

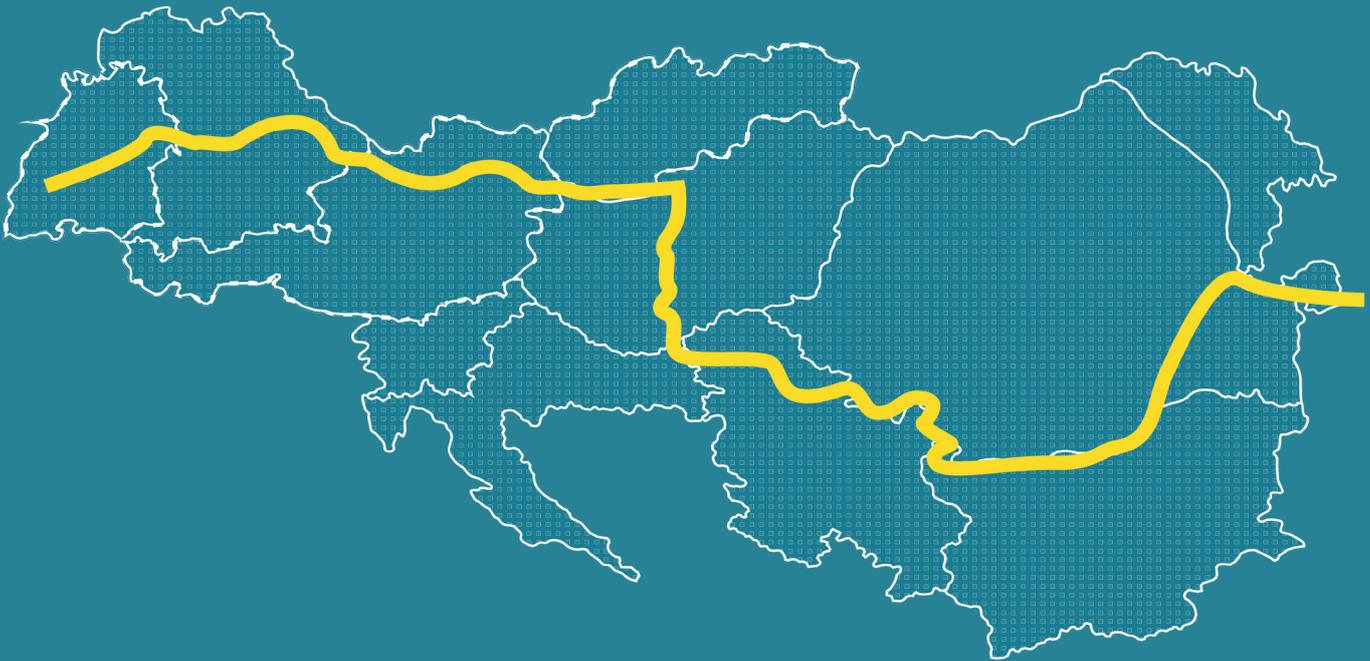
MOVECO

THE DANUBE GOES CIRCULAR

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

– Croatia, Hungary, Slovakia –

Prepared by MOVECO | April 2019



A stream of cooperation

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1. EXECUTIVE SUMMARY

In December 2015, the European Commission launched an ambitious Action Plan to support the transition towards a circular economy. The Action Plan proposed a number of measures, which are currently in different phases of implementation. These measures include an amended waste legislation framework, adopted at EU level at the end of May 2018. A European strategy on plastics was published in the beginning of 2018 and new rules for so-called single use plastics were negotiated at the end of 2018.

By the end of 2020, each country will must implement the new legislation to comply with the requirements of the modified waste directives. Measures from these adopted directives, together with the so-called Directive on single use plastic items, are largely targeted at packaging and will require additional measures for efficient transposition into national legislations.

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

This Road Map discusses the region of three countries, Croatia, Hungary, and Slovakia that belong to the same innovation group in MOVECO project. They are also EU member states, Hungary and Slovakia joined the EU in 2004, Croatia in 2009. In this Road Map the current situation is analysed and national legislation and empirical data are presented on packaging and packaging waste (PPW), waste electrical and electronic equipment (WEEE), and waste batteries and accumulators

(WB&A). The situation is analysed along the three stakeholders of providers of secondary raw materials (waste management operators), procurers of secondary raw materials (producers and distributors), and household and B2B consumers.

The Road Map also puts emphasis on group similarities in order to strengthen cooperation among the countries and to foster the transition toward circular economy. All three countries face similar problems and challenges in the process of transition. As to waste management operators, despite the presence or lack of EPR scheme, both Croatia and Hungary face the same challenge of constant changes in the legislative and policy framework. Croatia and Slovakia are also similar in that both of them face challenges concerning the relationship between taxation and capacity of operators. As to producers and distributors product fee is a common challenge for Croatia and Hungary. Regarding household and B2B consumers, all the three countries face challenges at local level of municipal waste management system. Measures and actions are suggested to overcome these challenges.

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 Croatia, Hungary, and Slovakia.

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 two-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

Croatia, Hungary, Slovakia 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 index.

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.

Resources in waste are still lost

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.

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.

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

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.

Experience from our project emphasizes disparities not only between the three determined



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

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 fulfil 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

By the end of 2020, each country will have to implement new legislation to comply with the requirements of the modified waste directives adopted at EU level at the end of May 2018. Measures from these adopted directives, together with the so-called Directive on single use plastic items, are largely targeted at packaging and will require additional measures for efficient transposition into national legislations. The main problems lie in the field of waste plastic packaging, which coincides with the main EU and global environmental issues. As to waste management operators, despite the presence or lack of EPR scheme, both Croatia and Hungary face the same challenge of constant changes in the legislative and policy framework. Croatia and Slovakia are also similar in that both of them face challenges concerning the relationship between taxation and capacity of operators. As to producers and distributors product fee is a common challenge for Croatia and Hungary. Regarding household and B2B consumers, all the three countries face challenges at local level of municipal waste management system.

4.1. PROVIDERS OF SECONDARY RAW MATERIALS (WASTE MANAGEMENT OPERATORS)

As to providers of secondary raw materials (waste management operators), although the policy and regulatory framework is the different in the countries Croatia and Hungary, they face similar problems.

As early as in 2006, Croatia started the adaptation of the existing waste collection system to EU directives and EU acquis and established Extended Producer Responsibility based on the “polluter pays” principle. First major challenge was to adopt legislation and to build necessary capacities at all levels of government (national, regional, and local). Another challenge was to start building the necessary infrastructure and completely rearrange the municipal solid waste collection system, to introduce separate collection of different waste categories from households, and to introduce environmental tax. In 2012, the government of Hungary decided to change the waste system that relied on EU directives and best practices. The state took over the responsibilities usually carried out by Extended Producer Responsibility Organizations (EPR) based on the “polluter pays” principle. This was the first major change in the Hungarian waste management system. That was followed by the total rearrangement of the system of municipal solid waste collection and the separate collection of different wastes from households (MSW system). Taxation related to different waste stream (product fee) also changed.

Croatia and Hungary face the same challenge of constant changes.

So, despite the presence or lack of EPR scheme, both Croatia and Hungary face the same challenge of constant changes. In Croatia one of the biggest problems is the constant changes in legislation, the inconsistent strategy and action plans for waste management. Also constant changes in the environmental

tax system create major problems for implementation of waste management for recyclers. In Hungary, too, the tendency of change is continuous. Fundamental and systematic changes in the legislation take place every year. This results in turbulent working environment for all stakeholders in waste management, including waste management operators. The modifications generate new organizational, financial and other challenges for the participants of the environmental sector every year. The new Law on Waste was modified approximately 25 times in the last 6–7 years.

In Slovakia, the largest challenge in relation to providers of secondary raw materials is the availability of data. Detailed information on waste recovery operators is not freely available. Data has to be requested from the Ministry of Environment that prolongs provision of data. Data quality is also questionable for various reasons such as duplicate data reporting, poor data control, and human error factor.

In Slovakia, the largest challenge in relation to providers of secondary raw materials is the availability of data.

Croatia and Slovakia are also similar in that both of them face challenges concerning the relationship between taxation and capacity. In Slovakia the landfilling tax is one of the lowest in the EU. Therefore, landfilling remains the most accessible way of waste recovery. Since the 1st of March 2019 a new law on landfill tax was released. Thanks to the new act, the currently low fees will be increased and will be based on the amount of waste generated by municipality and sent to landfill. Even though Slovakia is already taking steps in this area, it still belongs to countries with lowest landfill tax. In addition, capacity of the market to process and recover the current amount of sorted waste is insufficient, and packaging waste is exported to other countries for recycling. In Croatia, compared to other EU countries, landfilling tax is above the average, but landfill sites are close to reaching the planned capacity and their closure will involve major cost. Although there was a plan to build 12 waste management sites until the end of 2018, only 2 are operational, while the others are in early planning phases only.

Croatia and Slovakia are also similar in that both of them face challenges concerning the relationship between taxation and capacity.

RECOMMENDED MEASURES

- Provide necessary infrastructure for waste management at local level.
- Introduce product value chain to increase recycling and re-use on domestic market.
- Keep product value chain clean to increase quality and quantity of recycling by establishing support to enable better collection of waste.
- Collection of PET should be extended, and not only limited to beverage packaging.
- The waste management sector shall have a stable legislative framework, a clear strategy with clear and long-term goals without drastic changes in the system or in its sub-system.
- The financing of collection and recovery shall be reshaped to provide proper and timely support for collectors and recyclers.
- Support bio-based technologies and circular economy principles through concrete schemes and measures.
- Biodegradable plastics are still not collected separately, as we need to find out the best practice of its collection in order not to mix various materials that would cause non-recyclability.

RECOMMENDED ACTIONS

- Create a long term strategy with clear goals per waste stream, based on a reliable and stable legislation system, with government providing proper financing system and fair control mechanism.
- Optimising the distribution and use of containers for separate collection of specific waste streams (identification of generation points, types of waste, and level of separation).
- Provision of financing for building recycling yards, separation station at local level.
- Introduce deposit (returnable fee based) system for all PET and beverage containers.
- Support of take-back system for products and waste products, and introduction of local deposit system.

- Introduction of deposit system for single-use beverage containers (PET, Al and Fe cans, multilayer composite materials). Minimum percentage determination of reusable bottles (deposit reusable packaging) that the manufacturer must place on the market in proportion to single-use reusable packaging materials, or at least support of producers who meet the minimum criteria in the form of lower contributions to the EPR system.

4.2. PROCURERS OF SECONDARY RAW MATERIALS (PRODUCERS AND DISTRIBUTORS)

Product fee is a common challenge for Croatia and Hungary. In Croatia, the product fee was introduced as early as in 2006 in Croatia. The producers have a responsibility to pay environmental tax and to submit annual report on the types and amounts of products placed on the market in the previous year. However, there is lack of transparent data on the amount of tax collected and how the funds are actually spent. In 2015, Croatia introduced Green Public Procurement (GPP), and GPP is obligatory for certain categories of procurement (e.g. electronic equipment, electric appliances) since 2018. However, there is still low demand for green products. Tax incentives for reuse and eco innovation needs to be introduced and funding for R&D of green products based on eco innovation principles (e.g. trough incentives for KET – Key Enabling Technologies) needs to be provided.

Product fee is a common challenge for Croatia and Hungary.

Similarly to Croatia, Hungary also has product fee since 2000. Based on the “polluter pays” principle, in case of certain products producers have extended responsibility to the post-consumer stage of their goods. The fee is to be paid to the state out of which the state co-finances collection and treatment of the wastes of these goods through public procurements. Payment of the fee puts a great financial burden on producers, and only approximately 20% of the fee is used for financing collection and recovery. Although the quantities of products put on to market increase every year there is no incentive for producers to use secondary raw materials in this system. Although they would be the stakeholders whose decisions would reshape the material flows, no discount or special price on products meeting the circular economy criteria are offered. The lack of distinction between products that are more consciously designed recyclable or reusable leads to minimum development of eco-design. Single-use materials and products are ubiquitously used. Deposit-refund systems are voluntary, with mixed results in practice. The producers' responsibility ends by paying the environmental product fee to the tax authority. There is no motivation for eco-design, producing “green” packaging, EEE or any other materials. There is lack of central financing of R&D neither to producers nor to recyclers, and there is no feedback about the recycling rates from the governmental side.

Eco-design and GPP are also challenges in Slovakia. One of the commitments of the Slovak Republic towards the EU is to achieve a given level of Green Public Procurement (GPP). Slovakia should procure half of its public orders in green way by 2020, while nowadays it is far beyond achieving the goal. Value of public procurement bids amounts to high ratio of GDP (up to 20%). For this reason it should be taken seriously and be applied to a higher extent. GPP could favour eco-innovative companies and serve as a source of motivation for companies leading the way towards CiE. However, low demand for eco-innovative products and services, low level of public awareness of this issue, and consumer behaviour among B2B or B2C consumers also have negative effects on creation of partnerships among producers and waste management operators. The low market demand for eco-innovation products and services is still significant in Slovakia. Regarding EPR, producers do not see direct impacts of the service they pay for. In addition, no incentives or

Eco-design and GPP are also challenges in Slovakia.

motivation is provided for companies that wish to apply eco-design in their production process.

RECOMMENDED MEASURES

- Establishment of financing mechanism for R&D projects that promotes green, bio-based packaging, and eco design.
- Promote financial support schemes and tools for investing in eco-innovative technology and infrastructure in waste management.
- Include secondary raw materials as a must in design and production of new products and services.
- Raise awareness of a need of cooperation between producers, designers and recyclers for eco-innovation.
- Connecting and networking the whole value chain to improve design for better waste management
- Building a communication path between producers and waste management operators would be needed to assure high level of recycling and good quality secondary raw materials that later could be reused by the producers in the production of goods instead of raw materials.
- Responsibility of the producers shall be more devised, including eco-design with real incentives towards R&D and the use of secondary raw materials.

RECOMMENDED ACTIONS

- Creating new funding schemes and mechanism, and risk capital to accelerate transition towards CiE are needed.
- Creating innovative financing mechanism for R&D between producers and recyclers.
- A financing system for R&D activity of recyclers shall be set up to assure recycling technology is ready to take the challenge of the dynamically changing production technology.
- Creating market demand for green products through public procurement.

4.3. HOUSEHOLD AND B2B CONSUMERS

All the three countries face challenges at local level of municipal waste management system.

All the three countries face challenges at local level of municipal waste management system.

In Croatia, the current municipal waste management system is based on separate collection of glass, paper and cardboard, metal, plastic and bio-waste. However, on-site separation is still partial and limited to 3-4 fractions (e.g. there is no separate collection of packaging waste). Collection system predominantly used is door-to-door collection in combination with selective islands (green islands) and recycling yards. Several towns have introduced different collection bags for different waste streams or Pay-As-You-Throw or volume-based fee. The current challenge is to introduce Pay-As-You-Throw system by 2020 and the issue of financial incentives adapted to local needs to increase sorting. Expected rise in the prices for waste collection and rise in gate fee (landfill fee) will bring additional burden to households with low sorting and recycling rate.

In Hungary, the municipal solid waste management system that shall operate separate collection of packaging waste faces a country-wide challenge of under financing at the present. Former incomes of the MSW providers are taken by a state institution and redistribution does not work properly. There is no standardized system for collections neither in its form (door-to-door, selective

islands, etc.) nor in the type of materials collected. Incentives do not exist on selective collection for households. Pay-as-You-Throw system is not in function meanwhile the costs for collection increase. The service of door-to-door collection of several packaging waste streams operates without clear incentives and penalties, the residents misuse it, by putting mixed waste into bins dedicated to plastic and paper waste. This means that about 40% of the separately collected waste is actually mixed household waste that needs to be separated after collection what is expensive and provides less clean materials for recycling. No incentives or penalties are in place to solve this problem. Communication towards residents to promote proper usage of bins did not lead to clearer material or appropriate use of bins. Communication of the dynamic changes in waste management legislation resulted in a chaos and lack of interest and participation from the households. However, a system cannot function without long term planning, proper incentives and efficient communication towards the citizens.

Similarly, Slovakia also has challenges and problems in its municipal waste management system. Collection system from the households is not harmonised, and each municipality has its own waste management system. Normally, glass packaging is collected separately in collection points that are scattered across a settlement, while rest of waste packaging streams are collected door-to-door. Another issue is material collection. Some municipalities collect each waste packaging in separate container or bag, while others collect waste packaging in single container or bag. Almost 50% of municipal waste consists of bio waste, and measures also have to be taken to increase the ratio of sorting of metal and beverage cartons packaging in Bratislava, Slovakia's capital, through information harmonisation in form of container labels and website. Most efficient collection system in smaller municipalities proved to be the door-to-door one. Harmonization of collection is needed since there are still many municipalities with collection points that are scattered across the settlement. According to the Envirostrategy 2030, Slovakia will gradually deploy Pay-As-You-Throw system in every municipality that create direct financial incentive for citizens to increase their sorting rate. Changes in gate fee and gradual introduction of PAYT system can put substantial financial burden on households with low sorting rate.

RECOMMENDED MEASURES

- Improving “carrot and stick” system for motivating households for separation – incentives for waste separation as well as fines for mixing separate waste.
- Both positive incentives (PAYT) and negative penalties (extra fee for mixing separate waste) shall be put into practice to assure higher collection rates and clean waste streams for recyclers
- Active measures against illegal dumps.
- Promoting resource management instead of waste generation.
- Promote importance of shifting from waste to resource management. Educate and raise awareness in public administration and business community.
- Detailed analysis of municipal waste streams in order to have clear identification of the problems.
- Analysis of municipal waste samples for detecting problem commodities.
- Residents shall be given clear information on separate collection of wastes.
- Increasing knowledge of consumers on existing collection systems and new incentives
- Effective, transparent and motivating collection and sorting of waste at municipal level; comfortable collection system for residents (Door-to-Door system).

RECOMMENDED ACTIONS

- MSW service shall be paid by the residents after the actual quantity of waste generated, that is, Pay-As-You-Throw system shall be established.

- Establishment of Pay-As-You-Throw system that will create clear financial motivation for households to increase their sorting rate.
- Measurement of actually thrown away waste shall be solved.
- Collection based on real statistics on waste production - according to container capacity, and not to residency of inhabitants.
- Create and promote innovative deposit systems schemes.
- Establish reuse and recycle centres in major cities.
- Financial support for building reuse centres, libraries of things, no-packaging stores and local deposit systems.
- Promote reuse by establishing deposit system for multiple uses; promotion of sharing economy models or access instead ownership of EEE (household appliances, printers, etc.).
- Promote community base approach to reuse (second use of waste).
- Provide financial support to build community based reuse centres that would be points of citizen education.
- Awareness raising campaign should be constant from kindergarten onward.
- Conducting constant national campaign that will promote reuse, recycling, and composting.
- Organise nationwide campaigns (including schools) on importance of waste prevention, litter reduction, promoting reuse, repair, and refurbishment, etc.

5. CROATIA

REGULATORY AND POLICY FRAMEWORK

Ministry for Environmental Protection and Energy (MEPE) is responsible for overall waste legislation in Croatia. The Environmental Protection and Energy Efficiency Fund (EPEEF) is the central point for collecting and investing extra budgetary resources (environmental fees) in the programs and projects of environmental and nature protection, energy efficiency and use of renewable energy sources. Croatian Agency for Environment and Nature (CAEN, or in Croatian: HAOP – *Hrvatska agencija za okoliš i prirodu*) is the body responsible for collecting and reporting waste data. Since 2018 CAEN is part of MEPE.

There are number of regulations managing the policy framework for waste management and the circular transition aiming at streamlining the policy with that of the rest of the EU. These regulations include the Act on Sustainable Waste Management, the Ordinance on packaging and packaging waste, and Waste Management Strategy of the Republic of Croatia, Ordinance on by-products and end-of-waste status, and Waste Management Plan for the Republic of Croatia for the period 2017-2022.

Special waste categories are waste textile and footwear, waste tires, waste oil, waste batteries and accumulators, vehicles, medical waste, waste electrical and electronic equipment, construction waste and waste containing asbestos. They are regulated with additional regulations including Ordinance on the management of waste electrical and electronic equipment, Regulation on the management of waste packaging, Regulation on waste batteries and accumulators management, Ordinance on batteries and accumulators and waste batteries and accumulators, and Ordinance on the management of waste batteries and accumulators.

There are six special categories of waste in Croatia regulated separately. They include packaging waste, end-of-life vehicles, waste oils, waste batteries and accumulators, waste tires and WEEE. For these six special categories of waste, “extended producer responsibility” has been introduced by way of fees for launching products on the market which create special categories of waste, for which separate collection and treatment systems are established. Producers and importers pay environmental tax (producers/importers tax) when they put product on the market. The tax is based on amount (piece) and collected by EPEEF. Part of the funds collected is used to finance waste management system development as well as projects that are directly linked to waste management.

DATA

Table 1 presents data on the quantities of waste packaging, batteries and accumulators as well as WEEE collected in the period from 2010 to 2015.

² Official Gazette No. 94/2013; 88/2015, 78/2016; 130/2005; 117/2014; 3/2017.

³ Official Gazette No. 42/2014, 48/2014, 107/2014, 139/2014; 97/2015; 105/2015; 111/2015; 133/2006, 31/2009, 156/2009, 45/2012, 86/2013.

Table 1 *The quantities of waste collected for period 2010-2015 (tons)*

	2010	2011	2012	2013	2014	2015
WP	178 112	125 258	118 492	116 493	110 237	140 441
WB&A	8 290	8 480	7 165	7 296	6 965	5 965
WEEE	17 748	17 518	16 187	15 025	15 482	23 758

Source: EPEFF and CAEN, 2018.

If we compare quantities of packaging waste, collected and recovered in the period from 2010 to 2014 there was decrease, after which in 2015 there is an increase in quantities for all 3 categories (Table 2).

Table 2 *Quantities of packaging waste, collected and recovered (tons)*

	2010	2011	2012	2013	2014	2015
Put on the market	204 958	205 727	198 606	198 571	198 571	215 534
Collected	178 112	125 258	118 493	116 493	110 237	140 441
Recovered	178 112	125 258	118 493	116 796	100 696	129 554

Source: CAEN, 2017.

In 2015, over 55% of collected packaging waste was paper, cardboard and multi-layer packaging, 25% was glass packaging, 18% was plastic packaging, and the rest was made of wood or metal.

According to EPEEF, 60% of packaging waste was recovered via recycling in 2015, therefore EU goals were achieved.

In 2015, 9 570 tons of batteries and accumulators were put on the market in the Recovery Centres (RC). It was reported that 5 596 tons were collected and the recovered quantity was 6 198 tons. (Data discrepancy is due to the fact that part of the recovered quantities was collected in previous years). In the period 2013-2015, an average 336 tons of mobile batteries and accumulators were put on the market in the RC, while 98 tons of mobile waste batteries and accumulators were collected in 2015 (CAEN, 2018). The goal defined by the ordinance on waste batteries and accumulators, according to which it is necessary to achieve at least 25% collection rate, was met in 2012, was not met in 2013 and 2014, and then in 2015 the goal was met again.

The system for collection and recovery of waste electrical and electronic equipment started in 2006, and the goal of collecting 4 kg per capita was met already in 2010.

In the pre-accession period Croatia had committed to achieve goals stated in Table 3.

Table 3 *Obligations of the Republic of Croatia originating from EU legislation and regulations*

	Year goal has to be accomplished	Minimal recovery	Minimal recycling	Status
WP	2008	60%	55-80%	Goal met in 2008 except for part of metal and wood recycling
WEEE	2006	70-80%	50-80%	4 kg of WEEE/capita met in 2010
	2016		45% of total mass to be put on the market	Not accomplished
	2019		65% of total mass to be put on the market	
WB&A	2011	50-75%		Goal met in 2012, 2015

Source: Waste Management Plan for Croatia 2015-2022. MEPE.

Due to the new circular economy package and goals, by 2022 Croatia has to improve the management systems for PPW, WA&B, and WEEE in comparison with 2015,

5.1. PROVIDERS OF SECONDARY RAW MATERIALS – WASTE MANAGEMENT OPERATORS

CHALLENGES

As early as in 2006, Croatia started the adaptation of the existing waste collection system to EU directives and EU acquis. Croatia established Extended Producer Responsibility based on the Polluter Pays Principle. First major challenge was to adopt legislation and to build necessary capacities at all levels of government (national, regional, and local). Another challenge was to start building the necessary infrastructure and completely rearrange the municipal solid waste collection system, to introduce separate collection of different waste categories from households, and to introduce environmental tax.

The change took place slowly, especially at municipal level due to the limited funding, the lack of awareness and the public procurement process. The Fund for Energy Efficiency and Environment (FEEE) started with grant-based support for municipalities and cities in order to build the necessary infrastructure. Therefore, MEPE decided to support development of private recyclers (waste management operators) for WEEE, waste batteries, and WP that proved to be right concept since the set goals and targets were reached within five years.

However, there are still several challenges in the system. They are as it follows.

Legislation and tax system

One of the biggest problems is the constant changes in legislation, the inconsistent strategy and action plans for waste management. Also constant changes in the environmental tax system create major problems for implementation of waste management for recyclers.

Market for recycled materials

There is lack of technological solutions for recycled materials on domestic market (with exception



of PET, glass and paper), especially based on bio-based and circular economy principle. Also due to higher prices of recycled materials and low prices of raw materials there is low interest on manufactures' side (both on national and international market). Exception is WEEE and waste accumulators as there are local manufacturers that use them as resource. There is no market for waste batteries, very low interest in plastic waste packaging, and no market for other special waste categories such as plastic bags.

Constant changes in legislation, the inconsistent strategy and action plans for waste management.

Waste management operators and infrastructure

Compared to other EU countries, landfilling tax is above the average, but landfill sites are close to reaching the planned capacity and their closure will involve major cost.

Although there was a plan to build 12 waste management sites until the end of 2018, only 2 are operational, while the others are in early planning phases only.

Cities and municipalities also need to develop the infrastructure of complete waste separation. Currently there is lack of recycling yards, waste separation stations, and special recycling points (green islands) at local level, even in major cities (Zagreb, Split, Rijeka, etc.). Smaller and less developed municipalities have very limited infrastructure due to the lack of resources for waste packaging. Another major problem is islands that lack infrastructure. Major problems are related to the tourist season when the amount of waste is ten times higher and costs much more due to the transport.

Although, according to official data, WEEE and waste accumulators systems are fully operational and functioning at all levels in Croatia.

Additional waste streams

Further issue is related to the immixture of additional wastes into a waste management system, for example packaging polluted with hazardous material or plastic carrier bags.

RECOMMENDED MEASURES

- Provide necessary infrastructure for waste management at local level.
- Introduce product value chain to increase recycling and re-use on domestic market.
- Support bio-based technologies and circular economy principles through concrete schemes and measures.
- Collection of PET should be extended, and not only limited to beverage packaging.
- Promotion of re-use schemes for citizens has to be introduced and supported by MEPE and FEEE.

RECOMMENDED ACTIONS

- Optimising the number of containers and green islands for separate collection of special waste categories.
- Provision of financing for building recycling yards, separation station at local level.
- Introduce deposit (returnable fee based) system for all PET.

- Introduce deposit system for all beverage containers.
- Encourage re-use and recycling at local level through awareness raising, increase of disposal fee for landfilling and introduction of re-use and recycle centres.

5.2. PROCURERS OF SECONDARY RAW MATERIALS – PRODUCERS AND DISTRIBUTORS

CHALLENGES

Product fee was introduced as early as in 2006 in Croatia. The producer, a company that packs or imports packed products, has to cover the expenses of collection, disposal and recovery of waste packaging of products it has placed on the market. Also there are products fees for the following products: batteries, packaging, petroleum products, electric and electronic appliances and equipment, tires, commercial printing paper, plastic products, other chemical products. The producers have a responsibility to pay environmental tax and to submit annual report on the types and amounts of products placed on the market in the previous year. Taxes and reports have to be paid and submitted to the Environmental Protection and Energy Efficiency Fund.

Lack of transparent data on the amount of tax collected

There is lack of transparent data on the amount of tax collected and how the funds are actually spent. FEEE is publishing annual report but it is not transparent.

Distributors (sellers) with sales premises larger than 200 m² have to allow the setting up containers for the collection of packaging waste. They also must organize the transport of collected packaging waste from the sales premises and temporary storages to waste management or recovery-companies.

Packaging waste, accumulated at the sales premises, must be sorted free of charge according to the basic classification: glass, paper and cardboard, composites, metal, aluminium, PET, other plastics, wood and textiles. The seller is also responsible for the payback of a returnable fee of 0.50 HRK (0.13 EUR) per each unit of non-refillable beverage packaging, brought back by customers. Refunded amounts are paid back by the Fund.

There is still low demand for green products. In 2015, Croatia introduced Green Public Procurement (GPP) and since 1st of January 2018 GPP is obligatory for certain categories of procurement (e.g. electronic equipment, electric appliances). Public procurement represents 18% of Croatia's GDP and GPP should be extended to other products and services in order to reach the level of other EU countries (e.g. Germany or Austria – over 50%).

Low demand for green products

Another opportunity is to introduce tax incentives for re-use and eco innovation and to provide funding for R&D of green products based on eco innovation principles (e.g. trough incentives for KET – Key Enabling Technologies).



RECOMMENDED MEASURES

- One of the main measures should be the establishment of financing mechanism for R&D projects that promote green, bio-based packaging, and eco design.
- Include secondary raw materials as a must in design and production of new products and services.
- Raise awareness of a need of cooperation between producers, designers and recyclers for eco-innovation.
- Raise awareness of use of secondary raw materials and create market demand.

RECOMMENDED ACTIONS

- Creating new funding schemes and mechanism using for the Environmental Protection and Energy Efficiency Fund.
- Promote grant-based financing for R&D on eco design, green packaging, green EE and tax incentives (lower taxes).
- Establishing support networks for re-use of secondary raw materials, eco innovation, and eco-design.
- Creating innovative financing mechanism for R&D between producers and recyclers.
- Educating designers on eco design principles.
- Creating market demand for green products through public procurement.
- Raising awareness of re-use through national awareness raising campaigns and eco-innovation schemes.

5.3. HOUSEHOLD AND B2B CONSUMERS

CHALLENGES

The current municipal waste management system is based on separate collection of glass, paper and cardboard, metal, plastic and bio-waste. Each of the 428 municipalities and the city of Zagreb have obligation to introduce separation of waste according to EU regulations. However, on-site separation is still partial and limited to 3-4 fractions (e.g. there is no separate collection of packaging waste), except in few cities and municipalities (e.g. Krk, Cakovec, parts of Zagreb).

On-site separation is still partial and limited

Collection system predominantly used is door-to-door collection in combination with selective islands (green islands) and recycling yards. Several towns have introduced different collection bags for different waste streams or Pay-As-You-Throw or volume-based fee. Although, Zagreb is still using pay-per-square-meter fee.

The current challenge is to introduce Pay-As-You-Throw system by 2020 and the issue of financial incentives adapted to local needs to increase sorting. The Waste Management Plan for 2017–2022 promotes re-use, composting, and incentives as main measures that will contribute for reaching EU targets for Croatia. The results, however, have yet to be measured. Expected rise in the prices for waste collection and rise in gate fee (landfill fee) will bring additional burden to households with low sorting and recycling rate.

Most of WEEE is collected through nationally established free service, where citizens can call a toll-free number and arrange WEEE collection and disposal by authorized companies. The

system is in place since 2006, and showed good results within first 3 years of its implementation. According to official data 90% to 100% of set targets were accomplished each year since 2009, including WEEE produced in households.

Waste batteries can be disposed of in recycling yards or in almost all larger shops as they have waste battery containers. Used private car accumulators are recycled free of charge through national collection system similar to the one for WEEE. According to official statistics these goals are also 100% fulfilled. However, there are questions if the current data system is accurate. A current challenge is mobile phone batteries that are collected via specialized shops or recycling points, but there is lack of data on exact amounts of them.

RECOMMENDED MEASURES

- Improving “carrot and stick” system for motivating households for separation – incentives for waste separation as well as fines for mixing separate waste.
- Awareness raising of citizens on re-use and recycling.
- Increasing knowledge of consumers on existing collection systems and new incentives
- Active measures against illegal dumps.
- Promoting resource management instead of waste generation.
- Detailed analysis of municipal waste streams in order to have clear identification of the problems.

RECOMMENDED ACTIONS

- Each local service provider shall establish clear, measurable goals for waste management.
- Innovative payment systems should be developed together with citizens.
- Awareness raising campaign should be constant from kindergarten onward.
- Conducting constant national campaign that will promote re-use, recycling, and composting.
- Create and promote innovative deposit systems schemes.
- Establish re-use and recycle centres in major cities.
- Promote community base approach to re-use (second use of waste).
- Provide financial support to build community based re-use centres that would be points of citizen education.

6. HUNGARY

REGULATORY AND POLICY FRAMEWORK

Between 2003 and 2011 Hungary had one of the most effective EPR systems regarding packaging waste among the new EU members. Collection systems were set up, quantity of collection raised exponentially every year, financing of the waste sector was continuous. This resulted in the quick development of the collection and recycling industry, at the same time it assured the producers that their obligations are met. Due to the systematic changes in 2012, only a state-owned company, the National Waste Management Agency (NWMA) carries out the former Extended Producer Responsibility (EPR) tasks, most importantly the financing of the collection and treatment of wastes. Producers pay a tax (so called product fee) and, with the exception of the take-back obligation, they do not participate in the system and their responsibilities are merely financial. Out of the annual tax paid into the state budget, only 15-20% of the total amount is assigned to finance collections, treatment, communication and the development of the collection network and recycling technology systems.

NWMA operated for 3 years, and its integration with the State Environmental Protection Agency (SEPA) was ordered in 2015. Under the name of National Waste Management Directorate, NWMA and its tasks formed a semi-independent part of the SEPA. In 2016, SEPA was integrated into the regional governmental bodies and its tasks were taken over by the State Secretariat for Environment of the Ministry of Agriculture. After the election in April 2018, a new ministry was established and took over the tasks and employees of the former state agency. Now the Ministry of Innovations and Technology has a separate state secretariat for sustainable development that is partially responsible for waste management strategy and financing. Currently, at least three ministries are responsible for waste management and environmental protection (e.g.: environmental product fee – Ministry for Innovation and Technology; water treatment – Ministry of Interior; environmental authorities – Prime Minister's Office).

DATA

Due to the changes in the legal system, overall quantity of the packaging material put on the market has significantly increased from 2011 to 2012. Before that, the average quantity put on the market was constantly around 800 000 tons a years, while after that it went over 1 million tons. Collection quantities did not follow this tendency, According to the annual state reports of the National Collection and Recovery Plan, the amounts of material put on the market are increasing every year in all waste streams. While the overall amount put on the market was 1.023 million tons in 2012, it is expected that 1.297 million tons were on the input end in 2018. This is an increase by 27% under 7 years. The largest increase took place in glass where the state reports and plans show a 40% increase (2012: 107 000 tons; 2018: 144 000 tons). Plastics and paper both rose by 24% in this period (paper – 2012: 385 000 tons, 2018: 477 000 tons; plastics – 2012: 257 000 tons, 2018: 317 000 tons). Annual collection and recycling rates are not published since 2014. However, based on the fragmented information available, collections cannot follow the increase, especially in case of glass. Hungary is way under the obligatory EU level of 60%, the collection of glass stagnates on 34-35% for years. Development of a collection strategy is not planned for this

6.1. PROVIDERS OF SECONDARY RAW MATERIALS – WASTE MANAGEMENT OPERATORS

CHALLENGES

In 2012, the government of Hungary decided to change the waste system that relied on EU directives and best practices. The state took over the responsibilities usually carried out by Extended Producer Responsibility Organizations (EPR) based on the “polluter pays” principle. This was the first major change in the Hungarian waste management system. That was followed by the total rearrangement of the system of municipal solid waste collection and the separate collection of different wastes from households (MSW system). Taxation related to different waste stream (product fee) also changed. Since then the tendency of change is continuous. Fundamental and systematic changes in the legislation take place every year. This results in turbulent working environment for all stakeholders in waste management, including waste management operators. These modifications generate new organizational, financial and other challenges for the participants of the environmental sector every year. The new Law on Waste was modified approximately 25 times in the last 6–7 years.

The tendency of change is continuous

The collection and recovery goals set by the EU are getting higher by the circular economy waste package of 2018. Hungary still struggles to reach some of the less ambitious goals set earlier. In case of glass, the present target of 60% collection rate has never been reached; it is around 34–35%. Plastic collection rate is under 30%, and other waste streams are also far away from reaching their targets. However, without providing enough input materials to recyclers, it is impossible to make operators financially stable.

Financing the collection and recovery operations takes place through public procurements implemented by the Ministry for Innovation and Technology. Public procurement is a lengthy process, but is necessary in the present system since no state co-financing can be provided without it in the EU. As a result, the co-financing suffers from long delays, sometimes over a year, and collectors and recyclers face cash flow issues making it a non-reliable industry financially.

The co-financing suffers from long delays, sometimes over a year

As to waste packaging, the biggest problem is glass, as Hungary cannot fulfil the required EU recovery rate since 2012 (60% vs. 34–35%). The separate collection system started at the beginning of 2000 but because of the above mentioned changes its continuous development could not take place. Starting with collection bins on the streets, more and more door-to-door collection solutions were implemented in 2012. More and more collection islands were discontinued as a consequence. However, glass collection was not part of the new collection method that led to significant drop of collection rate of glass. Regarding plastics, Hungary’s recycling capacity is several times higher than the amount of collected plastic waste. It is even higher than the quantity put on the market as product.

As to WEEE, Hungarian people still use their houses as storage for WEEE. There is a common approach that waste electrical and electronic equipment can be used later. In this case it is difficult to explain the people that non-used waste electronic equipment is rather a hazardous waste than an outdoor flower stand.

Regarding WB&A, small batteries have a rather big collection network with over 35 000 collection bins. However, the level of collection is low as the small items are usually discarded as MSW.

RECOMMENDED MEASURES

- In order to fulfil the new goals of the circular economy waste package, the waste management sector shall have a stable legislative framework, a clear strategy with clear and long-term goals without drastic changes in the system or in its sub-system year-by-year.
- It also would provide a great advantage if sustainability questions, including the waste management system as a whole, would belong to one ministry,
- The financing of collection and recovery shall be reshaped to provide proper and timely support for collectors and recyclers.
- The collection rate of waste packaging should be increased or Hungary has to attract other input providers by showing Hungarian plastic recycling qualities as alternatives for non-EU export of this waste.
- Biodegradable plastics are still not collected separately, as we need to find out the best practice of its collection in order not to mix various materials that would cause non-recyclability.
- In order to increase the collection of WEEE, we need to spend more time and money for environmental awareness raising.
- Recycling of WEEE also shall be further developed as only pre-treatment of WEEE takes place in Hungary, leaving lot of resources out of the value chain.

RECOMMENDED ACTIONS

- The most important action is to create a long term strategy with clear goals per waste stream, based on a reliable and stable legislation system with one responsible ministry providing proper financing system and fair control mechanism.
- In case of glass it is essential to establish a new collection system, together with industrial and household waste collectors, and to find a motivation tool for waste management operators to deal more with this packaging waste.
- A comprehensive analysis is needed about the Hungarian plastic recyclers, including the types and quantities of plastic they can recycle. This information must be shared with DR countries to share our technology and knowledge for recycling our plastic waste in a more efficient way and in a site geographically closer.
- In case of WEEE the necessary action would be to improve the environmental awareness together with all stakeholders in order to change our citizens' way of thinking and to convince them to use the existing waste yards and get rid of their old habit and electric and electronic equipment.

6.2. PROCURERS OF SECONDARY RAW MATERIALS – PRODUCERS AND DISTRIBUTORS

CHALLENGES

Product fee has been a Hungarian “invention” from 2000. Based on the “polluter pays” principle, in case of certain products producers have extended responsibility to the post-consumer stage of their goods. Product fee is a tax to be paid by the producer based on the kilograms of certain goods put on the market in a given period of time. The fee is to be paid to the state out of which the state co-finances collection and treatment of the wastes of these goods through public procurements. Payment of the fee puts a great financial burden on producers, and only approximately 20% of the fee is used for financing collection and recovery. Although the quantities of products put on to market increase every year there is no incentive for producers to use secondary raw materials in this system. Although they would be the stakeholders whose decisions would reshape the material flows, no discount or special price on products meeting the circular economy criteria are offered.

There is no incentive for producers to use secondary raw materials in this system.

The lack of distinction between products that are more consciously designed, recyclable or reusable leads to minimum development of eco-design. Single-use materials and products are ubiquitously used. Deposit-refund systems are voluntary, and big breweries and the biggest wine company are operating such systems with mixed results in practice. Brewers reported a return rate of 45-47%, the wine company reached over 85%, but that is due to the standardized glass bottle and the high deposit (0,35 Euro/bottle).

Products subject to product fees include batteries, packaging products, other petroleum products, electric appliances and electronic equipment, tires, commercial printing paper, other plastic products, other chemical products, paper stationery. This means an incentive to producers to influence the production market to be more circular, to fund R&D, to design product with highly recyclable materials and to support re-use.

As the environmental product fee is a tax in Hungary, the producers and distributors have to take it very seriously. They have to have a transparent administration system and to be prepared for regular control by the National Tax Authority.

The producers' responsibility ends by paying the environmental product fee to the tax authority. There is no motivation for eco-design, producing “green” packaging, EEE or any other materials. There is lack of central financing of R&D neither to producers nor to recyclers, and there is no feedback about the recycling rates from the governmental side.

There is also a lack of real connection between the producers and the waste management operators that makes preparation for new products impossible for recyclers. This was clearly seen in case of CRT monitors and LED-Plasma and other monitor types. The recycling industry cannot prepare nor react in time for the non-environmental changes of production.

As real recycling mainly takes place for packaging waste streams, other waste streams shall be also given a priority to move from pre-treatment to recycling that in this case shall legally mean upcycling.

RECOMMENDED MEASURES

- Simplify the legislation based on the best practices of those EU countries that reach high collection and recycling rates.
- Building a communication path between producers and waste management operators would be needed to assure high level of recycling and good quality secondary raw materials that later could be reused by the producers in the production of goods instead of raw materials.
- Responsibility of the producers shall be more devised, including eco-design with real incentives towards R&D and the use of secondary raw materials.

RECOMMENDED ACTIONS

- Producers shall take part in the preparation of the product fee act and in the calculation of the product fee. The latter shall be based on collectability and recyclability, taken the product's hazardous feature to the environment into account.
- A Product Fee Committee shall be established with all the stakeholders in order to find a more efficient system to reach the common goals, to build a properly functioning system based on circularity, resource efficiency, internalization of externalities and based on facts and real waste figures.
- Improve the quarterly reporting system and responsibility takeover contracts of the producers to minimise their administrative burdens but assure good data.
- In the product fee act incentives shall be established for the use of secondary raw material and R&D related to this.
- A financing system for R&D activity of recyclers shall be set up to assure recycling technology is ready to take the challenge of the dynamically changing production technology.
- Building a proper communication channel between producers and recyclers would assure up-to-date information flows.

6.3. HOUSEHOLD AND B2B CONSUMERS

CHALLENGES

The Municipal Solid Waste (MSW) management system that shall operate separate collection of packaging waste is facing a country-wide challenge of under financing

The Municipal Solid Waste (MSW) management system that shall operate separate collection of packaging waste is facing a country-wide challenge of under financing at the present. Former incomes of the MSW providers are taken by a state institution and redistribution does not work properly.

There is no standardized system for collections neither in its form (door-to-door, selective islands, etc.) nor in the type of materials collected. Incentives do not exist on selective collection for households. Pay-as-You-Throw system is not in function meanwhile the costs for collection increase.

Door-to-door collection of several packaging waste streams was established in the last years. It offers high quality service to residents in several areas including Budapest, capital of the country. Even though the service operates without clear incentives and penalties residents misuse it, by putting mixed waste into bins dedicated to plastic and paper waste. On one hand, this means that about 40% of the separately collected waste is actually mixed household waste. On the other hand, it needs to be separated after collection what is expensive and provides less clean materials for recycling. No incentives or penalties are in place to solve this problem. Communication towards residents to promote proper usage of bins did not lead to clearer material or appropriate use of bins.

About 40% of the separately collected waste is actually mixed household waste

WEEE and other wastes other than packaging are not collected in a standardized manner either. Waste yards accept these wastes under different conditions. Bulky waste collections are usually accompanied by the destructive activity of the informal sector cherry-picking valuable materials from the wastes waiting for garbage truck and leaving damaged and costly trash on the streets.

Communication of the dynamic changes in waste management legislation resulted in a chaos and lack of interest and participation from the households.

No system can function without long term planning, proper incentives and efficient communication towards the citizens.

As for B2Bs, they are obliged to take the services of the appointed MSW service provider for their mixed, household-like waste. At the same time, they can choose and make contract with any licensed collector, treatment facility for their separated waste streams. B2B collection and recovery of separate waste fractions function well at the present. Multinational companies also pay a high attention to circular economy. They invest in special solutions and put financial and human capacities in R&D and industrial symbiosis to assure more resource efficient operations that generate less waste.



RECOMMENDED MEASURES

- A long term MSW strategy and its proper communication shall be carried out. Residents shall be given clear information on separate collection of wastes.
- Civic amenity sites shall be developed and operated with good locations to be easily reached and used by residents.
- Both positive incentives (PAYT) and negative penalties (extra fee for mixing separate waste) shall be put into practice to assure higher collection rates and clean waste streams for recyclers.

RECOMMENDED ACTIONS

- A long term MSW strategy with clear goals shall be communicated towards residents.
- Measurement of actually thrown away waste shall be solved.
- MSW service shall be paid by the residents after the actual quantity of waste generated, that is, Pay-As-You-Throw system shall be established.
- As mixing separate waste fractions jeopardizes upcycling of waste, this shall be prohibited and a financial penalty shall be established to these acts.

7. SLOVAKIA

REGULATORY AND POLICY FRAMEWORK

In Slovakia new Waste Act came into force in 2016. With 11 PROs managing packaging and WP until 2017, 11 PROs managing WEEE, 7 PROs and 4 so-called third parties for batteries and accumulators, the PROs were subject to competition for every waste stream. According to the Waste Act, these PROs must be non-profit and it also defined the conditions for establishing clearing house for each EPR waste stream (Bozic Cerar–Krošelj 2017, 73). Extended producer responsibility was imposed on producers and importers of electrical appliances, batteries and accumulators, packaging, cars, tyres, and other non-packaging products (e.g. paper, cardboard, glass). Obligations of waste producers include various duties related mainly to the responsibility to recover waste resulting from a product placed on the Slovak market. Producers can fulfil these obligations individually or collectively. In the first case producers are obliged to establish their own systems for handling the respective waste stream. They are required to obtain license directly from the Ministry of Environment to fulfil their obligations. In the second case producer obligations are fulfilled collectively through producers' organisation that has to apply to the Ministry of Environment for license (Bozic Cerar–Krošelj 2017).

In 2018, the Waste Act was amended in order to increase the amount of packaging and non-packaging waste collected separately. It has introduced the following issues: implementation of provisions on ship recycling; adjustment of procedures on illegally placed waste; changes in the special purpose financial reserve; cancellation of agreement obligation between a packaging producer and the respective coordination centre; introduction of collection targets for separate collection of municipal waste components (WP and waste from non-packaging products). The legislative proposal on fees for waste landfilling, amending the Act on Environmental Fund, aims to increase landfilling fees in order to reduce landfilling rate (MESR 2018b; NATUR-PACK 2018).

DATA

The amount of waste packaging put on the market increases constantly. In 2016, Slovakia put 512 000 tons of WP on the market, which is an increase by more than 70 000 tons in comparison to 2010. There is an average ratio of 42% of waste packaging sorting for glass and metals. Waste packaging recycling reaches an average ratio of 62% with highest value for metals, paper, cardboard, and glass, in all cases exceeding 60% (Dráb–Slučiaková 2018).

The State of the Environment Report for 2017 indicates that producers collected 29 829 589 kg of WEEE, which is 5.42 kg per capita. This amounts to 49% of the average weight of EEE placed on Slovak market in the past 3 years. WEEE recovery and recycling target values have been met since 2005 for all categories of WEEE. In addition, 1 103 54 tons of WB&A were collected in 2017, which is 91.1%, ensuring Slovakia has met the waste portable battery collection target (MESR 2018a).

Waste plastic is the most challenging and discussed waste stream in Slovakia nowadays. The country is currently considering introduction of deposit-refund system (DRS) for single-use beverage packaging (beverage PET bottles, aluminium cans). According to the study of the Institute for Environmental Policy, the system should generate 28 million Euros on the revenue side each year, while the annual operating cost estimated is 33.3 million Euros. The negative



balance should be paid by producers in form of administrative charges (Dráb–Slučiaková 2018, 5-6).

One of the challenges that hinder transition toward CiE on WEEE market is the end-of-waste criteria. Even though Slovak legislation allows preparation for reuse and reuse of used electronics, it hampers reuse of certain still functional components from discarded electronics to be applied in new or repaired products, when it was once labelled as WEEE. The terms preparation for re-use or re-use of discarded electronics only refer to used electronics in a complete and good conditions. The specifications for end-of-waste criteria for electronics and its components are missing.

One of challenges in transition towards CiE in Slovakia is the absence of coordination and interaction among policy-makers and other relevant stakeholders. The CiE topic is nowadays reflected mainly by the Ministry of Environment on the level of waste management which is leading the way towards circular transition. Eco-innovations should be supported by legislation related to R&D activities, production, consumption phase, covered by other national authorities, especially the Ministry of Education, the Ministry of Finance, and the Ministry of Economy. There are no fiscal measures dedicated directly to kick-start eco-innovations or support their implementation in Slovakia.

7.1. PROVIDERS OF SECONDARY RAW MATERIALS – WASTE MANAGEMENT OPERATORS

CHALLENGES

One of the biggest problems regarding waste management operators in Slovakia is availability of data. Detailed information on waste recovery operators is not freely available. Data has to be requested from the Ministry of Environment that prolongs provision of data. Data quality is also questionable for various reasons such as duplicate data reporting, poor data control, and human error factor. The Ministry is working on a new information system on waste management, the so called ISOH (*Informačný systém odpadového hospodárstva - Waste management information system*). First data input and output are scheduled for 2021 and 2022, respectively.

One of the biggest problems regarding waste management operators in Slovakia is availability of data.

In January 2019, the Ministry of Environment submitted a bill on deposit refund system (DRS) for single-use beverage packaging (beverage PET bottles and aluminium cans) in order to get closer to the EU binding targets. The main criticism of DRS lies in the absence of prior dialogue with relevant stakeholders while preparing the draft bill. The system raises many questions among waste management operators and other stakeholders including the concern of the outflow of high-quality material from Slovakia to other countries.

Due to higher prices of recycled materials, waste management operators (recyclers) face low interest of manufacturers in recycled materials. With the exception of PET, HDPE, glass, metals,

and paper, demand for recycled materials is also low due to high costs of recycling and current lack of application in production processes.

In case of WEEE, demand for recycled materials is affected by the low number of manufacturing companies compared to the number of distributors. In addition, although the public sector might have important role in creating market for secondary materials through green public procurement, the share of public orders procured in green way remains low.

One of the major challenges in Slovakia remains the landfilling tax, which is one of the lowest in the EU. Therefore, landfilling remains the most accessible way of waste recovery. Since the 1st of March 2019 a new law on landfill tax was released. Thanks to the new act, the currently low fees will be increased and will be based on the amount of waste generated by municipality and sent to landfill. Even though Slovakia is already taking steps in this area, it still belongs to countries with lowest landfill tax.

Landfilling remains the most accessible way of waste recovery.

In addition, capacity of the market to process and recover the current amount of sorted waste (beverage cartons, glass, metals, paper) is insufficient. Packaging waste is exported to other countries for recycling.

Similarly, as in the case of PPW operators, the use of composite materials and the low quality of used plastics in electrical equipment and stickers (e.g. on TV panels) hinder recycling of WEEE.

Slovakia has a well-established take-back collection system of e-waste in which customers can hand in their old EEE when buying new electric or electrical equipment (1:1). In case of very small e-waste and waste from light sources a take-back system is available free of charge. In addition, there are 375 collection yards operating all over the country. However, WEEE collection infrastructure is more than needed. This includes mobile WEEE collection (door-to-door), especially in smaller municipalities that do not have collection yards.

RECOMMENDED MEASURES

- When introducing the deposit system, Slovak processing companies should have preferential right to purchase deposited packaging. It is necessary to avoid outflow of high-quality material from the Slovak Republic - the situation in which retailers export PET produced in Slovakia to their own parent company, for example to Germany.
- Keep product value chain clean to increase quality and quantity of recycling by establishing support to enable better collection of waste.
- Implementation of the deposit refund system (DRS) needs to be carried out in line with the new Waste Act. The system might restrain the transition to CiE otherwise. Designing such systems should be done in cooperation with the respective PROs.
- Collection of all PET should be enabled, not only beverage packaging (with the exception of packaging that is subject to special hygienic requirements).

RECOMMENDED ACTIONS

- Optimising the distribution and use of containers for separate collection of specific waste

- streams (identification of generation points, types of waste, and level of separation).
- Creating uniform methodology for tracking waste quantity and waste streams in mixed municipal waste (by performing waste analysis in mixed municipal waste) and introducing obligation to carry out ongoing analysis.
- Support of take-back system for products and waste products, and introduction of local deposit system.
- Introduction of deposit system for single-use beverage containers (PET, Al and Fe cans, multilayer composite materials). Minimum percentage determination of reusable bottles (deposit reusable packaging) that the manufacturer must place on the market in proportion to single-use reusable packaging materials, or at least support of producers who meet the minimum criteria in the form of lower contributions to the EPR system.
- Establishing unified national data collection system on waste management, and making data sets publicly available.

7.2. PROCURERS OF SECONDARY RAW MATERIALS – PRODUCERS AND DISTRIBUTORS

CHALLENGES

Transition towards CiE is hampered by insufficient communication among individual players in Slovakia. With the exception of education and best practice examples, manufacturers lack a single contact point that would provide complex support to companies, a database of waste recovery operators in order to find potential partner or consumer for their wastes or by-products. That would create the opportunities for connecting producers and distributors with subjects representing other phases of product life-cycle. There is also a lack of financial incentives to accelerate transition towards CiE.

One of the commitments of the Slovak Republic towards the EU is to achieve a given level of Green Public Procurement (GPP). Slovakia should procure half of its public orders in green way by 2020, while nowadays it is far beyond achieving the goal (Szalai 2018).

In 2017, the average percentage of GPP of the total public procurement reached 3.25%, in value terms 6.43% of the total value of public procurement (GOSR 2018).

Value of public procurement bids amounts to high ratio of GDP (up to 20%). For this reason it should be taken seriously and be applied to a higher extent. GPP could favour eco-innovative companies and serve as a source of motivation for companies leading the way towards CiE.

Low demand for eco-innovative products and services

Low demand for eco-innovative products and services, low level of public awareness of this issue, and consumer behaviour among B2B or B2C consumers also have negative effects on creation of partnerships among producers and waste management operators.

The Ministry of Environment supports awareness raising campaigns focusing on education of youth and the general public via the Green Education Fund. The Ministry has launched the

online information platform “*Zelené hospodárstvo*” (“Green economy”). However, the low market demand for eco-innovation products and services is still significant in Slovakia (EIO 2018).

Higher price of secondary raw materials and insufficient information on origin and purity of recycled materials hinder the demand of producers for these materials. Wider use of recycled materials also requires adjustment of production processes, requiring specific training of responsible employees that results in lower interest in the use of recycled materials.

Producers do not see direct impacts of the service they pay for.

Regarding EPR, producers do not see direct impacts of the service they pay for. In addition, no incentives or motivation is provided for companies that wish to apply eco-design in their production process.

Manufacturers of electrical and electronic equipment point to contradiction among several laws on environmental requirements, energy efficiency, safety and functionality. Product innovation that is in line with CiE principles (miniaturization or eco-design) is limited by stringent standards resulting from product safety for example. Legislation also prohibits application of recycled materials in case of food packaging (e.g. plastics).

Introduction of bio-degradable materials made from renewable energy sources in the packaging sector faces innumerable economic and legislative barriers under Slovak conditions. Nevertheless the use of alternative bio-degradable packaging materials is on the rise. That draws attention to scarcity of adequate recycling infrastructure and immixture of bio-degradable packaging to plastic waste streams and their contamination during recycling process.

Manufacturers of packaging materials, on the other hand, have often no impact on how final packaging will look like and must respect the requirements of their client that decides about the type of material, its quality and design (Bozic Cerar–Krošelj 2017).

The Waste Prevention Programme (MESR 2018c), approved by the Government in February 2019, defines measures aiming at waste prevention or enhancing recyclability of plastic packaging.

RECOMMENDED MEASURES

- Building communication channel between producers and waste management operators would be necessary to ensure high level of recycling and secondary raw materials of good quality.
- Responsibility of producers shall be more elaborated, including eco-design with real incentives towards R&D and use of secondary raw materials.
- Promote financial support schemes and tools for investing in eco-innovative technology and infrastructure in waste management.
- Connecting and networking the whole value chain to improve design for better waste management
- Enable information support for SMEs and other businesses.
- Enable clearer regulation.



RECOMMENDED ACTIONS

- New financial schemes and risk capital to accelerate transition towards CiE are needed.
- Financial or non-financial support (reducing financial or non-financial burden) for companies conducting applied research in technologies towards circular future. Reinforcement of R&D partnerships in relation to a company and its value chain.
- Organise “Circular hot spot” or establish a platform offering SMEs complex support – all information they need for expansion on foreign markets, for changing business strategies (going circular), interconnecting organizations across the value chain, finding investors or appropriate funding at national or EU level, and for raising their circular business performance, and finding ‘circular’ business partner, etc.
- Ensure exchange of information among individual value chain stakeholders for identification and elimination of innovation barriers in EEE towards CiE. Manufacturers cannot innovate their products in line with the principles of CiE (miniaturization or eco-design). Product functionality and safety are first to focus on.
- Analysis and development of methodology for assessment of recyclability of products placed on the market.
- Use of green public procurement (GPP) to create demand for recycled content in plastic products by development of criteria for circularity (mandatory percentage of recycled content in products procured by the public sector).
- Lower fees to EPR system of products that are proven to be recyclable and/or repairable (certification required). Tax reliefs in form of reduced VAT for products with environmental labelling.
- Make assessment of enabling fiscal measures – tax relief, green tax reform, lower VAT for “green/circular” products, together with development of exact criteria or classification of what “green/circular” products are.
- Economic incentives - adjustment of the legislative frame, supporting awareness of benefits and necessity of using recycled plastics.
- Recognise, implement or prepare material and application of specific end-of-waste criteria to remove barriers for the free flow of secondary raw materials that are safe and of good quality.
- Continue with organizing seminars and/or workshops on topics related to CiE and funding options for CiE projects.
- Ensuring application of real-cost principles in all EPR systems and PROs (fees charged by PROs are based on real costs of collection, sorting and recovery of waste).

7.3. HOUSEHOLD AND B2B CONSUMERS

CHALLENGES

Collection system from the households is not harmonised – each municipality (more than 2900) has its own waste management system. Normally, glass packaging is collected separately in collection points that are scattered across a settlement, while rest of waste packaging streams are collected door-to-door.

Collection system from the households is not harmonised.

Because of large number of small municipalities, it would be advisable to create functional units. These units can effectively implement common strategies and solutions in waste management and in transition towards CiE.

Another difference identified at municipal level is material collection. Some municipalities collect

each waste packaging in separate container or bag, while others collect waste packaging in single container or bag. According to Circular Economy Institute (INCIEN), almost 50% of municipal waste consists of bio waste. Also according to INCIEN, measures have to be taken to increase the ratio of sorting of metal and beverage cartons packaging in Bratislava through information harmonisation in form of container labels and website (Maleš 2018).

Most efficient collection system in smaller municipalities proved to be the door-to-door one. Harmonization of collection is needed since there are still many municipalities with collection points that are scattered across the settlement.

Envirostrategy 2030, approved by the Government in February 2019, also counts with gradual deployment of Pay-As-You-Throw system in every municipality (IEP 2018). The system, rarely applied in municipalities currently, will create direct financial incentive for citizens to increase their sorting rate. In January 2019, gate fees (a charge levied upon a given quantity of waste received at a waste processing facility) for landfilling of mixed municipal waste were increased (Potočár 2018). Changes in gate fee and gradual introduction of PAYT system can put substantial financial burden on households with low sorting rate.

Substantial financial burden on households with low sorting rate.

The Waste Prevention Programme has introduced waste prevention as main priority of the Programme. It defines several measures to be taken to ensure awareness raising campaigns aimed at waste prevention and improvements in waste sorting and collection.

RECOMMENDED MEASURES

- Effective, transparent and motivating collection and sorting of waste at municipal level; comfortable collection system for residents (Door-to-Door system).
- Keep product value chain clean to increase quality and quantity of recycling by establishing support to enable better collection of waste.
- Increase awareness of consumers that the collection system for waste streams under EPR schemes are free of charge.
- Residents shall be given clear information on separate collection of wastes.
- Promote importance of circular economy principles among consumers.
- Measures against illegal dumps.
- Promote importance of shifting from waste to resource management. Educate and raise awareness in public administration and business community.
- Establish circular business model promoting reuse and refurbishment.
- Analysis of municipal waste samples for detecting problem commodities.
- Measures to separate valuable waste streams (PET, metals, etc.) from mixed waste ending in landfills or incineration plants, e.g. by introducing take-back/deposit systems.
- Initiate clear measures distinguishing industrial waste from municipal waste in EPR system.

RECOMMENDED ACTIONS

- Establishment of Pay-As-You-Throw system that will create clear financial motivation for households to increase their sorting rate.
- Replacement of collection points in smaller municipalities with more effective kerbside collection system that will increase quality and quantity of municipal waste collection.

- Clear container labelling and waste sorting information as every municipality has its own system. Special focus on district and regional cities where a substantial fluctuation of people to work and school takes place. Ensure that each school has access to effective sorting infrastructure and takes steps to waste prevention.
- Organise nationwide campaigns (including schools) on importance of waste prevention, litter reduction, promoting reuse, repair, and refurbishment, etc. Focus on adult education by organizing workshops, information campaigns, and discussion forums with best practice examples.
- Clear and accurate campaign to inform consumers and society about the impossibility to recycle certain materials.
- Promote reuse by establishing deposit system for multiple uses; promotion of sharing economy models or access instead ownership of EEE (household appliances, printers, etc.)
- Financial support for building reuse centres, libraries of things, no-packaging stores and local deposit systems.
- Electronic registry of the amount of household waste (e.g. marking waste bins with QR codes, GPS, or RFID) for complex overview and to save costs.
- Actions to fight illegal dumps: higher financial penalties, installation of lighting and camera system near to dumps.
- Introduction of two price lists into the system: one for the cost of municipal waste, and the other for industrial waste.
- Collection based on real statistics on waste production - according to container capacity, and not to residency of inhabitants.
- Development and unification of waste analysis methodology; regular analysis of mixed municipal waste and waste streams subject to EPR.

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Slovak Business Agency also conducted interviews with various stakeholders that served as a valuable first-hand source of information for the Road Map's chapter dedicated to Slovakia:

- Meeting with the representatives of PRO Reclay on 5th of February 2018.
- Meeting with the representatives of PRO ENVIDOM on 21st of March 2018.
- Meeting with representatives of Faculty of Chemical and Food Technology, Slovak University of Technology on 27th of April 2018.
- Meeting with the representatives of recycling company OFIR on 18th of June 2018.
- Meeting with the representatives of recycling company Ekolumi on 19th of June 2018.
- Meeting with the representative of the Slovak Plastic Cluster on 31st of May 2018.
- Meeting with the representative of Ministry of Environment on 18th of October 2018.
- Meeting with representatives from SKC foundry on 12th of November 2018.

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“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.

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