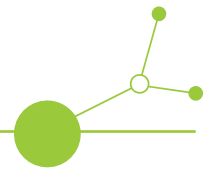


D.1.1.1 Conclusions on the Central Europe WEEEP



Final Version
04 2024





Contents

Abbreviation	7
A. Introduction	8
B. Methodology.....	9
C. Overview	10
D. Country Profile	16
1. Austria	16
1.1. Law and Regulation.....	16
1.2. Financial scheme.....	18
1.3. Stakeholders	18
1.3.1. Organizations.....	18
1.3.2. Local repairs shops.....	18
1.3.3. Domestic EEE Producer.....	18
1.4. Best Practice	20
1.4.1. Local incentives	20
1.4.2. Online platforms.....	20
1.5. Challenges and recommendations	21
1.5.1. Challenges	21
1.5.2. Recommendations	26
2. Croatia.....	28
2.1. Law and Regulation.....	28
2.2. Financial scheme.....	29
2.3. Stakeholders	29
2.3.1. Organizations.....	29
2.3.2. Local repairs shops.....	30
2.3.3. Domestic EEE Producer.....	30
2.4. Best Practice	30



2.4.1. Local incentives	30
2.4.2. Online platform	30
2.5. Challenges and recommendations	31
2.5.1. Challenges	31
2.5.2. Recommendations	33
3. Czech Republic.....	35
3.1. Law and Regulation.....	35
3.2. Financial scheme.....	35
3.3. Stakeholders	35
3.3.1. Organizations.....	35
3.3.2. Local repairs shops.....	36
3.3.3. Domestic EEE Producer.....	36
3.4. Best practice	36
3.4.1. Local incentives	36
3.4.2. WEEE Collection	36
3.4.3. Online platforms.....	37
3.5. Challenges and recommendations	37
3.5.1. Challenges	37
3.5.2. Recommendations	39
4. Italy	41
4.1. Law and Regulation.....	41
4.2. Financial scheme.....	42
4.3. Stakeholders	42
4.3.1. Organizations.....	42
4.3.2. Local repairs shops.....	42
4.3.3. Domestic EEE Producer.....	43
4.4. Best Practice	43



4.4.1. Local incentives	43
4.4.2. Online platform	43
4.5. Challenges and recommendations	43
4.5.1. Challenges	44
4.5.2. Recommendations	46
5. Poland	49
5.1. Law and Regulation	49
5.2. Financial scheme	51
5.3. Stakeholders	51
5.3.1. Organizations - Collection points	51
5.3.2. Local repairs shops	53
5.3.3. Domestic EEE Producer	56
5.4. Best Practice	56
5.4.1. Local incentives	56
5.4.2. Online platform	57
5.5. Challenges and recommendations	58
5.5.1. Challenges	59
5.5.2. Recommendations	62
6. Slovakia	64
6.1. Law and Regulation	64
6.2. Financial scheme	65
6.3. Stakeholders	66
6.3.1. Organizations	66
6.3.2. Local repairs shops	66
6.3.3. Domestic EEE Producer	67
6.4. Best Practice	67
6.4.1. Local incentives	67



6.4.2. Online platform	68
6.5. Challenges and recommendations	68
6.5.1. Challenges	68
6.5.2. Recommendations	70
7. Slovenia	71
7.1. Law and Regulation	71
7.2. Financial scheme	71
7.3. Stakeholders	73
7.3.1. Organizations	74
7.3.2. Local repairs shops	75
7.3.3. Domestic EEE Producer	76
7.4. Best practice	76
7.4.1. Local incentives	76
7.4.2. Online platforms	76
7.5. Challenges and recommendations	77
7.5.1. Challenges	78
7.5.2. Recommendations	80
E. Conclusion	82



Table of Figures

Figure 1 CE WEEEP Methodology	9
Figure 2 Example of CRMs in WEEE (CEWASTE, 2021).....	11
Figure 3 EEE POM per capita of project countries in 2019-2021 [6;7;8;9;10;11;12; 13].....	12
Figure 4 WEEE collection per capita in 7 project countries in 2019-2021 [6;7;8;10;11;12;13; 14;15]	12
Figure 5 Share of WEEE generation from Households in project countries [9; 10; 11; 16; 17; 18; 19].....	13
Figure 6 Preparation for reuse of WEEE per capita in project countries [9; 10; 11; 16; 17; 18; 19]	14
Figure 7 WEEE Recycling rate in 7 project countries (Eurostat, 2020)	15
Figure 8 Percentage of expert experiences in Austria.....	21
Figure 9 Percentage of expert experiences in Croatia.....	31
Figure 10 Percentage of expert experience in Czech Republic.....	37
Figure 11 percentage of expert experiences in Italy	44
Figure 12 Percentage of expert experiences in Poland	58
Figure 13 Percentage of expert experience in Slovakia's respondents	68
Figure 14 Map of repair and collection points in Slovenia.	75
Figure 15 Percentage of expert experiences in Slovenia	77

Table of Tables

Table 1 Increase and decrease demands of EEE in project countries (%) [6; 11; 20; 21; 22]	13
Table 2 Preparation for reuse per categories in project countries [9; 10; 11; 16; 17; 18; 19]	14
Table 3 WEEE Treatment facility in project countries (EU, 2020)	15
Table 4 List of EEE producers in Austria [25]	19



Abbreviation

AMS	Austrian Public Employment Service (Arbeitsmarktservice)
ASSO	Agency for Sustainable Development
B2B	Business to Business
B2C	Business to Customers
BBP	butyl benzyl phthalate
BOKU	University of Natural Resources and Life Science Vienna
CE	Circular Economy
CENELEC	European Committee for Electrotechnical Standardization
CFCs	Chlorofluorocarbons
Circular WEEEP	Design and test of policies for reducing, repairing, recovering and reusing waste from electrical, electronic equipment and plastic in Central Europe
CRM	Critical Raw Material
DBP	dibutyl phthalate
DEHP	bis(2-ethylhexyl) phthalate
DIBP	diisobutyl phthalate
DRZ	Demontage- und Recycling-Zentrum
EC	European Commission
EEE	Electrical and Electronic Equipment
EoL	End of Life
EPR	Extended Producer Responsibility
ESM	Environmentally Sound Management
EU	European Union
OECD	Organisation for Economic Co-operation and Development
PBB	polybrominated biphenyls
PBDE	polybrominated diphenyl ethers
POM	Put on Market
PRO	Producer Responsibility Organisation
PSZOK	Point of Selective Collection of Municipal Waste PI RERA S.D. for Coordination and Regional Development of Split Dalmatia County
RERA	Restriction of the use of certain Hazardous substances in electrical and electronic equipment
RoHS	Restriction of the use of certain Hazardous substances in electrical and electronic equipment
VAT	Value-Added Tax
WEEE	Waste of Electrical and Electronic Equipment
WP	Work Package



A. Introduction

Global Waste of Electrical and Electronic Equipment (WEEE) generation reached a total of 53.6 million metric tons in 2019. Only 17 percent of these were officially recorded as being managed in an environmentally sound management (ESM). The whereabouts or disposal of approximately 83 percent (44.3 Mt) of the WEEE produced remains uncertain. These WEEE may undergo treatment and recycling through unregistered methods, or it may be disposed of, incinerated, exchanged, or even recycled informally [1]. WEEE is one of the leaders growing waste in Europe, while, starting from 2019, the WEEE Directive mandates a minimum collection rate of 65% for all WEEE that has been put on market in the past 3 years [2].

WEEE comprises a complex combination of substances, including specific ones that pose a risk to health or the environment. If the discarded WEEE are not properly managed, they might lead to significant environmental and health issues. Modern electronic devices also comprise scarce including critical raw materials. When WEEE is properly managed, these materials can be recycled and reused.

Enhancing the process of collecting, processing, and reusing electrical and electronic equipment at the end of their lifespan can optimize the utilization of resources and facilitate the transition towards a circular economy. 'Design and test of policies for reducing, repairing, recovering and reusing waste from electrical, electronic equipment and plastic in Central Europe (Circular WEEEP)' project is co-funded by the European Union consisting of 12 partners from 7 European countries namely:

- Austria: University of Natural Resources and Life Science Vienna (BOKU)
- Croatia: PI RERA S.D. for Coordination and Regional Development of Split Dalmatia County (RERA)
- Czech Republic: Czech Technical University in Prague (Lead partner)
- Italy: Province of Rimini; ASSO Agency for Sustainable Development
- Poland: Regional Development Agency in Bielsko-Biała, City of Lublin, Bielsko District, Municipality of Gdańsk
- Slovakia: Bratislava Old Town
- Slovenia: Municipality Rogaška Slatina; REUSE Center

The project aims to develop a strategy for circular management of waste electrical and electronic equipment and plastic waste on a regional level. There are three main Work Packages (WP) which are briefly described as follows:

- WP1: Development of a transnational strategies which allows local, regional, and national institutions to design Action Plans which will increase their capacity to transform current WEEEP management into a circular WEEEP.
- WP2: pilot actions are implemented to test the action plan solutions for transnational WEEEP-CE management. The pilot actions refer to the design of appliances, re-use and recycling and awareness-raising which build 5 efficient pilot projects to make society more aware of the WEEEP topic.
- WP3: Testing and implementation of digital solutions for the circular economy of WEEEP, aiming to increase capacities of central European public and private stakeholders to implement circular economy policies and to exploit innovative solutions in practice.

Conclusions on the Central Europe WEEEP assessment Report is part of the WP1, which is under the responsibility of the WP leader: BOKU together with ASSO. In order to develop the transnational strategies, it is essential to understand the current management and practices of WEEE in the project countries not



only the statistical level but as well as the stakeholders involved in the WEEE management chains. Therefore, this report represents the finding of the WEEE country profiles of the project which consists of the analysis of the current policies, the comparison of different levels of policy applications, the WEEEP market size, main producers, main consumers and the results from the key actors consultation.

B. Methodology

In order to collect information, two questionnaires were developed and distributed to project partners and relevant stakeholders. The questionnaires I aims to collect the general information regarding to WEEE management of the project countries which consists of current regulations, Put on Market (POM), collection, generation, relevant stakeholders on reuse and repair with its current practices and statistics. Questionnaire II aims to obtain insight opinions from relevant stakeholders' group of WEEE value chains namely 1) Producer / Importer / Producer Responsibility Organisation; 2) Municipality; 3) Re-use organization; and 4) Recycler. Therefore, this WEEEP sector assessment requires the involvement of every partner, providing interviews, questionnaires, market desk research, and meeting with key actors. These questionnaires were developed in an online based which is organized by ASSO to facilitate and support the project partners on the data collection process.

The results were then compiled and evaluated by BOKU and then validated by the project partners for the final version. The detailed questionnaires I & II can be found in the Annex A; the result of the questionnaire will be available upon request.

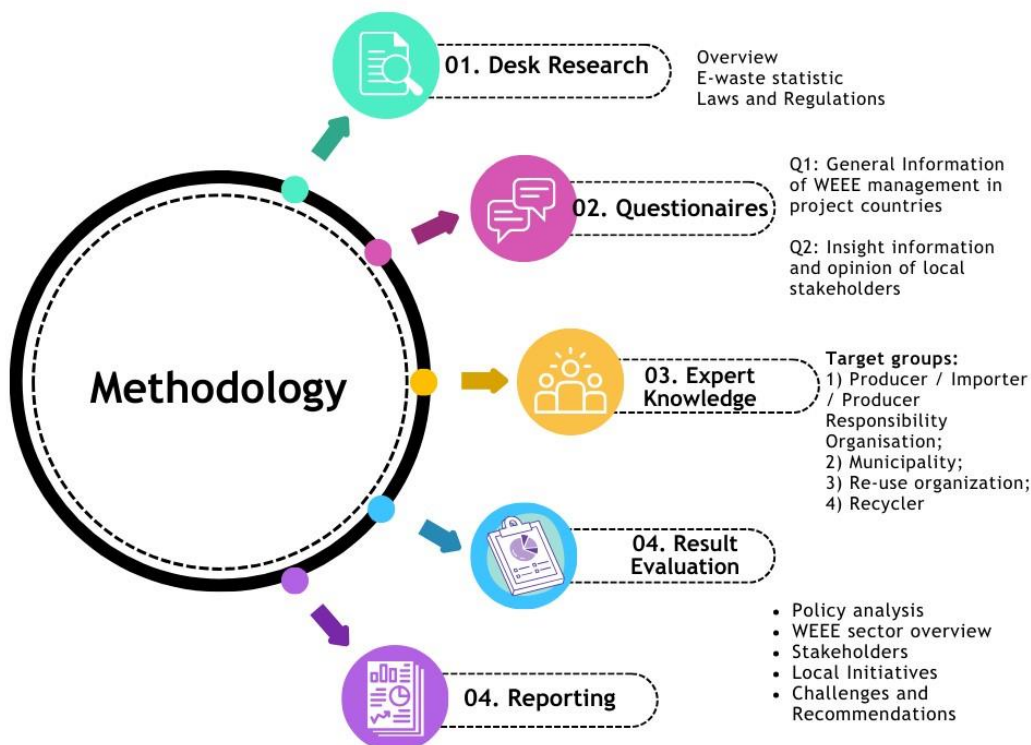


Figure 1 CE WEEEP Methodology



C. Overview

In 2020, there were approximately 12.4 million tonnes of Electrical and Electronic Equipment (EEE) POM in the European Union (EU), where only 4.7 million tonnes of WEEE were collected which equivalence to 10.5 kg per capita [3]. Despite the difficulty in precisely determining the extent of illegal waste exports, from 2 to 17 kt of WEEE were confiscated for being illegally transferred over international borders in 2019 from the European Union [1].

The EU integrated the Basel Convention and the Organisation for Economic Co-operation and Development (OECD) Council Decision on transboundary movements of recyclable waste into European legislation in 2006 with the European regulation on shipment of waste 1013/2006/EC. The regulation on shipment of waste regulates transboundary movement within a member state, between member states and into and out of the EU.

The European Union has a highly advanced WEEE management system in place, which includes the collection of WEEE in municipality, retailers, and through private operators. Additionally, there are established procedures for both the initial processing and final processing of WEEE to guarantee that the materials inside WEEE are recycled into secondary raw materials, while also ensuring that non-recyclable and particularly hazardous components are disposed of in a safe manner. The majority of European countries has the capability to manage and treat hazardous wastes.

The WEEE Directive (2012/19/European Union) establishes specific goals for the collection, recovery, recycling, and reuse of WEEE in six defined categories from 2018, as outlined in section 1.1. Member states are encouraged to prioritize the design and manufacturing of electrical and electronic equipment (EEE) that make it easier to dismantle and recover. The establishment of dedicated WEEE collection points is required to allow final holders and distributors to return such waste without any cost. Distributors of new products must also guarantee that waste of the same type of equipment can be returned to them at no charge on a one-to-one basis. Producers are permitted to establish and manage either individual or collective take-back systems. Beside this, minimum requirement of WEEE are specified in the Article 8 and in the related Annexes VII and VIII which specific treatment is necessary for some components such as PCB-containing capacitors, mercury-containing components, batteries, printed circuit boards, and chlorofluorocarbons (CFCs) [3]. In order to assist the operators to meet the obligations, therefore CENELEC (the European Committee for electrotechnical standardization) has developed a series of European standards for the treatment of WEEE (EN 50625 series, 25) and a European standard on the requirements for preparing WEEE for re-use (EN 5061426), which are collectively known as "CENELEC standards".

Within this scope, the Restriction of the use of certain Hazardous substances in electrical and electronic equipment (RoHS) Directive plays an essential role in mitigating the hazards that arise for both humans and the environment through the WEEE management cycle. It achieves this by imposing limitations on the utilization of specific hazardous compounds in EEE that can be replaced with safer alternatives. The Directive aims to enhance the recyclability of EEE by reducing the presence of hazardous chemicals in both EEE and its waste components. Simultaneously, it guarantees fair competition for manufacturers and importers of EEE in the European market. The RoHS Directive presently imposes limitations on ten substances: lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE), bis(2-ethylhexyl) phthalate (DEHP), butyl benzyl phthalate (BBP), dibutyl phthalate (DBP), and diisobutyl phthalate (DIBP) [4].

The WEEE Directive establishes the Extended Producer Responsibility (EPR) as "[...] one of the means of encouraging design and production of EEE which take into full account and facilitate its repair, possible upgrading, re-use, disassembly and recycling." EPR includes the following obligations:

- Each producer has to set up systems for the collection of e-waste (individually or collectively).



- Each producer has to meet the minimum recovery targets for the treatment of WEEE
- Each producer provides at least for the financing of the collection, treatment, recovery and environmentally sound disposal of e-waste from private households relating to the waste from its own products.
- Each producer provides a guarantee when placing a product on the market to ensure that the proper management of e-waste will be financed.

Despite this, in 2023 the European Commission (EC) adopted a new proposal on common rules promoting the repair of goods - Right to Repair. This right to repair aims to enhance the number of products being repaired under the legal guarantee and provide consumers with more accessible and cost-effective alternatives to repair technically repairable devices. Moreover, increased demand will result in a surge in the repair industry, while also motivating manufacturers and dealers to create more environmentally friendly business models. The current product groups covered include household washing machines, household dishwashers, refrigerating appliances, and vacuum cleaners. Additional items will be incorporated in the forthcoming years, beginning with smartphones and tablets [5].

Critical Raw Materials (CRMs) are crucial for the manufacture of Electrical and Electronic Equipment (EEE) and the management of Waste Electrical and Electronic Equipment (WEEE). Europe faces limited access to certain raw materials and therefore needs to ensure a more secure and sustainable supply of both primary and secondary CRMs.

	WASTE TYPE	Valuable and Critical Raw Materials	Required/Viable Input for End-processing	Current Business Practice
PCBs Desktop computers, professional IT Laptops Mobile phones Tablets External CDDs/ODDs, devices with internal CDDs/ODDs	WEEE		PCBs (shredded and unshredded), CuPM granulates, mobile phones w/o. batteries	✓
Li-ion BATTERIES Laptops Mobile phones Tablets Li-ion batteries in other WEEE (battery packs from e-bikes, tools, ...) BEV, (P)HEV	WEEE ELV		Batteries	✓*
LEAD-ACID BATTERIES Uninterruptable Power Supplies Other WEEE (e-scooters without seats, ride-on toys,...) Cars containing LABs, other vehicles (e-scooters with seats, ...)	WEEE ELV		Batteries	✓
FLUORESCENT POWDERS Fluorescent lamps CRT monitors and TVs	WEEE		Fluorescent Powder	✗
Nd-MAGNETS Laptops (HDD) Desktop computers, professional IT (HDD) E-bikes BEV, (P)HEV (electro engine)	WEEE ELV		Magnets	✗

Figure 2 Example of CRMs in WEEE (CEWASTE, 2021)



Within this project scope, 7 European countries namely Austria, Croatia, Czech Republic, Italy, Poland, Slovakia, and Slovenia were studied regarding to their WEEE regulations, EEE POM, WEEE generation, collection, reuse and repair potential.

The quantity of EEE POM were researched between 2019-2021 and the result shown that all 7 countries have an increased demand of EEE POM. The highest EEE POM per capita in 2021 was Poland at 32 kg/cap/year, following with Austria at 30.8 Kg/cap/year, where Croatia has the lowest EEE POM among the project countries which is approximately 18.4 kg/cap/year. Figure 3 shown the comparison of EEE POM per capita of 7 project countries in 2019 - 2021.

EEE POM per capita 2019-2021

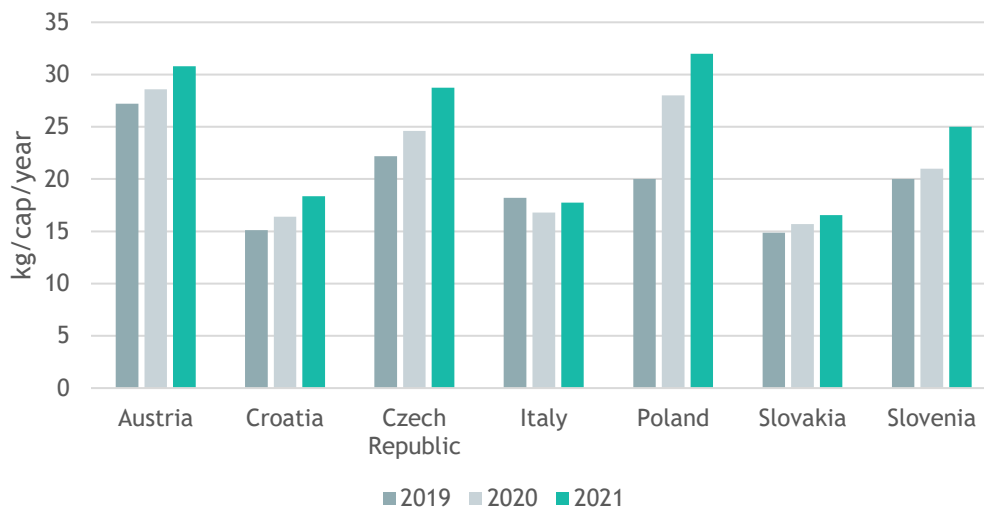


Figure 3 EEE POM per capita of project countries in 2019-2021 [6;7;8;9;10;11;12; 13]

Among the EEE that POM, about less than 50% of WEEE were collected among the project countries. In 2021, about 18 kg/cap/year of WEEE were collected in Croatia which is the highest collection rate among the project countries follow by Austria at 16 kg/cap/year, Poland at 14 kg/cap/year, Czech Republic at 12.7 kg/cap/year, Slovenia at 7.4 kg/cap/year, Slovakia at 3.7 kg/cap/year and Italy at 6.5 kg/cap/year. Figure 4 shown the WEEE collection per capita in 7 project countries between the year 2019 to 2021.

WEEE Collection per Capita (2019-2021)

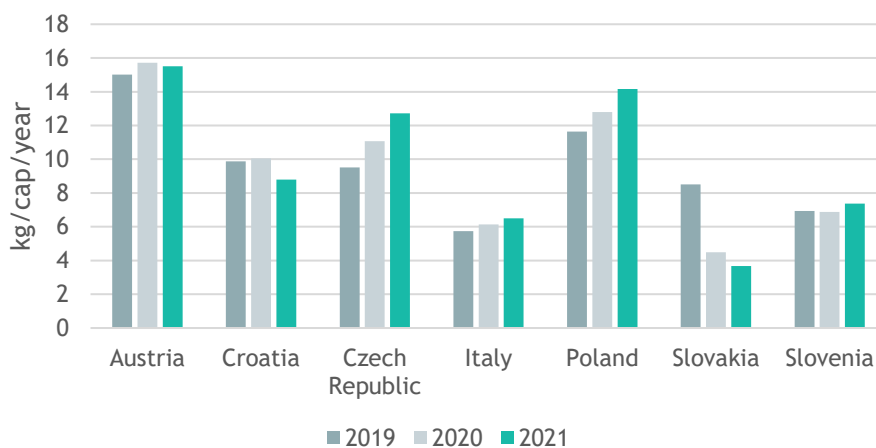


Figure 4 WEEE collection per capita in 7 project countries in 2019-2021 [6;7;8;10;11;12;13; 14;15]



Upon detailed examination of the distribution of WEEE generation in each project country, it is intriguing to observe significant differences in the proportions attributed to households and commercial sectors. For instance, in Austria, over 91% of WEEE came from households, a percentage comparable to Slovenia's average of 96.4% and Slovakia of 92.7%. While Poland's average is around 81% similar to Czech Republic at 83.2%. In Italy, household contribute 73.2% of the total WEEE generation. **Chyba! Nenalezen zdroj odkazů.** s hown the share percentage of WEEE generation from households.

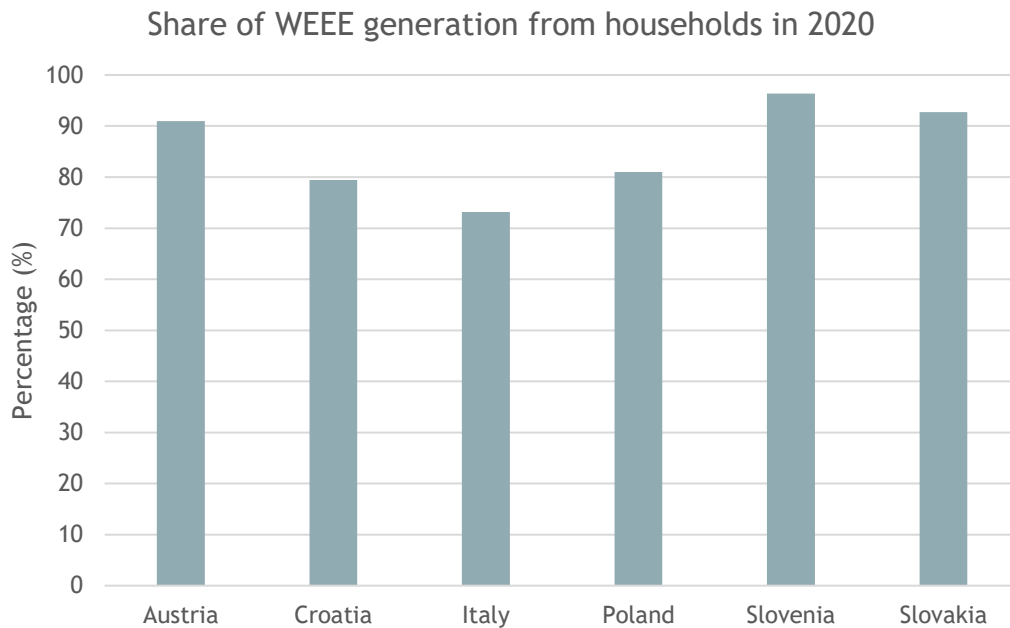


Figure 5 Share of WEEE generation from Households in project countries [9; 10; 11; 16; 17; 18; 19]

Beside this, the increase and decrease demand of the EEE in 6 categories namely Temperature exchange equipment; screens and monitors; Lamps; Large equipment; small equipment, small It and telecommunication equipment were examined. Table 1 shown the Increase and decrease demands of EEE in project countries on 6 EEE categories.

Table 1 Increase and decrease demands of EEE in project countries (%) [6; 11; 20; 21; 22]

Country	Temp. Exchange	Screens, monitors	Lamps	Large Equipment	Small Equipment	Small IT	Total	Remark
Austria	3.7	-13.6	-3.8	-2.5	4.6	4.6	-2	2020 vs 2021
Croatia	-11	-9	-16	-18	-4	-10	-13	2020 vs 2021
Czech Republic	+1	-4	0	+5	+1	-3	-	2020 vs 2021
Italy	-0.7	-6.7	-9.9	-9.3	-7.5	-7.5	-6.2	2021 vs 2022
Poland	-17.3	-57.4	69.9	25	56	-11.3	64.9	2020 vs 2021
Slovenia	-8.8	-16	-9.2	0.4	16.5	-10	-0.5	2021 vs 2022
Slovakia	8.9	-4.9	-9.7	5.4	6.7	10.5	17.2	2020 vs 2021



For reuse and repair of WEEE, this activity is obviously not taking much of the share in the WEEE management for all project countries. However, Croatia and Slovenia shown a relatively positive progress in their reuse potential at the rate of 8 and 6 kg/cap/year respectively. For Austria, it is about 1 kg/cap/year of WEEE preparation for reuse where the rest of the project countries are less than 1kg/cap/year. Figure 4 shown the preparation of reuse per capita in 2021 of the project countries.

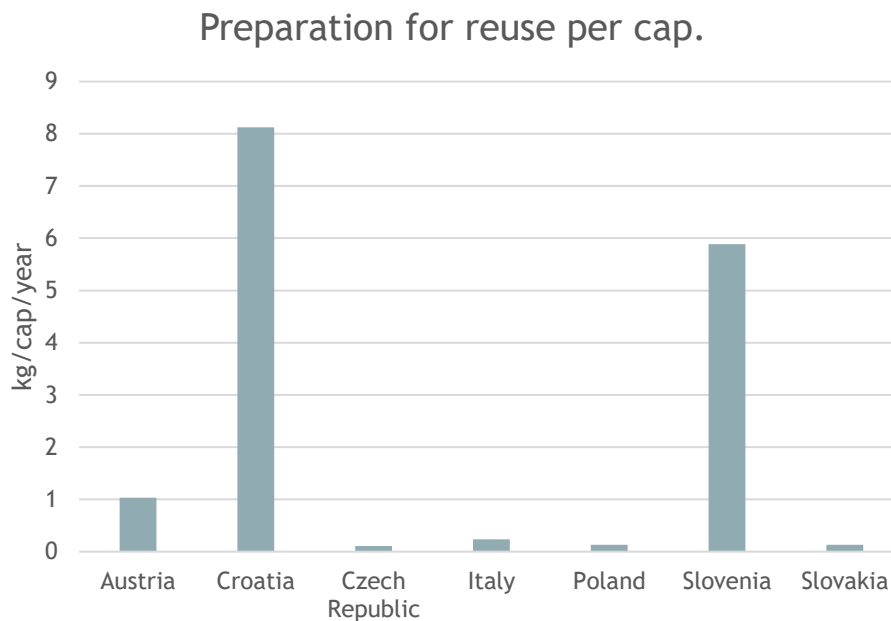


Figure 6 Preparation for reuse of WEEE per capita in project countries [9; 10; 11; 16; 17; 18; 19]

Remark for fig 4: data for Slovenia represent reuse and recycling [SI_WASTE_WEEEDAT_2021.pdf \(arso.si\)](#). In Croatia; everything that is collected by official companies is counted as prepared for reuse. Data are official and they are in official report.

Table 2 Preparation for reuse per categories in project countries [9; 10; 11; 16; 17; 18; 19]

Country	Prep. Reuse (t/year)	Temp. Exchange (t/year)	Screens, monitors (t/year)	Lamps (t/year)	LHA (t/year)	SHA (t/year)	Small IT (t/year)	Remark
Austria (2021)	9198.08	-	118.36	-	8473.03	479.29	127.4	2021
Croatia (2021)	32786	6201	8827	75	13546	2286	1851	
Czech Republic (2021)	1151	17	184	0	379	179	392	2021
Italy (2020)	14120	0	0	0	0	0	0	
Poland (2021)	4985.74	209.77	144.53	0.69	2153.44	1514.19	963.12	2021
Slovenia (2020)	12339	1904	1.98	155	3961	2888	1451	2020
Slovakia (2021)	718	-	-	-	-	-	-	-

According to the [European Union](#), the national regulations of Austria and Slovakia incorporate components of the CENELEC standards, while Slovenia has legally mandated compliance with either the complete CENELEC standards or the matching WEEELABEX standards. Other member states did not



establish any further minimum treatment requirements beyond those outlined in the WEEE directive. Therefore, around 630 out of the approximately 2,860 WEEE treatment facilities operating in the EU as of 2019/2020 are adhering to the CENELEC/WEEELABEX requirements. The majority of facilities that adhere to the CENELEC/WEEELABEX standards are primarily engaged in the treatment of temperature exchange equipment (46%), followed by facilities that handling of lamps (40%) and screens (35%).

Table 3 WEEE Treatment facility in project countries (EU, 2020)

Country	No. Facilities	Min. treatment capacity (t/year)	No. facilities compliant with WEEELABEX/ CENELEC standards (certified by the WEEELABEX organisation)
Austria	43	Approx. 850,000	4 (1)
Croatia	3	58,850	0 (0)
Czech Republic	Approx. 200	n.a	7 (6)
Italy	906	n.a	58 (6)
Poland	128	900,000	1 (2)
Slovakia	21	445,558	3(3)
Slovenia	9	10,000	0(0)

In 2020, the WEEE recycling rate is varied in the project countries ranging from 5.9 kg/cap/year in Slovenia up to 11.8 kg/cap/year in Austria.

WEEE Recycling rate in 2020

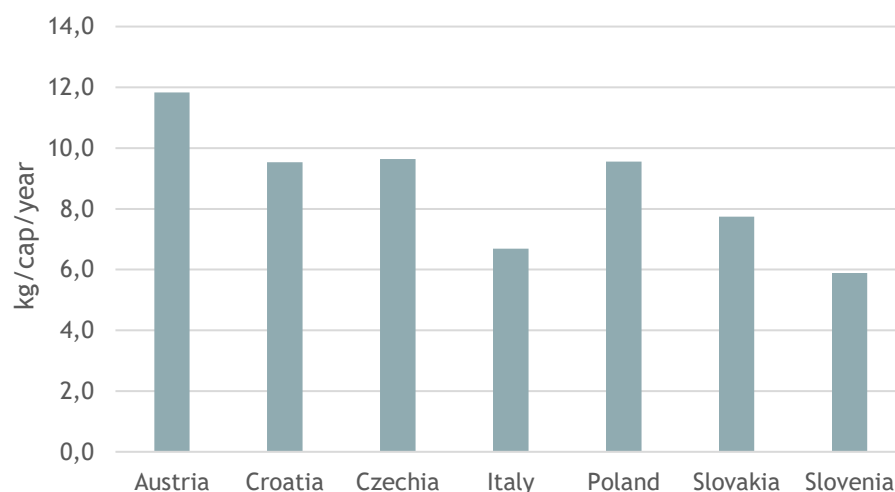


Figure 7 WEEE Recycling rate in 7 project countries (Eurostat, 2020)



D. Country Profile

1. Austria

1.1. Law and Regulation

National legislation that implements the WEEE Directive in Austria are listed as follows:

- Waste Management Act (Abfallwirtschaftsgesetz, AWG 2002):
https://www.ris.bka.gv.at/Dokumente/BgblAuth/BGBLA_2021_I_200/BGBLA_2021_I_200.pdf
- WEEE Ordinance (Elektroaltgeräteverordnung, EAG-VO):
https://www.bmk.gv.at/themen/klima_umwelt/abfall/Kreislaufwirtschaft/elektroaltgeraete/rec ht/eag-vo_geltungsbereich.html
- Waste Treatment Obligation Ordinance (Abfallbehandlungspflichtenverordnung):
https://www.bmk.gv.at/themen/klima_umwelt/abfall/recht/vo/abfallbehandlung.html
- Reporting: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2021.010.01.0001.01.ENG&toc=OJ%3AL%3A2021%3A010%3ATO C
- Guarantee period for repaired equipment: Bundesgesetz über die Gewährleistung bei Verbraucherverträgen über Waren oder digitale Leistungen (Verbrauchergewährleistungsgesetz - VGG) StF: BGBl. I Nr. 175/2021 (NR: GP XXVII RV 949 AB 980 S. 115. BR: AB 10704 S. 929.) [CELEX-Nr.: 32019L0770, 32019L0771]

The public authority responsible for implementing the Directive in Austria is the Federal Ministry of Climate Action, Environment, Energy, Mobility, Innovation and Technology (Bundesministerium Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie). The WEEE Directive (2002/96/EC) came into force in Austria in 2005. The revisions of 2012 (Directive 2012/19/EU) were implemented in Austria back in 2014, and revised in 2016 and 2018. The WEEE legislation affects the following:

- Austrian manufacturers, importers and sellers of own brands
- Foreign companies that sell electrical or electronic equipment directly to end users in Austria with the help of telecommunications technologies and that are based in a different member state or outside the EU - so-called distance sellers.

Legal obligations of those affected [23]:

- Registration: Manufacturers must register with the Austrian manufacturers registry EDM.
- Participation in take-back system: There is a legal obligation in Austria to participate in a system for taking back household appliances (B2C). Manufacturers must take part in a compliance scheme designed to collect and recycle equipment. There is no legal obligation in Austria to participate in a system for commercial appliances (B2B). Manufacturers can take part in such a system voluntarily.
- Disposal and treatment of waste electrical and electronic equipment in line with Austria's Waste Treatment Obligation Ordinance.
- Reporting the quantities of sold products.



- **Marking:** Manufacturers must affix the crossed-out wheeled bin and the CE marking to their products permanently and legibly.
- **Authorised representatives:** Foreign distance sellers are obliged to appoint an authorised representative who is responsible for meeting their obligations under the EAG-VO. Such representatives must be based in Austria.
- **Retail take-back obligation:** Austrian retailers are obliged to take back waste electrical and electronic equipment when a consumer purchases new equipment of similar value. Exceptions are made in the case of retailers having a sales area of less than 150 m².

Austrian Waste prevention program [24]

(R1) Research and development to extend the lifespan and service life (e.g. through functional upgrading of products, innovative business models, second-life use, such as of traction batteries), incl. strategies against obsolescence; baseline study on reuse in the furniture segment

(R2) Continuation of the reuse & repair platform for the exchange of experience, information and networking

(R3) Support for repairs through a repair bonus

(R4) Measures to increase reuse and repairs in public procurement, in particular through reuse-friendly procurement guidelines and guidelines for action and/or reuse of material goods within the public sector and/or transfer to reuse companies

(R5) Support activities at EU level, e.g., to introduce a reparability index for selected product groups and examine extended producer responsibility to promote reuse

(R6) Promoting professionalisation in the field of reuse product marketing

(R7) Provision of basic building blocks for standard terms and conditions for the transfer of reuse equipment

(R8) Educational activities on reuse, repair and longevity of products as well as the publication of best practice examples and development of educational offers on repair and reuse

(R9) Taking repair and reuse design into consideration in design curricula, e.g. in the furniture sector

(R10) The digitalisation of product information systems relevant for reuse and repair (e.g. for clothing, furniture, electrical appliances or building components)

(R11) Promotion of the concept "use instead of buy", e.g. by expanding the category "rental" under reparaturfuehrer.at and further services, information on www.bewusstkaufen.at ("long use" section to be further expanded)

(R12) Encourage the transfer/donation of usable, unsold product stocks or returned goods from online/retail e.g., to social organisations

(R13) Promotion of repair possibilities (e.g. via repair networks, repair guides, repair cafes)

(R14) Continuation of the expansion of reuse networks in the federal provinces and promoting the establishment of networks with other actors from the private and public sector (in particular through the further development of instruments of labour market policy and innovative financing instruments for social-economy reuse & repair businesses to promote long-term stable partnership projects)

(R15) Promotion of waste prevention initiatives, such as lending shops/libraries, exchange initiatives etc. and related initiatives in companies, institutions and schools

(R16) Expansion of the reuse collection of usable goods in the municipalities



(R17) Promotion of the concept (reuse and repair) for second-hand shops - also taking into account online shops

1.2. Financial scheme

According to the WEEE Directive, producers of electrical and electronic equipment must finance the environmentally sound collection and the entire recovery and recycling cycle at the end of the useful life of their equipment. Each producer is to provide a financial guarantee to ensure the financing of the disposal of its WEEE, which will take the form of the producer's participation in financing schemes, recycling insurance or a blocked bank account.

However, for reuse and repair, there is no clear regulation how these activities are financed. In Austria, there are different financial channels support the reuse and repair of WEEE such as financial support from the Austrian Public Employment Service (AMS - Arbeitmarktservice), donations, revenue from selling products and materials. Beside this, there is a repair network in Austria - so called Reuse-Austria (formerly Repanet) - where Sponsoring members support the work with a minimum sponsoring contribution of 150 euros and thus clearly position themselves as active supporters of a consistent, social circular economy in Austria. In doing so, they contribute to improving the framework conditions for re-use and repair. Supporting members also benefit from the Re-Use Austria network, receive relevant information and benefit from discounted participation in webinars.

1.3. Stakeholders

1.3.1. Organizations

About 16 organizations associated with WEEE management including the reuse and repair were identified which are not only located in Vienna but also Salzburg, Graz, St.Pölten & NÖ-West, Eisenstadt, Burgenland, Carinthia, upper Austria, Salzburg, Steiermark, Vorarlberg for example Carla, RepaServ, Reparaturnetzwerk Wien, R.U.S.Z Reparatur- und Service-Zentrum, DRZ Demontage- und Recycling-Zentrum, GRAZ repariert - Das Reparaturnetzwerk Graz, etc. More details on their organizations and activities can be found in the link: <http://u.pc.cd/s7q7>

1.3.2. Local repairs shops

There are approximately 159 local repair shops listed in Austria the following link: <https://www.reparaturnetzwerk.at/betriebeliste?br=9>

1.3.3. Domestic EEE Producer

There are about 19 notable list of EEE producer in Austria with a wide range of products and spare parts such as printed circuit boards (PCB), lighting, cables, industrial automation, appliances, batteries and refrigerators. Please note that there are more companies presented in Austria than listed in this report and can be found here: <https://weee-directory.com/reports-downloads/database-ewaste-stakeholders/austria/>



Table 4 List of EEE producers in Austria [25]

No	Name	Sale (Mio)	Type of products
1	Infineon Technologies Austria AG*	5,240.40	printed circuit boards
2	ams-Osram AG*	4,819	lighting
3	Siemens in Österreich*	2,819.73	convertors, generators
4	AT & S Austria Technologie & Systemtechnik AG*	1,791.34	printed circuit boards
5	Siemens AG Österreich	1,310.77	industrial automation
6	Fronius International GmbH*	1,228	components
7	Zumtobel Group AG*	1,148.32	lighting
8	Meinhart Holding GmbH*	790	cables
9	Eglo Leuchten GmbH*	619	lighting
10	Gebauer & Griller Kabelwerke GmbH*	603	cables
11	Keba Group AG*	553	industrial automation
12	Meinhart Kabel Österreich GmbH	526.06	cables
13	Schrack Technik Holding AG*	498.60	electrical engineering, lighting
14	Rexel Austria GmbH	490	cables. Lighting
15	IMS Nanofabrication GmbH	489.75	multi-beam mask writers
16	Melecs EWS GmbH*	456.85	Electronic Manufacturing, tailor-made for industries
17	SKB Industrieholding GmbH*	378.44	cables
18	Banner GmbH*	307	Appliances, Electrical, and Electronics Manufacturing, batteries -Banner Batteries
19	PKE Holding AG*	305	refrigerations, ventilation



1.4. Best Practice

1.4.1. Local incentives

Upper Austria - ReUse ReVital [26]

Reuse ReVital is an established initiative in Upper Austria that addresses the issue of wasteful consumption and advocates for the circular economy. The thinking of the organization is centred around the concept of repairing and reusing things rather than discarding of them. The ReVital Network Upper Austria is a prosperous collaboration between municipal waste management authorities and socio-economic ReUse enterprises. Intact and operational items like as electrical appliances, furniture, sports and recreational equipment, and home products are gathered at waste collection centres. In 2018, refrigerators that were free of CFCs were also included. Furthermore, there is the alternative of gathering second-hand items through the ReVital Box. The processing is conducted either by the store partners themselves or, particularly in the domain of second-hand electrical items, by certified socio-economic processing institutions. Every partner utilizes the shared product brand "revital ist genial". Products having the ReVital logo correspond to a specific standard of quality, and ReVital sales partners are required to meet the following quality criteria:

- complete and undamaged
- visually appealing
- functional (with test certificate for large WEEE units)
- safety-tested (for electrical appliances)
- hygienically harmless

The website (www.revitalistgenial.at) offers comprehensive information to users, including a list of ReUse retailers and collection sites available.

Reparaturbonus - Voucher for repair [27]

The repair bonus, provided by the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK), aims to encourage the repair of electrical and electronic devices often utilized in private households. Starting from April 2022, individuals who hold Austrian citizenship have the opportunity to request a repair voucher. This voucher will cover a maximum of 50 percent of the expenses incurred for repairs, and up to 30 Euros for obtaining a cost estimate. The total amount covered by the voucher cannot exceed 200 Euros. The repair of non-electronic components of electrical and electronic equipment, such as a damaged wheel of a vacuum cleaner, is also mentioned. The repair voucher can be obtained on the website www.reparaturbonus.at and must be used either digitally or in printed form at participating partner establishments. The repair voucher's value will be directly deducted from the invoice payment. After redeeming a voucher, one can request and utilize a fresh coupon to cover the cost of repairing a different electrical or electronic device. There are no limitations on the quantity of coupons that can be redeemed by an individual or a family.

1.4.2. Online platforms

WIDADO - online platform for ReUse [28]

WIDADO is an association including 26 social-economic and charitable Re-use enterprises located around Austria, founded in 2022. The website (www.widado.com) enables easy access to a diverse selection of goods from more than 146 re-use retailers, promoting resource conservation. Furthermore, there is support



for the notion that digitalization is essential in ensuring the sustainability of re-use. Available are used items in the following categories: apparel & footwear, household & furniture, books & media, recreation & sports, technology & electronics, decoration.

Widado: <https://www.widado.com/>

Willhaben - online ads platform for second hands products [29]

Willhaben is founded in 2006 as an advertising platform encompasses the domains of real estate, automobiles and motors, jobs, as well as a marketplace for a wide range of goods and services. As of February 2021, the number of online adverts on willhaben exceeds 9,000,000. Willhaben marketplace in Austria is the largest free online marketplace.

Willhaben: <https://www.willhaben.at/iad?autoLoginAttempted=1>

1.5. Challenges and recommendations

The questionnaires were distributed to in total of 34 organizations and we have received 18 respondents. Among the stakeholders, there are 4 from Producer / Importer / Producer Responsibility Organisation; 7 from municipality, 8 from reuse organizations and 3 from recyclers. The respondents have a varied years of experiences working on WEEE which divided into 1. Early career (0-5 years); Mid-career (5-10 years) and Long term career (> 10 years). Figure 8 shown the share percentage of experiences from the questionnaire respondents.

Percentage of expert experience in Austria

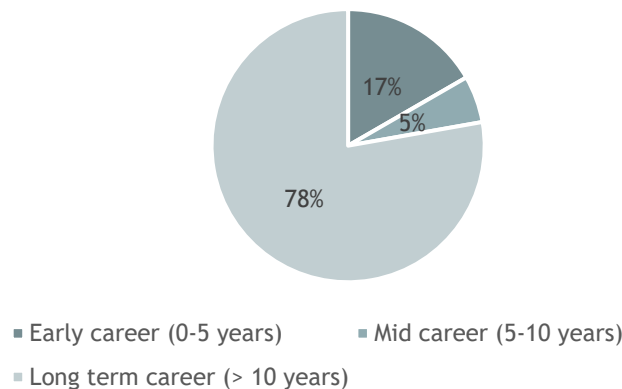


Figure 8 Percentage of expert experiences in Austria

1.5.1. Challenges

WEEE Management

Describe briefly the main challenges with electric and electronical waste that you are facing with e-waste

Hazardous components & product complexity:

- Built-in Lithium batteries;
- Potential hazards, fire
- Glued casing; complexity of design slow down the dismantling process



Product design:

- Short lifespan
- Difficult to repair
- No instruction for repair

Cost and time constraints:

- Personnel cost
- Expensive to repair
- High cost in transport route (collection, testing, return)
- Time intensive for repair
- Reuse & repair is economically disadvantage compared to recycling
- Training employee (handling of tools, correct dismantling, differentiation of fractions)

Collection:

- Illegal collection
- Difficulty in access to high quality of WEEE for reuse & repair
- Higher quantity of WEEE but same number of collection points
- Households store WEEE at home
- Quality of collected appliances is worsen.

Regulation and administration:

- To achieve the collection and recycling rate
- Lack of quantity information
- High administrative burden in collection systems
- official regulations that affect or restrict operational processes (e.g. box containers during transports)
- Legal requirement often not clear and/or cannot be implemented in practice
- Stricter requirement lead to export

Awareness:

- Lack of information for customers
- No demand or interests for repaired products

In your experience, what are the main barriers faced in implementing effective WEEE management and circular economy?

About 50% of the respondents think that lack of awareness and understanding of circular economy concepts is one of the main barriers faced in implementing effective WEEE management and CE. About 50% agreed that it is also due to insufficient collaboration among stakeholders and 67% think that due to limited funding and resources. About 33% of the respondents think that it is because of a complex regulations and



compliance requirements, additionally with an inadequate infrastructure for collection and processing. Only 28% stated that it could related to the resistance to change within organizations.

Despite this, the costs of collection, recycling and also re-use are still largely socialised, while profits remain with manufacturers and online retailers.

WEEE recycling

In your opinion, what are the main challenges in the market for recycling WEEE materials?

About 16% of the respondents agreed that having limited access to recycling facilities is the main challenges for WEEE recycling materials, while 6.7% thinks that it is due to the regulator barrier. Additionally, one respondent stated that manual dismantling in Europe only possible with subsidised labour - but higher recycling rate and strongly increasing quantities of WEEE.

WEEE Reuse and Repair

In your opinion, what are the main challenges in the market for reusing WEEE materials?

Regulation:

- Lack of legal framework (e.g. obligatory reparability, availability of spare parts, no specifications on the minimum service life)
- Cost constraints:
- Testing the equipment is sometimes more expensive than the retail value.
- Heterogeneous equipment mixed, no standardised reprocessing possible = high cost burden

Collection:

- Reusable products may not remove from the collection points
- still few professional distribution channels
- Re-use quantity of other collection channels not available (willhaben.at, Refurbed.at, etc.);

Others:

- limited availability of skilled personnel for repair
- capable repair personnel
- interested customers
- quality controls
- consumption behaviour

Policy instrument

Describe briefly which policy instruments did you use for your business development

- Creation of a RE-USE master plan, which was approved by the LR.
- Co-design of the WEEE Re-Use Guideline of the BMLFUW;
- EU regulatory policy on the circular economy



- Supporting the community in implementing the Reparturcafé
- Participate in the CPA and in the technical bodies for recycling at EU level.
- Labour market policy: About two thirds of the total costs of the DRZ are covered by the Public Employment Service (AMS) Vienna, for the employment and support of approx. 200 long-term job-seekers who are distant from the labour market per year (maximum length of stay of 6 months).
- Contract with MA 48 (Waste Management Department of the City of Vienna) for the free collection of separately collected (small and large electrical appliances)
- Integration into the "Public Contracts" department of the Vienna Adult Education Centres.

Has your organization received any subsidies or financial incentives for managing WEEE or promoting circular economy initiatives? Yes / No questions

Yes: 5 respondents

No: 10 respondents

Result: < 50% received subsidies or financial incentives

What kind of support on the market would you appreciate? (ex. law change, subsidies etc.)

Regulation and standards:

- Collection standards
- Uniform manufacturer criteria
- Clear, strict legal requirements on reparability with complete financial responsibility of the manufacturers
- Take-back obligations for retailers, online retailers to be fully accountable
- Promotion of the use of secondary raw materials
- Integration of reuse into collection systems; mandatory reuse quotas
- Suitable laws to recycle recovered raw materials, especially plastics (end of waste)
- Recycling is only permitted if re-use is impossible
- Product identification/digital product passport: with all relevant information on repair, spare parts, technical repair, spare parts, technical information etc.

Financial aspects:

- Subsidies for companies that operate reuse
- No subsidies! Simply true-cost prices for appliances (including all costs from raw material Extraction, production, distribution, collection, recycling)
- Reduction of VAT on the sale of re-use equipment
- Taxation of the use of primary raw materials
- Finance R&D in the area of re-use.
- Continuation of the repair bonus to extend the use of the appliance at the original installation site (instead of return delivery, repair and resale)

Others:



- Repair instructions, circuit diagrams
- Warranty
- Awareness-raising cooperation projects: e.g. guided tours and workshops at the workshops at the DRZ, media work...)
- Matchmaking platform for repairs and refurbished goods
- Increase interests of customers on repairs and refurbishments products; provide more choices to customers
- More public awareness campaigns
- More transparency, the availability of reuse company, scope of authorization



1.5.2. Recommendations

What changes would you like to see on the market to more promote and utilize the WEEE management?

Product design:

- Design for repair
- Longer lifespan with the possibility of repair
- Obligation for manufacturers to use standard tools
- More durable, repairable and recyclable electrical and electronic equipment (eco-design)

Awareness:

- Information on WEEE and where/how to collect it correctly
- More awareness for reuse and repair of WEEE
- Raise awareness for less consumption

Regulation:

- No stricter chemical legislation than for production. Often lower limits are applied in Austria for substances than for products and new goods.
- Companies need special permits to be allowed to recycle such WEEE; currently too many active on the market with little knowledge.

Others:

- Addressing the market failure: negative externalities for new appliances need to be corrected, prices need to speak the environmental and social truth
- Professionalisation of the distribution of reuse devices (best-practice example: company Refurbed in the IT sector)
- Primary raw material cost explosion and supply chain disruption
- Swapping, passing on, reusing and recycling, empowerment for repair, continuation of the repair voucher, promotion and exchange among repair cafés/repair shops incl. creation of socio-economic fields of activity for people disadvantaged in the labour market.
- Better access to equipment in large quantities
- Less logistics costs and personnel costs

how to motivate the market to follow the rules of Circular economy and manage the WEEE waste more effectively.



Regulation:

- Clear legal requirements on service life, reparability and repair liability, complete producer responsibility, use of recycles, material recovery
- Introduction of a mandatory return quota
- Mandatory ReUse quota
- Take back old appliances free of charge
- Introduction of a phased-in primary commodity tax at EU level
- High raw material tax
- High CO2 tax
- High modular EPR fee for short-lived, poorly repairable products
- Clear legal framework for the sale of re-use products regarding liability and warranty.
- Software update Minimum rules for longest possible use
- Open-source software and hardware from a certain period after first use, access via digital product passport
- Digital product passport with relevant re-use information

Financial aspects:

- Cost incentive for repair products; make new equipment more expensive than spare parts for repairs
- A real eco-social tax reform is missing: tax (critical) resources, relieve labour
- Correct the market failure: negative external effect for new appliances must be corrected, prices must speak the ecological
- Repair bonus

Others:

- Promote understanding & awareness: Children, teenage and adult education
- Experience of guided tours & workshops at the DRZ
- Increased collection points for at least small electrical appliances (pilot test in the DRZ with own containers with appropriate labelling in the waste room of a housing estate at the Kabelwerk in Vienna for several years.
- Point out positive examples and best practices



2. Croatia

2.1. Law and Regulation

Croatia has 2 Acts and 2 Ordinances which regulates reuse and repair of WEEE. The information of Waste Management Act can be found in the following links:

- Law on waste management NN 84/21, 142/23. Available online: <https://www.zakon.hr/z/2848/Zakon-o-gospodarenju-otpadom>
- Environmental Protection Act. Available online: <https://www.zakon.hr/z/194/Zakon-o-za%C5%A1titi-okoli%C5%A1a>
- Ordinance on batteries and accumulators and waste batteries and accumulators. Available online: https://narodne-novine.nn.hr/clanci/sluzbeni/2015_10_111_2147.html
- Rulebook on waste management. Available online: https://narodnenovine.nn.hr/clanci/sluzbeni/2022_09_106_1552.html
- Ordinance on the management of waste electrical and electronic equipment. Available online: <https://www.zakon.hr/cms.htm?id=31223>

Collection of e-waste comprises collection, sorting, and temporary storage for the purpose of transport to treatment. The disposal is completely free of charge for the holder of e-waste. Licensed companies collectors or their authorized collecting subcontractors will take the e-waste from the holder and dispose of it in a safe manner. The e-waste collector is a legal or natural person tradesman that, pursuant to the Act on Sustainable Waste Management, holds the license for E waste collection. They are obliged to take the entire E waste from the holder, free of charge and within 20 days from the date of.

The holder of e-waste can dispose of the waste free of charge in the following manner:

- By calling a toll-free line, by e-mail, SMS, or registration on the web portal, depending on the county/City of Zagreb, category, and type of EE waste (household, registered persons).
- By returning E waste to the seller on the “one for one” basis, for the household holder.
- By returning light bulbs to the seller which sells light bulbs, category 3 (halogen, fluorescent, and other types of energy saving light bulbs), for household holders, free of charge and with no obligation to purchase
- By returning to the seller EE waste with outer dimensions of up to 25 cm, whose store has the selling surface area greater than 400 m², for household holders free of charge and with no obligation to purchase
- By personally disposing of EE waste at the collection centers. The addresses of the collection centers are located in the towns in each county/districts in the City of Zagreb, and you can view the list with contacts here.
- By personally disposing under collection schemes organized by the licensed collectors, pursuant to the legal provisions

Note: E waste is collected by licensed collectors separately from the municipal waste and other types of waste, including bulky waste!



2.2. Financial scheme

Producers of EEE are obliged to pay the fee for the management of WEEE to cover the costs of separate collection and treatment of WEEE in the system managed by the Environmental Protection and Energy Efficiency Fund. More on the obligations of producers can be found at http://www.fzoeu.hr/hr/naknade/naknade_temeljem_zakona_o_odrzivom_gospodarenju_otpadom/nakna_da_gospodarenja_ee_otpadom/

The collector is entitled to a compensation for the costs for the quantities of e-waste that were collected, temporally stored, sorted, transported, and handed over to the treatment operator. The treatment operator is entitled to a compensation for the costs for the treatment of e-waste for e-waste accepted from the collector.

Producers of the EEE have an obligation (given by the mentioned law) for take-back, processing, use and disposal of waste electrical equipment, informing the end user about take-back and other related obligations. They usually create a joint stock company to operate the collective take-back system and ensure the processing, utilization, and removal of e-waste. However, these financial supports of e-waste management are not including the reuse and repair activities.

2.3. Stakeholders

2.3.1. Organizations

Environmental Protection and Energy Efficiency Fund: In accordance with the provisions of the Environmental Protection Act, the Fund is established for the purpose of securing additional resources for the financing of projects, programmes and similar activities in the field of conservation, sustainable use, protection and improvement of the environment. Under the provisions of the Energy Act, the Fund is established for participating with its resources in the financing of the national energy programmes, with a view to achieving energy efficiency and use of renewable energy sources.

There are several big companies which are in charge of collecting WEEE and they are authorized for collection namely FLORA VTC d.o.o. , CE-ZA-R d.o.o, METIS d.d,. They have their branches in whole country that are in charge of WEEE collection in each county.

Despite this, Croatia's first reuse-center has opened in 2017 in Prelog. Discarded objects will revive in the center rather than end up in the landfill. The reuse center in Prelog consists of two parts: the exhibition and sales area of 220 squares and the warehouse-workshop section, also of 220 square meters. Large items such as furniture, footwear and clothing, consumer goods (utensils, books, toys, children's and sports equipment ...) that is usually disposed of will be repaired or refurbished and reused. The benefits of the center are a high level of work intensity, which requires a greater number of employees, the employment of people with invalidity and, of course, the prolongation of the useful life of the goods by re-use, which reduces environmental pressure.

Article 16 of the Law on Waste Management (adopted on 16th July 2021) contains many information regarding the obligations and legal entities of reuse-centers in Croatia. Measure 10 of the Waste Prevention Programme includes reuse procedures that shall encourage the reuse of products. For example, within recycling yard, a so called "Re-use corner" may be organised, where citizens can bring items, they do not need anymore, and other citizens (of weaker financial status) can take these items for further use. Additionally, a reuse-campaign includes making posters, brochures, flyers and video-informational educational content, containing useful information on the value of so-called used-up materials and the possibilities of its repair and/or re-use.



These materials will contain data on where and how the citizens can donate their used products, i.e. exchange them for some others that they need. For this goal, it is necessary to establish an Internet portal for re-use, collecting and distributing products (clothes, books, electronic and electric equipment, computers, furniture, food etc.) which can be used in the widest sense of that word and which are useful and necessary to someone, donated by people that do not need them anymore. The portal can be organised within the existing Croatian Waste Market, started by the CCE, organised with the goal of connecting business partners offering or seeking all types of useful waste/secondary resources that can be used as input resource for further production (EEA, 2023).

2.3.2. Local repairs shops

In Croatia, each city has several repair shops, and inhabitants usually before buying a new device they try to repair the old one, mainly due to the expensiveness of the new equipment.

2.3.3. Domestic EEE Producer

Within this period, two EEE producers were identified:

- Končar - producer of electronic equipment
- Dalekovod proizvodnja d.o.o. - transmission line production

2.4. Best Practice

2.4.1. Local incentives

The most important incentive for WEEE repairing is the fact that collection of WEEE in Croatia is free of charge. That fact motivates people for proper disposal, and also companies for repairing.

Beside this, numbers of activities are implementing in Croatia for the support of repair activities and WEEE collection such as repair shops, Popravljionice (occasionally organized with similar concept of Repair café), collection boxes for batteries and small WEEE and call to collect initiative.

2.4.2. Online platform

There is no official online platform for second-hand reuse and repair of electric or electronic waste in Croatia, but there are several online platforms for selling used EE products, mainly those one which still can be used. Part of that products are out of use so these platforms can be considered as online platforms for EE products reuse or repair.

<https://www.njuskalo.hr/>

<https://www.index.hr/oglas/strojevi-i-alati/gid/3229>

https://www.cackalo.hr/search-results/?cat_id=2319

<https://digitalnakomora.hr/e-gospodarske-informacije/tenderi/trazilica-medunarodnih-tendera> - newest online platform e-waste market - it was launched last year, but it is not promoted well and there are no EE products listed, but through the CIRCULAR WEEEP project we can do the promotion.



2.5. Challenges and recommendations

The questionnaires were distributed to in total of 200 organizations and we have received 13 respondents. Among the stakeholders, there are 5 from Producer / Importer / Producer Responsibility Organisation; 4 from municipality, 1 from reuse organizations and 4 from recyclers. The respondents have a varied years of experiences working on WEEE which divided into 1. Early career (0-5 years); Mid-career (5-10 years) and Long term career (> 10 years). Figure 11 shown the share percentage of experiences from the questionnaire respondents.

Percentage of expert experiences in Croatia

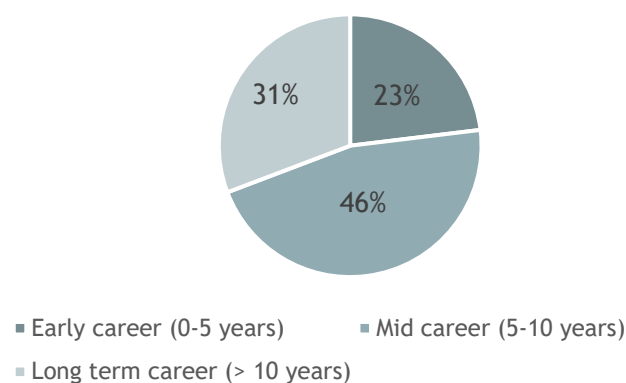


Figure 9 Percentage of expert experiences in Croatia

2.5.1. Challenges

WEEE Management

Describe briefly the main challenges with electric and electronical waste that you are facing with e-waste

Collection:

- Collection and transport between collection points and recycler
- Informal sector involvement in collection
- Insufficient collection
- Limited collection points and services

Financial aspect:

- current price in the reuse/repair market is not favourable to cover the cost of separate collection
- Lack of market interests

Others:

- Lack of WEEE awareness in older generations
- High consumption of EEE
- Most EE waste ends up in the unsorted waste stream due to a lack of information and awareness among citizens
- No guidelines for recycling sectors



In your experience, what are the main barriers faced in implementing effective WEEE management and circular economy?

About 85% of the respondents think that lack of awareness and understanding of circular economy concepts is one of the main barriers faced in implementing effective WEEE management and CE. About 54% agreed that it is also due to insufficient collaboration among stakeholders and 77% think that due to limited funding and resources. About 23% of the respondents think that it is because of a complex regulations and compliance requirements, additionally 46% with an inadequate infrastructure for collection and processing. About 46% stated that it could related to the resistance to change within organizations.

WEEE recycling

In your opinion, what are the main challenges in the market for recycling WEEE materials?

About 15% of the respondents agreed that the main challenges in the market for recycling WEEE materials are due to 1) Limited access to recycling facilities; 2) Insufficient demand for recycled materials; 3) Inadequate recycling technologies and 4) regulatory barriers.

WEEE Reuse and Repair

In your opinion, what are the main challenges in the market for reusing WEEE materials?

About 62% of the respondent think that the lack of standardized collection processes is one of the main challenges in the market for recycling WEEE materials. About 92% agreed that the lack of awareness among the consumers/organizations also play a major role. 54% foreseen that there is an insufficient demand for reuse products. Only 15% of the respondents think that market challenges could be the limited availability of WEEE materials for reuse. Less than 50% selected quality control issues with reused materials and only 23% considered regulatory barriers as the market challenges.

Policy instrument

Describe briefly which policy instruments did you use for your business development

- Educating users, constructing temporary storage facilities, and procuring transport means
- As a public service provider in Katela, Zeleno i modro d.o.o. collects and recycles WEEE
- We used subsidizing local self-government units
- Subsidies to public service providers, e.g. managers of recycling yards from unauthorized persons
- constant market research, search for offers from salvagers

Has your organization received any subsidies or financial incentives for managing WEEE or promoting circular economy initiatives? Yes / No questions

Yes: 1 respondent

No: 9 respondents

Result: < 20% received subsidies or financial incentives



What kind of support on the market would you appreciate? (ex. law change, subsidies etc.)

Regulation and standards:

- Law changes in the whole waste management plan so that each island has possibility to solve its waste problem with a waste incinerator, and subsidies for building a waste sorting plant
- Action plans for "Right to repair", greater reusability, a universal charger, and incentives for recycling are listed explicitly as immediate objectives in the proposal
- Regulations support on reuse and repair

Financial aspects:

- Subsidies; subsidies for collection point, transport, storage, recycling
- Participation (share) of collection costs
- Increase market price; and regulation on refurbished product prices

Others:

- Product designs - for longer lifespan
- Design for repair

2.5.2. Recommendations

What changes would you like to see on the market to more promote and utilize the WEEE management?

Product design:

- Design for repair
- Longer lifespan with the possibility of repair

Awareness:

- Information on WEEE and where/how to collect it correctly
- More promoting material, advertisement everywhere about the importance of waste separating including penalties for improper handling of waste
- More awareness for reuse and repair of WEEE

Financial aspects:

- Subsidies for consumers, companies, producers, recyclers, collectors those in the value chains
- Co-financing collection and reuse
- Easy and inexpensive process of repairing existing products

Others:

- Cooperation with authorized collectors and processors;
- Contracts with the Fund for Environmental Protection and Energy Efficiency
- Organize a waste exchange where all recyclers will be visible, and prices will vary
- Better collaboration between waste collector and waste producer
- Increase number of collection points



How to motivate the market to follow the rules of Circular economy and manage the WEEE waste more effectively.

Through the implementation: it's important to understand the difference between the linear and circular economy to explain why it's crucial to protect the planet. By encouraging both producers and consumers to recycle and repurpose products that are no longer used, we can all do our part to preserve the environment. Beside this, penalties for improper handling of waste are a must.



3. Czech Republic

3.1. Law and Regulation

In Czech Republic, the Law 542/2020 Sb. regulates end-of-life products. It obliges manufacturers and importers of electrical equipment to create a system that ensures and finances the take-back, processing and environmentally friendly disposal of electrical equipment. More information can be found here Link: https://en.asekol.cz/data/uploads/2022/12/Manufacturers-obligations-by-Act-No.-542_2020-Coll..pdf

Additional information on WEEE regulations in Czech Republic: <https://en.asekol.cz/czech-legislation/>

3.2. Financial scheme

Producers of the electric and electronic devices have an obligation (given by the mentioned law) for take-back, processing, use and disposal of waste electrical equipment, informing the end user about take-back and other related obligations. They usually create a joint stock company to operate the collective take-back system and ensure the processing, utilization and removal of waste electrical equipment.

However, these activities are not specifically including the reuse and repair of WEEE activities.

3.3. Stakeholders

3.3.1. Organizations

In the Czech Republic, the following associations are involved in reuse and repair activities in the field of electronic waste:

- Association for the Deposit and Recycling of Electrical Appliances (AZRE) - is a professional organization that brings together manufacturers, importers, sellers, and recyclers of electrical appliances. AZRE is involved in promoting the deposit system for electrical appliances, recycling of electrical appliances, and other related activities.
- Association for the Repair of Consumer Electronics (AOSE) - is a professional organization that brings together repairers of consumer electronics. AOSE is involved in promoting the repair of consumer electronics, educating repairers, and other related activities.
- Association for the Support of Recycling and Recyclability (ASRR) - is a non-profit organization that deals with the promotion of recycling and recyclability. ASRR deals with recycling awareness, collaborates with manufacturers and recyclers, and other institutions.

Other organisations involved in reuse and repair activities in the field of electronic waste:

- Center for Recycling and Re-use (CRRR) - is a non-profit organization that deals with recycling and re-use of electrical appliances. CRRR operates a re-use center in Prague, where it offers for sale used electrical appliances that have been repaired or improved.
- Elektroodpad.cz - is a non-profit organization that deals with awareness of electronic waste and its recycling. Elektroodpad.cz operates a website that provides information on electronic waste, its recycling, and other related topics.



- Opravárna - is a non-profit organization that deals with the repair of consumer electronics. Opravárna operates a repair shop in Prague, where it offers repairs of consumer electronics at affordable prices.

These organisations contribute to the promotion of reuse and repair activities in the field of electronic waste. They support the repair of consumer electronics, promote the deposit system for electrical appliances, and other activities that aim to reduce the amount of electronic waste that ends up in landfills.

3.3.2. Local repairs shops

There are several local repair shops identified namely:

- Opravy elektrozařzení - Šamalík
- POHAS s.r.o. - služby
- Chráněné dílny Charity Opava
- N&N spol. s r. o.
- and many more

3.3.3. Domestic EEE Producer

- Isolit-Bravo, spol. s r.o. - household electrical appliances
- ETA a.s. - household electrical appliances
- MORA MORAVIA, s. r. o. - household electrical appliances
- FAST ČR a.s., the owner of Sencor - household electrical appliances
- Jindřich Valenta - Concept - household electrical appliances

3.4. Best practice

3.4.1. Local incentives

There is no local incentive regarding to reuse and repair in Czech Republic.

3.4.2. WEEE Collection

EKO-KOM, a non-profit organization established under the Czech Act on Waste, is responsible for organizing the take-back system for WEEE in the Czech Republic ([EKO-KOM, a.s., Homepage, <https://www.ekokom.cz/en/>]). EKO-KOM establishes collection points for WEEE across the country, partnering with municipalities, retailers, and waste management companies. Consumers can conveniently deposit their used electronics at these designated locations, ensuring proper collection and responsible treatment.



EKO-KOM's take-back system plays a crucial role in facilitating WEEE collection, preventing improper disposal, and channelling e-waste towards authorized recycling facilities. This system is a cornerstone of WEEE management in the Czech Republic.

3.4.3. Online platforms

There are several online platforms available for reuse and second-hand products which listed as following:

- <https://www.sbazar.cz>
- <https://aukro.cz>
- <https://bazos.cz>
- <https://elix.cz/kategorie-produktu/bazar/>
- <https://www.it-bazar.cz/>
- <https://hyperinzerce.cz/>
- <http://www.pocitace-zizkov.cz/>
- and many more

3.5. Challenges and recommendations

One of the challenges is to get feedback from stakeholders where 8 responds were received. Among the stakeholders, there are 4 from Producer / Importer / Producer Responsibility Organisation; 1 from municipality, 2 from reuse organizations and 2 from recyclers. The respondents have a varied years of experiences working on WEEE which divided into 1. Early career (0-5 years); Mid-career (5-10 years) and Long term career (> 10 years). Figure 11 shown the share percentage of experiences from the questionnaire respondents.

Percentage of expert experience in Czech Republic

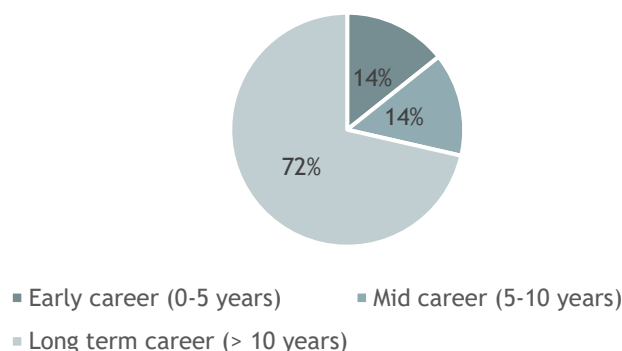


Figure 10 Percentage of expert experience in Czech Republic

3.5.1. Challenges

WEEE Management

Describe briefly the main challenges with electric and electronical waste that you are facing with e-waste



Collection:

- Unfair competition from one of the collective systems
- incompetence and insufficient control activities of state authorities,
- incompleteness of appliances
- Informal sector involvement in collection
- Not able to collect sufficient quantity

Financial aspect:

- Insufficient state support for the development of new technologies for the processing of e-waste
- Support of the projects and infrastructure for waste management of take-back scheme
- waste streams from the cohesion fund of the Operational Programme Environment of the European Union.

Others:

- recycling batteries and toners
- Lack of recycling capacity
- Notification of the current set up process which serves more for bureaucratic solution than for purpose

In your experience, what are the main barriers faced in implementing effective WEEE management and circular economy?

About 50% of the respondents think that lack of awareness and understanding of circular economy concepts is one of the main barriers faced in implementing effective WEEE management and CE. About 50% agreed that it is also due to insufficient collaboration among stakeholders and 50% think that due to limited funding and resources. About 25% of the respondents think that it is because of a complex regulations and compliance requirements, additionally 25% with an inadequate infrastructure for collection and processing. About 37.5% stated that it could related to the resistance to change within organizations.

WEEE recycling

In your opinion, what are the main challenges in the market for recycling WEEE materials?

About 25% of the respondents agreed that the main challenges in the market for recycling WEEE materials are due to 1) Insufficient demand for recycled materials; 2) Inadequate recycling technologies; 3) regulatory barriers. About 12.5% also think that it is because of the limited access to recycling facilities.

WEEE Reuse and Repair

In your opinion, what are the main challenges in the market for reusing WEEE materials?

About 37.5% of the respondents agreed that the main challenges in the market for reusing WEEE materials are due to 1) Lack of standardize of collection process; 2) Quality control issues with reused materials; 3) Lack of awareness among consumers/organizations. About 50% of respondents think that it is due to Insufficient demand for recycled materials, and regulatory barriers. About 12.5% also think that it is because of the limit availability of WEEE material for reuse.



Policy instrument

Describe briefly which policy instruments did you use for your business development

- Implementation of material flow control improving the company's quality standards.

Has your organization received any subsidies or financial incentives for managing WEEE or promoting circular economy initiatives? Yes / No questions

Result: none of the respondents received subsidies or financial incentives

What kind of support on the market would you appreciate? (ex. law change, subsidies etc.)

Regulation and standards:

- Law amendments
- simplification of the waste-non-waste transition process
- Regulations support on reuse and repair
- consistent activity of control authorities with a focus on illegal handling of e-waste
- lower bureaucratic burden with issues related to waste disposal on the product

Financial aspects:

- Subsidies; subsidies for collection point, transport, other take-back scheme e.g. batteries or tyres
- more subsidies for developing new technologies.

Others:

- More containers in streets for small WEEE collection from public.

3.5.2. Recommendations

What changes would you like to see on the market to more promote and utilize the WEEE management?

Awareness:

- Information on WEEE and where/how to dispose of WEEE - Technical guidelines
- Compulsory in teaching
- Motivation and promotion among companies and people in the Czech Republic
- Information of e-waste management and EoL; batteries
- State campaign for rising of awareness about take back and circular economy.

Others:

- Proper collection of retired batteries
- More active approach of the collective schemes (PROs)

How to motivate the market to follow the rules of Circular economy and manage the WEEE waste more effectively.

The enforcement of the law and regulations, promoting companies that meet the standards and have permit and supporting them to access to materials for further processing; however, a strict control by state



authorities of the implementation of the End-of-Life Products Act is essential. Although the law stipulates the obligation to process EEE according to CENELEC standards, it is still not complied with by all processors. This results in poor quality processing and, above all, disadvantages those processors who comply with the standards.



4. Italy

4.1. Law and Regulation

In Italy, the main regulatory reference for the management of WEEE is Legislative Decree No. 49/2014, which transposed the European Union's WEEE Directive (Directive 2012/19/EU) into national law.

For more information about the regulation can be found here: <https://www.cdcreae.it/normativa/>
<https://erionprofessional.it/en/legislation/italian-legislation/> (Italian language)

Additionally, here are some ways these policies have been implemented:

- **Extended Producer Responsibility (EPR):** Italy follows the principle of Extended Producer Responsibility, where producers or importers of electrical and electronic equipment are responsible for managing the entire lifecycle of their products, including collection, treatment, and environmentally sound disposal of WEEE. Producers are required to register with the National Register of Producers and fulfil their obligations under the law.
- **Collection and Recycling:** The legislation establishes a system for the separate collection of WEEE. Producers, individually or collectively through compliance schemes, are responsible for organizing and enhancing the collection of WEEE. They must ensure that collection points are available and accessible to consumers. Collection points can include authorized retailers, municipal collection centres, and specific collection events.
- **Treatment and Recovery:** Once collected, WEEE undergoes appropriate treatment and recovery processes. Treatment facilities must comply with the technical requirements and guidelines specified in Ministerial Decree 65/2010. Moreover, the government, in collaboration with producers and other stakeholders, conducts awareness campaigns to educate consumers and raise awareness about the proper disposal of WEEE. These campaigns aim to promote the separate collection of WEEE, inform consumers about collection points, and encourage the reuse and repair of electrical and electronic equipment.

The management of WEEE in Emilia-Romagna, like in other regions of Italy, is based on the national legislative framework. However, Emilia-Romagna is a virtuous case in terms of quantity (higher than the national average) and of infrastructure dedicated to the collection of WEEE.

The Emilia-Romagna Region has signed an agreement with Atersir (the Emilia-Romagna Territorial Agency for Water and Waste Services) and the WEEE Co-ordination Centre (the national body which, within the multi-consortium system, plays the central role of optimising the collection, take-back and management of WEEE) aimed at further improving the collection and recovery of this type of waste.

The primary objective of the agreement was to encourage the delivery of household WEEE to public collection centres by simplifying access procedures, and to promote specific awareness and information campaigns among citizens and operators in the sector, such as electrical and electronic equipment maintainers and installers. One of the aims of the agreement was also to encourage the traceability of waste collection and recycling, an objective in line with the Regional Waste Management Plan that aimed at the sustainable management of waste to be achieved through prevention, separate collection and material recovery. The agreement was part of similar initiatives already activated by the Region and aimed at supporting the development of the green industry, doing business and creating new jobs, and contributed to a slight increase in WEEE production and collection in recent years. In 2022 Emilia Romagna reversed the positive trend of the previous year, but despite a drop in volumes collected (-11.9%) greater than the negative national average (-6.2%), it maintains a higher per capita figure (7.10 kg/inhabitant) than the Italian average (6.12 kg/inhabitant).



The contraction affects all provinces except for Ravenna, which grew by 0.3% and, with 10.42 kg/inhabitant, stands out in terms of per capita collection. per capita, stands out in terms of collection per capita. Forlì-Cesena (-1.8%) and Rimini (-3.6%) show the smallest decrease in quantities.

57% of the total volumes are collected by only two companies of the collection management at municipal collection centres (CdR): the first one collects 40% and is active in the provinces of Bologna, Forlì-Cesena Ferrara, Modena, Ravenna and Rimini; the second handles the remaining 17% in the provinces of Piacenza, Parma and Rimini.

4.2. Financial scheme

The financing and economic support for policies related to the management of WEEE in Italy, including Emilia-Romagna, primarily rely on the principle of EPR. Under EPR, producers or importers of EEE bear the financial responsibility for the collection, treatment, and environmentally sound disposal of WEEE. Producers are required to finance the entire WEEE management process, including the costs associated with collection, transportation, treatment, and recycling.

Producers fulfil their financial obligations by paying an environmental contribution. This contribution is based on the quantities of electrical and electronic equipment placed on the market and is used to cover the costs of WEEE management. The contribution is typically collected by compliance schemes or directly by the competent authorities. Then, EEE producers require consumers to pay an eco-contribution when purchasing a new product. Compliance schemes play a crucial role in the economic support of WEEE management policies. Producers join compliance schemes and contribute financially to cover the costs associated with WEEE collection, treatment, and recycling. Compliance schemes manage the financial resources and allocate them to various activities within the WEEE management system. Another revenue stream is generated through the recycling of WEEE, by recovering valuable materials, such as metals and precious metals. Treatment facilities and recycling operators may sell these recovered materials, which can help offset the costs of WEEE management. This revenue can contribute to the economic sustainability of the system.

In some cases, public authorities provide financial support or incentives to promote the reuse, repair, and environmentally sound management of WEEE. This can include grants, subsidies, or tax incentives for activities that encourage the circular economy and sustainable waste management practices.

4.3. Stakeholders

4.3.1. Organizations

There are few organizations associated with reuse and repair of WEEE which is listed as follows:

- Area del Riuso (Reuse area). It is a project carried out by the Municipality of Rimini, Hera and the social cooperative La Fraternità.
- Regional Reuse Centers (Not present in the province of Rimini, the closest is in Forlimpopoli).
- Local experiences and labs (for example the Repair Cafè "Rusko" in Bologna)

4.3.2. Local repairs shops

The reuse and repair sectors contribute to the extension of the use of goods, avoiding waste. According to data processed by Eurostat, it is stated that in Italy in 2018 there are just over 25,000 companies that carry out repairs of electronic goods, but also other personal goods such as clothing, footwear, watches, jewellery, furniture, etc..., putting our country in third place among the five most important economies in Europe, behind France (over 33,000 companies) and Spain (over 28,600).



4.3.3. Domestic EEE Producer

They are several and must register on a national database. More details can be found in the link: <https://www.registroaee.it/RicercaProduttori>)

4.4. Best Practice

4.4.1. Local incentives

“TV Scrapping Bonus”

It was a national incentive to encourage the purchase of TV sets compatible with the new digital terrestrial transmission standard and the scrapping of obsolete equipment through proper disposal of electronic waste. The bonus consisted of a 20% discount on the purchase price, up to a maximum amount of EUR 100. Scrapping took place directly at the retailer’s venue where the new TV was purchased, handing in the old TV at the time of purchase.

The customer could also decide to dispose of the old TV at an authorised waste disposal site, before going to buy the new one. In this case, the employee at the WEEE collection centre would have to validate the form certifying that the device had been handed in.

Another national incentive regards the Call for proposals for the co-financing of research projects aimed at developing new technologies for the recovery, recycling and treatment of WEEE. The grant awarded for each of the project initiatives eligible for co-financing was between € 100,000.00 and € 300,000.00.

4.4.2. Online platform

There is no online platform available.

4.5. Challenges and recommendations

There were 20 responds received. Among the stakeholders, there are 13 from Producer / Importer / Producer Responsibility Organisation; 3 from municipality, 2 from reuse organizations and 3 from recyclers. The respondents have a varied years of experiences working on WEEE which divided into 1. Early career (0-5 years); Mid-career (5-10 years) and Long term career (> 10 years). Figure 11 shown the share percentage of experiences from the questionnaire respondents.



Percentage of expert experiences in Italy

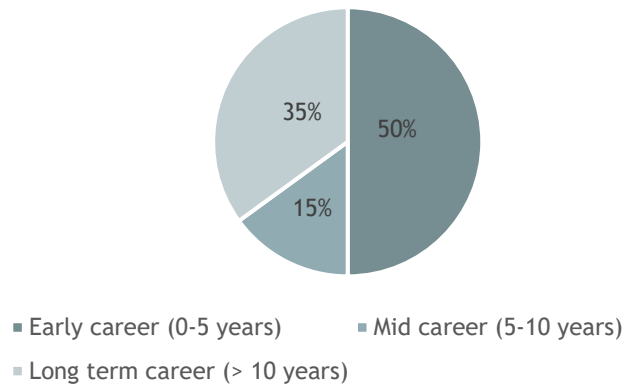


Figure 11 percentage of expert experiences in Italy

4.5.1. Challenges

WEEE Management

Describe briefly the main challenges with electric and electronical waste that you are facing with e-waste

Collection:

- Increase the collection rate
- Information on proper allocation, increase in collection still below targets
- Uncertified parallel flows, guaranteed supply chain, WEEE dispersion
- Creating a robust system for the collection and recycling of end-of-life devices presents its own set of challenges.
- High disposal cost

Legislation:

- A complex landscape of regulations, certifications, and environmental standards to ensure compliance and minimize the environmental impact of e-waste disposal
- Complexity of management and too much bureaucracy
- Complying with regulations and laws regarding e-waste disposal and management can be a demanding and time-consuming task

Product design:

- Limited availability of raw material for reuse
- Proper tracking, documentation, and coordination with recycling facilities are essential.
- Managing the sheer quantity of computers and the diversity of models, brands, and components can be challenging. Each computer may require unique handling and recycling processes.



In your experience, what are the main barriers faced in implementing effective WEEE management and circular economy?

About 60% of the respondents think that lack of awareness and understanding of circular economy concepts is one of the main barriers faced in implementing effective WEEE management and CE. About 35% agreed that it is also due to insufficient collaboration among stakeholders and 20% think that due to limited funding and resources. About 45% of the respondents think that it is because of a complex regulations and compliance requirements, additionally 20% with an inadequate infrastructure for collection and processing. About 15% stated that it could related to the resistance to change within organizations.

WEEE recycling

In your opinion, what are the main challenges in the market for recycling WEEE materials?

About 5% of the respondents agreed that the main challenges in the market for recycling WEEE materials are due to 1) Limited access to recycling facilities; 2) Insufficient demand for recycled materials; 3) Insufficient collection infrastructure; and 4) regulatory barriers. Beside this, the respondent also noted the complex and the expensive recycling process of WEEE.

WEEE Reuse and Repair

In your opinion, what are the main challenges in the market for reusing WEEE materials?

About 50% of the respondent think that the lack of standardized collection processes is one of the main challenges in the market for recycling WEEE materials. About 45% agreed that the lack of awareness among the consumers/organizations also play a major role. 15% foreseen that there is an insufficient demand for reuse products. Only 15% of the respondents think that market challenges could be the limited availability of WEEE materials for reuse. About 30% selected quality control issues with reused materials and 35% considered regulatory barriers as the market challenges.

Additionally, lack of control in collection was also mentioned. In term of recyclable material, there are no shortages for metals. For plastics: lack of steady demand for recycled plastics, competition with virgin plastics. For CRM (critical raw materials): lack of facilities and technologies for recycling CRMs and lack of demand for recycled CRMs.

Policy instrument

Describe briefly which policy instruments did you use for your business development

- Industria 4.0 e EOW Regulations (Reg. 1179/2012 e Reg. 333/2011)
- Majority of the respondents has no policy instrument

Has your organization received any subsidies or financial incentives for managing WEEE or promoting circular economy initiatives? Yes / No questions

Yes: 1 respondent

No: 6 respondents

Result: < 10% received subsidies or financial incentives



What kind of support on the market would you appreciate? (ex. law change, subsidies etc.)

Regulation and standards:

- Issuance of the planned decree "preparing for re-use"
- More streamlined laws
- Better legislation on recycling of the WEEE
- Activation of the Ministry's Supervisory and Control Committee
- Law must be more sufficiently designed and implemented
- Continuous and targeted support from governments and institutions to promote and facilitate the recycling of electronic waste
- The implementation of clear and robust regulations
- Promoting global standards for WEEE recycling and adopting circular economic models
- Provide clear guidelines, standardized reporting requirements, and streamlined registration procedures to reduce administrative burdens and make compliance with WEEE regulations more accessible
- Enhance and expand Extended Producer Responsibility (EPR)
- More controls, creation of booklets, guidelines

Financial aspects:

- Subsidies for virtuous enterprises
- Incentives and subsidies
- National grants for standardisation of the WEEE reuse process
- Increase funding for research and development
- Incentives to encourage end customers to separate waste and incentives for companies to reuse raw materials
- Tax incentives for companies
- Subsidies and incentives for investments in recycling infrastructure, eco-design initiatives, or the use of recycled materials in production
- Others:
- Product designs - for longer lifespan
- Design for repair
- Collaboration between governments, businesses, and environmental organizations to facilitate the development of integrated electronic waste recycling solutions
- To increase collection rate, collection points
- Awareness and information of WEEE management for consumers

4.5.2. Recommendations

What changes would you like to see on the market to more promote and utilize the WEEE management?



Regulations:

- Checks and penalties applied to all persons carrying out illegal management
- Less bureaucracy
- Specific laws to incentivize and streamline the processes of disposing of WEEE waste
- Increased producer responsibility throughout the lifecycle of their products
- Ensure that producers bear the responsibility for the entire lifecycle of their products, including the proper collection, recycling, and disposal of end-of-life devices.
- Enforce stricter regulations and compliance monitoring to encourage manufacturers to adopt sustainable product design and recycling practices.

Awareness:

- Launch public awareness campaigns to educate individuals, businesses, and institutions about the importance of recycling computers and other electronic devices
- Raise awareness among consumers, businesses, and institutions regarding responsible disposal of WEEE and the inherent value of reusing electronic materials
- Engage in comprehensive educational initiatives
- campaigns, disseminate information
- Greater consumer awareness, simplified authorization of recycling facilities for WEEE

Others:

- Greater involvement of stakeholders
- Increased promotion of reconditioned/recycled/reused products to consumers in the market
- A structured process for disposing WEEE and retrieving of raw material
- Improve the accessibility and convenience of e-waste collection points. Increase the number of collection centres, including dedicated drop-off locations at electronics stores, recycling centres, and public facilities. Consider implementing mobile collection units or periodic collection drives to reach remote areas.
- Economic incentives for recycling obsolete electronic devices
- Product design for longer lifespan of the products
- Development of prepare for reuse

how to motivate the market to follow the rules of Circular economy and manage the WEEE waste more effectively.

- Activation of the Supervisory and Control Committee and introduction of regulations on the disposal of materials arising from the treatment of metals.
- It is necessary to share awareness among citizens of their correct recycling and increase controls where necessary to ensure that environmental requirements are respected by all parties.
- There should be an increased level of awareness among operators and end-users, and incentives should be introduced to promote



- Reuse of WEEE materials
- Allocate resources to research and development aimed at creating ground breaking technologies and processes for recycling WEEE.
- Provide support for initiatives that prioritize the extraction of valuable materials, including rare earth metals from WEEE
- Promote the adoption of incentives that encourage computer recyclers to prioritize the refurbishment and reuse of functional devices.
- Foster the development of programs aimed at extending the lifespan of computers, minimizing waste generation, and increasing the availability of affordable computing devices for underserved communities.



5. Poland

5.1. Law and Regulation

There are number of acts and directives in the scope of WEEE which are listed below:

Acts:

- (1) Act of 11 September 2015 on waste electrical and electronic equipment (i.e. Journal of Laws 2022, item 1622);
- (2) Act of 27 April 2001. - Environmental Protection Law (Journal of Laws of 2022, item 2556, as amended);
- (3) Act of 13 September 1996 on maintaining cleanliness and order in communes (Journal of Laws of 2022, item 2519 as amended);
- (4) The Act of 14 December 2012 on waste (Journal of Laws of 2022, item 669 as amended);
- (5) Act of 24 April 2009 on batteries and accumulators (Journal of Laws of 2022, item 1113).

Directives:

- (1) Regulation of the Minister of the Environment of 25 April 2019 concerning annual external audit of electrical and electronic equipment recovery organisations and processing plants (Journal of Laws of 2019, item 798);
- (2) Regulation of the Minister of Climate and Environment of 26 July 2021 concerning the scope and model of the annual report on functioning of the waste equipment management system (Journal of Laws of 2021, item 1461);
- (3) Regulation of the Minister of the Environment of 14 June 2018 concerning specific rates of product fees for groups of equipment (Journal of Laws of 2018, item 1194);
- (4) Regulation of the Minister of the Environment of 16 December 2016 on a model certificate confirming recycling and a model certificate confirming recovery processes other than recycling (Journal of Laws 2016, item 2213);
- (5) Regulation of the Minister of the Environment of 29 April 2019 on the certificate of waste equipment (Journal of Laws of 2019, item 818);
- (6) Regulation of the Minister of the Environment of 21 July 2017 on minimum annual collection levels of waste electrical and electronic equipment (Journal of Laws of 2017 item 1499);
- (7) Regulation of the Minister of the Environment of 19 January 2018 on the rates of registration fee and annual fee (Journal of Laws of 2018, item 184);
- (8) Regulation of the Minister of Climate and Environment of 13 December 2022 regarding the method and detailed manner of calculating the minimum annual level of waste electrical and electronic equipment collection (Journal of Laws of 2022, item 2704).

The main tool for implementing legal acts at the EU and national level in Poland is the "National Waste Management Plan 2028." The Council of Ministers adopts the National Waste Management Plan, developed by the minister responsible for climate issues, in consultation with the ministers responsible for water management and the minister responsible for maritime economy. The overriding objective of the waste management policy is to prevent the generation of waste by solving the problem of waste "at the source" and then recovering raw materials, reusing waste, and ensuring environmentally safe disposal of unused waste.



Mainly, the different in the documents implementing policies regarding the broadly understood WEEEP economy concern the territorial area of regulations and the scope of their application. Accordingly, the following documents are in force in the Śląskie Voivodship and the Bielsko Poviát (regional and local level of regulation):

1. "Waste management plan for the Śląskie Voivodship for the years 2016-2022 updated to 2028". The main assumption of the plan is to construct a modern, comprehensive and regional waste management system allowing rational management of generated waste. However, achieving the target levels of municipal waste recycling resulting from the plan, including a radical reduction in the amount of handled waste, and will not be possible without further development of selective collection at source along with systematic and systemic educational activities and the implementation of thermal treatment of non-recyclable waste with energy potential, as an element supplementing the comprehensive municipal waste management system. An integral part of the document is the Investment Plan, which indicates the municipal waste management infrastructure necessary to achieve the objectives set out in Polish law and EU directives.
2. "Environmental Protection Program for the Bielsko District for the years 2021-2027 with an outlook until 2030." The main objective of the preparation and adoption of the Environmental Protection Program is the implementation by local government units of the environmental protection policy consistent with the assumptions of the most important strategic and programming documents. At the same time, the program is designed to set the framework for subsequent projects implemented within the scope of other sectoral programs of the poviát and the voivodship.
3. "Waste Management Plan for the Bielsko District" takes into account the provisions contained in the "Waste Management Plan for the Śląskie Voivodship". Moreover, the Plan is an integral part of the "Environmental Protection Program for the Bielsko District". The plan describes the current state of waste management, forecasts, goals and directions of activities as well as the necessary costs related to the implementation of waste management projects. The municipal sector includes municipal waste, packaging waste and municipal sewage sludge. On the other hand, in the economic sector, non-hazardous waste was analysed. The problem of waste and hazardous waste was also addressed, paying particular attention to hazardous waste from industry, health and veterinary units, asbestos-containing waste, automotive waste, waste electrical and electronic equipment, and hazardous waste separated from the stream of municipal waste.

In the Lublin Voivodship (regional and travel regulation level) Detailed information:

1. "The environmental protection program of the city of Lublin for 2021-2024 with a perspective until 2028" was launched by Resolution No. 922/XXIX/2021 of the Lublin City Council of May 27, 2021. It is a strategic document presenting the current state of the environment in the city and indicating the main problems in the field of environmental protection. The document in question defines actions to prevent the condition from occurring within the analyzed areas within the time range, i.e. in the years 2021 - 2024 with a perspective until 2028.
2. The "Waste Management Plan for the Lublin Voivodship 2022" was adopted by the Lublin Voivodship Assembly on December 2, 2016. The creation of the document results directly from the provisions of the Act of December 14, 2012 on waste (i.e.: Journal of Laws of 2022 . item 699, as amended), a document used to achieve the goals used in environmental protection policy. It contains information on waste, the amount and type of waste generated, its collection and methods of production and disposal. Determining the location and processing capacity of individual waste processing devices and those available for waste disposal problems. In addition, the plan is taken into account in forecasts of changes in waste. A document regarding the scope of waste, including the date of its occurrence. also detected, among others, elements constituting waste and shaping the waste system, as well as systems for monitoring and distributing activities on the device and implementing goals and tasks in the system. Additional goals and actions cover the years 2023-2028 with perspective until 2034.
3. Analysis of the state of municipal waste in the city of Lublin for 2022. The basis for the "Analysis of the state of municipal waste in the city of Lublin for 2022" is presented in the provisions of the Act of September



13, 1996 on order in municipalities (Journal of Laws 2022.2519, as amended). Pursuant to art. 3 section 2 point 10) www. of the Act, the commune maintains order in its area and the conditions necessary for its supply, and also: conduct an annual analysis of the status of municipal waste in order to check the technical and organizational capabilities of the commune in the field of municipal waste management.

5.2. Financial scheme

According to Art. 15 of the Act on waste equipment, the entity that introduces the equipment is obliged to conduct public educational campaigns in relation to the equipment that it has placed on the market. This obligation may be fulfilled independently or through a recovery organization. In case of fulfilling this obligation, the entity introducing equipment is obliged to allocate to public educational campaigns a total of at least 0.1% of net revenues from placing equipment on the market achieved in the previous calendar year (the entity placing equipment on the market that starts operating in a given calendar year calculates the amount of these funds, in relation to net revenues from placing equipment on the market achieved in that calendar year), or transfer these revenues to a separate bank account of the competent marshal's office. In turn, the recovery organization in accordance with Art. 62 above of the Act allocates at least 5% of net revenues earned in the previous calendar year to public educational campaigns. In 2019-2021, the entities introducing the equipment and the electrical and electronic equipment recovery organizations spent a total of PLN 24,332,223.00 on public education campaigns. The entities introducing the equipment independently implementing the above-mentioned the obligation allocated a total of PLN 3,177,134.00 for this purpose in 2019-2021. In turn, all recovery organizations conducted educational campaigns on their own, allocating PLN 21,155,089.00 for this purpose in 2019-2021.

5.3. Stakeholders

5.3.1. Organizations - Collection points

In the city of Bielsko-Biała and the Bielsko District, as well as in the neighbouring municipalities, you can find:

- a) numerous computer hardware services of various types,
- b) numerous mobile phone services,
- c) repair services for industrial machines (e.g. Lamp Serwis Bielsko-Biała),
- d) services of electrical and electronic devices ""on the phone"" with access to the customer (equipment, radio, audio, satellite receivers, etc.).

In addition:

- e) the City Hall in Bielsko-Biała organizes cyclical campaigns to collect waste electrical and electronic equipment under the name "SEGREAKCJA"
- f) MB Recycling from Piekoszów, together with the City of Bielsko-Biała and other local government units, e.g. from the area of the Bielsko District, implement the "Electric Waste" project - characteristic red containers for waste electrical and electronic equipment are placed in Bielsko-Biała and neighbouring units. Participation in the "Electric Waste" project means in practice trouble-free and cost-free disposal of electrical waste. Residents of Bielsko-Biała are able to throw WEEE not exceeding 50 cm in the red containers, i.e.: laptops, mobile phones, hair dryers or toasters,



g) collections of waste/electrical and electronic devices are organized periodically in the communes (by Point of Selective Collection of Municipal Waste and other waste collection entities).

h) Pursuant to the Act on waste equipment, the person introducing the equipment is obliged to conduct public educational campaigns in relation to the equipment that he has placed on the market.

i) Waste Management Department ""Point Second Life"" - in City of Bielsko-Biała there are a special place where you can bring things that you don't need or don't want, but which could be used by others."

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

It is also possible to report the collection of WEEE by phone or via an electronic form. The equipment will be collected within 72 hours of receiving the notification. The returned equipment must be complete. Waste is collected free of charge. There is over 300 containers in Poland which 36 of them located in Bielsko Region.

Fulfilling the obligation to organize a selective collection system for waste electrical and electronic equipment, the Lublin Commune cooperates with Polska Korporacja Recyklingu Sp. z o. o., which has the technical potential, knowledge and experience necessary to organize the collection of waste electrical and electronic equipment.

Residents can deliver used equipment FREE OF CHARGE to designated places in the city where specialized, marked containers are placed:

- fixed point - PKR, ul. Metalurgiczna 13F (open Monday to Saturday from 7 a.m. to 8 p.m.)
- mobile points (open on the last Saturday of the month from 9 a.m. to 2 p.m.):
 - Chodźki 14 - parking lot at Auchan Shopping Center
 - Zana 19 - parking lot at Shopping Center E. Leclerc
 - Turystyczna 1 - parking lot at Shopping Center E. Leclerc
 - Botanical Garden - parking lot at ul. Willowa
 - Al. Kraśnicka 128 - parking lot next to the BRICOMAN supermarket
 - Metalurgiczna 13F
- containers for small electronic waste:
 - street Zana 19 - lawn on the left side of the main entrance to the E. Leclerc Shopping Center from Zana Street
 - street Zana 38 - under the Inwestprojekt/Multimedia building
 - Aleja Spółdzielczości Pracy 86 - Skende Shopping Center - parking lot on the side of ul. Kupiecka opposite the entrance, among others. to the Biedronka store
 - street Witolda Chodźki 14 - parking lot in front of the Auchan Czechów shopping center - at the entrance from Czapskiego Street
 - street Królowej Jadwigi 19 - parking lot at the back of the block
 - street Żołnierska - between blocks 7 and 13
 - street Braci Wieniawskich 2 - open from: 9 a.m. - 5 p.m. on weekdays, Saturdays 9-13
 - street Tumidajska 24 - at the entrance to the estate administration building
 - street Gęsia 19 - next to the parking lot
 - street Pergolowa 1 - next to the garbage gazebo, near the entrance to the parking lot



Residents of Lublin can also take advantage of the FREE collection service from their apartments/houses for bulky electronic waste such as washing machines, refrigerators, ovens, stoves and dishwashers, as well as smaller devices - telephones, printers, TV sets, irons and microwave ovens, etc. The offered electronic waste collection service from home is extremely simple, just fill out the form on the website www.odbiorydomowe.pl or call 573 269 484 and provide all the necessary details (address, contact phone number and quantity and type of equipment). Collections are carried out from Monday to Friday between 8 a.m. and 6 p.m., and the waiting time at the agreed date is a maximum of 5 business days.

The "ELECTRICAL WASTE" collection and management system is responsible for efficient management covering collection, take-back and management of waste electrical and electronic equipment, batteries and portable accumulators. The system refers to the collection of WEEE from households. WEEE is collected by means of specialized containers for this type of waste, the so-called "Red Containers" (ASEKOL Poland).

"Red containers", which are easily accessible to residents, are designed for the collection of small-sized electro-waste up to 50 cm in size. The use of the service of placing electro-waste in the "Red Containers" is free of charge for residents. The design of the containers allows for the safe collection of electro-waste and prevents emptying by unauthorized collectors. The main stakeholders and beneficiaries of this system are the residents of the city of Gdansk at the local level.

The first "Red containers" stood in Gdansk in January 2021. Since the start of this task, the system has attracted a lot of interest from the city's residents. This has been confirmed by the systematic increase in the number of containers distributed around Gdansk and the gradual increase in the amount of electro-waste collected in the 'Red containers'. So far, 81.94 tonnes and 121.05 tonnes of electro-waste have been collected under the "Electrical Waste" system in 2021 and 2022, respectively. This illustrates the year-on-year increase in the amount of electro-waste.

The prominence (distinctive colour) of the "Red containers" allows them to reach a larger group of residents. The increasing number of containers placed in the city of Gdansk shows the expansion of the system. This should be understood to mean that with the increase in the number of containers placed and their filling, the "Electrical Waste" System is reaching more and more of the city's inhabitants. An important role is played by the "Czyste Miasto Gdańsk" application, which, among other things, includes an interactive map informing residents of the location of the 'Red containers', thereby facilitating access to them.

Costs of implementing the programme from 2021: PLN 0.00 for the City of Gdansk as a participant in the "Electrical Waste" system. On the basis of a partnership agreement, the City of Gdansk gives advertising opportunities to the company responsible for the implementation of WEEE collection, and in return receives free of charge collection of electro-waste collected in "Red containers". This illustrates the good cooperation between the City and the private entity in this area. No public funds were involved in this good practice.

5.3.2. Local repairs shops

- (1) Bestwina: https://www.baza-erm.com.pl/?vn=&vu=&vm=Bestwina&vw=&vwn=&v_br_opis=-+--+wybierz+--+&v_br=&vsk=serwis+komputer%C3%B3w&b_szukaj=szukaj
- (2) Czechowice - Dziejowice: https://www.baza-erm.com.pl/?vn=&vu=&vm=Czechowice-Dziejowice&vw=&vwn=&v_br_opis=-+--+wybierz+--+&v_br=&vsk=serwis+komputer%C3%B3w&b_szukaj=szukaj
- (3) Jasienica: https://www.baza-erm.com.pl/?vn=&vu=&vm=Jasienica&vw=&vwn=&v_br_opis=-+--+wybierz+--+&v_br=&vsk=serwis+komputer%C3%B3w&b_szukaj=szukaj



- (4) Jaworze: https://www.baza-erm.com.pl/?vn=&vu=&vm=Jaworze&vw=&vwn=&v_br_opis=-+--+wybierz+--+&v_br=&vsk=serwis+komputer%C3%B3w&b_szukaj=szukaj
- (5) Kozy: https://www.baza-erm.com.pl/?vn=&vu=&vm=Kozy&vw=&vwn=&v_br_opis=-+--+wybierz+--+&v_br=&vsk=serwis+komputer%C3%B3w&b_szukaj=szukaj

List of entities collecting waste electrical and electronic equipment in the Lublin Voivodeship.

Waste electrical and electronic equipment **processing plants**:

1. Eco Harpoon - Recycling Sp. z o. o., ul. Cementowa 20, 22-170 Rejowiec Fabryczny
2. Helios Recykling Lidia Skubisz, ul. Anny Walentynowicz 9, 20-328 Lublin
3. Polish Recycling Corporation Sp. z o. o., ul. Metalurgiczna 15C, 20-234 Lublin
4. Green Office Ecologic Sp. z o. o., ul. Lubelska 54, 21-532 Łomazy

Collectors with a decision regarding **WEEE management**:

1. Ekoland, ul. Piłsudskiego 14, 23-200 Kraśnik
2. KomEko, ul. Metalurgiczna 9b, 23-200 Kraśnik
3. Koma Lublin, ul. Mełgiewska 11 E, 20-209 Lublin
4. Remondis, Al. Lotników Polskich 5, 21-040 Świdnik
5. Municipal Services Plant, ul. Armii Krajowej 2, 21-050 Piaski
6. Ekoprim, ul. Metalurgiczna 17h, 20-234 Lublin
7. Waste Management Plant in Wólka Rokicka, Wólka Rokicka 100, 21-100 Lubartów
8. PROEKOB Waste Management Plant in Bełżyce, ul. Przemysłowa 35 A, 24-200 Bełżyce

Repair services for waste electrical and electronic equipment:

1. Ducat Serwis, ul. Braci Wieniawskich 2, 20-844 Lublin
2. Pokhaus. Household appliances service, ul. Słowackiego 52, 20-431 Lublin
3. A4Copy Polska sp. z o. o., ul. Wojciechowska 20, 20-704 Lublin
4. Studio-tech AGD Serwis, ul. Betonowa 6, 20-402 Lublin
5. Klima Bud A. Szymoniuk, R. Albin sp. j. ul. Nowy Świat 40a, 20-418 Lublin
6. Print-tech, ul. Długa 5, 20-346 Lublin

Distributors of waste electrical and electronic equipment:

1. Euro-net - Lublin logistics center (Euro RTVAGD chain of stores), ul. Mełgiewska 18E, 20-234 Lublin
2. Terg - Lublin logistics center (Media Expert store chain), Dominów 163, 20-388 Lublin
3. Elektrodom Bicki sp. j., ul. 1 Maja 47, 20-410 Lublin
4. Elektrodom Bicki sp. j., ul. Wojska Polskiego 1, 22-200 Włodawa
5. Market Manhattan FHU Patryk Przygoda, ul. Niepodległości 7k, 23-210 Kraśnik



6. Maxelektro Grzegorz Wosik, ul. Brzozowa 3, 24-320 Poniatowa
7. Domes Max Elektro, ul. Gospodarcza 2, 20-217 Lublin
8. Super-Sandra electronics and household appliances store, ul. Fabryczna 7, 24-300 Opole Lubelskie

Other **non-professional collectors** of waste electrical and electronic equipment:

1. Secretariat of the Foreign Missions of the Fathers of the Sacred Heart in Lublin, ul. Radzyńska 3a, 20-850 Lublin
2. Emaus-Lublin Association, ul. Tęczowa 173, 20-517 Lublin
3. Czerniejów Volunteer Fire Department, Czerniejów 102, 21-107 Czerniejów
4. Mełgiew Volunteer Fire Department, ul. Kościelna 10, 21-007 Mełgiew
5. Parish of St. blessed Bishop Władysław Goral, ul. Popiełuszki 28b, 20-052 Lublin



5.3.3. Domestic EEE Producer

- AMICA - Amica's domain is large household appliances. Despite the growing competition from abroad, it remains the largest Polish manufacturer of household appliances and a leader on the domestic market. The company's shares in Poland amount to over 16 percent. Ovens, free-standing cookers, hobs, hoods, heating drawers - these are her main specialties. However, Amica also produces refrigerators, dishwashers, washing machines, dryers, wine coolers, microwave ovens and small household appliances.
- MPM- is a Polish company and brand of mechanized household appliances - with a 30-year tradition. MPM designs and manufactures the equipment itself. This includes mushroom and fruit dryers, wine coolers, low-speed juicers and equipment for kitchens with non-standard dimensions. The company covers over 250 different products.
- Manta - Polish family company producing e.g. televisions and mobile phones. It is basically the only Polish company producing this type of consumer electronics equipment. Manta successfully competes on the Polish market with large global corporations.
- Łucznik - Polish manufacturer of legendary sewing machines. Today, it also produces vacuum cleaners, air purifiers, cup blenders, slicers and mixers.
- Esperanza - Esperanza offers data carriers, computer accessories, photo accessories and RTV equipment.
- Kruger & Matz - Polish brand of mobile phones, laptops, TV sets, headphones and speaker sets. The brand exists since 2010.
- BitStream - is a manufacturer that has been producing solutions in the field of broadly understood electronics for over 10 years, in particular devices for data transmission for optical and wired networks Ethernet, PDH, SDH, RS, CAN. The company provides its solutions to telecommunications operators, energy companies, the army, the police, railways, industrial automation and CCTV.

5.4. Best Practice

The Emaus - Lublin Association is a social enterprise supporting people in crisis homelessness. Collects used items free of charge (furniture, household appliances, electronics, trinkets). The entire income from the sale is allocated to the maintenance of the Emmaus-Lublin Community.

Emmaus Association:

- helps others (L'Abbé Pierre),
- participates in building a community,
- gives a second life to things
- prevents mindless consumption
- protects the environment

5.4.1. Local incentives

- In shops selling electronic/electrical products, including electronics and household appliances (mobile phones, computer equipment, TV sets, audio equipment), when buying new equipment, it



is possible to return used equipment, which sometimes involves the possibility of obtaining a discount on the purchase new device.

- Campaigns are held in schools to raise awareness of the possibility of reusing e-waste, circular economy, knowledge competitions on topics related to environmental protection,
- the InPOST courier company has introduced a new offer: free electro returns. It allows users of the system to recycle waste electronic devices free of charge using the network of InPost „Paczkomaty”. By giving away equipment that someone no longer uses, and which is potentially operational, we give it a chance to be reused by another person or institution - and thus we positively affect the environment.
- "Green for Electrotrash" and "Flowers for Electrotrash" - a campaign that raises awareness and encourages the inhabitants of Bielsko-Biała and the county's communes to collect and return e-waste in exchange for seedlings of garden plants or flowers, which is an attractive form of promotion.
- On the occasion of Battery Recycling Day, the City of Lublin organizes an eco-collection of batteries. Residents of Lublin in return, they will receive small gifts and gadgets, and people who bring larger amounts of this waste will also receive new batteries.
- Schools carry out campaigns to raise awareness of the possibilities of reusing electronic waste, circular economy, knowledge competitions on environmental protection topics, including: competition "We all know the colors - we love segregation".
- As part of the International Earth Day, electronic waste is collected in Lublin. Residents receive flower seedlings for delivered old, worn-out or faulty electrical equipment. The action aims, among others, to: making residents aware of how important it is not to throw electronic waste into standard waste containers, but to send it to designated collection points.
- The "Tree for secondary raw materials" campaign is also organized in Lublin, during which, among others, electronic waste. The aim of the campaign is to collect recyclable materials in exchange for plant seedlings and transferring them to entities authorized to process, transport, etc., as well as strengthening ecological awareness and its promotion.

5.4.2. Online platform

There are number of online platforms listed as follows:

- www.olx.pl;
- www.radiobielsko.pl;
- www.allegro.pl;
- www.allegrolokalnie.pl;
- www.sprzedajemy.pl;
- www.gratka.pl;
- www.pokato.pl;
- www.decathlon.pl (używana elektronika 2nd Life);
- www.ceneo.pl



- www.less.app;
- www.abc.pl;
- www.amso.pl;
- Facebook - equipment exchange groups- I will give away / exchange
- <https://icentrumsklep.pl/>

5.5. Challenges and recommendations

There are in total of 40 respondents from Polish stakeholders. Among the stakeholders, there are 6 from Producer / Importer / Producer Responsibility Organisation; 13 from municipality, 5 from reuse organizations and 21 from recyclers. The respondents have a varied years of experiences working on WEEE which divided into 1. Early career (0-5 years); Mid-career (5-10 years) and Long term career (> 10 years). Figure 12 shown the share percentage of experiences from the questionnaire respondents.

Percentage of expert experience in Poland

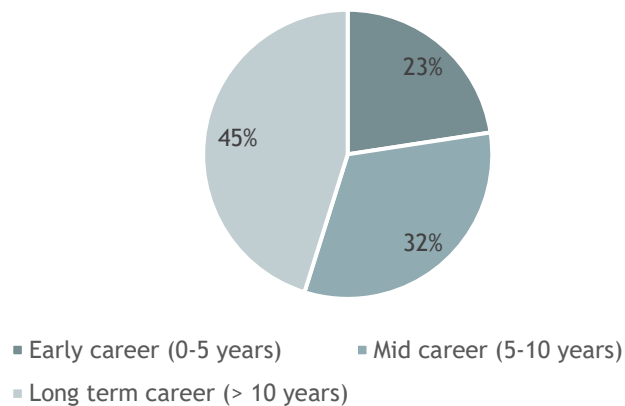


Figure 12 Percentage of expert experiences in Poland



5.5.1. Challenges

WEEE Management

Describe briefly the main challenges with electric and electrical waste that you are facing with e-waste

Collection:

- Lack of free access for residents to basic infrastructure for the collection of WEEE
- Restrictions on the amount of collected waste due to the lack of a Selective Waste Collection Point in the Commune.
- There is no selective waste collection Point in the commune, which makes it difficult to collect waste, which actually takes place only a few times a year
- Collection requirement and regulations
- Difficulties in finding entities in WEEE management
- Informal sector involving in collection

Legislation:

- Frequently changing and uncertain legislation causing high investment risk
- Expensive requirements authorizing a legally operating entity to collect and process WEEE
- High legislative requirements
- Regulatory barriers in the process of obtaining location decisions for new installations and significant changes in processing processes that require environmental proceedings.

Awareness:

- Lack of awareness among stakeholders for WEEE management
- Mis-disposal of WEEE
- Lack of public trust in used and repaired devices

Financial aspects:

- Creating incentives for consumers in the field of recycling electronic waste
- Increasing prices for collection and treatment due to growing demand for WEEE on local market
- Costly storage of WEEE
- Collection costs

Product design, technology, and hazardous components:

- Difficulties to separate fractions
- Large quantities of lithium-ion batteries
- Lack of product transparency in the market
- Lack of uniform and simplified standardization in terms of materials that could be used in the production of devices
- Very diverse composition and construction of WEEE devices, which causes difficulty in such mechanical processing to obtain high-purity component raw materials, and manual disassembly, although it allows to obtain clean raw materials, is labour-intensive, and therefore expensive



- Short lifecycle of the products.

In your experience, what are the main barriers faced in implementing effective WEEE management and circular economy?

About 65% of the respondents think that lack of awareness and understanding of circular economy concepts is one of the main barriers faced in implementing effective WEEE management and CE. About 47.5% agreed that it is also due to insufficient collaboration among stakeholders and 50% think that due to limited funding and resources. About 60% of the respondents think that it is because of a complex regulations and compliance requirements, additionally 32.5% with an inadequate infrastructure for collection and processing. About 25% stated that it could related to the resistance to change within organizations.

WEEE recycling

In your opinion, what are the main challenges in the market for recycling WEEE materials?

About 27.5% of the respondents agreed that the main challenges in the market for recycling WEEE materials are due to limited access to recycling facilities; 17.5% thinks that it is the lack of market demand for recycled materials, 7.5% agreed for insufficient demand for recycled materials; 20% for Insufficient collection infrastructure and inadequate recycling technologies and about 32.5% of the respondent thinks that it is due to the regulatory barriers.

Beside this, the respondent also noted the complex and the expensive recycling process of WEEE and frequent changes in law and regulations which is pose risk and difficulty to the investment. Furthermore, there is a lack of a coherent and uniform strategy and regulations for post-recycling products for all EU countries; (raw material standards, certification, regulatory or financial support for the use of recycled raw materials; currently, products after deep, often costly recycling processes must compete with the often unfair competition of products and primary raw materials supplied.

WEEE Reuse and Repair

In your opinion, what are the main challenges in the market for reusing WEEE materials?

About 55% of the respondents think that the lack of standardized collection processes is one of the main challenges in the market for recycling WEEE materials. About 75% agreed that the lack of awareness among the consumers/organizations also play a major role. About 35% foreseen that there is an insufficient demand for reuse products. 35% of the respondents think that market challenges could be the limited availability of WEEE materials for reuse. About 35% selected quality control issues with reused materials and 57.5% considered regulatory barriers as the market challenges.

Additionally, inconsistency of regulations and lack of a clear division of responsibilities between e.g. shops and municipality. Other collection rules in stores and e.g. PSZOK (Point of Selective Collection of Municipal Waste). The verification of the adequate operation is costly and difficult to generate profits, which resulting in high production costs of secondary materials.

Policy instrument

Describe briefly which policy instruments did you use for your business development

- focus on standardization in the production process



- raising awareness of the risks of inappropriate handling of WEEE, education and continuous communication with the public
- Database on Products and Packaging and on waste management
- Register of the Chief Inspectorate for Environmental Protection

Has your organization received any subsidies or financial incentives for managing WEEE or promoting circular economy initiatives? Yes / No questions

Yes: 6 respondent

No: 26 respondents

Result: about 15% received subsidies or financial incentives

What kind of support on the market would you appreciate? (ex. law change, subsidies etc.)

Regulation and standards:

- Change of laws
- Strong commitment from local authorities
- Clear, stable and transparent regulations
- Legislative changes regarding greater responsibility of producers
- A change in the law particularly in obliging sellers/manufacturers to take back used equipment, as well as to produce equipment with greater possibilities of repair and replacement of individual parts
- Relaxation of regulations, faster way to obtain permits

Financial aspects:

- Grants for further installations to improve and modernize processing
- Subsidies and grants for the collection and recycling of WEEE
- Subsidies for the implementation of new solution
- Subsidies for recycling companies
- The possibility of obtaining a non-refundable subsidy
- Operating subsidies

Others:

- Support in promoting collection at source
- Support for municipalities in the promotion of WEEE waste management
- Right to repair, improving reusability, establishing a reward system to encourage recycling
- Greater advertising, greater social awareness



5.5.2. Recommendations

What changes would you like to see on the market to more promote and utilize the WEEE management?

Regulations:

- Law changes
- Simplify and elimination of inconsistencies in the legal system
- European product passport, to the extent introduced by the new EU regulations on batteries and accumulators;
- Creating clear regulations and financial support for re-entering the market

Awareness:

- More emphasis on environmental education with a particular focus on WEEE.
- Greater involvement of companies in educating the society in proper WEEE management
- Social campaign in the media
- Social campaigns on recycling and reuse, repair

Others:

- Discounts for the purchase of reused equipment.
- Open repair shops
- Used/repaired equipment at attractive prices
- Possibility to repair WEEE and promotion of equipment through the possibility of long-term use and repair.
- Complete elimination of the gray zone (informal sector)
- Promoting a longer lifespan for electrical and electronic equipment
- Cost incentives for reuse and repair products
- Increase collection points with easy access

how to motivate the market to follow the rules of Circular economy and manage the WEEE waste more effectively.

Regulations:

- Enforcement of applicable regulations and penalties related to improper handling of WEEE
- Changing the law
- Exclusion of WEEE waste from the Act on Maintaining Cleanliness and Order in Municipalities or full integration with UCIPG.
- Removal of many laws dealing with waste and creating one large and, most importantly, internally consistent law on waste
- Clear, strong and harmonized EU-wide regulations on the mandatory use of recycled raw materials in new products

Awareness:



- Education, awareness campaign on WEEE management
- Promoting the importance of reusing materials
- Stimulating various types of social and economic initiatives, raising the awareness of the society on the principles of recycling

Others:

- Subsidies for reuse and repairs
- Focus on extending the life of products by ensuring their repairability and the availability of spare parts.
- Ensure the possibility of recovering the raw material



6. Slovakia

6.1. Law and Regulation

There are number of laws covering WEEE which are:

- Law number 79/2015 Coll. of Laws, Waste Act, wording until June 30,2022
- Decree number 371/2015 Coll. of Laws, Implementing to the Waste Act, effective from June 02, 2022
- Decree number 373/2015 Coll. of Laws on Extended Producer Responsibility, effective from June 02, 2022
- Decree number 320/2018 Coll. of Laws amending and supplementing Decree number 365/2015 Coll. of Laws (waste catalogue), effective from January 01, 2018
- Decree number 366/2015 Coll. of Laws on the registration and reporting obligation effective from January 01,2021

General criteria for reuse of WEEE:

- (1) the equipment is fully functional,
- (2) the equipment is electrically safe,
- (3) the cover of the equipment is undamaged,
- (4) the equipment contains all important components, if they are in good condition,
- (5) the insulation of the equipment is complete and undamaged,
- (6) there is no scale on the heating elements of the equipment,
- (7) metallic parts of the equipment show little or no rust
- (8) parts of the equipment show little or no aesthetic defects.

Requirements for the handling of WEEE:

The collection container designated for the collection of very small electronic waste and waste from light sources, which is part of the electronic waste collection point, must meet the following requirements:

- a) The dimensions of its opening for depositing electronic waste must correspond to the maximum external dimensions of the collected very small electronic waste; the container may have multiple openings, the dimensions of which correspond to the dimensions of various categories of very small electronic waste collected through one container (e.g., mobile phones, gaming consoles, calculators).
- b) If it is located in outdoor, publicly accessible spaces, the construction of its opening must ensure the protection of deposited electronic waste against theft or other unauthorized handling, and its overall construction must prevent its forcible opening, breaking, or other damage.
- c) It must be visibly labelled with an information label containing the name and identification details of the person responsible for operating the electronic waste collection point under a contract according to § 32 para. 25 of the law (hereinafter referred to as the "operator of the electronic waste collection point"). It must also include a contact number for reporting container fullness and ensuring its replacement or emptying according to paragraph 2 letter b).



Additional details on the decree number 365/2015 Coll. of Laws - Waste catalogue effective from January 01, 2018; where the waste catalogue consists of:

- a) a list of waste
- b) criteria for assessing the hazardous properties of waste

This waste catalogue includes only the description of devices according to specific criteria.

Recordkeeping and Reporting on Electrical Appliances and Management of E-waste

(1) The manufacturer of electrical appliances fulfilling specific individual obligations and the organization responsible for the producers' responsibility for electrical appliances maintain a record of electrical appliances continuously throughout the calendar year, containing the necessary data for preparing a report, the template of which is provided in Annex No. 15.

(2) The manufacturer of electrical appliances fulfilling specific individual obligations and the organization responsible for the producers' responsibility for electrical appliances keep records of the management of electrical waste continuously throughout the calendar year, containing the necessary data for preparing a report, the template of which is provided in Annex No. 15.

(3) The records according to paragraphs 1 and 2 are kept in electronic or paper form for five years.

(4) Reports on the data from the records of electrical appliances and the management of electrical waste are submitted for the calendar year by the manufacturer of electrical appliances fulfilling specific individual obligations and the organization responsible for the producers' responsibility for electrical appliances on the form whose template is provided in Annex No. 15 to the ministry by February 28 of the following year.

(5) Reports according to paragraph 4 are kept in electronic or paper form for five years.

§ 15 Recordkeeping and Reporting on Packaging and the Management of Packaging Waste

6.2. Financial scheme

In Slovakia waste collection for electrical devices is the responsibility of manufacturers respectively organizations representing manufacturers. For example, if someone introduces EE products to the Slovak market, they are obligated to collect a recycling fee from the customer upon sale (recycling fees - the amount of recycling fees varies by organization and is specified in the contract for fulfilling the obligations of electrical equipment producers.)

Example - let's say you buy an electric kettle for 10€ in some electronics store - 9€ is the price of the kettle, and 1€ is a recycling fee. The electronics store then forwards the 1€ to the organization responsible for manufacturers with whom they have contract for fulfilling designated obligations. This 1€ ensures the proper handling of the electrical device (kettle or such), when it becomes electronic waste - includes collection, transportation and processing.

Manufacturers of electrical appliances are obligated to meet the collection, recovery, recycling and reuse limits for electronic waste. Achieving the goals set in the Directive 2012/19/EU of the EP and of the Council on WEEE, the Ministry of the Environment in Slovakia has been monitoring and evaluating the collection target fulfilment since 2016 - involves achieving a minimum weight percentage of collected waste from average weight of electrical appliances placed on the market in the SR in the previous 3 years.



In Slovakia, we have 9 producer responsibility organizations for electrical devices that are also responsible for promotional and educational activities in handling electronic waste (Law number 79/2015 Coll. Of Laws, Waste Act):

- Asekol SK, s.r.o.
- E - cycling s.r.o.
- Ekolamp Slovakia - The association of manufacturers and distributors of lighting technology
- Elekos
- **Envidom** - Our partner in the WEEEP project,
- Natur - Pack
- Nowas, s.r.o.
- SEWA, a.s.
- Slowmas, a.s.

6.3. Stakeholders

6.3.1. Organizations

- <https://www.elektroodpad.zivica.sk/>
- bratislava.makerfaire.com
- <https://www.nulaodpadu.sk/triedme-odpad>

Our SK partner - Envidom organizes the collection of EEE annually (more information, see the link) and collaborates with the NGO Jeden Rodič, which forwards functional electrical appliances to families in need.

<https://zberelektroodpadu.sk/>

6.3.2. Local repairs shops

Slovakia, limited take back for repair of EEE is available. Instead, online groups or private repairers who can come to your home and fix mostly household appliances are popular. Various events took place, such as repair cafes, community living room Bystro - these initiatives were focused on repair and repairability of EEE. Also sustainability festivals in the past took place. So, in Slovakia, it has evolved more in the form of organized events or online groups.

A repair store is available online, offering repair and service for appliances of all brands at homes or at their business premises, mostly repair/service of household appliances, for example washing machines, dryers, dishwashers, and stoves.

[Oprava domácich spotrebičov všetkých značiek - Elektroservis \(opravyspotrebicov.sk\)](https://oprava-domacich-spotrebicov.vsetkych-znaciek-elektroservis-opravyspotrebicov.sk)



6.3.3. Domestic EEE Producer

<https://www.iso.h.gov.sk/en/about.html>

Products:

- Temperature exchange equipment
- TEE for non - household usage
- Other TEE - e.g. large heating EEE requiring installation.
- Screens, monitors, and equipment containing screens with surface greater than 100cm²
- Large equipment with any external dimension more than 50 cm
- Small EEE with any external dimension less than or equal to 50 cm
- Small IT and telecom. Equipment with any external dimension less than or equal to 50 cm

6.4. Best Practice

6.4.1. Local incentives

Lab.cafe | Cafe, Workshops, Education

This place provides space and supplies tools and materials so people can come and repair a variety of things (doesn't need to be necessary WEEE but is included as well). Meetings are regular for all repair enthusiasts and people who have something broken.

The most important idea is to give new life to broken things, connect people and build awareness about the possibilities of reusing items. Free entry and free coffee included.

Facebook initiative: Repairs of electronics and all kind of electrical appliances - A group where they exchange experiences with repairing all electrical devices and the idea is to repair as inexpensively as possible - it has 15K members in total and it is still active. The group does not include only professionals necessarily but rather people who are very enthusiastic about repairing things.

In the past (last time in 2019) NGO company Repairably (their goal is to bring repairability back into life as the fundamental quality of every product) organized sustainability festival POMALO - visitors learned about circular economy (and much more topics) through lectures, workshops and discussions.

[Repairable Product Certification - Repairably](#)

Despite this, there is also a cooperation between Envidom and BGO One Parent that aim deepen the knowledge of students in the area of waste sorting and recycling and to enable them to have personal experience with the collection of batteries and used small electrical devices. The project is intended for all preschools, primary schools, and secondary schools in Slovakia, and participation in it is completely free of charge. RECYCLE GAMES foster children's relationship with the environment through thematic games, practical activities, quizzes, and smaller projects, as well as children's personal experiences in collecting used small electrical devices and batteries. For completing tasks and collections, schools earn points, which they can then exchange for various rewards such as artistic or sports supplies, games, school materials, or even tickets to theatres, cinemas, and zoos in the special online catalogue.



6.4.2. Online platform

There is no online initiative regarding second hands products of WEEE in Slovakia. However. There is one site [alza.sk](https://www.alza.sk/EN/mobile-phones/bazaar-used-items/u18843445.htm?setlang=en-GB), which sells refurbished mobile phones back to their customers (<https://www.alza.sk/EN/mobile-phones/bazaar-used-items/u18843445.htm?setlang=en-GB>)

6.5. Challenges and recommendations

The questionnaires were distributed to in total of 165 organizations and we have received 10 respondents. Among the stakeholders, there are 7 from Producer / Importer / Producer Responsibility Organisation; 2 from municipality, 0 from reuse organizations and 1 from recyclers. The respondents have a varied years of experiences working on WEEE which divided into 1. Early career (0-5 years); Mid-career (5-10 years) and Long term career (> 10 years). Figure 13 shown the share percentage of experiences from the questionnaire respondents.

Expert experience in Slovakia

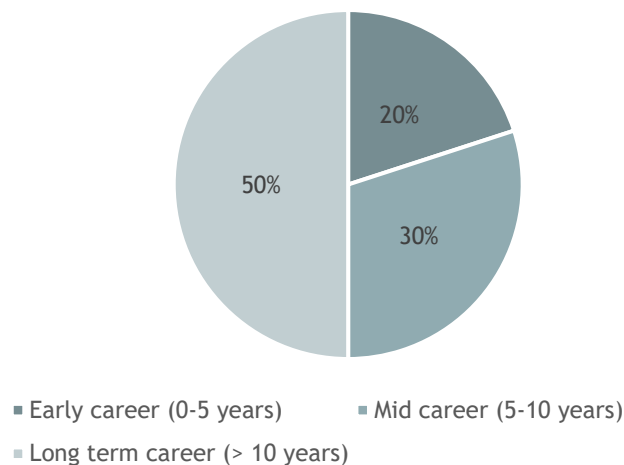


Figure 13 Percentage of expert experience in Slovakia's respondents

6.5.1. Challenges

WEEE Management

Describe briefly the main challenges with electric and electronical waste that you are facing with e-waste

- Environmental protection
- introduce a mobile collection of e-waste directly from households for citizens who don't have opportunity to take larger appliances to the collection yard.

In your experience, what are the main barriers faced in implementing effective WEEE management and circular economy?



About 60% of the respondents think that lack of awareness and understanding of circular economy concepts is one of the main barriers faced in implementing effective WEEE management and CE. About 50% agreed that it is also due to insufficient collaboration among stakeholders and 70% think that due to limited funding and resources. About 50% of the respondents think that it is because of a complex regulations and compliance requirements, additionally 30% with an inadequate infrastructure for collection and processing. About 20% stated that it could related to the resistance to change within organizations.

WEEE recycling

In your opinion, what are the main challenges in the market for recycling WEEE materials?

About 30% of the respondents agreed that the main challenges in the market for recycling WEEE materials is due to Insufficient demand for recycled materials. About 20% think that it is due to the regulator barriers. Additionally causes were also mentioned in the following:

- Limited availability of materials in electronic waste for reuse
- Lack of awareness between consumers and organizations

WEEE Reuse and Repair

In your opinion, what are the main challenges in the market for reusing WEEE materials?

About 10% of the respondents agreed that the main challenges in the market for reusing WEEE materials is due to lack of standardize of collection process; about 40% agreed that it is because of 1) Limited availability of WEEE materials for reuse; 2) Lack of awareness among consumers/organizations; 3) Regulatory barriers. About 50% think that it is due to the Insufficient demand for reuse products. About 60% of respondents think that it is due to Lack of awareness among consumers/organizations.

Policy instrument

Describe briefly which policy instruments did you use for your business development

- None

Has your organization received any subsidies or financial incentives for managing WEEE or promoting circular economy initiatives? Yes / No questions

Result: none of the respondents received subsidies or financial incentives

What kind of support on the market would you appreciate? (ex. law change, subsidies etc.)

None



6.5.2. Recommendations

What kind of support on the market would you appreciate? (ex. law change, subsidies etc.)

- Revision of the collection target
- Changes in law and regulations for e-waste collection
- Reduction of administrative requirements
- Simplification of rules for reuse
- Subsidies for development of collection network
- Price adjustment for used materials and products

What changes would you like to see on the market to more promote and utilize the WEEE management?

- Law changes
- Awareness raising in collection points, places of reverse collection, guidelines for handling e-waste
- Increase options for recycling of specific e-waste category e.g. Photovoltaics
- Increase the involvement of external stakeholders in WEEE management
- Reduction of administrative requirements
- Public Awareness raising

how to motivate the market to follow the rules of Circular economy and manage the WEEE waste more effectively.

- Consistency of the legislation
- Increase the awareness on circular economy



7. Slovenia

7.1. Law and Regulation

Legislation establishing the management of WEEE:

- Uradni list RS, št. 77/22 <http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED8482>.

The Regulation establishes (among other things) the measures to promote the reuse of products and the establishment of systems to encourage repair and reuse activities, particularly in relation to WEEE.

- Regulation on waste electrical and electronic equipment (Official gazette of RS, no. 55/15, 47/16, 72/18, 84/18 - ZIURKOE, 108/20 and 44/22 - ZVO 2)

<https://www.uradni-list.si/glasilo-uradni-list-rs/vsebina/2015-01-2350?sop=2015-01-2350>

There is nothing in the Regulation on the topic of repair, but regarding reuse it only says about preparation for reuse.

- Environmental levy regulation for environmental pollution due to the generation of waste electrical and electronic equipment and waste portable batteries and accumulators (Official gazette of RS, no. 84/18 and 44/22 - ZVO-2) <http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED6701>

In 2020, the Environmental and Spatial Inspectorate carried out a targeted control action on the implementation of the provisions of the Regulation on Waste Electrical and Electronic Equipment (WEEE Regulation) at all holders of joint WEEE management plans in Slovenia, which on behalf of producers who joined the individual holder of the joint of the plan, on their behalf they ensure the collection and processing of the collected WEEE. These are Zeos d. o. o., Slopak d. o. o., Trigana d. o. o., Recikel d. o. o. and Interzero d. o. o. ZEOS d.o.o. is the main organization that handles WEEE.

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

7.2. Financial scheme

The financial scheme for e-waste management in Slovenia operates based on the principle of Extended Producer Responsibility (EPR). Key stakeholders include producers of electrical and electronic equipment (EEE), collective systems, system operators, the Ministry of the Environment, Climate and Energy (MOPE), and public companies and private contractors.

Producers are financially responsible for the collection, recycling, and disposal of e-waste generated from their products. They participate in collective systems, organizations that bring together multiple producers, and contribute financial resources for effective waste management. System operators monitor and supervise the implementation of the scheme, while MOP provides regulatory framework and guidelines.

Public companies and private contractors are responsible for the actual collection, recycling, and disposal of e-waste in accordance with regulations. The financial contributions from producers are used to cover the costs of the entire e-waste management process.



This comprehensive approach ensures that producers take responsibility for their products throughout the entire life cycle, while enabling efficient management and recycling of e-waste in line with environmental standards.

The financial scheme for e-waste management in Slovenia operates based on the principle of Extended Producer Responsibility (EPR). Below is a description of how this scheme typically functions:

Producer Responsibility:

- Producers of electrical and electronic equipment are financially responsible for the management of waste generated by their products.
- This includes the collection, transportation, processing, recycling, and environmentally friendly disposal of e-waste.

Producer Obligations:

- Producers must fulfill specific obligations regarding the quantities of collected and recycled e-waste.
- They can participate in collective systems or independently organize their waste management processes.

Collective Systems:

- Organizations known as collective systems may be established, bringing together multiple producers.
- These collective systems perform the collection and waste management, ensuring transparency and effective financial management.

Funding:

- Producers contribute financial resources to a fund or waste management system.
- These funds are used to cover the costs of collecting, transporting, recycling, and disposing of e-waste.

Awareness and Education:

- Part of the financial resources may be allocated to raising awareness and educating the public and stakeholders about proper e-waste management.

Supervision and Reporting:

- Organizations implementing the financial scheme are responsible for monitoring producers' compliance with obligations.
- Regular reporting is done on the quantities of e-waste collected and recycled, as well as the utilization of financial resources.

This financial scheme is designed to encourage environmentally friendly handling of e-waste and establishes a system where producers take responsibility for the entire life cycle of their products. For precise information, it is advisable to consult official documents and communicate with relevant regulatory authorities in Slovenia.

Financial schemes for handling e-waste in Slovenia involve specific entities responsible for their implementation and management. Key stakeholders include:

Producers of electrical and electronic equipment (EEE):

- Producers are central to the financial scheme as they are responsible for funding and implementing procedures for handling e-waste generated from their products.

Collective systems:

- Organizations known as collective systems act as stakeholders, bringing together multiple producers.
- Their role includes organizing the collection, recycling, and managing financial resources for effective e-waste management.

System operators:



- Organizations or agencies responsible for overseeing and implementing the financial scheme and ensuring compliance with regulations.
4. Ministry of the Environment, Climate and Energy (MOPE):
- A government body that monitors and supervises the implementation of financial schemes and may provide guidelines for their execution.
- Public companies and private contractors:
- Companies engaged in the actual collection, recycling, and disposal of e-waste in accordance with the scheme's provisions.

These stakeholders collaborate synergistically to ensure efficient and sustainable management of e-waste in Slovenia. Their collaboration is crucial for achieving the goals of EPR and compliance with relevant legislation in this field.

7.3. Stakeholders

Stakeholders in the field of e-waste management in Slovenia include:

- **Producers of electrical and electronic equipment (EEE):** Responsible for the production and financing of waste management for their products.
- **Collective systems:** Organizations that bring together multiple producers and carry out the collection and management of e-waste.
- **System operators:** Organizations or agencies responsible for overseeing and implementing financial schemes and ensuring compliance with regulations.
- **Ministry of the Environment, Climate and Energy (MOPE):** A government body that monitors and supervises the implementation of financial schemes and may provide guidelines.
- **Public companies and private contractors:** Carry out the actual collection, recycling, and disposal of e-waste.

All these stakeholders collaborate to ensure effective management of e-waste, in line with the principles of EPR and environmental standards.

Stakeholders in the field of e-waste management in Slovenia operate within a coordinated system, each having specific roles and responsibilities:

- **Producers of electrical and electronic equipment (EEE):** Producers are responsible for financing and implementing procedures for handling e-waste generated from their products. This includes collection, recycling, and disposal of e-waste.
- **Collective systems:** Organizations, known as collective systems, bring together multiple producers. These organizations carry out the collection of e-waste and manage financial resources for effective waste management.
- **System operators:** System operators monitor and supervise the implementation of financial schemes. They are responsible for ensuring compliance with regulations and effective management of e-waste.
- **Ministry of the Environment, Climate and Energy (MOPE):** A government body with a supervisory role. MOP monitors the implementation of schemes, provides guidelines, and contributes to shaping the appropriate legislative framework.
- **Public companies and private contractors:** They perform the practical collection, recycling, and disposal of e-waste in accordance with regulations and stakeholder guidelines.

Collaboration among these stakeholders is crucial to establish an effective system for managing e-waste in line with the principles of Extended Producer Responsibility (EPR) and sustainable approaches to e-waste



management. This enables sustainable management of electronic waste and reduces negative environmental impacts.

7.3.1. Organizations

In the field of e-waste management in Slovenia, various organizations and institutions are active. Some of them include:

- ZEOS d.o.o.: Responsible for proper sorting and collection of waste electrical and electronic equipment (WEEE) or e-waste and local waste management service providers, EEE retailers, EEE producers, municipalities, and other stakeholders (More information: <https://www.zeos.si/en/>)
- RCERO Ljubljana: Regional Center for Waste Management, representing the most modern waste processing facility in Europe. (More information: https://www.rcero-ljubljana.eu/upload/dokumenti/rcero_ljubljana_brusura_ang.pdf)
- Ministry of the Environment, Climate and Energy (MOPE): Involved in the establishment of deposits in Slovenia and regulates environmental protection and waste management. (More information: <https://www.gov.si/en/state-authorities/ministries/ministry-of-the-environment-climate-and-energy/>)
- Association for Waste Management and the IS-Waste Application: Information system on waste management maintained and managed by the government.
- CPU REUSE: Center for Reuse, playing a crucial role in the reuse of e-waste in Slovenia. (More information: <https://www.cpu-reuse.com/>)
- Voka Snaga: A company that unites 56 municipalities and operates in RCERO Ljubljana, the newest waste processing facility in Europe.
- Information System for Waste Management (IS-Waste): A system covering information on waste management in Slovenia.

These organizations collaborate at various levels, from the collection and processing of waste to raising public awareness about the importance of proper e-waste management.



7.3.2. Local repairs shops

Most of the repair shops of different devices are available on ZEOS d.o.o. website.

REUSE network (Center ponovne uporabe, EKO d.o.o. EKO-TCE d.o.o., Fundacija Vincenca Drakslerja, CARNUS, KNOF Stara šola, JP Komunalno podjetje Vrhnika- DEPO, Local repair shops operate as follows:

- Collection and receipt of equipment: Repair shops accept various electrical and electronic equipment brought or delivered by customers. This includes devices in need of repair or refurbishment.
- Diagnosis and Repair: Experts in the shop diagnose issues with received devices and then perform necessary repairs. This involve replacing faulty parts, restoration processes, or other necessary fixes.
- Reuse and Sale: Repaired devices are then prepared for reuse. Repair shops sell these products at a lower cost than new ones, promoting reuse and reducing waste.
- Awareness and education: Local repair shops often engage in raising public awareness about the importance of repairs and reuse. They may also organize educational events or workshops for people interested in learning more about repairs.
 - Sustainable approach: Repair shops often operate within a sustainable framework, emphasizing the importance of extending the lifespan of products and reducing waste. This contributes to sustainable e-waste management.



Figure 14 Map of repair and collection points in Slovenia.

Source: <https://www.zeos.si/en/collection-points/#iskanje-zemljevid>



7.3.3. Domestic EEE Producer

The list of the domestic EEE producers in Slovenia can be found here: <https://podatki.gov.si/dataset/evidenca-proizvajalcev-in-poblascenih-zastopnikov-proizvajalcev-elektricne-in-elektronske-opreme>

Records of manufacturers and authorized representatives of manufacturers of electrical and electronic equipment. The records contain data on manufacturers of electrical and electronic equipment and authorized representatives of manufacturers of electrical and electronic equipment. In addition to basic data, it contains information on the classes and types of electrical and electronic equipment that the manufacturer puts on the market, on whether it also uses distance selling as a sales technique, and within the framework of which joint plan the manufacturer of electrical and electronic equipment fulfils its obligations. The annex contains the records in English translation.

7.4. Best practice

7.4.1. Local incentives

Reuse activities take place in various initiatives in Slovenia and enable the involvement of various stakeholders. By repairing, exchanging or renting items, it is possible to avoid buying a new product and we give this item a new life.

The website offers tools online maps with search engines and a calendar of events where we can exchange different things or learn new reuse skills. Both help us make more responsible decisions on a daily basis.

On the "less is more" link <https://manjjevec.si/karta-ponovne-uporabe/> you can find repairmen, zero waste shops, reuse centers, SH shops and rental shops.

Despite this, the Reuse Center (CPU) is working on collecting of WEEE and preparation for reuse. In 2023, there were about 309 units of WEEE were collected at CPU were 66% of these were suitable for reuse. The preparation for reuse at CPU consists the steps of collection, diagnostic, cleaning, reuse shop and awareness raising. Beside this, the Repair café was also organized at CPU where people bring their broken items (furniture, electrical appliances, toys, clothes...).

7.4.2. Online platforms

Within the project *LIFE TURN TO E-CIRCULAR #I'M STILL HERE USEFUL!* hold by ZEOS d.o.o. <https://www.zeos.si/en/turn-to-e-circular/> it has been established the first Slovenian circular economy online platform of electrical and electronic devices, designed as a meeting point for communication of all interested parties. The group on Facebook called "KAM S TASTARIM? - servis, ponovna uporaba in souporaba električnih aparatov" is intended for the exchange of opinions, advice and guidelines for repairs or servicing of electrical appliances, exchange or sale of still working electrical appliances and finding users for joint use/sharing of electrical appliances. It will serve as a tool to monitor changes in consumer habits.



7.5. Challenges and recommendations

Percentage of expert experiences in Slovenia

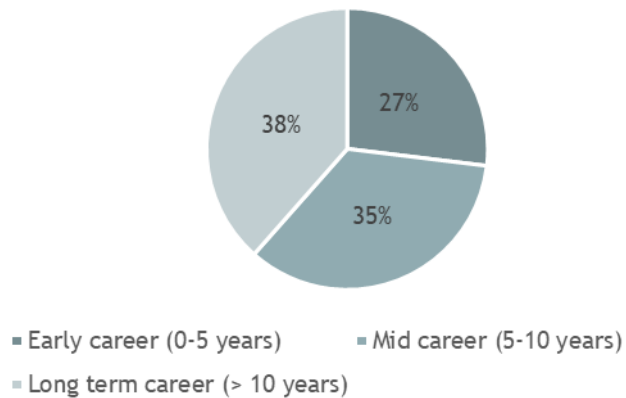


Figure 15 Percentage of expert experiences in Slovenia

The questionnaires were distributed to in total of 136 organizations and we have received 26 respondents. Among the stakeholders, there are 10 from Producer / Importer / Producer Responsibility Organisation; 9 from municipality, 4 from reuse organizations and 5 from recyclers. The respondents have a varied years of experiences working on WEEE which divided into 1. Early career (0-5 years); Mid-career (5-10 years) and long-term career (> 10 years). Figure 15 shown the share percentage of experiences from the questionnaire respondents.



7.5.1. Challenges

WEEE Management

Describe briefly the main challenges with electric and electrical waste that you are facing with e-waste

Informal sector:

- WEEE processed through informal sector
- Unwanted material disposed of together with mixed waste

Products design, completeness:

- Older generation of products, incomplete products received - cannot be repaired
- The complexity of repairs due to the large variety of electronic equipment

Others:

- Problem with sorting WEEE by consumer
- Environmental impact, resource Depletion, health and safety concerns
- Consumer Awareness and behaviour
- Administrative issue - paperwork
- Not enough reuse centres or pick up stations
- Limited collection points
- Global Trade and Regulation

In your experience, what are the main barriers faced in implementing effective WEEE management and circular economy?

About 77% of the respondents think that lack of awareness and understanding of circular economy concepts is one of the main barriers faced in implementing effective WEEE management and CE. About 42% agreed that it is also due to insufficient collaboration among stakeholders and 54% think that due to limited funding and resources. About 69% of the respondents think that it is because of a complex regulations and compliance requirements, additionally 31% with an inadequate infrastructure for collection and processing. About 15% stated that it could related to the resistance to change within organizations.

WEEE recycling

In your opinion, what are the main challenges in the market for recycling WEEE materials?

Only 4% of the respondents think that the main challenges in the market for recycling WEEE materials are due to the lack of market demand for recycled materials and only 8% of the respondent thinks that it is due to the regulatory barriers.

Beside this, the respondent also noted the complex and the expensive recycling process of WEEE.

WEEE Reuse and Repair



In your opinion, what are the main challenges in the market for reusing WEEE materials?

About 38% of the respondents think that the lack of standardized collection processes is one of the main challenges in the market for recycling WEEE materials. About 50% agreed that the lack of awareness among the consumers/organizations also play a major role. About 31% foreseen that there is an insufficient demand for reuse products. 35% of the respondents think that market challenges could be the limited availability of WEEE materials for reuse. About 50% selected quality control issues with reused materials and 31% considered regulatory barriers as the market challenges.

Additionally, standards are too demanding, consequently preparation for re-use is too expensive. Price of the end product would be too high compared to new. Furthermore, the cost of raw materials vs. secondary materials are playing a crucial role.

Policy instrument

Describe briefly which policy instruments did you use for your business development

- Decree on waste electrical and electronic equipment and Waste Regulation,

<https://www.uradni-list.si/glasilo-uradni-list-rs/vsebina/2022-01-1772/uredba-o-odpadkih>

Has your organization received any subsidies or financial incentives for managing WEEE or promoting circular economy initiatives? Yes / No questions

Yes: 2 respondents

No: 14 respondents

Result: about 8% received subsidies or financial incentives

What kind of support on the market would you appreciate? (ex. law change, subsidies etc.)

Regulation and standards:

- Law changes in the territory of WEEE reuse and guidelines
- Regulatory Frameworks, Extended Producer Responsibility
- Fewer administrative barriers for gaining export (notification) documents
- Establish clear legislative frameworks for e-waste, including regulations on collection, recycling, and penalties for improper handling

Financial aspects:

- Allocate financial resources and subsidies for the cleaning, restoration, and recycling of e-waste, including
- Incentives for e-waste recycling
- Subsidizing the repair of used electronic equipment
- Help from government or municipalities for starting re-use business (repair cafe, re-use shops)



- funding and resources for companies which use reused electronic devices
- lower VAT for reuse
- systemic financing reuse centres from waste companies or EPR schemes
- Incentive for returning an old machine

Others:

- Implement educational programs and campaigns to raise awareness about the importance of proper WEEE
- management and the reuse of electronic products
- Promotion of second hand EEE / community centres of joint ownership of EEE
- Provide support for research and development of new technologies for cleaning, diagnostics, and restoration of WEEE, aiming to enhance recycling efficiency

7.5.2. Recommendations

What changes would you like to see on the market to more promote and utilize the WEEE management?

Regulations:

- Strengthened Legislation
- Obligatory re-use purchases for government institutions
- Lower taxes

Awareness:

- Increased Awareness and Education
- Campaigns, educational programs, and information platforms have contributed to greater awareness and improved WEEE management
- Consumer awareness when purchasing products made from recycled materials

Others:

- Improved Collection Infrastructure
- Enhanced Recycling Technologies
- International Cooperation
- Expansion of Collection Points
- More recycling

how to motivate the market to follow the rules of Circular economy and manage the WEEE waste more effectively.

Financial aspects:

- Greater state assistance in subsidizing repairs of used electronic equipment



- Incentive for buying used or repair EEE
- Tax Incentives for Repairs and Refurbishment
- Introduce tax incentives or reduced tax rates for businesses and individuals engaged in repair and refurbishment activities
- Awards for Sustainable Practices: The government can establish award programs and recognitions for companies demonstrating sustainable practices, including product and packaging reuse.

Awareness:

- Producers take an active role in raising awareness
- Promoting reuse and repair - extending the product lifecycle

Others:

- Legislative Framework for Extended Product Life cycles: Enact legislation requiring manufacturers to ensure that their products are designed for easy repair and reuse
- Product Sharing Platforms.



E. Conclusion

In term of overall legislation of WEEE, the listed acts and directives in Austria, Croatia, Czech Republic, Poland, Italy, Slovenia, and Slovakia reflects a collective commitment to addressing the challenges posed by electronic waste. Each country has implemented measures to promote the reduction, recycling, responsible management and disposal of WEEE, aligning with broader European Union directives.

The common challenges and issues surrounding WEEE management underscore the complexity and importance of addressing electronic waste within a broader environmental context which include the improper disposal of electronic waste, lack of efficient collection systems, and the need for enhanced collaboration between governments, producers, and consumers. Additionally, the fast pace of technological advancement and the increasing volume of electronic products exacerbate the challenges in ensuring proper recycling and safe disposal.

The future of WEEE management depends on continued commitment to innovation, collaboration, and adaptation to emerging technologies. Strengthening collection and recycling infrastructure, encouraging eco-design practices, and fostering public engagement will be crucial for a sustainable electronic waste management landscape. Only through sustained commitment and cooperation these nations can pave the way for a more sustainable and environmentally friendly approach to electronic waste management.

In term of reuse and repair of WEEE, there is a need for robust incentives, public awareness campaigns, and collaboration with manufacturers to design products that are easier to repair and upgrade. Efforts to create a supportive ecosystem for repair businesses and initiatives to educate consumers about the benefits of repair contribute significantly to the success of WEEE reuse and repairs.

Furthermore, the reuse and repair sector can be fostering a circular economy mindset, providing financial incentives for repair businesses, and implementing policies that encourage manufacturers to design products with durability and repairability in mind will be crucial.



Reference

- [1] C.P. Baldé, E. D'Angelo, V. Luda O. Deubzer, and R. Kuehr (2022), Global Transboundary E-waste Flows Monitor - 2022, United Nations Institute for Training and Research (UNITAR), Bonn, Germany
- [2] European Union. WEEE Directive Available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02012L0019-20180704>
- [3] European Commission (2023). Environment - Waste from Electrical and Electronic Equipment (WEEE). Available online: https://environment.ec.europa.eu/topics/waste-and-recycling/waste-electrical-and-electronic-equipment-weee_en
- [4] European Commission (2023). Environment - Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS). Available online: https://environment.ec.europa.eu/topics/waste-and-recycling/rohs-directive_en
- [5] European Commission (2023). Rules promoting the repair of goods. Available online: https://commission.europa.eu/law/law-topic/consumer-protection-law/consumer-contract-law/rules-promoting-repair-goods_en
- [6] Elektroaltgeräte Koordinierungsstelle Austria GmbH (2019; 2020; 2021). Tätigkeitsbericht des Jahres 2019-2021.
- [7] Ministry of Economy and Sustainable Development (2020; 2021). Report on electrical and electronic equipment in 2020 & 2021 in Croatia. Available online: https://www.haop.hr/sites/default/%EAlles/uploads/dokumenti/021_otpad/lzvjescia/ostalo/OTP_lzvjesci%A1%C4%87e%20EE%20otpad_2020%20i%252
- [8] Ministry of the Environment of the Czech Republic (2020; 2021). Report Available online: [https://www.mzp.cz/C1257458002F0DC7/cz/odpadni_elektronicka_zarizeni_nakladani_cr/\\$FILE/OODPvybrane_ukazatele_elektrozarizeni_2021-20230420.pdf](https://www.mzp.cz/C1257458002F0DC7/cz/odpadni_elektronicka_zarizeni_nakladani_cr/$FILE/OODPvybrane_ukazatele_elektrozarizeni_2021-20230420.pdf)
- [9] Eurostat (2020). E-waste statistic.
- [10] EU (2023). EU Commission Report_ITALY 2023
- [11] Report on the functioning of the waste management system electrical and electronic equipment (Poland)
- [12] ZEOS d.o.o (2021). Annual report_Slovenia
- [13] Statistical Office of the Slovak Republic (2023). E-waste statistic. Available online: https://slovak.statistics.sk/wps/portal/ext/home/!ut/p/z1/04_Sj9CPykyssy0xPLMnMz0vMAfljo8ziA809LZycDB0NLPyCXA08QxwD3IO8TAWNTEz1wwkpiAJKG-AAjgZA_VFgJc7ujh4m5j4GBhY-7qYGno4eoUGWgcbGBo7GUAV4zCjIjTDIdFRUBADse0bP/dz/d5/L0lDUmlTUSEhL3dHa0FKRnNBLzROV3FpQSEhL2Vu/
- [14] Vento Di Coordinamento RAEE (2023). Report on RAEE. Available online: <https://www.cdcaee.it/rapporti-raee/rapporti-annuali/>
- [15] Agencija Republike Slovenije za Okolije ARSO (2022). WEEE collection Slovenia 2021-2022.
- [16] Elektroaltgeräte Koordinierungsstelle Austria GmbH (2021). Tätigkeitsbericht des Jahres 2021.



- [17] Ministry of Economy and Sustainable Development (2023). WEEE statistic per category. Available online: https://www.haop.hr/sites/default/%EAlles/uploads/dokumenti/021_otpad/Izvjesca/ostalo/OTP_lzvje%C5%A1%C4%87e%20EE%20otpad_2020%20i%252
- [18] Ministry of the Environment of the Czech Republic (2023). WEEE statistic per category. Available online: [https://www.mzp.cz/C1257458002F0DC7/cz/odpadni_elektronicka_zarizeni_nakladani_cr/\\$FILE/OODPvybrane_ukazatele_elektrozarizeni_2021-20230420.pdf](https://www.mzp.cz/C1257458002F0DC7/cz/odpadni_elektronicka_zarizeni_nakladani_cr/$FILE/OODPvybrane_ukazatele_elektrozarizeni_2021-20230420.pdf)
- [19] Ministry of Economy and Sustainable Development (2021). Report on electrical and electronic equipment in 2020. and 2021 in Croatia. Available online: https://www.haop.hr/sites/default/%EAlles/uploads/dokumenti/021_otpad/Izvjesca/ostalo/OTP_lzvje%C5%A1%C4%87e%20EE%20otpad_2020%20i%252
- [20] Ministry of the Environment of the Czech Republic (2023). Available online: [https://www.mzp.cz/C1257458002F0DC7/cz/odpadni_elektronicka_zarizeni_nakladani_cr/\\$FILE/OODPvybrane_ukazatele_elektrozarizeni_2021-20230420.pdf](https://www.mzp.cz/C1257458002F0DC7/cz/odpadni_elektronicka_zarizeni_nakladani_cr/$FILE/OODPvybrane_ukazatele_elektrozarizeni_2021-20230420.pdf)
- [21] ZEOS d.o.o (2022). Estimation based on ZEOS d.o.o annual report 2022.
- [22] Slovakia. Increase and decrease quantity of EEE - SK.
- [23] Bitkom (2019). WEEE directive - compliance Austria. Available online: <https://www.weee-full-service.com/en/news/weee-directive-what-do-companies-need-comply-austria>
- [24] European Environment Agency (2023) Waste prevention country profile Austria. Available online: <https://www.eea.europa.eu/themes/waste/waste-prevention/countries>
- [25] Advantage Austria (2023). Facts and figures- Electrics / Electronics / Mechatronics (2024). Available online: https://www.advantageaustria.org/lt/zentral/branchen/elektro_elektronik_mechatronik/zahlen-und-fakten/zahlen-und-fakten.en.html
- [26] Reuse-Revital (2023). Reuse in Austria. Available online: www.revitalistgenial.at
- [27] Reparaturbonus (2023). Repair bonus Austria. Available online: <https://www.reparaturbonus.at/>
- [28] Widado (2023). Online shop for second-hand EEE in Austria. Available online: <https://www.widado.com/>
- [29] Wilhaben (2023). Online shop for second-hand EEE and others product in Austria. Available online: <https://www.willhaben.at/iad>