NATIONAL E-WASTE MONITOR
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Authors
Cornelis Peter Baldé, Rohit Panchal, Vanessa Forti

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TABLE OF CONTENTS

ABBREVIATIONS AND DEFINITIONS

POM	Placed on Market
EEE	Electrical and Electronic Equipment
UNU	United Nations University
HS	Harmonized Commodity Description and Coding System
EU	European Union
WEEE	Waste Electrical and Electronic Equipment
EPR	Extended Producer Responsibility
ESM	Environmentally Sound Management
CRT	Cathode Ray Tube
FPD	Flat Panel Display
PV	Photovoltaic
BFR	Brominated Flame Retardant
PBDE	Polybrominated diphenyl ethers
PROs	Producer Responsibility Organizations
UNU-KEYS	E-waste classification developed by United Nations University
UNDP	United Nations Development Programme
UNITAR	United Nations Institute for Training and Research
kt	Kiloton (1 000 000 kg)
kg	kilogram
t	Tonnes (1000 kg)
Mt	Mega tonnes (1 000 000 000 kg)

EXECUTIVE SUMMARY

This report examines the overall statistics of electronic and electrical equipment (EEE) placed on the market (POM), the national stock and its subsequent e-waste generation, its disposal routes, and e-waste collection for environmentally sound management. The main findings are that 63 kt EEE were placed on the market in Lebanon in 2021, entering the stock of households and businesses. The total stock of EEE in Lebanon in 2021 is calculated at 659 kt. Once devices are broken or unused, the household survey suggests that repair and donation are the predominant intentions of Lebanese households, which is likely to extend the lifespan of the EEE. In 2021, 46 kt of e-waste was discarded from the stock and became e-waste. Once discarded, waste management infrastructure is lacking, and e-waste ends up with the municipal solid waste or is collected by the informal sector. As a result, of the 46 kt e-waste generation in 2021 only 0.09 kt was documented by two e-waste national dismantling entities in Lebanon to have been managed in an environmentally sound manner.

The statistical data can be used for national purposes to plan the number and the capacity of e-waste collection points and e-waste pre-treatment facilities, as well as for the financial planning of recycling fees and the setting of national collection targets to ensure that all e-waste will be properly managed. The statistical data can also be used for international reporting needs under Sustainable Development Goal 12 on sustainable consumption and production – specifically for indicator 12.4.2 on hazardous waste management and for indicator 12.5.1 on national recycling rates, both of which contain sub-indicators for e-waste.

It is very likely that the vast majority of e-waste is not managed in an environmentally sound manner. It might be that some cherry picking of valuable components is happening and that remaining materials are then dumped, or that entire devices are ending up in sanitary landfills or open dumpsites. This poses a risk to the environment and to the safety of workers, as e-waste contains hazardous materials that need to be separately and adequately managed. Calculations show that 71 kg of mercury, 81 t of lead and 63 t of polybrominated diphenyl ethers were added to the Lebanese e-waste stream in 2021. In addition, managing e-waste is an economic opportunity, as e-waste contains valuable materials, such as 19.5 kt iron and 2.5 kt aluminium in 2021.

To improve e-waste management in Lebanon, several practical steps need to be undertaken.

1. Design specific legislation on e-waste. Lebanon has a general Hazardous Waste Management Framework Decree, which includes e-waste. However, the country does not have a specific decree addressing the specific issues around e-waste management, such as assigning clear roles and responsibilities, the creation of a licensing system, and the establishment of a wide network of collection points or collectors able to separately collect all e-waste generated at the source. Such legislation should also be aligned with circular economy principles.

2. Introduce a financing mechanism in the legislation, such as extended producer responsibility or a polluter pays principle. Another possibility is to enact an import levy on all EEE to ensure that sufficient finances are available to maintain a sustainable e-waste management system. The transparency of the costs for running the system is important, as well as setting clear and independent monitoring protocols to yearly evaluate the effectiveness of the system.

3. Enforce legislation for all stakeholders and strengthen monitoring, statistics, and compliance mechanisms across the country to ensure a level playing field for all. The monitoring as performed in this report should be repeated on an annual basis for all EEE POM, for all e-waste that is generated, and for e-waste that is soundly managed through legislation, and it is recommended to ensure this through dedicated articles in the legislation.

4. Create favourable investment conditions for experienced recyclers and dismantlers to bring the required technical expertise to the country. A Lebanese e-waste management system could focus on establishing a wide network of decentralised collection sites and a centralized pre-processing site, which would include manual and mechanical treatment steps. These could establish business relations with international treatment facilities to ensure the end-processing of the e-waste generated locally (e.g., recovery of materials where smelters are needed).

5. Create a licensing system or encourage certification via international standards for collection and recycling. This ensures an international level playing field and that Lebanon does not end up as an importer of non-hazardous e-waste fractions with low environmental standards and resource efficiency or, even worse, through illegal imports of hazardous e-waste.

6. Develop a wide network of collection points or pick-up services to facilitate separate collection of the generated e-waste. The drop-off centres and points are to be distributed strategically and geographically through a properly designed overall plan. This should also include a programme for retailers to take back the EEE that they previously sold, the collection of smaller e-waste in supermarkets, etc.

7. Access to international recyclers. Lebanon does not have local end-processing facilities to manage specific e-waste fractions, such as printed circuit boards. However, it does have the capacity to perform the pre-treatment phase to separate the main components (e.g., printed circuit boards, compressors) and to recover some materials (e.g., iron, copper, plastics, etc.) and properly dismantle hazardous components. Lebanon can then explore possibilities to trade the products both nationally and internationally and to get access to international licensed treatment facilities for the treatment of complex components.

8. Improve awareness of e-waste stakeholders. Ensure that all stakeholders involved in placing EEE on the market, in e-waste collection, and in recycling are aware of the potential negative impacts on the environment and human health, as well as approaches to the environmentally sound treatment of e-waste.

9. Improve awareness of the general public. Create targeted awareness campaigns among consumers regarding a circular economy and its environmental benefits.

10. Strengthen the technical skills and networks of e-waste managers and public authorities. Ensure that e-waste managers have the skills and networks to legislate, monitor, and handle e-waste.

1.
INTRODUCTION

1.1 What is E-waste?

E-waste refers to all electrical and electronic equipment (EEE) and its parts that have been discarded by its owner as waste without the intent of reuse (Step Initiative, 2014). It includes a wide range of products – almost any household or business item with circuitry or electrical components with power or battery supply. Economic development and rapid changes in technology have made e-waste the fastest growing waste stream globally. This growing e-waste poses a threat to the environment, but at the same time it provides a business opportunity to extract common, precious, and critical raw materials embedded in e-waste. There are six main categories of e-waste as defined by international guidelines on e-waste statistics [Forti et al., 2018]:

1. temperature exchange equipment
2. screens and monitors
3. lamps
4. a. large equipment (excl photovoltaic panels)
    b. photovoltaic panels, including inverters
 5. small equipment
 6. small IT and telecommunication equipment

The six categories have each of them a distinct size, hazardous materials that need to be depolluted, and valuable materials that can be extracted. The six categories can be further detailed using the product oriented UNU-KEYS classification. The correspondence table of the UNU-KEYS and six e-waste categories are shown in Annex 1.

1.2 Why Does E-Waste Need Attention?

In 2019 the world generated a striking 53.6 Mt of e-waste, an average of 7.3 kg per capita. Asia generated the highest quantity of e-waste in 2019 at 24.9 Mt, followed by the Americas (13.1 Mt) and Europe (12 Mt), while Africa and Oceania generated 2.9 Mt and 0.7 Mt, respectively. Among the total e-waste generated, only 17.4 per cent is documented to have been collected and recycled. The fate of the remaining 82.6 per cent is unknown [Forti et al., 2020]. The global statistics of e-waste generation and flows are shown in Figure 1.

Global Scenario of E-waste Generation

17.4 % Documented
to be Collected and Recycled

53.6 Mt
(7.3 kg per Capita)

82.6 % Unknown

Asia
(24.9 Mt)

Americas
(13.1 Mt)
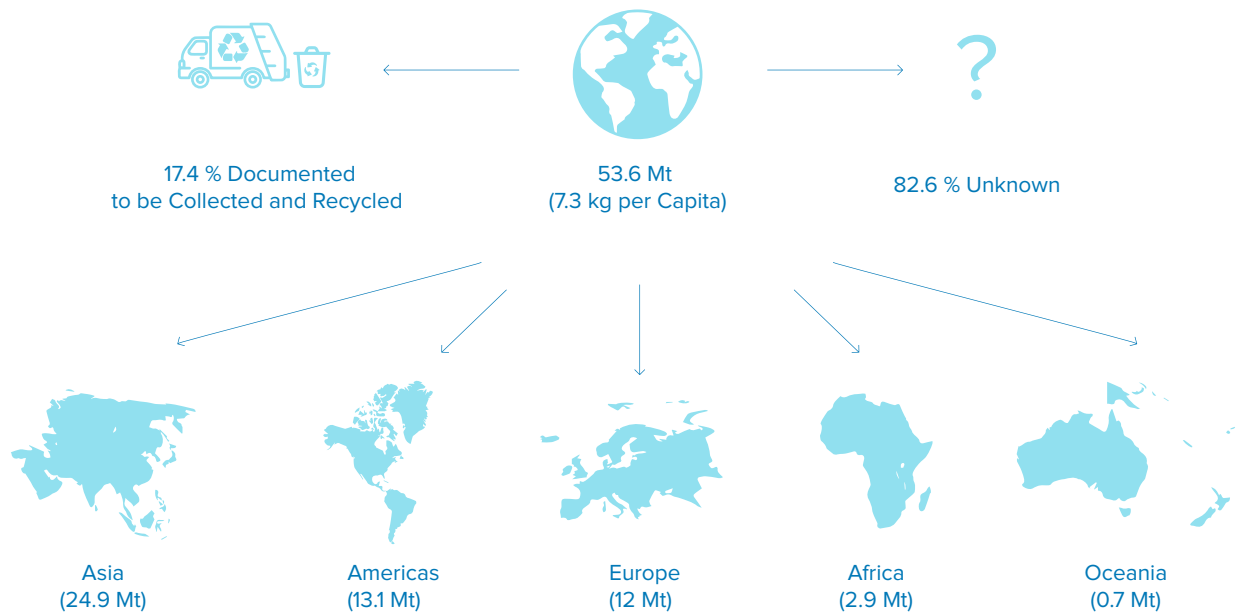
Europe
(12 Mt)

Africa
(2.9 Mt)

Oceania
(0.7 Mt)

Figure 1 – Global E-waste Generation and flows (Forti et al., 2020).

The e-waste statistics, legislation and management infrastructure were assessed in the Arab Regional E-waste Monitor[1] in 2021 and placed in an international context. The e-waste generated in the Arab region[2] is about 2.8 Mt, almost similar to the entire African continent. It is alarming that the e-waste collection for environmentally sound management (ESM) in the Arab region is only 2.2 kt, which means the collection rate is only 0.1 per cent [Iattoni et al., 2021]. Furthermore, the data on collection and ESM of e-waste is available for only four countries: Jordan, Qatar, State of Palestine, and United Arab Emirates. The other countries in the Arab region lack the collection network and infrastructure for ESM, and hence they do not have e-waste statistics [Iattoni et al., 2021]. Globally, legislation on e-waste and their extended producer responsibility (EPR) has been implemented in several countries, but the Arab region does not yet have any such specific legislation.

The Arab Regional E-waste Monitor concluded that e-waste management infrastructure was only basic throughout the Arab region [Iattoni et al., 2021]. Some initiatives on the ESM of