Interreg CENTRAL EUROPE

Co-funded by the European Union

Circular WEEEP

# Transnational Action Plan for WEEEP-CE

## CTU

10 - 2024

# INDEX

# 1. ABREVIATIONS

| | |
|---|---|
| **AEE** | Electrical and Electronic Equipment (Manufacturers) |
| **AIA** | Integrated Environmental Authorization (Autorizzazione Integrata Ambientale) |
| **ARSO** | Environmental Agency of the Republic of Slovenia |
| **CEAP** | Circular Economy Action Plan |
| **CdC RAEE** | Coordination Centre for Waste Electrical and Electronic Equipment (Italy) |
| **CFC** | Chlorofluorocarbons |
| **CONAI** | National Packaging Consortium (Italy) |
| **CPU** | Center Ponovne Uporabe |
| **EARFD** | European Agricultural Fund for Rural Development |
| **ECA** | Environmental Consolidated Act |
| **EEE** | Electrical and Electronic Equipment |
| **EIA** | Environmental Impact Assessment |
| **EPA** | Environmental Protection Agency |
| **ERP** | Extended Producer Responsibility |
| **ERDF** | European Regional Development Fund |
| **ESI** | European Structural and Investment Funds |
| **EU** | European Union |
| **GDP** | Gross Domestic Product |
| **ICT** | Information and Communication Technology |
| **I``C** | Integrated Pollution Prevention and Control |
| **ISTAT** | National Institute of Statistics (Italy) |
| **MBT** | Mechanical Biological Treatment |
| **MiTE** | Ministry of Ecological Transition (Italy) |
| **MSW** | Municipal Solid Waste |
| **NGO** | Non-Governmental Organization |
| **NOPs** | National Operational Programs |
| **OPE** | Operational Programme Environment |
| **OPs** | Operational Programs |
| **OAT** | Optimal Territorial Area |

| | |
|---|---|
| **PAYT** | Pay-As-You-Throw |
| **PPWD** | Packaging and Packaging Waste Directive |
| **PRO** | Producer Responsibility Organisation |
| **RGOK** | Municipal Waste Management Regions |
| **RoHS** | Restriction of Hazardous Substances Directive |
| **ROPs** | Regional Operational Programs |
| **TOC** | Total Organic Carbon |
| **WEEE** | Waste Electrical and Electronic Equipment |
| **WFD** | Waste Framework Directive |
| **WMP** | Waste Management Plan |

# 2. INTRODUCTION

The **Circular WEEEP** project, under the Interreg Central Europe Program, is a transnational initiative aimed at addressing one of the fastest-growing waste streams in Europe: **Waste Electrical and Electronic Equipment (WEEE)**. The project's core mission is to design and implement policies to reduce, repair, recover, and reuse WEEE and plastic waste across Central European countries. By bringing together multiple regions and stakeholders from different countries, the project seeks to tackle the pressing environmental and logistical challenges posed by WEEE, which requires innovative and collaborative solutions that transcend national boundaries.

WEEE represents a significant environmental challenge in Central Europe, and its management has become increasingly urgent. According to the European WEEE Directive, the minimum collection rate for WEEE should be 65% of all equipment placed on the market in the preceding three years. However, due to differences in regulations, infrastructure, and enforcement across Central European countries, meeting this target has proven to be difficult. The illegal movement of WEEE between regions with differing regulatory frameworks further exacerbates the problem, often leading to suboptimal recycling and disposal practices, with harmful environmental and social consequences.

The project's ultimate goal is to create a Transnational Action Plan that incorporates the diverse legal, regulatory, and infrastructural contexts of the partner countries while ensuring that WEEE management becomes more sustainable and effective. This action plan, supported by various stakeholders, is key to achieving a unified strategy for Central Europe, allowing for the seamless integration of local, regional, and national efforts.

The **Transnational Action Plan** in the Circular WEEEP project serves as a cornerstone for achieving effective and harmonized WEEE management across Central European countries. The plan arises from the necessity to tackle the rapidly growing issue of WEEE, a key environmental challenge, and address the disparities in waste management approaches across different regions. These disparities are often rooted in the distinct national and local regulations governing WEEE in each country, leading to fragmented management strategies. Moreover, the illegal transfer of WEEE between regions with varying levels of regulatory enforcement exacerbates the problem, making transnational cooperation vital for addressing this issue comprehensively. The success of the Circular WEEEP project, and particularly the implementation of the Transnational Action Plan, hinges on the involvement of a wide range of stakeholders. Effective WEEE management requires collaboration not only between governments and public authorities but also with private companies, consumers, and civil society organizations. Each stakeholder group plays a critical role in ensuring that WEEE is managed sustainably, and their involvement is crucial for the development and execution of the project's goals.

- **Public authorities** are responsible for creating and enforcing the regulatory frameworks that govern WEEE management. Their role in the Transnational Action Plan is to ensure that local and national policies are aligned with transnational strategies, enabling coherent and effective WEEE management practices across borders. These authorities also ensure that WEEE collection and recycling targets are met, and that illegal shipments of WEEE are prevented.
- **Private sector** involvement is equally important, particularly manufacturers, retailers, and recycling companies. These actors are at the forefront of the WEEE lifecycle, from production to disposal, and their participation in circular initiatives is vital. Manufacturers must embrace eco-design principles that extend the life of electrical goods, making them easier to repair, reuse, and recycle. Retailers and recyclers need to be active participants in WEEE collection and recycling schemes, providing consumers with accessible options for proper disposal.
- **Consumers and civil society** also play a fundamental role in the success of WEEE management strategies. Consumer behavior—such as how people dispose of electrical goods and their willingness to participate in repair and reuse initiatives—directly impacts the effectiveness of waste management systems. Public awareness campaigns and education programs are critical for encouraging responsible consumption and disposal habits, ensuring that citizens are aware of the environmental impacts of WEEE and their role in reducing waste.

Transnational cooperation is essential in this context because WEEE management is not confined to national borders. The illegal movement of WEEE from regions with strict regulations to those with more lenient enforcement can undermine national efforts to manage this waste stream responsibly. Central Europe, with its highly interconnected economies and shared environmental challenges, provides a fertile ground for transnational efforts aimed at harmonizing waste management practices. The Transnational Action Plan aims to unify waste management criteria across borders, ensuring that WEEE is handled in a manner that prevents illegal activities and promotes a circular economy, in line with the EU Circular Economy Action Plan and the "Circular Electronics Initiative." This plan will encompass six localized Regional and Local Action Plans designed for each project area, offering detailed actions, calendars, and resource allocations tailored to the specific needs of each region. The development of these plans is a collaborative effort, supported by joint co-creation processes involving public authorities, technical experts, and stakeholders from the regions involved. This process ensures that the strategies are not only region-specific but also aligned with the broader goals of transnational cooperation, fostering the exchange of knowledge and best practices across borders.

The long-term implementation of the Transnational Action Plan is crucial for achieving sustainable WEEE management across Central Europe. The collaboration between regions and the sharing of best practices will help to overcome local challenges while contributing to the broader European objectives of waste reduction, resource efficiency, and the promotion of a circular economy. By fostering this level of transnational cooperation, the Circular WEEEP project not only addresses the immediate challenges of WEEE management but also paves the way for a more sustainable and cooperative future in the field of waste management across Europe.

# 3. NATIONAL AND REGIONAL REGULATORY AND POLICY FRAMEWORK

The regulatory and policy framework is a key element for the success of the Transnational Action Plan in the management of WEEE across Central Europe. This action plan focuses on compiling and comparing the existing regulations from the countries involved in the project consortium. By bringing together the diverse approaches each country has developed in line with their own regulatory frameworks, the plan will facilitate an environment where stakeholders can analyze and evaluate the strengths and weaknesses of each system.

The importance of this process lies in fostering a mutual learning opportunity among the countries. With varying levels of policy maturity, some countries may have already developed more efficient or innovative WEEE management practices, while others may face challenges due to less effective frameworks. By comparing policies, the Transnational Action Plan encourages stakeholders to adopt best practices from countries with stronger WEEE regulations and apply them in regions where policies are not as advanced or comprehensive. This comparison also promotes harmonization across the region, as it offers practical insights into how countries with weaker frameworks can improve their systems through the adaptation of existing successful models from their neighbours. This collaborative approach offers several benefits. First, it allows stakeholders to see which regulatory measures have proven effective in practice, offering real-world examples of how policy can drive better environmental outcomes in WEEE management. Second, it ensures that countries with less developed WEEE policies are not left behind but instead have access to a set of tested and proven policy solutions that they can implement to improve their waste management practices.

## 3.1. CZECH REPUBLIC

In the Czech Republic, the first Waste Act was established in 1991. Currently, waste management is regulated by Act No 541/2020 Coll., Waste, which is effective from 1 January 2021. The Act sets out the rights and obligations of persons in the field of waste management and promotes the basic principles of circular economy, environmental protection and human health in waste management. The management of end-of-life products, which includes e-waste, is regulated by Act No 542/2020 Coll., effective from 1 January 2021. In general, national legislation is always based on EU directives and regulations. This obligation derives from the Treaty on the Functioning of the EU.

The waste management programme is regulated by the *Waste Management Plan*, which is currently in force for the period 2015-2024 (Decree 352/2014 Coll.). The obligation to prepare a waste management plan for its territory (WMP) is laid down in Directive 2008/98/EC of the European Parliament and of the Council on waste. The plan is a key document for the implementation of a long-term strategy for the management of waste, packaging waste and end-of-life products. The main objectives of the strategy are clearly the transition to a circular economy, waste prevention, increased recycling, and material recovery.

The Packaging Act (Act No. 477/2001 Coll.) regulates the obligation to take back the recovery of packaging waste for entities that place packaging or packaged products on the market or in circulation, i.e. import, fill, import into the Czech Republic or sell.

In the Czech Republic, several positive aspects contribute to waste management:

- **Infrastructure Development**: Significant investments have been made in waste management infrastructure, including recycling facilities, waste treatment plants, and sorting facilities. This has improved the country's capacity to handle different types of waste.
- **Increased Recycling Rates**: The Czech Republic has been progressively improving its recycling rates. Efforts in public awareness campaigns and accessible recycling facilities have contributed to higher rates of recycling for various materials, including paper, glass, plastic, and metal.
- **Waste-to-Energy Initiatives**: The country has also invested in waste-to-energy initiatives, converting waste into energy through advanced incineration technologies. This helps in reducing the volume of waste while generating electricity or heat.
- **Legislative Framework**: The Czech Republic has established comprehensive waste management laws and regulations in line with EU directives. This framework sets standards for waste treatment, landfill diversion, and encourages responsible waste handling practices.
- **Circular Economy Promotion**: There's an increasing focus on the concept of a circular economy, aiming to reduce waste generation by reusing, repairing, and recycling materials. Initiatives supporting eco-design and encouraging the use of recycled materials in manufacturing contribute to this approach.
- **Waste Prevention Programs**: Efforts to minimize waste generation include awareness campaigns and programs promoting waste reduction at the source, encouraging practices such as composting, reducing packaging, and reusing items.

Overall, while challenges exist, the Czech Republic has made commendable strides in waste management, focusing on infrastructure development, recycling, waste-to-energy initiatives, and a circular economy approach to tackle its waste challenges effectively.

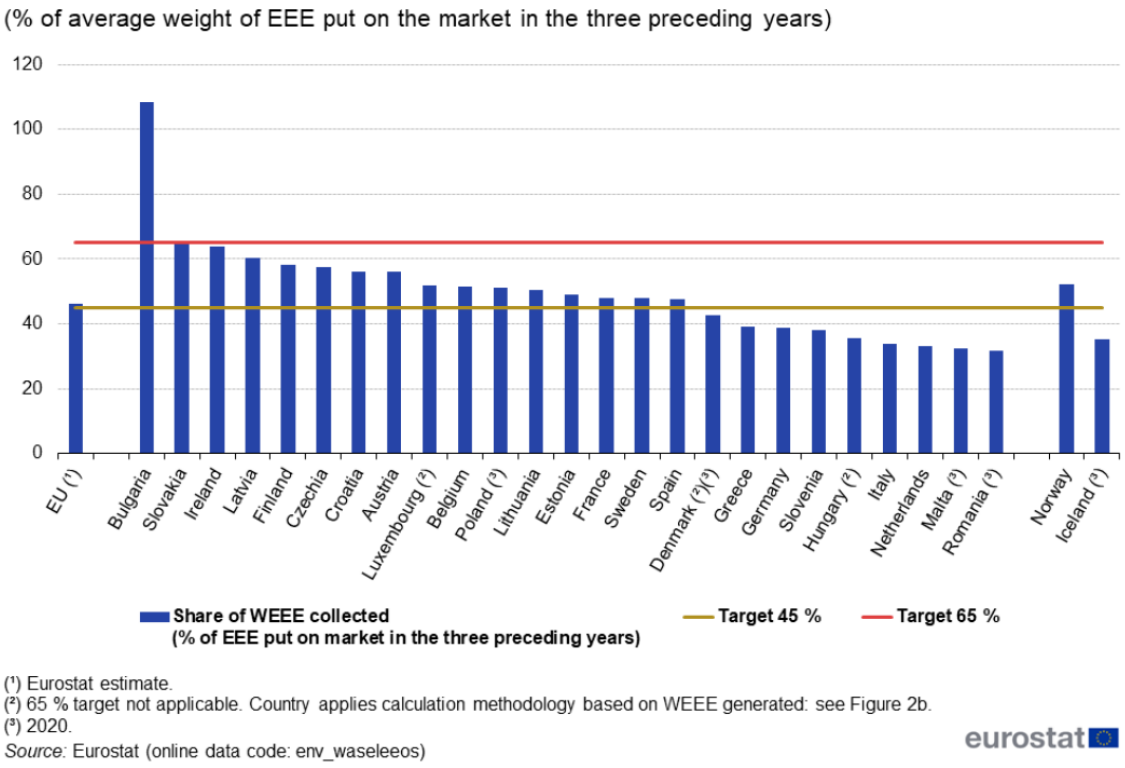
Certainly, waste management in the Czech Republic faces several challenges:

- **Landfill Dependency:** Despite progress, the country still heavily relies on landfilling for waste disposal. This can lead to environmental issues such as soil and groundwater contamination if not properly managed.
- **Low Waste Segregation Rates:** While recycling rates have improved, there's still room for enhancement in waste segregation. Insufficient separation of recyclables at the source can hinder effective recycling and increase the volume of waste sent to landfills.
- **Illegal Dumping and Littering:** Illegal dumping and littering in certain areas pose a problem. It not only affects the aesthetics but also harms the environment and wildlife, necessitating cleanup efforts and additional resources.
- **Waste Treatment Infrastructure:** While there have been investments, some regions may still lack adequate waste treatment facilities. Uneven distribution of infrastructure can hinder efficient waste management practices.
- **Challenges in Hazardous Waste Management:** Effective handling of hazardous waste, including proper disposal of electronic waste, chemicals, and medical waste, requires specialized treatment facilities and stringent protocols. Ensuring proper management of hazardous waste remains a concern.
- **Public Awareness and Participation:** Encouraging widespread public participation in waste reduction, proper segregation, and responsible disposal practices requires continuous education and awareness campaigns.
- **Regulatory Compliance and Enforcement**: Ensuring compliance with waste management regulations across industries and regions, as well as consistent enforcement of these regulations, can be challenging

### 3.1.1. General analysis of situation in the Country

In 2016, the Czech Republic had to achieve a minimum collection rate of 45 % of all WEEE, relative to the average weight of electrical and electronic equipment placed on the market in the preceding three years

(Directive 2012/19/EU, Article 7.1.). According to the derogation set out in Article 7.3. of the WEEE Directive, the Czech Republic among other countries could decide to postpone the achievement of the collection target until 14 August 2021. The average of the three preceding years has been calculated as WEEE collected divided by WEEE collection rate. Based on the data of the Ministry of Environment, the Czech Republic successfully achieved a collection rate of 55.7 % in 2021.



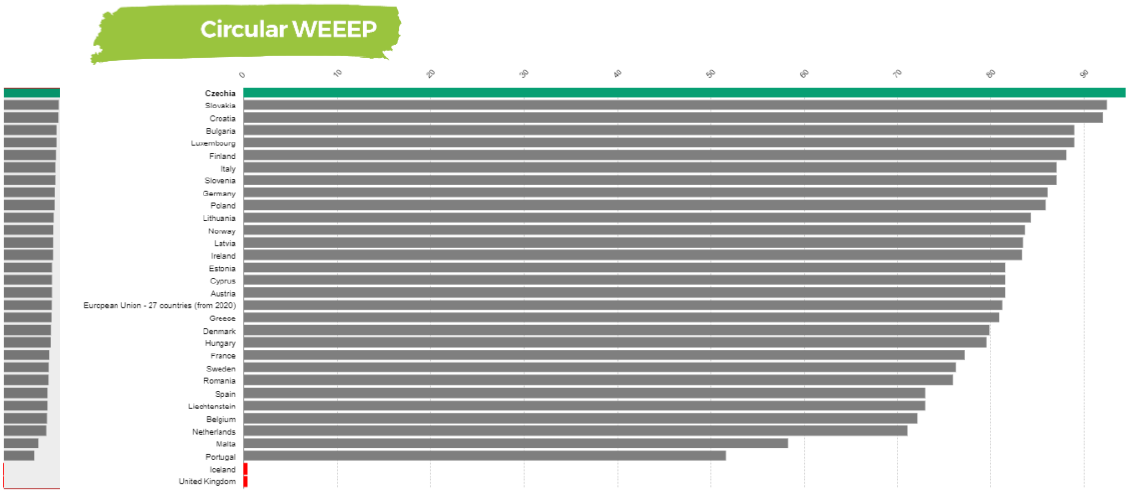

(1) Eurostat estimate.
(2) 65 % target not applicable. Country applies calculation methodology based on WEEE generated: see Figure 2b.
(3) 2020.
*Source:* Eurostat (online data code: env_waseleeos)

eurostat

*Total collection rate for waste electrical and electronic equipment in the EU, 2021 (Eurostat)*

The Waste Act sets targets to increase the level of preparation for reuse and recycling of municipal waste to at least 55 % of the total amount of municipal waste generated in Czechia by 2025, to at least 60 % by 2030 and to at least 65 % by 2035. Moreover, section 59 (3) of the new Waste Act stipulates new targets for separate collection to be met by municipalities. They are obliged to ensure that at least 60 % of the total amount of municipal waste generated is separately collected in 2025 and the following years, at least 65 % in 2030 and at least 70 % in 2035 and the following years. Section 95 of the Waste Act obliges municipalities to report on their waste production and management. The method of calculating the achievement towards the target for separate collection and the reporting form for municipalities to report on these targets are provided in Decree No. 273/2021 Coll. on the Details of Waste Management.

Based on the data of the Ministry of Environment, in 2021, the Czech Republic met the collection and recycling target of 94.5 % of the electrical waste separately collected. The Czech Republic has become the first country to reach such a high collection target.




*Recycling rate of WEEE separately collected in the EU, 2021 (Eurostat)*

In 2022, the non-profit company **ELEKTROWIN a.s.** had the highest collection of e-waste - 54,850 tonnes through its network of more than 14,000 collection points. Large household appliances, such as refrigerators, washing machines, dishwashers, boilers and cookers, accounted for the largest share of the total collection, followed by a large number of small appliances. In addition, at the end of the year Elektrowin received a decision from the Czech Ministry of the Environment authorising it to operate a collective system for all groups of waste electrical equipment. The company thus confirmed that it meets all legal requirements arising from the new legislation.

Elektrowin's collection results last year were the highest in the company's history. In the course of its 17 years of existence, Elektrowin collected and delivered 571,000 tonnes of old electrical appliances to contractual processors for recycling, which represents approximately 32 million electrical appliances. The total weight of the electricity collected is equivalent to that of 78 Eiffel Towers.

### 3.1.2. Main actors in the policy

***Development of the take-back of electrical equipment and separate collection of electrical waste since the year 2006***

In the period under review, from 2006 onwards, the quantity of products placed on the market initially followed an increasing trend (2006-2008). In the following period, the quantity of products placed on the market was affected by two waves of the economic crisis (2010 and 2012). Consumers and end-users purchased electrical equipment to a very limited extent. From 2013 onwards, the quantity of products placed on the market increased again until 2016, when the quantity of electrical equipment placed on the market was around 175 000 t/year. In the following years, the upward trend continued and in the reference year 2021 the quantity of EEE already exceeded 301 000 t.

***Subsidies in the area of e-waste***

Waste management is also influenced by subsidies. The inequality of possible support for individual technologies and individual applicants creates an unequal market environment. The high level of support for municipalities and for companies owned 100% by public entities may lead to a strengthening of the role of municipalities in waste management. Subsidies for selected applicants and selected types of projects act as an intervention tool in market environment, which can steer the functioning of the market in the desired direction. One of the main providers is State Environmental Fund.

***State Environmental Fund of the Czech Republic***

This Fund is provider of financial support in the area of the environment, respectively in the environment protection. One of the main programmes for this area is Operational Programme Environment (OPE). During the 3rd programme period, 2021-2027, it will be provided in the Czech Republic with approximately 61 billion CZK (2,5 bil. EUR) from EU funds (the European Regional Development Fund and Cohesion Fund). OPE focuses on the areas of support in the form of six specific objectives. One of the objectives is circular economy with the allocation about 7,1 billion CZK (296 mld. EUR).

Benefits of the support are waste prevention and reduction, minimising adverse effects on human health and the environment from waste generation and management, increasing the capacity of facilities for energy and material recovery of waste, increasing the quality of sorting and improving the recoverability of sorted waste or Extension of product lifetime. In the context of e-waste, only one supported activity is of interest, namely RE-USE centres for product re-use including activities for repair and life extension of products. For a subsidy can apply e.g. municipalities and regions, research institutions or universities, business companies. The amount of support in this case is up to 95 %.

***Recycling fee***

The Act on end-of-life products (542/2020 Coll.) imposes an obligation for the collective system operator to ensure the operation and financing of the collective system based on the contributions of the producers with whom it has entered into a collective performance agreement. Contributions are determined by the operator of the collective system depending on the type, weight, volume and eco-modulation of the selected products that the manufacturer puts on the market.

When selling new electrical equipment, the manufacturer of electrical equipment, the distributor and the last seller are obliged to state, separately from the price of the electrical equipment, the costs for the return, processing, use and disposal of waste electrical equipment, which pertain to one piece of new electrical equipment or one kilogram of new electrical equipment, in particular in the form of separate data on the tax document according to the Value Added Tax Act (Act No 235/2004 Coll.)

Determining the amount of the recycling fee differs depending on whether the producer fulfills his obligations in a collective or individual system.

Legal regulation has made the system more transparent for the consumer, who, according to the above contribution, will realise the value and cost of ecological recycling of the product. It has also greatly simplified checks on whether there is price discrimination against small and medium-sized producers - so that all producers in one collective system pay for the same type of electrical equipment the same recycling contribution.

The costs associated with the environmental recycling of end-of-life products are not small, and this way of reporting them will help to detect so-called free riders, i.e. producers or importers who try to avoid paying the recycling contribution.

***Take-back system***

One of the main instrument for waste management is the take-back system of WEEE. This system is mentioned in WEEE Directive, in the Czech legislation is described under the End-of-life product Act (Act No. 542/2020 Coll.) The manufacturer of electrical equipment shall:

a) provide without link to the purchase of new products and without charge for the take-back of waste of electrical and electronic equipment from households,
b) achieve in each calendar year a minimum level of take-back of waste electrical and electronic equipment in the range set out in Annex 2 to this Act; this obligation shall not apply to producers of electrical equipment who fulfil the obligations under this Act exclusively for solar panels.

In the table you can see the minimum level of take-back of end-of-life products in each year (Annex 2 of Act No. 542/2020 Coll.)

| | 2021 | 2022 AND THE FOLLOWING YEARS |
|---|---|---|
| | % | % |
| E-waste (all categories) | 65 | 65 |
| waste electrical equipment of group 1 | 65 | 65 |
| waste electrical equipment of group 2 | 65 | 65 |
| waste electrical equipment of group 3 | 65 | 65 |
| portable waste batteries and accumulators | 45 | 45 |

In the Czech legislation these criteria for the minimum recovery targets are described in the Annex 3 of *End-of-life products Act* (Act No. 542/2020 Coll.). The same indicators are set out in Regulation No. 352/2014 Coll (*Waste management plan*).

The Packaging Act regulates the take-back obligation. EKO-KOM, a joint-stock company, has been providing packaging take-back and packaging waste management in the Czech Republic since 1997. It is an authorized packaging company, which ensures the fulfillment of the Packaging Act and carries out its activities on the basis of the decision on authorization of the Ministry of the Environment.

All packaging belonging to the eco-com system is marked with a “GREEN DOT” or “EKO-KOM” label.

The brand GREEN DOT is a trademark. Labelling a packaging with the GREEN POINT mark means that a financial contribution has been made to an organisation providing take-back and recovery of packaging waste for that packaging. The brand GREEN DOT is a trademark. Labelling a packaging with the GREEN DOT mark means that a financial contribution has been made to an organisation providing take-back and recovery of packaging waste for that packaging. The label EKO-KOM has the same meaning as “GREEN DOT”

### 3.1.3. National and regional education strategies

WEEE education and awareness raising and environmental consulting are important preventive instruments within the State Environmental Policy of the Czech Republic. The purpose of WEEE education is to encourage the population to act and think in line with the sustainable development principles, to be aware of their responsibility for the maintenance of the environmental quality and to respect life in all its forms.

Above all, environmental education is an indispensable tool within the lifelong learning process. Its benefits consist in the gaining of knowledge, including the latest research results and scientific findings, new legislative regulations, outreach methods and application of knowledge and experience in the professional or private spheres. The principal task of education is systemic work with the young generation (including pre-school children) in order for them to adopt the values and patterns of conduct required for environmental protection and management. The tasks of awareness raising are largely informative and focus on the adult population and the public in general.

Information support and education is measure of *Waste prevention program* which is included in *Waste management plan* (Regulation No. 352/2014 Coll.). This prevention program is on the basis of Directive 2008/98/EC of the European Parliament and of the Council, on waste. The waste prevention program extensively affects various sectors of the Czech economy, touching not only the waste management sector, but also the mining and manufacturing industries, service design, educational outreach, public and private consumption. It also reflects efforts to reduce the consumption of primary raw materials and energy. This dimension had to be taken into account when drawing up the objectives and measures. The objectives and measures are therefore set in such a way that their effect is effective.

Comprehensive information support on the issue, including the introduction of waste prevention into school curricula, research programs and educational activities related to the protection and creation of the environment, is to be provided throughout the implementation of the program. But one of the sub-objectives of this plan is also to promote the use of service centers and organizations to extend the life and reuse of products and materials.

***Information, education and awareness-raising measures:***

- waste prevention issues at all levels throughout the implementation of the program.
- technically ensure the dissemination of information and awareness-raising programs in order to gradually increase the amount of electrical and electronic equipment taken back and to reduce the production of waste from these products. Promote the creation of an information network of service centers for the repair and continued use of EEE for its original purpose, including the preparation of rules for their operation and a system for their certification. Ensure the development and dissemination of a guide for citizens on how to optimize the purchase and use of EEE in terms of potential waste generation.
- within the framework of the Environmental Education, Education and Awareness Program, to ensure the development of study material on waste prevention and its subsequent practical integration into the school curriculum in order to raise awareness of the issue.
- within the framework of the activities of collective systems and product take-back systems, to ensure the expansion of waste prevention activities among all the entities concerned, in particular through information campaigns focusing on raising awareness among the general public
- Promote targeted support and promotion of credible environmental labels and low-impact products with the goal of gradually increasing the number of National Ecolabel Program guidelines and licenses.

One of the companies of the collective system (Rema system a.s.) also deals with environmental education as part of its activity. On their education website www.chytrarecyklace.cz (“clever recycling”), the issue of electrical waste is clearly and concisely described, it is succinctly explained why it is good to recycle old electrical equipment. You can also find a step-by-step guide on how you can e-waste recycle.

This company has a certified education program “*Waste is not to be discarded*”. This program focuses on environmental education for children in kindergartens and primary schools. Through the program, pupils will learn in an entertaining way everything important about waste prevention through responsible consumption, the correct management of end-of-life appliances, the importance of recycling waste electrical equipment and the related environmental protection.

*Education website “clever recycling” (https://www.rema.cloud/projekt/chytra-recyklace)*

## 3.2. SLOVENIA

A new Waste Management Programme and Waste Prevention Programme of the Republic of Slovenia has been adopted in April 2022 (Government Decision No. 35405-17/2021-2550) This programme is a revision of the Waste Management Program and Waste Prevention Program of the Republic of Slovenia of 2016 (Government Decision No. 35402-1/2016/6).

The Programme adopted in 2022 covers the whole territory of Slovenia, and it is intended to implement the obligation to draw up waste management plans under Directive 2008/98/EC on waste, Directive 94/62/EC on packaging and packaging waste, Directive 1999/31/EC on landfills and the drawing up of waste prevention programmes under Directive 2008/98/EC on waste. It contains separate chapters on municipal waste and on packaging waste.

In Slovenia, the regulations and directives governing the management of WEEE, batteries, accumulators, and related waste are correctly listed and valid. Here is an updated overview:

1. Directive 2012/19/EU of the European Parliament and of the Council on Waste Electrical and Electronic Equipment: This directive governs the management of WEEE at the EU level, including targets for the collection, treatment, recycling, and disposal of WEEE. In Slovenia, this directive has been transposed into national legislation.
2. Directive 2006/66/EC of the European Parliament and of the Council on Batteries and Accumulators and Waste Batteries and Accumulators: This directive sets requirements for the management of waste batteries and accumulators and their hazardous substances. This directive has also been transposed into Slovenian legislation.
3. Decree on Waste Electrical and Electronic Equipment (Official Gazette of the Republic of Slovenia, no. 55/15, 47/16, 72/18, 84/18 – ZIURKOE, 108/20, and 44/22 – ZVO-2): This decree establishes the obligations of producers, importers, and distributors of WEEE regarding the collection, treatment, and disposal of WEEE in Slovenia.
4. Regulation on the Management of Batteries and Accumulators and Waste Batteries and Accumulators (Official Gazette of the Republic of Slovenia, no. 3/10, 64/12, 93/12, 103/15, 84/18 – ZIURKOE, 101/20, and 44/22 – ZVO-2): This regulation governs the management of batteries and accumulators, including their collection, treatment, and disposal according to the law.
5. Decree on Waste Grave Candles (Official Gazette of the Republic of Slovenia, no. 25/19 and 44/22 – ZVO-2): This decree regulates the collection and treatment of waste grave candles.
6. Environmental Protection Act (Official Gazette of the Republic of Slovenia, No. 39/06 - officially consolidated text, 49/06 - ZMetD, 66/06 - decision of the Constitutional Court, 33/07 - ZPPlan, 57/08 - ZFO-1A, 70/08, 108/09, 108/09 - ZPPlan-A, 48/12, 57/12, 92/13, 56/15, 102/15, 30/16, 61/17 - GZ, 21/18 - ZNOrg, 84/18 - ZIURKOE, 158/20, and 44/22 - ZVO-2): This is the fundamental

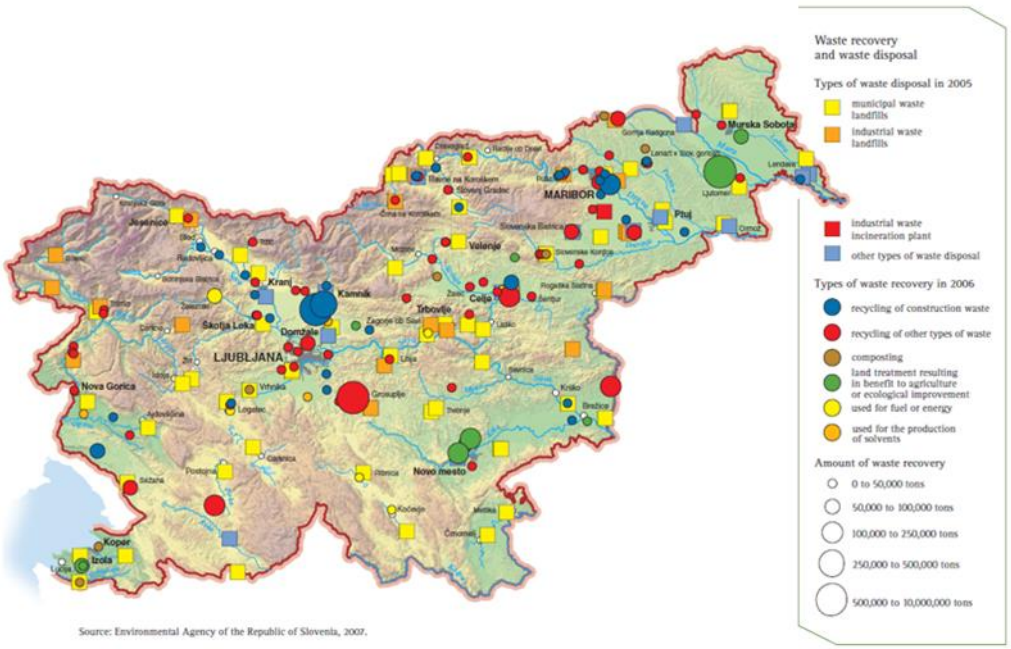
act that regulates environmental protection in Slovenia, including waste management, environmental charges, and environmental responsibility.

7. Waste Regulation (Official Gazette of the Republic of Slovenia, No. 37/15, 69/15, 129/20, 44/22 - ZVO-2, and 77/22): This regulation sets out the general conditions for waste management, including the treatment and disposal of waste in Slovenia.
8. Regulation on Environmental Charges for Environmental Pollution Arising from the Generation of Waste Electrical and Electronic Equipment and Waste Portable Batteries and Accumulators (Official Gazette of the Republic of Slovenia, No. 84/18 and 44/22 - ZVO-2): This regulation defines the environmental charges that producers must pay for the generation of this waste.
9. Regulation on Environmental Charges for Environmental Pollution Arising from the Generation of Packaging Waste (Official Gazette of the Republic of Slovenia, No. 32/06, 65/06, 78/08, 19/10, 68/17, 82/18, and 44/22 - ZVO-2): This regulation governs charges for environmental pollution caused by packaging waste.

All the listed regulations and decrees are in line with European directives and national requirements for environmental protection and sustainable waste management in Slovenia.

**Positive aspects of Slovenia's performance include the following:**

- An updated waste management plan for Slovenia is due to be adopted early next year including the waste prevention plan which was not previously in place.
- Legislation to ensure separate bio-waste collection is in place and door to door collection systems have now been implemented in areas all municipalities. This dictates certain aspects of the collection system, such as the frequency of collection points. However, many authorities have put in place collection systems that exceed the requirements of the legislation, and some areas such as Ljubljana are performing very well. There is a very active NGO sector and as a result of this, a number of areas (including the city of Ljubljana) have developed Zero Waste policies, with more currently working towards the same achievement.
- There has been some introduction of pay as you throw systems, although the approach taken is a relatively simple one, focusing on the application of charges to the residual and biowaste bins.




*Waste recovery and waste disposal in Slovenia. Source Environmental Agency of the Republic of Slovenia.*

**Potential issues include the following:**

- The governance of EPR schemes could be improved: local authorities bear a significant proportion of the cost of the EPR systems in respect of the separate collection system, and the EPR costs also do not cover the material collected through residual waste element or that which ends up as litter. Furthermore, there are indications that the packaging actors are not reporting the data correctly and that there is a considerable amount of packaging waste for which the producers are not contributing financially.
- There is a general lack of financial incentives to improve performance at a local level, with no fines or sanctions imposed at a local level if recycling targets are not met.
- Although a landfill tax is in place, the level of the tax is still relatively low, and there is no levy or tax on other forms of residual waste treatment, including thermal treatments or outputs from MBT systems other than those destined for landfill.
- Prices for key aspects of the system such as waste treatment are fixed by government, and local authorities do not have freedom in respect of setting charges for waste collection and treatment.
- There is a preparation for reuse target, but it is not clear what supporting measures have been put in place to ensure this is met.
- The data on waste management is lacking in clarity, and some work needs to be done to improve transparency. In some cases, there are issues of consistency between different sources, it is difficult to interpret the approach undertaken when deriving the figures, and some definitions used by the statisticians are not clearly indicated. Following on from this, concerns about the quality of the recycling data have been raised by court of auditors. The performance data on biowaste collection systems is also unclear. This means it is difficult to be sure how good performance of the systems currently is, and thus the extent to which the targets have actually been met. It is also unclear how much treatment capacity will be needed in the future for the treatment of biowaste.

### 3.2.1 General analysis of situation in the country

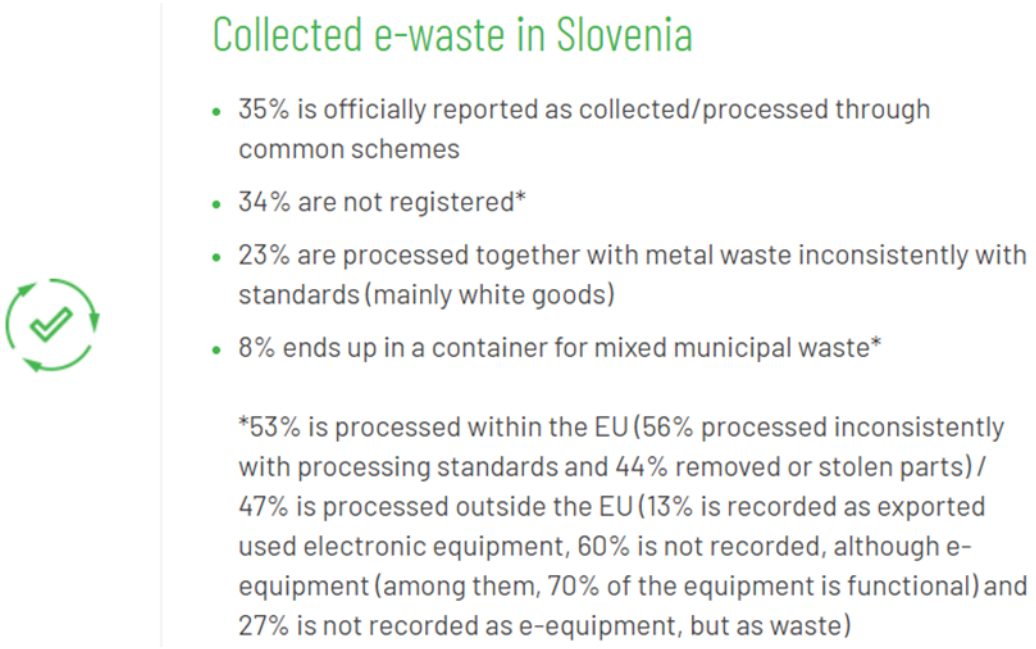
A new Waste Management Programme and Waste Prevention Programme of the Republic of Slovenia has been adopted in April 2022 (Government Decision No. 35405-17/2021-2550) (Ministry of Environment and Spatial Planning Slovenia, 2022). This programme is a revision of the Waste Management Program and Waste Prevention Program of the Republic of Slovenia of 2016 (Government Decision No. 35402-1/2016/6) (Ministry of Environment and Spatial Planning Slovenia, 2016).

The Programme adopted in 2022 covers the whole territory of Slovenia, and it is intended to implement the obligation to draw up waste management plans under Directive 2008/98/EC on waste, Directive 94/62/EC on packaging and packaging waste, Directive 1999/31/EC on landfills and the drawing up of waste prevention programmes under Directive 2008/98/EC on waste. It contains separate chapters on municipal waste and on packaging waste.

The types of waste to be covered in the new plan include: municipal waste, paper, kitchen waste, plastic, glass, metals, bio-waste, textile, wood, oil, WEEE, non-biodegradable waste, hazardous waste (batteries), and others. However, a recent review of the draft WMP suggested this was not compliant with the WFD, as required information on waste shipments and special arrangements (waste oils and hazardous wastes) had not yet been included.

The legislative target for 2022 - to collect 65% of WEEE, based on the average quantity of EEE placed on the market in the Republic of Slovenia in the past three years - was not achieved. Despite the fact that the mass of collected WEEE quantities is higher than in 2021, reaching the legislative target collection rate is challenging due to the calculation methodology. It takes into account the amount of EEE placed on the market in the past three years, which is constantly and rapidly increasing, while WEEE is generated in

accordance with the equipment's lifespan, which is longer than three years. Therefore, the focus remains on constant and systematic work with collectors, public service providers, and effective awareness-raising and collection campaigns throughout the year and across the entire territory of Slovenia is crucial.




Collected e-waste in Slovenia. Source: https://www.zeos.si/en/domov/

Data shows that the collected quantity of WEEE in Slovenia is growing linearly, while the quantity of new equipment put on the market is growing exponentially. The latter has doubled since 2012.

Despite ever-emerging solutions, increasing public awareness, and the expanding and more efficient collection network, it is impossible to ensure a collection increase capable of keeping up with such intensive growth in the quantities of new appliances and equipment entering the market. Waste is generated according to the period of use, which is mostly three years, leading to an unattainable gap.

This gap is also influenced by photovoltaic panels, classified as WEEE, where ZEOS record significantly increased quantities put on the market, while their lifespan is extremely long. Additionally, challenges arise from the accumulation of WEEE in households, illegal and unregistered collection of e-waste, illegal removal of valuable components and materials from e-waste, and illegal export of e-waste from the European Union.

### 3.2.2. Main actors in the policy

***Center Ponovne Uporabe (CPU doo SO.P.)***

The fundamental strategic goal of CPU doo SO.P. is the production of innovative products from discarded equipment and potential waste for the purpose of improving the lives of people, especially low-income families, people with special needs, and people who want to use multifunctional products in their homes, made according to the principle of a closed circle. The importance of this type B social enterprise lies in the creation of new, necessary, market-interesting products with a low ecological footprint, which are manufactured exclusively according to the REUSE principle, i.e., without burdening the environment and consuming new raw materials with the possibility of use for the purposes of improving the quality of life for people with special needs.

The company is established as a type B social enterprise in accordance with the 8th (eighth) article of the Social Entrepreneurship Act (ZSocP) and is established for the employment of persons specified in the 6th (sixth) article of the Social Entrepreneurship Act (ZSocP) in such a way that performs its entire activity by permanently employing at least a third of these workers out of all employed workers. The company occasionally includes volunteers in its activities. The company operates according to the principles and requirements set forth in Article 4 (fourth) of the Social Enterprise Act (ZSocP) in such a way that its public benefit and social character are guaranteed.

Reuse centers in Slovenia add value to products that would otherwise be thrown away, and the added value is changing consciousness in the direction of awareness of social responsibility, which also solves the problem of handling waste and resources in the country?

CPUs primarily contribute to waste prevention, preparation for re-use and re-use. From the perspective of a sustainable approach to saving resources, it is crucial to preserve the resource. Most products come to Slovenia. Their task is to preserve these resources, raw materials. They focus on the material flow of bulky waste, electronics, clothing, furniture, and other discarded products. Products that are recognized as waste are directed to preparation for reuse and then to further use.

This requires a complete logistics system. They collect, prepare, organize and make something out of products that are someone else's waste. The easiest is to collect. But then what to do anew, to create? That it will be attractive, that it will have added value and that the product will be of market interest. In today's world of globalization, it is not so easy to make something convincing and, of course, cheap. Cheap means that, in addition to the gross hourly rate, it is necessary to add costs such as rent, operation, licenses... The product must be competitive. The comparability of labor costs in our country or in countries further east is redundant.

The same in a different way. The product has already fulfilled its mission. With them, it gets a new function and a different look with creative solutions. Given that they employ vulnerable groups, they encourage the creativity of their employees.

The primary thing is to train employees to be ready for new challenges and to find themselves in different situations. To familiarize themselves with the latest techniques, trends, and also economic views on how to work with quality. Managers are responsible for the operational part. They follow trends and are connected to their partners with whom they collaborate on projects. They listen to what people are looking for, what they want, what they expect. They are always doing something that is not yet on the market. They cannot compare themselves with manufacturers and suppliers from third world countries, but they make products that they do not supply. These are unique products. People are looking for products for birthdays, for personal use, they want something different. Textile products are very cheap in their centers. In a consumer society, everyone can buy everything and quickly throw it away. They transform such products and add something to them, take something away and get a new product.

***ZEOS***

It was established that, in accordance with the requirements of the WEEE Regulation, the holders of joint plans maintain lists of producers and records of collected and submitted for processing and processed WEEE, that the parties have properly drawn up joint plans and that all report to the Environmental Agency of the Republic of Slovenia (ARSO) on time and shares of collected and processed WEEE by individual EEE classes in the previous calendar year.

It was also established that in 2018, some holders of joint plans collected and processed a larger, and others a smaller share of WEEE than prescribed in the Resolution of the Government of the Republic of Slovenia (RS) for 2018.

ZEOS was established on the basis of the requirements of Directive 2002/96 / EC of the European Parliament and of the Council on waste electrical and electronic equipment of 27

January 2003 and the decision of manufacturers / acquirers / importers of electricity equipment in Slovenia to fulfil their environmental obligations extended producer responsibilities in the form of a common scheme.

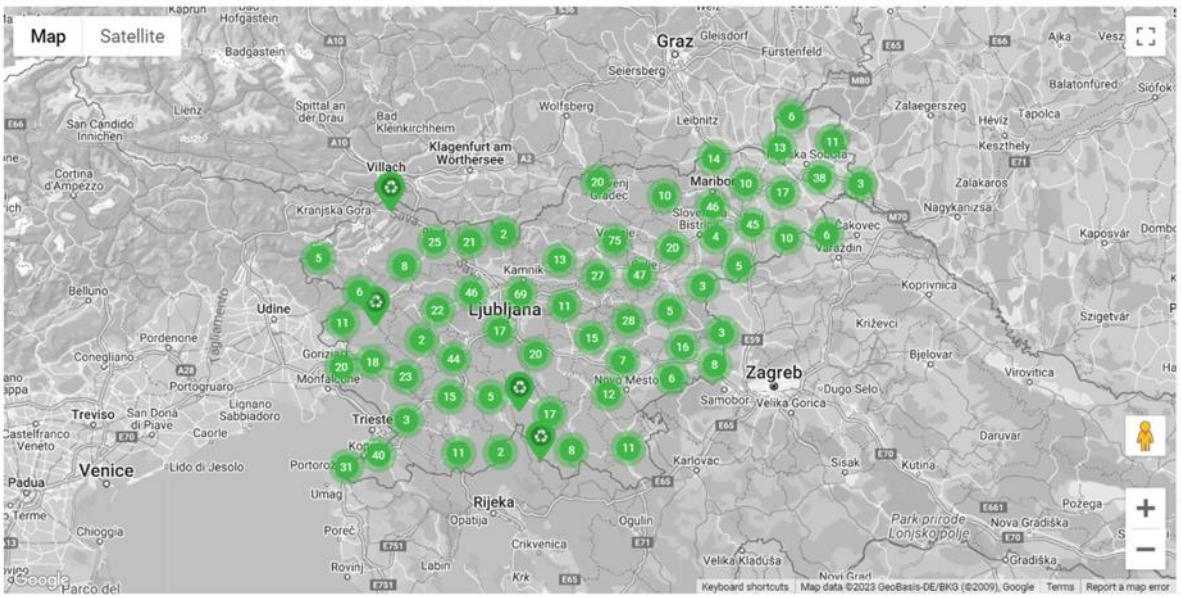
Throughout the entire period of its operation, the company has primarily focused on long-term stability and cost-effective achievement of goals. Not only did they succeed in establishing an efficient and comprehensive process of extended responsibility in the field of waste electrical and electronic equipment, they continued their successful path in 2009 in the field of waste batteries and accumulators, in 2013 they supplemented the company's activities with waste candles and in the same year established their subsidiary ZEOS eko-sistem in Sarajevo. In 2021, they added to their operations the management of industrial waste batteries and accumulators. Taking into account the Decree on Waste Electrical and Electronic Equipment, they also concluded contracts with manufacturers of electrical and electronic equipment from abroad to meet their obligations as producers

At present ZEOS have more than 370 members, which represent together with shareholders about 62% of the Slovenian market of EEE put on the market (in weight) and more than 120 members for portable batteries and accumulators.

ZEOS is financed by a contribution levied on producers. This contribution is calculated on the basis of products put on the Slovenian market (EUR/piece). There is no distinction between historical and new waste. For the administrational costs for the register, producers have to pay an environmental tax to the custom department.

ZEOS is organizing its collection system based on the 3 types of collection points:

- municipal collection points (“container parks“) (70 points),
- producer collection points run by waste management companies (60 points)
- distributor/retail collection points (more than 300 points).




*List of collection points and municipal waste yards - ZEOS*

***Slopak***

Founded in 2002, was founded by Slovenian companies with the aim of ensuring the fulfilment of environmental obligations through mutual control and regardless of the market value of the packaging. In addition to the leading role in the waste packaging management system, today they are also the leader in the field of handling waste tires and waste packaging of plant protection products.

***Trigana***

Company distinguished by many years of experience in environmental legislation, the development of concepts for the collection and processing of various types of waste and complying with the obligations of extended producer responsibility

***Recikel***

Is the holder of a common plan for handling waste electrical and electronic equipment, waste portable batteries and accumulators, and waste packaging

***Interzero***

Founded in 1991, is one of the leading full-service environmental service providers. They support the customers in preventing waste, securing raw materials and significantly improving their sustainability balance. The efficient closed-loop circulation of raw materials offers enormous opportunities. Interzero is one of the pioneers of recycling and it offers manufacturers and distributors a reliable take-back system for WEEE while developing bespoke solutions – from collection to recycling.

### 3.2.3. National and regional education strategies

In Slovenia, the focus on education, skills development, and capacity building in WEEE management is part of a broader effort to integrate sustainability into various sectors of the economy. These initiatives are closely tied to the country's commitment to the circular economy and environmental protection.

One of the significant efforts in this area includes the development of training and capacity-building programs aimed at enhancing the skills of professionals and stakeholders involved in WEEE management. For example, workshops focusing on life cycle analysis have been implemented to equip entrepreneurs and public sector participants with the necessary knowledge to assess and improve processes related to WEEE management. These sessions also introduce advanced methodologies for evaluating the environmental impact of products, which is crucial for integrating circular economy principles into business practices.

Moreover, Slovenia's approach to WEEE management also emphasizes cross-sectoral cooperation in adult education. The country's National Adult Education Master Plan highlights the importance of raising the education level of the population, improving basic skills, and enhancing employability through targeted education programs. These initiatives are crucial in building a workforce capable of effectively managing electronic waste and contributing to broader environmental goals.

Additionally, Slovenia has been proactive in integrating digital skills training within the framework of social inclusion programs. For instance, the Includ-EU project, implemented by the Adult Education Center Jesenice, included a 60-hour capacity-building program that blended digital skills with language training for migrants. This program not only helped participants improve their digital competencies but also facilitated their integration into the local community, which is essential for ensuring broad-based participation in WEEE management and other sustainability initiatives.

Overall, Slovenia's comprehensive approach to education, skills development, and capacity building in WEEE management serves as a model for other countries looking to enhance their sustainability efforts. By combining technical training with broader educational reforms and cross-sectoral cooperation, Slovenia is making significant progress toward achieving its environmental objectives.

In the field of e-waste management and awareness in Slovenia, two best practices have proven to be effective:

Reuse center Rogaška Slatina

**CPU REUSE Center**: The CPU REUSE Center is one of the leading centers in Slovenia focusing on the reuse and repair of electronic devices. The center collects used electronic devices, refurbishes them, and prepares them for reuse. This contributes to reducing the amount of e-waste and extending the lifespan of devices. Additionally, the center organizes workshops and events to raise public awareness about the importance of reuse and sustainable handling of electronic devices.

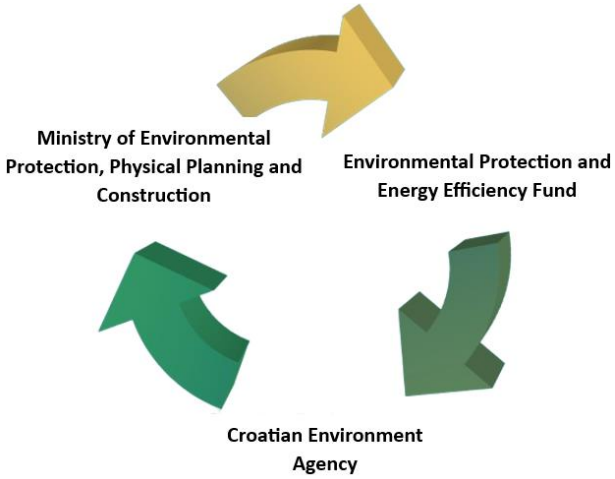
**ZEOS – E-cycling**: ZEOS d.o.o., the operator of the e-waste management scheme in Slovenia, runs the E-cycling project, which includes the installation of public collection bins for e-waste and used batteries across the country. The project aims to promote the separate collection of small electronic devices and batteries at convenient locations, such as shops and shopping centers. E-cycling also involves awareness campaigns that encourage residents to responsibly manage e-waste. The results of this project have significantly increased the collection rate of e-waste in Slovenia.

## 3.3. CROATIA

According to the Waste Management Plan of the Republic of Croatia for the period 2023-2028, The trend of increasing the total amount of waste generated in the Republic of Croatia continues, and in the period from 2016 to 20201 it amounted to 12%. In 2020, the amount of generated waste amounted to 6,003,759 tons, or 1.5 tons/inhabitant.

As a result of the increase in the amount of generated waste, the amount of processed waste is also increasing, but with a positive shift in the priority of waste management with an increase in the recycling rate of the total generated waste from 36.5% in 2016 to 46.2% in 2020, and a reduction in the total disposal rate of generated waste from 32.9% to 23.8%.

According to Spectra Media, Croatia, like all other EU member states, has implemented the provisions of the WEEE Directive 2002/96/EC and the RoHS Directive 2002/95/EC into its national legislation. As part of this transposition, Croatia has set a target to collect a minimum of 4 kilograms of electronic waste per inhabitant. This commitment aligns with the European Union's efforts to regulate the disposal and recycling of electronic products, ensuring environmental sustainability and the proper management of hazardous substances.



The Waste Management Plan of the Republic of Croatia (OG 85/07) represents the legislative basis for waste management in Croatia for the period 2007- 2015. Within the framework for preparing of the Plan is included the Waste Management Strategy of the Republic of Croatia (OG 130/05), existing legislation and EU guidelines.

The Strategy regulates the management of different types of waste in Croatia including from their generation to final disposal, with the underlying objective to establish an integrated waste management system organized in accordance with current European requirements and standards. The Legislative framework for waste management in Croatia comprises the Waste Act (OG 174/04, 111/06, 60/08 and 87/09) and by-laws that are focused on special categories of waste.

### 3.3.1. General analysis of situation in the Country

In 2020, 46.2% of the total generated waste was recycled, 3.3% was recovered by filling (R5), 1.5% was energy recovered (R1). Thus, the recovery rate in 2020 for the total waste generated in the Republic of Croatia is 51%. 23.8% of the generated waste was disposed of, while a negligible amount of waste (0.2%) was burned without energy recovery. Estimates for unrecorded handling of waste amount to 14.6% (construction waste, waste from the mining industry and municipal waste).

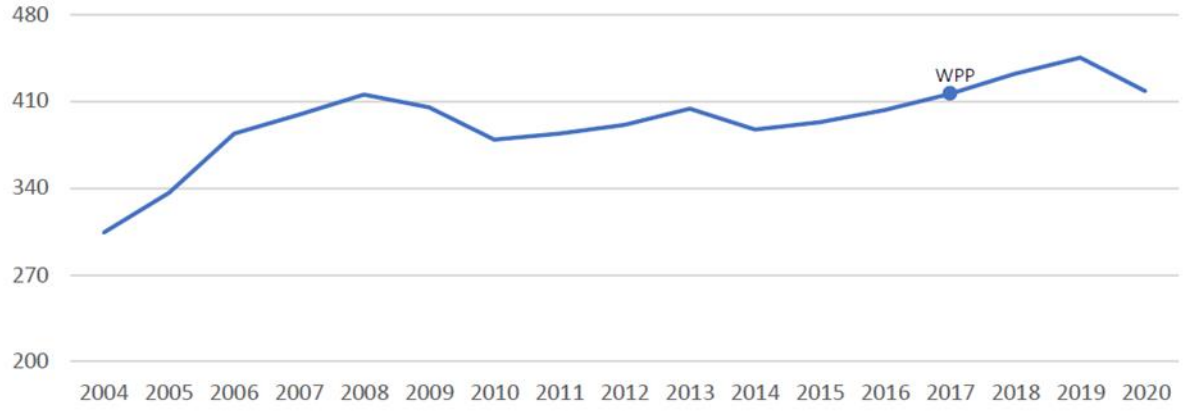
Not all generated amounts of waste are processed in the Republic of Croatia. In 2020, processors in the Republic of Croatia processed a total of 3,605,161 tons of waste generated in the territory of the Republic of Croatia, i.e. 60% of the total amount. These are the final processing procedures (mainly recycling and disposal) which are not followed by further handling of the waste. The remaining amounts of generated waste (2,398,598 tons) were processed by previous procedures before recovery/disposal in the Republic of Croatia, i.e. by preparatory actions (disassembly, shredding, mixing, repacking, etc.) for the final processing procedure in export or were exported directly, without prior pretreatment.

Part also refers to unregistered ways of dealing with waste that are evaluated, especially when it comes to construction waste, waste from the mining industry and municipal waste.

In 2020, the amount of waste exported was 898,267 tons, of which 18,760 tons were hazardous waste and 879,507 tons were non-hazardous waste. On average, 95% of the amount of waste exported/taken out of the Republic of Croatia is materially recycled, about 3% is energy recovered, while the rest of 2% is mostly burned without energy recovery and, to a lesser extent, disposed of in landfills.

According to Eurostat, municipal waste generation in Croatia increased from 304 kg per capita in 2004 to 418kg per capita in 2020. The trend shows small peaks for 2008 and 2013. The waste generation trend shows a continues increase from 2014 until 2019 with a small drop in 2020. However, the MSW generation throughout the time period remained below the European average of 517 kg1 per capita in 2020. The slightly decreasing trend between 2008 and 2010 can potentially be explained by the global financial crisis in 2008. Although the first WPP has been implemented in 2017, a mitigation of MSW has not been recorded yet.

The total waste generation in Croatia decreased between 2010 and 2012 and increased steadily for the years thereafter. Between 2010 and 2014 GDP decreased slightly (by 2%) but after that continued to increase, to reach the peak in 2018 (15% increase from 2010 level). Although a longer time series is needed to solidify a decoupling conclusion, Croatia does not seem to be on track to decouple total waste generation from economic growth.




*Municipal waste generation in Croatia (kg per capita), 2004-2020. Source: Eurostat*

### 3.3.2. Main actors in the policy

***CE-ZA-R***

Headquartered in Zagreb, it is a leading company and an extremely important participant in the waste management sector in Croatia. The main activity of the Recycling Center is the collection, recovery and trading of metal waste and other waste materials with a predominantly metal component. It is a leading collector of waste materials from numerous partners in the economic sector, local government units and citizens.

Thanks to 17 modernly equipped work units/recycling centers logistically connected by road, rail and ship transport, CE-ZA-R ensures the procurement of significant quantities of waste for their further processing and placement on the international market in Europe and outside the EU. On the market, it provides dismantling and collection services for factory and production waste, plants, buildings and equipment, and in addition provides a complete processing and recycling service for waste material.

In the CE-ZA-R recycling center in Zagreb, two unique facilities in Croatia are in operation, aligned with the best techniques and EU reference documents - a facility for the processing of large refrigeration devices, which enables the material recovery of useful raw materials and the separation of CFC compounds (freon) in under completely controlled conditions, meeting the highest standards of environmental protection and a plant for shredding and separation of waste, the so-called shredder.

***SPECTRA-MEDIA***

The company has been operating continuously since 1985, and with constant progress it has developed from a trade to a company that today employs 220 employees. The company headquarters is in Zagreb, the central warehouse is in Strmec Samoborski, and the facilities for recycling and processing electronic and electrical waste are in Virovitica and Donja Bistra. The main activity of the company is the collection, recovery and disposal of EE waste. The company's secondary activity is representation, wholesale, service and assembly of electronic devices.

The facility for recycling (recovery) of electrical and electronic waste in Donja Bistra near Zagreb was officially opened on April 22, 2009. Before the mentioned date, the plant was in trial operation for six months. The entire management of the plant is automated and is carried out from the control center. The nominal power is 280 kW with a capacity of 4,000 kg/hour. The capacities of both plants in one shift are 20,000 tons per year.

### 3.3.3. National and regional education strategies

The Zero Waste Cities model offers a blueprint for transforming the ambitious provisions outlined in legislation into tangible outcomes. The State of Zero Waste Municipalities Report serves as a testament to the realization of this vision. The goal of the report is to inspire optimism for a brighter future while offering concrete details and data on the implementation of effective policies and initiatives. It is hoped that this resource will be valuable in guiding communities on their path towards achieving zero waste goals. This year's efforts in Croatia encompass three primary areas: cooperation with waste management company PRE-KOM and 12 zero waste municipalities in Prelog, engagement with seven municipalities on Krk Island, and initiatives in the capital city, Zagreb.

In Croatia, collaborative endeavors have yielded significant advancements in waste management. Through translating new national legislation into local strategies, municipalities have achieved notable increases in separate waste collection rates and successfully implemented waste prevention measures. PRE-KOM's impressive results, particularly in separate waste collection, reflect the effectiveness of these efforts.

On Krk Island, despite the challenges posed by tourism seasonality, municipalities have made substantial progress in waste management. Their commitment to achieving high rates of separate waste collection and ambitious waste reduction goals is commendable. Implementation of the PAYT system shows promise for further improving waste management practices in the region.

In Zagreb, initiatives to enhance local waste management legislation have shown promising outcomes. Discussions have centered on implementing zero waste principles such as door-to-door collection and PAYT systems. The positive results observed since the implementation of new legislation highlight the effectiveness of these measures.

However, amidst these successes, challenges persist. National legislation barriers and funding shortages pose obstacles to municipalities' efforts to fully realize their zero waste ambitions. Addressing these challenges will be crucial for sustaining and expanding the progress made in waste management across Croatia.

## 3.4. ITALY

In Italy, the 27 January 2003 Directive 2002/96/EC of the European Parliament and Council on Waste Electrical and Electronic Equipment, was implemented under Legislative Decree No. 151/05.

Operational Programs (OPs) set out the strategic priorities each Member State lays down in its Partnership Agreement, itemized by sector and territory. Broken down into National Operational Programs (NOPs) and Regional Operational Programs (ROPs), OPs benefit from the resources of one or more Structural Funds, outlining the specific objectives within priority axes, on a multi-annual basis. The entity responsible for each OP is referred to as "Managing Authority" and may be either a Member State itself or a public/private body designated by the Member State.

The 2014-2020 EU programming cycle provides for the implementation of 75 Operational Programs in Italy co-financed by the 4 European Structural and Investment (ESI) Funds: The ERDF, the European Social Fund (ESF), the European Agricultural Fund for Rural Development (EAFRD), and the Maritime and Fisheries Policy Fund (EMFF). Further information is set out in the Section below.

No national waste management plan is in place in Italy. However, article 198-bis of the Legislative Decree 152/2006 has introduced into Italian law the preparation of a national waste management plan. Such plan has been elaborated by the Ministry of Ecological Transition (MiTE) and is currently in the public consultation phase under the strategic environmental assessment procedure.

In Italy, about 12.9 million tonnes (216 kg/cap) of packaging waste were generated in 2019, well above the EU average of 177 kg/cap. In the period from 2010 to 2019, the total weight of packaging waste

generation per capita has fluctuated between 190 and 217 kg/cap. Remarkably, the relative shares of the different packaging materials have barely changed between 2010 and 2019.

- In Italy, as regards EEE and WEEE, the European Directive 2012/19/EU was implemented with Legislative Decree 49/2014, while Directive 2006/66/EC, relating to batteries and accumulators and waste Batteries and Accumulators was implemented with Legislative Decree 188/2008.
- They have currently been modified by the current European Directive 2018/849 implemented in Italy with Legislative Decree 118/2020 present in the Circular Economy Package.
- Italy has transposed the amended Waste Framework Directive into national law. The corresponding law, L. n. 116/2020, was published in the Gazzetta Ufficiale della Repubblica Italiana on 11 September 2020, more than 2 months after the deadline of 5 July 2020.
- In Italy, clearly defined responsibilities at different government levels are contained in the Legislative Decree 152/2006 Environmental Code. The Decree establishes responsibilities at the level of state, region, province, Optimal Territorial Area (OTA) and municipality. The OTAs are generally represented by provinces.
- Pursuant to Law 191/2009 regions are responsible for organizing the integrated management of municipal waste within ATOs. Regional obligations include the preparation and updating of regional waste management plans and the regulation of waste management activities, including the separate collection of municipal waste.

The amended Legislative Decree no. 152/2006, the Environmental Consolidated Act (ECA) (Norme in materia ambientale or Codice dell'Ambiente), consists of seven parts:

- Environmental general principles;
- Environmental Impact Assessment (EIA) and Integrated Pollution Prevention and Control (IPPC) permit (Autorizzazione Integrata Ambientale) (AIA);
- Water resources management and soil protection;
- Waste and packaging management;
- Remediation of contaminated sites;
- Air protection and air emissions;
- Environmental damage

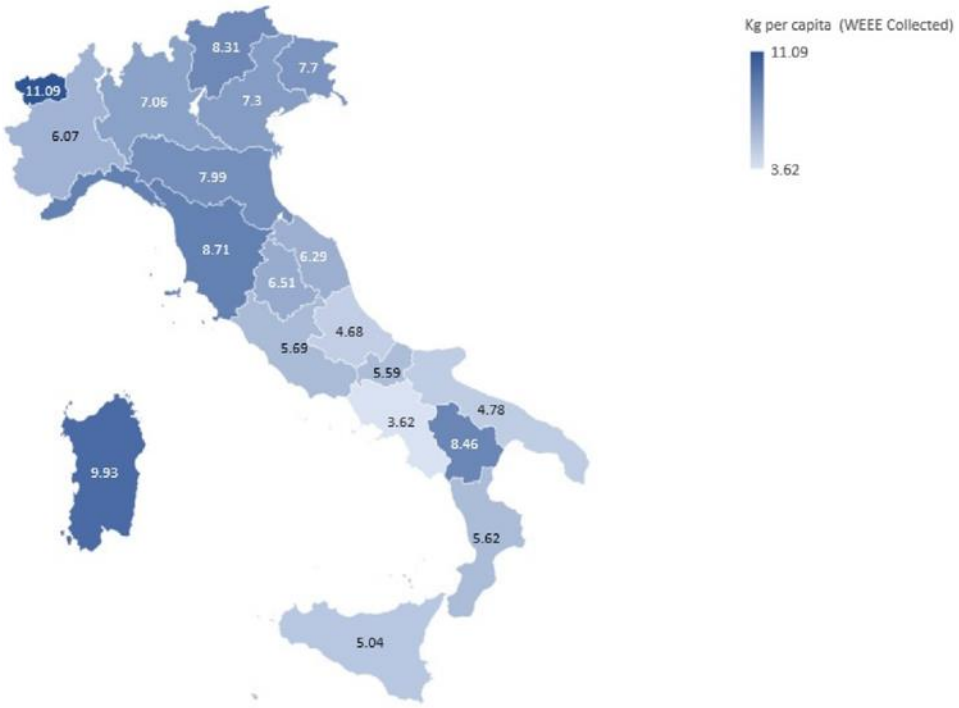
**Positive aspects of Italian performance includes the following:**

- Integration of municipal WEEE collection points (ecological islands) in all the areas for urban waste collection (such as eco-points or eco-stops).
- Improvements of the national laws transposing the WEEE Directives.
- Availability of more funds to improve the separated collection.
- Communication has been found to be a significant factor, positively affecting WEEE collection by citizens.
- The number of collection points, the percentage of females in the population, and the percentage of household waste separately collected positively affect the rate of WEEE collection per capita.

**Potential Issues includes the following:**

- Italian WEEE management system, although improving the collection performances over time, still shows a territorial divide between the Northern and Southern Italian Provinces as far as collection rates and collection centre infrastructures are concerned. Most of the provinces that perform better are in Northern Italy (Aosta, Bologna, Como, Gorizia, Isernia, and Nuoro), while those performing worst are in Southern Italy (provinces of Agrigento, Barletta-Andria-Trani, Caltanissetta, etc.)
- Lack of data about the reuse of WEEE.

- The need for cooperation between developed and developing countries for improving the wellbeing of producers, recyclers, and users.




*Ghisellini P, Quinto I, Passaro R, Ulgiati S. Circular Economy Management of Waste Electrical and Electronic Equipment (WEEE) in Italian Urban Systems: Comparison and Perspectives. Sustainability. 2023; 15(11)*

**Italy intends to make the following new investments:**

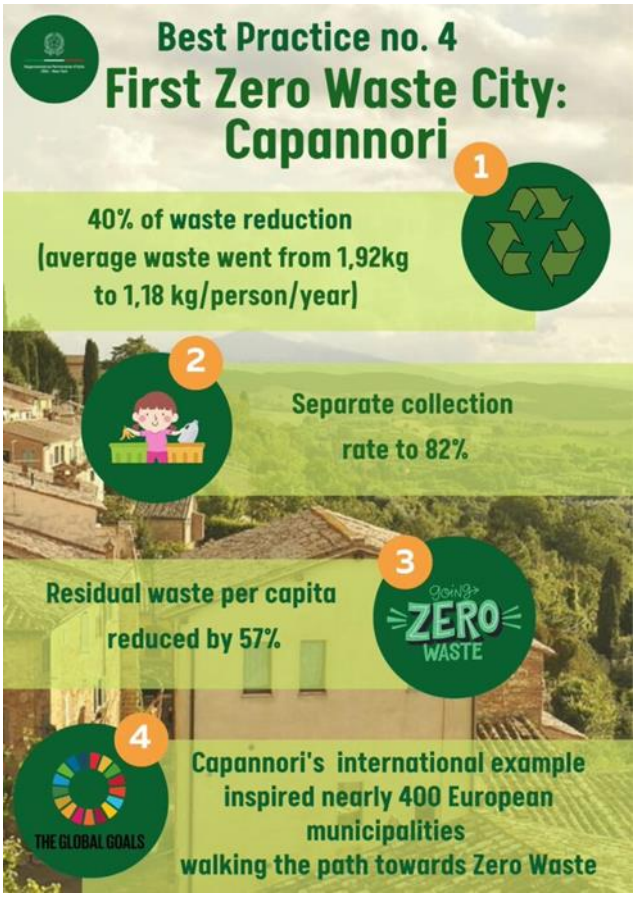
- Italy's Recovery Plan has great ambition for the transition to a circular economy. EUR 1.5 billion is available to reinforce waste management capacity in the cities and another EUR 600 million for the construction of flagship circular economy projects to strengthen and implement strategic industrial supply chains and compensate for the scarcity of raw materials, 65% of which is consumed in the cities.
- The Italian Ministry for Ecological Transition has recently published the calls for submitting proposals under the National Recovery Funds and Resilience. The funding is dedicated to circular economy projects to be completed by 30 June 2026.
- EUR 150 million will be dedicated to realising investments related to Waste Electrical and Electronic Equipment (WEEE) supply chains.

### 3.4.1. General analysis of situation in the Country

Since 2015, Italy generates about 30 million tonnes of municipal waste annually, with marginal yearly variations. Waste generation corresponded to 503 kg/cap in 2019, slightly above the (estimated) EU average of 501 kg/cap. The country has substantially reduced landfilling, showing a decrease of the landfill share from 26.5 % to 20.9 % in the period 2015 - 2019. The total tonnage of landfilled waste over the same period went down from 7.8 to 6.3 million tonnes. The amount of waste sent to incineration was fairly stable, fluctuating between 5.6 and 6.0 million tonnes annually, and accounting for about 20 % of the total volume of generated waste. The rate of material recycling and composting/digestion increased from 44 % to 51 % between 2015 and 2019.

It has been observed that the centre and south of the country perform less well in waste management than the north, although considerable progress has been made. For instance, in Campania, a functional waste management network has been put in place, and a protocol containing an action plan on waste fires was signed in 2018. Several Italian regions have integrated a circular economy approach into their regional waste planning. Ex-ante conditionalities of the ERDF have contributed to the elaboration of waste management plans in conformity with EU law, in particular in southern regions in need of waste management infrastructure.

Italy is also recognized as the birthplace of the Zero Waste Cities initiative in Europe and continues to be home to the highest number of municipalities who are implementing zero waste strategies today. Zero Waste Italy now works with 311 municipalities, covering over 6 million inhabitants.




Italian waste management authorities (Institute for Environmental Protection and Research, 2021) indicated that a detailed analysis on the prevalence of different waste collection systems (both for residual waste as for separately collected waste streams) was carried out in cities with a resident population greater than 200 000 inhabitants, 15 cities in total. In 2019, the corresponding municipalities represented a total population of almost 9.9 million inhabitants, equivalent to 16.4 % of the Italian population, and a share of 18.6 % of the total generation of municipal waste at national level. The analysis considered the prevailing collection system as the one that covered at least 70 % of the studied population and adopted the categorization of collection systems used by ISTAT (National Institute of Statistics).

Article 221 establishes that companies are responsible for the management of any packaging and packaging waste produced by the consumption of their products and consequently they should join the National Packaging Consortium (CONAI). The statute of CONAI is approved via Decree, by the Ministry for the Ecological Transition in conjunction with the Ministry of Economic Development. Packaging producers are required to join one of the Industry Consortiums. Optimal Territorial Areas (OTA), generally

represented by provinces, are responsible for checking any failure to join CONAI or the Industry Consortiums and for collecting any administrative fines (CONAI - Consorzio Nazionale Imballaggi).

It must be noted, however, that only a fraction of WEEE collected from retailers was subsequently managed by the formal WEEE system (CdC RAEE) in 2011:

- In 2011, there were just over 60 retailers (or retailer consolidation points) where compliance schemes provided WEEE pick-up service. These retailers/collection points accounted for a total of only 12,000 tonnes of WEEE collected, less than five per cent of total WEEE managed in Italy. The number of retailers subscribing to such compliance schemes rose in 2012, reaching anyway around one hundred collection points.
- A survey conducted in 2011 by ANCI and CdC RAEE on a sample of 325 collection points, representing 46 per cent of the population served by CdC RAEE, showed that only 7.6 per cent of the total WEEE collected by collection points was delivered by retailers.

There is therefore a need to track complementary streams, which would ensure consistency in the overall system of reporting.

Since 2003, with the publication of Directive 2002/96/EC, the European Union has managed WEEE using the Extended Producer Responsibility (EPR) principle, ensuring that producers have the chance to fulfil obligations either individually or collectively. The Directive, transposed in Italy in 2005 with the Legislative Decree 151/2005, has undergone a thorough review process (recast) by the EU between 2006 and 2012, including preparatory studies and impact assessments. After numerous amendments during the voting process, the final text of the new Directive (2012/19/EU) has been published in the Official Journal of the European Union on 24 July 2012.

### 3.4.2. Main actors in the policy

***Cobat RAEE***

Cobat was born as a mandatory consortium for spent lead batteries and lead waste. It is established by art. 9-quinquies of Legislative Decree 397/88 converted with Law 9 November 1988, n.475. Cobat was assigned the function of guaranteeing the collection and recycling of spent lead batteries throughout the national territory. Producers and importers of lead batteries were obliged to participate in Cobat by financing its activities, and they paid the Consortium an environmental contribution whose amount was established by a decree of the Ministry of the Environment.

The results recorded in the first 20 years of activity have confirmed a performance of absolute excellence, which affirms the Italian experience as a leader in the world: a collection of 200,000 tonnes/year of exhausted lead batteries, equal to 16,000,000 pieces, data close to 100% of the amount released for consumption, for a total of approximately 110 million saved on the national trade balance in the purchase of lead, a raw material used essentially to produce new batteries. From 1988 to 2008 Cobat recovered lead equivalent to that extractable from a 20 km long mine.

With legislative decree 188/08 and the repeal of the law establishing the Consortium and art. 235 of the Legislative Decree. 152/06, the no longer mandatory Cobat and the existence of a single Consortium for the management of exhausted lead batteries in Italy are definitively established. In addition to the regulatory changes envisaged by Legislative Decree 188/08, which established a free competition regime in the sector, there were the needs of producers, interested in identifying a single interlocutor to whom they could entrust the end-of-life management of the various products introduced on the market, to push Cobat towards this evolution. Cobat thus becomes a voluntary consortium (producers sign up by free choice) and operates on the national territory together with other competing systems. To increase its competitiveness, Cobat has modified its statute providing for the possibility of managing any type of

waste, except those for which the law does not specifically provide for the existence of mandatory consortia. Cobat RIPA, RAEE and TIRE are born, followed by Cobat Compositi and Cobat Tessile, thus increasing the supply chains covered

cobat RIPA | cobat RAEE | cobat TYRE | cobat COMPOSITI | cobat TESSILE

But evolution has never stopped. From a consortium, Cobat becomes a joint-stock company, always looking at environmental protection and the quality of services offered to its partners in the name of the circular economy. Not just a joint-stock company, but at the same time a Benefit Company, a legal entity which integrates into its corporate purpose the aim of having a positive impact on society and the environment.

Cobat RAEE represents a non-profit Private Law Association, aligned with provisions for Funding Collective Systems, as per Law 49/2014, is a collecting and recycling system of waste batteries accredited to the Coordination Centre RAEE (the acronym in Italian is CDCRAEE). Cobat RAEE befits from thirty years of experience Cobat has in managing the end of life of technological waste. The Consortium provides its Members with integrated and personalized services for the collection, treatment and recycling of Waste Electrical and Electronic Equipment.

Cobat RAEE's mission is making producers and importers of Electrical and Electronic Equipment protagonists of circular economy, turning products that have reached the end of their normal life cycle into raw materials. Cobat RAEE is guided by transparency, efficiency and sustainability. These values allow us to help companies to pursue sustainable development that benefits not only the environment, but also the entire national economic system.


*Treatment plants certified by the WEEE CdC*

***Erion WEEE***

Erion was created in October 2020 from the fusion of two of the most important national Consortia, Ecodom and Remedia, who played a key role in the creation and development of the Italian Waste Electrical and Electronic Equipment and Batteries and Accumulators sector.

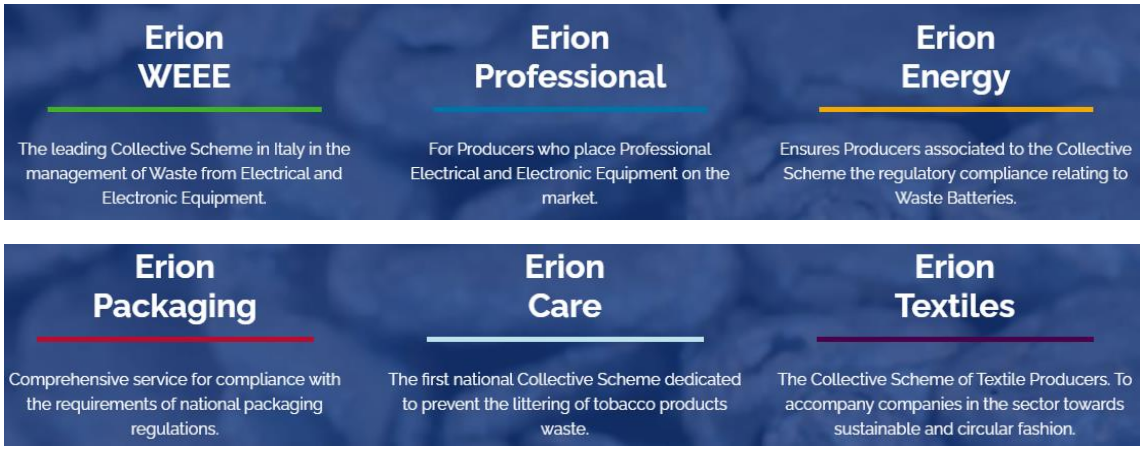
Born from the experiences of Ecodom and Remedia, Erion is the strategic evolution of both Consortia in terms of operational structure, services dedicated to the associated Producers and commitment to the environment, the circular economy, research and technological innovation. Erion is a non for profit organization, created by Producers for the purpose of ensuring:

- A full compliance with environmental regulations.
- A constant dialogue with all stakeholders involved.
- The creation of efficient eco-innovation services.
- The optimized and safe management of the collection, transport and treatment processes of WEEE (household and professional), WBA and Packaging Waste.

The Erion System's structure is designed to effectively fulfil all obligations arising from the Extended Producer Responsibility. We have created Erion WEEE, Erion Professional, Erion Energy and Erion Packaging to place at the service of stakeholders four sector Compliance Schemes responsible for regulatory conformity services and the coordination of WEEE (domestic and professional), WBA and Packaging Waste management activities.

The sector Compliance Schemes are supported by ECO (Erion Compliance Organization), the common platform responsible for providing them shared services and coordinating the areas of communication, innovation and development, European projects, regulatory compliance and operations.

Erion WEEE – member of the WEEE Forum since 2006 – is the largest national Collective Scheme for the management of all Waste Electrical and Electronic Equipment (WEEE). On behalf of its Members, it is responsible for the collection of both household and professional WEEE and its treatment at authorized plants, avoiding the dispersion of pollutants into the environment while ensuring through proper recycling the recovery of materials to be reintegrated into the production flow, in full compliance with the principles of the circular economy. Erion WEEE managed: Household WEEE, i.e. WEEE which derives from private homes (all categories covered: LHHA, SHHA, IT&T, CE, Lighting) and Professional WEEE, i.e. WEEE which comes from businesses and commercial and administrative activities. Erion WEEE members are 2,150 and Erion WEEE is part of WEEE Forum.




The Legislative Decree 49/2014 arises from the transposition of Directive 2012/19/EU which, in order to protect the environment and human health, defines the measures and procedures necessary for the

improvement, prevention and reduction of the negative impacts deriving from the production of Electrical and Electronic Equipment and associated waste, both from households and businesses.

***PV CYCLE***

PV CYCLE Italia Consortium is a Collective System that offers regulatory compliance and waste management services for Producers pursuant to the WEEE Regulations and the Batteries and Accumulators Regulations. Born in 2007 on the voluntary initiative of some leading European photovoltaic module producers, today PV CYCLE offers its services to companies and waste holders all over the world.

Maintaining its focus on Photovoltaics - the sector for which it was created - PV CYCLE manages waste from electrical and electronic equipment, batteries and accumulators, packaging and industrial waste in general.

- It is a Collective System pursuant to the national WEEE legislation (Legislative Decree 49/2014 and subsequent amendments) and the national Batteries and Accumulators legislation (Legislative Decree 188/2008 and subsequent amendments).
- Is a Collective System approved by the GSE for the end-of-life management of Photovoltaic Modules that receive incentives from the 4th and 5th Energy Bill.
- Is a member of the WEEE Coordination Center and the National Coordination Center for Batteries and Accumulators, which are responsible for organizing and optimizing the collection, collection and management of domestic WEEE and battery and accumulator waste respectively on the national territory.
- Is registered in the EEE Register (n. IT14011000033) and in the Batteries and Accumulators Register (n. IT16041P00035) as a collective financing system.

***ECODOM***

ECODOM is the largest Italian non-profit Consortium for the Recovery and Recycling of Household Appliances, created to fulfill the regulatory obligations which identify the Manufacturers of Electrical and Electronic Equipment (AEE) as those responsible for the management of waste deriving from this equipment (WEEE), in all phases following their collection.

Established in November 2004, on the initiative of the most important manufacturers of large household appliances (refrigerators, washing machines, ovens, hoods, water heaters) but - due to a series of delays in the issuing of the Decrees relating to WEEE - they became operational from the beginning of 2008. With the entry into force of Decree 188/2008 on batteries, they also became a Consortium for the management of Batteries and Accumulators.

Born to fulfill legal obligations. Since their establishment they immediately stood out for the interest in environmental protection, which then became the main objective of their activity. ECODOM interpreted the task entrusted by the law as a responsibility and a commitment: the responsibility to build a positive model, a new example of Italian excellence, a sustainable value and the commitment to strengthen the culture of sustainability and to promote the adoption of daily behavior that is more attentive to the environment, stimulating public opinion, the media and institutional decision-makers. After a few years, thanks to the experience gained in the Domestic WEEE sector, ECODOM has expanded the area of intervention, first dealing with Professional WEEE and subsequently with all Company Waste.

In the framework of the Circular Economy Pillar's activities of Merezzate+ project, a two-step activity will be organised to sensitize citizens to the correct e-waste collection and disposal:

- A webinar, open to the Merezzate District residents (615 dwellings) and to the community living nearby, aimed at describing how to properly manage e-waste and, more in general, how to correctly deal with domestic waste.

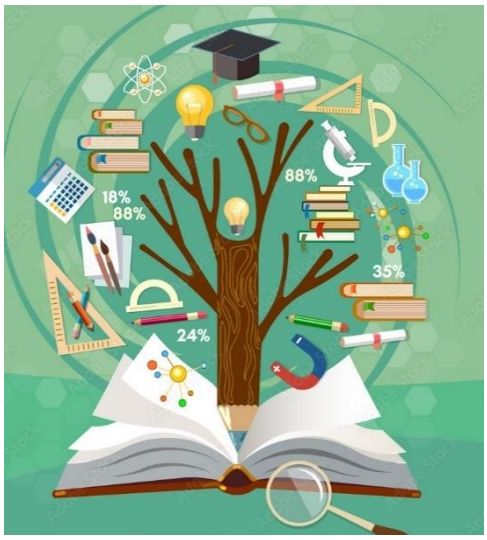
A dedicated e-waste collection event with a mobile recycling station for electrical and electronic waste. The collection event will take place in Merezzate District area and will be opened both for residents and people living in the adjoining neighbourhoods.

### 3.4.3. National and regional education strategies

At the beginning, the analysis of the potential social impacts of the WEEE management system on the Local Community shows that there are some social barriers to the local collection and recycling of WEEE, e.g., the lack of educational programs continue to generate awareness and appropriate perception of benefits, lack of incentives for entrepreneurial WEEE recycling projects as well as the presence of small municipalities that do not properly perform in the collection of WEEE, leaving space to informal collection exposing local communities and environment to potential health risks. Moreover, issues related to the past waste crisis still affect the citizens and their trust in the municipalities, discouraging WEEE collection. Therefore, the initiatives by the regional authorities and municipalities to involve the local communities and citizens are very important to improve their awareness about the need for collecting WEEE.

Producers of EEE in Italy are responsible for financing communication, information and education activities, which must be in line with the objectives set out in Article 6 of Legislative Decree 49/2014 and are required to promote public awareness of WEEE and its collection. Although there is no mandatory contribution to be payed, Italian EEE producers have in the recent years agreed to jointly finance national activities that promote the collection of WEEE within the country. The producers' share for these activities is collected through the participation fees of the PROs, which pass it on to the coordination centre according to the respective market share of their members. In 2019, the producers provided a total of 1,000,000 € for information and communication activities.

Using this money, the coordination centre finances nationwide media campaigns on television, radio and social media every year, focusing on a broad target group of people between the age of 14 and 64. Relevant information on the topic of WEEE collection and recycling as well as current information campaigns and initiatives are also published on a dedicated RAEE website.




In 2020, the communication efforts resulted in 196 television commercials and 1,045 airings on six different radio stations (CDC RAEE 2021). A Google Ads campaign for the social media pages of raccoltaraee.it further resulted in 83,943,361 impressions and over 555,000 views on YouTube, adding to a total of 807,000 views during one year. Both the ongoing Facebook campaign, which in 2020 was complemented by two new educational initiatives (Colora con RAEE Man and Caccia ai RAEE) and the Instagram channel further increase the number of their outreach to a total of 6,544 followers on Facebook and 6,320 followers on Instagram.

Complementary to the nationwide campaigns, a certain share of the total communication budget is allocated to local communication activities specifically aimed at improving WEEE collection in a given area. To access the funding, all collection operators registered with the coordinating body can submit proposals for information campaigns. An independent steering committee then selects the most promising applications to be awarded funding. In 2019, the producers provided 400,000 € for local communication campaigns.

According to the coordination centre and interviewed experts, the large-scale communication and awareness campaigns in Italy have notably improved the overall collection rate and especially the collection of small EEE and information technology. However, large appliances have also shown a significant increase in collection rates following the implementation of the various campaigns mentioned above.

ISPRA, a public body which carries out research and testing, control, monitoring and evaluation, strategic consultancy, technical and scientific support, information, reporting, education and training activities in relation to environmental matters, with a focus on water protection, protection of the atmospheric environment, soil, subsoil, marine and terrestrial biodiversity and their respective crops, is, however, supervised by the Ministry of the Environment.

The aim is to create, with the additional support of the bodies listed above, a technical policy framework to give impetus to the implementation of the Energy and Climate Plan, which provides for the active involvement of the Ministries of Economic Development, the Environment and Infrastructure and the Autonomous Regions and Provinces; those other Ministries which perform, in various capacities, functions of direct benefit to the implementation of the measures will also naturally be involved in this undertaking, including the Ministries of the Economy, Cultural Heritage, Agricultural Policies, Education and Labour. The framework may also represent an interface for efficient dialogue with associations representing the interests of businesses and workers in the sectors concerned, so as to promote the measures through an approach that distributes the costs and benefits of the energy transition in a balanced manner.

In addition, it has been established that the Ministry of Education, Universities and Research draw up a national plan of measures to improve energy efficiency in publicly owned school buildings which already meet all the necessary structural safety requirements, identified on the basis of criteria which take into account energy consumption, estimates of energy savings and management cost reduction for the local authorities that own or manage them, as well as the existing student population and the size of the buildings.

## 3.5. SLOVAKIA

The Waste Framework Directive 2008/98/EC (as amended by Directive (EU) 2018/851) includes a target to recycle and prepare for reuse, by 2025, 55 % of municipal waste generated. The Packaging and Packaging Waste Directive (94/62/EC as amended by Directive (EU) 2018/852) includes targets for the recycling of packaging waste, both in total and by material, to be achieved by 2025. The Landfill Directive (1999/31/EC as amended by Directive (EU) 2018/850) requires to limit the landfilling of municipal waste to 10 % of the generated municipal waste by 2035.

According to EC (2019b), Slovakia has a rather intricate legislative framework for waste management. The Waste Act (No. 79/2015) came into force in 2016 and has been amended several times since then. Based on the Act, EPR for packaging waste was introduced in Slovakia in 2016. The separate collection of bio-waste became mandatory for individual households not practising home composting in 2017. However, due to insufficient specification of sorting requirements and several exemptions included (e.g. food waste does not have to be collected in municipalities that send their residual waste for incineration), the separate collection and treatment of food waste in particular has not been efficient. In 2018, a fee for disposable light plastic bags was implemented (EC, 2019b). The recent amendment No. 460/2019 is especially relevant for transposing the WFD and PPWD, including the reuse and recycling target for municipal waste and the recycling targets for packaging waste.

The Act on Fees for Waste Disposal, effective from 2014 to 2018, implemented a landfill tax, called a fee in Slovakia, but the rate of the fee was too low to induce enhanced separate collection. Thus, increased fee levels were introduced in the Act on Fees for Waste Disposal (No. 329/2018) that entered into force in January 2019. Together with the 2019 amendment of the Act on the Environmental Fund No. 587/2004, which aims to increase sorting of municipal packaging and non-packaging waste and introduced reinforced rules for landfill operation and closure, these measures aim to divert recyclables from landfills (EC, 2019b).

**The general legislative framework concerning waste and packaging is presented below:**

- Act on Waste No. 79/2015 and on amendments to certain acts (Amended several times between 2016-2021. Act No. 460/2019 amending and supplementing Act No. 79/2015 is especially relevant for transposing WFD and PPWD. In addition, Act No. 285/2020 amending Acts No. 79/2015 and No. 302/2019 as amended by Act No. 74/2020 is especially relevant for transposing WFD);
- Act on Fees for Waste Disposal No. 329/2018 and on the amendment of Act on the Environmental Fund No. 587/2004 and on the amendment of certain acts (Amended in 2019 and 2021. Act No. 67/2021 amending Act No. 329/2018 and amending Act. No 587/2004 is especially relevant for transposing WFD);
- Act on the deposit of disposable beverage packaging No. 302/2019 and amending certain acts (Amended in 2020. Act No. 285/2020 amending Acts No. 79/2015 and No. 302/2019 as amended by Act No. 74/2020 is especially relevant for transposing WFD);
- Regulation of the Government No. 388/2005 setting limits for the recovery of electrical waste and for the reuse and recycling of components, materials and substances (Amended in 2010);
- Regulation of the Government 330/2018 establishing the amount of rates of fees for waste disposal and details related to the redistribution of income from fees for waste disposal (Amended in 2020 and 2021);
- Decree of the Ministry of the Environment No. 365/2015 establishing the Waste Catalogue (Amended in 2017);
- Decree of the Ministry of the Environment No. 366/2015 on record-keeping and reporting obligations (Amended in 2017, 2018, 2020. Decree No. 317/2020 amending Decree No. 366/2015 is especially relevant for transposing WFD and PPWD);
- Decree of the Ministry of the Environment No. 371/2015 implementing certain provisions of the Act on waste (Amended in 2017, 2018, 2020. Decree No. 348/2020 amending Decree No. 371/2015 is especially relevant for transposing WFD);
- Decree of the Ministry of the Environment No. 382/2018 on landfilling of waste and storage of waste mercury (Amended in 2021);
- Decree of the Ministry of Environment of SR No. 372/2015 Coll. on Landfills and temporary storage of metallic mercury;
- Decree of the Ministry of Environment of SR No. 465/2013 Coll. on Technical requirements for electrical and electronic equipment;
- Decree No. 352/2005 Coll., on Particulars of Handling Electrical and Electronic Equipment and Waste Electrical and Electronic Equipment;
- Decree of the Ministry of the Environment No. 373/2015 on extended producer responsibility and the management of specified dedicated waste (Amended several times between 2017-2021. Decree No. 25/2021 amending Decree No. 373/2015 is especially relevant for transposing PPWD);
- Notification No. 368/2015 as a Decree No. 1/2015 on Uniform method for analytical inspection of waste; and
- Notification of the Ministry of the Environment No. 222/2020 on the issuance of the measure of 29 July 2020 no. 1/2020 on the methodology of mixed waste analysis. (The Ministry of the Environment, 2021).

Slovakia has transposed the amended Packaging and Packaging Waste Directive into national law, but the full transposition of the Waste Framework Directive is still in progress (status as of November 2021). The legislative amendments especially relevant for the transposition of the WFD and PPWD are mentioned above.

### 3.5.1. General analysis of situation in the Country

The Waste Management Plan of the Slovak Republic for 2016 – 2020, approved in 2015, set objectives to be achieved by 2020 e.g. for obtaining the target of 50 % municipal waste recycling, limiting the amount of biodegradable municipal waste landfilled, as well as objectives for packaging and non-packaging waste fractions. The measures to achieve these objectives included:

- Implementation of Extended producer responsibility (EPR) into the separate collection system of municipal waste for those fractions that are covered by the EPR principle;
- Implementation of the principle that the amount of landfill fee varies depending on the sorting level of municipal waste;
- Adoption of a common methodology for the definition of MSW composition;
- Analysing the possibility of implementation of a new system for disposable beverage packaging collection, based on an evaluation of municipal waste separate collection efficiency;
- Support to financing projects focusing on home and community composting, the modernisation of currently existing composting plants as well as biogas facilities treating food waste;
- Adoption of a nationwide home composting plan;
- Carrying out the Action Plan on Support of Placement of Compost from Biodegradable Waste on the Market;
- Investigation of the possibility of introducing a ban on landfilling biodegradable municipal waste with total organic carbon (TOC) content exceeding 5 weight-%;
- Support for using alternative fuels produced from residual municipal waste in case their material recovery is not appropriate in an environmentally suitable manner;
- Enhancement of MSW separate collection; and
- Support to funding technologies aiming at reaching a high recycling level. (Ministry of Environment of the Slovak and Republic, 2015; EEA, 2016).

A new national Waste Management Plan (WMP) for 2021-2025 (Ministry of the Environment of the Slovak Republic, 2021) was adopted on 24 November 2021. At the present, regional WMPs are not in place, but according to § 9 point 4) of the Waste Act, regional WMPs shall be developed based on the national WMP, and the drafts shall be submitted for environmental impact assessment. The WMP covers all waste streams with dedicated sections on targeted waste streams.

Several waste streams are covered by separate collection schemes, such as paper, plastics, metals, glass, composite packaging, biodegradable waste, bulky waste, small construction waste and hazardous waste. However, separate collection of municipal waste can be assessed as insufficient, and many municipalities don’t comply with the obligation. To improve separate collection, the WMP foresees a number of measures, such as the introduction of Act No 329/2018 on fees for waste, that shall disadvantage landfilling, and a deposit system for single-use beverage packaging which has entered into force in January 2022.

The main objective of the Slovak waste management by 2025 is to divert waste away from landfill, especially for municipal waste. To reach this goal, the expansion of certain waste treatment technologies plays an important role, especially for recycling, preparing for reuse and energy recovery. The latest environmental policy called Greener Slovakia - Strategy of the Environmental Policy of the Slovak Republic until 2030 approved by the Slovak Government in 2019, states that waste management is amongst the biggest environmental challenges Slovakia is currently facing, and describes a target to recycle 60 % of municipal waste by 2030 (including preparation for reuse); and to decrease the share of landfilling to < 25 % by 2035. According to the Strategy, important measures to help in achieving these targets include e.g. an extension of the current deposit return system (DRS), limitation of the use of disposable plates and cups, supporting the establishment of reuse centres, gradual increasing of landfill fees to divert recyclables from landfill, widening the use of pay-as-you throw (PAYT) systems, improving the functionality of the extended producer responsibility (EPR) system, increasing the use of preventive

measures in the prevention of illegal dumping, limiting the generation of biodegradable and food waste, enhanced educational and awareness-raising activities, and improvement of the data collection and processing (Ministry of Environment of the Slovak Republic, 2019).

### 3.5.2. Main actors in the policy

***ENVIDOM***

ENVIDOM is the Association of Producers of Appliances For Recycling. It was established as a non-profit association of special interest of private entities in March 2005 by the 10 of the largest producers/importers operating in the Slovak republic. Since its foundation, the number of ENVIDOM members has increased to 298 direct participants. ENVIDOM represents the interests of manufacturers who make up 30 % of the household appliances market in Slovakia.

ENVIDOM is a member of the WEEE Forum international association, which brings together 50 organisations of producers and importers of electrical equipment for the collection and recycling of WEEE from 33 countries. They participate in harmonising and setting uniform European standards, processes and rules for the entire process of collection, transport, processing and recycling of WEEE – from its receipt from consumers, through proper storage, handling, preparation for re-use to the actual processing, with the main aim being environmental protection.

ENVIDOM provides door-to-door collection of WEEE in 11 cities in Slovakia (all regional towns and 3 district towns of Partizánske, Pezinok and Považská Bystrica).


*Map of cities in Slovakia with WEEE collection points. Source: envidom.sk*

***ASEKOL***

ASEKOL SK is a producer responsibility organisation founded in 2010 by major manufacturers and importers of electrical equipment, batteries, accumulators, packaging and non-packaging statements. On behalf of manufacturers and importers, ASEKOL SK organises and finances a system of sorted collection of waste from packaging and non-packaged products and its recovery and recycling, as well as a nationwide system of collection, transport and processing of electrical waste, used batteries and accumulators.

asekol
ZE STARÉHO NOVÉ!

ASEKOL SK is the largest producer responsibility organisation for portable batteries and accumulators and the largest producer responsibility organisation for electrical equipment in the field of consumer electronics.

***NATUR-PACK***

The company NATUR-PACK, a. s., is a producer responsibility organisation for packaging, which ensures for manufacturers of packaging and non-packaging products, electrical equipment, batteries and accumulators, the fulfilment of obligations arising from the Waste Act No. 79/2015 Coll.

NATUR-PACK, a. s., was established as an authorised organisation by entry to the Commercial Register of the Slovak Republic on 16 February 2006. The newly created obligations for the so-called obliged persons (so-called producers, at present) acted as the main impetus – collection, recovery and recycling of the packaging waste. These obligations resulted from the Directive No. 94/62/EC on packaging and packaging waste, implemented into Slovak legislation by the Act No. 529/2002 Coll., replaced by the Act No. 119/2010 Coll., which was amended by the Waste Act No. 79/2015 Coll., currently in force.

Based on the above facts, several obliged entities in cooperation with the important recyclers (Vetropack Nemšová, s. r. o., Smurfit Kappa Štúrovo, a. s.,...) and collection companies (OLO, a. s., KOSIT, a. s., .A.S.A. SLOVENSKO, spol. s r. o.) decided to create an authorised organisation NATUR-PACK, a.s.

***ENVI-PAK***

The authorised organisation ENVI-PAK started its activity in 2003. It is thus the oldest and most experienced system in Slovakia registered at the Ministry of the Interior of the Slovak Republic. It is also the largest system operating in Slovakia, providing fulfilment for more than 160,000 tons of packaging placed on the market in the Slovak Republic annually.

The ENVI-PAK system operates on the principle of cooperation of all entities involved in the material flow of packaging waste: from persons introducing products in packaging to the market or into circulation, through cities and municipalities that are responsible for introducing separate collection on their territory, collection companies, which ensure the collection and sorting of waste up to the waste processors who manufacture their products from the separated and sorted secondary raw materials.

***SEWA***

SEWA, a. s. is a Producer Responsibility Organization. It has been operating on the market since 2005, when it was founded directly by manufacturers of electrical equipment associated with ITAS and ADAT. The mission of SEWA, a. s. is to simplify the business of manufacturers of electrical equipment, batteries and packaging by providing services related to the collection and ecological recycling of waste from the above-mentioned commodities.

The service package also includes administrative support for clients in fulfilling the registration, registration and reporting obligations that manufacturers and sellers of electrical equipment have towards state and public administration bodies.

***NOWAS***

NOWAS s.r.o. was founded in 2010, registered in the Bratislava I District Court Commercial Register, Sec. Sro., Insert No. 69367/B. In 2016, the Ministry of the Environment of the SR granted NOWAS s.r.o. the authorization for the activities of the association of producers' responsibility for packaging and non-packaging, electrical equipment and tires.

### 3.5.3. National and regional education strategies

In the era of rapid technological advancement, electronic waste, or Waste Electrical and Electronic Equipment (WEEE), has become a growing concern worldwide. WEEE management is crucial not only for environmental sustainability but also for human health and economic growth.

In order to get inhabitants involved in the WEEE collection and recycling process, it is essential to provide them with the necessary information about the importance of proper disposal and recycling of electronic waste, the potential hazards associated with improper handling, and the benefits of participating in WEEE management programs. This awareness can drive responsible consumer behaviour, promote recycling, and ultimately contribute to a more sustainable and healthier planet. Furthermore, a sufficient collection network throughout the entire Slovak Republic will help residents to manage WEEE ecologically.

In 2022, ENVIDOM focused its awareness raising campaign in the form of paid articles in the most widely read national print media, such as Nový čas, Pravda, Plus jeden den, and also in online media, such as pravda.sk and cas.sk. They have also used weekly magazines like Tempo, monthly magazines Ružinovské Echo, Hlas Nové Mesto, Karloveské Noviny or Radničné noviny in Žilina. Regarding social networks, their Facebook page, Zberelektroodpadu.sk has proven to be an excellent way to disseminate information from the world of WEEE, so in 2022 they started using another social network - Instagram. Both of these communication platforms enable them to regularly inform their users about what is happening regarding WEEE. They also bring them practical advice on how to prevent the occurrence of WEEE, for example by taking better care of the appliances they have at home.


*ENVIDOM communication in the regional media to raise awareness. Source: ENVIDOM Activity / Annual Report 2022*

The PRO ASEKOL SK has developed multiple awareness programs, such as:

- **ECOCHEESE:** It is an environmental project that aims to teach children, families and individuals in a fun way to sort used batteries and accumulators. It is also a stylish collection container for used batteries, which everyone will receive in their mailbox.

- **RECYKLOHRY:** The "Recyklohry" scheme is a long-term educational programme aimed at developing the right attitude to the environment among children through theme tasks, games and quizzes. It involves direct participation of pupils in the collection of small items of electric waste and batteries. The schools are collecting points for fulfilling the tasks and collecting waste. Then they are rewarded for the points collected with arts and sports tools, games and/or theatre, cinema and zoo tickets.

- **Donate a Mobile:** This collection event is focused on mobile phones that are no longer in use – more than 6 million of which exist in Slovak households. ASEKOL checks the selected phones, hands over the non-functional ones for recycling, and donates the functional ones to children's homes, children from socially disadvantaged families, and other organisations.

**International E-Waste Day:** International E-waste Day is a yearly awareness raising celebration initiated by the WEEE Forum and its members and takes place every year on 14th of October. It aims to highlight the growing issue of electronic waste and promote responsible e-waste management. Year 2023's edition ran under the slogan "You can recycle anything with a plug, battery or cable!" highlighting the issue of invisible e-waste - the electronic items that often go unrecognized and are not properly recycled within the appropriate waste stream


*International E-Waste Day campaign organized by WEEE Forum in 2023. Source: https://weee-forum.org/iewd-about/*

## 3.6. POLAND

Throughout the country, only approximately 10% to 20% of waste electrical and electronic equipment from households collected in Poland is collected as part of municipal waste management systems.

According to the Regulation of the Minister of the Environment on minimum annual collection rates of waste electrical and electronic equipment, starting from 2020, the minimum collection rate is 60% – for equipment groups 1 and 2, and 65% for group 3, of the average annual weight of equipment placed on the market in the territory of the country.

ustawa z dnia 11 września 2015 r. o zużytym sprzęcie elektrycznym i elektronicznym (t.j. Dz. U. z 2022 r. poz 1622); (Act of 11 September 2015 on waste electrical and electronic equipment (consolidated text: Journal of Laws of 2022, item 1622));

ustawa z dnia 27 kwietnia 2001 r. – Prawo Ochrony Środowiska (Dz.U. z 2022 r. poz. 2556 ze zm.); (Act of April 27, 2001 - Environmental Protection Law (Journal of Laws of 2022, item 2556, as amended));

ustawa z dnia 13 września 1996 r. o utrzymaniu czystości i porządku w gminach (Dz.U. z 2022 r. poz. 2519 ze zm.); Act of 13 September 1996 on maintaining cleanliness and order in municipalities (Journal of Laws of 2022, item 2519, as amended);

ustawa z 14 grudnia 2012 r. o odpadach (Dz. U. z 2022 r. poz 669 ze zm.); Act of December 14, 2012 on waste (Journal of Laws of 2022, item 669, as amended);

ustawa z dnia 24 kwietnia 2009 r. o bateriach i akumulatorach (t.j. Dz. U. z 2022 r. poz. 1113). Act of April 24, 2009 on batteries and accumulators (consolidated text: Journal of Laws of 2022, item 1113).

Rozporządzenie Ministra Środowiska z dnia 25 kwietnia 2019 r. w sprawie rocznego audytu zewnętrznego organizacji odzysku sprzętu elektrycznego i elektronicznego oraz zakładu przetwarzania (Dz.U. z 2019 r. poz. 798); *Regulation of the Minister of the Environment of April 25, 2019 on the annual external audit of the organization of recovery of electrical and electronic equipment and processing plants (Journal of Laws of 2019, item 798);*

Rozporządzenie Ministra Środowiska z dnia 14 czerwca 2018 r. w sprawie szczegółowych stawek opłaty produktowej dla grup sprzętu (Dz.U. z 2018 poz. 1194); *Regulation of the Minister of the Environment of June 14, 2018 on detailed product fee rates for groups of equipment (Journal of Laws of 2018, item 1194);*

Rozporządzenie Ministra Środowiska z dnia 16 grudnia 2016 r. w sprawie wzoru zaświadczenia potwierdzającego recykling oraz wzoru zaświadczenia potwierdzającego inne niż recykling procesy odzysku (Dz. U. z 2016 poz. 2213); *Regulation of the Minister of the Environment of December 16, 2016 on the template of a certificate confirming recycling and the template of a certificate confirming recovery processes other than recycling (Journal of Laws of 2016, item 2213);*

Rozporządzenie Ministra Środowiska z dnia 29 kwietnia 2019 r. w sprawie zaświadczenia o zużytym sprzęcie (Dz.U. z 2019 r. poz. 818); *Regulation of the Minister of the Environment of April 29, 2019 on the certificate of waste equipment (Journal of Laws of 2019, item 818);*

Rozporządzenie Ministra Środowiska z dnia 21 lipca 2017r. w sprawie minimalnych rocznych poziomów zbierania zużytego sprzętu elektrycznego i elektronicznego (Dz.U. z 2017 poz. 1499); *Regulation of the Minister of the Environment of July 21, 2017 on minimum annual levels of collection of waste electrical and electronic equipment (Journal of Laws of 2017, item 1499);*

Rozporządzenie Ministra Środowiska z dnia 19 stycznia 2018 r. w sprawie wysokości stawek opłaty rejestrowej oraz opłaty rocznej (Dz.U. z 2018 r. poz. 184); *Regulation of the Minister of the Environment of January 19, 2018 on the rates of the registration fee and the annual fee (Journal of Laws of 2018, item 184);*

Rozporządzenie Ministra Klimatu i Środowiska z dnia 13 grudnia 2022 r. w sprawie metody oraz szczegółowego sposobu obliczania minimalnego rocznego poziomu zbierania zużytego sprzętu elektrycznego i elektronicznego (Dz.U. z 2022 r. poz. 2704) *Regulation of the Minister of Climate and Environment of December 13, 2022 on the method and detailed method of calculating the minimum annual level of collection of waste electrical and electronic equipment (Journal of Laws of 2022, item 2704)*

**Positive aspects of Poland performance includes the following:**

PAYT systems are designed to incentivise citizens to make a bigger effort in separating their waste at source. However, a PAYT system should be designed with the appropriate level of source separation encouragement to ensure that citizens do not misplace waste in recycling bins in order to avoid residual waste charges. Overall, PAYT usually has a positive effect on source separation and thus recycling rates through direct involvement of citizens.

According to the Ministry of Climate and Environment (2021), Poland has a PAYT system in use, but it is targeted only to non-household waste producers. The system is based on collection frequency and declared number of bags or containers. According to a 2021 survey, out of the 1868 responding municipalities, around 73 % indicated to use PAYT based fees for municipal waste from non-household waste producers. (Ministry of Climate and Environment, 2021).

**Potential Issues includes the following:**

The reasons for this can be attributed to a number of factors, in particular:

- the inconsistent reporting system in Poland, as a result of which municipal reports are not included:
  - the mass of WEEE collected by distributors at points of sale, in accordance with Article 37 of the Waste Electrical and Electronic Equipment Act,
  - the mass of WEEE collected by NGOs, recovery organisations and similar bodies at educational establishments, retail outlets, areas adjacent to churches, etc,
  - the mass of WEEE collected by casual scrap collectors,
- low public awareness, resulting in, among other things:
  - WEEE being left at rubbish bins and displayed at so-called 'bulky waste auctions', from where it is collected by unauthorised operators who illegally dismantle and dispose of it in ways that are unlawful and unmanageable and detrimental to the environment,
  - WEEE collection in households,
  - the disposal of WEEE in mixed waste
- lack of economic incentives for residents to manage WEEE in a way that increases the efficiency of the municipal waste management system in Gdańsk,

low effectiveness of penalties for inappropriate handling of WEEE and inability to penalise the entire community of residents (cooperatives, communities) for incidents of display of rtv and WG equipment by individual residents as part of bulky waste displays.

### 3.6.1. General analysis of situation in the Country

The functioning of the waste management system depends on many factors that vary in time and space. These include: spatial accessibility between the entity generating waste - the entity collecting waste - the entity managing/processing waste, the degree of centralization or decentralization of the system, population density, ecological awareness of society, organization of waste collection and transport, mass of waste generated. Moreover, different waste management models have developed in Poland depending on the voivodeship, which is a consequence of statutory changes in the organization of the waste management system and the lack of precise guidelines in the delimitation of Municipal Waste Management Regions (RGOK). Actions aimed at organizing waste management should go beyond the objectives that are included in the framework of EU directives and national and provincial strategies. Generally, these activities should include activities enabling the transformation of the economy from linear to circular, i.e. one in which the product life cycle is closed and waste arising from production or consumption is reused. One of such activities is the appropriate management of the waste management system, the principles of which are included in the Waste Act of 2012, i.e. the so-called "waste law". From a spatial point of view, the most important element of waste management is the appropriate optimization of the system's operation, which includes:

- delimitation of Municipal Waste Management Regions (RGOK),
- location of installations collecting waste from entities generating waste,
- arrangement of waste management and processing installations,

- variation in the amount of waste generated in space. The research presented in the article is based on the above-mentioned. factors. The aim of the study is to assess the division of the country into individual RGOKs and to identify the differences between them in the context of the above-mentioned factors. RGOK was vectorized based on data available in the voivodeships' waste management plans. The analyzes were carried out with full awareness of the differences in the size of the reference units, which was intentional, enabling the assessment of individual RGOKs. However, assessing the efficiency (effectiveness) of the system's operation is a separate issue. Considerations on this topic were not undertaken in the presented work and focused on the diversity of reference units on a country scale.

**The article is divided into four main parts:**

1. review of research in the field of waste management,
2. description of legal conditions,
3. analytical part consisting of a description of methods and presentation of results
4. conclusions.

In Poland, the Act on waste electrical and electronic equipment has been in force since October 2005 (consolidated text: Journal of Laws of 2022, item 1622, as amended). It introduces a ban on throwing WEEE into regular garbage containers and obliges society to properly dispose of WEEE.

- producers and importers of this equipment are obliged to organize and finance a collection system from WEEE collection, transport, processing and recycling points;
- electrical and electronic equipment recovery organizations are enterprises established by producers and importers - they ensure WEEE recycling;
- municipalities should provide citizens with the opportunity to transfer WEEE free of charge;
- retailers and wholesalers trading in electrical and electronic equipment are obliged to accept WEEE from the customer free of charge in an amount not greater than the new equipment sold, on a "1 for 1" basis, e.g. a refrigerator for a refrigerator, a fluorescent lamp for a fluorescent lamp;

Penalties for improper handling of electronic devices, i.e. placing used equipment together with other waste, are subject to a fine, which currently amounts to PLN 5,000.

Waste electrical and electronic equipment, so-called ‘electro-scrap’ or electro-waste, is a waste increasingly generated in highly developed countries. The relentless pursuit of comfort, improved quality of life and rapid technological progress is resulting in products with ever shorter life cycles becoming ‘electro-waste’. In our country, the rules for handling waste electrical and electronic equipment are laid down in the Waste Electrical and Electronic Equipment Act and its implementing regulations. It imposes obligations (including financial ones) on the producer of equipment, i.e. the entrepreneur who manufactures and markets equipment (under its own label), on the system for managing such waste and on Poland as a member state of the EU. The rules also apply to those who trade in equipment produced by another business entity and market it (under their own brand).

Polish and EU laws impose a number of obligations on WEEE producers, marketers (manufacturers, importers, sellers), and collectors and processors of the resulting electrical and electronic waste. Irregularities in its functioning may pose a threat to the environment through the release of harmful compounds, as a result of irregularities in the recovery and recycling processes, pose barriers to the implementation of the GOZ strategy, but also economic losses associated with both the storage of raw material fractions that could be used, and financial penalties for not achieving recovery and recycling levels. Electrical and electronic waste is a source of potential secondary raw materials, from which recoverable and recyclable waste must be dismantled and separated before disposal. Waste electrical and

electronic equipment is treated as a separate group of waste introduced due to its separation by law. It is produced both in households and in the commercial sector. Often abbreviated as WEEE (Waste of Electrical and Electronic Equipment), it includes waste constituting a separately described group such as bulky waste (waste household appliances and rtv equipment) and hazardous waste (elements of electrical and electronic equipment containing components with properties or effects hazardous to the environment, used refrigerators containing freons and compressor oils).

When recognising and analysing the risks in WEEE management with regard to the equipment introducer, it is possible to speak of the risk of not collecting a sufficient amount of WEEE resulting from the amount of new equipment placed on the market. According to the Waste Electrical and Electronic Equipment Act, the equipment marketer is obliged to achieve minimum annual collection rates of waste equipment, which are:

1) from 1 January 2018 to 31 December 2020 – not less than 40% of the average annual weight of equipment placed on the market, and in the case of equipment belonging to equipment group No. 3 defined in Annex 1 to the Act – not less than 50% of the average annual weight of equipment placed on the market;

2) as of 1 January 2021 – not less than 65% of the average annual weight of equipment placed on the market or 85% of the weight of waste equipment produced in the territory of the country.

For an electro-waste management plant, one can speak of economic risks concerning production, commercial and financial activities. One can speak of the risk of not achieving the expected profits in view of, for example:

- incurring excessive costs for organising and operating the plant (e.g. purchase of inadequate or energy-intensive equipment, sub-optimal transport of waste from collection points to the recovery facility),
- “technology barrier”, i.e. the lack of appropriate facilities to treat certain types of WEEE,
- lack of marketability of recovered raw materials due to poor market conditions,
- not enough electro-waste collected from residents due to poor education or poor organisation of the collection system,
- destruction of electro-waste or recovered raw materials due to improper storage or treatment (lack of thrift),
- strong global and local competition in the electro-waste market,
- activities of the ‘grey zone’, i.e. illegal waste management (without the required decisions and without complying with basic environmental protection requirements) and activities carried out in violation of the law in legally operating entities,
- insufficient financing of recovery organisations,
- penalties or restrictions as a consequence of non-compliance with national laws.

With regard to the issue of state risk, one can speak of the possibility of incurring:

- penalties or restrictions as a consequence of non-compliance with EU Directives,
- losing the chance to obtain raw materials ‘cheaply’ in the face of having to extract or import them from abroad,

- competition from foreign companies operating within or outside the country, skilfully extracting valuable raw material fractions from electro-waste

The examples given above show that the individual risks are not independent. At the same time, each of them can be regarded as a dynamic risk, the variability of which over time is related to changes in economics, technology, user preferences, level of consumerism, dynamics of the waste market, residents' wealth and lifestyles, environmental education or lack thereof, and many other factors. The management of the risks associated with electro-waste should be economic and social and take into account the principles of sustainability in different areas, e.g. in the raw materials sector, with regard to the environment, the impact on it, as well as the benefits of proper waste management.

Poles buy 2.3 million TVs per year, 12-13 million mobile phones, 3.5 million washing machines and other large household appliances. Selected information on possible volumes of raw material recovery is given below:

- The average composition of a printed circuit board is approximately 40 % metals, 30 % glass fibres and plastics and 30 % resins. Among the metals are by weight: copper 10 – 27 %, aluminium 1.3 – 4.8 %, lead 1 – 4.2 %, zinc 0.2 – 2.2 %, nickel 0.3 – 2.4 % iron 1.2 – 8 %, tin 1 – 5.3 %, antimony 0.06 – 0.4 % and gold 80 – 1000 ppm, platinum 4.6 – 30 ppm, silver 110 – 3300 ppm, palladium 10 – 290 ppm. According to data from electro-scrap processors, the annual processing of 1800 – 2000 tonnes of PCBs yields up to 200 kg of copper, up to 50 kg of tin and lead and small amounts of gold, silver and platinum,
- From a used computer and monitor weighing 27 kg, the following can be recovered: up to 6.8 kg of glass; 6.2 kg of plastic; approx. 5.6 kg of steel; approx. 3.8 kg of aluminium; approx. 1.9 kg of copper; 1.7 kg of lead.

It is nowadays considered that no human activity, installation or facility is free of risk. In colloquial terms, risk is understood as the possibility of a so-called harmful (dangerous, undesirable) event occurring, resulting in losses (e.g. financial), damage (e.g. to health, environment) or other negative effects. To reduce the chance of harmful scenarios occurring and to ensure that losses are minimised, risk management is required.

In terms of environmental risks for waste management, WEEE in particular, it is possible to talk about risks:

- environmental pollution, as both the disposal of electro-waste by dumping it on so-called "wild dumps" or in the container intended for municipal waste (if it is not later rejected during the selection at the plant and ends up in a landfill or in an incineration plant) and non-professional dismantling (with the aim of recovering valuable raw materials, e.g. copper, but without recovering or recycling the remaining hazardous components) will result in the release of hazardous or toxic substances into the air, soil or groundwater,
- the need to extract raw materials that are not recovered from electro-waste, which in the extreme case could lead to a breach of sustainability (depletion of natural resources too quickly and unnecessarily) and a breach of the principles of a circular economy,
- the need to close landfill sites too quickly as a result of a lack of reduction in the mass to be landfilled and the unnecessary occupation of space by mainly bulky waste, which in the long term could lead to a new landfill site being opened and adverse changes to the landscape,
- putting the health and lives of people "collecting equipment unprofessionally" and carrying out dismantling and recovery "on their own" with primitive methods, without specialised equipment and in inadequate facilities, and putting the health of residents in neighbourhoods where

someone is recovering unprofessionally (e.g. by smelting or burning cables or dismantling refrigerators) at risk

Raw fractions including heavy metals, which are part of electrical and electronic waste, introduced into the environment in small doses at a time over a long period of time can cause environmental hazards and chronic poisoning in humans. Hazardous waste in municipal waste includes: fluorescent lamps (fluorescent tubes, mercury vapour lamps, etc.), batteries, batteries, paints and varnishes and waste electrical and electronic equipment. The table below shows the content of selected heavy metals in the printed circuit boards of various types of electrical and electronic equipment

### 3.6.2. Main actors in the policy

***International No E-waste Day***

A cyclical event, celebrated in October, aimed at drawing attention to the issue of e-waste. The initiative was initiated by the international organization WEEE Forum. A program of educational activities addressed to consumers, media, institutions and entrepreneurs is being implemented. The first edition, which took place in 2018, took place in over 40 countries around the world, including: in Great Britain, Austria, Norway, Italy, as well as in Australia and Canada. On October 13, we celebrated the International No E-Waste Day for the sixth time. This year's motto of the event is "Recycle everything that runs on batteries or has a plug." The slogan aims to draw attention to "invisible" e- waste - electronic items that we often do not associate as e-waste and are not sent for recycling.

More at www.dzienbezelektrosmieci.pl

***Educational Program "My city without electronic waste"***

This is an idea for real assistance for local governments in implementing the provisions regarding waste electrical and electronic equipment resulting from the amendment to the Maintenance Act Order and Cleanliness in Municipalities. The program is addressed to primary schools and kindergartens

and municipalities. Educational institutions receive packages of free educational materials and have the possibility of using the Educational Fund, under which they can provide schools with aids didactic. However, local governments can count on building an effective WEEE collection system under the program. The program is implemented in thousands of educational institutions throughout Poland, including the Bielsko County. Many schools can boast of receiving awards for collecting e-waste.

More at www.mmbe.pl

***Public educational campaign "No longer lit? "Deliver it to the electronic waste bin"***

This is a campaign that was launched in October 2019. The aim of the campaign is to provide broad education in the proper handling of used lighting equipment. Such equipment does not pose a threat when properly managed, and is also a valuable source of secondary raw materials, which is one of the key goals of the campaign. Almost 90 percent materials from used lighting equipment obtained in recovery and recycling processes can be reused. Recovery processes produce many valuable raw materials: glass, aluminum, phosphor and metallic mercury. As part of the campaign, a comic book "Żarosław on the trail" was created. The idea of creating a comic book was born out of concern for our planet. By following the neighborhood adventures of the detective and other characters, you can learn what used lighting is and that used lighting also includes electronic waste. In addition, you can receive valuable tips on how to

properly dispose of used lighting. The comic also explains the benefits of recycling used lighting, and debunks myths regarding improper handling of used lighting.

More at *www.zuzyteoswietlenie.pl*

***Point of selective collection of Municipal waste (PSZOK)***

PSZOK is a place specially organized for commune residents where they can leave municipal waste, especially waste that should not be thrown into household containers/bags, such as:

- large-size,
- construction, renovation and demolition waste,
- green waste,
- used tires,
- e-waste, i.e. electrical and electronic equipment, as well as batteries and accumulators,
- expired medicines and chemicals, waste that does not qualify as medical waste generated in households (needles and syringes).

*PSZOK in the Bielsko region (city Rybarzowice)*

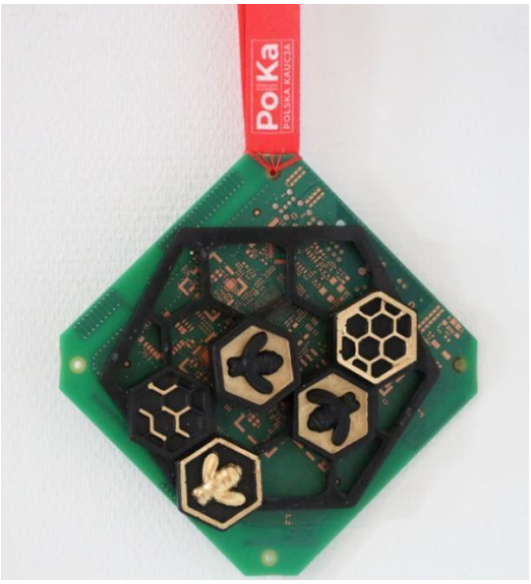
PSZOK accepts only municipal waste, segregated, without contamination in a way that allows for its selective collection, originating from properties located in a given area for which PSZOK is created.

***Red conteiners***

The Bielsko region takes part in the "Electric waste" project, under which red bins (containers) for used electrical and electronic equipment are placed in cities and villages.


*Red conteiners fot. Jacek Kachel*

Waste is collected free of charge. It is also possible to report the collection of electronic waste by phone or via an electronic form. The equipment will be collected within 72 hours of receiving the notification. The returned equipment must be complete. Waste is collected free of charge. There is 36 red conteiners in Bielsko Region.




*Recycling medal*

The EKOcity certificate and recycling medal went to Bielsko-Biała for its huge contribution to education about e-waste and for collecting over 50 tons (in 2023) of e-waste in special red containers!

In 2021, Bielsko-Biała signed an agreement with MB Recycling as a result of which 28 were installed free of charge in our city.

***RE-PACZKA (Re-pack)***

Although we have more and more equipment, it is difficult to get rid of electronic toys that children have long forgotten, impractical decoders, unused phones and cameras. Accumulated in houses and apartments for months, and sometimes even years, they clutter up the space. So, it's worth giving them a second life. As part of a joint initiative of the Odzyskaj Środowisko (Reclaim the Environment) Foundation and a private logistics operator specializing in parcel shipping ("InPost"), you can send unnecessary equipment using a parcel locker completely free of charge. Just prepare the parcel, complete the form available at https://re-paczka.pl/ and send it without any additional conditions or fees.


*Re-pack*

You can donate laptops, computers, phones, tablets, small household appliances, radios, audio, video and photographic equipment, power tools, electronic toys, and even drones or sports equipment. However, you cannot send batteries, light sources, medical or chemical waste or incomplete equipment. The package will go to a professional company where it will be checked for efficiency and reusability, in accordance with the "reuse" principles.

The cost of producing a new device and its carbon footprint are much higher than an item that can be reused, so the environmental benefit is very large.

When RePaczka contains equipment, whose service is not possible or exceeds the production cost, the device will be transferred to professional processing plants and recycled.

***ECO-EDUCATIONAL BOARDS ON WASTE MANAGEMENT***

Boards informing about how to properly segregate waste and how it can be reused (including waste electrical and electronic equipment) are placed every year in new locations in the Bielsko region. During the walks you can learn, among others: what is the path of waste from disposal to processing and how to segregate it properly.


*Eco-education boards*

***PROGRAM: "EVERY PRESCHOOLER KNOWS WHAT HAPPENS TO WASTE!"***

A local educational program addressed to the youngest, the aim of which is to develop appropriate ecological attitudes among preschoolers and promote the idea of zero waste.

As part of the project, children can learn how to properly segregate waste and what are the possibilities of giving it a "new life".

*Source:* *https://przedszkole25-bielsko.pl/aktualnosci/warsztaty-edukacyjne-kazdy-przedszkolak-wie-co-z-odpadami-dzieje-sie*

Children are particularly sensitive to the world around them, which is why it is so important to awaken the love of nature in the youngest and teach them pro-ecological behavior. Their commitment and knowledge of environmental protection is crucial to the future of the planet.

### 3.6.3. National and regional education strategies

In order to achieve collection levels, Member States are required to establish collective and/or individual systems, appropriate and accessible collection points, and to take and promote actions to increase collection (e.g. national public awareness campaigns). The person placing the equipment on the market is obliged to conduct public educational campaigns regarding the equipment he has placed on the market. The obligation may be performed by the person introducing the equipment himself or through an electrical and electronic equipment recovery organization. The term "public educational campaign" is understood to mean any activity aimed at raising the level of ecological awareness of society and supporting the achievement of a high level of waste equipment collection, including information about the possible impact of waste equipment on the environment and human health and about the proper handling of waste equipment, in particular on separate collection methods, available return systems and the role of equipment users in contributing to the reuse and recovery, including recycling, of used

equipment, including mass media campaigns, information leaflets and brochures, posters, competitions, conferences and events information and education.

Nowadays, ecological issues are becoming more and more popular. This is related to the increasing awareness of society about the threats that may occur in the natural environment. In Poland, it is possible to expand professional competences, among others: by obtaining the title of waste management technician, completing studies specializing in Waste Management at the engineering

level or undertaking postgraduate studies in waste management. Graduates of these fields of study acquire knowledge, skills and professional competences in the field of legal provisions related to waste management, organization of waste management in the sector of large and small enterprises and administration at various levels, the scope of monitoring in waste management, methods of waste recovery and recycling, technologies for the management of selected waste. industrial, biological and thermal methods of waste processing or transformation, operation of investment projects in waste management, operation and recultivation of landfills, and procedures for assessing the impact of projects related to waste management on the environment. In addition, the proposed fields of study will allow for the transfer, systematization and expansion of theoretical knowledge on air protection, environmental management and monitoring, waste management and related legal aspects, as well as the basics of using technologies and management information systems.

# 4. EU POLICY

The environmental policy of the European Union (EU) regarding waste management is grounded in the objective of ensuring a high level of environmental protection while considering the unique circumstances and challenges faced by different regions within the EU. This policy is manifested in Directive 2008/98/EC on waste, which serves as a cornerstone of EU legislation in this area. Subsequent amendments, such as Directive (EU) 2018/851, have further refined and augmented these provisions, particularly within the context of advancing the circular economy.

It sets out the legal framework for waste management in the European Union (EU). It aims to protect the environment and human health by emphasizing the importance of proper waste management, recovery and recycling techniques to reduce pressures on resources and improve their use. The key point of the directive is an establishment of a waste hierarchy with the following principles:

- Prevention
- Preparing for reuse
- Recycling
- Other recovery (e.g., energy recovery)

The directive also introduces the concept of the waste hierarchy, which prioritizes actions such as waste prevention and recycling over disposal.

Central to the directive is the principle of the "polluter pays," which mandates that the costs associated with waste management should be borne by those responsible for producing the waste. This principle serves as a crucial mechanism for incentivizing producers and consumers to adopt more sustainable practices and reduce waste generation.

The amendment introduced by Directive (EU) 2018/851 further strengthens the EU's commitment to the circular economy by setting more ambitious targets for waste prevention and recycling. It underscores the need to transition towards a more resource-efficient and sustainable economic model, where waste is minimized, and valuable resources are kept in circulation for as long as possible.

Additionally, the directive lays the groundwork for specific measures aimed at addressing various waste streams and sectors. For instance, it provides a framework for managing electronic and electrical equipment waste (WEEE), packaging waste, and hazardous substances in electrical and electronic equipment (RoHS).

Directive 2018/852/ES specifically targets packaging and packaging waste. It mandates measures to prevent the generation of packaging waste, promote reuse, recycling, and other forms of recovery, and contribute to the transition to a circular economy. Member states are required to increase the proportion of reusable packaging and implement schemes to facilitate environmentally friendly packaging reuse.

Moreover, legislation concerning WEEE aims to regulate the management of electronic and electrical equipment waste uniformly across EU member states. Directives such as 2012/19/EU and 2012/65/EU establish extended producer responsibility for the proper treatment of WEEE. Producers are obligated to ensure the separate collection, treatment, and recycling of WEEE, thereby contributing to resource conservation and environmental protection.

The RoHS Directive (2011/65/EU) complements these efforts by restricting the use of hazardous substances in electrical and electronic equipment. This directive promotes environmentally sustainable manufacturing practices and reduces risks to human health and the environment posed by hazardous substances.

The EU's waste management directives and regulations form a comprehensive framework for promoting sustainable waste management practices, fostering resource efficiency, and advancing the transition to a circular economy. These measures reflect the EU's commitment to environmental protection, resource conservation, and sustainable development.

## 4.1. Circular Economy Action Plan

The resource efficiency potential of WEEE was iterated in the first Circular Economy Action Plan, which underlined the importance of critical raw materials for the EU and in particular those present in electronic devices and also announced legislative and non-legislative actions to increase the low level of recovery of such critical raw materials.

Decoupling economic growth from resource use and shifting to circular systems in production and consumption is key to achieving EU climate neutrality by 2050.

In March 2020, the Commission presented a new circular economy action plan, on which the Council adopted conclusions in December 2020. The conclusions also highlight the role of the circular economy in ensuring a green recovery from COVID-19.

The action plan envisages over 30 action points on designing of sustainable products, circularity in production processes and empowering consumers and public buyers. It targets sectors such as electronics and ICT, bateries, packaging, plastics, textiles, construction and buildings, and food.

In June 2023, the Council adopted its negotiating position on the construction products regulation. The proposed regulation sets new requirements to ensure that the design and production of construction products make these more durable, repairable, recyclable and easier to re-manufacture.

The European Commission furthermore supported the implementation of the WEEE Directive through various initiatives such as reports reviewing some of its aspects including targets and preparation for reuse, a compliance promotion initiative and technical studies.

The electronics sector and ICT have also been identified as a “key product value chain” under Commission’s second Circular Economy Action Plan. The CEAP 2020 in this respect envisages the following measures:

1. Regulatory measures for electronics and ICT including mobile phones, tablets and laptops under the Ecodesign Directive (2009/125/EC), so that devices are designed for energy efficiency, durability, reparability, upgradability, maintenance, re-use and recycling;
2. Focus on electronics and ICT as a priority sector for implementing the ‘right to repair’, including a right to update obsolete software;
3. Regulatory measures on chargers for mobile phones and similar devices, including the potential introduction of a common charger, improving the durability of charging cables and incentives to decouple the purchase of chargers from the purchase of new devices; and
4. Improving the collection and treatment of waste electrical and electronic equipment including by exploring options for an EUwide take back scheme to return or sell back old mobile phones, tablets and chargers.

## 4.2. Circular Electronics Initiative

Under the European Green Deal, the European Commission presented in March 2020 a New Circular Economy Action Plan, in which it announced a circular electronics initiative that would promote longer product lifetimes and include, among others, the following actions:

- Regulatory measures for electronics and ICT including mobile phones, tablets and laptops under the Ecodesign Directive;
- Implementation of the 'right to repair', including a right to update obsolete software;
- Regulatory measures on chargers for mobile phones and similar devices (including the introduction of a common charger);
- Improvement of the collection and treatment of waste electrical and electronic equipment;
- Review of EU rules on restrictions of hazardous substances in electrical and electronic equipment.

In the Commission work programme for 2021, published on 19 October 2020, the non-legislative initiative was announced for the fourth quarter of the year.

In its resolution of 10 February 2021 on the New Circular Economy Action Plan, the European Parliament supported the Circular Electronics Initiative, which should address the shortcomings in durability, circular design, presence of hazardous and harmful substances, recycled content, reparability, access to spare parts, upgradability, e-waste prevention, collection, reuse and recycling. It also called for the integration of issues linked to early obsolescence including product obsolescence caused by software changes, and for the harmonisation and improvement of recycling infrastructure for waste electrical and electronic equipment in the EU. It asked for a mandatory certification scheme for recyclers of electronics waste to guarantee efficient material recovery and environmental protection.

The European Commission adopted on 16 June 2023 measures to ensure that mobile phones and tablets are designed to be energy efficient and durable; consumers can easily repair, upgrade and maintain them; it is possible to reuse and recycle the devices.

The Commission put forward a proposal for a common charger for electronic devices on 23 September 2021. The legislative process is now completed, with the final act signed on 23 November 2022 and published in the EU Official Journal as Directive (EU) 2022/2380. In the Commission work programme for 2022, adopted on 19 October 2021, the revision of EU rules restricting the use of hazardous substances in electronics was announced for the last quarter of 2022.

On 22 March 2023, the Commission tabled a proposal for a directive on common rules promoting the repair of goods ('right to repair').

# 5.POLICY BEST SAMPLES ON WEEE MANAGEMENT

In the global landscape of rapid technological progress, the issue of electronic waste, often referred to as Waste Electrical and Electronic Equipment (WEEE), has gained significant attention. Effectively managing WEEE is not only crucial for preserving the environment but also for safeguarding human health and fostering economic development.

One effective strategy in WEEE management involves raising public awareness. Educating individuals about the proper disposal and recycling of electronic waste, highlighting the potential risks associated with improper handling, and emphasizing the advantages of participating in WEEE management initiatives are essential steps. This increased awareness can encourage responsible consumer behavior, promote recycling practices, and ultimately contribute to a more sustainable and healthier planet.

Numerous companies, both large and small, globally engage in efforts to extend awareness regarding the proper treatment of WEEE. However, this section will focus specifically on startups that have experienced significant growth in the past year, reaching the status of unicorns. These startups serve as notable examples of initiatives dedicated to addressing the challenges of electronic waste management.

## 5.2.1. Best Practice 1: The Wecycle Premium Pick-up Partners. NETHERLANDS

The Wecycle Premium Pick-up Partners offer a convenient service in the Netherlands for collecting small appliances. When customers receive a new large electrical appliance, they have the option to return their old small appliances to the delivery personnel. This service is a collaboration between Wecycle, the primary PRO (Producer Responsibility Organization), and EEE (Electrical and Electronic Equipment) sellers along with their logistics service providers.

At Wecycle Premium Pick-up drop-off points, consumers can not only dispose of large appliances like washing machines or refrigerators but also smaller electrical devices such as hair dryers, drills, laptops, mobile phones, desk lamps, or TVs.

For added convenience, consumers can use Jekko, a practical collection box for their home. They can neatly store used electrical appliances, batteries, and light bulbs in a central location and then easily hand them in for proper disposal or recycling.

*Key factors.*

The OPEN Foundation assumes legal producer responsibility for electronic waste (e-waste). Operating under the name Wecycle, they launch campaigns aimed at boosting the collection and recycling of e-waste in the Netherlands. Their approach involves enhancing public awareness and bolstering confidence in recycling practices.

In 2022, the OPEN Foundation, in collaboration with their partners across the supply chain, successfully collected a total of 159 million kilograms of e-waste. Additionally, over 11 million kilograms were routed to certified processors through metal recyclers, marking a 2% increase from the previous year. This effort marks a significant step toward minimizing the primary 'leakage flow' of e-waste. Furthermore, there's a continued emphasis on prolonging the lifespan of equipment, parts, and materials to reduce the influx of electrical waste into disposal streams.

E-waste collection points, including nearly 8,000 Wecycle return points, are strategically positioned at over 15,000 locations nationwide, including recycling centers, municipal facilities, petting zoos, retailers, and technical wholesalers. Consumers are already familiar with the accessibility of Wecycle points throughout the Netherlands.

Despite a declining percentage of e-waste ending up in standard waste bins, the focus remains on increasing collection rates, promoting repairs, reuse, and sales, and ensuring responsible processing of discarded equipment and materials. Each device's proper disposal is paramount.

To further encourage municipal collection efforts, a benchmark for recycling centers was introduced in 2022, which tracks e-waste collection rates per municipality and the resulting CO2 emissions reduction.

In addition, the groundwork for Wecycle for companies was laid in 2022, culminating in its official launch in early 2023. This online platform provides businesses, clubs, and foundations with information on proper disposal methods for various electrical waste items, ranging from lamps and flat screens to solar panels and ICT equipment. It also offers insights into whether compensation is available for surrendered electrical waste, fostering responsible collection and processing practices within the business community.

### 5.2.2. Best Practice 2: Aiven. FINLAND

A lesser-known startup that achieved unicorn status in the past year is Aiven. This company specializes in offering a cloud data platform that encompasses fully managed open-source databases, streaming, and search applications, among other services. Since its establishment in 2015, Aiven has emerged as a significant player in the tech sector by simplifying the complexities of setting up and managing cloud databases. This streamlined approach enables developers to concentrate on application development rather than infrastructure management.

Aiven's services are accessible across all major cloud platforms, including AWS, Google Cloud, and Azure. This widespread availability, coupled with their dedication to leveraging open-source technologies, has positioned Aiven as an appealing option for numerous organizations seeking to innovate and scale their data-intensive applications.

In addition to its core tech offerings, Aiven actively contributes to Waste Electrical and Electronic Equipment (WEEE) management. They advocate for the proper treatment of electrical and electronic devices at the end of their lifespan, thereby enhancing awareness among their clients. Aiven conducts various awareness campaigns aimed at educating both its customers and the broader public about the significance of responsible e-waste management.

Furthermore, by delivering cloud-based services, Aiven plays a role in reducing the demand for physical hardware, consequently potentially mitigating electronic waste. Cloud-based solutions facilitate more efficient utilization of hardware resources, thereby reducing the necessity for new devices and extending the lifespan of existing ones. This indirect contribution to e-waste reduction aligns with Aiven's commitment to sustainability and responsible technology usage.

*Key factors.*

Aiven provides data infrastructure elements in the form of a service. They don't engage in license sales nor do they own servers; rather, they handle the management of data infrastructure on behalf of their clients.

Data infrastructure encompasses all components within a company's IT system that handle data processing. This can include databases for information storage, data brokers facilitating data exchange with other systems, visualization solutions, analysis tools, monitoring and metrics platforms, search engines, cache systems, and connectors for seamless integration with other systems.

By leveraging open-source software (OSS), Aiven and their clients ensure they avoid vendor lock-in situations. Open source offers numerous advantages beyond this. Development occurs transparently, making access to tools more accessible, and the software itself is available to anyone in need.

The global and extensive developer community associated with open source ensures a wide range of expertise and continuous scrutiny of code. Consequently, security and reliability tend to be superior in the open-source realm compared to proprietary software alternatives.

### 2.2.3. Best Practice 3: WEEE Ireland Public Collection Day Events. IRELAND

WEEE Ireland operates as a not-for-profit organization dedicated to ensuring cost-effective compliance on behalf of its Producer Members. Representing a significant portion of the Irish battery and household electrical and electronic industries, WEEE Ireland serves producers with responsibilities outlined in the EU Battery Directive 2006/66/EC and the WEEE Directive 2012/19/EU. These directives mandate the organization to manage and finance the environmental disposal of products at their end of life.

Established in 2005, WEEE Ireland has maintained its status as the preferred scheme in Ireland, boasting a majority market share across various sectors. Operating under the approval of the Minister for the Environment, Climate, and Communications, the organization collaborates closely with partners in local authorities and community recycling groups. In 2019 alone, WEEE Ireland collected 835 tonnes of WEEE, with targeted promotion efforts driving a 17% increase compared to 2018.

Through initiatives such as public collection events, which are heavily promoted through various channels including press, radio, PR, social media, and local community networks, WEEE Ireland aims to enhance operational efficiencies and achieve positive outcomes. These events, held in partnership with local authorities, civic amenity centers, and participating electrical retailers, offer an excellent opportunity for households to dispose of their electronic waste responsibly, thereby reducing the detrimental practice of binning and preserving valuable materials.

One notable event took place in Galway, where residents were encouraged to participate in a free collection day organized by WEEE Ireland in collaboration with the University of Galway. This event, held on September 21, welcomed household items equipped with plugs, batteries, or cables, including washing machines, TVs, toasters, kettles, electronic tools, toys, cables, IT equipment, mobile phones, remote controls, batteries (including farm fence batteries), and even watches, all at no cost to participants. Such initiatives play a crucial role in helping counties meet national e-waste recycling targets for 2023 while promoting environmental stewardship among communities.

*Key factors.*

WEEE Ireland showcased its Scheme as a prime Case Study at the European Commission's Compliance Promotion exercises held in Dublin and Brussels. During this period, they achieved significant milestones, including:

- Expanding Membership numbers by another 30% to surpass 1300 Producers.
- Sustaining and bolstering their dominant market share.
- Offering EPR support for emerging technologies across both WEEE and Battery Sectors.
- Introducing additional collection programs to address growing takeback challenges.
- Redirecting over 225,000 tonnes of waste towards recycling and recovery initiatives.

Additionally, WEEE Ireland forged partnerships with indigenous Irish treatment operators to fortify national recycling and recovery infrastructure in alignment with EN 50625 standards. They actively contributed to the formulation of new circular economy policies and regulatory frameworks for WEEE and Battery sectors in Ireland and Europe through engagement, submissions, and expert insights.

Their compliance services were further extended through collaborations with the pan-European WEEE Europe platform, as well as the EUCOBAT and WEEE Forum Centers of Excellence. WEEE Ireland led initiatives in research and development (R&D) and Circular Economy (CE) innovation programs, co-funding and partnering with EPA Strive and CIRCULÉIRE.

With a commitment to social responsibility, WEEE Ireland contributed over €250,000 in corporate sponsorship, with cumulative donations exceeding €500,000 over the last decade, to LauraLynn Children's Charity, fostering increased participation in battery and small WEEE recycling.

They actively promoted WEEE and Battery takeback initiatives and environmental management messages through comprehensive Communications Programs, featuring far-reaching campaigns.

Anticipating a Whole of Government Circular Economy Strategic focus and the next phase of Scheme Approval from 2022, WEEE Ireland launched its new Circular Vision strategy. This forward-looking approach aims to align with evolving regulatory landscapes and promote sustainable practices in the management of electrical and electronic waste.

### 2.2.4. Best Practice 4: Ecolight Consortium. ITALY

Ecolight serves as a trusted partner for companies, institutions, independent contractors, and Organized Large-scale Distributions, facilitating integrated waste management solutions. This Italian company has introduced innovative smart bins designed specifically for the collection of small WEEE, in alignment with the requirements of the Italian Decree Uno contro Zero ("one against zero").

At Ecolight, environmental protection and compliance with regulations are fundamental principles. The company operates through an authorized logistics network and certified facilities for waste treatment, ensuring adherence to high-level standards of recovery and disposal. Ecolight prioritizes sustainability and regulatory compliance, striving to contribute positively to environmental preservation while meeting the needs of its diverse clientele.

*Key factors.*

The Ecolight Consortium in Italy has introduced innovative smart bins tailored for distribution and commercial environments. Known as RAEE EcoIsoles (Italian for "WEEE Eco-islands"), these smart bins are specifically designed for the collection of small WEEE in accordance with the requirements of the Italian Decree Uno contro Zero ("one against zero").

Featuring compact dimensions (1.5 x 1.2 x 1.5 meters) and fully automated operation, these bins serve as efficient tools for collecting various types of small electronic waste, including mobile phones, small household appliances, light bulbs, and energy-saving lamps. Strategically positioned in urban areas near major shopping centers, the WEEE eco-islands ensure convenient accessibility for citizens.

The operation of these eco-islands involves consumer registration (via the regional health card), waste identification, and separate disposal based on waste type. Upon completion, the machine issues a receipt confirming the waste delivery. A monitoring system notifies technicians via text message when internal containers reach full capacity, prompting timely emptying. Furthermore, a comprehensive tracking system monitors the waste from delivery to treatment and recovery stages.

Presently, there are 30 operational WEEE eco-islands located across the regions of Emilia Romagna, Veneto, Lazio, Lombardia, and Toscana, highlighting the ongoing commitment of the Ecolight Consortium to efficient waste management and environmental sustainability.

### 2.2.5. Best Practice 5: Bolt. ESTONIA

Bolt, a recent unicorn in the tech industry, has made significant contributions to the management of Waste Electrical and Electronic Equipment (WEEE). Founded in August 2013, this Estonian mobility company offers a diverse range of services, including ride-hailing, micro-mobility rental, food and grocery delivery, and car-sharing.

Operating in over 500 cities across more than 45 countries in Europe, Africa, Western Asia, and Latin America, Bolt boasts a customer base exceeding 150 million and collaborates with over 3 million driver and courier partners.

Bolt's prominence stems from its innovative approach to mobility. As the first European mobility super-app, it provides superior alternatives for various transportation needs, reducing reliance on private cars. This approach has positioned Bolt as a preferred choice for individuals seeking convenient access to services via smartphones.

Moreover, Bolt demonstrates a strong commitment to sustainability. The company actively addresses its carbon footprint by offsetting the CO2 emissions generated by its transportation and delivery solutions. As one of the few mobility companies globally to offset carbon emissions for all rides, Bolt invests in projects aimed at reducing carbon dioxide levels in the atmosphere. Consequently, all Bolt rides are rendered 100% carbon-neutral, underscoring the company's dedication to environmental responsibility and contributing positively to local ecosystems.

*Key factors.*

Bolt allocates a portion of its budget to its e-scooter project, aiming to recycle electric scooters at the end of their lifecycle. This initiative significantly reduces hardware waste and aligns with circular economy principles, ensuring sustainable scooter operations. By prioritizing the use, reuse, maintenance, and repair of resources, Bolt minimizes waste and diminishes the demand for new raw materials through a robust recycling system.

Furthermore, Bolt integrates circular economy principles throughout the entire lifecycle of its products and services. This approach emphasizes resource efficiency and waste reduction through reuse and maintenance wherever feasible. Notably, Bolt has achieved a remarkable 92% reuse of electronic and electrical components within its electric scooter fleet. The remaining 8% consists of scooter batteries, which are safely recycled through partnerships with local providers.

In addition to its internal initiatives, Bolt actively contributes to Oslo's sustainability objectives as a member of Næring for Klima, a climate collaboration between the municipality and businesses. One of Oslo's key goals is to reduce greenhouse gas emissions by 95% by 2030. To support responsible waste management, Bolt collaborates with RENAS, a company with a network of partners specializing in various aspects of the recycling process. Within this network, Batkomp (formerly known as Yedlik) inspects and repairs scooter batteries, while Norsk Gjenvinning handles the recycling of remaining scooter waste materials, including wood, metals, plastics, rubber, and more. Through these partnerships and initiatives, Bolt demonstrates its commitment to environmental stewardship and sustainable business practices.

### 2.2.6. Best Practice 6: RefugeePhones. SWEDEN

Refugee Phones is an initiative dedicated to encouraging individuals and organizations to donate their old smartphones to refugees and migrants. Since its launch in Sweden a year ago, the initiative has successfully distributed over 6,000 smartphones, with a significant effort underway ahead of the planned demolition of the "Jungle" refugee camp in Calais.

RefugeePhones previously distributed thousands of prepaid cards and mobile phones to refugees between 2015 and 2017. Their operations relied on donations from mobile phone manufacturers and private individuals, as well as extensive collaboration with telecom operators. For instance, Sony Mobile directly donated handsets to the initiative in Sweden, while telecom companies like Telia and 3 contributed by donating SIM cards.

Operated from the UK, another organization called Phone Credit for Refugees facilitates direct payments from individual donors to provide credit for refugees in need. This coordination ensures that refugees have access to essential communication tools, contributing to their connectivity and support during challenging times. Through collaborative efforts and generous donations, Refugee Phones and Phone Credit for Refugees play crucial roles in providing vital assistance to refugees and migrants.

*Key factors.*

After ensuring the functionality of the devices, any data stored on the phones was erased, and the donated phones were reconfigured for distribution. The charity maintained an online order system, allowing refugees to submit applications for smartphones. Only high-quality phones suitable for reuse were donated, while phones of lesser quality were sold to an EPR scheme for recycling. This careful selection process ensured that refugees received reliable devices while also promoting sustainable practices through responsible recycling of electronic waste.

### 2.2.7. Best Practice 7: Back Market. FRANCE

Established in August 2014, this startup operates as an online marketplace specializing in the sale of refurbished electronic devices. Back Market has emerged as a transformative example in the electronics market, offering consumers an innovative alternative to purchasing new devices, which often come with hefty price tags.

*Key factors.*

By offering refurbished devices, Back Market provides consumers with the opportunity to purchase high-quality electronics at a reduced cost. This not only benefits individuals financially but also contributes to the reduction of electronic waste and the demand for new devices, thereby promoting environmental sustainability. This approach is in line with the principles of the WEEE directive, which emphasizes proper disposal of electronic waste and the reduction of wasteful consumption of natural resources.

Back Market's provision of refurbished devices extends the lifecycle of electronic products, ultimately reducing the volume of electronic waste that ends up in landfills. Moreover, the company's stringent vetting process for sellers ensures that all refurbished devices sold on their platform have been properly restored and tested, guaranteeing their quality and longevity.

In addition to these practices, Back Market plays a significant role in WEEE management by raising awareness among its clients. Through educational efforts, the company informs consumers about the environmental impact of electronic waste and highlights the benefits of purchasing refurbished devices. They also provide guidance on proper disposal methods for electronic devices at the end of their lifecycle, further promoting responsible e-waste management.

This educational approach empowers consumers to make informed decisions that align with both their financial interests and environmental concerns. In essence, Back Market is not merely selling refurbished electronics; they are advocating for a more sustainable and responsible approach to consuming electronics. This approach has a ripple effect, as informed customers can influence others, leading to a broader societal shift towards more sustainable consumption habits.

## 2.2.8. Best Practice 8: Revolut. ENGLAND

This corporation is a British financial technology company established on July 1, 2015, offering a comprehensive suite of digital banking services. Revolut's services encompass seamless money management, consolidated within a single app. Renowned for its innovative banking approach, Revolut has experienced remarkable growth, emerging as the most profitable unicorn in Europe in the past year.

As of 2023, Revolut boasts a customer base exceeding 18 million globally, earning accolades as a "tech superstar" and renowned for its rapid expansion and diverse feature set. However, Revolut's impact extends beyond financial success; the company has initiated a program to allocate part of its budget towards Waste Electrical and Electronic Equipment (WEEE) management, promoting the reuse of electronic devices.

This initiative involves the donation and refurbishment of redundant electronic equipment at the end of its lifecycle. In cases where refurbishment or reuse is not feasible, Revolut collaborates with trusted global partners to ensure responsible recycling of e-waste, preventing any material from ending up in landfills. Through these efforts, Revolut demonstrates its commitment not only to financial innovation but also to environmental stewardship, contributing to the sustainable management of electronic waste.

*Key factors.*

Revolut has implemented various initiatives to minimize its carbon footprint, including:

- Establishment of clear waste management protocols enabling sorting and recycling of general waste across all locations.
- Implementation of stringent e-waste management practices, focusing on the proper disposal and recycling of discarded electrical and electronic technologies.
- Introduction of a sustainable business travel policy aimed at reducing and offsetting emissions associated with corporate travel.
- Adoption of 100% renewable energy sources for powering their London and Vilnius offices, with plans to extend this policy to other areas as the company expands.
- Reduction of energy consumption by closing one floor of their London headquarters.
- Provision of access to the Cycle to Work scheme for all United Kingdom employees, promoting the use of environmentally friendly transportation options.

These measures underscore Revolut's commitment to environmental sustainability and responsible corporate citizenship.

# 6. Conclusions

The **Transnational Action Plan** for WEEE management in the Circular WEEEP project represents a significant step forward in addressing the complexities and challenges associated with WEEE across Central European countries. The plan is designed to unify regional and national policies, enabling the development of cohesive waste management practices across borders. With an approach rooted in collaboration, the plan leverages the diverse regulatory, infrastructural, and logistical strengths of each participating country to create a comprehensive framework that can be applied and sustained over time. A critical aspect of the Transnational Action Plan is the collaborative model it fosters among stakeholders, including public authorities, private companies, and civil society organizations. This cooperation is essential not only for implementing effective WEEE management practices but also for encouraging knowledge sharing and best practices across regions. By examining successful policies from partner countries and adapting them to regions with less advanced frameworks, the plan ensures that all stakeholders are equipped with the tools and strategies necessary for achieving sustainable WEEE management. This adaptive approach is vital in a transnational context, where diverse regulatory environments can often hinder unified waste management efforts. Focus on stakeholder engagement highlights the importance of each party's role in the sustainable management of WEEE. Public authorities are pivotal in aligning national and local regulations with transnational strategies, ensuring that the policies in place are not only effective within individual regions but also compatible with the broader goals of the project. Private companies, particularly those involved in production and retail, contribute by embracing eco-design and circular principles that enhance the longevity, repairability, and recyclability of electronic products. Consumers and civil society organizations, through education and awareness campaigns, play an equally important role by influencing responsible disposal practices and supporting recycling initiatives that align with the circular economy goals of the EU.

The plan also underscores the necessity for ongoing monitoring and reporting throughout its implementation phase, with provisions for continuous assessment of progress in each region. This monitoring ensures that the project remains flexible and responsive to changing conditions, allowing for adjustments that support long-term success. Furthermore, the political commitments established as part of the Transnational Action Plan lay a strong foundation for the sustainability of these practices beyond the project's duration, ensuring that WEEE management in Central Europe continues to evolve and improve over time.

In conclusion, this doccument exemplifies the strength of a collaborative, cross-border approach to WEEE management. By uniting regions under a shared framework and fostering a culture of cooperation, the plan not only addresses immediate environmental challenges but also sets a lasting precedent for sustainable waste management practices across Central Europe. Through this unified effort, the project aligns with the EU's Circular Economy Action Plan, driving progress toward a circular economy that benefits both the environment and society at large.

# 7. ANNEX

## 7.1 NATIONAL, REGIONAL AND LOCAL POLICY

Each of Member States has an obligation to implement the EU legislation into a national legislation. The European Commission may initiate infringement proceedings under Article 258 against a Member State that fails to implement the Directive in time. The Court of Justice may then decide to impose a substantial financial penalty on the basis of the action.

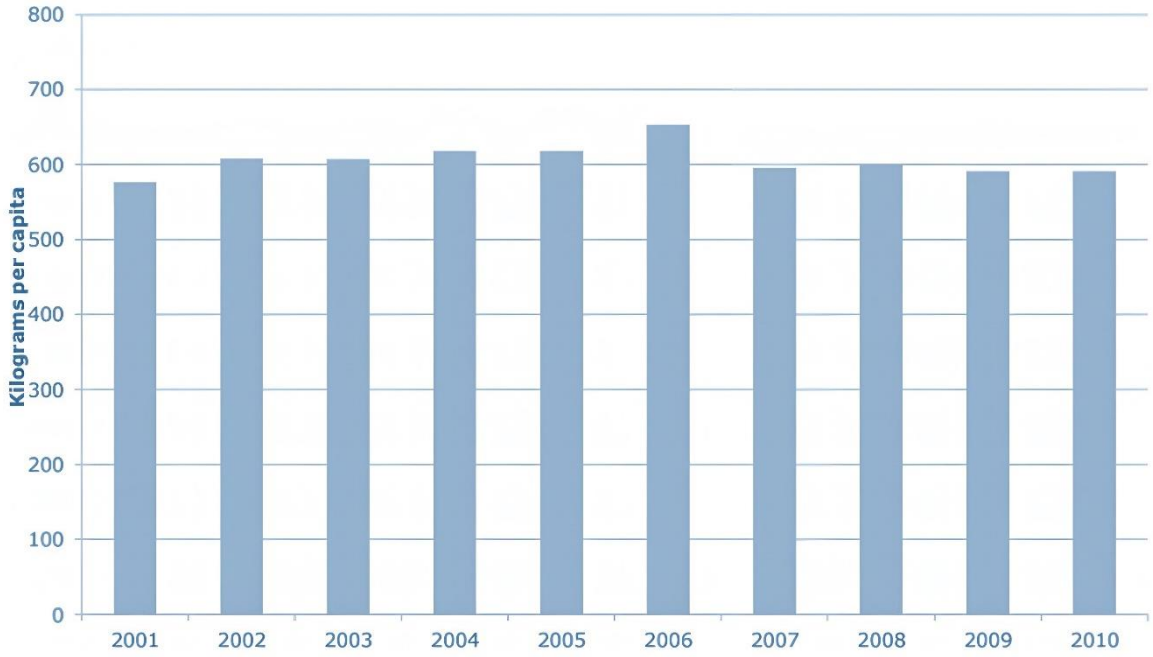
The Commission launched 28 infringement proceedings against Member States in relation to the implementation of the WEEE Directive. It referred three cases to the European Court of Justice for failure to notify national transposition and withdrew from these proceedings after the three Member States concerned had transposed the Directive. As of December 2020, three cases of incorrect transposition of the Directive remained pending.

### 7.1.1. Austria

The Austrian Regulations on Waste Prevention, Collection, and Treatment of WEEE and Batteries impose several obligations on producers/importers, retailers, and municipalities.

Producers/importers must register online with the Environment Agency Austria, report EEE and portable battery quantities, operate collection points nationwide, arrange agreements with municipalities for waste collection, ensure reuse of WEEE, and provide financial guarantees for collection and recycling. They must also mark new appliances, inform consumers, and comply with hazardous substance restrictions.

Retailers are required to accept household WEEE free of charge on a 1:1 basis, while municipalities must also accept household WEEE at no cost.



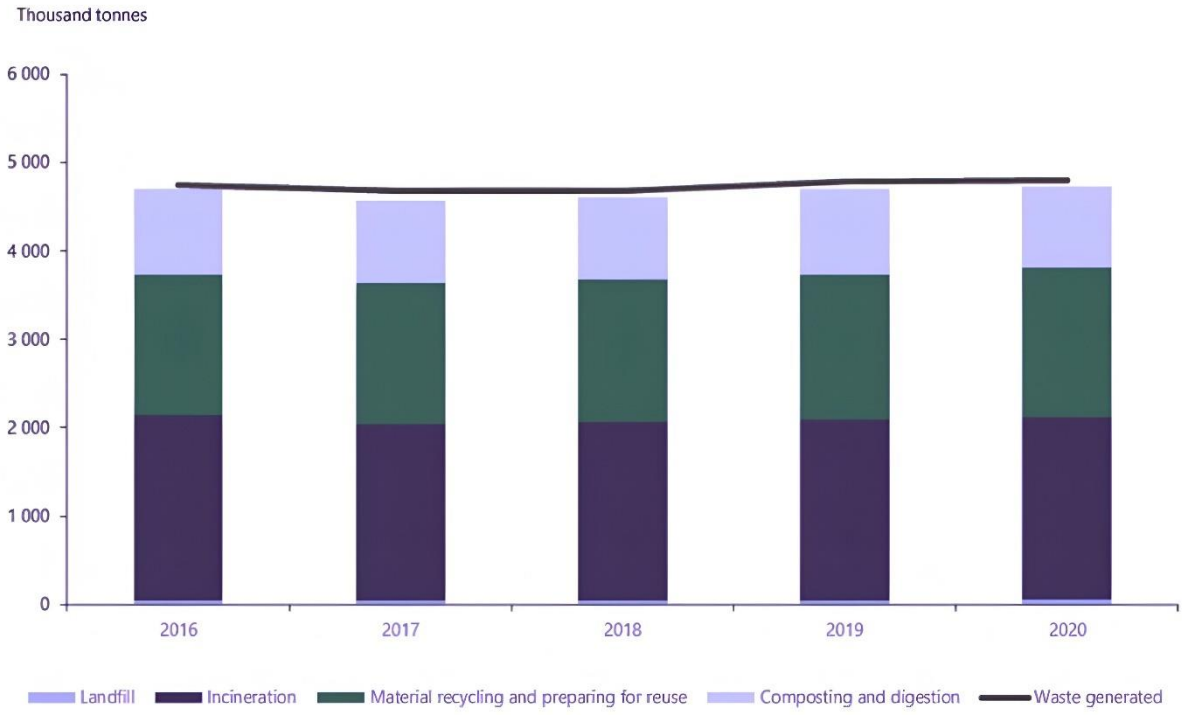

*MSW generation in Austria for the period 2001-2010*

### 7.1.2. Belgium

Flemish Decree on Waste Prevention and Management and the Environmental Policy Agreement (MBO) - an agreement between the 3 regional governments of Belgium and the industry sectors. Decrees regarding the collection and treatment of WEEE for the Walloon Region and the Brussels Capital Region followed in 2002. Based on the legal background and the 'MBO' there is the obligation:

- To organize separate collection of WEEE (for municipalities or municipalities working together)
- To include social economy undertakings in the collection of WEEE,
- To take back a similar product when a new product is purchased (for retailers), and
- To arrange an environmentally sound treatment of WEEE.

Each manufacturer or importer has to join a system for WEEE collection and treatment. Alternatively, manufacturers or importers may establish an individual waste management plan and have it approved by the authorities.

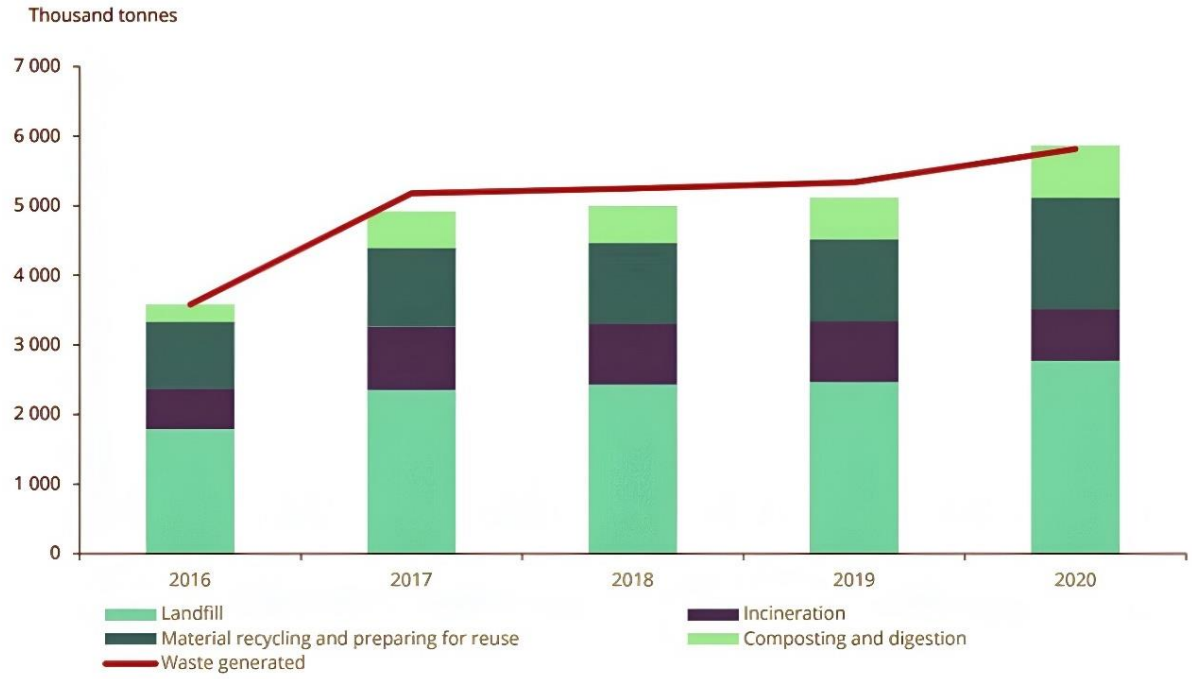



*Municipal waste generation and treatment in Belgium between 2016 and 2020, in thousand tonnes. Source: European Environment Agency*

### 7.1.3. Czechia

Currently, waste management is regulated by Act No. 541/2020 Coll., on Waste, which is effective from 1 January 2021 and its implementing legislation Decree No. 8/2021 Coll. called as Waste Catalogue, where each waste type has a specific handling method.

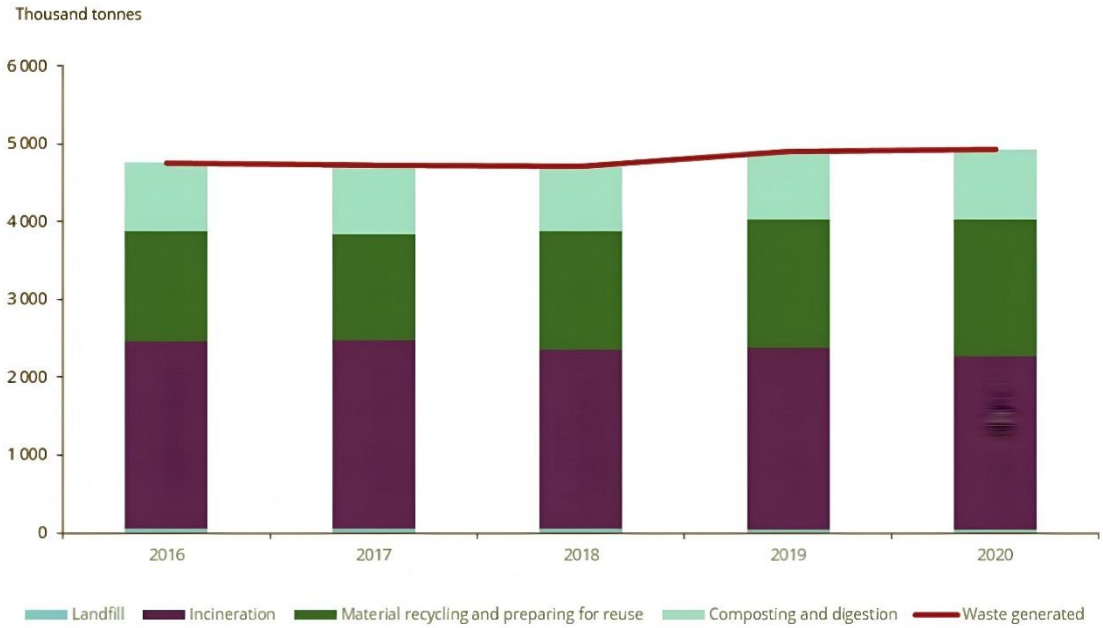
Generally, the Waste Act establishes the rights and obligations of persons in the field of waste management and regulates the obligations of waste generators (citizens, municipalities, towns and companies), the obligations of persons who collect, transport, treat, use and dispose of waste (landfills, incinerators, waste collection centres, sorting lines, etc.), the obligations of the public administration and local government and, last but not least, regulates penalties and fees. The Waste Act also promotes the basic principles of circular economy, environmental protection, and human health in waste management.




*Municipal waste generation and treatment in Czechia between 2016 and 2020, in thousand tonnes. Source: European Environment Agency*

### 7.1.4. Denmark

The WEEE-directive was transposed into Danish legislation by the below regulations Act no. 385 of 25th May 2005 amending the Environmental Protection Act (Producer liability for electronic waste, etc.) Statutory Order no. 664 of 27th June 2005 on management of waste electrical and electronic equipment (the WEEE Order).




*Municipal waste generation and treatment in Denmark between 2016 and 2020, in thousand tonnes. Source: European Environment Agency*

### 7.1.5. France

The 2012/19/UE Directive published on the 24 July 2012 have been transposed into French law through a decree on the 19 August 2014. It includes obligations for:

**Producers:**

- To finance the take-back and the ecological treatment of WEEE according to their current market share for historical WEEE,
- To guarantee the financing of the take-back and treatment of products put on the market.

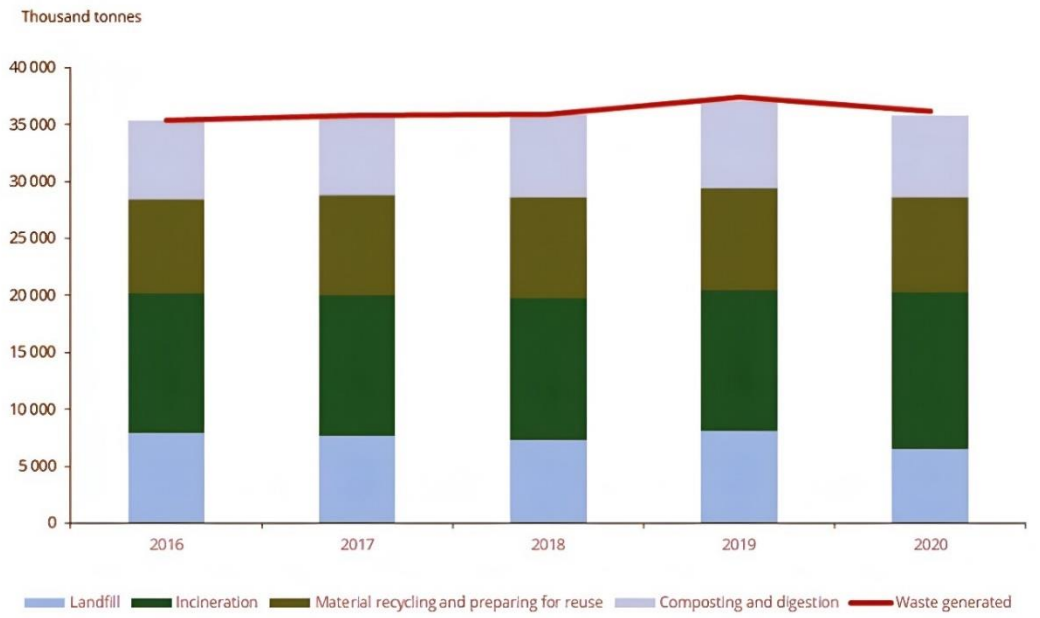
**Retailers:**

- To take back household WEEE free of charge on a one-to-one basis,

For stores with an EEE sale space superior to 400sqm, to take back very small household WEEE free of charge on a one-to-zero basis

On a voluntary basis, local authorities and municipalities can organize a selective collection of households WEEE, lighting equipment and small fire extinguishers

*Municipal waste generation and treatment in France between 2016 and 2020, in thousand tonnes. Source: European Environment Agency*

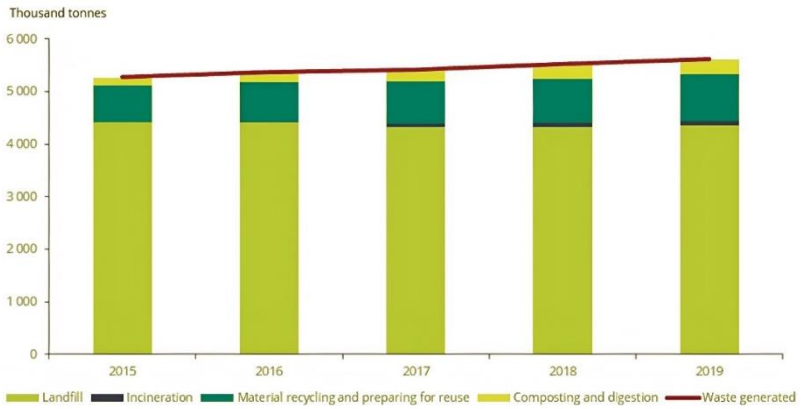



### 7.1.6. Greece

Directive 2008/98/EC and Directive 2008/99/EC have been implemented in Greece through Law 4042/2012, which focuses on criminal-law protection of the environment and waste management. The law, consisting of 72 articles divided into four parts, aims to harmonize Greek legislation with EU directives:

- Part I incorporates provisions from EU Directive 2008/99/EC, establishing penalties for activities causing substantial environmental damage.
- Part II aligns Greek legislation with EU Directive 2008/98/EC, aiming to protect the environment and human health through waste prevention, recycling, and control of hazardous waste.
- Parts III and IV introduce amendments to existing legislation and address matters under the jurisdiction of the Ministry of Environment, Energy, and Climate Change.

Overall, Law 4042/2012 seeks to ensure effective environmental protection and sustainable waste management practices in Greece in line with EU directives



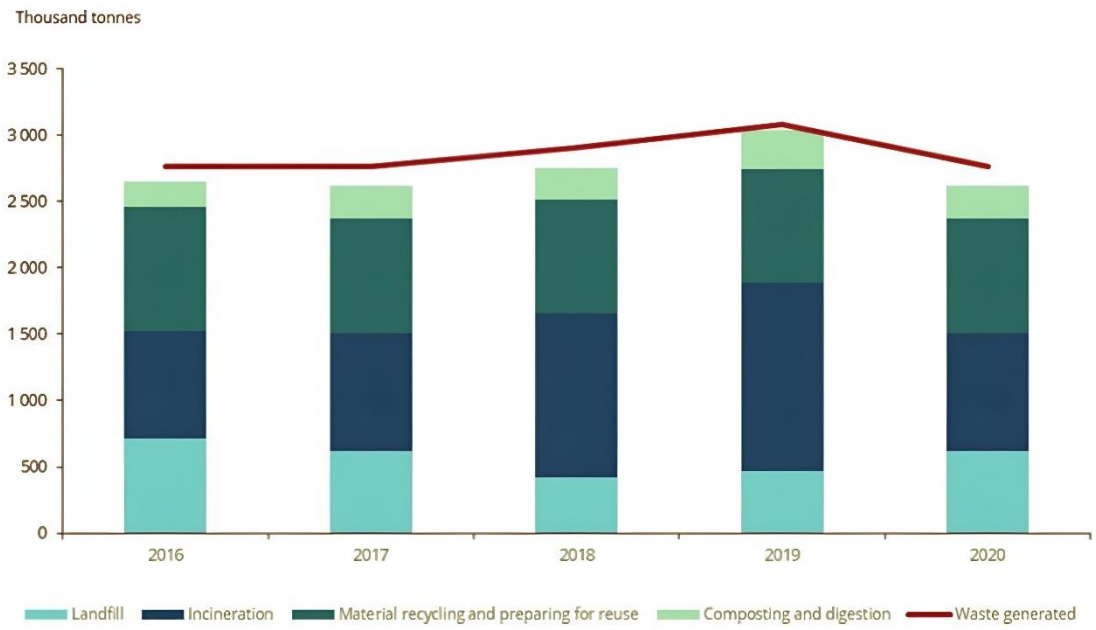

*Municipal waste generation and treatment in Greece between 2015 and 2019, in thousand tonnes. Source: European Environment Agency*

### 7.1.7. Ireland

Producer responsibility under WEEE Directive 2012/19/EU & EU Batery Directive 2006/66/EC is transposed in Ireland under WEEE Regulations 2014 S.I. No. 149 of 2014 (as recently amended under S.I. No. 233 of 2019) and Batery Regulations 2014 S.I. No. 283 of 2014 (as amended).

The WEEE Regulations 2014 - S.I. No. 149 of 2014 govern the sustainable production, reuse, recycling and appropriate disposal of WEEE. The WEEE Regulations are in place since 29th March 2014 and replace the 2005 and 2011 WEEE Regulations. As of the 31st of May 2019, the Iris Oifigiuil published the amended S.I. No. 233 of 2019 of the 2014 WEEE Regulations 2014 for the purposes of giving full effect to Directive 2012/19/EU on waste electrical and electronic equipment.

The European Union (Bateries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014), as amended came into effect on 3Oth July 2014 in Ireland and promote the recycling of waste bateries. In particular, they also facilitate the achievement of targets for the collection, treatment, recycling and disposal of waste bateries in an environmentally sound manner.




*Municipal waste generation and treatment in Ireland between 2016 and 2020, in thousand tonnes. Source: European Environment Agency*

### 7.1.8. Italy

The Legislative Decree 49/2014 in Italy transposes Directive 2012/19/EU, aiming to protect the environment and human health by regulating the production of Electrical and Electronic Equipment (EEE) and associated waste from households and businesses. Several Ministerial Decrees complement the legislative framework, focusing on aspects relevant to producers:

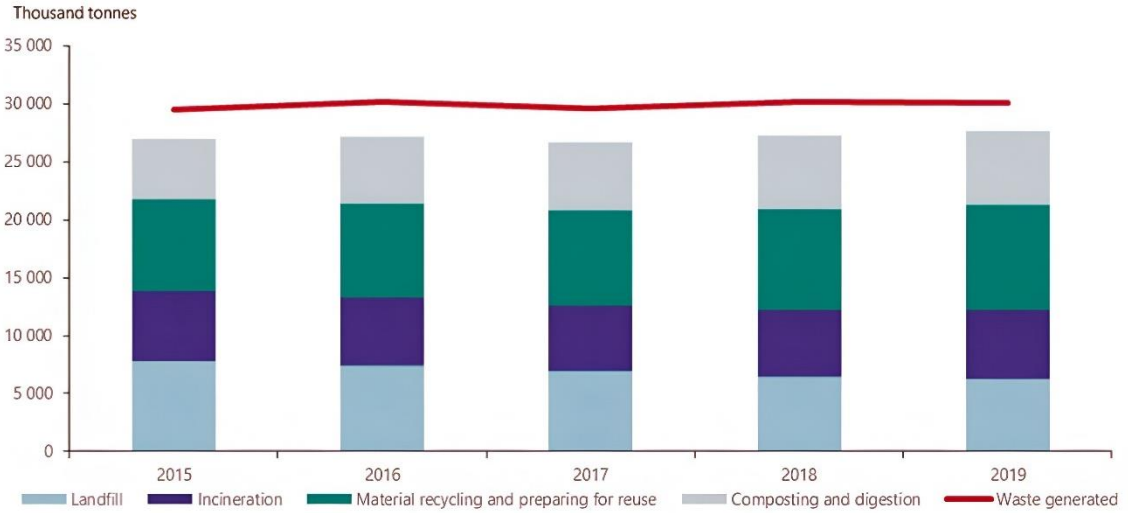
Financial Guarantees Decree (Ministerial Decree No. 68 of March 9, 2017): This decree specifies the requirements for EEE producers to provide financial guarantees, particularly for WEEE from private households, excluding professional WEEE.

Rates Decree (Ministerial Decree of June 17, 2016): This decree establishes charges and payment methods to cover the operating costs of various committees and activities related to WEEE management, including supervision, control, monitoring, and inspections.

'One-for-Zero' Decree (Ministerial Decree No. 121 of May 31, 2016): This decree outlines simplified procedures for distributors to take back small-sized WEEE from households free of charge, without requiring the purchase of an equivalent product.

'One-for-One' Decree (Ministerial Decree 65/2010): This decree provides guidelines for the free take-back of WEEE from private households by distributors, EEE installers, and assistance center operators when purchasing an equivalent product, ensuring the proper disposal of old equipment.

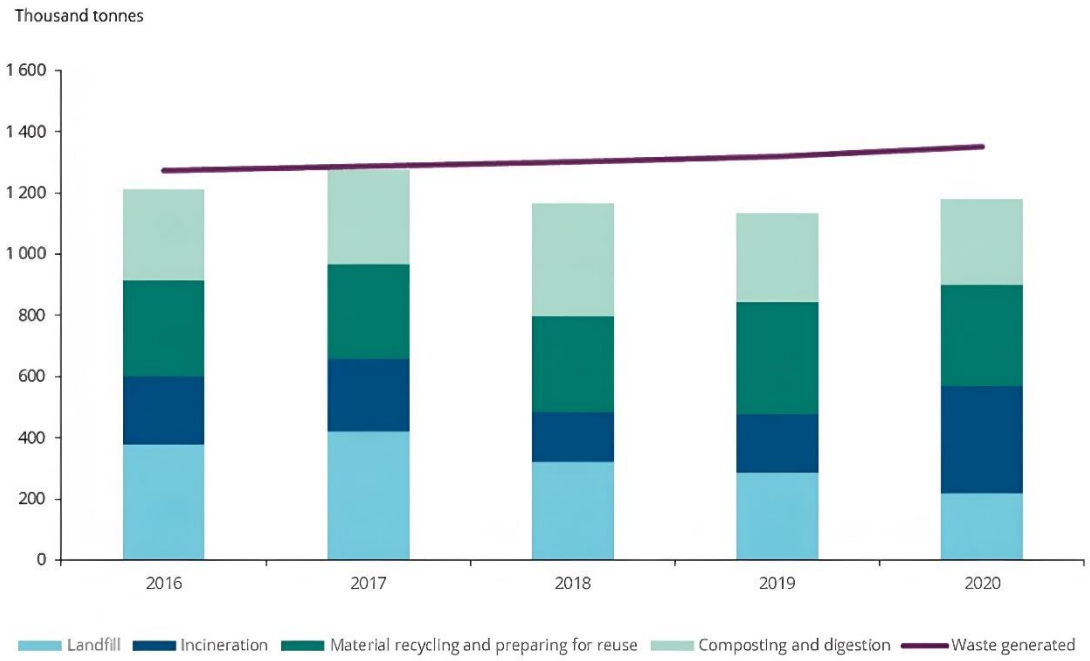
These ministerial decrees complement Legislative Decree 49/2014 by establishing specific measures and procedures to ensure effective implementation and compliance with EU directives, contributing to the reduction of negative environmental impacts associated with EEE production and waste management




*Municipal waste generation and treatment in Italy between 2015 and 2019, in thousand tonnes. Source: European Environment Agency*

### 7.1.9. Lithuania

The Law on Waste Management (No. VIII-787) establishes fundamental guidelines for the prevention, handling, and disposal of waste to mitigate its negative impact on the environment and human health. It outlines the roles and responsibilities of public authorities and other entities involved in waste management, setting forth regulations for waste prevention, organization of waste management systems, and economic measures related to waste management. The law covers various types of waste, including oils, electrical and electronic equipment, vehicles, disposable plastic products, and packaging. Its primary objective is to ensure compliance with relevant European Union regulations and standards. Additionally, the law mandates the prohibition of products made of aerobically degradable plastic and requires waste facilities to safely treat hazardous waste to protect public health and the environment.




*Municipal waste generation and treatment in Luxembourg between 2016 and 2020, in thousand tonnes. Source: European Environment Agency*

### 7.1.10. Luxemburg

Pursuant to the Law of 21 March 2012 on waste, as amended, and the Law of 9 June 2022 on waste electrical and electronic equipment, waste electrical and electronic equipment (WEEE) is subject to the principle of extended producer responsibility. The modified Luxembourgish regulation initially transposing the directives 2002/95/CE and 2002/96/CE and now the directive 2012/19/EU forces:

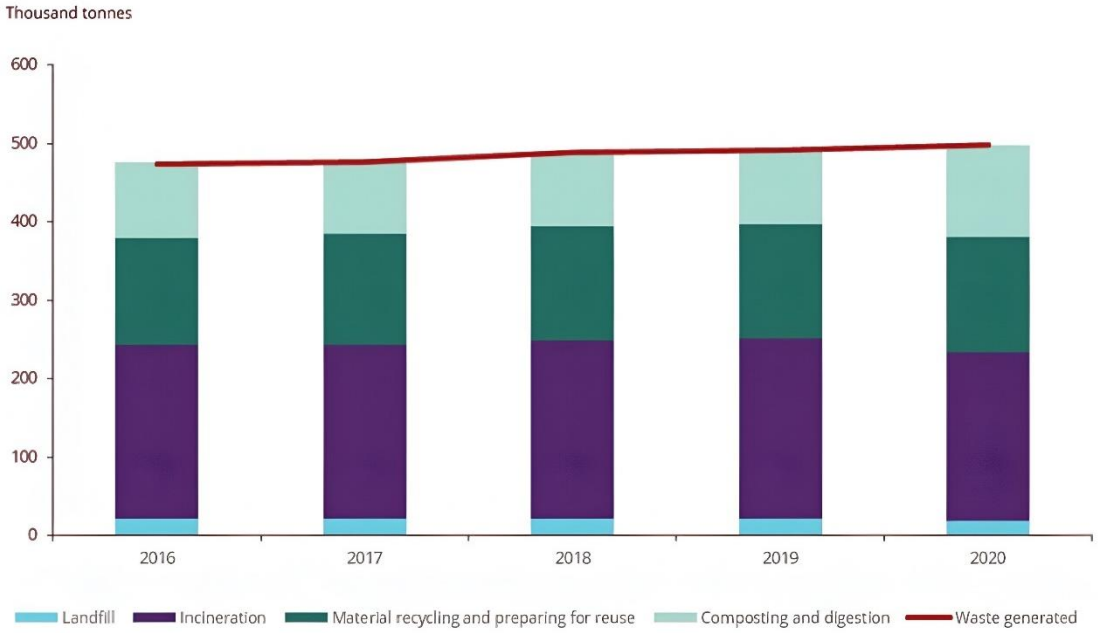
Producers and importers:

- To finance the take-back and treatment of WEEE from the exit of the selective collection points according to their current market share for the historical WEEE
- To provide a guarantee for the take-back and treatment of appliances placed on the market after the 13th of August 2005

Retailers to take back free of charge WEEE from household on a one-for-one basis and all WEEE smaller than 25 cm even if there is no purchase of a new appliance.

Municipalities to take back free of charge all WEEE from households and to sort and store them.

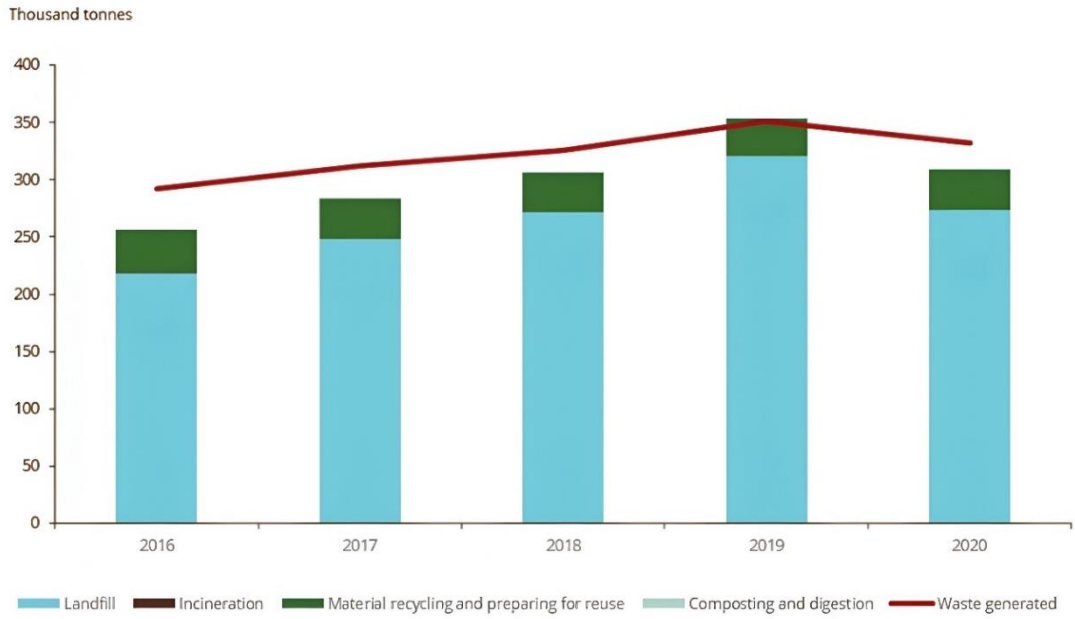
A voluntary agreement has been signed between the ministry of environment, the municipalities and the private sector. This agreement specifies the rights and obligations of each stakeholder




*Municipal waste generation and treatment in Luxembourg between 2016 and 2020, in thousand tonnes. Source: European Environment Agency*

### 7.1.11. Malta

The WEEE Directive (Recast) was transposed into Maltese Law through Legal Notice 204 of 2014 updating the Subsidiary Legislation 549.89. The legislation came into force as of 14th February 2014 and subsequently also repealed Legal Notice 63 of 2007. Additional regulations to the Subsidiary Legislation 549.89 were through Legal Notice 532 of 15 bringing into effect the provisions of Directive 2012/19/EC of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment and repealing Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003. S.L. 549.63(2). Producers' obligations came into force on 1st September 2015.

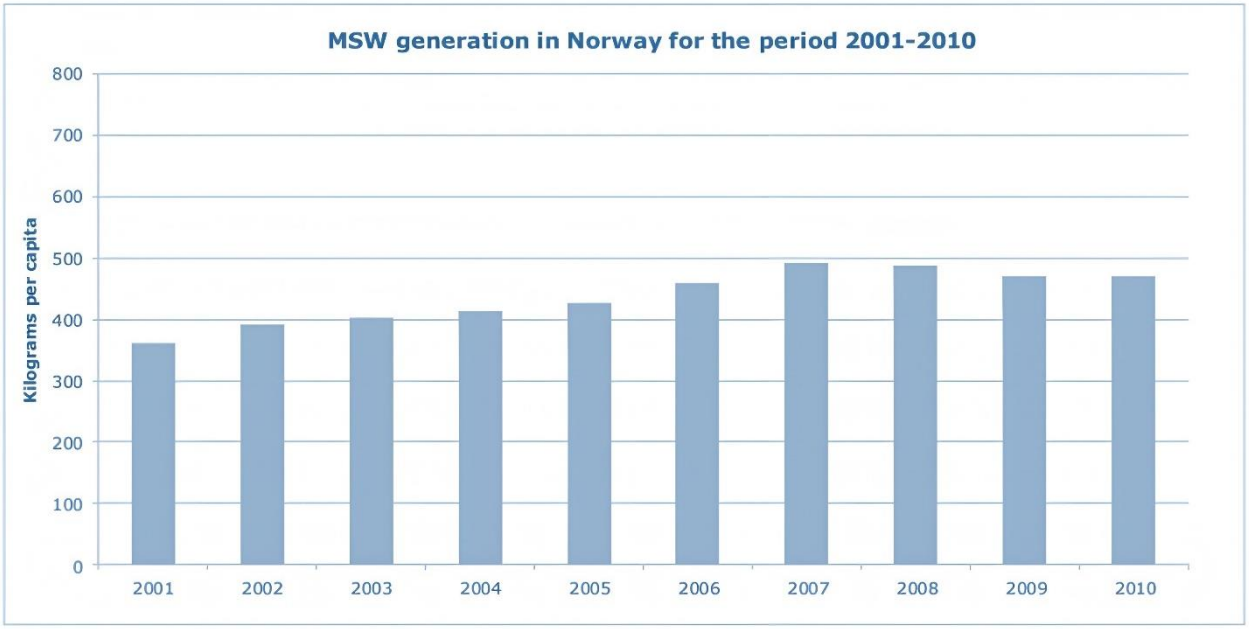



*Municipal waste generation and treatment in Malta between 2016 and 2020, in thousand tonnes. Source: European Environment Agency*

### 7.1.12 norway

WEEE take-back has been part of Norwegian regulations since 1998 and is now subject to the national Waste Regulations FOR-2004-06-01-930, Chapter 1. Waste electrical and electronic equipment (WEEE directive 2012/19/EU).

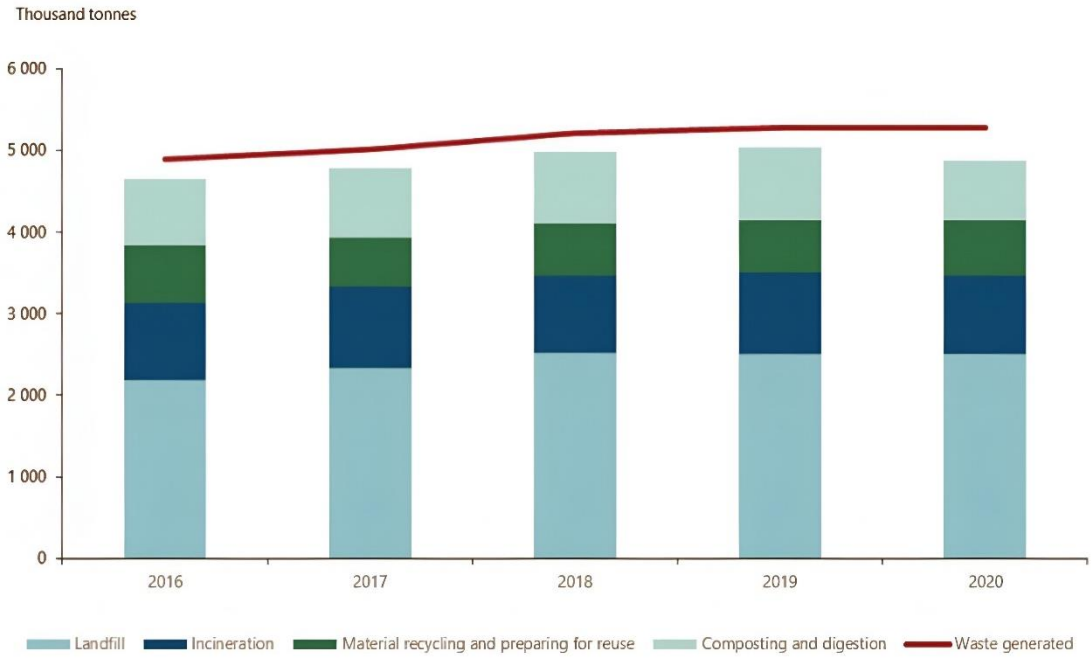
- Producers are to finance the take-back, sorting, and correct treatment of put on market for WEEE.
- Retailers and municipalities to free of charge take back WEEE from households




### 7.1.13. Portugal

The WEEE European legal frame, defined by Directive (2012/19/CE), where transposed into law in Portugal on December 2017 by Law Decree nº 152-D/2017, 11 December. This diploma established the conditions for the organization and management of an Integrated Waste Electric and Electronic Equipment Management System (SIGREEE).

This legislation is the fifth update to Decree-Law No 152-D/2017 of December 11, 2017, introducing the requirement to mark reusable packaging and packaging managed under the deposit system, as well as the requirement to mark recyclable packaging with the indication of its appropriate destination. The draft Decree-Law also provides for the obligation for waste treatment operators to prove annually to the licensing entity that they have complied with the qualification requirements and applicable standards by means of a document issued by qualified verifiers




*Municipal waste generation and treatment in Portugal between 2016 and 2020, in thousand tonnes. Source: European Environment Agency*

### 7.1.14. Romania

EU Directive 2012/19/EU has been transposed into Romanian legislation through Emergency Ordinance no. 5, which was published on April 16, 2015. This ordinance introduces measures aimed at protecting the environment and public health by mitigating the negative impacts of waste electrical and electronic equipment (WEEE) generation and management.

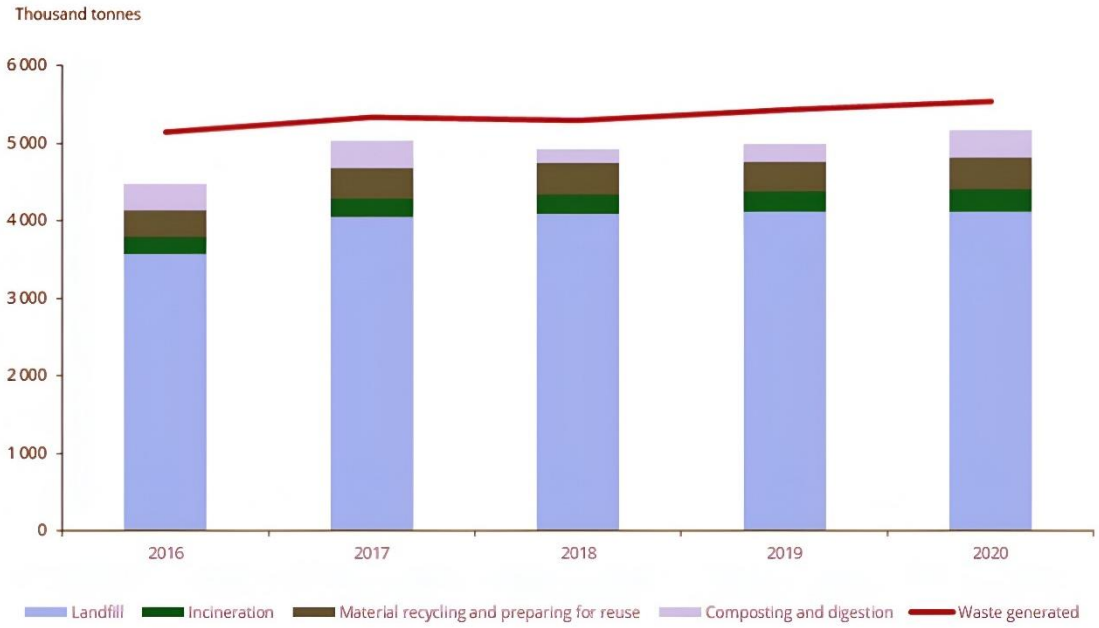
Among its provisions, Emergency Ordinance no. 5 places specific obligations on producers of electrical and electronic equipment, including:

- Meeting ecological protection requirements to facilitate the reuse and treatment of WEEE.
- Avoiding design features or manufacturing procedures that hinder the reuse of WEEE, except where such features or procedures offer clear advantages, such as safety requirements.
- Implementing waste collection from private households to achieve a minimum average annual rate of separate waste collection at the national level.

Furthermore, retailers are mandated to accept WEEE on a "one-for-one" basis from customers, free of charge, provided the equipment is of an equivalent type and serves the same function as the newly purchased product. Retailers with retail spaces exceeding 400 square meters must also offer collection services for small WEEE from end-users, without any obligation to make a purchase.

Additionally, all economic operators involved in the collection and transport of separately collected WEEE must ensure optimal conditions for preparing the equipment for reuse or recycling, including the proper isolation of hazardous substances.

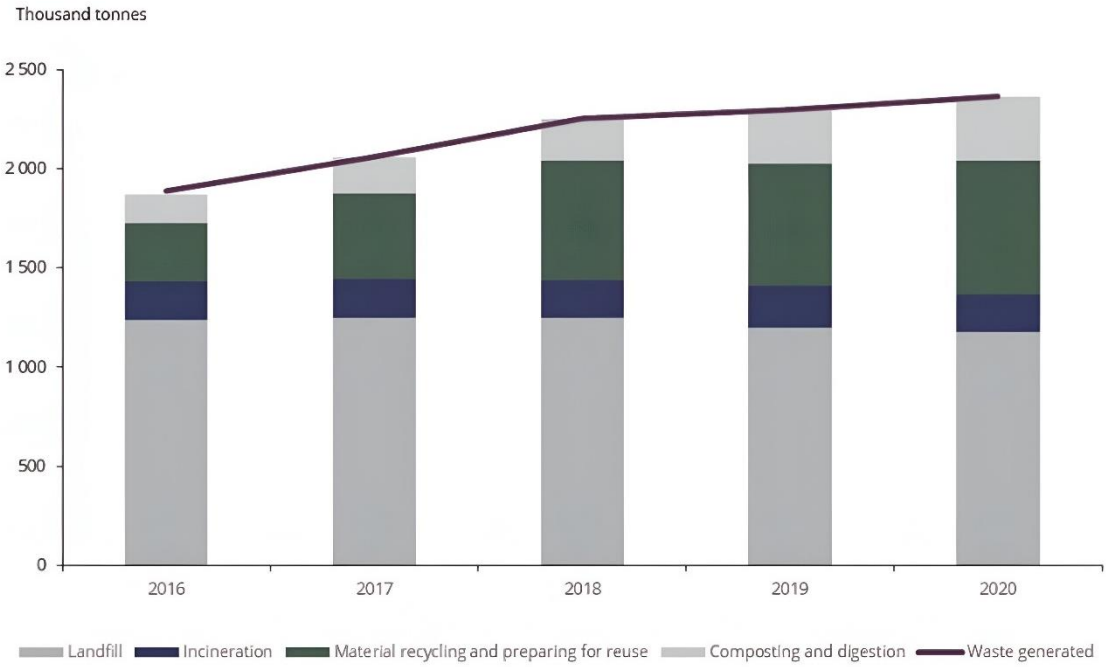
Overall, Emergency Ordinance no. 5 seeks to align Romanian legislation with EU directives, promoting responsible waste management practices and environmental protection




*Municipal waste generation and treatment in Romania between 2016 and 2020, in thousand tonnes. Source: European Environment Agency*

### 7.1.14 Slovakia

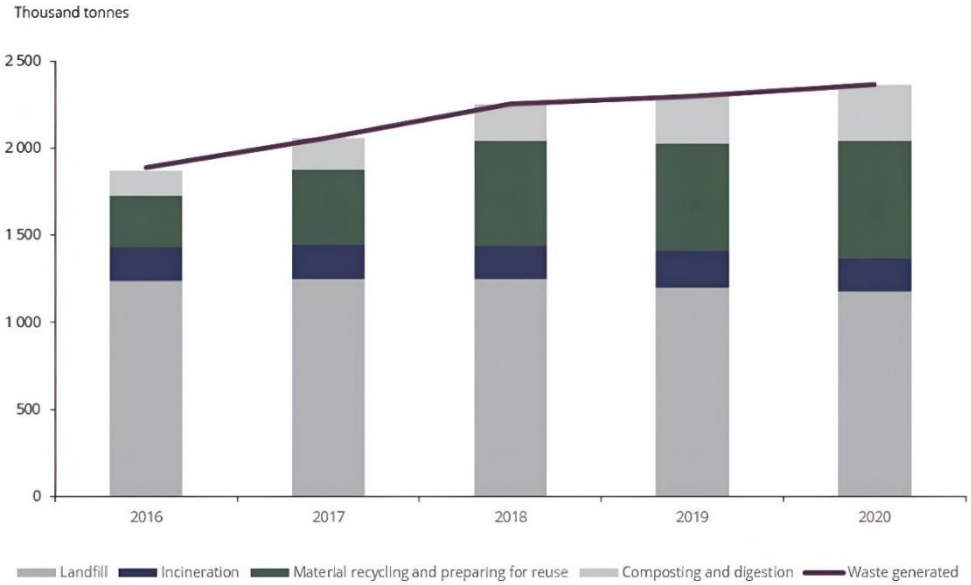
The Slovak government established the Act on Waste No. 223/2001 in 2001 to regulate waste management. The WEEE Directive was incorporated into Slovak law through an amendment to this act in 2004. Subsequently, in 2015, the new Act on Waste No. 79/2015 was introduced, accompanied by several decrees issued by the Ministry of Environment. These decrees cover various aspects related to WEEE, such as applications and permits for waste handling, waste cataloging, waste evidence and reporting, and extended producer responsibility. The legislation outlines the obligations of producers and importers to ensure the proper handling, collection, recycling, and disposal of WEEE, as well as the responsibility of consumers to return end-of-life appliances. Producers' obligations are determined by their market share, and permits and authorizations are required for producer responsibility organizations. However, municipalities are not obligated to provide separate collection of WEEE, although they must offer their collection capacities to producers/importers and may request compensation. Similarly, retailers are not mandated to accept returned appliances.




*Municipal waste generation and treatment in Slovakia between 2016 and 2020, in thousand tonnes. Source: European Environment Agency*

## 7.1.15 Slovenia

The WEEE directive has been transposed into Slovenian law on November 4th 2004 through "THE DECREE on treatment of Waste Electrical and Electronic Equipment" (the decree is applicable from November 2nd 2006 onwards) and Decree of environmental tax for Waste Electrical and Electronic Equipment. Transposition of new Directive 2012/19/EU is not finished yet. Decree on treatment of waste bateries and accumulators is applicable from 15.8.2008.




*Municipal waste generation and treatment in Slovenia between 2016 and 2020, in thousand tonnes. Source: European Environment Agency*

### 7.1.16. Spain

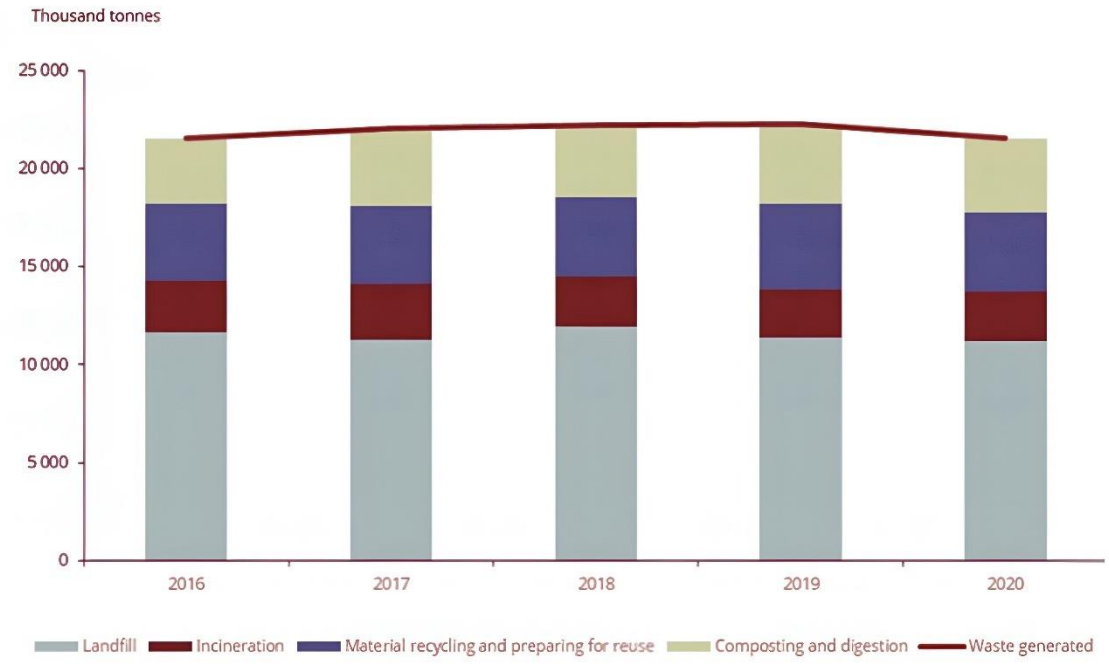
The Spanish law transposed the WEEE Directive 2002/96/CE through Royal Decree 208/2005 on February 25, 2005. Subsequently, the update of the WEEE Directive in February 2012 was transposed into Spanish law through RD 110/2015.

The Royal Decree aims to achieve several immediate objectives:

- Clarify regulations to increase legal certainty and define obligations for various stakeholders.
- Integrate a single control instrument for regional and national WEEE data to ensure compliance and traceability.
- Promote re-use and preparation for re-use, fostering the establishment of re-use centers and job creation.
- Systematize reporting obligations for EEE producers and WEEE managers on collection and recovery throughout the country.
- Optimize and efficiently manage WEEE under extended producer responsibility, ensuring competitiveness while meeting EU objectives.

These objectives will be accomplished through the establishment of a WEEE management model that updates existing practices, ensuring environmental protection and compliance with EU standards. Key changes include the creation of a working group under the coordination commission on waste, the implementation of an electronic platform for waste information and traceability, and the possibility for local authorities to entrust waste management to EEE producers or WEEE managers directly.

The Royal Decree aims to enhance WEEE management in Spain, aligning with EU directives and optimizing resources provided by EEE producers, while fostering sustainable waste management practices

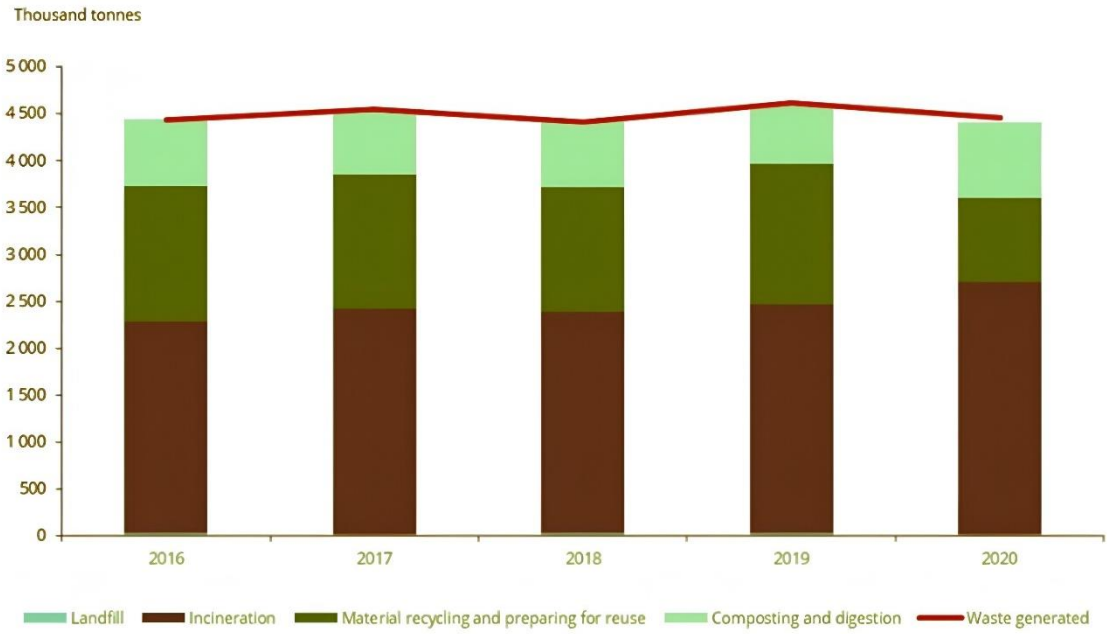



*Municipal waste generation and treatment in Spain between 2016 and 2020, in thousand tonnes. Source: European Environment Agency*

### 7.1.17. Sweden

The Swedish Ordinance on Producers Responsibility 2005:209 transposes the EU Directive on WEEE into national legislation. The Ordinance strictly follows the EU Directive.

Producers of household electrical and electronic equipment (EEE) in Sweden bear financial responsibility for the waste generated by their products, whether sold before or after August 13, 2005. They must participate in an approved WEEE collection system, provide product content information to waste management operators within a year of sales commencement, label their products, and design them for easy recycling and reuse. The Swedish EPA oversees this responsibility and charges inspection fees. Electrical and electronic equipment not intended for household use falls under different regulations, with the Swedish EPA also supervising collection responsibilities and inspection fees. Additionally, products with integrated batteries are subject to both EEE and battery producer responsibility regulations.

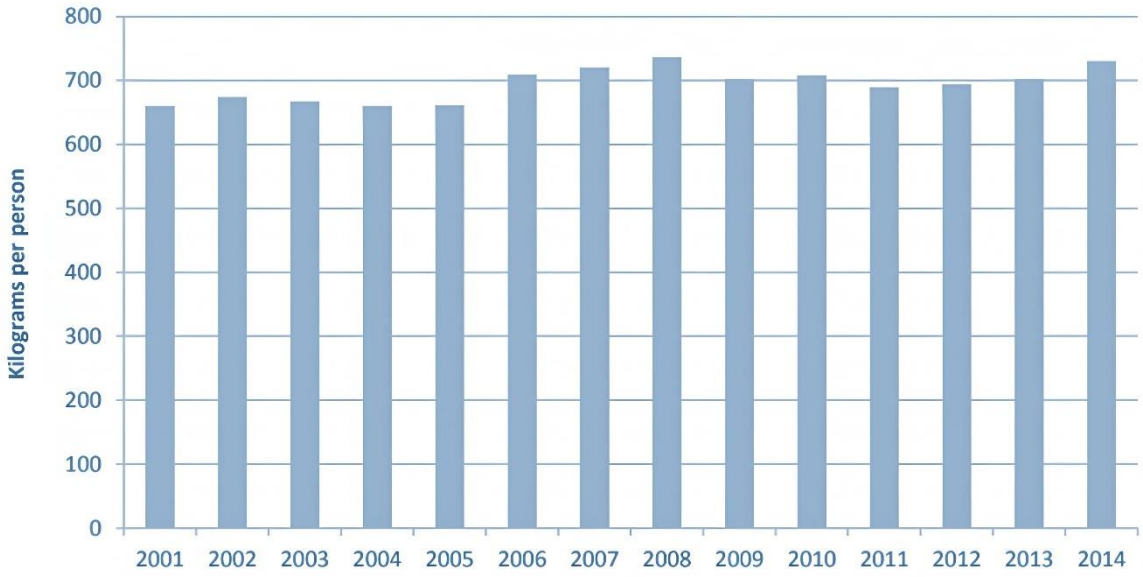



*Municipal waste generation and treatment in Sweden between 2016 and 2020, in thousand tonnes. Source: European Environment Agency.*

### 7.1.18. Switzerland

On 1 July 1998 the ORDEE came into force (Ordinance on the return, the taking back and the disposal of electrical and electronic equipment). It has been amended to incorporate tighter regulations with effect as of 1 January 2005, and pursues the same objectives as the European WEEE Directive.

The ORDEE is made up of responsibilities at five different levels: 1. Consumers must hand in used equipment to the trade. 2. Distributors, retailers and manufacturers must take back used equipment free of charge (even if no new equipment is purchased). 3. Distributors, retailers and manufactures must professionally dispose of equipment that is taken back. 4. Recycling companies must be in possession of a cantonal license. 5. Exporters must be in possession of a license issued by the federal authorities




*Switzerland, municipal solid waste generation per person, 2001–2014*