**E-Waste Assessment**

**Kosovo**

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# **Executive summary**

This executive summary provides an overview of a research study conducted to assess e-waste management in Kosovo. The research aimed to evaluate the current legal and institutional framework, examine the practices of various stakeholders, and present a case study of a major waste management company. The study utilized the methodology of the Partnership for Action on Computing Equipment (PACE) of the Basel Convention, in collaboration with EMPA, a renowned Swiss research institute. The research was conducted in two main parts: a review of e-waste laws and policies, and a comprehensive survey involving small and medium-sized retailers of electric and electronic equipment, an interview with Kosovo's largest waste management company, and a focus group discussion with young individuals.

The research findings serve as a baseline for understanding e-waste practices and attitudes in Kosovo, while also providing a framework for future interventions. The results highlight several key insights and recommendations:

* Legal and Institutional Framework: The research examined the existing legal and institutional framework governing e-waste management in Kosovo. This analysis helps identify areas where improvements can be made to ensure effective and sustainable management practices.
* Stakeholder Practices: The study explored the practices of various stakeholders involved in e-waste management, including retailers of electric and electronic equipment. The findings shed light on the current approaches and challenges faced by these stakeholders, highlighting opportunities for collaboration and improvement.
* Case Study of Waste Management Company: A case study of Kosovo's largest waste management company was conducted to gain insights into their operations, challenges faced, and best practices implemented. The findings from this case study can serve as a valuable reference for other waste management entities in Kosovo.
* Capacity Building: The research identified a significant need for capacity building initiatives in e-waste management. This includes training programs and workshops for stakeholders involved in the collection, transportation, recycling, and disposal of e-waste. Strengthening the knowledge and skills of individuals and organizations in this sector is crucial for enhancing overall e-waste management practices.
* Advocacy and Awareness Campaigns: The research highlights the importance of advocacy campaigns to raise awareness among citizens and businesses regarding the environmental and health risks associated with improper e-waste disposal. By promoting responsible e-waste management practices, these campaigns can encourage behavior change and foster a sense of responsibility among all stakeholders.
* Ethical E-Waste Management: The study emphasizes the need for ethical practices in e-waste management, both by citizens and companies. This includes adhering to proper disposal procedures, promoting recycling and reuse, and discouraging illegal and harmful practices such as e-waste dumping.

The results of this research provide valuable insights into the current state of e-waste management in Kosovo. The findings serve as a foundation for future interventions, including policy reforms, capacity building initiatives, advocacy campaigns, and the promotion of ethical practices. By implementing the recommended measures, Kosovo can work towards sustainable and responsible e-waste management, contributing to the protection of the environment and human health.

# **Introduction**

## Background

The rapid advancement of technology in the ICT markets contributes to the accelerated obsolescence of electronic products, leading to a significant increase in the volume of discarded electronic equipment worldwide. This discarded electronic waste, commonly referred to as e-waste, encompasses items such as computer monitors, television screens, and mobile phones. These devices contain hazardous substances that can pose severe health risks, including damage to the circulatory system, heightened cancer susceptibility, and other detrimental health effects. Improper recycling or disposal of e-waste can also result in its contamination of rivers and water sources, thereby endangering nearby communities. While some recyclers in developed countries prioritize minimizing pollution and health hazards during the processing of e-waste, a substantial portion is sold to intermediaries who export it to developing nations with weak environmental regulations.

In the context of Kosovo, the implementation of an e-waste management system and practical solutions has yet to be realized. Currently, only a few private companies have initiated collection systems, primarily targeting businesses and larger quantities of e-waste, in an attempt to capitalize on potential profits from recycling discarded electronic and electrical equipment. However, a comprehensive and inclusive e-waste management framework is lacking within the country.

## Problem Identification

The Balkans frequently serves as a destination for e-waste disposal from developed countries, while the management practices for locally generated e-waste remain inadequate. The present state of waste management in the region can be characterized as below standard due to limited human and financial resources, coupled with insufficient and ineffective monitoring and enforcement of existing regulations. Unfortunately, there is a lack of official statistics regarding e-waste in Kosovo, including data on quantities, sources, and disposal methods.

## Research Objectives

The research objectives of this study are:

* Assess the current legal and institutional framework for e-waste management in Kosovo.
* Examine the existing practices of different stakeholders involved in e-waste management.
* Establish a baseline understanding of consumer e-waste practices and attitudes in Kosovo.
* Providing a framework for future interventions and improvements in e-waste management.

# **Research Methodology**

## Methodological framework

This assessment adopts the assessment methodology established by the Partnership for Action on Computing Equipment (PACE) of the Basel Convention and EMPA, the Swiss Federal Laboratories for Material Testing and Research. However, certain adaptations have been made to align the methodology with the specific objectives of this assessment, as well as to accommodate the available resources and time constraints associated with the study. These modifications ensure the suitability and feasibility of the assessment approach while maintaining its scientific rigor and reliability.

## Data acquisition

The data for the study was collected through online reviews of policies and laws, interviews with stakeholders, such as small and medium electric and electronic retailers, and focus groups complemented by questionnaires.

## Literature review and statistical data

Sources of data and important indicators for the assessment of e‐waste practices and habits were used by researching the following:

* Internet sites (governmental sites for law and strategy research and commercial for information on their current practices)
* National Statistics

## Semi structured interviews, questionnaires and focus groups

Interviews and questionnaires were conducted with key stakeholders such as electronic retailers and a waste treatment company

Questionnaires and a focus group was conducted with consumers of electronics (household consumption)

# **Law on the Protection of the Environment[[1]](#footnote-2)**

The Law on Environment Protection in Kosovo aims to harmonize economic development and social welfare with the fundamental principles of environmental protection based on the concept of sustainable development. The purpose of this law is to promote the creation of a healthy environment for the people of Kosovo by gradually adopting European Union environmental standards.

This law regulates the integrated system for environmental protection, reduction of risks of environmental pollution, and the protection of human life and health based on the concept of sustainable development. Its objectives are as follows:

1. Rational use of natural resources and limitation of emissions and pollution to prevent damage, rehabilitation and improvement of the damaged environment;
2. Improvement of environmental conditions related to the quality of life and protection of human health;
3. Preservation and maintenance of renewable and non-renewable natural resources, as well as sustainable management of these resources;
4. Coordination of state activities to meet environmental protection requirements;
5. Regional and international cooperation in the field of environment;
6. Encouragement and participation of the public in environmental protection activities;
7. Ensuring that development in Kosovo is sustainable in a way that protects and preserves the soil, air, water, and livelihood resources for future generations;
8. Promotion of regional and international measures for the preservation, protection, and improvement of environmental quality;
9. Adaptation of laws, sub-legal acts, procedures, and institutions of Kosovo with the legislation of the European Union.

The implementation of the provisions of this law is mandatory for all central and local institutions, legal and natural persons, domestic and foreign, who exercise their activities in the territory of Kosovo.

*Articles:*

Article 1: General provisions

Article 2: Objectives of the law

Article 3: Scope of the law

# **Law on waste[[2]](#footnote-3)[[3]](#footnote-4)**

In 2022 Kosovo passed an amendment of the existing law on waste which aimed to modify and supplement the existing law on waste and bring it closer to European standards (more specifically, Directive 2008/98/EC [[4]](#footnote-5)of the European Parliament and Council on Waste).

The updated Law on Waste of Kosovo aims to modify and supplement the previous Law on Waste with a special focus on protecting the environment and human health by preventing or reducing waste generation and negative impacts of waste management. It also aims to reduce the overall impacts of resource use and improve the efficiency of such use, which is deemed essential for transitioning to a circular economy and ensuring competitiveness.

**Specifically, the objective of the amended Law on Waste is as follows:**

“This law lays down measures to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use, which is essential for transitioning to a circular economy and ensuring competitiveness.”

The updated law is partially in line with Directive 2008/98/EC of the European Parliament and Council on Waste.

The scope of application of this law applies to all natural persons, legal entities, and institutions that create and deal with waste management.

Currently, Kosovo lacks a specific law dedicated to e-waste. The aforementioned Law on Waste is the most relevant law on the issue of e-waste and sets out the requirements of managing e-waste in Kosovo.

In the law e-waste is defined as:

"Special waste - Waste which, by nature of its generation and treatment, is considered special according to Article 38, paragraph 4, of this law;

*Followed up by the cited Article and corresponding paragraph and subparagraph:*

Article 38, paragraph 4, subparagraph 5:

“Waste from electrical and electronic equipment”

*Articles:*

Article 1 – Purpose of the Law

Article 2 – Scope of application

According to Article 38 where the outline for managing *Special Waste* is set, the law requires that special waste be managed using methods that do not pose a risk to the environment and human health. The Minister takes additional measures for the management of special waste if the waste and any action with waste poses a risk to the environment and human health. Whereas the Government is obliged to take swift measures to prevent risks if it assesses that they may pose a risk to the environment and human health.

Article 43 of the Law on Waste is specifically dedicated to the management of e-waste. The handling of electric and electronic waste must be carried out in the following manner:

1. Waste from electrical and electronic equipment must not be mixed with other types of waste.
2. Deposition of waste from electrical and electronic equipment is prohibited if they have not been previously treated.
3. Liquid waste from electrical and electronic equipment must be collected separately and treated properly.
4. Persons collecting waste from electrical and electronic equipment must issue a receipt for the received goods and deliver them for storage or treatment.
5. Persons collecting waste from electrical and electronic equipment must maintain records of the quantity of generated waste and imported electrical and electronic equipment.
6. Producers, importers, and owners of waste from electrical and electronic equipment must deliver them to operators.
7. The Minister, through subordinate legislation, determines the method for managing waste from electrical and electronic equipment, the list of electrical and electronic equipment, and measures for prohibitions or restrictions on the use of products containing harmful components to the environment.

Paragraph 6 of Article 5 of the Law on Waste defines the principles upon which responsibility is placed on producers and owners, emphasizing their accountability for the waste generated throughout the product's development and life cycle. The scope of this law encompasses responsibility principles for all waste, including e-waste. It states the following:

 Article 5, Paragraph 5

*The principle of producer and owner responsibility:*

6.1. Producers, distributors, sellers, and importers of goods that contribute to the generation of waste bear responsibility for the waste created during their activities.

6.2. The producer and owner have greater responsibility as they can influence the qualities and packaging of the produced goods. The producer and owner are also obligated to take measures to minimize waste generation from the manufactured goods and to develop technology and the market for the production of reusable and recyclable products.

6.3. This principle is closely linked to the concept of "extended producer responsibility," where the producer is responsible for the waste generated at every stage of the product's development and its life cycle.

## Illegal practices of e-waste management and penalisations under the Law on Waste

The Law on Waste foresees fines for infringements regarding the handling and managing of waste. Specifically, for e-waste, the law foresees this range of fines for legal persons for the infringements listed below:

Paragraph 1 of Article 71 states that a fine ranging from five thousand (5.000) to forty thousand (40.000) Euros will be issued to legal persons for non-compliance with the provisions of this law if:

 1.18. [*a legal person*] Mixes waste from electrical and electronic equipment with other types of waste, deposits them without prior treatment, does not separate and treat liquid waste from electrical and electronic equipment properly, does not maintain records of the quantity of waste generated and imported electrical and electronic equipment, and fails to comply with the provisions of the subordinate act of this law - Article 43, paragraphs 3, 4, 5, and 6 of this law.

Whereas Article 74, Paragraph 1 foresees fines ranging from twenty (20) to five-hundred (500) Euros for physical persons engaged in illegal activities which cause pollution to the environment and harm to human health. There are different fines for different categories of law violation. Violations and fines relevant for the e-waste subject are described as below:

1. According to Subparagraph 1.4.10, a fine of **50 Euros** will be issued to every physical person who disposes of electrical and electronic equipment in containers designated for municipal waste.
2. Whereas Subparagraphs (i) 1.5.10 and (ii) 1.5.11 state that a fine of **70 Euros** will be issued to every physical person who:
3. disposes electric and electronic devices in public spaces or in nature and
4. disposes batteries or accumulators in public spaces or in nature.
5. Subparagraph 1.6.5 foresees fines of **200 euros** for physical persons who dispose *“Bulk Waste”* in nature, public spaces or containers designated for municipal waste. While not specifically referencing to e-waste, this law is relevant to the subject because of visible citizen practices of disposing large electric machines in containers designated for municipal waste.

# **Waste Management Strategy (2021-2030)**

The Strategy for Waste Management reflects the national legislation on waste management and sets the basis for achieving future targets and objectives, outlined in the Strategy and supported by the legislation of the country.

As required by law, in 2021 the Government of the Republic of Kosovo approved the new Waste Management Strategy for a 10-year period (2021-2030).

The *aim* of the document is to achieve integrated and sustainable waste management that contributes to the preservation of public health and the social and economic development of the country, in line with European standards and norms.

The approved strategy and activity plan aims to address the shortcomings and limitations in the waste management sector in order to push the country towards the development of a circular economy. The document outlines *four (4) objectives* which will contribute to achieving the aforementioned goals.

The *strategic objectives* and respective specific objectives are:

1. **Strategic Objective 1**: Development of a new generation of integrated waste management services and infrastructure. This strategic objective will be achieved through the following three specific objectives:
	1. *Specific Objective 1.1*: Ensuring regular and reliable solid waste collection services for the entire population.
	2. *Specific Objective 1.2*: Development of a network of integrated waste management facilities.
	3. *Specific Objective 1.3*: Development of systems and infrastructure for non-municipal waste management.
2. **Strategic Objective 2**: Professionalization of the waste management and recycling sector. This strategic objective will be achieved through the following three specific objectives:
	1. *Specific Objective 2.1*: Continued development of professional capacities in the public and private sectors. This includes enhancing the skills and knowledge of professionals involved in waste management and recycling through training and capacity-building programs.
	2. *Specific Objective 2.2*: Establishment of an industry code for the waste management and recycling sector in national statistics. This involves creating standardized guidelines and criteria for data collection and reporting, ensuring accurate and reliable statistical information for monitoring and evaluation purposes.
	3. *Specific Objective 2.3*: Promotion of research and development in universities. This objective aims to foster innovation and advancements in waste management and recycling through academic research, collaboration with industry stakeholders, and support for projects that contribute to sustainable waste management practices.
3. **Strategic Objective 3**: Strengthening regulation and control in the waste management sector by addressing gaps and clarifying enforcement mechanisms. This strategic objective will be achieved through the following three specific objectives:
	1. *Specific Objective 3.1*: Establishment of a comprehensive and functional information system for waste management. This involves developing an integrated platform that enables effective monitoring, data collection, and reporting on waste management activities, including waste generation, collection, treatment, and disposal.
	2. *Specific Objective 3.2*: Expansion of the licensing and permitting system for waste management to cover all types of waste, operators, and waste management facilities. This objective aims to ensure that all entities involved in waste management comply with regulatory requirements and obtain the necessary licenses and permits to operate legally.
	3. *Specific Objective 3.3*: Strengthening enforcement mechanisms, including municipalities and inspectorates. This involves enhancing the capacity of regulatory bodies and local authorities to enforce waste management regulations, conduct inspections, and impose penalties or sanctions for non-compliance. It also includes raising awareness among stakeholders about their roles and responsibilities in waste management.
4. **Strategic Objective 4**: Promoting the values and practices of a circular economy. This strategic objective will be achieved through the following three specific objectives:
	1. *Specific Objective 4.1*: Increasing awareness of the importance and benefits of waste management and recycling. This objective focuses on raising public awareness and understanding of the environmental, social, and economic advantages of proper waste management practices. It aims to encourage individuals, businesses, and communities to actively participate in waste reduction, reuse, and recycling efforts.
	2. *Specific Objective 4.2*: Stimulating innovation in waste prevention. This objective aims to foster creativity and technological advancements in developing innovative solutions to minimize waste generation at the source. It encourages the adoption of sustainable production processes, eco-design principles, and the development of eco-friendly products that are designed with waste prevention in mind.
	3. *Specific Objective 4.3*: Establishing recycling and reuse systems based on the concept of extended producer responsibility (EPR). This objective emphasizes the role of producers in taking responsibility for the entire lifecycle of their products, including their end-of-life management. It involves creating systems and mechanisms that incentivize producers to design products for recyclability, establish take-back programs, and invest in recycling infrastructure.

According to the preliminary research done to complement the drafting of the Strategy on Waste Management, there is no sufficient data to calculate the approximate or total amount of electrical and electronic waste (WEEE) in Kosovo.

* Referencing the Strategy, the legal framework is developed in Kosovo in line with the standards and norms required by the EU, and a vision for a full contextual adaptation. Nevertheless, it is noted that the there is a lack of enforcement of these regulations. The enforcement of these regulations is cited to be hindered by the lack of resources for monitoring these regulations, and the lack of concrete mechanisms of stimulation and fines for producers and managers of waste.
* An administrative guidance document has been issued, with the objective of starting an Extended Producer Responsibility scheme regarding electric and electronic waste (WEEE). The adopted administrative guidance document foresees a gradual objective increase in the collection of WEEE-s, reaching 85% by 2019. Since there is no available data to set a baseline or compare the progress of reaching this objective, it is not possible at the moment to gauge the success of this policy or identify the main obstacles in achieving this target.
* There are five (5) licensed companies that currently operate in Kosovo for the collection and processing of WEEE-s. Currently, there are no collection schemes, centres or dismantling plants and there is no data on the types and quantities of WEEE-s.
* There is only one (1) company in Kosovo which is licensed for the collection of batteries and there are six (6) companies which are licensed to collect accumulators. Currently,

there is no labelling or marking system or any database regarding these imported products. There are also no collection centres, there are no classifications done on the municipal level, and there is no data for the quantities and no economic instruments in use to facilitate calculating the amount or quality of these indicators.

## WEEE-s in the context of the Strategy on Waste Management

In this Strategy, there is a dedicated part regarding WEEE. It reiterates the obligations set by the Law on Waste which states that persons handling electric and electronic waste must be licensed.

The Strategy also states that these licensed persons are accountable for the separation and classification of these products and are obligated to keep evidence of the amount, origin and destination of the treated waste. The strategy notes the attempt to further advance the Extended Producer Responsibility (EPR) scheme regarding WEEE-s.

There is also a special entry on batteries, which states that persons involved in managing this type of waste are obligated to obtain a licence and keep evidence of the types and amount of batteries treated. Furthermore, anchoring on the EPR principle, importers, distributors, and retailers are required to create return or collection schemes for these products, but acknowledges that this requirement has yet to be fulfilled.

## The Waste Management Strategy and Priority Measures

The waste management strategy encompasses several priority measures aimed at achieving its objectives and realizing the benefits expected from this policy. These measures are not specific to WEEE-s, but they aim to impact several indicators which, by implementation, can directly impact the WEEE management in the country. The main priorities are as follows, summarized:

* Capacity Building: Emphasizing the professionalization of the waste management sector through the continuous development of professional skills and knowledge. This involves strengthening the capacities of both the public and private sectors, including municipal authorities, waste management companies, and academic institutions.
* Infrastructure Development: Focusing on the comprehensive development of infrastructure for the collection, transfer, and disposal of municipal waste. This includes the establishment of integrated waste management facilities and the expansion of waste collection services through the use of multiple containers and public participation.
* Regulation and Control: Strengthening the regulatory framework and enforcement mechanisms in waste management by establishing effective procedures, licensing systems, and monitoring mechanisms. This ensures compliance with professional standards and promotes responsible waste management practices.
* Awareness and Innovation: Promoting public awareness of the importance and benefits of waste management, fostering a cultural shift towards responsible waste practices. Encouraging innovation in waste prevention and promoting the concept of extended producer responsibility. This involves incentivizing the development of sustainable practices, such as waste reduction and recycling, to prevent contamination and optimize resource utilization.

These priority measures collectively aim to contribute to the achievement of the waste management strategy's objectives, including the protection of public health, preservation of the environment, promotion of a circular economy, and alignment with sustainable development goals, impacted by relevant changes in legislation which reflects EU standards and norms.

# **Activity Plan complementing the Waste Management Strategy**

The *Action Plan*, as the key implementation tool of the *Waste Management Strategy*, identifies the leading and potentially supporting institutions for each action specified. Each identified institution bears the responsibility for implementation, monitoring, and reporting, relevant to their juristiction.

The Ministry of Environment, Spatial Planning, and Infrastructure (MESP), as the coordinating body, is responsible for overall coordination among the implementing agencies and ensures that deadlines and objectives are met.

The *Action Plan* is valid for three years (2021-2023) and is presumed to be updated and gradually expanded after a cycle of mid-term evaluation and re-planning.

While other Strategic and Specific Objectives reference indirectly to e-waste management, Specific Objective 4.3 is the most relevant and directly referenced objective regarding e-waste.

Specific references to e-waste and relevant activities are listed in the table below:

|  |  |
| --- | --- |
| 4.3 | Specific objective: Establishment of reuse and recycling systems based on the concept of extended producer responsibility.  |
| 4.3 | Indicators: Until the year 2024-mechanisms of extended producer responsibility are implemented for 4 categories of products/fractions/waste(packaging, WEEE, batteries, end-of-life vehicles). | No mechanism of EPR [2018] is being implemented | There is 1EPR scheme | There are 4 EPR schemes. | Four waste fractions for which EPR schemes are applied |
| Nr. | Action |  Deadline | Budget | Funding Source | Leading and supporting institution | Result | References in documents |
| 2021 | 2022 | 2023 |
| 4.3.1 | Development and implementation of necessary regulations and schemes for packaging waste based on EPR | 2022Q4 | 98 000 | 148 000 | 80 000 | State budget and technical assistance grant | MESP | There is EPR for packaging waste. | N/A |
| 4.3.1 a | EPR systems (WEEE systems) under development.  | 2023Q4 | 50 000 | 130 000 |  | GDC | GIZ | The WEEE system is being established. |  |
| 4.3.2 | Development and implementation of necessary regulations and schemes for WEEE, batteries, ELVs, waste and tires based on EPR. | 2022Q4 | 136 000 | 136 000 |  | Technical assistance grant | MESP | There are five EPR schemes for specific waste fractions | N/A |
| 4.3.3 | Feasibility study and its preparation for the sorting center and composting center in Prizren | 2023Q4 | 0 | 0 | 231 176 | Private sector EPR | Municipality | Feasibility study for has been developed. | PKZMSA/LVP |
| 4.3.6 | Feasibility study and its preparation for the sorting center in Peja  | 2023Q4 | 0 | 0 | 153 811 | IPA,EPR | Municipality | Feasibility study for has been developed. | PKZMSA/LVP |
| 4.3.9 | Feasibility study and its preparation for the establishment of a sorting center in Prishtina | 2023Q4 | 0 | 0 | 498 000 | Technical assistance grant | Municipality | Feasibility study for has been developed. | KASh |
| 4.3.12 | Feasibility study and its preparation for the establishment of a sorting center in Mitrovica | 2023Q4 | 50 000 | 0 | 0 | State budget, Municipal Public Enterprise for waste management, total 3,300,000 euros | Municipality | Planning documents are avaliable | KASh |
| 4.3.28 | Promotion of the values of source separation and recycling chain. | 2023Q4 | 50 000 | 250 000 | 255 000 | State funds and GDC | MESP, GIZ | Enhanced collection and separation of recyclable materials. | N/A |
|  | **Total budget for specific objective IV.3.** |  | **384 000** | **664 000** | **1 217 987** |  |  |  |  |
|  | From which capital |  | 0 | 0 | 0 |  |  |  |  |
|  | From which sources |  | 384 000 | 664 000 | 1 217 987 |  |  |  |  |
|  | **Overall budget for the Action Plan** |  | **551 000** | **833 000** | **1 992 737**  |  |  |  |  |
|  | From which capital |  | 0 | 0 | 0 |  |  |  |  |
|  | From which sources |  | 551,000 | 833,000 | 1,992,737 |  |  |  |  |

# **The Study with Stakeholders**

## Questionnaire with Retailers of Electronics – Mobile and Computer Retailers

This study focuses on mobile shops and computer shops from diverse cities to gain insights into their perspectives and practices in e-waste management. These establishments are significant stakeholders in the retail sector due to their involvement in the sale and distribution of electronic devices. By examining their experiences, valuable insights can be obtained regarding the challenges and opportunities in e-waste disposal. Furthermore, including retailers from different cities allows for capturing regional variations and identifying best practices to inform targeted strategies for effective e-waste management.

The study involved administering questionnaires to assess the e-waste management practices of mobile shops and computer shops. A total of 12 questionnaires were distributed, with an equal representation of participants from both types of businesses. The obtained responses are as follows:

Seventy-five percent of the businesses reported that they were involved in electronic retail for more than five years. This demonstrates a long-term experience in the market and knowledge on the common local management practices, or a lack thereof, regarding e-waste.

The findings reveal several important aspects related to e-waste management practices in the surveyed businesses. Firstly, concerning awareness and knowledge about the environmental and health risks associated with e-waste, 58% of the participants acknowledged being informed, while 58% stated that they were not aware of the importance of proper e-waste management. These results highlight a potential gap in understanding the significance of responsible e-waste disposal among the surveyed businesses.

Secondly, when asked about their familiarity with local regulations and guidelines for e-waste management, 91% of the participants reported a lack of knowledge in this area. This finding indicates a need for businesses to enhance their understanding of the existing regulations to ensure compliance and proper handling of e-waste.

Thirdly, all the participants (100%) stated that they have not received any training related to e-waste management. This lack of training suggests the need for educational programs and initiatives to equip businesses with the necessary knowledge and skills for effective e-waste management.

In terms of the process of e-waste disposal within the businesses, the results indicate a lack of defined policies and organized processes. Specifically, 92% of the participants stated that their companies did not have a clear policy for e-waste management, and the same percentage reported an absence of organized procedures for e-waste disposal. Moreover, 83% of the participants mentioned that their businesses did not maintain documented records for e-waste disposal, raising concerns about the lack of systematic control and documentation practices.

Furthermore, the findings indicate limited collaboration with specialized e-waste recycling companies. A considerable majority (83%) of the participants reported no collaboration with such companies. Similarly, 83% stated that their businesses did not engage with informal collectors for e-waste removal. These results underscore the missed opportunity for businesses to establish partnerships and utilize available resources for proper e-waste disposal.

The level of customer interest in e-waste disposal was found to be low, as reported by all the participants (100%). Similarly, businesses showed limited provision of assistance and advice to customers regarding the proper management of non-functional electronic devices, with 83.3% of the participants stating that they do not offer such guidance. Retailers declared that they rarely offer disposal of costumers’ electronic equipment, mainly because of a lack of selling or disposal opportunities from their part.

Regarding government support and regulations, all the participants (100%) reported a lack of government programs or support for e-waste management. Furthermore, all the participants (100%) reported a lack of local organizations outreach regarding proper e-waste management and disposal training. Additionally, no regular inspections from the government for quality control of the e-waste disposal process were reported.

The participants' further comments provide additional insights on their perspectives regarding e-waste management practices. These comments reveal a desire for knowledge about e-waste classification programs based on recycling types, a lack of understanding regarding proper disposal methods for collected electronic devices, challenges in incentivizing customers to return electronic waste, limited accessibility to recycling options in specific locations, and a practice of disposing of electronic waste together with other municipal waste. Some of the participants reported that they continued to store their old electronic devices in depos, because of a lack of clarity, opportunity and information on where to dispose them. These insights emphasize the need for comprehensive educational resources, clear guidance on responsible disposal, and improved accessibility to recycling services.

In summary, the findings highlight the need for increased awareness, knowledge, and training among mobile shops and computer shops regarding e-waste management. Considering the common regulation and resources that these companies face, these findings may be generalized for other retailers dealing in other electronic equipment. There is a clear opportunity for businesses to establish clear policies, improve organizational processes, foster collaborations with recycling companies and informal collectors, and enhance customer engagement in responsible e-waste disposal. Furthermore, government initiatives and regulatory enforcement are crucial for promoting effective e-waste management practices within the business sector. These findings contribute to the understanding of current practices and provide insights for developing strategies to address the challenges associated with e-waste management in the studied context.

## Semi-structured interview with the largest waste management company in Kosovo – REC-Kos

REC-Kos is a well-established company that has been actively engaged in the management of electronic waste since 2012, alongside general waste management since 2008. The company reports that it diligently adheres to all legal requirements pertaining to waste management, and it has successfully avoided any penalties for non-compliance. Notably, there are currently no active government programs providing assistance specifically for electronic waste management in Kosovo. As for regulatory oversight, REC-Kos does not undergo routine quality control inspections by government authorities, except during the environmental permit application process, which occurs once every five (5) years.

Regarding the collection of electronic waste, REC-Kos collaborates with both formal and informal collectors. Formal collectors contribute by either delivering the waste separately or combined, while informal collectors gather electronic waste from municipal containers. However, it is worth mentioning that REC-Kos's involvement with informal collectors is relatively limited. Moreover, the company also maintains collaborative relationships with private landfill and scrap metal facilities located in other cities, which supply mixed waste irrespective of its nature. REC-Kos assesses the quantity and quality of materials received from informal collectors as generally low, except in cases where government tenders or dealings with large companies are involved.

In terms of the sources of electronic waste, REC-Kos primarily relies on local landfills as the predominant providers. Additionally, the company maintains regular connections with prominent companies and private landfill facilities to ensure a consistent supply of waste. However, collaborations with small and medium-sized businesses are infrequent and typically involve relatively minor quantities. It is also worth noting that private individuals generally exhibit limited interest in depositing electronic waste directly at REC-Kos; instead, they tend to dispose of it in municipal containers or hand it over to informal collectors.

While REC-Kos does not currently operate specific programs for collecting electronic waste from consumers, it does offer collection services tailored to large businesses. Upon receiving the waste, the company diligently sorts and classifies it before exporting it to other countries for further processing, as domestic recycling facilities are currently unavailable within Kosovo.

Notwithstanding its operational successes, REC-Kos faces significant challenges in electronic waste management. One notable obstacle is the difficulty of exporting waste due to Kosovo's non-membership in the Basel Convention. Although this concern has been brought to the attention of government authorities, concrete steps toward resolution have yet to be taken. Additionally, REC-Kos has yet to implement specialized training programs for its employees pertaining to electronic waste management.

In conclusion, REC-Kos actively collaborates with various stakeholders, with a primary focus on sorting, classifying, and exporting electronic waste. Nonetheless, the company grapples with considerable challenges related to waste export and the absence of domestic recycling facilities in Kosovo.

## Limitations of the study

While the research provides valuable insights into the management of e-waste, there are certain limitations that should be acknowledged:

* Limited Sample Size: The study has relied on a limited sample size or specific geographical area, which could limit the generalizability of the findings to a larger population or different contexts. Further research with a more diverse sample could provide a broader understanding of the challenges and recommendations related to e-waste management.
* Data Availability and Reliability: The availability and reliability of data on e-waste management practices and their impacts has posed certain challenges. The study has relied on existing data sources, which are insufficient and incomplete or subject to reporting biases. Obtaining more comprehensive and accurate data on e-waste quantities, recycling rates, and disposal methods would enhance the reliability of the findings.
* Lack of Longitudinal Analysis: The research has focused on a specific point in time, providing a snapshot of the e-waste management landscape. Longitudinal analysis that tracks changes and trends over time would offer a more comprehensive understanding of the progress made in implementing recommendations and addressing the challenges associated with e-waste.
* Stakeholder Perspectives: The study has focused on a limited number of stakeholder groups, such as government agencies, industry representatives, and a small number of demographically specific consumers, potentially overlooking the perspectives of other relevant stakeholders. Including a wider range of stakeholders, including consumers, waste management providers, and community representatives, and environmental organizations would provide a more holistic view of the complexities surrounding e-waste management.
* Economic Considerations: The research has not explored the economic implications of implementing the recommended measures. The costs associated with infrastructure development, technology advancements, and enforcement measures are crucial factors that need to be considered for effective implementation. Future research could delve deeper into the economic feasibility and cost-benefit analysis of various e-waste management strategies.

Acknowledging these limitations is important for a comprehensive understanding of the research findings and for guiding future studies in addressing the gaps and further advancing knowledge in the field of e-waste management.

## Focus group with young people from 6 different Municipalities of Kosovo

The focus group comprised participants with varying levels of knowledge and understanding concerning the environmental and health impacts of electronic waste. All of the participants demonstrated awareness of the potential damage to devices and the environment.

In terms of decision-making regarding computer device purchases, participants primarily considered factors such as performance, durability, and personal requirements. Environmental considerations were generally not prioritized, as participants believed that their country lacked the necessary infrastructure for effective electronic waste recycling. Furthermore, they believed that as a small country, Kosovo has limited capacities to impact the environment positively or negatively, so it is not feasible for them to sacrifice product usability and performance to protect the environment.

Participants reported diverse practices related to the disposal and recycling of computer devices. Depending on the size and utility of the device, some individuals chose to retain functional devices for extended periods, choosing to prolong the items usability by gifting it to their close family members or community. Phones, computers and TV sets were generally more prone to be transferred to relatives.

Participants mainly relied on informal collectors or private companies for disposal of items that were barely functional or no longer functional. The process of transportation and logistics emerged as a significant challenge during disposal, especially in rural areas and especially for larger electric devices, such as fridges and boilers.

None of the participants actively engaged in local or national recycling programs specifically targeting electronic waste. Moreover, there was a general lack of awareness regarding such initiatives in their respective regions.

When attempting to dispose or recycle computer devices, participants encountered difficulties, including logistical issues and limited acceptance of electric and electronic waste by the informal businesses dealing in waste.

Opinions regarding responsibility for the disposal and recycling of computer devices varied among participants. Some believed that consumers bear the responsibility, while others argued for greater involvement of producers and municipalities.

When queried about their willingness to pay a nominal fee or contribute to an Extended Producer Responsibility (EPR) program to ensure proper disposal and recycling, participants expressed mixed views. Some participants indicated their willingness to pay if the service quality and recycling processes were transparent, while others expressed scepticism about the effectiveness of such programs.

Participants proposed several strategies to improve awareness and education regarding sustainable practices for electronic waste disposal and recycling. These included clearer legislation, enhanced enforcement, and improved information dissemination. Additionally, they suggested incentivizing consumers through discounts or incentives for adhering to proper waste classification and disposal practices.

In conclusion, the focus group emphasized the need for heightened awareness, improved infrastructure, and stronger regulations to foster sustainable practices in the management of electronic waste.

# **Stakeholder Assessment and the flow of e-waste**

Referencing the legislative research and the studies conducted above, the cluster below shows the flow of e-waste in Kosovo between different stakeholders.



# **Conclusion**

The findings from the three complementary studies underscore the urgent need for comprehensive actions to address the lack of awareness, knowledge, and engagement among consumers regarding electronic waste management. To effectively tackle this issue, it is essential to prioritize collaboration among government agencies, environmental organizations, and the electronics industry.

First and foremost, the government should implement policies that enforce responsible electronic waste management. This includes the establishment of stringent regulations on electronic waste disposal, ensuring that waste dumps are equipped with the necessary infrastructure to handle electronic waste. Adequate facilities, such as designated areas within waste dumps, should be provided to accommodate the growing volume of electronic waste.

Empowering municipalities with the authority and resources to manage waste is crucial. The government should support municipalities in developing comprehensive waste management plans that incorporate strategies for electronic waste. This can be achieved by providing financial assistance, technical expertise, and training to enhance their capacity in handling electronic waste.

Investing in classification containers for citizens to use is another important step. These containers can be distributed to households, enabling them to separate electronic waste from other types of waste. This approach promotes proper waste segregation at the source, making it easier for waste management authorities to handle and process electronic waste effectively.

Furthermore, awareness-raising campaigns are vital to educate the public about the environmental and health impacts of electronic waste and the importance of sustainable practices. These campaigns should be targeted at different segments of the population, including households, educational institutions, and businesses. Collaborative efforts between the government, environmental organizations, and the electronics industry can facilitate the development and implementation of impactful awareness campaigns.

In addition to these measures, the government should incentivize and support the establishment and expansion of recycling facilities. This includes the promotion of partnerships between the public and private sectors to enhance recycling capacities. Financial incentives and tax benefits can encourage businesses to invest in electronic waste recycling infrastructure and technologies.

To ensure the success of these initiatives, ongoing monitoring and evaluation of electronic waste management practices are crucial. Regular assessments of the effectiveness of policies and programs will allow for necessary adjustments and improvements.

In conclusion, addressing the lack of awareness and knowledge regarding electronic waste management requires a multi-faceted approach. By implementing policies and regulations, empowering municipalities, investing in classification containers, conducting awareness-raising campaigns, and expanding recycling capacities, the government can effectively mitigate the environmental and health risks associated with electronic waste. It is through these collective efforts that a sustainable and responsible electronic waste management system can be achieved.

# **Key Findings**

* The studies conducted on electronic waste management revealed a significant lack of awareness and knowledge among consumers regarding the environmental and health impacts of electronic waste.
* Participants demonstrated limited engagement in sustainable waste management practices, such as recycling electronic devices or participating in recycling programs.
* The lack of knowledge regarding proper disposal methods and the whereabouts of electronic waste recycling centres was a common issue among participants.
* The findings highlighted the importance of implementing comprehensive interventions to address the gaps in consumer awareness and engagement in electronic waste management.
* Government involvement is crucial in promoting responsible electronic waste management, including the establishment of waste dump facilities specifically designed for electronic waste.
* Empowering municipalities with resources and authority in waste management can enhance their capacity to handle electronic waste effectively.
* Providing financial assistance, technical expertise, and training to municipalities can facilitate the development of comprehensive waste management plans that incorporate strategies for electronic waste.
* Investment in classification containers for households can promote proper waste segregation at the source and streamline electronic waste management processes.
* Awareness-raising campaigns targeted at different population segments are necessary to educate the public about the environmental and health implications of electronic waste and encourage sustainable practices.
* Public-private partnerships and financial incentives can stimulate the establishment and expansion of recycling facilities, enhancing electronic waste recycling capacities.
* Regular monitoring and evaluation of electronic waste management practices are essential to ensure their effectiveness and inform necessary adjustments to policies and programs.
* These key findings underscore the importance of comprehensive interventions, government support, and public awareness to foster responsible electronic waste management and mitigate the environmental and health risks associated with electronic waste disposal.

# **Recommendations**

Based on the extensive research conducted, a number of key recommendations can be put forth to enhance the management of e-waste:

* Raise Awareness and Education: Implementation of comprehensive awareness campaigns targeting diverse stakeholders, including the general public, businesses, and educational institutions, is crucial for fostering an understanding of the environmental and health implications of e-waste. Educational programs and informational materials should be employed to promote responsible consumption, proper disposal, and recycling practices.
* Strengthen Legislative Framework: Development and enforcement of comprehensive legislation and regulations addressing the entire lifecycle of electronic products, encompassing production, distribution, use, and disposal, is imperative. The establishment and monitoring of extended producer responsibility (EPR) programs are recommended to hold manufacturers and retailers accountable for the appropriate management of e-waste.
* Enhance Infrastructure and Collection Systems: Significant investments should be made in the advancement of e-waste collection, transportation, and recycling infrastructure. The establishment of accessible collection points and the implementation of efficient logistics systems are essential to ensure the proper handling and disposal of e-waste.
* Encourage Research and Innovation: Support for research and development endeavors focusing on innovative technologies for e-waste recycling and resource recovery is paramount. Collaboration between academia, industry, and governmental agencies should be fostered to facilitate sustainable solutions for e-waste management.
* Strengthen International Cooperation: The fostering of international collaboration and the harmonization of policies, regulations, and standards pertaining to e-waste management are crucial. The exchange of best practices, knowledge sharing, and coordinated efforts are essential to address the global challenges associated with e-waste, particularly cross-border movements.
* Enhance Monitoring and Enforcement: The reinforcement of monitoring and enforcement mechanisms is vital to ensure compliance with e-waste regulations. Effective inspection programs, regular audits, and penalties for non-compliance should be implemented to discourage illicit practices and ensure the appropriate handling of e-waste.
* Promote Circular Economy Principles: Encouraging the adoption of circular economy principles is instrumental in transitioning toward a more sustainable approach to e-waste management. Promoting repair, refurbishment, and recycling of electronic devices, incentivizing the design of products with extended lifespans, repairability, and recyclability, and supporting initiatives that facilitate the reuse of electronic components and the recovery of valuable materials from e-waste are recommended. Referencing the studies conducted above, financial incentives are highly recommended as a means to modify consumer behaviour towards e-waste management.

The implementation of these recommendations demands a concerted effort from governmental entities, industry stakeholders, civil society organizations, and the wider public. By adopting these measures, the state can significantly enhance e-waste management, mitigate environmental and health risks, and foster the sustainable utilization of resources.

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