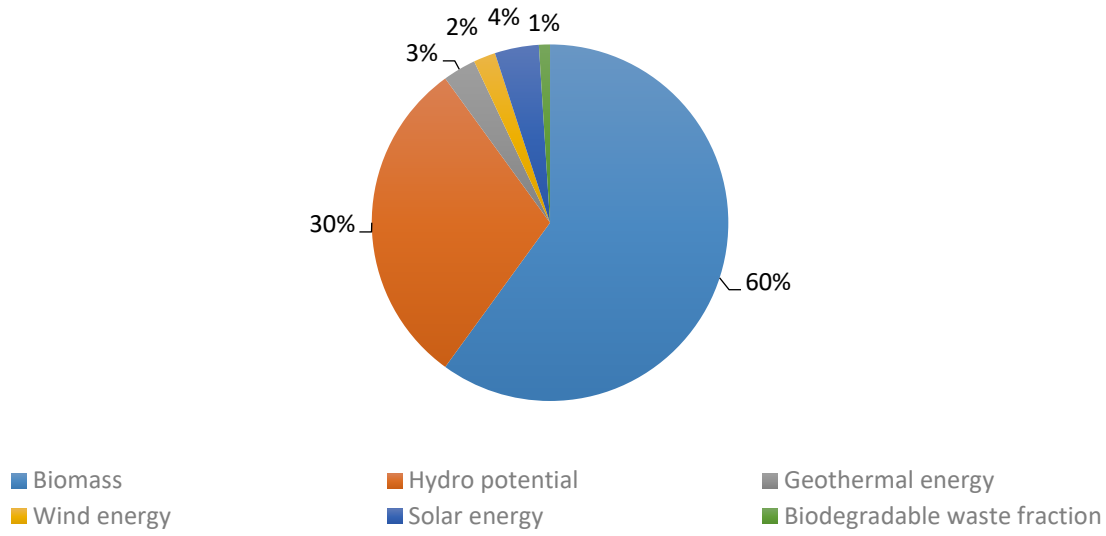

Figure 3.2 Structure of the estimated RES potential in the Republic of Serbia
(biomass, hydro potential, geothermal energy, wind energy, solar energy, biodegradable waste fraction)

In the structure of gross final energy consumption (GFEC), renewable energy sources account for about 2,063 Mtoe, i.e., about 20%, most of which is spent for the production of electricity (about 30%) and for heating and cooling (about 25%). The most used sources are solid biomass (56%) and

[7] The World Bank.

[8] Report on the implementation of the National Action Plan for use of RES in the Republic of Serbia for 2018 and 2019.

[9] National Action Plan for use of RES in the Republic of Serbia, 2013.

hydro potential (37%), while other sources are significantly less represented. Of the total energy produced from RES, only 14% is consumed in industry[10].

In the period from 2009, when legal framework with incentive measures ("feed-in" tariffs) was established, until the end of 2020, a constant increase in the construction of new capacities for the production of electricity from RES has been made in the Republic of Serbia. By December 2020, 278 power plants using RES with a total installed capacity of 540.54 MW were built within the incentive measures system. However, regardless of the built capacities, the share of RES in GFEC in 2019 was 21.44% of the planned 25.6%. The slower than expected development can be explained to some extent by the time needed for the incentive system to become operational and stabilise, to develop confidence in the functioning of the system among investors, as well as to prepare appropriate projects, especially for the construction of large power plants.

Natural resources of the Republic of Serbia, as renewable or non-renewable geological, hydrological and biological values, have real or potential economic value, but above all, they must be preserved in accordance with the sustainable development principles.

3.1.2. Economy

Although there is a tendency to increase awareness of the need for sustainable and responsible business in the Republic of Serbia, a significant number of companies are focused on economic and financial results in order to survive on the market, regardless of the negative impact on the environment and inefficient consumption of natural resources. The use of new technologies is still in its early age and is difficult to implement due to the small or limited capacity of the economy to bear the burden of change. Despite the fact that legal framework allows the introduction of circular economy principles and there is interest in business improvement and openness to change, awareness and knowledge about the principles, advantages and benefits of circular economy, is low.

Values of indicators, such as *Domestic Material Consumption (DMC), Gross Domestic Product (GDP)* and related values of *Resource Productivity,* which describe the economy of a country, are an indicator of general state of the economy of the Republic of Serbia. In the period 2001-2018, the values of all three indicators were on the rise, the consumption of domestic resources increased by 19.2%, and the productivity of resources by 39%, due to the faster growth of GDP than the growth of material consumption. Such a trend indicates that national economy is largely dependent on the exploitation of natural resources, as well as that only a relative separation of economic growth from the use of resources was achieved in the given period. For the sake of comparison, in the same period, productivity of resources in the European Union increased by 35% and an absolute separation of economic growth from the use of resources was achieved, due to the reduction of resource consumption (9%[11]).

The economy of the Republic of Serbia is based on the provision of various types of services, agriculture and industry. A comparison of the number of companies in 2019 according to the activity they carry out[12] indicates that the largest number of companies is concentrated in wholesale and retail trade and motor vehicle repair (34.2%). About 17.8% of companies are concentrated in the processing

[10] Energy Development Strategy of the Republic of Serbia until 2025 with projections until 2030, *The Official Gazette of the Republic of Serbia*, No. 101/15.

[11] Annual Report, 2020. Environmental Protection Agency.

[12] Statistical Yearbook of the Republic of Serbia 2021, Statistical Office of the Republic of Serbia, Belgrade, 2021.

industry sector, while 13.9% of companies are in the sector of professional, scientific, innovative and technical activities.

A comparison of the number of employees in different industries indicates that the processing industry is dominant, and the wholesale and retail trade is slightly less so. A significantly smaller number of employees are in other activities, of which state administration and mandatory social insurance, education, health and social protection, transport and storage, construction, professional, scientific, innovative and technical activities and administrative and auxiliary service activities can be distinguished (Figure 3.3). Also, the largest share in the total turnover is achieved by wholesale and retail trade and repair of motor vehicles (37.3%), and a slightly smaller one by the processing industry (30.9%).

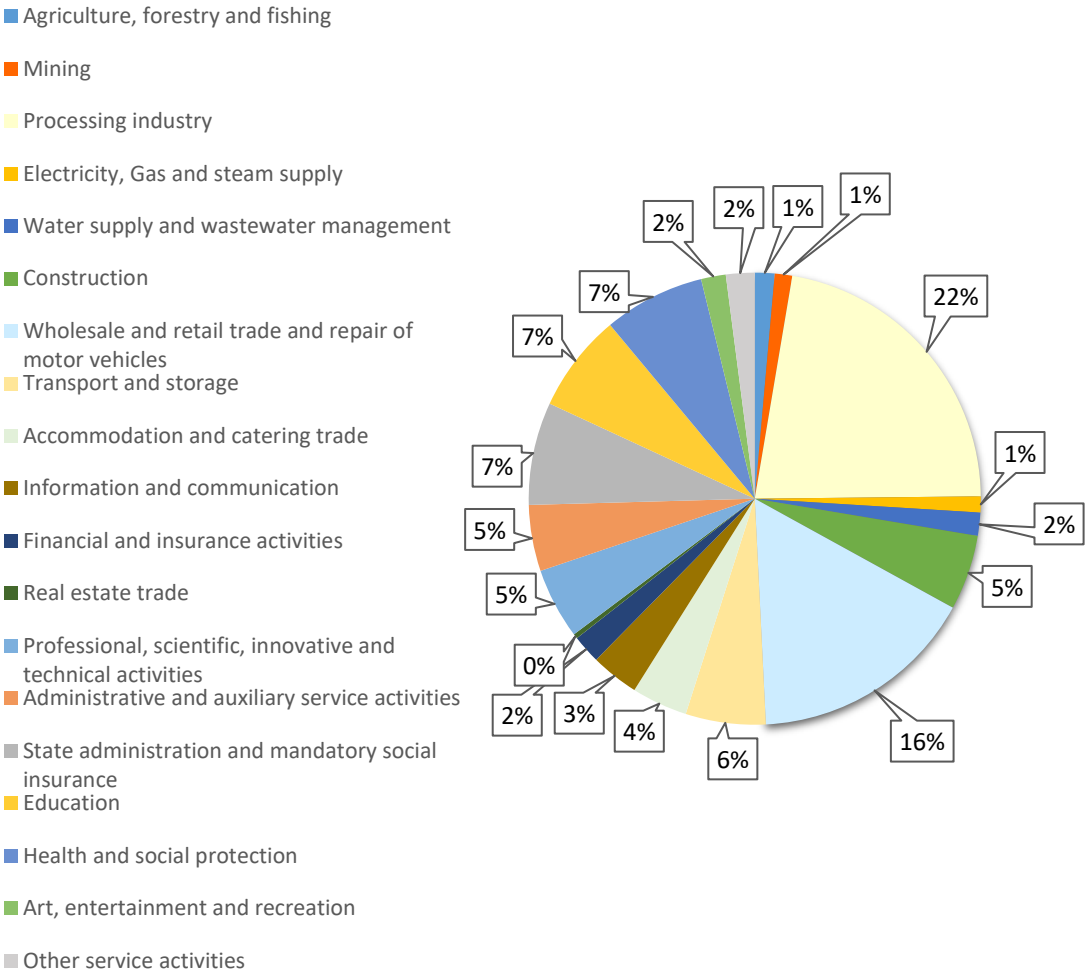

Figure 3.3 Employment per business activity in 2020[13,14]

Accordingly, the manufacturing industry represents the main economic branch in the Republic of Serbia, which according to the data of the Statistical Office of the Republic of Serbia achieved the most significant participation in the formation of GDP of 13.3% in 2020[15].

The share of **agricultural production** in the national GDP in recent years has ranged between 6 and 7%, which can be attributed, on one hand, to rich natural resources and favourable climatic conditions for agricultural production, and on the other hand, to the slower process of structural reforming of the

[13] Employees in legal entities who independently carry out business activity, entrepreneurs and their employees.
[14] Statistical Yearbook of the Republic of Serbia 2021, Statistical Office of the Republic of Serbia, Belgrade, 2021.
[15] Statistical Office of the Republic of Serbia, Gross Domestic Product, 2020.

rest of the economy. Agricultural sector is actively represented in foreign trade and contributes to the provision of food and economic development of rural areas. In total value of agricultural production, vegetable production is more represented than livestock production (67.5% and 32.5% in 2020, respectively).

Organic production in the Republic of Serbia is increasingly popular and economically significant. Thanks to the potential that is primarily reflected in the fragmented property and land that is not polluted by harmful substances, this type of agriculture can significantly contribute to the development of rural areas, and thus to agriculture in general. In the period 2019-2020, the share of the area under organic production in relation to the area of used agricultural land in the territory of the Republic of Serbia was 0.5%-0.6%, and the most represented were fruit and crops production, and the production of fodder plants[16].

Traffic (transport) represents an extremely important sector of the economy of the Republic of Serbia due to its very significant impact on the growth and competitiveness of the economy, regional development and demographic trends.

Serbia has a broad transport infrastructure network, but infrastructure of all types of traffic is generally at unsatisfactory level. Road transport in the Republic of Serbia is a dynamic and dominant form of traffic, which accounts for about 80% of the total volume of transported cargo, or about 74% of the total number of transported passengers[17]. Also, road vehicles are one of the main sources of air pollutant emissions in the Republic of Serbia, especially in larger cities. Bicycle traffic is almost exclusively reserved for the Autonomous Province of Vojvodina, while in the rest of the country it is mainly reduced to a form of recreation. The role of pedestrian movements varies depending on the size of the urban settlement and the existence of public urban transport.

3.1.2.1. Current problems and potential for introduction of circular economy

Numerous problems defined by the previous Strategy and Policy of Industrial Development of the Republic of Serbia[18] are still present today, such as: irrational use of resources, application of outdated technologies, low energy efficiency, high level of waste generation per unit of finished product, insufficient use of secondary raw materials and raw materials from the recycling process, as well as inadequate industrial waste management. A large number of industrial plants are generally in poor technical condition. The lack of facilities and equipment for pollution reduction (e.g. waste water treatment facilities, electrostatic precipitators and flue gas desulphurisation facilities) results in the emission of pollutants into the air, water and soil, generation of significant quantities of waste and inadequate disposal, i.e., negative impact on human health and environment.

Based on the data of the Statistical Office of the Republic of Serbia in 2019, about 4.2 billion m^3 of water was consumed in industrial production in the Republic of Serbia, primarily in the field of electricity, gas and steam supply (97.6%), of which the largest part belongs to cooling water (98-100%). Other significant consumers are the processing industry (2%) and mining (0.3%).

In 2019, 119 million m^3 of industrial waste water was discharged in the Republic of Serbia, most of which was waste water from the processing industry and the electricity, gas and steam supply sector. In total, 46 of the discharged 119 million m^3 of water were treated, of which 38.3% underwent

[16] http://www.minpolj.gov.rs/organska/

[17] Strategy of Railway, Road, Inland Waterway, Air and Intermodal Transport Development in the Republic of Serbia 2008-2015, page 7.

[18] Strategy and Policy of Industrial Development of the Republic of Serbia 2011-2020 (*The Official Gazette of the Republic of Serbia*, No. 55/11).

primary, 12.5% secondary, and 49.2% tertiary treatment. Water used for cooling was discharged without additional treatment. The industry sector with the largest share of treated water is the production of basic metals, followed by the production of chemicals and chemical products, then production of food, and the supply of electricity, gas, steam and air conditioning[19].

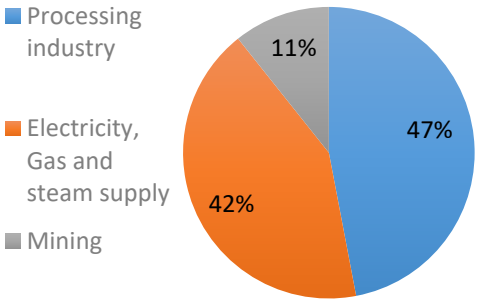

Figure 3.4 Contribution of certain economic sectors in the total quantity of generated waste water[20]

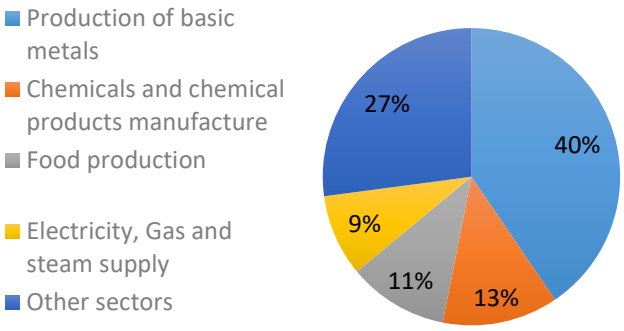

Figure 3.5 Share of treated water per industrial sectors

A relatively small share of treated waters clearly indicates a need for greater investments in waste water treatment plants, especially in the processing industry sector, which generates the largest amount of waste water requiring treatment.

Optimising water consumption and reducing the burden on waste water streams would contribute to reducing the otherwise high capital and operating costs of waste water treatment plants, which would make treatment more accessible to a larger number of companies. This involves measuring consumption, separating waste from clean water streams, water reuse and recycling, and better waste and by-products management. Previous experience in the introduction of cleaner production measures in the field of processing industry in the Republic of Serbia has shown that in this way, on average, about 15% of water can be saved[21]. Recycling and reuse of water will be particularly important in the coming period, considering that it is estimated that with the expected increase in industrial production, the need for water in the processing industry will increase from the current quantity of approximately 90 million m^3/year to 146.6 million m^3/year in 2024, i.e., 288.4 million m^3 in 2034.

According to the Annual Report of the Environmental Protection Agency, the largest amounts of sulphur oxides, nitrogen oxides and particulate matters emitted into the atmosphere in 2019 came from thermal power plants, chemical, mineral and food industries. The largest amount of gases in 2018 was emitted from energy production and distribution sectors (NOx – 53.52%, SO_2 – 89.56%), road transport sector (NOx – 19.09%) and agriculture (NH_3 – 85.30 %). The largest emitted amounts of nitrogen and phosphorus in industrial waste water came from plants within the energy sector and from PUCs that manage waste and waste water, followed by the chemical and mineral industries. Fly ash from coal was generated in the amount of 7.47 million tonnes, which indicates that thermal energy

[19] Water use and protection against pollution, 2019, Previous results, Communication No. 158 LXX Statistical Office of the Republic of Serbia, 2020.
[20] Water Management Strategy of the Republic of Serbia until 2034 (*The Official Gazette of the Republic of Serbia*, No. 3/2017).
[21] Draft Programme for the Introduction of Cleaner Production in the Republic of Serbia.

facilities are the largest waste generators[22]. According to the data of the Environmental Protection Agency[23], the share of industry in the production of non-hazardous waste in 2018 was 1.3%, the share in the production of hazardous waste was 10.3%, while the industry sector participates in final energy consumption with 28.6% on average.

The goals set in the Action Plans for Energy Efficiency (APEE) have not been achieved in the industry. Outdated technology, high specific energy consumption and lack of energy consumption monitoring in production processes are just some of the problems that characterise the industry. Efficient use of energy is one of the prerequisites for the development of circular economy. Achieving circularity by switching to renewable energy sources makes sense only if the existing systems are optimised and resources are used efficiently, regardless of whether they are renewable or not. Therefore, further development of energy management system and the reduction of losses are one of the ways to improve current state of the economy. Also, greater economic use of energy can be achieved by increasing the degree of product finalisation, wherein circular product design can play a major role.

Special attention should be paid to the production of chemicals, the use of chemicals as raw materials and the consumption of chemicals. Chemicals are in daily use and make an integrated part of numerous products that are used in the most diverse spheres of private and business life. However, some of them have very dangerous properties, especially those that belong to substances of very high concern (SVHC) and/or persistent organic pollutants (POPs), so potential exposure to such chemicals should be minimised.

According to data from the Register of Chemicals[24], 1,525 companies submitted applications for the registration of chemicals in the Register in 2019, applying with 41.8 thousand chemicals (substances and mixtures) that were placed on the market of the Republic of Serbia in a total amount of 16.37 million tonnes, of which about 8.76 million tonnes were produced in Serbia (53%), and about 7.62 million tonnes were imported (47%). In addition to the aforementioned amounts of chemicals that were placed on the domestic market, an additional 2.35 million tonnes of chemicals were produced and exported (Table 3.1). In terms of hazard classification, 84% of the total amount of chemicals on the Serbian market was classified as hazardous, while 16% did not meet the criteria for classification in any of the hazard classes. According to the category of use, oil derivatives and gases (B55) stand out, with 43% of the total amount of chemicals on the Serbian market (Figure 3.6).

Table 3.1 Quantity of chemicals on the Serbian market according to data from the Register of Chemicals for 2019

No.	Trade in chemicals in 2019	Qty (millions of tonnes)		
		Haz.	**Non-haz.**	**Total**
1.	**Production** for placement on the Serbian market	7.64	1.12	8.76
2.	**Import**	6.20	1.42	7.62
Placed on the Serbian market (1+2)**:**		**13.84**	**2.54**	**16.38**
Export (production for export – not included in 1):		1.80	0.55	2.35

[22] Annual Report, 2019. Environmental Protection Agency.

[23] Economic potential and activities of importance for environment of the Republic of Serbia, 2018.

[24] Regulation on the Register of Chemicals (*The Official Gazette of the Republic of Serbia*, Nos. 16/16, 6/17, 117/17, 7/19, 93/19 and 6/21)

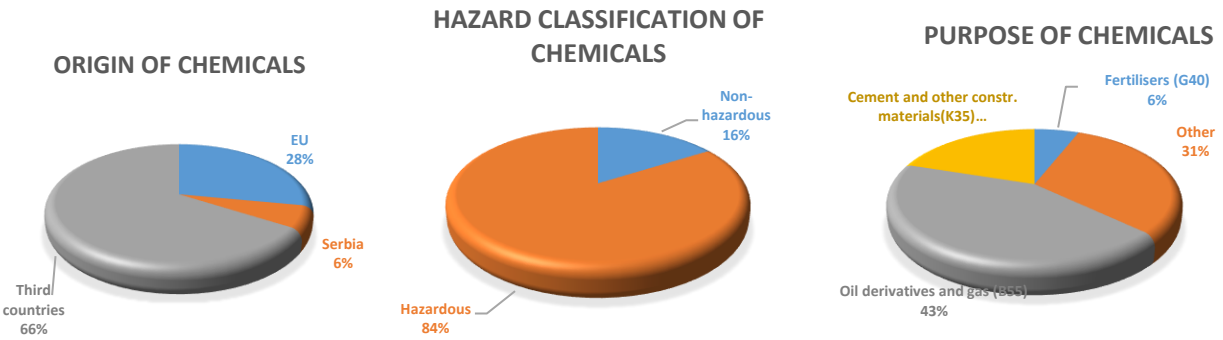

Figure 3.6 Origin, hazard classification and purpose of chemicals placed on the Serbian market according to data from the Register of Chemicals for 2019

With regard to substances from the List of Substances of Very High Concern (SVHC)[25], whether they were placed on the market as substances or as an ingredient of a mixture, a total of 681.30 tonnes were placed on the market of the Republic of Serbia in 2019, which is 0.004% of the total amount of chemicals on domestic market (Table 3.2). Out of the total amount of SVHC placed on the Serbian market, 94% is formulated of imported chemicals, and the remaining 6% is formulated of domestically produced chemicals. The largest share of SVHC chemicals on the Serbian market belongs to trichlorethylene (51%), which is used as a solvent and degreaser, followed by various phthalates (29%) which are used as plasticisers for plastics, rubber, paints and adhesives, as well as chromium compounds (8%), brominated flame retardants (2%) and other SVHC chemicals (Figure 3.7). Although the share of SVHC in the total amount of chemicals on the domestic market is relatively low, their amount is not negligible considering that even an exposure to small amounts of such substances can cause most dangerous effects on human health and/or long-term adverse effects on the environment. Also, their purpose is often such that they can be found in different products (e.g. phthalates and brominated flame retardants), indicating that both professional users and the general population can be exposed to these substances. In addition, it should be borne in mind that the List of Substances of Very High Concern is periodically supplemented with additional substances with the most dangerous properties, as well as that persistent organic pollutants are subject to bans and restrictions at the global level in accordance with the Stockholm Convention, which, *inter alia*, cover brominated flame retardants from the group of bromodiphenyl ethers that are not included in the List of Substances of Very High Concern (SVHC), but are on the List of Prohibited and Restricted POPs chemicals[26].

Therefore, efforts should be made to minimise the use of the most dangerous chemicals and replace them with safer alternatives, which is important both for the protection of human health and the environment, and for the observance of circular economy principles.

[25] List of Substances of Very High Concern (*The Official Gazette of the Republic of Serbia*, Nos. 94/13, 101/16, 22/18 and 86/21).

[26] Annex 2 of the Rulebook on restrictions and bans of production, placement on the market and use of chemicals (*The Official Gazette of the Republic of Serbia*, Nos. 90/13, 25/15 2/16, 44/17, 36/18 and 9/20).

Table 3.2 Amount of substances of very high concern on Serbian market according to data from the Register of Chemicals for 2019

No.	Trade in SVHC in 2019	Qty (tonnes)
1.	**Production** for placement on the Serbian market	43.70
2.	**Import**	637.60
Placed on the Serbian market (1+2)**:**		**683.30**
Export (production for export – not included in 1):		13.46

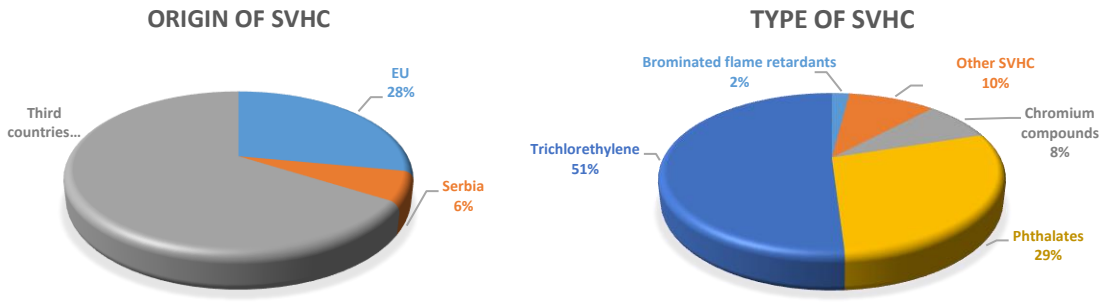

Figure 3.7. Origin and type of substances of very high concern according to data from the Register of Chemicals for 2019

According to the data of the Statistical Office of the Republic of Serbia (hereinafter referred to as: SORS)[27], consumption of hazardous chemicals in the economy of the Republic of Serbia in 2019 amounted to 1.04 million tonnes, which was about 38% more than in 2018 (751 thousand tonnes), but by 15% less than in 2017 (1.21 million tonnes). The highest consumption of hazardous chemicals was in the processing industry sector, or 98.1% (2017), 97.2% (2018) and 97.4% in 2019 of the total annual consumption. Other sectors where consumption of hazardous chemicals was also recorded, but to a much lesser extent, were mining, electricity, gas and steam supply and water supply and waste water management (Table 3.3). Within the sector of the processing industry, the largest share in the consumption of hazardous chemicals was by far the field of production of chemicals and chemical products (92.4%[28] in 2019).

Table 3.3 Consumption of hazardous chemicals according to business sector classification

Economic sector	**Qty (tonnes)**		
	2017	**2018**	**2019**
Mining	1 107	1 893	7 375
Processing industry	**1 189 077**	**729 720**	**1 012 696**
Electricity, gas and steam supply	7 203	5 468	5 341
Water supply and waste water management	14 848	13 640	13 931
Total	**1 212 236**	**750 721**	**1 039 343**

In the fields of processing industry that belong to chemical industry in a broader sense, production of basic pharmaceutical products and preparations, production of rubber and plastic products, and production of coke and petroleum derivatives should also be highlighted. Among other fields of the

[27] Research on hazardous chemicals, Statistical Office of the Republic of Serbia.

[28] Eco bulletin 2019, Statistical Office of the Republic of Serbia, ISSN 0354-3641.

processing industry wherein dangerous chemicals are also used (i.e., raw materials and parts containing them), production of textiles, leather and leather goods, computers, electronic and optical products, electrical equipment, motor vehicles, trailers and semi-trailers, as well as furniture production should also be mentioned. Slight but continuous growth in turnover, as well as growth in the number of employees recorded year after year in the processing industry, shows the potential for business improvement in this sector, especially if the consumption or use of resources is rationalised. Introduction of circular economy can make a significant contribution in this regard, but special attention should be paid to production areas whose products may contain the most dangerous chemicals that need to be removed from circular flows.

Considering that the processing industry achieves by far the highest consumption of hazardous chemicals compared to other economic sectors (>97%), the use of the most dangerous chemicals and their potential content in the products of the processing industry deserves attention when considering the introduction of circularity in this sector. Therefore, the design of circular products and the procurement of chemical raw materials for their production should also include the criterion that raw materials should pose as few dangers and risks as possible, both in the production process and during the use of the product, as well as that the product should be such that upon the expiry of its life cycle, it can enter circular flows as easily as possible, including recycling, with the tendency for additional value to be achieved precisely as a result of such circularity. In this regard, of particular note is the need to remove the most dangerous chemicals (SVHC and POPs) from circular products and processes, i.e., to replace them with safer alternatives, , which will ensure a high level of protection of human health and the environment starting with the product design stage, and safe recycling or reuse according to a circular model after the product has been used.

In addition, before the introduction of the used product into the next cycles, it is necessary to ensure checks for the presence of the most dangerous chemicals that can contaminate circular flows, and their removal from circular materials and products, especially in the case of recycling, where the existing recycling processes should be further improved in order to prevent the appearance of most dangerous chemicals in recycled products. Also, the improvement of production processes in a circular context should take into account possibilities for rationalising the consumption of chemicals, especially with the application of business models such as chemical leasing, which implies transition from the concept of traditional production and consumption of chemicals to the achievement of additional value through the provision and use of chemicals' functionalities. Such business models, by redefining the business relationship between chemical users and suppliers, ensure more efficient use of chemicals, and reduce the risk associated with the use of chemicals. Innovative business models, such as chemical leasing, can significantly contribute to the transition to circular economy, as they are characterised by thinking about chemicals from a zero-waste perspective and a comprehensive overview of their functionality and life cycle. Therefore, introduction of new business models will be an important driver of circular transition in the chemical sector and related chains.

Although circular economy has become the subject of interest of certain companies and stakeholders in recent years, there is still a lack of information about the concept and advantages of the circular model, as well as relevant support and incentives that will help the economy to upgrade the existing knowledge and skills and provide funds for the development of circular products and processes. Bearing in mind the provisions of regulations in the field of chemicals management, especially those related to substances of very high concern and bans and restrictions, current national legislation encourages the replacement of most dangerous chemicals with safer alternatives and provides a good starting point for considering chemicals in the context of circular economy. Introducing the principle

of circularity into the operations of the processing industry and other economic sectors with adequate management of chemicals, their rational and efficient use and prevention of contamination of circular flows of products and materials, can provide added value and ensure sustainable business activity, with rational use of resources, reduction of emissions of dangerous chemicals into the environment, and protection of human health.

To date, not much has been done in terms of applying best available techniques and good practices in production processes, and companies are not sufficiently encouraged to introduce cleaner technology and modern equipment which are energy and resource efficient.

Also, the environment for economic growth is unfavourable in terms of financial support – **there are no effective support mechanisms or systemic incentive measures**. In terms of the availability of domestic loans to private sector as a percentage of GDP, the Republic of Serbia is ranked 80th, while low financing of small and medium enterprises places Serbia in the 95th place out of 140 countries[29]. Lack of affordable financing prevents domestic enterprises from modernizing their production and investing in innovation and commercialisation, leading to a low productivity with only 9.2% of production with high and medium technology products. Thus, the chances of small and medium-sized enterprises to produce high-quality products capable of competing in international markets on the basis of quality, quantity and unit costs are significantly lower, as well as for the application of circular economy model.

In general, the level of competitiveness of the sector of small and medium-sized enterprises and entrepreneurs (hereinafter referred to as: SMEs) of the Republic of Serbia is significantly below the EU-27 average. In the SME sector of the Republic of Serbia, the number of employees per company is 2.4, while this ratio is around 4.0 in the EU-27 countries. The productivity of the SME sector in the Republic of Serbia is also significantly lower compared to the EU-27 average.

Low competitiveness of Serbian industry is reflected in the fact that the processing industry sector is dominated by companies of low and medium-low technological complexity. These companies create products with low added value, little differentiation, lower price and profit margins, and weak competitive positions on the market.

Looking at the data on the foreign trade exchange of companies, the import in 2018 was higher than export by RSD 638.8 billion (EUR 5.4 billion). The processing industry had the largest share in foreign trade (60.5%), which accounted for 76.5% of total exports and 48.6% of imports. The structure of the foreign trade exchange of the processing industry is dominated by large companies (70.4%), especially in export, where they participate with 71.6%, while their share of the import is 69.1%[30].

In general, the economy of the Republic of Serbia is significantly dependent on the **import of raw materials**. Although the share of Serbian sectors in European and global value chains is increasing, the import of raw materials for the production of final products for export is more significant in terms of volume than the export of semi-finished products, which contributes to reducing the competitiveness of the export of the Republic of Serbia. Currently, leading companies of highly complex products base their production largely on imported raw materials and semi-finished products. For example, the Republic of Serbia does not have a raw material base for the chemical industry, making it completely dependent on import. The chemical industry is the largest importer of raw materials (especially production of artificial fertilisers, production of glass, production of

[29] Global Competitiveness Report 2018-2019.

[30] Report on SMEs and entrepreneurship 2018, Ministry of Economy. Authors: Marko Danon and Nemanja Šormaz.

cosmetics). Also, raw material base for the textile industry is very weak, which is why more than 90% of raw materials (fabrics and yarns) are imported. About three quarters of the required plastics and almost all additives are imported, as well as 50-60% of raw materials for the production of paper and cardboard. In the food industry sector, milk and milk powder are imported.

At the same time, part of the production potential of the economy is currently not adequately utilised. A typical example is the production of glass and the wood processing industry. Serbia exports glass for recycling, and imports glass packaging. Most municipalities do not have the means, capacity or necessary knowledge to establish appropriate infrastructure to effectively manage the collection, separation and recycling of glass. According to the Report of the Environmental Protection Agency for 2020, 44.2 tonnes of glass were placed on the market of the Republic of Serbia by legal entities or entrepreneurs that are not included in the packaging waste management system. Only 1.9 tonnes of glass were treated for recovery in 2020.

Wood industry, as a part of the economy that relies on forestry, has great potential for the application of circular economy. Namely, wooden products are characterised by a long service life. They can be recycled and repaired. Considering the percentage of the territory of Serbia under forests and the fact that the processing capacity of the wood industry is two to three times greater than the raw material base available to the Republic of Serbia, there is significant potential for the production and export of finished products. Efficient use of raw materials, i.e., its better use in all stages of processing, would mean reduced waste generation, thereby reducing the loss of value through the chain, while effective use would mean directing the raw wood material to those parts of the chain where it adds the most value.

For this reason, wood industry is recognised by the Industrial Policy Strategy 2021-2030 as a branch with great potential for circular economy. In order to change this situation, the largest amount of wood products with low added value need to be directed towards finalisation instead of export. According to the Action Plan for Supporting the Wood Industry of Serbia with the aim of increasing product finalisation, public companies planned to, according to their capabilities, encourage SMEs to direct their products from primary processing to companies involved in the production of products with a high degree of finalisation, in order for them to network and thereby contribute to the reduction of the export of semi-finished products in favour of the export of final wood products[31].

In general, it is necessary to determine the possibilities of developing a programme of direct support for import substitution[32]. Rounding off the production process in the national economy and establishing circular economy can significantly contribute to releasing a part of the economy from the import of raw materials, replacing them with recycled materials.

Export of the Republic of Serbia is characterised by an unfavourable sectoral structure, dominated by raw materials, semi-finished products and products of lower stages of processing and lower added value (raw materials and labour- and resource-intensive products), which is characteristic of underdeveloped countries. In order to improve export competitiveness, it is necessary to change the structure of exports in favour of more competitive products in terms of price and quality, with a higher degree of processing (finalisation), which is possible only by investing in modern technologies that lead to an increase in supply, reduced production costs, more efficient use of production factors, and improved characteristics of products and a growth of export revenues.

[31] Action Plan for Supporting Export of the High Added Value Products of the Serbian Wood Industry, Prof. Dr Branko Glavonjić, Jeff Baron, Tamara Dunđerović, Tatjana Pavlović-Križanić, 2016, United Nations Office for Project Services (UNOPS).

[32] Performance and value chain analysis of selected sectors, CEVES, SCC, 2017.

This situation has a lot of potential for the development of products designed on the basis of circular economy principles, taking into account the entire life cycle of the product. Creating products that can be repaired or recycled after their use means more efficient use of resources and reduced environmental pollution.

Strengthening export competitiveness through transformation of export structure is only possible with significant growth of business and investment activities of domestic and foreign companies that base their operations on high technologies, knowledge and innovations. The latest report of the European Innovation Scoreboard states that the Republic of Serbia has achieved a significant growth of almost 30% in the last three years in the field of innovation. According to this report, which evaluates various components of innovation based on official data, such as fields of human capital, digitalisation, innovative economies and other, the growth of the Republic of Serbia has been twice as fast as the growth of EU Member States. The European Commission report estimates that Serbia has had significant growth in all fields, especially in the past three years. The Republic of Serbia has reached 66.2% of the EU average (in 2018 it was at 58%), while in certain fields it is far above the EU average. In the field of creating innovations in small and medium-sized enterprises, the Republic of Serbia is 65.8% above the EU average, and in the field of employment in innovative companies, it is 46% above the EU average. According to the European Commission report, the Republic of Serbia is the regional leader on this list, and considerably ahead of individual EU Member States. This success is a result of increased investments by the state in innovation, science and education, as well as by private sector, which has recognised the future of economy in the field of innovation. The number of employees in the IT industry has doubled in less than four years to more than 40,000 in 2021. In the Republic of Serbia, an increasing number of companies are developing their innovative products, as evidenced by the sales of Serbian IT companies for hundreds of millions of euros. The recommendation of the report is that additional investments, especially through financial support for the development of start-ups, investments in venture capital funds and the development of education that will enable a greater number of talented personnel, will enable further rise of the Republic of Serbia on this list. The European Innovation Scoreboard report provides a comparative analysis in the field of innovation for EU Member States and other European countries.

Research potential of the scientific community in the Republic of Serbia is not used to a sufficient extent to contribute to the development of industry and economy. The largest number of companies that are classified as medium-sized enterprises employ from 1% to 4% of highly educated personnel, while almost a third of large enterprises employ from 10% to 24% of highly educated personnel.

In 2018, only 1.08% of the total number of employees in the Republic of Serbia were researchers. The number of research papers (projects and studies) in 2018 decreased by 2.13% compared to 2017, and the majority were fundamental papers (47%). The percentage of applied and development papers was smaller, 34% and 19% respectively.

In the introduced innovations, the largest percentage are product and service innovations, 39.7%. In the total expenditures for the introduction of technological innovations, the percentage of expenditures for scientific research activities was over 27%[33].

However, although the economy has recognised the importance of investment in research and development and innovation, it is still far below the European average.

[33] Statistical Yearbook of the Republic of Serbia, 2020.

According to SORS data for the period 2019-2020, about 700 million m^3 of water is used annually in the field of **agriculture**, some of which is used for irrigation of agricultural fields. Between 47,000 and 52,000 hectares of land are irrigated (about 1.5%), for which 67-69 million m^3 of water is used annually, mostly from watercourses (about 93%)[34]. In terms of circular economy, this represents a potential for improvement, because some of the water used for irrigation of arable land for the needs of agricultural production could be replaced with treated municipal waste water. This is one of the important activities for the introduction of the circular economy concept in the field of water management in the European Union. It could be also important for the Republic of Serbia, because it is estimated that in the period until 2034, the area for irrigation will increase by 250,000 – 350,000 hectares, and it will thus be necessary to provide additional amounts of water.

Also, the agricultural sector is one of the largest sources of greenhouse gas emissions. The agricultural sector is the largest source of nitrogen suboxide (N_2O) emissions, which occur as a result of artificial addition of nitrogen to the soil, and methane (CH_4) emissions, which occur as a result of anaerobic decomposition of biomass, intestinal fermentation and decomposition of animal waste.

Although one of the largest sources of greenhouse gas emissions, the agricultural sector is also a significant source of renewable energy sources (biomass, biogas). Agricultural production, especially arable farming, is a large source of biomass, most of which remains unused.

Some of the research in the recent past has shown that 30% of the total available potential for **biomass** is currently being used. The extent of utilisation of biomass as an alternative source of energy for the production of electricity in the Republic of Serbia in 2019 was 10.5%[35]. For wood biomass (forest biomass) in Central Serbia, the extent of utilisation is 66.7%, the extent of utilisation of agricultural biomass in the Autonomous Province of Vojvodina is around 2%, while biodegradable municipal waste is not used as a source of energy. Animal by-products can be used to obtain biogas that contains a high percentage of methane.

To that end, there is great potential for the application of circular economy model regarding the use of biomass and animal by-products for the production of energy, compost and other. The emphasis should be on better utilisation of existing biogas plants, and especially on composting activities, which are currently limited to individual farmers and are carried out without any quality control of compost. However, it must be noted that certain sanitary landfills built in the recent past plan to use biogas, when its quantities are satisfactory. Therefore, education and an established system of primary waste selection are necessary prerequisites for using organic waste for biogas production.

Further development and **wider use of renewable energy sources (hereinafter referred to as: RES)** are very important for the Republic of Serbia, both in terms of increasing the competitiveness of the economy and energy security, as well as in terms of reducing greenhouse gas emissions, reducing air pollution and fulfilling international obligations regarding the fight against climate change. Also, for a part of the economy, the use of RES may soon become a way to reduce the amount of taxes for exporting products to the EU market, which will be applied with the introduction of the cross-border carbon adjustment mechanism (CBAM).

In the previous period, business environment for the development of RES projects in the country was significantly improved, with the adoption of a series of bylaws, which, among other things, for the first time regulate the field of biofuel use and create conditions for biofuels to be placed on the market of the Republic of Serbia. Also, the Law on the Use of Renewable Energy Sources was drafted, which

[34] Irrigation 2020, Communication 006 LXXI, Statistical Office of the Republic of Serbia, 2021.

[35] Ex-ante impact assessment for circular economy.

potentially opens the possibility for an even more dynamic growth of production capacities based on renewable energy sources in the Republic of Serbia. It is expected that this law will primarily be the driver of large investments in the construction of solar power plants and wind farms.

This Law, *inter alia*, introduced the prosumer category, i.e. the right to produce electricity from RES for own consumption, which will contribute to a more widespread application of RES in the field of electricity production, especially in smaller capacity systems. In the field of thermal energy use, significant support for the application of renewable energy sources was given by opening the possibility of providing incentive measures for energy entities that use highly efficient cogeneration, waste heat or renewable energy sources, that is, their connection to the thermal energy distribution system.

For the further development in this field, it is necessary to ensure the security of investments and the conditions for achieving a commercially viable business. For the achievement of such conditions, a further liberalisation of the electricity market, the adoption of a mechanism for achieving a low-carbon economy in the Republic of Serbia, as well as investments in the development of new innovative technologies for the use of RES, increasing the efficiency of existing solutions, the development of energy storage systems, as well as the development and adoption of new business models, will be of great importance.

In terms of circular economy, **transport** is a very important segment, because it provides an opportunity to achieve significant results in the field of natural resource conservation and environmental protection. The potential for circular economy is reflected in the possibility of using waste materials for the construction of transport infrastructure, such as non-hazardous ash from thermal power plants and rubber granulate, improving vehicles in terms of their efficiency and changing the type of fuel, improving the organisation of public transport, as well as recycling materials from end-of-life vehicles and their parts (metal, rubber). Also, additional benefits in urban areas can be achieved by encouraging cycling, as well as by improving the functioning of public transport in urban areas in order to apply the sharing economy as one of circular models that can be significant for urban areas.

3.1.3. Local self-governments

Local self-governments are one of the key factors for the development of circular economy. Due to increasing population migration to urban areas and limited technical and social infrastructure, the preservation of resources and the environment become significant challenges. One of the promising solutions is the formation of circular communities, based on circular economy, which, by applying modern technologies and “smart city” concepts, can provide an environment suitable for the prosperity of economy and citizens in a sustainable and environmentally friendly way.

The role of local self-government units (hereinafter: LSGUs) in the process of circular economy development is primarily reflected in the definition of the appropriate regulatory framework at the local level. Adoption of regulations has the most direct impact on all players at the local level and can significantly contribute to an efficient and effective transition to a circular economy. In this regard, it is necessary to establish appropriate systems of resource management, waste management and urban mobility in the territory of LSGUs, in accordance with the principles of circular economy, as well as urban development and construction plans of LSGUs tailored to citizens and the environment.

Establishing a legal framework is a necessary, but not sufficient, condition for the development of circular economy. It is necessary to create and provide an environment in which the economy and citizens have an interest and motivation to contribute to that process. The role of local self-government in this sense is to provide appropriate incentives for economic operators and for citizens, as well as to encourage greater involvement of citizens in the application and promotion of the circular economy concept. These incentives can be of a financial nature in the form of appropriate subsidies (improvement of energy efficiency, use of renewable energy sources, green roofs, urban mobility), administrative relief, release or reduction of certain levies in the case of rational use of resources and implementation of activities that contribute to the transition to a circular economy.

In order to promote the transition of the economy to a circular economy model, one of the mechanisms that local governments can use is green public procurement (hereinafter referred to as: GPP). In this way, the demand and use of goods, services and works with better environmental performance are encouraged. At the LSGU level, some of the significant fields of application of GPP are: construction and reconstruction of buildings and infrastructure, procurement of food and catering services, procurement of cleaning products and cleaning services, procurement of office supplies, procurement of vehicles, procurement of public lighting and other products and devices that consume energy.

Depending on the extent and manner of use of the aforementioned LSGU mechanisms, they can provide a strong incentive or hinder the process of circular economy development. Therefore, in order to ensure support for that process, it is important that political decision-makers within LSGUs recognise the concrete benefits of the transition to circular economy, which are reflected as benefits for the local community, economy and citizens.

Based on an analysis carried out in the previous period in order to assess the capacity of local self-government units in the Republic of Serbia[36] for the development of circular economy, in the current state, the biggest barriers to the transition to circular economy at the local level are low awareness of key actors, lack of a regulatory framework and lack or absence of financial instruments for circular economy projects.

Regarding the existing regulatory frameworks in LSGUs, the principles of circular economy are not sufficiently included in the planning documents. Only a small number of the local self-government units in the Republic of Serbia have incorporated the principles of circular economy in some form in their planning documents, mostly in the field of waste management, energy efficiency or use of renewable energy sources. In the coming period, it will be necessary to systematically work on the introduction of the concept of circular economy into the planning documents of LSGUs, both in the drafting of new plans and within the revision of local and regional waste management and development plans. On that occasion, it is necessary to cover all aspects relevant to circular economy, for which local roadmaps for circular economy can be of great benefit.

A significant challenge will be the limited capacities within the LSGUs. It is estimated that only about 3% of LSGUs have organisational units in their administrations that, in a direct or indirect way, cover the issues of circular economy, that is, recognise the need to perform activity in this field. Such information indicates the need for capacity development at the local level and the provision of appropriate professional and financial support to LSGUs.

The level of awareness of population should be raised to a higher level and efforts should be made to develop circular culture. To this end, it will be especially important to implement education and

[36] Analysis of LSGU capacities in terms of creating conditions for the shift to circular economy, SCTM, 2019.

positive promotional campaigns at the local level aimed at citizens, more significant connection and communication with the economy, citizens and civil society, cooperation with educational institutions and initiation of cooperation between companies in the public and private sectors.

In general, LSGUs have a great responsibility in creating a comprehensive environment for the application of circular economy principles at the local level, on which the behaviour and mutual relations of key actors most directly depend.

As fields of special importance for creating the basic preconditions for developing an environment that will support the activities in the transition to circular economy, the following can certainly be singled out: waste management, energy management (especially energy efficiency and renewable energy sources), water management and mobility.

An efficient waste management system, selection and recycling are important elements of circular economy, without which this model is not achievable. In accordance with the Law on Waste Management, local self-governments are responsible for collecting and disposing of solid municipal waste, which is entrusted to utility companies. The management of municipal solid waste is mainly based on the collection of mixed waste, and the percentage of population covered by the system of organised collection in the Republic of Serbia is about 86%, which is why the construction of new systems at the local level has recently intensified. In order to fulfil the obligations arising from legal regulations and reduce the costs of municipal waste management at the local level, regional association approach is applied.

In addition to the modernisation of the waste management system, increasing the rate of material recycling and the energy utilisation of municipal waste fractions are also crucial for the achievement of circular economy. To that end, the main problem for the introduction of circular economy is that a complete system of primary selection, i.e., waste sorting at source, has not yet been established, which is necessary for further development of waste management, and therefore circular economy.

Prevention of waste generation is equally important for circular economy. LSGUs have an important role in raising the awareness of population on this issue, but also in creating interest in the prevention of generation and responsible management of solid municipal waste in both the economy and the population. Unfortunately, this is not supported by the current policy of charging fees for solid municipal waste management services, according to which these services are calculated by the area of residential/business space or household, and not by the amount of waste delivered.

Regarding the composition of waste, the greatest potential for circular economy is biodegradable waste, which in most local governments makes up about 50% of municipal waste. Further activities are necessary both for the prevention of its generation, and for its better use for energy purposes (biogas) or for the purpose of renewing natural resources (composting). Packaging waste is very important for circular economy, primarily from the aspect of designing and choosing materials for the production of packaging in order to prevent waste generation. A type of waste that represents a significant problem for most LSGUs, but has the potential for the development of circular economy, is construction and demolition waste. Collection and recycling of this type of waste is sporadic and practically only at its earliest stage. Bearing in mind the accelerated development of the construction sector in recent years, it is necessary to establish an adequate system for managing construction and demolition waste.

As already mentioned, efficient use of energy (energy sources) is one of the prerequisites for the development of a circular economy. Through the Law on Energy Efficiency and Rational Use of Energy, the system of energy management is further developed, which means that the obligors of

energy management, which include companies and public enterprises with high energy consumption, local self-government units and city municipalities with more than 20,000 inhabitants, as well as public sector bodies and institutions, have an obligation to implement energy efficiency measures, to achieve energy saving goals set by the Government, as well as to conduct energy audits in order to better plan the measures they will implement.

Improvements in district heating systems primarily include modernisation of equipment and improvement of control systems. In order to achieve greater circularity in this domain, the inclusion of RES in district heating systems will be of great importance, as well as the connection of such systems with companies, for the better use of their RES capacities, but also the use of waste heat from production processes.

Public lighting systems represent a significant potential for reducing electricity consumption in LSGUs, where by replacing lamps with those with more energy efficiency and improving the management system, significant savings were achieved in both energy and money, for which the public-private model proved to be a good financing mechanism in the previous period. A good incentive to improve energy efficiency of public buildings is provided by the new Law on Energy Efficiency and Rational Use of Energy, which opens up the possibility of financing such measures through the energy service model (ESCO).

In terms of heat energy consumption within local self-governments, significant potential for improvement is represented by residential buildings, which in the Republic of Serbia make up as much as 75% of buildings. The new Law envisages wider subsidisation of the replacement of carpentry, thermal insulation of buildings, as well as the modernisation of the heating system. However, the fact that heat energy billing for citizens is mostly still done according to the area of the residential building, and not according to the consumption of delivered energy, does not contribute to the awareness or motivation of citizens to save energy.

For the needs of households, of the available energy sources, electricity and coal are mainly used, and RES to a lesser extent. Connection to gas is relatively rare, which is why households have a significant share in the final consumption of electricity (48%). Household participate in total final energy consumption in Serbia to a higher degree (34%) than in the EU (27%), which can be explained by a higher degree of industrialisation, but also by a more rational consumption of energy by the population.

As much as 83% of the total energy produced from RES in the Republic of Serbia is consumed in households. Unfortunately, for the most part, it is a matter of simple burning of solid biomass in individual fireplaces for heating purposes. More complex and technically advanced systems, such as solar collectors, are far less commonly used. A big incentive for a more widespread use of RES and achievement of greater circularity in households in the coming period was given by the Law on the Use of Renewable Energy Sources, which introduced the category “prosumer”. In accordance with this, a part of the population will be able to produce electricity from RES for their own consumption and deliver surplus electricity to the power system, thus reducing the bill for consumed electricity.

According to SORS data, the majority of population in the Republic of Serbia is supplied with water from the water supply system (89.4%), and the existing water supply systems are characterised by a low rate of raw water utilisation. About 320 million m^3 of water annually (2017-2019) is used for the sanitary needs of households, which corresponds to a specific consumption of about 142 l/user/day. Water losses in the network are on average about 35%, and in some cases exceed 50% of the intake water. For the sake of comparison, the average losses in the EU amount to 23%, and the lowest ones

are from 6 to 8% (Germany, Denmark and the Netherlands)[37]. This is a case of irrational consumption of a valuable resource, which also causes irrational consumption of energy and chemicals in the process of capturing, preparing and distributing water, and creates significant financial costs. One of the reasons for this is the inadequate price of water, which in some areas is lower than the cost of operating the system, as well as the low level of collection. Together, these two factors significantly affect the operations of public companies and prevent adequate system maintenance and further development of activities.

Investments in the construction of sewage networks are constant, but still insufficient in relation to needs. The percentage of the population that is connected to the sewage system is 65.2%, and about 30% of the population uses septic tanks for the discharge of waste water. Organized and built sewerage exists mainly in urban parts of municipalities (towns and villages), and most of them consist of systems of the general type, where atmospheric water is not separated from sanitary water. Also, the percentage of treated wastewater in the total amount of wastewater collected by public sewage systems is low. According to the available capacities in 2018, 14.1% of the population was covered by wastewater treatment, which is significantly less than in countries in the surrounding area and in the territory of the EU (Croatia 52.9%, Slovenia 67.4%, Hungary 80.4%[38]) in the same period. In addition, the actual volume of municipal waste water that is treated is less than possible, because most of the available waste water treatment plants (WWTP) operate with efficiency far below the designed one and some of them are not always in operation (e.g. in 2020, out of 47 available, there were only 26 WWTPs in operation[39]). The consequence of that is that in the current situation, circularity in water use cannot be achieved to a significant extent.

Problems of this type slow down the introduction of circular economy, but their solution is covered by existing planning documents and corresponding legal documents and bylaws of the Republic of Serbia. An additional contribution to their solution can be achieved by strengthening the capacities of local governments, public and utility companies in terms of the necessary professional knowledge and raising awareness of the importance of saving water, monitoring water consumption and its realistic pricing. Also, it will be especially important to better inform the public and work on educating the population about the need for rational use of water, as a part of circular economy, given that according to existing projections, the current needs for supplying the population in the Republic of Serbia will more than double by 2034, for which it will be necessary to increase existing and open new source capacities.

In accordance with the concept of circular economy, it is necessary to foresee the use of all secondary products and waste generated in the process of wastewater treatment. One of the problems in Serbia, related to this, is the low utilisation of sludge that is created in the processes of purification of waste municipal water. According to the results of a survey conducted in 2020, more than half of the plants in the Republic of Serbia dispose of the resulting sludge in a sanitary landfill, and some even hand it over to operators abroad for further treatment at a high price. According to data from the EUROSTAT database, in 2018, about 9,600 t of sludge[40] was generated in the waste water treatment processes in Serbia. In order to comply with the provisions of the Urban Waste Water Treatment Directive, it is planned that by the end of 2044, the number of wastewater treatment plants (hereinafter referred to

[37] European Federation of National Associations of Water Services

[38] Eurostat database

[39] Mapping of wastewater treatment plants in Serbia, Excerpts from the study, Association for Water Technology and Sanitary Engineering, Belgrade 2020.

[40] Eurostat database

as: WWTP) will increase from the current 47 to 293[41], so it is to be expected that the problem with further disposal of sludge will only grow. In order to make better use of this material, it would certainly be necessary to harmonize the existing legislation, in order to more closely define the requirements regarding the composition and safe use of such materials, but also to open up the market for them. Also, by encouraging research and innovation in the field of use waste sludge can be used to find new products and methods for their greater use.

In general, achieving circularity in the segment of water management in the Republic of Serbia will be of great importance for the preservation of watercourses, as well as ensuring a sufficient amount of water for the needs of the economy and the population in the period to come. The biggest challenge in this regard will certainly be the construction of new capacities for the treatment of waste municipal water, which are necessary to achieve a higher degree of water recycling.

Urban mobility implies a balanced relationship between different types of traffic and is the basis for sustainable modes of transport in cities[42]. At the same time, urban mobility includes, apart from car traffic and public transport, other types of people's movement such as walking, cycling, etc.

One of the ways LSGUs can strategically approach the improvement of urban mobility atthe local level is through the establishment of sustainable urban mobility plans, which is recognized and encouraged through the Sustainable Urban Development Strategy until 2030 (*The Official Gazette of the Republic of Serbia*, No. 47/2019). Measures for the improvement of urban mobility include, in addition to the preparation of planning documents: improvement of public transport, non-motorised movements, provision of appropriate capacities and levels of services for users (pedestrians, cyclists, people with disabilities, vehicles for emergency interventions, stationary traffic), introduction of new technology in transport (modular public transport, transport sharing), improvement of intermodal capacities and introduction of standards for the design of roads in urban settlements into practice. Although it is still not a legal obligation, some of the cities in the Republic of Serbia have begun to develop Sustainable Urban Mobility Plans (Kruševac, Belgrade, Šabac, Pirot)[43].

By applying the measures prescribed through the Sustainable Urban Mobility Plans, the quality of life of citizens is improved, environmental pollution is reduced, resources are conserved and the overall efficiency of activities at the local level is increased. Taking into account that the mobility of the population in the Republic of Serbia is even two to three times less compared to developed European countries, as well as that bicycle traffic is insufficiently developed, traffic flow is limited, monitoring of the overall situation is irregular or very limited, it can be concluded that there is significant potential for improvements in the field of sustainable urban mobility.

3.1.4. Waste management

Waste management is a key element of circular economy, but not only in terms of recycling, but above all the prevention of waste generation through the design of products according to the principles of circular economy, which saves materials, extends the life of products and designs modular products. In order to implement the process of transition from a linear to a circular economy, it is necessary to organize the waste management system through changes to the legal framework, analysis of fiscal policy in this field (fees and subsidies), establishment of a system for exchanging waste data

[41] Draft Water Management Plan for the territory of the Republic of Serbia 2021 to 2027, Ministry of Agriculture, Forestry and Water Management, Republic Directorate for Water

[42] Sustainable Urban Development Strategy until 2030 (*The Official Gazette of the Republic of Serbia*, No. 47/2019)

[43] Sustainable urban mobility. A chance for the development of sustainable cities in Serbia, 2020. Publisher: BFPE (Belgrade Fund for Political Excellence)

between companies, raising awareness about the prevention of the generation of waste through all structures of society.

Data on waste management in the Republic of Serbia are collected in accordance with the Law on Waste Management and the Law on Packaging and Packaging Waste, which prescribe the obligations of submitting data/reporting to the Environmental Protection Agency (hereinafter referred to as: the Agency), including all types of waste except for wastes that are exempted from the application of the aforementioned laws. Based on the collected data, the Agency prepares relevant reports that were the basis for assessing the situation in the field of waste management.

3.1.4.1. General data

Based on the data submitted to the National Register of Pollution Sources in 2020 (Report on the State of Environment in the Republic of Serbia for 2020), the total amount of waste generated in 2020 amounted to approximately 12.5 million tonnes, or about 1.8 tonnes per inhabitant per year (these data do not include waste from group 01 – Waste generated in research, excavations from mines or quarries and physical and chemical treatment).

Based on the data submitted by 320 operators who have a permit for waste recovery, 2.34 million tonnes of waste were processed in 2020. In the same year, 9.57 million tonnes of industrial waste were generated in the Republic of Serbia, of which 68,000 tonnes were hazardous waste. Metals were the most represented of the total amount of treated waste, followed by slag from thermal processes, waste paper, and paper and cardboard packaging. Electrical and electronic equipment, lead batteries and sludge from the tanks from oil refining process constituted a significant amount of hazardous waste.

In 2020, approximately two million tonnes of waste were disposed of, of which 11.6 thousand tonnes were hazardous waste. Hazardous waste was mainly disposed of at the industrial waste landfill, where 11.389 tonnes of hazardous waste (mainly sludge and filter cakes) were disposed of, and 269 tonnes were disposed of at a regional landfill that has a permit for hazardous waste disposal.

Of the exported quantities of non-hazardous waste, ferrous metals are the most represented. Hazardous components removed from discarded equipment, cleaning acids and slag from thermal lead metallurgy represent the largest quantities of hazardous waste exported.

3.1.4.2. Municipal waste management

The total amount of municipal waste generated according to the aforementioned report of the Agency in 2020 was 2.95 million tonnes, based on 102 reports on municipal waste and estimated amounts for local governments that did not fulfil their reporting obligation. According to EUROSTAT data, 338 kilograms of municipal waste per inhabitant (0.95 kilograms per day) were generated in the Republic of Serbia in 2019, while the average for the EU (27 countries) of 502 kilograms per inhabitant (1.4 kilograms per day).

Morphological composition of municipal waste in 2020 indicates the highest representation of biodegradable waste in the share of 48.4%. Types of waste that are significantly less common are: paper and cardboard, fine elements and other (leather, diapers, rubber, etc.).

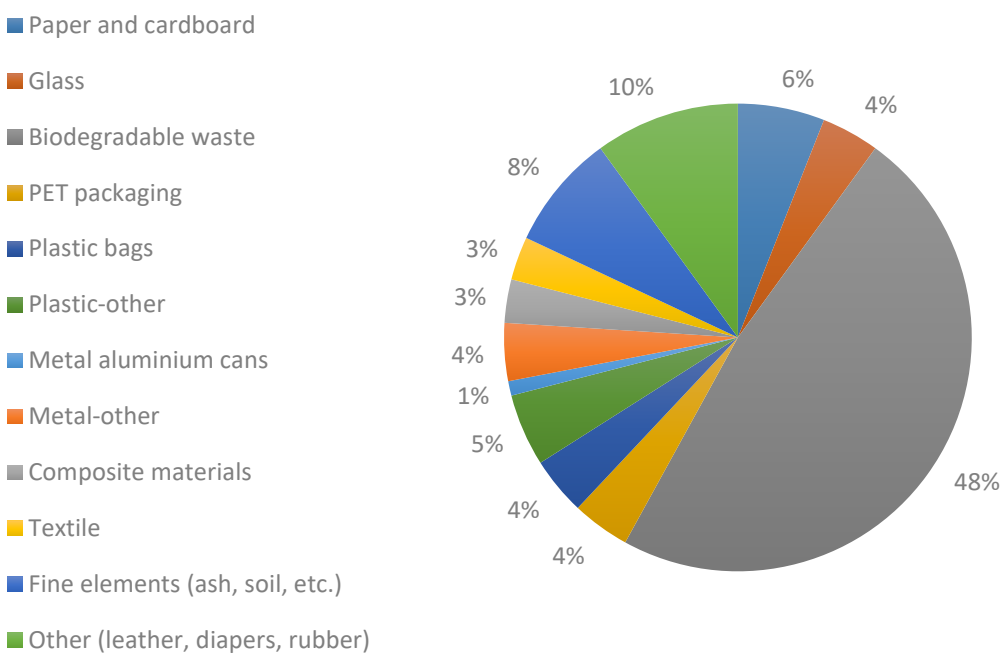

Figure 3.8 Morphological composition of municipal waste in 2020 (Report on the State of Environment in the Republic of Serbia for 2020)

Methodology for calculating the total amount of municipal waste and the degree of recycling in the Republic of Serbia is aligned with the requirements of Commission Implementing Decision (EU) 2019/1004 laying down rules for the calculation, verification and reporting of data on waste in accordance with Directive 2008/98/EC, as well as for reporting to Eurostat. With this methodology, completely new reporting rules on municipal waste are established for the purpose of clear evidence of the fulfilment of the management goals of this type of waste.

In the mentioned methodology, the index numbers from the European Waste Catalogue representing fractions of municipal waste were also applied. Accordingly, the degree of municipal waste recycling was calculated for the period 2017-2020, as shown in Table 3.4. (Waste management in the Republic of Serbia in the period 2011-2019, Environmental Protection Agency, 2020).

Table 3.4 Indicators related to municipal waste*

Indicator	**2017**	**2018**	**2019**	**2020***
Total quantity of generated municipal waste (million tonnes)	2.71	2.77	2.80	2.95
Recycled fractions of municipal waste (million tonnes)	0.283	0.330	0.334	0.343
Exported fractions of municipal waste (million tonnes)	0.098	0.096	0.109	0.114
Quantity of collected and landfilled waste (million tonnes)	2.33	2.34	2.36	2.46
Average coverage of waste collection (%)	83.7	87.2	86.2	86.4
Mean daily quantity of municipal waste per capita (kilogram)	1.07	1.10	1,11	1.17

Degree of municipal waste recycling (%)	14,1	15,4	15,8	15,7

* The assessment conducted based on the population in 2019

In 2020, approximately 19% (558,568 tonnes) of total generated municipal waste was disposed of at 11 (out of a total of 12) existing sanitary landfills, and there is an increasing trend of disposal at these landfills, by about 60,000 tonnes compared to 2019. However, large amounts of municipal waste are still disposed of in unsanitary landfills.

Based on the collected and published data for 2019, the following indicators additionally show the current situation:

- There are 15 transfer stations located in the territory of the Republic of Serbia, 11 of which are in operation, and only 5 are used to separate individual fractions of municipal waste.
- Out of 36 recycling centres, 28 are in operation, of which 27 separate fractions of municipal waste are separated;
- Based on data provided by 131 local self-government units, there are a total of 2,305 illegal dumpsites in the Republic of Serbia.

According to the last updated data of the Agency from 29 November 2021, in the Republic of Serbia, a total of 2,509 permits were issued for waste management at all levels. Based on the analysis of issued permits, it can be concluded that there are 1,745 operators who hold one or more permits (integrated). The number of operators holding permits for waste treatment is 695, while 41 operators have permits for disposal. Based on these data, it can be concluded that in our country there is a very extensive network of operators in waste management, but based on the aforementioned data on the number of submitted reports, it can be concluded that a large percentage of operators who hold permits are not active on the market in this area, or do not act in accordance with legal reporting requirements.

Based on the above data, it can be concluded that for further development of circular economy in the Republic of Serbia in the field of waste management, it is necessary to establish an adequate and efficient system of primary selection of municipal waste at least for paper and cardboard, plastic, glass, metal and textiles, in order to achieve the goals of Directive 2018/851 amending Directive 2008/98/EC on waste. In addition, it should be borne in mind that the existing system of charging for removal and disposal of municipal waste per square meter of residential area should be analysed in detail and improved in order to create the conditions to establish a model by which the population and legal entities would be stimulated to sort out municipal waste and carry out primary selection.

Also, the provisions and objectives of this Directive set high requirements that must be met regarding the degree of recycling of non-hazardous construction waste. In our country, a system for separate collection and recycling of this type of waste, which has great potential for a circular economy, has not yet been established. The arrangement of this area represents a special challenge considering that the use of waste from construction and demolition is significant for circular economy because, according to the experiences of developed countries, this waste can be recycled up to 80%.

Bearing in mind the provisions of Directive 2018/850 on waste disposal and the requirement that the amount of municipal waste disposed of in landfills starting from 2035 be reduced to 10% of the total amount of municipal waste generated, and especially due to the high proportion of biodegradable waste in municipal waste in our country, it is necessary to plan and develop a system for the prevention of this type of waste, as well as adequate treatment, which will ensure the recovery and valorisation of biodegradable waste. Aerobic and anaerobic treatment options (composting and biogas

plants) are the most favourable options for reducing the disposal of biodegradable waste and implementing the circular economy concept.

In our country, according to estimates, about 247,000 tonnes of food are thrown away annually, which is between 30 and 40 kilograms per inhabitant per year[44]. On average, catering establishments prepare 137 meals per day, from which approximately 8 kg of food waste is generated, and the largest health institutions prepare up to 1,000 meals per day on average, from which approximately 28 kg of food waste is generated. Only 21% of mass catering establishments have knowledge about the proper management of food waste, what this waste entails, as well as what the specific procedures for responsible management of this waste are. The key thing for applying circular economy in the field of catering and food preparation is the prevention of food waste, which can be achieved by applying the models and tools for proper food application that already exist in the EU.

One of the problems for better waste management is the low utilisation of residues from the production process and the weak exchange of information about their possible reuse among companies. There is a procedure for registering by-products and materials that have ceased to be waste, but the process is quite slow.

At this moment, 17 applications have been submitted for registration in the register of by-products, of which 4 operators have received confirmation of registration in the register, and one decision is in the process of cancellation. Three operators have submitted the application for the end-of-waste status for some waste types, and for two operators the procedure has been completed. This process is of great importance for increasing the competitiveness of the domestic industry and the consistent application of the circular economy concept, but it is still in its initial phase. For circular economy, it is of great importance to improve the existing system in order to increase the use of residues from production processes, and through a more efficient exchange of information, companies are better connected.

3.1.4.3. Packaging and packaging waste management

Based on the SEPA's Report on the packaging and packaging waste management in the Republic of Serbia in 2020, the total amount of packaging placed on the market of the Republic of Serbia was 362,236.7 tonnes. Permits for the management of packaging and packaging waste are held by 7 national operators who managed packaging and packaging waste for 1,918 legal entities that put packaged products on the market of the Republic of Serbia. The amount of packaging placed on the market of the Republic of Serbia by legal entities or entrepreneurs who transferred their obligations to operators amounted to 360,942.8 tonnes in 2020.

The amount of packaging placed on the market of the Republic of Serbia by 248 legal entities or entrepreneurs who did not transfer their obligation to the packaging waste management operator amounted to 1,293.9 tonnes. These legal entities or entrepreneurs who have placed more than one ton of packaging on the market are charged a fee for waste management.

In 2020, the Government of the Republic of Serbia adopted the Regulation on the establishment of the Packaging Waste Reduction Plan for the period from 2020 to 2024 (*The Official Gazette of the Republic of Serbia*, No. 81/20). The prescribed overall targets for 2020 were 61% for recovery and 56% for recycling. The operators reported an amount of 226,020.8 tonnes of recovered packaging waste, of which 216,711.2 tonnes were delivered for recycling. Thus, the general national goals for the Republic of Serbia in 2020 were met, as a value of 62.6% was achieved for waste recovery, and

[44] Guide for the proper management of food waste, NALED, 2020.

for waste recycling it was 60.0%. In addition to general national goals, specific objectives for the year 2020 in terms of packaging waste recycling were also met, as can be seen in Table 3.5.

Table 3.5 Fulfilment of specific objectives for packaging waste for 2020

Packaging waste	Set specific objectives (%)	Fulfilled specific objectives (%)
Paper/cardboard	62	95,1
Plastic	26	33,8
Glass	44	48,1
Metal	45	78,0
Wood	17	39,9

(Source: Report on packaging and packaging waste management in the Republic of Serbia in 2020, Environmental Protection Agency).

Directive 2018/852 amending Directive 94/62/EC on packaging and packaging waste has increased general and specific objectives for recycling and recovery, so that regardless of the fulfilled national goals, it is necessary to plan and invest in systems for the separate collection of packaging waste as required materials. It is necessary to intensify activities on raising the level of awareness of the population and the capacity of legal entities, even more intensive involvement of public utility companies in the implementation of the packaging and packaging waste management system, as well as strengthening the inspection supervision of companies.

3.1.4.4. Management of special waste streams

Products that become special waste streams after their use in accordance with the Law are:

- tires;
- batteries or accumulators;
- oils;
- electrical and electronic products;
- vehicles.

The Law on Waste Management prescribes the obligation to manage certain special streams of waste, as well as the obligation to the owners of these types to report of waste and submit appropriate data to the Agency. According to the Agency's data, in the last three years the trend of reporting within the prescribed legal deadline has varied, ranging from 5,743 companies in 2018 to 5,392 companies in 2020 (Products that after use become special waste streams in the Republic of Serbia in 2020, Agency, June 2021).

The Law on Charges for the Use of Public Goods (*The Official Gazette of the Republic of Serbia*, Nos. 95/18, 49/19, 86/19 – harmonized RSD amounts, 156/20 – harmonized RSD amounts and 15/21 – addition) prescribed is the amount of compensation for products that become special waste streams after their use.

The amount of tires placed on the market in 2020 was 39,882.3 tonnes. During the same year, 49,512 tonnes of waste tires were recovdered, 6,186 tonnes of this type of waste were imported and 72 tonnes were disposed of.

The total amount of accumulators and batteries (starters, portable batteries or accumulators, industrial batteries and accumulators) placed on the market in 2020 was 17,950.7 tonnes. According to the reports of the waste recycling plant operator, 15,839 tonnes of this type of waste were processed, 4,280 tonnes were exported, while 4,782 tonnes were imported in the same period.

The total amount of oil (mineral and synthetic) placed on the market in 2020 was 36,792.9 tonnes. Based on the annual waste reports, it was found that in 2020, 2,178 tonnes of waste oil were processed, while 730 tonnes of waste oil were exported in the same period.

Electrical and electronic products that are placed on the market are classified into ten classes. Quantities are reported in two types of units, i.e. they are reported per piece or in kilograms, so we can conclude based on the data that in the course of 2020, 23,836,999 pieces of mainly large household appliances, small household appliances and IT equipment were placed on the market of the Republic of Serbia. At the same time, 19,425.7 tonnes of electrical and electronic products, which do not include IT equipment and lighting equipment, were put on the market.

In 2020, 41,716 tonnes of electrical and electronic waste were treated, mostly discarded equipment, while 4.88 tonnes of electrical and electronic waste were exported in the same year.

The biggest challenge for the development of circular economy in special waste streams is the establishment of a system that ensures that all valuable components during pre-treatment and after treatment remain in our country, in order to be further treated or referred to production processes, and not exported. In this sense, it is necessary to consider the possibilities of developing a collection system and appropriate facilities in which valuable components would be adequately treated and which could be further used in domestic production capacities.

In addition, the content of certain components of waste from electrical and electronic devices must be tested for certain dangerous substances (e.g. polybrominated diphenyl ethers, so-called flame retardants, lead, phosphorus powder, etc.), because the concentration is what determines if this waste be recycled. The lack of knowledge and testing instruments can be a problem that needs to be solved in order to use all the advantages of recycling, but also to avoid the undesirable consequences of recycling inadequate materials.

3.1.5. Green public procurements and voluntary instruments

3.1.5.1. Green public procurements

Green public procurement has a significant role in achieving the goals of sustainable development defined in the Agenda for Sustainable Development 2030[45], especially goal 12 – Responsible consumption and production (12.7 Promote sustainable public procurement practice in accordance with national policies and priorities). Also, green public procurement is recognized as one of the priority areas in the strategic documents of the EU for circular economy.

The EU Green Deal references the European Commission plan to propose minimum mandatory criteria for green public procurement and objectives in sectoral legislation, as well as gradual mandatory reporting in connection with green public procurement, in the coming period.

The Republic of Serbia, within the framework of harmonisation with the *acquis*, has undertaken to promote green public procurement under Chapter 5, which concerns public procurement.

According to the data from the annual report of the Public Procurement Office[46], the share of public procurement in the gross domestic product in the Republic of Serbia in 2019 was 8.14% (RSD 440,522 million), while in 2020 this amount was 6.88% (RSD 376.124 million). At the same time, it should be taken into account that these percentages do not include the part of procurements also carried out by the public sector, which are exempted from the application of the Law on Public

[45] https://sustainabledevelopment.un.org/?menu=1300

[46] https://jnportal.ujn.gov.rs/annual-reports-ppo-public

Procurement due to their value (the new Law on Public Procurement from 2019 increased the value to which the Law on Public Procurement does not apply, which partly influenced the recorded lower values of the share of public procurement in the 2020 GDP). Within the EU, these percentages are higher: public procurement accounts for an average of 14% of the GDP at the EU level.

In the previous period, several activities in the field of green public procurement were implemented (through various projects, as well as through the activities of the Public Procurement Office). Several guides and guidelines relevant to the field of green public procurement were developed, of which two documents with guidelines were made available via the project banner on the website of the Public Procurement Office: Guidelines for Green Public Procurement (2019) and Guidelines for Life Cycle Costing (2019)[47].

In the period 2019-2021, appropriate guides for the application of criteria for green public procurement in the Serbian language for several groups of goods, services and works were prepared< the Report on green public procurement in the Republic of Serbia with recommendations for improvement (2019) was prepared, and presentations and expert consultations were held. During 2021, a virtual knowledge base for green public procurement was created on special websites. Also, in 2021, a survey was carried out in which citizens, contracting authorities and bidders participated. It included issues related to green public procurement. In the coming period, the Report on the Analysis of the State of Green Public Procurement with recommendations for improvement is to be published.

In the Republic of Serbia, for the time being, there is still not enough collected data or official reports on implemented green public procurements (including the Annual Report of the Public Procurement Office for 2020)[48], or more detailed priorities and individual goals for groups of goods, services and works. for which it would be most optimal to apply green public procurement. However, as of 2020, there is a technical possibility to record data on green public procurement through the Public Procurement Portal (for now, the data are available internally to the Public Procurement Office). Based on the analysis of those data, a total of 650 green public procurement procedures were conducted in the Republic of Serbia during 2021.

As the implementation of green public procurement is still at the beginning in the Republic of Serbia, a search for green public procurement procedures and an insight into examples of realized green public procurements would help generate knowledge faster and encourage more clients to decide to apply them.

Greater application of green public procurement in the Republic of Serbia would have a strong positive impact on the development and implementation of circular economy. By applying green public procurement, the contracting authorities (to which the Law on Public Procurement applies), as the largest buyers, encourage the development of the supply of goods, services and works with better environmental performance, introduction of voluntary environmental instruments is encouraged, the creation of new “green” jobs, innovation and creation of new business models. By applying green public procurement, resources are used more efficiently and purposefully, with the achievement of appropriate savings and better environmental performance throughout the life cycle of goods, services and works.

[47] http://eupodrska.ujn.gov.rs/dokumenta/

[48] Annual Report of the Public Procurement Office for 2020.

3.1.5.2. Voluntary instruments in the field of circular economy

The availability of appropriate standards in the field of environment, sustainability, energy management, energy saving and circular economy in the Republic of Serbia is very high. In the Institute for Standardisation of Serbia, there are appropriate national technical committees for relevant EN and ISO standards, and Serbia actively participates in the development of new standards in the field of circular economy (within ISO TC 323 Technical Commission for Circular Economy).

Work on standards in the field of circular economy is organised through the national committee within the Institute for Standardisation of Serbia, KS Z183 Circular economy and waste management, while a considerable part is organised through other relevant national committees, especially the committee in the field of environmental management KS A 207, which monitors the work of the international committee ISO TC 207. Most of the international standards that are deemed to be of particular importance to stakeholders are translated and published in Serbian or bilingually by the Institute for Standardisation of Serbia, creating proper preconditions for their application by stakeholders in the Republic of Serbia.

According to data from the International Standardisation Organisation (ISO), the number of certified organisations in the Republic of Serbia in 2020 according to the standard for the environmental management system (ISO 14001:2015) was 1,629, and 77 according to the standard for the energy management system (ISO 50001:2018).

EMAS (EMAS – Eco Management and Audit Scheme) is an EU programme that enables organisations to verify their environmental management system in accordance with the relevant EU Regulation (Regulation (EC) No. 1221/2009).

In terms of circular economy, EMAS is extremely important because it is recognised as the most credible environmental management system that helps organisations to implement an effective environmental management system, to continuously improve their environmental performance and report on it publicly in a transparent manner. Within the framework of EMAS, there are also requirements related to the recognition of relevant needs and expectations of stakeholders in relation to the environment, direct and indirect impacts on the environment, continuous improvement of performance in relation to the environment, which is also the basis for a systemic approach for application of circular economy within the respective organisations.

EMAS can be directly linked to Sustainable Development Goal 12 – Responsible consumption and production.

Figure 3.9 EMAS logo

EMAS in the Republic of Serbia is partially defined by the Law on Environmental Protection, which was amended in 2016, *inter alia*, with the aim of actually encouraging the first EMAS registrations of organisations from Serbia. Registration of organisations from the Republic of Serbia in the EU EMAS register is possible through special conditions for Global EMAS registration and registration of organisations from third countries, which are given within the EU EMAS regulations for third

countries[49]. Unfortunately, not a single organisation from the Republic of Serbia has yet achieved EMAS registration.

In order for organisations from Serbia to register in the EU EMAS system, they need to fulfil a whole set of requirements, of which a certain number of requirements concern the fulfilment of legal environmental requirements in the Republic of Serbia. This part of the EMAS registration procedure is checked by an independent, authorised EMAS verifier. Additionally, it is important that there is some form of communication between the competent authorities for EMAS from the EU, where registration is carried out, with the relevant competent authority in the Republic of Serbia (with the Ministry responsible for environmental affairs) and some form of confirmation by the competent authorities from the Republic of Serbia that specific organisation has no recorded non-compliances with environmental legislation. The issuance of such a certificate, which would help organisations in the EMAS registration process, is provided for by a special bylaw for EMAS (the basis is provided by Article 44, paragraph 9 of the Law on Environmental Protection). The adoption of this bylaw for EMAS would help further encourage organisations to the EMAS registration process.

Very important prerequisites for the wider application of voluntary instruments (including EMAS) are good knowledge of the economy and users about them, and various incentives at the state level for organisations which decide to introduce and apply some of the voluntary instruments. There are already examples of good practice from EU countries that could be used for further affirmation of voluntary instruments such as EMAS and the national Eco label, which, with additional analysis and adaptation, could be applied in the Republic of Serbia.

The Eco-label of the Republic of Serbia (the national Eco-label of the Republic of Serbia: “Friend of the environment”) and the EU Eco-label belong to the Environmental Labelling Programme type I (in accordance with the ISO 14024 and ISO 14050 standards).

The Eco-label encourages the application of circular economy, because the focus thereof is the reduction of negative environmental impacts, extension of product life through appropriate eco-design of the product, simple repair and maintenance, taking into account the reduction or elimination of certain hazardous substances that are included in the composition products. Currently, in the Republic of Serbia, only two organisations have products for which the national Eco-label has been awarded.

Awarding of the EU Eco-label in accordance with the relevant EU Regulation on the Eco-label for products manufactured in the Republic of Serbia is not possible within the Republic of Serbia. Such a thing will be possible when the Republic of Serbia becomes an EU Member State or a part of the European Economic Area (EEA). However, it is possible to do this in the corresponding EU member state (i.e., within the EEC) in which the product is placed on the market, provided that the product also meets all the appropriate requirements for a specific product group for the EU Eco-label.

[49] EMAS

Figure 3.10 National Eco-label of the Republic of Serbia

Details regarding the procedure and conditions for awarding the national Eco-label are defined by the Law on Environmental Protection and the special Regulation on detailed conditions, criteria and procedure for obtaining the right to use the eco-label, elements, appearance and manner of using the eco-label for products and services (*The Official Gazette of the Republic of Serbia*, No. 49/16). The Regulation also contains specific criteria for the Eco-label for 26 different groups of products. The criteria were created based on the corresponding criteria for the EU Eco-label[50], which were valid at the time of the creation of the aforementioned rulebook. The strategic direction of the development of the national Eco-label of the Republic of Serbia is seen through the decision that the groups of products and services for which the national Eco-label can be awarded, as well as the criteria for individual groups, should be the same as the product groups and criteria for awarding the European Eco-label – the EU Flower. Currently, there are certain discrepancies in the criteria of the national Eco-label and the EU Eco-label, due to the changes that have taken place in the meantime in the criteria for the EU Eco-label. Therefore, it is necessary to revise the current Rulebook taking into account additional groups of products and services, as well as the priorities that will be defined for green public procurement and the representation of appropriate products/services on the market of the Republic of Serbia.

Similar to EMAS, important prerequisites for the wider application of the Eco-label are good familiarity with the economy and users, as well as various incentives at the state level for the introduction of the Eco-label. Currently, there is significant potential to increase the level of application of voluntary instruments in the field of environmental protection by developing appropriate guidelines, introducing incentive measures, as well as implementing additional promotion thereof.

3.1.6. Public and educational system

Although circular economy has recently become a current topic among some representatives of the professional public, the awareness of the general public about the importance of circularity and the advantages that circular economy brings is at a low level. Media announcements on the topic of circular economy are very rare and there is a lack of information on this topic in the public space, and successively the interest of the population in circular processes. In the general public, the need to preserve the environment is recognized to a significant extent, but not the fact that the transition to a circular economy can significantly contribute to the achievement of that goal, as well as that the further progress of society as a whole depends to a significant extent on the achievement of the goals of sustainable development. Consumer habits, value system, way of thinking and understanding are still based on linear consumption and there is a lack of awareness that every individual can contribute to the introduction of circular economy by making changes to their daily routine. There is a lack of a systematic approach to raising awareness among the interested public (including the population, the media, representatives of civil society organisations and consumer associations, etc.) that would provide clear information about the principles of circular economy and the advantages that its introduction brings to the relevant target groups, as well as to society as a whole. Bearing in mind that the transition to a circular economy requires radical changes, not only in the economy but also in consumer habits, the development of circular awareness among the general public could encourage this process. In doing so, the differences between the target groups within the general public should

[50] Group of products and criteria for the EU Eco-label.

be taken into account and the way in which relevant information is communicated to them should be adapted to suit their interests, education and age.

In the current educational system of the Republic of Serbia, at all levels of education, the topics related to the reduction of resource and energy consumption and the increase of energy efficiency, reduction of waste streams in production processes (aspiration towards zero waste), use of renewable energy sources, minimisation of the use of hazardous chemical etc are still sporadically present. However, there is no widely established, methodologically clear approach to these topics, which would inform primary and secondary school students, as well as university students, about the importance of the practical importance of the mentioned topics and other basic principles of circular economy, i.e. how to apply the principles of circular economy in various economic and social activities. At the secondary school level, some of the topics related to circular economy are studied as part of the *sustainable development* optional subject, but they are available to only a small number of students. At faculties of technical sciences, there are courses that train students to apply certain concepts of **circular economy**, although this is not always so clearly emphasised.

The concept of circular economy is not recognised at faculties of social sciences, primarily at faculties of economics and law, except for a small number of master's programmes. In addition to formal education, non-formal education also does not offer adequate programmes in the field of circular economy (training, courses, etc.). Here too, the lack of adequate education and training in the field of economics and law (for example, circular financing, risks that circular projects entail, regulation) is very visible. The importance of including the educational sector in the application of the circular economy concept is great, because institutionalisation of the concept and its introduction into the activities provided for in the curricula would enable a wider social acceptance of the aforementioned ideas, the adoption of principles at the earliest ages, but also the creation of experts who are, after completing their education, capable of getting directly involved in the activity of companies that operate according to the stated principles, or who with their knowledge can contribute to the introduction of new technologies and new approaches to the organisation of production in order to minimise or neutralise all waste streams, reduce energy consumption and achieve all other social benefits from the application concept of circular economy. In this way, it would also help define jobs and positions that fall under the domain of the circular, i.e., green economy, that is, definition of new educational profiles with the necessary knowledge, skills and qualifications.

3.2 SWOT analysis

During the development of the Circular Economy Development Programme in the Republic of Serbia, a SWOT analysis was used as an auxiliary tool for a better overview of the current situation and identification of specific further activities that are planned.

The input data for the SWOT analysis were obtained from the following sources of information:

- Consultative meetings held with stakeholders during the development of the Programme (meetings, discussions);
- Collected stakeholder comments during public consultations;
- Data from the Ex-ante impact assessment related to circular economy;
- Insight into the available documentation (policy documents, EU and national legislation, statistical data and expert analyses);

- Meetings of the project team, expertise of the consultants engaged in the preparation of the Programme.

Results of the SWOT analysis are presented in 4 sections:

- Strengths
- Weaknesses
- Opportunities
- Threats.

STRENGTHS

- The economy shows interest in circular economy (as a chance for saving and reduction of negative environmental impacts);
- Institutional frameworks as a good basis for further development of circular economy (Section for Circular and Green Economy, Centre for Circular Economy of the Serbian Chamber of Commerce, etc.);
- The Republic of Serbia is committed to meeting the sustainable development goals (Agenda 2030) and the Paris Climate Agreement;
- Commitment to circular economy through the Green Agenda for the Western Balkans;
- Legal regulations that contribute to the transition to a circular economy (reduction in the number of plastic bags by introducing their collection, renewable energy sources, introduction of by-product mechanisms and end-of-waste status, subsidising energy efficiency measures);
- SORS is familiar with the new indicators for monitoring of circular economy and is already reporting on some of them. Certain indicators are also monitored by the Agency;
- There are preconditions for the implementation of green public procurements;
- There is a large number of different training programmes and projects on the topic of circular economy and innovation, as well as opportunities for co-financing (Innovation Fund, international organisations and donors, etc.), business models such as chemical leasing, cleaner production, etc.;
- Citizens' environmental awareness has increased to a great extent;
- A commission for standards has been formed at the Institute for Standardisation of Serbia (Circular Economy and Waste Management), which monitors the work of the ISO Technical Commission for Circular Economy (TC 323).

WEAKNESSES

- Waste management was found to be the main weak link in the entire system (inadequate application of regulations, failure to recognise the specifics of micro and SMEs within the framework of legal regulations, poor state of communal infrastructure, lack of systemic approach, small percentage of primary waste selection, lack of sanctions and adequate incentive measures, insufficient awareness and education of citizens);
- An underdeveloped circular model of single-use plastic product management and the use of more sustainable materials;
- Low utilisation of residues from the production process and weak exchange of information about their possible utilisation among companies;
- Lack of an adequate system for recovery and recycling of non-hazardous construction waste;

- Lack of suitable waste management operators on the market, inability to deliver waste in small quantities;
- Absence of sanctions in cases of inadequate handling of waste (burning of stubble, waste cables and other waste materials outdoors, use of inadequate energy sources, etc.);
- A large percentage (50%) of biodegradable waste in municipal waste. A third of the food produced for human consumption is discarded as unconsumed surplus;
- Priorities and individual prices for the implementation of green public procurement are not clearly defined by groups of goods, services and works;
- Insufficient representation of the application of green public procurement criteria in public procurement procedures;
- Systematic data collection and reporting on green public procurements are not carried out to the required extent;
- Unsuitable water regime at the local level, potentially increasing dependence on transit waters and the expected increase in water consumption for the needs of the economy and the population;
- A small part of the population (14.4%) included in the municipal wastewater treatment system;
- Significant water losses (about 35%) in the distribution network of the water supply system;
- Low efficiency of water use in the economy, low level of water recycling and reuse;
- Insufficient utilisation of sludge from the wastewater treatment process;
- Lack of regulatory, financial and non-financial incentives for organisations that have achieved EMAS registration and/or the right to the Eco-label for some of their products and/or services;
- The bylaw for EMAS, which is provided for in the Law on Environmental Protection and should facilitate registration, has not yet been adopted;
- Significant energy net import dependence of the country;
- A large share of coal (low-calorie lignite) in the total primary energy (about 50%), which is dominantly used for the production of electricity;
- From 1.5 to 2 times higher energy intensity than the European average;
- High share of final energy consumption in households compared to the EU;
- Relatively small share of renewable energy sources (RES) in gross final consumption (about 26.3%) compared to the existing potential;
- Outdated technology, high specific consumption and lack of energy consumption monitoring in production processes;
- Weak interest and awareness of companies (especially micro and SMEs) about the possibilities of using new technologies that include the use of renewable energy sources and more energy efficient equipment in production processes;
- Significant dependence of the economy on the import of raw materials;
- Significantly higher export of products with a low degree of finalisation compared to products with a high degree of finalisation;
- Insufficiently developed cooperation between the economy and scientific research organisations in the field of innovation and improvement of production in the field of circular economy;
- Low investments in the environment;

- Charging for the consumption of resources, energy and waste generation is in most cases not related to the achieved effects/results;
- Insufficient information among citizens about specific actions that they can apply at the micro level (surplus food, waste management, energy and resource efficiency, use of RES, etc.);
- Weak representation of environmental and circular economy topics in the media and formal education;
- A modest offer of loans for circular economy.

OPPORTUNITIES

- Serbia's strategic direction towards the EU, new EU package for circular economy, the Green Agenda for the Western Balkans;
- Good examples in the EU in the field of circular economy; opportunities to support innovative ideas and circular economy projects;
- Reducing the consumption of raw materials, energy sources and the negative impact of companies on the environment with corresponding savings during the life cycle by applying eco-design, green public procurement, best available techniques, cleaner production, applying voluntary environmental systems, etc.;
- Creation of a reliable and transparent market for waste, products that ceased to be waste, by-products, semi-finished products and raw materials created from waste;
- Increasing the share of green public procurements in total public procurements by their additional affirmation and education of stakeholders;
- Development of additional guides with criteria for green public procurement – based on the EU model;
- Possibility of registering organisations in the Republic of Serbia in the EMAS scheme within the EU;
- Stimulating measures for the Eco-label, EMAS, cleaner production, innovations in terms of business models and eco-products;
- New standards for circular economy (new Commission TC 323 within the ISO organisation) – active inclusion and implementation in the Republic of Serbia;
- Reducing the generation of plastic waste and encouraging the use of reusable products;
- Greater use of residues from production processes by creating better connections between companies, more efficient exchange of information and improvement of procedures for registering by-products and materials that have ceased to be waste;
- Reducing the total amount of waste by recycling and reusing non-hazardous construction waste and developing a market for that type of waste;
- Reduction of the share of biodegradable waste in municipal waste by better management of food, surplus food and food waste;
- Utilisation of food waste for the production of biofuel and compost;
- Reducing water consumption, improving water pollution prevention and increasing the degree of recirculation and reuse of water in the economy, public and utility companies by applying best available techniques, cleaner production measures, management system standards and EMAS, by eliminating certain hazardous chemicals;
- Provision of some of the water needed for agriculture and industry by recycling treated waste process and urban waters;

- Reduction of water consumption by informing and raising awareness of the population about the importance of efficient water use, related costs and environmental impact;
- Utilisation of sludge from urban waste water treatment for industrial, agricultural and energy purposes;
- Support to the economy in the development of business plans in accordance with the principles of CE, financial support to the economy for the transition to a circular business model;
- Better connection of scientific institutes and the economy for projects that lead to circular economy (e.g. green chemistry, etc.);
- Phasing out of single-use plastics where they are not currently necessary;
- Possibility of introducing a deposit system for packaging waste;
- Possibility of cooperation with civil society organisations and international organisations on projects to improve circular economy;
- Revising educational programmes with topics in the field of circular economy;
- Incentives for employment in fields related to circular economy;
- Presentation of successful examples and financing of implementation of pilot projects;
- Education at the local level for citizens, schools, economic operators;
- The development of start-ups and the introduction of new technologies that would allow to immediately switch to the best practice and thus make up for the backlog of the Serbian economy;
- Encouraging a preventive approach (avoidance of redundant packaging, reuse of packaging, returnable packaging) in order to reduce waste generation (through various types of incentives);
- Increased price for waste disposal/landfill tax;
- Use available EU funds to a greater extent;
- Easier access to bilateral and multilateral funds and favourable conditions for project funding;
- Encourage demand for recycled raw materials, not just recycling;
- International and regional cooperation – CEFTA, Regional Economic Union, duty-free unions, better and coordinated flow of goods and raw materials (waste);
- Digitalisation;
- Faster application of the circular economy concept through certain legal solutions as well (imposing obligations for certain segments). For example, introducing a requirement for a certain content of recycled materials in the finished product, a requirement that certain percentage of construction recycled material should be used for the construction of new buildings, etc.;
- Introducing a system of more transparent communication about the circularity of products through the supply chain.

THREATS

- Sudden changes in regulations may threaten some industrial sectors (e.g., sudden abolition of plastic bags and single-use plastics, without optimal time for adjustment), which may negatively affect a part of industry;

- Slowing down the development in the field of circular economy due to insufficient synchronisation with plans in other fields;
- Duplication of planning documents in local self-government units;
- Insufficient capacities of state and local administrations;
- Illegal construction, endangerment of infrastructure, inadequate handling of waste, unequal treatment of different players;
- Large import of old vehicles that have a short useful life, are not safe, generate a high degree of pollution, and are not recycled sufficiently and in the right way;
- Difficult access to financial resources due to an unregulated legal environment;
- Weak penalty and ineffective incentive policy;
- Appearance of hazardous chemicals from recycled materials in new products;
- Overlapping of various policy documents and lack of clear coordination, control and monitoring of all activities.

Mapping the stakeholders

The field of circular economy is very complex and requires a multidisciplinary, holistic approach, through the involvement of a large number of stakeholders.
As circular economy is a concept that has positive effects on the environment, but also on society as a whole, with the increase of new business models, encouraging innovation, new jobs, less dangerous products and the like, it can be concluded that the effects of establishing a circular economy and appropriate public policies are mostly positive for stakeholders (most stakeholders benefit from the application of circular economy).
Potentially negative effects that have been identified are the impacts that sudden changes in the respective bans (e.g., the ban on plastic bags and single-use plastics) can have on a part of the economy, due to the risk to business in the specific industry that is affected by it, with job losses. The mentioned potential impacts were considered during the development of this Programme and the definition of specific measures and activities in such a way that the desired changes happen according to plan and that the operations are predictable and fair for all participants.
The table below provides a mapping of the key stakeholders for circular economy.

Stakeholder	Needs and expectations related to circular economy, notes	Impact of the proposed policy on stakeholders	
		Positive	Negative
Ministry of Environmental Protection	Primary role for the circular economy system and coordination of activities. Good cooperation with other stakeholders. Providing the necessary resources.	x	
Economic operators (in general)	New business opportunities for commercial sector, savings, clear legislative framework. The main driver of the real transition to a circular economy. Expectations – favourable business environment, infrastructure, applicable	x	

	and harmonised regulations and business predictability. Stimulating business environment. Incentives for those companies that make a step towards circular economy and voluntary environmental instruments. Indiscriminate application of regulations.		
Specific industry sectors that may be negatively affected by the changes brought about by circular economy (products pushed out of use, e.g. manufacturers of bags and single-use plastics)	Predictability in business, enough time to adapt to changes. Negative impact is due to potential sudden and major changes. When creating a policy document and specific objectives, measures and activities, this group of businesspeople must be taken into account. That is why the impact can be positive.	x	x
Serbian Chamber of Commerce	It represents the interests of its members (companies that carry out economic activities). Partner to the Ministry of Environmental Protection for circular economy activities.	x	
Public Procurement Office	Assistance from the Ministry of Environmental Protection in connection with criteria for green public procurement, determining priority groups of goods, services and works It is in its interest that green public procurements are carried out in best possible way, and that obligations from Chapter 5 are met.	x	
Citizens	Infrastructure for primary waste selection, healthy environment. Informed about the choice of products and services (smart decisions based on the life cycle of products/services). Informed regarding more active involvement in circular economy flows. Reduction of environmental pollution. Clean air, water, soil. Limiting the use of single-use plastics, less waste generation. Safe products (without dangerous chemicals). Limiting the use of plastic bags (especially oxo-degradable ones with the risk of creating microplastics). Timely reaction of competent authorities in case of non-compliances.	x	

	Planned system of collection and general waste management. Incentives for those citizens who make efforts in primary selection and in reducing the amount of waste. Clear guidelines for citizens.		
Local self-governments, Standing Conference of Towns and Municipalities	Support to local circular economy activities. Establishment of appropriate infrastructure.	x	
Ministry of Finance	Planning and provision of financial resources needed for the implementation of activities and measures for circular economy.	x	
Educational institutions, pre-school institutions	Training for users of education services, better conditions in terms of infrastructure and environment, savings in business.	x	
Civil Society Organisations	Fulfilling the primary goals of the association. Cooperation with other interested organisations.	x	
Statistical Office of the Republic of Serbia	Monitoring key indicators for circular economy, reporting.	x	
Serbian Environmental Protection Agency	Monitoring key indicators for circular economy, reporting.	x	
Public sector (contracting authorities)	Application of circular economy in business, application of green public procurement criteria. For now, green public procurement is seen as a burden, but on the other hand, application of green public procurement will enable procurement of goods, works and services that are less harmful and better in use and whose life cycle costs are lower. Available criteria for green public procurement. Available information and guidelines in the field of green public procurement. Examples of good practice for green public procurement. Other fields – similar to the economy.	x	x
Financial institutions, banking sector	Marketing of new “sustainable” financial products, lower business risks.	x	
International organisations, UNDP, GIZ etc.	Support for circular economy activities, implementation of circular economy projects.	x	

Ministry of Mining and Energy	Cooperation regarding issues of energy efficiency and energy management in general, renewable energy sources, eco-design, etc.	x	
Ministry of Labour, Employment, Veteran and Social Affairs	Creation of new jobs, sustainable public procurement that also takes into account social aspects, creation of conditions for the inclusion of social enterprises.	x	
Ministry of Science, Technological Development and Innovations	Encouraging scientific and technological innovation related to circular economy.	x	
Other ministries	Involvement of individual Ministries in special parts that fall within the scope of their competences.	x	
Institution for Standardisation of Serbia	Knowledge of relevant national (SRPS), European (EN) and international (ISO) standards.	x	
Inter-ministerial working groups for the implementation of the UN Sustainable Development Agenda until 2030	Joint activities to fulfil sustainable development goals – especially goal 12 – Sustainable consumption and production.	x	
Media	Raising awareness in the field of circular economy, examples of good practice.	x	

3.3 International experience in introduction of circular economy

In terms of implementing the principles of circular economy at the global level, the European Union has done the most. The first significant and organised activities for the introduction of circular economy in the European Union began in 2015 with the adoption of the Action Plan for Circular Economy, which defined several measures with the aim of opening new jobs, supporting further development and investments, and achieving resource-efficient, climate-neutral and competitive economy. The focus of these measures was on production – design and manufacture of products, consumption of resources, waste management, creation of markets for secondary raw materials and recycled water and introduction of innovations. The Action plan for the first time promoted a systematic approach in all value chains and incorporated the principles of circular economy in the field of production and consumption of plastic materials, water management, food systems and management of specific waste streams.

As part of the support to the economy, circular design and energy efficiency were primarily promoted, and special attention was paid to small and medium-sized enterprises. In order to improve energy and raw material efficiency in this segment of the economy, the European Resource Efficiency Knowledge Centre (EREK) was established and a pilot programme for the verification of technological solutions in the field of environmental protection was launched. In addition, initiatives to replace substances of very high concern in products and to facilitate easier access to innovative

technologies are supported. In terms of materials, special attention was paid to single-use plastic products and their impact on the environment. Voluntary instruments, such as the criteria for awarding the EU Eco-label and participation in the EMAS system and green public procurement, have proven to be a very good mechanism for improving the company's relationship with the environment.

One of the priorities of the Action Plan was the introduction of innovations in the economy. In the period 2016-2020, more than 10 billion euros were invested in research through various programmes and projects (Cohesion Policy, Horizon 2020, European Fund for Strategic Investments). Recommendations for improving the profitability of circular projects, coordination of financing activities and exchange of good practices were made, and measures were taken to remove existing regulatory obstacles to the introduction of innovations in the economy.

In the social segment, special attention is paid to the inclusion of stakeholders, such as local governments, economic actors and civil society organisations, in the process of transition and their mutual connection. Also, an important aspect was the protection of consumers, primarily through the development of a system for adequate information on the characteristics of products that are significant for circular economy (e.g. repairability, products with a longer shelf life).

The results recorded in 2019 showed that circular economy model brings benefits to the economy and society as a whole. The implementation of the proposed measures contributed to greater employment in the sectors of the economy relevant to CE (6% compared to 2012), created conditions for the development of new business models and increased the share of recycled municipal waste. Also, activities such as repair, reuse and recycling in 2016 achieved almost 147 billion euros of added value and attracted investments worth about 17.5 billion euros[51].

3.3.1. Circular economy and digitalisation

Previous experience in the introduction of CE has shown that artificial intelligence and digitalisation can significantly contribute to the transition process. Business models based on CE principles are by their very nature connected and networked, and their development and management require the collection, exchange and analysis of a large amount of data, for which digital systems and platforms have the capacity. Also, concepts such as "smart cities" and "internet of things" enable the formation of circular communities and the development of a circular culture in society.

The increased use of data and digital tools like online applications and artificial intelligence are drastically changing the way we live and do business. From the perspective of the development of circular economy, their role will primarily be to enable the development of new business models, accelerate the research and development of new products, extend the life of products and enable their easier repair and recycling. To this end, the use of online platforms, digital passports, blockchain and the concept of "internet of things" will be especially important, and will facilitate the exchange of information between key players, such as producers, consumers and recyclers. In addition, it will make a strong contribution to the application of public procurement, the processes of notification and reporting by producers on products and waste, in the context of extended producer responsibility and the development and implementation of public policies that support the development of a circular economy.

[51] Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the implementation of the Circular Economy Action Plan, COM 2019, 90, European Commission, Brussels, 2019.

Some of the mentioned opportunities are already being implemented, while other solutions have yet to be fully implemented (e.g. the use of digital passports for products). Among the implemented solutions, the following stand out:

- Databases and online platforms that enable exchange of information between different sectors (e.g. producers and recyclers) on substances of concern in products (SCIP), product composition (I4R, Circularise), or on the quality of food products (TagItSmart);
- Online platforms that provide services for renting and recycling clothes (Tale Me, MUD Jeans, Nuuly) or renting white goods to households (Bundles);
- Projects for the implementation of circular product design, such as the Accelerated Metallurgy project, funded under the Horizon 2020 programme, which aims to find new metal alloys and create new types of circular and sustainable materials with the help of artificial intelligence;
- Online platforms, applications and solutions for achieving circular practices in the phase of product use, such as the iFixit platform for repairing machines, the Scan4Chem application for providing information on the composition of products to consumers. The use of 3D printers for the production of spare parts for machines (Bosch) and connected machines to collect information on the condition of elevators for the implementation of planned maintenance (ThyssenKrupp);
- Systems for circular waste management, such as smart landfills for electrical and electronic waste (InnoWEEE), artificial intelligence systems and robots for separating waste based on visual recognition or infrared sensors (Recupel, ZenRobotics, SUEZ).

3.3.2. Challenges for digitalisation

Although digitalisation represents a significant opportunity for further development of circular economy, there are several challenges for its implementation. Some of the key challenges in this regard are:

- Absence of technical standards on data management, which makes it difficult to exchange and process data, both in the public and private sectors;
- Indecision of private actors, especially companies, due to concern for the protection of valuable information and data (e.g. protection of intellectual property), as well as the concern of citizens for the protection of personal data, can make information exchange difficult;
- Insufficient development of certain digital technologies, e.g. the application of robots in disassembling products at the end of their life cycle is usually limited to a certain type of product;
- High cost of digitalisation. Recyclers are often small businesses that do not have enough funds to invest in new digital technologies, such as robots or artificial intelligence;
- Absence of knowledge and skills, among entrepreneurs, consumers and civil servants, about how digital tools can contribute to the development of circular economy;
- Necessity of having a developed digital infrastructure (e.g. the spread of high-speed internet, 5G networks) for the optimal use of digital solutions for circular economy;
- Digitalisation is a necessary, but not sufficient solution for achieving circular economy. For example, digital passports cannot be used for products that have already been placed on the market. Blockchain technology enables more secure data exchange, but does not guarantee

that the first information entered into the system is correct, which means that an additional method of verification (e.g. independent audit) is required;

- Digitalisation can contribute to the development of circular economy, but it can also become a source of new problems. Introduction of digital tools, such as chips on products and robots, can lead to an increase in e-waste when such equipment enters the final phase of its life cycle.

3.3.3. Further steps in digitalisation and development of circular economy in the European Union

When it comes to the role of digitalisation in the development of circular economy in the European Union, it is important to point out that the connection between the digital and green transition is recognised by the European Green Deal, but that the networking of the two agendas is yet to come. The Action Plan for Circular Economy of the European Union recognises the importance of digitalisation, especially the development of digital passports for products. The introduction of digital passports for the needs of circular economy is foreseen as part of the Sustainable Products Initiative 0SPI), which the European Commission will propose most likely by the end of 2021. The basis of the initiative will be new rules for the circular design of certain products (e.g. electronics, textiles), including rules for the use of digital passports in products. The European Commission has already proposed the introduction of digital passports for large batteries used in industry and transport within the proposed Battery Regulation[52] in cooperation with the European Battery Alliance.

The European Data Strategy (COM/2020/66) envisages the establishment of a common European data space. In this way, some of the challenges in the exchange of data and information will be overcome, which will favour the development of the European economy, including the transition to a circular economy. Although the concept of a common data space has not yet been defined, the basic idea is to establish rules for the use and exchange of data in the EU that will promote the use of digital tools such as digital passports for products. The common data space will have its legal basis primarily in the proposed Data Governance Act[53] and the upcoming Data Act[54], which seek to promote the exchange of information between the public and private sectors, i.e. within the private sector, following already adopted legal acts for the exchange of information[55]. The Data Strategy and Circular Economy Action Plan foresee that the common data space will also be used for the development of circular economy.

The EU Multiannual Financial Framework 2021-27 and the Recovery and Resilience Facility will provide significant funds for the digitalisation of the European economy and society[56]. A particularly important role for further digitalisation will be played by the Digital Europe and Horizon Europe programmes, which are expected to support the establishment of a common space for data and the development of digital tools for the needs of circular economy.

---

[52] European Commission, Proposal for a Regulation of the European Parliament and of the Council concerning batteries and waste batteries, repealing Directive 2006/66/EC and amending Regulation (EU) No 2019/1020.

[53] European Commission, Proposal for a Regulation of the European Parliament and of the Council on European data governance (Data Governance Act).

[54] The European Commission has yet to submit a draft Data Regulation. Currently only the document on the impact assessment of the possible act is available: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13045-Data-Act-&-amended-rules-on -the-legal-protection-of-databases_en

[55] These are primarily: Regulation (EU) 2018/1807 of the European Parliament and of the Council of 14 November 2018 on a framework for the free flow of non-personal data in the European Union; Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019 on open data and the re-use of public sector information.

[56] The EC website: https://ec.europa.eu/info/strategy/eu-budget/long-term-eu-budget/2021-2027_en

3.3.4. Digitalisation in the Republic of Serbia

In the coming period, the Republic of Serbia should do everything to maximize the benefits of digitalisation, including the role of digitalisation in the transition to a circular economy. To that end, events in the European Union should be closely monitored and efforts should be made to apply EU rules in accordance with domestic needs and specificities. This is important, both because of the entire EU accession process, and because of successful trade exchange and increasing the performance of domestic companies when doing business on the single European market. Further steps that should be taken include:

- Defining a vision for the development of a digital circular economy, which may include timelines. Such a vision should be determined after constant and comprehensive consultations with representatives of the economy, professional circles (universities, consulting firms, research centres), civil society and local communities;
- Defining clear rules for using data for circular economy needs. The first step should be to determine what information is needed to transition to a circular economy. It is necessary to establish technical standards that actors in circular economy can use to share and process data. It is necessary to define rules that will facilitate the exchange of data for the needs of circular economy, and which at the same time ensure the protection of personal and business-sensitive data (e.g. intellectual property). Special attention should be paid to defining the rules for using digital passports for products in cooperation with businesspeople. When defining these rules, one should carefully follow the developments in the EU and, if possible, take part in discussions about the development of a common space for data and rules for digital passports in the EU;
- Investments in the digitalisation of the economy, society and state administration, including the development and introduction of digital solutions for the needs of circular economy. In order to define priorities for investments, it is necessary to consult representatives of the public sector (state administration, provincial authorities, local self-government units), producers, operators for waste management, representatives of civil society, professional circles and associations for consumer protection; and to take part in the Horizon Europe and Digital Europe programmes.

4. VISION AND GENERAL OBJECTIVE OF THE PROGRAMME

By applying the circular economy concept, Serbia becomes modern, resource and energy efficient and safe country, with a regionally and globally competitive economy, innovatively and digitally transformed and dedicated to achieving climate neutrality, along with the development of education for sustainable development. It is committed to green transition wherein the economy develops, pollution is reduced, and sustainable communities are created, which leads to the preservation of health and the improvement of the quality of life of its citizens.

General objective: Creating a stimulating environment for the development of circular economy in order to support green transition in the Republic of Serbia

The general objective of this Programme is to organise and systematically initiate the development of circular economy in the Republic of Serbia and involve all key actors in it. The process of transition

from a linear to a circular economy is a long-term process that goes beyond the duration of this Programme. This document defines the priorities for three years, which lay the foundation for the further development of circular economy.

Although several activities have been carried out to introduce the principles of circular economy, they were sporadic and with a narrow focus on certain subjects or topics. With the proposed package of measures, all current and future activities in this field are intensified and directed towards laying the foundations for the development of a circular economy in the economy and society, which achieves a synergistic effect. By including the relevant state institutions, economic operators, local self-governments, the civil sector, the scientific community, the media, educational institutions and the general public in that process, the effective realisation of the set goal and the continuity of the initiated changes are ensured. The implementation of the measures contributes to the further development of a more resource-efficient, climate-neutral and competitive economy, attracting additional investments and creating circular communities across the country, which also supports green transition in the Republic of Serbia.

Domestic material consumption per capita (t) will be used as an indicator for monitoring the achievement of the overall objective, and its value from 2019 will be used as a reference (baseline) value.

5. ANALYSIS OF OPTIONS FOR THE ACHIEVEMENT OF OBJECTIVES

5.1. Analysed options – assumptions

For the purposes of analysing the achievement of the of Circular Economy Development Programme, in addition to the status quo option, three possible options were considered, which differ from each other in terms of the number of implemented measures and the group of participants included in them.

The impact of the implemented measures was analysed in each of the options through:

- economic savings based on the reduced use of resources and energy for those economic sectors that are recognised as the most important for the development of circular economy (industry, agriculture and construction);
- economic benefits for households (increase in their average income due to the increase in employment and lower expenses for the purchase of new products due to the longer life of final goods);
- economic benefits for economic operators due to the reduction of CO_2 emissions (reduction of the carbon footprint in the stages of the production process);
- change in Gross Domestic Product;
- change in the number of employees of the economic operators;
- change in tax revenues of local self-government units;
- change in state budget revenues.

Basic macroeconomic assumption for the projection of savings and economic benefits is an average annual GDP growth rate of 3%. The time horizon of the analysis is ten years, that is, the total economic benefits and savings are calculated and presented for the three-year Programme implementation period (2022-2024) and the period after the Programme implementation (ending in

2032). Namely, more significant economic benefits for industry and households, as well as the impact of circular economy development on macroeconomic parameters in the Republic of Serbia can be expected only after the implementation of this Programme, while in the short term, these impacts are less pronounced. This is because a certain period of time is needed for companies, households, individuals and local self-government units to accept the principles of circular economy and adjust their behaviours and expectations in accordance with them.

A social discount rate of 5% was used to calculate the present value of the total economic benefits in the specified period. Due to the lack of adequate data, the presented options do not include potential economic benefits for the environment resulting from reduced emissions of harmful gases into the atmosphere, nor economic benefits for the population due to the reduction of health costs due to a cleaner environment. The calculation of economic benefits by economic sector (industry, agriculture and construction) was done exclusively on the basis of estimated direct savings in the use of energy, fuel and water at the sector level.

5.1.1. Status quo option

This option is based on the following assumptions:

- none of the proposed measures from the Circular Economy Development Programme are applied;
- the use of energy from fossil fuels (coal) changes in accordance with measures from other national strategies and programmes;
- the share of renewable energy sources changes in accordance with measures from other national strategies and programs;
- no replacement of primary sources of energy by secondary ones;
- no change in consumption patterns;
- no new products with extended lifespans are created.

5.1.2. Option 1

The first option assumes the implementation of activities aimed at supporting the industry in the transformation to a circular business model, such as education, financial incentives, analysis of the situation in the field of fiscal policy, as well as the creation of business plans and good practice guidelines that would serve as a positive example for other companies in and outside the sector.

This option implies that the criteria for allocating funds to companies through public calls (grants) within the available programmes/funds are adapted to the introduction of circular economy principles. Also, companies receive support for applying to public calls by providing assistance in the preparation of applications and their submission in accordance with the procedures defined by open public calls.

The first option implies that government institutions and commercial banks are connected in order to find easier access to funds for financing projects of companies in the field of circular economy (loans, subsidies, etc.), but that the banks themselves have developed and incorporated into their operations a general understanding of the importance and ways of functioning of circular economy (creation of a guide for “circular financing”, development of new credit lines, recognition of the risks involved in financing this field, etc.).

Although these measures cover only the economic sector, economic savings and benefits will also be achieved by households, as well as by local self-government units and the state through an increase in budget revenues due to an increase in employment.

5.1.3. Option 2

In addition to the measures aimed at supporting the industry, activities are also carried out to support local self-government units, i.e. to raise the awareness of competent authorities of local self-governments and public and utility companies about the concept of circular economy. The assumption of this option is that the creators of local policies, by applying the principles of circular economy, change the structure and operations of the local economy, improve the infrastructure and contribute to more sustainable local development. Also, by applying the concept of circular economy, local governments improve the quality of the environment by reducing emissions of polluting substances into the air, water and soil, thereby simultaneously improving the quality of life of their citizens.

The second option foresees the application of innovation and smart specialisation in the development of the circular economy concept. This means that cooperation has been established between scientific and research organisations and companies in the field of innovation and optimisation of production. Improving cooperation between scientific research organisations and economic operators and increasing innovative performance affects all sectors of the economy and serves as the basis for sustainable economic development. At the same time, the improvement of processes and equipment contributes to a more efficient use of resources, the replacement of hazardous materials and raw materials from the production process, and the reduction of waste generation.

5.1.4. Option 3

In addition to supporting the economic sector and local governments, this option also assumes the improvement of the waste management system, the application of green procurement and voluntary instruments, as well as the significant participation of educational institutions in the development of circular economy concept. This option assumes that a system of primary waste selection has been established, forms of industrial symbiosis have been established in order to optimise the use of resources and reduce the amount of waste, the construction sector has developed a system for construction and demolition waste management, recycling processes for certain waste streams and systems for managing food, surplus food and food waste have been improved compared to the status quo scenario.

In the third option, policy makers correctly foresee where imbalances can arise between the skills that employees currently possess and those skills that are necessary for the transition to a circular economy. Harmonisation of the aforementioned skills of the workforce is possible only with strong cooperation between educational and scientific institutions and companies.

Given that this option implies the application of the concept of circular economy to all subjects in society with a special emphasis on raising consumer awareness, the expected economic benefits at the micro and macro level are significantly higher compared to the status quo option.

5.1.5. Initial assumptions for the projections of economic indicators as per option

The following table indicates numerically expressed changes in the costs of raw materials and energy in industry, agriculture and construction, changes in gross domestic product, changes in employment and changes in CO_2 emissions in relation to the status quo option for each of the three analysed options.

Table 5.1 Expected changes in basic economic parameters in relation to the status quo option (percentage change at the annual level)

Economic indicator	Option 1	Option 2	Option 3
Use of raw materials and energy	-15%	-20%	-25%
Gross Domestic Product	+0.1%	+0.4%	+0.6%
Employment	+0.1%	+0.2%	+0.3%
CO_2 emission	-0.1%	-0.2%	-0.3%

5.2. Expected economic benefits and implementation of the Circular Economy Development Programme

The following table provides a comparison of options based on the economic benefits that arise due to the reduction in the use of resources and energy, that is, lower costs in business.

Table 5.2 Economic savings for the economy (industry, agriculture, construction) (million dinars, constant prices from 2021)

Option	Discounted value (2022-2032)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Status quo	0	0	0	0	0	0	0	0	0	0	0	0
Option 1	1.049.823	0	14,167	14,592	45,089	77,402	159,449	197,079	253,739	261,351	269,192	277,268
Option 2	1.392.520	0	14,167	29,184	60,118	123,844	191,339	246,349	338,319	348,468	358,922	369,690
Option 3	1.688.740	0	14,167	43,776	75,148	154,805	223,229	295,618	372,151	435,585	448,653	462,113

Total potential economic savings for the three economic sectors based on the reduction in the use of resources and energy for the period from 2022 to 2032 range between 1,049 and 1,668 billion RSD (discounted value).

Reducing the use of resources and energy due to the application of circular economy principles has a positive impact on the increase in productivity in the observed economic sectors, which further results in a change in the Gross Domestic Product. The following table shows the potential increase in Gross Domestic Product in the Republic of Serbia.

Table 5.3 Gross Domestic Product (change compared to the status quo scenario, millions of RSD, constant prices from 2021)

Option	Discounted value (2022-2032)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Status quo	0	0	0	0	0	0	0	0	0	0	0	0
Option 1	186.795	0	2.834	5.840	9.627	14.878	21.719	28.964	36.630	44.737	53.304	62.353
Option 2	411.471	0	2.834	6.424	11.433	17.981	31.316	52.063	80.906	111.543	144.057	178.539
Option 3	538.006	0	2.834	7.008	13.239	21.085	37.719	65.287	101.413	146.892	195.263	246.668

The projection of the GDP trend in the following period of ten years for each of the analysed options is presented in the following figure.

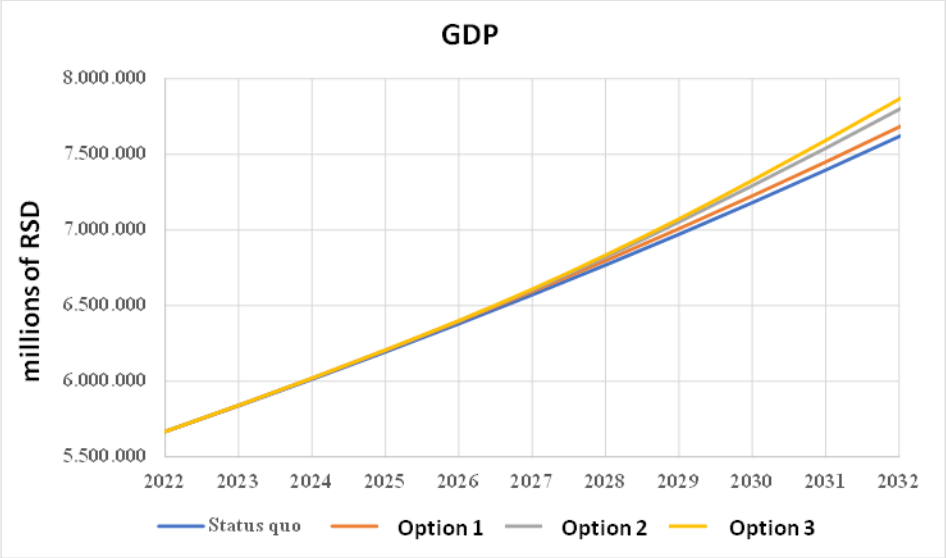

Figure 5.1. Projection of GDP (2022-2032, millions of RSD, constant prices from 2021)

When it comes to employment, previous empirical research indicates that the greatest positive impact of circular economy is visible in the waste management sector (including recycling). On the other hand, a negative impact may appear in the construction sector, as a result of increased productivity and the use of new construction techniques, but also in sectors related to the production of durable consumer goods, such as electronics and motor vehicles. The estimated effects on employment may be different, depending on the degree of mechanisation and automation of those jobs. The proposed options are based on the assumption that sectoral shifts in the labour market due to the application of circular economy concept in accordance with this programme will have a positive net effect on total employment in the economy in the coming period.

The following table provides an overview of employment growth by option compared to the status quo.

Table 5.4 Number of employees (change compared to status quo scenario)

Option	Total (2022-2032)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Status quo	0	0	0	0	0	0	0	0	0	0	0	0
Option 1	50,777	0	230	462	1,626	3,502	5,868	8,260	10,679	13,123	15,594	18,092
Option 2	84,275	0	230	693	2,555	4,904	8,453	12,753	17,580	22,464	27,406	32,407
Option 3	110,356	0	230	924	3,252	6,773	11,.041	15,832	21,872	29,189	36,600	44,106

Total increase in employment for the period from 2022 to 2032 ranges between 50 and 110 thousand new employees.

The projection of employment trends in the following period of ten years for each of the analysed options is presented in the following figure.

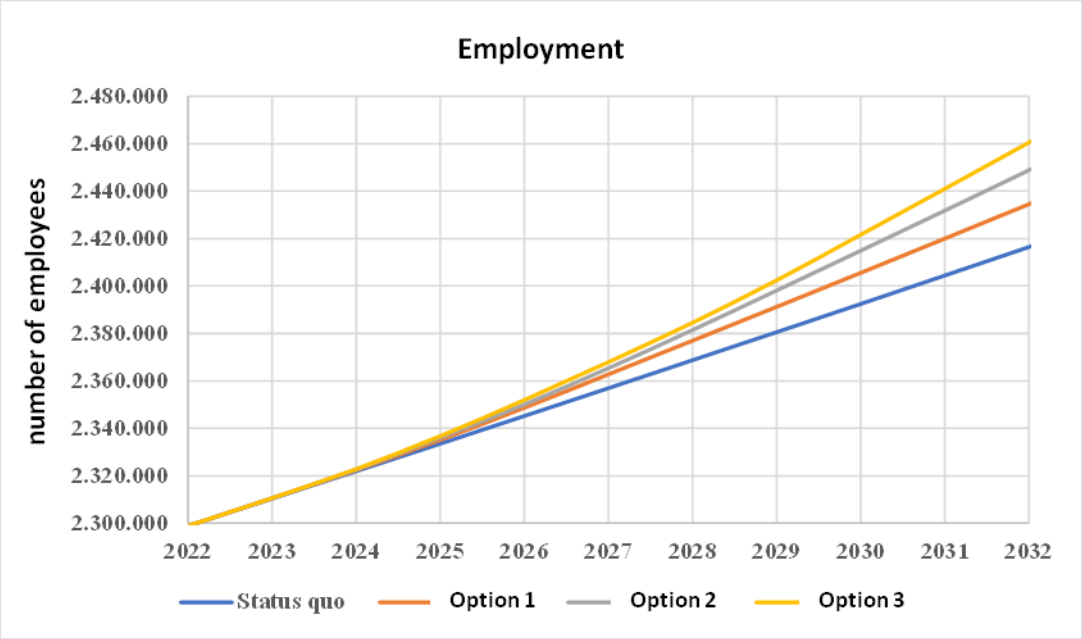

Figure 5.2. Projection of employment trends in Serbia (2022-2032)

Due to the increase in employment, the average household income will increase. Also, individuals and households will gain economic benefits (savings) based on a longer period of replacement of durable consumer goods, i.e. a longer product life. The following table shows the total economic benefits for households.

Table 5.5 Total economic benefits for households (change compared to the status quo scenario, millions of RSD, constant prices from 2021)

Option	Discounted value (2022-2032)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Status quo	0	0	0	0	0	0	0	0	0	0	0	0
Option 1	33,464	0	152	305	1,071	2,308	3,867	5,444	7,037	8,649	10,277	11,923
Option 2	55,540	0	152	457	1,684	3,232	5,571	8,405	11,586	14,805	18,062	21,357
Option 3	72,728	0	152	609	2,143	4,464	7,276	10,434	14,415	19,236	24,120	29,067

The total potential economic benefits for households based on the application of circular economy concept for the period from 2022 to 2032 range between 33 and 72 billion RSD (discounted value).

The increase in labour productivity, GDP and employment will have a positive impact on the budget revenues of local self-government units and the state. The following tables show the potential increase in total budget revenues of local self-government units, as well as state budget revenues.

Table 5.6 Change in budget revenues of LSGUs (change compared to the Status quo scenario, millions of RSD, constant prices from 2021)

Option	Discounted value (2022-2032)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Status quo	0	0	0	0	0	0	0	0	0	0	0	0
Option 1	6,693	0	30	61	214	462	773	1,089	1,407	1,730	2,055	2,385
Option 2	11,108	0	30	91	337	646	1,114	1,681	2,317	2,961	3,612	4,271
Option 3	14,546	0	30	122	429	893	1,455	2,087	2,883	3,847	4,824	5,813

The total increase in budget revenues of local self-government units in Serbia for the period from 2022 to 2032 ranges between 6 and 14 billion RSD (discounted value).

Table 5.7 Change in state budget revenue (change compared to the status quo scenario, millions of RSD, constant prices from 2021)

Option	Discounted value (2022-2032)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Status quo	0	0	0	0	0	0	0	0	0	0	0	0
Option 1	56,039	0	850	1,752	2,888	4,463	6,516	8,689	10,989	13,421	15,991	18,706
Option 2	123,441	0	850	1,927	3,430	5,394	9,395	15,619	24,272	33,463	43,217	53,562
Option 3	161,402	0	850	2,102	3,972	6,325	11,316	19,586	30,424	44,068	58,579	74,001

Total increase in revenue of the Serbian state budget for the period from 2022 to 2032 ranges between 56 and 161 billion RSD (discounted value).

Application of the circular economy concept will result in a reduction of CO_2 emissions. In addition to the significant impact on improving the quality of the environment, the reduction of CO_2 emissions will also have an impact on the competitiveness of the Serbian economy and lead to significant economic savings. The EU Green Deal clearly defines the necessity of reducing carbon emissions in the production cycle as a condition for placing products on the EU market. That is why it is necessary to lower the carbon footprint of production cycles in the Republic of Serbia to at least the average level of EU countries so that Serbian products remain competitive on this market, i.e., so that they are not charged additional customs duties during importation.

The following table shows the potential economic savings resulting from the reduction of CO_2 emissions.

Table 5.8 Economic savings based on the reduction of CO_2 emissions (change compared to the Status quo scenario, millions of RSD, constant prices from 2021)

Option	Discounted value (2022-2032)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Status quo	0	0	0	0	0	0	0	0	0	0	0	0
Option 1	16,801	304	627	968	1,329	1,710	2,112	2,537	2,985	3,457	3,954	4,478
Option 2	33,495	609	1,253	1,934	2,653	3,413	4,214	5,059	5,949	6,887	7,874	8,913
Option 3	50,084	913	1,878	2,898	3,974	5,109	6,306	7,566	8,894	10,291	11,760	13,305

The total economic savings based on the reduction of CO_2 emissions for the period from 2022 to 2032 ranges between 16 and 50 billion RSD (discounted value).

5.3. Justification of the accepted option

Environmental protection is one of the most important problems faced by policy makers today. The way in which the production of material goods is organized, the ways of manifesting the stages of the product's life cycle (depending on the type of activity and the sector of the economy, such as the exploitation of raw materials, distribution/logistics), the ways of using goods and their disposal have a great impact on the environment. at the end of life. Traditional production processes do not take into account problems such as pollution and degradation of environmental quality and depletion of natural resources. If economic (fiscal) policy does not internalize indirect external costs, producers will not pay attention to the effects of their business activities on the environment. In addition to the increase in environmental pollution, the increase in the prices of resources, materials and energy, as well as the increase in the number of inhabitants, especially in urban settlements, require companies and policy makers at all levels to adopt strategies and action plans to reduce the extraction of new resources from nature and the amount of waste which occurs at the end of the product's life.

In contrast to the traditional economy as it is currently represented in Serbia, circular economy implies that the main source of economic growth is the reuse of a large number of materials obtained from products that have completed their life cycle, with as little extraction of new resources as possible. In this way, companies achieve significant economic savings based on the use of smaller amounts of resources and energy.

Economic benefits from the introduction of circular economy are realized at three levels: at the level of the economy as a whole, companies and consumers. For the economy, significant material savings are reflected in the reduction of the risk of price instability and reduced supply, an increase in the rate of employment and productivity (multiplicative effect) and long-term general benefits (reduction of external effects). Circular economy enables economies to grow sustainably, reduce dependence on changes in resource markets, and reduce exposure to sudden price changes.

The benefits that companies have from circular economy originate from several factors. Firstly, it is assumed that companies will reduce the cost of purchasing materials. Secondly, interaction with customers is improved and their loyalty increased. Thirdly, the complexity of final products is reduced, thanks to which their life cycle is easier to manage. As a result of the cooperation of manufacturers with scientific and educational institutions and innovators, but also as a result of the engagement of their internal resources, manufacturers are able to design their products in such a way as to reduce the consumption of natural resources, reduce the generation of waste and emissions and minimize (or even eliminate) the use of harmful substances in all phases.

Consumers and users of products also benefit from a circular economy as opposed to linear economy, and not only due to the assumed price change of the final products. Firstly, consumers benefit from lower costs due to the extended life of the product. Also, consumers benefit from increased choice and customisation of products for customers. Consumers in circular economy also have the so-called secondary uses when products have more uses than their basic ones and thus satisfy needs for which they were not originally intended.

The transition to a circular economy, in addition to changes in production processes and business models, also causes changes in the labour market. This influence is also reflected in the change in the number of jobs in individual sectors of the economy and in the knowledge and skills that workers must possess in an economy that has introduced the concept of a circular economy. In order to develop adequate skills among employees to implement the principles of circular economy, close cooperation between educational and scientific institutions and companies is necessary.

In order to implement the transition to a circular economy and realize all the aforementioned benefits, it is necessary to plan certain activities at the level of the state, local self-government units, companies and households. Based on the analysis of the three proposed options (plus the status quo option), it has been observed that the implementation of option 3 achieves the highest values of all observed economic indicators (economic savings based on lower consumption of energy and resources, increase in GDP and employment, economic savings based on the reduction of CO2 emissions, economic savings for households, i.e. consumers and potential income for the budgets of local self-government units and the state). If circular economy were to develop only through the support of certain social entities (as envisaged in Options 1 and 2), the economic benefits for the entire economy, but also for individual producers and consumers, would be many times smaller.

6. SPECIFIC OBJECTIVES OF THE PROGRAMME AND MEASURES FOR THE ACHIEVEMENT THEREOF

Specific objective 1: Support to economy in transforming towards a circular business model

Economic operators play a very important role in the transition to a circular economy and are one of the key participants in that process. Accordingly, this specific objective refers to providing support to economic operators and laying the foundations for the transformation of the economy to a circular business model. Planned measures include the education of companies, the development of additional mechanisms of financial incentives for the economy and the provision of direct technical assistance to a selected number of companies in the development of business action plans for the adoption of the principles of circular economy, as well as encouraging cooperation between scientific and research organisations and companies in the field of innovation and production optimisation.

Innovations are an integrated part of the transition to a circular economy. The transition of the economy to a circular business model requires the development and application of innovative solutions in all phases of production (from product design and process design, production management, packaging and market placement) as well as in the after-sales phase, which includes servicing and maintenance until the end of the product's life. The focus of these solutions is on more efficient use of resources, raw materials and energy, and the goal is environmental protection, which requires a good knowledge of materials and modern techniques for analysing their chemical and physical properties, process modelling, as well as access to specialized research equipment. Innovative solutions constitute a significant challenge for companies in the Republic of Serbia, which are mostly micro, small and medium enterprises with limited capacities for research and development. The lack of capacity of economic operators can be overcome by encouraging cooperation between economic operators and scientific research organisations. At the same time, existing research capacities in scientific organisations will be more efficiently and fully utilized.

To monitor the achievement of this specific objective, the *circular use of materials rate (%)* will be used as an indicator, and its 2019 value will be used as a reference (baseline) value.

Measure 1.1: Education of specific groups of companies for the application of the circular economy concept

Adequate technical capacities are necessary for the transition of companies to a circular economy; therefore the measure foresees the education of professionals who are in a position to carry out this transition. It is expected that the acquired knowledge will initiate a search for ideas on the application of technical and technological, organisational and business innovations and other changes in production processes in order to reduce resource consumption and increase energy efficiency.

The focus of the measure is on the education of specific groups of companies[57], such as:

1. Operators who are obliged to obtain integrated permit on the topics of applying best available techniques and reaching the emissions limit values prescribed by BREF documents with the help of the circular economy concept and with the aim of: reducing waste generation,

[57] Recommendations from the document "Road Map for Circular Economy" and the priority groups recognised in the "Green Agenda for the Western Balkans" and the Action Plan will be the basis for identifying target groups whose capacities should be strengthened.

obtaining energy-efficient processes and products, improving water and wastewater management;

2. Manufacturers of packaging on the topic of circular product design, use of alternative materials that generate less waste, as well as materials to replace single-use plastics;
3. Entities from the agricultural sector on the topic of utilisation of by-products, energy production from renewable energy sources;
4. Companies from the processing industry sector (production of electrical and electronic equipment, batteries and vehicles, furniture, plastic products, textiles, etc.), on the topic of efficient use of raw materials and energy, circular product design, chemical leasing and the introduction of voluntary instruments.
5. Small and medium-sized enterprises in production that, when designing products, should apply the requirements of eco-design for products when these requirements are prescribed by special technical regulations.

Effective education of specific groups of companies implies a detailed analysis and identification of their needs for new knowledge and a well-designed plan to strengthen the capacity of companies, which includes a training programme and schedule of implementation. In addition, it is planned to produce specialised manuals and other informative and educational material on topics that are particularly important for understanding and applying the concept of circular economy.

The institution responsible for the implementation of the measure is the ministry responsible for environmental protection of the Republic of Serbia, which is to implement the measure in cooperation with the ministry responsible for economic affairs of the Republic of Serbia, the Chamber of Commerce of Serbia, the National Alliance for Local Economic Development (NALED) and civil society organisations. Some of the activities provided for in the measure will be implemented by the staff of the Ministry of Environmental Protection of the Republic of Serbia as a part their regular activity, which will be covered by funds regularly allocated from the budget of the Republic of Serbia. Additional funds will be provided from international donors in the amount of RSD 4,285,000 for the implementation of activities related to the creation of specialised manuals and the organisation of workshops. The degree of implementation of the measure will be monitored through the total number of drafted specialised manuals intended for companies and the total number of companies that participated in the organised workshops.

The measure is informative and educational in nature.

Measure 1.2: Support to companies in finding incentives and financial instruments

The transition to a circular economy entails certain costs, which are the main obstacle for companies striving to modernise their production and invest in innovation. Increasing the investment of companies in the application of circular economy model can be achieved through appropriate programmes for the allocation of grants or the use of favourable loans and timely and adequate information of companies about the programmes/sources of financing that are available to them.

Current levels of investment are still insufficient to develop the transition to a circular economy on a comprehensive basis. In the previous period, economic and fiscal incentives were predominantly aimed at overcoming the negative consequences of the crisis caused by the COVID-19 pandemic. Such incentives were in fact an incentive to a linear economic system, rather than an investment in the transformation of the Serbian economy towards a sustainable economy. Therefore, it is necessary

to conduct an analysis of fiscal policy and administrative procedures in order to define proposals for incentive mechanisms for companies for a faster and simpler introduction and application of circular economy principles in business.

Also, it is necessary to adjust the criteria for the allocation of funds through public calls (grants) within the available programmes/funds so that they support the application of circular economy principles. At the same time, in order to better absorb the available financial resources, it is necessary to provide support to companies in the preparation and submission of applications for public calls in accordance with the defined procedures of public calls.

Connecting government institutions and commercial banks through consultative activities in order to find easier access to funds for financing projects of companies in the field of circular economy (loans, subsidies, etc.) is very important. In order for the role of banks in this direction to be stimulating, it is necessary for banks to develop and incorporate into their operations a general understanding of the importance and manner of functioning of the circular economy. Banks should create and issue widely accepted and recognised guidelines for financing circular economy projects. It is also necessary for banks to adapt existing financial models or develop completely new ones for projects in the field of circular economy. This means that social benefits and environmental costs need to be included in existing or new financial models.

Currently in the Republic of Serbia, banks that offer "green loans" in fact finance, to the greatest extent, projects in the field of energy efficiency, but not those in the field of circular economy. That is why it is important to introduce new credit lines to small, medium and large companies that will follow circular business activities. Commercial banks should also work on improving their personnel so that they can effectively assess the risks and vulnerabilities of circular projects.

Providing assistance to companies in ensuring favourable financial means for the introduction of circular economy principles will affect their competitiveness on the domestic and foreign markets, as well as the quality of the environment, the reduction of climate change and, consequently, the health and general well-being of citizens.

The institution responsible for the implementation of the measure is the Ministry of Environmental Protection of the Republic of Serbia, which is to implement the measure in cooperation with the Ministry of Economy and the Ministry of Finance of the Republic of Serbia, the Chamber of Commerce of Serbia, the Association of Banks of Serbia, the National Alliance for Local Economic Development (NALED) and the companies. Some of the activities provided for in the measure will be implemented by the staff of the Ministry of Environmental Protection of the Republic of Serbia as a part of their regular work, which will be covered by funds regularly allocated from the budget of the Republic of Serbia. Additional funds from international donors in the amount of RSD 1,500,000 will be provided for the implementation of activities related to the adjustment of the criteria for the allocation of funds and the preparation of the analysis of fiscal policy and administrative procedures. The degree of implementation of the measure will be monitored through the total number of commercial banks that were involved in consultative activities, the total number of continuously available programs/funds that support the introduction of circular economy principles and the analysis of fiscal policy and proposals for incentive mechanisms for the introduction of circular economy.

The measure is of an incentive type.

Measure 1.3: Analysis of the potential for the application of the circular economy model in certain fields of processing industry and support to selected companies

The measure involves selection and detailed analysis of at least two different fields of the processing industry in order to assess the potential and the necessary investments for the transition to a circular economy. The basis of the analysis should be the processes and activities carried out by companies, which are most often linked to the goals of circular economy, such as:

- increasing energy efficiency at the level of an installation or its individual parts;
- reducing the use of natural resources as a result of best available techniques;
- reduction of waste generation;
- reduction of air, water and soil pollution;
- use of renewable energy sources and materials;
- application of new technologies and replacement of raw materials with less harmful and renewable ones;
- extending the life of the product through design and maintenance;
- reprocessing and recycling of certain components and materials;
- research projects and innovations;
- digitalisation.

The analysis of individual fields should point to the potential of the introduction of circular economy and serve as a basis for initiating more intensive and extensive cooperation between businesspeople of different sectors of the industry, as well as between scientific and research organisations and educational institutions with economic operators.

Representatives – companies for each of the analysed fields of the processing industry – are to be selected, and a business action plan for the transition to circular economy will be drawn up for them, based on a detailed assessment of the current situation, as well as an analysis of the potential for the application of the circular economy model. The analysis needs to use modern tools, such as indicators of circularity, life cycle analysis, etc.

In addition to increasing the competitiveness of companies on the domestic and foreign markets, the implementation of business action plans for the transition to a circular economy will contribute to a more efficient use of resources, reduction of pollution, improvement of working conditions in selected companies, as well as employment of additional personnel. Successfully implemented business action plans can serve as case studies and examples of good practice for other companies in the covered fields of the manufacturing industry.

Financial resources for the implementation of the measure in the amount of RSD 10,000,000 will be provided from international donor aid. The institution responsible for the implementation of the measure is the Ministry of Environmental Protection of the Republic of Serbia, which is to implement it in cooperation with the Ministry of Economy and the Chamber of Commerce of Serbia. The degree of implementation of the measure will be monitored through the total number of fields of the processing industry included in the analysis of the potential for the application of circular economy and the total number of companies that have prepared business action plans for the transition to circular economy.

The measure is informative and educational in nature.

Measure 1.4: Encouraging cooperation between scientific-research organisations and companies in the field of innovations and production optimisation

Bearing in mind that the transition to a circular economy model is closely related to the development and application of innovative solutions in production and business and requires significant research and development activities, it is necessary to encourage cooperation between companies and scientific research organisations in achieving this goal.

Accordingly, the measure envisages the establishment of a programme for the allocation of financial resources for the introduction of innovative and other technical solutions in companies, with the aim of transitioning to a circular economy model. Funding programmes should be implemented through specialized public calls that will support the cooperation of companies and scientific-research organisations on priority topics for the development of the national economy, such as, for example, development of smart packaging, development of new additives (fillers, pigments), digitalisation of processes, etc.

Improving cooperation between scientific research organisations and economic operators and improving innovative performance affects all sectors of the economy and is a driver of economic growth and the basis of sustainable economic development.

Financial resources for the implementation of the measure will be provided from the budget of the Republic of Serbia, from the project "Reducing the carbon footprint of local communities by applying the principles of the circular economy in the Republic of Serbia", in the amount of RSD 10,800,000 and from the Global Environment Fund (GEF) in the amount of RSD 3,600,000. The institution responsible for the implementation of the measure is the Ministry of Environmental Protection of the Republic of Serbia, which is to implement the measure in cooperation with the Innovation Fund, the United Nations Development Programme (UNDP) office, scientific research organisations and companies. The degree of implementation of the measure will be monitored through the total number of published public calls for projects related to the introduction of innovative and other technical solutions with the aim of applying circular economy model and the total number of companies that have achieved cooperation with scientific and research organisations through the mentioned calls.

The measure is of an incentive type.

Specific objective 2: Support to local self-governments in creating circular communities

Strengthening the capacity of local self-governments is a necessary step in the implementation of any type of reform at the national level, and it is especially important for circular economy in which, in addition to economic operators, citizens also participate directly, as consumers and users of services.

The gap between the existing situation in local self-governments and the situation in a community that functions in accordance with the principles of circular economy in terms of resource use, waste and water management, energy use, urban mobility and others, opens up a huge potential for improvement, but also represents a great challenge for LSGUs . To fully utilise that potential, specific knowledge and skills are needed. An additional challenge is the fact that each LSGU is characterised by a specific social, economic and territorial context.

The starting point is the creation of a local road map for circular economy, wherein achievable goals are set based on the real situation, which also takes into account the specificities of the local community. The local road map is a comprehensive document that looks at the incorporation of circular economy principles into local policies and a roadmap for the transition to a circular economy

model, which focuses equally on economic development, environmental and human health protection, and resource conservation. By providing expert support in that step, a secure foundation is laid for the sustainable development of LSGUs based on the principles of circular economy.

The conducted analysis of the current situation in the Republic of Serbia indicated that the priority areas for circular economy at the local level, in addition to waste management and mobility, should be water management and energy efficiency.

By achieving the goal, it is possible to transfer necessary knowledge for the introduction of circular economy at the local level, which ensures the capacities for achieving the transition. In a broader context, local self-governments are supported to ensure a better quality of life in a healthier environment for their citizens, paving the way for the formation of a network of circular communities that use resources and energy in a sustainable manner, thereby reducing their carbon footprint.

To monitor the achievement of a specific objective, the t*otal number of LSGUs supported through the programme in the introduction of the circular economy concept* will be used as an indicator.

Measure 2.1: Support to selected local self-government units in preparation of local road maps for circular economy

The measure involves providing assistance to selected LSGUs in the preparation of a local road map for circular economy through pilot projects.

Within the projects, representatives of the competent authorities, in cooperation with a group of recruited experts from the field of circular economy, will work on an analysis of the current situation in their LSGU (review of institutional capacities and local regulations, determination of material and energy flows), as well as on a definition of the necessary measures and creation of a local road map based on the performed analysis. The projects will be implemented through cooperation with local authorities, public and utility companies and interested companies in the territory of the local self-government. During cooperation with experts, LSGU representatives will simultaneously acquire the necessary knowledge to present the measures foreseen in the road map, and the prepared documents will serve as case studies and examples of good practice for other local governments. Local road maps need to be linked and harmonized with existing LSGU documents, such as low-carbon production strategies or waste management plans. In this manner, local roadmaps for circular economy are to be prepared for 5 selected LSGUs. The selection of LSGUs should be carried out on the basis of previously defined criteria, which, in addition to the size of LSGUs, should also include the level of development, impact on the environment, threats to human health, as well as available capacities.

Financial resources for the implementation of the measure in the amount of RSD 4,900,000 will be provided by the Global Environment Fund (GEF). The institution responsible for the implementation of the measure is the Ministry of Environmental Protection of the Republic of Serbia, which is to implement the measure in cooperation with local self-government units, the Standing Conference of Towns and Municipalities, the National Alliance for Local Economic Development (NALED) and the United Nations Development Programme (UNDP) office. To monitor the degree of implementation of the measure, the total number of LSGUs for which local road maps have been prepared will be used as an indicator.

The measure is informative and educational in nature.

Measure 2.2: Raising awareness at local authorities, public and utility companies and local economic operators on the circular economy concept

Creation of local road maps for a few selected LSGUs is not enough to achieve necessary changes at the national level, which is why it is necessary to work on the transfer of knowledge on a wider scale.

As the first step, it is necessary to prepare a guide that contains the method and principles for the correct identification and quantification of the existing potential for the application of circular economy (analysis of the flow of materials and energy, impact on the environment, etc.), as well as guidelines for the correct definition of measures for the road map, in regarding the necessary investments and profits.

As the second step, it is necessary to implement distribution of the prepared guidelines, which should be followed by an appropriate promotional campaign, which includes organisation of workshops and seminars for local governments, public and utility companies and other stakeholders (business representatives, associations, etc.). These promotional gatherings are an opportunity to present previously prepared local road maps for the selected LSGUs to the participants, as well as for them to get to know each other, exchange experiences and orient towards further connection and networking. An important segment of the campaign should certainly be the transmission of information about the available funds and funding programmes that can be used to implement the measures and projects foreseen in the local road map. In order to further strengthen capacities, as a part of the campaign, study trips can be organized for representatives of LSGUs and stakeholders to EU countries and cities that have already reached the level of circular sustainable communities.

Financial resources for the implementation of the measure in the amount of RSD 1,683,000 will be provided from the budget of the Republic of Serbia, from the project "Reducing the carbon footprint of local communities by applying the principles of the circular economy in the Republic of Serbia". The institution responsible for the implementation of the measure is the Ministry of Environmental Protection of the Republic of Serbia, which is to implement the measure in cooperation with the Standing Conference of Towns and Municipalities, the National Alliance for Local Economic Development (NALED) and civil society organisations. To monitor the degree of implementation of the measure, the total number of LSGUs included in activities for strengthening the capacity for the introduction of circular economy will be used as an indicator. The planned measure is informative and educational in nature.

Specific objective 3: Improving the waste management system through more efficient use of waste in circular economy

This goal includes measures and activities that will contribute to further development of the circular economy in the Republic of Serbia in the field of waste management. The implementation of the planned measures will contribute to the reduction of plastic waste generation, more efficient recycling of non-hazardous construction waste, as well as the improvement of recycling processes and ensuring the circularity of recyclates, which will be achieved by checking the presence and by removal of the most dangerous chemicals that can contaminate circular flows. In addition, development of industrial symbiosis will enable the establishment of market mechanisms for the supply of residues from production processes and the demand for these residues that can be used as a resource in production cycles. Also, the improvement of the food management system and more rational procurement of food will contribute to the appropriate use of surplus food and reduce the amount of waste disposed of in landfills, and increase the utilisation of food waste for compost or energy production.

To monitor the achievement of a specific objective, the *total number of prepared documents and the total number of workshops and promotional activities for the improvement of the waste management system* will be used as an indicator, and the value from 2021 will be used as the reference (baseline) value.

Measure 3.1: Reducing the generation of waste from single-use plastic products

Directive (EU) 2019/904 of the European Parliament on the reduction of the impact of certain plastic products on the environment entered into force in 2019. The requirements and prescribed goals are aimed at establishing a circular economy model, as a concept for creating value for the economy and society as a whole, while reducing the use of resources and environmental impacts. The provisions of this Directive have not yet been transposed into the legislation of the Republic of Serbia and the implementation of the prescribed measures to reduce and ban the use of certain products as well as the goals to be achieved regarding the share of recycled plastic in beverage bottles placed on the market, which are made of polyethylene terephthalate as the main components (PET bottles) are not yet binding for our country. The requirements of the aforementioned Directive are very clear, but it should be borne in mind that their implementation is complex. For this reason, it is necessary to implement preparatory activities that will contribute to the establishment of a circular model of single-use plastic product management and develop the use of more sustainable materials.

The measure includes preparation of an analysis in order to assess the types and quantities of single-use plastic products placed on the market in the Republic of Serbia. Based on the results of the analysis, the measure includes the development of guidelines for the use of more sustainable materials for the mentioned products, including recommendations for gradually reaching the goals regarding the share of recycled plastic in beverage bottles made from polyethylene terephthalate as the main component.

The measure helps the reduction of plastic waste generation and encourages the use of reusable products, which, when they become waste, can be directed into recycling processes.

Financial resources for the implementation of the measure in the amount of RSD 2,400,000 will be provided from international donor aid. The institution responsible for the implementation of the measure is the Ministry of Environmental Protection of the Republic of Serbia, which is to implement the measure in cooperation with the Ministry of Economy of the Republic of Serbia, the Chamber of Commerce of Serbia and the Environmental Protection Agency. Implementation of the measure will be proven by the prepared documents, Market analysis related to single-use plastics in the Republic of Serbia and Guidelines for the replacement of single-use plastics with more sustainable materials.

The measure is informative and educational in nature.

Measure 3.2: Introducing industrial symbiosis aimed at optimising resource use and reducing waste quantities

The reuse of used resources is one of the principles of circular economy, the application of which has a significant potential in the industry in which certain streams of waste materials can be efficiently used in various production processes. This potential can be achieved to a greater extent if a better exchange of data between companies is enabled on the available production residues that can potentially be placed on the market as a by-product or as a material that has ceased to have the status of waste. The existing system of registration of by-products and the end of waste status implies that

a company that wants to register a by-product or to end the status of waste from production has a valid contract with another company that will use them in its production process.

The measure envisages the establishment of a digital database of companies that will contribute to better interconnection and exchange of information, both in terms of available residues from production processes, and in terms of the demand for residues that can be used by the same or other companies as a resource in production cycles, i.e. to the development of the stock market of secondary raw materials. To that end, it is necessary to make certain changes to the bylaws – regulations related to by-products and the end-of-waste status in order to speed up and facilitate registration of production residues or certain types of waste in the appropriate registers.

Financial resources for the implementation of the measure in the amount of RSD 11,200,000 will be provided by the Global Environment Fund (GEF). The institution responsible for the implementation of the measure is the Ministry of Environmental Protection of the Republic of Serbia, which is to implement the measure in cooperation with the Ministry of Economy of the Republic of Serbia, the Chamber of Commerce of Serbia and Serbian Environmental Protection Agency. Implementation of the measure will be monitored through the total number of issued certificates of registration in the Register of by-products and the total number of issued certificates for certain types of waste on the termination of waste status, as well as proven by the created and established database for information exchange.

The measure is of regulatory type.

Measure 3.3: Support to construction sector and development of a system for construction waste and demolition waste management

The measure envisages the creation of an analysis of the current state of dealing with construction and demolition waste and the potential for recycling in the construction sector in the Republic of Serbia, which should serve as the basis for establishing a network of facilities for recycling non-hazardous construction and demolition waste. In addition, for the needs of additional education of the construction sector, the preparation and presentation of an expert guide on the proper handling of this waste, legislative requirements, and the economic effects of its use after recycling is also planned.

Construction and demolition waste has great potential for the development of circular economy, and the implementation of the measure will improve the management of this type of waste, which is practically just beginning at the state level.

Financial resources for the implementation of the measure in the amount of RSD 1,698,000 will be provided from international donor aid. The measure is to be implemented in cooperation with the Ministry of Construction, Transport and Infrastructure of the Republic of Serbia and the Chamber of Commerce of Serbia. The fulfilment of the tasks envisaged by the measure will be proven by the analysis of the current state of handling of construction and demolition waste and the potential for recycling in the construction sector and the prepared guide on the proper handling of construction and demolition waste.

The measure is informative and educational in nature.

Measure 3.4: Support for the recycling sector to improve recycling process for certain waste streams with regard to substances of very high concern

The measure foresees the creation of analyses of the potential for improving recycling processes for selected waste streams, i.e. types of products that are recycled (e.g. electronic and electrical waste, waste plastics or textiles), with a special emphasis on the most dangerous chemicals that can contaminate circular streams.

In addition, a manual or similar publication (in print and electronic form) should be developed that will contain information on methods and techniques that can be used to control substances of very high concern in recycling processes, including techniques for their detection, quantification and removal.

The results of the performed analyses of the potential for improvement of recycling processes for selected waste streams, as well as information from the manual for the control of substances of very high concern in recycling processes, should be presented at relevant workshops/seminars aimed at the recycling industry, recyclers' associations and other organisations working in the field of waste management .

The implementation of the activities planned by this measure will encourage the inclusion of the recycling industry in circular processes and help ensure the circularity of recycled materials, as well as more rational use of resources and protection of human health and the environment. Financial resources for the implementation of the measure in the amount of RSD 1,593,600 will be provided from international donor aid. The institution responsible for the implementation of the measure is the Ministry of Environmental Protection of the Republic of Serbia, which is to implement the measure in cooperation with recyclers' associations. Implementation of the measure will be monitored through the total number of workshops held for recycling companies on the topic of improving recycling processes, as well as proven by the prepared manual for the control of substances that cause concern in recycling processes.

The measure is informative and educational in nature.

Measure 3.5: Support for the improvement of a food management, surplus food management and food waste management system in the context of the circular economy

The measure envisages activities to improve the food management system in the HORECA sector, among retail chains and among consumers.

The first planned activity is the implementation of a pilot project within which the potential for the introduction of a circular economy for several selected hotels and restaurants will be analysed and recommendations will be made for the management of food, surplus food and food waste. Based on the results of the pilot project, a model proposal for managing food, surplus food and food waste for the HORECA sector will be developed, which will be presented to the relevant institutions and representatives of this sector.

In order to improve the food management system among retail chains and among consumers, it is necessary to establish digital tools to improve the traceability and labelling of food products, in order to ensure food safety. Established tools need to be presented to retail chains, consumers and citizens at dedicated promotional gatherings.

The expected effects of the measure are a more rational procurement of food that is mostly discarded, greater use of surplus food and a reduction in the amount of waste disposed of in landfills, as well as greater use of food waste for the production of biofuels and compost.

Financial resources for the implementation of the measure will be provided by the United Nations Development Programme (UNDP), in the amount of RSD 5,800,000, as well as from international donor aid, in the amount of RSD 1,612,900. The institution responsible for the implementation of the measure is the Ministry of Environmental Protection of the Republic of Serbia, which is to implement the measure in cooperation with the Ministry of Internal and Foreign Trade, the Ministry of Information and Telecommunications, the Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia, the Chamber of Commerce of Serbia, the United Nations Development Programme office (UNDP) and NALED. Implementation of the measure will be monitored through the total number of organized events during the promotion of the results of the pilot project for the HORECA sector and the total number of organized events during the promotion of digital tools for monitoring food and food management among retail chains and consumers. Also, implementation of the measure will be proven by the analysis of the potential for introducing circular economy and the proposed model for managing food, surplus food and food waste for selected hotels and restaurants.

The measure is informative and educational in nature.

Specific objective 4: Support for application of green public procurements and voluntary instruments in the field of environmental protection

One of the proven mechanisms by which the state can promote and accelerate the transition of the economy to a circular economy model is the application of green public procurement. In general, public procurements make up a significant part of turnover on the national market, which is why the conditions set in the procurement documentation can have a great impact on bidders, manufacturers and service providers, and on the products and services themselves. The transition from a linear to a circular economy requires fundamental changes in the way of production and business, which represents an additional cost for the economy and for which there must be an economic justification. By setting requirements regarding the consumption of raw materials and energy sources and the impact on the environment in the procurement documentation, support can be effectively provided to companies that adopt the principles of circular economy in their business activity and develop products and services in accordance with them. Also, an additional contribution to the transition to a circular economy can be made by recognising and valuing voluntary environmental instruments, such as EMAS and/or the Eco-label.

This goal includes a series of measures and activities aimed at encouraging the application of voluntary environmental instruments, as well as providing support to the public sector and the economy for the successful implementation of green public procurement in Serbia.

To monitor the achievement of a specific objective, the number of annually implemented additional trainings/seminars and expert consultations in the field of GPP, number of annually implemented GPP from the respective groups of goods, services and works, and total number of organisations with the introduced national Eco-label for some of the products and/or service of the organisation will be used. It will be proven in accordance with the adopted Rulebook on EMAS.

Measure 4.1: Defining priority groups of goods, services and works for the Republic of Serbia for the application of public procurements

The measure envisages the definition of a list of priority groups of goods, services and works which have the greatest potential for the application of green public procurement in the Republic of Serbia

in the coming period, based on the analysis and consultations with stakeholders. When defining priority groups of goods, services and works, the following should be taken into account:

- their representation in total public procurement in the Republic of Serbia,
- environmental impacts (and impacts on human health) and the potential to reduce them through green public procurement (including measurability through tools such as life cycle costing);
- availability of green public procurement criteria for specific groups of goods, works and services.

The institution responsible for the implementation of the measure is the Ministry of Environmental Protection of the Republic of Serbia, which is to implement the measure in cooperation with the Public Procurement Office, the Chamber of Commerce of Serbia and other interested organisations (including civil society organisations and NALED). Some of the activities envisaged by the measure will be implemented by the staff of the Ministry of Environmental Protection of the Republic of Serbia and the Public Procurement Office as a part of their regular work, which will be covered by funds regularly allocated from the budget of the Republic of Serbia. The remaining funds necessary for the implementation of the measure, in the amount of RSD 2,949,000, will be provided from international donor aid. Implementation of the measure will be proven by a prepared list of selected priority groups of goods, services and works for the implementation of GPP.

The measure is informative and educational in nature.

Measure 4.2: Additional affirmation of green public procurements and drafting of guidelines

As a part of the measure, special expert guides for green public procurement are planned for topics that are estimated to be the most necessary for clients and bidders. The following fields have been singled out as particularly significant for the improvement of the application of green public procurement: chemical management (classification, packaging and labelling of chemicals, substances of very high concern), EMAS, Eco-label, environmental standards and life cycle costs for certain groups of goods, services and works.

The prepared guidelines should be easily accessible to stakeholders, which will be achieved by placing the guidelines in electronic form on the website for green public procurement, which will be a part of the website of the Ministry of Environmental Protection (the link to the mentioned website will be on the website of the Public Procurement Office). It is desirable to combine all other information, materials and guides relevant to green public procurement prepared in the previous period, on the same page. Also, in order to present and distribute the guidelines, it is necessary to foresee the holding of professional consultations and training for stakeholders.

The institution responsible for the implementation of the measure is the Ministry of Environmental Protection of the Republic of Serbia, which is to implement the measure in cooperation with the Public Procurement Office, the Standing Conference of Towns and Municipalities, the Chamber of Commerce of Serbia and other relevant stakeholders (including civil society organisations). Some of the activities provided for in the measure will be implemented by the staff of the Ministry of Environmental Protection of the Republic of Serbia and the Public Procurement Office as a part of their regular work, which will be covered by funds regularly allocated from the budget of the Republic of Serbia. The remaining funds necessary for the implementation of the measure, in the amount of RSD 2,949,000, will be provided from international donor aid. Implementation of the measure will

be monitored through the total number of prepared additional guides in the field of GPP and through the number of realized seminars and/or trainings in the field of GPP on an annual level.

The measure is informative and educational in nature.

Measure 4.3: Drafting the criteria for green public procurements for respective groups of goods, services and works

In order to facilitate the application of green public procurement in the Republic of Serbia, the measure envisages the translation of the available EU criteria for green public procurement into the Serbian language, with additional adaptation to the national context.

Criteria for green public procurement should be developed gradually, taking into account the information on already available criteria in the Serbian language and the application of the corresponding criteria within the EU. The developed criteria must be published on the website of the Ministry of Environmental Protection, so that they are available to the contracting parties and other stakeholders for the implementation of green public procurement (the link to the mentioned website will also be available on the website of the Public Procurement Office). Also, it is necessary to organise appropriate professional training courses in connection with the created criteria, for clients and bidders.

The institution responsible for the implementation of the measure is the Ministry of Environmental Protection of the Republic of Serbia, which is to implement the measure in cooperation with the Public Procurement Office, the Chamber of Commerce of Serbia and other relevant stakeholders (including civil society organisations and NALED). Some of the activities provided for in the measure will be implemented by the staff of the Ministry of Environmental Protection of the Republic of Serbia and the Public Procurement Office as a part of their regular work, which will be covered by funds regularly allocated from the budget of the Republic of Serbia. The remaining funds necessary for the implementation of the measure, in the amount of RSD 2,949,000, will be provided from international donor aid. Implementation of the measure will be monitored through total number of prepared documents for the criteria for GPP for the corresponding groups of goods, services and works.

The measure is informative and educational in nature.

Measure 4.4: Improving the regulations in the field of EMAS and Eco-label

In order to improve the regulations related to the implementation of voluntary instruments in the field of environmental protection in the Republic of Serbia, the following measures are planned to be prepared, adopted and published:

- Rulebook on EMAS, the legal basis of which is provided by Article 44, paragraph 9 of the Law on Environmental Protection;
- Amendments to the Regulation on detailed conditions, criteria and procedure for obtaining the right to use the eco-label, elements, appearance and manner of using the eco-label for products and services (*The Official Gazette of the Republic of Serbia*, No. 49/2016).

The Rulebook on EMAS should provide additional assistance to organisations from the Republic of Serbia to achieve registration in the EMAS register within the EU, while amending the Regulation on the Eco-label is necessary to achieve further harmonisation of the criteria for the national Eco-label with the valid criteria for the EU Eco-label, as well as to cover additional groups of products

and services (according to the priorities that will be defined for green public procurement and their representation on the market of the Republic of Serbia).

In addition to the planned changes to the regulations, it is also desirable to define proposals for additional measures to further improve the application of voluntary instruments in the field of environmental protection.

The institution responsible for the implementation of the measure is the Ministry of Environmental Protection of the Republic of Serbia. Financial resources for the implementation of the measure will be provided from the budget of the Republic of Serbia. Some of the activities provided for in the measure will be implemented by the staff of the Ministry of Environmental Protection of the Republic of Serbia as a part of their regular work, which will be covered by funds regularly allocated from the budget of the Republic of Serbia. The remaining funds necessary for the implementation of the measure, in the amount of RSD 300,000, will be provided from the project "Reducing the carbon footprint of local communities by applying the principles of the circular economy in the Republic of Serbia". The degree of implementation of the measure will be proven by the publication of the Rulebook on EMAS and publication of the revised Regulation on the Eco-label, as well as the preparation of analysis with proposals for measures for further improvements, encouraging the application of existing and the possibility of introducing additional voluntary instruments.

The measure is of regulatory type.

Measure 4.5: Promotion of EMAS and Eco-label

In order to promote the existing voluntary instruments and increase the number of registrations for EMAS and the Eco-label, the measure envisages the creation of guidelines for the registration of companies in the EMAS register and the exercise of right to the national Eco-label for the economy. In addition, it is necessary to establish a special website for voluntary instruments within the website of the Ministry of Environmental Protection, which would contain appropriate guides, brochures and up-to-date information on products that have been awarded the national Eco-label and completed EMAS registrations, and organise expert meetings on the subject of EMAS and the Eco-label.

Financial resources for the implementation of the measure, in the amount of RSD 950,000, will be provided from the budget of the Republic of Serbia, from the project "Reducing the carbon footprint of local communities by applying the principles of the circular economy in the Republic of Serbia". The institution responsible for the implementation of the measure is the Ministry of Environmental Protection of the Republic of Serbia, which is to implement the measure in cooperation with the Serbian Chamber of Commerce. Implementation of the measure will be monitored through total number of published guidelines related to EMAS and the Eco-label and the total number of expert meetings held on the topic of EMAS and the Eco-label.

The measure is informative and educational in nature.

Specific objective 5: Raising awareness at interested public and educational institutions about the circular economy concept

In order for the process of transition to a circular economy to be successful, it is necessary to develop certain knowledge and skills among the professional public, as well as to motivate and encourage the population to change their habits. Therefore, the strengthening of awareness, timely information and education of the population of all ages about the principles and benefits of the transition to a circular

economy is a necessary goal of this Programme. To achieve it, it is necessary to carry out systematic education using promotional materials, media and educational institutions.

Raising awareness of the interested public and educational institutions about the importance of introducing a circular economy for the economy and modern society, as well as the preservation of resources and the protection of human health and the environment, can be achieved by applying informational and educational measures/activities. Also, considering that the introduction of the circular economy concept contributes to achieving the goals of sustainable development, special attention will be focused on the connection between circular economy and sustainable development, and the concept that strives to improve the quality of life through the interconnection of economic development, environmental protection and social responsibility will be promoted.

Achieving this specific objective will contribute to the development of a circular culture among different layers of society, including young people who are future participants in social and economic processes. To monitor the achievement of a specific objective, the *total number of implemented circular economy campaigns* will be used as an indicator.

Measure 5.1: Informing and educating the interested public about the circular economy concept and sustainable development

Transition to circular economy requires radical changes in the entire society, which is why it is necessary to include, interested public (population, media, representatives of civil society, consumer associations, entrepreneurs as well as experts in companies and state institutions) in the transition process, beside the economy.

The measure envisages implementation of a campaign to raise the awareness of the interested public about the circular economy concept and sustainable development, which includes development of a Plan for strengthening the awareness of the interested public. This Plan includes identification of campaign objectives, defining the messages that need to be conveyed to the target audience, as well as methods (TV and radio advertising, social networks, involvement of the community) and tools (promotional materials, workshops, lectures, conferences, round tables and debates) for their transmission and education of target groups. Information and education should encourage a change in habits, value systems, ways of thinking and understanding among the public, which is necessary for the adoption of circular economy principles. The role of the media and representatives of civil society in the campaign is particularly significant, bearing in mind that they can influence further raising of public awareness, primarily of consumers.

Financial resources for the implementation of the measure will be provided from the budget of the Republic of Serbia, from the project “Reducing the carbon footprint of local communities by applying the principles of the circular economy in Republic of Serbia”, in the amount of RSD 3,600,000, as well as from international donor aid, in the amount of RSD 900,000. The institution responsible for the implementation of the measure is the Ministry of Environmental Protection of the Republic of Serbia, which is to implement the measure in cooperation with the Ministry of Internal and Foreign, Trade, the Ministry of Information and Telecommunications of the Republic of Serbia, consumer associations, the Serbian Chamber of Commerce, media and civil society associations. The degree of implementation of the measure will be monitored through the total number of events held as part of the implementation of the Plan to strengthen the awareness of the interested public, where circular economy is promoted, and will be proven by the aforementioned Plan.

The measure is informative and educational in nature.

Measure 5.2: Informing and upskilling educational institutions about the circular economy concept and sustainable development

A key strength for the process of transition from a linear to a circular economy lies in the fact that all current and future participants in the process have been informed about the models and possibilities of circular economy. This implies adequate education from the earliest age of life, i.e., educating pupils and students in this field and motivating them to apply the acquired knowledge in everyday life, as well as in future professions.

The measure envisages systematic education on the principles and benefits of the transition from a linear to a circular economy through educational institutions, from elementary schools, through secondary educational institutions, to universities. The starting point for the implementation of the campaign is the creation of the Campaign Plan for raising awareness of circular economy in educational institutions, which will provide an overview of the campaign's goals, communication messages, methods and means of communication and the necessary resources, taking into account the need to adapt to the age, as well as the educational level and profile of school and university students. An important aspect of the campaign is the fact that those who will be the bearers of social and economic activities in the future understand the principles of circular economy and can recognise the benefits that its application brings.

In addition, in order to raise the level of knowledge and information about the concept of circular economy, during the campaign, in cooperation with a certain number of higher education institutions, the possibility of introducing new subjects or changing the content of existing subjects should be considered, with the aim of introducing circular economy into study programmes at basic and master's academic or professional studies.

Financial resources for the implementation of the measure will be provided from the budget of the Republic of Serbia, from the project “Reducing the carbon footprint of local communities by applying the principles of the circular economy in the Republic of Serbia”, in the amount of RSD 2,200,000, as well as from international donor aid, in the amount of RSD 1,490,000. The institution responsible for the implementation of the measure is the Ministry of Environmental Protection of the Republic of Serbia, which is to implement the measure in cooperation with the Ministry of Science, Technological Development and Innovations of the Republic of Serbia, educational institutions, faculties and vocational schools. Implementation of the measure will be monitored through the total number of educational institutions included in the awareness raising campaign and the total number of higher education institutions that have introduced the concept of circular economy in the course contents of the basic and master's academic or professional studies during the campaign.

The measure is informative and educational in nature.

7. MECHANISMS FOR IMPLEMENTATION OF THE PROGRAMME AND METHOD OF REPORTING ABOUT THE IMPLEMENTATION RESULTS

The Ministry of Environmental Protection proposes this programme and is responsible for implementing its activities and evaluating the achieved results. The Action Plan for three years (2022-

2024) is an integral part of this document and contains one overall objective, five specific objectives with measures and activities that will be implemented in the period 2022-2024.

In accordance with Article 39 of the Law on the Planning System of the Republic of Serbia, this document is implemented by undertaking measures and activities determined in the action plan. In accordance with Article 40, monitoring will be carried out through qualitative and quantitative performance indicators. Data and information obtained from all relevant authorities and organisations, as well as data and information obtained from other sources, related to the effects of policy will be used to monitor the implementation and evaluation of the results.

The programme as a public policy document is also monitored through the Information System for planning, implementation monitoring, coordination of public policies and reporting, which is a unique electronic system in which participants in the planning system enter the content of their policy documents and medium-term plans and report in accordance with the Law on the Planning System of the Republic of Serbia. This information system is managed by the Government through the Public Policy Secretariat of the Republic of Serbia in such a way as to ensure a connection between the content of public policies, medium-term plans of users of budget funds responsible for the implementation of public policy measures and their financial plans. In accordance with Article 47 of the Law on the Planning System, this information system will ensure timely reporting on achieved goals and monitoring of achieved values of performance indicators.

Pursuant to Article 43, paragraph 3 of the Law on the Planning System of the Republic of Serbia, the Ministry of Environmental Protection, as the proponent of this policy document, has the obligation to report to the Government, through the competent authority for public policy coordination, on the results of the implementation of this document, no later than 120 days after the end of each calendar year from the day of adoption. In addition to the annual report, a final report on the implemented activities will be submitted to the Government no later than six months after the expiration of the application of this document.

In accordance with Article 40, after the expiration of the period of validity of the programme and the termination of its application, the competent authority is obliged to prepare an ex-post impact assessment, which will look at the impacts of the measures and activities contained in the programme, the actual positive and negative, direct and indirect impacts during the application of the public document policies, in order to review and improve them. The elements to be assessed include relevance, efficiency, effectiveness and sustainability of the policy.

8. ESTIMATED FUNDS NEEDED FOR THE PROGRAMME IMPLEMENTATION

For the implementation of Circular Economy Development Programme and its Action Plan, funds will be provided both from the budget of the Republic of Serbia and from donations. In addition to regular disbursements from the budget, it is estimated that an additional RSD 79,859,500 will be needed to implement the Programme.

For the implementation of measure 1.4, as well as for the implementation of measures within the framework of specific objectives 2 and 3, funds from the Global Environment Facility (GEF) are planned within the project “Reducing the carbon footprint of local communities by applying the principles of circular economy in the Republic of Serbia”, which is implemented in cooperation between the Ministry of Environmental Protection and the United Nations Development Programme

(UNDP). Also, certain measures within the framework of Specific objectives 2, 4 and 5 will be implemented using budget funds that are a contribution to the mentioned project. In this way, a total of RSD 19,533,000 will be provided from the budget, RSD 19,700,000 from the Environmental Fund, and RSD 5,800,000 from UNDP. Funds for the implementation of other measures, in the amount of RSD 34,826,500, will be provided from other donations.

9. CONSULTATIONS WITH STAKEHOLDERS

The field of circular economy is very complex and requires a multidisciplinary, holistic approach, through the involvement of a large number of stakeholders.

Target groups and stakeholders took part in the preparation of the relevant document.

Drafting of the document began in July 2021 and was completed in late November 2021.

During the development of the Circular Economy Development Programme in Serbia, consultations were conducted with stakeholders and target groups in order to collect proposals and suggestions for improving the defined goals and proposed measures and activities. Consultations were carried out in compliance with the Regulation on the Methodology of Public Policy Management, Policy and Regulatory Impact Assessment, and Content of Individual Public Policy Documents, as well as in accordance with the guidelines given in the Rulebook on Good Practice Guidelines for Exercising Public Participation in the Drafting of Laws and Other Regulations and Acts (*The Official Gazette of the Republic of Serbia*, No. 51/19). During the development of this Programme, separate meetings were held with individual institutions to which some of the proposed measures relate, in order to define and agree on the appropriate optimal measures and activities in the foreseen time period. In addition, consultations were also conducted using the focus group method, with members of the Circular Economy Working Group and representatives of relevant institutions:

- Ministry of Environmental Protection,
- Ministry of Economy,
- Ministry of Construction, Transport and Infrastructure,
- Ministry of Science, Technological Development and Innovation,
- Serbian Environmental Protection Agency,
- Public Policy Secretariat of the Republic of Serbia,
- Chamber of Commerce of Serbia,
- Standing Conference of Towns and Municipalities – Association of Towns and Municipalities of Serbia (SCTM),
- National Alliance for Local Economic Development (NALED),
- Institute for Standardisation of Serbia,
- Statistical Office of the Republic of Serbia,
- Public Procurement Office,
- United Nations Development Programme (UNDP) Office,
- Organisation for Security and Co-operation in Europe – Mission in Serbia (OSCE).

In addition to the aforementioned participants, representatives of civil society, universities, the business sector, as well as consultants from the field of environmental protection and circular economy were included in the consultations.

The consultations were held on 26 October 2021, in the form of a web conference, during which the structure of the Programme and the Draft Action Plan were presented to the participants. In order to achieve a better dialogue and discussion, Draft Action Plan and a description of the planned measures were delivered to the participants along with the invitation to participate in the consultations. During the discussion, after the presentation, the participants had the opportunity to express their opinion on the Draft Action Plan and make suggestions, and they could also submit additional comments after the conference, via e-mail.

Following the public consultations, all proposals, objections and suggestions received during and after the public consultations were carefully considered and the possibility of their integration into the text of the aforementioned draft Programme was considered. The submitted proposals and suggestions were classified into two groups, those that were accepted, and those that were rejected or on which no agreement was reached.

After consideration of all objections and proposals, taking into account the interests of various stakeholders, a compromise solution was proposed which, to the greatest extent possible, met all submitted proposals and comments.

The process of preparing the document continued and was completed in late November 2021.

The public hearing was held from 23 December 2021 to 14 January 2022. Draft Programme was posted on the MEP website to introduce the public to the document.

The public presentation of the Draft Programme was held in the form of a web conference on 28 December 2021. The document with its Action plan was presented to the participants. The interested public could submit written comments to the e-mail address circularna@eko.gov.rs.

Written comments were collected after public consultations and public hearing.

Systematised comments with the answers from the Ministry were available to the public on the website of the Ministry of Environmental Protection within the legally prescribed period.

10. ACTION PLAN

The Action Plan foresees specific measures and activities that will be undertaken in order to ensure the conditions for the implementation of the Programme's goals, identifying institutions responsible for and partners in the implementation of those measures and activities, as well as the time required for the implementation of the aforementioned activities.

The Action plan is attached to the Circular Economy Development Programme in the Republic of Serbia 2022-2024 and is its integral part.

11. FINAL PROVISIONS

This Programme shall be published on the website of the Government and the Ministry of Environmental Protection and the eGovernment Portal no later than seven days from the date of the adoption thereof.

This Programme shall be published in *The Official Gazette of the Republic of Serbia*.

05 Number: 353-9836/2022-2

Belgrade, 1 December 2022

G O V E R N M E N T

Certification of accuracy by:
DEPUTY
SECRETARY GENERAL
Petar Janjić

PRIME MINISTER

Ana Brnabić, sgd.

ACTION PLAN

Action Plan:	**Circular Economy Development Programme in the Republic of Serbia 2022 – 2024**
Proponent:	Ministry of Environmental Protection of the Republic of Serbia
Coordination and reporting:	Ministry of Environmental Protection of the Republic of Serbia

General objective: Creating a stimulating environment for the development of circular economy with the aim of supporting the green transition in the Republic of Serbia						
Institution responsible for monitoring and control of implementation: Ministry of Environmental Protection of the Republic of Serbia						
Indicator(s) at the general objective level (*effect indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2024	Last year of the AP validity
Domestic material consumption per capita	tonne	SORS	18.2	2019	15.2	2024

Specific objective 1: Support to economy in transforming towards circular business model							
Institution responsible for coordination and reporting: Ministry of Environmental Protection							
Indicator(s) at the specific objective level (*outcome indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
The rate of use of circular resources in the industry	%	SORS	1.4	2019.			2

Measure 1.1: Education of specific groups of companies for the application of the circular economy concept	
Institution responsible for implementation: Ministry of Environmental Protection	
Implementation period: 2022 – 2024	Measure type: information-educational
Acts that need to be amended/adopted for the implementation of measure:	

Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Total number of specialised manuals intended for companies	Number	MEP's website where the manuals are published	0	2021		1	3
Total number of companies that participated in the workshops	Number	Workshop Minutes	0	2021		15	70

Funding source	Link to the programme budget	Total estimated funds in 000 RSD		
		In 2022	In 2023	In 2024
Donor funds*			2,264	2,021
01 – Budget revenues/Regular disbursements	0404-0004			

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024
1.1.1. Drafting the Plan for strengthening the capacities of identified groups of companies	MEP	ME SCC NALED	2022	01 – Budget funds / Regular disbursements	0404-0004			
1.1.2. Drafting the specialised manuals for identified groups of companies	MEP	ME SCC	2024	Donor funds			2,000	1,720
1.1.3. Holding workshops/seminars for companies on specific topics that are of key	MEP	ME SCC NALED	2024	Donor funds			264	301

importance for the application of the circular economy in accordance with the prepared Training Plan		CSO						

Measure 1.2: Support to companies in finding the incentives and financial instruments							
Institution responsible for implementation: Ministry of Environmental Protection							
Implementation period: 2022 – 2024			Measure type: incentive				
Acts that need to be amended/adopted for the implementation of measure:							
Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Total number of continuously available programmes/funds that support the introduction of CE principles	Number	Websites of institutions that publish public calls within programmes/funds that support the introduction of CE principles	0	2021		1	2
Fiscal policy analysis and proposal of incentive mechanisms for the introduction of CE	Yes/No	MEP's Report on the implemented activity	No	2021		Yes	
Total number of commercial banks that were involved in consultative activities in order to find easier access to funds for financing enterprise projects in the field of CE	Number	MEP's Report on the implemented activity/meetings with banks	0	2021	3		

Funding source		Total estimated funds in 000 RSD

	Link to the programme budget	In 2022	In 2023	In 2024
Donor funds*			1,500	
01 – Budget revenues/Regular disbursements	0404-0004			

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024
1.2.1. Adapting the criteria for awarding funds through public calls (grants) within the available programmes /funds to include CE principles	MEP	ME	2023	Donor funds			300	
1.2.2. Analysis of fiscal policy and administrative procedures in order to define proposals for incentive mechanisms for companies	MEP	MF SCC NALED	2023	Donor funds			1,200	
1.2.3. Connecting government institutions and commercial banks through consultative activities in order to find easier access to funds for the financing of companies' projects in the field of CE (loans, subsidies...)	MEP	MF ME Association of Serbian Banks Companies	2022	01 – Budget revenues/Regular disbursements	0404-0004			

Measure 1.3: Analysis of the potential for the application of the circular economy model in certain fields of processing industry and support to selected companies							
Institution responsible for implementation: Ministry of Environmental Protection							
Implementation period: 2022 – 2024			Measure type: information-educational				
Acts that need to be amended/adopted for the implementation of measure:							
Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Total number of fields of the processing industry included in the analysis of the potential for the application of the CE model	Number	MEP's Report regarding the implemented activity	0	2021	1	2	
Total number of companies that have developed business action plans for the transition to CE	Number	MEP's Report regarding the implemented activity	0	2021		3	6

Funding source	Link to the programme budget	Total estimated funds in 000 RSD		
		In 2022	In 2023	In 2024
Donor funds*		1,000	5,000	4,000

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024
1.3.1. Analysis of the potential and necessary investments for the	MEP	SCC	2023	Funding sources and funds				

transition to CE for two fields of the processing industry				defined at the measure level				
1.3.2. Development of business action plans for the transition to CE for selected representatives of the analysed fields of the processing industry	MEP	SCC	2024	Funding sources and funds defined at the measure level				

Measure 1.4: Encouraging cooperation between scientific-research organisations and companies in the field of innovations and production optimisation							
Institution responsible for implementation: Ministry of Environmental Protection							
Implementation period: 2022 – 2024			Measure type: incentive				
Acts that need to be amended/adopted for the implementation of measure:							
Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Total number of public calls for projects on the topic of introducing innovative and other technical solutions in order to apply the CE model	Number	MEP's Report about completed calls and accepted projects	0	2021	1	2	3
Total number of companies that have cooperated with scientific and research organisations in order to develop innovations and solutions based on the principles of CE through calls for projects	Number	MEP's Report about completed calls and accepted projects	0	2021	3	6	9

Funding source	Link to the programme budget	Total estimated funds in 000 RSD		
		In 2022	In 2023	In 2024

Direct donor support		3,600		
01 – Budget revenues – Reducing the carbon footprint of local communities by applying the principles of the circular economy in the Republic of Serbia	0405-4011	3,600	3,600	3,600

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024
1.4.1. Publication of calls and selection of submitted projects in accordance with defined criteria	MEP	UNDP Innovation Fund Scientific research organisations Companies	2024	Funding sources and funds defined at the measure level				
1.4.2. Award of funds to selected projects and promotion of the call results	MEP		2024	Funding sources and funds defined at the measure level				

Specific objective 2: Support to local self-governments in creating circular communities							
Institution responsible for coordination and reporting: Ministry of Environmental Protection							
Indicator(s) at the specific objective level (*outcome indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Total number of LSGUs that were supported through the	Number	MEP's Report	0	2021			50

programme in introducing the CE concept							

Measure 2.1: Support to selected local self-government units in preparation of local road maps for circular economy							
Institution responsible for implementation: Ministry of Environmental Protection							
Implementation period: 2022 – 2024			Measure type: information-educational				
Acts that need to be amended/adopted for the implementation of measure:							
Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Total number of LSGUs for which local road maps have been prepared	Number	MEP's Report	0	2021	1	3	5

Funding source	Link to the programme budget	Total estimated funds in 000 RSD		
		In 2022	In 2023	In 2024
01 – Budget revenues – Reducing the carbon footprint of local communities by applying the principles of the circular economy in the Republic of Serbia	0405-4011	1.600	1.600	1.700

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024
2.1.1. Analysis of the current situation and potential for the introduction of the circular	MEP	SCTM LSGU	2023	Funding sources and funds				

economy in the selected LSGUs		UNDP NALED		defined at the measure level				
2.1.2. Creation of local circular economy roadmaps for selected LSGUs	MEP	SCTM LSGU UNDP NALED	2024	Funding sources and funds defined at the measure level				

Measure 2.2: Raising awareness at local authorities, public and utility companies and local economy on the circular economy concept							
Institution responsible for implementation: Ministry of Environmental Protection							
Implementation period: 2022 – 2024			Measure type: information-educational				
Acts that need to be amended/adopted for the implementation of measure:							
Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Total number of LSGUs included in capacity building activities for the introduction of CE	Number	MEP's Report	0	2021			50

Funding source	Link to the programme budget	Total estimated funds in 000 RSD		
		In 2022	In 2023	In 2024
01 – Budget revenues – Reducing the carbon footprint of local communities by applying the principles of the circular economy in the Republic of Serbia	0405-4011	1,416		267

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024
2.2.1. Preparation of guidelines with a methodology for creating a local roadmap for the circular economy	MEP	SCTM NALED CSO	2022	Funding sources and funds defined at the measure level		1.416		
2.2.2. Promotion of the prepared guidelines and local road maps for CE through workshops and campaigns	MEP	SCTM NALED CSO	2024	Funding sources and funds defined at the measure level				267

Specific objective 3: Improving the waste management system through more efficient use of waste in circular economy							
Institution responsible for coordination and reporting: Ministry of Environmental Protection							
Indicator(s) at the specific objective level (*outcome indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Total number of drafted documents	Number	MEP's Report	0	2021		3	5
Total number of workshops and promotional activities for the improvement of the waste management system	Number	MEP's Report	0	2021		5	14

Measure 3.1: Reducing generation of waste from single-use plastic products	
Institution responsible for implementation: Ministry of Environmental Protection	
Implementation period: 2022 – 2024	Measure type: information-educational
Acts that need to be amended/adopted for the implementation of measure:	

Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Market analysis regarding the single-use plastic in the Republic of Serbia	Yes/No	MEP's Report about the conducted analysis	No	2021		Yes	
Developed guidelines for replacing single-use plastics with more sustainable materials	Yes/No	MEP's Report about the conducted analysis	No	2021		Yes	

Funding source	Link to the programme budget	Total estimated funds in 000 RSD		
		In 2022	In 2023	In 2024
Donor funds*			2.400	

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024
3.1.1. Market analysis regarding the single-use plastic in the Republic of Serbia	MEP	ME SCC	2023	Funding sources and funds defined at the measure level				
3.1.2. Drafting the guidelines for replacing single-use plastics with more sustainable materials	MEP	SCC	2023	Funding sources and funds defined at the measure level				

Measure 3.2: Introducing industrial symbiosis aimed at optimising resource use and reducing waste quantities

Institution responsible for implementation: Ministry of Environmental Protection							
Implementation period: 2022 – 2024			Measure type: regulatory				
Acts that need to be amended/adopted for the implementation of measure:			Regulation on criteria for determining by-products and on the form of reports on by-products, manner and deadlines for their submission (*The Official Gazette of the Republic of Serbia*, No. 76/2019) Regulation on technical requirements and other special criteria for certain types of waste that cease to be waste (*The Official Gazette of the Republic of Serbia*, No. 78/2019) Regulation on contents of the request for entry in the Register of by-products and Register of waste that has ceased to be waste (*The Official Gazette of the Republic of Serbia*, No. 76/2019)				
Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Established database on quantities and types of production residues	Yes/No	SCC	No	2021		Yes	
Total number of certified entries in the Register of by-products	Number	SEPA's Report	4	2021	5	10	20
Total number of certificates issued for certain types of waste that has ceased to be waste	Number	SEPA's Report	2	2021	3	6	8

Funding source	Link to the programme budget	Total estimated funds in 000 RSD		
		In 2022	In 2023	In 2024
Donor funds*		1,200	6,000	4,000

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024

3.2.1. Improvement of rulebooks concerning by-products and end-of-waste status with the aim of faster and easier registration of production residues or certain types of waste in the appropriate registers	MEP	ME SCC SEPA	2022	Funding sources and funds defined at the measure level				
3.2.2. Establishment and promotion of a digital database of companies on quantities and types of production residues in order to develop a stock market of secondary raw materials	MEP	ME SCC SEPA	2023	Funding sources and funds defined at the measure level				

Measure 3.3: Support to construction sector and development of a system for construction and demolition waste management							
Institution responsible for implementation: Ministry of Environmental Protection							
Implementation period: 2022 – 2024				Measure type: information-educational			
Acts that need to be amended/adopted for the implementation of measure:				Law on Waste Management (*The Official Gazette of the Republic of Serbia*, Nos. 36/2009, 88/2010, 14/2016 and 95/2018 – as amended)			
Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Analysis of the current state in construction and demolition waste management and potential for recycling in the construction sector	Yes/No	MEP's Report about the conducted analysis	No	2021			Yes

Prepared guidelines on proper handling of construction and demolition waste	Yes/No	MEP's Report	No	2021			Yes

Funding source	Link to the programme budget	Total estimated funds in 000 RSD		
		In 2022	In 2023	In 2024
Donor funds*			882	816
Budget of the Republic of Serbia	0404-0004			

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024
3.3.1. Analysis of the current state in construction and demolition waste management and potential for recycling in the construction sector	MEP	MCTI	2024	Funding sources and funds defined at the measure level				
3.3.2. Drafting and promotion of guidelines on proper handling of construction and demolition waste	MEP	SCC	2024	Funding sources and funds defined at the measure level				

Measure 3.4: Support for recycling sector to improve recycling process for certain waste streams with regard to substances of very high concern							
Institution responsible for implementation: Ministry of Environmental Protection							
Implementation period: 2022 – 2024			Measure type: information-educational				
Acts that need to be amended/adopted for the implementation of measure:							
Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
A manual for the control of substances of very high concern in recycling processes has been developed	Yes/No	MEP's Report about the drafted manual	No	2021		Yes	
Total number of workshops on the topic of improving recycling processes with an emphasis on the most dangerous chemicals that can contaminate circular flows	Number	Workshop Minutes	0	2021		1	2

Funding source	Link to the programme budget	Total estimated funds in 000 RSD		
		In 2022	In 2023	In 2024
Donor funds*			1.116	477,6

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024
3.4.1. Analysis of the potential for improvement of recycling processes for protected waste streams in	MEP	Associations of recyclers	2024	Donor funds				300

relation to substances of very high concern								
3.4.2. Development of a manual for the control of substances of very high concern in recycling processes	MEP	Associations of recyclers	2023	Donor funds			1.116	
3.4.3. Delivering workshops/seminars on topics that are important for recycling processes in accordance with the principles of CE and the introduction of recyclates into circular flows	MEP	Associations of recyclers	2024	Donor funds				177,6

Measure 3.5: Support for the improvement of a food management, surplus food management and food waste management system in the context of the circular economy							
Institution responsible for implementation: Ministry of Environmental Protection							
Implementation period: 2022 – 2024			Measure type: information-educational				
Acts that need to be amended/adopted for the implementation of measure:							
Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Guidelines for the management of food, surplus food and food waste for the HORECA sector	Yes/No	MEP's Report	No	2021		Yes	
Total number of events during the promotion of the pilot project and guidelines for the HORECA sector	Number	MEP's Report	0	2021			3

Total number of events in the course of promoting digital tools for food tracking and food management among retail chains and consumers	Number	MEP's Report	0	2021			5

Funding source	Link to the programme budget	Total estimated funds in 000 RSD		
		In 2022	In 2023	In 2024
Donor funds*		500	1,612.9	
Direct donor support		2,300	3,500	

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024
3.5.1. Pilot project – analysis of the potential for the introduction of CE for selected hotels and restaurants	MEP	MIFT MAFWM NALED	2023	Donor funds		500	602.5	
3.5.2. Development of guidelines for the management of food, surplus food and food waste for the HORECA sector	MEP	MIFT MAFWM SCC NALED	2023	Donor funds			744	
3.5.3. Promotion of results of the pilot project and the prepared guidelines to relevant institutions and representatives of the HORECA sector	MEP	MIFT MAFWM SCC	2023	Donor funds			266.4	
3.5.4. Promotion of food traceability and food management among retail	MEP	MAFWM UNDP	2024	Direct donor support – UNDP		2,300	3,500	

chains and consumers through the use of digital tools								

Specific objective 4: Support for application of green public procurements and voluntary instruments in the field of environmental protection							
Institution responsible for coordination and reporting: Ministry of Environmental Protection							
Indicator(s) at the specific objective level (*outcome indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Number of annual training courses/seminars and expert consultations in the field of GPP	Number	MEP's and PPO's Reports	1	2021	2	2	2
Number of annually implemented GPP from the respective groups of goods, services and works	Number	PP Portal Report of the PPO	3	2021		3	5
Adoption of the Rulebook on EMAS	Yes/No	*The Official Gazette of the Republic of Serbia*	No	2021		Yes	
Total number of organisations with the introduced national Eco label for some of the organisation's products and/or services	Number	MEP's Register	2	2021		4	6

Measure 4.1: Defining priority groups of goods, services and works for the Republic of Serbia for the application of public procurements	
Institution responsible for implementation: Ministry of Environmental Protection	
Implementation period: 2022 – 2024	Measure type: information-educational
Acts that need to be amended/adopted for the implementation of measure:	

Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Selected priority groups of goods, services and works for implementation of GPP	Yes/No	MEP's and PPO's Reports	No	2021		Yes	

Funding source	Link to the programme budget	Total estimated funds in 000 RSD		
		In 2022	In 2023	In 2024
Donor funds*		983	983	983
01 – Budget revenues/ Regular disbursements	0404-0004			

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024
4.1.1. Analysis of the application potential of GPPs in certain groups of goods, services and works	MEP	PPO SCC NALED	2023	Funding sources and funds defined at the measure level				
4.1.2. Professional consultations with stakeholders for individual groups of goods, services and works	MEP	PPO SCC NALED	2023	Funding sources and funds defined at the measure level				
4.1.3. Preparation and publication of a list of groups of goods, services and works with priorities for implementation in the Republic of Serbia	MEP	PPO NALED	2023	Funding sources and funds defined at the measure level				

Measure 4.2: Additional affirmation of green public procurements and drafting of guidelines							
Institution responsible for implementation: Ministry of Environmental Protection							
Implementation period: 2022 – 2024			Measure type: information-educational				
Acts that need to be amended/adopted for the implementation of measure:							
Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
The total number of prepared practical guidelines in the field of GPP	Number	MEP's and PPO's webpages	2	2021	3	4	5
Number of delivered seminars and/or training courses in the field of GPP per year	Number	MEP's and PPO's training courses Reports	1	2021	1	1	1

Funding source	Link to the programme budget	Total estimated funds in 000 RSD		
		In 2022	In 2023	In 2024
Donor funds*		983	983	983
01 – Budget revenues/ Regular disbursements	0404-0004			

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024

4.2.1. Adding a special section for GPPs to the MEP website	MEP	PPO	2022	Funding sources and funds defined at the measure level				
4.2.2. Drafting additional guidelines for the application of GPPs	MEP	PPO SCC NALED CSO	2024	Funding sources and funds defined at the measure level				
4.2.3. Delivery of seminars and/or training courses for relevant stakeholders	MEP	SCC NALED CSO	2024	Funding sources and funds defined at the measure level				

Measure 4.3: Drafting the criteria for green public procurements for the corresponding groups of goods, services and works							
Institution responsible for implementation: Ministry of Environmental Protection							
Implementation period: 2022 – 2024			Measure type: information-educational				
Acts that need to be amended/adopted for the implementation of measure:							
Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Total number of prepared documents for the criteria for GPP for the corresponding groups of goods, services and works	Number	Webpages of the MEP and PPO	0	2021	6	10	18

Funding source	Link to the programme budget	Total estimated funds in 000 RSD		
		In 2022	In 2023	In 2024
Donor funds*		983	983	983

01 – Budget revenues/ Regular disbursements	0404-0004			

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024
4.3.1. Adoption and adaptation of EU criteria for green public procurement for selected groups of goods, services and works	MEP	PPO NALED CSO	2024	Funding sources and funds defined at the measure level				
4.3.2. Presentation of published criteria for GPP to stakeholders	MEP	PPO SCC NALED CSO	2024	Funding sources and funds defined at the measure level				

Measure 4.4: Improving the regulations in the field of EMAS and Eco-label	
Institution responsible for implementation: Ministry of Environmental Protection	
Implementation period: 2022 – 2024	Measure type: regulatory
Acts that need to be amended/adopted for the implementation of measure:	Rulebook on the amount of costs of granting the right to use the Eco-label (*The Official Gazette of the Republic of Serbia*, No. 81/2010) Regulation on detailed conditions, criteria and procedure for obtaining the right to use the eco-label, elements, appearance and manner of using the eco-label for products and services (*The Official Gazette of the Republic of Serbia*, No. 49/2016) Rulebook on EMAS (basis for adoption in Article 44, paragraph 9 of the Law on Environmental Protection) Law on Republic Administrative Fees

Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Analysis with proposals for measures to improve, encourage the application of existing and the possibility of introducing additional voluntary instruments has been conducted	Yes/No	MEP's Report	No	2021		Yes	
Rulebook on EMAS published	Yes/No	*The Official Gazette of the Republic of Serbia*	No	2021		Yes	
Revised Eco-label Regulation published	Yes/No	*The Official Gazette of the Republic of Serbia*	No	2021		Yes	

Funding source	Link to the programme budget	Total estimated funds in 000 RSD		
		In 2022	In 2023	In 2024
01 – Budget revenues – Reducing the carbon footprint of local communities by applying the principles of the circular economy in the Republic of Serbia	0405-4011	300		
01 – Budget revenues/ Regular disbursements	0404-0004			

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024

4.4.1 Preparation of an analysis with proposals for measures for further improvements, encouraging the application of existing and the possibility of introducing additional voluntary instruments	MEP	SCC	2022	Budget of the Republic of Serbia	0405-4011	300		
4.4.2. Preparation, adoption and publication of the Rulebook on EMAS	MEP	SCC	2022	01 – Budget revenues/ Regular disbursements	0404-0004			
4.4.3. Preparation, adoption and publication of amendments to the Eco-label Regulation	MEP	SCC	2022	01 – Budget revenues/ Regular disbursements	0404-0004			

Measure 4.5: Promotion of EMAS and Eco-label							
Institution responsible for implementation: Ministry of Environmental Protection							
Implementation period: 2022 – 2024			Measure type: information-educational				
Acts that need to be amended/adopted for the implementation of measure:							
Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Total number of published guidelines/manuals related to EMAS and Eco-label	Number	Webpage of the MEP	0	2021		2	
Total number of expert meetings on the subject of EMAS and Eco-label	Number	Meeting Minutes	0	2021	2	4	6

Funding source	Link to the programme budget	Total estimated funds in 000 RSD		
		In 2022	In 2023	In 2024
01 – Budget revenues – Reducing the carbon footprint of local communities by applying the principles of the circular economy in the Republic of Serbia	0405-4011	100	850	

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024
4.5.1. Creation of a special page for voluntary instruments within the MEP website	MEP	SCC	2022	Funding sources and funds defined at the measure level				
4.5.2. Creation and publication of guides and brochures for EMAS and the Eco-label for the economy	MEP	SCC	2023	Funding sources and funds defined at the measure level				
4.5.3. Organisation of expert meetings on EMAS and the Eco-label for the purpose of further promotion	MEP	SCC CSO	2024	Funding sources and funds defined at the measure level				

Specific objective 5: Raising awareness at interested public and educational institutions about the circular economy concept
Institution responsible for coordination and reporting: Ministry of Environmental Protection

Indicator(s) at the specific objective level (*outcome indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Total number of conducted campaigns on circular economy	Number	MEP's Report	0	2021			2

Measure 5.1: Informing and educating the interested public about the circular economy concept and sustainable development							
Institution responsible for implementation: Ministry of Environmental Protection							
Implementation period: 2022 – 2024			Measure type: information-educational				
Acts that need to be amended/adopted for the implementation of measure:							
Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024
Prepared Plan for awareness raising among interested public about CE and sustainable development	Yes/No	MEP's Report	No	2021	Yes		
Total number of events held within the implementation of the Plan for interested public on the occasion of which CE is promoted	Number	MEP's Report	0	2021	3	6	10

Funding source	Link to the programme budget	Total estimated funds in 000 RSD		
		In 2022	In 2023	In 2024
01 – Budget revenues – Reducing the carbon footprint of local communities by applying the principles of the circular economy in the Republic of Serbia	0405-4011	1,200	1,200	1,200

Donor funds*		300	300	300

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024
5.1.1. Preparation of a plan for the awareness raising campaign about the concept of CE and sustainable development for the interested public	MEP	MIFT Consumer associations SCC CSO	2022	Funding sources and funds defined at the measure level				
5.1.2. Creation of informative and educational material in accordance with the campaign plan	MEP	MIFT Consumer associations SCC CSO	2023	Funding sources and funds defined at the measure level				
5.1.3. Implementation of a awareness raising campaign in order to promote CE and sustainable development	MEP	MIFT Consumer associations SCC CSO	2024	Funding sources and funds defined at the measure level				

Measure 5.2: Informing and upskilling educational institutions about the circular economy concept and sustainable development							
Institution responsible for implementation: Ministry of Environmental Protection							
Implementation period: 2022 – 2024			Measure type: information-educational				
Acts that need to be amended/adopted for the implementation of measure:							
Indicator(s) at the measure level (*result indicator*)	Unit	Checked against	Initial value	Baseline year	Target value in 2022	Target value in 2023	Target value in 2024

Total number of educational institutions included in the awareness raising campaign	Number	Reports from the conducted campaigns	0	2021	5	15	30
The total number of higher education institutions that introduced the CE concept in the curricula of basic and master academic or professional studies during the campaign included in this Programme	Number	Information from the institution's website about the content of the subjects planned for the 2024/2025 school year	0	2021		2	4

Funding source	Link to the programme budget	Total estimated funds in 000 RSD		
		In 2022	In 2023	In 2024
01 – Budget revenues – Reducing the carbon footprint of local communities by applying the principles of the circular economy in the Republic of Serbia	0405-4011	200	1,000	1,000
Donor funds*		490	500	500

Activity	Implementing body	Implementing partners	Deadline for completion	Funding source	Link to the programme budget	Total estimated funds per source in 000 RSD		
						2022	2023	2024
5.2.1. Preparation of a campaign plan for awareness raising in educational institutions	MEP	ME	2022	Funding sources and funds defined at the measure level				
5.2.2. Implementation of the campaign in educational institutions in accordance with the plan	MEP	ME Educational institutions	2024	Funding sources and funds defined at the measure level				

5.2.3. Introduction of new courses or changes to current courses in order to apply the CE concept in study curricula at basic and master academic or professional studies	MEP	Faculties and high vocational schools	2024	Funding sources and funds defined at the measure level				

*Funds are not provided. It is planned that, in negotiations with international donor organisations, relevant funds will be provided that would contribute to faster and more efficient achievement of the defined specific objectives, as well as the general objective of the Programme.

List of abbreviations

SEPA	Serbian Environmental Protection Agency
BAT	Best available techniques
GDP	Gross Domestic Product
BREF	Best Available Techniques reference document
GEF	Global Environment Fund
GHG	Greenhouse gases
EMAS	Eco-management and Audit Scheme
EEZ	European Economic Zone
GPP	Green public procurement
IPA	Instrument for Pre-Accession Assistance
ISO	International Organisation for Standardisation
ISS	Institute for Standardisation of Serbia
LSGU	Local self-government units
PP	Public procurement
PPO	Public Procurement Office
MCTI	Ministry of Construction, Transport and Infrastructure
MPALSG	Ministry of Public Administration and Local Self-Government
MEP	Ministry of Environmental Protection
MAFWM	Ministry of Agriculture, Forestry and Water Management
ME	Ministry of Economy
MSTDI	Ministry of Science, Technological Development and Innovation
MED	Ministry of Education
SME	Small and medium enterprises and entrepreneurs
MIFT	Ministry of Internal and Foreign Trade
MF	Ministry of Finance
NALED	National Alliance for Local Economic Development
CSO	Civil Society Organisations
RES	Renewable energy sources
SCC	Serbian Chamber of Commerce
SORS	Statistical Office of the Republic of Serbia
RS	Republic of Serbia
SCTM	Standing Conference of Towns and Municipalities
UNDP	United Nations Development Programme
CE	Circular economy
CEFTA	Central European Free Trade Association
HORECA	Hotels, restaurants and cafés