

# e-Waste in the Republic of Moldova

Study on the generation and  
management of e-Waste in Chisinau municipality



This study is conducted and published as the part of the **project "Clean City with Recycled e-Waste - Recycle Today for Your Tomorrow's Health"** launched by NGO "Association for Waste Recovery" with the support of the Global Environment Facility Small Grants Program (GEF SGP), implemented by UNDP Moldova and in partnership with MoldRec.

The content of this study provides an overview of the determinants of consumer behavior (individuals and legal entities) of electrical and electronic equipment, the level of health hazard awareness, decisions made regarding the fate of a generated e-Waste, including identification and justification of incentives aimed to increase e-Waste collection rates.

The study provides the necessary information support for the formulation of legislative initiatives, the extension and improvement of WEEE collection and recycling infrastructure, the empowerment of the population and the establishment of sustainable partnerships with economic agents directly involved in the production and management of this type of waste.

For additional information regarding this study you can contact us at:  
Association for Waste Recovery  
MD-2005, Chisinau, Capriana 50 street, of.219. Republic of Moldova  
Tel: (373) 60 50 99 34  
E-mail: [info@e-circular.org](mailto:info@e-circular.org)  
[www.e-circular.org](http://www.e-circular.org)



"We cannot solve our problems with the same thinking we used when we created them."

**Albert Einstein**

## CONTENT

<b>INTRODUCTION .....</b>	<b>5</b>
<b>SUMMARY .....</b>	<b>6</b>
<b>CHAPTER 1 – GENERAL INFORMATION .....</b>	<b>7</b>
1.1. What are e-Waste. Estimated impact on the environment and health? .....	8
1.2. Statistics and trends on e-Waste.....	10
1.3. National legislative framework .....	13
1.4. E-Waste and SDGs.....	15
<b>CHAPTER 2 – CASE STUDY – CHISINAU MUNICIPALITY .....</b>	<b>ERROR! BOOKMARK</b>
<b>NOT DEFINED.</b>	
2.1. Methodology .....	18
2.2. Study results for individuals.....	19
2.3. Study results for legal entities.....	26
<b>CHAPTER 3 – THE PROJECT "CLEAN CITY WITH RECYCLED E-WASTE -</b>	
<b>RECYCLE TODAY FOR YOUR HEALTH TOMORROW" .....</b>	<b>33</b>
3.1. About the project .....	34
3.2. Map of collection points.....	35
<b>CONCLUSIONS AND RECOMMENDATIONS.....</b>	<b>36</b>
Conclusions.....	37
Recommendations .....	38
<b>BIBLIOGRAPHY .....</b>	<b>41</b>

## INTRODUCTION

The global information society is growing rapidly. At the same time, the increase in purchasing power, urbanization and industrialization in many developing countries have led to an increase in the quantities of electrical and electronic equipment (EEE) placed on the market and purchased, thus generating large volumes of e-Waste.

Although digitalization and connectivity are critical to help achieve the Sustainable Development Goals, the transition to an increasingly digitalized world also involves multiple risks due to irrational consumption of resources and mismanagement of waste generated.

These wastes contain many substances that can be particularly harmful, and their incineration could release 36 tons of mercury and 16 tons of cadmium annually, which confirms their toxicity and danger if they reach landfills. garbage.

The issue of e-Waste is a global concern and challenge, most notably affecting weak or developing countries, such as the Republic of Moldova, which do not have a functional system for managing this toxic waste, an infrastructure necessary for selective collection of this waste, necessary financial assistance, sufficient specialized and trained operators (recyclers) to operate in an e-Waste market, including an adequate level of information and awareness among the population.

At the end of 2018, A.O. The Association for Waste Recovery launched in Chisinau, the project "Clean city with recycled e-Waste", with the support of the Small Grants Program GEF SGP Moldova, implemented by UNDP in

partnership with Moldrec Association. Through this project, we managed to create the minimum necessary infrastructure for selective collection of e-Waste in Chisinau, later being extended to several districts of the Republic of Moldova. A total of 128 specialized dumpsters were installed in various institutions in the public, private, academic, NGOs, etc. and collected over 50 tons of e-Waste, which were exported to authorized recyclers in European countries, thus avoiding soil contamination, water and air.

Given the purpose of the project, namely ensuring its sustainability and continuity, this "Study on the generation and management of e-Waste in Chisinau" was developed in order to provide an overview of the determinants of consumer behavior and the decision to recycling, the level of knowledge on the toxicity of this waste and the danger to health and the environment, the identification of existing obstacles to the selective collection of waste, but also the justification of incentives, which aim to increase the collection and recycling rates of WEEE.

The results of the study, the first of its kind in the country, have an applicative purpose and provide the necessary information support for formulating legislative initiatives, expanding and improving WEEE collection and recycling infrastructure, empowering the population and establishing sustainable partnerships with economic agents involved directly in the production and management of this waste.

The results of the study can serve as a benchmark in the future regarding the elaboration of legal acts in the field and the justification of some investment projects relevant to the national specificity.

## SUMMARY

### Assessment of usage preferences of EEE

- Top 5 equipment used in the household are mobile phone (91%), refrigerator (90%), washing machine (85%), TV (84%) and landline (80%);
- Top 5 equipment used within the companies are computer (93%), printer (81%), mobile phone (74%), landline phone (69%) and air conditioner (67%);
- 50% of respondents (individuals) and 59% (legal entities) stated that they do not purchase EEE more frequently than once every 2 years;
- The mobile phone is the device with the shortest period of use. According to the analyzed data, 37% of individual respondents and 27% of legal respondents change their mobile phone once every 2 years at most, and 53% respectively, 54% change it once every 5 years;
- The landline phone is the electronic device that has the longest period of use. According to the analyzed data, 55% of individuals and 49% legal entities, respectively, use this type of equipment for more than 10 years.

### Assessing the level of awareness of the impact of WEEE

- The study shows a high share of 80% of respondents' individuals and 82% legal entities who know that WEEE is hazardous and contains chemicals, and another 20% and 18% respectively do NOT know this information. In both cases, the Internet is the most widely used source of information;
- Less optimistic are the results of the study on the methods used in e-Waste management, especially for individuals. Respectively, we have 56% individual respondents, who for various reasons ignore the consequences on environmental and health pollution in case of long-term storage of this waste in the household and landfilling together with other waste and another 44% who apply several options considered to be correct in relation to the WEEE generated. In the case of legal entities, the share of those who manage e-Waste correctly is higher (52%) compared to individuals. At the same time, there are another 43% respondents of legal entities (a large share related to the amount of e-Waste generated in a company compared to households), which do not apply correct methods of waste management;
- Both categories of respondents (71% individuals and 72% legal entities) expressed their willingness to pay a fee for the disposal of WEEE. The decision is directly conditioned by the transparency and correctness of the methodology for calculating these tariffs by the competent bodies in the field.

### Identify obstacles to WEEE collection

- the biggest obstacles in the process of WEEE collection faced by individuals and legal entities are: insufficient information on their collection and recycling (73% and 71%), poor infrastructure on e-Waste collection (71% and 66%), few e-Waste collectors and recyclers (59% and 44%) and lack of incentives (56% and 44% respectively);
- the study also shows a very low credibility and appreciation of the respondents (individuals and legal entities) in relation to the result of the actions taken by the competent public authorities in the field of WEEE, (score of 1.65 from individuals and 1.55 from part of legal entities) out of a total of 5.



# Chapter I General Information

# 1.1. What is e-Waste. Estimated impact on the environment and human health

In this study, WEEE and e-Waste are used as synonyms and include all 10 categories of EEE (Table 1), as specified in Annex I of the Waste Electrical and Electronic Equipment Regulation, which has become the most accepted classification. We note that from August 2018 all EEE is classified in 6 categories provided in Annex III of Directive 2012/19 / EU on WEEE (Table 2), including ITU statistics.

**Table 1 - EU10  
(applicable for the Republic of Moldova)**

Waste category
1. Large household appliances
2. Small household appliances
3. Computer and electronic communications equipment
4. Consumer electrical appliances and photovoltaic panels
5. Lighting equipment
6. Electrical and electronic tools (except large fixed industrial tools)
7. Toys, leisure equipment and sports equipment
8. Medical devices (except for all implanted and infected products)
9. Supervisory and control tools
10. Vending machines

**Table 2 - EU6**

Waste category
1. Heat transfer equipment
2. Screens, monitors and equipment containing screens
3. Lamps
4. Large equipment
5. Small equipment
6. Small ICT equipment

According to the Regulation on waste electrical and electronic equipment, approved by Government Decision no. 212 of 07.03.2018, which transposes at national level Directive 2012/19 / EU of the European Parliament and of the Council of 4 July 2012:

**"Electrical and Electronic Equipment" OR "EEE"** means equipment the proper operation of which depends on electric currents or electromagnetic fields and equipment for the generation, transmission and measurement of such currents and fields in the categories set out in Annex no. 1A and designed to be used at a voltage less than or equal to 1,000 volts AC or 1,500 volts DC.

**Waste of Electrical and Electronic Equipment (WEEE)** - electrical and electronic equipment that constitutes waste according to the provisions of art. 50 of Law no. 209/2016 on waste, including all components, subassemblies and consumables an integral part of the equipment when it becomes waste.

From the total flow of solid waste, e-Waste represents only 2%, instead it accounts for 70% of the volume of hazardous waste that reaches the landfill, containing many substances that can be particularly harmful, both for the environment and for health. Due to its properties, this waste is included in Annex VIII to the Basel Convention under the heading for hazardous waste. For example, the cathode ray tube of a TV set can pollute about 50 m<sup>2</sup> for 30 years, having materials such as aluminum, lead, zinc, nickel, manganese, barium or cobalt. Refrigerators contain chlorofluorocarbons (CFCs), which are responsible for damaging the ozone layer and reducing the Earth's ability to protect itself from the sun's harmful rays. The phones contain heavy metals and rare metals. If this equipment were incinerated, it could release 36 tonnes of mercury and 16 tonnes of cadmium annually. Being so dangerous, this waste should not end up in landfills, but should be collected separately and recycled accordingly [1].

On the other hand, up to 60 elements in the periodic table can be found in the components of electronic equipment, and exactly 70% of the components of electrical and electronic waste can be recovered by collection and recycling. E-Waste contains precious metals such as gold,

copper, and nickel, as well as rare, strategically valuable materials such as indium and palladium. Many of these metals could be recovered, recycled and used as a secondary raw material for new goods. The challenge is the incredible complexity of doing this, since electronic products can be made up of more than 1,000 different substances. Up to 93% of materials can be recovered from a properly recycled refrigerator. Certain types of plastic can be reborn as musical instruments, boxes, bumpers for cars. Copper-containing motors provide secondary raw material for cables, coins and new appliance motors such as refrigerators, toys, etc. As an example, mixed with zinc, copper becomes brass. Game consoles offer steel for computer cases, car parts. Their circuits contain precious metals that can only be recovered by recycling.

Zinc in mobile phones, for example, is useful in galvanizing steel. Zinc is used to protect ships and submarines from rust. In addition to established raw materials, recently the activity of recovering precious metals, such as gold and silver, from electrical and electronic equipment and microprocessors has intensified. It may contain various amounts of gold, depending on the model, Table 3 [2]

**Table 3. Composition of precious metals in the structure of EEEs**

Equipment	Au		Ag		Pd	
	mg	(ppm)	mg	(ppm)	mg	(ppm)
<b>Computer</b>	316 - 338	21 - 23	804 - 2.127	54 - 142	146 - 212	10 - 14
<b>Laptop</b>	246 - 250	85 - 86	440	152	50 - 80	17 - 28
<b>Tablet</b>	131	215	26	43	-	-
<b>Mobile phone</b>	50 - 69	455 - 627	127 - 715	1155 - 6500	10 - 37	91 - 336

The recycling of WEEE results in economic and environmental benefits, such as the reduction of the amount of energy used, and of some raw materials necessary for the manufacture of new

products, but also the re-entry into the economic circuit of important quantities of raw materials. WEEE recycling also has benefits on the natural environment, such as: reducing the amount of

waste stored in landfills, reducing the risk of disease of humans or animals, reducing soil, air or water contamination.

In the Republic of Moldova, the WEEE recovery industry is not developed, respectively we cannot

benefit from the recovery of significant quantities of raw materials. The amount of WEEE collected at national level is mostly exported to large recycling companies in Romania and other European countries.

## 1.2. Statistics and trends on e-Waste

Electrical and electronic waste is now the fastest growing waste stream globally. The United Nations Environment Program (UNEP) has categorized e-Waste as a "tsunami" that threatens humanity. According to the latest data published in the [Global E-waste Monitor 2020](#), 53,6 million tons of e-Waste were generated in 2019 alone, and by 2020, is

estimated to reach over 55 million tons (Figure 1). This amount is equivalent to 7,5 kilograms per inhabitant of the planet. Of the total amount generated, no more than 20% is properly recycled. The rest ends up either in landfills or on illegal recovery channels [3].



Figure 1. e-Waste generated globally: total + per person

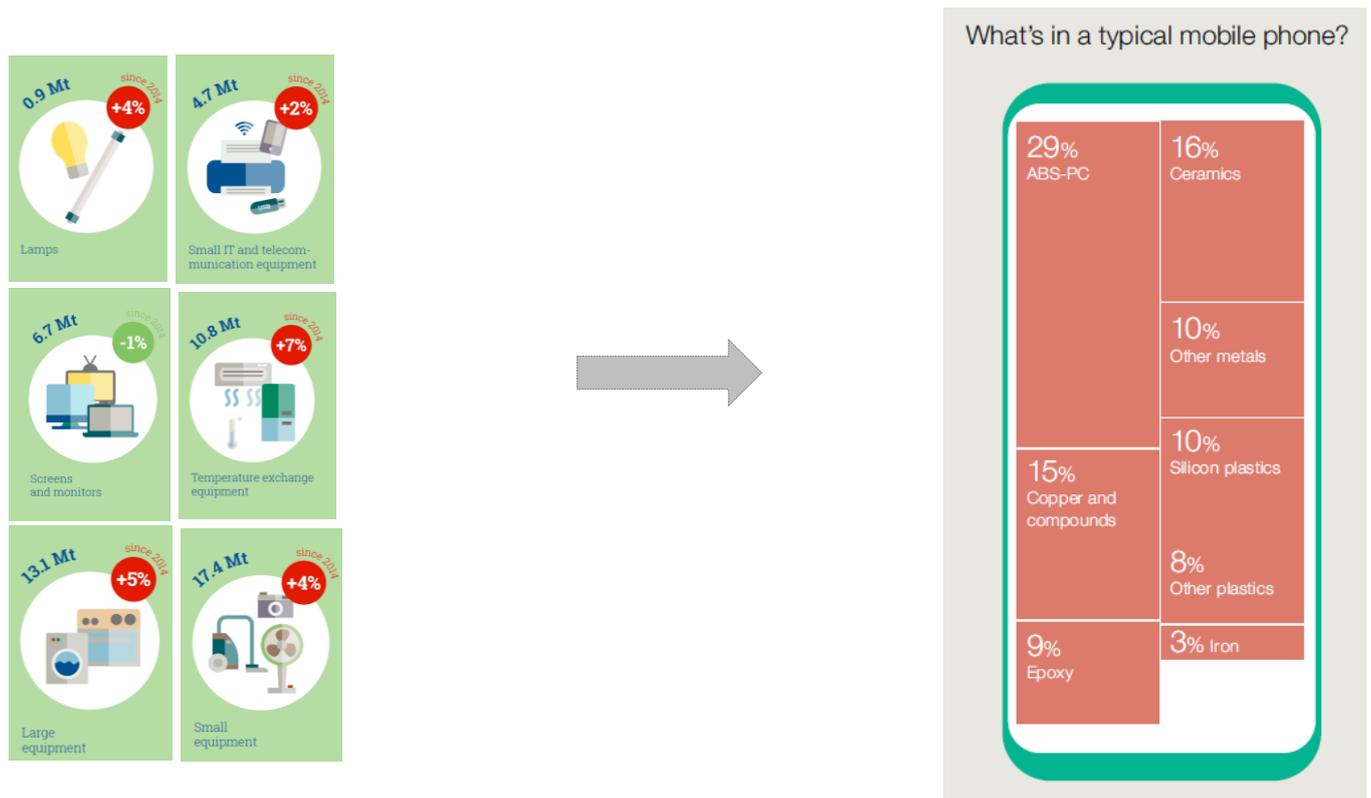
(Source: Global E-waste Monitor, 2020)

International e-Waste statistics are based on the classification of this waste into 6 categories (as required by Annex III of Directive 2012/19 / EU on

WEEE) and not according to 10 categories (in force in the Republic of Moldova).

Of the total amount of electrical and electronic waste generated, the largest share belongs to small equipment (17,4 million tons), followed by large equipment (13,1 million tons) and heat transfer equipment (10,8 million tons). The lowest share of total e-Waste generated belongs to screens and monitors (6,7 million tons), IT and

telecommunications equipment (4,7 million tons) and lamps (0,9 million tons), according to the data presented in Figure 2.



**Figure 2. Amount of e-Waste by categories**

(Source: Global E-Waste Monitor 2020, A New Circular Vision for Electronics, 2019)

Most e-Waste globally is generated in Asia - 49%, and this is because 60% of the world's population is concentrated here. But the largest quantities of e-Waste generated per person is recorded in Europe, 16,2 kg per capita

(compared to Asia, where each inhabitant has 5,6 kg of WEEE generated per person). However, according to the data presented in Table 4, Europe has the highest regional collection rate of 42,5% of total e-waste generated.

**Table 4. Total e-Waste generated and collected by region**

Indicator	Africa	America	Asia	Europa	Oceania
Countries in the region	53	35	49	<b>40</b>	13
Population in the region (mil)	1,174	977	4,374	<b>738</b>	39
E-waste generated (kg / person)	2,5	13,3	5,6	<b>16,2</b>	16,1
Total e-Waste generated (million tons)	2,9	13,1	24,9	<b>12,0</b>	0,7
Collection rates	0,9%	9,4%	11,7%	<b>42,5%</b>	8,8%

(Source: Global E-waste Monitor, 2020)

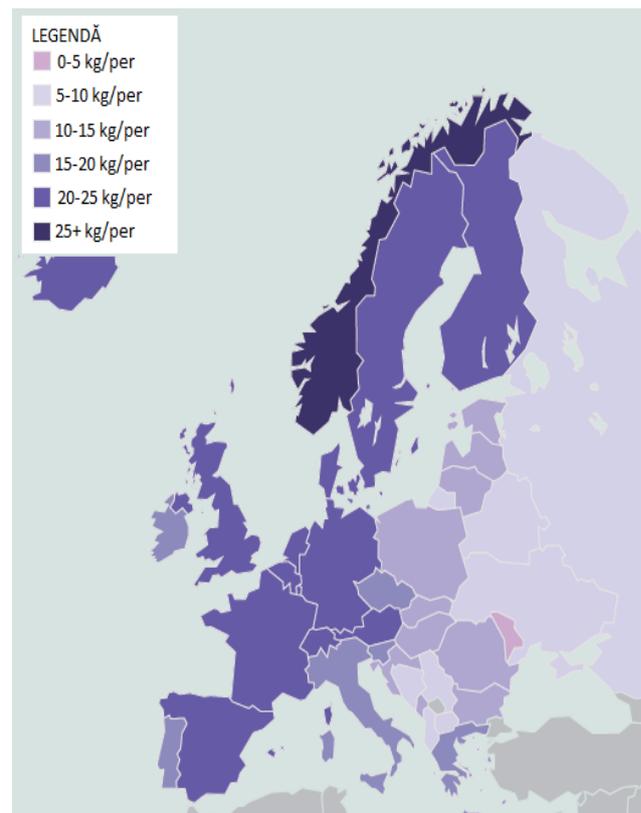
It is also worth noting the differentiated distribution of e-Waste generated in developed countries compared to less developed countries. The richest countries in the world generate on average 19.6 kg per capita, while in the poorest generate approximately 0.6-0.8 kg per capita.

Of European countries, Norway generates the largest amount of e-waste per capita (28.5 kg per capita), followed by the United Kingdom and Denmark (each 24.9 kg per capita). At the same time, countries such as Switzerland, Norway and Sweden have the most advanced e-waste management practices in the world.

The collection and recycling of e-waste in Eastern European countries, such as the Republic of Moldova, Russia and Ukraine, is not as advanced as in other European Union countries, being insufficient and poorly functional. However, today there is national legislation governing e-waste management, including some initiatives from grant programs and projects launched by civil society representatives, which aim to reduce WEEE to landfill, awareness and informing the population about the environmental and health risks, but also the creation of the minimum infrastructure necessary to manage correctly, but also cost-effectively, the amount of waste generated and ensuring the traceability of this waste to the final stage of recycling.

E-Waste metering is a challenge for many countries, especially if there are no statistics for this type of waste, as is the case of the Republic of Moldova.

However, we estimate that in accordance with the legal provisions governing this field, the first data



on the amount of e-Waste generated at national level is expected to be reported starting with 2020.

The only data on the amount of e-Waste generated at national level are found in the Global E-waste Monitor Report 2017 and 2020 (data for 2015-2019). The table 5 shows the evolution of the quantity generated in the Republic of Moldova for the period 2017-2020 (total and per / place). The amount of e-Waste generated in the Republic of Moldova is estimated to be about 4,2 kg per capita, or about 14.800 tons - in 2020.

Table 5. Total e-Waste generated in Moldova

Indicator	2016	2017	2018	2019	2020
Total WEEE generated (thousand kg)	12.400	13.100	13.500	14.200	14.800
Kg WEEE generated / inhabitant	3,5	3,7	3,8	4,0	4,2

Source: <https://globalewaste.org/statistics/country/republic-of-moldova/2019/> . Note: 2020 – estimated.

## 1.3. National legislative framework

In total, about 70 countries have adopted legislation on the e-Waste they generate (about two-thirds of the world's population), including the Republic of Moldova. Although there is a national legal framework governing the management of WEEE and the application of the principle of Extended Producer Responsibility (REP), it still remains a non-functional tool for transposing the obligations of e-Waste producers and educating society through environmental responsibility. The national legislative framework on WEEE includes several normative acts:

**Waste management strategy** approved by Decision no. 248 of 10.04.2013 to ensure the execution of priority actions in the field of environmental protection. According to the strategy, in the Republic of Moldova there is no system for collecting and treating waste electrical and electronic equipment, and no data are provided on the quantities of waste generated, because so far no evidence of this waste has been implemented. This Strategy was approved as a mechanism for implementing the old Law no. 1347- XIII of 09.10.1997 on production and household waste (subsequently repealed) and so far has not been updated in accordance with the provisions of the Law on waste no. 209 / 2016, which was adopted by taking over most of the provisions of Directive no. 2008/98 / EC of the European Parliament and of the Council.

**Law no. 209/2016 on waste**, which establishes the legal bases, state policy and measures necessary for the protection of the environment and public health by preventing or reducing adverse effects caused by waste generation and management and by reducing the general effects of resource use and efficiency their use.

This law regulates the principle of extended producer responsibility to strengthen the reuse, prevention, recycling and other types of waste recovery. Among the provisions of the Law directly relevant to WEEE are art.50 and Annex 5 (WEEE categories).

**Government Decision no. 212 of 07.03.2018** on the approval of the Regulation on waste electrical and electronic equipment. This Regulation transposes the provisions of Directive 2012/19 / EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment, published in the Official Journal of the European Union of 24 July 2012. The regulation regulates the categories of waste electrical and electronic equipment listed in annex no. 1A for their management in order to prevent or reduce the impact on the environment and human health, thus contributing to a sustainable development of society and the implementation of the provisions of art. 12 of Law no. 209 of July 29, 2016 on waste. The Regulation lays down the conditions for the protection of the health of all actors involved in the life cycle of electrical and electronic equipment, such as manufacturers, importers, distributors, consumers and businesses responsible for the collection, treatment, recycling, recovery and clean disposal of WEEE.

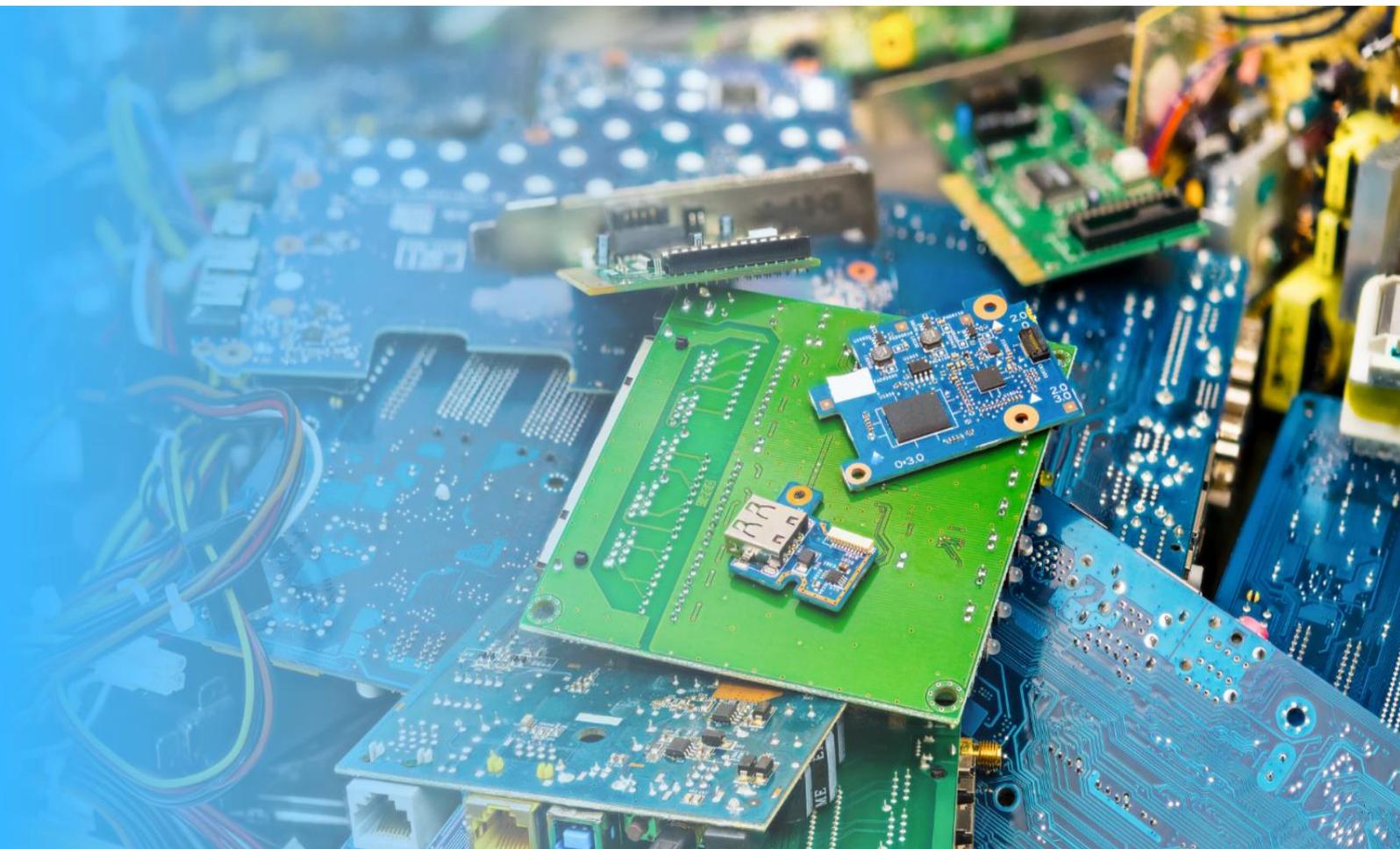
**Government Decision no. 682 of 11.07.2018** on the approval of the Concept of the Automated Information System "Waste Management" (SIA "MD"). This system serves as a tool for accumulating information on the products placed on the market and the waste generated, based on the reports of the economic agents participating in the waste management process. The information system managed by the Environment Agency, performs the automated validation of the content of the applications sent by the authorization applicants and records the totality of the actions performed by the users. At the same time, the information regarding the implementation of the measures related to the application of the Extended Producer Responsibility (REP) for the products mentioned in art. 12 of the Law on waste and data on the quantity of products made available on the market, specified in tons and number of units, as well as information on the

quantity, number and categories of waste collected and treated.

**Government Decision no. 99 of 30.01.2018** for the approval of the Waste List. In the list of waste categories, WEEE falls into category 16 "Wastes not otherwise specified in the list" out of a total of 20 categories of waste according to the source of their generation. In the detailed list of wastes in this Decision, WEEE is assigned 6-digit codes.

**Government Decision no. 501 of 29.05.2018** for the approval of the Instruction on keeping records and transmitting data and information on waste and their management. According to this instruction, waste owners, regardless of the type of activity, type of ownership, legal form of organization and source of funding are required to prepare and submit data and information on waste and its management. Respectively, in order to facilitate the reporting of data and information on waste and their management, waste holders must keep a monthly record of the waste generated and report annually the data collected to the Environment Agency by April 30 of the year following the management year, ensuring the quality information presented.

**Basel Convention** on the Control of Transboundary Transports of Hazardous Wastes and Their Disposal, to which the Republic of Moldova has acceded by Parliament Decision no. 1599-XIII of March 10, 1998, and of the guidance documents adopted within it. The transboundary shipment of WEEE must be carried out in accordance with the requirements of the Basel Convention on the control of transboundary movements of hazardous wastes and their disposal. Each batch of WEEE must be accompanied by the documentation required under the control procedure of the Basel Convention on the control of transboundary shipments of hazardous wastes and their disposal, and art. 64 of Law no. 209 of July 29, 2016 on waste. In the absence of consent given in accordance with the requirements of the said Convention, the export shall be deemed to constitute a case of illicit trafficking.



## 1.4. E-Waste and SDGs

In September 2015, the United Nations and all Member States (including the Republic of Moldova) adopted the ambitious 2030 Agenda for Sustainable Development, which includes 17 Sustainable Development Goals (SDGs) and 169 targets to end poverty, protect the planet and ensure prosperity for all of us. The SDGs recognize the role of natural resources and ecosystem services in ensuring human well-being economic opportunities and social and environmental resilience.



The accelerated increase in the amount of electrical and electronic waste generated, including improper treatment and disposal, poses an increased risk to the environment and human health, as well as to the achievement of the proposed SDGs. A better understanding and more data on e-Waste will contribute to the achievement of several objectives of the 2030 Agenda. This will be helpful in addressing the SDGs related to environmental and health protection and will of course foster sustainable growth and the generation of new jobs, actively stimulating the eco-responsible involvement of the business sector. Efficient e-waste management at national level conditions the successful achievement of at least 6 SDGs (SDG 3, SDG 6, SDG 8, SDG 11, SDG 12 and SDG 17).

### SDG 3: Good Health and Well-being

Toxic substances contained in e-Waste often irreversibly affect human health. This highly toxic waste causes allergies, infertility, memory loss, heart disease, cancer, etc.

Efficient management of waste, especially hazardous waste such as WEEE, guarantees a low level of pollution and health risks, respectively, by reducing the number of deaths and diseases caused by hazardous chemicals, pollution and contamination of air, water and of the soil.

### SDG 6: Clean water and sanitation

Toxic substances contained in e-Waste (mercury, lead, nickel, cadmium, lithium) reach the soil and water, and then through contamination, negatively affect the environment. If this waste were collected selectively from the generation source and ensured direct recycling, then it will be possible to reduce pollution, minimize the release of hazardous chemicals and materials as provided for in Objective 6 of the 2030 Agenda.



### **SDG 8: Decent work and economic growth**

Good e-waste management can create new jobs and contribute to economic growth in the recycling and redevelopment sector. Now, e-waste is often processed in the informal sector, and many e-waste disposal and recycling jobs are unsafe and not protected by formal regulations. Therefore, it is necessary to formalize the ecological management of e-waste and respectively to identify the multiple business opportunities it offers.

### **SDG 11: Sustainable cities and communities**

As more than half of the world's population lives in cities (1/3 of the Republic of Moldova population), rapid urbanization requires new solutions to address the growing risks to environmental and human health, especially in densely populated areas. Most e-waste is generated in cities and it is particularly important to properly manage e-waste in urban areas, but also in rural areas.

By creating smart WEEE collection infrastructure and using ICT to manage this waste, it is possible

to target cities that offer new and exciting opportunities including reducing the negative impact on the environment per capita and of course conserving the country's natural capital.

### **SDG 12: Responsible consumption and production**

Sustainable economic growth means using natural resources in the most intelligent and sustainable way possible. In Moldova, about 1.5 million tons of waste are generated annually (NBS data 2018), a large part of this amount being thrown in landfills. In the context of the growing pressure of production and consumption on resources, the environment and the planet, it is necessary to abandon the linear pattern of consumption such as "procurement - production - disposal" and start the transition to a circular economy. This new development model fully transposes SDG 12, making possible the environmentally sound management of chemicals and all waste throughout the life cycle, based on reuse, repair, reconditioning and recycling of existing materials and products. What was considered "waste" can turn into a resource, especially when it comes to WEEE [5].

### **SDG 17: Partnerships for the goals**

Public, public-private and civil society partnerships are very important and necessary in the process of implementing public policies and stable priorities for efficient waste management at national level. Although there is a legal framework, it is insufficient to be able to mobilize the necessary resources to achieve the objectives set by the 2030 Agenda.

The development of sustainable collaborative partnerships is a sure tool in capacity building and attracting the necessary resources for the implementation of viable and socio-economically and environmentally sustainable projects for the Republic of Moldova.



**Chapter II**  
**Case Study**

## 2.1. Methodology

The data presented in this report were collected using the CATI (Computer Aided Telephone Interviews) method, which allows the collection of information in quantitative telephone surveys, based on clearly structured questionnaires. The sample of the study is probabilistic, stratified, random, with respect to gender and age quotas. For the reporting of data at the level of Chisinau municipality, a weighting was applied that respects the gender distribution, age according to NBS RM. The maximum sampling error is  $\pm 4.4\%$ . The study was conducted on a sample of 500 individuals and 300 legal entities, representative of Chisinau. Detailed data on the study sample are presented in Figure 3 and 4.

The aim of the study is to provide an overview of the determinants of consumer behavior and the decision to recycle, the level of knowledge on the toxicity of this waste and the danger to health and the environment, identification and justification of incentives to increase collection rates. and e-Waste recycling. The data collected and analyzed in the study provide a clear vision of the existing situation in the field of WEEE in households and companies in Chisinau, as well as the existing obstacles to collect this waste properly.

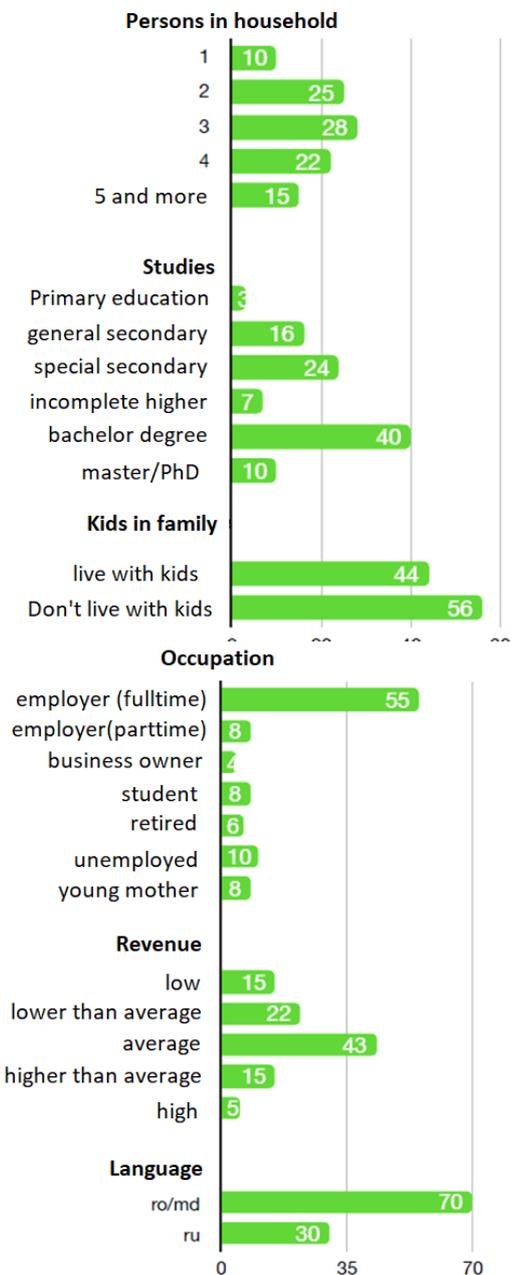


Figure 3. Sample details (individuals)

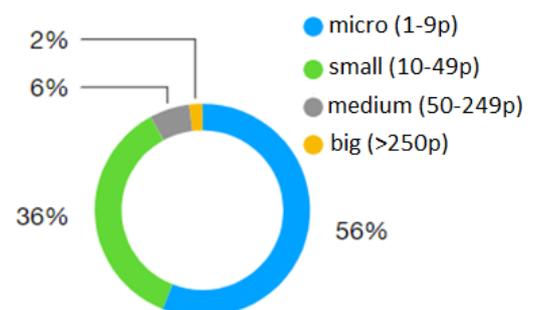


Figure 4. Sample details (legal entities)

## 2.2. Study results for individuals

### Assessment of consumption preferences and duration of use of EEE

Consumption preferences and the level of use of EEE by individuals allow the quantification of the share of the most common types of EEE in households, including the possibility of estimating the most widespread WEEE subsequently at national level. Of course, the diversity of EEEs in households is influenced by various factors, reasons for purchasing and periods of use of the equipment, until they acquire the status of e-Waste.

Thus, according to the data collected from respondents and presented in Fig. 5, it is observed that the top 5 equipment used in the household are mobile phone (91%), refrigerator (90%), washing machine (85%), TV set (84%) and landline phone (80%). Details of the answers, classified on demographic criteria are presented in table 6 (breakdown by demographic criteria).

#### Question:

What types of electronic equipment are in your household? (multiple choice)

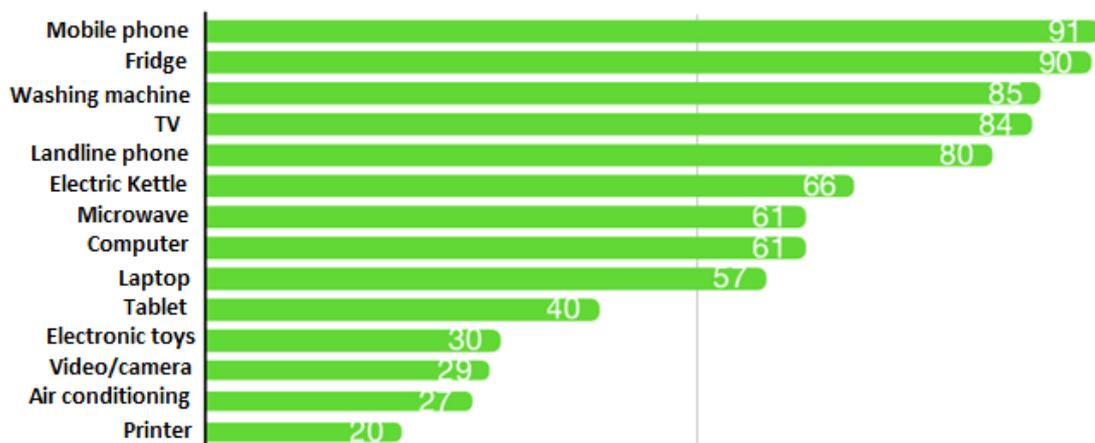


Figure 5. Uptake of EEE in the household (%)

Table 6. Breakdown by demographic criteria (%)

Detail by demographic criteria (%)	Total	Family with children	Family with NO children	Low income	Medium income	High income
Mobile Phone	91	92	91	86	95	93
Refrigerator	90	92	89	82	94	93
Washing Machine	85	87	84	76	89	89
Tv	84	88	81	76	88	85
Landline phone	80	81	79	77	81	85
Electric Kettle	66	67	65	65	67	56
Microwave	61	69	56	55	65	67
Computer	61	63	59	51	66	67
Laptop	57	57	58	44	64	63
Tablet	40	47	35	31	46	41
Electronic Toys	30	42	20	23	34	30
Video / Camera	29	31	27	17	35	37
Air conditioning	27	33	24	18	32	41
Printer	20	19	20	12	24	26

The reason for purchasing an EEE is a determining factor in the accumulation of WEEE, thus, when asked “Why are equipment and electronics purchased?”, 72% of respondents chose as a reason - “Necessity”, and another 30% the appearance of some new features. Instead, advertising proved to have a minor role, of only 4% in arguing the reason for acquiring a new EEE, according to the data presented in fig.6.

**Question**

*For what reasons are electrical and electronic equipment purchased?*

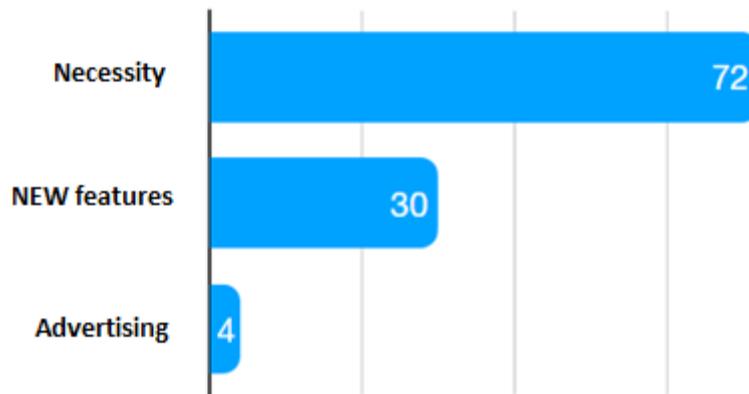


Figure 6. Reasons for purchasing new EEEs (%)

According to the data resulting from the study and presented in Fig. 7, 50% of respondents (individuals) stated that they do not purchase EEE more frequently than once every 2 years.

**Question:**

*How often do you buy electronic equipment?*

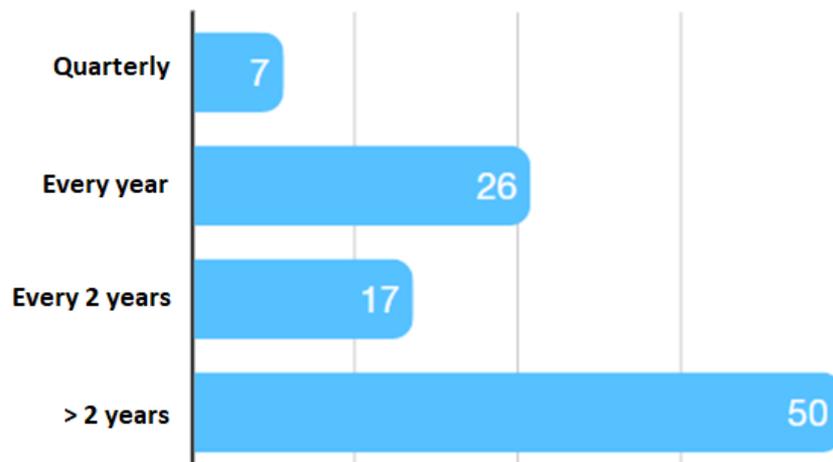


Figure 7. Frequency of purchase of new EEE (%)

The duration of use of an equipment is also an important parameter to estimate the amount of e-waste generated. This is because the more time equipment is used, the less WEEE will be generated, and vice versa, the more often the equipment is changed - the more waste will be generated.

**Question:**

What is the period of use of an electronic equipment in the household until you replace it with a new one?

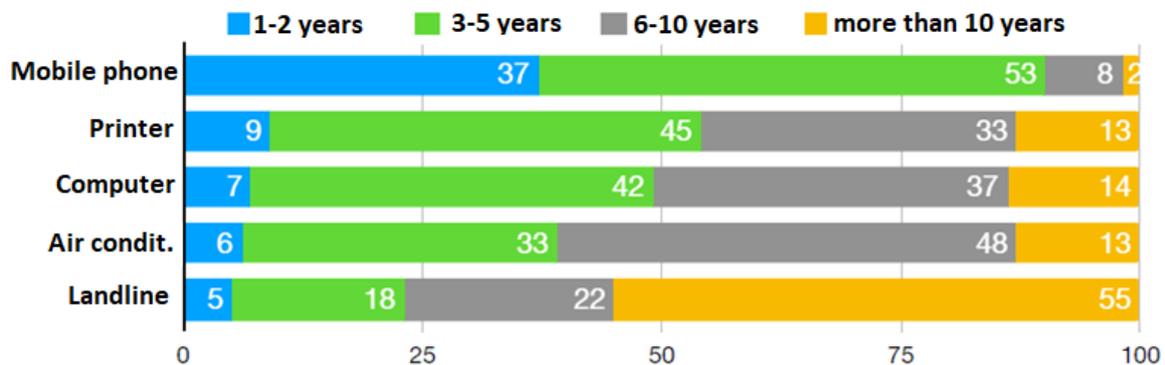


Figure 8. Using period of EEE

As can be seen in Fig. 8, the mobile phone is the equipment with the shortest period of use among individuals. Respectively, 37% of the respondents change their mobile phone once every 2 years, and 53% change it once every 5 years. Instead, the landline is the electronic equipment that has the longest period of use in the

household, 55% of respondents use it for more than 10 years. The equipment in the household is changed on average once every: 4 years for mobile phone, 7 years for printer, computer and air conditioner, 11 years for landline.

### Assessing the level of awareness of the impact of WEEE

The level of information and awareness on the consequences of irresponsible behavior in the management of generated WEEE, on the environment and health, can play a decisive role in educating correct skills in relation to the waste generated. At the level of the entire sample, 80% of respondents noted that they know that WEEE is hazardous and contains chemicals, and another 20% do NOT know this information.

**Question:**

Do you know that stored electronic equipment is dangerous and contains chemicals?



Figure 9. Awareness level on the impact of WEEE

The present study aims to assess the level of knowledge of the benefits and initiatives launched in support of the practices of reuse of used equipment. As a result, according to the data collected and presented in Fig. 10, the Internet is the most important source of information on the reuse of electronic equipment (53% of respondents), followed by TV (20%) and social networks (19%).

**Question:**

From what sources do you find out about the selective collection of electronic equipment?

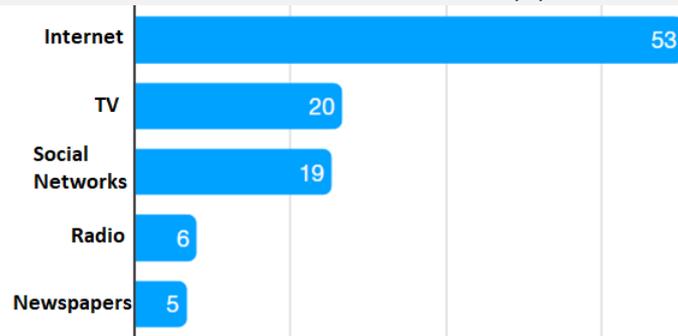


Figure 10. Sources of information to reuse EEE

At the same time, as shown in Fig. 11, 30% of respondents are informed about initiatives launched in Chisinau for selective collection of WEEE, like "Clean city with recycled e-Waste" and another 70% does not know such information, data that confirms the need to expand the actions and projects implemented in this field.

**Question:**

Do you know of any initiatives regarding the selective collection of WEEE?



Figure 11. Knowledge of initiatives on selective collection of WEEE (%)

At the same time, the study data according to Fig. 12, shows a low level of knowledge of the Map of e-Waste collection points (7% of respondents) compared to another 93% who do not know about the existence of this map. However, it should be noted that since its launch, it has been accessed more than 33,000 times.

**Question:**

Find out about the Map of electrical and electronic waste collection points?  
Did you access the Map in the last 12 months?

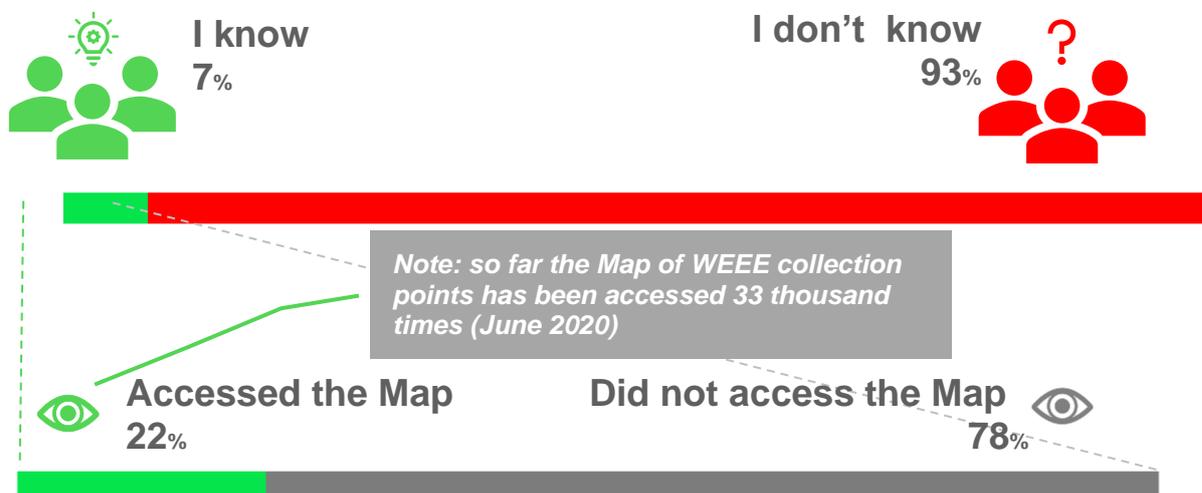


Figure 12. Knowledge and access to "Map of WEEE collection points"

At the same time, the answer to the question addressed to individuals when they have questions regarding the correct management of WEEE, confirms an important role of civil society and the projects launched by them in informing the population. According to the data collected from respondents and presented in Fig. 13, 44% trust civil society, followed by another 35% who turn to Environmental Protection Inspectorate (IPM), 30% to the Environment Agency and 6% to the Ministry.

**Question:**

*Please assess If you have questions about electronic equipment waste (e.g. what to do with electrical and electronic waste), what actions do you take? Do you ask ...?*



Figure 13. Where do people address questions about WEEE

Although at first glance the data of the study reveal a large share of people in Chisinau apparently informed about the impact and danger of irresponsible behavior in relation to WEEE generated, then less optimistic are the results on the methods used in their management. Respectively, as shown in Fig.14, we have 38% of respondents who for various reasons ignore the consequences on environmental and health pollution in case of long-term storage of this waste in the household and other 18 % who practice e-waste landfilling together with other types of waste. In contrast, we have another 44% of respondents who apply more options considered to be correct in relation to the generated WEEE (22% of respondents prefer to donate WEEE if they are still functional, 7% throw this waste in specialized dumpsters, 6% - offer to specialized recyclers, 5% store them in specially designed places and 4% practice the sale of WEEE).

**Question:**

*If the equipment is obsolete or is already a waste, what actions do you take (within the household)?*

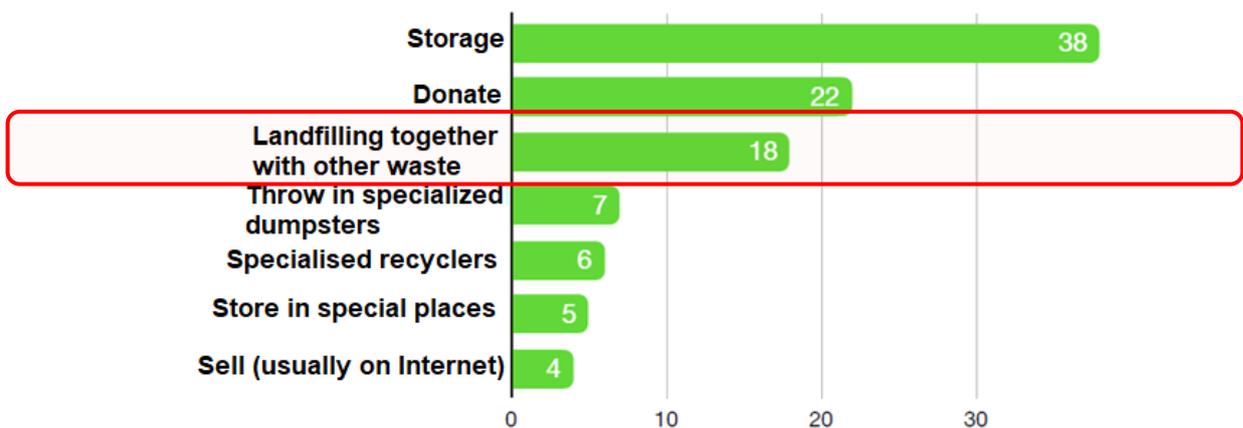


Figure 14. Generated WEEE management practices (%)

**Question:**

If you will be informed **TRANSPARENTLY** about the correct and adequate collection and recycling of electrical and electronic waste, for example, by the recycler or state institutions, would you agree to pay (a fee, not too high) for WEEE collection?

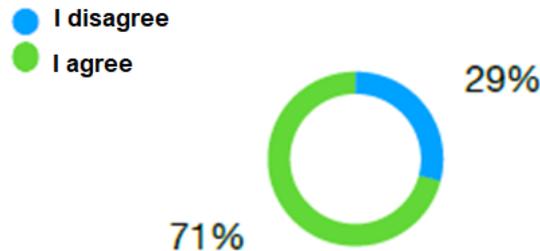


Figure 15. The share of households willing to pay a fee for **WEEE** collection

It should be noted that through this study and the data collected from respondents, we also identified the willingness of the population to pay a fee for WEEE disposal. Respectively, 71% of respondents agree to pay for these services compared to another 29% do not agree to pay. Of course, this decision is directly conditioned by the transparency and correctness of the methodology for calculating these tariffs by the competent bodies in the field and the transparency regarding the correct and adequate collection and recycling of electrical and electronic waste.

### Identify obstacles for WEEE collection

Given the high share of respondents who do not apply the correct rules for the management of WEEE generated, the study also presents obstacles encountered by them. Respectively, the biggest obstacles in the WEEE collection process are insufficient information on their collection and recycling, insufficient infrastructure for e-waste collection, as well as too few e-waste collectors and recyclers.

**Question:**

From your point of view, how do you think - what are the obstacles for collecting WEEE?

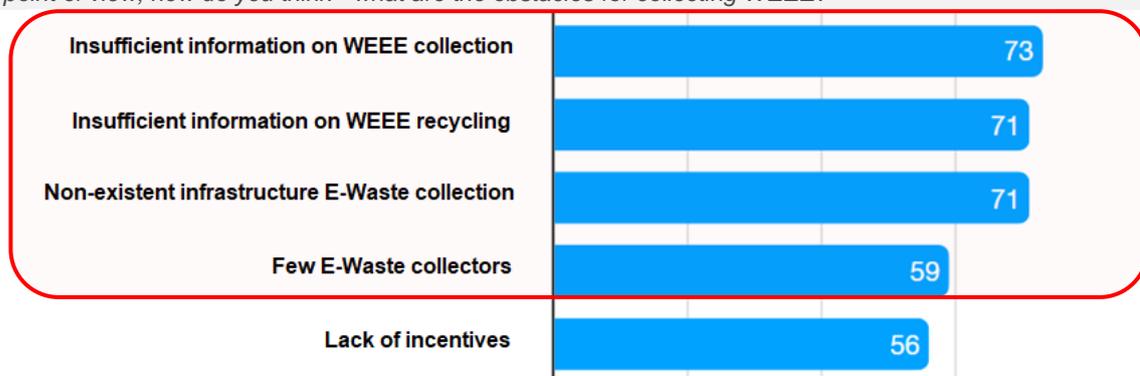


Figure 16. Obstacles for e-Waste collection (individuals)

Given the listed obstacles, the actions selected by the population to stimulate the selective collection of e-Waste, according to the results presented in Fig. 17 are related to the multiplication of information and awareness actions (73% of respondents), **the creation of several collection points**

(64 %), the role and number of recyclers who would take over the accumulated electronic waste upon request (61%), but also the applicability of economic incentives (56%).

**Question.**

*What should be done to facilitate / stimulate the collection of electrical and electronic waste?*



Figure 17. **Actions needed to stimulate WEEE collection (%)**

The correct management of e-Waste is a complex process, which involves the active participation of all actors present on the e-Waste market (state, economic agents producing / importing WEEE, operators authorized to collect and recycle this waste, population procuring and using EEE, etc.). However, a special role belongs to the representatives of the competent authorities in the field, who must be the main promoters of a circular consumption model, pushing all actors towards creating the conditions and regulations necessary to increase the rates of selective collection and recycling of WEEE. In this respect, the data of the study present a very low credibility and appreciation of the population in relation to the result of the actions undertaken by the public authorities in the field of WEEE management, fig. 18.

**Questions:**

*Please evaluate from 1 to 5 to what extent the state takes enough action on the recycling of waste electronic equipment, where 1 - not enough action is taken, 5 - enough action is taken?*

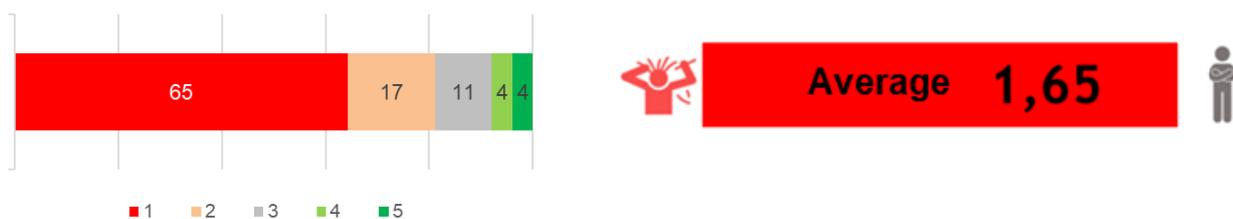


Figure 18. **Assessment of actions taken by competent public authorities in the field of WEEE (individuals)**

## 2.3. Study results for legal entities

### Assessment of consumption preferences and the level of use of EEE

The usage preferences of EEE and the duration of use for legal entities differ from the results recorded for individuals. These being the reasons why this study included 2 different samples.

Thus, according to the data presented in Fig.19, it is observed that the top 5 equipments used within the companies are computer/laptop (93%), printer (81%), mobile phone (74%), landline phone (69%) and air conditioner (67 %).

**Question:**

*What types of electronic equipment are in your company? (multiple choice)*

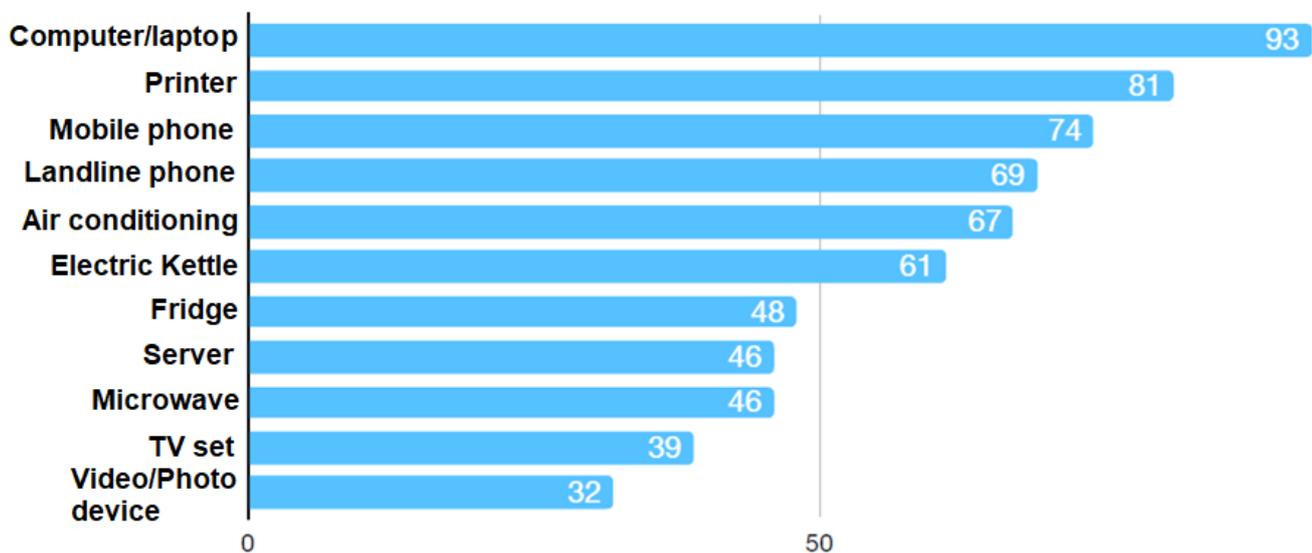


Figure 19. Electrical and electronic equipment used (%)

The reason for the purchase is also a determining factor, thus, to the question "For what reasons are equipment and electronics purchased?" we notice that the equipment is purchased primarily for necessity (over 77% of

legal respondents), and the second reason is the emergence of equipment that has new features (18%). As in the case of individuals, advertising has a low share in decision-making (6%).

**Question:**

*For what reasons equipment and electronics are purchased?*

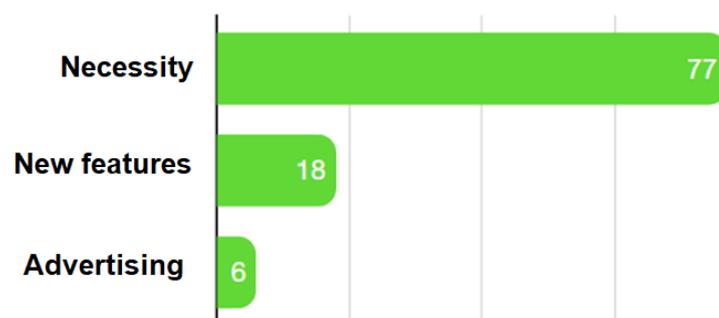


Figure 20. Reasons for purchasing EEE - legal entities (%)

As in the case of individuals, legal entities (59%), according to the results presented in Fig. 21, purchase new EEEs less frequently than once every 2 years.

**Question:**  
How often do you buy electronic equipment?

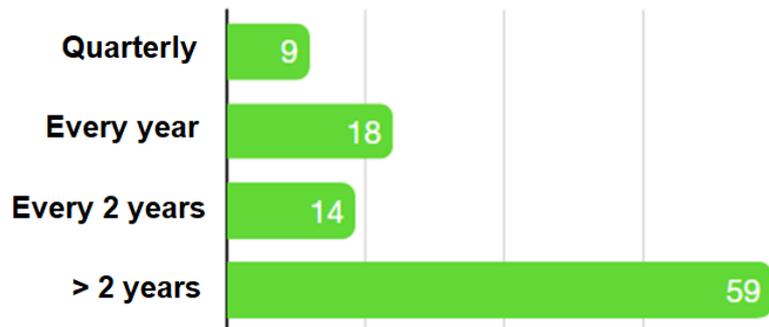


Figure 21. Periodicity of acquisition of EEE - legal entities (%)

Another important indicator analyzed in this study is the duration of use of an EEE, in order to be able to estimate how quickly it can turn into waste. As shown in Fig. 22, the mobile phone is also the most frequently replaced equipment by legal entities. Most respondents in companies noticed that most often (once every 2 years)

they change their mobile phone - 27%, and 54% change it once every 5 years.

As in the case of households, the landline phone is used the most in companies, almost half of the companies (49%) use this type of equipment for more than 10 years.

**Question:**  
What is the period of use of electronic equipment in the company until you replace it with a new one?

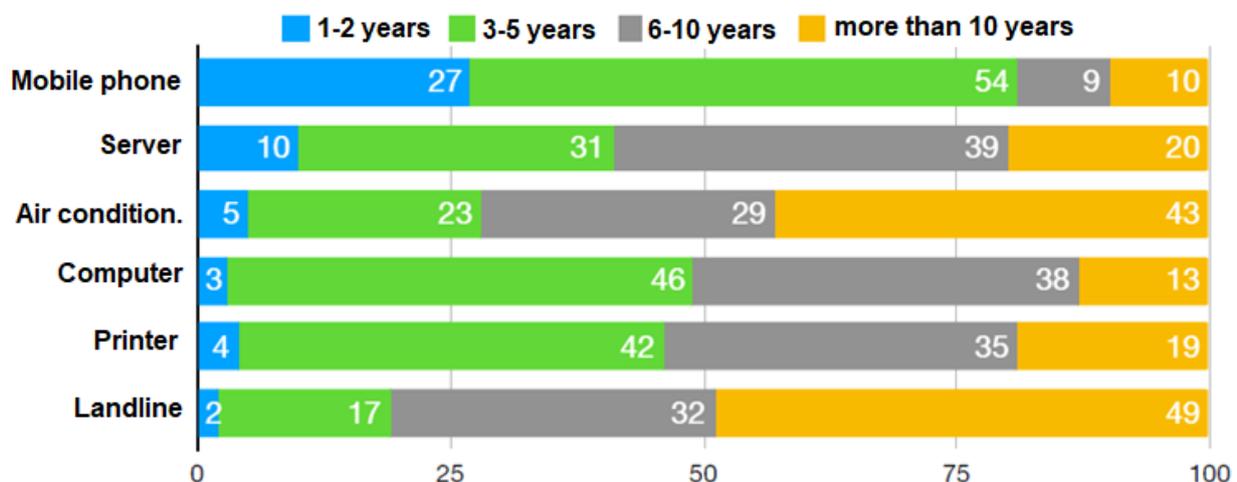


Figure 22. Period of use of EEE (legal entities)

Thus, the equipment in the company is changed on average once every: 5 years for mobile phone, 7 years for computer, printer and server, 10 years for air conditioner and 11 years for landline.

## Assessment of awareness level of the WEEE impact

The level of information that WEEE is hazardous is very important and may or may not motivate companies to take fair and eco-responsible action in organizing the management of this waste at the institutional level. This study also aimed to assess the level of information of companies in Chisinau on how to collect and dispose of generated WEEE. At the level of the entire sample, 82% of companies confirmed that they know that WEEE is hazardous and contains chemicals harmful to the environment and health, unlike another 18% who do NOT know this information, according to data shown in Fig. 23 (we notice that in companies the level of awareness is 2 p.p. higher than in the case of population).

### Question:

*Do you know that stored electronic equipment is dangerous and contains chemicals?*



Figure 23. Knowledge level about the danger of WEEE

The most important source of information on the reuse of electronic equipment remains the Internet (56%), about which more than half of the companies mentioned.

### Question:

*From what sources do you find out about the reuse of electronic equipment ?*

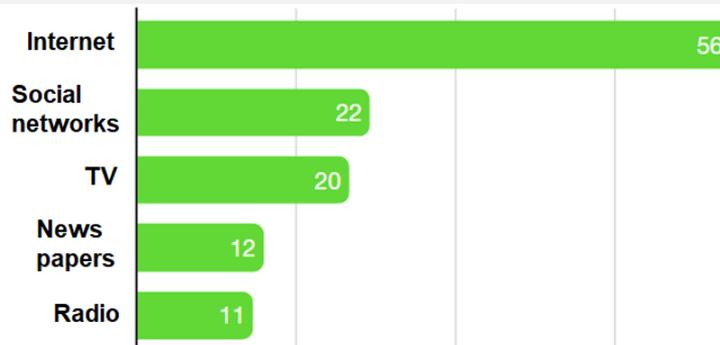


Figure 24. Sources of information on EEE reuse

As shown in Fig. 25, 33% of respondents are informed about initiatives launched in Chisinau for selective collection of WEEE, like "Clean city with recycled e-Waste" and another 67% do not possess such information, data that confirm the need to expand the actions and projects implemented in this field.

### Question:

*Do you know about initiatives to selectively collect WEEE?*



Figure 25. Knowledge of selective WEEE collection initiatives (%)

To the question **Do you know about the Map of electrical and electronic waste collection points**, **11% of respondents answered that they know about the Map, and 89% do NOT know about the Map**. Here we notice that the level of knowledge by companies is higher (by 4 p.p) than among the population, this is because companies are responsible by normative acts to properly collect waste, including WEEE.

**Question:**

*Do you know about the Map of electrical and electronic waste collection points?  
Have you accessed the Map in the last 12 months?*

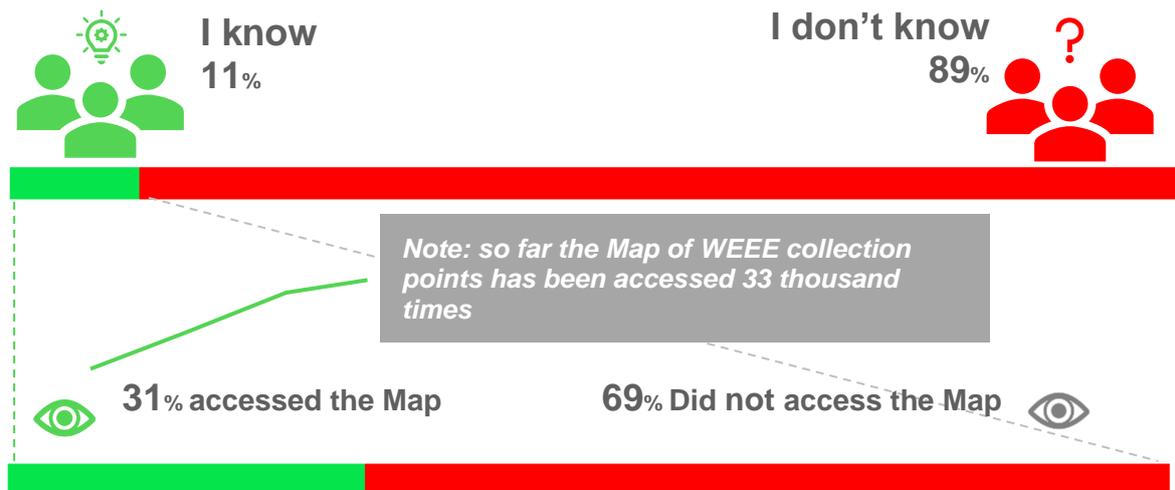


Figure 26. Knowledge and Accessing the Map of WEEE collection points

Unlike individuals, who interact more actively with civil society to find out more information and consultations in the management of WEEE, legal entities turn to the competent bodies in this case the Environment Agency (47%), to receive consultations and answers to questions regarding WEEE management. Another 39% of respondents address the Environmental Protection Inspectorate, 32% the civil society and 11% the branch ministry.

**Question:**

*Please assess if you have questions about electronic equipment waste (e.g. what to do with WEEE), what actions do you take? Are you asking ...?*



Figure 27. Where do companies turn if they have questions about WEEE

**Question:**

*If an equipment is obsolete or already waste, what actions do you take (within the company)?*

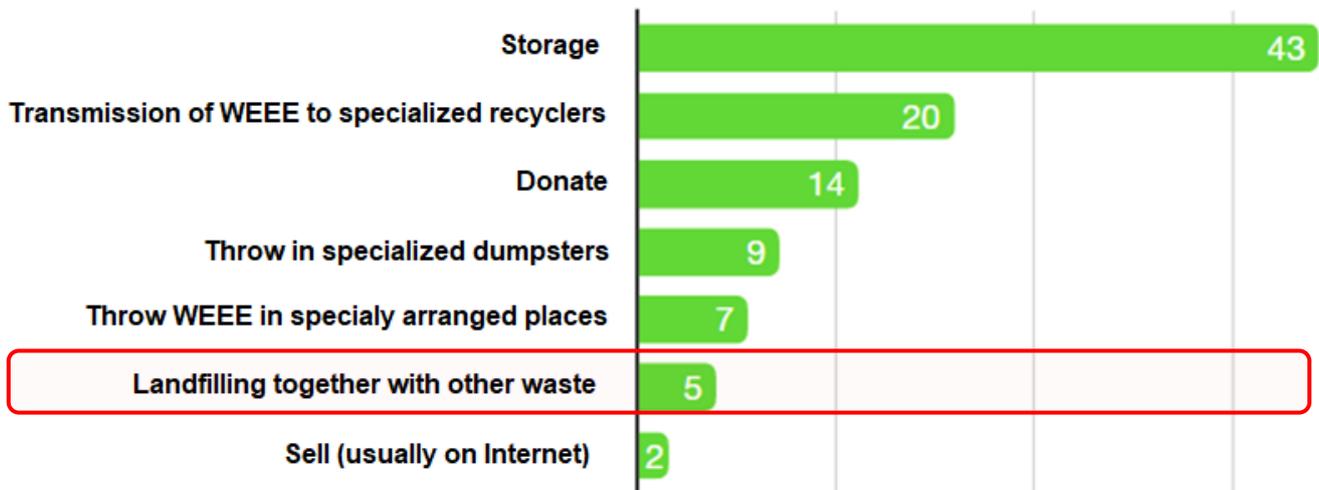


Figure 28. Actions on obsolete EEE or waste - in the company

In the case of both legal entities and individuals surveyed for this study, there are a high level of awareness regarding the impact of WEEE on environmental pollution and health damage. However, the study confirms for both categories of respondents that there are a very low share of persons (individual or legal) who practice the transmission of WEEE to specialized recyclers or storage in specially designed places, compared to their long-term storage in household or office. Respectively, as shown in Fig. 28, only 9% of the respondents throw the WEEE in specialized places, another 20% give them to the specialized recyclers. Instead, just 43% of respondents prefer to keep this waste for a long time, and another 5% landfilling the WEEE together with other waste. The registered data actually confirm an undeveloped infrastructure at municipal level, including a low presence of specialized recyclers on the e-Waste market in the Republic of Moldova.

**Question:**

*If you have been informed TRANSPARENTLY about the correct and proper collection and recycling of electrical and electronic waste, for example by the recycler or state institutions, you would agree to pay (a not too high fee) for the collection of WEEE ?*

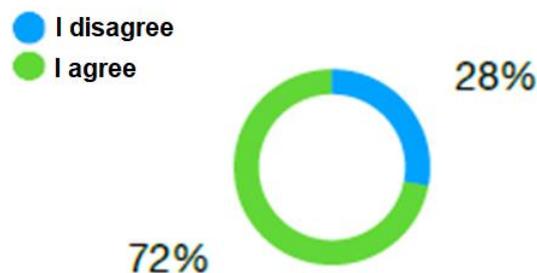


Figure 29. Collection fee payment agreement

Taking into account the high costs related to the organization of the necessary WEEE collection infrastructure, including supporting the process of collection, transportation, treatment, recovery, etc., through the study we identified a large share of (72%) legal respondents who agree to pay a fee for the collection of WEEE, as shown in Fig. 29. Of course, that decision is directly conditional on the transparency and correctness of the methodology for calculating those charges by the competent bodies in the field, and transparency on the correct and appropriate collection and recycling of electrical and electronic waste.

## Identify obstacles for WEEE collection

The biggest obstacles encountered by legal entities in the correct organization of the selective collection processes of WEEE are conditioned by insufficient information on the collection and recycling of this waste (71% and 66% of respondents, respectively), insufficient collection points of these waste (55% of respondents), too few authorized collectors / recyclers active on the e-Waste market (44%), but also the lack of incentives for WEEE collected selectively and handed over to recyclers (44%). It should be noted that economic incentives (eg bonuses, reductions, prizes, etc.) are considered globally effective tools in increasing WEEE collection and recycling rates.

**Question:**

“ From your point of view, how do you think - what are the obstacles to WEEE collection?”

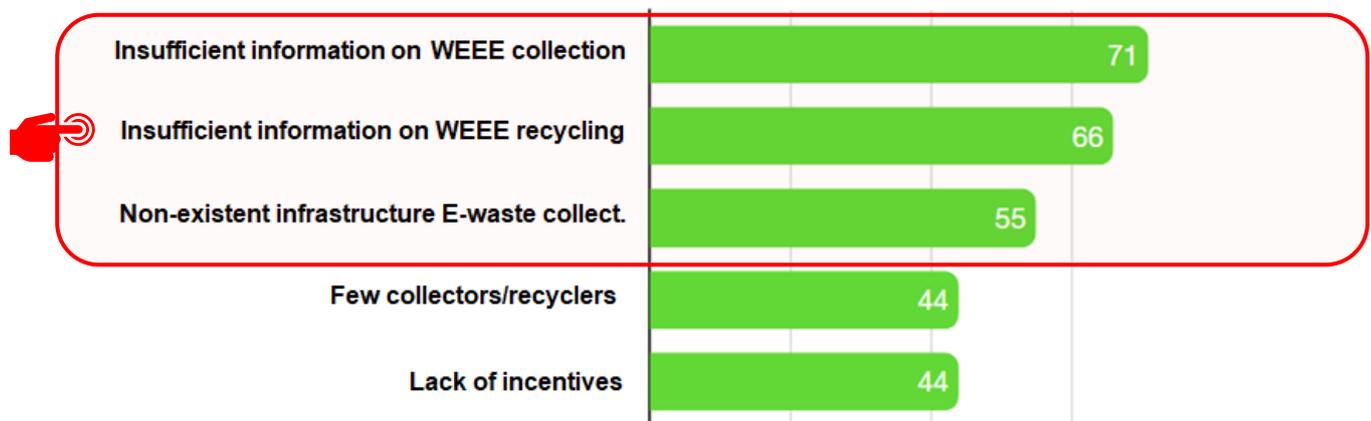


Figure 30. **Obstacles to WEEE collection (legal entities)**

Based on the listed obstacles, respondents identified a few actions needed to facilitate and stimulate the process of selective collection of WEEE and their proper delivery to authorized recyclers in the field. Respectively, as shown in Fig. 31, the most important action in this process is the creation and development of a municipal / national infrastructure for selective collection of WEEE (60%), followed by the multiplication and promotion of information and awareness campaigns (57%), the existence of several recyclers on market that operates transparently and according to the legal provisions in the field (46%). At the same time, some respondents noted the role of economic incentives in increasing their availability to selectively collect and deliver used equipment, especially in the case of WEEE with a high value content such as mobile phones, printed circuit boards, laptops, etc.

**Question:**

What should be done to facilitate / stimulate the collection of electrical and electronic waste?



Figure 31. **Actions required for WEEE collection - in the company**

Despite an existing legal framework in the field of WEEE management, both individuals and legal entities face many difficulties in organizing the process of waste management. Even worse, there is very little credibility on the part of legal persons as in the case of individual persons in relation to the actions and involvement of the competent authorities in the field. As shown in Fig. 32, 67% of respondents, legal entities assessed with a score of 1.55 out of a total of 5, the role of actions taken by the state in the field concerned.

**Question:**

Please assess from 1 to 5 to what extent the state takes enough action on the recycling of electronic equipment waste, where 1 - not enough action is taken, 5 - enough action is taken?



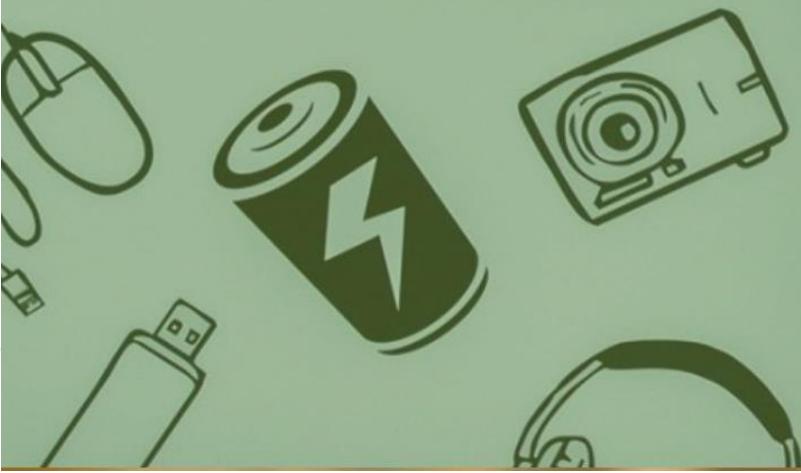
Figure 32. Assessment of actions taken by competent public authorities in the field of WEEE (legal entities)



**Chapter III**  
**Clean city**  
**with recycled**  
**e-Waste**



**REDUCE**



## 3.1. About the project

**T**he project “Clean city with recycled e-Waste— Recycle today for your health tomorrow” was launched at the end of 2018 by A.O. “Association for Waste Recovery” with the support of the Small Grants Program GEF SGP Moldova, implemented by UNDP and in partnership with MoldRec. The project aims to create the minimum infrastructure necessary for the proper collection of e-Waste in Chisinau and take over this model for later implementation at the national level, including the formation and education of an ecological and sustainable behavior among the population. **The objectives** of the project are in direct liason to the objectives provided in the National Waste Management Strategy for the period 2013-2027, Law no. 209 on Waste, WEEE Regulation, UN Sustainable Development Goals 2030, Moldova Association Agreement with the European Union, Chapter 16 on waste management, implementation of progressive methods of waste collection, recycling, recovery and storage. During the project implementation, 128 specialized dumpsters were placed inside 115 private sector institutions (including several of their subsidiaries), public, academic and civil society:

- **32 public institutions**, NGOs encouraged to adopt sustainable and environmentally friendly practices in its activity, correctly collecting and sorting e-Waste in offices.
- **13 economic agents** (Maximum, Fourchette, BEMOL, Linella, etc.), waste producers, which apply in its activity the principle of Extended Producer Responsibility and the provisions of the Regulation on waste management of electrical and electronic equipment.
- **70 educational institutions** and over 70 thousand students and teachers, who know the danger of e-Waste on the environment and health and have specialized dumpsters for their correct collection.

Altogether, over 50 tons of e-Waste have already been collected, systematically taken over upon request by the authorized operator Moldrec and exported to GreenWEEE Buzau for recycling. Other operators authorized to collect and recycle waste will be invited to be part of this project, in order to ensure its sustainability and expansion at national level as well.



## 3.2. Map of collection points

Once the minimum infrastructure necessary for e-Waste collection in Chisinau has been created by placing specialized medium and large dumpsters, The Association for Waste Recovery has also developed a Map of collection points. Since the launch of the map, it has registered over 33 thousand views (*June 2020*) and is appreciated as useful and informative for selecting the nearest point where a dumpster is located suitable for the selective collection of WEEE.

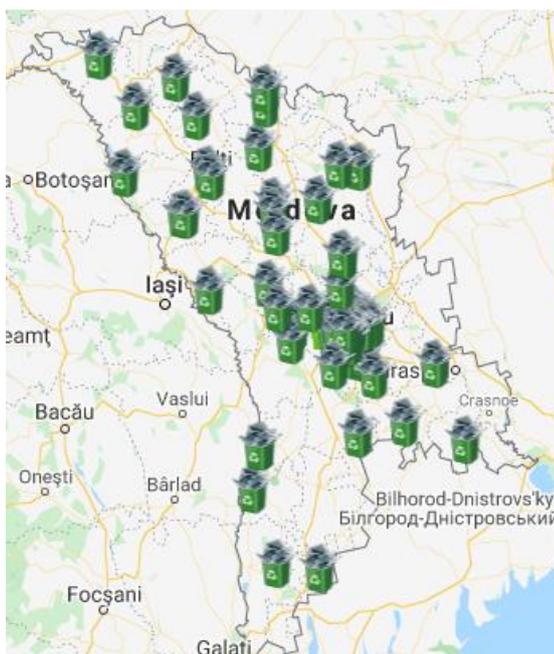
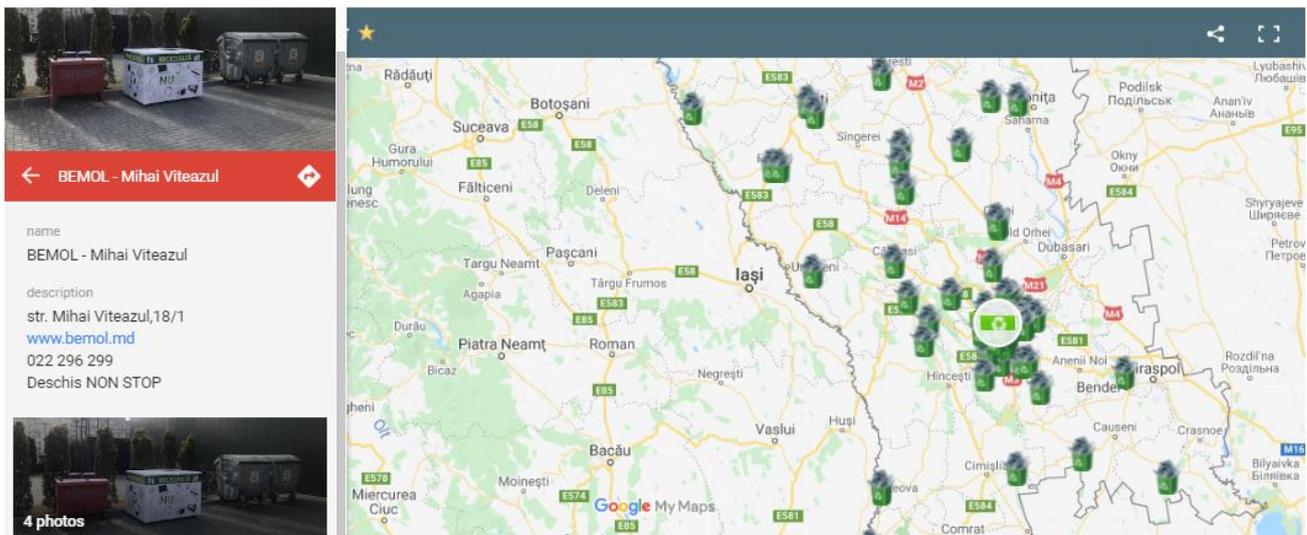


Figure 34. Map view - nationwide

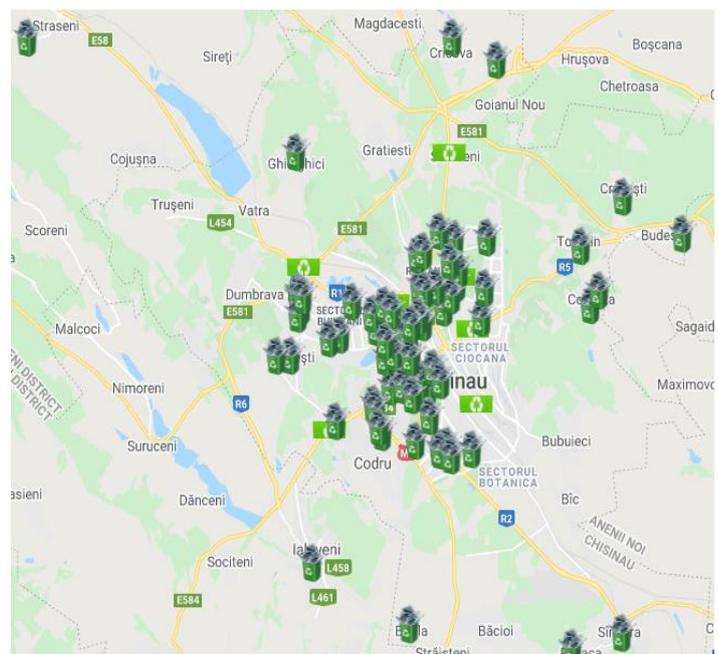
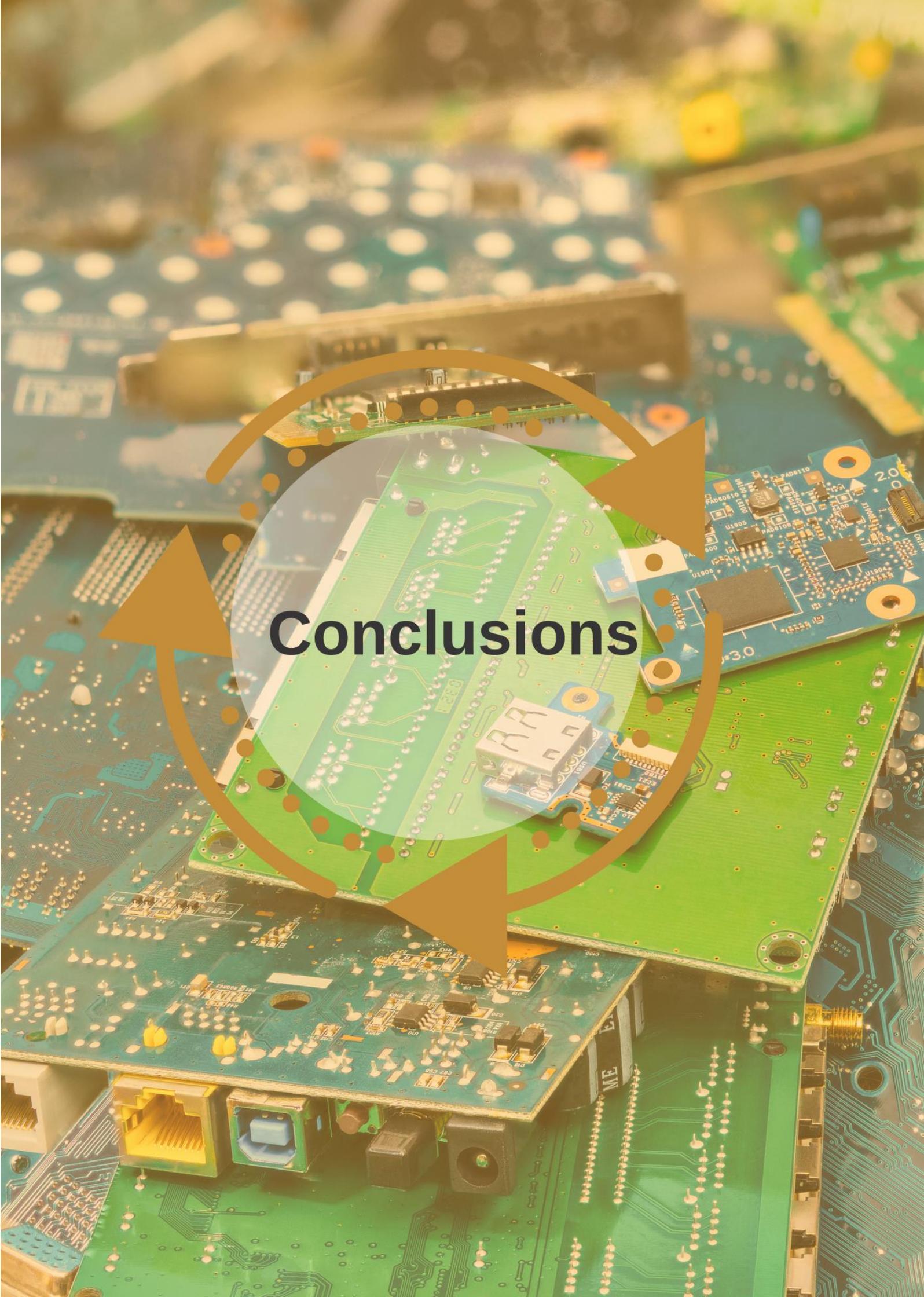


Figure 35. Map view - municipal level



**Conclusions**

## Conclusions

The results of the study present a series of important and general aspects regarding the mechanism of generation and management of e-Waste by individuals and legal entities in Chisinau municipality. The most important thing to mention is that despite a large share of respondents who know the impact of WEEE on the environment and health, for various reasons do not practice the selective collection and delivery of this waste to authorized recyclers. Therefore, each of the groups covered by this study continues to keep their electronic waste in households, offices, specially designed spaces, including disposal with other waste.

Respectively, in order to identify the most efficient mechanisms that would boost the e-Waste market in the Republic of Moldova by increasing the selective collection rates and reducing the quantities of WEEE reached to landfills, first of all through this study, was analyzed the data collected from respondents and so elucidated the main determinants of consumer behavior, as presented:

- Lack of a functional WEEE management system, despite an existing legal framework. Although apparently the responsibilities of each actor involved are outlined and defined, the applicability and control are not ensured, with the liability of those who do not comply with the legal provisions;
- There is no good collaboration and open communication between the central authority, local authorities, sanitizers, collectors, recyclers and the business environment;
- Insufficient infrastructure for the selective collection of all types of e-Waste and total reluctance on the part of economic agents, e-Waste producers, to respect the principle of extended producer responsibility (EPR). As an example, starting with September, 2016, according to the WEEE Regulation, all distributors of EEE operating in commercial units with a commercial area of more than 200m<sup>2</sup>, had to ensure the free takeover in its immediate vicinity of WEEE of small size, without the obligation to buy EEE of a similar type and to make available to buyers a collection container in a visible place in the sales area. Nowadays, we have very few economic agents such as Maximum, Orange Moldova, Riolit Sistem, which honors these obligations, but not the others;
- Lack of municipal points for temporary collection of WEEE, accessible to the population;
- Very few authorized operators / recyclers active on the e-Waste market, involved in collection, treatment, recovery, etc. of used EEE. Unfortunately, their presence is not well known to the population, and the presence on the e-Waste market in Moldova is not transparent;
- Lack of economic incentives to increase the share of e-Waste quantities collected selectively and handed over to authorized operators;
- Lack of statistical data collected and organized by types of WEEE generated;
- Lack of environmental managers in institutions (public / private), who know how to organize the proper management of this waste at the institutional level;
- Too few projects and initiatives in the field of selective collection and recycling of e-Waste;
- Reduced communication and information capacities both by the competent authorities and by the mass media;
- Poor assessment of the actions taken by the public authorities responsible for WEEE management.

## Recommendations

Based on the conclusions of the Study, we come with a series of proposals and recommendations addressed to the main actors of the e-Waste market in the Republic of Moldova, in order to improve the current WEEE management mechanism at national level and to reduce the growing pressure of irrational production and consumption on resources, the environment and the planet.



### Proposals for the Government, the central environmental body and its subordinate administrative authorities:

- Develop and approve the National E-Waste Management Policy in order to reduce the impact of WEEE on the environment and health, thus ensuring the transposition of sustainable development objectives according to the 2030 Agenda;
- Strengthen existing environmental policy instruments and extend them through new and innovative approaches to legislation and decision-making;
- Make full use of public resources by the Government to support investment in innovation, make sustainable purchases and support the sectors, producers, recyclers directly involved in the management of this extremely hazardous waste and ensure environmental sustainability;
- Organizing public consultations to see what are the obstacles in infrastructure development (they can be administrative, legislative, organizational, social or economic);
- Strict monitoring of the process of implementation and execution of legal provisions, with accountability of those who do not comply with legal provisions;
- Revision of the current model of implementation of EPR (Extended Producer Responsibility) schemes. Although in the Republic of Moldova these schemes cover a wide range of products, for the time they remain inefficient, due to the fact that the fees charged from producers / importers of EEE are not sufficient to cover the costs of collection, treatment and recycling;
- Proximity amendment of the WEEE Regulation Annex 1A to transpose the new WEEE categories (from 10 categories / EU10 to 6 categories / EU6 - which are representative of the waste collection flows in practice), thus ensuring the comparability of statistical data in the future Moldova with other international reports (eg EU and ITU (ITU));
- **Organization of national statistics on WEEE (lack of information). The lack of accurate and well-organized statistics is a major impediment to decision-making and proper monitoring of the e-Waste market;**
- Creating competitive conditions for the development of national infrastructure, in particular to have as many e-Waste recyclers as possible (according to European / international best practices);
- Promoting the creation of dismantling facilities, municipal / district collection centers and e-waste collection points, in order to ensure the correct collection, transport, dismantling, disposal and recycling of e-waste properly;
- Promoting the principle of WEEE repair by disseminating information and creating joint with LPA the repair centers in all districts of the country (not only Chisinau). In this sense, the collaboration of LPA with the professional schools (vocational) must be supported;
- **Revitalize communication and information capacities** in order to maintain public confidence in the competent public authorities, including credibility with foreign partners and potential investors in the field. At present, none of the public authorities' web pages present usefully structured and constantly updated information on the proper management of WEEE (including other types of waste).



### Proposals for LPAs (local public authorities):

- Elaboration of local WEEE management plans / programs in the locality;
- Correct evidence of data on WEEE generated;
- Creation of municipal / district points for the collection / repair of WEEE, accessible to the population to repair the EEE and to hand over the WEEE free of charge;
- Applying to external funds to financially support sustainable local projects in the field of increasing the selective collection rates of WEEE among the population;
- Active involvement of the community in information and selective collection of WEEE.



### Proposals for waste producers (producer, importer, exporter or seller of EEE):

- Establish an active dialogue with representatives of central authorities, local authorities, sanitizers, operators authorized for the collection and recycling of WEEE;
- Assuming extended responsibilities of the manufacturer and implementing the responsibilities reflected in the legal framework (eg registration on the portal <https://siamd.gov.md>, monthly records and reporting of waste generated, creation of collection points in stores and informing consumers about the possibility of returning equipment used, etc.);
- Establishment of public-private partnerships (PPP), which would facilitate the creation of temporary WEEE collection centers of all sizes until their subsequent delivery to authorized operators;
- Association with projects already initiated, to which companies can contribute significantly both through financial involvement and through the human resources at their disposal;
- To carry out educational and information / awareness programs regarding the collection and treatment of products that have become waste;
- Implementation of Trade-in schemes for the purchase of new equipment;
- Production of environmentally friendly equipment - at all stages of equipment creation (equipment design and production).



### Proposals for consumers:

- Assessment of the need to purchase new electronic equipment at the acquisition stage. The correct decisions will avoid the accumulation of WEEE in the household or office, and in the longer term, reach to the landfill;
- Information and awareness on the risks caused by WEEE on health, caused by long-term storage in the household and institutions of e-Waste accumulated historically over 5-10 years in landfills, storage and drawers;
- Separate collection of e-Waste and their placement only in specialized dumpsters or direct transport to authorized operators for their collection and recycling;
- Knowledge of the right to return free electrical and electronic devices of small size to EEE distributors operating in commercial units with a commercial area of more than 200m<sup>2</sup>, without the obligation to buy EEE of a similar type;
- Reducing the amount of WEEE generated by applying eco-responsible skills (eg repairing used waste or renovating functional waste, purchasing environmentally friendly equipment, selling or donating functional equipment, etc.). An example would be the video guide [10 Recommendations to Reduce the amount of WEEE](#)

Finally, by conducting this **Study on the generation and management of e-Waste in Chisinau municipality** and based on the data analyzed, it is more than obvious that the efficient management of WEEE in Chisinau, but also at national level, it depends on educating eco-responsible behavior on the part of WEEE generators and creating the necessary premises (eg infrastructure, economic incentives, policies and regulations, etc.), which would facilitate the process of selective collection from the source of this extremely hazardous waste, directly influencing the decision to hand them over to authorized operators to the detriment of the decision to keep them on a long-term basis or even worse storage in a mixture with other waste.

Based on the above, but also in order to achieve several objectives of the 2030 Agenda, it is absolutely necessary to start the transition to a circular economy, recognizing from the start the value of e-Waste (resources) that we throw in the landfill. Namely through the correct management of this waste by all the actors involved in these processes, we have the solution for a better quality of life, with safe jobs and a clean environment.



## Bibliography

1. Prisecaru, M., About the recycling of electrical and electronic waste. website: Social responsibility, available online at : <http://www.responsabilitatesociala.ro/editoriale/despre-reciclarea-deseurilor-electrice-si-electronice.html>, accesat în ianuarie 2016
2. The circular economy and the field of electrical and electronic components, Corina Ortan, Alina-Oana Ciomos, Oana-Adriana Pavel, Elena-Simina Iakatos
3. The Global E-waste Monitor 2017. Quantities, Flows, and Resources, articol disponibil online la adresa: <https://www.itu.int/en/ITU-D/Climate-Change/Documents/GEM%202017/Global-E-waste%20Monitor%202017%20.pdf>
4. CE. Circular economy - The way to a Circular Economy, 2014, available online at: [http://ec.europa.eu/environment/news/efe/articles/2014/08/article\\_20140806\\_01\\_ro.htm](http://ec.europa.eu/environment/news/efe/articles/2014/08/article_20140806_01_ro.htm), accesat în ianuarie 2016
5. A New Circular Vision for Electronics, Time for a Global Reboot, available online at: <https://www.weforum.org/reports/a-new-circular-vision-for-electronics-time-for-a-global-reboot>
6. The Global E-waste Statistics Partnership (GESp), Moldova, available online at: <https://globalewaste.org/countrystatistics/republic-of-moldova-2016/>
7. Anuarul IPM - 2018 „Protecția mediului în Republica Moldova”, disponibil online la adresa: <http://ies.gov.md/wp-content/uploads/2019/04/04.08-ANUARUL-IPM-2018.pdf>
8. Natural resources and environment in the Republic of Moldova, available online at: [https://statistica.gov.md/public/files/publicatii\\_electronice/Mediu/Resurse\\_naturale\\_2019.pdf](https://statistica.gov.md/public/files/publicatii_electronice/Mediu/Resurse_naturale_2019.pdf)