Bulgaria
2020

Regional Circular Economy Status Quo

REDUCES – Rethinking Sustainable Development in European Regions by Using Circular Economy Business Models

REDUCES
Interreg Europe

European Union
European Regional
Development Fund

Writers: Vihra Andonova, Euro Perspective Foundation; Vessela Petrova, University of Mining and Geology “St. Ivan Rilski”

Photos: Maria Vassileva (cover), Dundee Precious Metals Krumovgrad; www.capital.bg (p. 16), www.texcycle.bg (p. 17), https://bagri-restaurant.bg/bg/ (p. 19), http://pam-consult.eu/ (p. 20)

Content

1 Background and context

Circular economy changes the methods and revenue models of business. Instead of traditional ownership, consumption is based on the use of services: sharing, leasing and reusing. The new method challenges countries and regions to develop and construct new business models that can be used to respond to the global climate crisis, among other things.

REDUCES contributes to the EU2020 strategy by advocating the priorities of Sustainable, Inclusive and Smart Growth. In addition, improving resource efficiency by sharing experiences on circular economy practices will translate into lower GHG emissions and give a much-needed boost to economic growth in the regional context. The project will also contribute to the vision of "Resource-efficient Europe" via inter- and intraregional cooperation and learning processes. This kind of interaction is vital in order to reach the EU2020 strategy goals. REDUCES also supports the fundamental objectives of decoupling economic growth from the use of resources and increasing the use of renewable energy sources which are underlying themes in the EU2020 strategy. The EU action plan of the circular economy also accentuates the need to create the conditions under which a circular economy can flourish and resources be mobilised. It is recognised in the plan that new business models are needed to enable us to rethink our ways of producing and consuming.

REDUCES brings together six European regions:

- Southwest Finland
- Utrecht, Netherlands
- Greater Manchester, UK
- Valencia, Spain
- Bulgaria
- Maramures, Romania

The overall objective of the project is to improve the implementation of regional policies in order to enable regions to adopt more environmentally sustainable ways of production and to reduce the negative environmental impacts of economic development. Circular business models can be used to help companies achieve resource efficiency and subsequent net revenue gains, and by doing so help regions achieve a more innovative, resilient and productive economy. Although circular

business models are often viewed as sustainable by nature, it is recognised that there are uncertainties about their potential impacts, such as externalities and rebound effects. REDUCES results will facilitate and better enable the adoption of environmentally sustainable circular business models with the support of improved regional policies.

Sub-objectives of the REDUCES project are:

1. To increase the knowledge and capacity of regional and European policymakers and stakeholders on circular economy business models
2. To improve the competence of partners and involved stakeholders to make informed decisions on promoting the transition to the circular economy in regions
3. To discover innovative and the most feasible circular economy business models in each region, which are instrumental to transforming production value chains towards environmental sustainability
4. To improve the competence of regional actors to assess the environmental impacts of circular economy business models in order to choose the most feasible and environmentally sustainable models recognizing regional assets, barriers, needs and strengths necessary for the circular economy transition
5. To improve policy instruments (4 ERDF policies and 2 regional plans) via 6 action plans to better introduce or integrate circular economy business models into the policy instruments and supporting the theme by proposing new project ideas or funding.

The purpose of this Status Quo report is to summarize the results of the studies carried out about the existing circular economy business and actions, strengths, opportunities, threats and weaknesses in Bulgaria. The Status Quo report provides the basis for the development work planned in the REDUCES project.

2 Definitions and methods

2.1 Circular economy

"Circular economy" can mean a lot of different things in different sectors. Common denominators include designing out waste and pollution (reduction of waste), keeping products and materials in use (quality improvement and value retention), regenerating natural systems (loops, transition) and social aspects, such as creating well-being. (Ellen MacArthur Foundation 2017b.)

A circular economy refers to an economic system that is based on business models that replace the current linear economic model. These business models replace the conventional model with reuse, recycling and alternative production, distribution and consumption processes. A new business context aiming at sustainable development requires extensive action at several levels, ranging from the micro-level (products, businesses and consumers) to the meso-level (eco-industrial parks) and even up to the macro-level (cities, regions, states and even more extensive entities). All of these share a common view and goal of more sustainable business that takes into account the environment, economic well-being and social justice at different operational levels. (Kirchherr et al. 2017, 224–225.)

According to the Ellen MacArthur Foundation, the aim of a circular economy is to look beyond the current take-make-waste extractive industrial model. The idea is to gradually decouple economic activity from the consumption of finite natural resources. At the same time, the amount of waste is reduced and finally it is designed out of the entire system. The focus is on positive, society-wide benefits. The circular economy builds economic, natural and social capital, supported by the transition to renewable energy sources. (Ellen MacArthur Foundation 2017b.) The Finnish Innovation Fund Sitra defines the circular economy as a future economic model in which natural resources are used within the Earth's carrying capacity. (Sitra 2019a).

Based on the knowledge and understanding of the REDUCES project partners, the circular economy refers to socially sustainable business that creates well-being. The objective of the economy is to maintain and restore the value of our natural resources. Even though the objective is full circulation, the number and level of loops can vary. The transition to a circular economy, as well as business in a circular economy, requires extensive cooperation between different parties.

2.1 Circular economy business models

The corporate world is shifting from the traditional model of a linear economy towards a circular economy. In the circular economy, production and consumption are increasingly based on services instead of owning. The operating methods and

earning models of companies change, and operations need to be updated so that they will support the mitigation of climate change. (Sitra 2019b.)

The themes of the circular economy business models investigated in the REDUCES project are based on the definitions of the Finnish Innovation Fund Sitra. The themes are renewability, sharing platforms, product as a service, product-life extension and resource efficiency and recycling. (Sitra 2019a.)

The circular economy business model is an economic model in which business is largely based on the forms of business mentioned above, i.e. consumption is based on the use of services – sharing, renting and recycling – instead of owning and increasing production of goods. Materials are not destroyed at the end but used over and over again for making new products. (Sitra 2019a).

Design plays a crucial role in ensuring that products are durable and environmentally friendly and that the materials can be reused at the end of the product life cycle. The circular economy requires us to redesign our ways of working: our products, business models, cities and the linear systems that have lasted for the past centuries. Choices made at the start of the life cycle have impacts on each phase during the product life cycle. (Ellen MacArthur Foundation 2020a.)

2.3 Multi-stakeholder governance model

The multi-stakeholder governance model is a governance structure that comprises institutional ways of involving non-governmental actors, i.e. internal and external stakeholders in the dialogue, decision-making and implementation of solutions to common problems or goals. It relies on the principle that if enough input is provided by all actors involved in a question, the eventual consensual decisions gain more legitimacy and therefore better reflect the set of perspectives rather than a single source of validation. Unlike in multilateralism, in which governments, as representative of their citizens, take the final decisions on global issues and direct international organizations to implement them, in multi-stakeholderism stakeholders become the central actors. Multi-stakeholderism often disconnects decision-making and the implementation of these decisions from the interngovernmental sphere, having no obligation to either report to or take instructions from the interngovernmental community. (Lin 2018, Gleckman 2018, Szuppinger & Kállay 2017)

In the REDUCES project, the multi-stakeholder governance model appears in involvement and engagement of the stakeholders from the different sectors and levels in all the regions in the project. Circular economy is not an individual game, and this gives a crucial role to wide cooperation between different stakeholders. Involvement appears in different ways for different project regions depending on the policy instrument and its role and activities in the field of business and circular economy activities.

2.4 Policy instrument

In general, a policy instrument is a means for public intervention in local, national or international economies, referring to any policy, strategy, instrument or law developed by government/public

authorities and applied on the ground in order to improve a specific territorial situation. Policy instruments are linkages between policy formulation and policy implementation, intended to achieve outcomes which conform to the objectives of public policy. They can take many forms, ranging from regulatory régimes to the provision of services to help improve the performance of businesses, and in most cases, financial resources are associated. However, an instrument can sometimes refer to a legislative framework with no specific funding. (Interreg Europe 2020, Saublens 2012.)

Policy instruments are often known as governing tools as well, particularly when they are applied to all conditions associated with them. The implementation of governing tools is usually meant to achieve policy targets of resource management but adjusted to social, political, economic, and administrative concerns. Concerns of sustainability largely depend not only on what instruments are selected but also on how they have been applied. Assessment of policy instruments can therefore be an important component of policy sustainability. (Ali 2013)

In the context of Interreg Europe, "operational programmes for Investment for Growth and Jobs as well as Cooperation Programmes from European Territorial Cooperation are considered policy instruments. Beyond EU Cohesion policy, local, regional or national public authorities also develop their own policy instruments. Macroregional strategies can also be considered policy instruments in the context of Interreg Europe. However, considering the characteristics of these strategies, it may be easier for projects to influence the corresponding transnational cooperation programmes than the macroregional strategy itself." (Interreg Europe 2020.)

3 Status quo of the regional circular economy: Bulgaria

3.1 Main features of the circular economy in Bulgaria

For the preparation of the Bulgarian Status Quo report a compination of desktop research and interviews with representatives of Ministry of Environment and Municipalities and NGOs engaged in the "green deal", and experts in CE is implemented. In addition surveys in two sectors: Raw Mineral Materials and Food have been organised. The initial phase of the process is focused on data mining in official and verified secondary sources, which include, but are not limited to:

- Bulgarian trade register database;
- National statistical institute;
- websites and publications of government and regulatory bodies;
- websites of NGOs;
- reports.

Bulgaria is a medium sized country in the EU according to land surface with 7 million inhabitants resulting in a relatively low population density. The average income level in Bulgaria is the lowest in Europe. It has a higher urbanisation level as 75% of the population lives in a predominantly urban area. But artificial and build up area make up only 4% of the land surface while the most dominant land cover classes by far are woodland (40%), cropland (29%) and grassland (18%) areas.

Bulgaria has relatively large resources of agricultural and woodland areas, as these land resources expressed per capita are twice the per capita availability for the EU average.

Bulgaria: General Figures

Category	Unit
Population	6.9 million (2019)
Area (total)	11 million ha (2019)
% population in urban areas	18.8 % of total population (2019)
% territory predominantly rural	22.1 % of total territory (2019)
% territory predominantly urban	1.2 % of total territory (2019)
Agricultural Area	4.5 million ha (2017)
Forest area	4.6 million ha (2017)
Population density	64 n°/km² (2018)
Agricultural Area per capita	0.63 ha/capita(2017)
Forest area per capita	0.65 ha/capita(2017)
GDP current	60.7 EURO billion (2019)
GDP growth	3.6%

Source: *Eurostat and National Statistical Institute (2019)*

Structure of the economy

Traditionally Bulgaria was considered as an agricultural country, but in fact, the agricultural sector only accounts for 4% of GDP and employs 6% of the workforce (World Bank Report on Bulgaria). The main crops are sunflower, tobacco and wheat. Industry today represents 26.6 % of the GDP, and 29% of the workforce is employed in the industrial sector. Industry continues to rely heavily on the manufacturing sub-sectors (metallurgical, chemical, machine building), which are estimated to contribute to 14.7% of GDP (World Bank on Bulgaria). Bulgaria's main mineral resources include bauxite, copper, lead, zinc, coal, lignite (brown coal) and iron ore.

However, the most dynamic sectors are textile, pharmaceutical products, cosmetic products, the mobile communication and the software industry. The service sector has more than doubled its contribution to the country's economy in the last decade accounting for 69 % of the GDP and employing 64.5% of the workforce.

The material resource efficiency data show the development and implementation of the respective policies in Bulgaria. The figures bellow show that Bulgaria is lacking behind the EU average and needs to put significant efforts to catch up with EU average.

Use of materials

- 140 million tonnes DMC (2.1 % of EU-28 total in 2017)
- 19.4 tonnes DMC/person (149 % of EU-28 average per person in 2017)

Resource productivity

- 0,30 EUR/kg (EU-28 average – 2,04 EUR/kg)

According to the latest National Statistical Institute data for 2018, the total number of non-financial enterprises in Bulgaria is 406 310. More than 99 % of all companies are SMEs, over 92 percent of them are even micro-enterprises—up to 10 employees. With a similar size structure of the companies in the country, the innovation process wich is the main driver for circular economy business models application, is hampered by the limited financial, production and technological capacity of the majority of the companies.

To some extent, innovation is hampered by the specific sector-by-branch distribution of companies of varying sizes. The concentration of companies does not coincide entirely with the ranking of the sectors on their relative shares in GDP. However, the prominent discrepancy with the leading (in GDP) services sector, together with the predominantly small Bulgarian firms, are among the reasons for the weaker effects of innovation dynamics, the more limited potential for long-term and lasting stabilization of growth. This conclusion is confirmed by the statistics on the amount of investments, innovations and R&D expenditures undertaken in the country, as well as on their main structural features.

Due to the already clarified sectoral distribution of the companies, the better innovation potential

and the functioning of the bigger ones in the manufacturing industry, the higher share of the innovative enterprises is characterized by the industry (31.6%), while in the services sector they are about one-fifth (22.1%). These stakes have remained relatively constant over the past few years. A significant part (almost 82%) of the enterprises identified as innovative are large—they refer to the group of companies with up to or over 250 employees. By comparison, they are far less in the SMEs group; for example, only about a fifth of companies employing between 10 and 49 people are innovative.

3.2 Regional circular economy profile: Bulgaria

3.2.1 Regional CE drivers, strengths and opportunities

Bulgaria: Current situation related to circular economy (CE)

CE in BULGARIA policy framework

Currently the main National strategies and action plans tackling the circular economy are:

- National Development Programme: Bulgaria 2020;
- Innovation Strategy for Smart Specialization of the Republic of Bulgaria 2014–2020;
- National Waste Management Plan 2014–2020;
- Strategy and Action Plan for 2021–2027 under development - Coordinator of the document development is MOEW and the strategy is in compliance with EU Circular Economy Action Plan.

The institutional set up for material resource efficiency policies is as follows:

- **Ministry of Environment and Water** - waste management policy; OP „Environment"; eco-labelling, water management policy, biodiversity;
- **Ministry of Economy** - competitiveness and investment policy; OP "Innovation and Competitiveness"; public procurement policy; innovation; SMEs standardization and technical harmonization, Innovation Strategy for Smart Specialization;
- **Ministry of Energy** - mineral resources and mining waste management; energy efficiency and renewable energy policy;
- **Municipalities** - management of the waste generated on their territory, local taxes, others.

Resource efficiency activities are described under Objective 2 of RIS3. Fast and efficient utilization of technology and knowledge is required and support for creation and implementation of own technologies and knowledge in the field of resource effectiveness in order to achieve a degree of integration in this market. To support the innovation is foreseen financing of measures and activities under procedure "Implementation of demonstration/pilot projects in waste management".

Currently Bulgaria is struggling regarding circular economy efforts. On the bright side, it has a low per capita waste production with of about 407 kg per year and solid number of extended producer responsibility schemes in place. On all other circular economy indicators, Bulgaria ranks very low compared to EU average. Resource efficiency is of particularly concerning, ranking second to last amongst all EU member states and little focus on waste minimizations by SME's.

The country's accession to the EU improved quality of life for the population, in turn ramping up demand for high quality products and services and it is expected to give a strong boost of the circular economy business models in Bulgaria.

BULGARIA - CIRCULAR ECONOMY INDICATORS

Indicator	Value
Production and consumption	n/a
Waste generation	
Generation of municipal waste per capita (Kg per capita)	407 (2018)
Generation of waste excluding major mineral wastes per GDP unit (Kg per thousand euro, chain linked volumes (2010))	418 [2016]
Generation of waste excluding major mineral wastes per domestic material consumption (percentage) Source Metadata	13.3 [2016]
Food waste (million tonne)	N/A
Waste Management	
1. Recycling rates	
Recovery rate of construction and demolition waste (percentage) Source Metadata	87 [2017]
Recycling rate of municipal waste (percentage) Source Metadata	47.5 [2018]
Recycling rate of all waste excluding major mineral waste (percentage) Source Metadata	56 (2017]
2. Recycling / recovery for specific waste streams	
Recycling rate of overall packaging (percentage) Source Metadata	67.5 [2017]
Recycling rate of plastic packaging (percentage) Source Metadata	41.2 [2017]
Recycling rate of wooden packaging (percentage) Source Metadata	41.2 [2017]
Recycling rate of e-waste (percentage) Source Metadata	38.8 [2017]
Recycling of biowaste (kg per capita) Source Metadata	N/A
3. Contribution of recycled materials to raw materials demand	
Circular material use rate (percentage) Source Metadata	11.2[2017]
End-of-life recycling input rates (EOL-RIR) (percentage) Source Metadata	N/A
4. Trade in recyclable raw materials (tonne)	
Imports from non-EU countries Source Metadata	8,877,945 [2019]
Exports to non-EU countries Source Metadata	25,467,976 [2019]
Intra EU trade Source Metadata	47,905,897 [2019]
Innovation and Competitiveness	
1. Private investment, jobs and gross value added related to circular economy sectors	
Gross investment in tangible goods (percentage of gross domestic product (GDP) at current prices) Source Metadata	0.12 [2017]
Persons employed (percentage of total employment) Source Metadata	1.72 [2017]
Value added at factor cost (percentage of gross domestic product (GDP) at current prices) Source Metadata	0.96 [2017]
Number of patents related to recycling and secondary raw materials Source Metadata	337.74 [2017]

Source: *Eurostat and National Statistical Institute*

Bulgaria: Levels of SMEs involvement in green and circular economy:

- 36% of SMEs in BG are undertaking energy saving actions (3rd lowest EU level);
- 4 % of SMEs in BG use predominantly renewable energy (2nd lowest EU level);
- 7% of SME's are planning additional actions to use predominantly renewable energy (3rd lowest EU level);
- 4% of SMEs in BG are self-assessing how resource efficient their company is (lowest EU level);
- 15% of SMEs in BG are offering green products or services (3rd lowest EU level);
- No official data or plans about minimizing the waste for SMEs. The new Waste law will enter into force on January 1st, 2021 in Bulgaria.

Only one fifth of the companies are investing in new technologies whereas 70% indicate positive results from the investments. Main drivers for these companies to invest are the needs for technology level improvement to secure resource efficient production. The majority of the companies are from sectors such as chemistry, tailoring and textile and construction.Companies investing in technologies for protection of environment are mainly from the mining industry (50%), construction (19%) and pharmaceutical companies (75%).

Key industries of the circular economy profile in Bulgaria

Machinery sector

Machinery sector generated net sales revenue of EUR 1,676 bln up 10.9% y/y in 2018 *(Industry report, Bulgarian Chamber of Machine Building).* The sector employees a total of 30,952 people, or 5 . 9 % of the total for the manufacturing industry. 984 companies represented the manufacture of machinery and equipment sector, compared to 972 a year earlier. Most of them are based In Sofia, Plovdlv and Stara Zagora. Foreign direct tnvestments (FDI) in the Bulgarian manufacturing of machinery and equipment sector totalled EUR 436.3 mln in 2018, an 18 % annual increase,compared to EUR 330.3 mln in the previous year. The sector is export oriented. Main export products are refrigerators, freezers, engines and motors, valves, machinery parts, as well as automatic data processing machines, according to data from UN Comtrade.

The negative impact on the environment in this sector comes from increased industrial energy consumption and the related CO2-emissions. In pursuit of sustainable change in the machine building industry in Bulgaria the companies are developing innovative solutions for machine tools as well as for production processes. Digitalisation of the industry is also very importnat factor to increase the sustainability of the sector. Circular models demonstrated by the companies include technology and innovations powered by the evolution of Industry 4.0. State-of-the-art technologies such as the Internet of Things (IoT) and machine learning, increase in accuracy of machine tool frames, the usage of mechatronics and recycling of components and equipment, reverse logistics are supporting the circular economy practices.

As a result the industry is positively influenced from improving business sustainability by reinserting waste into the supply chain, manufacture products on demand, apply automate manufacturing processes, use of three-dimensional (3D) printing technologies and many more. These have several environmental, sociotechnical and economic benefits for the society.

The business models enabling the circular economy in machine building industry are in resource efficiency, renewability, product as a service and sharing platforms.

Raw Material and Energy Industries

The raw material and energy industries are the basis of the Bulgaria's economy and is an important factor for the state stability and the energy independence of the country. The activity of the branch is related to: prospecting, exploration and extraction of the mineral and energy resources on the territory of the Republic of Bulgaria, in the continental shelf and in the exclusive economic zone in the Black Sea; protection of the earth's bowels and rational use of the underground resources in the exploration, extraction and primary processing; management of mining waste from the exploration, extraction and primary processing of the mineral resources.

The fundamental role of the raw material industry positions it as one of the best developing in recent years. In this sector our country comes closest to the EU average in terms of labor productivity and significantly exceeds the average productivity for other industries. Bulgaria is one of the EU countries with long traditions and experience in the development of the mineral industry. Bulgaria is third in copper production and fourth in gold production in Europe, which shows the leading position of our country in European ore mining and it is can names as „mining country".

At the present, the Bulgarian mining companies operate successfully and profitably. In 2018, 338 companies and organisations in the field of exploration, extraction and processing of mineral resources and related activities and services are developing active economic activity in the branch. The Bulgarian mining industry forms on average about 5% of the country's Gross Domestic Product and provides direct employment to about 22 000 people, and through related industries to about 120 000 people.

According to data from the Bulgarian Chamber of Mining and Geology in 2017, the total value of production of industrial enterprises in the mining industry amounted to BGN 2.85 billion (around 1.45 billion EURO), which is an increase compared to previous years.

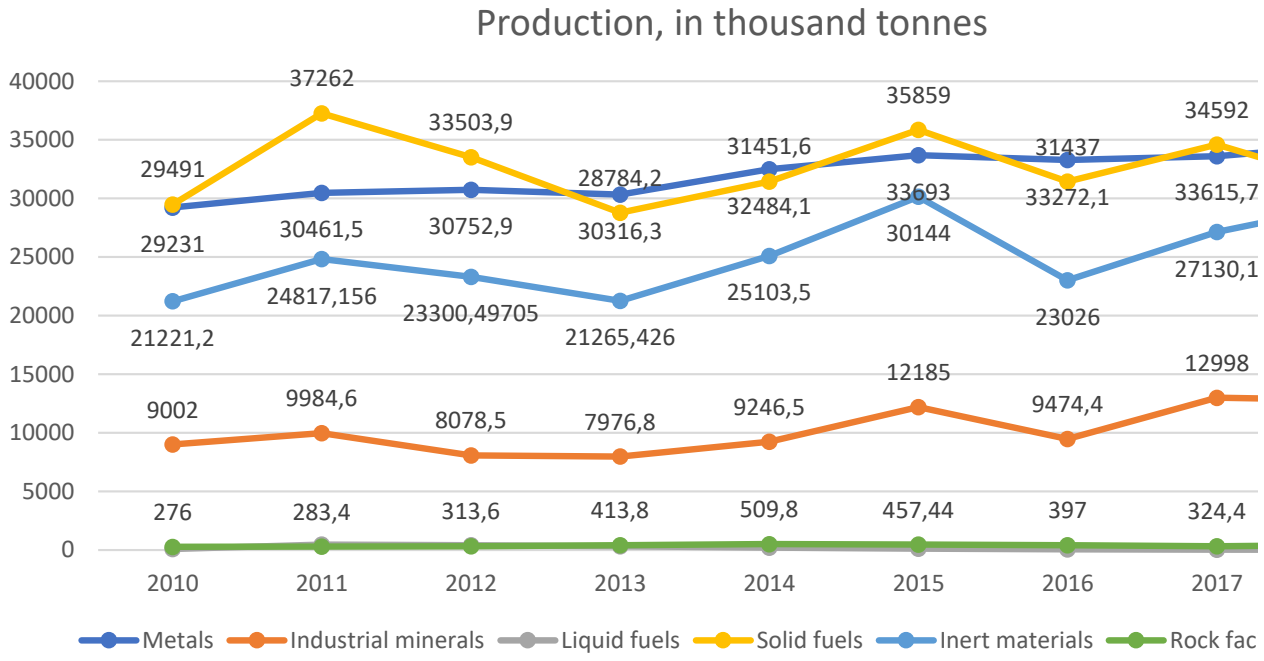
The number of people employed in the mining industry in 2019 is 20 779 people, and the trend is insignificant compared to previous years.

The raw material industry is a specific one because the number of operating enterprises is relatively small, but they still manage to generate output and added value, which in absolute terms exceeds the production of many other industries.

The following graph (slight) traces the pace of production since 2010, broken down by sub-sector. Each sub-sector has a relatively stable pace, as traditionally the highest productivity are the sub-sectors „Mining of ore materials", „Coal mining" and „Mining of industrial materials (no-metalic)", as the total extraction of the raw and energy (coal) materials in our country in 2018 is in the amount of 108.42 million tons and has a slight decrease compared to the previous year.

the so-called chamber system was introduced with the subsequent filling of the seized mining spaces with hardening material, which includes all ore-free rock masses and a large part of the flotation waste mixed with cement.

Assarel Medet has an oxide embankment (a hill formed by the disposal of oxide copper ores, once treated as waste)—is simultaneously recultivated and operated through a drainage system for capturing and draining water to be directed to the



The examples of waste-free production in Bulgaria are becoming more and more, as the raw material industry is among the leaders in the field of circular economy. For the sector, the situation is slightly different from the traditional one—material flows are usually large and concentrated and therefore the utilisation of waste occurs much more often. Given the specifics of the activity, the business models that have been proven to be applicable are „Resource efficiency and recycling" and „Renewability".

A good example in the circular economy is one of the best underground mines in the world—**Dundee Precious Metals Chelopech**. In 2005,

production of cathode copper or to treatment facilities. Lavender is grown on the reclaimed land for oil production—copper is also extracted at the same time.

In order to establish the understanding and application of the models for circular economy at the beginning of 2020, in the frame of the REDUCES project was conducted a survey among the companies from the Bulgarian raw material industry.

The analysis of the results show that circular models are applied in most of the surveyed companies for modernisation and innovation:

- To allow efficient processing of poor ores;
- Industrial water supply in a closed cycle to power the production process;
- Installation of extraction plant and electrolysis of cathode copper from mine water, through which an additional by-product is obtained—pure copper;
- Technology for extraction of accompanying gold from the copper concentrate, so as not to lose useful components in the waste maximum and full utilization of the mineral resources.

Application of a method of extraction that includes backfilling, ie. the ground ore-free rock mass is returned to the underground mine in the form of a pasty filling, is an example of a circular economy, which not only reduces the amount of waste deposited on the surface, but is also used as a raw material, which is mixed with cement and returned to the seized chambers, ensuring the stability of the rock massif. Part of the mine ballast is used for filling the used spaces underground, for paving during the construction of the underground roads after crushing and for upgrading the walls of the tailings pond. In the extraction of limestone, which is needed for the production of lime, many additional fractions of material are released, which are not discarded but are sifted and placed on the market . The rock masses and sludge are used for reclamation of disturbed terrains. Waste oils are handed over to companies for recycling and use in other industries. Recycling of metals used for drill tool crowns. Separate collection of the waste and its transfer for specialized treatment.

Textile and apparel industry

Textiles and clothing are a fundamental part of everyday life and the fashion industry is an important sector in the Bulgarian economy especially in the Southern regions of the country. The sector is dominated by SMEs estimated to be above 2200 in 2018 employing more than 30 000 people in the production and more than 100 000 along the value chain (Industry Report, Executive Agency for Support of SMEs). The majority of the companies are working for international brands and when it comes to small series and flexible orders the Bulgarian companies are preferred compared to the big suppliers like China.

However, as explained in a report on business models in fashion industry for transition to circular economy, the current system for producing,

distributing and using clothing cannot be sustained. It operates mostly in a linear way, following the take-make waste model. Large amounts of nonrenewable resources are extracted from the earth to produce clothes that are often used for only a short time period, and then discarded. The emergence of the business model „fast fashion" has increased the introduction of trends leading to the premature end of an existing product's life. 73% of all clothes that have reached their end-of-life stage is landfilled or incinerated, while less than 1% is used to produce new apparel.T his naturally has had a negative impact on the environment and people at the bottom of the supply chain - garment and textile manufacturers. The business-as-usual scenario depicts a further increase in textile production, thereby tripling the global consumption of fossil fuels and adding 22 million tonnes of microfibres to marine waters by 2050. Exhaustion of resources and irreversible environmental changes have provoke a new understanding of efficiency, namely resource efficiency and a regenerative circular economy.

Business models enabling the circular economy can target textile industry in several sub-areas:

- Production processes
- Product life cycle management
- Trade
- Consumer behavior
- Waste management system for textile

New business models that recently have gained attentions regarding efforts to transition towards a circular economy in Bulgaria are mainly in the field of product-life extension model, renewability and sharing platforms. The models are focusing on how to reuse textiles: by repair, maintenance, reuse as a product (e.g. second-hand trading), and as a material (e.g. as handicraft), selling and sharing through online platforms.

TexCycle - second life for the clothes **is an example for product-life extension** existing solution but not only. TexCycle are active in 10 municipalities all over Bulgaria with 93 locations with installed containers for textile. The largest number of locations is in Sofia Capital city—43 followed by the city of Bourgas 19 and the other 30% of the locations distributed among the other 8 municipalities. Reuse is the most environmentally friendly extension of the life of the textile, as it requires the least additional resources and energy. The collected clothes are sorted and disinfected and according to their condition are sold in the second hand markets. Most of the usable clothes collected in Bulgaria are sold in countries with a lower standard of living. The main goal is for each garment to find an owner who needs it and would wear it, extending its life cycle.

Similar business model is offered also by another Bulgarian company - **Huminita Ltd in cooperation with the Bulgarian Red Cross.** With 92 containers for textile located in the three largest cities in Bulgaria – Sofia, Plovdiv and Varna and a large sorting and processing center Humanita Ltd maintain the crisis reserve for the Bulgarian Red Cross to help victims of disasters, accidents and crises, which if necessary can immediately provide clothes for 1,000 people. About 10% of the collected quantities are suitable for cutting and from them are made cotton towels used for cleaning in various industries. About 50% are clothes that are reusable and exported to countries in

Africa, Central America, the Middle East. Some of the quantities are redirected to recycling facilities in the country and abroad for the production of insulating wool, filling for upholstery, and knitted for yarn, etc.

Zona Urbana is an example for **renewability** business model. Zona Urbana was established in 2004 and offers hand crafted products created from different kinds of recycled materials. Zona Urbana is the place where the consumer can buy a unique bag or wallet made from old newspapers or paper maps in Sofia. The three shops of the company are perfect for recycle freaks" who will immediately fall in love with the great variety of stuff. To reuse, recycle and be more careful with nature is the main idea behind the magnificent hand crafted items of Zona Urbana.

Remixshop.com is a leading **online platform** for second hand and outlet fashion in Europe. With a team of more than 600 employees and a logistic center in Bulgaria the platform offers brands and accessories in 9 countries—Austria, Bulgaria, Germany, Greece, Poland, Romania, Slovakia, Czech Republic and Hungary. In addition to buying the customers can also sale to remixshop.com their clothes and accessories through the service "Sell to Remix".

Food Chain

Bulgaria has strong traditions in the Food sector. Given her small size, the ciuntry has a surprisingly diverse climate and offers grate variety of food products. Advantages of Bulgaria in the sector Food and Agriculture Unique environmental conditions support wide variety of crops, fruits and vegetables 50% of the territory is agricultural land. Health and environmental standards make Bulgarian food products fully prepared to meet the highest and most sophisticated demands from consumers. There are significant foreign investment in sectors such as confectionery, dairy and beverages. Rising demand for novel and ethnic food and drink across Western Europe and beyond is boosting demand for traditional Bulgarian production and beverages.

The Food Production sector is leading in the number of SMEs—4736 in 2017. The highest concentration of companies and employees is in the South-West region, followed by the South-Central region. This distribution of the companies active in the sector is closely linked to the size of the markets, Sofia being the largest one in the country.

In Bulgaria like in EU the food systems depend on natural resources (e.g. water, soil, minerals) and energy, and are a notable source of GHG emissions (i.e. agriculture generates 10% of all EU emissions) and pollution (e.g. due to fertilisers, pesticides). Retailers find it often impractical and costly to distribute surplus (unsold) food, which means valuable nutrients are wasted. In Bulgaria around 170 kg per person of food are wasted every year, which is equivalent to more than 20% of all produced food.

The circular economy business models in Bulgaria are focused on **preventing food waste** and **design and marketing of healthier products**. Organic resources such as those from food by-products are free from contaminants and can safely be returned to the soil in the form of organic fertilizer. Some of these by-products provide additional value and are used for creating new food products, fabrics for the fashion industry, or as sources of bioenergy. These cycles regenerate living systems, such as soil, which provide renewable resources, and support biodiversity. Converting organic waste into a source of value requires effective collection systems and pure waste streams. Besides the new technologies introduced at company levels more effective supporting policy frameworks and community engagement can rapidly

transform collection systems and increase organic waste collection rates.

Existing examples include companies producing innovative products **from food waste**. **Biomyc Ltd** offers 100% degradable packaging material from organic waste (mushroom mitzel).

Nasekomo Ltd produces premium sustainable insect products, such as protein meal, for the animal feed and agriculture industries by converting organic waste into a rich protein ingredient. Food businesses organize in house food waste control.

ADM Amilum is a corn wet mill production plant located in Razgrad, in the northeast of Bulgaria, producing a wide range of corn-based products for the food, beverage, paper, packaging and animal nutrition industries. The little waste which remains from the processing of corn is used for animal food.

In **Bagri restaurant** in Sofia the menu is based on the seasonal food concept, the recipes are healthy. Most of the food products are locally supplied, the food waste is separated by type and content and a small composting installation is installed.

Construction and demolishing waste

Construction and Demolition Waste is a major challeng and opportunity in a circular economy in Bulgaria.

The construction industry uses million of tonnes of (scarce) minerals, ores and other resources per year. This amounts to big quantity of extracted raw material and is expected to only increase, especially due to demand in Bulgaria. Extracting, transporting and processing construction materials (e.g. concrete) consumes much energy, and in effect, the construction industry accounts for a quarter of global GHG emissions. Conventionally, used materials are usually landfilled, incinerated or downcycled (e.g. used in road pavements). In Bulgaria around 30 million tonnes of construction and demolition waste is generated per year. While the EU and Bulgarian legislation has recovery targets for the aforementioned waste, recent analysis shows that its implementation has been inadequate. The target set in Ordinance for Construction Waste Management and Use of Recycled Building Materials in Bulgaria is for 70% of the construction waste to be recycled and reused by 2020, which will not be reached.

The prevention of construction waste generation is possible trough adquate planing and design of the construction, use of proper construction techniques, good communication between the participants in the process as well as minimum construction materials stored on the construction site, buildings and construction elements are designed to be easy to adapt.

Knauf Bulgaria offers a renewability business model for production of gypsum construction products like plasters and sheets by using waste from desulphurization installations from Thermal power stations.

Existing example for product life extension business model in Bulgaria is **Buildings construction from shipping containers.** The humble shipping container is finding new life in Bulgaria through the Architectural Studio PAM Consult. Shipping containers are an appealing construction material and affordable for social housing since they

are much cheaper compared to the costs of labor and materials needed to build a more traditional home.

Prolonging the life cycle of the buildings in Bulgaria is also demonstrated by projects related to **renovation and retrofitting of state owned, municipal and private buildings** in the cities of Bulgaria. These are initiatives mainly funded by National and EU Structural Funds programs. The main activities funded are introduction of energy efficiency measures and RES use in the buildings. **Sofia Municipality** announced a project for substitution of fossil energy carriers like natural gas and coal with biomass heating in households with lower income. The impact on the environment is mainly reduction of air pollution and CO^2 emissions.

The **mobility sector** is also very importnat in proper city planing with allocation of places for electricity vehicles and supporting sustainable mobility revolves around public transport and multimodal approaches (e.g. combining walking, cycling, rail and vehicles). Sofia Municipality has invested heavily in reorganising the public transport. Cycling paths have been developed in the city, blue and green zone cover the extended center of the Sofia, parking lots for electrical cycles have been allocated.

Since 2018 **SPARK.bg** is the very first fully electric car sharing company in capital city of Sofia, which provides affordable eco-friendly mobility solutions. The easy-to-use system along with the newest vehicles inspires the customer reaching their destination faster, in style and respecting the environment**.** Using **SPARK mobile app**, vehicle reservation, accessibility and billing information is just a few clicks away. SPARK ride is charged per minute usage, allowing our customers to manage both their trip and expenses. **SPARK** is a good existing example of product as a service business model in Bulgaria.

Other sectors and business models activity compliant with and promoting the principles of the circular economy

Waste management

In recent years, Bulgaria has adopted an integrated waste management approach. It is planned to introduce new models of household and construction waste management that will help reduce the total amount of landfill waste, as well

as for their environmentally friendly recovery. Activities for providing containers for waste collection, transportation, waste disposal and cleaning of public places are the responsibility of local authorities. Waste management activities are regulated in Ordinance of the Municipal Council, which also regulates the payment for the services provided under the order of the Law on local taxes and fees. The mayor of the municipality develops and implements Waste management program.

Currently in Bulgaria, 72% of generated municipal waste goes to landfills where 50% of it is biodegradable waste.

The National Waste Management Plan 2014–2020 envisages that 50% of generated municipal bio-waste should be separately collected and treated. National targets also state that the share of biodegradable waste going to landfills should be reduced to 35% and share of recyclable waste should be increased to 50% by 2020. OP Environment earmarks funds for actions supporting the achievement of this target.

Bulgaria has regulatory and economic instruments for waste prevention: landfill charges, producer responsibility schemes for specific waste flows, license fees to waste recovery organisations in relation to the producer responsibility principle, municipal waste tax, fee limiting the use of plastic bags with certain parameters, deposit schemes (currently optional).

There are only 3 facilities for treatment of biodegradable municipal waste currently operating (Varna, Plovdiv and Sofia Municipality), which is insufficient, considering the generated amount of waste. Therefore, investments are required to ensure additional recycling capacity.

Introducing separation at the source in small and rural municipalities is feasible. However, there is a lack of resources, in addition to a lack of experienced, qualified personnel to provide good service. Moreover, there is a lack of public awareness. The OP Environment is testing measures in this field (within pilot projects, information campaigns are foreseen).

In Bulgaria, the Waste Management Act (WMA) regulates the hierarchy for waste management, where two priorities are set:

Priority 1 - waste prevention;

Priority 2 - recovery of waste through recycling, reuse and / or extraction of secondary raw materials and energy;

Priority 3 - final disposal by landfilling or incineration of the waste, for which it is impossible to prevent and / or recover.

Waste is categorized into four groups - household, construction, industrial and dangerous.

The recovery of waste in Bulgaria is extremely insufficient and is carried out in:

1. **Installations and facilities for incineration and co-combustion** - Waste incineration it is not a common practice in the country. At the moment it is not built installation for incineration of household waste. Only the hospitals are using incineration equipment for the hazardous waste. Sludge from waste water treatment plants, containing oils and petroleum products shall be disposed of in incineration plants Lukoil Neftochim Burgas. Co-incineration is carried out in industrial combustion plants of 5 cement plants - the total amount of energy recovered waste in them is about 2,600 tons. Serious contribution to The disposal of inorganic waste has the cement plants “Zlatna Panega Cement ”and“ Devnya Cement ”.

2. **Installations and equipment for mechanical treatment** - Mechanical treatment of waste is in most cases important as pre-treatment, prior recovery or final disposal. The facilities are baling presses, briquetting installations, mills and separators.
3. **Recycling plants** - The total capacity for recycling of paper and cardboard waste is about 200 thousand tons and it is concentrated mainly in the enterprises of the pulp and paper industry and in those producing building boards. The processing of plastic waste is concentrated in three main enterprises with a capacity of about 12 thousand tons / year. Processing of waste glass is carried out in 6 enterprises in the country. The annual amount of processed glass waste is about 15 thousand tons / year
4. **Landfilling** is the only method for disposal of municipal waste in the country and the main method for all other types of waste. Disposal as a method ranks last in the accepted waste hierarchy and are one of the most undesirable treatment options. However, this method will play an important role in the next planning period in Bulgaria and landfills will be an important element of the future waste treatment infrastructure. Although many countries still use and increase their capacity for waste incineration, there are no facilities for incineration of household waste in Bulgaria. An alternative to landfill is recovery / recycling of waste, and since 2004 it has been realized through the introduction of targets for recycling and recovery of widespread waste.

The separate waste collection system is realised by different companies and organizations following the regulation set in The Law on Waste Managem and provides separate collection of waste from paper, metal, glass, plastic, obsolete electrical and electronic equipment, batteries and others. This prevents hazardous waste from entering the environment and reduces human impact on it by reusing raw materials after recycling.

Existing business model complying with the circular economy principles is applied by Veolia Company, which in 2010 acquired the majority stake in Sofiyska Voda (Water utility company of the City of Sofia) and put in place new projects for optimization and environmental protection by reusing the waste from its activity. The production of green energy from biogas at the plant continued to increase steadily and in 2014 for the first time since the co-generation system was installed, Sofiyska Voda reached 98% self-sufficiency with green energy. The capacity of the co-generation installation includes three co-generators, each of them can produce 1063 kW of electricity and 1088 kW of heating power. **The wastewater treatment plant** promotes the implementation of the principles of circular economy through generation of biogas from the treatment plant sludge, and developing the end use of the sludge with soil masses or in agriculture. Similar technologies are applied in two more wastewater treatment plants in two more big cities in Bulgaria.

When it comes **to electronics,** the recycling rate of e-waste (percentage) in Bulgaria is around 38 % in 2017. Multiple device ownership, the growth of cloud computing services and short replacement cycles are paving the way towards a growing e-waste generation, as well as GHG emissions due to electricity consumption. Electronics contain critical materials and precious metals as well as iron and aluminium, which together with plastic components could, to a large extent, be recovered. Given that electrical and electronic equipment (EEE) contains substances of concern (e.g. mercury, lead, flame retardants), landfilling, incineration or littering may result in adverse effects on the environment and human health.

In Bulgaria several companies are active in collecting electronic waste. **Ecologica Ltd** is located close to the capital city of Sofia. The company is collecting e-waste from different clients, including banks, public administration, companies, and

private individuals. The waste is checked at the production site of the company. Part of it is repaired and offered for use, other parts are recycled in Bulgaria or in factories in Germany and other EU countries.

Recycling rate of **plastic packaging** in Bulgaria is around 41 % for 2017, while less than 1% is integrated into new products.

Reuse and recycling of end-of-life plastics remains very low, particularly in comparison with other materials such as paper, glass or metals. Ecopack Bulgaria and Ecobulpack are the two main companies having the highest share in rycic-lyng of plastic packging.

3.2.2 Regional CE barriers, weaknesses and threats (possible bottlenecks)

The introduction of circular economy business models require a comprehensive approach and engage many and at different level institutions, companies, local authorities, consumers, NGOs.

Barriers to circular economy implementation in Bulgaria are mostly economic with limited funding available for enterprises to modernize equipment and a notably low level of domestic, private and foreign capital investments. The largest contributing factor to the poor performance can be attributed to a lack of funding at the country's disposal for the circular economy. Government support is lacking and initiatives are few and far between, with those in place focusing primarily on collaboration between businesses.

The complexity of reporting the results is also problematic. A step in the right direction was the introduction of circular economy indicators by EC and reported by Eurostat. Next, it should be noted that there is lack of information and data on macro level and lack of awareness of good practices and the opportunities the CE models can offer.

Major barrier for application of the circular economy concept is the silo structure of the Bulgarian industrial system, which has been established over the years. The intersectoral collaboration and links are poorly developed. Important feature of the circular economy is the industrial symbioses. Strengthening the interaction between different sectors of the economy would allow the reuse of components, production of recycled materials and their use as secondary raw materials in the next stage of a product life cycle. The systematic approach and the intersectoral links is an important condition for the success of the circular economy.

The lack of managerial skills among the entrepreneurs should also not be underestimated. Last but not least, financial constraints create barriers, especially for SMEs, as the implementation of the circular economy inevitably comes with serious investments in new resource-saving and efficient technologies.

The SMEs selling on the local market to a greater extent tend to ignore the principles of environmental friendly production and have more general idea about the benefits of the circular economy and underestimate its capabilities. Many waste streams are too small and uncertain for high-volume production to utilise and to base investments on. Unreliable availability or quality are an obstacle to using other operators' waste and side streams. In addition, use might require initial investments and special expertise. The challenges, obstacles and impediments to using other operators' waste and side streams include the complexity of utilisation, equipment investments, quality and price of the materials, as well as lack of supply. In addition, there being several small streams is considered challenging and laborious.

Although very limited the industrial symbiosis is already in place but as isolated examples of individual companies in Bulgaria, and it is not as a result of targeted state policy.

3.2.3 Vision of the CE development in the region

For the business and the entrepreneurs, the transition to a circular economy model would be attractive if there are clear economic benefits but that is not enough to make the transition to circularity successful. Possible **drivers** for this transition include:

- Reducing the use of materials that are dangerous or difficult for recycling;
- Creating products with better characteristics and longer life cycle;
- More efficient production processes, turning waste into resources through new technologies.
- Design of products that are easily repaired, upgraded and recycled;
- Providing incentives for waste reduction.

With regard to SMEs, public policies could be much more supportive and engaged. So far, it has mainly been limited to the energy efficiency program. In order to realize a real ecological transformation of the production models, the companies must be stimulated and co-financed in initiatives related to technological renewal, purchase of new resource efficient technologies, which minimize the waste production and introduce waste free technologies.

Equally important is the role of public authorities in the widespread promotion and launch of campaigns, initiatives and actions related to good practices in the field of environmental responsibility.

Changes in customer behavior are also important driver and challenge in the transition to circular economy. Consumers must also actively cooperate, gradually changing the pattern of consumption - from „consumer“ to „user“ and from owner to „sharing“. Creating greater demand for services of this type will stimulate a change in attitudes and the applied business models. The traditional consumer habits can be an obstacle to the development of new products and services. If prices do not reflect the real costs to society of resource use, and when policies fail to provide strong and coherent signals for the transition to a circular economy, such obstacles could slow down the process.

At the heart of the circular economy, as a base, is a gentle attitude towards the environment and compliance with environmental standards. In this sense, the launch of low-carbon production, the reduction of greenhouse gas emissions and the transition to energy from renewable sources are priority axes of development. Setting specific, measurable targets, both in terms of renewable energy sources and energy efficiency, would mobilize the efforts of local authorities and lead to focus actions and initiatives in this direction.

Priority funding for research projects in the field, development of smart grids and power generation, the stimulation of private investment and the co-financing with public resources of initiatives related to the reuse, sharing and extension of the product life cycle would be actions in the right direction by the public authorities.

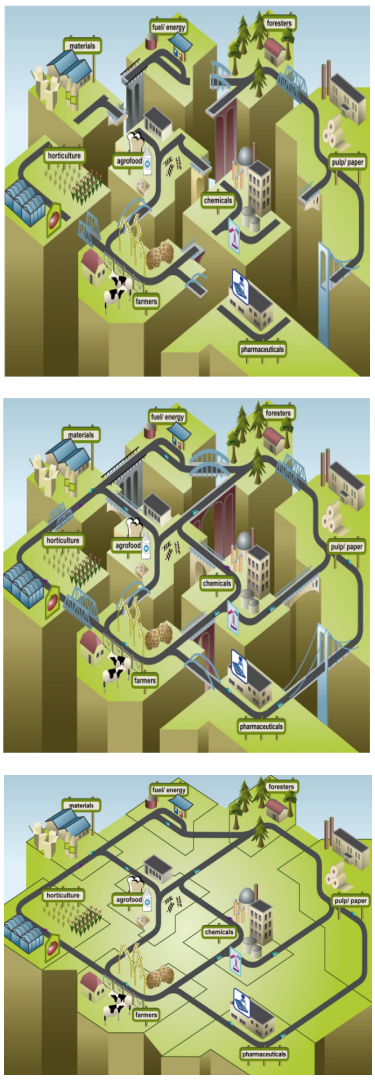
Setting up targets and specific indicators to be achieved in the mid term plan leads to more concreteness, and creates better and more stable environment for business development.

Commitments for resource efficiency Roadmap

Sustainable consumption and production	Transformation of waste in resources	Support of R&D and innovation	Harmful to the environment subsidies and taxation with taxes
Introduction of initiatives for companies, for measuring, detection and improvement of the effective use of resources and research of the industrial symbiosis;	• Providing full transposition of EU requirements on waste, including minimum targets through the National Strategy for prevention and management of waste. • Harmonization of legislation in relation to the different waste streams; • Elimination of illegal landfills with special attention to hazardous waste.	Focusing of the public Financing on key goals to achieve effective use of resources.	• Identification of the most significant damaging environment subsidies and development of plans for their elimination; • Change of focus of taxation to activities affecting environment.

Several specific proposals to the public authorities can be synthesized:

1. Encouraging (stimulating) greater use of renewable energy sources.
2. More effective incorporation of adequate institutional mechanisms for monitoring and control, ensuring the strict application of environmental standards and the transition to practices based on the principles of the circular economy.
3. A more focused and large-scale investment policy, oriented to the needs to prevent and overcome environmental crises.
4. Reform aimed at strengthening the role of CSR and, above all, the environmental responsibility of companies, in order to support sustainable territorial development.
5. Promote sustainable development through clean technologies and green innovation in Bulgaria. Focus on enabling collaboration, professional matchmaking and innovation and support commercial and strategic partnerships among different clusters, associations and companies.



3.3 Policy instrument: Bulgaria

The policy instrument addressed in the REDUCES project is OP Environment 2014 – 2020, Priority Axis "Waste", focused mainly on sustainable growth priority of Europe 2020 Strategy and in particular the following elements of the sustainable growth definition:

- Building a more competitive, low-carbon, resource efficient economy
- Protecting the environment, reducing emissions and preventing the loss of biodiversity
- Exploiting Europe's leadership in the development of new green technologies and production methods.

Out of the 6 measures included in the Priority Axis "Waste", 5 are related and contribute to the application of the principles of the circular economy. In accordance with the hierarchy, the following prioritization of the waste management measures in OPE 2014-2020 is encouraged: prevention, re-use, recycling, other recovery (e.g. energy recovery and disposal).

There is a lack of technical capacity to develop demonstration projects and business models contributing to waste reduction through proper waste management systems and better CE development. Both regional authorities and companies lack information on material flows and scientific and technological issues. In addition, Circular Economy Business Models need to be demonstrated e.g. through demonstration projects and the analysis on the prospects for particular sectors and markets. It has also been recognized that achieving the targets for waste reduction built in the OP Environment is possible only through improved close collaboration between local authorities, businesses and citizens.

There is an apparent absence of well functioning frameworks and business models across or between municipalities and lack of structured cooperation or communication mechanisms between national and any regional business representational organisations and the municipalities. Demonstration of possibilities to reduce the amount of waste going to landfil and to increase the share of recyclable waste through implementation of CE business models will help development of projects that will provide support to municipalities to reach the National targets in this field.

Next to the main instrument OPE 2014–2020 the circular economy activities can have limited support through OP Innovation and Competitiveness where limited funds are allocated for companies active in sectors defined as innovative according to the Innovation Strategy for Smart Specialisation (ISSS) in two of the thematic objectives clean technologies and healthy products.

4 Regional conclusion

Bulgaria is behind in the field of green markets, including technologies for recycling and treatment of waste. Knowledge on fast and efficient use of technology is required. Bulgaria has the potential to introduce innovations in waste, through the new waste management plan and the new circular economy strategy.

Bulgaria is struggling regarding circular economy eforts. On the bright side, it has a low per capita waste production with of about 400 kg per year2, a solid number of EPR schemes in place. On all other circular economy indicators, Bulgaria ranks very low. Resource eiciency is of particularly concerning, ranking second to last amongst all EU member states and little focus on waste minimisations by SME's according to the Flash Eurobarometer.

Barriers to circular economy implementation are mostly economic with limited funding available for enterprises to modernise equipment and a notably low level of domestic, private and foreign capital investments. The largest contributing factor to the poor performance can be attributed to a lack of funding at the country's disposal for the circular economy. Government support is lacking and initiatives are few and far between, with those in place focusing primarily on collaboration between.

Recommendations can be summariesed as follows:

- Launch a "New Green Deal" Circular Procurement for the public and the private sector;
- Formulate and launch a Bulgarian Circular Economy Strategy and Roadmap how to become fully circular in 2050 focuses on bio economy development;
- Make a free training programme and commitments from companies;
- Use the EU funds to set up a national support programme for SMEs with focused activities and access to finance to create a circular economy "hub";
- Implement the new EU regulations on waste management and plastics as soon as possible;
- Make the Bio-based economy development priority for Bulgaria as national source with a big potential;
- Connect all global challenges as SDG's, Climate, etc. to the circular economy development;
- Evaluate the existing EPR schemes based on the latest recommendations of the OECD191, EY192 and Ecopreneur193 as a basis for improvement, and extend them to cover ecomodulation of fees.

Promote sustainable development through:

- Clean technologies and green innovation in Bulgaria.
- Focus on enabling collaboration, professional matchmaking and innovation and support commercial and strategic partnerships among different clusters, associations and companies
- Maintenance of strategic partnerships at the local and international level:

  ✓ Green Business Network (since 2013 with CEOs as 150 members);
  ✓ Horizon 2020 National Contact Points for 3 topics;

- ✓ Technology transfer centres;
- ✓ Universities;
- ✓ Bulgarian Academy of Science;
- ✓ Ministries and Municipalities, etc.

References and additional material

Ali, M. 2013. Sustainability Assessment.

Bulgarian Chamber of Mining and Geology. 2010-2019. Godishen byuletin 2010-2019, Mineralno-surovinnata industria v Bulgaria. BMGK, Sofia. https://www.bmgk.bg/%d0%b1%d1%8e%d0%b-b%d0%b5%d1%82%d0%b8%d0%bd%d0%b0%d1%80%d1%85%d0%b8%d0%b2/

Bulgarian Chamber of Machine Building - Industry report, 2019. https://cdn.seenews.com/reports/MACHINERY%20REPORT_BULGARIA_March2019.pdf

Ellen MacArthur Foundation. (2017a). *Learning path - Circular design*. https://www.ellenmacarthurfoundation.org/explore/circular-design

Ellen MacArthur Foundation. (2017b). *The concept of a circular economy*. https://www.ellenmacarthurfoundation.org/circular-economy/concept

EUROSTAT STATISTICS. https://ec.europa.eu/eurostat/web/structural-business-statistics/overview

Executive Agency for SME support Sectoral Business Reports, 2019. https://www.sme.government.bg/?p=50820

Eionet Report - ETC/WMGE 2020/1, January 2020 *Construction and Demolition Waste: challenges and opportunities in a circular economy*

Gleckman, H. 2018. Multistakeholder Governance and Democracy: A Global Challenge. New York: Routledge.

Interreg Europe 2020. Help - FAQs - Policy instrument / Focus on Structural Funds. https://www.interregeurope.eu/help/faqs/12/.

Kirchherr, J.; Reike, D. & Hekkert, M. 2017. Conceptualizing the circular economy: An analysis of 114 definitions. Resources, Conservation and Recycling. Volume 127. https://www.sciencedirect.com/science/article/pii/S0921344917302835

Lin, T. 2018. Incorporating Social Activism. Philadelphia: Temple University - James E. Beasley School of Law.

Kapka Manasieva (2018) Business models in the fashion industry for transition to a circular economy. https://bgtextilepublisher.org/spisanie/pdf/2018-broi-11-12/spisanie-br11-12-statia-6.pdf

Magazine Ecology and infrastructure issue 1, 2017. https://www.ecology-and-infrastructure.bg/bg/koncepciyata-za-kragova-ikonomika-v-evropa/2/321/

Ministry of Environment and Water: Strategies and action plans on waste management, biodiversity, OP Environment. https://www.moew.government.bg/en/

Ministry of Economy of Bulgaria: OP Innovation and Competitiveness, Smart Specialization Strategy. https://mi.government.bg/en

National Statistical Institute, Annual reports. https://www.nsi.bg/en

Publication: *Analysis of normative documents and programs for construction waste prevention and management in BULGARIA,* Ventseslav Stoyanov, Vilma Petkova, Vihra Andonova, 2018

Saublens, C. 2012. Policy instruments. http://www.know-hub.eu/knowledge-base/videos/policy-instruments.html.

SITRA. (2019a). *The most interesting companies in the circular economy in Finland*. https://www.sitra.fi/en/projects/interesting-companies-circular-economy-finland/#business-examples

SITRA. (2019b). *Dictionary - The circular economy*. https://www.sitra.fi/en/dictionary/the-circular-economy/

SITRA. (2019). *The critical move - Finland's roadmap to circular economy 2.0*. https://www.sitra.fi/en/projects/critical-move-finnish-road-map-circular-economy-2-0/#summary

Szuppinger, P. & Kállay, T. 2017. Multi-Stakeholder Governance Model. Interreg Central Europe.

www.mediapool.bg

REDUCES
Interreg Europe

European Union
European Regional
Development Fund