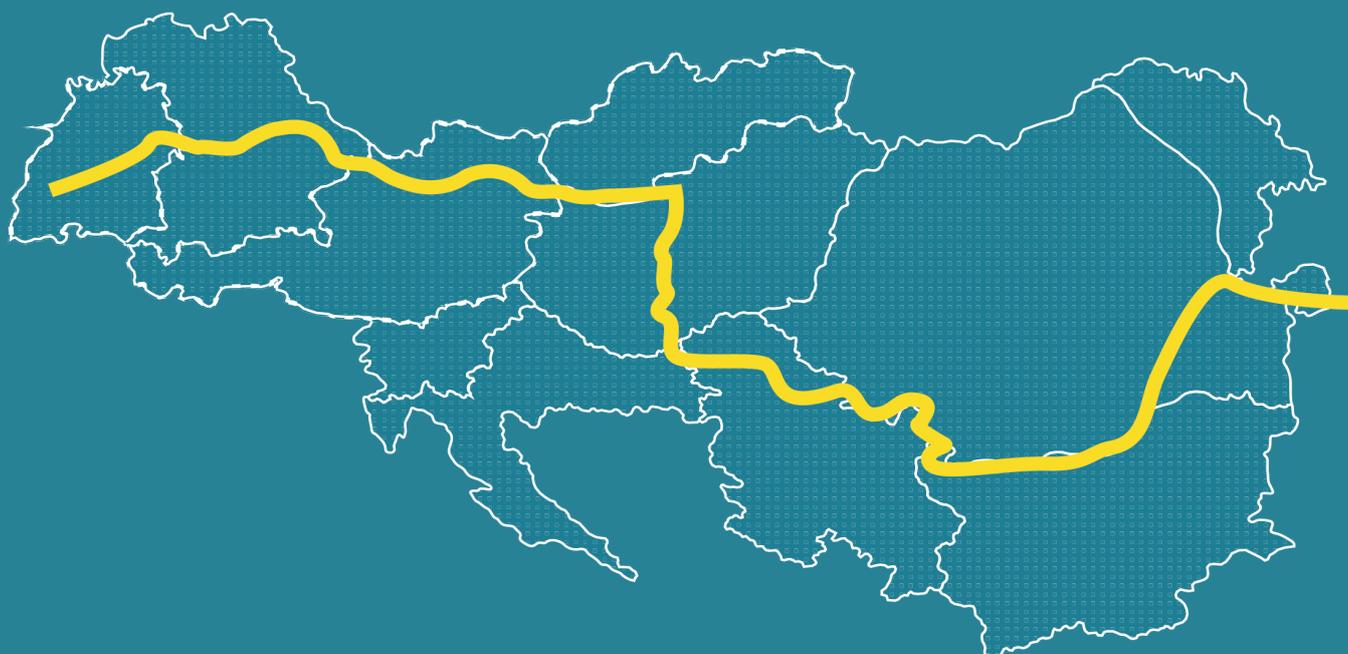


MOVECO

THE DANUBE GOES CIRCULAR

Cross-Country Road Map to Accelerate Transition towards a Circular Economy in the Danube Region

– Bulgaria, Romania, Serbia –



 **Interreg** 
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MOVECO

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1. EXECUTIVE SUMMARY

Today the circular economy becomes one of the very important subjects not only due to the environmental protection but also because of the potential of economic development and growth that comes with it. According to the experts transformation from linear model (“take-make-dispose” pattern) to circular model which is more efficient in term of resources [i.e. which aims to maintain manufactured products, their components and the materials as long as possible within the system while ensuring the quality of their usage] will help to generate new economic activity while preserving and reducing the environmental impact. The circular economy can be a source of cost reductions, as is the case for the procurement of raw materials and other inputs linked to the production, but also for waste management, and also can stimulate the development of new products, goods and services, for example in the field of repair, recycling, economy of functionality, etc.

MOVECO helped to improve policy framework and to promote understanding of circular economy in the Danube Region

Since environment protection is global and can't be limited only to one country, this document Road map refers to a region of three countries, Bulgaria, Romania and Serbia. Romania and Bulgaria are the EU countries and their environmental protection laws, regulation and policies concerning waste management and waste production, are fully in line with EU directives. Serbia is still non EU country but working very intensively to modify all environmental protection laws according to EU directives and to open the Chapter 27 in the process of Accession to the European Union. But all three countries are facing very similar problems and challenges in the process of transition toward circular economy and they are lagging behind in terms of implementation of the circular economy principles

In this document the current situation was analyzed and national legislation and empirical data were represented. The study is focused and brings a quantitative insight on three sectors: packaging waste, electrical and electronic waste and batteries and accumulators waste. It brings a relationship between three key players, important for the development of circular economy – providers of secondary raw materials, procurers of secondary raw materials (producers and distributors) and household and B2B consumers. It was very important to point out what are the main challenges and suggested appropriate actions and measures according to national strategies, laws and directives. These challenges show there are some problems common to all three countries. Road map also put emphasis on group similarities in order to straighten cooperation among countries. This can help whole region in order to move faster toward full implementation of circular economy and to contribute not only to environmental protection but also to economical prosperity of a region.

MOVECO project realized the challenges described above and the pressing needs of fostering the transition from a linear to a circular economy . It understood that circular economy approaches need to be implemented in strategic documents of national and regional public authorities. Responding to these needs MOVECO developed Cross-Country Road Maps that helped to improve policy framework and to promote understanding of circular economy in the Danube Region and in its innovation group of Bulgaria, Romania and Serbia.

From a linear to a circular economy

2. METHODOLOGY – THREE STAGES AND STAKEHOLDERS OF THE CIRCULAR ECONOMY

The Cross-Country Road Maps are important deliverables of the MOVECO project. Aim of the Road Maps is to implement the "Danube goes circular. Transnational strategy to accelerate transition towards the circular economy in the Danube Region", also developed by MOVECO. For this reason the Road Maps focus on the three waste streams discussed by the Transnational Strategy (PPW, WEEE, WB&A). The Strategy has also identified three stages of the circular economy, encompassed by competitiveness and innovation. These stages include 1. production and consumption; 2. waste management; and 3. secondary raw materials. Our Road Maps focus on these stages where the „field work“ for waste management and recovery takes place. The Strategy has identified stakeholders who are involved in these stages. These stakeholders include a.) providers of secondary raw materials (waste management operators), b.) procurers of secondary raw materials (producers and distributors), and c.) household and B2B consumers. In order to implement the Strategy, our Road Maps discuss each country along these stakeholders.

Focus on realistic recommendations

Development of the Road Maps was a multi-step process. On a partner meeting of May 2018 in Munich, partners were introduced into the know-how of writing road maps. We decided that we will focus on realistic recommendations in order to translate and implement the Transnational Strategy in cross-country contexts. We also decided to include relevant stakeholders into road map preparation and to get their endorsement. In

August, partners responsible for the Strategy and the Road Maps, met for a 2-day international staff exchange in Belgrade. During the staff exchange we discussed the relationship between the Strategy, the Road Maps, and the prospective Action Plan, and their harmonisation and integration. We prepared a matrix of recommended measures and actions that can be applied to the Road Maps, and we also developed a Road Map template. In September road map leaders had a skype meeting where we finalized content structure of the Road Maps and the planned time table for their development. In early October we had a 2-day skype training during which all project partners were introduced into the Road Map template, and time schedule for road map development between October 2018 and February 2019. Partners were also instructed on how to translate measures and actions from the Strategy into the Road Maps. In addition, each innovation group had trilateral (skype) meetings and discussions during the development its own Road Map. We have also arranged cross-country workshops and stakeholder forums to receive feedbacks from stakeholders.

Include relevant stakeholders

Bulgaria, Romania, and Serbia are discussed in this Cross-Country Road Map. The reason for their selection is that they belong into the same innovation group. MOVECO identified three groups of innovation leaders, moderate innovators and modest innovators. Innovation leaders include Austria, Germany, and Slovenia, moderate innovators are Croatia, Hungary and Slovakia, while Bulgaria, Romania, and Serbia are modest innovators. These three innovation groups were established by MOVECO using the European Union's (eco)-innovation scoreboards and index¹.

Readers interested in the other six countries are referred to Cross-Country Road Maps of the other two innovation groups.

¹For more information see MOVECO's report „Extended Producer Responsibility Schemes and their Influence on Innovation in the TransDanube Region. Executive Summary.“ December 2017. Deliverable D.3.1.3, prepared by Antonija Božič Cerar.



3. INTRODUCTION – CIRCULAR ECONOMY, ECO INNOVATION, AND WASTE MANAGEMENT

Municipal waste makes up less than 10 per cent of the total waste generated in the EU. Due to its complex nature, resulting from the mixture of different waste streams, a wide range of materials and levels of cross contamination, municipal waste presents an especially significant challenge to our current society with regards to a more efficient use of resources.

Due to our take, make and throw away, linear economic model, an alarming rate of resources in waste are still lost to landfills, incineration and inefficient recovery. Retaining the value of materials hidden in waste, especially municipal waste within the economy as long as possible is the main rationale behind the idea of a circular economy. The perception of raw materials is widening, adding new definitions and characteristics to the existing known technical attributes of individual materials. A list of critical materials, which could hamper industrial production and development, due to Europe's dependency on their imports from regions outside the European Union, has been compiled at EU level.

Resources in waste are still lost

waste are still lost to landfills, incineration and inefficient recovery. Retaining the value of materials hidden in waste, especially municipal waste within the economy as long as possible is the main rationale behind the idea of a circular economy. The perception of raw materials is widening, adding new definitions and characteristics to the existing known technical attributes

Materials are not only being ranked according to their possible detrimental effects on human health and the environment, but also on their effect to recovery operations and recycling. High-level recycling is particularly relevant for retaining critical raw materials contained in WEEE waste streams within the economy. Volume-based targets may inadvertently encourage the uptake of low-quality recycling, or downcycling of e.g. contaminated mixed household waste, if not complemented by additional legislation. While the goal of the circular economy transition is to maximise the 'value' of materials retained within the economy, efforts toward achievement of current targets may lead to investments toward processing high volumes of waste, but with low value.

Since the adoption of the Circular Economy Action Plan by the Commission in December 2015, a number of measures from the Action Plan have been set into motion. The report from the Commission on the implementation of the Circular economy action plan in March 2019, recognises that circularity has opened up new business opportunities, given rise to new business models and developed new markets. In 2016, circular activities such as repair, reuse and recycling generated almost €147 billion in value added while standing for around €17,5 billion worth in investments.

Waste must be perceived as a resource. Currently, recycled materials on average only meet less than 12% of EU demand for materials.

Waste must be perceived as a resource.

Efficient waste management systems are an essential building block of a circular economy. In July 2018 a revised waste legislative framework entered into force to modernise waste management systems in the Union and to consolidate the European model as the most effective in the world. The framework defines new ambitious recycling rates, simplification and harmonisation of definitions, reinforced rules and new obligations for separate collection, strengthened waste prevention and waste management measures and minimum requirements for extended producer responsibility.

Extended producer responsibility ascertains producers to be responsible for financial, technical

and organisational management of postconsumer waste streams. This strategy is based on the assumption that this responsibility will influence the design of new products in a manner, which will reinforce more effective waste management after the product has been discarded by the consumer.

Extended producer responsibility is expected to be expanded to a wide range of consumer goods in the future. The current legislative frameworks requires implementation obligatory extended producer responsibility measures for packaging and waste packaging, (waste) electrical and electronic equipment, (waste) batteries and accumulators, and end-of-life vehicles. Future waste management will not be orientated only on recycling targets, but will also be reinforcing waste prevention measures such as durability, reusability, reparability and the presence of critical materials.

Recycling measures will need to be implemented in conjunction with measures to increase the use of secondary raw materials . The interface between chemicals, product and waste legislation needs to be clarified improving substance traceability and information flows. Access to information about presence and composition of hazardous substances in waste streams in key to improving dismantling and decontamination techniques facilitating better recovery. It is necessary not only to identify hazardous materials, but also valuable materials, especially critical materials which are currently slipping through the cracks due to focus on bulk secondary materials such as steel, copper and aluminium.

Recycling measures will need to be implemented in conjunction with measures to increase the use of secondary raw materials.

In the beginning of 2018, an EU strategy for Plastics in a Circular Economy was presented as an additional measure in the Action Plan. The strategy sets out a number of objectives with recommended measures for their achievement. One of these objective is that all plastic packaging placed on the EU market by 2030 is reusable or recyclable. Extended Producer Responsibility Schemes must be altered to facilitate design for recyclability through “eco-modulation” of producers fees.

MOVECO has identified possibilities to harmonize requirements for PROs.

Nevertheless, despite the challenges presented above, MOVECO has identified possibilities to harmonize requirements for PROs .

New rules on Single Use Plastic items address the ten most found items on EU beaches, which include a number of packaging items such as plastic bottles and their caps, plastic carrying bags, and food and beverage containers, The rules introduce new measures to reduce consumption of food containers and beverage cups made of plastic through specific marking and labelling. From 2030 onwards, 30 % of recycled plastic must be incorporated into new plastic bottles, while 90% of plastic bottles will need to be collected separately, while bottle caps will need to stay attached to the bottles during their whole life cycle. Better eco-design requirements will lead to support for eco-innovation.

Circularity will remain a pillar of the Cohesion Policy over the 2021-2027 programming period. The Commission’s proposal for a new European Regional Development Fund and Cohesion Fund places the circular economy on the list of priorities in EU’s efforts for a greener, smarter Europe, excluding investments in landfills and facilities for the treatment of residual waste.



MOVECO has built bridges between policy makers, R&D organisations, enterprises, and the public for the transition to a circular economy

Experience from our project emphasizes disparities not only between the three determined innovation groups, but also within each individual group. Higher recycling rates are linked to higher waste generation; qualities of recycled materials, especially plastics need to be improved through better separate collection and improved waste management infrastructure.

Potential to exploit these opportunities in the Danube Region lie within the four pillars addressing the major issues emphasised in the action plan proposed by EU Strategy for the Danube Region. These comprise of ensuring better resource and energy sustainability, through the development of a knowledge society, through research, education and information technologies, supporting competitiveness of enterprises, including cluster development, investing in people and skills and stepping up institutional capacity and cooperation.

MOVECO closes loops

The MOVECO project has forged a strong transnational partnership to prepare a transnational strategy for the transition towards the Circular Economy within the DR and roadmaps for their implementation in different innovation regions. In doing so MOVECO worked on to fulfill its ambition to close the loop and has built bridges between policy makers, research and development organisations, enterprises, and the public for the transition to a circular economy.

4. COMMON MEASURES FOR IMPLEMENTING THE TRANSNATIONAL STRATEGY

Romania and Bulgaria are the EU countries and their environmental protection laws, regulation and policies concerning waste management and waste production, are fully in line with EU directives. Serbia is still non EU country but working very intensively to modify all environmental protection laws according to EU directives and to open the Chapter 27 in the process of Accession to the European Union. But all three countries are facing very similar problems and challenges in the process of transition toward circular economy and they are lagging behind in terms of implementation of the circular economy principles.

4.1. CONFUSING LEGISLATION, POOR ACCOUNTABILITY, LIMITED ENFORCEMENT BY THE GOVERNMENT

Although there are great efforts and lot of directives regulating the field of waste management, landfills continue to be the main places for waste disposal.

The policy frameworks in the region face many challenges and in addition in the case of Serbia it is not sufficiently supported at national level, which results in very loose control and sanctioning mechanisms in all three countries.

Apart from transposing of EU directives into national legislation the governments in Bulgaria and Romania are doing little to lay down the foundations for the waste-to-resources ecosystem to function. The long term strategy on circular economy is missing altogether. There are many problems with the legislation and its enforcement instead due to continuous changes in the legislation, its poor implementation and the failure of various key actors in taking ownership of responsibilities.

RECOMMENDED MEASURES

- Clearer and more demanding legislation, less bureaucracy
- Enforce implementation of legislation (WP, WEEE, WA&B)
- Enhance all stakeholders accountability and increase their capacities

RECOMMENDED ACTIONS

- Consolidate and simplify existing laws and introduce clear and readable requirements
- Connect various types of stakeholders in order to foster cooperative processing
- Increase communication between local authorities and government
- Establish comprehensive mechanism for cross checking of all involved stakeholders

4.2. UNRELIABILITY AND LACK OF COMPREHENSIVE AND COMPARABLE STATISTICS

Regular statistics on the production and management of waste from businesses and private households are collected from Member States to monitor the implementation of European Union waste policy. But in order to achieve excellence in waste prevention, maximization of recovery, safe disposal and resource efficiency there is a huge demand for detailed statistics on waste generation, source, collection and treatment. More detailed statistic we have about waste, easier will be to measure the current situation, compare and predict the necessary actions.

RECOMMENDED MEASURES

- Building comprehensive and transparent regular statistics on different waste streams

RECOMMENDED ACTIONS

- Improve practice in reporting, collecting, integrating and evaluating products use and waste data (all waste streams)
- Finance the digitalization of waste management system
- Foster transparency and traceability of all waste streams
- Foster transparency and traceability of and hazardous materials in waste streams (e.g. legacy substances) and substances of concern

4.3. LOW LEVEL OF WASTE COLLECTION (PPW, WEEE, WB&A)

There is still a big gap between the percentage of waste defined by law that needs to be collected and recycled and the one that is really recycled. Even more, to different extend all three countries are struggling to implement effective separate waste collection and have lack of administrative capacity to enforce the existing legislation, with Serbia still having plenty of illegal landfills, both Serbia and Bulgaria having 'informal' waste collectors, Romania not meeting WP, WEEE and WB&A collection targets and despite of the official requirements not all of the municipalities and business in Bulgaria are fulfilling their requirements for fulfilling their obligation for separate waste collection.

RECOMMENDED MEASURES

- Establishing support for local authorities to enable better collection of waste (WP, WEEE, WA&B)
- Reduce or integrate informal economy activities in waste management
- Increase transparency and accountability of EPR Schemes
- Bring up the financial incentives by changes in legislation
- Promote financial instruments to support the transfer of recycling technologies (WP, WEEE, WA&B)

RECOMMENDED ACTIONS

- Increase capacity of public administration to implement and coordinate waste management process
- Implement pay-as-you-throw instrument based on quantity of non-recyclable waste and deposit schemes for beverage packaging
- Keep the number of EPR Schemes low for better control and monitoring
- Monitoring and auditing packaging EPR schemes
- Setting market shares and obligations for individual EPR schemes
- Tracking the activities of any producers that are not part of an EPR scheme
- Address and eliminate the issue of illegal land filling

4.4. POOR USE OF SECONDARY RAW MATERIALS

The recyclable fractions of all three waste streams are processed by waste recyclers (plastic, cardboard, metal, WEEE, batteries and accumulators), struggling for the moment with the low quality of waste, insufficient quantities, undeveloped technologies, and a fluctuating market for recycled materials. The standards for recycled materials are still missing, while there are no

legal requirements are in place to oblige producers, respectively the procurers of secondary raw materials, to use the secondary raw materials, as a result the real opportunities to valorise those materials are still limited.

RECOMMENDED MEASURES

- Clearer and more demanding legislation regarding the recycled materials standards (quality, content)
- Create a market for recycled materials by demanding more recycled material content in products
- Promote financial instruments to support the transfer of recycling technologies

RECOMMENDED ACTIONS

- Develop standards for products and materials with higher recycled content
- Promote existing information and knowledge platforms for businesses
- Publish lists of potential counterparts for both buyers and sellers of recycled materials, support the use of websites for exchanges
- Establish technology financing schemes for companies, providing free assistance programs
- Guarantee loans for investments in eco-innovative and quality recycling technologies
- Enable information and technical support for SMEs and other businesses for increasing recyclability of products and better use of recycled material. Connecting and enabling the whole value chain to improve design of products and prevent waste

4.5. NOT ENOUGH NEW ECO-DESIGN PRODUCTS OR PACKAGING

It is very important to support the companies to invest in eco-design of their products and to create special funds for SMEs with new ideas in innovation of product design. These products and products' packaging should be more flexible, modular, and reusable and at the end of its life cycle should produce less waste.

RECOMMENDED MEASURES

- Adoption of minimum environmental criteria for products, rules and product standards (design for reliable products, extended warranty) and services
- Adopt green public sector procurement (GPP) to create demand for eco-products
- Establish circular business model promoting reuse and refurbishment

RECOMMENDED ACTIONS

- Support R&D organisations developing eco-innovative technologies and products
- Create a pool of experts and business support organisation to provide assistance and information to companies in the field of eco-innovation, eco-design, circular economy, energy efficiency and others
- Enhance cooperation between producers, consumers and recyclers for facilitation of the re-use, renovation, repair, dismantling and capitalization of resulted components and other materials
- Extract critical raw materials and rare earth materials, currently lost with recycled base metals (WEEE, WB&A)
- Provide facilities and incentives for green products and services

- Implement awareness and education programs focused on resource efficiency, waste prevention and increased circularity of products and services for public and private sectors
- Provide vouchers schemes for technical support, audits, consultancy
- Finance business support organizations to provide assistance and information to companies in the field of eco-innovation, eco-design, circular economy, energy efficiency and others

4.6. LOW LEVEL OF AWARENESS REGARDING SEPARATE WASTE COLLECTION

One of the most important things in process of transition towards circular economy is the collection and separation of waste. But many SMEs, as well as citizens, are not involved in this process and feel that they are not part of it. The waste collection should be increased not only through a better infrastructure, more organized EPR schemes, but also through intensive education of all SMEs as well as all citizens. Final consumer's behavior has a huge impact on the way how products are designed, produced and used. Household and consumers have a low level of awareness and ecological education, are not entirely following the waste segregation rules and make acquisition decision based on low price rather than ecological criteria. Moreover, public authorities and institutions are lacking capacity to manage waste legal requirements, establish effective waste infrastructure, manage data and educate citizens.

RECOMMENDED MEASURES

- Educate and raise awareness among consumers and wider society (WP, WEEE, WA&B)
- Educate and raise awareness in public administration and business community
- Enable information support for SMEs and other businesses
- Adopt ecological education at all levels (schools, universities)

RECOMMENDED ACTIONS

- Organise periodic awareness raising campaigns for large public on waste segregation and consumer responsibility
- Promote awareness and education programs focused on waste prevention and management and the importance of circular economy for public and private sectors
- Engage EPR organizations in raising awareness about sorting and recycling among the inhabitants and provide support for educational programs. (at least one national program per year per EPR scheme)
- Develop Resource Efficiency and Circular Economy Educational programs and include them in the academic curricula for engineers, economist and managers

5. BULGARIA

REGULATORY AND POLICY FRAMEWORK

The representative documents are the Waste Management Act, its successive Regulations and the National Waste Management Plan and the Programmes included thereof.

The Waste Management Act (2003) is the framework document governing the waste management in the country. The latest changes were from 2012 when the provisions of Directive 2008/98/EC were introduced including the principles 'Polluter pays' and 'Extended producer responsibility'.

There are still challenges related to major requirements of the Act. This is illustrated by the provision of the Act where mayors of municipalities in Bulgaria are under legal obligation to establish and organize systems for separate collection of paper, cardboard, metal, plastics and glass waste and to secure conditions for separate collection of waste from packaging. Not all municipalities in Bulgaria, however, have fulfilled this obligation. One undesirable example is that of resourceful Tsarevo Municipality, managing the territory of one of the emblematic nature parks in Bulgaria, which is still not introducing separate waste collection system (first offer from waste management operator being deposited over 10 years ago). Another example is the requirement for all trading, production, administrative and commercial buildings to collect separately paper, cardboard, metal, plastics and glass waste. A requirement that is neglected by many concerned parties due the lack of administrative capacity to enforce the law. Both requirements concern all agglomerations with over 5000 inhabitants and for all resorts. There are separate regulations coming from the Act that concern the waste management of the streams subject to the Road Map.

The regulations define the obligations of persons and requirement for production and distribution of packages and packaging materials, electrical and electronic equipment and batteries and accumulators, as well as the requirements for the consecutive treatment of those. The regulations are fully transposing the relevant European Directives. Other regulations define the financial instruments related to waste management e.g. the product tax for products that after use will generate one of the waste streams concerned. Other regulations define the requirements for the machineries and installations for waste treatment.

National Waste Management Plan (2014-2020). The main objective of the Plan is to interrupt the positive correlation between economic growth and generation of waste by improving hierarchy of waste management by elaboration of a national programme for prevention of waste generation, by defining concrete quantitative objectives for preparation for reuse, recycling or other material recovery of specific waste streams (including those subject of the Road Map).

DATA

In 2016, the following amount of packaging waste circulated in Bulgaria.

Table 1 *Packaging waste in 2016 (tons)*

	Produced/used	Recycled	Incinerated
Plastics	108 247	56 959	185
Paper and cardboard (incl. composites)	148 229	118 673	131
Metal	31 890	18 936	-
Wood	51 400	20 058	126
Glass	77 421	54 061	-
Other	3 958	37	113
Total	421 145	268 724	555

Source: National Statistics Institute Bulgaria.

In 2016, the following amount of electrical and electronic equipment (waste) circulated in Bulgaria.

Table 2 *Electrical and electronic equipment in 2016 (tons)*

	Released on the market	Collected households	Collected not households	Total collected	Recovered	Recycling/ Reuse
Electrical and electronic equipment	72 304	56 269	5 212	61481	51 427	50 113

Source: Eurostat 2016.

In 2016, the following amount of batteries and accumulators waste circulated in Bulgaria.

Table 3 *Batteries and accumulators in 2016 (tons)*

	Released on the market	Collected	Recycling of materials
Automobiles	11 421	11 421	*
Industrial	1 799	540	162
Portable	750	362	173

Source: Executive Environmental Agency 2017. * See Table 4.

According to the annual reports submitted by the key actors to the national authorities all targets related to the recycling of the selected waste streams are being fulfilled in Bulgaria.

Table 4 *Recycling of the selected waste streams in 2016 (%)*

	Target 2016	Result 2016
Packaging (recovery)		
Paper and cardboard (incl. composites)	60	80
Plastics	22.5	53
Metal	50	59
Glass	60	70
Electrical and electronic equipment		
Total EEE collected	-	85
Total EEE recovered	-	71
Total EEE recycled/reused	-	69
Batteries and accumulators (recycling by weight of materials)		
Automobiles (lead acid)	65	98
Automobiles (nickel-cadmium)	75	68
Industrial	25	30
Portable	45	48

Source: Key actors' annual reports to the national authorities.

OVERARCHING CHALLENGES FOR THE CIRCULAR ECONOMY

Incineration on a pedestal

Official authorities namely Sofia city Municipality, the largest and most resourceful municipality in the country, chooses to prioritise the burning of refuse-derived fuel (RDF) from municipal solid waste (MSW) to other higher order alternatives as a priority action towards managing municipal solid waste (including waste from plastics) that is 'escaping' recycling efforts and policies.

Procurers also claim energy recovery is a preferred treatment for municipal solid waste collected from households². Recycling from that stream they point as the hardest challenge. This is partly due to low awareness and culture among households and other end users improperly disposing of the recyclable fractions with the general waste and being careless of the systems for separate waste collection. The latter is also provoked by the fact that end users receive no economic incentives to apply the practice. This poses too much trouble for separating the included plastics, also characterised by a high level of complexity and diversity leading to highly heterogeneous streams.

One of the largest procurer companies (42% market share), a provider as well, is also planning on opening a line for the production of refuse-derived fuel (RDF)³. The company is claiming the fuel is to be burned in cement furnaces. A practices evaluated as too costly from the official authorities in their efforts to justify the incineration of RDF in existing thermo power plants in the heart of the capital city.

5.1. PROVIDERS OF SECONDARY RAW MATERIALS – WASTE MANAGEMENT OPERATORS

CHALLENGES

As to packaging, according to the Waste Management Act all commercial entities and administrative buildings must have systems for separate collection of paper and cardboard, plastics, metals and glass waste (including packaging). The Regional Inspectorate of Environment and Water and municipal authorities are responsible to perform regular control of that legal requirement. However, this practice is rare and insufficient to the extent where in some cases the authorities themselves are not fulfilling the requirements.

The authorities themselves are not fulfilling the requirements.

Furthermore, the level of collection from households and commercial entities (bars and restaurants, hotels, groceries, supermarkets, repair shops, etc.) of all types of recyclable packaging waste is insufficient.

Circular Economy Package requires 85% of the aluminium cans to be separately (also from other metals) collected and recycled by 2030. This is reported by the industry as a serious challenge especially so since there was 0% target before the package.

² News feed by Nord Holding AD.

³ News feed by Ecopack Bulgaria AD.



For waste electrical and electronic equipment the treatment in most countries is limited to R13 and R12. The lack of data and transparency is especially grave for complex products such as batteries and EEE. They contain unknown quantities of different materials, including critical or precious metals. There is a need for better monitoring and enhanced transparency throughout the chain from collection to secondary raw materials. Not only for the quantities of the materials but also monitoring the processing of the materials and refining processes.

A recent European Commission study has found, that more than half of all batteries in the EU are not collected or recycled⁴. This study concludes that the waste battery collection within the EU is insufficient; with a large amount of batteries ending up in municipal waste.

The currently available technologies for WEEE dismantling do not ensure a sufficiently effective recycling process. Pre-processing and dismantling needs to be improved. High-quality pre-processing and dismantling of WEEE are a prerequisite for efficient recovery of critical metals.

RECOMMENDED MEASURES

- Keep product value chain clean to increase quality and quantity of recycling by establishing support to enable better collection of waste.
- Promote importance of shifting from waste to resource management among consumers and wider society.
- Educate and raise awareness in public administration and business community.
- Enable information support for SMEs and other businesses.
- Promote financial resources for investing in waste management eco-innovative technology and waste management infrastructure.
- Connecting and networking the whole value chain to improve design for better waste management.
- Establish circular business model promoting reuse and refurbishment.

RECOMMENDED ACTIONS

- Make assessment of possibility of organising national waste management system in separate way for businesses and households.
- Improve design of containers to restrict possible theft of recyclable resources.
- Increase separate collection and introduce customised deposit schemes to ensure higher collection rates. Seeing custom made versions of traditional deposit schemes (not fitting to the waste infrastructure in Bulgaria) is an opportunity to diversify the mix of channels for acquiring good quality recyclable packaging waste. For instance, the circular economy package aluminium target could be an opportunity for providers to reconsider their opposition to the introduction of deposit systems for recyclable single use packaging like the aluminium cans. In coordinated effort with primary producers they could re-invent deposit schemes suitable to the existing waste infrastructure in

⁴ Study in support of evaluation of the Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators.

Bulgaria and offer award schemes for selected customer groups. Such efforts would raise overall consumer consciousness and stimulate separate waste collection. • Exchange good practices concerning deposit systems organisation using advantages of digitalisation with publishing on EU online platforms.

- Focus collection on product categories instead of material waste streams – current goals focus on mainstream materials with higher mass flows, neglecting components and materials in small quantities.
- Motivating citizens to source separate waste more and better through innovative communication actions, such as competitions among territories (districts) or through introducing different incentives for the citizens.
- Maintain and improve national-wide campaigns on importance of quality separate collection of ordinary waste (also hazardous waste) so less contaminated waste leaks to the environment threatening also human health.
- Include good practices from Green Public Procurement in awareness campaigns for consumers.
- Optimising the use of containers (identification of the generation points, the types of waste and the level of segregation).
- Create online tools with information for the location of containers or designated collection points (e.g. warehouses) and the type of waste collected thereof.
- Increasing the requirements the number of containers, number of inhabitants covered shorter intervals for emptying the containers, fixed minimum percentage of their services to be dedicated to small and remote villages.

Packaging

- Enhanced control by the authorities for the application of the legal requirements.
- Improved joint communication and information strategies by the providers and the national authorities.
- Increased scope for collection of glass waste, including distribution of individual containers for significant generators (bars and restaurants, hotels, groceries, supermarkets).
- Improve design of containers with more appealing messages.

Electrical and electronic equipment

- WEEE must be clearly branded as hazardous and provisions taken to prevent export to countries lacking regulatory infrastructure and technical and economic capacities for hazardous waste management.

Batteries and accumulators

- Increase the number of collection points and designing more appealing containers for portable batteries.

5.2. PROCURERS OF SECONDARY RAW MATERIALS – PRODUCERS AND DISTRIBUTORS

CHALLENGES

Insufficient level of collection of quality glass and plastic wastes results in imports to fulfil the needs of the recycling companies. According to data by the National Statistics Institute and the Executive Environmental Agency the import of glass packaging equals 30 328 tons, while plastic packaging equals 8 138 tons (2011). Those imports are strictly for material recycling purposes. Bulgarian companies are exporting mainly paper and cardboard packaging waste (23 058 tons) and metal packaging (5 260 tons).

Millions of tonnes of waste electric and electronic equipment are generated in Europe every year, but only a minor part of the WEEE reaches the final recycling step where critical metals are recovered for secondary use. WEEE is composed from various metals, different types of plastics and ceramics.

Where products are complex and include many different materials and metals, recovery of iron and steel scrap from these products may be technically difficult or economically non-viable.

Lack of transparency

The lack of data and transparency is especially grave for complex products such as batteries and WEEE. They contain unknown quantities of different materials, including critical or precious metals. There is a need for better monitoring and enhanced transparency throughout the chain from collection to secondary raw materials. Not only for the quantities of the materials but also monitoring the processing of the materials and refining processes.

Procurers prefer the most accessible to the available recycling technologies types of plastics. Those include polyethylene terephthalate (PET), polyethylene (PE), polystyrene (PS), polypropylene (PP), and polyvinyl chloride (PVC). Even in that limited choice of recycling interest some plastics are more challenging than others. The more additives in the plastic the lower value secondary raw material. For example, the content of additives in plastics varies widely, from less than 1% in PET bottles and up to 50-60 % in PVC. Therefore, the majority of plastics that are recycled originate from packaging waste, the rest are preferable prepared for incineration.

Another challenge is that hazardous additives used in primary plastics can make their way into recycled plastics where they may pose a health risk, particularly where they are present in products that are used for sensitive applications such as toys and food packaging. This concern is reinforced by the lack of transparency in the use of additives in plastics. This results in the mentioned preference of procurers to be looking at 'energy from waste' as a means to manage a number of waste plastics (especially dismantled from electrical and electronic equipment and accumulators).

Current standards for flame retardant chemicals in electronic and electrical products need to be reviewed and updated to ensure they adequately measure fire safety and take adverse environmental and health aspect into account.

The primary producers of performs for PET bottles are mostly supplying the primary granulate from Asian countries. With the new circular economy package requirement for recycled materials to be included in new plastic products primary producers would need to change with suppliers

from EU member states that could guarantee the standard quality of the recycled granulate. That means the procurers face the challenge of proving high quality recycled granulate.

Procurers are generally producing lower quality granulate

At the moment the procurers are generally producing lower quality granulate that is further fabricated into single use products such as waste bags. After use those products can no longer be recycled (further downgraded material quality and dirtiness). The general fate of those is to be sent to landfills, dumps or incinerators. In this sense

in the current system the providers and procurers are only postponing the transition of primary plastic resources into waste.

Sorting and recycling are highly affected by the design of products and performance of collection schemes. Even if the performance in these steps is improved, certain technical barriers need to be addressed through increased research and development efforts to allow the recycling of residual plastic waste from WEEE.

RECOMMENDED MEASURES

- Connecting and networking the whole value chain to improve design for better waste management.
- Enable transparent framework conditions for tracking material flows inside production value chain and encourage all involved stakeholders to collaborate.
- Enable clearer regulation.
- Create a market for recycled plastic materials.
- Promote financial resources for investing in waste management eco-innovative technology and waste management infrastructure.
- Enable information support for SMEs and other businesses.
- Promote importance of circular economy principles among consumers.

RECOMMENDED ACTIONS

- In close cooperation with primary producers improve the expected recovery rates at the stage of product design and focus strategies at the level of products rather than only materials.⁵
- Enhanced communication throughout the whole recycling chain, from packaging designers to end-users in order to complement and to support as well as to create synergies amongst different actions. This will also help in identifying possible areas of improvement.

Packaging

- Initiation of productive consultations between authorities, primary producers, providers, procurers, consumer associations, for the introduction of 'environmental tax' for composite packaging in order to stimulate 'ecological design' for improved recycling.

⁵ Treating Waste as a Resource for the EU Industry. Analysis of Various Waste Streams and the Competitiveness of their Client Industries. Final Report. ECSIP Consortium Rotterdam/Copenhagen (2013).

<https://ec.europa.eu/docsroom/documents/3866/attachments/1/translations/en/renditions/native>; accessed 3 December 2018.



Electrical and electronic and batteries and accumulators

- Reduction in waste management fees for primary producers taking measures to reduce the content of hazardous substances in EEE.
- Increase WEEE recycling rates by developing economic, energy efficient and environmentally sound pre-processing technologies for complex WEEE that can generate output fractions that fit optimally into consecutive metallurgical extraction.
- A lifecycle perspective is needed to increase understanding of value chain interactions and impacts, thereby raising awareness among EEE primary producers of the importance of their design for disassembly/recycling, i.e. product design that eases disassembly and increases recycling rates.

5.3. HOUSEHOLD AND B2B CONSUMERS

CHALLENGES

- There is almost constant total household waste generation in Bulgaria during the last decade, with slight trend in decreasing the amount of waste per person. The population covered by the separate waste collection system in 2016 was over 92%, but yet most of the waste is still ending in landfills or dumps, while only 32 % of the waste collected is recycled.⁶
- There are not strategic incentives to contribute to less waste generation at first place.
- There is not an overarching policy for design and organization of information campaigns aimed at households. The efforts by providers are sporadic and non-inspirational.
- There is not a monitoring scheme in place to assess the satisfaction of households and businesses from the waste management system in the country.
- Only one in three Bulgarians is separately collecting recyclable waste.⁷
- A main shortcoming regarding consumer information is that end-users do not have enough information to make an informed purchase relating to waste reduction measures.

Most of the waste is still ending in landfills or dumps

Packaging

- Insufficient level of collection from households of all types of recyclable packaging waste. The situation is similar with all type of SMEs (bars and restaurants, shops, hotels, groceries, etc.).
- Due to lack of awareness and education part of the waste collected separately is contaminated which creates further difficulties for its recycling.
- The overall level of waste generation from packaging in Bulgaria remains a constant with plastics representing 26% of the mix.

Electrical and electronic equipment, and batteries and accumulators

- Scarce information to general public about the systems for waste management (e.g. where is the disassembly of end of life electrical and electronic equipment taking place, what are the derived fractions thereof).

⁶ National Statistics Institute (2016).

⁷ Survey from Bulgarian Recycling Association.

- Current battery labelling does not support better sorting and recycling efficiency. There is no standardization or consensus as to a system that would support communication of information to end-users, but also providers and/or procurers.
- WEEE is currently considered to be one of the fastest growing waste streams in the EU, growing at 3-5% per year. Discarded laptops, mobile phones and electronic goods are now the world's fastest growing waste problem. Researches show that half of the electronic devices which are thrown away still work. In addition, end-users store in their homes big amount of electrical and electronic equipment which they no longer use, even if it is still working.
- Lack of understanding that WEEE is a valuable source of resources.
- Insufficient waste batteries collection from household, with a large amount of portable batteries ending up in municipal solid waste.
- Lack of understanding the impact of waste batteries and accumulators as hazardous waste

RECOMMENDED MEASURES

- Keep product value chain clean to increase quality and quantity of recycling by establishing support to enable better collection of waste.
- Enable information support for SMEs and other businesses.
- Enable clearer regulation.
- Promote importance of shifting from waste to resource management among consumers and wider society.
- Educate and raise awareness in public administration and business community.
- Establish circular business model promoting reuse and refurbishment.
- Promote importance of circular economy principles among consumers.

RECOMMENDED ACTIONS

- Maintain and improve national-wide campaigns on importance of quality separate collection of ordinary waste (also hazardous waste) so less contaminated waste leaks to the environment threatening also human health.
- Include good practices from Green Public Procurement in awareness campaigns for consumers.
- Create framework for awareness rising campaigns by providers and procurers.
- Organise national-wide campaigns on importance of hierarchy of waste management.
- Empower the local communities by supporting small local initiatives on regular basis, which promote importance of circular economy principles among consumers.
- Make assessment of possibility of organising national waste management system in separate way for businesses and households.
- Develop online tools with information for the location of containers or designated collection points (e.g. warehouses or similar) and the type of waste collected thereof.
- Introduce pay-as-you-throw programs, where residents are charged for the collection of municipal solid waste based on the quality (volume) they throw away. This creates a direct economic incentive to recycle more and to generate less waste.
- Increase the requirements for the providers concerning the number of containers, number of inhabitants covered, shorter intervals for emptying the containers, fixed minimum percentage of their services to be dedicated to small and remote villages and etc.

- 
- Eliminate the issue of illegal dumping.
 - Enforce small enterprises (including restaurants, shops, hotels, bars and etc.) responsibilities related to waste sorting.
 - Recognise and award innovative products, services or technologies supporting the shift from waste to resource management.
 - Create guidance for different products which enable producers and brands to increase durability and to minimise product returns.

Packaging

- Develop a label showing the content of recycled fractions in new products will build trust and eventually increase the consumer demand of products with a high share of recycled plastics.
- Create a label for household and businesses taking active part in separate waste collection of packaging waste. The label could also mean reduction in taxation for municipal solid waste management.

Electrical and electronic equipment, and batteries and accumulators

- Decrease the overall level of waste generation from electrical and electronic equipment in Bulgaria.
- Increase separate waste collection of WEEE.

6. ROMANIA

REGULATORY AND POLICY FRAMEWORK

Romania is far behind in terms of implementation of the circular economy principles. Land filling continues to be the prevalent management practice, with only 13,3 % recycled waste from the total waste collected, consequently the WP, WEEE and WB&A collection targets are not met and the circular material use rate is the smallest in Europe. The key challenge Romania is facing is the inability to sort all waste streams and collect sufficiently the three waste streams. There are many reasons for that, starting with the continuous changing of legislation and its poor implementation, the failure of various key actors in taking ownership of responsibilities, the ineffective EPR Schemes and the low level of awareness and education, starting with public institutions until the final consumer. Inadequate practice in reporting, collecting, integrating and evaluating the data and the slow implementation of policy and economic instruments are serious barriers against creation of the necessary arguments for enhancing waste prevention and reduction and for the transition to a circular economy.

Romania has not yet adopted a national policy for resource efficiency nor for circular economy, although various legal requirements and proposed measures are stipulated in the waste legislation, waste planning documents and other strategies. The Waste Management Law no. 211/2011, as the main legal act, is a full transposition of the Waste Framework Directive and establishes the hierarchical approaches in waste management, starting from product sustainable design and waste sorting obligations to the waste final treatment. The waste legal framework includes full transposition of the related European Directives in specific legislation packages for PPW, EEE and WEEE, B&A and WB&A.

In order to ensure effective collection and recycling of WP, WEEE and WB&B, a legal framework has been established for the full operation of the EPR Schemes. The legislation has been recently amended in order to ensure and enforce of a national packaging and WEEE clearing house system in line with the principles set out in the revised Waste Framework Directive as general minimum requirements for extended producer responsibility (EPR). The new duties assigned include (1) collecting and reporting national data on production and recycling/recovery of packaging and WEEE; (2) monitoring and auditing packaging EPR schemes; (3) setting market shares and obligations for individual EPR schemes; (4) tracking the activities of any producers that are not part of an EPR scheme. Those are completed by the recent adoption of a set of economic incentives such as the implementation of the landfill tax, setting up the circular economy tax for authorities failing to implement the required collection services, the introduction of a deposit refund scheme for beverage containers as a way to capture more high-quality material and of the pay as you throw instrument.

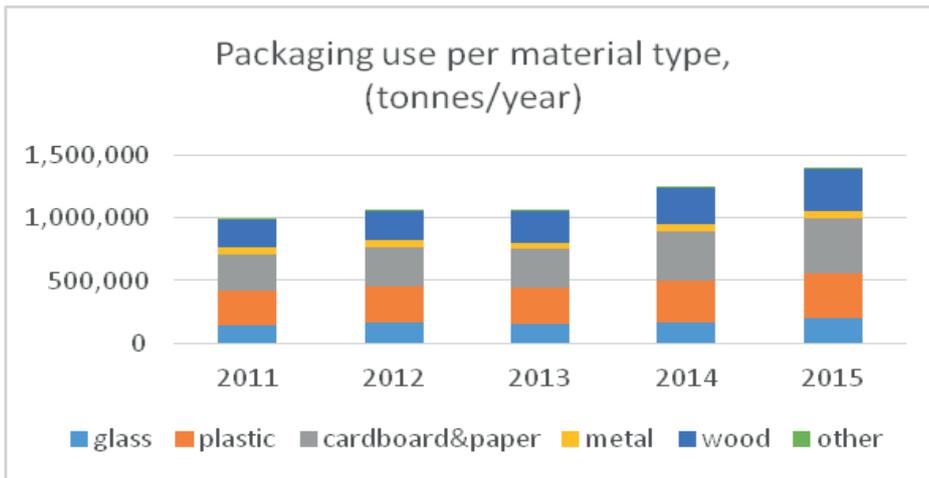
DATA

Packaging and Packaging Waste (PPW)

The types of packaging introduced on the market are: paper and cardboard packaging, plastic packaging, wooden packaging, metallic packaging (aluminum or steel), glass packaging and other. The packaging is used mainly in industry, for products and for commercial purposes. The packaging materials are dominated by paper/ cardboard and plastic. The packaging use has been increased almost by 50% between 2011 – 2015 and the tendency continues to follow the GDP grow (see Figure 1).



Figure 1 Packaging use in tonnes, 2010–2014



Source: Annual Report on State of the Environment in Romania. National Environmental Protection Agency. Bucharest, 2016.

Packaging waste has three main sources of generation: the industry, including packaging generated by imported raw materials, the commerce and the municipal waste including household and similar waste.

The recovery rates have been increased in 2019 for all categories are: 70% for paper & cardboard, 45% for plastic, 65% for glass, 70% for metal, 50% for wood. The overall recycling objective is minimum 60% and maximum 60% for incineration with energy recovery.

WP generation and the recovery rates are increasing in the last 5 years. According to official data, the overall recovery rate in 2015 was 54%⁸ and did not meet the overall objective of 55% for 2015, in particular, due to not meeting the objectives for glass and plastic.

The generation indicator of packaging waste in 2015 in Romania was 70 kg/inhabitant and year, while in EU-28 it was about 166, 3 kg/inhabitant and year⁹. Packaging waste generation indicator is much lower in Romania as compared to the European average due several reasons: poor collection of packaging waste as separate fraction from domestic waste, low consumption rate due to the large number of population in rural areas, lagging in data reporting by economic operators.

Recycling is the major waste management operation. Co-incineration of WP with energy recovery is performed, but on smaller scale. A large quantity of WP is still landfilled due to incapacity to properly sort the domestic waste.

Waste Electrical & Electronic Equipment (WEEE)

WEEE is generated in from industry, institutions, and from households. In the period 2008-2015, the annual WEEE collection target was at least 4 kg waste / capita, while the achieved rate was between 1,0 – 1,7 kg per capita/year, the smallest collection rate among the EU members.

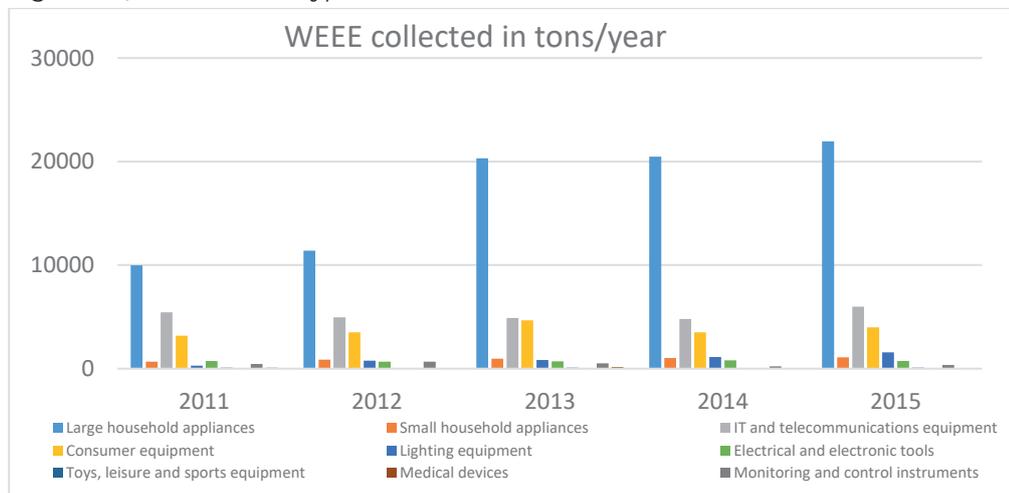
⁸ Annual Report on State of the Environment in Romania. National Environmental Protection Agency. Bucharest, 2016.

⁹ Packaging waste statistics. Eurostat's online figure.

https://ec.europa.eu/eurostat/statistics-explained/index.php/Packaging_waste_statistics; accessed 3 December 2018.

The total WEEE treatment capacity in Romania is about 120,000 tons/year, recovery rates ranging between 82 and 93% for all WEEE categories¹⁰. Since January 2016, the target of 4 kg per capita has been replaced with a rate of 40% of the average weight of products put on the market by Romanian producers in the three preceding years and the rate will increase gradually to 65% until 2020 (see Figure 2),

Figure 2 Quantities and types of WEEE collected in 2011-2015



Source: Annual Report on State of the Environment in Romania. National Environmental Protection Agency. Bucharest, 2016.

Recently, the MMDD has introduced 60 000 vouchers to stimulate acquisition of new EEE, class A energy efficient equipment (fridges, washing machines and refrigerant equipment) and the collection of old EEE.

Waste Batteries and Accumulators (WB&A)

WB&A collection and management - the collection rate for portable batteries increased sharply from 11% in 2012 to 32% in 2014 but still far from the 45% collection rate required as of 2014.

The NWMP indicates that not all collected batteries and accumulators have been sent for recycling. The batteries and accumulators not sent for treatment/recycling are stored at the collecting/treatment undertakings.

Figure 3 Quantities of WB&A collected in 2011-2015



Source: Annual Report on State of the Environment in Romania. National Environmental Protection Agency. Bucharest, 2016.

¹⁰ National Waste Management Plan. MMDD. Bucharest: POCA, 2017.



The levels of recycling efficiency for 2012-2014 for lead acid batteries and accumulators (81-82%) exceed the minimum targets, while for other categories such as nickel-cadmium and other batteries and accumulators is not reported¹¹. The official data for WB&A recycling do not specify the batteries type, but provides overall quantities (see Figure 3).

HIERARCHY OF WASTE STREAMS

According to the methodology used in the NWMP, a set of criteria recommended by the EU Commission¹² were used in order to evaluate the three waste streams and priorities them: (1) reduction potential and impact on the environment; (2) the weight of the waste flux from total waste; (3) data reporting system and data availability; (4) prevention potential and available instruments for waste prevention. According to table V-1 .page 313 from NWMP, the hierarchy is as follows: (1) Packaging Waste 13 points, (2) WEEE 9 points, (3) WB&A 8 points.

The special focus on plastic in the packaging material is valid for Romania for two reasons: is the second packaging waste flows in weight, after cardboard and paper, and is made up mostly from recyclable types meaning a high potential for recovery and generation of secondary materials. Even though the composition and origin of packaging is reported, in this moment we have no official statistic about the source of plastic waste and plastic types included in the packaging; most probably the content is similar to the one in EU 28 with polyethylene (HDPE and LDPE) and polypropylene (PP) as the most common polymers in the waste streams.

6.1. PROVIDERS OF SECONDARY RAW MATERIALS – WASTE MANAGEMENT OPERATORS

CHALLENGES

As to PPW, an entire infrastructure is in place to ensure collection, waste transfer, sorting and composting. Currently, at the country level there are 710 authorized economic operators for collection of packaging waste. The 93 sorting plants in operation have a total capacity of about 2,281,420 tons/year. Over 2344 operators are authorized to collect packaging waste from population, from industry and commerce: waste collectors, sanitation companies and recyclers. Amongst them 971 are authorized to collect plastic, 580 for cardboard and paper, 462 for metal, 202 for wood and 129 for glass¹³.

A high number of companies are authorized to recycle plastic and metal waste, ensuring a recycling capacity of approx. 284,000 tones/year for plastic waste (134,000 tones/year for PET and 150,000 tones/year for other plastic waste), 2,700,000 tones/year for metal waste (2,500,000 tones/year for ferrous waste and 200,000 tones/year for non-ferrous waste)¹⁴. In reality a reduced number of companies are performing recycling activities, the rest are involved in collection, storage and commerce with WP.

Reduced number of companies are performing recycling activities

¹¹ Study in support of the preparation of the Implementation report of the Directive 2006/66/EC on batteries and accumulators and waste of batteries and accumulators. Directorate-General for Environment. Brussels: European Commission, 2018.

¹² Guidelines on Waste Prevention Programmes. BioIntelligence Service S.A.S. DG Environment: Brussels, 2012.

¹³ National Waste Management Plan. MMDD. Bucharest: POCA, 2017.

¹⁴ *Supra*.

WEEE is mainly managed through the EPR Schemes. The share of the amount of EEE for which collective responsibility was taken, has steadily increased during the analysis period, from about 80% in 2010 to over 99% in 2014¹⁵. The main actors involved in the WEEE management are the PROs, municipalities, collectors, waste transfer and recyclers. Currently 883 companies are authorized for WEEE collection and disassembly, 75 of those are having an environmental permit for WEE treatment. In reality there are no more than 15 companies recycling and treating WEEE, among those.

Municipalities are required to set up collection points (at least one in 50,000 people) and mobile collection points and to collect regularly using designated operators. Moreover, individuals and legal entities holding WEEE, including those resulting from EEE imported for own use, are obliged to deliver them to the collection systems.

As to WA&B, currently, 1,524 economic operators are authorized for collecting and treatment of WB&A, and seven have the environmental permit for waste treatment activities. The total WB&A treatment capacity is 75,807.5 tons/year¹⁶. The only economic operators that recycle WB&A waste are Monbat Recycling S.R.L. and Rombat S.A., both companies operating in the field of lead batteries, with a combined capacity of 70,000 tons/year.

Romania is far behind in terms of implementation of the circular economy principles. Land filling continues to be the prevalent management practice, with only 13,3 % recycled waste from the total waste collected, consequently the WP, WEEE and WB&A collection targets are not met and the circular material use rate is the smallest in Europe.

Collection targets are not met

Regulatory challenges

- Poor quality of planning documents, lacking specific data and insufficient integration with other plans and programmes
- Frequent amending and updating of specific legislation
- Lack of correlation between different legal requirements
- Inadequate practice in reporting, collecting, integrating and evaluating available data, reporting requirements are poorly understood.
- Failure of parties involved in taking ownership of responsibilities,
- Lack of incentives for the recycling industry

Economic challenges

- Plastic stream recycling is still not stabilised due to insufficient implementation of separate collection
- The quality of materials in the waste streams is low due to contamination, improper separation and long storage (WP, WEEE, WA&B)
- Vulnerability in price volatility on a global market

¹⁵ *Supra.*

¹⁶ *Supra.*



Technical/Technological challenges

- Service coverage and low degree of expansion of separate waste collection
- Infrastructure – not enough developed, including infrastructure support to enable waste recovery (all waste flows)
- Recyclers are missing information on disassembly techniques (WEEE) and adequate technologies (all waste flows)
- Lack of recycling capacities for critical raw materials and rare earth metals (WEEE)

Environmental challenges

- Large quantities of WP are land filled;
- WEEE and WB&A are stored by owners and collectors and can cause causing damages to the environment
- No information on chemical contents and presence of the hazardous additives in plastic waste
- B&A containing forbidden substances are still penetrating the market

Other challenges

- Low level of awareness and education regarding waste prevention and separate waste collection (all waste flows)
- Low level of WP, WEEE, WB&A collection

RECOMMENDED MEASURES

- Enable clearer regulation and enforce (WP, WEEE, WA&B)
- Enforce implementation of legislation (WP, WEEE, WA&B)
- Increase the quality and quantity of recycling by establishing support and enabling better collection of waste (WP, WEEE, WA&B)
- Promote financial instruments to support the transfer of recycling technologies (WP, WEEE, WA&B)
- Create a market for recycled plastic materials
- Educate and raise awareness among consumers and wider society (WP, WEEE, WA&B)

RECOMMENDED ACTIONS

- Improve practice in reporting, collecting, integrating and evaluating products use and waste data (WP, WEEE, WA&B)
- Implement mandatory deposit schemes to all packaging waste categories to ensure higher packaging waste collection rates. (Law no. 249/2015, article 10, line 5)(WP)
- Implement pay as you throw instrument based on quantity of non-recyclable waste fraction (Law 211 /2011, &9 Waste valorisation, art 17)
- Address and eliminate the issue of illegal landfilling (WP, WEEE, WA&B)
- Rethink rules on imports and exports of waste (WP, WEEE, WA&B)
- Setting up a clearinghouse mechanism for secondary raw materials (WP, WEEE, WA&B)
- Extend application of specific end-of waste criteria to remove barriers for the free flow of secondary raw materials, which are safe and good quality (WP, WEEE, WA&B)
- Ensure appropriate infrastructure for WEEE collection in cities and towns (WEEE)
- Enforce obligation of producers/importers to provide: free of charge reuse and treatment information for each new type of EEE within one year of the placing on the market of the equipment. (WEEE)

- Keep the number of EPR Schemes low for better control and monitoring
- Finance the recycling sector to adopt more effective and quality recycling technologies to extract critical raw materials and rare earth materials, currently lost with recycled base metals. (WEEE, WB&A)
- Finance the digitalisation of waste management system (WP, WEEE, WA&B)
- Improve practice in reporting, collecting, integrating and evaluating available data (WP, WEEE, WA&B)
- Enforce requirements of Law 211/2011, chapter 16 on traceability of hazardous waste, obligation to characterise HW art. 49 and reporting of hazardous waste (WEEE, WA&B)
- Publish lists of potential counterparts for both buyers and sellers of waste and recyclable materials, support the use of websites for exchanges (WP, WEEE, WA&B)

6.2. PROCURERS OF SECONDARY RAW MATERIALS – PRODUCERS AND DISTRIBUTORS

CHALLENGES

Procurers of secondary raw materials, products or product's components are the producers of the products or components, manufacturers and their distribution networks. The way how they design, manufacture and market the products is essential for the enhancement of secondary raw materials market and beyond. Some requirements referring to products design for durability, reparability and recyclability are included in the Waste Law 11/2011, however, they are more formal than effective as long there are no specific rules or standards for products from the eco-design perspective. Rules on banning certain heavy metals in the electric and electronic equipment, batteries and packaging are applied since 2006. Romania has adopted the European eco label system,

No specific rules or standards for products from the eco-design perspective

The indicators proposed by the EU Commission are measuring the trends in secondary raw materials markets (1) the circular materials use rate as the share (%) of material recovered and fed back into the economy and the trade in recyclable raw materials measuring the quantities of selected waste categories and by-products that are shipped between the EU Member States and across the EU borders. In case of Romania both indicators are well below the EU 28 average, the circular material use rate in 2017 is 1, 5 % comparing to 11, 7% , the EU 28 average¹⁷ , while the trade of recyclable raw materials is 17 657 tones comparing to 210 592 tones, the EU 28 average¹⁸.

Regulatory challenges

- Green public procurement is not enforced (P, EEE, A&B)
- Missing standards for recycled materials
- No legal requirements regarding minimal recycled material content in products, except the automotive industry (P, EEE, A&B)
- Safety and hygiene standards are forbidding the use of secondary raw materials in food packaging (WP)

¹⁷ Circular material use rate. Eurostat's online data table.

https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=cei_srm030&plugin=1; accessed 3 December 2018.

¹⁸ Trade in recyclable raw materials. Eurostat's online data table.

https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=cei_srm020&plugin=1; accessed 3 December 2018.

- EU legislation on chemicals, products and waste is not coherent and uniform (WEEE, WB&A)
- Poor environmental criteria for products, rules and product standards (design for reliable products, extended warranty) and incentives for green products and services (WP, WEEE, WB&A).

Economic challenges

- Primary raw materials are still cheaper than secondary raw materials.
- Not enough demand for recycled materials, consequently the offer for secondary raw materials is not stable .
- Not enough investments in innovation in product design and circular business models.

Technical/Technological challenges

- The quality of secondary raw materials is lower than the quality of primary raw materials .(WP, WEEE, WB&A)
- Technical requirements for packaging, not adapted to resource efficiency and waste minimisation (WP)
- Unsustainable products and services (poor quality, short lifetime, difficult to reuse, repair, remanufacture) (EEE, A&B)

Other challenges

- Missing industry sector reports and data on materials use, products and specific waste flows
- Lack of knowledge among CEOs with regard to circular economy, life cycle thinking, green labels,
- Insufficient information and knowledge about circular products and services supporting the transition to a circular economy.
- Weak collaboration in the business value chain
- Lack of circular economy /eco innovation education and technical support programmes
- Difficult access to finance
- Missing standards and technical guidance for reuse, repair, maintenance of products

RECOMMENDED MEASURES

- Clearer and more demanding legislation and products standardisation
- Improve the products design in order to increase lifetime, reparability and recyclability of products
- Create a market for recycled materials by demanding more recycled material content in products
- Enable information and technical support for SMEs and other businesses.
- Connecting and enabling the whole value chain to improve design of products and prevent waste
- Educate and raise awareness among consumers and wider society

RECOMMENDED ACTIONS

- Adoption of more demanding environmental criteria and product standards (design for reliable products, extended warranty) (EEE, B&A)
- Enforce application of GPP Law 69/2016 to create demand for eco- products (P, EEE, B&A)
- Enhance cooperation between producers, consumers and recyclers for facilitation of the re-use, renovation, repair, dismantling and capitalization of resulted components and other materials (WEEE, WA&B)
- Transpose requirements of Annex 5 from Waste Law 211/2011 into methodological norms, in order to enable better products design (P, EEE, A&B)
- Promote awareness and education programs focused on resource efficiency, waste prevention and increased circularity of products and services for public and private sectors (P, EEE, A&B)
- Encourage programs providing technical assistance and support to businesses for resource efficiency and life cycle thinking
- Provide vouchers schemes for technical support, audits, consultancy (P, EEE, A&B)
- Finance business support organizations to provide assistance and information to companies in the field of eco-innovation, eco-design, circular economy, energy efficiency and others.
- Promote existing information and knowledge platforms for businesses (P, EEE, A&B)
- Publish lists of potential counterparts for both buyers and sellers of recycled materials, support the use of websites for exchanges (WP, WEEE, WA&B)
- Expand the use of the Environment Fund to finance and stimulate sustainable companies to produce green products and services (P, EEE, A&B)
- Facilitate companies' participation in technology financing schemes by providing free assistance programs (WP, WEEE, WA&B)
- Develop, recognise, implement quality standards and technical guidelines for reuse, repair and maintenance of products (EEE)
- Develop Romanian standards for products and materials with higher recycled content
- Changing the evaluation criteria for different financing schemes by including resources efficiency, energy efficiency (P, EEE, A&B)
- Ensure effective public-private partnership between municipalities/local authorities and the industry-owned EPR organisation, based on mutual trust, as a condition sine qua non for the success as well as the economic and environmental sustainability of the EPR compliance scheme (WP, WEEE, WA&B)
- Guarantee loans for investments in eco-innovative technologies and quality recycling technologies (WP, WEEE, WA&B)
- Develop Resource Efficiency and Circular Economy Educational programs and include them in the academic curricula for engineers

6.3. HOUSEHOLD AND B2B CONSUMERS

CHALLENGES

Romanian consumers have a low level of awareness

Final consumer's behaviour has a huge impact on the way how products are designed, produced and used; this category is made up of households and a large part of industrial and service sectors. Romanian consumers have a low level of awareness and make acquisition decision based on low price

rather than ecological criteria.

Regulatory challenges

- Not enough information for household consumers about hazardous elements in EEE and B&A content
- Legislation on take back schemes related obligations for consumers is not fully enforced (WEEE, WA&B)
- Legislation on packaging prevention/sustainable packaging not enforced (P)
- Legislation on deposit schemes for packaging not yet in place (P)
- Lack of incentives for acquisition of greener products (P, EEE, A&B)
- No legal requirements of banning certain types of packaging (P)
- Low level of awareness at the consumer level (P, EEE, A&B)

Economic challenges

- Non sustainable products are cheaper and easy affordable for final consumers (EEE, A&B)
- The price, the main decision criteria in B2B purchasing, in particular for SMEs (P, EEE, A&B)

Technical challenges

- Little choice in choosing between products ownership, leasing models (EEE) and green, circular products
- WEEE and WB&A take back infrastructure geographically not developed

Environmental challenges

- Consumerism has an impact on resource depletion and environmental degradation (P, EEE, A&B)
- Improper use, storage and disposal of WEEE and WB&A causing health and environmental impact

Other challenges

- Low level of awareness and information of consumers and negative effects of consumerism (P, EEE, A&B)
- Poor involvement of EPR Schemes in raising awareness about WP, prevention and sorting requirements
- Lack of knowledge in public institutions (as main purchasers) about green, circular products and services (P, EEE, A&B)

- Requirements in the value chain(B2B, in particular retailers) not adapted to sustainable packaging and sustainable products (P, WP)

RECOMMENDED MEASURES

- Educate and raise awareness among consumers and wider society
- Promote importance of shifting from waste to resources in public administration and business community.
- Establish circular business model promoting reuse and refurbishment.

RECOMMENDED ACTIONS

- Develop, recognise and implement quality standards and technical guidelines for reuse, repair and maintenance of products (EEE, A&B)
- Establish reuse, repair and maintenance centres for EEE with support of local authorities
- Supporting new business models, products service system, internet of things, access instead of ownership leasing systems for EEE (household appliances, printers, etc)
- Organise training for public servants on waste prevention, green public procurement and circular economy principles (P, EEE, A&B)
- EPR organisations engage in raising awareness about sorting and recycling among the inhabitants and provide support for educational programmes. (at least one national programme per year per EPR scheme) (WP, WEEE, WA&B)
- Consumer information campaigns about the product end of life fate via direct marketing (TV, posters, FB.), full information labels on RE features or certifications (WP, WEEE, WA&B)
- Adopt acquisitions schemes such as „savings cards” designed to offer incentives to buyers of the eco-labelled or more efficient products, discount coupons, or direct discounts(EEE, A&B)
- Enforce obligations of providing quality and visible consumer information on waste prevention, reuse centres, preparation for reuse, collection systems and the prevention of their uncontrolled dumping;(Law 211/2011. Art. 12 , line) (EEE)
- EPR organisations engagement in raising awareness about sorting and recycling among the inhabitants and provide support for educational programmes. (at least one national programme per year per EPR scheme)
- Educate consumers in order buy items manufactured from recycled materials

7. SERBIA

REGULATORY AND POLICY FRAMEWORK

Active strategy for waste management is based on the *National Waste Management Strategy 2010-2019*.¹⁹ It is planned to be amended with a new waste management strategy, currently in the making.

DATA

Waste Packaging

WP is the best organized stream even though it yet not as efficient as EU demands. It is operated by 6 major National Operators (PRO companies) out of which 2 are responsible for 78,5% of recovered waste. These two major actors are SEKOPAK formed as a LTD organization by founders: Knjaz Milos, Ball Packaging Europe, Carlsberg, Teetra Pak, Coca Cola Hellenic, Apatinska Pivara (brewery), A&P Pepsi, Fresh & Co and Bambi Concern.

The other major PRO is EKOSTAR PAK, a member of KappaStar Group and formed by Umka (Carton Factory), Jaffa Crvenka, Avala Ada, Belgrade Paper Factory, Brzan Plast and Beohemija.

Covering the topic of plastics, there are no real bottle-to-bottle technologies applied, so the real process of recycling is in fact shredding, separation and production of PET flakes and PET granulate. Processes that could contribute to a greater value creation (PET fiber or filament production from flakes) are missing. Bigger recyclers are ALWAG and Jugoplastic recycling. Some uses that the flakes could eventually be used for are:

- Bags,
- Fleece clothing,
- Insulation,
- Geotextiles,
- Carparts, fillings and seatbelts, or when assessed as Food Safe, for
- Bottles and food containers.

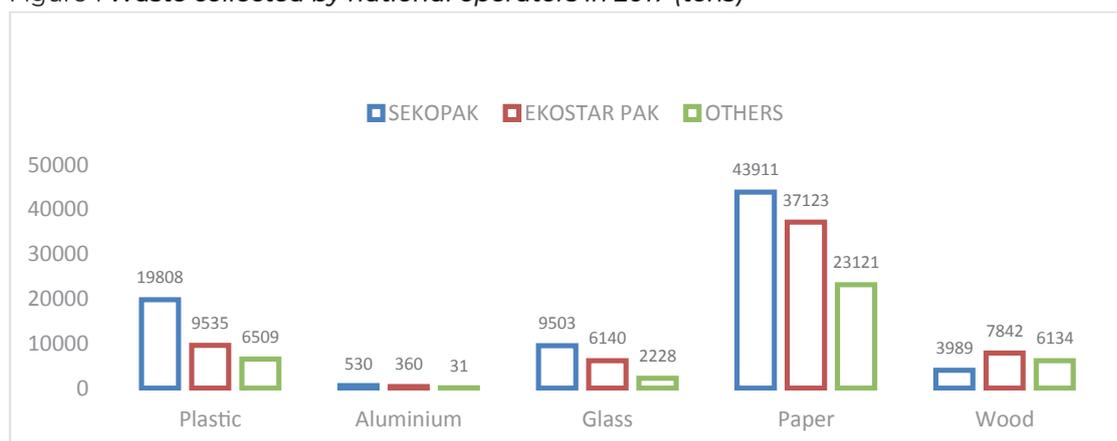
Carton and paper on the other side is on a better side of a coin, where cardboard could be produced again out of the recycled material. Some of actors in this field of recycling are Umka (Cardboard Recycling) and Belgrade Paper Factory

Metal packaging, mainly ALU cans is provided mainly by Ball Packaging Europe, which oversees and through SEKOPAK regulates the ALU beverage packaging recycling scheme. Collected ALU packaging is exported to England primarily to be recycled and returned in form of ALU beverage containers in Serbia.

The total amounts of waste collected for treatment are presented on Figure 1.

¹⁹ Official Gazzete of RS 29/2010.

Figure 1 Waste collected by national operators in 2017 (tons)



Source: SEPA, 2018. Report on packaging and waste packaging management in 2017.

Very low price of the glass prevents recyclers to treat this waste stream with more seriousness, even though this material could most probably bring the added value in the easiest fashion, respecting the true circular economy principles.

Waste Electric and Electronic Equipment

The whole process of WEEE is mainly ending at smelters' gates for major metals like aluminum, copper and steel, and exports gates for fine metals such as gold, rare earths, silver and other precious metals. In spite the fact that WEEE is increasing constantly, Serbia does not have the facility that could extract all valuable materials and place them back on the market, thus failing to capture the potential value out of the resources.

The process of WEEE treatment is based on dismantling, shredding, separating and export (or sales in cases of aluminum, copper and steel (and in some cases iron). Toxic waste (parts) are generally exported (motherboards, heavy monitor glass, condensers, etc.).

Among actors the ones that usually stand out are SET reciklaža, Bozic i Sinovi, E-reciklaza and EKOMETAL. In total there are 9 operators that are registered and licenced to treat WEEE. In general there is no effective collection system primarily for small house appliances that could greatly improve the potential of this industry bottom-up, while there is no effective policy instrument in place that could also push the development from the top.

Referring to the Table 1 below, it is obvious that the figures are not comparable, thus the systematization and normalization of the reporting system in WEEE is heavily needed. Likewise, a strong IT system behind the reporting is not yet developed to its full capacity.

While major exports lines are going to Romania and Germany, the reported amounts of exported WEEE is 2.827 tons, while Serbian enterprises treated (basically prepared for recycling) 34.210 tons of this waste.

Table 1 Amount of products placed on the market in 2017

Waste type	Total (pieces)	Total (tons)
Large household appliances	1 103 370	2561.1
Small household appliances	1 184 025	701.4
IT equipment	8 234 092	-
Entertainment	-	1769.9
Lighting equipment	3 664 991	-
Lighting	-	1466.9
EE Tools	-	2665.4
Toys, and sports equipment	-	648.5
Medical equipment	-	348.4
Surveillance and monitoring	-	520.3
Automates	-	235.9

Source: SEPA, 2017. Proizvodi koji posle upotrebe postaju posebni tokovi otpada u Republici Srbiji u 2017 godini.

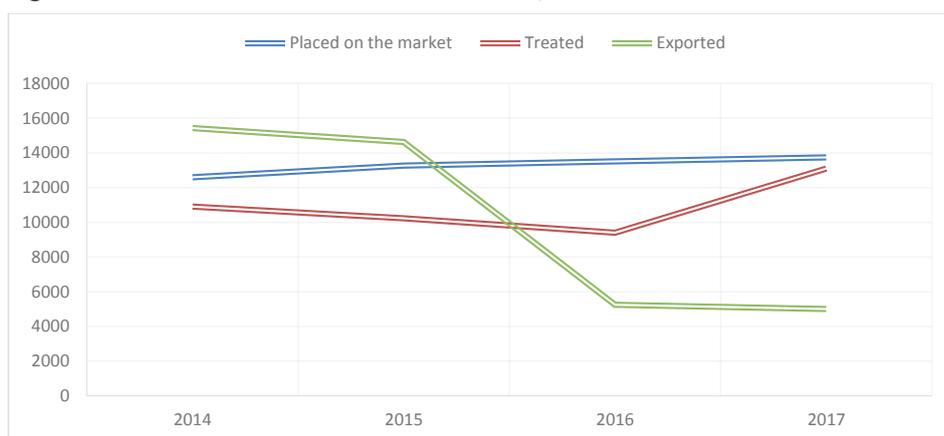
Finally, smelters are major procurers of metals that are extracted from WEEE (primarily copper, aluminum and iron/steel).

Waste Batteries and Accumulators

The main (and the only) actor for WBA treatment is Monbat with its new treatment facility, while the other known operator is MiteCo. However, the latter one is only collecting, sorting, storing and exporting these materials, and not really treating WBA. The final interesting actor is Ecomet, the coordinator of the Sombor facility that got out of the business, have been bought again by Bersk investments but it is still not recognized to be fully operational. This, however, might change any moment now.

Finally, Figure 2 below shows trends that are (by the official reports) starting to emerge for WB&A in Serbia.

Figure 2 Waste batteries and accumulators, 2014-2017



Source: SEPA, 2018. Proizvodi koji nakon upotrebe postaju posebni tokovi otpada u Republici Srbiji u 2017. godini.

Small and button used batteries, however, are not collected anymore in any way systemically, even though Delhaize-Maxi (the food retailer) had dedicated place and system of collection in their stores. They would have later been exported. A rather new retailer – LiDL had created a similar activity of collecting used batteries in their stores.

7.1. PROVIDERS OF SECONDARY RAW MATERIALS – WASTE MANAGEMENT OPERATORS

CHALLENGES

The 2008 recession had induced more stringent allocation of funds for innovation and research for the environment and in that, for the waste management's system. Low competitiveness of Serbian products and companies on the international market pushed prioritization in industrial focus on volume, not on development and increase of quality of products. That is so with the waste management and with it, with the secondary raw material providers.

Lack of investments and low priorities did not provide for an infrastructure build-up, thus the secondary raw material providers are just a few. They are generally operating with metals, as the most valuable resources and the most easily retrievable. Usually metals are retrieved from large dumped infrastructural products, wires, cables, and machines, while WEEE and metal packaging (aluminium primarily) are in rise in popularity.

Lack of investments and low priorities

WBA is also retrieved in a big percentage, although the final over-border waste streams for B&A are not sufficiently transparent. The information from the Serbian Agency for Environmental Protection (SEPA) only reports that out of collected 13.093 tons of these products, only 5.005 tons is exported. That is not only the case with WBA, thus the transparency is by itself a big hurdle to create an efficient waste management system. (See Table 2.)

Table 2 *Total amount of batteries and accumulators placed on the market in 2017 and collected for reuse (tons)*

	Weight
Starters	9 145
Portable batteries and accumulators	518
Industrial batteries and accumulators	4 080
Total	13 743
Batteries and accumulators recovered	13 093

Source: SEPA, 2017. Proizvodi koji posle upotrebe postaju posebni tokovi otpada u Republici Srbiji u 2017 godini.



The lack of capacity (know-how and financial) to embrace the newest technologies in order to produce higher quality secondary raw materials are also amongst the biggest barriers to create a working market for the raw material providers. Most of the final processing technologies for SRMs do not follow the EU IPPC Directive. Along with the mentioned, Serbian market is highly dependent on imported raw materials, which provide the procurers with lower price and higher quality materials for final production.

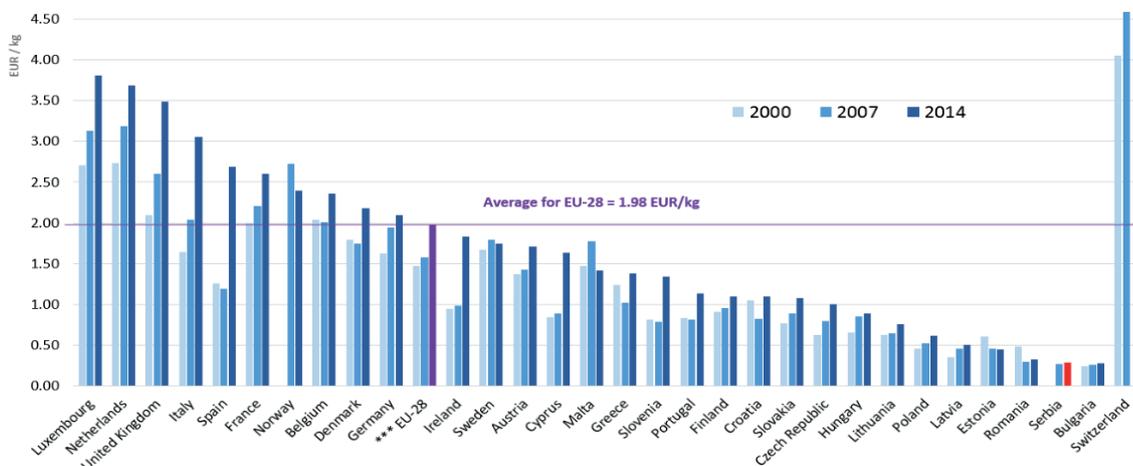
Corruption and lack of financial capacity to support the controlling system are also amongst the top problems for SRM providers. Likewise, the integration of informal sector in legal streams is necessary in order to avoid challenges of evidently illegal waste stream creation (for instance the informal sector is prone to destroy cables, sewage vents, valves and other metal urban infrastructure and furnishing in order to provide the “waste” to the SRM providers who then place the new flows back on the market). Currently approximately 70% of WEEE is collected by the informal sector.

70% of WEEE is collected by the informal sector.

Finally, a strategic orientation of the Serbian national industrial system is not (yet) aiming for the utilization of materials, the resource productivity is rather low with no dedicated action plan to improve it (see Figure 7), although some key players like Chamber of Commerce are making strong moves in the resource utilization, cleaner production and circular economy direction. Lack of sustainable procurement incentives for public authorities that could push SRMs on the market, is also evident.

Figure 3 Comparative view of resource productivity in Serbia and rest of the European countries

Resource productivity (GDP/DMC), participating countries and EU-28 (2000, 2007 and 2014)



Source: More from less — material resource efficiency in Europe. 2015 overview of policies, instruments and targets in 32 countries. EEA Report No 10/2016. European Environment Agency, 2016.

Before the final SRM production, it is important to assess the potential of refurbishment and remanufacturing as options with higher value output and shorter material cycles, contributing to savings in transport, materials and emissions, but contributing to the higher value added economy.

RECOMMENDED MEASURES

- Reduce informal economy activities in waste management and SRM sectors to bring up the transparency and increase the value of legal material streams
- Increase quantity and quality of the finally processed materials to minimize quality risks in new procurement systems.
- Bring up the financial incentives by changes in legislation to incentivize SRM market creation
- Connect various types of stakeholders in order to foster cooperative processing to reduce risks and costs for high quality recycling
- Assessment of priorities in circular economy cycles to ensure best possible value extraction from End Of Life (EOL) products. (Before SRMs consider impacts of implementing remanufacturing, refurbishing and repairing)

RECOMMENDED ACTIONS

- Regulate informal sector in order to bring transparency and bring waste collection and separation to a higher level.
- Improve the technology and increase the capacity according to the total assessed potential for recycling most prominent materials in WEEE, WBA and WP, such as Metals (steel, copper and aluminium), paper and carton, plastics and glass
- Transpose the latest Circular Economy Package and its accompanying Action Plan especially in domain of waste management in order to setup strategic national goals for Waste special streams such as WEEE and WBA, define regulations that would create modern EPR schemes for these two value streams.
- Create an incentive-based environment and in that:
 - New taxes and fees for disposing of or land filling of WEEE and WBA streams
 - Switch incentives from dismantling of WEEE to final processing for SMR.
 - Set minimum quality standards for processed SMR, but before that for repaired, refurbished and remanufactured goods.
- Organize collective recycling business models. Connect local, regional and European best case model providers in order to collaboratively bring down costs for knowledge and technology transfers, as well as for know-how.
- Create guidelines for GPP to drive up the demand for SRMs.
- Capacity building campaigns for public servants in order to properly assess optimal recycling options.

7.2. PROCURERS OF SECONDARY RAW MATERIALS – PRODUCERS AND DISTRIBUTORS

CHALLENGES

Two sides of the same coin are the potential procurers of SRMs. Very low quality in some cases, in others it is the problem of ambiguous quality of materials. Also, lack of regulations are preventing major stakeholders in form of big international companies from investing in their own infrastructure that could produce SRMs for their needs.

The lack of awareness of potential existence of SRMs

Yet above all, the lack of awareness of potential existence of SRMs on the Serbian market is also the lagging factor for a greater utilization of these materials.



The lack of a structured market (presumably the online market) that could connect supply and demand is also evident. That is one of the reasons why the situation in Serbia shows that almost the same amounts of paper, plastics and high amounts of metals are exported from and imported into the country (see Table 3). Even more interesting is the fact that the same material imports and export is happening between same countries. That information shows that procurers and providers of SRMs are not communicating effectively or that the prices are not adjusted.

Table 3 Cumulative amounts of imported and exported SRMs in 2016(tons)

Type of waste	Export	Import
Metals	164 642	40 337
Plastics	9 267	9 282
Glass	14 109	1 417
Wood waste	0	49 376
Paper and carton	84 744	83 823
Batteries and accumulators	5 249	163
Textile	580	455

Source: SEPA – Upravljanje otpadom u Republici Srbiji u periodu od 2011–2016. godine.

Wood waste is very interesting to analyse, and from these numbers it could be shown that local capacity for wood waste for pellets is insufficient. Above all, there is high amount of waste moves across the borders even though there are underused capacities for these wastes to be treated in Serbia. Other main challenges include the lack of regulations, old technologies, and the lack of transparency and weak controlling system.

RECOMMENDED MEASURES

- Increasing visibility of procurers (demand) and providers (supply) to connect the supply and demand in an effective way.
- Legislation and regulation change and improvement to ensure minimal quality and “rules of the game”.
- Improve capacity and technology of used processing plants to improve competitiveness of producers of SRMs, reduce operation costs and improve quality of final products
- Secure financial support for eco-innovative solutions in waste management infrastructure to ensure that small players, unable to independently invest, get to the level-playing field.

RECOMMENDED ACTIONS

- Map current capacities and future needs (opportunities) in every stream under the observed waste stream materials (metals, plastics, P&C, glass).
- Create an (online) platform to meet the supply and demand and avoid over-boarder value lost.
- Support R&D organisations developing eco-innovative technologies (with know-how and financially).
- Connect producers of SRMs with the international market.
- Improve controlling systems of waste flows to avoid informal waste stream occurrence as well as illegal over-boarder waste movements.
- Create a pool of experts to reduce time and know how costs to improve the implementation

- Explore additional SRM streams such as in industrial symbiosis, remanufacturing or refurbishing industries.
- Include 3ple helix system to assure development of local experts and their involvement from research, innovation institutions and universities.
- Promote material tagging to track source and movement history and ensure proposed quality of SRMs.

7.3. HOUSEHOLD AND B2B CONSUMERS

CHALLENGES

Firstly, the lack of awareness about resource use and lack of positive culture towards waste call for better education of the citizens towards waste to create a positive atmosphere around recycling and primarily around primary separation of waste. Public utility companies (PUCs) are traditionally charging only the waste disposal services and they calculate it by the m2 that occupants of households hold. Also, PUCs are traditional, the knowledge about modern waste management options is limited and the incineration of waste is primarily promoted. This situation is not contributing to better recycling options.

Better education of the citizens

The culture is a very much of a “throw away society” character. Lower educated residents are more prone to disrespect laws regarding waste management and weak control system is not contributing to bettering the situation. Also, lack of financial support where only 0.23% of a yearly national budget is allocated to environmental protection is hampering better solution provision. There is a clear notion of reluctance to abide to the primary separation culture since majority of the residents believe that whatever they do, the waste goes to the same place after all – to landfills.

Transparency of waste flows, information dissipation and education are lacking to activate citizen’s change of behavior. Informal sector is contributing to non-economically feasible options because majority of waste is collected by that sector, which in turn, reduces options for professional operators to invest in better collection systems. The fact that the fraction of reported separated waste dropped in 2016 to only 20% of the amount reported in 2011, proves that major waste flows are operated by the informal sector.

90% of waste collected is really ending up on landfills.

Finally, there is a lack of separation infrastructure, construction of sanitary landfills is lagging behind (10 out of 27 planned sanitary landfills are built) and secondary separation lines are not in function in many areas in Serbia, thus the present situation shows that more than 90% of waste collected is really ending up on landfills. Waste collection is not as good as it should be, especially in distant rural areas. The unofficial information is that more than 3000 illegal dumpsites are present in Serbia where around 20% of municipal waste is being disposed off. That increases environmental hazard, and additionally complicate the situation. There are virtually none of the controlled gas extraction while leakage from these dumpsites is neither prevented nor treated. Total amount of collected waste is nearly 82%, and it is slowly improving.

RECOMMENDED MEASURES

- Raise the awareness of residents to tackle waste problems in order to increase responsibility of residents towards waste. Present drawbacks of irresponsible behaviour and illegal, unsanitary landfills.
- Improve education of youth for environmental protection to provide information basis for future improvements coming from youth.
- Regulate the informal sector of waste separation and collection to prevent current trend of irregular waste stream creation.
- Promote importance of shifting from waste to resource management among consumers and wider society in order to shift in the way of thinking “from cost to benefits” in regard to resource management.
- Educate and raise awareness in public administration and business community to improve capacity of public servants to pursue and chose the right solutions for the citizens.
- Improve collection and separation infrastructure and models for solid municipal waste in order to improve coverage of waste collection and modernize separation.
- Fight corruption to reduce extra costs, increase security of investments and transparency and detach the development from personal interest points.

RECOMMENDED ACTIONS

- Organise national-wide campaigns (also in schools) on importance of quality separate collection of household waste (also hazardous waste from households) so less contaminated waste is prepared for recycling.
- Organise courses, education modules or at least provide financial support.
- Include citizens and NGOs in concrete impact reducing long term projects that will change the attitude of citizens towards waste in general. (Aimed at younger population, and up to 30).
- Promote non-single use packaging through online information videos, lectures, news, conferences and workshops.
- Promote cost savings related to energy and material utilization in circular business setup via inhouse or outsourced simple assessment tools.
- Commence nationwide education campaigns for public servants and PUC officials for BAT for recycling and social diffusion tactics.
- Include quintuple helix analysis in order to activate media, civil society and residents to tackle waste problems.
- Support civil society long term programmes that tackle waste related problems.
- Improve operationalization of transition towards sanitary landfills.
- Build, populate and popularize an online tracking system that would bring the waste flow transparency up, that will, in turn raise trust in citizens about waste not ending up on landfills.
- Improve communication and relation between PUCs and residents through platforms, communication campaigns, modern customer service, etc.

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About Moveco

“Your trash is my treasure”

This is the motto of the EU co-funded project MOVECO – Mobilising Institutional Learning for Better Exploitation of Research and Innovation for the Circular Economy. Sixteen partners from ten countries of the Danube region want to promote transnational cooperation to accelerate the transition to a circular economy.

The MOVECO consortium is working on topics like eco-design, producer responsibility and green innovation, supporting best practices in these areas.

Under the framework of the Danube Transnational Programme, MOVECO is an Interreg project, co-funded by the European Regional Development Fund (ERDF) and the Instrument for Pre-Accession Assistance (IPA).

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