



# NATIONAL REVIEW OF THE CURRENT SITUATION ON ELECTRONIC WASTE IN THE REPUBLIC OF UZBEKISTAN





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## Abbreviations

<b>SUE</b>	– State Unitary Enterprise
<b>NNO</b>	– Non-governmental non-profit organization
<b>LLP</b>	– Limited liability company
<b>EPR</b>	– Extended producer responsibility
<b>MSW</b>	– Municipal solid waste
<b>WEEE</b>	– Waste of electronic and electrical equipment
<b>EEE</b>	– Electronic and electrical equipment
<b>CIS</b>	– Commonwealth of Independent States
<b>ITU</b>	– International Telecommunication Union
<b>UNEP</b>	– United Nations Environment Programme



## Introduction

Technical progress leads to a rapid increase in the waste of electronic and electrical equipment. In 2019, a record amount of waste of electronic and electrical equipment was produced in the world – 53.6 million tons, which is, on average, 7.3 kg per capita.

At the same time, according to official data, 17.4% (9.3 million tons) of electronic waste from the total volume of waste produced was collected and recycled.

In the CIS countries and Georgia, 2.5 million tons of waste of electronic and electrical equipment (hereinafter referred to as WEEE) were generated in 2019, which is 50% higher than in 2010. The level of collection and recycling of WEEE in the countries amounted to 79 thousand tons (3.2%) of the generated waste.

The Republic of Uzbekistan belongs to the countries in which there is no effective system of collection and processing of WEEE.

Despite the fact that in recent years some analysis attempts have been made and individual projects and initiatives related to WEEE in Uzbekistan have been implemented, there is still a lack of assessment of ways to handle WEEE and analysis of the situation with electronic waste in the country.

Thus, the purpose of this report is to review the current situation on the management of WEEE in Uzbekistan from the point of view of the various stages of the waste life cycle and the stakeholders involved.

The review was prepared within the framework of the ITU-UNEP project "Implementation of the concept of EPR in policies and regulations for the rational management of electronic waste". The



## Methodology

This review presents an analysis of the WEEE management system in the Republic of Uzbekistan, including various processes of the WEEE life cycle and various stakeholders.

Two approaches have been adopted to evaluate the existing system of dealing with WEEE and to prepare this review:

1. Analysis of available information, including international studies of the United Nations Educational and Research Institute (UNITAR) "Regional monitoring of electronic waste CIS + Georgia", the results of the project "Conducting an initial assessment of electronic waste management systems in Uzbekistan", implemented in 2021 with the support of UNEP, official statistical information.
2. Conducting online and offline consultations with electronics manufacturers in the Republic of Uzbekistan, representatives of associations, higher educational institutions, the non-governmental sector, the State Committee of the Republic of Uzbekistan on Ecology and Environmental Protection.

Survey forms were developed for consultations with stakeholders, which were distributed by mailing and used during the interview.

The interpretation of the statistical data presented in the first chapter is based on the data of the Regional Survey prepared by the United Nations Institute for Training and Research (UNITAR) and official statistics on the population living in the regions of the Republic of Kazakhstan.

The description of the processes of dealing with the WEEE by various stakeholders is presented on the basis of the results of consultations, as well as data from previously implemented projects.

The general assessment of the WEEE management system in Uzbekistan was prepared by experts based on a comparative analysis with international experience.



## 1. Review of data on waste management of electronic and electrical equipment in Uzbekistan

Waste of electronic and electrical equipment in most countries of the world, including Uzbekistan, is part of the MSW flows.

In 2021, the volume of solid waste generation in the territory of the Republic of Uzbekistan amounted to 9.5 million tons, which is 5.5% higher compared to 2018. Figure 1 shows the formation of solid waste in the context of the regions of the Republic of Uzbekistan. Most of the waste (16%) is generated in Tashkent. At the same time, in Namangan, Andijan and Ferghana regions, there is also a high concentration of solid waste formation (28%).

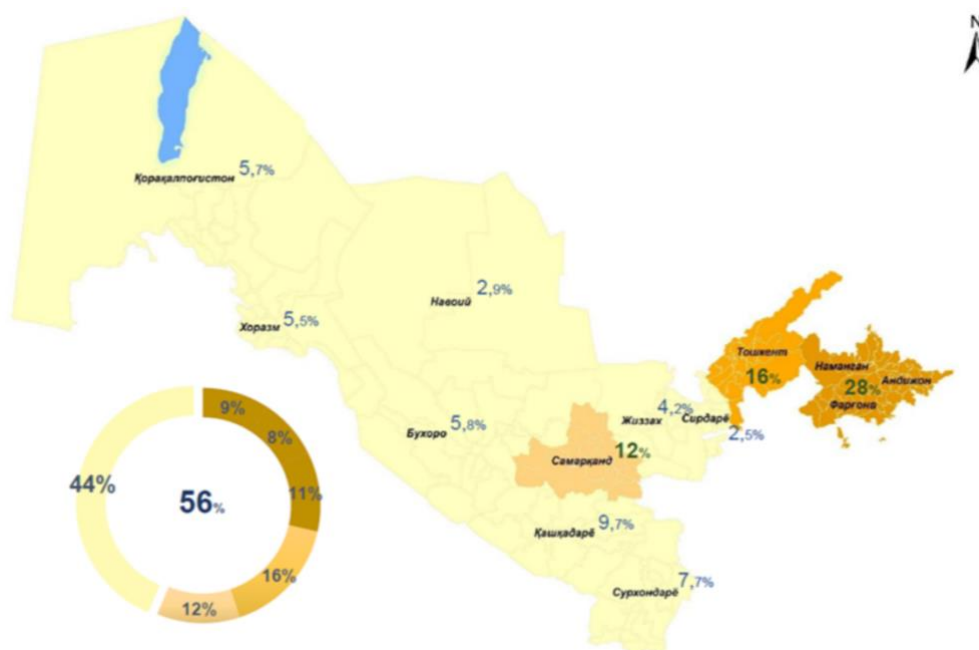


Figure 1 – Solid waste generation by regions of the Republic of Uzbekistan<sup>1</sup>

In 2021, the share of recycling was 26%, and the remaining 74% of solid waste was placed in landfills. At the moment, there are 239 landfills operating in various regions of Uzbekistan.

Currently, the solid waste recycling sector is actively developing in Uzbekistan. There are 307 MSW processing enterprises in the country, which is 35% more than in 2021. Separate collection of secondary raw materials is also developing in the country. So, there are 321 points of reception of secondary raw materials in the country, which accept plastic, glass containers, scrap metal, organic waste, waste paper and other waste. According to the forecasts of the State Committee of the

<sup>1</sup> Presentation of specialists of the State Committee of the Republic of Uzbekistan on Ecology and Environmental Protection, VI Eurasian Business Forum "Green Energy & Waste Recycling Forum - 2022", July 4-5, Nur-Sultan



Republic of Uzbekistan for Ecology and Environmental Protection, in 2022, MSW processing is expected to increase by up to 40%.

At the same time, the analysis of the morphological composition of solid waste for 2020 shows that the WEEE, including lamps, medical and wireless chargers, make up 0.29% of the total composition of solid waste (Figure 2).

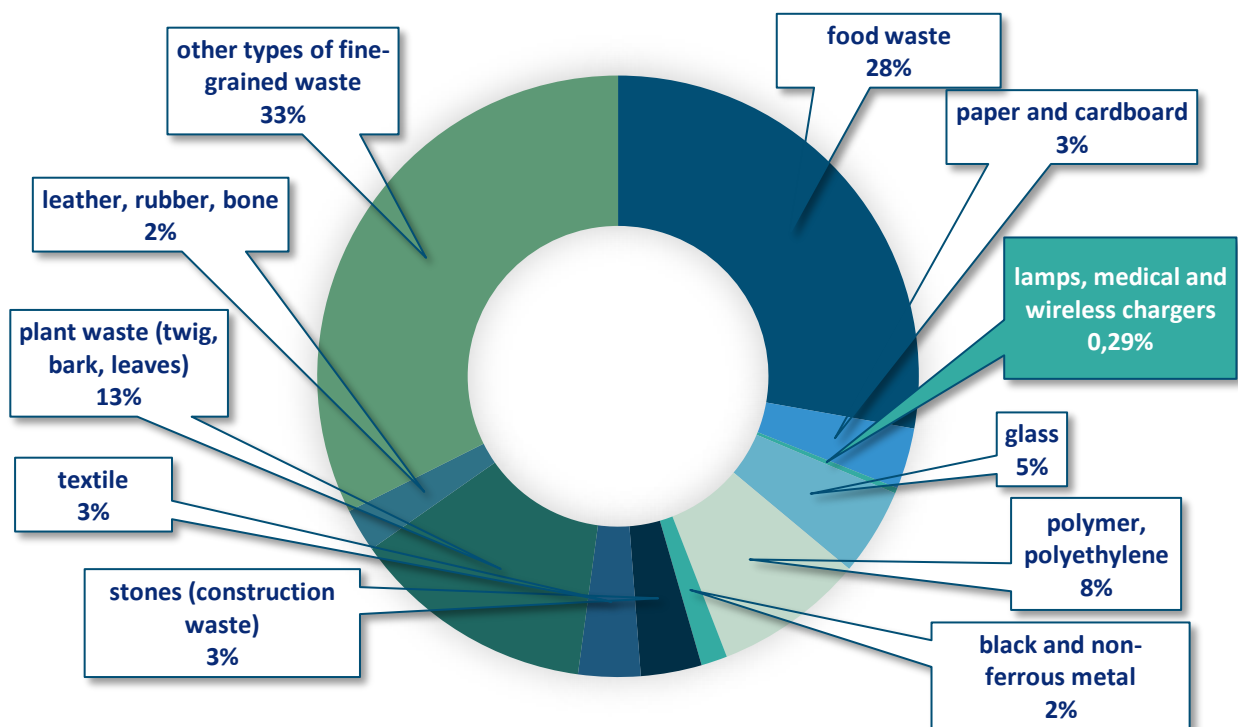


Figure 2 – Morphological composition of municipal solid waste in the Republic of Uzbekistan <sup>2</sup>

The presented morphological composition characterizes the low proportion of waste of electronic and electrical equipment in the composition of solid waste. But it should be noted that 33% of MSW are other types of small-fraction waste, which, among other things, may include small electronic and electrical equipment.

At the moment, the Republic of Uzbekistan does not have its own reliable statistical data on the formation of WEEE. But there are data obtained at the international level with the assistance of state bodies of the Republic of Uzbekistan by the method of expert assessment.

Thus, according to the United Nations Institute for Training and Research (UNITAR), the volume of sales of electronic and electrical equipment in 2019 amounted to 5.1 kg per capita.

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<sup>2</sup> Compiled by the authors on the basis of a presentation by specialists of the State Committee of the Republic of Uzbekistan on Ecology and Environmental Protection "Solid waste management on the territory of the Republic of Uzbekistan", Webinar "Electronic waste in Uzbekistan: current situation, problems and prospects", October 28, 2021





The volume of electronic waste generation in Uzbekistan, according to UNITAR, is 4.2 kg per capita. Applying this value to the total population of the Republic of Uzbekistan, it can be concluded that the formation of WEEE in 2022 amounted to 148.1 thousand tons.



Figure 3 – Waste generation of electronic and electrical equipment in the regions of the Republic of Uzbekistan

Due to the large population in such areas as Samarkand, Ferghana, Kashkadarya, Andijan and Tashkent regions are the leading regions in the formation of electronic waste in Uzbekistan (Figure 3).

It should be noted that recently in the Republic of Uzbekistan there has been an accelerated development of the electrical industry, which is being strengthened as part of the implementation of state policy, including through the implementation of the Program of Accelerated Development of the electrical industry for 2019-2022. There is also an increase in the import of electronic and electrical equipment, which may indicate the saturation of the Uzbek market with electronic and electrical equipment and an increase in the volume of electronic waste generation.

According to the results of the UNITAR research, the level of e-waste collection in Uzbekistan is below 1%, which, in comparison with some CIS countries (Belarus, Russia, Moldova and Kazakhstan), requires appropriate measures to increase the level of collection and recycling of WEEE.



Thus, an important task is to monitor the flows of WEEE generated by the population and legal entities of Uzbekistan, and the existing methods of handling them, in order to further improve the system of collection, transportation and recycling of WEEE in the country.

## **2. Review of legislation in the field of waste management of electronic and electrical equipment**

Currently, in Uzbekistan, the main law regulating waste management is the Law "On Waste" (№-362-II of 05.04.2002) and a number of by-laws. There is no separate by-law on electronic waste. However, the current regulations regulate some issues of electronic waste management. Among them:

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan "On streamlining the activities of enterprises for the use and disposal of mercury-containing lamps and devices" (№ 405 of 23.10.2000);
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan "On approval of the Regulations on the organization of collection and disposal of spent mercury-containing lamps" (№ 266 of 21.09.2011);
- Resolution of the Cabinet of Ministers "On Approval of Regulatory Legal Acts in the field of waste management" № 95 06.02.2019, which partially regulates the issues of waste management of electronic and electrical equipment, including large-sized electronic equipment and mercury-containing lamps that have spent their life.
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan "On measures to improve the procedure for handling scrap, waste of non-ferrous and ferrous metals" (№ 425 dated June 6, 2018) which regulates the handling of scrap, waste of non-ferrous and ferrous metals;
- The Regulation on the write-off of fixed assets in Uzbekistan (№ 1401 of August 29, 2004), which regulates the procedure for writing off the cost of fixed assets from the balance sheet at all enterprises, including budgetary, state and unitary.

The current legislation of the Republic of Uzbekistan establishes the following requirements in the field of EEE waste management.

### **1. Regulation of mercury-containing waste management issues**

In particular, obligations have been introduced to enterprises, organizations, institutions, regardless of departmental affiliation and forms of ownership, to deliver spent and defective mercury-containing lamps, appliances, products, intermediates and production waste to enterprises and organizations that have the appropriate permits of the State Committee of Ecology of the Republic of Uzbekistan for the disposal or neutralization (demercurization) of mercury-containing products.

Legal entities using mercury-containing lamps deliver spent and defective mercury-containing lamps only to recycling organizations. The procedure for collecting spent mercury-containing lamps by legal entities and individuals; the procedure for accumulating spent mercury-containing lamps, the procedure for storing spent mercury-containing lamps. Disposal and recycling of spent mercury-containing lamps are carried out by recycling organizations that ensure their neutralization and



recycling by methods that ensure compliance with established sanitary, hygienic, environmental and other requirements.

## **2. Requirements for large-sized household waste**

Among other things, large-sized household waste includes solid household waste generated as a result of the replacement of morally and physically obsolete household appliances (refrigerators, washing machines, televisions, etc.), office equipment (computers, printers, etc.), technical equipment.

Consumers are obliged to store large-sized household waste in temporary, specially designated places and not allow them to be thrown into containers in garbage collection points. The requirements for the collection, storage and removal of large-sized household waste have been established.

## **3. The procedure for processing scrap, waste of non-ferrous and ferrous metals and the list of scrap and waste of non-ferrous metals for household use, allowed to receive from individuals**

From January 1, 2019, physically and morally obsolete equipment containing non-ferrous and ferrous metals, written off in accordance with the established procedure during the bankruptcy, liquidation, reconstruction and modernization of organizations, with the exception of those having their own foundries and metal rolling productions (except in cases of bankruptcy and liquidation), is subject to delivery to “Uzmetkombinat” JSC and “Uzvtortsvetmet” JSC at a free (contractual) price.

Since June 1, 2019, organizations in the electrical industry have been allowed to recycle scrap and non-ferrous metal waste generated as a result of production activities at their own facilities or on a tolling basis at specialized organizations producing the corresponding non-ferrous metals, with the re-involvement of processed raw materials in production.

## **4. Accounting for mercury-containing lamps**

State accounting is maintained for toxic and non-toxic waste, including waste that is subject to and inappropriate recycling. Mercury-containing lamps are included in the list of toxic waste to be recycled. Thus, the State Committee for Ecology and Environmental Protection of the Republic of Uzbekistan keeps records of these wastes and monitors their management.

In general, the regulatory framework of Uzbekistan partially regulates the issues of electronic waste management. At the same time, there are deficiencies in the legislation of the Republic of Uzbekistan that prevent the provision of environmentally safe waste management of electrical and electronic equipment.

# **3. Waste management of electronic and electrical equipment at the stages of the life cycle**

## **3.1. Waste generation of electronic and electrical equipment**

### ***Manufacturers of electronic and electrical equipment***

There are about 100 manufacturers of various types of electronic and electrical equipment in the Republic of Uzbekistan, including large-sized, small-sized equipment, lamps and others. The country has mastered high-tech production of LCD and LED TVs, new models of household washing machines,



electric stoves and stoves, air conditioners, refrigerators, electric and solar water heaters, LED lamps, electric meters and other electrical appliances, educational and laboratory equipment, transformers and their components, new modern cables and wires.

The largest electronics manufacturers include: “Uzkabel”, “Andizhankabel”, “Chirchik Transformer Plant”, enterprises of “Artel”, “ZENITH ELECTRONICS”, “ECTACO” and others.

Many manufacturers of electronic and electrical equipment do not pay due attention to waste management of electronic and electrical equipment generated as a result of production processes. For example, most companies do not have a system for accounting for the generation and transfer of such waste.

A number of companies producing large-sized and small-sized equipment return defective components to the production cycle at factories. In addition, companies report that part of the production waste is transferred to companies for further recycling.

Despite the absence of an existing system of extended obligations of manufacturers, companies are taking initiatives to use safer alternatives in the production of products, for example, replacing electronic products or using safer freons. Also, companies on an initiative basis periodically organize actions to collect WEEE from the population.

Thus, the companies of the electrical industry of Uzbekistan demonstrate responsibility for the waste management of electronic and electrical equipment and interest in participating in the management system of the WEEE in Uzbekistan.

### ***Legal entities – waste producers***

The number of registered enterprises and organizations in the Republic of Uzbekistan in 2020 amounted to 440.9 thousand units<sup>3</sup>, including 73.6 thousand enterprises in the industrial sector.

Due to the fact that there are no clear legislative requirements in the country for the collection and transfer of WEEE to specialized recyclers and the mechanism for their implementation, not all legal entities that form WEEE have an established system for managing such waste.

However, electronic and electrical equipment, as a rule, is on the balance sheet of organizations and disposal can be carried out only after the write-off of fixed assets from the company's balance sheet. The disposal of fixed assets in Uzbekistan is controlled in accordance with national standard № 5 and the Regulation on the Write-off of fixed assets in Uzbekistan №1401 of August 29, 2004, which provides for the entry of unusable materials, non-ferrous and precious metals as secondary raw materials (scrap metal). This Regulation regulates the procedure for writing off the cost of fixed assets from the balance sheet at all enterprises, including budgetary, state and unitary.

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<sup>3</sup>[https://stat.uz/ru/?preview=1&option=com\\_dropfiles&format=&task=frontfile.download&catid=190&id=478&Itemid=100000000000](https://stat.uz/ru/?preview=1&option=com_dropfiles&format=&task=frontfile.download&catid=190&id=478&Itemid=100000000000)



Thus, legal entities that are budgetary state and unitary enterprises transfer decommissioned equipment to enterprises that provide the relevant act. Other legal entities, as a rule, do not have a system for transferring WEEE to specialized enterprises for the purpose of recycling them.

### **Population**

According to the State Statistics Committee of the Republic of Uzbekistan, the country's population at the beginning of 2022 amounted to 35.2 million people, of which the urban population is 17.9 million people, and the rural population is 17.3 million people<sup>4</sup>.

According to the estimates carried out, the majority of the population of Uzbekistan throws SEEE into garbage cans as part of jointly collected solid waste. Almost a third of residents transfer electronic and electrical equipment to someone for further use, and one in five stores used equipment at home (Figure 4).

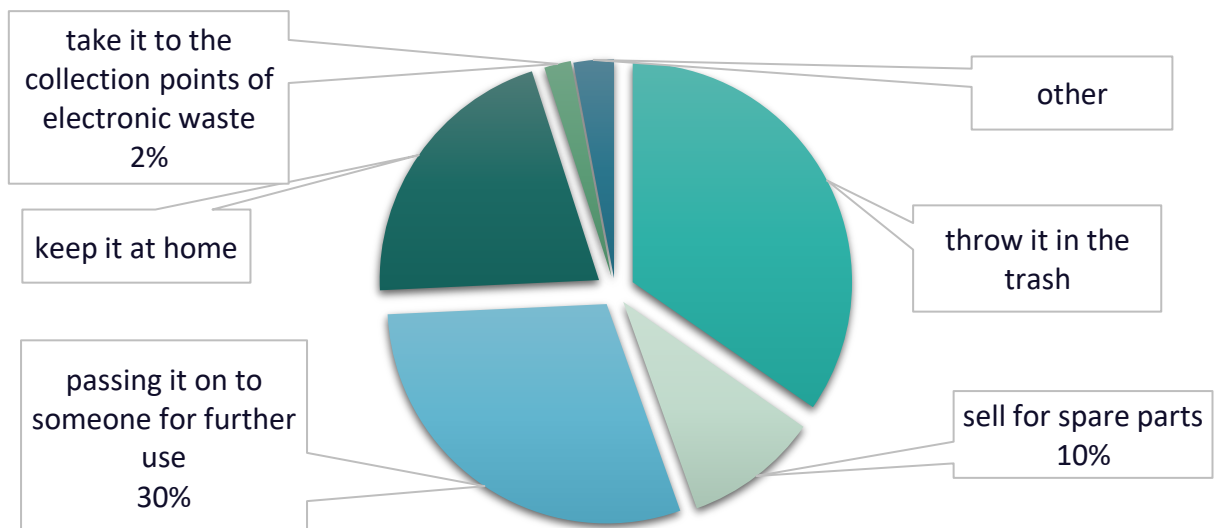


Figure 4 – Methods of waste management of electronic and electrical equipment of the population of the Republic of Uzbekistan<sup>5</sup>

At the initiative of manufacturers of companies and with the support of government agencies, actions are periodically held in Uzbekistan to collect used electronic and electrical equipment, including LED lamps. For example, residents can bring old household appliances and get a discount on new appliances. The WEEE collected as part of such actions is transferred to recyclers.

One of the ways of handling used electronic and electrical equipment among the population is selling for spare parts.

According to the survey, 88% of the population is ready to hand over waste of electronic and electrical equipment. Also, the majority of respondents (46%) are ready to exchange their old electronic

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<sup>4</sup> <https://stat.uz/ru/ofitsialnaya-statistika/demography>

<sup>5</sup> Results of a survey conducted in 2021 within the framework of the project "Conducting an initial assessment of electronic waste management systems in Uzbekistan"



equipment for a new one using the "trade in" system, that is, when handing over old equipment, get a discount on the purchase of a new one. For 27% of the people who responded to the survey, the reward for the delivery of waste to the collection points will be an incentive for the transfer of the WEEE for recycling. Concern for the environment is an incentive for 23% to hand over electronic waste, for and 3% of the population are ready to hand over waste in the event of a large monetary fine.

Thus, at present, the population of Uzbekistan does not have access to the collection system of used electronic and electrical equipment. However, it is ready to participate in the system of collection and transfer of WEEE to specialized enterprises their recycling.

### 3.2. Collection and transportation of electronic waste

As mentioned earlier, there is no universal system of collection and export of WEEE in the country. However, attempts are being made to establish this system.

Thus, waste collection companies, with the support of government agencies, are making attempts to introduce a system of separate collection of WEEE. In particular, the waste collection organization in Tashkent (SUE "Makhsustrans") has installed containers for the separate collection of used batteries in the city districts, promoting the culture of separate waste collection among the population. In 2020, 530 containers from the State Unitary Enterprise "Makhsustrans" and 171 from private enterprises were installed in Tashkent (Figures 5 and 6).



Figure 5 – A container for receiving batteries from the public



Figure 6 – Container for receiving lamps from the public

In addition, manufacturers and suppliers of EEE periodically conduct actions to collect electronic waste. Electronics stores periodically launch a trade-in system and, in cooperation with waste recycling organizations, collect lamps and batteries from the population. Collection is carried out through installed containers in residential buildings and districts or through individual delivery to lamp manufacturers, hardware stores or recycling organizations. Also, it is worth noting that in the country in some stores there are discounts on new mercury-containing lamps for the delivery of outdated lamps.

Non-governmental organizations are also engaged in the organization of the collection and export of WEEE formed by the population. For example, the NNO Hashar Week conducts eco-campaigns for separate collection. Reception points are being set up around the city, including reception points for electronic waste, such as mercury-containing lamps and batteries, accumulators. Sorted waste is weighed and points are awarded for them, which are credited to people in their personal account in the "Hashar Week" application for Android and iOS smartphones or a telegram bot.

Thus, attempts are being made in the country to establish a system of collection and export of WEEE, however, the system does not work everywhere yet.

### **3.3. Recycling of electronic and electrical equipment waste**

#### ***General information***

The waste recycling industry in Uzbekistan is developing rapidly. Over the past year, the number of enterprises in the field of waste management has increased by 34.6% and amounted to 307 units in 2021.

The key enterprises in the field of recycling of WEEE are several enterprises (table).



**Table – List of enterprises operating in the field of recycling of WEEE in Uzbekistan**

№	Company name	Field of activity
1	LLP "Toshrangmetzavod Recycling"	The company was established as part of a joint program with the State Committee for Ecology and Environmental Protection of Uzbekistan and carries out the reception and recycling of electronic waste. The main activity of assistance to legal entities and state organizations in the write-off and disposal of used electronic equipment. The company has all the necessary permits for the write-off and recycling of office equipment, as well as a permit to work with precious metals in accordance with the legislation of the Republic of Uzbekistan.
2	"Uzvtortsvetmet" JSC and its structural divisions	An enterprise for the collection of non-ferrous metal waste and their subsequent recycling. Acceptance of household non-ferrous metal scrap from individuals, including household appliances and equipment through specialized points. There are 14 branches and 51 collection points in the country. Electronic waste collected at collection points is subjected to manual analysis. Then the components are sent for further processing to specialized enterprises.
3	JSC "Uzmetkombinat"	In accordance with the resolution of the Cabinet of Ministers of the Republic of Uzbekistan, it is the only authorized body for the procurement (purchase) of scrap and waste of ferrous metals.
4	"Almalyk MMC" JSC (AMMC)	AMMC is one of the largest mining and metallurgical enterprises in Uzbekistan. It is the producer of about 90% of silver and 20% of gold in Uzbekistan, the largest copper producer in Central Asia. AMMC receives electronic boards for processing. In the course of processing, valuable metals are extracted, mainly gold.

At the same time, enterprises are actively developing in the country for the recycling of individual components that make up the waste of electronic and electrical equipment, including ferrous and non-ferrous metals, batteries, plastic and others.

***Recycling of ferrous and non-ferrous metals***

The key enterprises for the recycling of ferrous and non-ferrous metals in Uzbekistan are JSC "Uzmetkombinat" and JSC "Uzvtortsvetmet". However, during the consultations, it was revealed that the company Uzvtortsvetmet JSC has stopped receiving and recycling WEEE due to the lack of state regulation, support and unprofitability of this activity.

At the same time, according to the Bureau of Statistics of Uzbekistan, 16 companies providing services for the disposal (restoration) of sorted metal materials are registered in the country. These include: "TOSHKENTIKILAMCHIQRAMETALL" (Tashkent city), "METALL GOLD AND" (Andijan region), "QORA VA RANGLI METALLAR" (Surkhandarya region), "METALL KON AMUDARYO" (Republic of Karakalpakstan) and others. These companies are engaged in the production and sale of rolled metal products of a wide range.





### ***Recycling of mercury-containing lamps***

Uzbekistan has a number of legislative acts regulating the handling of mercury-containing lamps. In accordance with the current requirements, several enterprises for the disposal of mercury-containing waste operate in the country. These include: LLC "Asp Selta" (Tashkent), JV "Neo Sunlight" (Tashkent), LLC "Eco toza havо" (Fergana), LLC "Eco-Tibbet" (Andijan) and others.

These organizations accept mercury-containing light bulbs from legal entities for disposal on a contractual basis (payment for services by transfer).

For individuals, the following procedure has been established for the disposal of mercury-containing lamps and thermometers:

1. Used and unsuitable for further use bulbs of local production can be handed over at the place of purchase. At the same time, the dealer receives a 10% discount on the purchase of a new light bulb.
2. Used and unusable light bulbs and thermometers must be packed and taken to the nearest household waste collection point, where they must be put in a separate box. When filling, the box with light bulbs and thermometers is taken out by transport and a representative of the garbage collection organization "Makhsustrans" to the disposal point.

Enterprises for the disposal of mercury-containing lamps use various demercurization technologies, including their own patented technologies, the equipment for which was developed and manufactured in Uzbekistan.

### ***Recycling of accumulators and batteries***

According to official statistics, there is one company in the country for recycling waste and scrap of primary cells, primary cell batteries, electric batteries – "O'ZBEKISTON RANGLI METAL PARCHALARI CHIQUINDILARINI TAYYORLASH VA QAYTA ISHLASH ZAVODI", located in the city of Tashkent.

However, the issue of recycling used batteries remains unresolved in the country. Work is underway in the country to install containers for separate collection of batteries, but the technology of their recycling has not yet been determined.

### ***Recycling of climate equipment***

There are a number of companies in the country that are engaged in the design, installation, maintenance of climate equipment at industrial enterprises and in everyday life, refrigerant recycling centers. The companies are also involved in the processes of processing heating and cooling equipment.

In case of detection of the impossibility of using a particular climatic equipment for its intended purpose, companies use technologies for manual disassembly and sorting of secondary raw materials into fractions (ferrous and non-ferrous metals, plastic, glass and others). In the future, the secondary raw materials are transferred to the appropriate plants. The illiquid fraction, which includes ABS plastic, is sent to the landfill.



### ***Plastic recycling***

Considering that EEE waste includes a significant proportion of plastic (from 12 to 37%), it is relevant to develop existing plastic recycling facilities in order to process ABS plastic, which is predominant among EEE and difficult to recycle.

There are 28 plastic recycling companies registered in the country. These include "RIVER NOISE" (Tashkent city), "MANSURBEK Q'RG'ON BIZNES" (Samarkand region), "MURODIL AGRO FAYZ SAVDO" (Ferghana region), "RAVNAQ BARAKA PLAST" (Tashkent region).

However, at the moment, the possibility of recycling plastic from EEE by these enterprises has not been established.



#### 4. Assessment of the WEEE management system in Uzbekistan

The waste management system of electronic and electrical equipment in Uzbekistan is in the process of formation.

At the moment, in Uzbekistan, the life cycle of electronic and electrical equipment generated by the population is linear and, as a rule, ends with getting to the landfill (Figure 7).

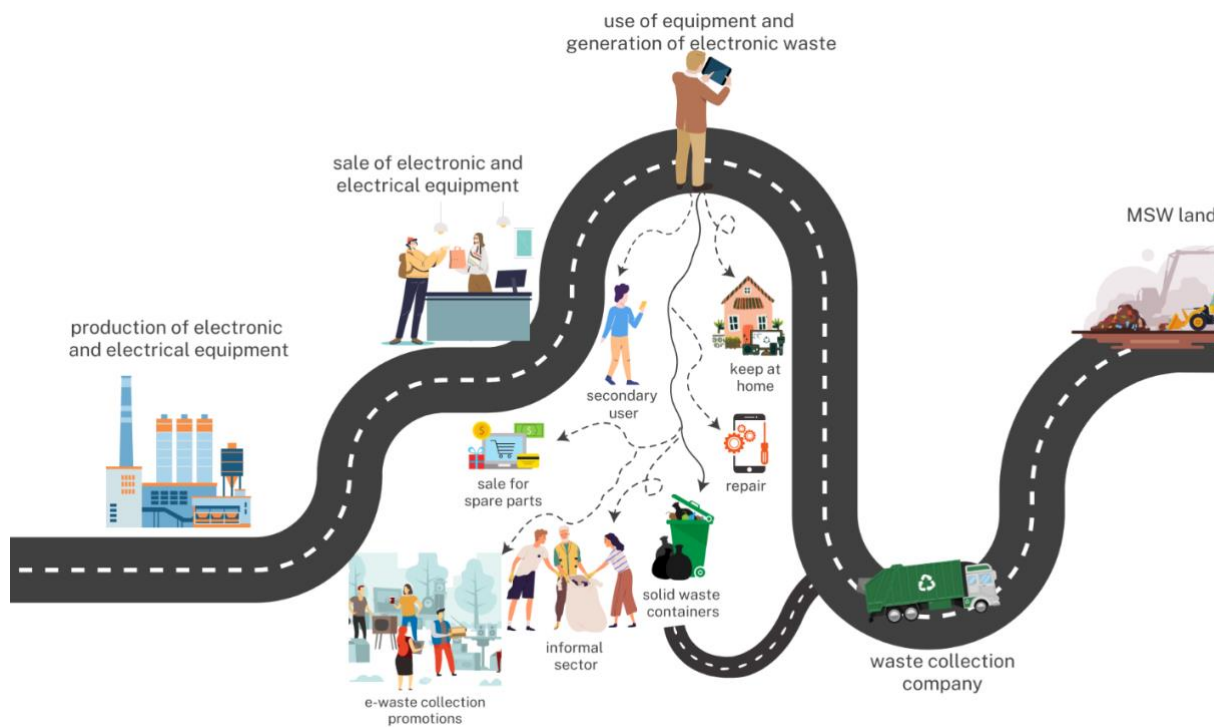


Figure 7 – Life cycle of electronic waste in Uzbekistan<sup>6</sup>

The system of dealing with WEEE formed by legal entities also requires close attention and improvement, since it does not provide a full collection and transfer of WEEE for recycling to specialized enterprises.

WEEE includes many dangerous chemicals such as lead, mercury, antimony, cadmium, a mixture of hexavalent chromium, brominated flame retardants (gorenje retard), polyvinyl chloride and others.

In this regard, the lack of an established system of collection and recycling of WEEE presents the following problems:

1. groundwater pollution by persistent organic pollutants and heavy metals;
2. heavy metal pollution of the soil;
3. toxic substances entering the atmosphere;
4. an increase in the number of diseases of people due to exposure to persistent organic pollutants and heavy metals;
5. rapid, excessive overflow of existing landfills and landfills;

<sup>6</sup> Compiled by the authors on the basis of meetings and consultations with interested parties



6. the lack of areas suitable for landfills at a convenient distance from large cities, the expansion of cities displaces landfills forever longer distances. This factor, combined with rising land prices, increases the cost of transporting EEE waste to landfills;
7. a large number of precious metals and other valuable components that are part of some types of EEE are irrevocably subject to burial.

To date, in world practice, the most effective system of the life cycle of electronic and electrical equipment is the scheme of the circulation economy (Figure 8), where all the details of the EEE are recycled and do not pollute the planet when they get to the landfill.

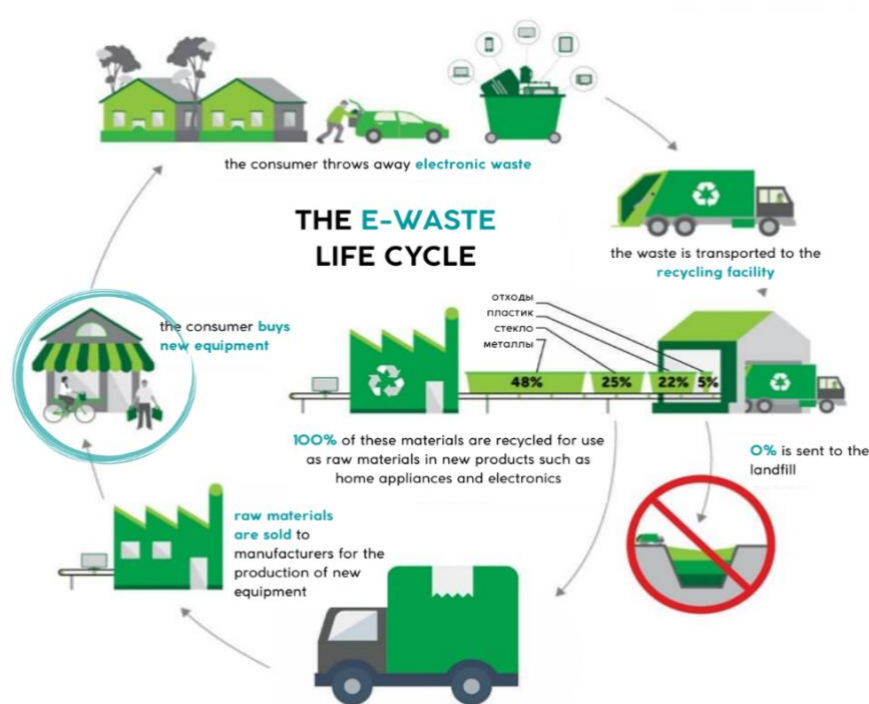


Figure 8 – The life cycle of electronic waste in the circulation economy

Such a system allows you to maximize the preservation of precious metals contained in electronic and electrical equipment, which are subject to reuse as secondary raw materials.

To improve the management system of the WEEE in Uzbekistan, coordinated work of all stakeholders is necessary, including government agencies, manufacturers, suppliers of electronic and electrical equipment, specialized enterprises for the management of WEEE, the civil sector, and science.

The development of the WEEE management system in Uzbekistan should follow the path of improving the following aspects:

- Legislation;
- Infrastructure and technology;
- Business development in the field of WEEE management;
- Implementation of extended manufacturer responsibility;
- Awareness of stakeholders and the public.



## **5. Problems and challenges in the field of waste management of electronic and electrical equipment**

The assessment of the current situation with regard to the management of WEEE in Uzbekistan, carried out within the framework of this review, revealed the key problems hindering the establishment of a rational system for the collection and recycling of used electrical and electronic equipment in the country.

### **1 The absence of a national policy providing for the establishment of a system for collecting and recycling waste of electronic and electrical equipment**

The current strategic documents of the Republic of Uzbekistan, in particular, the Solid Waste Management Strategy in Uzbekistan for 2019-2028, do not imply the creation of an effective waste management system for electronic and electrical equipment. There are no national targets for the collection and processing of WEEE in the country.

### **2 The absence of clear requirements of the legislation of the Republic of Uzbekistan in the field of mandatory recycling of EEE waste and control over the implementation of existing requirements**

The current legislative acts do not establish clear requirements for the handling of used electronic and electrical equipment. This leads to the fact that the responsible parties are poorly involved in the development of the system of collection and recycling of WEEE, and most legal entities and individuals are not concerned about the need to transfer electronic waste for recycling to specialized enterprises. In addition, even the current legal requirements in the field of handling large-sized electronic equipment, mercury-containing lamps are poorly implemented by individuals and legal entities due to the absence of control mechanisms.

### **3 The absence of accounting for the formation, collection and recycling of WEEE**

The existing system of accounting and reporting in the field of waste management in Uzbekistan assumes reporting only in the field of mercury-containing lamps. While the rest of the WEEE remain outside the accounting and, accordingly, without control from the waste owners and government agencies.

### **4 Weak infrastructure in the field of electronic waste collection**

In Uzbekistan, there is a shortage of waste collection points for electronic and electrical equipment. Collection points that operate within the framework of the scrap, non-ferrous and ferrous metal waste management system do not perform the function of collecting the WEEE generated by the population. Collection points for used batteries are not widespread enough. In addition, the country does not have developed technologies for the recycling of WEEE, including technologies for disassembly, deep recycling with the use of valuable fractions (ferrous and non-ferrous metal, plastic, glass) in the production of new products.



## **5 The absence of support measures for enterprises dealing with the WEEE**

today, the existing specialized enterprises for the collection and recycling of WEEE are experiencing a number of difficulties. The absence of support from the state, manufacturers and importers of products affects the development of infrastructure and deep processing of the components of the WEEE. There is no EPR tool for electronic and electrical equipment waste in the country, which negatively affects the development of the system of collection, transportation and deep recycling of WEEE.

## **6 Low potential of stakeholders in the management of WEEE**

The country has a low potential of manufacturers, suppliers, specialists of enterprises and organizations, civil servants, NNOs on waste management of electronic and electrical equipment. The country has an insufficiently developed expert capacity on the regulation of EEE waste.

## **7 Low awareness of the population in the management of WEEE**

One of the reasons contributing to the development of an unfavorable situation in the field of management of WEEE and the ingress of spent electronic products into landfills and landfills in Uzbekistan is the low awareness of the population about the dangerous effects of electronic waste and existing waste collection and recycling systems.