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LOCAL ACTION PLAN. MUNICIPALITY OF RETHYMNO GREECE

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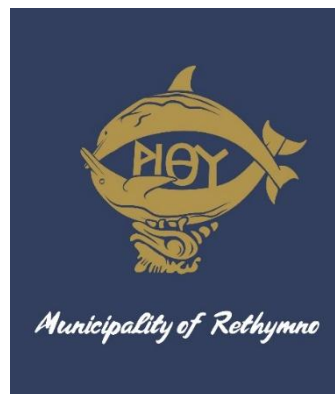
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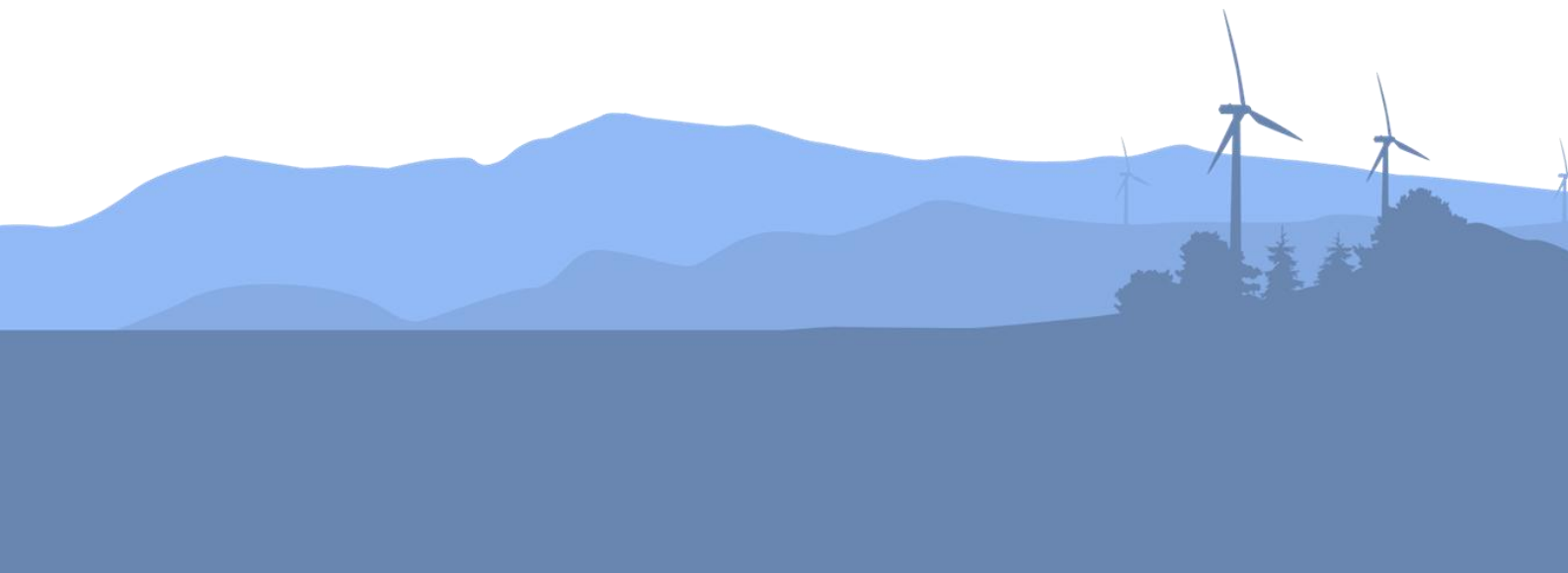


LOCAL ACTION PLAN. MUNICIPALITY OF RETHYMNO. GREECE



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Contents

1.	EXECUTIVE SUMMARY	4
2.	ABBREVIATIONS	5
3.	PURPOSE AND METHODOLOGY	6
4.	INTRODUCTION TO THE TOPIC	7
4.1.	Introduction to the WEEE challenge	7
4.2.	eWAsTER project	9
4.3.	Introduction to main WEEE Waste key concept.....	9
5.	BACKGROUND TO THE LOCAL ACTION PLAN	13
5.1.	Introduction to Local Action Plan	13
5.2.	Methodology to be implemented in eWAsTER	13
6.	WEEE CONCEPTUAL FRAMEWORK	15
6.1.	E-WASTE / WEEE CLASSIFICATION	15
6.2.	EU classifications	15
6.3.	Other classification system outside the EU.....	22
6.4.	HS 2022 codes	29
6.5.	Correlations between the classifications	29
6.6.	WEEE classification and reporting categories in Greece	30
7.	ACTORS INVOLVED IN THE SYSTEM.....	33
7.1.	Producers and producer responsibility organizations (PRO)	33
7.2.	Extended Producer Responsibility (EPR).....	35
7.3.	Retailers, dealers, recyclers, etc.	37
7.4.	National competent authorities and Enforcement bodies	39
7.5.	Coordination body.....	40
7.6.	Local authorities.....	41
7.7.	Other collection channels (e.g.B2B collection points, installers, demolition companies, social economy, etc).....	42
7.8.	Preparing for reuse organizations.....	42



7.9. WEEE treatment companies	43
7.10. Citizens/Business/Public sector-WEEE generators	43
8. STANDARD MONITORING SYSTEMS	44
8.1. POM	44
8.2. Life time	46
8.3. System of Environmental-Economic Accounting (SEEA).....	46
8.4. Framework for the Development of Environment Statistics (FDES).	47
8.5. Stock (S).....	47
8.6. Formal collection of e-waste (Wformal)	48
9. THE AREA UNDER ANALYSIS	51
9.1. WEEE Context in the area under analysis.....	51
9.2. Situation of the WEEE Policy	52
9.2.1. Legal Framework in Greece.....	52
9.2.2. Waste management plan(s)	53
9.2.3. Rates and Figures related to the country and region	54
9.2.4. National and Regional status: Improvements and challenges	60
9.2.5. Collection network in Greece	63
9.3. Actors involved in the WEEE policy in Greece	63
9.3.1. Main actors in the policy	63
10. THE EEE/WEEE ECONOMIC CONTEXT.....	70
10.1. The WEEE industrial and environmental impact	71
10.2. The WEEE industrial and environmental impact on the policy area	73
10.3. EEE/WEEE Education, skills and capacity building.....	74
10.3.1. National and Regional	74
11. STRATEGIC AND POLICY CONTEXT.	76
11.1. EU POLICY	76
11.2. National, Regional and local policy	79
11.3. Implementation level of policies.....	96



11.3.1. Collection rates (EU).....	96
11.3.2. Problems, barriers, achievements (EU)	98
12. POLICY BEST SAMPLES ON WEEE MANAGEMENT.	103
12.1. Policy samples for increasing collection.....	103
12.2. Policy samples for recycling, up-cycling, repairing and second life	114
13. INDICATORS BENCHMARKING AND CONVERGING MEDITERRANEAN POLICY	125
13.1. KPIs to be achieved.....	125
13.2. Proposals of improvements at local and regional level	126
14. WP3 eWAsTER Solutions Endorsement and Transfer Framework	128
14.1. Purpose of the WP3 Consolidation.....	128
14.2. Evidence from WP2 Pilot Solutions	128
14.3. Selection of Solutions for Endorsement	129
14.4. Conditions for Future Adoption	129
14.5. Stakeholder Alignment and Governance Pathway	130
14.6. Endorsement Statement	130
15. CONCLUSIONS	131
16. REFERENCES	132
17. ANNEXES	134
17.1. Educational community report of the final stakeholder meeting.	134
17.2. Producers report of the final stakeholders meeting.	134



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 legal compliance, eWAsTER fosters cooperation between participating regions by encouraging the exchange of best practices and collective learning. Through knowledge sharing, joint policy development, and tailored regional solutions, the project strengthens local capacities while ensuring broad geographical impact. This collaborative approach accelerates progress toward circular e-waste management throughout the EU.

By engaging partners like Municipality of Rethymno, which actively supports WEEE management in the city, eWAsTER not only addresses policy gaps and promotes best practices but also takes tangible steps toward achieving circular economy goals. In Greece, the project's implementation—guided by key stakeholders such as Municipality of Rethymno—will be instrumental in aligning with regulations, advancing sustainability, and contributing to environmental protection.



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
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

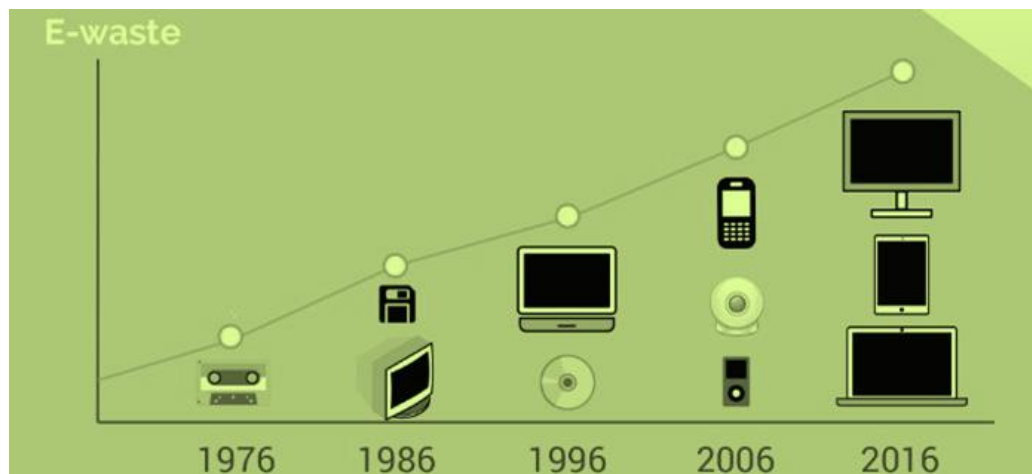
4.1. Introduction to the WEEE challenge

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.

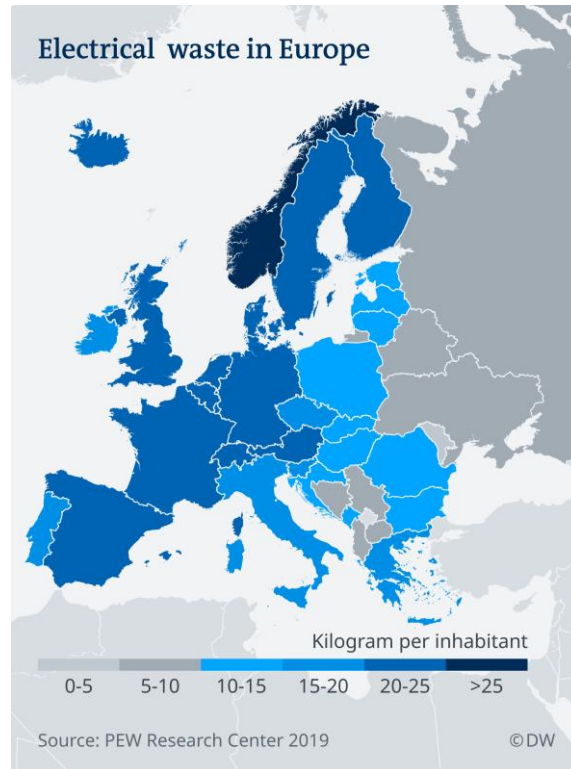
Below is an overview of the primary materials and their proportions in commonly used electronic products. Electrical and electronic equipment (EEE) typically contains metals like iron, copper, and aluminum, along with plastic and glass. Given this composition, establishing an effective and efficient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



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

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 co-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 linear electrical and electronic (E&E) sector into a sustainable circular model. There are three main Work Packages (WP) which are briefly described as follows:

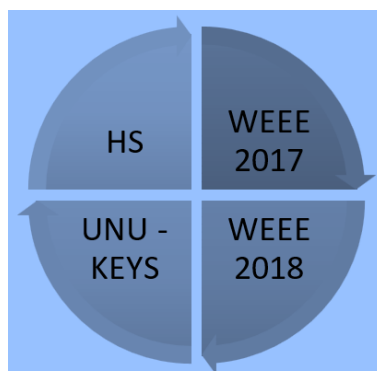
- WP1: To create local and regional Action Plans for e-waste prevention and management, based on the project self-assessment tools and the project “Methodology for designing Strategies for Mediterranean e-waste prevention and management”
- WP2: To demonstrate and test the feasibility and effectiveness 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



Key actors in waste management. Source: An enhanced definition of EPR and the role of all 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.



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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) serves as the EU's waste classification system for administrative purposes, such as permitting and oversight of waste generation and management. Many European, Caucasian, and Central Asian countries also



utilize the LoW as a framework for collecting waste statistics, typically reported at an aggregated level based on waste type.

The LoW categorizes 839 waste types within 20 chapters, primarily organized by waste source (e.g., economic sector or origin process). Each waste type is assigned a six-digit code, with the allocation process detailed in Decision 2000/532/EC. Thirteen LoW codes specifically relate to e-waste, differentiated as hazardous or non-hazardous. However, the following table excludes fractions or components resulting from e-waste treatment, like metal scrap, plastics, and lead glass.

While useful for measuring separately collected e-waste, these LoW codes are too general for comprehensive e-waste statistics. They fail to distinguish between different e-waste types, overlooking variations in environmental impact and recycling potential. Furthermore, e-waste is often collected and registered under other LoW codes, such as mixed municipal waste or metal scrap.

Currently, EU member states adhere to the WEEE Directive, which mandates data collection across 10 e-waste categories. These categories are:



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

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

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

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

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

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

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

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

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)

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 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

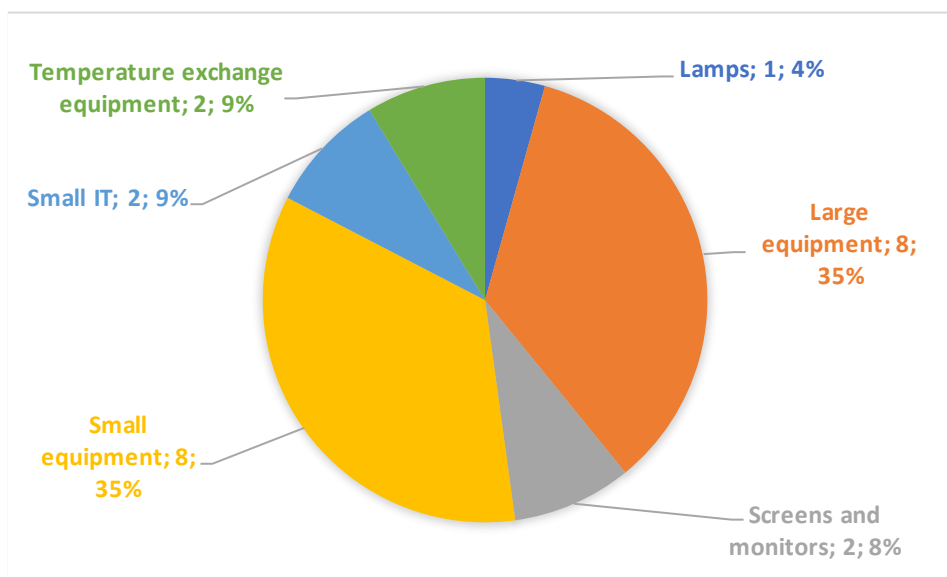


Large equipment	Monitoring and control instruments
Large equipment	Automatic dispensers
Screens and monitors	IT and telecommunications equipment
Screens and monitors	Consumer equipment
Small equipment	Large household appliances
Small equipment	Small household appliances
Small equipment	Consumer equipment
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%

WEEE 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

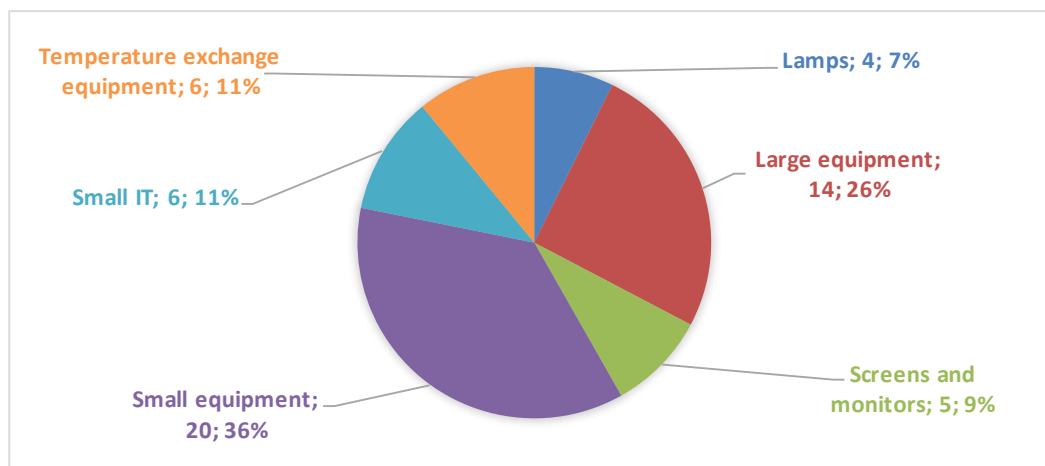
6.3. Other classification system outside the EU.

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.

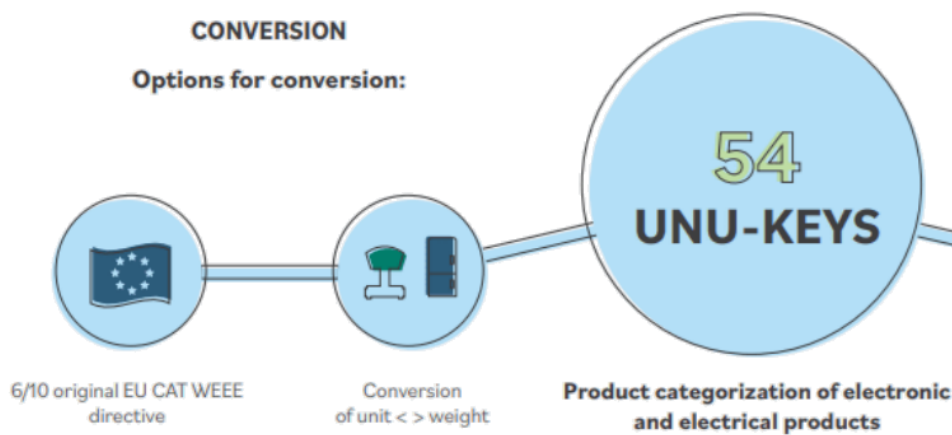
UNU-KEYS

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	Account EEE CATEGORY UNDER UNU-KEY
Lamps	4
Large equipment	14
Screens and monitors	5
Small equipment	20
Small IT	6
Temperature exchange equipment	6



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-functional, 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	Small equipment	Monitoring and control instruments



	(alarm, heat, smoke, excl. screens)		
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 6 categories of the WEEEDirective 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 (European Commission, 2016). The LoW and Basel codes are currently not correlated to each other.

6.6. WEEE classification and reporting categories in Greece

From year 2019, Greece uses the six categories while the EPR Appliances Recycling considers additional classification in 64 subcategories as presented in the EPR ‘Appliances Recycling SA 2019 annual report’.

The EPR Fotokyklosi utilizes six main categories. The following figure illustrates the 64 subcategories used by EPR Appliances Recycling. According to recycling facilities in Greece, classifying, sorting, and reporting within these 64 subcategories presents significant operational, administrative, and financial challenges. This complexity impedes the sorting and handling processes while increasing costs. The EPR ‘Appliances Recycling SA 2019 Annual Report mentions that these subcategories can be adjusted, if necessary, based on updated statistical data from Greece and the EU. However, no updates have been made as of the release of this report.



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ΟΝΟΜΑΣΙΑ ΝΕΑΣ ΥΠΟΚΑΤΗΓΟΡΙΑΣ - ΚΩΔΙΚΟΠΟΙΗΣΗ				Κωδικοί ΕΚΑ	UNU Code	ΠΑΛΙΑ ΥΠΟΚΑΤΗΓΟΡΙΑ
1	1Α (ΨΥΓΕΙΑ-ΚΑΤΑΨΥΚΤΕΣ)	1Α1 (ΨΥΓΕΙΑ ΟΙΚΙΑΚΟΥ ΤΥΠΟΥ cat1-4)	1Α1100 Ψυγεία - καταψύκτες Οικιακού τύπου full (unknown insulation)	16 02 11* 16 02 13* 20 01 23* 20 01 35*	0108, 0109	1a
			1Α1200 Ψυγεία - καταψύκτες Οικιακού τύπου no (unknown insulation)	16 02 11* 16 02 13* 20 01 23* 20 01 35*		1a
		1Α2 (ΨΥΓΕΙΑ ΜΗ-ΟΙΚΙΑΚΟΥ ΤΥΠΟΥ cat. 5)	1Α2100 Ψυγεία - καταψύκτες Μη Οικιακού τύπου cat.5 full (unknown insulation)	16 02 11* 16 02 13* 20 01 23* 20 01 35*		1a
			1Α2200 Ψυγεία - καταψύκτες Μη Οικιακού τύπου cat. 5 no (unknown insulation)	16 02 11* 16 02 13* 20 01 23* 20 01 35*		1a
		1Α3 (ΑΜΜΩΝΙΑ)	1Α3000 Ψυγεία Αμμωνίας	16 02 11* 16 02 13* 20 01 23* 20 01 35*		1a
			1Β1100 Κλιματιστικά Οικιακού και Φορητού τύπου (Εσωτερικές μονάδες)	16 02 11* 16 02 13* 20 01 23* 20 01 35*		1β
	1Β (ΚΛΙΜΑΤΙΣΤΙΚΑ)	1Β1 (ΟΙΚΙΑΚΑ & ΦΟΡ.)	1Β1210 Κλιματιστικά Οικιακού και Φορητού τύπου (Εξωτερικές μονάδες) full	16 02 11* 16 02 13* 20 01 23* 20 01 35*	0111	1β
			1Β1220 Κλιματιστικά Οικιακού και Φορητού τύπου (Εξωτερικές μονάδες) no	16 02 11* 16 02 13* 20 01 23* 20 01 35*		1β
			1Β1300 Κλιματιστικά Οικιακού και Φορητού τύπου (Αυτόνομες / Φορητές μον.)	16 02 11* 16 02 13* 20 01 23* 20 01 35*		1β
		1Β2 (ΜΗ-ΟΙΚΙΑΚΑ)	1Β2100 Κλιματιστικά Μη-Οικιακού και Μεγάλου τύπου (Εσωτερικές μονάδες)	16 02 11* 16 02 13* 20 01 23* 20 01 35*		1β
			1Β2200 Κλιματιστικά Μη-Οικιακού και Μεγάλου τύπου (Εξωτερικές μονάδες)	16 02 11* 16 02 13* 20 01 23* 20 01 35*	0113	1β
						1β
2	2Α (ΟΘΟΝΕΣ)	1Γ (ΕΛΑΙΑ)	1Γ0000 Εξοπλισμός που περιέχει έλαια	16 02 13* 20 01 35*	0112	1γ1
		1Δ (ΔΙΑΝΟΜΕΙΣ)	1Δ0000 Διανομείς με ψύξη - κατάψυξη (unknown insulation)	16 02 11* 16 02 13* 20 01 23* 20 01 35*	1002	10α
		1Ε (ΑΦΥΓΡΑΝΤΗΡΕΣ)	1Ε0000 Αφυγραντήρες	16 02 11* 16 02 13* 20 01 23* 20 01 35*	0112	1β
		1Ζ (ΑΛΛΑ)	1Ζ0000 Άλλος εξοπλισμός με ρευστά (εκτός νερού)	16 02 11* 16 02 13* 20 01 23* 20 01 35*		1β
		2Α1 (ΟΘΟΝΕΣ FPD)	2Α1110 Οθόνες (Τηλεοράσεις) FPD full (unknown type)	16 02 13* 20 01 35*	0408	4a2
			2Α1120 Οθόνες (Τηλεοράσεις) FPD no (unknown type)	16 02 13* 20 01 35*	0408	4a2
			2Α1210 Οθόνες (Monitor) FPD full (unknown type)	16 02 13* 20 01 35*	0309	3a2
			2Α1220 Οθόνες (Monitor) FPD no (unknown type)	16 02 13* 20 01 35*	0309	3a2
			2Α2110 Οθόνες (Τηλεοράσεις) CRT full	16 02 13* 20 01 35*	0407	4a1
			2Α2120 Οθόνες (Τηλεοράσεις) CRT no	16 02 13* 20 01 35*	0407	4a1
		2Α2 (ΟΘΟΝΕΣ CRT)	2Α2210 Οθόνες (Monitor) CRT full	16 02 13* 20 01 35*	0308	3a1
			2Α2220 Οθόνες (Monitor) CRT no	16 02 13* 20 01 35*	0308	3a1
		2Β1 (LAPTOPS)	2Β1000 Laptops/Notebooks	16 02 13* 20 01 35*	0303	3β
		2Β2 (TABLETS)	2Β2000 Tablets	16 02 13* 20 01 35*	0303	3β
3	2Β (ΕΞΟΠΛΙΣΜΟΣ ΜΕ ΟΘΟΝΕΣ)	2Β3 (ΠΑΙΧΝΙΔΙΑ)	2Β3000 Πααιχνίδια με με οθόνη	16 02 13* 20 01 35*		7a
		2Β4 (ΑΛΛΑ)	2Β4000 Λοιπός εξοπλισμός με οθόνη	16 02 13* 20 01 35*		7a
	3Α (ΛΑΜΠΗΡΕΣ ΕΚΚ. ΑΕΡΙΩΝ)	3Α (ΕΚΚΕΝΩΣΗΣ)	3Α0000 Λαμπήρες εκκένωσης αερίων (unknown type)	20 01 21* 16 02 13* 20 01 35*	0502, 0503, 0504	5β
		3Β (LED)	3Β0000 Λαμπήρες LED	16 02 14 20 01 36	0505	5β
	4	4Α1 (ΟΙΚΙΑΚΕΣ κ1)	4Α1000 Οικιακές (κατ.1) πλήρ. θερμοσίφωνων / πλυντηρίων	20 01 35* 20 01 36 16 02 13* 16 02 14	01, 0101, 0102, 0103, 0104, 0105, 0106	1γ1
			4Α2110 Πλυντήρια Οικιακού τύπου full	20 01 35* 20 01 36 16 02 13* 16 02 14		1γ1
			4Α2120 Πλυντήρια Οικιακού τύπου no	20 01 35* 20 01 36 16 02 13* 16 02 14		1γ1
			4Α2200 Πλυντήρια Επαγγελματικού τύπου	20 01 35* 20 01 36 16 02 13* 16 02 14		1γ1
			4Α3100 Θερμοσίφωνες OTHER	16 02 14 20 01 36		1γ2
			4Α3200 Θερμοσίφωνες PU	16 02 11* 16 02 13* 20 01 23* 20 01 35*		1γ3
		4Β (ΟΙΚΙΑΚΕΣ κατ.2)	4Β0000 Οικιακές (κατ.2)	20 01 35* 20 01 36 16 02 13* 16 02 14	0201, 0202, 0203, 0204, 0205	2
		4Γ (PV PANELS)	4Γ0000 PV PANELS (unknown type)	20 01 35* 20 01 36 16 02 13* 16 02 14		0002
		4Δ (ΉΧΟΣ-ΕΙΚΟΝΑ)	4Δ0000 Ήχος-Εικόνα	20 01 35* 20 01 36 16 02 13* 16 02 14		4β
		4Ε (ΦΩΤΙΣΤΙΚΑ ΕΙΔΗ)	4Ε0000 Φωτιστικά είδη	20 01 35* 20 01 36 16 02 13* 16 02 14	0405	5a
		4Ζ (ΕΡΓΑΛΕΙΑ)	4Ζ0000 Εργαλεία	20 01 35* 20 01 36 16 02 13* 16 02 14	0602	6
		4Η (ΠΑΙΧΝΙΔΙΑ)	4Η0000 Πααιχνίδια	20 01 35* 20 01 36 16 02 13* 16 02 14	0703	7β
ΕΞΟΠΛΙΣΜΟΣ ΜΕΤΑΛΛΟΥ ΜΕΤΕΩΟΥΣ (≤50 cm έστω μια διάσταση)	4Θ (ΙΑΤΡΙΚΑ)	4Θ (ΙΑΤΡΙΚΑ)	4Θ0000 Ιατρικά	16 02 13* 16 02 14 20 01 35* 20 01 36	0802	8β
		4Ι (ΠΑΡΑΚ. - ΕΛΕΓΧΟΣ)	4Ι0000 Παρακολούθηση - Έλεγχος	20 01 35* 20 01 36 16 02 13* 16 02 14	0902	9
		4Κ (ΑΥΤΟΜΑΤΟΙ ΔΙΑΝ.)	4Κ1000 Αυτόματοι Διανομείς (ΑΤΜ)	20 01 35* 20 01 36 16 02 13* 16 02 14	1001	10β
		4Κ (ΑΥΤ. ΔΙΑΝΟΜΕΙΣ)	4Κ2000 Αυτόματοι Διανομείς (Λοιποί)	20 01 35* 20 01 36 16 02 13* 16 02 14		10γ
		4Λ (ΕΞΟΠΛΙΣΜΟΣ Ι.Τ.)	4Λ0000 Εξοπλισμός Ι.Τ. (unknown type)	20 01 35* 20 01 36 16 02 13* 16 02 14	0307	3β



5	5A (ΟΙΚΙΑΚΕΣ κατ.1)	5A (ΟΙΚΙΑΚΕΣ κατ. 1)	5A0000	Οικιακές (κατ.1)	20 01 35* 20 01 36 16 02 13* 16 02 14	0114	1y1
	5B (ΟΙΚΙΑΚΕΣ κατ.2)	5B (ΟΙΚΙΑΚΕΣ κατ.2)	5B0000	Οικιακές (κατ.2)	20 01 35* 20 01 36 16 02 13* 16 02 14	0201, 0202, 0203, 0204, 0205	2
	5F (PV PANELS)	5F (PV PANELS)	5F0000	PV PANELS (unknown type)	20 01 35* 20 01 36 16 02 13* 16 02 14	0002	
	5Δ (ΉΧΟΣ- ΕΙΚΟΝΑ)	5Δ (ΉΧΟΣ-ΕΙΚΟΝΑ)	5Δ0000	Ήχος- Εικόνα	20 01 35* 20 01 36 16 02 13* 16 02 14	0401, 0402, 0403, 0404, 0405, 0406	4β
	5Ε (ΦΩΤΙΣΤΙΚΑ ΕΙΔΗ)	5Ε (ΦΩΤΙΣΤΙΚΑ)	5Ε0000	Φωτιστικά είδη	20 01 35* 20 01 36 16 02 13* 16 02 14	0506, 0507	5α
	5Ζ (ΕΡΓΑΛΕΙΑ)	5Ζ (ΕΡΓΑΛΕΙΑ)	5Ζ0000	Εργαλεία	20 01 35* 20 01 36 16 02 13* 16 02 14	0601	6
	5Η (ΠΑΙΧΝΙΔΙΑ)	5Η (ΠΑΙΧΝΙΔΙΑ)	5Η0000	Παιχνίδια	20 01 35* 20 01 36 16 02 13* 16 02 14	0701, 0703	7β
	5Θ (ΙΑΤΡΙΚΑ)	5Θ (ΙΑΤΡΙΚΑ)	5Θ0000	Ιατρικά	20 01 35* 20 01 36 16 02 13* 16 02 14	0801	8β
	5Ι (ΠΑΡΑΚΟΛ.- ΈΛΕΓΧΟΣ)	5Ι (ΠΑΡ.-ΕΛΕΓΧΟΣ)	5Ι1100	Ανιχνευτές καπνού Ραδιενεργοί	20 01 35* 20 01 36 16 02 13* 16 02 14	0901	9
			5Ι1200	Ανιχνευτές καπνού Μη Ραδιενεργοί	20 01 35* 20 01 36 16 02 13* 16 02 14		9
			5Ι2000	Παρακολούθηση - Έλεγχος (Λοιπός εξοπλισμός)	20 01 35* 20 01 36 16 02 13* 16 02 14		9
	5Κ (ΑΥΤΟΜΑΤΟΙ ΔΙΑΝΟΜΕΙΣ)	5Κ (ΑΥΤ. ΔΙΑΝ.)	5Κ0000	Αυτόματοι Διανομείς	20 01 35* 20 01 36 16 02 13* 16 02 14	1001	10γ
6	6Α (ΕΞΟΠΛΙΣΜΟΣ Ι.Τ.)	6Α (ΕΞΟΠΛ. ΙΤ)	6Α0000	Εξοπλισμός Ι.Τ. (unknown type)	20 01 35* 20 01 36 16 02 13* 16 02 14	0301, 0302, 0304, 0305	3β
	6Β (ΠΑΙΧΝΙΔΟΜΗΧΑΝΕΣ)	6Β (ΠΑΙΧ/ΜΕΣ)	6Β0000	Παιχνιδομηχανές (Κονσόλες)	20 01 35* 20 01 36 16 02 13* 16 02 14	0702	7β
	6Γ (ΚΙΝΗΤΑ ΤΗΛΕΦΩΝΑ)	6Γ (ΚΙΝ. ΤΗΛΕΦΩΝΑ)	6Γ0000	Κινητά τηλέφωνα	20 01 35* 20 01 36 16 02 13* 16 02 14	0306	3β
	6Δ (ΤΟΝΕΡ/ΜΕΛΑΝΙΑ)	6Δ1 ΤΟΝΕΡ	6Δ1000	Τόνερ (unknown type)	16 02 15* 16 02 16		3γ
		6Δ2 ΜΕΛΑΝΙΑ	6Δ2000	Μελάνια (unknown type)	16 02 15* 16 02 16		3γ
	6Ε (ΚΑΛΩΔΙΑ)	6Ε (ΚΑ/ΩΔΙΑ)	6Ε0000	Καλώδια	20 01 35* 20 01 36 16 02 13* 16 02 14		3β

WEEE classification and reporting in 64 sub-categories for Greece. Source: 2019 Annual Report, EPR 'Appliances Recycling SA

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

Collective Producer Responsibility (CPR)





system supports sustainable WEEE management and advances the principles of a circular economy.

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

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

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.



Extended 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, dealers, recyclers, etc.

Retailers play a significant role in e-waste management through various initiatives:

- **Take-Back Programs:** Many retailers offer take-back programs where customers can return old electronic devices for recycling or proper disposal when purchasing new ones. This encourages responsible disposal and ensures that the old devices are recycled rather than ending up in landfills.
- **Recycling Services:** Some retailers have partnered with recycling facilities or organizations to provide convenient drop-off points for e-waste. They may offer in-store collection bins for customers to deposit old electronics.
- **Promotion of Sustainable Products:** Retailers also contribute to e-waste management by promoting more durable, repairable, and environmentally friendly products. They might highlight devices that are easily upgradable or have longer lifespans, reducing the frequency of disposal.
- **Education and Awareness:** Retailers often engage in educational initiatives, providing information to customers about the importance of proper e-waste disposal, recycling options, and the environmental impact of electronic devices.
- **Repair Services:** Some retailers offer repair services or partner with repair centers to extend the lifespan of electronic devices, encouraging customers to repair rather than replace.
- **Compliance with Regulations:** Retailers must adhere to e-waste regulations and policies, ensuring that their disposal methods align with environmental standards and legal requirements.

Several large retailers around the world have taken active steps in e-waste management. They engage in these practices not only to fulfil regulatory obligations but also to demonstrate corporate social responsibility and meet consumer demands for more sustainable business practices



Dealer

In the realm of e-waste management, various entities and organizations can be considered "dealers" involved in different aspects of the e-waste lifecycle:

- **E-Waste Recyclers and Processors:** These are companies or facilities specialized in collecting, dismantling, recycling, and processing electronic waste. They handle the proper disposal of e-waste, ensuring that valuable materials are recovered, and hazardous components are disposed of safely.
- **E-Waste Collection Centers:** These centers may operate independently or in partnership with local governments, businesses, or non-profit organizations. They serve as collection points where individuals or businesses can drop off their old electronics for recycling or proper disposal.
- **E-Waste Brokers:** Brokers act as intermediaries between e-waste generators (individuals, businesses, organizations) and recyclers or processors. They facilitate the collection, transportation, and processing of e-waste.
- **Technology Refurbishers:** Some entities specialize in refurbishing and repairing electronic devices to extend their lifespan. They may refurbish electronics for resale or donation after ensuring they meet certain standards.
- **Reverse Logistics Providers:** Companies involved in reverse logistics manage the logistics of collecting used electronics, transporting them to processing facilities, and ensuring their proper disposal or recycling.
- **Certification and Compliance Organizations:** Entities that certify or audit e-waste management practices and ensure compliance with regulations and environmental standards also play a crucial role in the industry.

These dealers or entities contribute to different stages of the e-waste management chain, from collection and transportation to processing and recycling. They work to ensure that e-waste is managed responsibly, promoting environmental sustainability and compliance with regulations.

Recycler

In the field of e-waste management, recyclers are entities or companies specializing in the collection, processing, and recycling of electronic waste. These recyclers play a pivotal role in managing e-waste in an environmentally responsible manner. They're responsible for various aspects of the e-waste lifecycle:

- **Collection:** Recyclers often operate collection centers or partner with organizations to collect electronic devices from consumers, businesses, municipalities, or other sources.
- **Transportation:** They handle the logistics of transporting collected e-waste to their processing facilities or partnering recycling centers.
- **Dismantling and Sorting:** Recyclers dismantle electronic devices to separate materials and components. They sort these materials into



categories like plastics, metals, glass, circuit boards, etc., preparing them for the recycling process.

- **Processing and Recycling:** Recyclers use specialized methods and technologies to recycle e-waste materials. This may involve shredding, smelting, refining, or other processes to extract valuable metals (like gold, silver, copper) and recover usable materials.
- **Disposal of Hazardous Components:** Proper disposal of hazardous components, such as batteries and certain electronic parts containing toxic substances, is a crucial responsibility of e-waste recyclers. They ensure these materials are disposed of safely and in compliance with environmental regulations.
- **Certification and Compliance:** Reputable recyclers often obtain certifications or comply with standards to ensure they operate in an environmentally responsible manner. Certifications like Responsible Recycling (R2) and e-Stewards demonstrate adherence to specific industry best practices.

Recyclers are essential players in the e-waste management ecosystem, working to minimize the environmental impact of electronic waste by recycling materials, reducing the need for new resource extraction, and properly disposing of hazardous components. They contribute significantly to the circular economy by reintroducing valuable materials into the production cycle, promoting sustainability and resource conservation.

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.

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.

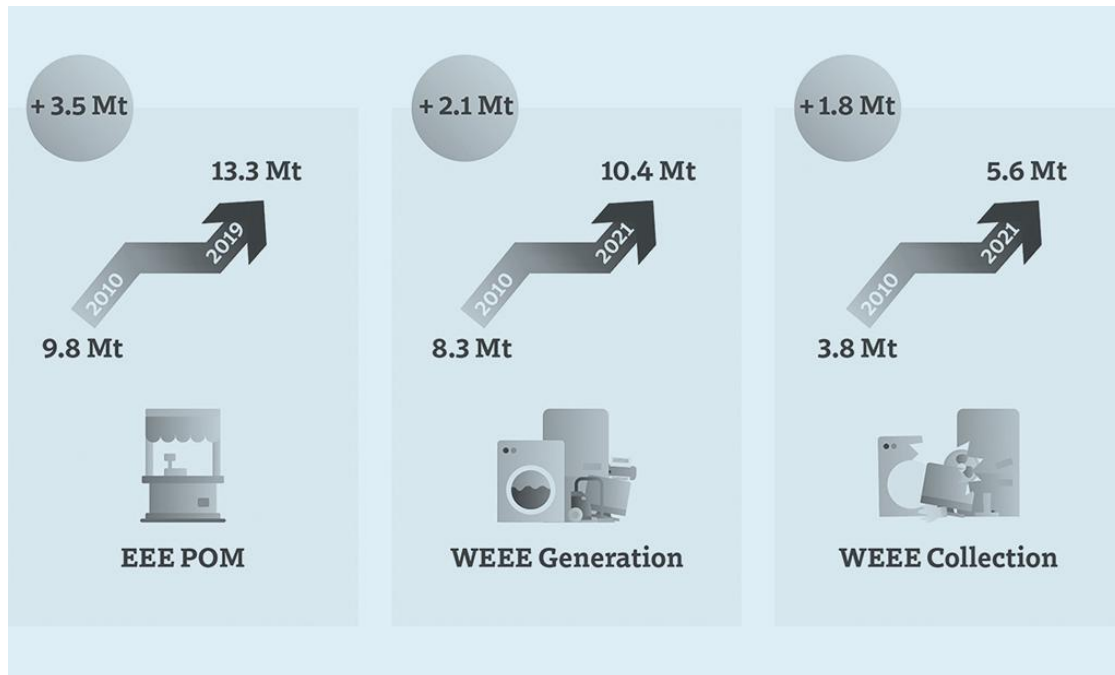
Furthermore, standard monitoring systems are often integrated into broader policy frameworks, such as Extended Producer Responsibility (EPR) programs, ensuring alignment with legal requirements. Overall, these monitoring mechanisms are vital for effective oversight and governance, allowing stakeholders 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

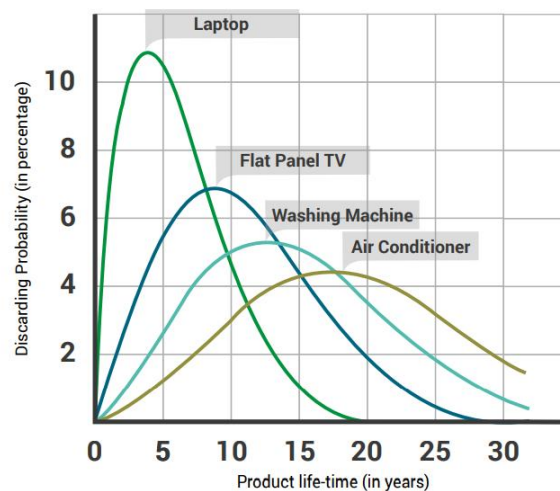
waste by the entities involved in the product lifecycle, ensuring environmentally responsible practices.

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.

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.



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>

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) contains the internationally-adopted standard concepts, definitions, classifications, accounting



rules, and tables for producing internationally-comparable statistics on the environmental-economic accounts and their relationship with the economy. The SEEA framework follows a similar accounting structure as the System of National Accounts (SNA) and uses concepts, definitions and classifications consistent with the SNA's in order to facilitate the integration of environmental and economic statistics. In the SEEA, e-waste would fall under Chapter 3.6.5 on Waste Accounting. Following the concepts of SEEA, e-waste statistics is a subset of the aggregates on waste from EEE and vehicles. The e-waste guidelines lack the origin of the waste generated (ISIC/NACE 18 or household), which is essential for SEEA. This requires additional modelling, which could be done on the UNU-KEY level. SEEA also reports on import and export data, which is also part of those guidelines. However, at this moment, a good measurement of transboundary flows of e-waste is very difficult to ascertain. The generation of secondary materials from e-waste (plastics, scrap metal, residues) is included in the concepts of SEEA, and these materials are excluded from e-waste statistics, but they could be modelled.

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

The Framework for the Development of Environment Statistics (FDES) is a flexible, multipurpose conceptual and statistical framework that is comprehensive and integrative in nature. It marks out the scope of environmental statistics and provides an organizing structure to guide their collection and compilation and to synthesize data from various subject areas and sources, covering the issues and aspects of the environment that are relevant for analysis, policy, and decision-making. Subcomponent 3.3: Generation and Management of Waste includes statistics on the amount and characteristics of waste (including e-waste), defined as discarded material for which the owner or user has no further use, generated by human activities in the course of production and consumption processes. The FDES provides the structure for identifying and collecting waste statistics, including e-waste statistics. The FDES structure links waste statistics to the International Standard Industrial Classification (ISIC), which facilitates the integration with economic statistics.

8.5. Stock (S)

The Stock (S) refers to the equipment in households, businesses and the public sector. Stock levels of appliances in households and businesses are generally unavailable for all 54 UNU-KEYS, especially levels measured in a harmonised manner. There may be stock data available in some countries for some products; sometimes, national statistical institutes survey households about their household possessions or penetration rate of several types of households EEE. This data can feed into the measurement framework. It should be noted that with this methodology, both functioning and non-functioning appliances have to be counted. Another, but less reliable data source, could be the number of subscriptions. In that case, one subscription would mean a stock level of at least one appliance. But there might be appliances with two subscriptions, or appliances in stock without a subscription. Sometimes, penetration rates of ICT use is measured by countries. In that case, one can calculate the minimum stock



level, as the surveys do not monitor whether a household has more than one appliance.

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



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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

The "Integrated Framework for Waste Management" introduced by Law 4819/2021 (A129) outlines Greece's waste management policies and legislation, focusing on waste prevention, preparation for reuse, and recycling. This law incorporates Directives 2018/851 EC and 2018/852 EC, which amend Directive 2008/98/EC on waste, into Greece's national law. It creates a unified institutional framework for waste management, maintaining consistency with Law no. 2939/2001, Law 4042/2012, and relevant regulatory decisions. The measures aim to protect the environment and human health by preventing waste generation, minimizing the negative impacts of waste, promoting recycling, reducing resource use, and improving resource efficiency, all in support of transitioning to a circular economy.

The framework also sets out the main principles for managing municipal solid waste in Greece, such as the Waste Hierarchy and Extended Producer Responsibility (EPR). It establishes EPR Programs, including those outlined in Law No. 2939/2001 and 4736/20. The regulations concerning Waste Electrical and Electronic Equipment (WEEE) ensure that product manufacturers are financially or both financially and organizationally responsible for managing the end-of-life stage of their products.



In particular, the framework defines in a clear manner the roles and obligations of the actors involved, including "product producers" who place goods on the market in the sense defined in Article 11 of Law 4819/2021. It also defines the objectives in accordance with the waste hierarchy as defined in this law, in Law No. 2939/2001 and in CMO 23615/651/E.103/2014,

The framework as well define a reporting system for the collection of data on products placed on the Greek market by producers of products under extended producer responsibility and data on the collection and treatment of waste resulting from products and on material flows; and principles are defined to avoid barriers to trade or distortions of competition, to ensure information on prevention measures, re-use centres, waste return and collection systems, incentives for the transfer of waste to separate collection systems, guidelines for the organisation of alternative management operations in accordance with the Waste Hierarchy including the obligation to design, organise and operate an Alternative Management System (AMS).



Law No. 4496/2017, which incorporates Directive 2015/720/EU, amended Law No. 2939/01 and, reformed the provisions, rules, terms and conditions of alternative waste management and the operation of Alternative Management System and the National Recycling Agency.

Government Gazette 181504/2016, as in force, defines the establishment and management of the National Register of Producers (NRP) and establishes the registration procedure of producers in the framework of alternative waste management.

The National Waste Management Plan (NWMP), approved by the Act of the Council of Ministers No. 39 of 31-8-2020 (Government Gazette A 185/29-9-20), revises the recovery, recycling and landfill targets, the actions and measures for the alternative management of waste products and for the prevention of waste generation, and adopts the good practices of the Circular Economy.

Collective Alternative Management System (CAMS) are the approved bodies that organise on an individual or collective basis the alternative management of each waste stream in accordance with the applicable provisions.

9.2. Situation of the WEEE Policy

9.2.1. Legal Framework in Greece

The Directive 2012/19/EU on WEEE management was implemented in Greek legislation by the Joint Ministerial Decision (JMD) 23615/651/E.103 in 2014. The management of Waste Electrical and Electronic Equipment (WEEE) is governed by a comprehensive legal framework aligned with European Union directives. Primary legislation is Law 4819/2021, which integrates Directives 2018/851 and 2018/852 into national law, establishing an integrated approach to waste management.

In particular, WEEE management is primarily based on the following legislation:

- JMD 181504/2016 National Producers' Registry of Hellenic Recycling Agency
- Decision 133480/2011 (Rules, terms and conditions for the Management of Waste Electrical and Electronic Equipment (WEEE))
- Presidential Decree 15/2006 (Transposition of EU Directive 2003/108/EU into National Law)
- JMD 112145/24.12.2004 about the mandatory invoicing of the recycling fee in a separate line.

The legal framework for WEEE includes key aspects such as producer responsibility, where manufacturers of electrical and electronic equipment (EEE) are responsible for funding the collection, treatment, and recycling of WEEE. They can meet this responsibility by establishing individual systems or participating in collective schemes. Producers of EEE must also register in the National Producers' Register and obtain a Producer Registration Number. Greece is required to meet specific WEEE collection targets, determined by the quantity of EEE placed on the market. Proper treatment and recycling of WEEE are mandatory to ensure the recovery of valuable materials and the safe disposal of hazardous substances. Furthermore, producers and distributors of EEE must inform consumers about proper WEEE disposal and available collection systems.



The Hellenic Recycling Agency (HRA), operating under the Ministry of Environment and Energy, is responsible for designing and implementing policies related to the alternative management of waste, including WEEE. The agency authorizes and supervises national systems for alternative management, ensuring compliance with the extended producer responsibility principle.

Producers and importers of electrical and electronic equipment are obligated to organize or participate in approved alternative management systems. This requirement is outlined in Law 2939/2001, which mandates the collection and recycling of various products, including electrical and electronic devices.

The legal framework emphasizes waste prevention, the "polluter pays" principle, and the responsibility of all economic actors involved in the lifecycle of electrical and electronic products. It also highlights the importance of public information and awareness to promote effective waste management practices.

9.2.2. Waste management plan(s)

Greece has implemented a structured approach to managing Waste Electrical and Electronic Equipment (WEEE), aligning with European Union directives to ensure environmental protection and resource efficiency.

National Waste Management Plan (NWMP):

The NWMP, revised in 2015 (Act of Ministerial Council 49/15.12.2015), sets ambitious targets for waste management, including WEEE. By 2020, the plan aimed to:

- Drastically reduce waste generation per capita.
- Achieve 50% preparation for re-use and recycling of municipal solid waste through separate collection of recyclables and bio-waste.
- Limit landfill disposal to less than 30% of municipal solid waste.

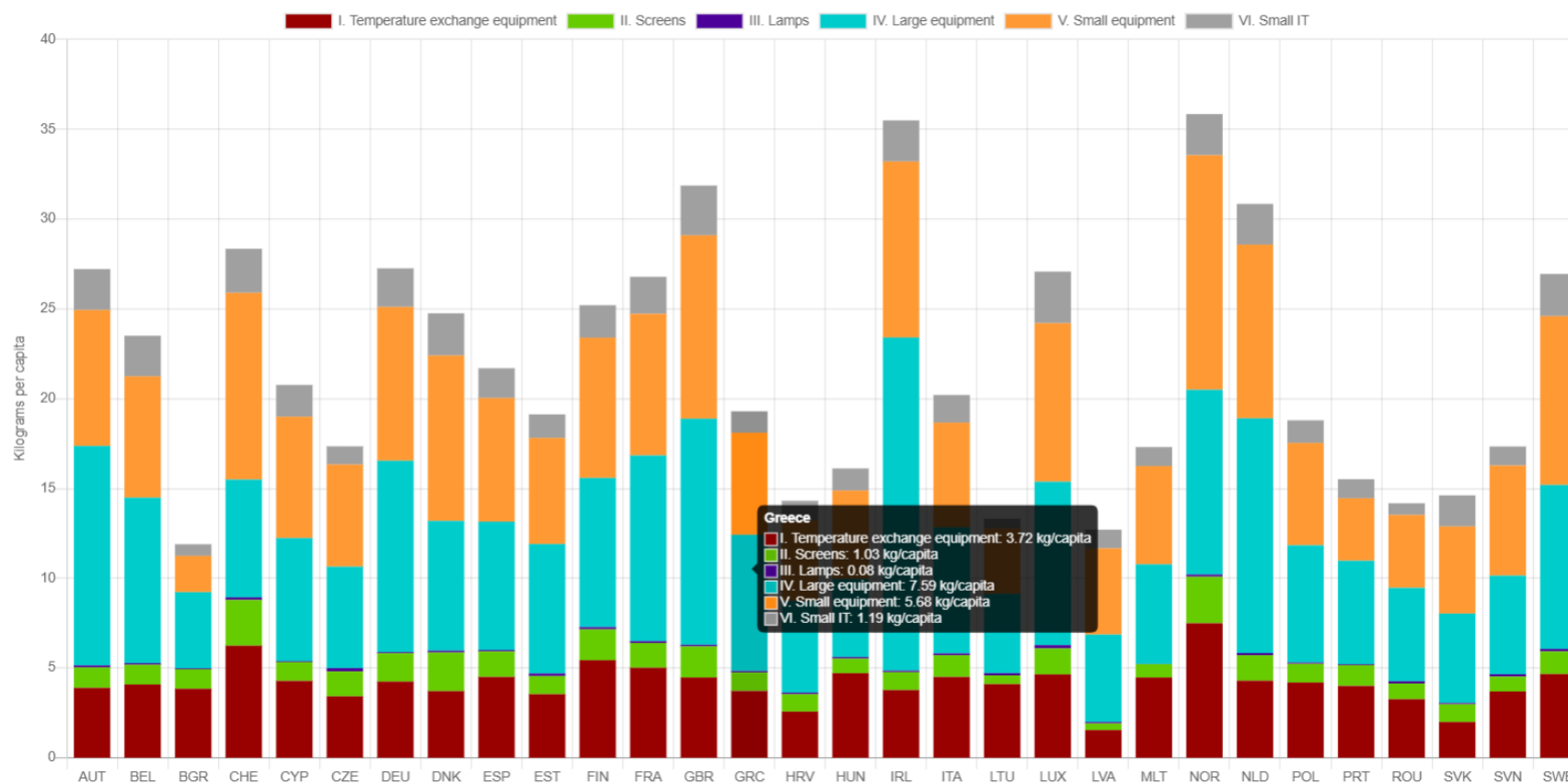
These objectives underscore Greece's commitment to sustainable waste management practices.



9.2.3. Rates and Figures related to the country and region

Weight of EEE per capita

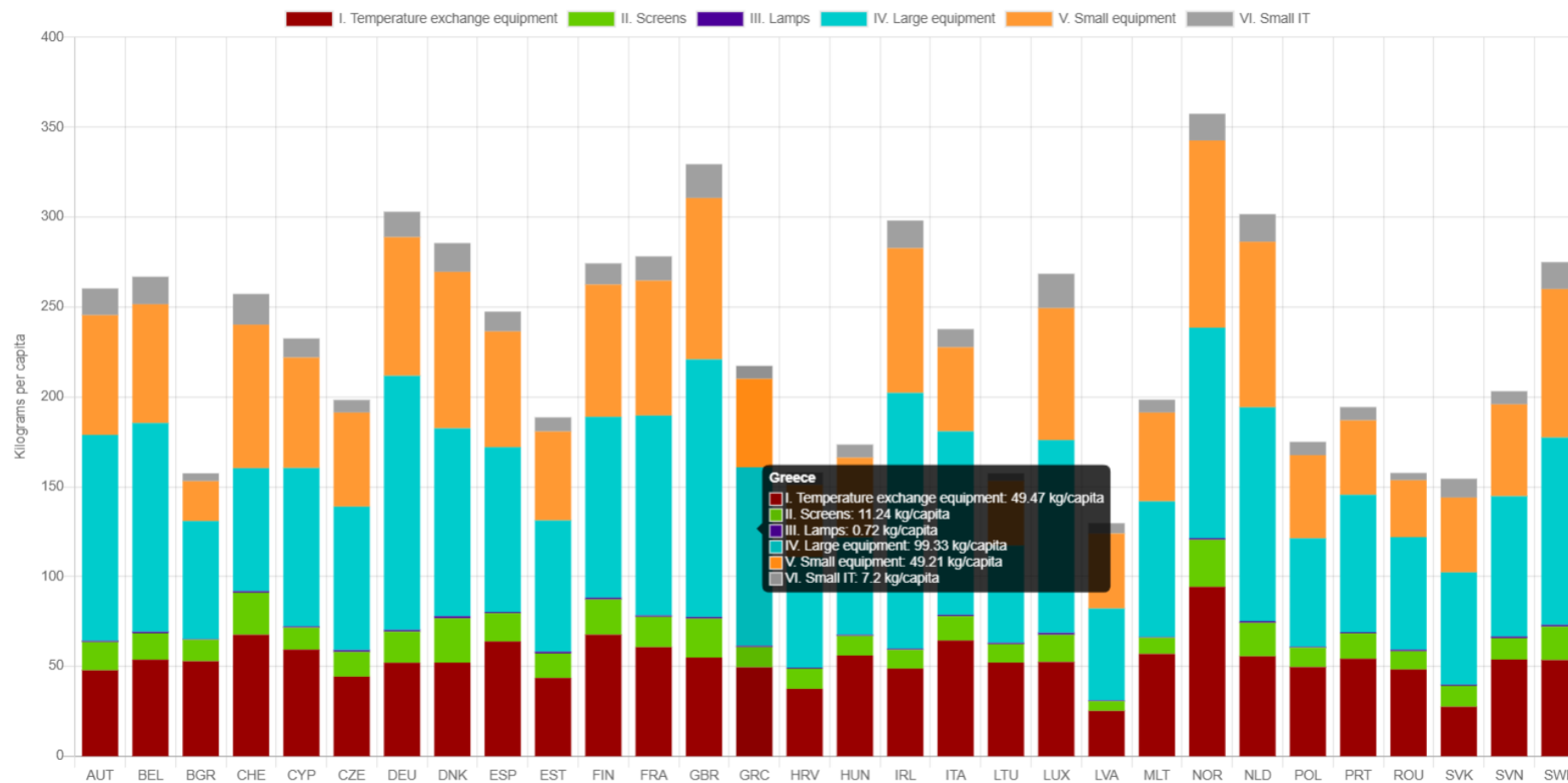
Placed on the Market for GREECE. (Source: Urban Mine Platform).





Weight of EEE per capita

In stock for GREECE (Source: Urban Mine Platform)





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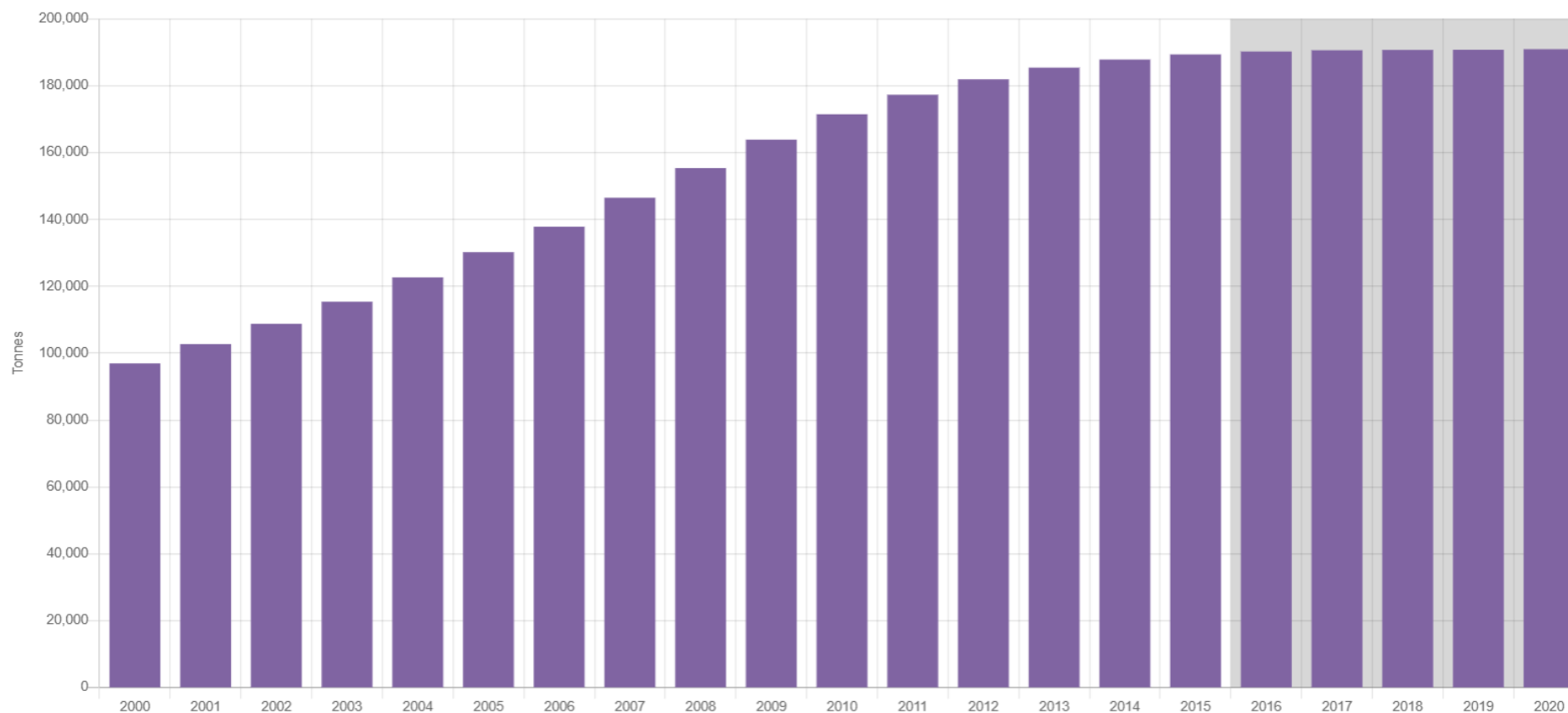


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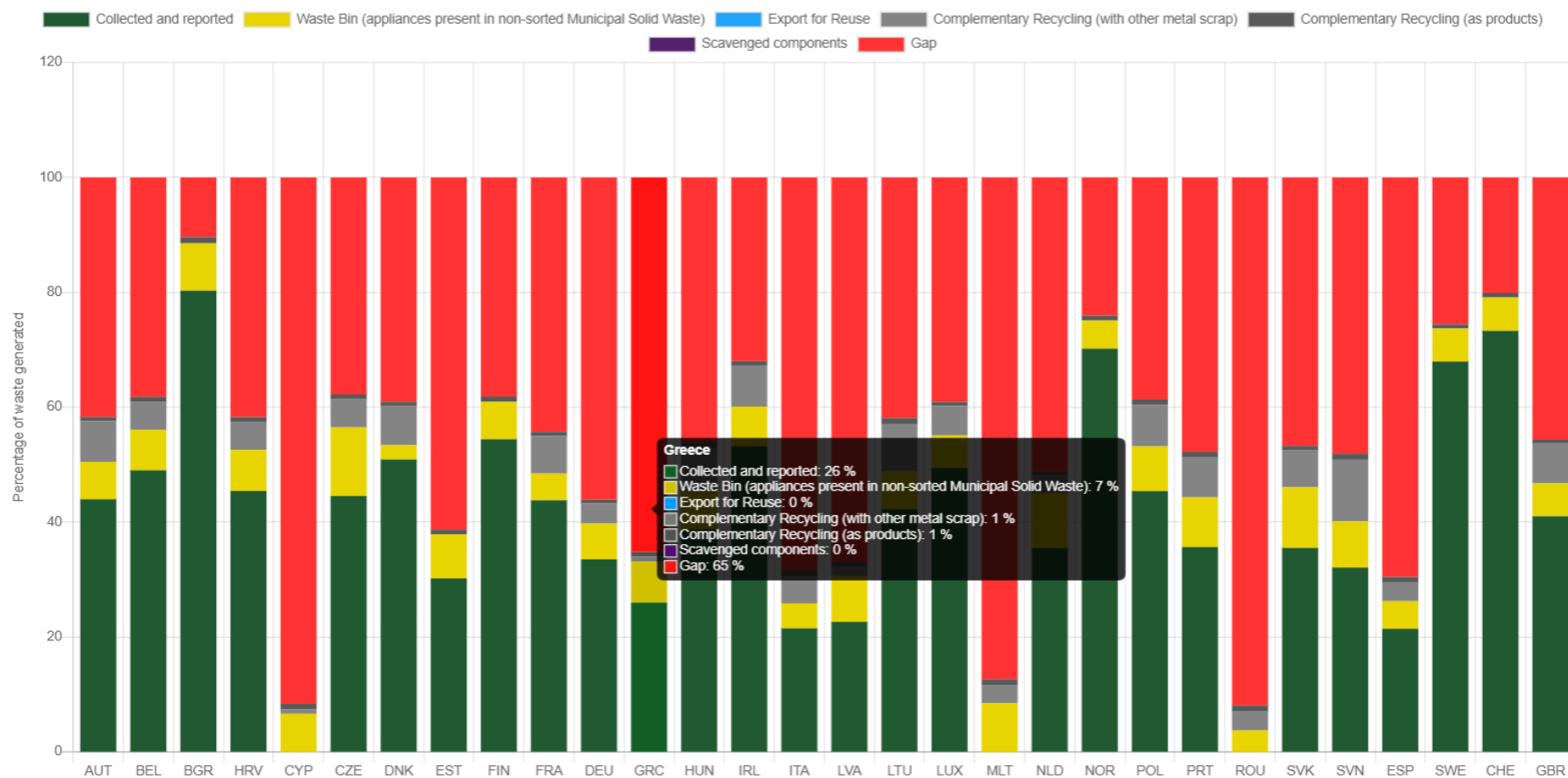
Weight of EEE - Waste Generated

Waste generated for GREECE.



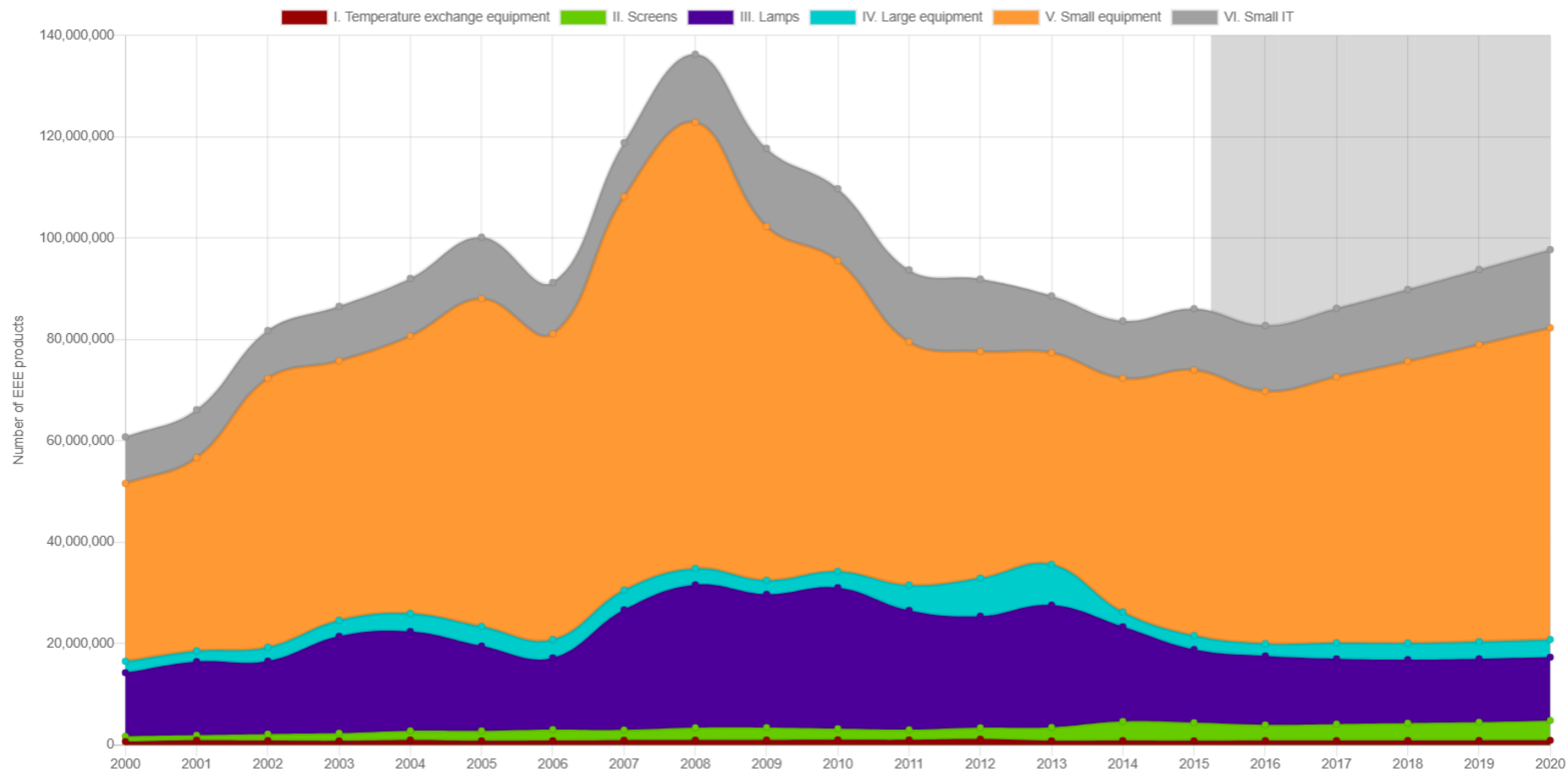


Percentage of collected EEE from waste generated in 2015 for All collection categories (Source: Urban Mine Platform)



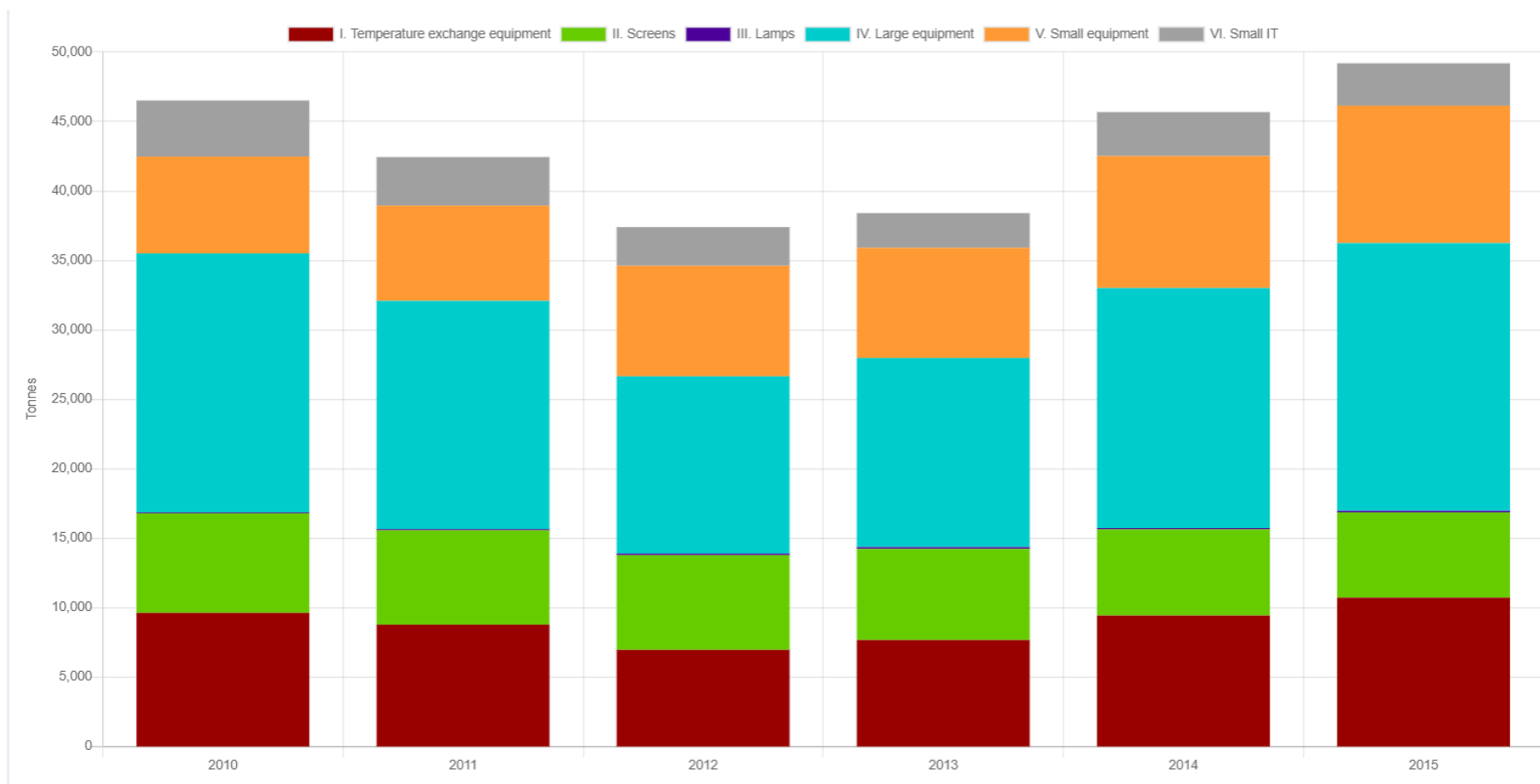


Number of EEE products - Placed on the Market in Greece (Source: Urban Mine Platform)





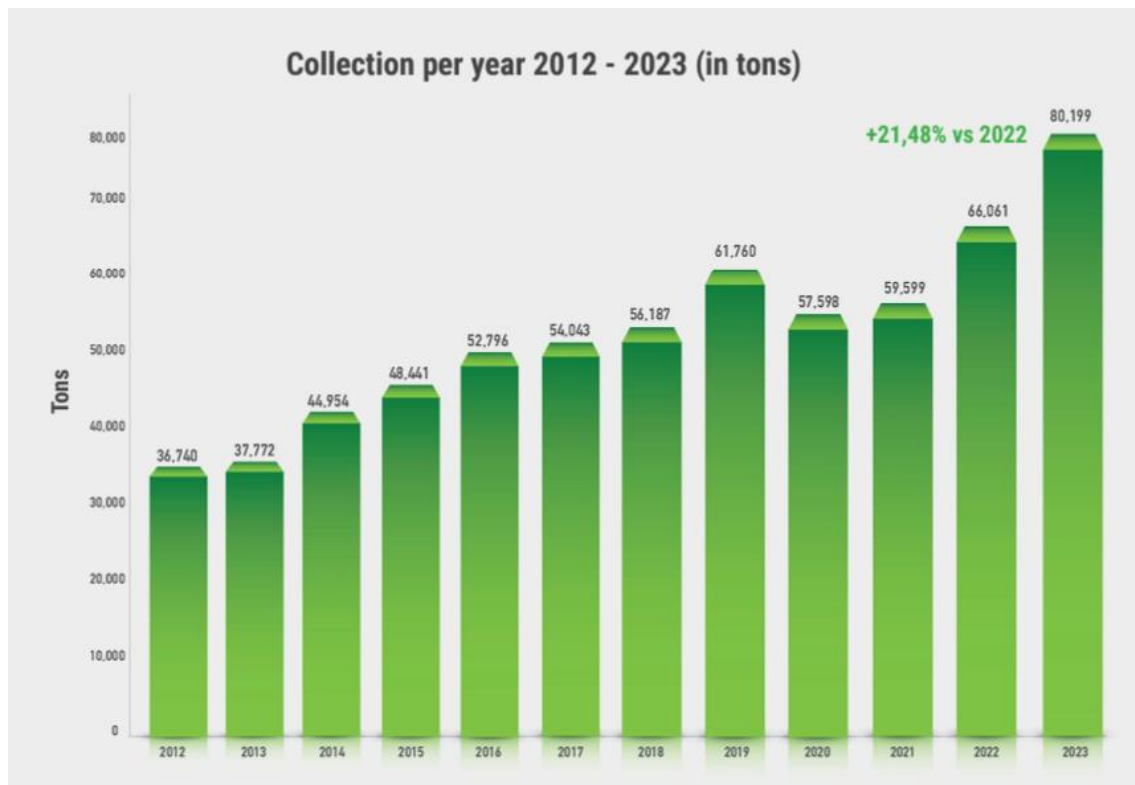
Weight of Collected and reported EEE in Greece. (Source: Urban Mine Platform)



9.2.4. National and Regional status: Improvements and challenges

During the last years, Greece has continued to work towards meeting the EU target of collecting 65% of the average weight of EEE placed on the market or 85% of the total WEEE generated. However, the country has struggled to meet these ambitious targets consistently. The collection rate, while improved, remains below the EU average, partly due to the country's geographic challenges, including many islands and remote areas where WEEE collection infrastructure is more difficult to implement.

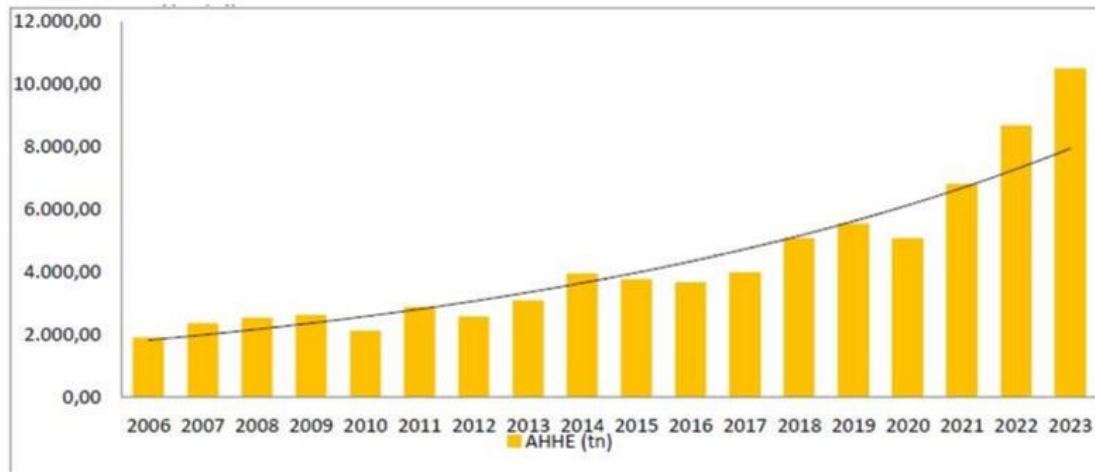
Greece has made progress in improving its WEEE recycling rates through public awareness campaigns and the establishment of more recycling points. Municipalities, private enterprises, and WEEE compliance schemes have increased their efforts to ensure that collected WEEE is treated properly. Despite this, the recovery rates could be higher, as informal recycling practices persist in some areas, leading to inefficient recovery and potential environmental harm.



Progress of Collection of WEEE. Source: Annual Report 2023 of Appliances Recycling S.A.

Regarding the Annual Reports of 2021, 2022 and 2023 of Fotokiklosi SA, about the quantities of products placed on the market (put in the market), in 2021, there was a notable 34% increase in the quantities introduced to the market compared to 2020. This growth can be attributed to two main factors: a substantial rise in the number of producers registered in the EMS, and the strong economic performance of Greece in 2021, driven by the reduced impact of the pandemic on businesses and government operations. However, in 2022, the quantities entering the market saw a significant rise of approximately 27.4% compared to 2021. This growth is due to a notable increase in the number of producers registered in the ETS, along with the strong economic growth rates achieved by the Greek economy during that year.

About 2023, the quantities entering the market experienced a significant rise of approximately 20.91% compared to 2022. Over the first four years of the Alternative Management System's six-year operational plan (2020-2026), the declared quantities of U.N. items entering the market had increased by nearly 90% by the end of 2023.

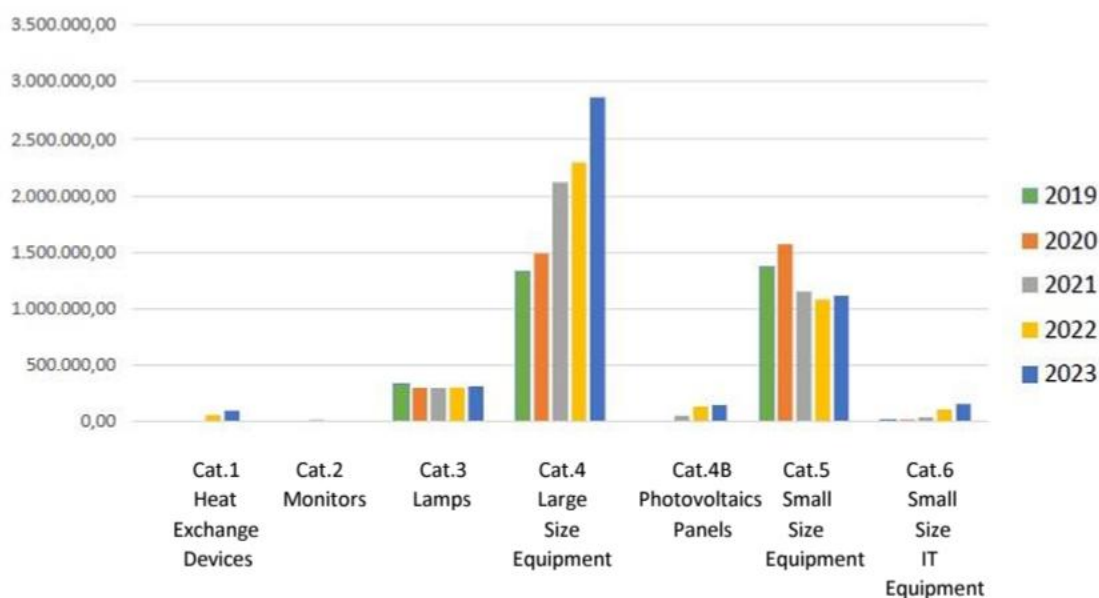


Quantities of products POM. Source: Annual Report of 2023 of Fotokiklosi SA

During 2020, there were in total 25.155 collection points in Greece. In particular, there were 16.749 points by the PRO Appliances Recycling S.A., and 8.406 points by the PRO Fotokiklosi SA. Both PROs are continuously increasing their collection points network to improve their collection services. Appliances Recycling has the majority (66%) of collection points distributed in the country.

The main type of collection points/modes in Greece include:

- Collection from businesses (B2B) (in total 4,234 collection points)
- Collection points in municipalities (collection bins in public buildings or collection in containers) (in total 5,526 collection points)
- Collection points in retail stores of EEEE (in total 6,606 collection points)
- Scrapyards (328 collection points throughout Greece).

Collection of WEEE 2019 - 2023 (Kg)


Waste Collection 2019-2023. Source: Annual Report of 2023 of Fotokiklosi SA

Some challenges and obstacles in general are the informal sector, the public awareness and the geographical challenges. A significant challenge for Greece is the presence of an informal sector handling WEEE, which often leads to improper dismantling, disposal, and recovery methods. Informal recyclers may strip valuable metals without following environmental regulations, contributing to pollution and loss of valuable resources. This sector can compete with formal collection systems, reducing the amount of WEEE entering official recycling streams.

Public awareness of the importance of recycling WEEE has been a key focus of recent efforts, yet challenges remain in achieving high participation rates. Many residents are still unaware of proper disposal methods or lack access to convenient collection points. This is especially true in rural and island regions where infrastructure is less developed.

Greece's unique geography, with its many islands, presents logistical difficulties for the collection and transportation of WEEE to recycling facilities. This can lead to disparities in WEEE management between urban centers like Athens and Thessaloniki, and more remote regions.

In summary, during the last years, Greece's WEEE management is characterized by progress toward EU compliance, increased efforts in public awareness and a growing focus on the circular economy. Despite improvements, the country faces persistent challenges such as informal recycling practices, geographic barriers, and the need for greater public engagement. Future efforts are likely to focus on enhancing compliance schemes, embracing technological solutions, and further promoting a circular economy approach to create a more sustainable electronic waste management system.



9.2.5. Collection network in Greece

According to the WEEE Directive all producers including producers supplying EEE by means of distance communication (e.g. web platforms, on-line sales websites), or through their authorised representative (EPR schemes), that put EEE on the market of each MS are mandated to be registered in a register setup by each MS, as to facilitate their monitoring in regards to their compliance to the WEEE Directive.

The register is to be accessible online for producers to be able to provide all the relevant information reflecting their activities in the MS they provide their products.

In Greece, the national registry is the named EMPA (ΕΜΠΙΑ), and it is under the supervision of EOAN. When registered on EMPA the producer is getting a national identification code. In EMPA producers or the PRO they are members of, are providing information regarding their compliance such as their name and type of business, contact information, selling technique (e.g. distance selling) and information on the reporting period, category of EEE (based on the six categories), the quantities put on the national market, by weight, quantity of waste of EEE separately collected, recycled (including prepare for reuse), recovered and disposed of (by weight and per category) within the MS, in another EU MS or outside the Union.

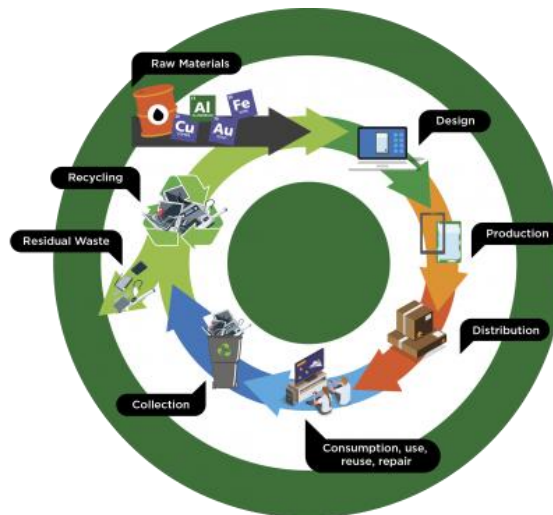
Appliances Recycling S.A. is the largest WEEE PRO in Greece representing over 93% of the registered producers in the Greek market. On the PROs Annual report, they divide their registered producers base on whether their agreements have been 'active' or 'non-active'. These 'non-active' agreements can be assumed to be producers that either haven't reported any quantities or haven't paid their fees to the PRO, and therefore can be potential free-riders.

9.3. Actors involved in the WEEE policy in Greece

9.3.1. Main actors in the policy

The Common Ministerial Decision 23615/651/E.103 (2014), provides a first framework of responsibilities and appropriate actions to be taken regarding the organization of the WEEE collection and transport network. As a first step, and according to Article 5A, it is explicitly mentioned that for the companies that carry out the processes of WEEE management, the relevant licenses and the cooperation agreements with the respective PROs are mandatory.

In general, the certain Decision provides for mandatory separate collection of WEEE from household waste. Regarding the collection of WEEE, Greek legislation distinguishes two cases, depending on whether the waste is of private household origin or not. In the first case, the end user discards the WEEE at the collection points which are either municipal (determined by the municipalities in cooperation with the PROs) or located in retail stores and private sector businesses, public services, or public bodies. For WEEE of non-household origin, the legal collectors/transporters who collaborate with the respective PROs collect from the users' facilities/premises, while the issuance of a Receipt Certificate is also mandatory.



The main actors involved in the WEEE value chain in Greece are:

- Producers of EEE and Consumers/users.
- Environmental authority, enforcement inspectorate, like YPEN (Greek Ministry of the Environment and Energy) and EOAN (Hellenic Recycling Agency). These organizations are responsible for the licencing of facilities, monitoring and enforcement of legislation;
- PRO: (Appliance Recycling S.A. is the main supplier of the feedstock/input to the treatment facilities in Greece). PROs are responsible for the coordination and supervision of the collection and transfer, with the corresponding procedures defined in the approval decisions of these systems by EOAN. In addition, PROs must also define measures to ensure the proper operation of the collection points, in the context of the cooperation agreements drawn up with the interested parties for the placement of collection points;
- Municipalities are obliged to determine collection points taking into account population density and to ensure their availability and accessibility, while they are also obliged to organize the collection and transport of bulky and heavy WEEE from the end-user's premises/private households. Therefore, for the WEEE received by the municipalities, they are also responsible for maintaining the condition in which the WEEE were received, until they are delivered to the transport companies/distributors.
- Distributers: any natural or legal person in the supply chain, who makes EEE available on the market. If they provide a new product, are required to receive retired electronic and electrical equipment from end users, free of charge. Also, they must have a space with specific specifications for the disposal of very small WEEE in their stores, which they then deliver to legal collectors-transporters. For the space they have, they should take measures to ensure their proper operation;
- Recycling facilities formally accredited, permitted and equipped facilities, to collect/take back and/or recycle WEEE or materials streams ensuing from WEEE. In Greece the WEEE recycling facilities are part of a PRO;



- Informal sector / scavengers: the illegal collection from unregistered scrapyards and backyard collectors (mainly from specific minorities, homeless people and immigrants), or stored quantities from previous years.
- Scrap dealers: legitimate or illegitimate scrap collectors and treatment facilities who collect and manage WEEE as scrap. In many cases. In Greece certain scrap yards are registered with the PROs (Appliances recycling S.A. is cooperating with more than 250 scrap yards) with the majority of them being unregistered and even unlicensed. The registered scrapyards are getting a paid compensation for having collection points in their facilities (container) from which the PRO is collecting and then delivers them to one of the treatment facilities.
- WEEE traders and brokers: these actors buy WEEE and sell them to other parties not necessarily in the same country and not always in a legal way, in unknown destinations of illegal exports most of which is assumed to end-up in Africa or Asia for some form of material recovery. These actors are a challenge for both PROs (unable to close their mass balances) and to recycling facilities due to the unfair competition and the loss of quantities (loss of revenue due to the loss of incoming quantities).
- Metallurgical Industry: The end-users of the metallic recovered material, where further refining and use as a raw material is happening. The metallurgical industries can be divided in three production operations: primary (processing of ores to extract metals to produce alloys); secondary (using scrap and salvage for the manufacturing of alloys); and miscellaneous (industries with operations producing or using metals for final products. They include aluminium and copper smelters and blast furnaces.
- Other specialised material recyclers: Recycling facilities for materials other than metals e.g. plastic, glass, oils, concrete, mercury etc.
- Hazardous waste companies, Industrial landfills for disposing hazardous materials, recycling plants of hazardous materials, treatments plants for distraction of Hazardous materials.

There are two PROs for WEEE: Appliances Recycling (covering all WEEE categories, both household and non-household sources) and Fotokiklosis (covering lamps, lighting equipment, and some small appliances). They collect WEEE via bins located, for example, in public and private locations and shops. The PRO for portable batteries, AFIS SA, organises the separate collection via its partner network (Ministry of Environment and Energy, Secretariat-General for Waste Management Coordination, Directorate for Waste Management, 2021).

Appliances Recycling SA is an official Producer Responsibility Organization (PRO) for Waste Electrical and Electronic Equipment (WEEE) management in Greece. The company is established on June 2004 by the leading Producers in the electrical/electronic field and operates in the Greek market. The role of the company is to organize, coordinate and supervise all stages of WEEE management chain, including collection, transportation, storage, reuse and



treatment of WEEE, so that hazardous substances are eliminated after the proper waste management and recovered materials are streamed back into production.



The mission of Appliances Recycling SA is based on the principle that preventive action should be taken by the polluter, in order to rectify environmental damage at source. The company's activities aim at the environmentally proper treatment of WEEE and the recovery of WEEE components in order to be used as raw material in the production of new products.

The company's objectives are:

- To contribute to the achievement of the national targets set by the Greek Legislation.
- To ensure excellence in environmental protection through a strict selection of suppliers and a continuous monitoring of the activities at all stages of the WEEE management chain.
- To continuously optimize the procedures of the company operation in order to improve efficiency at a low cost for the stages of the WEEE management.

Fotokiklosi S.A. is a nonprofit Collective Scheme founded in December 2005 for Waste Electrical and Electronic Equipment (WEEE) management in Greece.



The goal of FOTOKIKLOSI S.A. is to:

- Improve the country's performance in terms of waste recycling indicators
- Widely inform the professional and consumer public about the feasible way and the benefits of recycling in the context of the value of environmental protection
- Implement the Legislation regarding the management - collection - processing - recycling of WEEE.



Fotokiklosi S.A. is continuously improving its operation structure and is continuously searching for partners and local operators in respect to its commitments and the main aim to protect the environment and inform citizens about properly WEEE treatment. More than 8.500 collection points nationwide, including the islands, our network includes local authorities, municipalities, military, retailers, supermarkets, banks, schools and universities and other selected points. In order to track all waste from pick up to final treatment, the system has developed a fully dedicated information system.

Fotokiklosi S.A. has developed educational programs for schools and local communities about the importance of proper treatment of waste, environmental protection, and circular economy.

ECORESET SA (located in Attica Region) was established in 2010. The company develops techniques for the industrial separation of composite streams of materials and the recovery of usable raw materials and resources, aiming to reintroduce them into the production chain, as well as the maximum diversion of materials from landfill.



By implementing the best available practices, ECORESET carries out processes for the environmental management of end-of-life cables and electrical/electronic equipment, shredder residues and other composites, from which it recovers secondary raw materials (metals, plastics, inerts, etc.) and materials for energy recovery by the industry.

ECORESET is the only industrial company fully licensed to manage WEEE in the Prefecture of Attica, and is under contract with ELECTROCYCLE SA, the Collective System for the Alternative Management of WEEE, receiving each year 25% of the total WEEE collected in Greece.

After all the hazardous elements have been removed, the appliances are dismantled in specialised production lines, where their components are marked for re-use, recovery of useful parts, accessories and recyclable materials. Through the production process, metals (ferrous, non-ferrous and alloys), non-metal materials (plastics, glass) and inert materials are recovered and reintroduced in relevant production activities or forwarded for energy recovery by the industry sector, while a very small fraction of 0.5-1% is taken to landfill.

Adhering to the hierarchy set by the European legislation on sustainable waste management, as well as to the Circular Economy principles, the company gives priority to re-use, recovery of recyclable materials and energy recovery, thus exploiting more than 96% of all its total infeed materials.

By continuously investing in the research and development of know-how, ECORESET diverts more than 32,000 tonnes of materials from landfill each year and therefore ranks among the best companies in its sector. Given its environmental performance, the award-winning company contributes positively to the protection of citizens' health from the leakage of harmful substances into the soil, the air and the water.



EKAN SA (located in Peloponnese Region). The Hellenic Recycling Center S.A. (EKAN S.A.) was founded in June 2002 with a scope for the treatment of Waste of Electrical and Electronic Equipment (W.E.E.E.) according to the Law 2939/2001 (Solid Waste Management & Producers responsibility) and the Presidential Decree 117/2004 (transposition of the EU Directives 2002/95/EC (RoHS) & 2002/96/EC (WEEE) into national law).



In October 2004, EKAN S.A. signed a contract with the company “Appliances Recycling S.A.”. The full operation of company’s plant for the dismantling and recovery of WEEE, as well as the removal of hazardous waste, started in August 2005.

KONSTANTINIDIS BROS SA (located in Thessaloniki, Central Macedonia Region) is the first company in Northern Greece to recycle waste electrical and electronic equipment.



It has a fully automated unit for decontamination of refrigerators and air conditioners, achieving very high rates of material recovery, with a clear environmental benefit.

Refrigerators, air conditioners, computers, televisions, washing machines, kitchens, but also small household appliances are collected in the company, in a specially certified space “Primary collection and storage of WEEE”.

HELLENIC ENVIRONMENTAL RECYCLING SA (located in Larissa, Thessaly Region) grew rapidly having as its main aim the gathering and processing of metal scrap which, in turn, was given to the Steel Industries. At the same time, the company expanded by use of modern technology and equipment, giving emphasis on new machinery concerning gathering, compression, transferring, sorting and recycling of most of the waste like household, industrial or commercial waste.

It, also, has an expanding group of customers with a view to bring pioneering technology and all the necessary know-how to the Greek market.





AEGEAN RECYCLING SA (located in Lesvos Island, North Aegean Region). The range of services offered by AEGEAN RECYCLING SA. it applies to almost all the recycling categories that are approved in Greece. Thus, all the items described in the Environmental Conditions Approval Permit (EPA) can be collected, stored and processed at our site or forwarded to other management companies. About WEEE, the collaboration with Recycling Devices S.A. started in 2008 and the amount of waste that has been collected to date by the company reaches 7,000 tons.



A not small number if you consider that many of these species are abandoned in canyons and landfills while these materials are major sources of environmental pollution mainly due to the fluids contained in refrigerator motors (CFCs, chlorofluorocarbons, oils) and capacitors found in electronic systems.

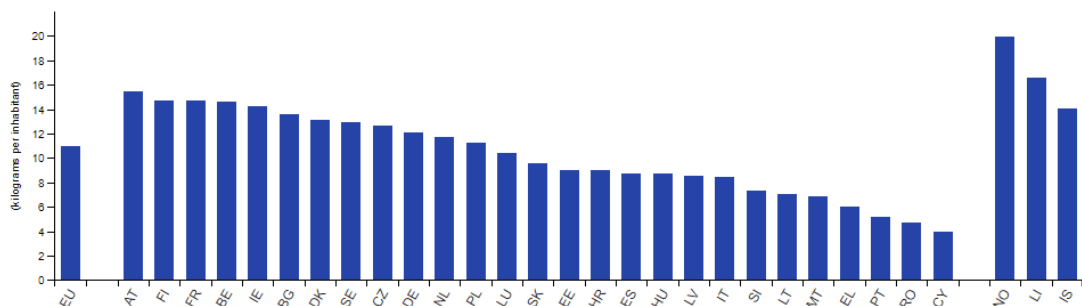
10. THE EEE/WEEE ECONOMIC CONTEXT

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 categories 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

Waste electrical and electronic equipment collected, 2021



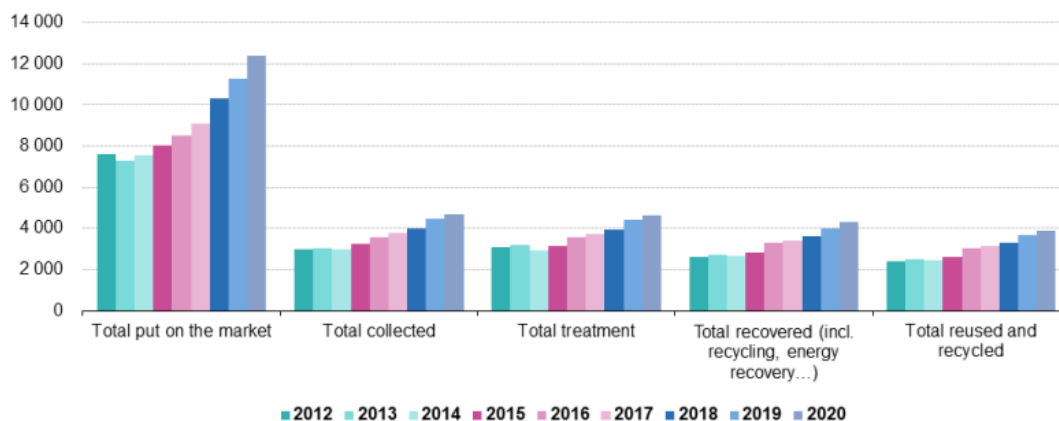
EU: Eurostat estimates.

Malta, Poland, Romania and Iceland: 2020 data.

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

the similar trend was observed with collected, treatment, recovered and recycled/reuse of EEE, resp. WEEE.

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)



Note: 2019 and 2020: Eurostat estimates

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

eurostat

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. The WEEE industrial and environmental impact

EU

The business environment surrounding Electrical and Electronic Equipment (EEE) and Waste Electrical and Electronic Equipment (WEEE) is influenced by various factors, including regulatory frameworks, technological advancements, consumer behaviour, and sustainability initiatives.

In the European Union (EU), the business environment surrounding Electrical and Electronic Equipment (EEE) and Waste Electrical and Electronic Equipment (WEEE) is heavily influenced by stringent regulations, sustainability initiatives, and evolving consumer behaviour. Here are key aspects shaping the EEE/WEEE business environment in the EU:

WEEE Directive

The WEEE Directive sets the framework for the collection, recycling, and proper disposal of electrical and electronic waste in the EU. It mandates extended producer responsibility (EPR), obligating manufacturers to manage the end-of-life disposal of their products.

Circular Economy Action Plan

The EU's Circular Economy Action Plan aims to promote a more circular approach to product lifecycles, emphasizing waste reduction, resource efficiency, and



recycling. This initiative influences product design, waste management strategies, and business practices.



Extended Producer Responsibility (EPR)

EPR programs in the EU require manufacturers to take responsibility for the collection, recycling, and disposal of their products at the end of their life cycle. This affects product design, material choices, and recycling infrastructure. Strict Waste

Management Regulations

The EU has stringent regulations governing the handling, recycling, and disposal of electronic waste, ensuring compliance with environmental standards and encouraging sustainable practices.

Consumer Awareness and Preferences

EU consumers are increasingly conscious of environmental issues. Their preferences for sustainable products, responsible disposal, and support for eco-friendly brands influence business strategies and product offerings.

Green Public Procurement

EU policies promote green public procurement, encouraging public authorities to choose environmentally friendly products and services. This incentivizes businesses to develop sustainable EEE products.

Innovation and Research

The EU invests in research and innovation for sustainable technologies and recycling methods, supporting businesses in developing eco-friendly products and waste management solutions.

Cross-Border Compliance

EEE/WEEE businesses in the EU must adhere to cross-border regulations and standards, ensuring consistency in waste management practices across member states. In legislation, this issue is defined in Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste. In order to protect the environment, the above-mentioned Directive prohibits the export of waste intended for disposal to third countries which are not EFTA (European Free Trade Association) countries, or which are not parties to the Basel Convention.

The EU's EEE/WEEE business environment is characterized by a strong regulatory framework, sustainability commitments, and a push for circular economy principles. Businesses operating in this sector navigate these regulations and



consumer expectations while innovating to develop environmentally responsible products and sustainable waste management practices. And last but not least consumer awareness and preferences- EU consumers are increasingly conscious of environmental issues. Their preferences for sustainable products, responsible disposal, and support for eco-friendly brands influence business strategies and product offerings.

10.2. The WEEE industrial and environmental impact on the policy area

As e-waste generation continues to rise due to increased consumption of electrical and electronic devices, the country faces both opportunities and challenges in handling this complex waste stream effectively.

From an industrial perspective, the WEEE sector has experienced growth, particularly in response to European Union regulations that require member states to properly manage and recycle e-waste. The establishment of specialized recycling facilities has contributed to the development of a formal WEEE management industry, creating jobs and fostering innovation in waste treatment technologies. Companies involved in collection, dismantling, and material recovery have expanded, supporting Greece's transition to a more circular economy. Programs such as LIFE RE-WEEE have played a crucial role in promoting reuse and refurbishment, allowing functional electronic devices to be repaired and reintroduced into the market. This has led to the rise of second-hand electronics businesses, offering affordable alternatives to new products while reducing e-waste generation.

However, Greek businesses face challenges in complying with strict EU directives, which often require significant investments in infrastructure and compliance measures. Many companies must allocate resources to meet regulatory requirements, which can be a financial burden, particularly for small and medium-sized enterprises. Additionally, the presence of informal recycling and illegal e-waste dumping reduces the effectiveness of the formal WEEE management sector. These informal practices not only lead to economic losses but also pose health and safety risks for unregulated workers handling hazardous components. Despite these obstacles, Greece has the potential to further develop its WEEE industry by enhancing enforcement measures, encouraging public participation in recycling programs, and investing in research and development for improved e-waste processing techniques.



The environmental impact of WEEE in Greece is substantial, as improper disposal of electronic waste can lead to severe pollution and resource depletion. Many electronic devices contain hazardous substances such as lead, mercury, cadmium, and brominated flame retardants, which can leach into the soil and water if not handled correctly. Illegal dumping and inadequate recycling efforts contribute to



contamination, posing risks to ecosystems and public health. When WEEE is processed in uncontrolled conditions, the release of toxic chemicals into the air and water further exacerbates environmental damage.

On the positive side, improved WEEE management helps mitigate these environmental risks. By increasing recycling rates, valuable materials such as gold, silver, copper, and rare earth metals can be recovered from discarded electronics, reducing the need for raw material extraction. This process not only conserves natural resources but also decreases energy consumption associated with mining and production. Greece has made progress in enhancing WEEE collection and recycling, with national programs working to raise awareness about the importance of proper disposal and sustainable consumption. The establishment of WEEE sorting centers in regions like Attica and Central Macedonia has also contributed to more efficient waste processing and material recovery.

Despite these advancements, challenges remain in ensuring that WEEE collection rates continue to improve. In 2022, Greece generated approximately 194 kilotonnes of e-waste, but only about 30.4% was formally collected and treated. This indicates a need for stronger infrastructure, better public awareness campaigns, and incentives to encourage responsible disposal behaviors. Expanding educational programs and promoting consumer responsibility could help increase participation in WEEE recycling initiatives. Furthermore, collaboration between government authorities, businesses, and research institutions could drive innovation in sustainable e-waste management practices.

In conclusion, WEEE management in Greece has both industrial and environmental implications that require continuous improvement. The growth of the recycling sector and the push towards a circular economy present opportunity for economic development, job creation, and technological advancement. However, regulatory compliance, illegal dumping, and low collection rates pose significant challenges. From an environmental standpoint, effective WEEE management can prevent pollution, conserve resources, and reduce energy consumption, but only if stronger measures are implemented to enhance collection and processing efforts. Strengthening regulations, investing in infrastructure, and promoting public awareness will be key to ensuring that Greece maximizes the industrial benefits of WEEE while minimizing its environmental footprint.

10.3. EEE/WEEE Education, skills and capacity building

10.3.1. National and Regional

Several initiatives in Greece focus on enhancing education, skills, and capacity building related to Electrical and Electronic Equipment (EEE) and Waste Electrical and Electronic Equipment (WEEE) management. These efforts are crucial for promoting sustainable practices, minimizing environmental impact, and ensuring the proper handling of electronic waste.

One notable project is BUILD UP Skills Greece, which aims to elevate the skills of professionals in key sectors, including energy, education & training, and building, with a specific focus on EEE and WEEE. This project recognizes the interconnectedness of these sectors and the importance of a skilled workforce to



implement effective EEE and WEEE management strategies. By providing targeted training and educational programs, BUILD UP Skills Greece contributes to a more knowledgeable and capable workforce, better equipped to handle the challenges of electronic waste.



Another valuable resource is the "Assessment of WEEE management in Greece" report, which offers a comprehensive overview of the current state of WEEE management in the country. This report delves into various aspects, including existing infrastructure, recycling processes, and, importantly, education and awareness initiatives. By providing a detailed analysis of the current landscape, the report helps identify areas for improvement and informs the development of more effective strategies for EEE and WEEE management. It serves as a valuable tool for policymakers, researchers, and practitioners working in this field.

The Countering WEEE Illegal Trade (CWIT) project is another significant undertaking that addresses the critical issue of illegal WEEE trade in Europe, including Greece. This project recognizes that illegal trade undermines efforts to manage WEEE responsibly and can lead to significant environmental and health risks. A key component of the CWIT project is its focus on education and awareness raising. By educating stakeholders about the dangers of illegal WEEE trade and promoting responsible practices, the project aims to curb this illicit activity and ensure that electronic waste is handled in an environmentally sound manner. The CWIT project highlights the importance of international cooperation and coordinated efforts to combat the global challenge of illegal WEEE trade.





11. STRATEGIC AND POLICY CONTEXT.

11.1. 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.

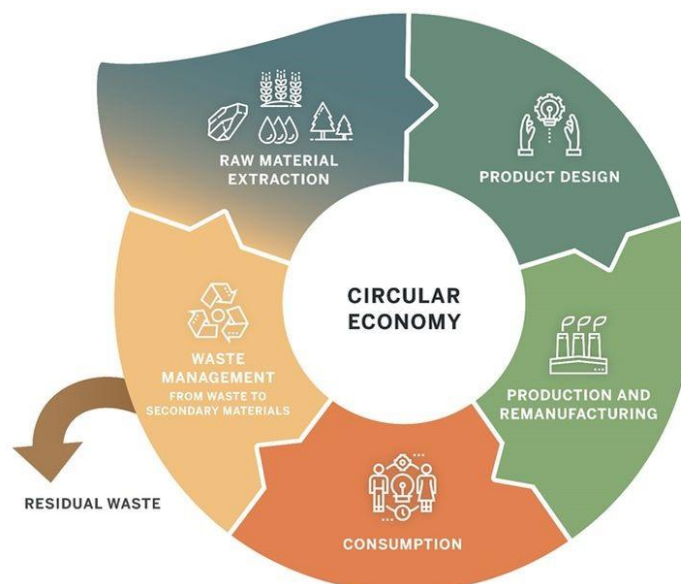
The RoHS Directive (2011/65/EU) complements these efforts by restricting the use of hazardous substances in electrical and electronic equipment. This directive promotes environmentally sustainable manufacturing practices and reduces risks to human health and the environment posed by hazardous substances.

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 policy

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

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

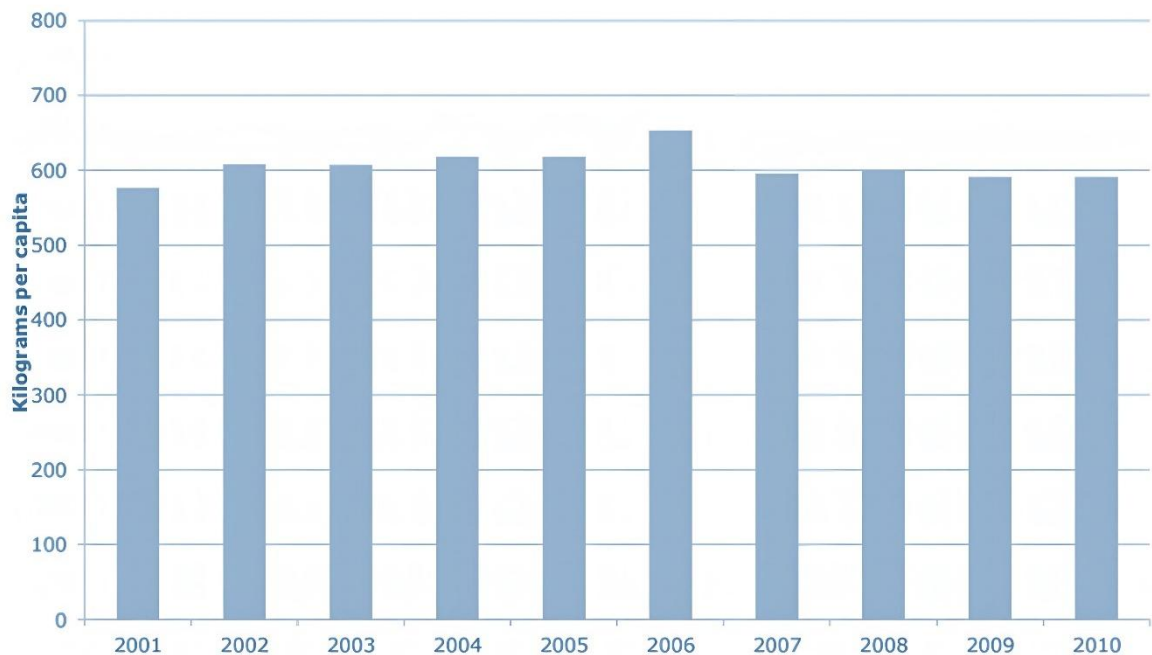
AUSTRIA



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.



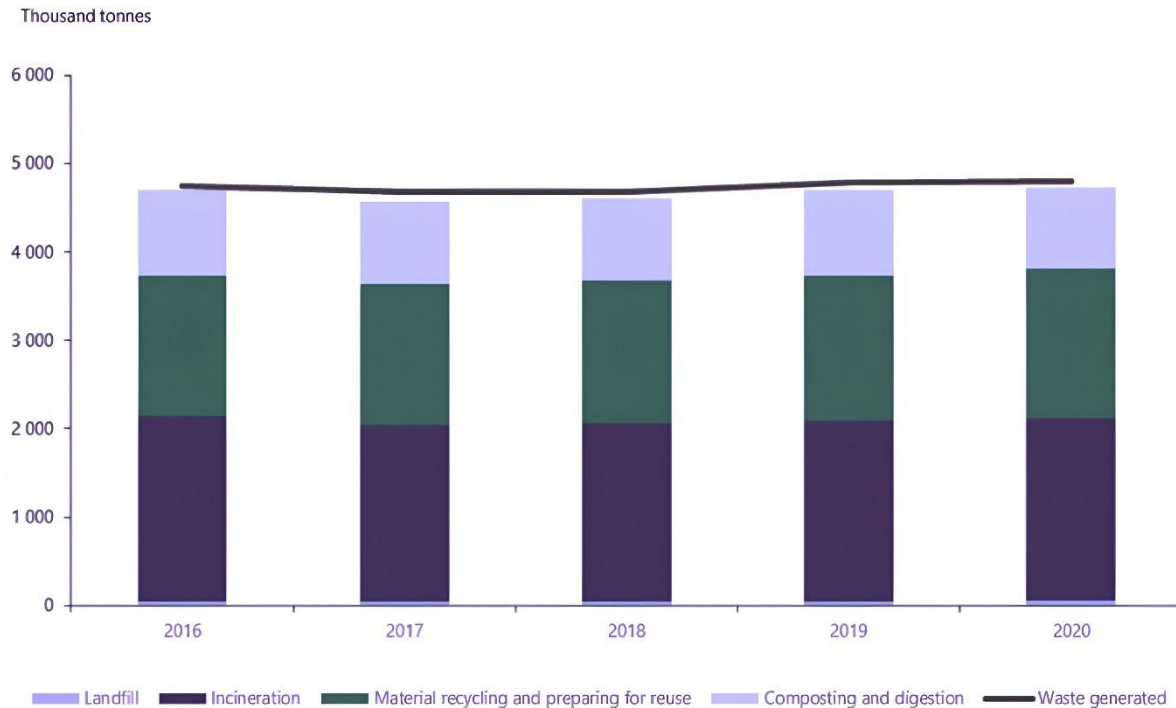
MSW generation in Austria for the period 2001-2010

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.

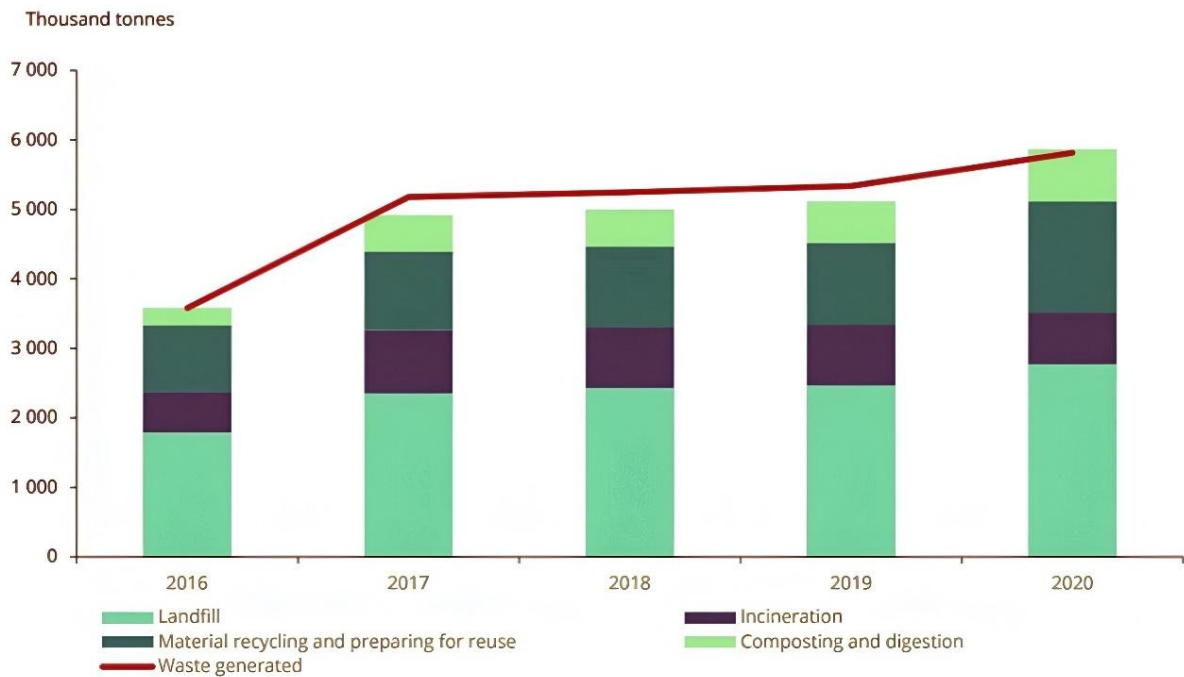


*Municipal waste generation and treatment in Belgium between 2016 and 2020, in thousand tonnes.
Source: European Environment Agency*

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.

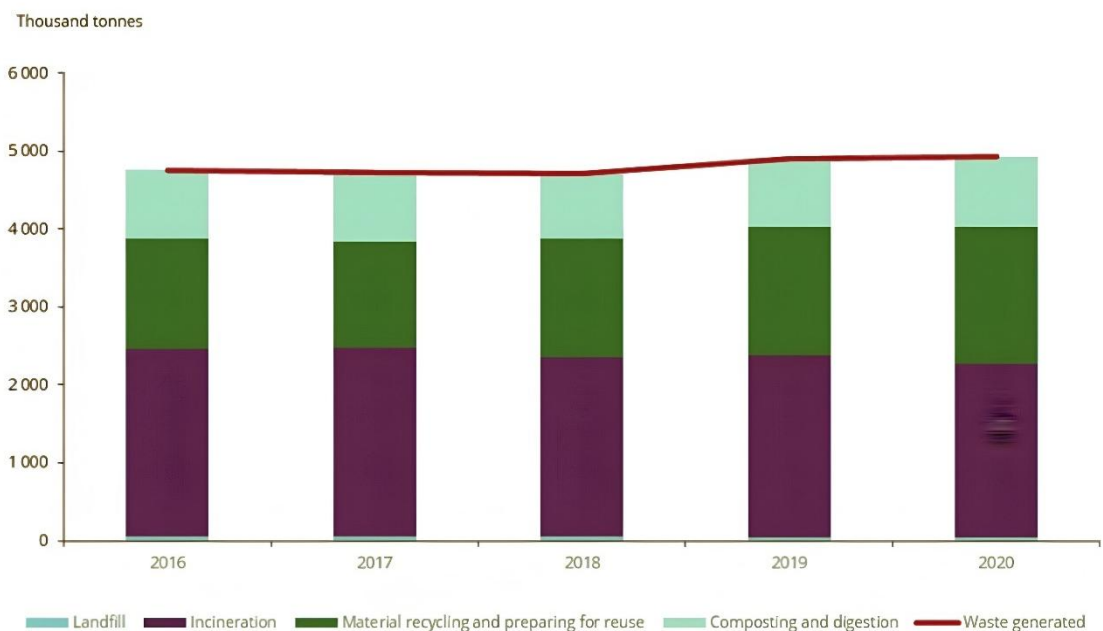
Generally, the Waste Act establishes the rights and obligations of persons in the field of waste management and regulates the obligations of waste generators (citizens, municipalities, towns and companies), the obligations of persons who collect, transport, treat, use and dispose of waste (landfills, 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:

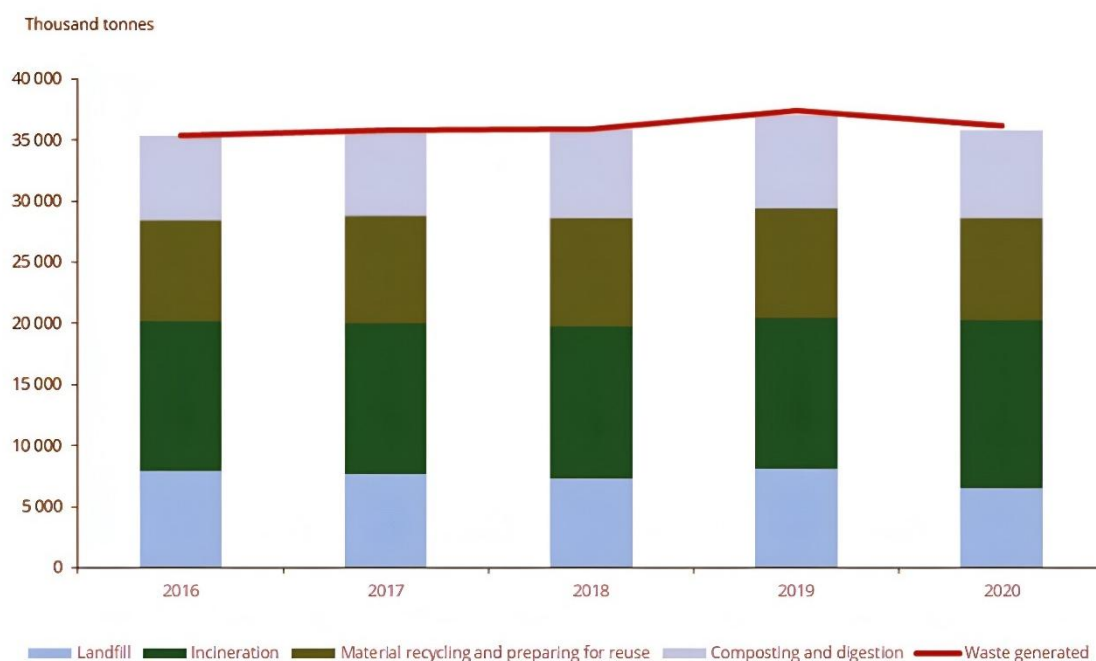
Producers:

- 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.



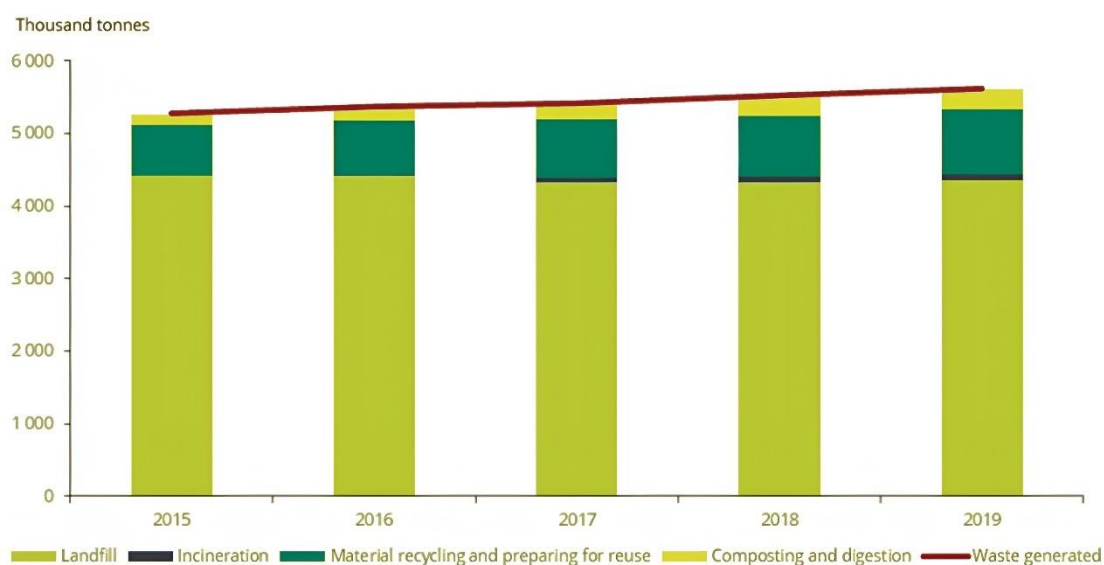
*Municipal waste generation and treatment in France between 2016 and 2020, in thousand tonnes.
Source: European Environment Agency*

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*

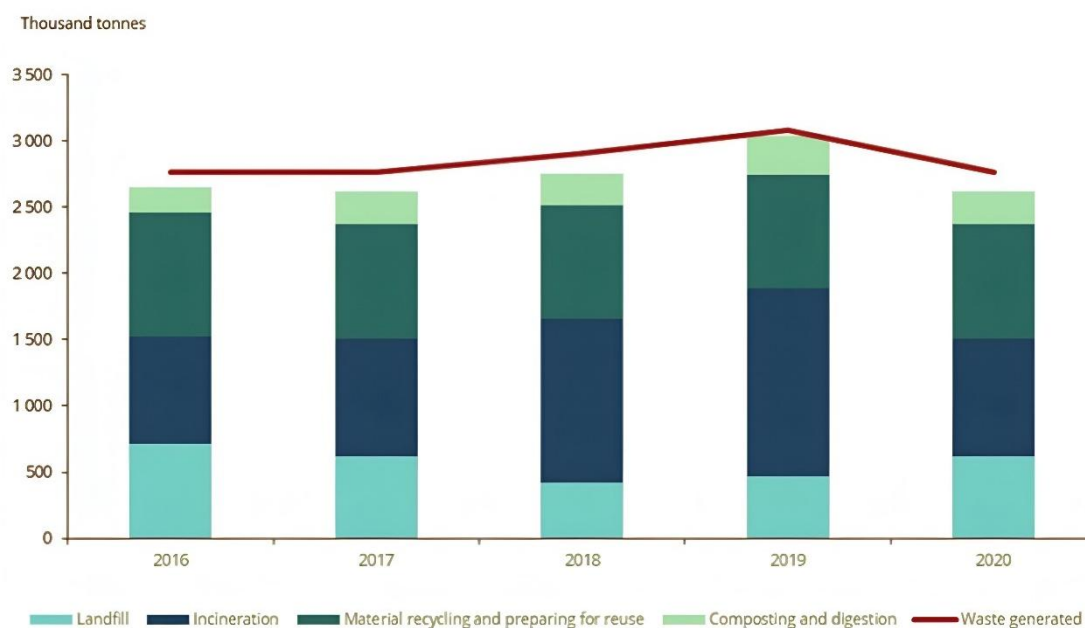
IRELAND

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.

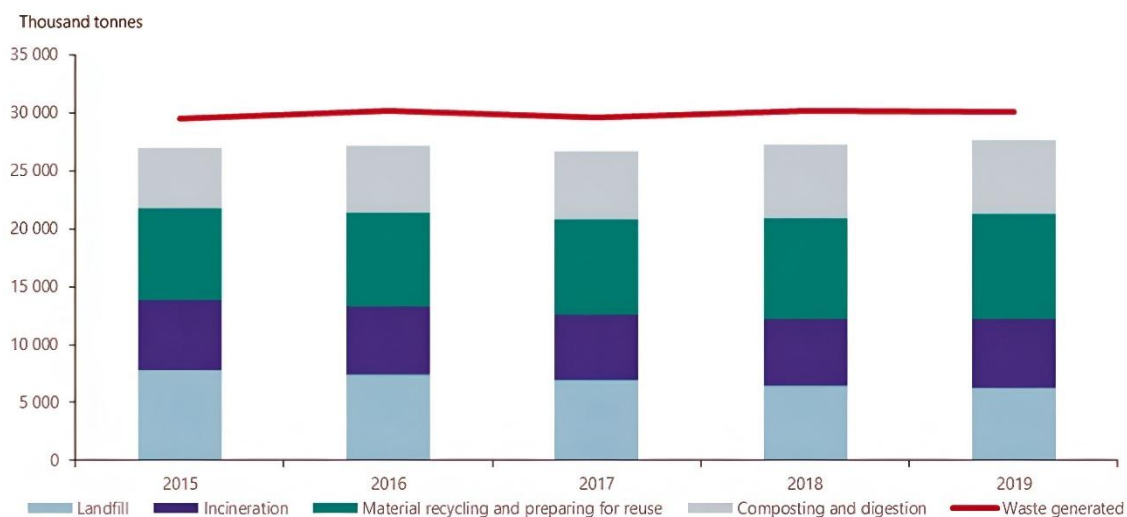
'One-for-Zero' Decree (Ministerial Decree No. 121 of May 31, 2016): This decree outlines simplified procedures for distributors to take back small-sized WEEE from households free of charge, without requiring the purchase of an equivalent product.

'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



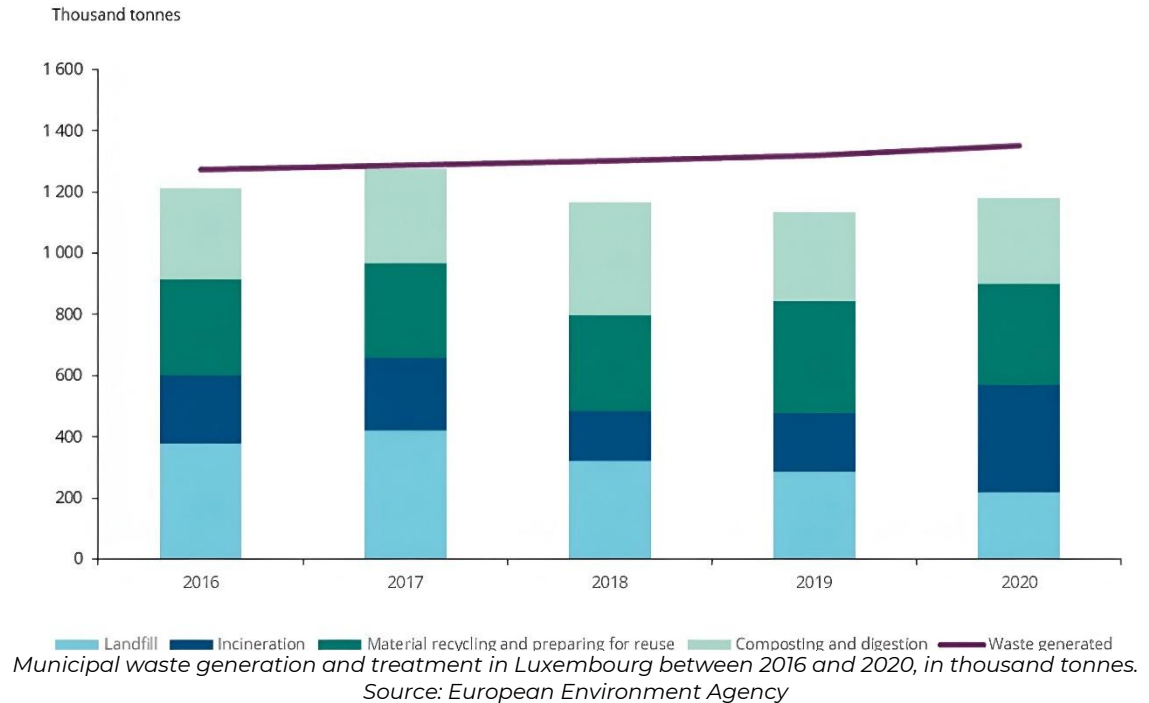
compliance with EU directives, contributing to the reduction of negative environmental impacts associated with EEE production and waste management.



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:

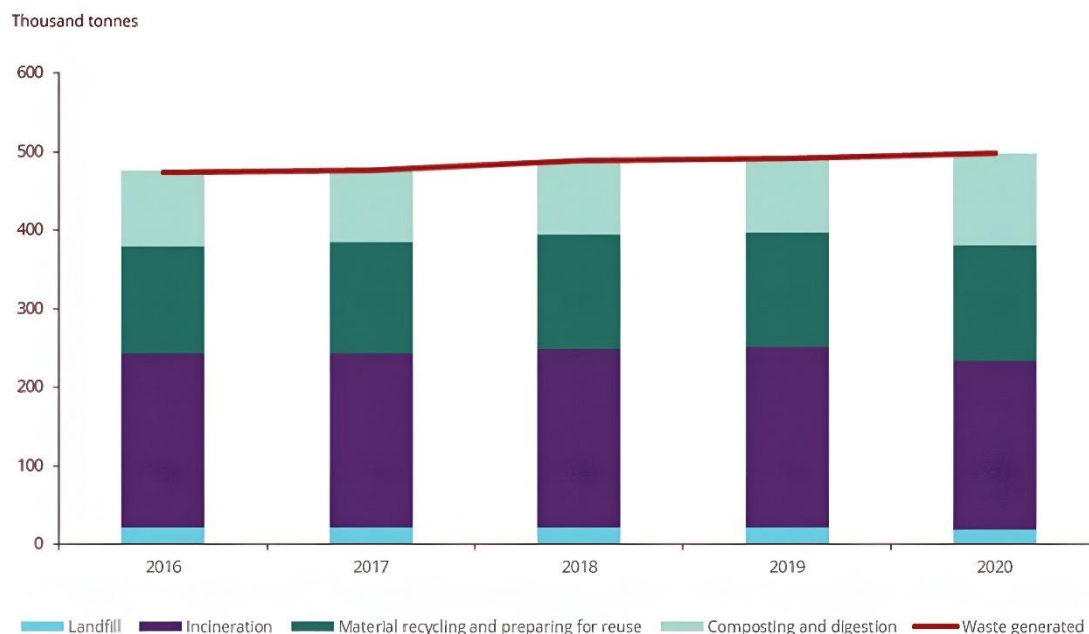
- To finance the take-back and treatment of WEEE from the exit of the selective collection points according to their current market share for the historical WEEE
- To provide a guarantee for the take-back and treatment of appliances placed on the market after the 13th of August 2005

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.

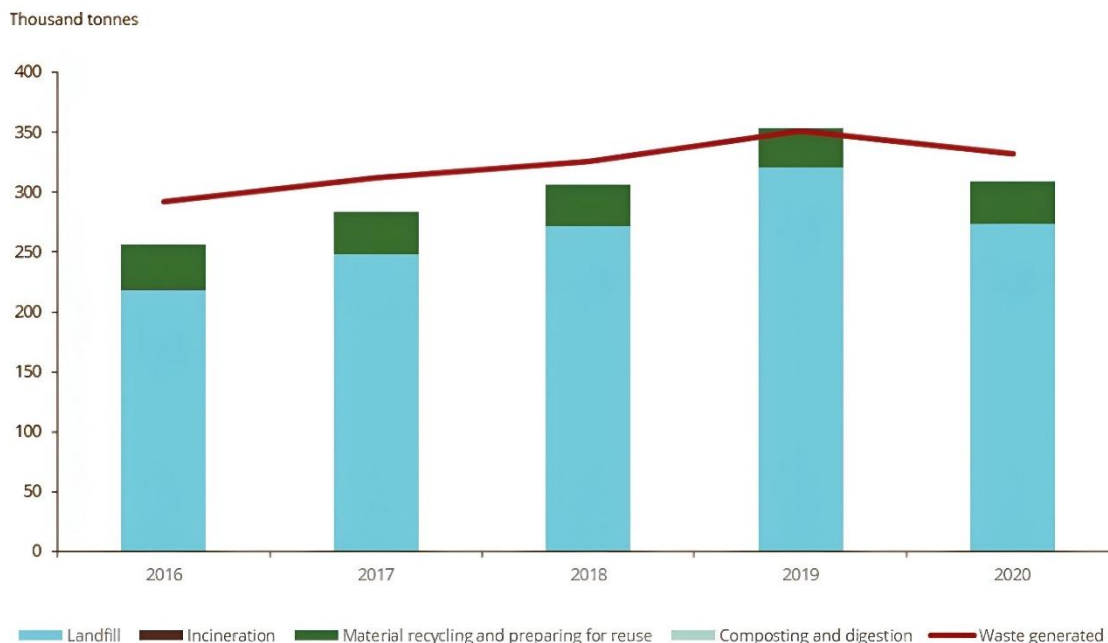
A voluntary agreement has been signed between the ministry of environment, the municipalities and the private sector. This agreement specifies the rights and obligations of each stakeholder.



*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.

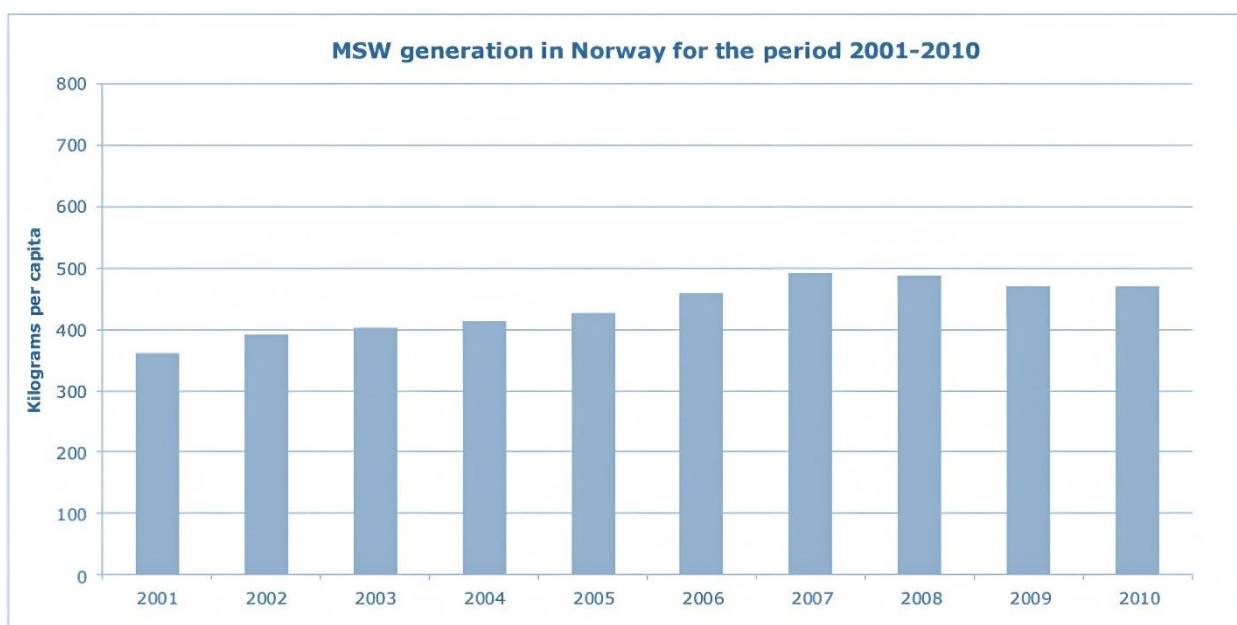


Municipal waste generation and treatment in Malta between 2016 and 2020, in thousand tonnes.
Source: European Environment Agency

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).

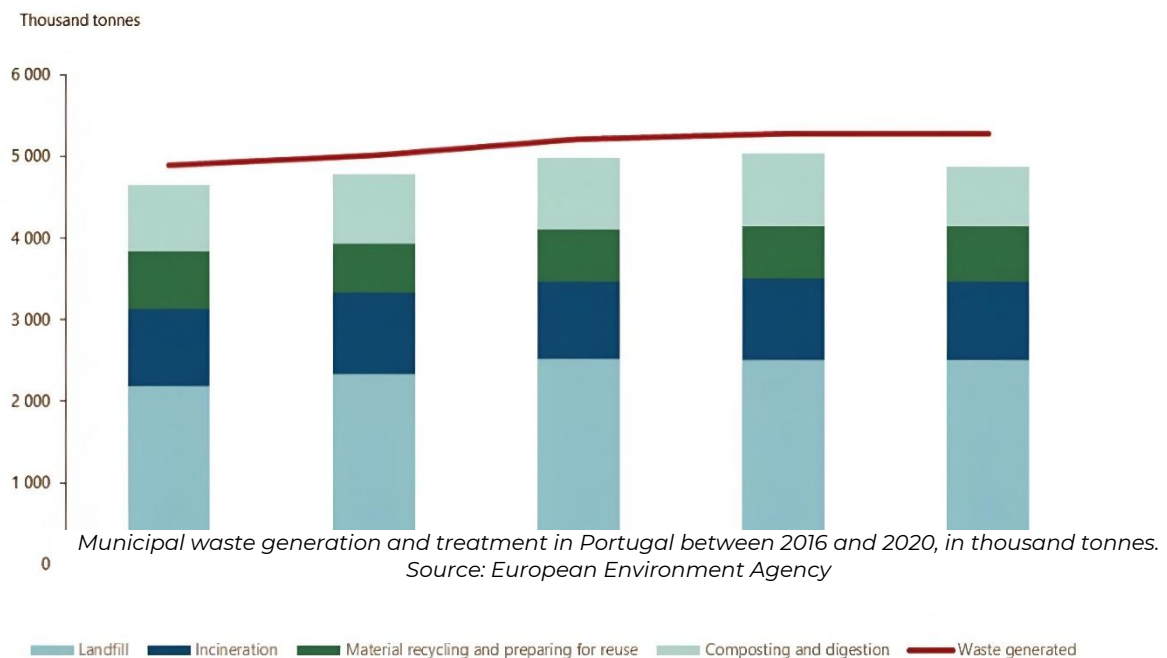
- Producers are to finance the take-back, sorting, and correct treatment of put on market for WEEE.
- Retailers and municipalities to free of charge take back WEEE from households



PORTUGAL

The WEEE European legal frame, defined by Directive (2012/19/CE), where transposed into law in Portugal on December 2017 by Law Decree n° 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:

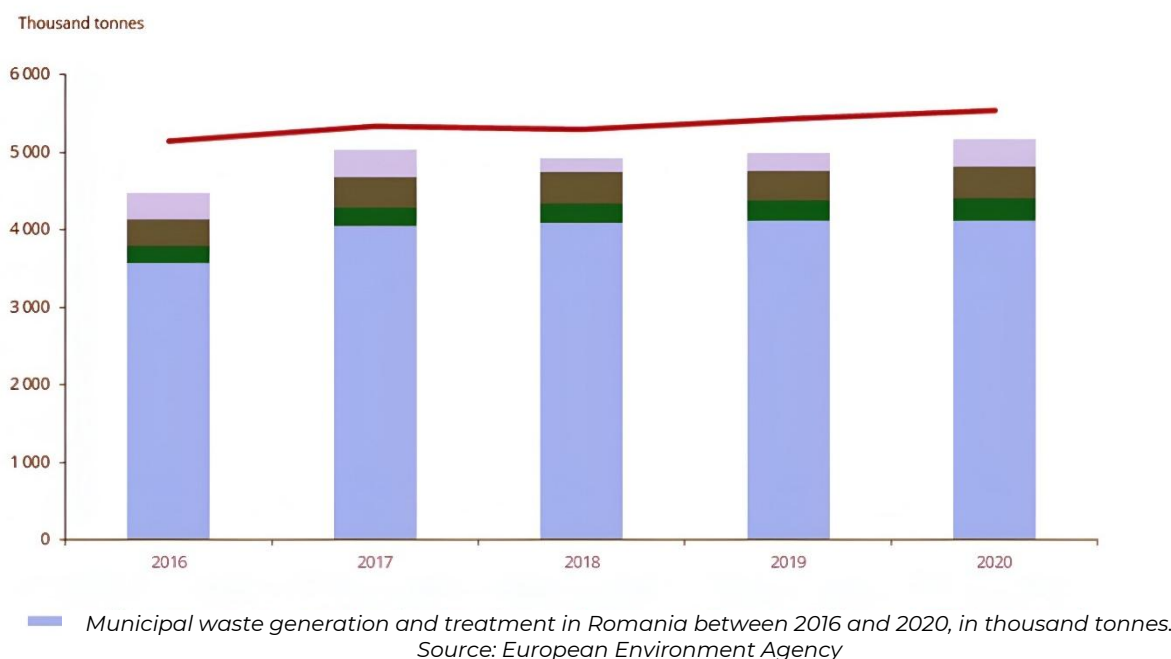
- Meeting ecological protection requirements to facilitate the reuse and treatment of WEEE.

- 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.

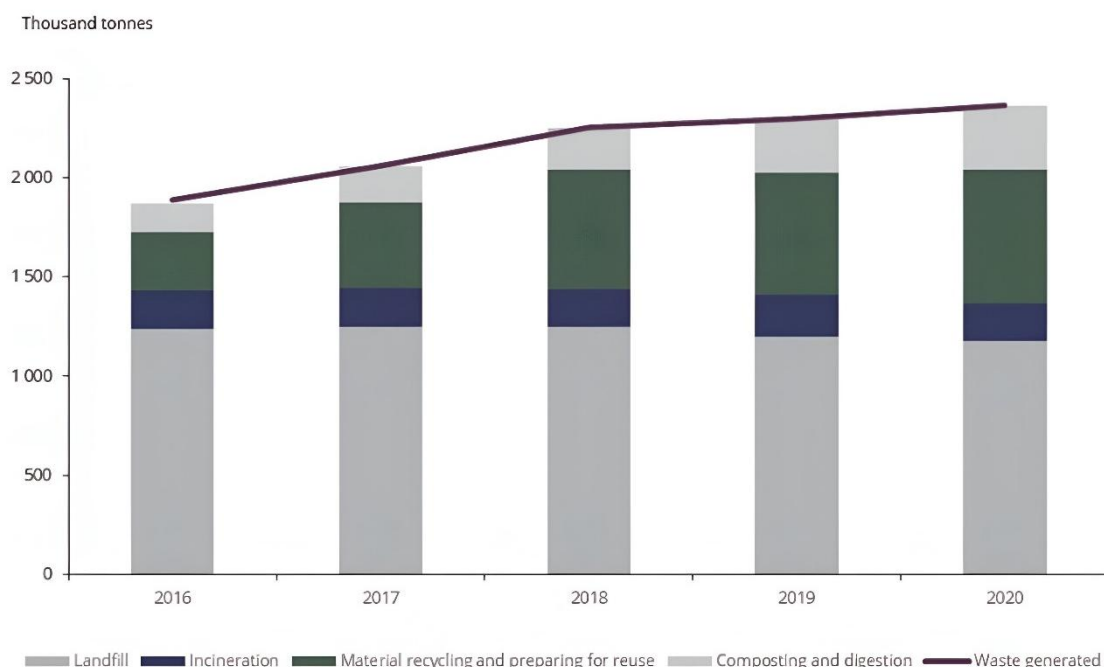


SLOVAKIA

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



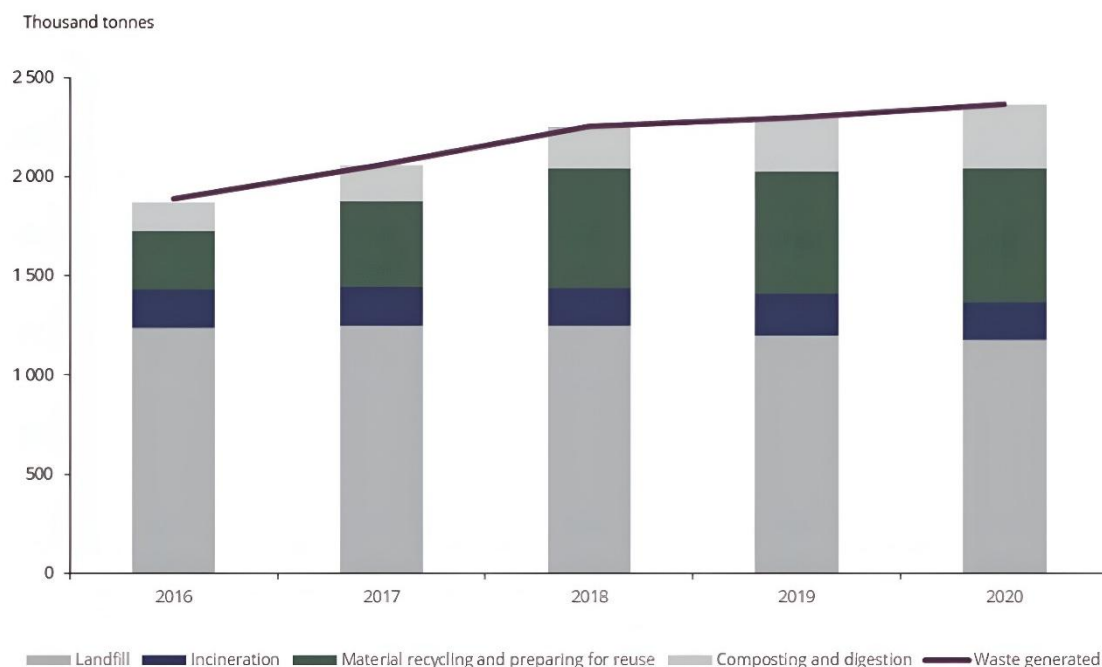
end-of-life appliances. Producers' obligations are determined by their market share, and permits and authorizations are required for producer responsibility organizations. However, municipalities are not obligated to provide separate collection of WEEE, although they must offer their collection capacities 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

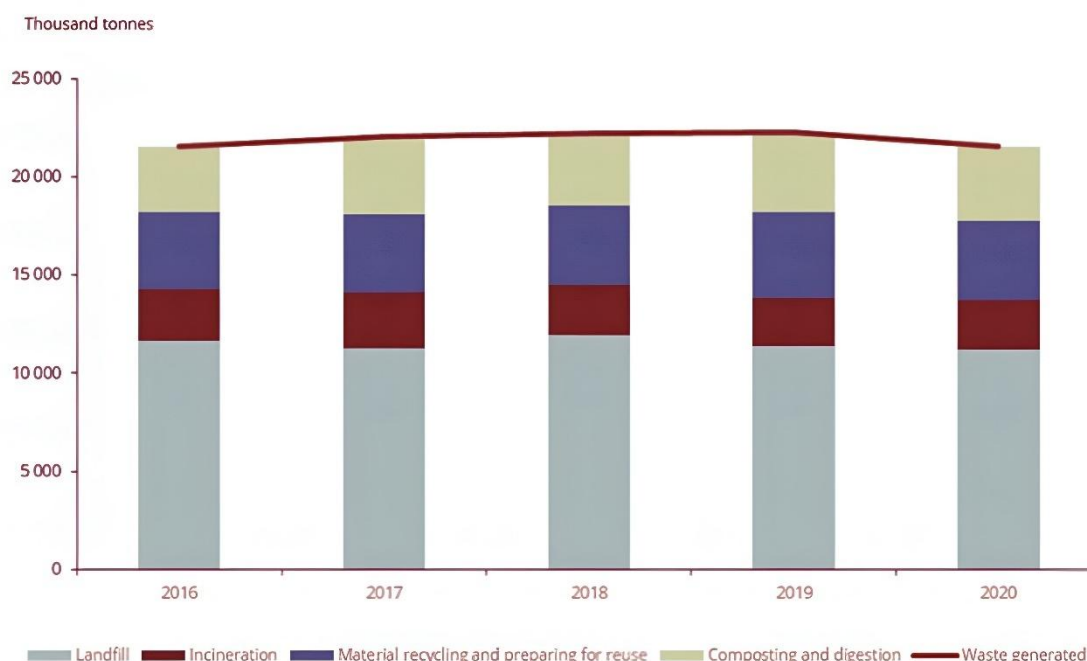
The Spanish law transposed the WEEE Directive 2002/96/CE through Royal Decree 208/2005 on February 25, 2005. Subsequently, the update of the WEEE Directive in February 2012 was transposed into Spanish law through RD 110/2015.

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.

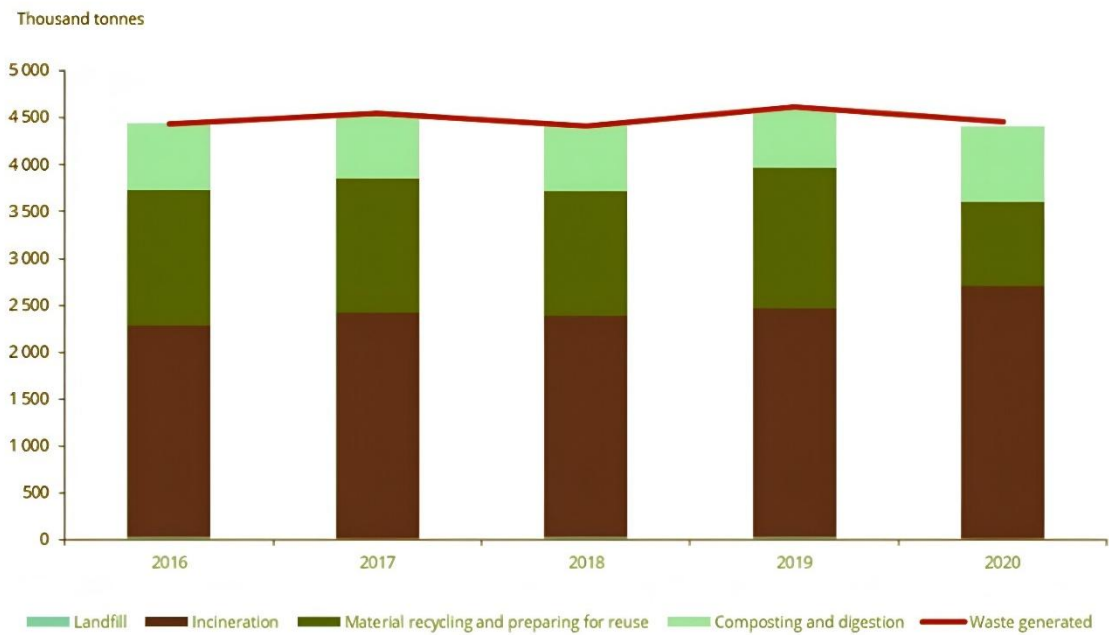


Municipal waste generation and treatment in Spain between 2016 and 2020, in thousand tonnes. Source: European Environment Agency

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.

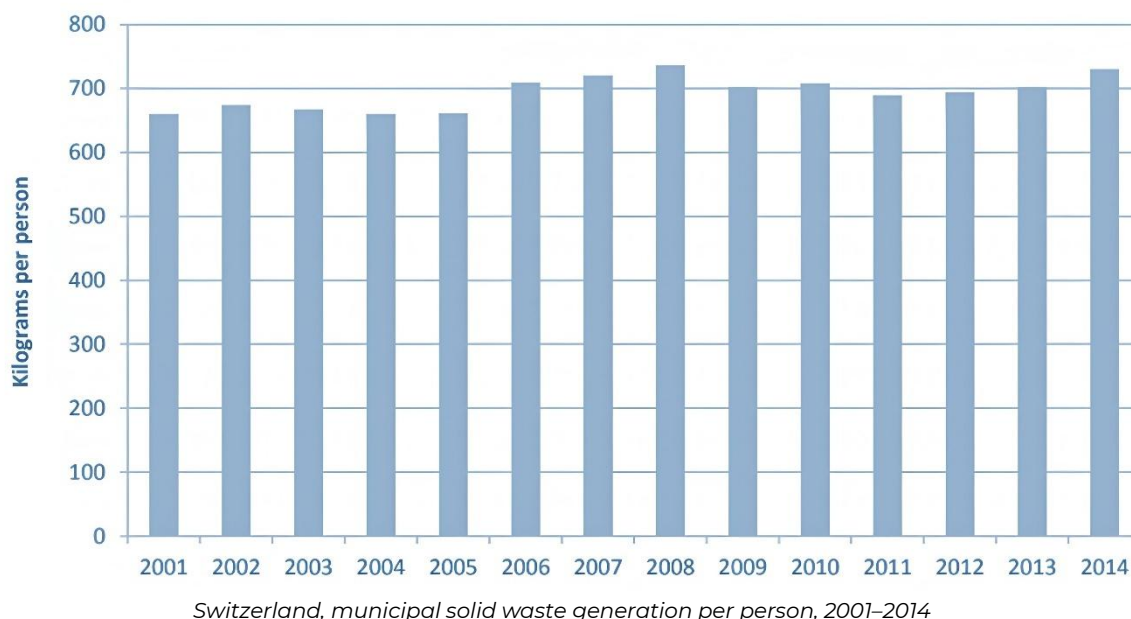


Municipal waste generation and treatment in Sweden between 2016 and 2020, in thousand tonnes.
Source: European Environment Agency

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.



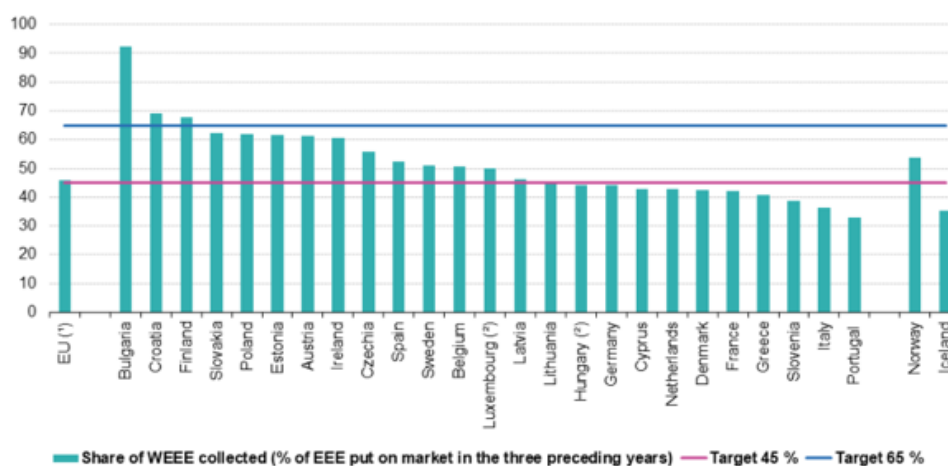
11.3. Implementation level of policies

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 (EEE), 2020
(% of the average weight of EEE put on the market in the three preceding years (2017-2019))



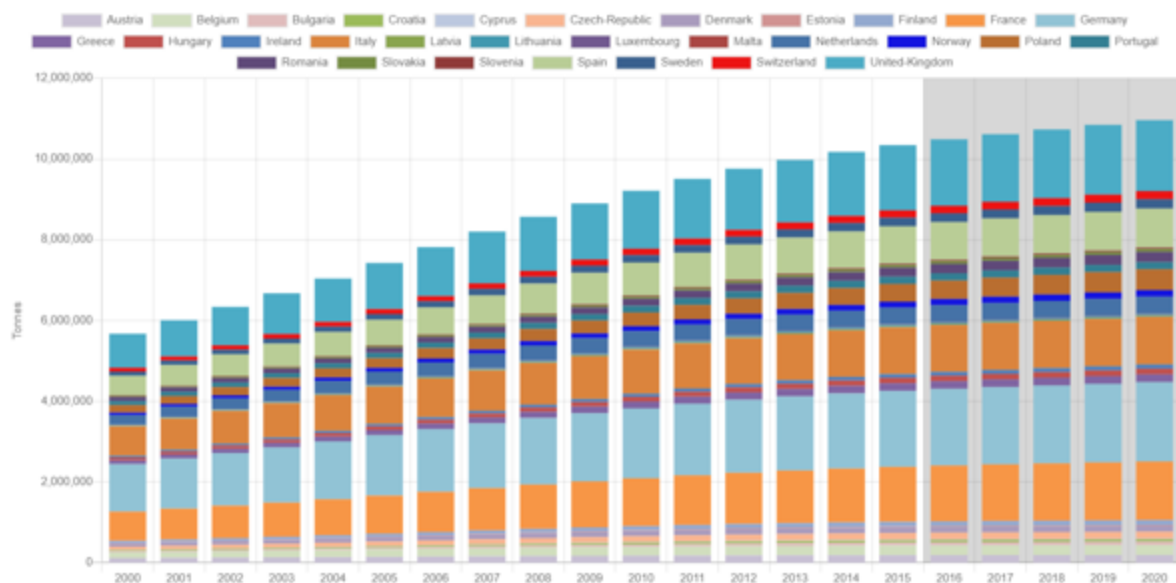
Source: Eurostat (online data code: env_waseleees and env_waselee)

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.

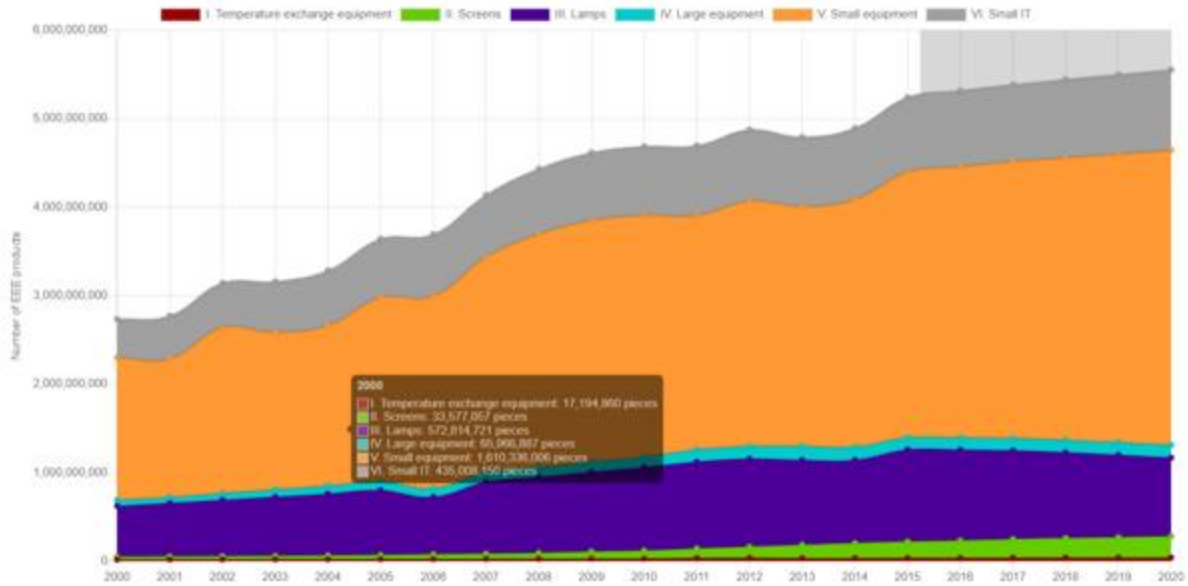


Weight of EEE - Waste Generated. Source:
<http://www.urbanmineplatform.eu/urbanmine/eee/weightpercountry>

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.



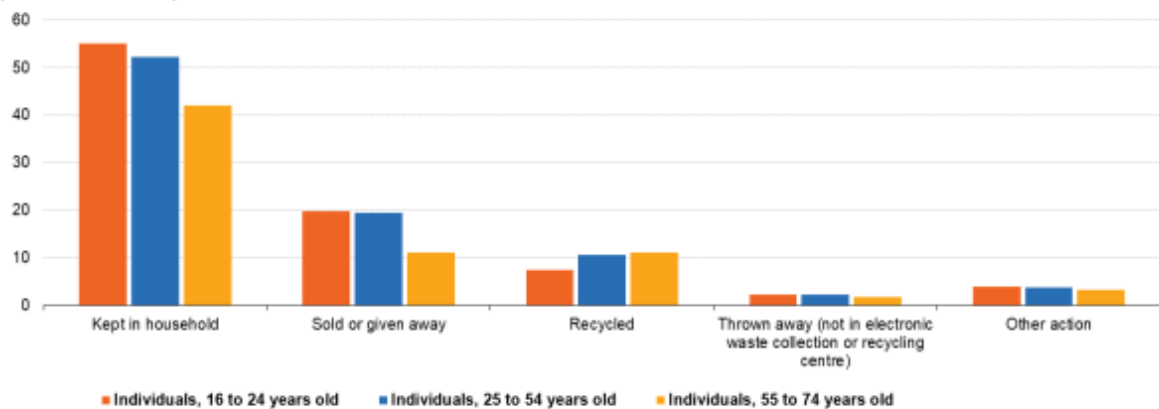
Number of EEE products - Waste Generated in EU28 + Norway and Switzerland.

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)

eurostat

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 in 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 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 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.

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

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

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

12.1. Policy samples for increasing collection

Leading initiative 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.

Leading Initiative 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.

Donner une seconde vie aux objets, le geste solidaire !

Où donner ?
Redonnez de la valeur à vos objets et vêtements en les donnant au centre Emmaüs le plus proche de chez vous.

Où acheter ?
Faites un achat solidaire et responsable en achetant un objet ou un vêtement revalorisé par nos centres Emmaüs.

Trouver un centre

Trouver un centre



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

Leading Initiative 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.

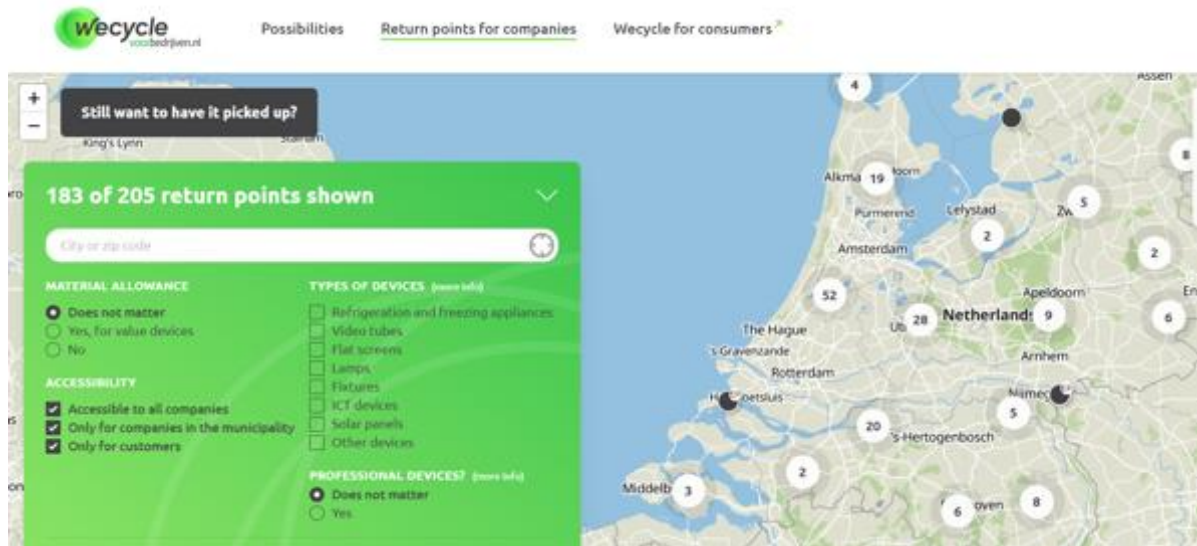
In 2022, the OPEN Foundation has collected a total of 159 million kilos of e-waste in collaboration with our chain partners. In addition, more than 11 million kilos were offered to certified processors via metal recyclers: 2% more than last year; a good start to our effort to minimize the most important '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

Leading Initiative 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 Ecolsoles (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.

Leading Initiative 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 Centers 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 Hagisse, 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](#)
**Cello 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

Leading Initiative 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.

Leading Initiative 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.

Leading Initiative 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

Leading Initiative 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.

Leading Initiative 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.

Leading Initiative 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 >](#)

Leading Initiative 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.

Leading Initiative 5: Back Market. FRANCE

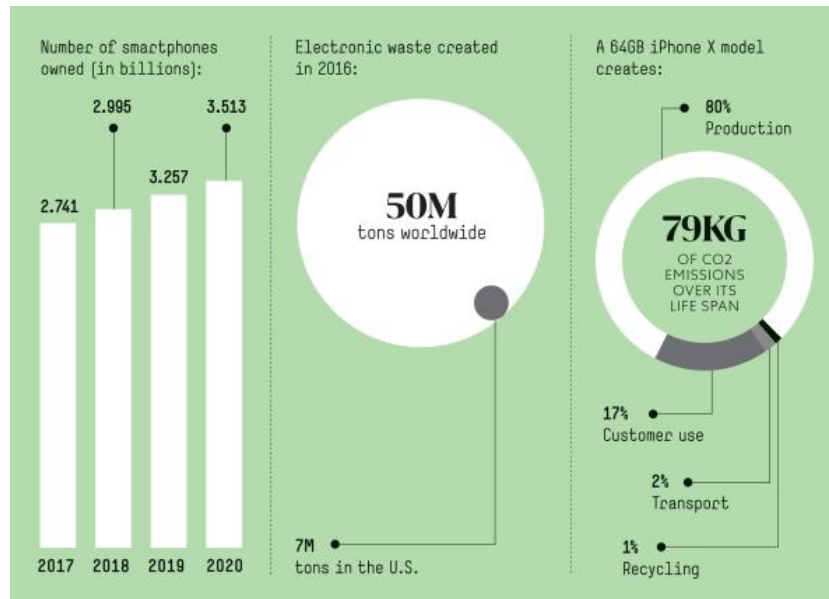
Introduction

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.

Leading Initiative 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.

Leading Initiative 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.

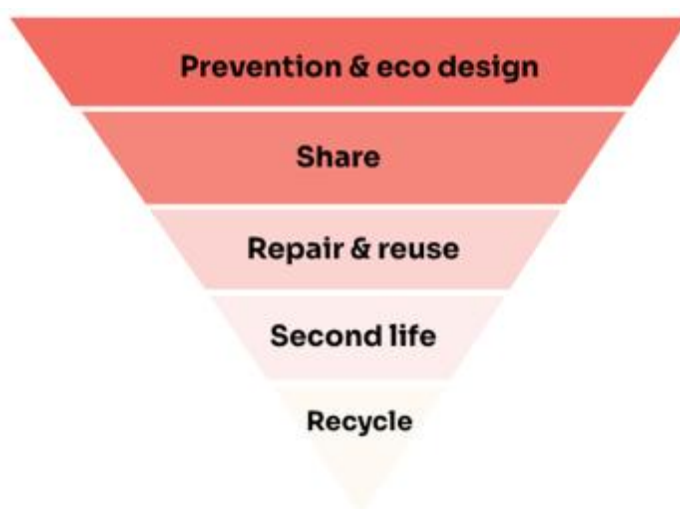
Furthermore, this enterprise is also committed to sustainability and compensates for the CO2 emissions its transport and delivery solutions create, minimizing its impact on the local environment. Bolt is one of the few mobility companies that offsets the carbon emissions of all its rides globally. They 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



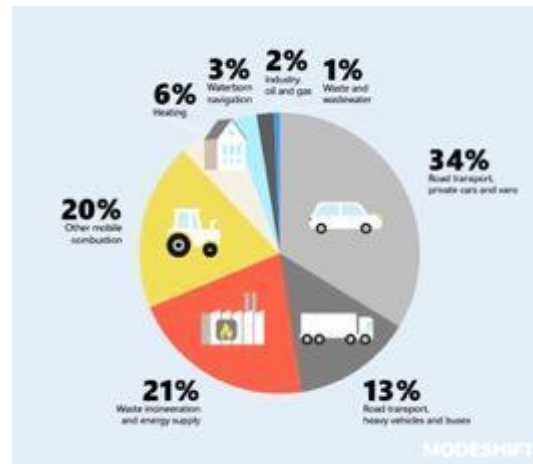
end of the life cycle thus managing to reduce waste from hardware, thereby embedding circular economy principles across the scooter operations. That is the main reason why they're using, reusing, maintaining, and repairing resources wherever possible to reduce waste and the need for new raw materials 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 Klima, 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.



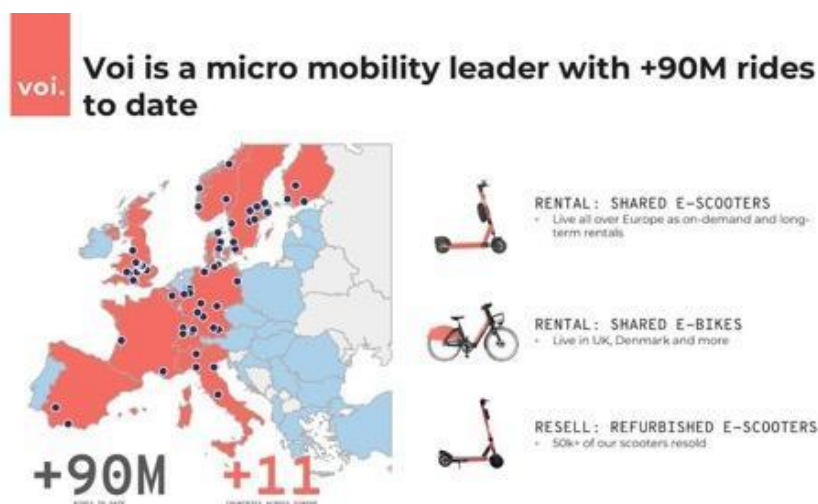
Leading Initiative 8: Voi. SWEDEN

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.

voi.

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



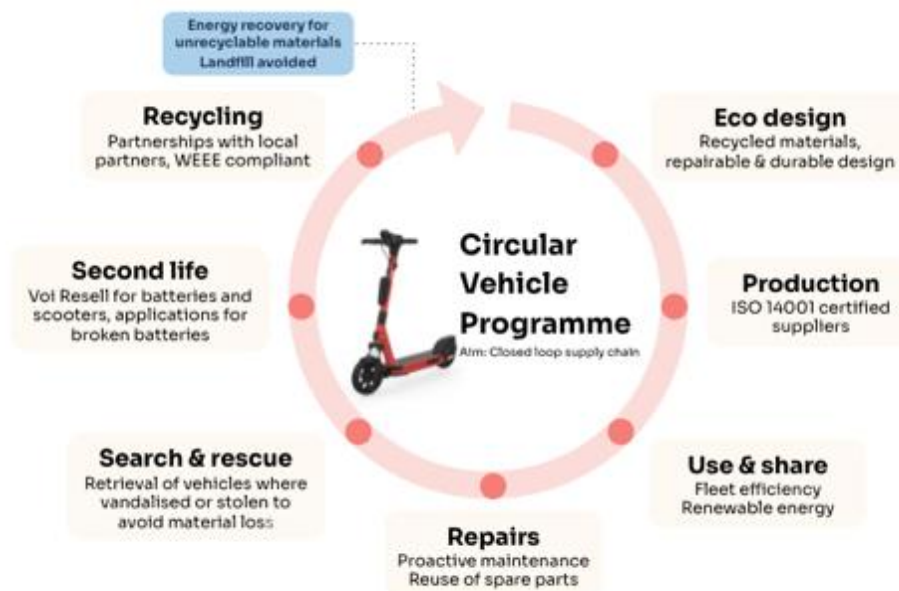
Voi, as a provider of electric scooters, falls under the category of producers of electrical and electronic equipment. As such, it has responsibilities under the Waste Electrical and Electronic Equipment (WEEE) regulations. These responsibilities include ensuring the correct disposal and treatment of 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, Municipality of Rethymno will be in charge of carrying out the pilot called WEEE BEHAVE, which will implement a competition and awareness campaign at schools and city halls, presenting the idea that cooperation is required at every level of the society.

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

School-Based Competition & Awareness Campaign

- Number of participating students: This measures the reach of the campaign within the school system.
- Number of participating schools: This shows how widespread the campaign is across the school district.
- Student engagement: This could be measured through surveys, focus groups, or observation of student participation in campaign activities.



- Changes in student attitudes and behaviors: This could be measured through pre- and post-campaign surveys or assessments of student knowledge and understanding of cooperation.
- Teacher involvement: This measures the level of support from teachers and their engagement in the campaign.
- Number of external organizations (NGOs, sponsors) supporting the campaign.

City Hall Awareness & Participation Campaign

- Number of participating city departments: This shows how many departments are involved in the campaign and committed to cooperation.
- Number of city hall employees involved: This measures the reach of the campaign within the city government.
- Changes in city hall policies and practices: This could be measured through an analysis of new policies or changes in existing ones that promote cooperation.
- Public awareness of the campaign: This could be measured through surveys or media coverage.
- Community engagement: This measures the level of participation from the wider community in campaign activities.
- Number of new policies or procedures introduced to improve cooperation between departments

Overall Campaign Impact & Long-Term Sustainability

- Number of campaign events and activities: This shows the level of activity generated by the campaign.
- Media coverage: This measures the amount of media attention the campaign receives, which can help to raise awareness and promote cooperation.
- Social media engagement: This measures the level of online interaction with the campaign, such as likes, shares, and comments.
- Partnerships: This measures the number of partnerships that are formed between schools, city hall, and other organizations as a result of the campaign.
- Sustainability: This measures the extent to which the campaign's impact continues beyond the pilot phase.

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

Meetings among local stakeholders, businesses, primary education representatives and authorities on WEEE recycling are particularly important for the region of Rethymno, as they foster shared understanding and coordinated action. Through dialogue and knowledge exchange, local challenges and opportunities are identified, while environmental responsibility and collaboration across the community are strengthened.

After the first engagement with local businesses and the educational visits to schools, it became clear that political and institutional bodies should support the continuation and expansion of these actions. This includes integrating the results into local planning, improving recycling infrastructure, and promoting policies that raise awareness and encourage citizen participation.

At this stage, the priority is to secure approval and active engagement from stakeholders through a joint discussion that identifies problems and explores solutions. Building consensus and a shared vision is essential before implementation, ensuring future actions are coordinated, effective and sustainable.

14.2. Evidence from WP2 Pilot Solutions

Educational campaigns and school visits showed strong participation from school units, with students demonstrating interest, effective cooperation and active knowledge exchange. Some schools were already familiar with circular economy topics through similar projects. A key limitation was the absence of nearby recycling facilities suitable for experiential learning activities. An important lesson for policy decisions is that initiatives funded through dedicated projects can significantly support awareness and engagement, while also encouraging policies that strengthen repair, reuse and recycling practices. For replication or scaling, consistency, cooperation and strong commitment from all stakeholders are essential to ensure long-term sustainability and promote a broader shift in mindset toward circular economy principles.

The installation of WEEE collection points proved effective both in schools and municipal buildings. In schools, the presence of bins made recycling easy and visible, encouraging continuous participation from students and staff while reinforcing educational messages. The competition element further motivated schools, and families also contributed, extending the impact beyond the school environment. In municipal buildings, collection points provided residents with accessible and familiar locations for proper WEEE disposal, increasing visibility and participation while promoting responsible recycling behavior. Implementation faced no major issues, aside from minor adjustments in bin placement in some locations. A key lesson is that visible and accessible collection infrastructure significantly improves participation and proper disposal, especially when combined with awareness activities. Early involvement of schools and



municipalities strengthens local ownership and cooperation, while simple and practical solutions tend to be more effective than complex systems. For successful replication or scaling, strong collaboration between municipalities, schools and waste management authorities is required, along with adequate funding, logistical support, clear guidance on accepted WEEE types, flexible bin placement and regular monitoring to ensure long-term effectiveness.

14.3. Selection of Solutions for Endorsement

The Municipality of Rethymno selected WEEEBEHAVE. The municipality is willing to endorse the installation of WEEE collection points in schools and municipal buildings, expand awareness campaigns to more schools and high schools, and implement additional campaigns targeting the general public.

These solutions were selected because they align with political priorities related to sustainability and the circular economy, demonstrating a visible commitment to responsible WEEE management. Institutionally, they build on cooperation between schools and the Municipality, strengthening local ownership, accountability and long-term engagement. Strategically, combining educational campaigns with easily accessible collection points addresses both awareness and practical action. The approach is scalable and replicable, encouraging community participation and reinforcing positive recycling behaviors. Overall, it creates an effective link between knowledge, motivation and concrete action.

Other options were not selected, including centralized recycling centers, online-only campaigns and monetary incentive schemes. These alternatives were considered less suitable due to higher costs, logistical complexity and limited accessibility. Online campaigns alone do not provide hands-on learning opportunities, while monetary incentives may weaken intrinsic motivation for responsible recycling. Centralized solutions were also seen as less effective in encouraging regular participation or visible engagement within the community. Overall, these approaches were considered less capable of combining awareness with immediate, practical action that supports long-term circular economy behavior.

14.4. Conditions for Future Adoption

Adoption could take place within institutional frameworks that prioritize the circular economy and effective WEEE management, with clearly defined roles for schools, the Municipality and waste management companies. Policies should encourage cross-sector collaboration, support educational initiatives and ensure alignment with national or regional environmental objectives. Regulatory clarity regarding recycling requirements and accepted WEEE types is also necessary. Strong political support, combined with public awareness and engagement strategies, would help normalize recycling practices and integrate them into everyday institutional activities.

The local level is the most appropriate governance level for adoption, as it allows direct engagement with schools and community members and enables infrastructure and awareness actions to be tailored to local needs. Local governance ensures visibility, accessibility and immediate impact, encouraging



regular participation and local ownership. Regional authorities can play a complementary role by providing coordination, guidance and policy alignment, while daily implementation and community engagement are best managed at the local level.

Adoption could be incorporated into municipal or regional waste management plans, circular economy or sustainability strategies, and educational or environmental programmes targeting schools and communities. Regulations on WEEE collection and recycling could formalize procedures and responsibilities, while awareness initiatives could be integrated into existing programmes to promote participation. Using multiple policy instruments helps connect planning, education and practical action.

14.5. Stakeholder Alignment and Governance Pathway

In WP3, stakeholders consulted included local authorities (Municipality departments), local primary schools with teaching staff and principals, waste management companies (e.g., APPLIANCES RECYCLING SA, ESDAK), and selected businesses and industries. Schools had been actively involved in WP2 (WEEE BEHAVE pilot), and producers are now being engaged.

The pilot phase showed strong consensus within the educational community. Teachers and school directors supported the initiative, noting that it effectively raised student awareness and encouraged environmentally friendly behaviors aligned with circular economy principles. Schools agreed to serve as permanent collection points with special bins. Post-campaign questionnaires confirmed high satisfaction among educators and students, interest in repeating the initiative, and engagement with the educational material.

Critical concerns for endorsement include maintaining long-term coordination once project support ends, establishing clearer monitoring and evaluation to show measurable impact, and increasing awareness among entrepreneurs and policymakers about the environmental and economic benefits of WEEE recycling, highlighting the need for targeted communication and capacity-building alongside policy endorsement.

14.6. Endorsement Statement

Through this Local Action Plan, the Municipality of Rethymno acknowledges the relevance of the solutions identified above and expresses its commitment to consider their future adoption, in line with institutional competences and applicable policy frameworks.



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.



16. REFERENCES

- BUILD UP Skills Greece. <https://build-up.ec.europa.eu/en/skills/projects/build-skills-greece-pillar-1>
- Countering WEEE Illegal Trade (CWIT) project. <https://weee-forum.org/projects-campaigns/cwit/>
- Early warning assessment related to the 2025 targets for municipal waste and packaging waste <https://www.eea.europa.eu/publications/many-eu-member-states/croatia>
- European Commission (2020) Circular Economy Action Plan. <https://circabc.europa.eu/ui/group/6e9b7f79-da96-4a53-956f-e8f62c9d7fed/library/37e8e207-6222-4212-ad7c-e809e64df72c>
- European Commission (2021a): Batteries and accumulators. https://ec.europa.eu/environment/topics/waste-and-recycling/batteries-and-accumulators_en
- European Commission (2021b): Waste and recycling. https://ec.europa.eu/environment/topics/waste-and-recycling_en
- European Commission, Directorate-General for Environment, Romagnoli, V., Bruijne, E., Drapeau, P. (2022). Study on options for return schemes of mobile phones, tablets and other small electrical and electronic equipment in the EU, Publications Office of the European Union. <https://data.europa.eu/doi/10.2779/237189>
- European Commission, Directorate-General for Environment, Weißenbacher, J., Magalini, F., Lecerf, L. (2015). Study on WEEE recovery targets, preparation for re-use targets and on the method for calculation of the recovery targets: final report, Publications Office. <https://data.europa.eu/doi/10.2779/235063>
- European Parliament and Council (11/22/2008): DIRECTIVE 2008/98/EC on Waste (WFD).
- European Parliament and Council (12/20/1994): DIRECTIVE 94/62/EC on packaging and packaging waste.
- European Parliament and Council (7/4/2012): DIRECTIVE 2012/19/EU on waste electrical and electronic equipment (WEEE).
- European Parliament and Council (7/6/2006): DIRECTIVE 2006/66/EC on batteries and accumulators and waste batteries and accumulators.
- F. Magalini, J. Courtois, A. Concheso, C. Heinz (2021), Extended Producer Responsibility schemes and their strategic role for producers. <https://www.consultdss.com/content-hub/extended-producer-responsibility-schemes/>
- Forti, Vanessa, Baldé, Kees and Kuehr, Ruediger (2018), E-waste Statistics: Guidelines on Classifications, Reporting and Indicators, second edition. <https://collections.unu.edu/view/UNU:6477#viewMetadata>



- Haarman, F. Magalini, J. Courtois (2020), Study on the Impacts of Brominated Flame Retardants on the Recycling of WEEE plastics in Europe. <https://www.bsef.com/wp-content/uploads/2020/11/Study-on-the-impact-of-Brominated-Flame-Retardants-BFRs-on-WEEE-plastics-recycling-by-Sofies-Nov-2020-1.pdf>
- Hara Xirou, Natalie Cretsi Bacolas, Alexandros Stamos, Vasiliki Stergiou (2023), Assessment of WEEE management in Greece. https://orca-butterfly-rcdn.squarespace.com/s/Final-Report_Technical-Support-to-EERA-EERA-Greek-Committee_v21.pdf
- Hellenic Recycling Agency. <https://www.eoan.gr/>
- Law no. 4819/2021 on Integrated framework for waste management. <https://leap.unep.org/en/countries/gr/national-legislation/law-no-48192021-integrated-framework-waste-management>
- M. A. Tortarolo (2023), Circular economy: management of waste electrical and electronic equipment (WEEE) in Europe. <https://repositori.uji.es/xmlui/handle/10234/203322?show=full>
- OECD (2016), Extended Producer Responsibility: Updated Guidance for Efficient Waste Management, OECD Publishing, Paris. DOI: <http://dx.doi.org/10.1787/9789264256385-en>
- RREUSE (2002), The Management of Waste Electrical and Electronic Equipment – A Guide for Local Authorities. <https://rreuse.org/wp-content/uploads/00028-Brochure-ACRR-Part-I.pdf>
- RREUSE (2021), Job creation in the re-use sector: Data insights from social enterprises. <https://rreuse.org/job-creation-in-the-re-use-sector-data-insights-from-social-enterprises/>
- S. Šipka (2021), Towards circular e-waste management: How can digitalisation help? https://www.epc.eu/content/PDF/2021/E-waste_DP_v5.pdf
- SCYCLE Programme, United Nations Institute for Training and Research (UNITAR) (2022), C.P. Baldé, G. Iattoni, C. Xu, T. Yamamoto, Update of WEEE Collection Rates, Targets, Flows, and Hoarding – 2021 in the EU-27, United Kingdom, Norway, Switzerland, and Iceland, 2022. <https://www.scycle.info/new-study-update-of-weee-collection-rates-targets-flows-and-hoarding/#:~:text=The%20WEEE%20generated%20also%20shows.kg%2Finhabitant%20in%202021>
- United Nations Environment Programme (2007), E-Waste Vol.1: Inventory Assessment Manual. <https://www.unep.org/ietc/resources/toolkits-manuals-and-guides/e-waste-vol3-weeee-waste-%E2%80%9Ctake-back-system%E2%80%9D>
- United Nations Environment Programme (2007), E-Waste Vol.2: E-waste Management Manual. <https://www.unep.org/ietc/resources/toolkits-manuals-and-guides/e-waste-vol3-weeee-waste-%E2%80%9Ctake-back-system%E2%80%9D>
- United Nations Environment Programme (2012), E-Waste Vol.3: WEEE/E-Waste “Take Back System”. <https://www.unep.org/ietc/resources/toolkits-manuals-and-guides/e-waste-vol3-weeee-waste-%E2%80%9Ctake-back-system%E2%80%9D>



- United Nations Environment Programme (2017), Compendium of Technologies for the Recovery of Materials from WEEE / E-waste. <https://www.unep.org/ietc/resources/report/compendium-technologies-recovery-materials-weee-e-waste>
- United Nations Institute for Training and Research (UNITAR), C.P. Baldé, E. D'Angelo, V. Luda O. Deubzer, and R. Kuehr (2022), Global Transboundary E-waste Flows Monitor. https://ewastemonitor.info/wp-content/uploads/2022/06/Global-TBM_webversion_june_2_pages.pdf
- United Nations University (UNU) / United Nations Institute for Training and Research (UNITAR) (2020) C.P. Baldé, M. Wagner, G. Iattoni, R. Kuehr, In-depth Review of the WEEE Collection Rates and Targets in the EU-28, Norway, Switzerland, and Iceland. https://www.scycle.info/wp-content/uploads/2020/11/In-depth-review_WEEE-Collection-Targets-and-Rates_UNITAR_2020_Final.pdf
- Urban Mine Platform. <http://www.urbanmineplatform.eu/homepage>
- WEEE Forum (2020), An enhanced definition of EPR and the role of all actors. https://weee-forum.org/wp-content/uploads/2020/11/EPR-and-the-role-of-all-actors_final.pdf

17.ANNEXES

17.1. Educational community report of the final stakeholder meeting.

17.2. Producers report of the final stakeholders meeting.



EDUCATIONAL COMMUNITY MUNICIPALITY OF RETHYMNO

Report of the meeting with Educational
Community
Municipality of Rethymno

<https://ewaster.interreg-euro-med.eu/>

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Table of Contents

Glossary	4
Executive Summary	5
1. Objective and need for the Consultation	6
2. Design and Purpose of the Meeting	7
3. Analysis of the proposals	8
4. Conclusions	10
Annexes	10
Annex 1 -Attendants List.....	11
Annex 2-Proposals.....	12

Glossary

EU -European Union

LAP - Local Action Plan

MED -Mediterranean

WEEE - Waste from Electrical and Electronic Equipment

4R – Reuse Reduce Repair Recycle

Executive Summary

The WEEE BEHAVE pilot initiative implemented a series of educational and awareness-raising activities in schools and within the wider community of the Municipality of Rethymno between March 2025 and February 2026, aiming to promote the proper management and recycling of Waste Electrical and Electronic Equipment (WEEE). The pilot engaged more than 2,200 students from 11 schools through workshops, interactive sessions, recycling exercises, competitions, and awareness campaigns, while also involving local authorities and the general public through communication activities, staff training sessions, and the installation of dedicated WEEE collection points.

As part of the WEEE BEHAVE pilot initiative described above, this report consolidates the outcomes of the meeting held with school principals and teachers who participated in these activities. The educational community evaluates the implemented actions very positively and supports moving from fragmented initiatives toward structured, long-term interventions with a strong experiential and participatory character. Key findings highlight the need for permanent infrastructure, creative educational approaches, and formalization of the program within the school system.

A total of five representatives, one from each participating school in the Municipality of Rethymno, attended the meeting. The collected proposals highlight the critical role of stakeholder participation in WEEE management initiatives and provide valuable insights into current awareness levels, time management constraints, and the willingness to co-create a structured action program. Through the analysis of these results, this report explores how educators, students, and parent associations can be involved in the co-design of WEEE-related actions. The findings contribute to a broader understanding of the challenges and opportunities associated with improving WEEE management within the educational sector.

1. Objective and need for the Consultation

The present meeting was conducted within the framework of WP3 implementation activities in order to ensure a more comprehensive understanding of local WEEE activities and to support the development of the Municipality of Rethymno's Local Action Plan (LAP).

As the WEEE BEHAVE pilot campaign primarily focused on awareness-raising activities targeting schools, students, and the wider community, the primary objective of the consultation was to ensure the sustainability and continuation of WEEE recycling initiatives within the educational system. It was considered essential to integrate teacher and principal proposals into a comprehensive framework for future actions while expanding awareness to the wider public. There is a clear need to move beyond short-term activities and establish a dedicated "recycling culture" through formal structures and stable coordination.

During the meeting, representatives from each participating school were invited to share their observations regarding changes in student awareness, recycling behavior, and adaptation following the campaign. Furthermore, the consultation sought recommendations for additional actions, innovative approaches, and municipal or governmental support measures to strengthen local WEEE management and assist the educational system in transitioning toward circular economy practices.

The findings are expected to contribute to the formulation of more targeted and effective actions and recommendations within the LAP of the Municipality of Rethymno.

2. Design and Purpose of the Meeting

The meeting was designed to explore ways to develop awareness-raising and educational actions both within the school community and the wider community. The purpose was to gather feedback on feasibility, identify potential challenges like limited funding and lack of technical knowledge, and prioritize future interventions. The process involved gathering insights from those directly implementing the pilot to ensure that future steps are grounded in real-world educational experience.

In summary, the meeting aimed to explore the current level of awareness and the implementation of WEEE-related practices within local schools, assess perceptions regarding students' behavior and recycling habits following the campaign, and identify potential measures, initiatives, and forms of financial support that could further improve local WEEE management. Furthermore, a primary objective of the meeting was to collect proposals from the educational community regarding future actions, cooperation schemes, and innovative approaches that could contribute to strengthening the adoption of proper WEEE management practices and reducing electronic waste generation in the region.

3. Analysis of the proposals

A total of five representatives from the 11 local schools that participated in the campaign attended this meeting. The objective was to engage with stakeholders involved in the pilot from the initial phase to obtain a comprehensive overview of the WEEE BEHAVE pilot campaign outcomes. The analysis of the meeting results was structured around four key factors, with proposals from the educational community categorized into the following four pillars of intervention:

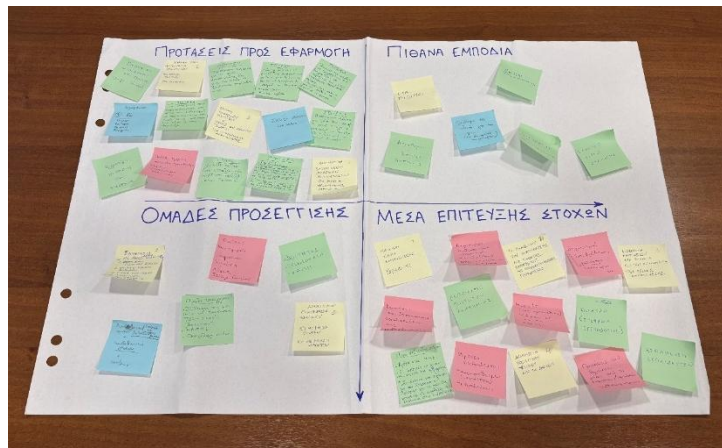


Figure 1 . Proposals categorized into the four pillars of intervention

A) Proposals for Implementation

The main goal is to transition from a one-time school competition into a permanent, city-wide habit. Teachers want to keep the recycling bins in schools, expand into e-waste (WEEE) collection, and shift the curriculum toward the 4Rs (Reduce, Reuse, Repair, Recycle) through long-term hands-on workshops. They also highly recommend embedding recycling into Rethymno's local identity using art—specifically through student theater, school environmental committees, and eco-themed Carnival Parade floats.

B) Potential Obstacles

The success of these proposals hinges on overcoming five specific barriers: securing consistent funding, finding physical storage space in schools for collected materials, ensuring that materials brought in for student crafts are safe/non-toxic, overcoming public reluctance to repair old items, and fighting civic skepticism about whether the recycled waste actually gets processed correctly.

C) Target Groups & Networking

The strategy expands far beyond just the classroom. While the immediate focus remains on the entire school ecosystem (from Kindergartens to High Schools, Parents and Teachers Association, and drama teachers), the plan intentionally loops in the broader Rethymno community. This includes collaborating with major local events (like the Treasure Hunt or City Run), partnering with university students, local hotels, senior citizens' centre, and village cultural clubs to create a unified front.

D) Means of Achieving Goals

To keep people motivated, the strategy relies on modern, highly visible engagement tools. Key ideas include building an Eco-Playground, launching student-designed digital games and media campaigns, and setting up dedicated "Recycling Corners" in schools. Crucially, the plan favours student leadership (for example forming a Student Recycling Council, designing a mascot or writing news articles) and suggests boosting adult engagement by introducing a refund system as an incentive for a sustainable WEEE management.

4. Conclusions

The evaluation meeting highlights that the WEEE BEHAVE pilot program in Rethymno has created valuable momentum among educators, students, and parents. This strong support provides a solid foundation for a natural turning point: the program should consider transitioning from a short-term, competitive school project into a permanent, institutionalized civic habit. To successfully scale this initiative, it would be beneficial for the Municipality to bridge the gap between classroom enthusiasm and real-world logistics by addressing practical bottlenecks. At the same time, integrating digital tools, artistic interventions, and localized reward systems while leveraging Rethymno's unique cultural fabric—such as local festivals, the Carnival, businesses, and community networks—could help make sustainability a natural, long-term practice for all citizens.

Next Steps:

1. Prioritize proposals based on feasibility and cost.
2. The program should become a permanent initiative run by teamwork between school coordinators and parent-teacher groups.
3. Schools should keep their current recycling bins, add spots for electronic waste, and make bulk trash pickup easier for everyone.
4. Education should move away from short-term prizes and instead focus on teaching daily habits like fixing and reusing items.
5. Environmental themes should be added directly into Rethymno's major events like local theatre, festivals, and the annual Carnival.
6. The city and schools should work together to find safe and clean spaces to store materials for student crafts.
7. The project should expand its reach to include university students, local hotels, senior centres, and church leaders.

Annexes

Annex 1 -Attendants List

Attendants List – Meeting on the feedback from the Educational Community

eWaster Project | Preventing electronic waste pollution and turning waste into resources

Ευρωπαϊκό έργο eWAsTER με στόχο την ορθή διαχείριση των Α.Η.Η.Ε.
Pilot action WEEE BEHAVE : increasing the awareness on WEEE waste prevention

1η διαπροσωπική συνάντηση στα πλαίσια του WP3 1st in-person meeting in the framework of WP3

Παρουσιολόγιο Συμμετεχόντων Attendee list

	Όνοματεπώνυμο Full Name	Δημοτικό Σχολείο Primary School	Ιδιότητα Role	Υπογραφή Signature
1	ΕΚΟΛΦΙΔΟΠΟΥΛΟΥ ΝΙΝΟΛΕΤΑ		Δ/ΝΣΗ ΠΕΡΙΣΤΑΛΛΟΝΤΟΣ ΔΗΜΟΥ ΡΕΘΥΜΝΗΣ	
2	ΤΡΙΝΙΩΤΑΚΗ ΜΑΡΙΑ	10 ^ο Δ.Σ. ΡΕΘΥΜΝΟΥ	ΥΠΟΔΙΕΥΘΥΝΤΡΙΑ - ΕΚΗ/ΚΟΣ ΠΕ 70	
3	Αβραάμης Γεώργιος	2 ^ο Δ.Σ. Ρεθύμνου	Δ/ΝΤΗΣ	
4	ΜΗΕΝΑΚΗΣ ΑΝΔΡΕΑΣ	15 ^ο Δ.Σ. ΡΕΘΥΜΝΟΥ	Δ/ΝΤΗΣ	
5	ΓΕΡΟΥΚΗ ΜΑΡΓΑΡΙΤΑ	16 ^ο Δ.Σ. ΡΕΘΥΜΝΟΥ	Δ/ΝΤΡΙΑ	
6	ΤΙΑΣΙΑ ΑΝΤΩΝΙΑ		Δ/ΝΣΗ ΠΕΡΙΣΤΑΛΛΟΝΤΟΣ ΔΗΜΟΥ ΡΕΘΥΜΝΗΣ	
7	ΣΤΕΦΟΣ ΣΠΑΝΟΔΑΚΗΣ	ΔΗΜΟΣ ΡΕΘΥΜΝΗΣ	ΑΝΤΙΔΗΜΑΡΧΟΣ ΠΕΡΙΒΑΛΛΟΝΤΟΣ	
8	Γεωργία Παπαδοπούλου	2 ^ο Πειραματικό Δ.Σ. Ρεθύμνου	Υπεύθυνη Περιβαλλοντικών Δράσεων	



EWAsTER



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the European Union



Ευρωπαϊκό έργο eWAsTER με στόχο την ορθή διαχείριση των Α.Η.Η.Ε.
Pilot action WEEE BEHAVE : increasing the awareness on WEEE waste prevention

1η διαπροσωπική συνάντηση στα πλαίσια του WP3 1st in-person meeting in the framework of WP3

Παρουσιολόγιο Συμμετεχόντων Attendee list

	Όνοματεπώνυμο Full Name	Δημοτικό Σχολείο Primary School	Ιδιότητα Role	Υπογραφή Signature
9	Φυρογιάννη Άννα		eWAsTER team	
10	Γλαυκίτη Γαλιάννη		eWAsTER team	
11				
12				
13				
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15				
16				



EWAsTER

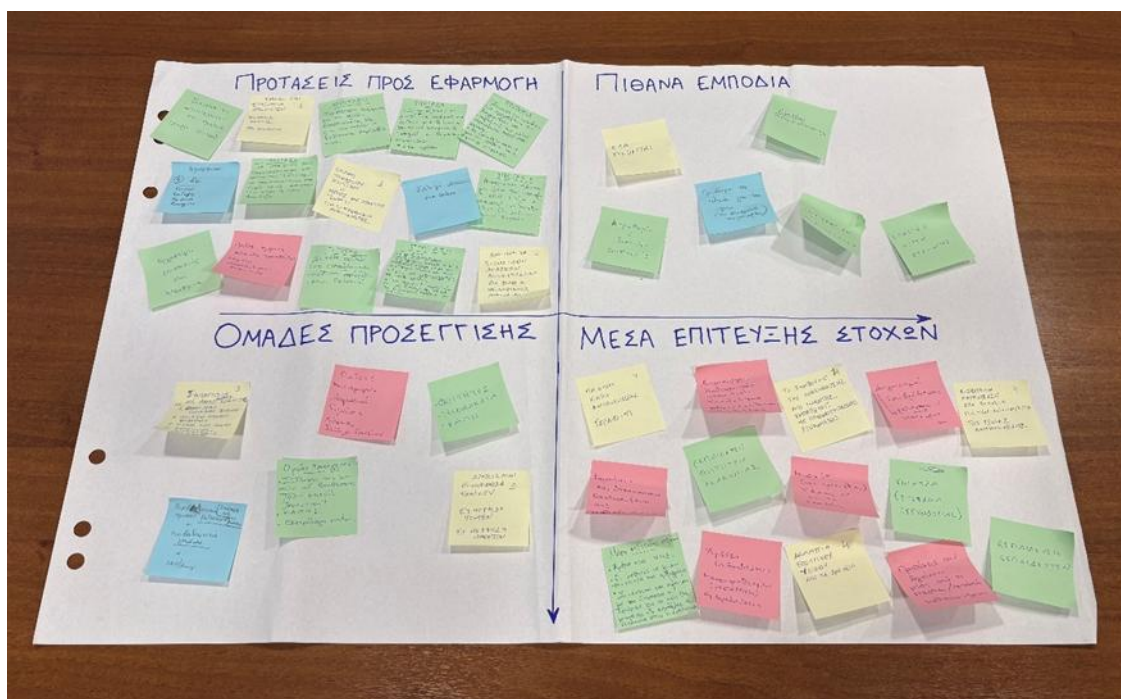


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Annex 2-Proposals

Proposals categorized into the four pillars of intervention



MAPPED PROPOSALS

A) Proposals for Implementation

- Continuous Education: Maintain recycling awareness and educational activities in schools permanently, shifting the focus away from competitive prizes.
- Infrastructure Maintenance: Keep existing recycling bins inside schools.
- E-Waste Expansion: Provide WEEE (Waste Electrical and Electronic Equipment) bins to all schools and public services.
- The 4Rs Framework: Implement training programs centered around Reuse, Reduce, Repair, and Recycle.
- Practical Workshops: Establish repair workshops in Secondary Education and introduce skill-building labs in Primary Education.
- Cultural Outreach: Expand the audience for the student theatrical plays originally performed at the "House of Culture" by staging them again there or at the Fortezza Fortress.
- E-Waste Accessibility: Set up multiple, highly visible, and easily accessible collection points for recycling electronic devices across the city.
- Bulky Waste Management: Improve public information regarding bulky waste disposal and simplify the collection request process.
- School Coordinators: Appoint a designated teacher and a Parent-Teacher Association (PTA) member in each school to oversee the recycling program.
- Artistic Expression: Embed a steady recycling-themed activity (e.g., a short play or a song) into the standard school calendar.
- Upcycling Materials: Collect clean, discarded materials to be used for creative crafts and activities in classrooms.
- Environmental Committees: Form a dedicated school environmental committee comprising teachers, students, PTA members, and municipal representatives.
- Immersive Learning: Design long-term, experiential (hands-on) recycling projects.
- Carnival Integration: Create Rethymno Carnival floats made from recycled materials, inspired by "The Fly" sculpture currently displayed outside the Municipal Technical Department.

B) Potential Obstacles

- Funding: Securing the necessary financial resources to back long-term projects.
- Repair Reluctance: Overcoming public reluctance or technical difficulties regarding repairing items instead of replacing them.
- Material Safety: Managing health hazards from potentially toxic or unsafe materials brought in for student crafts.
- Storage Shortage: The physical lack of dedicated storage spaces to collect and sort materials within schools.
- Public Skepticism: Addressing general skepticism or distrust regarding the actual effectiveness of the recycling system.

C) Target Groups & Networking

- Local Events: Collaborate with organizers of major local events, such as the Children's Book Festival, the Children's Treasure Hunt, the City Run, and various municipal sports tournaments.
- The School Community: Directly engage Kindergartens, Primary Schools, Junior Highs, High Schools, and PTAs.
- Broader Demographics: Expand outreach to University students, local hotels, and Senior Citizen Centers (KAPI).
- Green Teams: Empower active environmental groups composed of students, parents, and educators.
- Cultural Associations: Partner with local neighborhood and village cultural clubs.
- Drama Teachers: Utilize specialized drama educators to spearhead theatrical and performance-based awareness.
- Community Training: Run joint educational workshops where teachers, parents, and students learn alongside each other.

D) Means of Achieving Goals

- Eco-Spaces: Build a dedicated "Recycling Playground" and commission educational eco-themed graffiti murals.
- Gamification: Develop online educational games to boost youth engagement and environmental awareness.
- Student Recycling Council: Form a municipal student council with elected school representatives meeting at scheduled intervals.
- Reward Systems: Organize eco-competitions with rewarding incentives.
- Media Campaigns: Produce radio spots, local media advertisements, and press campaigns.
- Recycling Corners: Stylistically upgrade specific areas in schools to create visually appealing "Recycling Corners."
- Student-Led Activism: Support students in designing and launching their own environmental awareness campaigns.
- Higher Education: Train future educators by integrating recycling education into University pedagogical faculties.
- Program Mascot: Have children design an official mascot to be distributed and used across all local schools.
- Deposit-Refund Schemes: Introduce financial incentives, such as a deposit-refund system for packaging.
- Student Journalism: Encourage students to act as environmental reporters, publishing research and opinion articles in the local press.
- Faith-Based Outreach: Arrange a formal meeting with the local Archbishop to discuss how the Church can assist in raising civic environmental awareness.
- Tiered Incentives: Combine instant, small rewards with larger, long-term acknowledgments for sustainable practices.
- Visual Aids: Develop original educational and visual materials created directly by the schools.
- Train-the-Trainer: Design peer-led strategies and train-the-trainer programs based on direct feedback and ideas arising from student brainstorming sessions.

Thank you very much for your participation!



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PRODUCERS MUNICIPALITY OF RETHYMNO

Report of the questionnaires from producers
Municipality of Rethymno

<https://ewaster.interreg-euro-med.eu/>

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Table of Contents

Glossary	4
Executive Summary	5
1. Objective and need for the Survey	6
2. Design and Purpose of the Questionnaire.....	7
3. Analysis of the quastionnaires.....	9
4. Conclusions	22
Annexes.....	23
Annex 1 -Questionnaire	23

Glossary

EU -European Union

LAP - Local Action Plan

MED -Mediterranean

WEEE - Waste from Electrical and Electronic Equipment

Executive Summary

The WEEE BEHAVE pilot initiative implemented a series of educational and awareness-raising activities in schools and within the wider community of the Municipality of Rethymno between March 2025 and February 2026, aiming to promote the proper management and recycling of Waste Electrical and Electronic Equipment (WEEE). The pilot engaged more than 2,200 students from 11 schools through workshops, interactive sessions, recycling exercises, competitions, and awareness campaigns, while also involving local authorities and the general public through communication activities, staff training sessions, and the installation of dedicated WEEE collection points.

As part of the WEEE BEHAVE pilot initiative described above, an additional evaluation activity was carried out in order to assess the impact of the campaign from the perspective of local producers and businesses. More specifically, a dedicated survey was conducted after the completion of the awareness-raising activities to gather feedback on:

- Improvement of their knowledge regards WEEE management
- the level of stakeholder engagement,
- the perceived changes in citizens' behaviour regarding WEEE management and recycling, as well as
- local businesses' views on the actions and initiatives that the Municipality should prioritize in order to improve WEEE management practices.

In total, 7 local businesses from the Municipality of Rethymno participated in the survey. Furthermore, the analysis also took into account the questionnaires that had been collected before the campaign, at the beginning of the project, allowing for a comparative assessment of attitudes, awareness levels, and behavioural changes throughout the implementation period.

The analysis of the survey results highlights the important role of local businesses in the management of Waste Electrical and Electronic Equipment (WEEE) and provides valuable insights into their level of awareness, operational practices, and perceptions regarding local waste management policies. Through the examination of frequencies and crosstabulation analyses, the study explores how businesses understand and implement WEEE-related regulations, how actively they participate in collection and recycling activities, and how they evaluate both citizen engagement and the effectiveness of local waste management initiatives. The findings contribute to a broader understanding of the challenges and opportunities associated with improving WEEE management at the local level.

1. Objective and need for the Survey

The present survey was conducted within the framework of WP3 implementation activities in order to ensure a more comprehensive understanding of local WEEE management practices and to support the development of the Municipality of Rethymno's Local Action Plan (LAP).

Although the WEEE BEHAVE pilot campaign primarily focused on awareness-raising activities targeting schools, students, and the wider community, it was considered equally important to involve local producers and businesses, as they represent key stakeholders in the management and circulation of Waste Electrical and Electronic Equipment (WEEE). Since producers had not been actively engaged during the implementation of the awareness campaign, the present research was designed as a complementary follow-up activity aiming to incorporate their perspective into the project outcomes and to identify future strategic priorities.

Through the questionnaire, local businesses were invited to share their views on whether they had observed any changes in citizens' awareness, recycling behaviour, or demand for repair and recycling services following the campaign. Furthermore, local businesses were invited to provide recommendations on additional actions, forms of innovation, and municipal or governmental support measures that could further strengthen local WEEE management and support businesses in the transition towards more circular economy practices.

The findings of the survey are expected to contribute to the formulation of more targeted and effective actions and recommendations within the LAP of the Municipality of Rethymno.

2. Design and Purpose of the Questionnaire

The questionnaire addressed to local producers and businesses was carefully designed to collect meaningful and reliable feedback regarding the WEEE BEHAVE pilot initiative and the actions that should follow next.

The number of respondents was intentionally defined as limited from the outset, as the survey specifically targeted local businesses that participated in the first survey that took part at the beginning of the project. Additionally, the questionnaire was designed to be as concise as possible, consisting of fewer than 10 questions, in order to reduce respondent fatigue and encourage active participation. Despite its brevity, the questionnaire provided valuable insights into the perceptions, experiences, and level of engagement of local businesses following the awareness-raising campaign, as well as useful recommendations for the continuation and further strengthening of the campaign and future WEEE management actions.

More specifically, the questions included in the questionnaire were designed to evaluate the level of knowledge and awareness of local businesses regarding the regulatory framework and legal obligations for WEEE management in Greece, as well as their familiarity with and implementation of key requirements such as producer registration procedures, participation in Extended Producer Responsibility schemes, and relevant treatment and recycling standards.

Furthermore, the survey examined the quantity of WEEE collected annually by local businesses and whether they had observed any changes in citizens' behaviour, particularly in terms of inquiries about repair and recycling services following the campaign. It also explored perceptions of the most effective initiatives for reducing WEEE generation before disposal, alongside stakeholders' views on additional municipal actions, forms of support, and innovation mechanisms considered necessary to strengthen WEEE management at the local level.

The questionnaire was developed taking into consideration the survey previously conducted for the purposes of WPI, through which an initial overview of local producers' and businesses' awareness, practices, and perceptions regarding WEEE management had already been recorded. In this sense, the present research constitutes an extension and follow-up of the initial survey, as it revisits the same target group almost two years later in order to explore whether the implementation of the project and its awareness-raising activities contributed to any changes in knowledge, attitudes, behaviours, and management practices related to WEEE.

Briefly, the questionnaire aimed to explore the level of awareness and implementation of WEEE-related regulations and practices among local businesses, assess perceptions regarding citizens' behaviour and recycling habits after the campaign, and identify potential measures, initiatives, and forms of institutional support that could further improve WEEE management at local level. In addition, major target of the survey was to collect proposals from businesses regarding future municipal actions, cooperation schemes, and innovative approaches that could contribute to strengthening circular-economy practices and reducing electronic waste generation in the region.

Finally, Annex 1 presents the questionnaire designed and used for the purposes of the present research.

3. Analysis of the questionnaires

A total of 7 questionnaires were collected from 7 local producers that participated in the first survey that took part at the beginning of the project. The target was to reach out to all the producers that had already participated, in order to have an overall picture for the outcomes of the WEEE BEHAVE pilot campaign. The questionnaire analysis was conducted using IBM SPSS Statistics 21 software. The following content is structured by presenting each question separately.

Firstly for better tracking of the consistency of responses between the two phases of the study we recorded how many respondents were the same as those who had answered the questionnaires in the first survey. This procedure contributes to improving the comparability of the results and strengthening methodological accuracy, as it ensures that any observed changes are not due to differences in the sample but rather to real changes in attitudes or practices.

Table 1

Has the questionnaire been answered by the same person as in the first questionnaire?

	Frequency	Percent	Valid Percent	Cumulative Percent
No	3	42.9	42.9	42.9
Valid Yes	4	57.1	57.1	100.0
Total	7	100.0	100.0	

As presented in the Table below, Table 1, 4 out of the 7 respondents, which represent the 57.1% of the sample, were the same individuals as those who participated in the first survey.

➤ **Question 1: “Does your business have sufficient knowledge of the specific regulations and legal obligations governing the management of Waste Electrical and Electronic Equipment (WEEE) in Greece?”**

To begin with, the first question was inspired by question 4 in the initial question questionnaire. The initial question aimed to identify and document in detail the laws and regulations of which businesses were aware, in order to examine the ones they actually recognize as existing and applicable. The current question aimed to investigate whether, after almost two years, local businesses are now better informed.

As can be seen from the respondents' answers in Table 2, a highly significant percentage, 71.4% of the businesses that participated in the survey, are aware of the regulations governing them, while only one business is not aware of them.

Table 2

Q1.Does your company have sufficient knowledge of the specific regulations and legal obligations governing the management of WEEE in Greece?

	Frequency	Percent	Valid Percent	Cumulative Percent
No	1	14.3	14.3	14.3
Yes	5	71.4	71.4	85.7
Valid I do not know / Prefer not to answer	1	14.3	14.3	100.0
Total	7	100.0	100.0	

➤ **Question 2: “Please select which of the following areas you are familiar with (multiple choice)”**

The second question was included in order to assess the extent to which respondents are aware of specific procedures and regulations, such as: registration procedures in the Electronic Registry of Producers (ERP), participation in approved Extended Producer Responsibility (EPR) schemes, standards for the treatment and recycling of Waste Electrical and Electronic Equipment (WEEE) and regulations- legislation related to the management of WEEE.

The findings presented in Table 3 indicate varying levels of awareness among respondents regarding different aspects of Waste Electrical and Electronic Equipment (WEEE) management. The highest level of familiarity was observed in relation to WEEE treatment and recycling standards, with 71.4% of respondents selecting this option, suggesting that most participants are aware of the technical and environmental requirements associated with proper WEEE handling.

Table 3

Q2. Please select which of the following areas you are familiar with

	Frequency (selected)	Percent (selected)
Registration procedures in the Electronic Producers Register	2	28.6

Participation in approved Extended Producer Responsibility (EPR) schemes	1	14.3
WEEE treatment and recycling standards	5	71.4
Regulations and legislation related to WEEE management	4	57.1
I don't know	2	28.6

Furthermore, 57.1% reported being familiar with regulations and legislation related to WEEE management, demonstrating a relatively strong understanding of the legal framework governing the sector. In contrast, awareness of registration procedures in the Electronic Producers Register was lower, with only 28.6% indicating familiarity, while participation in approved Extended Producer Responsibility (EPR) schemes was the least recognized aspect, selected by just 14.3% of respondents.

Notably, 28.6% of participants stated that they did not know any of the listed topics, highlighting the existence of important knowledge gaps. Overall, the results suggest that respondents are generally more informed about operational and legislative aspects of WEEE.

➤ **Question 3: “Please select which of the following areas you implement (multiple choice)”**

Subsequently, this question included the same parameters as the previous one; however, its purpose was to identify what practices are actually implemented by businesses. As can be seen, the results in Table 4 reveal the extent to which respondents apply WEEE-related practices and regulations within their businesses.

Table 4

Q3. Please select which of the following areas you implement

	Frequency (selected)	Percent (selected)
Registration procedures in the Electronic Producers Register	2	28.6
Participation in approved Extended Producer Responsibility (EPR) schemes	1	14.3
WEEE treatment and recycling standards	6	85.7
Regulations and legislation related to WEEE management	4	57.1
I don't know	1	14.3

Similar to the previous findings concerning knowledge and awareness, the highest percentage was recorded for the implementation of WEEE treatment and recycling standards, selected by 85.7% of respondents, indicating that the majority actively apply environmentally responsible waste management practices. Moreover, 57.1% stated that they implement regulations and legislation related to WEEE management, suggesting a moderate level of compliance with the legal framework governing the sector.

On the other hand, only 28.6% reported applying registration procedures in the Electronic Producers Register, while participation in approved Extended Producer Responsibility (EPR) schemes remains particularly limited, with just 14.3% indicating active involvement. It is also noteworthy that only one respondent (14.3%) stated that they do not apply any of the listed practices.

Overall, the findings demonstrate that although businesses appear to implement operational recycling and treatment standards to a considerable extent, lower levels of participation are observed in administrative and collective responsibility mechanisms, such as producer registration and EPR schemes.

➤ **Question 4: “How many kilograms of WEEE does your business collect annually?”**

Additionally, question 4 aims to determine the quantities of WEEE collected by each business. An essential question, as the measurement of WEEE quantities represents a key KPI that was monitored throughout the entire duration of the project.

Table 5

Q4. How many kilograms of WEEE does your company collect annually?

	Frequency	Percent	Valid Percent	Cumulative Percent
<250 kg	1	14.3	14.3	14.3
250-500 kg	1	14.3	14.3	28.6
Valid > 1000 kg	4	57.1	57.1	85.7
No statistical record	1	14.3	14.3	100.0
Total	7	100.0	100.0	

The results of Table 5 indicate that the majority of participating local businesses collect relatively large quantities of Waste Electrical and Electronic Equipment (WEEE) annually. More specifically, 57.1% of respondents reported collecting more than 1,000 kilograms of WEEE per year, suggesting that most businesses included in the survey are significantly involved in WEEE management activities.

In contrast, smaller proportions of respondents stated that they collect less than 250 kilograms (14.3%) or between 250 and 500 kilograms (14.3%) annually, reflecting lower levels of collection activity among a limited number of businesses. Additionally, 1 local business indicated that they do not keep a statistical record of the quantities collected, highlighting a potential lack of systematic monitoring and documentation practices.

Overall, the findings suggest that while most companies manage substantial amounts of WEEE, there are still inconsistencies in data recording and reporting among some businesses.

Additionally, Table 6 illustrates the results of the crosstabulation between WEEE collection quantities (Q4) and companies' knowledge of the regulations and legal obligations governing WEEE management in Greece (Q1). The crosstabulation reveals a clear relationship between regulatory awareness and operational practices. Among businesses reporting sufficient knowledge of the relevant regulations, the majority (80.0%) collect more than 1,000 kg of WEEE annually, while a smaller proportion (20.0%) collect less than 250 kg. This suggests that higher regulatory awareness is associated with higher levels of WEEE collection activity.

In contrast, the company that reported not having sufficient knowledge of the regulations is associated with the category of "No statistical record," indicating a lack of systematic monitoring and documentation of WEEE quantities. Similarly, the respondent who selected "I do not know / Prefer not to answer" reported collecting between 250 and 500 kg annually, reflecting a moderate level of activity but limited clarity regarding regulatory knowledge.

Overall, the findings indicate a positive association between regulatory awareness and higher levels of WEEE collection, suggesting that companies with better understanding of legal obligations tend to be more actively engaged in structured WEEE management practices and more consistent in reporting collected quantities.

Table 6

Q4. How many kilograms of WEEE does your company collect annually? * Q1.Does your company have sufficient knowledge of the specific regulations and legal obligations governing the management of WEEE in Greece?
Crosstabulation

% within Q1.Does your company have sufficient knowledge of the specific regulations and legal obligations governing the management of WEEE in Greece?

	Q1.Does your company have sufficient knowledge of the specific regulations and legal obligations governing the management of WEEE in Greece?			Total
	No	Yes	I do not know / Prefer not to answer	
Q4. How many kilograms of WEEE does your company collect annually?	<250 kg			14.3%
	250-500 kg		100.0%	14.3%
	> 1000 kg	80.0%		57.1%
	No statistical record	100.0%		14.3%
Total	100.0%	100.0%	100.0%	100.0%

Additionally, in order to further explore the relationship between respondents' operational practices and their perceptions regarding WEEE management, an additional crosstabulation analysis was conducted. This analysis aimed to identify possible patterns and associations between the quantities of WEEE collected annually and respondents' evaluations of the effectiveness of local waste management practices and policies (question from the first questionnaire).

As illustrated in Table 7, among businesses who considered the implementation of the waste management hierarchy to be "Effective," 50.0% belong to companies collecting more than 1,000 kg of WEEE annually, while the remaining 50.0% correspond to companies that do not maintain statistical records of collected quantities. This suggests that businesses with substantial involvement in WEEE collection may recognize positive aspects of the current system.

Similarly, among respondents who evaluated the implementation as "Moderately effective," half of the responses (50.0%) come from companies collecting more than 1,000 kg annually, while the remaining responses are distributed equally between companies collecting less than 250 kg (25.0%) and those collecting between 250–500 kg (25.0%). This indicates that smaller-scale collectors tend to express more moderate assessments regarding the effectiveness of local waste management practices.

Notably, all respondents who characterized the implementation as "Ineffective" belong to the category of companies collecting more than 1,000 kg annually (100.0%). This finding may

imply that companies with higher operational engagement and greater experience in WEEE management are more aware of the practical limitations and challenges associated with implementing prevention, reuse, and recycling strategies at the local level.

Overall, the results suggest that businesses collecting larger quantities of WEEE demonstrate more critical and experience-based evaluations of the effectiveness of the waste management hierarchy, whereas smaller-scale collectors tend to provide more moderate assessments.

Table 7

Q4. How many kilograms of WEEE does your company collect annually? * AQ_12.How would you assess the effectiveness of implementing the waste management hierarchy (prevention, reuse, recycling) in your local community? Crosstabulation

% within AQ_12.How would you assess the effectiveness of implementing the waste management hierarchy (prevention, reuse, recycling) in your local community?

	AQ_12.How would you assess the effectiveness of implementing the waste management hierarchy (prevention, reuse, recycling) in your local community?			Total
	Effective	Moderately effective	Ineffective	
<250 kg		25.0%		14.3%
Q4. How many kilograms of WEEE does your company collect annually?				
250-500 kg		25.0%		14.3%
> 1000 kg	50.0%	50.0%	100.0%	57.1%
No statistical record	50.0%			14.3%
Total	100.0%	100.0%	100.0%	100.0%

➤ **Question 5: “Have you observed an increase in the frequency with which citizens ask you about the possibilities for recycling or repairing their devices?”**

This question represents a very important parameter, as it essentially aims to determine whether, due to the WEEE BEHAVE campaign, there has been increased interest in recycling WEEE.

Table 8

Q5. Have you noticed an increase in how often citizens ask about the possibilities for recycling or repairing their devices?

	Frequency	Percent	Valid Percent	Cumulative Percent
Not at all	1	14.3	14.3	14.3
A little	1	14.3	14.3	28.6
Much	3	42.9	42.9	71.4
Valid Very much	1	14.3	14.3	85.7
I do not know / Prefer not to answer	1	14.3	14.3	100.0
Total	7	100.0	100.0	

The findings presented in Table 8 suggest that businesses have generally observed an increased level of public interest regarding the recycling and repair of electronic devices. More specifically, 42.9% of respondents stated that they have noticed a significant increase ("Much") in how often citizens ask about recycling or repair possibilities, while an additional 14.3% reported a very strong increase ("Very much"). These results indicate a growing environmental awareness and interest among consumers in sustainable waste management practices and device lifespan extension. On the other hand, 14.3% of respondents indicated only a slight increase, while another 14.3% stated that they had not noticed any increase at all. Furthermore, 14.3% selected "I do not know / Prefer not to answer," suggesting some uncertainty or lack of direct interaction with customer inquiries on this issue. Overall, the findings indicate a clear tendency toward increased citizen engagement and awareness regarding recycling and repair opportunities for electronic equipment.

Additionally, a further crosstabulation analysis was conducted in order to examine whether the quantity of WEEE collected annually by companies is associated with their perceptions regarding changes in citizen interest toward recycling and repair practices. This analysis aimed to identify potential relationships between operational involvement in WEEE management and the level of public awareness observed by businesses.

The crosstabulation in Table 9 between annual WEEE collection quantities (Q4) and respondents' perceptions regarding the increase in citizen inquiries about recycling or

repairing devices (Q5) reveals notable patterns linked to the scale of WEEE collection activity.

Table 9

Q5. Have you noticed an increase in how often citizens ask about the possibilities for recycling or repairing their devices? * Q4. How many kilograms of WEEE does your company collect annually? Crosstabulation

% within q4. How many kilograms of WEEE does your company collect annually?

		Q4. How many kilograms of WEEE does your company collect annually?				Total
		<250 kg	250-500 kg	> 1000 kg	No statistical record	
Q5. Have you noticed an increase in how often citizens ask about the possibilities for recycling or repairing their devices?	Not at all				100.0%	14.3%
	A little			25.0%		14.3%
	Much	100.0%		50.0%		42.9%
	Very much			25.0%		14.3%
	I do not know /		100.0%			14.3%
	Prefer not to answer					
Total		100.0%	100.0%	100.0%	100.0%	100.0%

Among local businesses collecting more than 1,000 kg of WEEE annually, responses are distributed across multiple categories. Specifically, 50.0% of these respondents reported noticing a significant increase (“Much”) in citizen inquiries, while 25.0% observed only a slight increase (“A little”) and another 25.0% reported a very strong increase (“Very much”). These findings suggest that businesses with high levels of WEEE collection are more likely to observe growing public interest in recycling and repair opportunities.

In the category of businesses collecting less than 250 kg annually, respondents (100.0%) indicated that they had noticed a considerable increase (“Much”) in citizen inquiries. Meanwhile, the businesses collecting between 250–500 kg responded entirely with “I do not know / Prefer not to answer”, reflecting some uncertainty in assessing changes in public behavior.

Notably, the respondent belonging to the “No statistical record” category reported “Not at all” (100.0%), indicating that companies lacking systematic monitoring practices may also be less aware of changes in citizen engagement related to recycling and repair activities.

Overall, the findings suggest a positive relationship between active involvement in WEEE collection and the perception of increasing public awareness regarding recycling and repair possibilities, while also highlighting the importance of systematic operational monitoring in identifying such trends.

➤ **Question 6: “Which initiative do you consider to have the greatest potential for improving the reduction of WEEE before it reaches the recycling stage?” (multiple choice)**

Question 6 was designed to explore respondents’ perceptions regarding the most effective initiatives for reducing WEEE before it reaches the recycling stage. More specifically, it focuses on preventive actions and strategies aimed at extending product lifecycles, such as repair programs, product warranty schemes, take-back and replacement initiatives (e.g., “Recycle and Replace” programs), the establishment of local reuse centers, and the provision of incentives to encourage longer product use and more sustainable consumption of electrical and electronic equipment.

Table 10

Q6. Which initiative do you believe has the greatest potential for improvement in reducing WEEE before it reaches the recycling stage?

	Frequency (selected)	Percent (selected)
Old device recycling programs (e.g. “Recycle - Change Device” programs)	5	71.5
Repair programs	1	14.3
Creation of local reuse points/centers	2	28.6
Product warranty programs	1	14.3
Provision of incentives to extend product life cycles	1	14.3
I do not know / Prefer not to answer	1	14.3
Other	1	14.3
Other: Collaboration with a certified recycling company		

The results presented in Table 10 indicate that the majority of respondents believe that old device recycling programs, such as “Recycle - Change Device” initiatives, have the greatest potential for improving the reduction of Waste Electrical and Electronic Equipment (WEEE) before it reaches the recycling stage. More specifically, 71.5% of participants selected this option, suggesting that incentive-based replacement and recycling schemes are

considered the most effective approach for encouraging proper device disposal and reducing waste generation. In contrast, 28.6% identified the creation of local reuse points or centers as an initiative with high improvement potential, highlighting comparatively lower confidence in reuse infrastructure as a primary solution. Additionally, 14.3% selected “I do not know / Prefer not to answer.”

Overall, the findings suggest that respondents place greater emphasis on organized recycling and replacement programs as the most promising strategy for minimizing WEEE before it enters the recycling process.

➤ **Question 7: “What additional actions would you propose the Municipality to undertake in order to further support local businesses in the management of Waste Electrical and Electronic Equipment (WEEE)?” (multiple choice)**

The present question aims to explore respondents’ views on additional actions that could be undertaken by the Municipality to further support local businesses in the management of Waste Electrical and Electronic Equipment (WEEE). The question aims to identify areas where public intervention and local governance can strengthen business engagement and improve WEEE management practices at the community level. In particular, it focuses on measures such as public awareness campaigns, training and educational initiatives for business staff, and collaborative actions between local businesses and the Municipality aimed at raising environmental awareness.

This question constitutes an important part of the questionnaire, as it aimed to record the views of businesses regarding the areas on which the Municipality should focus its efforts and initiatives.

Table 11

Q7. What additional actions would you propose the Municipality to undertake in order to further support local businesses in the management of Waste Electrical and Electronic Equipment (WEEE)?

	Frequency (selected)	Percent (selected)
Public awareness initiatives	2	28.6

Training and awareness-raising initiatives for business staff	3	42.9
Collaboration between stores and the Municipality on awareness-raising activities	4	57.1
Other	1	14.3
Other: Closer collection points with bins and improved telephone-based service for municipal pick-up.		

The findings presented in Table 11 highlight the types of initiatives that respondents consider most important for improving WEEE management through increased cooperation and awareness. The most frequently selected option was collaboration between businesses and the Municipality on awareness-raising activities, chosen by 57.1% of respondents, indicating that coordinated efforts between local authorities and businesses are viewed as the most effective approach for enhancing public engagement and improving waste management practices.

Additionally, 42.9% of participants emphasized the importance of training and awareness-raising initiatives for business staff, suggesting that internal capacity-building within businesses is also seen as a key factor in improving WEEE handling.

Public awareness initiatives were selected by 28.6% of respondents, reflecting a moderate level of support for broader community education campaigns. Finally, 14.3% of respondents provided an “Other” response, highlighting the need for collection points closer to the city center and improved telephone-based services for municipal pick-up.

Overall, the results suggest that respondents prioritize collaborative and educational strategies, particularly those involving cooperation between municipalities and businesses, as the most effective way to strengthen WEEE management systems.

➤ **Question 8: “What forms of innovation or governmental/municipal support do you consider necessary for improving the management of electronic waste in our area?” (multiple choice)**

Finally question 8 aims to investigate respondents’ views on the forms of innovation and governmental or municipal support considered necessary for improving the management of Waste Electrical and Electronic Equipment (WEEE) in the local area.

The question aims to identify the key policy instruments and enabling conditions that could strengthen the effectiveness of WEEE management systems. In particular, it focuses on financial incentives such as direct governmental measures (e.g., tax exemptions for circular economy initiatives), participation in European innovation programs, the reinforcement of

collaboration among relevant local stakeholders, and the development of digital tools for monitoring waste streams.

Table 12

Q8. What forms of innovation or governmental/municipal support do you consider necessary for improving the management of electronic waste in our area?

	Frequency (selected)	Percent (selected)
Direct government incentives (e.g. tax exemptions for circular economy initiatives)	5	71.4
Participation in innovative European programs	3	42.9
Strengthening collaboration among the involved local stakeholders	2	28.6
Development of digital tools for monitoring waste streams	2	28.6

The results presented in Table 12 indicate the types of policy and strategic interventions that respondents consider most important for enhancing WEEE management and promoting circular economy practices. The most frequently selected option was direct government incentives, such as tax exemptions for circular economy initiatives, chosen by 71.4% of respondents. This suggests that financial support and fiscal motivation are viewed as the most effective drivers for encouraging businesses to adopt more sustainable waste management practices.

Additionally, 42.9% of participants highlighted participation in innovative European programs, indicating a strong interest in leveraging EU-level initiatives to support local sustainability efforts and innovation in waste management systems. Strengthening collaboration among involved local stakeholders and the development of digital tools for monitoring waste streams were each selected by 28.6% of respondents, reflecting a moderate level of support for both improved coordination and technological solutions.

Overall, the findings suggest that respondents place the greatest emphasis on economic incentives, while also recognizing the importance of European cooperation, stakeholder collaboration, and digital transformation in improving WEEE management systems.

4. Conclusions

In conclusion, the results indicate that the majority of participating businesses demonstrate a relatively satisfactory level of awareness regarding WEEE treatment, recycling standards, and the relevant legislative framework. At the same time, however, important gaps remain in more specialized areas, such as participation in Extended Producer Responsibility (EPR) schemes and familiarity with specific administrative procedures. The findings also suggest that businesses with greater operational involvement in WEEE collection tend to possess a more informed and critical perspective on the effectiveness of existing waste management practices and policies.

In addition, the survey reveals a noticeable increase in citizen interest regarding recycling and repair opportunities for electronic devices. Businesses that collect larger quantities of WEEE reported more frequent inquiries from citizens, indicating a growing level of public environmental awareness and engagement. This trend reflects the potential positive impact of awareness-raising initiatives and highlights the importance of continuing educational and communication activities aimed at strengthening sustainable consumption and disposal behaviours within the local community.

Finally, respondents emphasized the importance of stronger collaboration between the Municipality of Rethymno and local businesses, as well as the need for direct government incentives, staff training, and improved collection infrastructure in order to enhance WEEE management systems. The findings suggest that effective WEEE management requires a combination of regulatory awareness, institutional cooperation, economic support, and active citizen participation. Consequently, local authorities should prioritize integrated and collaborative approaches that encourage both businesses and citizens to participate more actively in circular economy and sustainable waste management practices.

Annexes

Annex 1 -Questionnaire

Questionnaire – Survey on the Management of Electrical and Electronic Waste at Local Level

eWaster Project | Preventing electronic waste pollution and turning waste into resources

This questionnaire aims to evaluate the effectiveness of existing Waste Electrical and Electronic Equipment (WEEE) management practices in the Municipality of Rethymno following the pilot awareness campaign WEEE BEHAVE, which was implemented in 11 primary schools in the city. The data collected will be used exclusively for the purposes of the project and will be analysed and presented in aggregate form, ensuring that no participant can be identified.

Question 1: *Does your business have sufficient knowledge of the specific regulations and legal obligations governing the management of Waste Electrical and Electronic Equipment (WEEE) in Greece?*

- ☐ Yes
- ☐ No
- ☐ I don't know / I prefer not to answer

Question 2: *Please select which of the following areas you are familiar with (multiple choice):*

- ☐ Procedures for registration in the Electronic Producer Register (EPR)
- ☐ Participation in approved Extended Producer Responsibility (EPR) schemes
- ☐ WEEE treatment and recycling standards
- ☐ Regulations and legislation regarding WEEE management
- ☐ I do not know
- ☐ I prefer not to answer

Question 3: *Please select which of the following areas you implement (multiple choice):*

- ☐ Procedures for registration in the Electronic Producer Register (EPR)
- ☐ Participation in approved Extended Producer Responsibility (EPR) schemes
- ☐ WEEE treatment and recycling standards
- ☐ Regulations and legislation regarding WEEE management
- ☐ I do not know
- ☐ I prefer not to answer

Question 4: *How many kilograms of WEEE does your business collect annually?*

- ☐ < 250 kg
- ☐ 250 – 500 kg
- ☐ 500 - 1.000 kg

- ☐ > 1.000 kg
- ☐ No relevant data are recorded
- ☐ I do not know / I prefer not to answer

Question 5: *Have you noticed an increase in the frequency with which citizens ask you about the possibilities for recycling or repairing their devices?*

1=Not at all	2=Slightly	3=Neither little much	4=Much	5=Very much	I don't know / I prefer not to answer
☐	☐	☐	☐	☐	☐

Question 6: *Which initiative do you consider to have the greatest potential to improve the reduction of WEEE before it reaches recycling?*

- ☐ Repair programs
- ☐ Product warranty programs
- ☐ Old appliance recycling programs (e.g. "Recycle – Replace Appliance")
- ☐ Creation of local reuse points/centres
- ☐ Provision of incentives for extending product lifespan
- ☐ Other: _____
- ☐ I do not know / I prefer not to answer

Question 7: *What additional actions would you propose that the Municipality undertake in order to further support local businesses in the management of Waste Electrical and Electronic Equipment (WEEE)?*

- ☐ Public awareness-raising actions
- ☐ Information/training activities for business staff
- ☐ Collaboration between shops and the Municipality on awareness-raising activities
- ☐ Other: _____
- ☐ I do not know / I prefer not to answer

Question 8: *Which forms of innovation or governmental/municipal support do you consider necessary for improving WEEE management in our region?*

- ☐ Direct governmental incentives (e.g. tax exemptions for circular economy activities)
- ☐ Participation in European innovative programmes
- ☐ Strengthening cooperation among involved local stakeholders
- ☐ Development of digital tools for monitoring waste streams
- ☐ Other: _____

☐ I do not know / I prefer not to answer

Thank you very much for your participation!



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