

E-waste monitors in Central Asia and Western Balkan

Methods and results

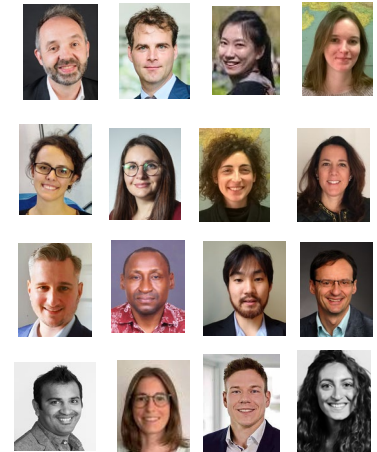
Kees Balde and Guilia Iattoni
UNITAR-SCYCLE Programme

UNECE Joint Task Force Environmental Indicators
16 October 2023



SCYCLE Programme

- United Nations Institute for Training and Research established in 1963
- Sustainable Cycles (SCYCLE) Programme is based in Bonn (Germany) and joined UNITAR's Division for Planet in 2021 after transitioning from the United Nations University (UNU)



Regional e-waste monitors aims and objectives

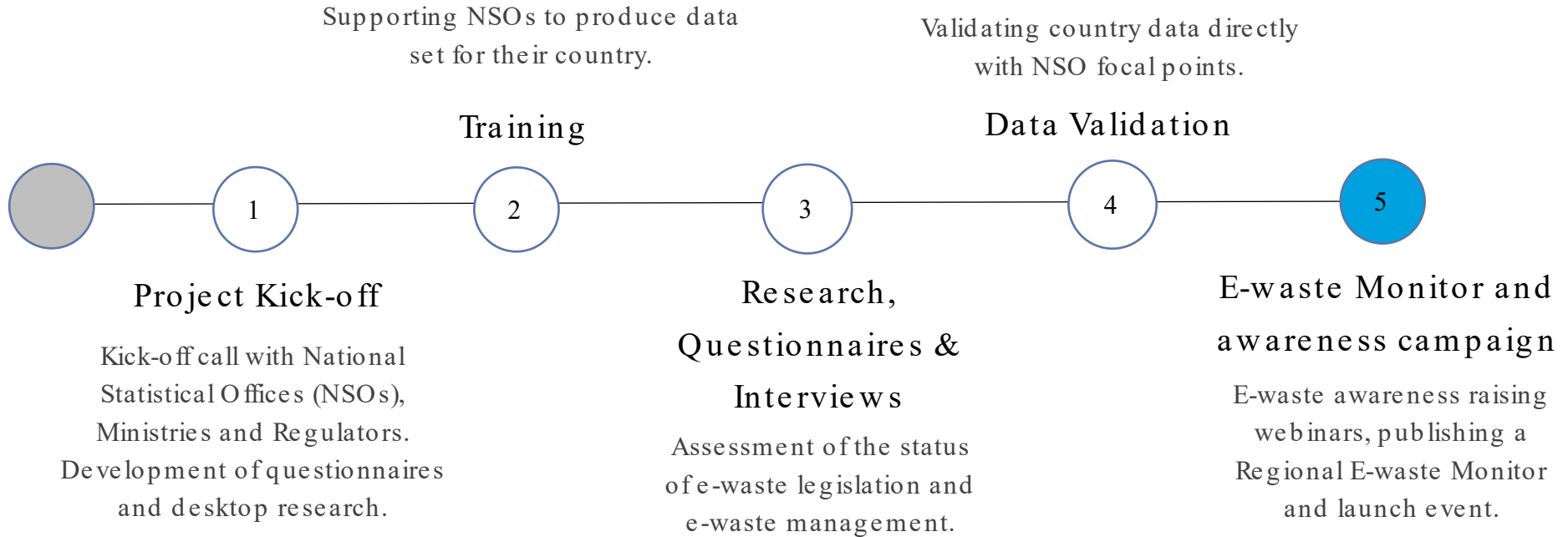
The e-waste monitors aim to collect statistics, map the situation of e-waste management and legislation in the beneficiary countries as well as build subregional capacities in the field of e-waste monitoring and reporting.

The Monitors have the following **objectives**:

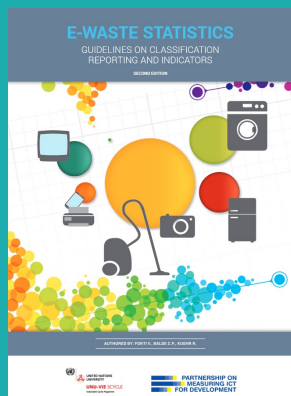
- **Train National Statistical Offices (NSOs)** to produce e-waste data for **monitoring of SDG 12.5.1**.
- Contribute to the development of **internationally comparable e-waste statistics**.
- **Inform** policy makers, industries, and business about regional e-waste data.
- Support the development of national and regional counter-measures through policies, regulations, awareness raising and industrial response.



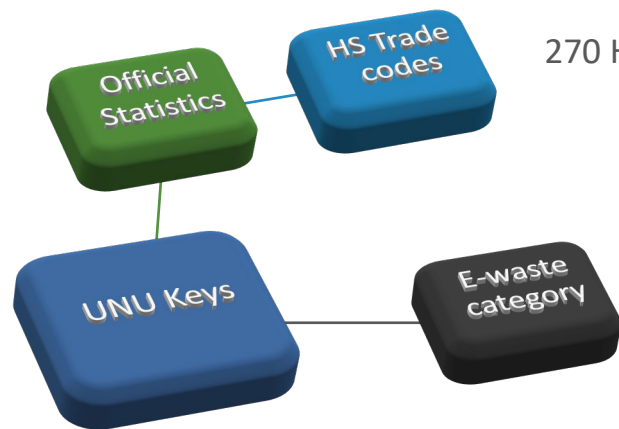
Method



Method



How to classify e-waste?



270 HS codes are relevant for e-waste

- (1) Temperature exchange equipment
- (2) Screens and monitors
- (3) Lamps
- (4) Large equipment
- (5) Small equipment
- (6) Small IT

UNU KEY	Description	e-waste category
0001	Central Heating (household installed)	Large equipment
0002	Photovoltaic Panels (incl. inverters)	Large equipment
0101	Professional Heating & Ventilation (excl. cooling equipment)	Large equipment
0102	Dishwashers	Large equipment
0103	Kitchen equipment (e.g. large furnaces, ovens, cooking equipment)	Large equipment

Global level

- Waste classification: Six categories of e-waste
- Product classification: 54 UNU-KEYS

[Publications \(globalewaste.org\)](http://globalewaste.org) - Also available in Russian

Indicator 1. EEE Placed on the Market

Apparent Consumption Method:

- Calculated for each UNU-KEY
- $EEE \text{ Put on the Market} = \text{Domestic Production} + \text{Imports} - \text{Exports}$
- For preferably 1980 to now
- Includes imports of both new and used-EEE, domestically produced EEE.
- EEE POM calculation tool

EEE Put on Market Tool

Institutions Name	UNU-VIE Scycle
Current version	V1
Contact	Kees Balde (blade@vie.unu.edu)

Goal

The tool assist the user in the following steps:

- 1) Inserting available country data on Imports and Exports of EEE per year and per HS code
- 2) Linking the available country data on Imports and Exports of EEE in HS codes to the international classification system
- 3) Converting the data on Imports and Exports that is expressed in number of pieces into weight; calculating the Put on Market of EEE in the country from the Imports and Exports and converting them in the right unit (tonnes)
- 4) Restructuring the data in a PIVOT table
- 5) Restructuring the data in the same format as it needs to be inserted in the E-waste generated Tool (sheet "POM")

For further information and more detailed instructions please refer to the EEE Put on Market Tool Manual.

Contents

Sheet name	Contents
RAW_DATA	Working file where to insert available country data on Imports and Exports, link data to the UNU_KEYS, convert to correct unit and calculate EEE Put on Market (POM)
PIVOT	Results of the calculations performed in the excel sheet "RAW_DATA" by UNU_KEY, EU-6 and year.
POM_to_Tool	Results of the calculations performed in the excel sheet "RAW_DATA" in the

About this File

The EEE Put on Market Tool has been developed by UNU-VIE-SCYCLE to help the user to prepare, adjust and convert the available country data on EEE Put on Market (POM) of new electronics prior to inserting them in the E-waste generated Tool.

Cell legend

Aval
Con
Calc

> 0. Content | RAW_DATA | PIVOT | POM_to_Tool | HS_UNU_KEYS_year | Unique_HS_codes | Weight_year | UNU_KEYS_EU-6

Indicator 2. E-waste generated

E-waste generation is calculated, using the EEE POM and lifespans for each UNU-KEY. E-waste generated is the total mass of e-waste, prior to any e-waste management activity.

E-waste generated in a country refers to the total weight of e-waste resulting from EEE, that had been POM of that country, prior any other activity such as collection, preparation for reuse, treatment, or recovery, including recycling and export.

E-waste generated Tool

Hide Sheets
Show Sheets


Country: BIH

Input POM data

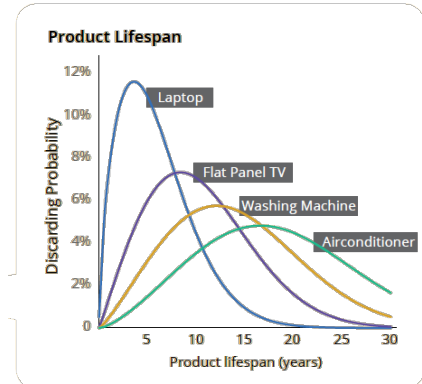
Calculate E-waste generated

Export results

Developed by

 UNITED NATIONS UNIVERSITY

FrontPage | Indicators | ResultPOM | ResultWG | ResultIMP | ResultEXP | ResultCOL | GraphLi



Indicator 3 E-waste managed in an environmentally sound manner

E-waste generation is the basis for making the assessment of the e-waste flows. Crucial is the assessment of the amounts of e-waste that are treated using environmentally sound management (ESM) approaches.

- Separate collection
- Depollution
 - Dismantling of hazardous components and depollution
 - environmentally sound disposal of the hazardous fractions
- Dismantling of high value fractions
 - recycling of recyclable components

This is typically, but not exclusively, performed under the requirements of national e-waste legislation.

Indicator 4. E-waste collection rate

Indicator 4. E-waste collection rate

1. E-waste collection rate (%)

$$= \frac{\text{E-waste formally collected (weight)}}{\text{E-waste generated (weight)}} \times 100$$

The performance of the entire e-waste management is expressed using the e-waste collection rate, defined as Indicator 4. The collection rate can be an indication of the progress made by the country toward achieving a proper management of the e-waste sector.

Statistical training impact

Western Balkans

- 3 countries made statistics using the UNITAR EEE POM and E-waste generated tools
- 4 countries provided statistics on separately e-waste collection for environmentally sound management

CIS+Georgia

- 4 countries made statistics using the UNITAR EEE POM and E-waste generated tools
- 7 countries provided statistics on separately e-waste collection for environmentally sound management

Challenges:

EEE POM and e-waste generated

- *Entering domestic production data was in other classifications.*
- *Resource constraints to use the EEE POM and E-waste generated tools*

E-waste collection

- *National classifiers for separate e-waste collection not always existing and aligned with international standards*
- *No separate e-waste legislation, hence little data*



Monitor content

Legislation



1. What is E-waste?

Definition, product categories, disposal routes,
key issues



2. Methodology

Statistics, Management Assessment,
Sources



3. Regional Overview Legislation and Systems

Status, International Agreements, Stakeholders,
Projects

Statistics



4. Statistics

EEE POM and E-waste Generated, Categories,
ESM



5. Transboundary Movement

Policies, Quantities, Issues and Impacts



6. Management Assessment

Comparative Performance Review

Management
infrastructure



7. Common Issues

Five Driving Reasons



8. Recommendations



9. Country Profiles

Two e-waste monitors



*Published in 2021 and
available at:*

<https://ewastemonitor.info/>

*Georgia, Moldova,
Belarus, Russia,
Kazakhstan, Ukraine,
Tajikistan, Armenia,
Uzbekistan, Azerbaijan,
Kyrgyzstan and
Turkmenistan*

REGIONAL E-WASTE MONITOR

Western Balkans
2023

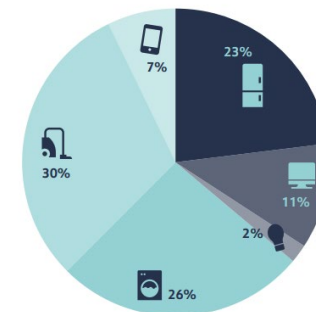
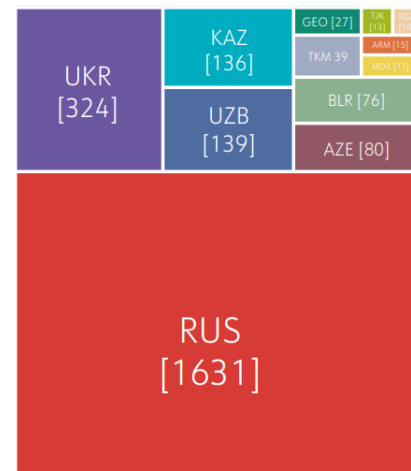
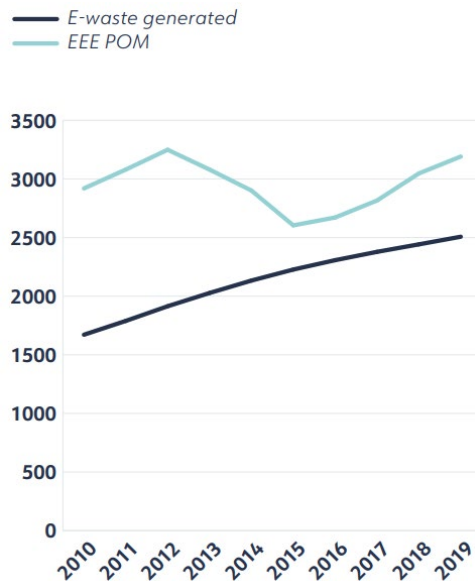
Upcoming in November
2023

Albania, Bosnia and
Herzegovina, Montenegro,
North Macedonia and Serbia

CIS+Georgia Monitor 2021

Key statistical results:

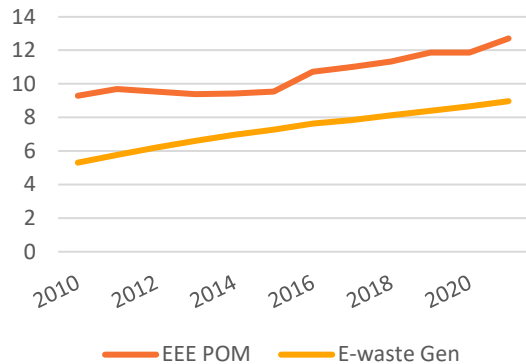
- **EEE POM in the region increased by 10% between 2010-2019** from 2.9Mt (10.4 kg/inh) to 3.2 Mt (11.0 kg/inh).
- **E-waste generation increased by 50% to reach 2.5 Mt (8.7 kg/inh) in 2019.** Temperature exchange equipment and large and small equipment represent 77% of the e-waste generated.



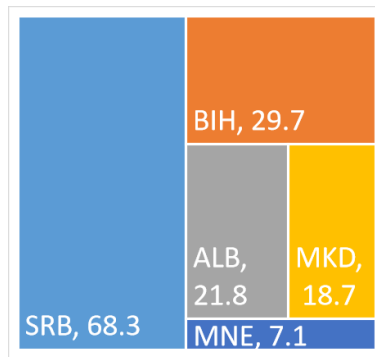
SIX CATEGORIES OF E-WASTE GENERATED IN 2019 (%)

Western Balkans: Overview on e-waste statistics

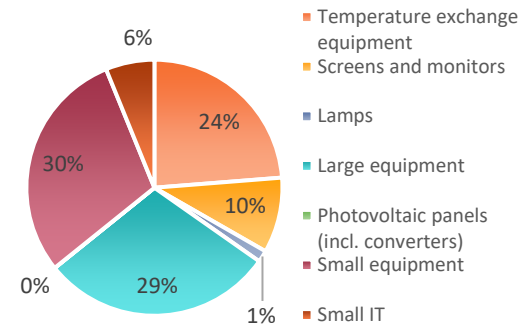
Regional EEE POM vs e-waste generated (kg/inh)



E-waste generated (kt) per country in the region



E-waste generated in 2021 (%)



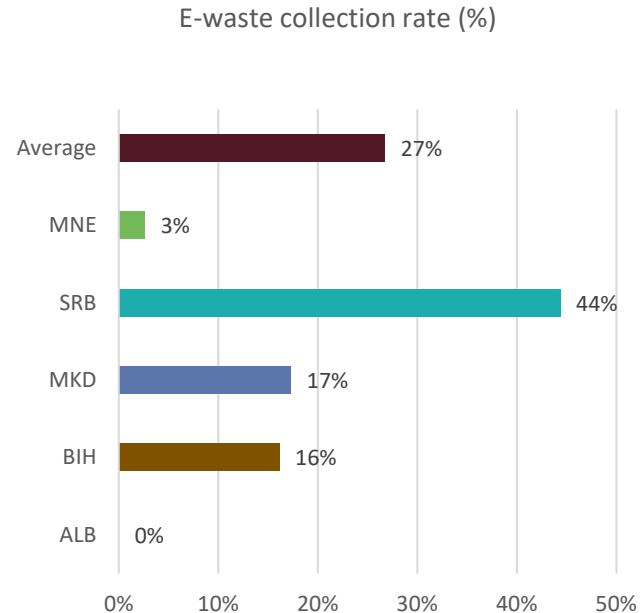
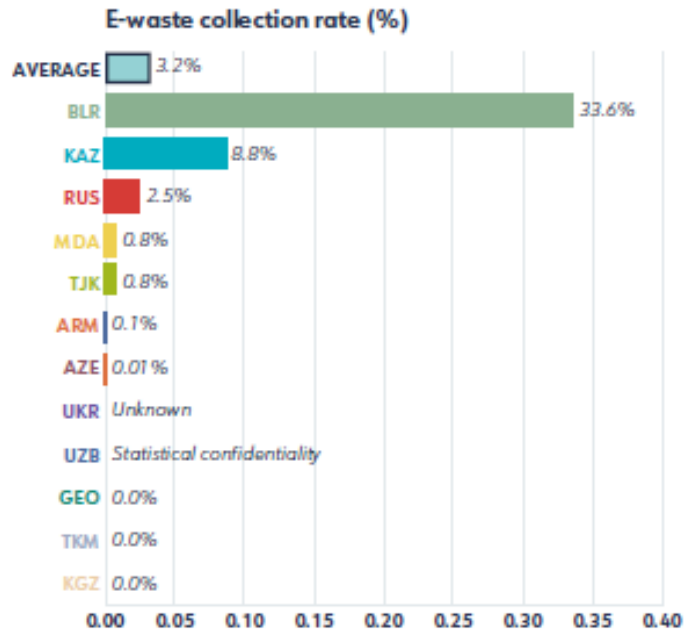
- From 2010 to 2021, the amount of **EEE POM** in the region increased from **9 kg/inh** to **13 kg/inh**, while **e-waste generated** increased from **5 kg/inh** to **9 kg/inh**.

- In absolute terms, Serbia is the **largest generator** of e-waste in the region (68 kt), but looking at the amount per capita then North Macedonia is generating more (15 kg/inh).

- Large equipment** (Cat. IVa) and **small equipment** (Cat. V) are the greatest categories of e-waste generated at **59% in total** (Cat. IVa 29%, Cat. V 30%).

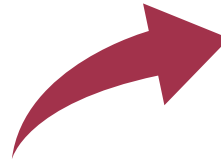
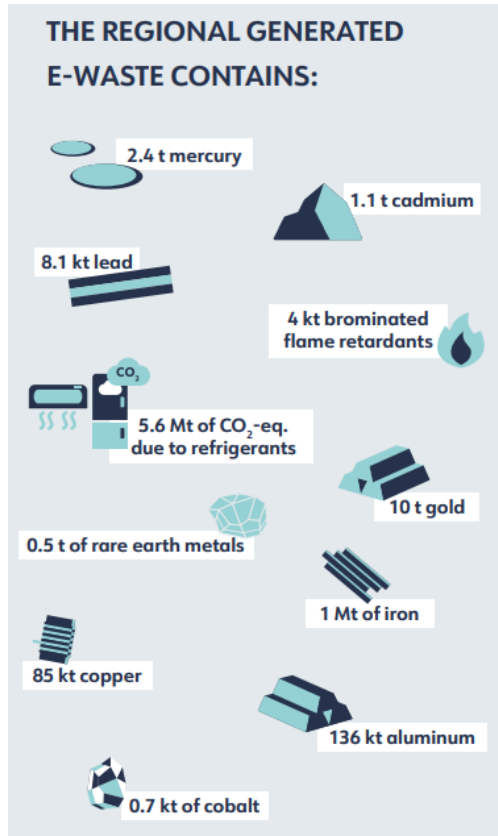
Collection rates

- In the CIS+, the average collection rate is 3.2 %, mostly from Belarus, Kazakhstan and Russian Federation
- Western Balkans, the average collection rate is 27%, mostly in Serbia, North Macedonia and Bosnia and Herzegovina.



CIS+Georgia Monitor 2021

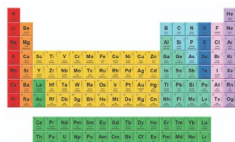
Hazardous substances vs valuable resources in e-waste



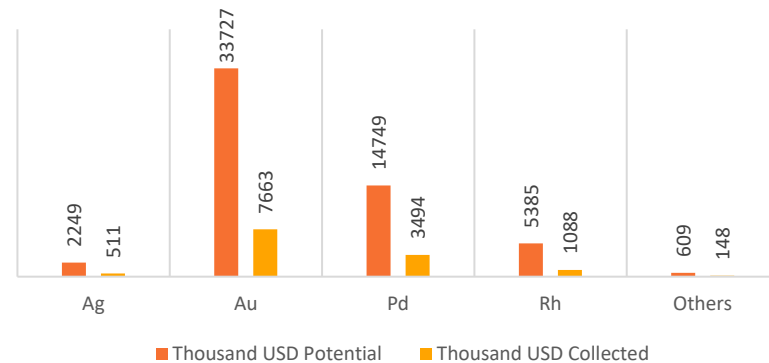
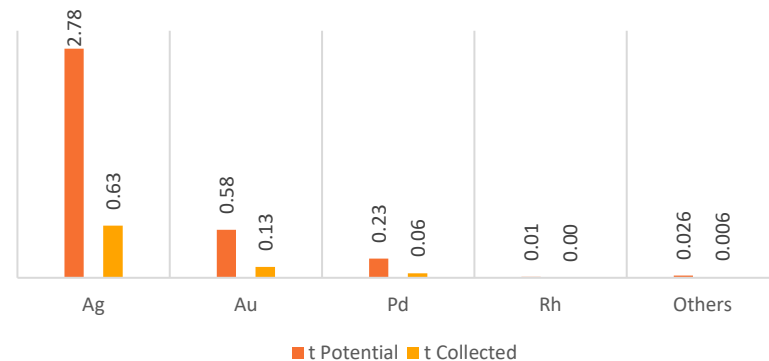
E-waste generated in the CIS+ region represents a total value of **200 billion Russian rubles** (equivalent to \$2.6 billion USD) of secondary raw materials.

E-waste economic value in Western Balkans

- Regionally, in 2021, **\$144 million USD (18 kt)** of **secondary raw materials** embedded in the e-waste were potentially available, out of which **\$34 million USD (4.2 kt)** was collected and recovered.



- Precious metals collected in 2021 versus their collection potential in tonnes (above), and their monetary value (below) in thousands of USD. Ir, Os, Pt and Ru are clustered as others.



CIS+Georgia Monitor from 2021 and the upcoming Western Balkans monitor

Overview of national legal frameworks

Country	Legislation/Regulation Specific on E-waste	EPR Relating to E-waste	Status of E-waste EHS
Armenia	✘	⚙️	✘
Azerbaijan	✘	✘	✘
Belarus	✘	✓	✓
Georgia	✓	✓	✓
Kazakhstan	✘	✓	⚙️
Kyrgyzstan	✘	✘	✘
Moldova	✓	✓	✓
Russia	✘	✓	✘

Dashboard of e-waste management system and performance

Country / Region	Legislation (5 indicators)	Infrastructure (2 indicators)	Collection Rate	E-waste Generated
EU-27	●●●●●	●●	●●●●●	●●●●●●●●
CIS +	●●●●●	●●	○	●●●●○
Georgia	●●●●●	●●	○	●●●●●
Moldova	●●●●●	●●	○	●●
Russia	●●●●●	●●	○	●●●●●●●
Belarus	●●●●●	●●	●●●●○	●●●●○
Kazakhstan	●●●●●	●●	●	●●●●●
Ukraine	●●●●●	●●	*	●●●●●
Tajikistan	●●●●●	●●	○	●
Armenia	●●●●●	●●	○	●●
Uzbekistan	●●●●●	●●	○	●●
Azerbaijan	●●●●●	●●	○	●●●●●
Kyrgyzstan	●●●●●	●●	○	●
Turkmenistan	●●●●●	●●	○	●●●○

In total 17 country profiles

Moldova

3.5 million inhabitants
 33,846 km²
 Borders: Romania and Ukraine
 GDP per capita PPP: \$6,725 USD
 Average household size: 2.8 members

Legislation:
 ●●●●●
Infrastructure:
 ●●●●●
Collection Rate:
 0.8%

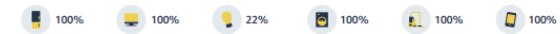
Legend:

- Advanced
- Transition
- Basic

National legislation on e-waste:

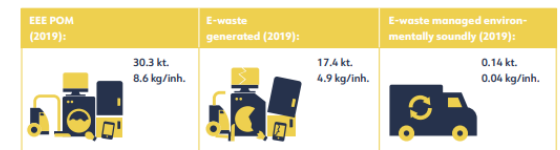
Extended Producer Responsibility: ✓ Introduced in 2016
National e-waste standards: ✓ Since 2018 on e-waste collection and materials treatment and recycling
E-waste collection target: ✓ 10% of EEE POM in 2021, to be increased annually by 5% until 30% in 2025

Legislation product coverage in UNU-KEYS: 49 of 54
Legislation product coverage in weight (%) on total and per category: Total: 99% of the e-waste generated in 2019



International Conventions:

	Signature	Ratification/Accession	Entry into force
Basel Convention	-	02/07/1998 (a)	30/09/1998
Rotterdam Convention	-	27/01/2005 (a)	27/04/2005
Stockholm Convention	23/05/2001	07/04/2004	06/07/2004
Minamata Convention	10/10/2013	20/06/2017	



(Source: Ministry of Agriculture, Regional Development and Environment)

Formal/environmentally sound e-waste management system in place:

✓ 2 private companies dealing with e-waste handling.

Central Asia Monitors 2023-2024

Kazakhstan,
Kyrgyzstan,
Tajikistan and
Uzbekistan

Method:

- Training of NSOs of the 4 countries
- Analysis of core statistics, e-waste legislation, management infrastructure
- Projections to 2050, environmental, metal resources, economic impact
- Stakeholder consultations
- National roadmap to improve e-waste management
- National Forums
- National launch events



National E-waste Monitor - Kazakhstan
published in 2023 and available at:

<https://ewastemonitor.info/>

Central Asia Monitors

The “**E-Waste Collected Tool**” is an interactive tool for setting e-waste collection targets to explore the resulting amounts of managed and unmanaged waste from 2020 to 2050.

It allows users to calculate the corresponding recovered and lost materials, their value and the associated compliant recycling costs, and the environmental and socio-economic impacts due to release of hazardous substances and loss of valuable materials for Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan.

Select Country

Select Management Base Year

Select Management Cycle Duration

Select Granularity of Collection Targets & Data

Enter Required Collection Rate Targets

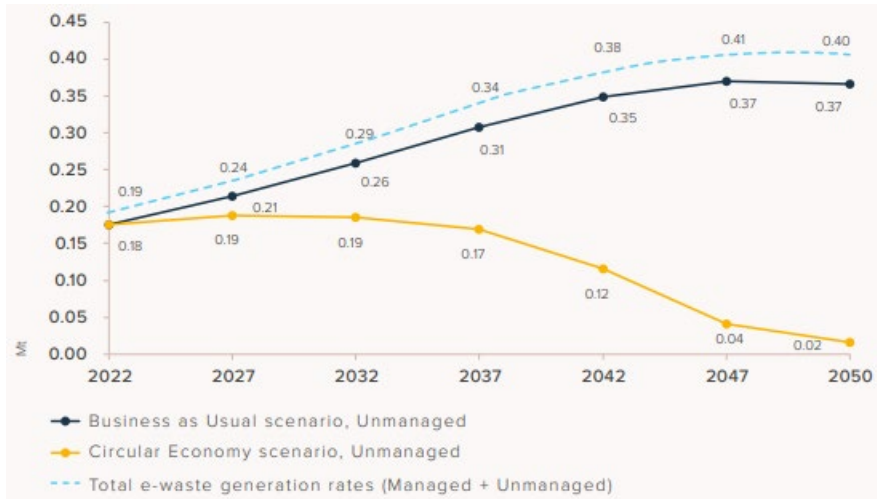
Country

KAZ	
ARM	
AZE	2022
BLR	
GEO	5 years
KAZ	
KGZ	Waste
MDA	
RUS	
TJK	
TKM	
UKR	
UZB	

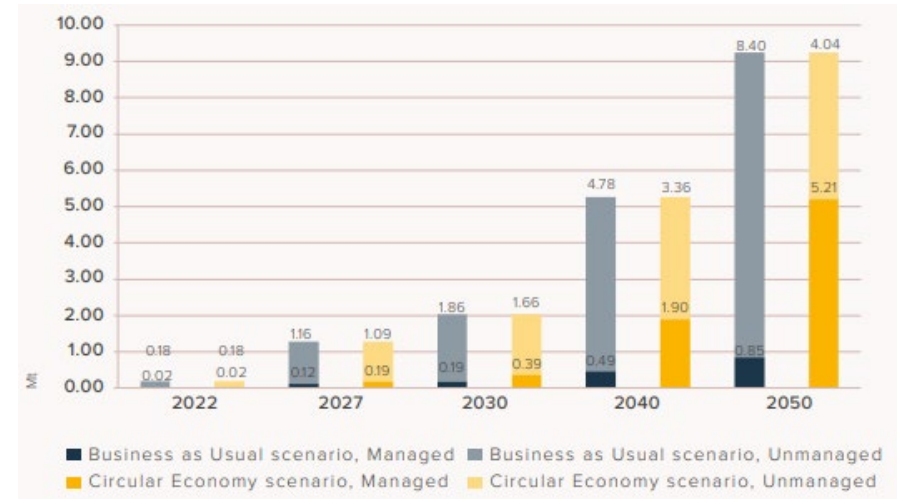
Toolkit available in English and Russian at:
<https://www.scycle.info/toolkit-to-assess-environmental-economic-impact-of-e-waste-management-from-2020-to-2050/>

National E-waste Monitor Kazakhstan

Projections of unmanage e-waste generation

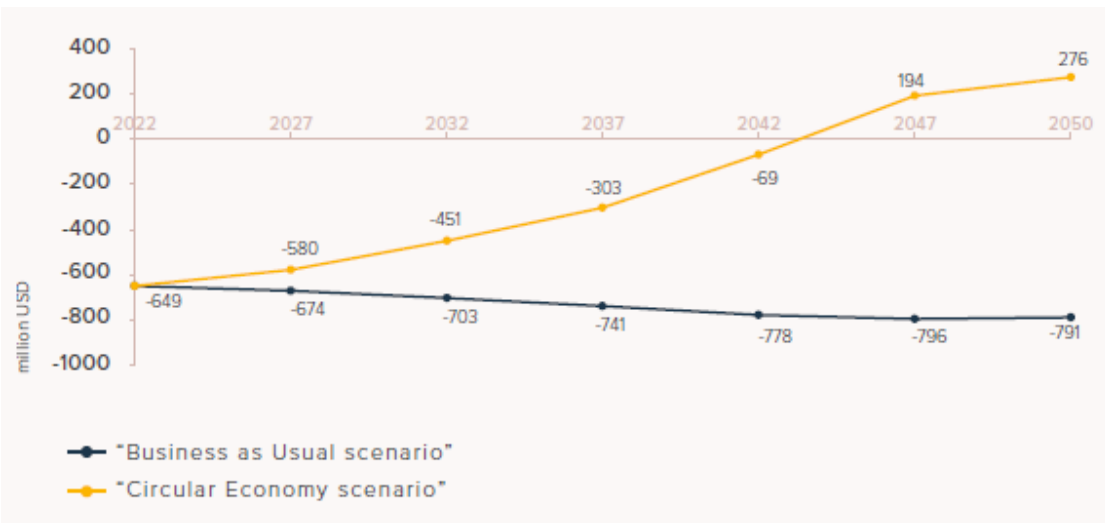


Total volumes of accumulated e-waste under two scenarios of e-waste management



National E-waste Monitor Kazakhstan

Economic analysis



Benefits of the circular economy scenario

More valuable metals as secondary resources

- 130 kt of copper
- 12 t of gold
- 5.3 t of palladium

Less hazardous chemicals emitted in environment:

- 650 t of lead
- 1 t of mercury
- 5 t of CFCs
- 4000 t HCFCs

National E-waste Monitor Kazakhstan

National Roadmap

N°	ACTIVITIES	DEADLINES	COMPLETION FORM	EXECUTORS
Development of infrastructure and improved technology for e-waste collection and recycling				
1.	Develop an action plan to introduce e-waste recycling technologies with the mandatory implementation of BAT, launching technological lines for the depollution of hazardous components of e-waste, including recycling of lithium-ion batteries	2024/2025	Action plan for the implementation of e-waste recycling technologies	Local Executive Bodies; EPR Operator.
2.	Include the development of infrastructure for collecting e-waste from the population in the local waste management programs developed by local executive bodies	2024-2025	Approved waste management programs of districts and cities	Local Executive Bodies; EPR Operator.
3.	Stimulate formalisation of the informal sector, facilitate the process of transition to formal activities, and include them in the e-waste management system	2025-2027	Company Map/Report	EPR Operator; Local Executive Bodies; Recyclers/collectors of e-waste.
Necessary measures to support the e-waste collection and recycling sector				
1.	Amend the tax legislation of Kazakhstan on tax benefits for specialised enterprises in the field of collection and recycling of e-waste for the duration of the approbation	2025-2026	Updated Tax Code of the RK	Ministry of Ecology and Natural Resources; Ministry of Finance Industry Business Associations.
2.	Improve financial and non-financial reporting for the distribution of recycling fees	2023	Reports to Ministry of Ecology and Natural Resources	EPR Operator.
3.	Train e-waste management companies on how to attract investment and obtain grants and soft loans	2023-2025	Records of events Event reports	Industry business associations; NGOs; Development institutions.
4.	Development of recommendations to encourage manufacturers and importers to switch to their own e-waste collection system	2024	Report	Industry business associations; NGOs.
Capacity-building and stakeholder awareness on e-waste management and community outreach				
1.	Conduct consultative seminars, roundtables for government agencies on environmentally sound handling of e-waste, EPR, familiarisation with international directives and initiatives on e-waste management, etc.	2023-2025	Records of events Event reports	Industry business associations; NGOs; Development institutions.
2.	Conduct training seminars to improve the competence of producers and suppliers of EEE, industry associations, e-waste educators, specialised waste management companies	Annually	Records of events Event reports	Producers/importers; Local executive bodies; All stakeholders.
3.	Conduct information campaigns for the public on the negative impact of e-waste on the environment and human health	Annually	Records of events Event reports	Producers/importers; Local executive bodies; All stakeholders.
4.	Conducting information work on the need to comply with legal requirements for the collection and recycling of electronic waste	2024-2025	Reports on activities	Producers/importers; Local executive bodies; All stakeholders.

Upcoming e-waste work in the region

2023

- November
 - Publication of Western Balkans Monitor (17 November)
 - National E-waste forum in Tashkent (27-29 November)
- December
 - Publication of global e-waste monitor (14 December)

2024

- Quarter 1
 - consultations in Tajikistan
 - Launch of Kyrgyz e-waste monitor (February)
 - Central Asian e-waste forum in Bishkek (February)
 - Start new project in Azerbaijan. E-waste monitor + research on informal sector + e-waste household surveys
 - Start new project in Turkmenistan. Update of country profile + statistical training
- Quarter 2 or 3
 - National e-waste forum in Tajikistan
 - Launch event Uzbekistan monitor
- Quarter 4
 - Launch event Tajikistan monitor



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www.scycle.info

