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LOCAL ACTION PLAN SLOVENIA

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1. EXECUTIVE SUMMARY

The increasing presence of electronic devices in our daily lives has brought about a significant challenge: electronic waste, or e-waste. As these devices reach the end of their usability, the need for responsible and sustainable management becomes more critical than ever. The eWAsTER project, a collaborative initiative funded by the Interreg Euro-Med program, is actively addressing this issue.

Operating across eight European regions, eWAsTER aims to bridge the gap between existing regional and local policies and the objectives set out in the EU's Circular Economy Action Plan. This initiative promotes a shift from the traditional "take, make, dispose" model to a circular system where resources are utilized more efficiently for extended periods. By improving e-waste management processes, eWAsTER contributes directly to this transition.

Beyond ensuring compliance with legislation, eWAsTER fosters a collaborative environment among participating regions, facilitating the exchange of best practices and shared learning. Through knowledge transfer, information sharing, and joint policy development, the project enables regions to tailor effective solutions to their unique circumstances. This collaborative approach not only ensures diverse geographical impact but also strengthens the capacity of individual regions, creating a ripple effect that can advance circular e-waste management practices across the EU.

By involving partners like ORZ, which actively contributes to device reuse and repair, the eWAsTER project not only addresses policy gaps and promotes best practices but also practically realizes the goals of the circular economy. In Slovenia, the implementation of this plan, supported by key actors like ORZ, will be especially important for aligning with legislation and circular economy goals while contributing to environmental protection and sustainable development.



2. ABBREVIATIONS

AP	Action Plan
BP	Best Practices
CPU	Central Processing Unit
CWC	Chemical Weapons Convention
EC	European Commission
EEE	Electrical and Electronic Equipment
EP	European Parliament
EPR	Extended Producer Responsibility
ERDF	European Regional Development Fund
EU	European Union
E-waste	Electronic waste
HS	Harmonized System
KPI	Key Performance Indicator
LAP	Local Action Plan
LoW	European List of Wastes
OECD	Organization for Economic Co-operation and Development
OECD	Organization for Economic Co-operation and Development
POM	Put on Market
PRO	Producer Responsibility Organization
RoHS	Restriction of the use of certain Hazardous Substances in electrical and electronic equipment
TBD	Take-back scheme
SWOT	Strengths, Weaknesses, Opportunities, and Threats
WCO	World Customs Organization
WEEE	Waste Electrical and Electronic Equipment

3. PURPOSE AND METHODOLOGY

This Local Action Plan (LAP) for Waste Electrical and Electronic Equipment (WEEE) serves as a strategic framework for managing e-waste at the local level. Its primary goal is to promote sustainable waste management by ensuring the safe collection, treatment, and disposal of WEEE while minimizing environmental and health risks. Additionally, it emphasizes the recovery and recycling of valuable materials such as metals and plastics, helping reintegrate them into production cycles and supporting the shift toward a circular economy.



A key focus of the plan is raising awareness among citizens and stakeholders about the significance of proper e-waste disposal. By encouraging public participation in collection programs, it fosters responsible waste management practices. The plan also ensures alignment with national and international regulations, including the WEEE Directive and Basel Convention, to maintain compliance with legal standards. Strengthening collaboration among local authorities, producers, recyclers, and the community, the LAP facilitates the implementation of Extended Producer Responsibility (EPR) schemes and supports economic growth by generating green jobs and driving innovation in recycling technologies.

The development process begins with an assessment and baseline analysis, identifying local WEEE sources, types, and volumes while mapping existing collection, recycling, and disposal systems. A review of current practices highlights gaps in infrastructure, regulations, and public awareness. Through consultation workshops and community engagement, stakeholders collaboratively identify challenges and develop targeted solutions.

The strategic framework of the plan is structured around clear objectives, policies, and financial mechanisms. It sets measurable goals, strengthens regulations, and identifies funding sources such as municipal budgets, EPR schemes, or external grants. Specific actions include improving e-waste collection and treatment infrastructure, launching targeted awareness campaigns, and introducing tracking systems for monitoring WEEE flows.

Implementation is carried out in phases, outlining short-term, medium-term, and long-term actions with clearly defined responsibilities. Capacity-building initiatives ensure that workers are trained in e-waste management best practices. To track progress and maintain accountability, the plan establishes key performance indicators (KPIs) and includes mechanisms for regular evaluations and transparent reporting.

By adopting this comprehensive approach, the LAP ensures efficient WEEE management, benefiting the environment, public health, and the local economy. Tailored to the unique needs and resources of the area, it provides a sustainable pathway for responsible e-waste handling and long-term development.

4. INTRODUCTION TO THE TOPIC

4.1. Introduction to WEEE challenge

Electrical and electronic devices—ranging from household appliances like washing machines and vacuum cleaners to essential gadgets such as smartphones and computers—are fundamental to modern life, making it difficult to envision a world without them.

The term “WEEE” (Waste Electrical and Electronic Equipment), commonly known as “e-waste”, refers to discarded electrical and electronic devices. The key aspect of this definition is the word “waste,” which signifies that the item is no longer functional or useful, requiring proper disposal. WEEE encompasses nearly all household and business equipment that contains electronic components, whether powered by electricity or batteries.

Managing WEEE in Europe is a growing challenge due to the increasing volume of discarded electronics, which complicates sustainable waste management efforts. E-waste is composed of a complex mix of materials, including hazardous substances such as brominated flame retardants (BFRs) and polychlorinated biphenyls, as well as valuable materials like rare earth elements. Proper handling and disposal of WEEE are essential not only to minimize environmental and health hazards but also to maximize resource recovery.

Below is an overview of the primary materials and their proportions in commonly used electronic products. Electrical and electronic equipment (EEE) typically contains metals like iron, copper, and aluminum, along with plastic and glass. Given this composition, establishing an effective and efficient waste management

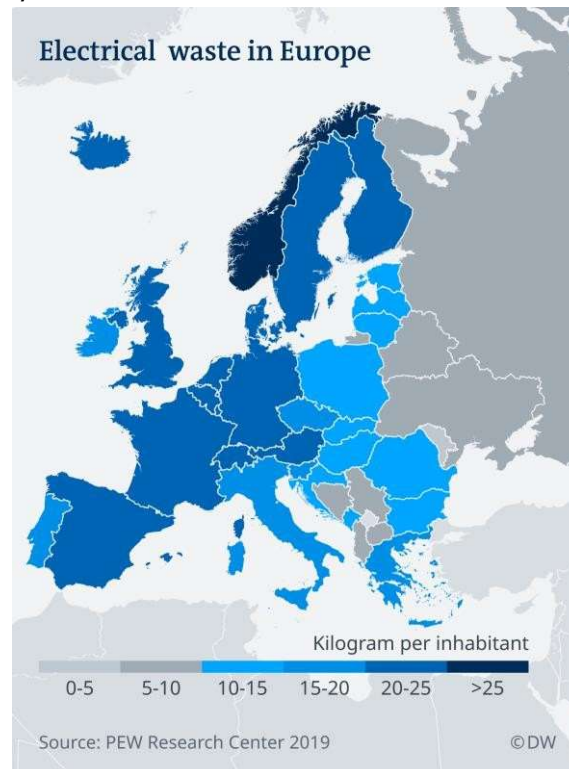


History of E-Waste. Source: <http://e-wastedmovie.com/index.php/e-wasted-timeline.html>

system—focused on recycling and reuse—is crucial.

In Europe, the management of WEEE is regulated by a comprehensive framework of directives and policies designed to reduce its negative impact and promote circular economy principles. These regulations establish standards for the collection, processing, and recycling of electronic waste, ensuring the safe handling of hazardous materials and the recovery of valuable resources.

However, the implementation of WEEE regulations varies across European countries and regions, leading to differences and challenges in effectiveness. Factors such as the accessibility of collection points, the efficiency of recovery networks, and the level of stakeholder involvement all influence the success of WEEE management systems.



Kilogram per inhabitant. Source: <https://www.dw.com/en/the-eu-declares-war-on-e-waste/a-51108790>

In response to the ever-growing volume of discarded electrical and electronic appliances, the European Parliament put into effect the Waste Electrical and Electronic Equipment (WEEE) Directive in February 2003. The purposes of the WEEE Directive 2002/96/EC were:

- to prevent and reduce the amount of WEEE,
- to improve the reuse, recycling, and recovery of WEEE,
- and to ensure discarded appliances are treated using environmentally sound processes.

The revised WEEE Directive (2012/19/EU) was officially adopted on August 13, 2012. Its primary goal is to support sustainable production and consumption by prioritizing the prevention of electronic waste. Additionally, it promotes the reuse, recycling, and recovery of WEEE to minimize waste disposal, enhance resource efficiency, and facilitate the retrieval of valuable secondary raw materials.

Furthermore, the Directive aims to improve the environmental performance of all stakeholders involved in the lifecycle of electrical and electronic equipment, including producers, distributors, and consumers. Special emphasis is placed on those directly engaged in the collection and treatment of WEEE to ensure responsible and efficient waste management.



4.2. eWAsTER project

The “Preventing e-waste from polluting MED water by turning waste into a resource (eWAsTER)” project is c-funded by the European Union (Interreg Euro-Med project) consisting of 10 partners from 8 European countries namely:

- Portugal: Parque do Alentejo de Ciência e Tecnologia (PACT)
- Greece: Rethymno Municipality
- Italy: Marche Region
- Slovenia: Environmental Research Institute (ORZ)
- Bosnia and Herzegovina: Neum Municipality
- Bulgaria: Union of Bulgarian Black Sea Local Authorities
- Italy: Union of the Municipalities Pian del Bruscolo (UCPB)
- Spain: Provincial Waste Consortium of Malaga (RSU Malaga)
- Bosnia and Herzegovina: Association LINK Entrepreneurial Center (LINK)
- Cyprus: Aradippou Municipality

The project eWAsTER aims to promote local and regional policies for better e-waste management, to reduce e-waste environmental damage in the selected areas, while promoting new innovative eco-business models based on the conversion of the currently lineal electrical and electronic (E&E) sector into a sustainable circular model. There are three main Work Packages (WP) which are briefly described as follows:

- WP1: To create local and regional Action Plans for e-waste prevention and management, based on the project self-assessment tools and the project “Methodology for designing Strategies for Mediterranean e-waste prevention and management”
- WP2: To demonstrate and test the feasibility and effectiveness of 8 innovative solutions selected from the 8 consortium LAPs, providing validation at small scale prior to applying the solution at full scale and to transfer them to the programme Area.
- WP3: To enlarge the number of institutions up-scaling tested solutions from WP2, and increase the number of institutions using the project tools to create new Action Plans and Strategies for Mediterranean e-waste prevention and management.

4.3. Introduction to main WEEE Waste key concept

Before delving into the various factors influencing national and local policies in WEEE management, it is essential to highlight key definitions that will play a crucial role in the Action Plan.

WEEE classification.



There are main classifications launched by the EU and international organisms that will be of common use in the document.



WEEE Classification. Source: Own

- WEEE 2017 and 2018 are classifications provided by the European Union in their WEEE Directives.
- UNU-KEYS is a classification system launched from the UNU which categorises products by similar function, comparable material composition and related end-of-life attributes UNU.
- HS 2022 codes, harmonised statistical coding of the international trade codes, includes specific provisions for its classification to assist countries in their work under the Basel Convention. The HS codes link to the CPC product classification.

WEEE monitoring systems and concepts

When defining the data sources for calculation and monitoring, many potential options are currently used in different world locations. Some of the most necessary to understand the EU system are:

Concepts on WEEE monitoring	EEE Put on Market,
	Life-time of EEE products, stocks,
	Formal collection of e-waste.
	Extended Producer Responsibility (EPR)
	Other recycling (Wother)

Key actors

This section will examine the various stakeholders involved in the e-waste flow, from producers to consumers and regulatory authorities.

Currently, there is a clear imbalance between the responsibilities and competencies assigned to different actors in the WEEE value chain. In many Member States, Producer Responsibility Organizations (PROs) and producers are



considered the primary entities responsible for achieving collection and recycling targets. However, this approach overlooks the fact that PROs and producers do not have full access to all WEEE, whereas other actors outside the formal system do—an essential factor in meeting the required targets. Additionally, some Member States have imposed penalties on PROs for failing to meet these targets, despite their limited control over certain aspects of the collection process.

Since their inception, PROs, representing over 31,000 brand owners and electrical appliance producers, have collaborated with logistics and recycling operators to collect, decontaminate, recycle, and recover nearly 26 million tonnes of WEEE, adhering to the highest treatment standards. According to Eurostat, the total volume of collected WEEE increased from 3.0 million tonnes in 2012 to 4.9 million tonnes in 2021.

The WEEE Forum, the largest association of PROs, alone manages more than 114,000 collection points, demonstrating the scale and reach of the system.

The actors in the All-Actors Approach (AAA)
National competent authorities include: Member State governments; National waste authorities
Control and enforcement bodies: Inspection and customs
Coordination body.
EEE Producers and PROs
Retail. Including household and non-household WEEE.
Local authorities.
Other collection channels (e.g.B2B collection points, installers, demolition companies, social economy, etc).
Preparing for reuse.
WEEE treatment companies. Including: WEEE recyclers and licensed (for treating/accepting WEEE) scrap and car shredders.
Brokers, dealers, traders, other actors involved in legal export of UEEE/WEEE (producers, NGOs, facility managers...)
Citizens/Business/Public sector-WEEE generators



5. BACKGROUND TO THE LOCAL ACTION PLAN

5.1. Introduction to Local Action Plan

Managing Authorities aim to improve WEEE management policies at the national, regional, and local levels, aligning with the EU's Circular Electronics Initiative within the broader Circular Economy Action Plan. This begins with a thorough assessment of the current WEEE landscape and policies within the target area. This assessment, often referred to as a regional analysis or state of the art (and termed "Action Plan" within the eWAsTER project), will benchmark the area against neighboring regions to identify potential discrepancies that could lead to illegal WEEE shipments. A SWOT analysis will also be conducted. This initial phase (Phase 1) involves a comprehensive analysis of the regional WEEE sector, including key stakeholders and existing policies.

WEEE management presents a complex web of challenges. Local authorities grapple with technical, legal, economic, and educational considerations, impacting everything from organizational structures and implementation to selective collection, sorting, and treatment systems. These national and regional specificities will shape the Action Plan's outcomes and the Key Performance Indicators (KPIs) it defines.

The Action Plan's conclusions will summarize these findings and serve as the foundation for the Pilot Action phase. Crucially, the Pilot Action will directly inform and refine the Action Plan. Leveraging the sectorial analysis, the Action Plan will then identify new policy tools and design specific actions for implementation in Phase 2.

5.2. Methodology to be implemented in eWAsTER

The Action Plan's methodology involved a multi-phase process of data collection, processing, verification, agreement, and delivery, ensuring the final product met the Policy Instruments' requirements. Beyond technical reliability, the data underwent review by experts and stakeholders for integration into the final Action Plan.

The initial phase consisted of a desk analysis using macro-level data from statistical sources, primarily national and European statistical agencies, as well as national and EU-level sectoral reports. These resources provided information on economic, educational, and industrial sectors, including trends and SWOT analyses, and in some cases, energy data like consumption profiles and market composition. Existing EU, national, and regional policies, along with their targets and achievement levels, were also identified.



For more granular data, sectoral research and on-site data collection were employed, utilizing specific data collection tools. This detailed information informed the development of Key Performance Indicators (KPIs), supplemented by data gathered in subsequent phases.



Following the desk research and initial data gathering, preliminary KPIs were identified for in-depth analysis. These socio-economic indicators provided an initial measurement tool for evaluating the adequacy of WEEE management in the best practices.

These initial KPIs were then evaluated against the best practices' results, with necessary modifications implemented. The finalized KPIs, along with preliminary conclusions, were incorporated into the Draft Action Plan. This draft, including a SWOT analysis, was presented to key stakeholders for validation, ensuring the KPIs and other information were accurate and relevant.

The Action Plan's results and conclusions form the basis for the Pilot Action structure, which will address the region's sectoral needs. Therefore, the document's conclusions are geared towards final integration into the Action Plan structure.

The expected results include the identification of:

- ✓ Challenges
- ✓ Existing tools and actors
- ✓ New pathways and solutions

6. WEEE CONCEPTUAL FRAMEWORK

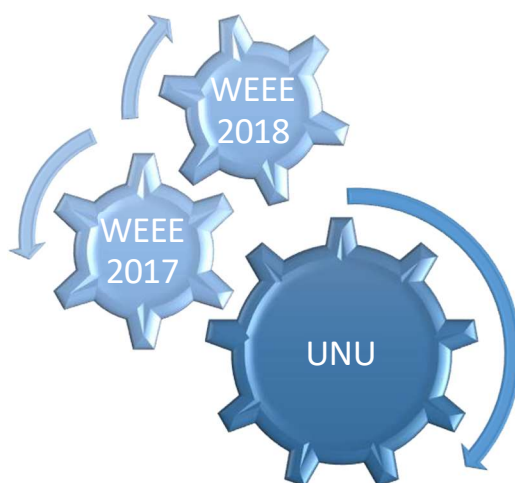
6.1. E-WASTE / WEEE CLASSIFICATION

Before detailing the measurement framework, we must address e-waste classification. E-waste encompasses all discarded electrical and electronic equipment (EEE) and its components, discarded by the owner without intent for reuse. The diverse nature of EEE necessitates categorization for effective management.

While various e-waste classifications exist, each potentially valuable for constructing e-waste statistics within our proposed framework, specific criteria must be met for effective harmonization and the development of meaningful, internationally comparable indicators.

Categories should avoid excessive specificity around products posing minimal environmental risk, lacking valuable materials, or having small market shares. Overly detailed classifications create numerous irrelevant codes, placing an unnecessary administrative burden on those reporting. Furthermore, relevant data for such granular classifications is often scarce. Conversely, overly aggregated classifications hinder the interpretation of cross-country differences. Such reporting inconsistencies compromise data quality, hindering international benchmarking and effective policymaking.

Two primary classifications have been used recently: those defined within the EU Directives (pre- and post-2017) and the UNU classification.



Eu directives WEEE classifications: Source: Own

6.2. EU classifications

European List of Wastes

The European List of Wastes (LoW) is the waste classification in the EU for administrative purposes (i.e., for permits and supervision in the field of waste generation and management). Many European, as well as some Caucasian and Central Asian countries use the LoW as a central framework to gather data for waste statistics. Waste statistics reporting is typically done on an aggregated level, based on the type of waste.



The LoW defines 839 waste types, which are structured into 20 chapters mainly according to the source of the waste (i.e., the economic sector or process of origin). Each waste type is characterised by a six-digit code. The allocation of wastes to the defined waste types is laid out in the introduction of Decision 2000/532/EC and explained in a separate section. There are 13 LoW codes that refer to e-waste. They are subdivided into hazardous and non-hazardous waste, and listed in Table 2 below. Fractions or components that can be generated during treatment of e-waste, such as metal scrap, plastics, and lead glass, are not listed in this table.

Those codes describe e-waste very generally and are merely useful to measure e-waste that is registered as separately collected e-waste. For compiling e-waste statistics however, these codes lack the ability to distinguish between different types of e-waste, thus ignoring differences in environmental relevance and materials' potential when recycled. Also, in practice, e-waste is collected and registered under other LoW codes, such as non-separately-collected domestic waste or metal scrap.

Currently, the WEEE Directive is enforced in the EU Member States. The WEEE Directive lists 10 categories for which data is collected. Those were:

1. Large house hold appliances

Large cooling appliances; Refrigerators; Freezers; Other large appliances used for refrigeration, conservation and storage of food; Washing machines; Clothes dryers; Dish washing machines; Cookers Electric stoves; Electric hot plates; Microwaves; Other large appliances used for cooking and other processing of food; Electric heating appliances; Electric radiators; Other large appliances for heating rooms, beds, seating furniture; Electric fans; Air conditioner appliances; Other fanning, exhaust ventilation and conditioning equipment

2. Small household appliances

Vacuum cleaners; Carpet sweepers; Other appliances for cleaning; Appliances used for sewing, knitting, weaving and other processing for textiles; Irons and other appliances for ironing, mangling and other care of clothing; Toasters; Fryers; Grinders, coffee machines and equipment for opening or sealing containers or packages; Electric knives; Appliances for hair cutting, hair drying, tooth brushing, shaving, massage and other body care appliances; Clocks, watches and equipment for the purpose of measuring, indicating or registering time; Scales

3. IT & Telecommunications equipment

Centralised data processing:: Mainframes; Minicomputers; Printer units; Personal computing; Personal computers (CPU, mouse, screen and keyboard included); Laptop computers (CPU, mouse, screen and keyboard included); Notebook computers; Notepad computers; Printers; Copying equipment; Electrical and electronic typewriters; Pocket and desk calculators and other products and equipment for the collection, storage, processing, presentation or communication of information by electronic means; User terminals and systems; Facsimile machine (fax); Telex; Telephones; Pay telephones; Cordless telephones; Cellular telephones; Answering systems and other products or equipment of transmitting sound, images or other information by telecommunications

4. Consumer equipment

Radio sets; Television sets; Video cameras; Video recorders; Hi-fi recorders; Audio amplifiers; Musical instruments and other products or equipment for the purpose of recording or reproducing sound or images, including signals or other technologies for the distribution of sound and image than by telecommunications; Photovoltaic panels

5. Lighting equipment

Luminaires for fluorescent lamps with the exception of luminaires in households; Straight fluorescent lamps; Compact fluorescent lamps; High intensity discharge lamps, including pressure sodium lamps and metal halide lamps; Low pressure



sodium lamps; Other lighting or equipment for the purpose of spreading or controlling light with the exception of filament bulbs

6. Electrical & Electronic Tools (with exception to large scale stationary Industrial Tools)

Drills; Saws; Sewing machines; Equipment for turning, milling, sanding, grinding, sawing, cutting, shearing, drilling, making holes, punching, folding, bending or similar processing of wood, metal and other materials; Tools for riveting, nailing or screwing or removing rivets, nails, screws or similar uses; Tools for welding, soldering or similar use; Equipment for spraying, spreading, dispersing or other treatment of liquid or gaseous substances by other means; Tools for mowing or other gardening activities

7. Toys leisure and sports equipment

Electric trains or car racing sets; Hand-held video game consoles; Video games Computers for biking, diving, running, rowing, etc; Sports equipment with electric or electronic components; Coin slot machines

8. Medical Devices (with exception of all implanted and infected products)

Radiotherapy equipment; Cardiology equipment; Dialysis equipment; Pulmonary ventilators nuclear medicine equipment; Laboratory equipment for in vitro diagnosis; Analysers; Freezers; Fertilization tests; Other appliances for detecting, preventing, monitoring, treating, alleviating illness, injury or disability

9. Monitoring & control instruments

Smoke detector; Heating regulators; Thermostats; Measuring, weighing or adjusting appliances for household or as laboratory equipment; Other monitoring and control instruments used in industrial installations (e.g., in control panels)

10. Automatic dispensers

Automatic dispensers for hot drinks; Automatic dispensers for hot or cold bottles or cans; Automatic dispensers for solid products; Automatic dispensers for money; All appliances which deliver automatically all kinds of products

EEE CATEGORY UNDER EU-10 (2017)
Automatic dispensers
Consumer equipment
Electrical and electronic tools
IT and telecommunications equipment
Large household appliances
Lighting equipment
Medical devices
Monitoring and control instruments
Small household appliances
Toys



The recast of the WEEE Directive lists six categories that should be reported from 15 August 2018, which are representative of the e-waste collection streams in practice. These categories are:

Group of EEE	Details
1	Temperature exchange equipment Refrigerators, Freezers, Equipment which automatically delivers cold products, Air conditioning equipment, Dehumidifying equipment, Heat pumps, Radiators containing oil and other temperature exchange equipment using fluids other than water for the temperature exchange.
2	Screens, monitors, and equipment containing screens having a surface greater than 100 cm ² Screens, Televisions, LCD photo frames, Monitors, Laptops, Notebooks.
3	Lamps Straight fluorescent lamps, Compact fluorescent lamps, Fluorescent lamps, High intensity discharge lamps - including pressure sodium lamps and metal halide lamps, Low pressure sodium lamps, LED.
4	Large equipment Washing machines, Clothes dryers, Dish washing machines, Cookers, Electric stoves, Electric hot plates, Luminaires, Equipment reproducing sound or images, Musical equipment (excluding pipe organs installed in churches), Appliances for knitting and weaving, Large computer-mainframes, Large printing machines, Copying equipment, Large coin slot machines, Large medical devices, Large monitoring and control instruments, Large appliances which automatically deliver products and money, Photovoltaic panels.
5	Small equipment Vacuum cleaners, Carpet sweepers, Appliances for sewing, Luminaires, Microwaves, Ventilation equipment, Irons, Toasters, Electric knives, Electric kettles, Clocks and Watches, Electric shavers, Scales, Appliances for hair and body care, Calculators, Radio sets, Video cameras, Video recorders, Hi-fi equipment, Musical instruments, Equipment reproducing sound or images, Electrical and electronic toys, Sports equipment, Computers for biking, diving, running, rowing, etc., Smoke detectors, Heating regulators, Thermostats, Small Electrical and electronic tools, Small medical devices, Small Monitoring and control instruments, Small Appliances which automatically deliver products, Small equipment with integrated photovoltaic panels.
6	Small IT and telecommunication equipment (no external dimension more than 50 cm) Mobile phones, GPS, Pocket calculators, Routers, Personal computers, Printers, Telephones.

The EU Member States either have a collection target based on a percentage of the amounts Put on Market (POM, in other words, EEE sales) in the three preceding years, or as a percentage of e-waste generated. The change from a flat target towards to a relative target requires improving e-waste statistics.

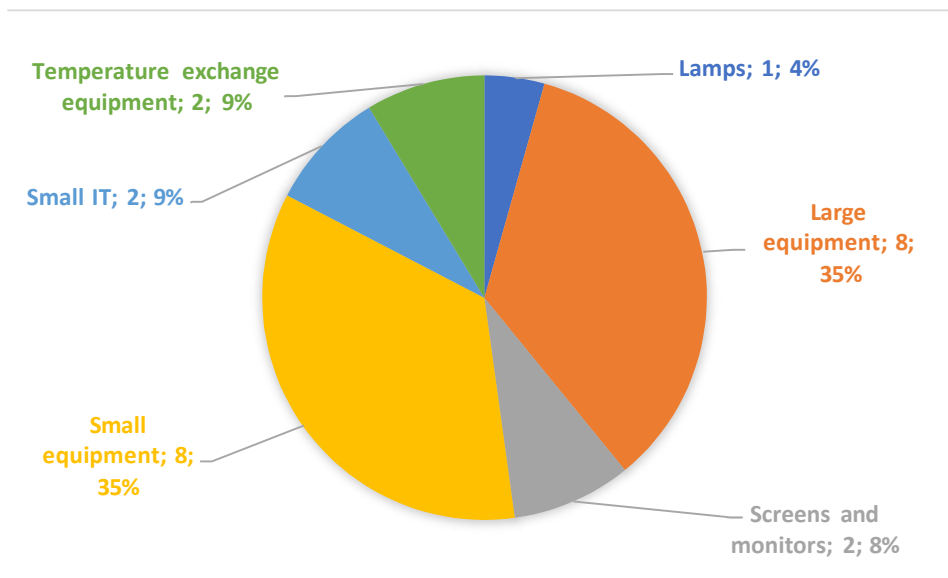


EEE CATEGORY UNDER EU-6 (2018)	EEE CATEGORY UNDER EU-10 (2017)
Lamps	Lighting equipment
Large equipment	Large household appliances
Large equipment	Consumer equipment
Large equipment	IT and telecommunications equipment
Large equipment	Electrical and electronic tools
Large equipment	Toys
Large equipment	Medical devices
Large equipment	Monitoring and control instruments
Large equipment	Automatic dispensers
Screens and monitors	IT and telecommunications equipment
Screens and monitors	Consumer equipment
Small equipment	Large household appliances
Small equipment	Small household appliances
Small equipment	Consumer equipment
Small equipment	Lighting equipment
Small equipment	Electrical and electronic tools
Small equipment	Toys
Small equipment	Medical devices
Small equipment	Monitoring and control instruments
Small IT	IT and telecommunications equipment
Small IT	Toys
Temperature exchange equipment	Large household appliances
Temperature exchange equipment	Automatic dispensers

Category	Q1 2021 WEEE collections	Q1 2022 WEEE collections	Q1 2023 WEEE collections	Progress toward 2023 target
1. Large household appliances	47,635	45,407	44,260	27%
2. Small household appliances	7,499	8,291	8,226	25%
3. IT and telecoms equipment	8,272	9,200	9,670	26%
4. Consumer equipment	5,024	5,414	5,069	24%
5. Lighting equipment	1,256	1,288	1,341	26%
6. Electrical and electronic tools	5,476	5,621	6,029	26%
7. Toys, leisure and sports	1,077	1,138	1,208	26%
8. Medical devices	1	1	3	27%
9. Monitoring and control instruments	278	245	265	24%
10. Automatic dispensers	0	1	0	0%
11. Display equipment	9,866	10,558	11,046	27%
12. Cooling appliances	33,184	31,624	32,208	24%
13. Gas discharge lamps and LED light sources	922	1,033	1,026	25%
14. Photovoltaic panels	64	50	80	26%
TOTAL	120,554	119,871	120,433	26%

EEE data collection. Source: 2bcompliance.org.uk/news/q1-2023-weee-data-shows-promising-collection-figures/

EEE CATEGORY UNDER EU-6	Account	EEE CATEGORY UNDER EU-10
Lamps	1	
Large equipment	8	
Screens and monitors	2	
Small equipment	8	
Small IT	2	
Temperature exchange equipment	2	



EEE Category under EU-10. Source: Own

6.3. Other classification system outside the EU

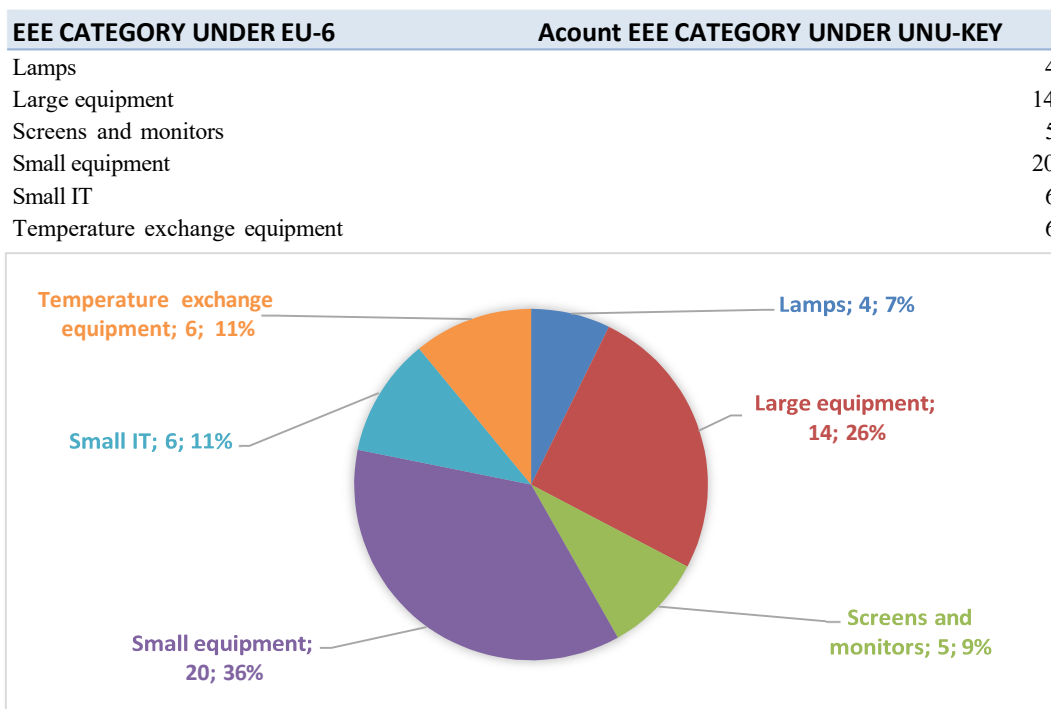
Classification of e-waste under the Basel Convention



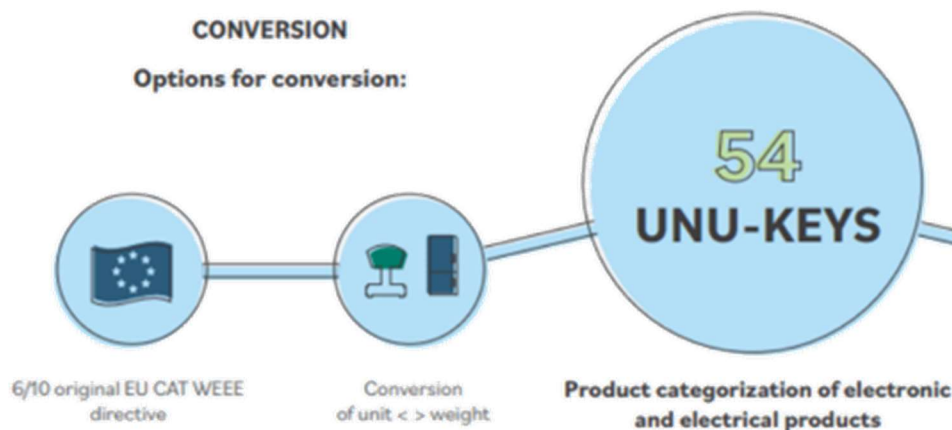
Article 2 ("Definitions") of the Basel Convention defines waste as "substances or objects, which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law." In paragraph four of that article, it defines disposal as "any operation specified in Annex IV" to the Convention 1.

UNU-KEYS

UNU-KEYS are designed so that product groups share comparable average weights, material composition, end-of-life characteristics and lifetime distributions. This makes the system very useful for compiling e-waste statistics. The full list of UNU-KEYS is given in Table 1. The 54 categories can be grouped into 10 primary categories according to the original EU Waste Electrical and Electronic Equipment (WEEE) Directive (see fourth column in Table 1). The classification can also be linked to the new reporting categories for the WEEE Directive recast (see third column in Table 1), which will come into force in the EU in August 2018. The UNU-KEYS classification is ideal as a link between the EU categories and the existing classifications. UNU-KEYS is used in the implementing law to describe the common methodology for calculating WEEE collection targets for Article 7 (European Commission, 2017/2018).



EEE category under EU-6. Source: Own



Monitoring global transboundary E-waste flows. Source: https://www.unodc.org/res/environment-climate/asia-pacific/unwaste_html/Unwaste_Webinar_14.09.22_SCYCLE_ppt.pdf

UNU-KEY	DESCRIPTION	EEE CATEGORY UNDER EU-6	EEE CATEGORY UNDER EU-10
0001	Central Heating (household installed)	Large equipment	Large household appliances
0002	Photovoltaic Panels (incl. inverters)	Large equipment	Consumer equipment
0101	Professional Heating & Ventilation (excl. cooling equipment)	Large equipment	Large household appliances
0102	Dishwashers	Large equipment	Large household appliances
0103	Kitchen equipment (e.g., large furnaces, ovens, cooking equipment)	Large equipment	Large household appliances
0104	Washing Machines (incl. combined dryers)	Large equipment	Large household appliances
0105	Dryers (wash dryers, centrifuges)	Large equipment	Large household appliances
0106	Household Heating & Ventilation (e.g. hoods, ventilators, space heaters)	Large equipment	Large household appliances
0108	Fridges (incl. combi-fridges)	Temperature exchange equipment	Large household appliances
0109	Freezers	Temperature exchange equipment	Large household appliances



0111	Air Conditioners (household installed and portable)	Temperature exchange equipment	Large household appliances
0112	Other cooling equipment (e.g. dehumidifiers, heat pump dryers)	Temperature exchange equipment	Large household appliances
0113	Professional cooling equipment (e.g. large air conditioners, cooling displays)	Temperature exchange equipment	Large household appliances
0114	Microwaves (incl. combined, excl. grills)	Small equipment	Large household appliances
0201	Other small household equipment (e.g. small ventilators, irons, clocks, adapters)	Small equipment	Small household appliances
0202	Equipment for food preparation (e.g. toaster, grills, food processing, frying pans)	Small equipment	Small household appliances
0203	Small household equipment for hot water preparation (e.g. coffee, tea, water cookers)	Small equipment	Small household appliances
0204	Vacuum Cleaners (excl. professional)	Small equipment	Small household appliances
0205	Personal Care equipment (e.g. toothbrushes, hairdryers, razors)	Small equipment	Small household appliances
0301	Small IT equipment (e.g. routers, mice, keyboards, external drives & accessories)	Small IT	IT and telecommunications equipment
0302	Desktop PCs (excl. monitors, accessories)	Small IT	IT and telecommunications equipment
0303	Laptops (incl. tablets)	Screens and monitors	IT and telecommunications equipment
0304	Printers (e.g. scanners, multi - functionals, faxes)	Small IT	IT and telecommunications equipment
0305	Telecommunication equipment (e.g. cordless phones, answering machines)	Small IT	IT and telecommunications equipment
0306	Mobile Phones (incl. smartphones, pagers)	Small IT	IT and telecommunications equipment



0307	Professional IT equipment (e.g. servers, routers, data storage, copiers)	Large equipment	IT and telecommunications equipment
0308	Cathode Ray Tube Monitors	Screens and monitors	IT and telecommunications equipment
0309	Flat Display Panel Monitors (LCD, LED)	Screens and monitors	IT and telecommunications equipment
0401	Small Consumer Electronics (e.g. headphones, remote controls)	Small equipment	Consumer equipment
0402	Portable Audio & Video (e.g. MP3, e-readers, car navigation)	Small equipment	Consumer equipment
0403	Music Instruments, Radio, Hi-Fi (incl. audio sets)	Small equipment	Consumer equipment
0404	Video (e.g. Video recorders, DVD, Blue Ray, set-top boxes) and projectors	Small equipment	Consumer equipment
0405	Speakers	Small equipment	Consumer equipment
0406	Cameras (e.g. camcorders, photo & digital still cameras)	Small equipment	Consumer equipment
0407	Cathode Ray Tube TVs	Screens and monitors	Consumer equipment
0408	Flat Display Panel TVs (LCD, LED, Plasma)	Screens and monitors	Consumer equipment
0501	Small lighting equipment (excl. LED & incandescent)	Small equipment	Lighting equipment
0502	Compact Fluorescent Lamps (incl. retrofit & non-retrofit)	Lamps	Lighting equipment
0503	Straight Tube Fluorescent Lamps	Lamps	Lighting equipment
0504	Special Lamps (e.g. professional mercury, high & low pressure sodium)	Lamps	Lighting equipment
0505	LED Lamps (incl. retrofit LED lamps)	Lamps	Lighting equipment
0506	Household Luminaires (incl. household incandescent fittings & household LED luminaires)	Small equipment	Lighting equipment
0507	Professional Luminaires (offices, public space, industry)	Small equipment	Lighting equipment



0507	Professional Luminaires (offices, public space, industry)	Small equipment	Lighting equipment
0601	Household Tools (e.g. drills, saws, high pressure cleaners, lawn mowers)	Small equipment	Electrical and electronic tools
0602	Professional Tools (e.g. for welding, soldering, milling)	Large equipment	Electrical and electronic tools
0701	Toys (e.g. car racing sets, electric trains, music toys, biking computers, drones)	Small equipment	Toys
0702	Game Consoles	Small IT	Toys
0703	Leisure equipment (e.g. sports equipment, electric bikes, juke boxes)	Large equipment	Toys
0801	Household medical equipment (e.g. thermometers, blood pressure meters)	Small equipment	Medical devices
0802	Professional medical equipment (e.g. hospital, dentist, diagnostics)	Large equipment	Medical devices
0901	Household Monitoring & Control equipment (alarm, heat, smoke, excl. screens)	Small equipment	Monitoring and control instruments
0902	Professional Monitoring & Control equipment (e.g. laboratory, control panels)	Large equipment	Monitoring and control instruments
1001	Non- cooled Dispensers (e.g. for vending, hot drinks, tickets, money)	Large equipment	Automatic dispensers
1002	Cooled Dispensers (e.g. for vending, cold drinks)	Temperature exchange equipment	Automatic dispensers

6.4. HS 2022 codes

The World Customs Organization (WCO) has updated the Harmonized System (HS) nomenclature with the HS 2022 edition, effective January 1, 2022. This seventh edition introduces 351 amendments, impacting a wide range of internationally traded goods.

The 2022 edition enhances visibility for several key product streams, reflecting evolving trade patterns. E-waste, a product class of significant policy concern and high trade value, now has specific HS provisions to support countries working within the Basel Convention.



Other notable changes include new classifications for emerging tobacco and nicotine products, dedicated provisions for unmanned aerial vehicles (UAVs or drones), and a unique subheading for smartphones.

Major reconfigurations have also been implemented for glass fibers (heading 70.19) and metal forming machinery (heading 84.62). These adjustments address technological advancements not adequately represented in existing subheadings, resolving resulting trade data gaps and potential classification issues.

Reflecting Customs' growing role in societal protection and counter-terrorism efforts, the HS 2022 edition also includes updated classifications for goods controlled under various conventions. This includes new subheadings for specific persistent organic pollutants (POPs) under the Stockholm Convention, chemicals controlled by the Chemical Weapons Convention (CWC), and certain hazardous chemicals under the Rotterdam Convention.

The WCO, an independent intergovernmental organization established in 1952, represents 183 customs administrations worldwide, collectively responsible for approximately 98% of global trade. Its mission is to improve the effectiveness and efficiency of customs administrations.

6.5. Correlations between the classifications

The correlations between the previously mentioned classifications are summarized in below table. The HS codes describe the products in the most detail. The UNU-KEYS are constructed from the HS codes, and this link is displayed in Annex 1. The UNU-KEYS, in turn, can be related to the 6 or 10 categories in the WEEE Directives, as indicated in the next Table.

The Basel Codes and LoW codes, however, are difficult to relate to the HS codes. This mainly is due to the fact that the HS nomenclature defines waste as the residual streams. This is in conflict with the definition of waste in Article 1 of the Basel convention, which states that wastes are substances or objects that are disposed of or are intended to be disposed of, or are required to be disposed of by the provisions of national law.



	UNU-KEYS	HS	EU LIST OF WASTE (LoW)	BASEL CODES	SEEA	EU WEEE DIRECTIVE, 6 CATEGORIES
HS	One HS code unique links to the UNU-KEYS					
EU LIST OF WASTE (LoW)	Not directly correlated	Not complete match, due to differing concepts of waste in HS classification and LoW				
BASEL CODES	Not directly correlated	EU has published a correlation table	Not directly correlated			
SEEA	One UNU-KEY can be linked to SEEA	One HS code is linked to SEEA	Not directly correlated	Not directly correlated		
EU WEEE DIRECTIVE, 6 CATEGORIES	One UNU-KEY can be correlated to the 6 categories, with the exception of the size distinction	One HS code can be correlated to the 4 categories of the WEEE Directive with the exception of the size distinction	Not directly correlated	Not directly correlated	Not directly correlated	
EU WEEE DIRECTIVE, 10 CATEGORIES	One UNU-KEY links to a category in the WEEE Directive	One HS code can be correlated to the 10 categories of the WEEE Directive	Not directly correlated	Not directly correlated	Not directly correlated	Not directly correlated, but can be linked with UNU-KEYS

Correlation between various classifications (source: UNU VIEW)

Objects that are “intended to be disposed of” include a larger variety of commodities that the HS would categorize as “products” in Chapters 84 and 85, as opposed to waste, which is their legal status according to the Basel convention. A preliminary correlation table between customs nomenclature codes and waste codes was published by the European Commission in the Commission Implementing Regulation (EU) 2016/1245. The LoW and Basel codes are currently not correlated to each other.



7. ACTORS INVOLVED IN THE SYSTEM

The "all actors" approach to WEEE management involves all stakeholders with legal responsibilities: those handling WEEE (collection, logistics, preparation for reuse, refurbishment, and treatment), those monitoring it, and those creating and enforcing WEEE legislation. All these actors are bound by the WEEE Directive, including compliance, monitoring, and reporting requirements, and must contribute to responsible WEEE practices and transparent oversight.

The principle of mandatory handover mandates that all WEEE management be conducted exclusively by certified WEEE collectors and recyclers. Any WEEE collected by uncertified entities must be transferred to certified ones, potentially with financial compensation. This mechanism aims to increase WEEE collection and registration rates.

List of actors in the model of All-Actors Approach (AAA)

National competent authorities include:

- Member State governments
- National waste authorities

Enforcement bodies:

- Inspection and customs

Coordination body.

EEE Producers and PROs

Retail. Including household and non-household WEEE.

Local authorities.

Other collection channels (e.g. B2B collection points, installers, demolition companies, social economy, etc).

Preparing for reuse.

WEEE treatment companies. Including: WEEE recyclers and licensed (for treating/accepting WEEE) scrap and car shredders.

Brokers, dealers, traders, other actors involved in legal export of UEEE/WEEE (producers, NGOs, facility managers...)

Citizens/Business/Public sector-WEEE generators

7.1. Producers and producer responsibility organizations (PRO)

A Producer Responsibility Organisation (PRO) is a national-level collective entity that helps producers comply with legal obligations on their behalf, funded through their contributions. When a producer becomes a member of a PRO— typically by paying a fee based on the type, quantity, and characteristics of the products it introduces to the market—the PRO assumes legal responsibility for meeting regulatory targets and requirements.



Source: <https://www.vana.dk/en/producer-responsibility/producer-responsibility-organisations-pros/>

The obligations of producers under the Extended Producer Responsibility (EPR) system for Waste Electrical and Electronic Equipment (WEEE) in Europe are established by the EU WEEE Directive. Producers are responsible for financing the collection, transportation, and environmentally sound treatment of WEEE, ensuring that the costs of management are covered either individually or through a collective scheme. In some European countries, they must register with a national WEEE management organisation, which oversees collection and treatment on their behalf. Additionally, producers are encouraged to design products that facilitate recycling and minimize the use of hazardous materials, thereby enhancing material recovery and reducing environmental impact. They must also meet collection and recycling targets set by each EU member state and report on their WEEE management activities, including the quantities collected and treated, along with associated costs. Furthermore, producers are required to provide consumers with information on the proper disposal of WEEE, including details on collection points and return procedures.

In Europe, the EPR system for WEEE ensures that producers take responsibility for their products throughout their entire life cycle, from manufacturing to disposal. By mandating that producers fund the collection, transportation, and treatment of WEEE while also encouraging product designs that facilitate recycling, the system supports sustainable WEEE management and advances the principles of a circular economy.

Collective Producer Responsibility (CPR)



Relationship between markets and actors. Source: <https://zerowastemaldives.com/producer-responsibility-organisation/>



7.2. Extended Producer Responsibility (EPR)

Extended Producer Responsibility (EPR) is a fundamental policy tool for managing WEEE in Europe. Introduced through the EU WEEE Directive, EPR places the responsibility for a product's entire lifecycle on electronic equipment producers, including funding its collection, transportation, and environmentally responsible treatment. This approach has proven effective in ensuring the sustainable management of WEEE, encouraging producers to develop more easily recyclable products and minimizing the environmental impact of electronic waste. Consequently, numerous European countries have implemented EPR policies, acknowledging the crucial role producers play in advancing the circular economy and reducing WEEE-related environmental harm.



The OECD defines EPR as an approach to environmental policy that extends producer responsibility for a product to the post-consumer phase of the product life cycle. In practice, EPR involves the responsibility of producers to collect products at the end of their life and to sort them before final treatment, ideally by recycling. EPR schemes can enable producers to exercise their responsibility either by providing the necessary funding or by taking over the operational and organisational aspects of the process from municipalities, e.g., in the case of packaging.

In Europe, there are two main types of EPR systems for WEEE: individual and collective. The key differences between the two systems are outlined below:

- **Individual EPR systems:** under an individual EPR system, each producer is responsible for financing the collection, transportation, and treatment of the WEEE generated by their products. This means that the producer must ensure that the WEEE generated by their products is collected, transported, and treated in an environmentally sound manner, either directly or through a contracted service provider. The producer is also responsible for reporting on their WEEE management activities to the relevant authorities.
- **Collective EPR systems:** In a collective EPR system, multiple producers of WEEE products join together to form a collective scheme. This scheme is responsible for financing the collection, transportation, and treatment of WEEE generated by the products of its members. This system allows producers to pool their resources and share the costs of WEEE management. The collective scheme is responsible for ensuring that the WEEE generated by its members is collected, transported, and treated in an environmentally sound manner. The collective scheme is also responsible for reporting on the WEEE management activities of its members to the relevant authorities.



Entended producer responsibility (EPR). Source: <https://500earth.com/what-is-extended-producer-responsibility-epr/>

The implementation of WEEE EPR in Europe varies by country, and each country has adopted its own specific system. The steps involved in implementing a WEEE EPR system in Europe can be broadly outlined as follows:

- Develop legislation: A country must develop national legislation to implement the EU WEEE Directive. This legislation outlines the obligations of producers, the requirements for the management of WEEE, and the penalties for non-compliance.
- Choose an EPR system: The country must decide which type of EPR system to adopt - individual or collective. This decision will depend on factors such as the size of the market, the number of producers, and the available resources.
- Establish a producer responsibility organisation (PRO): If the country chooses to adopt a collective EPR system, a PRO must be established. This is an organisation that is responsible for managing the collection, transportation, and treatment of WEEE on behalf of producers.
- Develop collection and recycling infrastructure: The country must develop infrastructure for the collection and recycling of WEEE. This may involve the establishment of collection points and recycling facilities, as well as the development of transportation networks.
- Establish a monitoring and reporting system: The country must establish a system for monitoring and reporting on the collection, transportation, and treatment of WEEE. This system is used to ensure that producers are meeting their obligations under the legislation.

Each country in Europe has its own specific implementation of WEEE EPR. For example, Germany has adopted a collective EPR system, where producers are required to join a PRO that is responsible for managing the collection and recycling of WEEE. France has also adopted a collective system, while Italy has adopted an individual EPR system, where producers are responsible for managing the collection and recycling of their own products.

Spain has adopted a hybrid system, where larger producers are required to manage their own WEEE, while smaller producers are allowed to join a collective scheme.

Overall, the implementation of WEEE EPR in Europe involves a combination of legislative, organisational, and infrastructural measures. The specific implementation of EPR systems varies by country, depending on the national context and resources available.

7.3. Retailers

Retailers constitute one of the pillars of the WEEE Collection network. It is suggested that each Member States explores the possibility of extending the 1x0 obligation to other retailers in addition to the ones cited in the WEEE Directive (selling surface > 400 m²), provided collection is economically and environmentally sustainable.

Retailers, in addition to the legal requirements applicable, are suggested to:

- Participate in a coordination body.
- Collect small WEEE (incl. non-household retailers), in store and at delivery.
- Report WEEE received, preferably using tools that will lower this administrative burden.
- Promote the use of reverse logics.
- Contribute finances to a central body for consumer campaigns.
- Provide any support required for tackling practices leading to irregular flows and treatment of WEEE (especially during delivery take back).



Extend retail in Netherlands that provides a pick-up service for small appliances.

Only in a fully implemented AAA, retailers should have the choice of arranging and paying for treatment of the WEEE collected at their facilities if they wish, and reporting it, provided they reach a proper treatment or handing it over to PROs with the right of free uplift and PROs pay for treatment. Retail associations and representatives of the retail sector are encouraged to proactively involve their members in awareness raising campaigns partnering with PROs and preferably through a coordination body. It is proposed that retail associations participate in R&D and initiatives promoting the use of reverse logistics for WEEE collection.

7.4. National competent authorities and Enforcement bodies

The role of national competent authorities in this AAA is about providing an appropriate legislative frame that will ensure all actors influencing collection will contribute to reaching national collection targets matching their competences.



Some of the actions that are envisaged for national (waste) competent authorities in this AAA are:

- Set up a coordination body.
- Ensure appropriate coordination amongst all actors is carried out through a coordination body, and including regular interaction and synergy building between policy makers and enforcement bodies, such as customs and inspection.
- Legislative support providing means for increasing collection, such as:
 - » Setting up policies requiring all actors to report.
 - Regulating and enforcing reporting including reporting of UEEE/WEEE exported and imported.
 - Defining a legal frame promoting the use of reverse logistics in WEEE collection.
 - Regulate and enforce mandatory handover of WEEE to PROs.
 - Making CENELEC standards mandatory.
- Contribute to monitoring / measurement campaigns of Complementary flows (e.g., MSW).
- Support targeted awareness raising campaigns at national level.
- Provide clear and harmonized collection and sorting guidance to local authorities.

Enforcement bodies, and in particular inspection, have a relevant role for ensuring the success of an AAA. Besides incentives and legislative endorsement, inspection campaigns are key to guarantee a level playing field for all actors.

Enforcement bodies are to set up national targeted inspections and measures for:

- All actors reporting WEEE received and UEEE exported/imported.
- Proper WEEE treatment, and
- Reporting of producers (addressing the issue of freeriding).

Customs ensure reporting of import and export of UEEE/WEEE. A critical assessment of the current practices should be done to set up an appropriate improvement plan that will:

- Allow an unequivocal traceability of UEEE and WEEE trans frontier shipments.
- Ensure appropriate treatment of WEEE is carried out outside Europe.
- Increase reporting of UEEE/WEEE from shipment companies.

International multi-stakeholder groups are encouraged for addressing trans-frontier movement, adequate knowledge and training.



7.5. Coordination body

In an AAA, all stakeholders that may influence WEEE collection rates should contribute to the attainment of the national collection targets. A coordinated response for ensuring an efficient use of resources and adequate monitoring requires coordination between parties and fluid communication. Ideally, a coordination body should be composed of representatives of all actors that may influence collection rates. PROs must play a critical role in the governance of the



coordination body, for example to ensure that any initiatives are cost-effective, proportionate and fair.

It is proposed that a coordination body:

- Coordinates and monitors the allocation of collection responsibilities.
- Monitors compliance of collection responsibilities and national collection in general.
- Sets a reporting framework / tool and coordinates reporting from all actors.
- Facilitates and channels agreements between PROs and local authorities to support efficient collection of households WEEE.
- Designs strategies for expanding and improving the collection network, such as improving existing collection or creating incentives for new collectors to be part of the national collection network.
- Coordinates with other sectors for monitoring and traceability (building, car...).
- Funds R&D e.g., running studies on WEEE flows, technical best practice development etc.
- Coordinates national and local communications campaigns for efficient use of resources and consistent and well researched messages and campaigns.
- Is involved in enforcement planning and supports enforcement.

The coordination body may be financially supported by public and/or private funding. The responsibilities allocated to producers (e.g., art. 14 and 15 of the WEEE Directive), though managed by the coordination body for an efficient use of resources and consensus, will remain financed by producers.

7.6. Local authorities

Local authorities should be considered the main pillar of the WEEE Collection network. A proactive and active role in promoting WEEE collection among their citizens is suggested for municipalities in this AAA.

In particular local authorities, in addition to the legal requirements applicable, should:

- Participate in a coordination body.
- Set agreements with PROs for handing over WEEE received at their facilities, when this is not required by law, and municipalities are entitled to hand over the WEEE to a downstream acceptor, additional control and evidence-based traceability and proper treatment should be ensured by for example laws setting up tendering conditions.
- Carry out targeted, harmonized and clear awareness raising campaigns.
- Implement measures for fighting theft and scavenging.
- Monitor and benchmark WEEE collection, scavenging and theft rates.



- Collaborate with enforcement for tackling thefts and scavenging issues by reporting such practices, training of staff working at collection points and implementing measures for reducing scavenging rates and thefts.
- When competence allows, local entities to run enforcement campaigns against illegal treatment and misreporting of WEEE.

Activities marked with an *should* preferably be facilitated by a coordination body.

7.7. Other collection channels (e.g. B2B collection points, installers, demolition companies, social economy, etc)

The AAA promotes the expansion of the collection network by the addition of all actors that have access to WEEE. This includes businesses, installers of equipment such as PV panels or A/C, demolition and construction companies, social economy entities, repair services, public institutions etc.

Contributions of such collectors to the WEEE collection rates should be traceable and follow official flows. For achieving all of the above, it is suggested that they:

- Become registered WEEE collectors upon requirement / take back and collection obligations. It is encouraged that the procedure for authorizing or registering such activities is free of charge and simple, otherwise, it may be a deterrent for these activities to become part of the collection network.
- Report any WEEE received and its fate to an official database.
- Ensure traceability and treatment of the WEEE collected in officially recognized facilities.
- Provide any support required for tackling practices leading to irregular flows and treatment of WEEE.

These collection channels are encouraged to set agreements with the national PROs and benefit from the resources PROs can tap into for an adequate handling of the WEEE.

7.8. Preparing for reuse organizations

Preparing for reuse organisations are becoming more and more relevant and supported by the WEEE sector. Their role as contributors to the circular economy is undeniable. In certain Member States, they offer an efficient collection network that should be used for collecting WEEE whenever it is possible. Alliances between preparing for reuse organisations and PROs have shown good results in some Member States. PROs and preparing for reuse organisations in other MS are encouraged to learn from successful experiences and try to replicate them. It is important to ensure proper traceability of the WEEE that is handed over to preparing for reuse organisations.

Exploring efficient and safe ways for ensuring access to WEEE to preparation for reuse is also encouraged. In this AAA approach, it is suggested that preparing for reuse organisations:

- Participate in a coordination body.



- Become authorised WEEE collectors.
- Report any WEEE received and its fate to an official database.
- Set up alliances with PROs for ensuring reporting of WEEE and proper management of it.
- Comply with preparation for reuse standards such as EN50614.
- Provide any support required for tackling practices leading to irregular flows and treatment of WEEE.

7.9. WEEE treatment companies

In many Member States, recyclers are not only dealing with treatment. They may act as logistics and collection companies as well and can be a relevant part of the WEEE collection network. Having access to WEEE, they become a contributor to the attainment of the national WEEE collection targets in this AAA. Some Member States do not entitle companies treating scrap for the specialist treatment of WEEE but are receiving WEEE mixed with scrap and treating it as the latter. In this case, and for a full implementation of this AAA, such companies should either become authorised companies for treating WEEE or separate WEEE from scrap and send the WEEE to an authorised facility.

It is suggested that metal recycling companies:

- Comply with standards that will include traceability protocols.
- Report on the amounts of WEEE received, categories, activity undertaken and fate of the WEEE and/or resultant fractions, either via agreements set with PROs, authorities or to a national database.
- Scrap facilities collecting or receiving WEEE mixed with scrap under a licence or registered exemption, must report on WEEE received and treated, or send to an authorised WEEE treatment facility.
- Provide reports on treatment quality to a coordination body.
- Contribute to law enforcement by supporting audits/inspection programs.

Brokers, dealers, traders, other actors involved in legal export of UEEE/WEEE (producers, NGOs, facility managers...).

Some types of WEEE can follow the path of a valuable commodity. Brokers, dealers, traders and alike are part of the value cycle of WEEE, and as actors having access to WEEE they must be obliged to contribute to the attainment of national collection targets aligned with their competences and bearing in mind their limitations.

It is suggested that they:

- Report any WEEE received and its fate to a national database.
- Report any UEEE exported/ imported either via agreements set with PROs, authorities or to a national database.
- Provide evidence of proper treatment of WEEE traded.



- Provide any support required for tackling practices leading to irregular flows and treatment of WEEE.

7.10. Citizens/Business/Public sector-WEEE generators

The levels of hoarding and the rates of wrong disposal may be significant in some Member States, and are practices occurring in all of them. Citizens, and WEEE generators in general, are the first holders of WEEE and decide disposal paths, hence, they are key players for ensuring correct disposal and increasing collection rates.

Citizens should be encouraged to:

- Reduce hoarding.
- Stop disposing of WEEE through the wrong channels.

8. STANDARD MONITORING SYSTEMS

A primary goal of the previously mentioned policies is to enhance the collection and recycling of WEEE, with specific targets established for each EU member state. The methods used for WEEE collection and recycling differ across countries and waste categories, typically involving a combination of government-led initiatives, producer responsibility schemes, and private sector involvement.

In the context of e-waste management, standard monitoring systems refer to structured frameworks for tracking, recording, and overseeing electronic waste throughout its lifecycle. These systems play a crucial role in ensuring regulatory compliance, assessing performance, and improving the efficiency of e-waste management.



Such monitoring systems incorporate various key components. Tracking and tracing mechanisms follow the movement of e-waste from collection points to recycling facilities, often using barcodes, digital tags, or other tracking technologies to verify proper handling. Data management systems compile and store information on the types and quantities of e-waste collected, processed, recycled, or disposed of, ensuring transparency and accuracy. Compliance monitoring ensures adherence to regulations, recycling targets, and environmental standards, while performance assessment evaluates key factors such as recycling rates, resource recovery, and the reduction of hazardous substances.

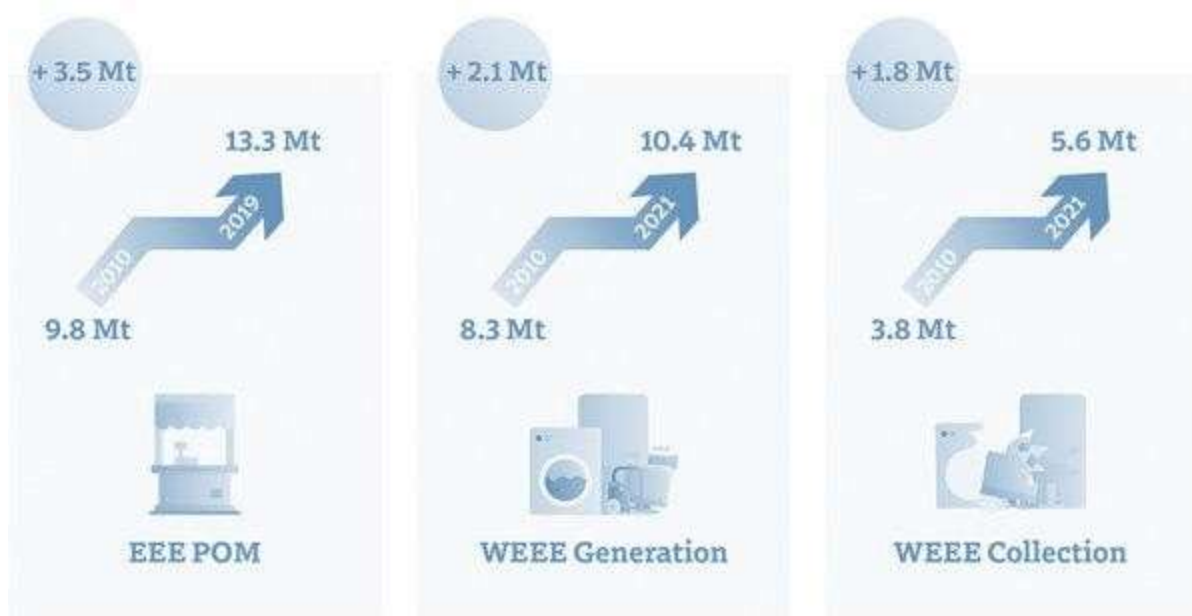
Additionally, reporting and transparency measures enable regulatory authorities, stakeholders, and the public to access information on e-waste handling and its environmental impact. Auditing and verification processes help confirm that e-waste is managed according to established protocols and best practices. These systems also support continuous improvement by identifying areas for enhancement and optimizing e-waste management strategies.

Furthermore, standard monitoring systems are often integrated into broader policy frameworks, such as Extended Producer Responsibility (EPR) programs, ensuring alignment with legal requirements. Overall, these monitoring mechanisms are vital for effective oversight and governance, allowing stakeholders to track, regulate, and enhance the environmental sustainability of e-waste management.

8.1. POM

The POM method, calculates the collection rate as the mass of WEEE collected divided by the average amount of Electrical and Electronic Equipment (EEE) Placed on Market (POM) in the three preceding years. From 2013 to 2016, the collection rate using this method increased from 39% to 50%. However, from 2016 to 2020, the collection rate using the POM method dropped to 44%. Despite the significant increase in the WEEE collection, the decrease in the collection rate is caused by even larger increases in POM, causing the collection rate to decrease using this method.

The POM method provides a longer-term perspective on the collection rate and is less sensitive to short-term fluctuations in WEEE generation and collection. However, this method may be affected by factors such as the accuracy of the data on POM and changes in the product mix of EEE placed on the market.



The amount of EEE POM (Source: <https://www.scycle.info/new-study-update-of-weee-collection-rates-targets-flows-and-hoarding/>)

Governments typically rely on information reported by producers and importers to determine how much weight of appliances are placed on the market. Producers and importers are required to report the quantities of electrical and electronic equipment that they place on the market to national authorities in accordance with the WEEE Directive. The authorities then use this information to determine whether the collection targets for different types of WEEE have been met.

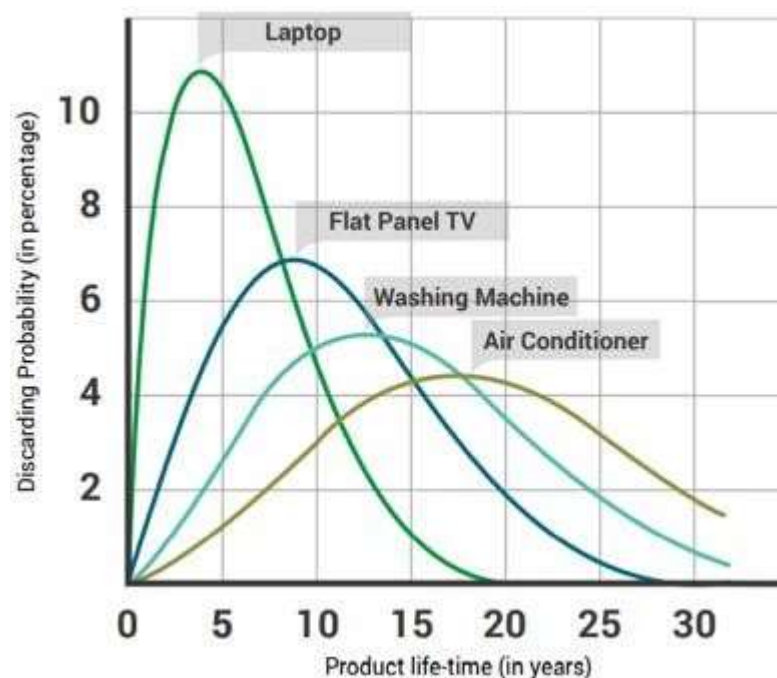
The initial approach to calculate the collection rate involved dividing the mass of WEEE collected by the average amount of EEE POM in the preceding three years, which was implemented in 2016. Since then, the collection target has been determined as the ratio between the collected amount and the average weight of EEE placed on the market in the previous three years. The collection target was set at 45% for 2016 and was increased to 65% in 2019.

Regulations and directives often govern the responsibilities of manufacturers, distributors, and consumers regarding e-waste management from the point of "putting on the market" to the eventual disposal or recycling of these devices. This includes obligations for proper disposal, recycling, and handling of electronic waste by the entities involved in the product lifecycle, ensuring environmentally responsible practices.

8.2. Life time

The lifetime of Electrical and Electronic Equipment (EEE) is defined as the period during which the equipment is expected to function correctly and efficiently before reaching the end of its usable life.

The life-time of EEE products could vary per product and country. The next figure shows an example of different life-time profiles expressed as Weibull functions per type of product in the European Union. There is generally no official data collection for life-times by governments. However, several countries may have this information available through scientific literature or other studies performed in their country.



Recycling Computation: Navigating the World of E-Waste Recycling. Source: <https://medium.com/greenbyte-labs/recycling-computation-navigating-the-world-of-e-waste-recycling-6612ce12c838>

As mentioned before, the life-time of EEE products could vary by product and country. For other EU countries a sensitivity analysis was carried out, and it is calculated that the margin of error for the e-waste generated related to the potential variation in life-time is approximately 10% per country. Therefore, countries may wish to determine life-time empirically per product and country. The variation for the life-times between the countries in EU has been small for most products.



When defining the lifetime of EEE, it's essential to consider these factors to ensure realistic expectations regarding the duration for which the equipment will function optimally. It's also important in the context of sustainability and responsible consumption, as it impacts the generation of electronic waste and the overall environmental footprint of the product.

8.3. System of Environmental-Economic Accounting (SEEA)

The System of Environmental-Economic Accounting (SEEA) provides internationally recognized standards for concepts, definitions, classifications, accounting rules, and tables to generate comparable statistics on environmental-economic accounts and their link to the economy. Its framework aligns with the System of National Accounts (SNA), ensuring consistency in concepts, definitions, and classifications to integrate environmental and economic data effectively.

Within SEEA, e-waste falls under Chapter 3.6.5 on Waste Accounting. According to SEEA principles, e-waste statistics represent a subset of overall waste from electrical and electronic equipment (EEE) and vehicles. However, the current e-waste guidelines do not specify the source of waste generation (ISIC/NACE 18 or household), which is crucial for SEEA. Addressing this gap requires additional modeling, potentially at the UNU-KEY level. SEEA also includes reporting on import and export data, as covered in e-waste guidelines, but accurately measuring transboundary e-waste flows remains a significant challenge.

Furthermore, SEEA accounts for secondary materials derived from e-waste, such as plastics, scrap metal, and residues. While these materials are excluded from e-waste statistics, they can still be incorporated into models for a more comprehensive analysis.

8.4. Framework for the Development of Environment Statistics (FDES)

The Framework for the Development of Environment Statistics (FDES) is a versatile and comprehensive conceptual and statistical framework designed to be both integrative and adaptable. It defines the scope of environmental statistics and provides a structured approach to collecting, compiling, and synthesizing data from various sources and subject areas. This framework supports the analysis of environmental issues relevant to policy and decision-making.

Subcomponent 3.3, *Generation and Management of Waste*, encompasses statistics on the quantity and characteristics of waste, including e-waste. Waste is defined as discarded material no longer needed by its owner or user, resulting from production and consumption activities. The FDES establishes a framework for identifying and gathering waste statistics, including those related to e-waste. Additionally, it aligns waste statistics with the International Standard Industrial Classification (ISIC), ensuring better integration with economic statistics.



8.5. Stock (S)

The stock (S) represents the equipment owned by households, businesses, and the public sector. However, comprehensive and harmonized data on stock levels for all 54 UNU-KEYS, particularly for appliances in households and businesses, is generally unavailable. Some countries may have stock data for specific products, often collected through household surveys conducted by national statistical institutes. These surveys may assess household possessions or the penetration rate of various electrical and electronic equipment (EEE), which can contribute to the measurement framework.

It is important to note that this methodology requires counting both functional and non-functional appliances. Another potential, though less reliable, data source is the number of subscriptions. In this case, one subscription is assumed to correspond to at least one appliance. However, discrepancies may arise, as some appliances may have multiple subscriptions, while others may exist without any. Additionally, some countries measure ICT penetration rates, which can provide a minimum estimate of stock levels, though these surveys do not account for households owning multiple appliances.

8.6. Formal collection of e-waste (W_{formal})

Data on formal collection of e-waste are not modelled. Data must be gathered by countries using the most appropriate data-gathering methods. The data that is reported under “formal collected e-waste” are the amounts of collected and recycled e-waste compliant with a specific e-waste management law, thus meeting the national environmental standards for recycling e-waste.

This is ideally a national e-waste legislation that regulates the e-waste management system in the country, sets collection and recycling targets, and sets minimum recycling requirements or has a certification 21 to recycle e-waste in an environmentally sound manner.

All the actors involved in the formal e-waste management system are potential sources for data. If the e-waste is collected through official take-back systems, it can be assumed that e-waste collected equals e-waste recycled, though in practice there might be losses taking place during the treatment phase. Data on e-waste formally collected and recycled can be gathered either by tracing the e-waste that is collected for recycling after its generation, and determining whether the collected e-waste is actually recycled in a treatment facility domestically or in another country. It is also possible to gather data on the amounts of e-waste that enter the treatment facility operating in an environmentally sound manner. In that case, imported e-waste for recycling should be subtracted from these amounts.

On the basis of legal provisions, data could be collected or recorded by competent authorities for licensing, monitoring and law enforcement scope. Such recording systems can also function as registers for e-waste statistics on formal collection of e-waste. This is mostly the case for countries that have adopted the Extended Producer Responsibility (EPR) principle for e-waste. In an EPR scheme, e-waste along with e-waste data should be collected by designated organizations, producers, and/or by the government (formal collection). The e-waste collected via

retailers, municipal collection points, and/or pick-up services should be then sent to e-waste treatment facilities. A distinction can be made between data collected or recorded by competent authorities on the basis of legal provisions and other data collected on a voluntary, economic, or other basis by the private or public sector; this includes, in particular, data collected by associations for their own purposes.

If there is no EPR scheme, or register, for e-waste in the country, the e-waste can still be recycled in the country in an environmentally sound manner. For instance, it can be sent to treatment facilities that are certified to recycle e-waste.



Possible flows to trace and potential data sources to gather data on formal collection

Household statistics: The collection of household statistics might also be a method to compile statistics on the collection and recycling of e-waste. In this case, a representative sample of the households in a country are sent a questionnaire in which they are asked details of the household (size, income levels, etc.), and information about e-waste. This should include which e-waste has been discarded (e-waste generated), how long the discarded product has been in use at the time of disposal (life-time "L"), and also how the product has been disposed of (Wofficial, Wbin or Wother). The information about the type of e-waste is usually reported in pieces (number of units). This will have to be converted to weight.

Survey collection points: E-waste can be collected at collection points established by municipalities or by private companies. Obsolete electric or electronic appliances can either be brought to a collection point by the previous owner, or it can be collected as bulky waste door to door (e.g. fridges or washing machines). It might be that municipalities and private companies register the collected e-waste separately from other wastes. If this separately collected e-waste is recycled, it may be reported here.

Collection points established from stores can also be a possible source of data because the possibility of returning broken or obsolete appliances to electronic stores is increasingly spreading worldwide. However, it should be ensured that the e-waste collected through these collection points are managed correctly in certified treatment facilities.



Questionnaire to e-waste treatment facility: E-waste statistics can also focus on tracing the quantities of e-waste entering the treatment facilities. Comprehensive registers are a prerequisite for the collection of facility-related information and for data on treated quantities, irrespective of the method of data collection used. For this reason, e-waste facility registers are likely to form the core of an e-waste information system. A disadvantage of focusing on waste treatment is that the constitution of the e-waste is different from the origin (it might have been dismantled into components). Also, it might be less clear which of the treated e-waste was imported, and which of the domestically generated e-waste was exported for treatment. Since the aim is to get the e-waste management data on the domestically produced e-waste, imports have to be deducted from this.

Other data sources: Other possible data sources are registers from waste companies, reports from NGOs, or other environmental surveys in the country. A number of public and industrial associations at the national level compile statistics for their own use on the management of e-waste streams. Sectoral data of this kind may be used by countries in their national statistics on e-waste treatment. Where such data are used, it is advisable to take steps to ensure that they meet the requirements and quality criteria defined by national e-waste legislations. Scientific literature may also be an interesting source for statistics on the collection and recycling of e-waste, as research in this field is making significant progresses worldwide.

9. THE AREA UNDER ANALYSIS

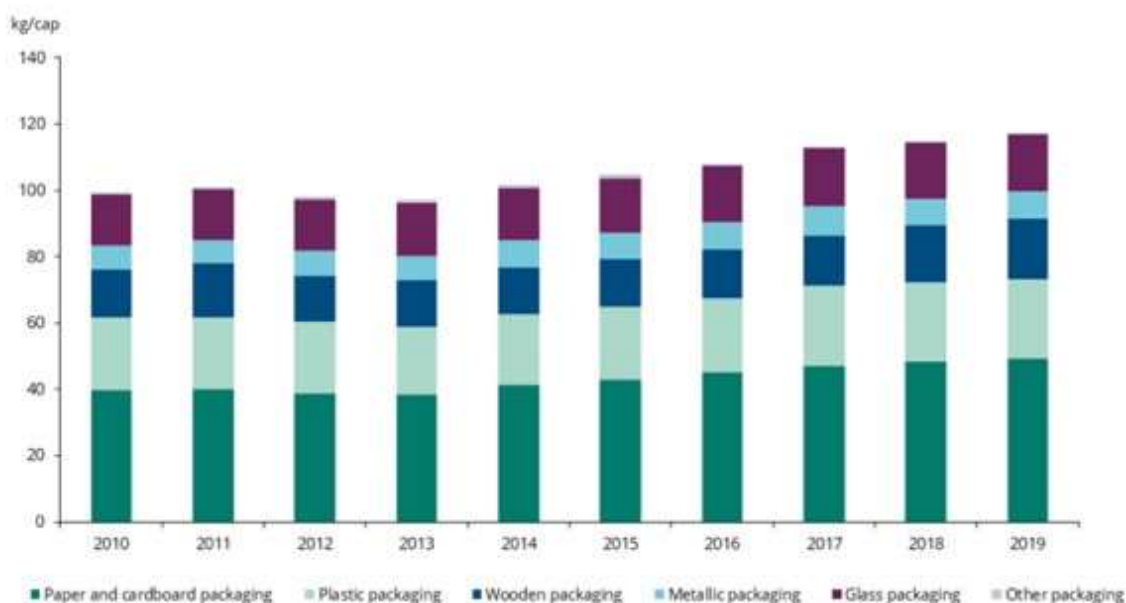
9.1. WEEE CONTEXT IN THE AREA UNDER ANALYSIS

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.

Figure 1.2 Packaging waste generation in Slovenia between 2010 and 2019, in kg per capita



In Slovenia, 245 thousand tonnes (117 kg/cap) of packaging waste were generated in 2019, which was below the EU average of 177 kg/cap. Figure shows that packaging waste generation has increased for all packaging fractions, except for other packaging, compared to 2010.

Considerable progress appears to have been made in recent years against the targets in the directives, such that Slovenia has a good chance of fulfilling the recycling target of 50% by 2020. In view of the amendments to legislation, the establishment of regional waste management centers, and the presence of a landfill tax, landfilled quantities of waste are expected to decrease.

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.





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.

At the local level, municipalities play a key role in setting guidelines and goals and implementing measures to ensure effective protection and preservation of the environment. In order to establish a quality environment in the area of the Municipality of Maribor, it is necessary to reduce negative impacts on it. This will be made possible by targeted planning of the municipality's development, clear development and environmental guidelines, the establishment of a quality environment in the area of the Municipality of Maribor, it is necessary to reduce negative impacts on it.

9.2. SITUATION OF THE WEEE POLICY

9.2.1. Legal Framework in Slovenia

- 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.

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.



9.2.2. Waste Management Plan(s)

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.

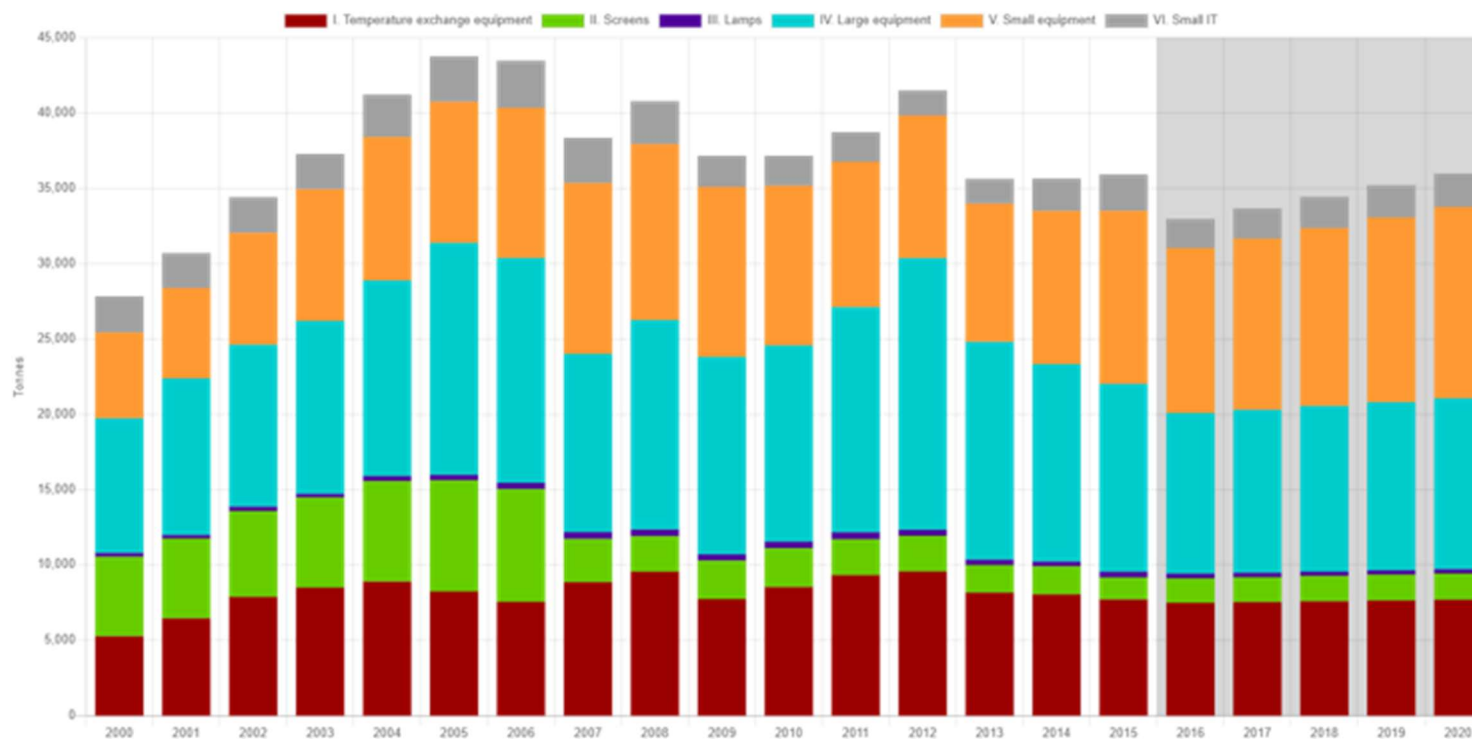
The types of waste to be covered in the new plan include: municipal waste, paper, kitchen waste, plastic, glass, metals, bio-waste, textile, wood, oil, WEEE, non-biodegradable waste, hazardous waste (batteries), and others. However, a recent review of the draft WMP suggested this was not compliant with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



9.2.3. Rates and figures related to the country and region

Weight of EEE

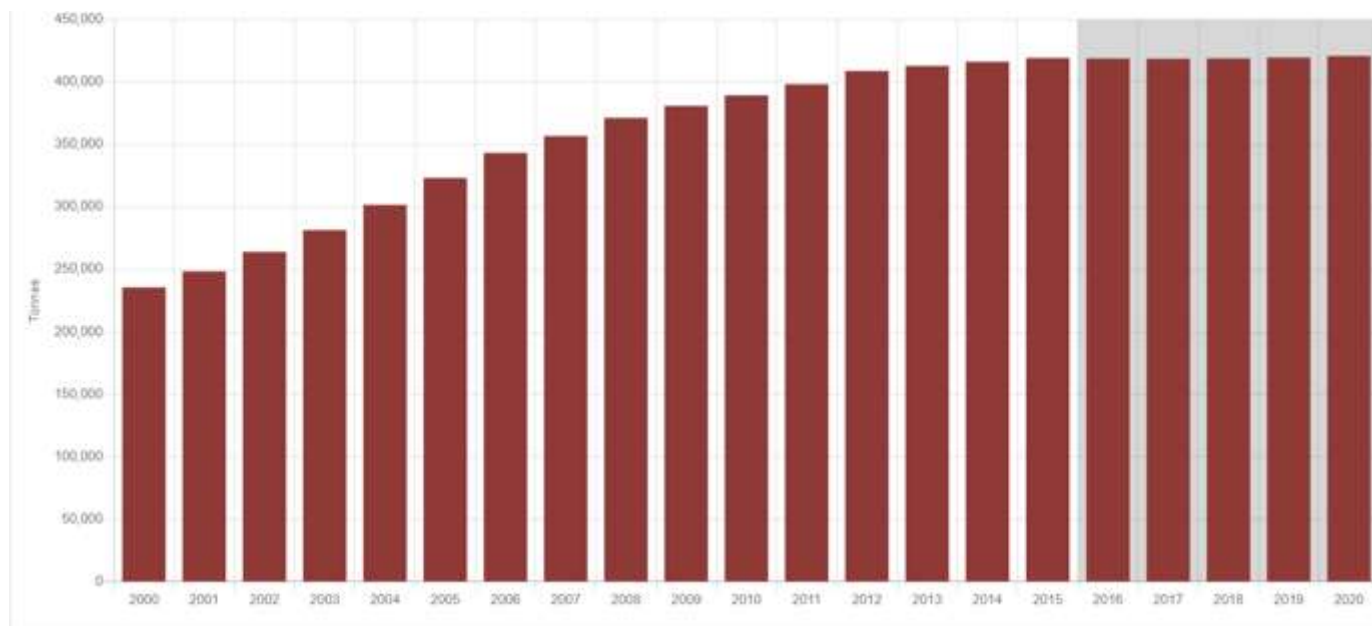
Placed on the Market for SLOVENIA





Weight of EEE

In stock for SLOVENIA

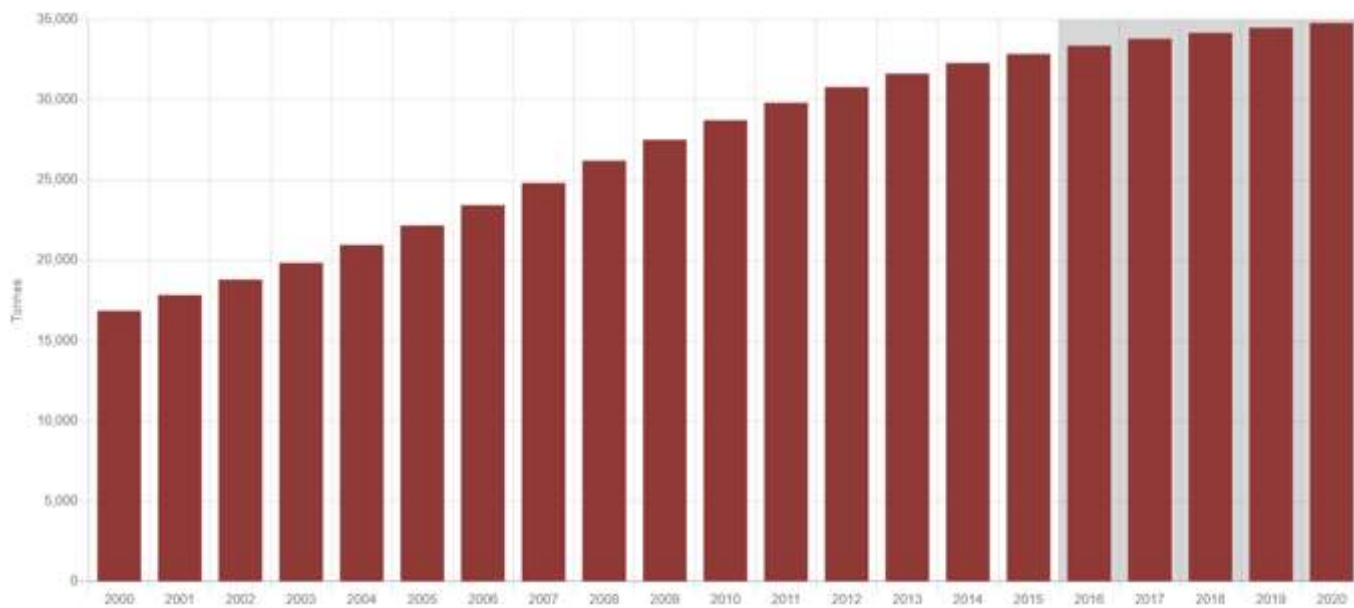


Source: <http://www.urbanmineplatform.eu/homepage>



Weight of EEE

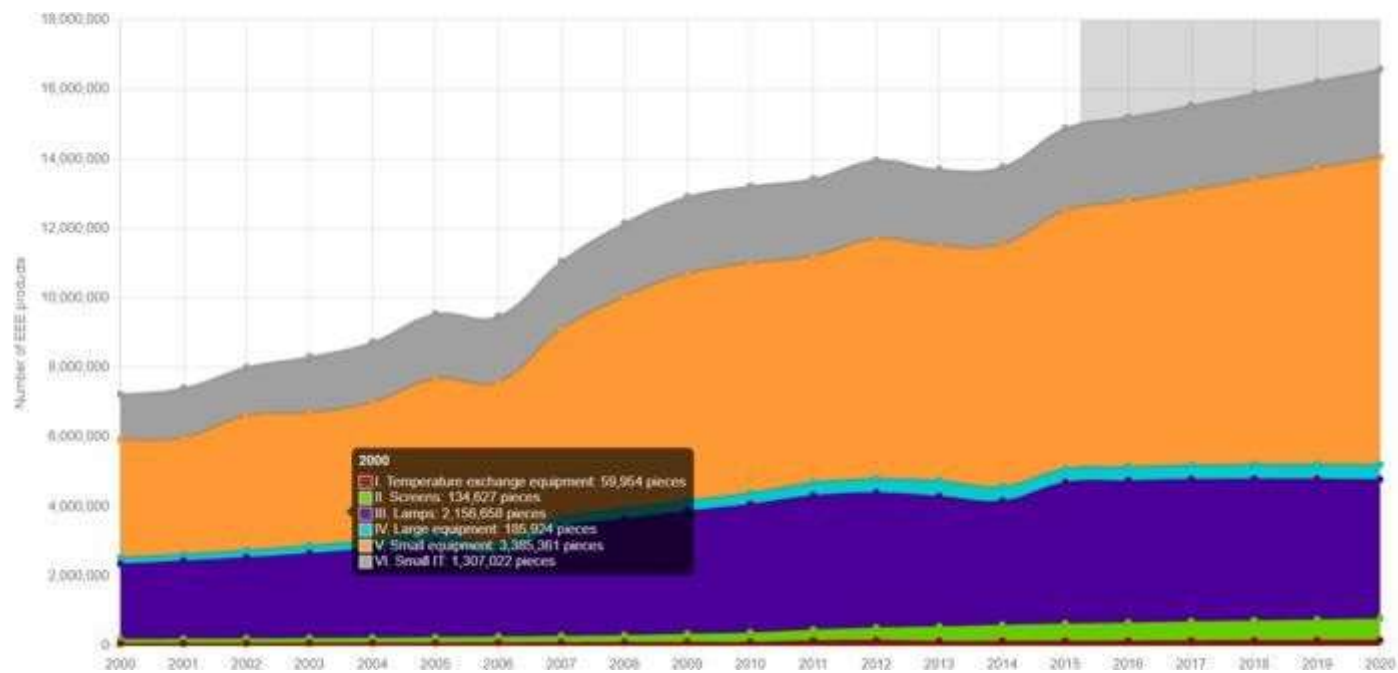
Waste generated for SLOVENIA



Source: <http://www.urbanmineplatform.eu/homepage>



Number of EEE products - Waste Generated in Slovenia

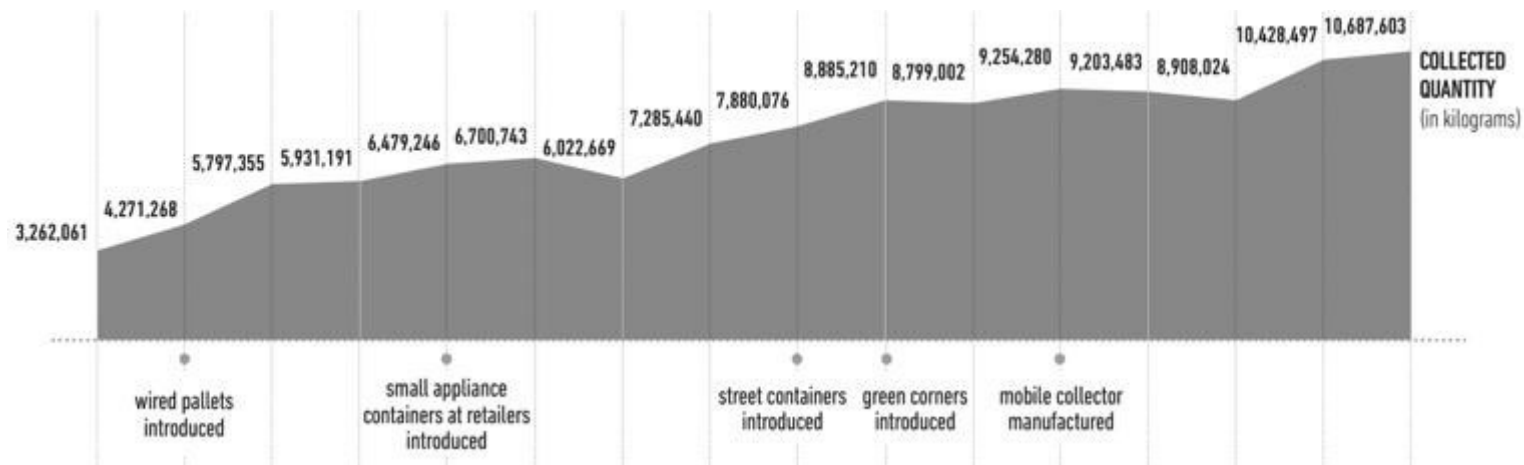


Source: <http://www.urbanmineplatform.eu/homepage>



9.2.4. Collection and processing of WEEE in Slovenia

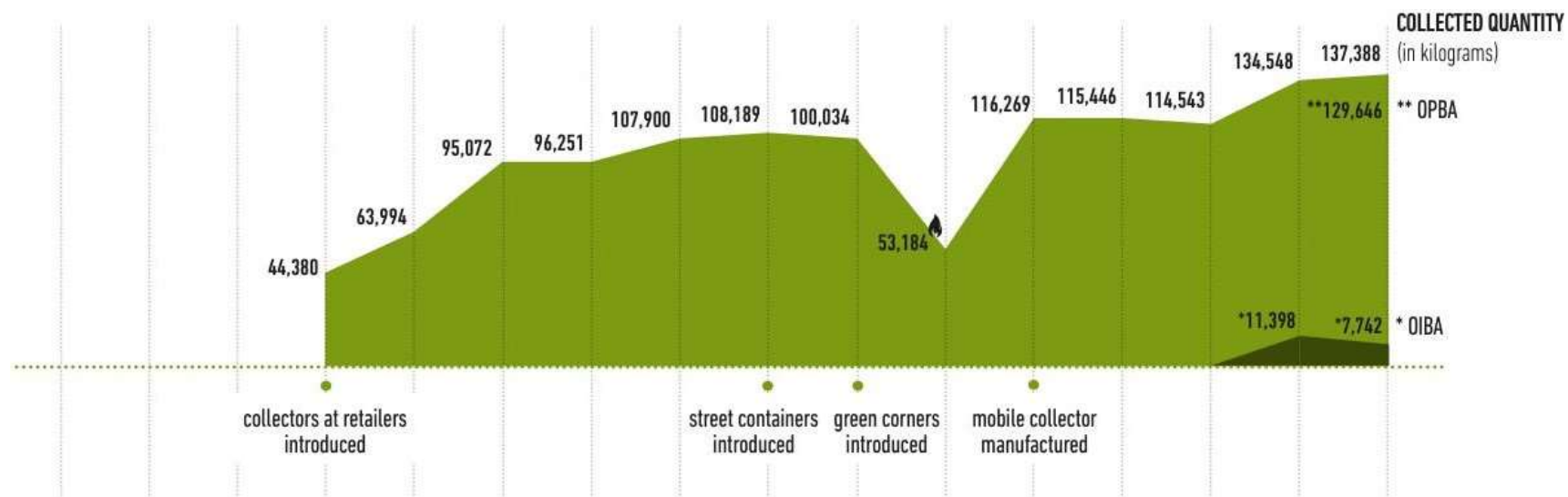
16 years of waste electrical and electronic equipment collection in Slovenia



Source: Annual Report 2022 ZEOS



13 years of waste batteries and accumulators' collection in Slovenia.

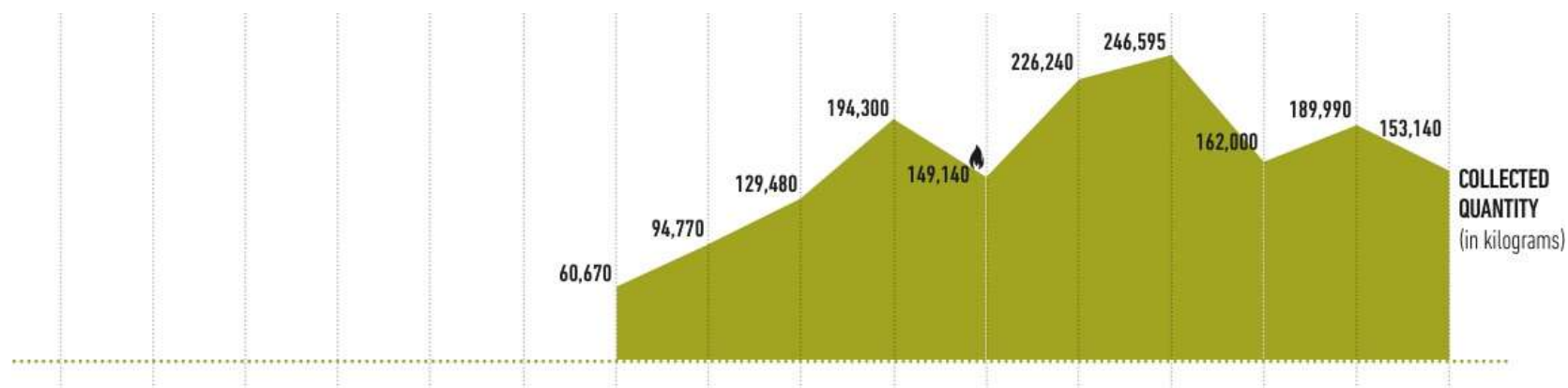


Source: Annual Report 2022 ZEOS

The collected quantities of WPBA exceed the target that requires collecting 45% of PBA put on the market in the last three years. The collection rate achieved is 51.2% of PBA put on the market by the participants in the scheme.



10 years of waste grave candles collection in Slovenia

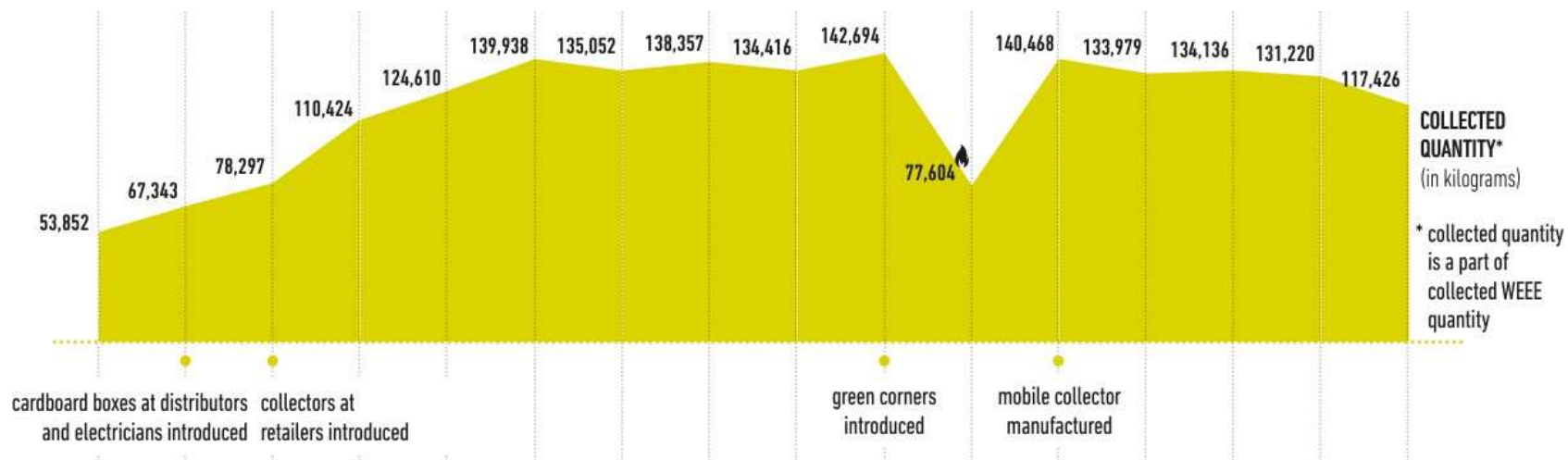


Source: Annual Report 2022 ZEOS

ZEOS company collected 153,140 kilograms of ONS (waste grave candles). Over the past four years the amount of paraffin candles put on the market in the Republic of Slovenia has decreased by 24%, while the number of electronic candles has increased by 31%.



16 years of waste lamps collection in Slovenia



Gas discharge lamps, which require a small amount of mercury, accounted for only 21% of the total mass of lights put on the market through the participants of the ZEOS scheme in 2022. The majority consisted of LED bulbs and modules, which do not contain mercury. In the future, this proportion will be drastically reduced as the ban on the sale of fluorescent lamps throughout the European Union comes into effect on August 25th, 2023, following the RoHS directive. Consequently, almost exclusively mercury-free bulbs lights enter the market. However, our mission does not end there, as lights containing mercury will remain in use for at least the next fifteen years. They will need to be collected and disposed of in accordance with applicable standards.

9.2.5. Regional status: Improvements and challenges

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



- 35% is officially reported as collected/processed through common schemes
- 34% are not registered*
- 23% are processed together with metal waste inconsistently with standards (mainly white goods)
- 8% ends up in a container for mixed municipal waste*

*53% is processed within the EU (56% processed inconsistently with processing standards and 44% removed or stolen parts) / 47% is processed outside the EU (13% is recorded as exported used electronic equipment, 60% is not recorded, although e-equipment (among them, 70% of the equipment is functional) and 27% is not recorded as e-equipment, but as waste)

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

Data shows that the collected quantity of waste electrical and electronic equipment (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.

According to the last annual report (2022) of ZEOS, in households, smaller items are most commonly accumulated: small IT equipment (14%), such as smartphones, tablets, laptops, speakers, cameras, and other small equipment (14%), such as small household appliances, personal care devices, tools, as well as televisions, screens, and monitors. Among the latter are also outdated cathode-ray tube monitors and flat panel monitors, as they are increasingly being replaced by laptops. There is less large equipment (9%), which includes stoves, cooktops, electric ovens, and radiators, temperature control equipment (8%), such as refrigerators, freezers, electric water heaters, heaters, and radiators, air conditioning units, etc. These are discarded more quickly which is understandable, as they take up too much space.



Based on data on the quantities of e-equipment put on the market and collected e-waste, it is estimated that Slovenian households have accumulated 345 kg of e-waste in the last fourteen years.

Management of waste industrial batteries: In the second year of operation under the new joint plan for the management of waste industrial batteries, which ZEOS submitted to the Slovenian Environment Agency in 2021, there were collected and processed 7,742 kilograms of waste industrial batteries.

Like everywhere else in the world, the amount of waste in Slovenia has been increasing. Slovenia produces on average over 8 million tons of waste per year. More than a million tons thereof is municipal waste, amounting to 495 kg of waste per capita. Hazardous municipal waste accounts for 6,700 tons of all municipal waste, but efforts to reduce it have already proved successful.

In the past, most municipal waste ended up in landfills. With amendments to legislation, through policy instruments and by establishing municipal waste management centres, this trend has been reversed, with the proportion of separately collected waste and the recycling rate both increasing. This has made Slovenia one of the European countries with the highest recycling rate for municipal waste (59%).



AMOUNT OF WEEE COLLECTED IN THE PROJECT AREAS COVERED BY ORZ IN 2022 AND 2023

SOURCE – ORZ RECORDINGS

2022

In the year 2022, a significant collection effort undertaken in the project areas managed by ORZ resulted in a total of 144 electronics being gathered. Notably, a large majority of these collected items were found to be still in operational condition, highlighting the potential for reuse and reducing environmental impact. Among the assortment of electronics collected, small appliances constituted the bulk of the items. These included a variety of gadgets and devices commonly used in households and offices, underlining the prevalent usage and disposal patterns of such items. Interestingly, the collection also encompassed a few heating, ventilation, and air conditioning (HVAC) units along with air conditioners (AC), indicating the diverse range of electronic equipment being discarded.

The successful collection of these electronics is a testament to the effective waste management and recycling initiatives put in place by ORZ. By focusing on the segregation and collection of electronic waste by category, ORZ not only ensures the proper disposal of potentially harmful materials but also promotes the recycling and refurbishment of usable electronics. This approach not only benefits the environment by preventing hazardous substances from polluting landfills but also contributes to the circular economy by giving these electronics a second life.

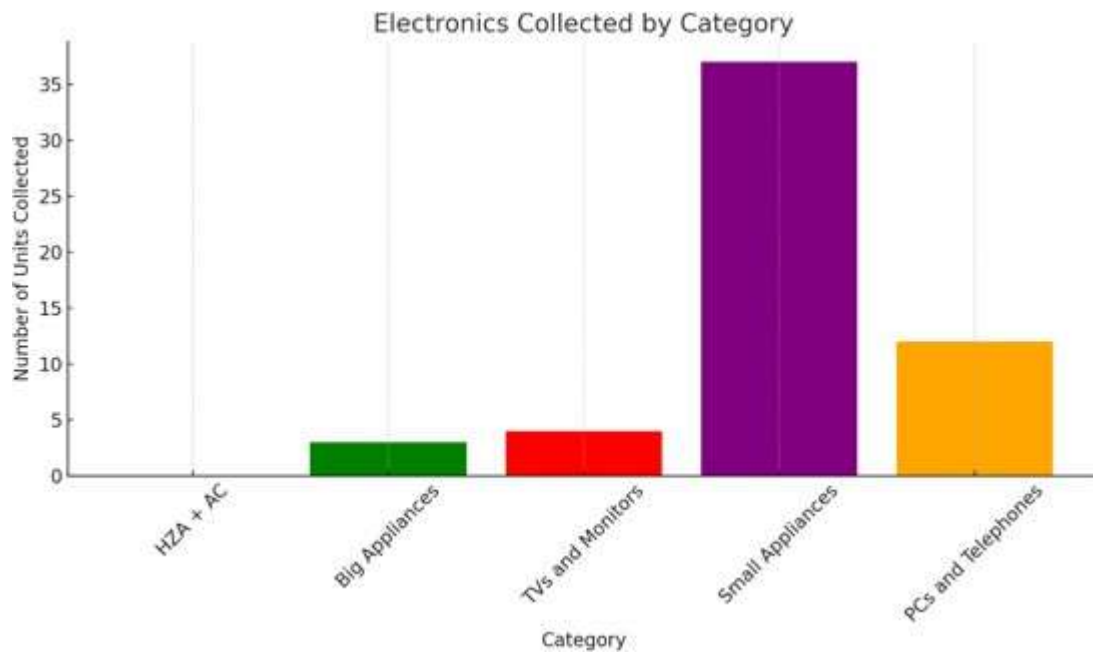
Furthermore, the fact that a significant portion of the collected electronics was still functioning suggests a need for increased awareness regarding the value of electronic items and the importance of responsible disposal practices. It underscores the potential for donation programs or refurbishment initiatives that could extend the lifecycle of these devices, thereby reducing the demand for new products and the associated environmental footprint.

The collection initiative by ORZ serves as an inspiring model for electronic waste management, demonstrating the importance of targeted collection strategies that take into account the operational status and category of electronic items. As society continues to grapple with the challenges of electronic waste, the efforts of ORZ highlight the critical role that such projects play in fostering sustainable practices and the responsible consumption of electronic goods. This endeavour not only aids in mitigating environmental impact but also in raising awareness about the significance of electronic waste recycling and the potential benefits it holds for both the planet and its inhabitants.

BY LOCATION:

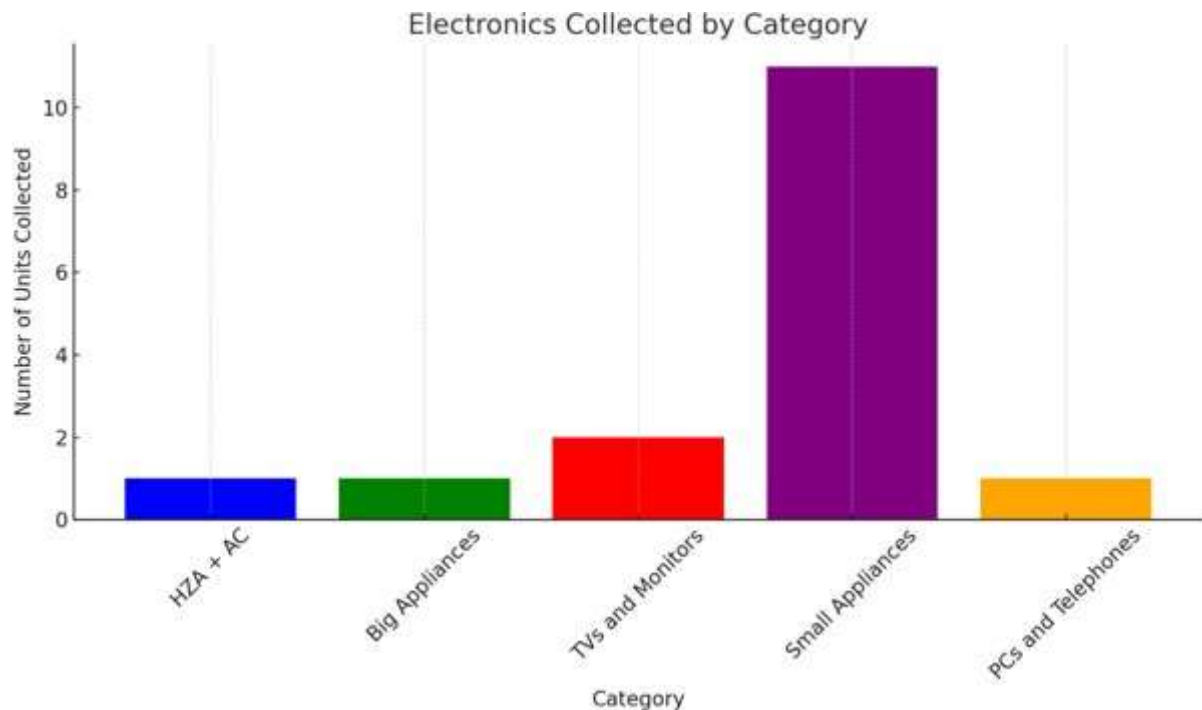
- PROJECT AREA ROGAŠKA SLATINA

Below, the quantity of electronics collected in the project area by category is displayed.



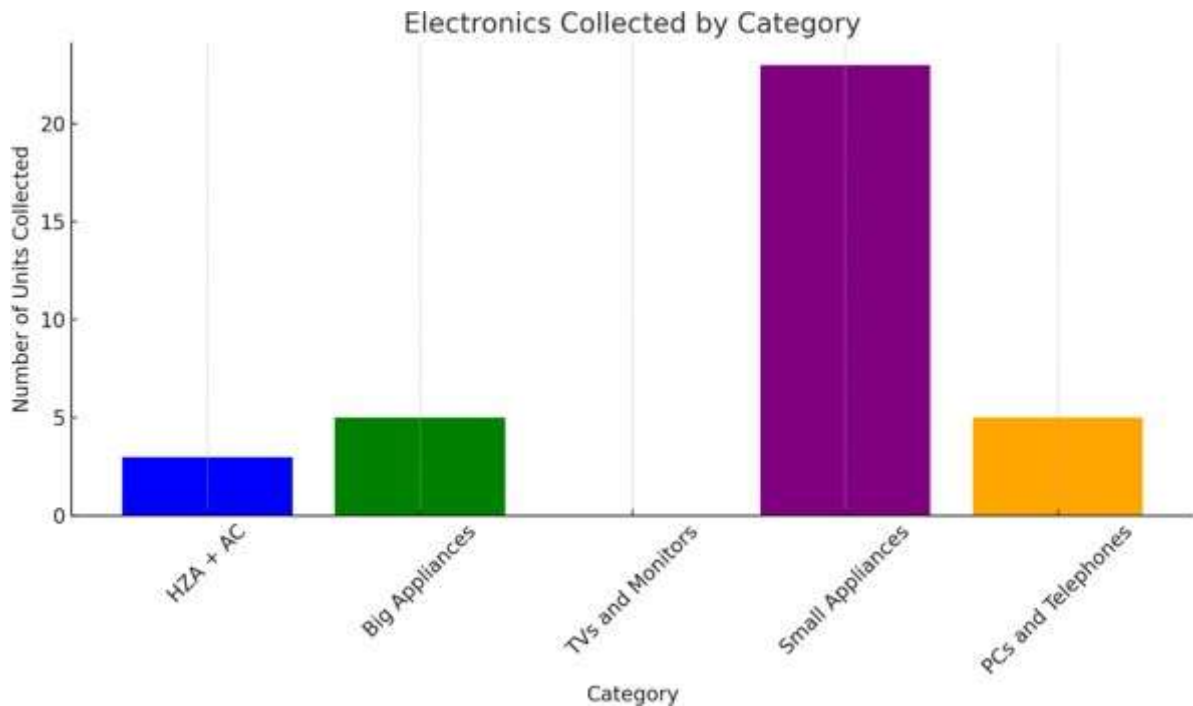
- PROJECT AREA SLOVENSKE KONJICE

Beneath this, we display the number of electronics gathered in the project area, broken down by category.



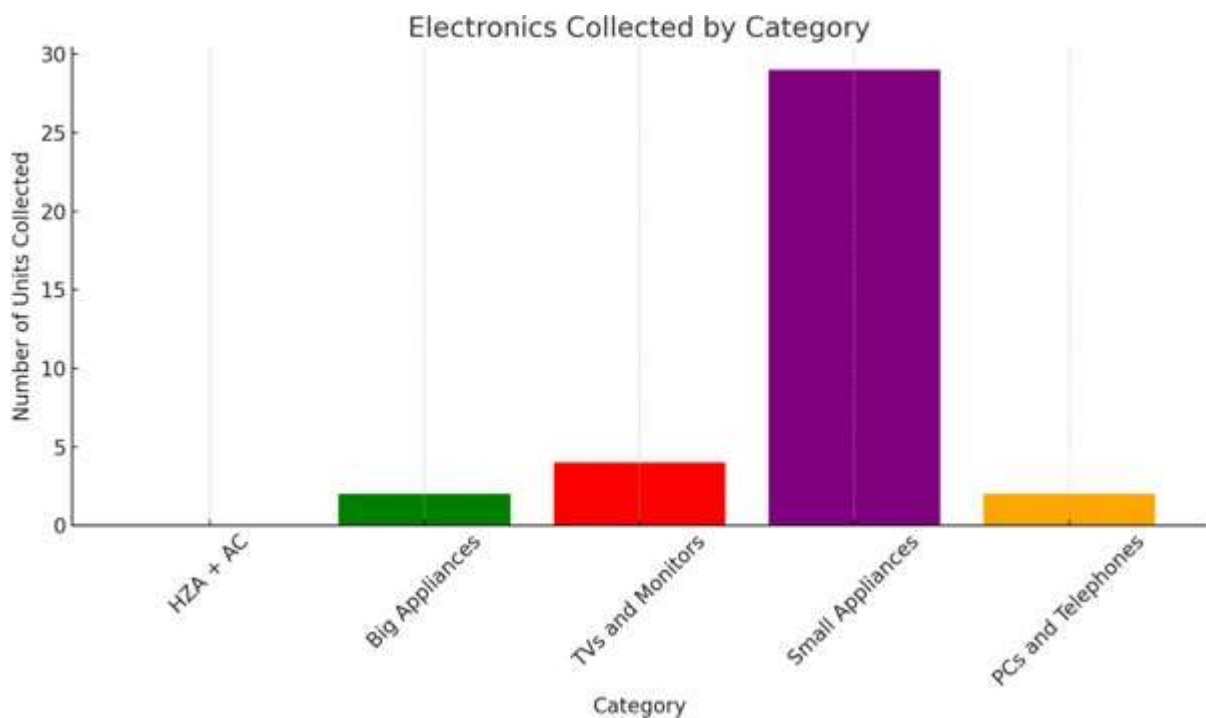
- PROJECT AREA ORMOŽ

The following shows the tally of electronics collected in the project area, categorized for clarity.



- PROJECT AREA LJUBLJANA

Below, observes the breakdown of electronics collected within the project area by their respective categories.



2023

In the expansive project areas overseen by ORZ, a remarkable total of 315 Waste Electrical and Electronic Equipment (WEEE) items were collected. This comprehensive collection effort saw the items meticulously sorted into five distinct categories for better management and processing: 1. Heating, Ventilation,



and Air Conditioning (HZA) + AC appliances, 2. Big appliances, 3. Small appliances, 4. TVs and screens, and 5. Computers and phones. This classification system not only streamlined the sorting process but also facilitated the identification of items most suitable for reuse or recycling.

The bulk of these collected items fell into the category of small appliances, which encompasses a wide range of products such as radios, cooking appliances, table lights, and more. These items, notable for their prevalence in daily life, emerged as particularly viable for reuse. The reasons for this are manifold. Small appliances are generally easier to inspect for functionality and safety, making them ideal candidates for second-life applications. This ease of verification ensures that items like radios and table lights, which often retain much of their utility even after primary use, can be efficiently checked and prepared for reuse, thereby extending their service life and reducing the need for new products.

Despite the success in collecting a diverse array of electronic items, it was observed that HZA and AC appliances were the least popular items to be donated. In fact, no such appliances were received across all the locations covered by the project. This phenomenon can be attributed to several factors. Primarily, it reflects the infrequency with which consumers replace their heating, ventilation, and air conditioning units. These appliances are significant investments for most households, and as such, they are usually retained until they cease to function. When these units are finally replaced, they are often either disposed of as waste, owing to their non-operational status, or if they are still in working condition, they are more likely to be sold rather than donated. This trend suggests a distinct consumer behavior pattern regarding the disposal and replacement of large, durable appliances.

This extensive collection and sorting effort by ORZ illuminates several critical aspects of electronic waste management. Firstly, it highlights the considerable potential for the reuse of small electronic appliances, which can significantly contribute to environmental sustainability by reducing the volume of waste and the demand for new products. Secondly, the reluctance to donate HZA and AC appliances underscores the need for targeted awareness campaigns and initiatives aimed at encouraging the donation of these larger items, especially when they are still functional. Such initiatives could focus on educating the public about the environmental benefits of donating versus disposing of these appliances and perhaps even developing dedicated channels for their collection and redistribution.

The work done by ORZ in collecting, sorting, and assessing these WEEE items is a commendable step towards addressing the growing challenge of electronic waste. By meticulously categorizing each item and identifying those with the greatest potential for reuse, ORZ not only contributes to environmental conservation but also provides a blueprint for effective electronic waste management. Looking ahead, there is a clear opportunity to build on this foundation through increased public engagement, enhanced awareness efforts, and the development of more robust systems for the collection and reuse of all types of electronic waste. This endeavor is not just about waste management; it's a critical component of a broader strategy aimed at promoting sustainability,

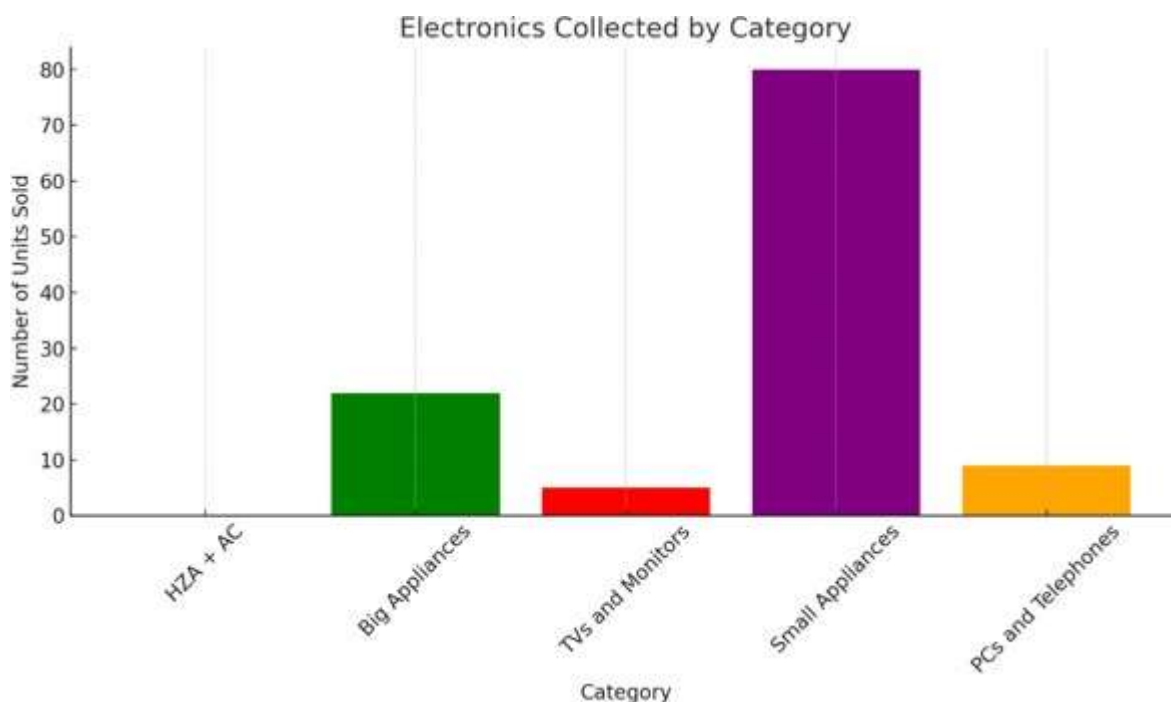


reducing environmental impact, and fostering a culture of responsible consumption and recycling within the community.

BY LOCATION:

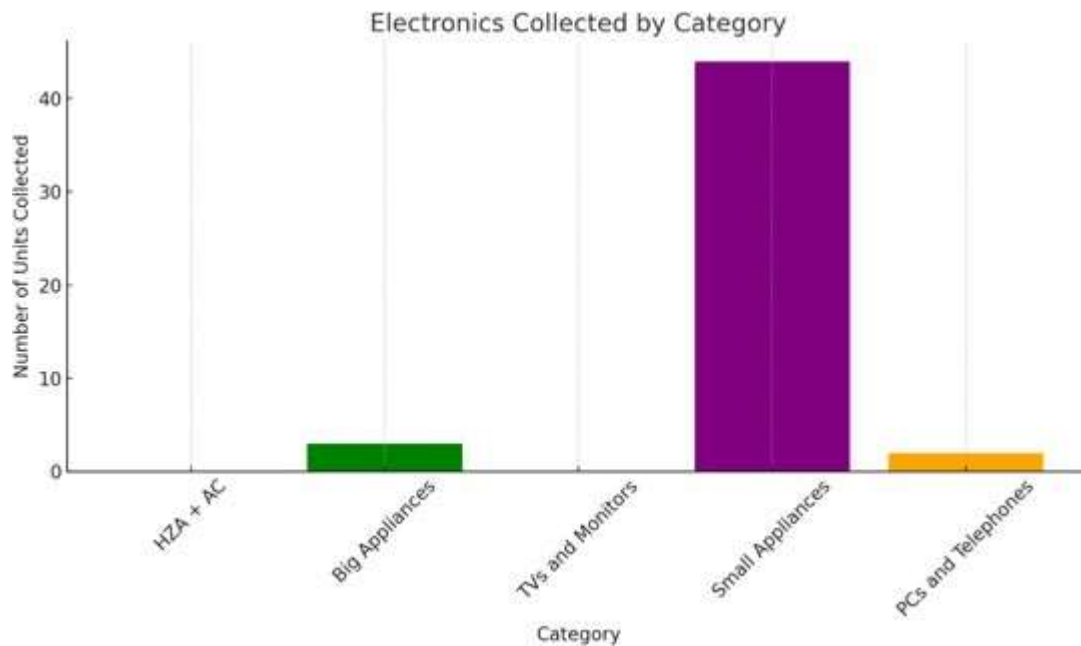
- PROJECT AREA ROGAŠKA SLATINA

Bellow we can see how many electronics were collected in the project area by category.



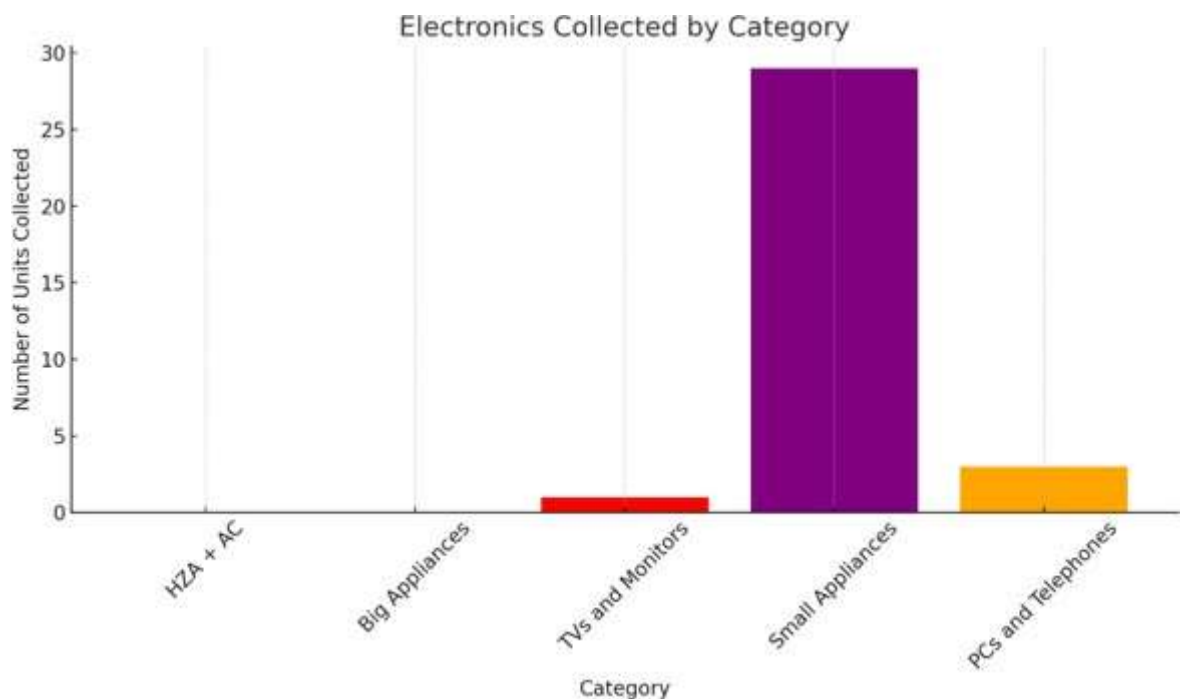
- PROJECT AREA SLOVENSKE KONJICE

The chart below illustrates how many electronics were amassed in the project area, segmented by category.



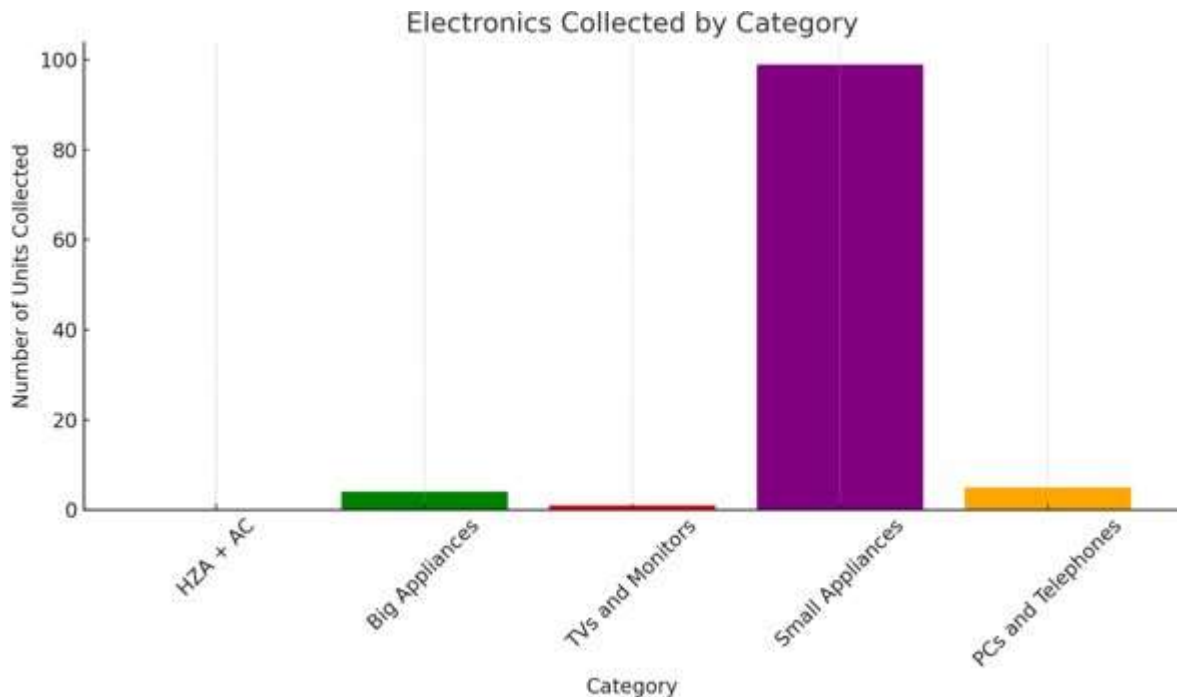
- PROJECT AREA ORMOŽ

Below, we present the count of electronics harvested in the project area, organized by category.



- PROJECT AREA LJUBLJANA

The graphic below details the volume of electronics collected in the project area, divided by category.



9.3. ACTORS INVOLVED IN THE POLICY INSTRUMENT

9.3.1. Main actors in the policy

The Ministry of Environment and Spatial Planning is responsible for the review of operational programs and other measures to reduce quantities of waste, and is responsible leading Slovenia towards better waste management.

The Ministry of the Environment and Spatial Planning carries out tasks in the field of environmental protection, nature conservation, water management, climate change, public services, environmental protection, nature conservation public services, public services, water management, radiation protection, elimination of consequences of natural disasters, investment in environmental and water infrastructure, and tasks related to the area of housing policy.

The waste division falls under the Environmental Directorate of the Ministry. The Ministry's tasks related to the management of municipal waste are carried out by multiple bodies. Information provided at the workshop in Slovenia indicates that the waste division of the Ministry is responsible for:

1. Preparation and monitoring of the implementation of regulations;
2. Monitoring the transposition of EU legislation into national law;
3. Participation in the working bodies of the EU and international organizations;
4. Monitoring and preparation of system solutions for waste management;
5. Preparation of technical basis for law enforcement;
6. Preparation and implementation of strategic documents and programs;



7. Co-operation with governmental and non-governmental organizations.

Bodies falling under the Ministry include the Environment Agency and the Inspectorate of the RS for the Environment and Spatial Planning:

- The Environment Agency issues environmental permits to waste facilities, and is involved in data collection, analysis and the implementation of state monitoring;
- The Inspectorate supervises the implementation of environmental regulations.

Municipalities

At a local level, municipalities are responsible for collection of municipal waste and treatment (including landfilling) of mixed municipal waste. At the time of writing there are 212 municipalities. In accordance with Article 149 of the Environmental Protection Act, specific responsibilities for the municipalities include the following:

- Collection of municipal waste.
- Handing over separate fractions of municipal waste for further treatment in accordance with the regulations.

Municipalities are free to associate as regards the implementation of mandatory municipal public services:

- treatment of mixed municipal waste; and
- disposal of residues from the recovery or disposal of municipal waste.

Infrastructure requirements at the local level encompass the subsequent sorting of waste; the transfer of fractions of municipal waste for further treatment in accordance (reuse and recycling of separately collected fractions of waste); waste treatment (composting, AD, MBT); the preparation of waste for thermal treatment, and landfilling of residues. The thermal treatment of waste residues takes place on the national level with energy recovery and disposal of residues after thermal treatment.

The European Affairs Service performs technical and coordinating tasks in the field of European affairs to appropriately promote, within the European Union, those Slovenian interests that fall within the competence of the ministry and are of strategic importance. The European Affairs Service participates in the development and formulation of positions in the procedure of adopting legislative proposals and other acts of the European Union falling within the competence of the ministry, and is responsible for their inter-ministerial coordination.

In 2020, the Environmental and Spatial Inspectorate carried out a targeted control action on the implementation of the provisions of the Regulation on Waste Electrical and Electronic Equipment (WEEE Regulation) at all holders of joint WEEE management plans in Slovenia, which on behalf of producers who joined the individual holder of the joint of the plan, on their behalf they ensure the collection and processing of the collected WEEE. These are:

1. Zeos d. o. o.



2. Slopak d. o. o.
3. Trigana d. o. o.
4. Recikel d. o. o. and
5. Interzero d. o. o.

ZEOS is the main organization that handles WEEE.



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 administrative 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) and
- 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 is a 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.



The company Recikel is the holder of a common plan for handling waste electrical and electronic equipment, waste portable batteries and accumulators, and waste packaging.



List of collection centers for waste electrical and electronic equipment for legal entities who work with Recikel:

Company	Address
BLOK d.o.o., PE Ljubljana	Ljubljana – Črnuče
BLOK d.o.o., PE Logatec	Logatec
AURENIS d.o.o.	Tolmin

List of collection centers for waste electrical and electronic equipment for natural persons who work with Recikel:

Public service provider	Link to collection center information
CEROP d.o.o.	https://www.cerop.si/
CLEAN PLACE PTUJ d.o.o.	https://cistomesto.si/
EKO-PARK d.o.o. Lendava OKO-PARK Kft. Two towns	https://eko-park.si/
INFRASTRUCTURE BLED d.o.o.	https://www.infrastruktura-bled.si/
Public services Ptuj d.o.o.	https://www.js-ptuj.si/
PUBLIC UTILITY COMPANY GROSUPLJE d.o.o.	https://www.jkpg.si/
The public company KOMUNALA Idrija d.o.o.	https://www.komunalaidrija.si/si/
Public company Snaga, d.o.o.	https://www.snaga-mb.si/
JEKO, d.o.o.	https://jeko.si/
JKP d.o.o. SLOVAK CAVALRY	https://www.jkp-konjice.si/
JP KUMUNALA Cerknica d.o.o.	https://www.komunala-cerknica.si/
JP KUMUNALA ČRNOMELJ d.o.o.	https://www.komunala-crnomelj.si/
JP KUMUNALA d.o.o. Mozirs	http://komunala-mozirje.si/
JP Komunala Ilirska Bistrica, d.o.o.	https://www.kp-ilb.si/
JP KPV, d.o.o.	https://www.kpv.si/
JP VOKA SNAGA d.o.o.	https://www.vokasnaga.si/
KOCEROD, d.o.o.	https://ko-cerod.si/
Komunala Brežice d.o.o.	https://www.komunala-brezice.si/
KOMUNALA d.o.o. Sevnica	https://www.komunala-sevnica.si/
Komunala Hrastnik d.o.o.	https://www.ksphrastnik.si/
COMMUNAL Izola d.o.o. KUMUNALA Isola s.r.l.	https://www.komunala-izola.si/
KOMUNALA KOČEVJE, d.o.o.	https://www.komunala-kocevje.si/
Komunala Kranj d.o.o.	https://www.komunala-kranj.si/
KUMUNALA LAŠKO d.o.o.	https://www.komunala-lasko.si/sl/
KUMUNALA METLIKA d.o.o.	https://www.komunala-metlika.si/



COMMUNAL Nova Gorica d.d.	https://www.komunala-ng.si/
COMMUNAL NOVO MESTO d.o.o.	https://www.komunala-nm.si/
KUMUNALA ORMOŽ d.o.o.	https://www.kp-ormoz.si/
COMMUNAL PTUJ d.d.	https://www.komunala-ptuj.si/
KUMUNALA RADEČE d.o.o.	https://www.komunala-radece.si/
COMMUNAL RADGONA d.o.o.	https://www.komunala-radgona.si/
KUMUNALA RADOVLJICA, d.o.o.	https://www.komunala-radovljica.si/
KUMUNALA RIBNICA d.o.o.	https://www.komunala-ribnica.si/
Communal Sežana d. d.	https://www.komunala-sezana.si/
Komunala Skofja Loka d.o.o.	https://www.komunalaskofjaloka.si/
COMMUNAL SLOVENSKA BISTRICA d.o.o.	https://www.komunala-slb.si/
Komunala Tolmin, d.o.o.	https://www.komunala-tolmin.si/
COMMUNAL TRBOVLJE, d.o.o.	https://www.komunala-trbovlje.si/
COMMUNAL TREBNJE d.o.o.	http://www.komunala-trebnje.si/domov/
KUMUNALA TRŽIČ d.o.o.	https://www.komunala-trzic.si/
KOMUNALA ZAGORJE, d.o.o.	https://www.komunala-zagorje.si/
COMMUNAL, Kranjska Gora, d.o.o.	https://www.komunala-kg.si/
Utility company Logatec, d.o.o.	https://www.kp-logatec.si/2018/
KOSTAK d.d.	https://www.kostak.si/
KSD d.o.o. Buckwheat	https://www.ksda.si/
KSP Litija d.o.o.	https://www.ksp-litija.si/
KSP Ljutomer d.o.o.	http://www.ksp-ljutomer.si/
MARJETICA KOPER, d.o.o.-s.r.l.	https://www.marjeticakoper.si/
Municipality of Bloke	https://www.bloke.si/
Municipality of Bohinj	https://obcina.bohinj.si/
Municipality of Gorenje vas-Poljane	https://www.obcina-gvp.si/sl/
Municipality of Osilnica	https://osilnica.si/
MUNICIPALITY OF SEMPETER - VRTOJBA	https://sempeter-vrtobja.si/
Municipality of Žiri	https://www.ziri.si/
ENVIRONMENT Piran, d.o.o.	https://okoljepiran.si/
OKP Rogaška Slatina, d.o.o.	https://www.okp.si/
PRODNIK d.o.o.	https://www.prodnik.si/
PUBLIKUS d.o.o.	https://www.publikus.si/
PUP - SAUBERMACHER d.o.o.	http://www.pup-saubermacher.si/
SAUBERMACHER - KUMUNALA Murska Sobota d.o.o.	https://www.saubermacher-komunala.si/
SAUBERMACHER SLOVENIA d.o.o.	https://saubermacher.si/
Simbio d.o.o	https://www.simbio.si/

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.

interzero[®]
zero waste solutions



Record of manufacturers and authorized representatives of manufacturers of electrical and electronic equipment of small equipment:

NAME	REGISTRATIO N NUMBER
240, TRGOVINA IN POSREDNIŠTVO, D.O.O.; ČAMPOVA	6362877000
3 DIM PODJETJE ZA IZDELAVO OPREME SPECIALNIH	5286638000
A4U, POSREDNIŠTVO IN TRGOVINA, D.O.O.; CESTA GORIŠKE FRONTE 84C, 5290 ŠEMPETER PRI GORICI	8440298000
ACINEL, SVETOVANJE, PROJEKTIRANJE IN INŽENIRING,	6639402000
AD VITA, PODJETJE ZA TRGOVINO, POSREDNIŠTVO,	2129787000
ADAPT GLOBAL LIMITED - PODRUŽNICA V LJUBLJANI;	8686840000
ADC SISTEMI, PAMETNI SISTEMI, D.O.O.; MEDETOVA	8657173000
ADVANSYS, RAČUNALNIŠKI INŽENIRING, PROIZVODNJA, TRGOVINA IN STORITVE D.O.O.; VELIKA POT 20, 5250 SOLKAN	1883780000
AQUA VIVA PROIZVODNJA IN TRGOVINA D.O.O.; PRESERSKA CESTA 4, 1235 RADOMLJE	1710516000
ARCHUS.SI, TRGOVINA IN STORITVE D.O.O.; CANKARJEVA ULICA 9C, 6000 KOPER - CAPODISTRIA	3528375000
ARMSTRONG-KOBILŠEK PODJETJE ZA PROIZVODNJO IN TRGOVINO D.O.O.; CANKARJEVA ULICA 21, 1234 MENGEŠ	5483328000
ASTRON, DRUŽBA ZA SVETOVANJE, STORITVE,	2187213000
AUDIO BM D.O.O., SLUŠNI APARATI, MEDICINSKA OPREMA IN STORITVE; ITALIJANSKA ULICA 8, 1000 LJUBLJANA	6509347000
AVTOTEHNA OPREMA, TRGOVINA, INŽENIRING, SVETOVANJE D.O.O.; KOSOVELOVA CESTA 2, 1290 GROSUPLJE	5925959000
B.D. BONAKO PROIZVODNJA IN TRGOVINA D.O.O.;	1798995000
BALDER OPTOELEKTRONSKI ELEMENTI IN MERILNA TEHNIKA D.O.O.; TESLOVA ULICA 30, 1000 LJUBLJANA	5415152000
BARGROUP DRUŽBA ZA SVETOVANJE IN INVESTIRANJE	8750416000
BARTOG PROIZVODNO IN TRGOVSKO PODJETJE	5298555000
BATEMIKA, MERILNI SISTEMI, D.O.O.; SLAP 57, 5271 VIPAVA	6393900000
BILOMA, VELEPRODAJA D.O.O.; POLJE 5, 5290	7236042000
BIOTEH PODJETJE ZA BIOTEHNOLOGIJO D.O.O.; PRESERSKA CESTA 9, 1235 RADOMLJE	5487668000
BOLT SERVICES SL, PROMOCIJSKE IN STROKOVNE	9117822000
BRALKO, TRGOVINA, SERVIS, STORITVE, D.O.O.; ŠMARTNO OB PAKI 134, 3327 ŠMARTNO OB PAKI	2195976000
BRODNIK BR, TRGOVSKO PODJETJE, D.O.O.; CESTA 24. JUNIJA 90, 1231 LJUBLJANA - ČRNUČE	1430602000
C & A MODA D.O.O.; ŠMARTINSKA CESTA 106, 1000 LJUBLJANA	1593838000
C-ASTRAL, PROIZVODNJA ZRAČNIH IN VESOLJSKIH PLOVIL D.O.O.; MIRCE 26, 5270 AJDOVŠČINA	2352931000
CCE, SVETOVANJE IN INŽENIRING, D.O.O.; STEGNE 21C, 1000 LJUBLJANA	5320674000
CPA MERILNI SISTEMI IN AVTOMATIZACIJA PROCESOV, D.O.O.; DEČMANOVA ULICA 3, 1000 LJUBLJANA	5903548000
CS-EUROTRADE, TRGOVINA, D.O.O. CS-EUROTRADE,	2009510000
DIAFIT TRGOVINA NA DEBELO IN DROBNO Z MEDICINSKIMI PRIPOMOČKI, DRUGA TRGOVINA TER STORITVE D.O.O.; SPODNJI SLEMEN 6, 2352 SELNICA OB DRAVI	5417392000



DIN-DIETMAR NOCKER SICHERHEITSTECHNIK TRGOVINA, PROIZVODNJA, STORITVE IN NAJEMI D.O.O.; ZAGREBSKA CESTA 90, 2000 MARIBOR	2135329000
DONET D.O.O. STORITVE IN PROIZVODNJA; TOVARNIŠKA CESTA 26, 5270 AJDOVŠČINA	6156118000
DRHLADNIK, MEDICINSKI PRIPOMOČKI IN NUTRACEVTIKA, D.O.O.; BUDANJE 3H, 5271 VIPAVA	8569827000
DSC D.O.O., DRUŽBA ZA DISTRIBUCIJO IN TRGOVINO ITK; BRNČIČEVA ULICA 41G, 1231 LJUBLJANA - ČRNUČE	2054540000
EDICOM IZVOZ-UVOZ, TRGOVINA IN STORITVE D.O.O. ŠENTJUR; PRIJATELJEVA ULICA 12, 3230 ŠENTJUR	5796067000
ELEKTRO CESTNIK, MATEJ CESTNIK S.P.; OJSTRIŠKA	7160666000
ELEKTRO OKROGELNIK, PODJETJE ZA PROIZVODNJO, TRGOVINO IN STORITVE D.O.O.; DOBRAVA 2, 2360 RADLJE OB DRAVI	1805649000
ELEKTRO STROJNI ELEKTRONSKI IZDELKI CVETKO ARTNAK S.P.; VRBNO 23, 3230 ŠENTJUR	5392751000
ELEKTRO ŠTUMPFL ELEKTROTEHNIČNO PODJETJE D.O.O.; PAMEČE 175, 2380 SLOVENJ GRADEC	5290406000
ELIZAN, TRGOVINA IN STORITVE, D.O.O.; BEŽIGRAD 2,	8663998000
ELSAT PRODAJNI INŽENIRING, RADENCI D.O.O.; NAZORJEVA ULICA 13, 9252 RADENCI	5309280000
ENTECH, TRGOVINA IN STORITVE, D.O.O.; FARČNIKOVA KOLONIJA 28, 1410 ZAGORJE OB SAVI	6039308000
ERZETICH PRODUKCIJA PODATKOV IN STVARI D.O.O.; OPEKARNIŠKA CESTA 15A, 5290 ŠEMPETER PRI GORICI	6522394000
ESE LAB, RAZVOJ IN PROIZVODNJA AVDIO NAPRAV D.O.O.; POBOČNA ULICA 1, 6310 IZOLA - ISOLA	1926349000
EUREL PODJETJE ZA PROIZVODNJO, TRGOVINO IN	5797870000
EURO FOTO, D.O.O., KRANJ; POSLOVNA CONA A 20,	5641241000
EUROCOM, TRGOVINA NA DEBELO IN DROBNO, D.O.O.,	5297338000
EUROM-DENIS-TOYS TRGOVINA IN ZASTOPANJE D.O.O. LJUBLJANA; CESTA V GORICE 40, 1000 LJUBLJANA	1363883000
EYRA ELEKTRONIKA IN FOTOGRAFIJA D.O.O.; GABRJE PRI STIČNI 45, 1295 IVANČNA GORICA	5662443000
FERKOL MATJAŽ S.P. ORODJARSTVO, KOVINOPLASTIKA, IZDELOVA UR, OKRASNIH PREDMETOV, TRGOVINA NA DEBELO IN DROBNO; RUSJANOVA ULICA 5, 1235 RADOMLJE	1451995000
FESTO AVTOMATIZACIJSKA TEHNIKA D.O.O. LJUBLJANA; BLATNICA 8, 1236 TRZIN	5631459000
FIRŠT PODJETJE ZA RAZISKOVALNO, RAZVOJNO, STORITVENO, PROIZVODNO IN TRGOVSKO DEJAVNOST D.O.O.; KOROŠKA CESTA 56, 3320 VELENJE	5493692000
FOTO BESENIČAR, PRODAJA FOTOGRAFSKE OPREME, D.O.O.; DUNAJSKA CESTA 57, 1000 LJUBLJANA	3915263000



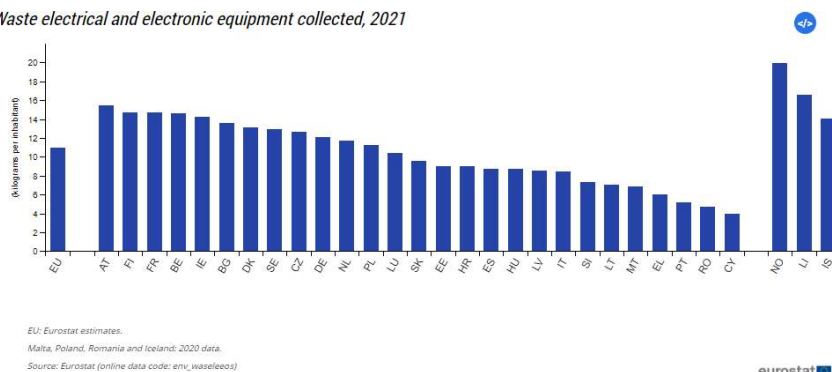
10. THE EEE/WEEE ECONOMIC CONTEXT

The Annex V of WEEE Directive describes the minimum recovery targets to in article 11. Regarding all WEEE separately collected in accordance with Article 5 and sent for treatment in accordance with Articles 8, 9 and 10, Member States shall ensure that producers meet the minimum targets set out in Annex V. This Annex is divided into 3-time parts. First two parts are no longer relevant. The third part is valid from 15 August 2018 with minimum targets applicable by categorie with reference to the categories listed in Annex III.

- for WEEE falling within category 1 or 4 of Annex III,
 - 85 % shall be recovered, and
 - 80 % shall be prepared for re-use and recycled;
- for WEEE falling within category 2 of Annex III,
 - 80 % shall be recovered, and
 - 70 % shall be prepared for re-use and recycled;
- for WEEE falling within category 5 or 6 of Annex III,
 - 75 % shall be recovered, and
 - 55 % shall be prepared for re-use and recycled;
- For WEEE falling within category 3 of Annex III, 80 % shall be recycled.

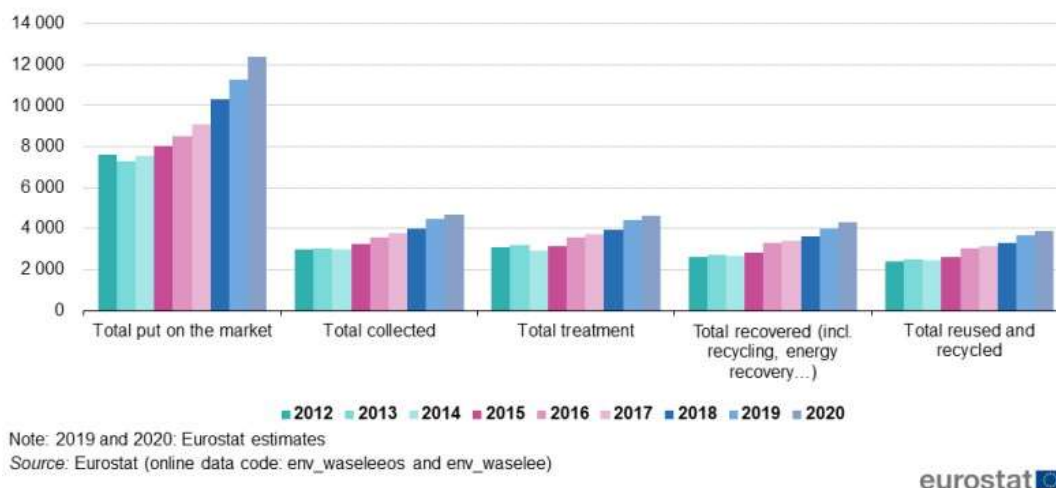
The amount of EEE put on the market in the EU evolved from 7.6 million tonnes in 2012 to a currently maximum peak of 12.4 million tonnes in 2020. Within this period, the lowest level was in 2013, with 7.3 million tonnes. Over the period 2012-2020 as a whole, the amount of EEE put on the market grew by 62.2 %. The total collected WEEE increased from 3.0 to 4.7 million tonnes (+57.8 %), while the total treated WEEE grew from 3.1 to 4.6 million tonnes (+49.1 %). Recovered WEEE developed from 2.6 to 4.3 million tonnes (+65.2 %), and WEEE recycled and prepared for reuse grew from 2.4 to 3.9 million tonnes (+61.7 %) from 2012 to 2020. Generally during this period was increasing trend of the EEE put on the market, on the other hand the similar trend was observed with collected, treatment, recovered and recycled/reuse of EEE, resp. WEEE.

Waste electrical and electronic equipment collected, 2021



WEEE collected in 2021 (https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Waste_statistics_-_electrical_and_electronic_equipment)

Electrical and electronic equipment (EEE) put on the market and waste EEE collected, treated, recovered, recycled and prepared for reuse, EU, 2012–2020 (thousand tonnes)

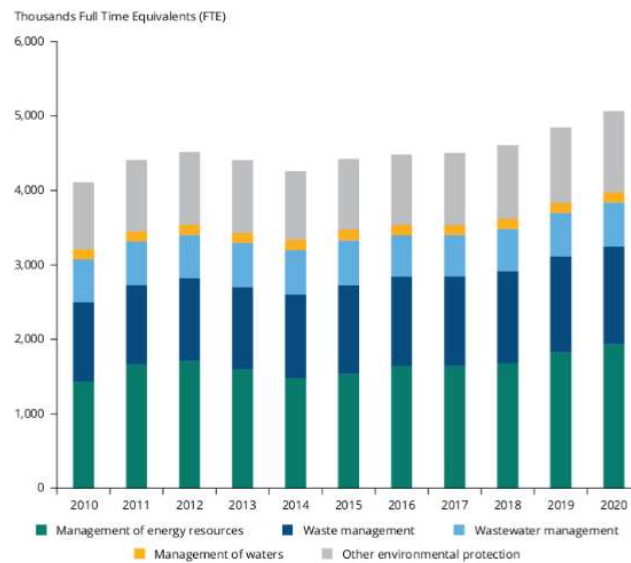


EEE put on the market and WEEE processed in the EU in years 2012-2020
(https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Waste_statistics_electrical_and_electronic_equipment#Electrical_and_electronic_equipment_.28EEE.29_put_on_the_market_and_WEEE_processed_in_the_EU)

10.1. EEE/WEEE BUSINESS ENVIRONMENT AND EMPLOYMENT

10.1.1. EU

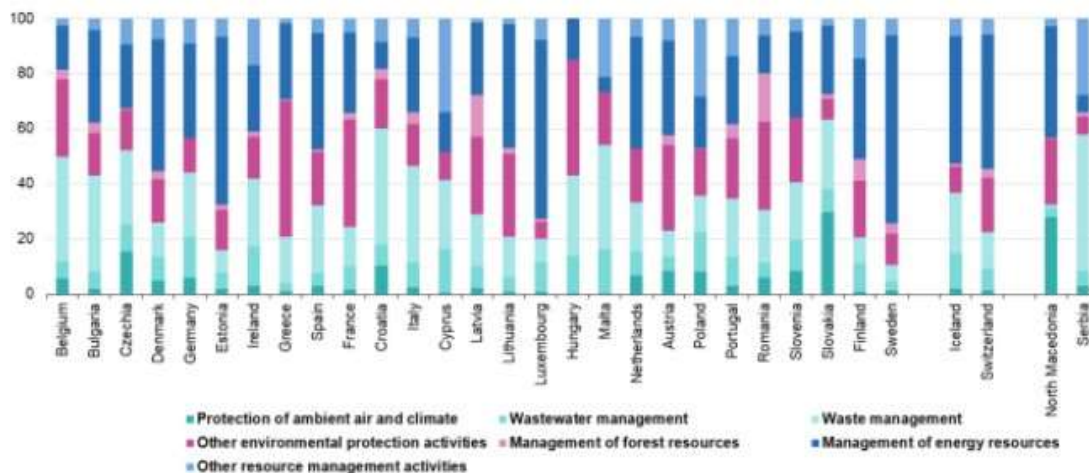
According to the European Environment Agency the employment in the EU's environmental goods and services sector has grown faster than total of EU employment over the last decade. It was increasing from 2,1% of total employment in 2010 to 2,5% in 2020. The number of full-time employees in this sector reaching 5,1 million. This was mainly driven by job creation related to renewable energy, energy efficiency and waste management. The EU goals to accelerate the green transition of its economy and also to become carbon neutrality until 2050. This expects to boost of job creation in the EU's green economy in the next years and increasing the share of green employment in the EU economy.



Employment in the EU's environmental goods and services sector by domain, in the period 2010-2020
(<https://www.eea.europa.eu/en/analysis/indicators/employment-in-the-environmental-goods>)

In 2020, the production of environmental goods and services created jobs in 15 EU Member States. The five countries with the largest contribution, Spain, France, the Czech Republic, the Netherlands and Slovakia, created around 87,000 new jobs in 2020. In contrast, 12 EU Member States showed a decline in the number of jobs in the environmental goods and services economy. The largest job loss in 2020 was recorded in Italy, with a loss of 46,000 jobs, followed by Romania, with a loss of 18,000 jobs. Most jobs in the environmental economy are related to waste management and energy resource management.

Employment related to total output of the environmental economy, by country, 2020
(Full time equivalent)



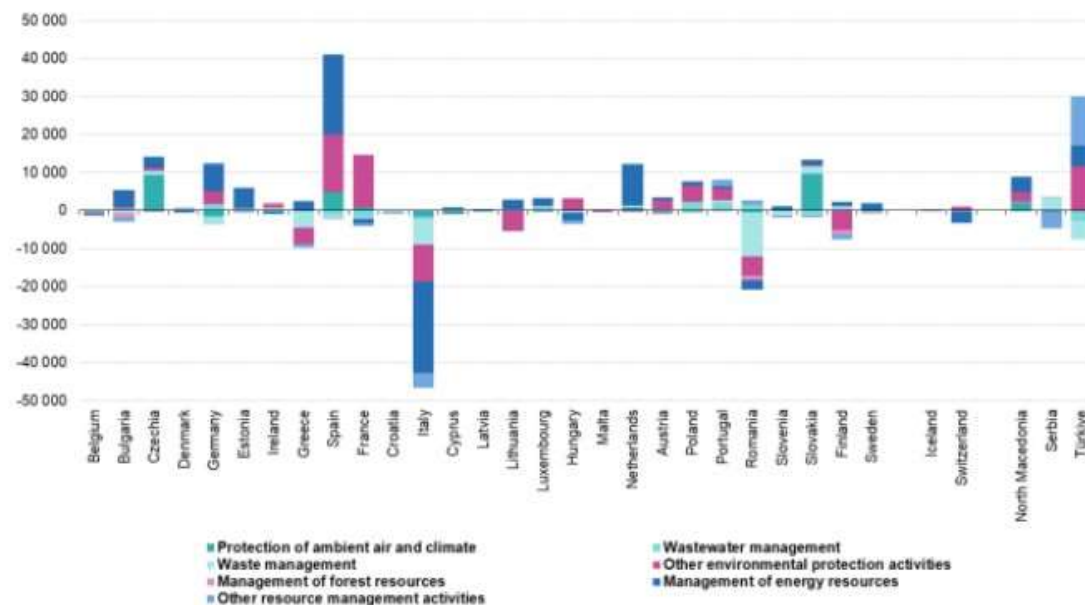
Source: Eurostat (online data code: env_ac_eggs1)

eurostat

Employment related to total output of the environmental economy in 2020 (*Environmental economy – statistics by Member State - Statistics Explained (europa.eu)*)



Job creation in the environmental economy, by country, 2019-2020



Source: Eurostat (online data code: env_ac_egss1)

eurostat

Job creation in the environmental economy in 2019-2020 ([Environmental economy – statistics by Member State - Statistics Explained \(europa.eu\)](#))

10.1.2. NATIONAL AND REGIONAL

The area of Ljubljana is characterized by a long industrial tradition. This development was first stimulated by the railway, and then by the exploitation of the water potential of the Drava River. This is how the textile, chemical and metalworking industries developed in Maribor. The latter was particularly strong in the automotive industry.

There are still several industrial and business zones in Ljubljana. One of the larger ones is the TEZNO ZONE, which covers an area of around 100 hectares, and more than 200 companies do business in it. In the Tezno business zone today, among other things, very demanding parts and assemblies are produced for the largest European car manufacturers, such as Citroën, Peugeot, Ford, Magna Steyr, VW, Daimler-Mercedes Benz and Iveco. At the same time, more and more highly sophisticated products and services are being created in the Tezno zone, including postal and logistics, banking and insurance, which mainly belong to the field of electronics and IT.

10.2. EEE/WEEE EDUCATION, SKILLS AND CAPACITY BUILDING

10.2.1. NATIONAL AND REGIONAL

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.

For example, the “Slovenia WEEE Campaign” project, which was managed by the company ZEOS between 2011-2013, was created to raise the awareness of target groups and have a positive impact in the long term with regard to the proper management of waste electrical and electronic equipment (WEEE) or e-waste and waste portable batteries and accumulators (WPBAs). The project was financed partly by the EU as part of the LIFE+ Information & Communication programme and partly by the Ministry of Agriculture and the Environment of the Republic of Slovenia. Some of the public awareness activities were:

- “E-transformer Makes a Visit” School Campaign. The project was primarily focused on raising awareness among the young. For this purpose, they constructed a multimedia vehicle called the E-transformer, which presented the importance of proper e-waste and waste battery management. The E-transformer is a foldable vehicle equipped with state-of-the-art multimedia and lighting presentation equipment, powered completely by its own solar power plant, which is fitted on the vehicle’s roof, and decorated with appealing and colourful graphics.



The E-transformer

- Role of Local Communities / “Doors Open Day” in Municipalities. The “Doors Open Day” campaign was named “Separate E-Waste and Protect the Environment” and was implemented in cooperation with 24 local public service providers (PSPs) providing waste management services. They included 89 municipalities in the campaign and educated 1.2 million Slovenian citizens and “cleaned” almost 500,000 households – almost 65% of all households in Slovenia – of e-waste.

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.



Reuse center Rogaška Slatina

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



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.

11. THE STRATEGIC AND POLICY CONTEXT

11.1. EU POLICY CONTEXT

11.1.1. WEEE 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.

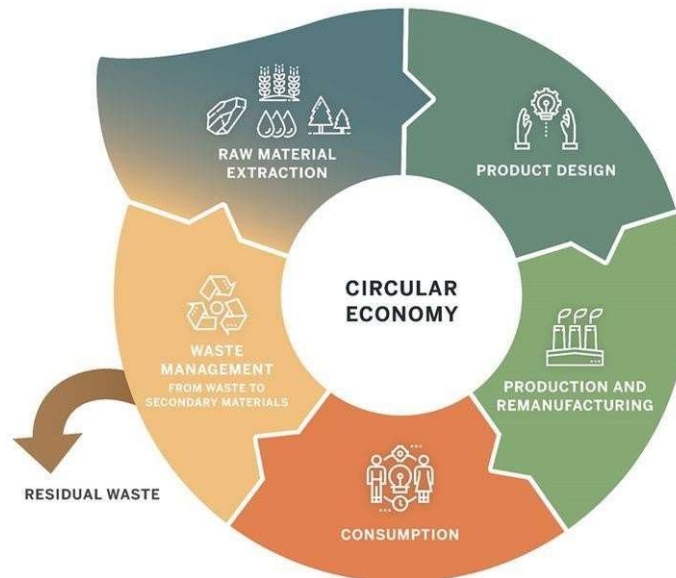
The RoHS Directive (2011/65/EU) complements these efforts by restricting the use of hazardous substances in electrical and electronic equipment. This directive promotes environmentally sustainable manufacturing practices and reduces risks to human health and the environment posed by hazardous substances.

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.

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, batteries, 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.

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').

11.2. NATIONAL, REGIONAL AND LOCAL POLICIES

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.

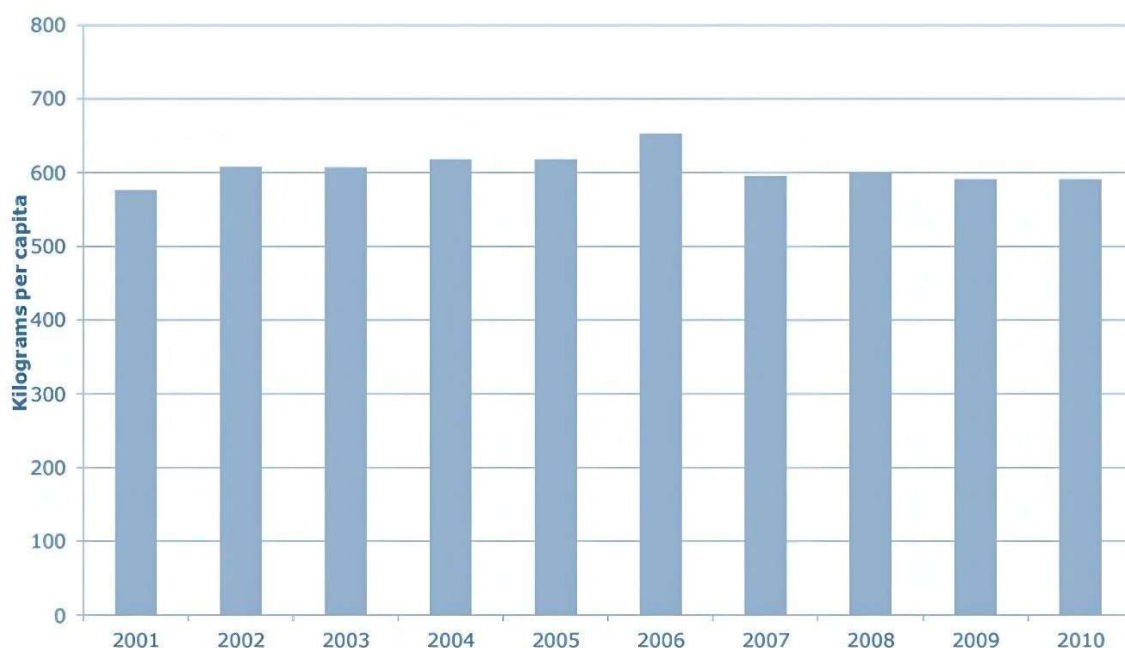
The Commission launched 28 infringement proceedings against Member States in relation to the implementation of the WEEE Directive. It referred three cases to the European Court of Justice for failure to notify national transposition and withdrew from these proceedings after the three Member States concerned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

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.



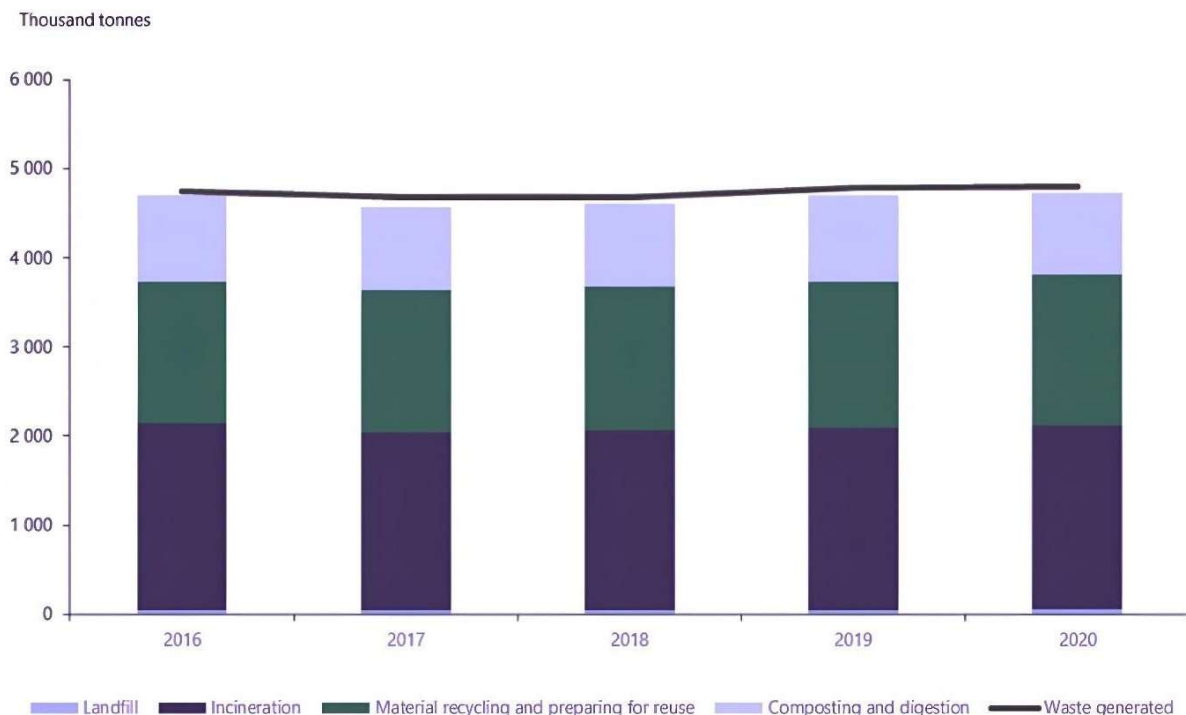
MSW generation in Austria for the period 2001-2010

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

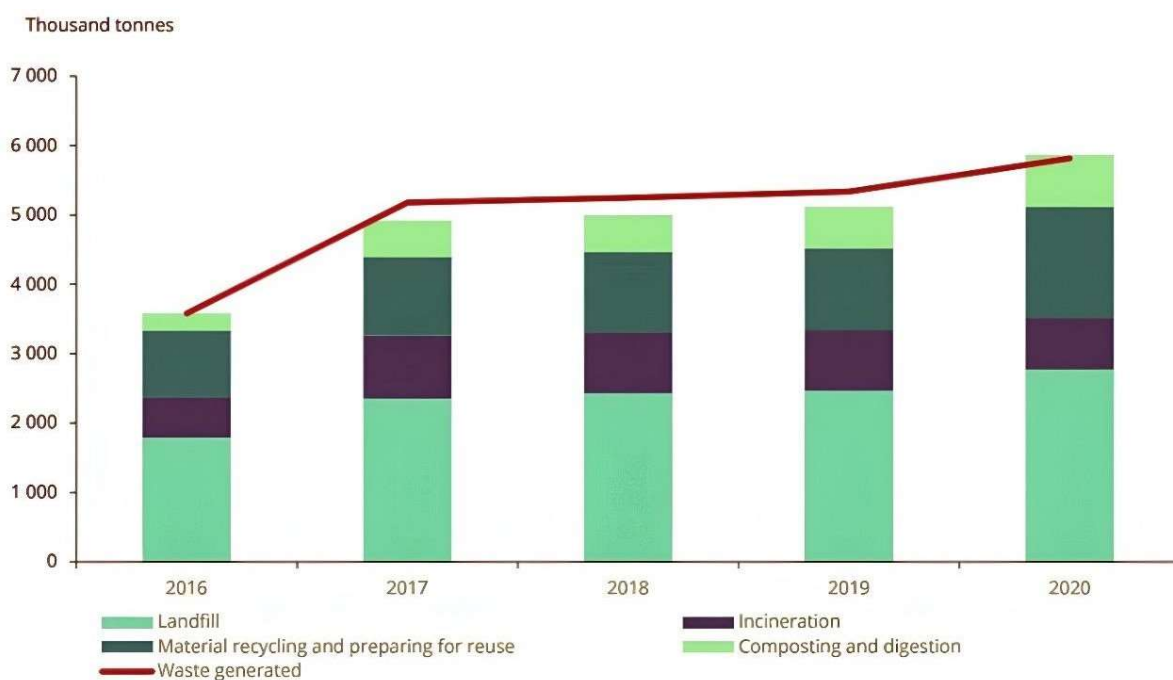
CZECHIA

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.

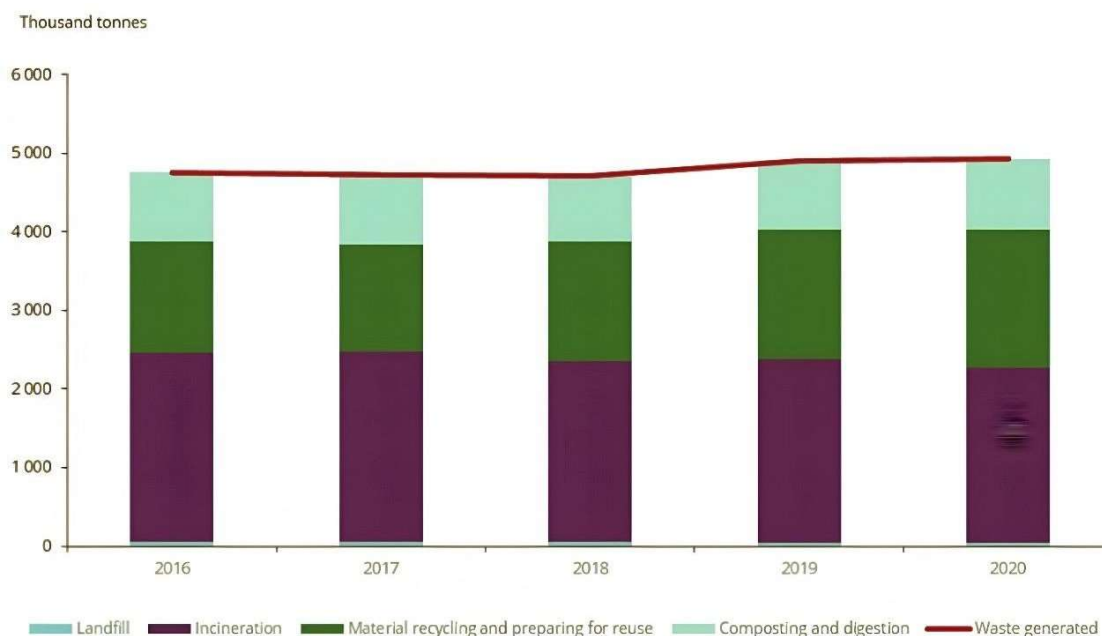


Municipal waste generation and treatment in Czechia between 2016 and 2020, in thousand tonnes.

Source: European Environment Agency

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

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:

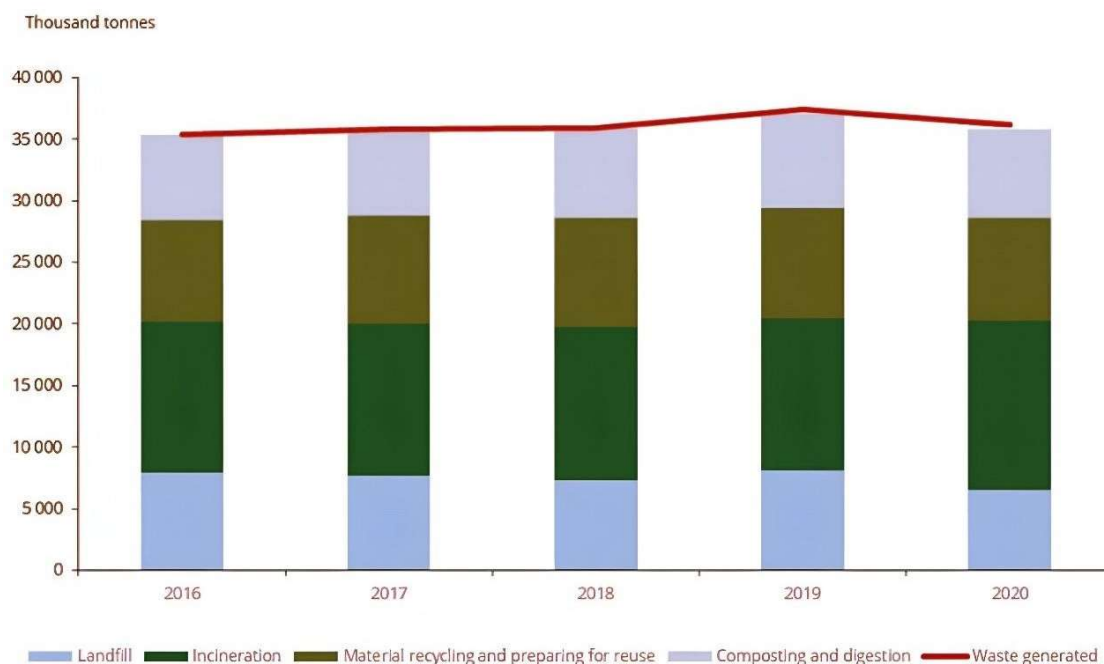
Producers:

- 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.



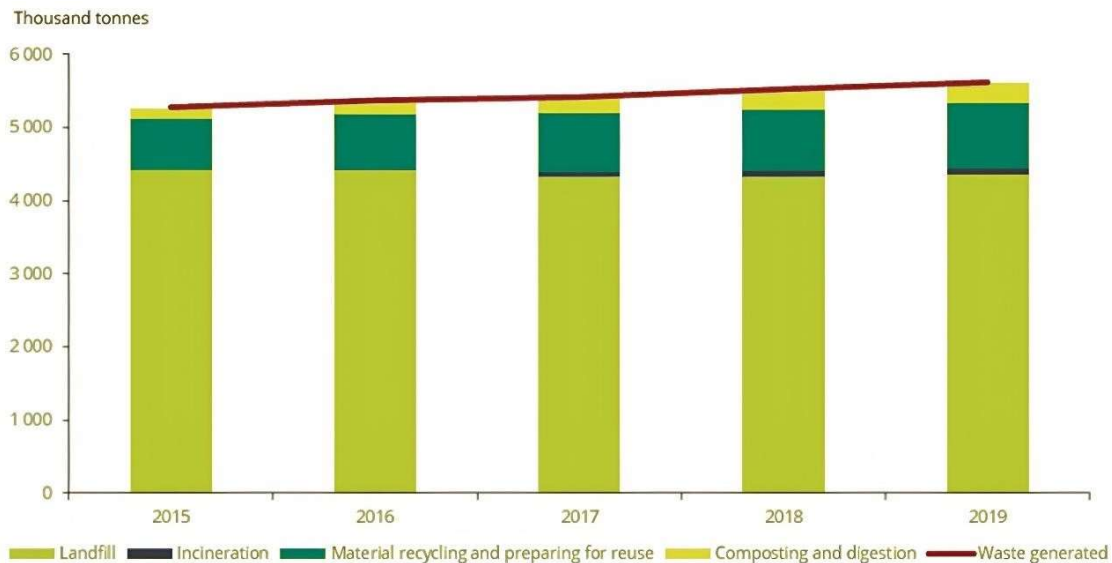
Municipal waste generation and treatment in France between 2016 and 2020, in thousand tonnes. *Source: European Environment Agency*

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.



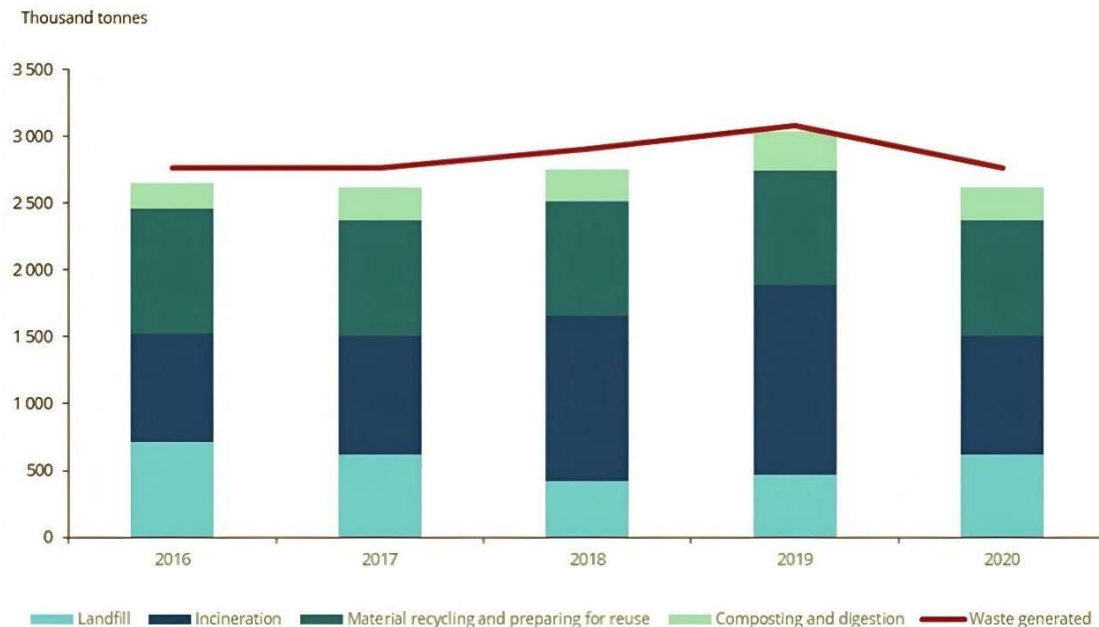
Municipal waste generation and treatment in Greece between 2015 and 2019, in thousand tonnes. *Source: European Environment Agency*

IRELAND

Producer responsibility under WEEE Directive 2012/19/EU & EU Battery 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 Battery 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 Oifigiúil 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 (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014), as amended came into effect on 30th July 2014 in Ireland and promote the recycling of waste batteries. In particular, they also facilitate the achievement of targets for the collection, treatment, recycling and disposal of waste batteries in an environmentally sound manner.



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

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:

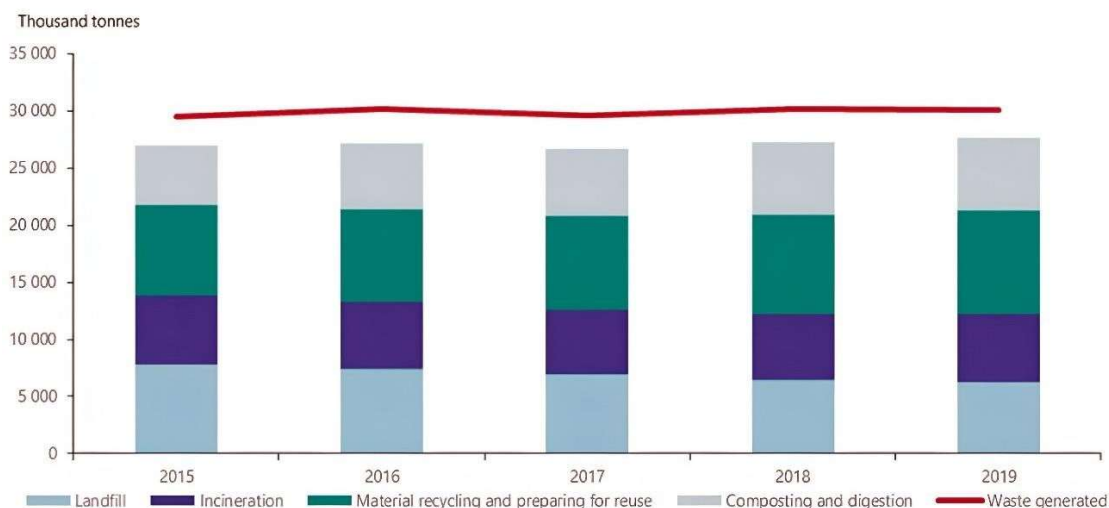
Financial Guarantees Decree (Ministerial Decree No. 68 of March 9, 2017): This decree specifies the requirements for EEE producers to provide financial guarantees, particularly for WEEE from private households, excluding professional WEEE.

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*

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.

LUXEMBOURG

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:

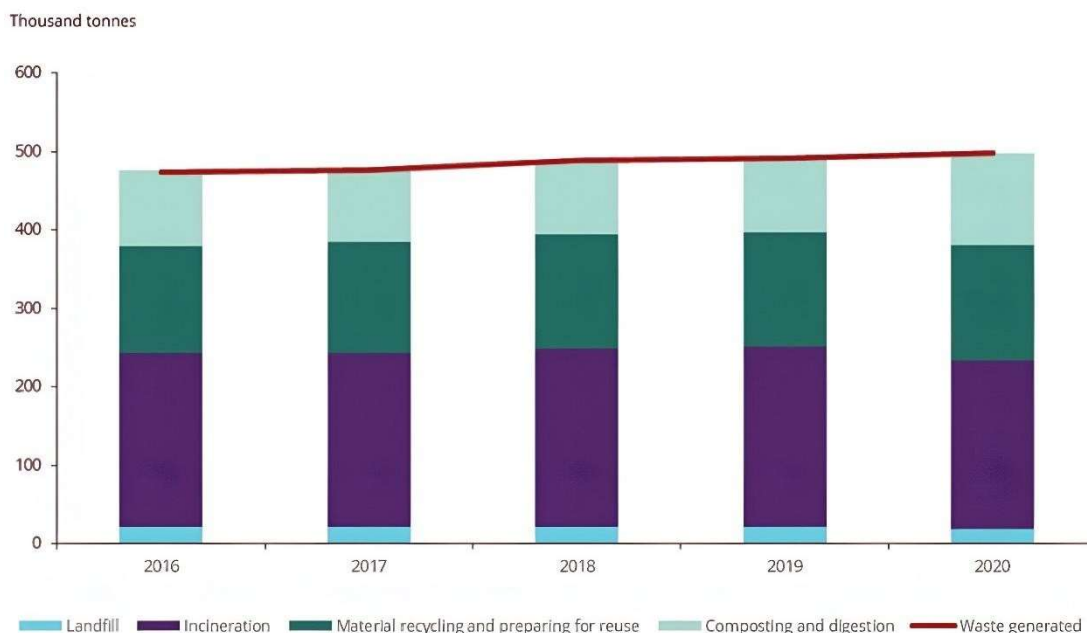
- To finance the take-back and treatment of WEEE from the exit of the selective collection points according to their current market share for the historical WEEE

- 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.

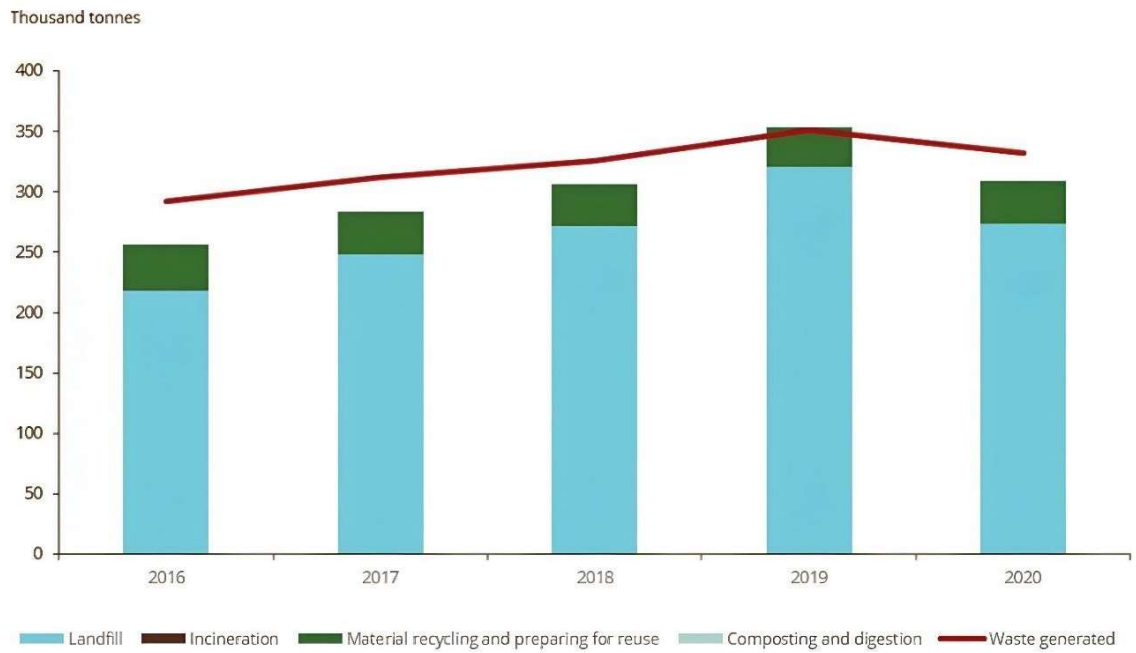


Municipal waste generation and treatment in Luxembourg between 2016 and 2020, in thousand tonnes.

Source: European Environment Agency

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*

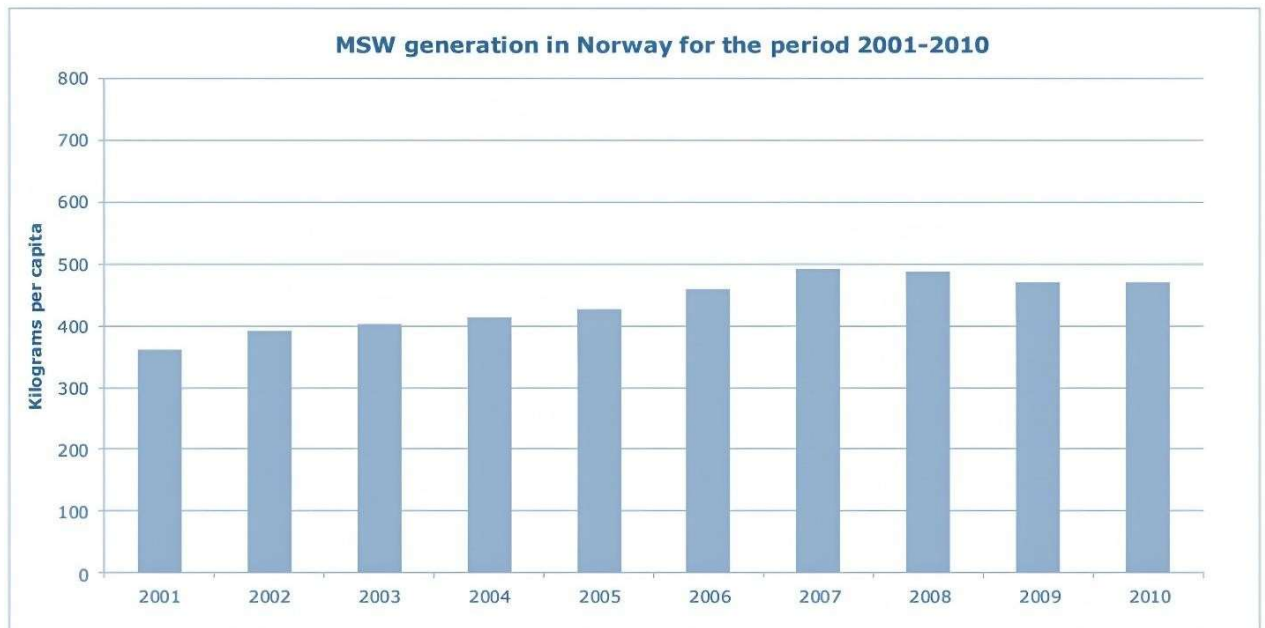
NORWAY

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.



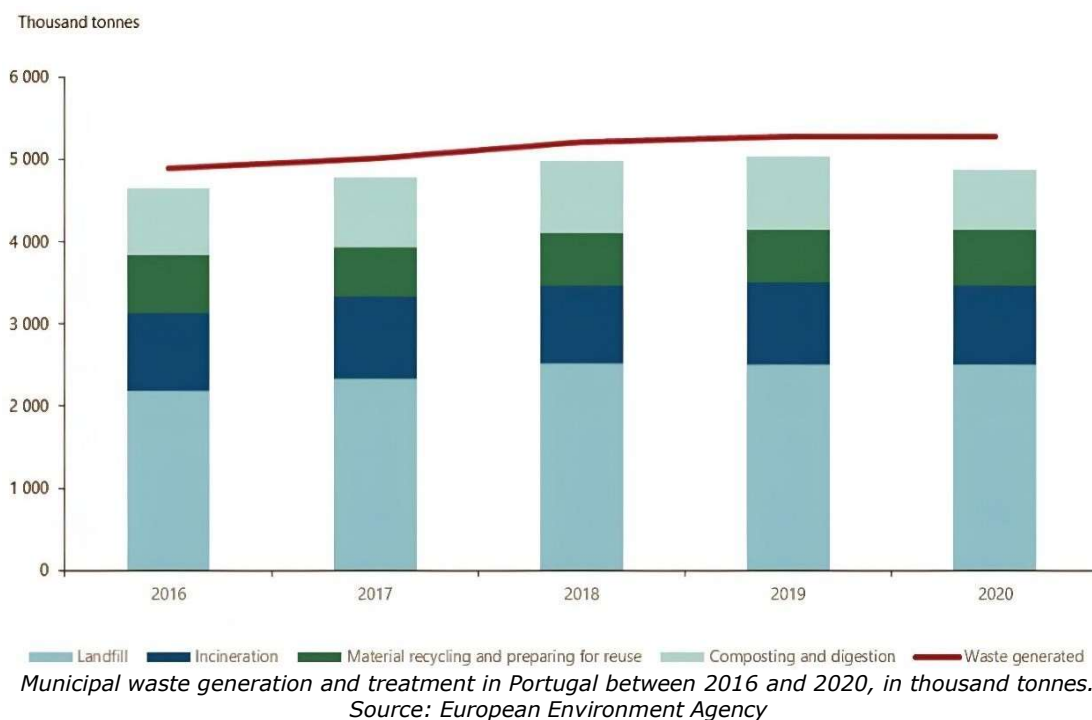
- Retailers and municipalities to free of charge take back WEEE from households



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.



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.

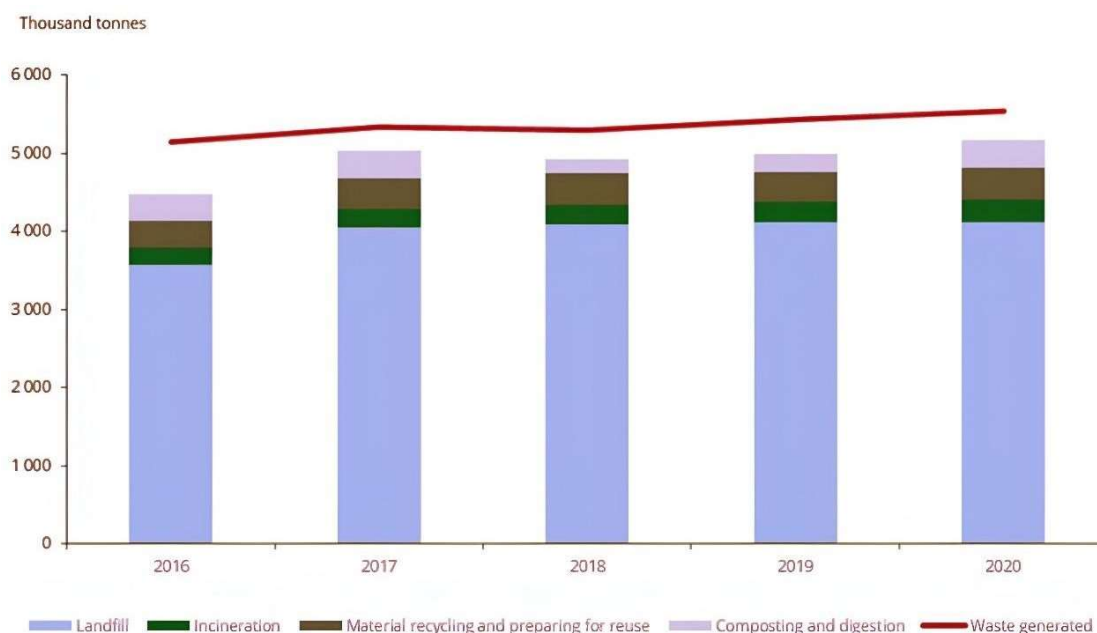
Furthermore, retailers are mandated to accept WEEE on a "one-for-one" basis from customers, free of charge, provided the equipment is of an equivalent type



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.

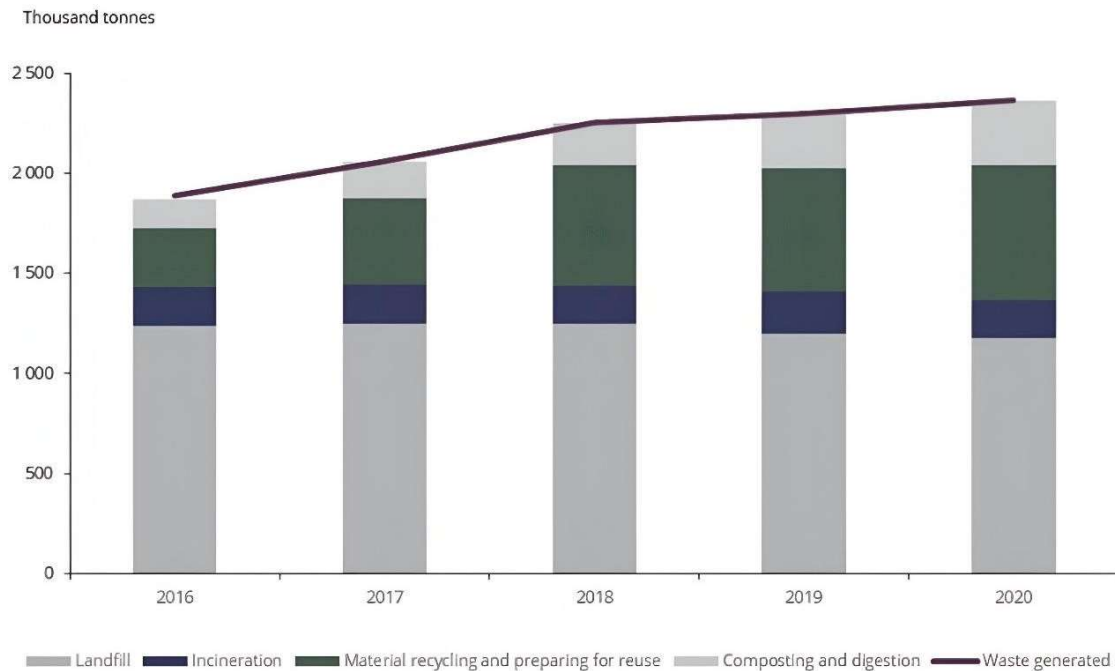
Overall, Emergency Ordinance no. 5 seeks to align Romanian legislation with EU directives, promoting responsible waste management practices and environmental protection.



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

SLOVAKIA

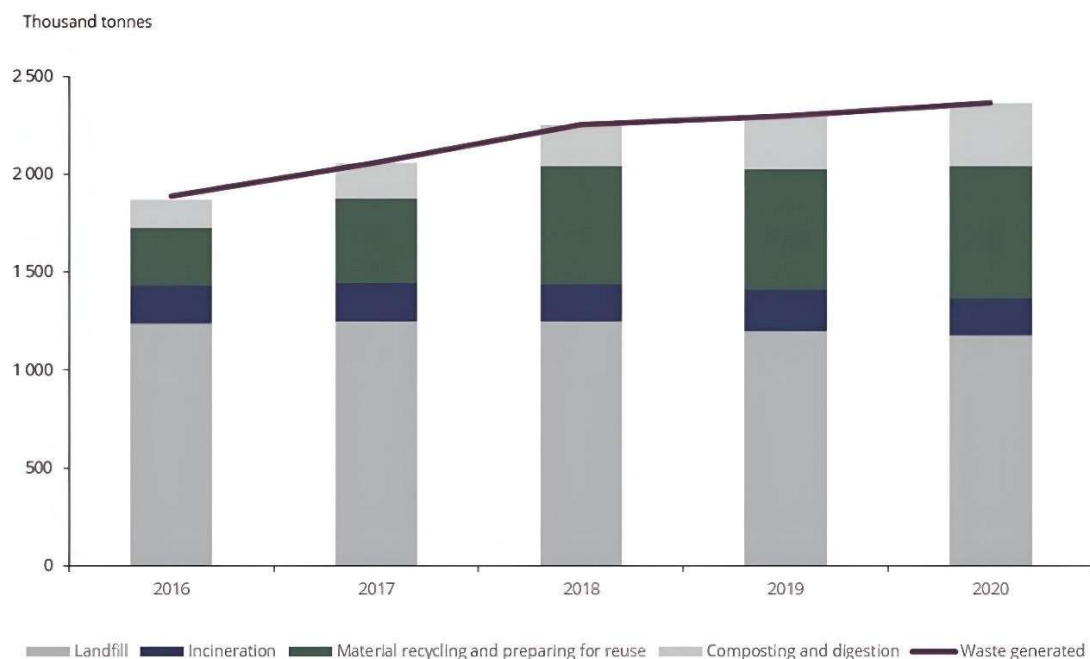
The Slovak government established the Act on Waste No. 223/2001 in 2001 to regulate waste management. The WEEE Directive was incorporated into Slovak law through an amendment to this act in 2004. Subsequently, in 2015, the new Act on Waste No. 79/2015 was introduced, accompanied by several decrees issued 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

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 batteries 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

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.

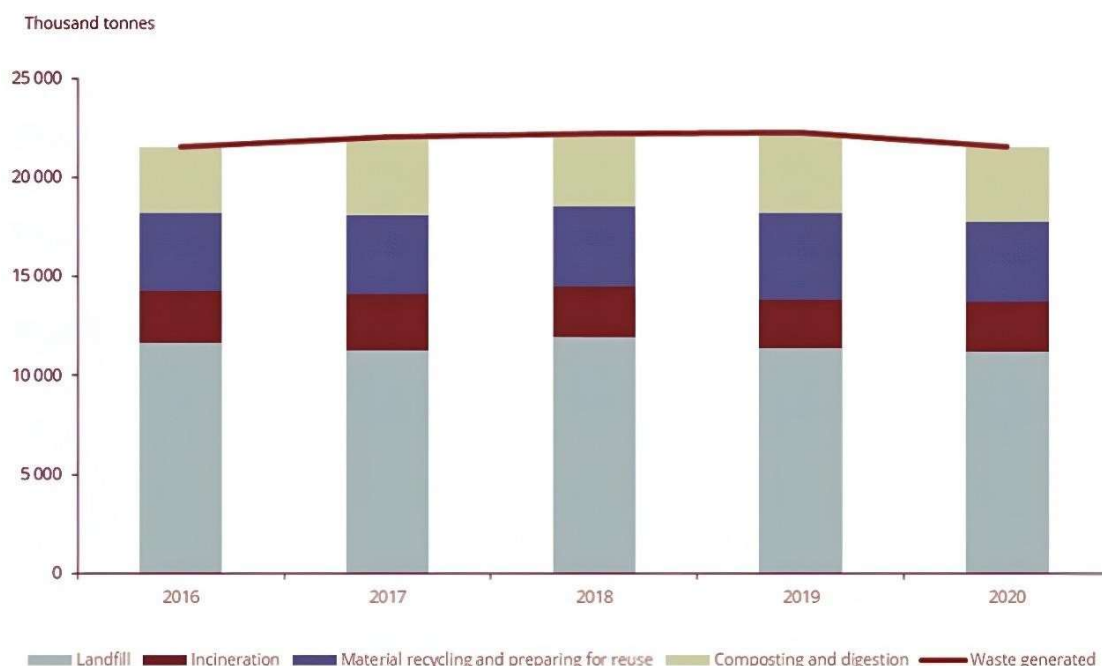
The Royal Decree aims to achieve several immediate objectives:

- 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.

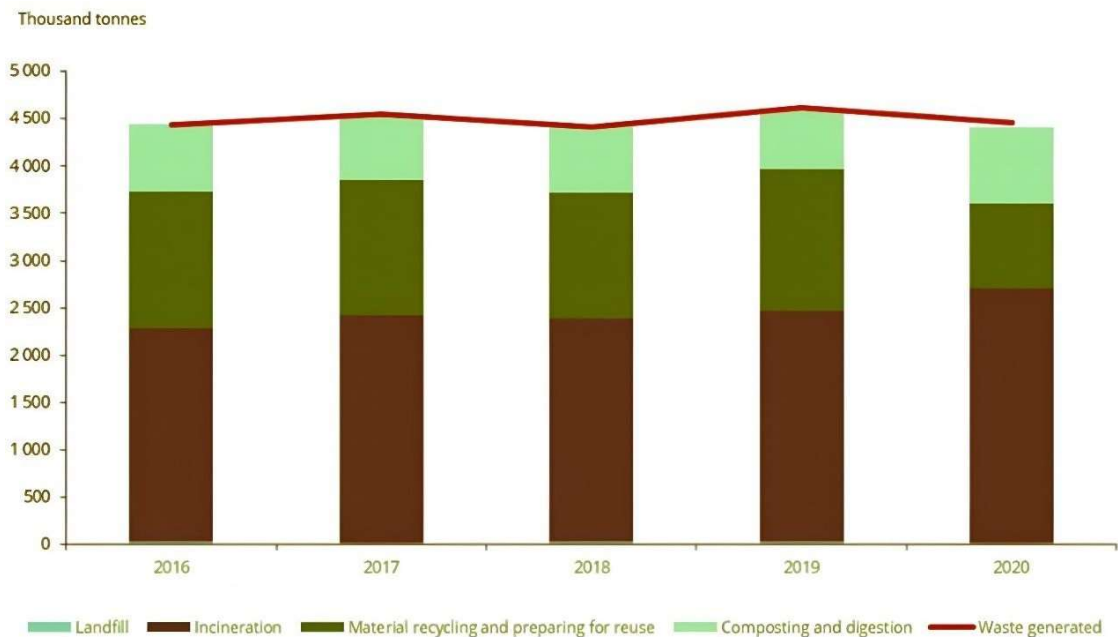


Municipal waste generation and treatment in Spain between 2016 and 2020, in thousand tonnes. *Source: European Environment Agency*

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.



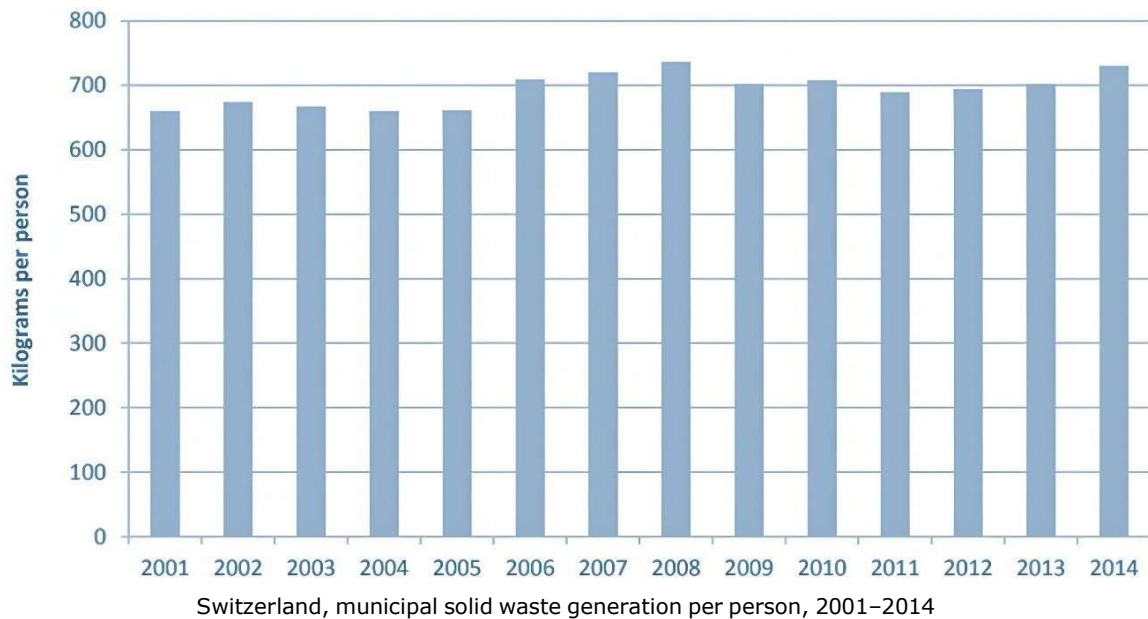
Municipal waste generation and treatment in Sweden between 2016 and 2020, in thousand tonnes.

Source: European Environment Agency

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.



11.3. IMPLEMENTATION LEVEL OF POLICIES

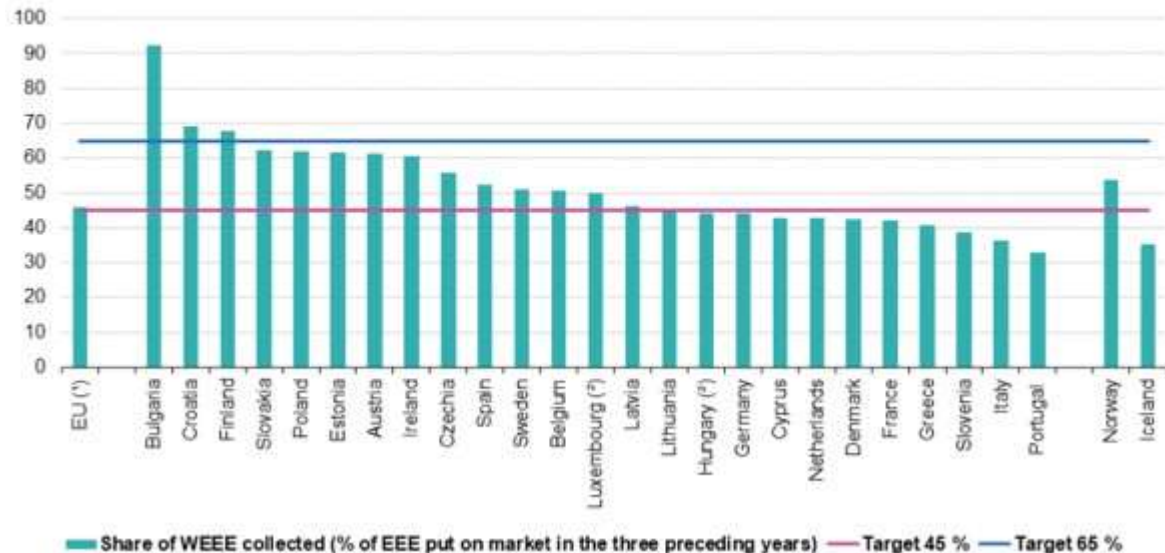
11.3.1. Collection rates (EU)

WEEE Directive describes two methods for calculating the collection rate in the EU Member States. The “WEEE Generated method” is calculated by mass of WEEE collected divided by the mass of WEEE Generated in the same year. The collection rate increased from 40% in 2014 to 54% in 2021 using this method. The increases are mainly driven by the significant increases of the WEEE collection compared to the WEEE Generation.

The second method is the ‘EEE POM method’, which is calculated as the mass of WEEE collected divided by the average amount of EEE POM in the three preceding years. The collection rate using the EEE POM method increased from 39% to 50% from 2013 to 2016. From 2016 to 2020, the collection rate dropped to 44%.

Total collection rate for waste electrical and electronic equipment (WEEE), 2020

(% of the average weight of EEE put on the market in the three preceding years (2017-2019))



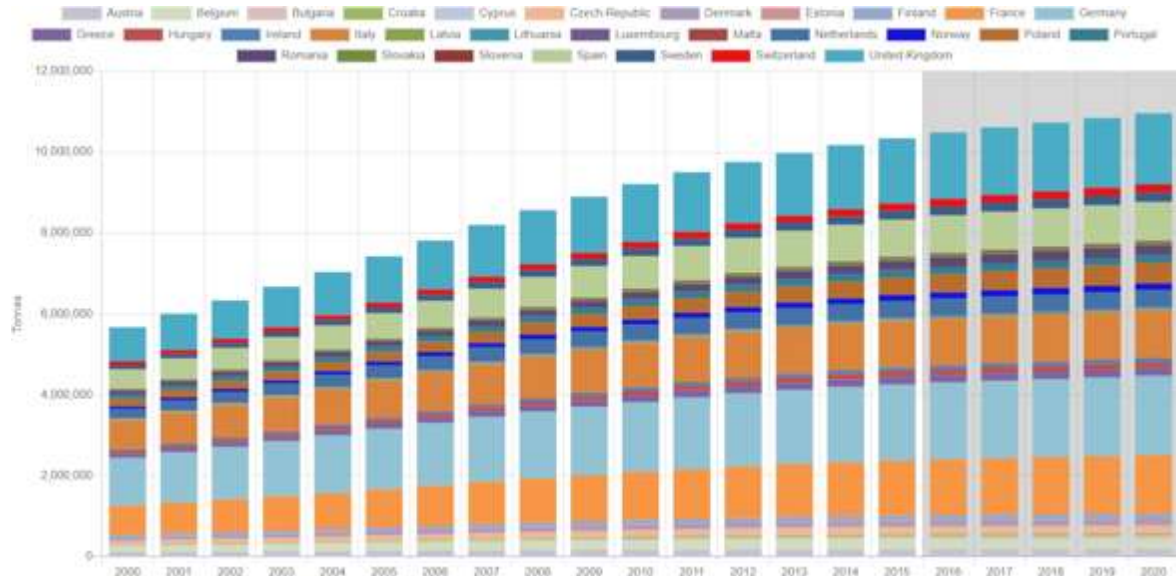
Source: Eurostat (online data code: env_waseleeeos and env_waselee)

Despite the significant increases of WEEE collection, the decrease in the collection rate is caused by even larger increases of the EEE POM, causing the collection rate to decrease, using this method. The Member States of the EU can annually choose either method for the calculation of the WEEE collection targets. For the WEEE Generated method, the target is 85%, and for EEE POM, the target has been 65% since 2019.

In considering all individual countries, only three of the 27 EU Member States (Croatia, Bulgaria, and Poland) have reached the collection target of the WEEE Directive, according to the latest set of data available in this study. Switzerland does not have such targets in place, but would meet the EU target. The countries that reach the targets seem to contradict both the overall trend and the underlying factors observed across the rest of the EU.

Besides official government statistics, there are no additional public reports or underlying information available that allow for a better understanding of the collection rates.

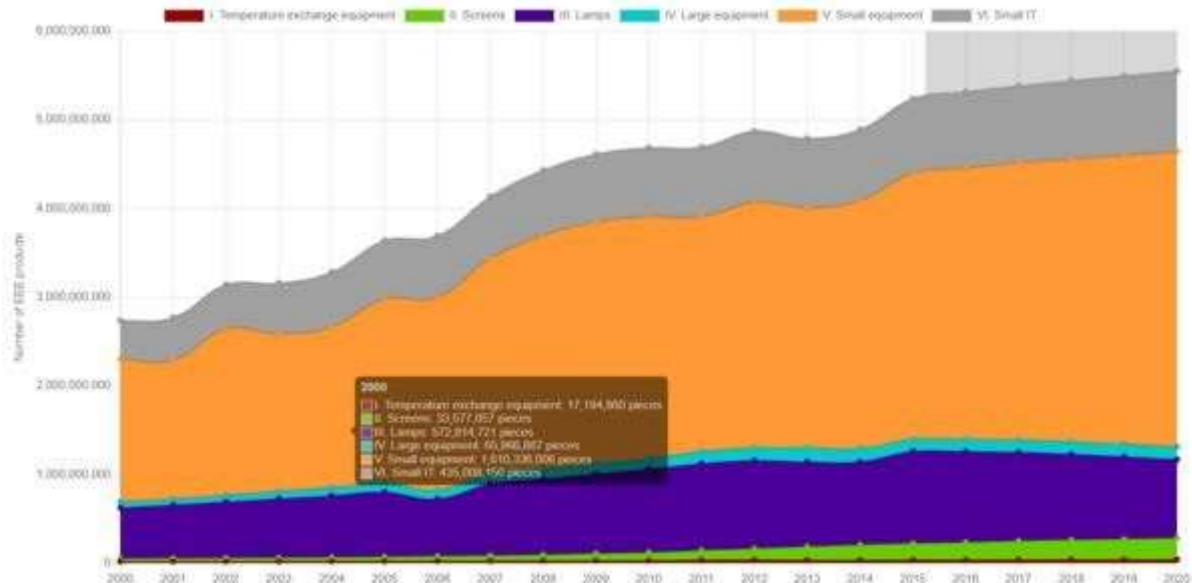
One of the obstacles in reaching collection targets is that considerable amounts of WEEE are diverted to other, undocumented WEEE flows. Unwanted WEEE flows need to be reduced and steered into the formal WEEE management regime. It is estimated that 1.4 Mt (2.7 kg/inhabitant) was collected with metal scrap to be recycled, but not with the same environmental and material efficiency standards as the formally managed WEEE.



Weight of EEE - Waste Generated. Source:
<http://www.urbanmineplatform.eu/urbanmine/eee/weightpercountry>

Approximately 0.8 Mt – 1.5 kg/inhabitant – of WEEE is estimated as being disposed of with mixed residual waste and ends up in incinerators and landfills. It is estimated that 0.5 Mt – 1 kg/inhabitant – is illegally exported outside the EU27. As well, 0.6 Mt – 1.1 kg/inhabitant – of EEE is estimated to be exported for reuse. The exports for reuse and illegal exports are hardly monitored in most countries, also due to the lack of trade codes for used EEE.

Better monitoring of used-EEE exports is essential in order to distinguish legal used EEE exports from exports of illegal WEEE. WEEE illegally exported often ends up illegally dumped in countries with no formal management systems. The legal exports of used-EEE could be corrected in the collection target, as they do not typically become waste in the country where they have been placed on the market initially. In the previous study over reference year 2019, the whereabouts of 2.7 Mt of WEEE were unknown. In this study, the unknown has reduced to 1.5 Mt of WEEE – 1.9 kg/inhabitant – over 2021. The unknown WEEE can still be part of the previous mentioned flows or could be uncertainties in the calculations.



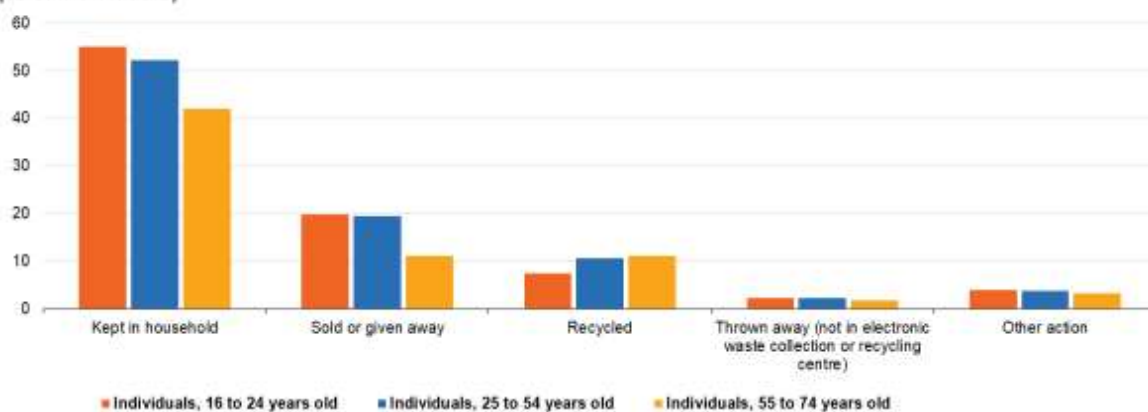
Number of EEE products - Waste Generated in EU28 + Norway and Switzerland.

11.3.2. Problems, barriers, achievements (EU)

Consumer relationships with electronics

Like fast fashion and fast food, electronics can involve a rapid turnover in style trends, with revenues dependent on selling the latest products, which are increasingly affordable.

Methods of disposing of a mobile/smartphone no longer in use, by age group, 2022 (% of individuals)



Source: Eurostat (online data code: isoc_eco_dd)

In particular, affordability has opened up opportunities in developing countries, for instance mobile money has dramatically increased financial inclusion and given rise to other developmental opportunities. In many cases, secondhand device markets flourish in these countries with products such as laptops and smartphones having second or third lives.

Yet eventually all these smartphones, tablets, cameras and home gadgets or appliances will become waste.



One report puts the global consumer electronics market at around \$1.1 trillion in 2017, growing at a rate of 6% until 2024, when it will be worth \$1.7 trillion. Rising smartphone adoption rates are fuelling global demand. There is also a major trend towards flat panel TV screens in developed markets and adoption of 3G and 4G in developing economies; electric vehicles are also on the rise. More clothes, furniture, toys, sports equipment and toothbrushes have complex electronic components.

Lack of recycling

Recycling rates globally are low. Even in the EU, which leads the world in e-waste recycling, just 35% of e-waste is officially reported as properly collected and recycled. Globally, the average is 20%; the remaining 80% is undocumented, with much ending up buried under the ground for centuries as landfill.

E-waste is not biodegradable. The lack of recycling weighs heavily on the global electronic industry and as devices become more numerous, smaller and more complex, the issue escalates. Currently, recycling some types of e-waste and recovering materials and metals is an expensive process.

The remaining mass of e-waste – mainly plastics laced with metals and chemicals – poses a more intractable problem. The waste stream is complex, containing up to 60 elements from the periodic table. In some cases, it contains hazardous chemicals, such as flame retardants, of which some are Persistent Organic Pollutants listed under the Stockholm Convention.

There is also confusion in global consumers' minds in terms of how they handle e-waste because the system is often complex. In many cases, it is treated as normal household waste, but it must be separated. Different streams of e-waste must also be dealt with separately, including batteries, light bulbs, smartphones, cables or computers. This lack of awareness about how to recycle and worries about data security mean there are vast tranches of residual electronics sitting in drawers, garages, bedrooms and offices across the globe waiting to be dealt with. An opportunity is waiting.

Labour, environmental and health issues

From lead-lined, cathode ray tubes from old TVs, to lead and chromium in circuit boards, e-waste can contain substances that are hazardous to human health if not dealt with properly, including mercury, cadmium and lead.



E-waste can pollute water sources and food supply chains. This is particularly true of older products making up today's e-waste. Regulation and some voluntary targets are driving the phase out of some of the worst offenders in new products. Recycling of valuable elements contained in e-waste, such as copper and gold, has become a source of income, mostly in the informal sector of developing countries.

However, basic recycling techniques to burn the plastic from electronic goods leaving the valuable metals (melting down lead in open pots, or dissolving circuit boards in acid) lead to adult and child workers, as well as their families, exposed to many toxic substances. In many countries, women and children make up to 30% of the workforce in informal, crude e-waste processing and are therefore particularly vulnerable.

E-waste compounds are also carcinogenic. Toxic elements are found in the blood streams of informal workers at dumping grounds for e-waste where open burning is used to harvest metals. These dumps have become economic hubs in their own right, attracting food vendors, and are often adjacent to informal settlements, leading to further contamination from the toxic fumes.

E-waste can contaminate groundwater, soil and air. Today, the total number of people working informally in the global e-waste sector is unknown. However, as an indication, according to the ILO in Nigeria up to 100,000 people are thought to be working in the informal e-waste sector, while in China that number is thought to be 690,000.⁴⁷

The upgrade and formalization of the industry to one where formal recycling plants provide safe, decent work for thousands of workers is a major opportunity. It is also worth considering the effects electronic goods have on climate change. Every device ever produced has a carbon footprint and is contributing to human-made global warming.

Manufacture of a tonne of laptops and potentially 10 tonnes of CO₂ are emitted. When the carbon dioxide released over a device's lifetime is considered, it predominantly occurs during production, before consumers buy a product. This makes lower carbon processes and inputs at the manufacturing stage (such as use of recycled raw materials) and product lifetime key determinants of overall environmental impact.



Legislation on e-waste

A total of 67 countries have legislation in place to deal with the e-waste they generate. This normally takes the form of Extended Producer Responsibility, when a small charge on new electronic devices subsidizes end-of-life collection and recycling.

The legislation covers about two-thirds of the global population. However, many countries do not have national legislation on e-waste. When it comes to the export of e-waste to developing countries, it is regulated under the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, which has been ratified by 188 countries, other similar conventions exist at a regional level.

Even with the convention in place, however, large amounts of e-waste continue to be shipped illegally. The difference in enforcement of conventions and transposing e-waste legislation globally means the regulatory environment can be complex and fragmented.



Illegal WEEE exports

The European Union has implemented regulations to control the proper handling and disposal of WEEE to ensure environmental sustainability. However, the illegal export of WEEE from Europe to developing countries continues to pose significant environmental and health risks.

The illegal exportation of waste electrical and electronic equipment from Europe to developing countries is caused by several factors. These include the lack of adequate regulatory frameworks, economic incentives, a lack of awareness, and corruption.

One factor contributing to the illegal export of WEEE is the lack of sufficient legal frameworks to enforce WEEE management policies in some European countries. This makes it easier for illegal exports to take place. Additionally, economic incentives have been established in some European countries to increase the cost of WEEE management, leading to companies exporting their waste to developing countries where disposal costs are lower.

Furthermore, many consumers and producers in Europe are not aware of the potential environmental and health hazards associated with improper disposal of electronic waste, which has contributed to the growth of the illegal WEEE trade. Finally, corruption may be a factor in illegal WEEE exports from Europe, with some officials susceptible to bribery or other forms of corruption.

The effects of illegal WEEE exportations from Europe to developing nations are carefully examined. One of the primary consequences of these exports is environmental damage. Improper disposal of electronic waste can lead to soil and water pollution, which can have long-term impacts on the environment and surrounding ecosystems. This pollution can also contaminate food and water sources, which poses a significant health risk to local communities.



Illegal WEEE exports can also have economic impacts, as local communities may bear the costs of waste disposal and cleanup efforts. These costs can be significant, and may ultimately limit economic development in affected areas. In addition, the illegal WEEE trade can contribute to corruption and undermine regulatory efforts to promote sound waste management practices.

Addressing these consequences requires a concerted effort from all stakeholders, including policymakers, producers, consumers, and law enforcement agencies. By promoting sound WEEE management practices, ensuring that electronic waste is disposed of in an environmentally responsible manner, and providing adequate protection for workers and local communities, the negative consequences of illegal WEEE exports can be minimized.



12. POLICY BEST SAMPLES ON WEEE MANAGEMENT

12.1. Policy samples for increasing collection

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.

One of the best practices in WEEE management is increasing public awareness. It is essential to educate individuals 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.



There are many small and big companies all around the world that participate actively in extending the awareness about the proper treatment of WEEE. But in this section, it will be treated only the ones that are startup that has significantly grown this last year until becoming a unicorn, where a couple of examples can be found.

Best practice 1: WEEE Ireland Public Collection Day Events. IRELAND

Introduction

WEEE Ireland is a not-for-profit organisation, committed to delivering cost effective compliance on behalf of our Producer Members.

WEEE Ireland represents 96% of the Irish battery industry and 74% of the household electrical and electronic industry who have a Producer responsibility under EU Battery Directive 2006/66/EC & WEEE Directive 2012/19/EU to organise and finance the environmental management of their products at their end of life.

WEEE Ireland has been operational since 2005 and has been the Scheme of choice in Ireland maintaining majority market share across all sectors. WEEE Ireland operates under the approval of the Minister for the Environment, Climate and Communications.



Working closely with their partners in Local Authority and Community Recycling Groups in each location, WEEE Ireland collected 835 tonnes of WEEE in 2019. Public local collection events were promoted locally through press, radio, PR, social media and local community networks. This targeted promotion of WEEE Ireland Public Collection Day Events supported annual increase efficiencies of operations to yield clear and positive results – increase 17% compared to 2018.

Local Authority civic amenity centres, a network of participating electrical retailers and WEEE Ireland free e-waste collection days across 2022 offered a golden opportunity to end the scourge of binning and the terrible loss of valuable materials in our end-of-life electrical goods.

This year one of these events was held in Galway. Galway householders are being urged to bring their batteries, electrical, and electronic waste to a free collection day to help the county meet national e-waste recycling targets for 2023.

The event, hosted by WEEE Ireland in partnership with University of Galway, kicks off on Thursday September 21 at University of Galway. All household items with a plug, battery or cable will be accepted free of charge, including old washing machines, TVs, toasters and kettles, electronic tools and toys, cables, IT equipment, mobile phones, remote controls, batteries, including farm fence batteries, and even watches.



Citybin welcome everyone to the event in Galway

Key factors

WEEE Ireland presented their Scheme as a best-in-class Case Study at the European Commission's Compliance Promotion exercises in Dublin and Brussels. In addition, during this time they have:

- Grown the Membership numbers by another 30% to more than 1300 Producers
- Continued to increase and maintain dominant market share
- Provided EPR support for new technologies across WEEE and Battery Sectors
- Delivered additional collection programmes to meet additional takeback challenges



- Diverted over 225,000 tonnes of waste for recycling and recovery during this time
- Partnered with indigenous Irish treatment operators to support national recycling and recovery infrastructure to EN 50625 standard.
- Supported the development of new circular economy, WEEE and Battery policy and regulatory frameworks in Ireland and Europe through engagement, submissions, and expert opinion.
- Extended their compliance services through links with the pan European WEEE Europe platform and the EUCOBAT and WEEE Forum Centres of Excellence
- Led the WEEE and Battery EPR sectors in Ireland in new R&D and CE innovation programmes through co-funding and partnership with EPA Strive and CIRCULÉIRE
- Contributed over €250,000 in corporate sponsorship (over €500,000 in the last decade), to LauraLynn Children's Charity, encouraging more people to collect batteries and small WEEE for recycling.
- Promoted the WEEE and Battery takeback and environmental management messages through a comprehensive Communications Programme with far-reaching campaigns
- Launched their new Circular Vision strategy in anticipation of the Whole of Government CE Strategic focus and the next phase of Scheme Approval from 2022.

Best practice 2: Emmaüs events. FRANCE

Introduction

Emmaüs was born 73 years ago to find, with people who are victims of exclusion, solutions that allow them to once again become active participants in their lives. Faithful to the wishes of Abbé Pierre, Emmaüs has become both a factory of social innovations and solidarity to help people in very precarious situations, and a committed and militant front in favor of a more humane and more just.

The PRO ecosystem and Emmaüs jointly organize regular neighbourhood solidarity collection events on the street to facilitate donation of old appliances. Emmaüs trucks are also present to welcome donors during the PROs solidarity collections. Emmaüs collects donations from individuals made during these events. WEEE appliances are sorted, cleaned, repaired and resold at solidarity prices by Emmaüs or, failing that, decontaminated and recycled in strict compliance with environmental standards.

Even when the donated devices cannot be repaired, Emmaüs receives financial compensation from ecosystem for its participation in the collection of used devices. The money collected by Emmaüs from the resale of old devices promotes employment and professional integration, accommodation and the fight against poor housing, as well as the fight against over-indebtedness. Ecosystem organised around 450 events every year.



Key factors

Emmaus started off in France in 1949 and the movement now has 220 member groups in the country. There are many different types of structures in France, providing a response tailored to the local situation (communities, social action and housing structures, SOS Families, friends committees and reintegration structures). The groups in the country benefit from the support of the national organisation, Emmaus France. Main activities:

- Welcome, providing accommodation, reintegration
- Collecting, reusing, recycling and selling on objects
- Political campaigning and awareness raising
- Social action and housing (emergency accommodation, social housing, fighting against excessive debt, etc.)
- Local, european and international solidarity initiatives

Key numbers

- 30,000 stakeholders involved with Emmaus (including companions, volunteers and employees)
- 480 sales areas
- 270,000 tons of merchandise collected every year



Map of places to donate high tech and small objects

Best practice 3: The Wecycle Premium Pick-up Partners. NETHERLANDS

Introduction

The Wecycle Premium Pick-up Partners provide a pick-up service for small appliances in the Netherlands. When a new large electrical appliance is delivered, users can also return old small appliances to the delivery person. This service has been set up between Wecycle, the main PRO, and EEE sellers and their logistic service providers.

At Wecycle Premium Pick-up drop-off points, consumers can bring not only the old appliance, such as a washing machine or refrigerator, but also smaller electrical appliances, such as a hair dryer, drill, laptop, mobile phone, desk lamp or TV.

With the Jekko, the practical collection box for the home, consumers can store used electrical appliances (and also batteries and light bulbs) neatly in a central location and then hand them in.

Key factors

The OPEN Foundation fulfills the legal producer responsibility for e-waste. Under the name Wecycle they run campaigns to stimulate the collection and recycling of e-waste. They do this by increasing knowledge of the Dutch and strengthening "recycling" self-confidence.

In 2022, the OPEN Foundation has collected a total of 159 million kilos of e-waste in collaboration with our chain partners. In addition, more than 11 million kilos were offered to certified processors via metal recyclers: 2% more than last year; a good start to our effort to minimize the most important 'leakage flow' of e-waste. In addition, they continue to focus on extending the lifespan of equipment, parts and materials: the longer they stay on the R-ladder, the more electrical waste we keep out of leakage currents.

They collect waste electrical and electronic equipment together with their partners at more than 15,000 service points, including almost 8,000 Wecycle return points. Think of recycling centers at municipalities, petting zoos, retailers

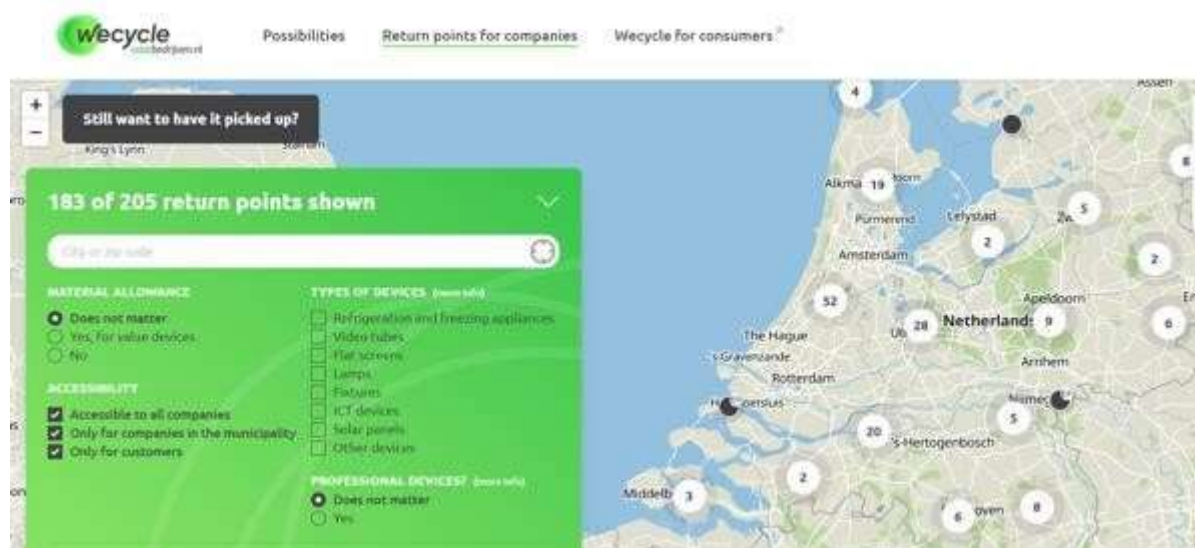


and technical wholesalers. Consumers already know where to find the Wecycle points in Netherlands.

The percentage of e-waste that ends up in the wheelie bin is decreasing. Nevertheless, they continue to focus on higher collection, more repairs, reuse and sales (other rungs on the R ladder) and responsible processing of discarded equipment, materials and raw materials. Every device counts.

To encourage collection from the municipality as well, they developed a benchmark for recycling centers in 2022 in which they map out how much e-waste is collected per municipality and how much CO2 they have saved as a result.

Moreover, in 2022 they laid the foundation for Wecycle for companies, an online platform that was officially launched in early 2023. As a company, club or foundation, it can be seen here where you can dispose of all kinds of electrical waste: from lamps and flat screens to solar panels and ICT equipment. You will also find indications on wecyclevoorbedrijven.nl whether you can expect compensation for your electrical waste. In this way we contribute to a responsible way of collecting and processing equipment from the business community.



wecyclevoorbedrijven.nl



Period January 1 – December 31, 2022

Collection channel	Service points (number)	Collection (ton)
Municipal	755	84,574
Retail	8,785	63,183
Social	1,011	62
Business-wise	5,121	10,830
Market parties	57	11,620
Grand total	15,729	170,268

The collect grades

Best practice 4: Ecolight Consortium. ITALY

Introduction

Ecolight is a qualified partner of companies, institutions, independent contractors and Organised Large-scale Distributions for the integrated management of a company's waste. This Italian company has launched new smart bins dedicated to the collection of small WEEE that meet the requirements of Italian Decree Uno contro Zero (Italian for "one against zero").

Ecolight has made environmental protection and compliance with the regulations its cornerstones: it operates with an authorised logistics network and certified facilities for waste treatment that guarantee high-level standards of recovery.



Key factors



The Ecolight Consortium in Italy has launched new smart bins designed for distribution and commercial spaces. RAEE EcoIsoles (Italian for “WEEE Eco-islands”) are smart bins dedicated to the collection of small WEEE that meet the requirements of Italian Decree Uno contro Zero (Italian for “one against zero”).

The small size of the container (1.5 x 1.2 x 1.5 metres) and its complete automation have made it an innovative tool for the collection of small electronic waste (e.g. mobile phones, small household appliances, light bulbs and energy saving lamps). The WEEE eco-islands are located in urban environments close to large shopping centres to easily reach the citizens.

The operation of the eco-islands involves the registration of the consumer (through the regional health card), the identification of the type of waste to be thrown away and the separate disposal according to the same type. At the end of the operations, the machine will issue a receipt confirming that the waste has been delivered. Through a monitoring system, when the internal containers are full, the machine alerts the technicians by text message to come and empty them. The waste delivered is then tracked from the point of delivery until treatment and recovery. To date, there are still 30 functioning WEEE eco-islands located in the regions of Emilia Romagna, Veneto, Lazio, Lombardia and Toscana.

Best practice 5: Helsinki Metropolitan Area Recycling Centre (Kierratyskeskus). FINLAND

Introduction

The Helsinki Metropolitan Area Recycling Centre (Kierratyskeskus) is a non-profit company founded in 1990 with the purpose of reducing resource consumption, increasing environmental awareness and creating opportunities for civic participation and employment.

Citizens, companies and institutions can hand in small EEE (including laptops and chargers) in any of Kierratyskeskus’ recycling centres. Kierratyskeskus also has a pick-up service for a small fee. Once or twice a year, the organisation plans a collection tour with 30 stops around the metropolitan area to make it easy for citizens to hand over their EEE.

Key factors

The EEE is transferred to a pre-sorting centre where resale potential is assessed. If it is economically reasonable, the EEE is repaired in one of the Centre’s four repair shops. Not all of the recycling centres have a repair shop, so EEE collected at centres without a repair shop are transferred to another centre for assessment. The repair shops differ in size. The Re-use Centre is planning on cutting the number of repair shops to two for better efficiency. The EEE that cannot be resold is sent to the SERTY EPR scheme for recycling.



Pick-up service and household company pick-up

Order an affordable pick-up service at a time that suits you online or by phone. Don't forget the convenient house company pick-up as well!

[Read more about the pickup service](#)



Donating in stores

You can bring intact, clean and reusable donations of goods to all Recycling Centres within the opening hours. You can also bring electrical equipment and bicycles with accessories in broken condition.

[Find your nearest store](#)



Collector cars

There are many types of collector cars; some are on duty in Töölö and Hagia, some are probably just around your corner of the house.

[Read more about collector cars](#)

The recycling center's donation points 1



Box donation points

The boxes can be used to donate extra household items in good condition.

[Find the nearest Box](#)



Sello donation point

You can find the recycling center's donation points at Sello's parking level, near the bottle return connection.

[Read more about Sello's donation points](#)



MyFetch service

With MyFetch, you can recycle clean and undamaged household items, clothes and textiles that are suitable as they are.

[Read more](#)

The recycling center's donation points 2

Best practice 6: Ö3-Wundertüte. AUSTRIA

Introduction

Ö3 Wundertüte (AT) is a yearly campaign implemented by the NGO Caritas and the Ö3 radio29 in 2005 to mail mobile phones to a charity for re-use or recycling. Paper bags are sent to households throughout Austria and consumers can send back used mobile phones with accessories free of charge at the post office.

The campaign achieves high collection (up to 31% of mobile phones put on the market in Austria) and re-use rates (60% of collected devices). The campaign is conducted through a partnership between a charity, a re-use organisation, a national radio and postal services.



Key factors

Around November every year, the Austrian system "Ö3-Wundertüte" sends red paper bags to households throughout Austria.

Used mobile phones can be placed with or without accessories in the Ö3-Wundertüte and handed in postage free of charge at the post office. The system cooperates with Austrian post, which is responsible for the logistics, the hit radio Ö319 which leads the communication and the social recycling business "magdas" which organises treatment.

The revenues from the sale of each donated mobile phone goes to the emergency aid fund "Licht ins Dunkel" and the emergency aid of Caritas.

Ö3-Wundertüte collects 400,000 – 500,000 mobile phones (including some chargers and other phone equipment) annually. This amount corresponds to 40 to 70 tonnes/per year. This shows a considerable potential for collection systems based on charity incentives.

Best practice 7: Jedonnemontelephone. FRANCE

Introduction

Jedonnemontelephone is a year-round mobile phone collection initiative implemented by the French PRO for WEEE.

Consumers can send their devices for free either by printing out a label to stick on an envelope or by ordering a prepaid envelope. Devices are received as products (EEE) and can therefore be assessed for re-use.



jedonnemontelephone.fr



Ecosystem, the NGO behind the project, said people could order a pre-paid envelope from its website jedonnemontelephone.fr (I give my phone) or simply print out a pre-paid address label.

Key factors

The phones are sent to a processing centre where all data is erased before the phone is either refurbished for sale at Emmaus charity shops, or in the majority of cases (83 percent) broken down for recycling and the removal of the most polluting components.

The project is an expansion of the nonprofit's main electronics recycling programmes that aim to keep appliances and other devices from incinerators or landfill sites.

Best practice 8: Aiven. FINLAND

Introduction

One not so well known startup that has become a unicorn in this last year is Aiven. This company offers a cloud data platform that provides fully managed open-source databases, streaming, and search applications, among other services. Founded in 2015, Aiven has become a key player in the tech industry by simplifying the process of setting up and managing cloud databases. This allows developers to focus on building applications rather than managing infrastructure.

Aiven's services are available on all major cloud platforms, including AWS, Google Cloud, and Azure. This wide availability, combined with their commitment to using open-source technologies, has made Aiven an attractive option for many organizations looking to innovate and scale their data-intensive applications.

As a tech company, Aiven also directly contributes to Waste Electrical and Electronic Equipment (WEEE) management. The way they contribute to this matter is by promoting the importance to treat electrical and electronic devices in a special way when they reach its end of life, increasing this way the awareness of their clients. One of the activities that Aiven carry out to promote this, is through awareness campaigns for their customers and the wider public about the importance of proper e-waste management.



Moreover, by providing cloud-based services, Aiven helps reduce the demand for physical hardware, which in turn can lead to a reduction in electronic waste. Cloud-based services allow for better utilization of hardware resources, which can reduce the need for new devices and prolong the lifespan of existing ones.

Key factors

Aiven offers data infrastructure elements as a service. They don't sell licenses, and they don't own servers - they manage people's data infrastructure for them.

Data infrastructure refers to all the pieces in a company's IT system dealing with data. It can include:

- Databases for storing information
- Data brokers for passing data to and from other systems
- Visualization solutions
- Analysis solutions
- Monitoring and metrics solutions
- Search engines
- Cache
- Connectors for integrating into other systems

By using open-source software (OSS), they and their customers make sure that they never get locked up in a vendor relationship.

Open source has many other benefits, too. The development happens out in the open, which means the bar of access is low, and the tools themselves are available for anyone who needs them.

The developer base is huge and global, and there are always many eyes on any piece of code. As a result, security and reliability is better in the open-source world than for proprietary software.



12.2. Policy samples for recycling, up-cycling, repairing and second life

Best practice 1: Refurb. DENMARK

Introduction

Refurb is a Danish company that acquires used functional IT (including laptops and tablets) from large companies (more than 200 employees) and public institutions. Refurb refurbishes, upgrades and cleans the EEE as required, and sells it again on the same terms of guarantee as new products.

Refurb's collection methods differ depending on the quality and condition of the used EEE or the need of the company/institution. In some cases, the company/institution has a permanent container where the used EEE can be placed. In other cases, the used EEE is packed in boxes.



Some companies/institutions transport their used EEE to Refurb and in other cases Refurb packs the used EEE at the company/institution. Refurb also sends cages out to companies in order to transport their IT in. Defective EEE is always collected in cages. When the used EEE arrives at Refurb the first step is to delete data from all data-bearing devices. Then they then assess the need for repairs. If it is profitable, they repair the device - if not, they take out useful spare parts and shred the rest.

Refurb has their own shredder, and materials from the shredder are sorted into 17 different fractions. The metal is then sold to a recycling company for recovery. If some products are still functional but not new enough to have any market value in Denmark, they are sold in other countries. Approximately 80% of the used laptops are sold in Denmark and 20% are sold to foreign markets.

Key factors

A Refurb product has gone through a series of specialized and certified processes before it lands in the hands of a new owner.

The processes involve thorough inspection, certified data erasure, testing and upgrading software to ensure the highest quality.

- 1) Certified data erasure. Data erasure requires professional skills. All previous data is deleted according to strict international standards and only with proven algorithms and recognized deletion software. You will experience the first start-up of your Refurb product exactly like a new purchase. Without it being one.
- 2) Test and grading. A Refurb product has been thoroughly tested by experts. All products are refurbished, upgraded, and installed with the latest software to work exactly like new products. The condition of the product is assessed and thoroughly cleaned inside and out.



- 3) Quality. The Refurb product is a quality product whose lifespan can and must be extended. It must meet strict quality requirements. This means that the Refurb product, with proper maintenance, has an expected lifespan of at least 2-4 more years with you as the new owner.
- 4) Warranty. Even if a Refurb product has been used before, the warranty is renewed after going through the refurbishment process. It's guaranteed with a 2-year warranty.
- 5) Result. A Refurb purchase is a better alternative to a new purchase. It is saved money on quality products that are also better for the environment.

A Refurb product uses an average of 300 kg less CO₂, 1.5 tonnes less water and 21 kg less chemicals compared to new models.

Best practice 2: RefugeePhones. SWEDEN

Introduction

Refugee Phones is an initiative that encourages people and organisations to donate their old smartphones to refugees and migrants.

It has delivered more than 6,000 smartphones since its launch in Sweden a year ago - and is in the middle of a big push ahead of the planned demolition of the "Jungle" refugee camp in Calais.

RefugeePhones distributed thousands of pre-paid cards and mobile phones to refugees between 2015 and 2017. Their business was based on donations from mobile phone manufacturers and private individuals and on extensive collaboration with telecom operators. Sony Mobile, for example, has directly donated handsets to the initiative in Sweden, while telecoms companies Telia and 3 have both donated SIM cards.

Coordinated from the UK, another group, Phone Credit for Refugees, enables individual donors to pay directly for credit for refugees who need it.



Key factors

After checking the functionality of devices, data contained on the phones was deleted and the donated phones were reconfigured. The charity had an order system online, where refugees could fill out an application form. Only high-quality



phones were donated for re-use; lesser-quality phones were sold to an EPR scheme for recycling.

Best practice 3: Apple. EEUU

Introduction

Apple is running a trade-in system for their devices (iPhone, iPad, Apple Watch, Mac, accessories, non-brand devices etc.). Apple offers product take-back and allows customers to hand in used devices online or in Apple stores.

Key factors

To ensure data privacy, the latest owner must delete the data on the device before trade-in. To estimate the remaining value of a device, the customers must answer a set of questions online, whereas the devices handed in in Apple stores are evaluated by retail specialists.

Depending on the condition and the model type, a monetary value is calculated and paid out to the customer as a gift card or amount towards the purchase of a new device. Apple's trade-in process is part of the buy-flow process, but customers can also simply return an old device without a new purchase. Devices with a remaining value are transferred to re-use/refurbishment activities whereas those without value are sent to recycling.

Apple has partnerships with trade-in vendors which organise the refurbishment and reselling process through existing channels. In select countries, iPhones directed to recycling can be dismantled by Apple's robot "Daisy". The materials obtained may be sold to specialised recycling companies.

All devices are tracked until the end of the recovery process. In 2019, 11.1 million devices were taken-back by Apple in the USA, with the number of devices sent to re-use/refurbishment greatly exceeding the number of devices directed to recycling. In 2018, for example, more than 7.8 million Apple devices got refurbished.

Good for the planet.

If your device is in good shape,
we'll help get it to a new owner.
Or, if it's seen better days, we
can recycle it for free.

[Recycle your device](#)

[More ways to recycle](#)



Doing more, using less. We're
using more recycled content in
our products than ever before.
And we're recovering crucial
materials from end-of-life
devices to use again in new
ones.

[Learn more](#)



For a better future. Our plan is
to have a net zero carbon
impact by 2030. We're
investing in low-carbon design,
energy efficiency, renewable
power, and more.

[See just how far we go >](#)



Best practice 4: Fairphone. NETHERLANDS

Introduction

Fairphone is a social enterprise that develops and produces smartphones (so called Fairphones) in a way that contributes to a fairer production and a more transparent supply chain. Thanks to the modular design of their phones, Fairphone's aim is to allow easy exchange and repair of phone parts to increase the lifetime of the whole device. Several materials in different parts of the phone originate from recycled sources.

FAIRPHONE

Since 2017, Fairphone takes back all types of smartphones (not only Fairphones) in France and Germany. In 2020, Fairphone collected around 17,000 phones from the European market which represents 18% of Fairphone's sales. Phones and batteries from African countries were also shipped back to Europe through a recycling initiative Fairphone supports.

Apart from increasing the collection awareness in the field relative to WEEE management, another technique with an equally impacting result is the second-life solution. This technique consists of recycle and reuse electrical and electronic waste through reconditioning.

Key factors

In March 2021, Fairphone launched a new Recycling Service to increase its collection rate. With this new service, customers sending in an old phone are offered a discount on a new Fairphone or a direct cash back.

Phones without remaining value are not refunded but can be sent in free of charge for recycling purposes. Customers can download a shipment label from the Fairphone website for free.

All phones are directly sent to Fairphone's French repair and recycling partner. The partner checks if any of the phones is black-listed (e.g. was stolen) and assigns a value to every phone. The value of the phone is calculated on the basis of its actual price on the second-hand market.

Customers receive their refund as soon as the phone has been reviewed. Phones in good condition are refurbished and resold on the (online) second-hand market whereas others are directed to a recycling company. In 2020, 40% of all phones collected could be re-used and 60% were recycled. Spare parts are also sourced from phones and are used internally by the repair and recycling partner.

Since 2020, Fairphone also offers a service to trade-in single parts (e.g. when a consumer upgrades a Fairphone 3 to a Fairphone 3+ with new parts). The parts are also repaired or recycled. Fairphone's overall goal is to implement a collection and re-use/recycling system that is scalable. Fairphone would like other (phone) companies to take over their concept and to take-back all types of phones



irrespectively of their market value. Fairphone is also thinking about taking back other small EEE (e.g. tablets). The company aims to offer its Recycling Service in all European countries.

Best practice 5: Back Market. FRANCE

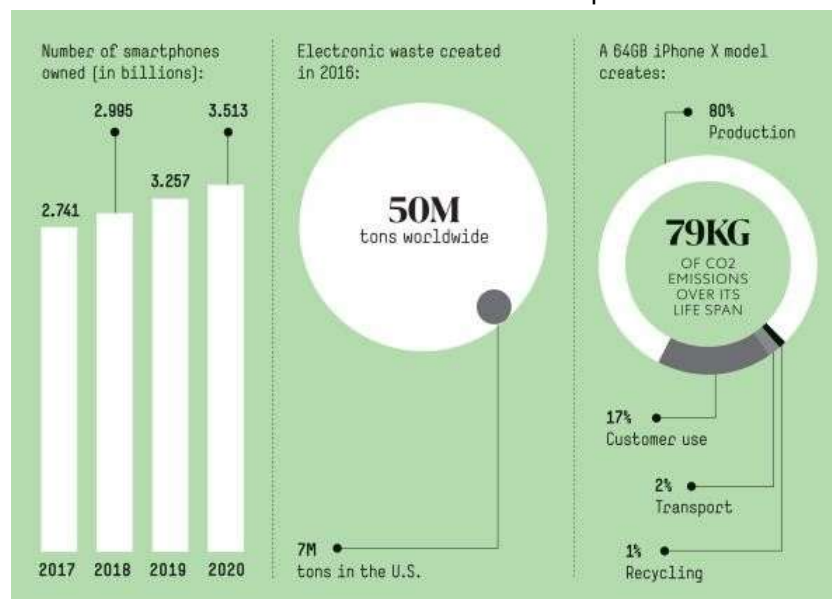
Introduction

This startup was founded on August 2014, and is an online marketplace that sells refurbished electronic devices.

Back Market has become world changing example due to its innovative approach to the electronics market, providing consumers with an alternative to buying new devices, which can be expensive.

Key factors

By offering refurbished devices, Back Market allows consumers to purchase high-quality electronics at a lower cost. This approach not only benefits consumers but also helps to reduce electronic waste and the demand for new devices, contributing to environmental sustainability. This approach aligns with the principles of the WEEE directive, which encourages the proper disposal of electronic waste and the reduction of wasteful consumption of natural resources.



By offering refurbished devices, this unicorn company extends the life cycle of electronic products, thereby reducing the amount of electronic waste that ends up in landfills. This not only helps to conserve natural resources but also reduces the demand for new devices, which in turn decreases the amount of waste generated.

Furthermore, Back Market's rigorous vetting process for sellers ensures that all refurbished devices sold on their platform have been properly restored and tested. This guarantees that these devices are of high quality and can continue to be used for a long time, further contributing to the reduction of electronic waste.

In addition to the practices mentioned above, one of the most significant ways Back Market contributes to WEEE management is through increasing awareness



among its clients. By educating consumers about the benefits of buying refurbished devices, Back Market not only promotes its own business but also raises awareness about the importance of reducing electronic waste.

Through their platform, they inform customers about the environmental impact of electronic waste and how purchasing refurbished devices can help mitigate this. They also provide information on how refurbished devices are a cost-effective and environmentally friendly alternative to buying new.

Back Market has also an extensive guide on how people can properly dispose of their electronic devices once they've reached the end of their life cycle, further promoting responsible e-waste management.

This educational approach empowers consumers to make informed decisions that benefit both their wallets and the environment.



In essence, Back Market is not just selling refurbished electronics; they're also selling the idea of a more sustainable and responsible way of consuming electronics. This approach has a ripple effect, as every informed customer can influence others, leading to a broader societal shift towards more sustainable consumption habits.

Best practice 6: Revolut. ENGLAND

Introduction

This corporation is a British financial technology company that was founded on July 1, 2015, and offers a range of digital banking services.

The services provided by Revolut include easy money management, all in one app. Revolut has become important due to its innovative approach to banking, and thanks to that it has grown significantly until becoming the most profitable unicorn in Europe this last year.

As of 2023, Revolut has attracted more than 18 million customers worldwide. It has been referred to as a "tech superstar" and is considered one of the fastest-growing digital banks with the widest range of features.



Revolut

But Revolut is not only a profitable startup but has also developed a program where it invests part of the budget in WEEE management through promoting the reuse of electronic and electrical devices.

The way that this is promoted is possible thanks to the donations and refurbishment of any redundant electronic equipment when it reaches its end-of-life, and if it cannot be refurbished or reused, Revolut rely on the services of a trusted global partner to recycle e-waste and ensure none of it is directed to landfill.

Key factors

Revolut has taken a number of steps to reduce our carbon footprint:

- Clear waste management procedures allowing for sorting and recycling of general waste across locations.
- Strict e-waste management (meaning discarded electrical and electronic technologies)
- They've introduced a sustainable business travel policy to reduce and compensate emissions linked to such travel.
- Energy used at our London and Vilnius offices is from 100% renewable sources. They expect our policy to expand to other areas as they grow.
- They closed one floor of their London head office to reduce energy consumption.
- All United Kingdom employees also have access to the Cycle to Work scheme to encourage the use of environmentally friendly transport.

Best practice 7: Bolt. ESTONIA

Introduction

Another recent unicorn that has contributed greatly to the cause of WEEE management is Bolt. This Estonian mobility company was founded in August 2013 and offers a variety of services including ride-hailing, micro mobility rental, food, and grocery delivery, and car-sharing.

Bolt operates in over 500 cities in more than 45 countries in Europe, Africa, Western Asia, and Latin America. The company has more than 150 million customers and more than 3 million driver and courier partners.

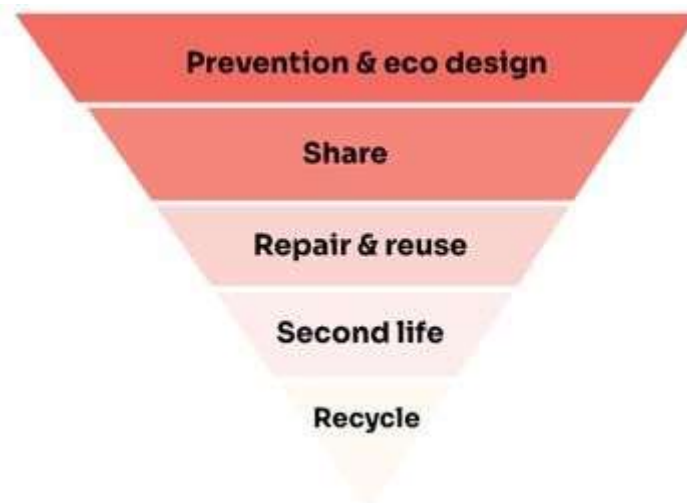


Bolt has become important due to its innovative approach to mobility. It is the first European mobility super-app offering better alternatives for every purpose a private car. This has made it a top choice for those who prefer to access most services through their smartphones.

Furthermore, this enterprise is also committed to sustainability and compensates for the CO₂ emissions its transport and delivery solutions create, minimizing its impact on the local environment. Bolt is one of the few mobility companies that offsets the carbon emissions of all its rides globally. They do this by investing in projects that reduce the amount of carbon dioxide in the atmosphere, making all Bolt rides 100% carbon-neutral.

Key factors

One of the projects where a certain percentage of the budget goes is to Bolt's e-scooters. This program consists in recycling the electric scooters that are at the end of the life cycle thus managing to reduce waste from hardware, thereby embedding circular economy principles across the scooter operations. That is the main reason why they're using, reusing, maintaining, and repairing resources wherever possible to reduce waste and the need for new raw materials through a robust recycling system.

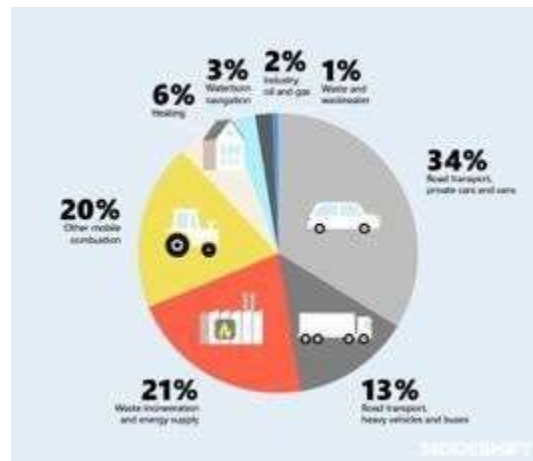


Bolt has also embedded circular economy principles across the entire lifecycle of their products and services. Wherever possible, they use, reuse, maintain, and repair resources to reduce waste and the need for new raw materials.

Thanks to these policies, this startup has managed to achieve 92% reuse of electronic and electrical components in its fleet of electric scooters. The other 8% consists of the batteries of these electric vehicles, which are recycled safely through robust partnerships with local providers.



Bolt is also doing its part to help the city of Oslo reach its sustainability goals being an active member of Næring for KIima, a climate collaboration between Oslo municipality and businesses. One of these goals is to reduce greenhouse gas emissions in the city by 95% by 2030. To enable responsible waste management, Bolt partnered with the company RENAS, which has a network of its partners to handle various aspects of the process. Battkomp (formerly known as Yedlik) inspects and repairs scooter batteries within this network. And Norsk Gjenvinning recycles many remaining scooters waste materials, including wood, metals, plastics, rubber, and others.



Best practice 8: Voi. SWEDEN

This mobility company was founded in 2018 and offers electric scooter sharing service. The company operates in several cities across Europe, providing an eco-friendly transportation alternative to traditional vehicles. Users can rent Voi's electric scooters through a mobile app, making it a convenient option for short distance travel.

Voi has become important due to its innovative approach to urban mobility.



It provides a solution to the "last mile" problem in transportation, which refers to the challenge of traveling the final stretch from a transportation hub to a final destination. By offering a convenient and eco-friendly transportation option, Voi helps to reduce traffic congestion and carbon emissions in cities, gaining great popularity among those people who want to contribute to reducing pollution.



Key factors

Voi, as a provider of electric scooters, falls under the category of producers of electrical and electronic equipment. As such, it has responsibilities under the Waste Electrical and Electronic Equipment (WEEE) regulations. These responsibilities include ensuring the correct disposal and treatment of their products when consumers dispose of them.

Voi contributes to this matter in several ways. Firstly, they have built a hierarchy of waste to consider its importance at every stage of our supply chain. From predicting potential for waste during the design stage, to managing waste in the warehouses as well at the point of disposal. There are four main steps that are taken at Voi to ensure best-in-class recycling processes:

- Optimise the use of recycled and recyclable materials in the vehicles.
- Repair and reuse spare parts.
- Implement industry-leading recycling processes.
- Establish zero-waste warehouses in all markets.

However, for the fraction of materials that cannot be reused, Voi strives to divert all waste from landfill and recycle and recirculate all materials elsewhere, by collaborating with local recycling experts.

Voi has also developed an eco e-scooter with a design where 91% of the materials that are used to build it can be recycled. With this, Voi has managed to carry out a circular approach where each scooter in their fleet can be used to build another one when it reaches the end of life.



Furthermore, in addition to all the supply chain recycling and circularity practices, Voi is also focusing on the eradication of all electronic and electrical waste at warehouses, and they aim to have zero-waste warehouses by 2024.



13. INDICATORS BENCHMARKING AND CONVERGING MEDITERRANEAN POLICY

13.1. KPIs to be achieved

According to the aim of the eWAsTER project it is important to set the KPIs, measuring success of the project and impact on the market and its regulation. Among the KPIs possible to watch can be:

1. Increased WEEE collection rates measured as a percentage increase in the amount of e-waste collected within participating regions over a set period.
2. Enhanced WEEE reuse and refurbishment rates by measuring the percentage of collected e-waste that is successfully reused or refurbished instead of being directly recycled.
3. Improved WEEE recycling efficiency through monitoring the percentage of collected e-waste that undergoes proper and efficient recycling processes, minimizing waste and maximizing resource recovery.
4. Policy alignment with the EU Circular Economy Action Plan using qualitative assessment of how well the policies developed or refined through the project align with the principles and goals outlined in the Action Plan.
5. Knowledge sharing and collaboration among participating regions measured by tracking the number of knowledge exchange events, best practice documents shared, or collaborative policy development initiatives undertaken by the regions.
6. Public awareness and participation, bringing the changes in public awareness of ewaste issues, monitor participation in e-waste collection programs, or engagement in initiatives promoting responsible e-waste management.

Measuring the Key Performance Indicators (KPIs) within the eWAsTER project will require a clearly defined methodology for data collection and analysis. Below is the proposed methodology for measuring each KPI.

In detail, within work package 2 of the project, ORZ will be in charge of carrying out the pilot called WEEE REUSE, which promotes the creation of new business models for reuse of plastic and e-waste, with a focus on creating jobs for vulnerable individuals.

The KPIs that have been agreed upon to reach the objective are the following:

Job Creation & Impact on Vulnerable Individuals:

- Number of Jobs Created: Track the total number of jobs created within the pilot program related to plastic and e-waste reuse. Target: Create X number of jobs.



- **Number of Vulnerable Individuals Employed:** Specifically track the number of jobs filled by individuals from vulnerable groups (e.g., long-term unemployed, people with disabilities, refugees, etc.). Target: Y% of jobs created are filled by vulnerable individuals.
- **Job Retention Rate:** Measure how long vulnerable individuals retain their employment within the program. Target: Achieve a job retention rate of Z% after a certain period (e.g., 6 months, 1 year).
- **Income Generated by Vulnerable Individuals:** Track the average income earned by vulnerable individuals employed in the program. Target: Ensure income meets or exceeds a living wage standard.
- **Skills Development & Training:** Measure the number of vulnerable individuals who receive training and develop new skills related to plastic and e-waste reuse, recycling, and business operations. Target: Provide training to X% of participating vulnerable individuals.
- **Improved Quality of Life (Qualitative):** Gather qualitative data (e.g., through surveys, interviews) to assess the impact of employment on the quality of life of vulnerable individuals (e.g., improved financial stability, social inclusion, self-esteem). Target: Demonstrate positive impact on quality of life through qualitative data.

Business Model Viability & Impact:

- **Number of Businesses Created:** Track the number of new businesses established as part of the pilot program focused on plastic and e-waste reuse. Target: Create A number of viable businesses.
- **Revenue Generated by Businesses:** Measure the total revenue generated by the businesses involved in the pilot. Target: Achieve a total revenue of \$B.
- **Profitability of Businesses:** Track the profitability of the participating businesses. Target: Achieve a profit margin of C% for participating businesses.
- **Volume of Plastic and E-waste Reused:** Measure the amount (in weight or units) of plastic and e-waste collected, processed, and reused through the program. Target: Reuse D tons/kg of plastic and E tons/kg of e-waste.
- **Types of Products/Services Developed:** Track the variety and innovativeness of products and services created using reused plastic and e-waste. Target: Develop F number of new and innovative products/services.
- **Market Demand for Reused Products/Services:** Assess the market demand for products and services made from recycled plastic and e-waste. Target: Achieve G% market penetration for recycled products.
- **Cost-Effectiveness of Reuse Processes:** Analyze the cost of collecting, processing, and reusing plastic and e-waste compared to traditional waste management methods. Target: Demonstrate cost-effectiveness of reuse processes.

Environmental Impact:

- **Reduction in Landfill Waste:** Estimate the amount of plastic and e-waste diverted from landfills due to the program. Target: Divert H tons/kg of waste from landfills.



- Reduction in Greenhouse Gas Emissions: Estimate the reduction in greenhouse gas emissions due to recycling and reuse activities. Target: Achieve I tons/kg of CO2 equivalent emission reduction.
- Resource Conservation: Quantify the amount of virgin materials conserved due to the reuse of plastic and e-waste. Target: Conserve J units of virgin materials.

13.2. Proposals of improvements at local and regional level

Building upon the eWAsTER project's foundation, here are some potential proposals for improvements at local and regional levels to further enhance e-waste management.

Local level

- ✓ Public awareness campaigns by organizing educational workshops, community events, and targeted social media campaigns to raise awareness about responsible e-waste disposal and the availability of local collection points.
- ✓ Incentivize e-waste reuse and refurbishment through partnership with local repair shops to offer discounts or vouchers for e-waste repairs and refurbishments, thereby extending the lifespan of devices.
- ✓ Organize community collection events, hosting regular e-waste collection drives in convenient locations, making it easier for residents to responsibly dispose of their unwanted electronics.
- ✓ Implement convenient e-waste drop-off points by establishing easily accessible and clearly marked drop-off locations, such as supermarkets, recycling centres, or public buildings, to encourage regular e-waste disposal.
- ✓ Partner with local schools and businesses to establish dedicated e-waste collection points and educational programs for staff and students on responsible e-waste management.

Regional level

- ✓ Develop regional comprehensive e-waste management plans that outline specific targets, strategies, and resource allocation for improving e-waste collection, reuse, and recycling across the region.
- ✓ Invest in e-waste processing infrastructure by supporting the development or upgrade of regional e-waste processing facilities to ensure efficient and responsible recycling, minimizing environmental impact.
- ✓ Standardize e-waste collection and recycling practices, establish consistent regional guidelines for e-waste collection, sorting, and recycling processes, ensuring efficient and high-quality recycling throughout the region.
- ✓ Foster collaboration among municipalities and stakeholders, encourage collaboration between local municipalities, waste management companies, and other stakeholders to share best practices, resources, and expertise for efficient e-waste management.



- ✓ Advocate for extended producer responsibility (EPR) schemes by lobbying national or regional governments to implement or strengthen EPR policies, holding producers financially responsible for the collection and recycling of their products at end-of-life.



14. WP3 eWAsTER SOLUTIONS ENDORSEMENT AND TRANSFER FRAMEWORK

14.1. Purpose of the WP3 Consolidation

WP3 consolidation in Slovenia is crucial for embedding tested WEEE prevention and reuse solutions into existing policy and governance frameworks. It builds on WP1 analysis and WP2 pilot testing, marking the transition from theoretical planning to validated, real-world solutions.

Pilot action confirmed the feasibility of reuse-oriented collection, the high reuse potential of small appliances, and the importance of targeted awareness and cooperation among actors.

WP3 aligns local stakeholders—including municipalities, social economy organizations, and PROs—around a shared, evidence-based approach, strengthens coordination, clarifies operational barriers, and refines priorities without creating parallel systems. At this stage, endorsement—not implementation—is pursued, securing institutional support, legitimizing tested solutions, and preparing the ground for future scalable adoption through policy instruments, funding, and long-term sustainable impact.

14.2. Evidence from WP2 Pilot Solutions

The WEEE Reuse pilot focused on the collection, testing, repair, and reuse of small appliances and small IT equipment, chosen for their high presence in households and relative ease of repair and refurbishment. The approach combined environmental objectives with social impact by engaging social economy actors, including reuse centers and repair initiatives, to manage collection, refurbishment, and redistribution of functional items. Awareness campaigns were closely linked to collection activities, encouraging citizens to hand in devices rather than discard or hoard them, which increased participation and strengthened the social visibility of reuse practices.

The pilot confirmed a high reuse potential for small household and IT equipment, demonstrating that these items can be efficiently repaired and reintroduced into circulation while delivering measurable environmental benefits through reduced waste and extended product lifetimes. Collaboration with social economy actors proved particularly effective, generating social outcomes such as employment opportunities, skill development, and local engagement. Structured coordination among municipalities, PROs, and social enterprises enabled credible and efficient reuse operations without duplicating existing waste management systems.

Despite these successes, some limitations were observed: large appliances, such



as refrigerators and air conditioners, were rarely donated due to long lifespans, logistical challenges, and consumer preferences to sell or discard them at end-of-life; administrative and reporting requirements for reuse actors remain complex and only partially aligned with EPR and WEEE frameworks, limiting scalability; and access to WEEE streams before shredding or recycling was constrained, reducing the volume of items suitable for reuse.

Lessons learned indicate that reuse must be formally recognized as complementary to recycling, particularly for small equipment, and that early sorting, traceability, and clear quality standards are essential for safe and credible reuse pathways. Policymakers should note that collection-weight-based targets underestimate the environmental value of reuse, as it extends product lifetimes and reduces resource consumption.

For replication and scaling, conditions include formal integration of reuse actors into EPR schemes, simplified authorization and reporting procedures, and stable cooperation frameworks among municipalities, PROs, and social economy organizations, supported by targeted incentives and awareness campaigns. These measures create a foundation for embedding reuse solutions into long-term policy frameworks, ensuring environmental, social, and economic benefits are realized at scale while maintaining operational efficiency, regulatory compliance, and public trust.

14.3. Selection of Solutions for Endorsement

WEEE Reuse (preparation for reuse of small appliances and small IT equipment) is selected because it strongly supports circular economy objectives by prioritizing waste prevention and extending product lifetimes, addressing the growing gap between electrical and electronic equipment placed on the market and achievable collection targets for Waste Electrical and Electronic Equipment.

Politically, it aligns with EU and national policies that promote circular economy and resource efficiency while offering a socially acceptable complement to recycling-focused measures. Institutionally, the solution can be integrated into existing governance structures such as Extended Producer Responsibility schemes, municipal waste management systems, and coordination bodies, without requiring the creation of new institutions, while also involving social economy actors consistent with Slovenia's inclusive and sustainable development goals.

Strategically, pilot results show strong reuse potential for small equipment and demonstrate measurable environmental and social benefits, supporting policy coherence and enabling future scaling once supportive frameworks and incentives are further developed.

The WEEE Procure solution is possible for endorsement in Slovenia by public authorities responsible for procurement and environmental policy—such as municipalities, regional governments, and national ministries promoting green public procurement and circular economy initiatives—while WEEE Behave is not endorsed because it significantly overlaps with similar awareness and behavioral

solutions (WEEE Lives and WEEE Aware) already developed within another project



that the ORZ consortium plans to endorse after this project ends, which would create duplication of initiatives.

14.4. Conditions for Future Adoption

Preparation for reuse of small appliances and IT equipment should be formally recognized as a complementary and measurable component of WEEE management alongside recycling. Clear allocation of responsibilities among municipalities, PROs, and reuse organizations is essential to ensure access to WEEE streams prior to treatment and compliance with traceability and quality standards, guaranteeing safe and credible reuse practices. Political endorsement at the competent authority level is required to confirm reuse as a legitimate policy option fully aligned with circular economy and waste prevention objectives.

At the national level, endorsement supports regulatory alignment and integration into Extended Producer Responsibility (EPR) schemes and reporting frameworks, providing the formal basis for reuse within existing governance structures. At the local and regional levels, operational uptake is facilitated through coordination with municipal collection systems, engagement with social economy actors, and citizen participation. Policy and planning instruments such as National Waste Management and Waste Prevention Programs provide the strategic framework, while EPR instruments and coordination bodies formally include reuse actors and define cooperation mechanisms. Local and regional action plans, circular economy strategies, and awareness campaigns serve as practical tools to implement reuse activities on the ground. This endorsement does not imply immediate implementation, mandatory targets, or financial obligations and applies exclusively to tested small appliances and IT equipment; large appliances or mandatory scaling beyond validated categories are not included at this stage.

14.5. Stakeholder Alignment and Governance Pathway

WP3 engaged a wide range of stakeholders, including local and regional authorities responsible for municipal waste management, EPR actors and PROs, social economy and preparation-for-reuse organizations such as reuse and repair initiatives, and environmental and policy experts involved in WEEE management and circular economy planning.

A high level of conceptual alignment was observed on the importance of complementing recycling with reuse, particularly for small appliances and IT equipment, and on the limitations of collection-weight-based targets alone. Broad consensus supports formal endorsement as the first step, while full implementation will follow once institutional and regulatory conditions are clarified.

Critical concerns raised by stakeholders include PROs' traceability and reporting requirements and potential cost impacts, municipal capacity and coordination challenges, and the need for clear quality standards and legal certainty for reuse



actors to avoid informal or non-compliant practices. The envisaged governance pathway positions national authorities to provide formal endorsement, while local and regional actors operationalize reuse activities within existing coordination and policy frameworks, ensuring both environmental and social benefits are realized.

14.6. Endorsement Statement

Through this Local Action Plan, the Environmental Research Institute (ORZ) acknowledges the relevance of the WEEE Reuse solution (preparation for reuse of small appliances and small IT equipment) and expresses its commitment to consider its future adoption and promotion, in line with institutional competences and applicable policy frameworks, in order to support the reduction and improved management of Waste Electrical and Electronic Equipment and advance circular economy practices.

15. CONCLUSIONS

To sum up, the project has proven to be a pivotal initiative in addressing the growing challenge of electronic waste (e-waste) across Europe. By fostering collaboration and facilitating the exchange of knowledge among participating regions, it has successfully bridged the gap between existing local and regional policies and the ambitious targets set by the EU's Circular Economy Action Plan. This achievement was made possible through a comprehensive strategy that tackled the e-waste challenge from a lifecycle perspective.

The project emphasized increasing collection rates, promoting the reuse and refurbishment of e-waste whenever possible, and ensuring responsible and efficient recycling practices. This holistic approach empowered individual regions to craft and implement policies tailored to their unique circumstances while creating an environment conducive to knowledge sharing and the dissemination of best practices. Such collaboration has the potential to extend its impact, influencing e-waste management practices beyond the original eight regions and benefiting the broader European Union.

Moreover, the project's influence goes beyond its initial objectives. It has provided a practical framework for advancing e-waste management at the local and regional levels. By adopting targeted improvements—such as public awareness campaigns, incentivized reuse and refurbishment programs, accessible e-waste collection points, and detailed regional management plans—authorities can significantly enhance e-waste practices and contribute to a more circular economy. Additionally, advocating for extended producer responsibility (EPR) schemes can further encourage sustainable e-waste management by making producers financially responsible for the collection and recycling of their end-of-life products. These measures collectively pave the way for a more sustainable future for e-waste management across Europe.

To build on these achievements, partners will develop a Methodology for designing Strategies/AP for Mediterranean e-waste prevention and management, implementing it in eight Action Plans, which will test three innovative pilot actions:



- WEEE REUSE: Fostering social enterprises and community initiatives to manage WEEE and create employment opportunities.
- WEEE PROCURE: Promoting a new eco-innovative business models based on the eco-renting of EEE, in cooperation between the demand side and the offer side, which allows the creation of a new eco-business
- WEEE BEHAVE: Increasing public awareness and engagement in e-waste management practices.



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