The United Republic of Tanzania

National E-Waste Statistics Report, 2019

Tanzania Mainland

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National E-Waste Statistics Report, 2019

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Abbreviations and Acronyms

Be	Beryllium
Cd	Cadmium
CPCT	Cleaner Production Centre of Tanzania
CRT	Cathode Ray Tube
EEE	electrical and electronic Equipments
EMA	Environmental Management Act
EU	European Union
FYDP	National Five Year Development Plan
GEM	Global E-waste Monitor
GIZ	Germany International Cooperation
GPS	Geographical Positioning System
ICT	Information and Communications Technologies
IT	Information Technology
LED	Light Emitting Diodes
LGAs	Local Government Authorities
MEAs	Multilateral Environmental Agreements
Mt	Metric tonnes
NBS	National Bureau of Statistics
NEMC	National Environment Management Council
NEWS	National E-Waste Statistics
NGOs	Non- Governmental Organisations
Pb	Lead
PHC	Population and Housing Census
POM	Put on Market
SDGs	Sustainable Development Goals
SIDP	Sustainable Industrial Development Policy
TBS	Tanzania Bureau of Standards
TCRA	Tanzania Communications Regulatory Authority
TRA	Tanzania Revenue Authority
UNEP	United Nations Environment Program
UNIDO	United Nations Industrial Development Organization
UNU	United Nations University
URT	United Republic of Tanzania
VPO	Vice President's Office
WEEE	Waste Electrical and Electronic Equipments

Foreword

E-waste has become an important environmental and public health issue, not only at global scale but also in low- and middle income countries as well. Many of Electrical and Electronic Equipments (EEE) contain hazardous chemicals and materials. For this reason, inadequacies in recycling and disposing of electronic waste (e-waste) can cause serious health and environmental pollution problems. Great care must be taken to prevent unsafe exposure in recycling operations and prevent contamination of the environment. In recognition of the potential environmental and health impact of e-waste, many countries have embarked on programs for e-waste management. The e-waste management programs are implemented as either specific e-waste policies or in a form of legislations. Availability of data on e-waste is therefore of paramount importance in these endeavors.

The National E-Waste Statistics Report, 2019 (NEWSR, 2019) is the first comprehensive analytical report on e-waste statistics in Tanzania Mainland. Most of the prior studies on e-waste conducted in Tanzania Mainland were limited in scope of EEE covered, or were primarily focused on addressing gaps in environmental legislations to give more impetus to e-waste issues. The NEWSR, 2019 features analysis of data on importation of EEE in Tanzania Mainland from Tanzania Revenue Authority (TRA); data on mobile phone subscriptions from Tanzania Communication Regulatory Authority (TCRA) and the selected stock data of EEE from Household Budget Surveys conducted by the National Bureau of Statistics. Capacity building on compilation of e-waste statistics and tools for data analysis were provided by the SCYCLE team from the United Nations University (UNU). The NEWSR, 2019 presents statistical estimates in the following dimensions of e-waste namely:- EEE Put on Market (POM); e-waste generated; stock and the penetration rate of some Information and Communication Technology (ICT). Due to lack of data, other dimensions of e-waste such as e-waste formally collected; recycled; imported and exported and the e-waste collection rate were not explored in this report.

The NEWSR, 2019 has helped shed light on the problem of e-waste in Tanzania, which had remained largely unknown. The report will be useful in various national programs for e-waste management, especially the National Environmental Policy (NEP), which is being reviewed to incorporate the emerging environmental challenges such as climate change and e-waste. The report is also useful in monitoring of the Sustainable Development Goals (SDGs), especially goals number 3, 6, 8, 11, 12 and 14 which are relevant with issues of e-waste.

Production of NEWSR, 2019 is a result of technical cooperation between the National Bureau of Statistics (NBS); the National Technical Working Group (NTWG) for environment statistics; and the United Nations University (UNU). The financial resources were provided by the Government of the United Republic of Tanzania; Germany International Cooperation (GIZ); the United Nations Environment Program (UNEP); and the Global e-waste Statistics Partnership. For this reason, I would like to extend my sincere gratitude to UNU, and particularly, Dr. Kees Baldé and Vanesa Forti for their invaluable technical contributions in compilation of this report. I am also very appreciative of the financial contributions of the GIZ, UNEP and the Global e-waste Statistics Partnership which facilitated this monumental work for e-waste statistics in Tanzania Mainland. I also reserve special thanks to the NTWG members from the Ministries, Departments and Agencies (MDAs) for their tireless efforts in ensuring this report is of the expected quality. Appreciations are particularly extended to Ruth Minja, the Acting Director for Population Census and Social Statistics; and the Environment Statistics and Further Analysis Departmental Manager at NBS; Jafari chobo (Tanzania Metorological Agency), Chairperson for the NTWG; Ndalu Youbert Amos (National Environment Management Council); Diana Kimbute (Ministry of Water and Irrigation); Jackson Birore (Ministry of Mineral); Dr. Annes Mahembe (Ardhi University); Deogratius Malamsha; Pius Kaskana; John Lyakurwa;

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Dr. Albina Chuwa,
Statistician General,
National Bureau of Statistics.

Executive Summary

The rapidly expanding use of Information and Communications Technologies (ICTs) has increased demand for electric and electronic Equipments. Increased consumption of these Equipments has come with the environment and health cost due to huge amounts of e-waste generated from scrapped electrical and electronic Equipments. Tanzania faces challenges on availability of e-waste data as estimates are scanty and sporadic, this makes e-waste problem largely unknown in the country. Unavailability of data impedes on country's programs for better management of e-waste and the monitoring of the Sustainable Development Goals (SDGs).

According to the Global E-Waste Monitor (GEM) estimates, by 2016, the annual global consumption of new electrical and electronic Equipments (EEE) was around 60 million metric tonnes (Mt). The consumption and use of EEE is probably most prevalent in the developed countries, but developing countries have also shown a rapid growth of consumption and use of EEE in recent years. The annual consumption of new EEE in developing countries increases by 10 percent to 25 percent annually. The GEM estimates also indicated the global e-waste generated reached about 44.7 million metric tonnes in 2016. This was equivalent to 6.1 kilogram per inhabitant (kg/inh.) of e-waste annually.

Moreover, GEM estimates that in 2016, domestic e-waste generation in Africa was approximately 2.2 Mt. Currently, little information is available on the amount of e-waste documented that is collected and recycled by the formal sector in Africa. Only a handful of countries in the continent have enacted e-waste-specific policies and legislation. Recycling activities are dominated by ill-equipped informal sectors, with related inefficient resource recovery and environmental pollution. Most African countries are currently developing various models of Extended Producer Responsibilities (EPR) schemes as part of their solution to the e-waste problem.

With regards to the possession of EEE at country level from the Household Budget Surveys (HBS), Proportion of households owned mobile phones have increased significantly, from nearly three in ten households (24.5 percent) in 2007 to nearly in 8 in ten households (78.1 percent) in 2017/18. On the other hand, possession of televisions at households has also shown an increase trend from 2.6 percent in 2001 to 23.9 percent in 2017/18.

Findings from this report indicate amount of EEE put on the market in Tanzania Mainland has increased from 21,692 tonnes in 1998 to 47,504 tonnes in 2017, with much of the increase observed from 2005 to 2017. EEE put on the market per inhabitant has also slightly increased from 0.72 kg/ inh to 0.93 kg/ inh over the same period. The findings also indicate large equipment account for the bigger share in the composition of EEE put on the market; however, small equipments are increasingly becoming prominent in recent years. The findings further indicate that, E-waste generated has increased from about 2000 tonnes in 1998 to 35,755, tonnes in 2017. E-waste generated per inhabitant has also been on the raise, from 0.01 kg per inhabitant (kg/inh.) in 1998 to 0.70 kg / inh. in 2017.

Table 1. 1: Summary of Key findings from the National E-Waste Statistics Report, 2019 in Tanzania Mainland

Key Indicators for E-Waste Statistics from 1998 - 2017	Value
Total Amount of EEE Put on Market, ("000" Tonnes, 2017)	**47,504**
Total Amount of EEE Put on Market by Categories ("000" Tonnes, 2017)	
Temperature exchange equipment	7,727
Screens, monitors, and equipment containing screens	2,612
Lamps	794
Large equipment (excluding photovoltaic panels)	20,865
Small equipments	13,893
Small IT and telecommunication equipments	1,612
Amount of EEE Put on Market per Inhabitant (Kg/ Inhabitant, 2017)	0.93
Total Amount of E-waste Generated (Tonnes, 2017)	**35,755**
Total Amount of E-waste Generated (Tonnes, 2017) by Categories	
Temperature exchange equipment	4,832
Screens, monitors, and equipment containing screens	1,878
Lamps	685
Large equipment (excluding photovoltaic panels)	18,980
Small equipments	7,884
Small IT and telecommunication equipments	1,496
E-Waste Generated per Inhabitant (Kg/ Inhabitant, 2017)	0.70
Mobile-Cellular Subscriptions (Million), 2018	43.6
Mobile-Cellular penetration (percent) (2018)	81.0
Number of interment users (million) (2018)	23.1
Interment penetration (percent)(2018)	43.0

Chapter One

Global and National Context of E-waste

1.1. What is E-Waste?

Electronic waste, or e-waste, refers to all items of electrical and electronic Equipments (EEE) and its parts that have been discarded by its owner as waste without the intent of re-use (Step Initiative 2014). E-waste is also referred to as Waste Electrical and Electronic Equipments (WEEE), electronic waste or e-scrap in different regions and under different circumstances in the world. It includes a wide range of products; almost any household or business item with circuitry or electrical components with power or battery supply.

Many of electronic Equipments contain hazardous chemicals and materials such as Lead (Pb), Cadmium (Cd), Beryllium (Be), or Brominated Flame Retardants. For this case, inadequacies in recycling and disposing of electrical and electronic waste can cause serious health and environmental pollution problems. Great care must be taken to prevent unsafe exposure in recycling operations and prevent leaching of these hazardous materials, such as heavy metals from landfills and incinerator ashes.

In addition to various hazardous materials, e-waste also contains many valuable and precious materials which could be mined and re-used. For instance, a normal Cathode Ray Tube (CRT) computer monitor contains many valuable but also many toxic substances. One of these toxic substances is Cadmium which accumulates in the environment and is extremely toxic to humans in particular adversely affecting kidneys and bones.

Due to its hazardous components, e-waste has become an important public health and environmental concern in many countries, and exceedingly so in developing countries where inadequate e-waste management infrastructure and informal recycling aggravate the problem. Liquid and atmospheric releases of hazardous materials in e-waste end up in bodies of water, ground water, soil and air which could affect directly or indirectly health and environment. For this reason, availability of data to inform on e-waste management is of paramount importance for environmental and public health planning and decision making, and for monitoring of the Sustainable Development Goals (SDGs).

1.2. Global Context of E-Waste

The rapidly expanding use of Information and Communications Technologies (ICTs) has increased demand for electric and electronic Equipments. Increased consumption of these Equipments has come with the environment and health cost due to huge amounts of e-waste generated from scrapped electrical and electronic Equipments. Tanzania faces challenges on availability of e-waste data as estimates are scanty and sporadic, this makes e-waste problem largely unknown in the country. Unavailability of data impedes on country's programs for better management of e-waste and the monitoring of the Sustainable Development Goals (SDGs), in particular SDG 12.5.1which has a sub indicator on e-waste.

According to the Global E-Waste Monitor (GEM) estimates, by 2016, the annual global consumption of new electrical and electronic Equipments (EEE) was around 60 Metric tonnes (Mt). The consumption and use of EEE is probably most prevalent in the developed countries, but developing countries have also shown a rapid growth of consumption and use of EEE in recent years. The annual consumption of new EEE in developing countries increases by 10 percent to 25 percent annually. The GEM estimates also indicated the global e-waste generated reached about 44.7 million metric tonnes in 2016. This was equivalent to 6.1 kilogram per inhabitant (kg/inh.) of e-waste annually.

The GEM also indicated that, in 2016, Asia was the region that contributed the largest amount of the global e-waste generated (18.2 million Mt, 40.7 percent); followed by Europe (12.3 million Mt, 27.5 percent); the Americas (11.3 million Mt, 25.3 percent); Africa (2.2 million Mt, 4.9 percent); and Oceania (0.7 million Mt, 1.6 percent). E-waste generated per inhabitant was the highest in Oceania with 17.3 kg/inh followed by Europe (16.6 kg/inh.); Americas (11.6 kg/inh.); Asia (4.2 kg/inh.) and Africa continent was the region with the least e-waste generated per inhabitant (1.9 kg/inh). E-waste collection rates ranged from 35 percent for Europe to 6 percent for Oceania. No information was available to account for Africa's e-waste collection. However, due to low levels of socio-economic development, Africa's e-waste collection rates are probably the lowest.

1.3. National Context of E-waste

Growth of an information society is becoming a common phenomenon in many developing countries, including Tanzania. This has resulted in an increase of users of Electrical and Electronic Equipments (EEE). For instance, Tanzania auspicious growth in the last decade has improved personal disposable income which in turn, has resulted in many people owning ICT devices.

Findings from the 2012 Population and Housing Census (PHC) indicated that, six in ten households (61.6 percent) owned a radio, and 63.9 percent of households owned a mobile or land line phone. In addition, 15.6 percent owned television, 10.0 percent owned electric irons and 6.8 percent owned refrigerators. The 2012 PHC report also indicated that, about 2.7 percent of households owned a computer or a laptop and 4.7 percent of households had access to internet. Consistent economic growth and technological advancement will increase substantially ownership of EEE in the foreseeable future.

With regard to the national context of e-waste, the Guidelines for Management of Hazardous Waste of the Vice Presidents Office, 2013 estimated that, the total e-waste generated was between 18,000 and 33,000 tonnes annually. Unavailability of data makes e-waste problem largely unknown in Tanzania, which impedes on country's programs aiming at better management of e-waste and also thwarting efforts in monitoring SDGs. However, there have been numerous efforts by the Government and environmental stakeholders to address the situation. Based on the URT-State of Environment Report, 2014, the projected amount of e-waste generated from computers alone was about 2,300 tonnes annually. According to this report, the average distribution of sales of new computers was 50 percent to the government, 40 percent to the private companies and 10 percent to private households and small businesses. The report also estimated that, the average life of computers was 4 years in government and most of its agencies and private sector and 8 years in households and small businesses.

Most of studies on e-waste conducted in Tanzania so far were either limited to exploring potential e-waste generated from a few Electrical and Electronic Equipments (EEE); or were focused in addressing gaps in e-waste legislations. The National E-Waste Statistics Report (NEWSR, 2019), is therefore the first comprehensive report on e-waste in Tanzania. The NEWSR, 2019 features analysis of data on importation of EEE in Tanzania Mainland from Tanzania Revenue Authority (TRA); data on mobile phone subscriptions from Tanzania Communication Regulatory Authority (TCRA) and the selected stock data of EEE from Household Budget Surveys conducted by the National Bureau of Statistics.

The NEWSR, 2019 presents statistical estimates in the following dimensions of e-waste, namely:- EEE Put on Market (POM); e-waste generated; stock and the penetration rate of some Information and Communication Technology (ICT). Due to lack of data, other dimensions of e-waste such as e-waste formally collected; recycled; imported and exported and the e-waste collection rate were not explored in this

report. NEWS report will help to evaluate trends of e-waste over time, set and assess targets, and identify best practices in managing e-waste and environment in Tanzania.

1.4. E-Waste Policies and Legislation in Tanzania

1.4.1 E-Waste Policies

According to a study conducted by Tanzania Communications Regulatory Authority (TCRA) in 2012 regarding the Electronic Waste Management in the country, Tanzania has no specific policy on e-waste management. However, there are a number of policies that are in existence which aim at protecting the environment and human health. Among the identified policies relevant to e-waste management include: - the Sustainable Industrial Development Policy (SIDP) 1996 –2020; National Environment Policy (1997) which is currently under review; National Water Policy (2002); National Energy Policy (2003); National Trade Policy (2003); National Health Policy (2003); and National Information and Communications Technologies (ICT) Policy (2003). An overview of objectives of the e-waste related policies and their relevancy to e-waste management are outlined in Table 1.

Table 1. 2: An overview of e-waste related policies and their relevancy to e-waste

Policy	Policy objectives	Relevancy to e-waste management
The Sustainable Industrial Development Policy (1996- 2020).	To achieve sustainable industrial development.	Promotes industrial development with less Pollution. *Promotes efficient use of resources and recycling activities.*
National Environmental Policy (1997).	To ensure, sustainability, security and equitable use of resources to meet the basic needs of the present population without compromising those of the future generations without degrading the environment or risking health or safety.	Promotes health related programmes including food hygiene, separation of toxic or hazardous wastes and pollution control. *Proper e-waste management reduces pollution load to the environment and reduces risks to human health.*
National Water Policy (2002).	To ensure that beneficiaries participate fully in planning, construction, operation, maintenance and management of community based domestic water supply schemes.	Promotes prevention of pollution of water resources. *Efficient e-waste management system prevents pollution of water bodies*
National Energy Policy (2003).	To ensure availability of reliable and affordable energy supplies and their use in a rational and a sustainable manner in order to support national development goals.	Promotes use of energy efficient Equipments. *Promotes use of EEE and hence contributes to e-waste generation.*

Policy	Policy objectives	Relevancy to e-waste management
National Trade Policy (2003).	To raise efficiency and widen linkages in domestic production and building of a diversified competitive export sector as the means of stimulating higher rates of growth and development.	Promotes trade development, *Recovery of valuable fractions in e-waste could contribute to this policy*
National Health Policy (2007).	To improve the health of all Tanzanians, particularly those at high risk.	Encourages safe disposal of hazardous waste from health services including medical Equipments and devices. *E-waste contains hazardous substances*
National ICT Policy (2003).	To provide a national framework that will enable ICT to contribute towards achieving the national development goals; and to transform Tanzania into a knowledge-based society through application of ICT.	Promotes investments in ICT Promotes competitive development and production of ICT products and services Promotes establishment of direct relationships with manufacturers and designers of ICT resources. *E-waste recycling activities could lead to establishment of relationships with manufacturers and designers of ICT Equipments.*

1.4.2 E-Waste Legislation

There is no specific e-waste management law in Tanzania. However, e-waste management has been partly addressed in the Environmental Management Act (EMA), which is the principle legislation for environment conservation and protection in Tanzania. The Act sets out legal basis for administration and institutional framework for sustainable management of environment. It provides for the principles of environmental management; mainstreams environmental planning at various hierarchies of the government including setting the modality for public participation in preparation of National Environment Action Plans. The Act also provides for obligations to undertake environmental assessment; pollution prevention and control and waste management. However, the Act does not provide for explicit obligations on management of e-waste, but includes it collaterally under management of hazardous waste.

The Act also provides a basis for the implementation of the international instruments on environment including establishment of national offices and focal points for the implementation of international agreements on environment. The Act stipulates the roles of the Local Government Authorities (LGAs) in management and control of solid waste such as minimization, segregation, collection, transportation, storage, treatment and disposal of solid waste from various producers in their jurisdictions.

Other important legislations of particular relevance to e-waste management in Tanzania are: - Occupational Safety and Health Act, 2003 and Tanzania Bureau of Standards (TBS) Act No. 2 of 2009. The Occupational Safety and Health Act provides for the safety, health and welfare of persons at work in factories and other places of work; also makes provisions for protection of persons other than persons at work against hazards to health and safety arising out of activities of persons at work. The Act also includes specific provisions for

safety of electrical apparatus, fittings and conductors. On the other hand, the TBS Act provides for promotion of standardization of commodities, which is an important measure in preventing substandard commodities, including substandard Electronical and Electronic Equipments (EEE) from entering the market. Substandard EEE can aggravate the problem of e-waste due to their shorter life spans.

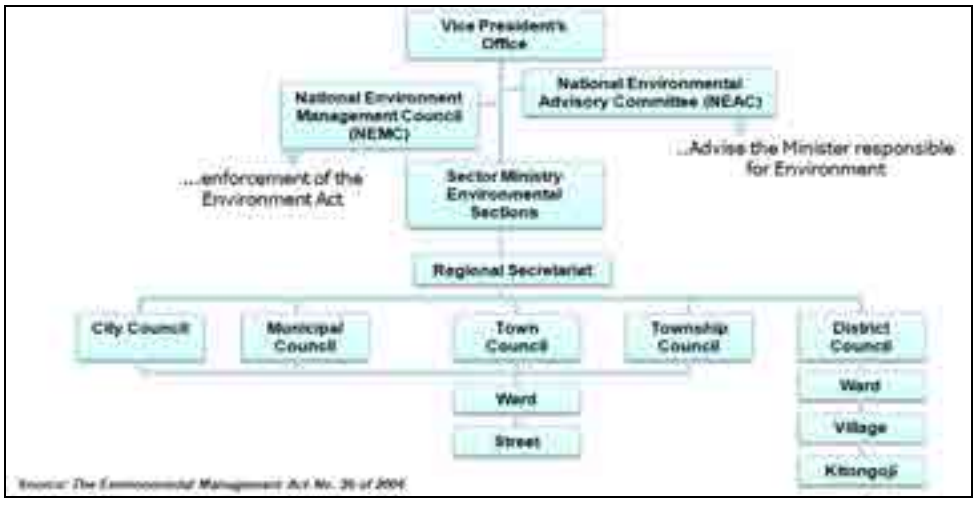
1.4.3 Institutional framework

The complexity of environmental problems requires collaborative actions from many stakeholders to address them. The Environmental Management Act (EMA) sets up the institutional framework to coordinate actions of various stakeholders for environmental management in Tanzania. In the laid institutional framework, the Vice President Office (VPO) is the lead institution and a flag bearer of environmental issues. The VPO holds the second-highest political position in Tanzania only behind the President's Office. Vesting of environment responsibilities at VPO ensures the agenda for the environment enjoys the utmost political will and prerequisite authority. Some of the environment related roles of the VPO include:- policy articulation; advocacy and implementation; monitoring and evaluation; environmental planning; environmental legislation; and international cooperation. The VPO is also the national focal point for Multilateral Environmental Agreements (MEAs).

According to EMA, other institutions for environmental management are: - sector ministries; Regional Secretarial; and Local Government Authorities (LGAs). LGAs are given specific obligations to minimize solid, liquid, and gaseous and hazardous wastes under their respective jurisdictions. Regional Secretarial are meant to provide regional coordination for environmental management, and sector ministries uphold environment related functions at ministerial portfolios.

The EMA also provides for establishment of the National Environment Management Council (NEMC). The object and purpose for which the Council is established is to undertake enforcement, compliance, review and monitoring of environmental impact assessment and in that regard, facilitating public participation in environmental decision making.

Figure 1.0: Institutional Framework for Environmental Management



1.4.4 International Conventions

Tanzania has ratified a number of international and regional conventions and agreements related to environmental management including the Basel Convention on Control of Trans-Boundary Movement of Hazardous Wastes and their disposal; and the Bamako Convention on Ban of the Import into Africa and Control of Trans-Boundary Movement and Management of Hazardous Wastes within Africa. The Bamako and Basel conventions are of particular relevance to e- waste management.

1.5. E-waste and its Relation to the Sustainable Development Goals

In September 2015, the United Nations and all member states adopted the ambitious 2030 Agenda for Sustainable Development. This new agenda identified 17 Sustainable Development Goals (SDGs) and 169 targets to end poverty, protect the planet, and ensure prosperity for all over the next 15 years. Increasing levels of e-waste, and improper and unsafe treatment, and disposal through incineration or in landfills pose significant challenges to the environment and human health, and to the achievement of the SGDs.

A better understanding and more data on e-waste will contribute in measuring progress towards achievement of several goals of SDGs related to health and environment; and also the National Five Year Development Plan II (FYDP-II), 2016/17 – 2020/21.

Measuring the progress of management of e-waste is addressed in the SDG 12.5.1. (national recycling rate), which has a sub indicator on e-waste. This currently defined as:

$$National\,recycling\,rate\,(\%) = \frac{Quantity\,of\,material\,recycled\,(kg) + quantity\,exported\,for\,recycling\,(kg)}{Total\,waste\,generated\,(kg)}$$

In the international guidelines on e-waste statistics, developed under the lead of UNU, defines e-waste generated. The amounts of the e-waste that are recycled are defined as activities that are usually under the requirements of national e-waste legislation. The final destination of this e-waste is in a treatment facility, where it recovers the valuable materials in an environmentally sound way.

Next to the specific sub-indicator on e-waste, management of e-waste is closely linked to several goals of the 2030 Agenda for Sustainable Development such as:- Goal 3 (Good health and Well-being); Goal 6 (Clean water and Sanitation); Goal 8 (Decent Work and Economic Growth); Goal 11 (Sustainable Cities and Communities); Goal 12 (Responsible Consumption and Production); and Goal 14 (Life Below Water).

Some health risks posed by inadequate disposal of e-waste include contamination of water sources, air, and soil. This put people's health at risk due to direct contact with harmful materials or inhalation of toxic fumes. Moreover, dismantling processes which do not utilize adequate means, facilities, and trained personnel pose additional threats to people and the planet. The specific SDGs targets and areas (themes) of (FYDP-II) that are relevant to e-waste management are addressed in the following matrix.

Table 1. 3: Sustainable Development Goals, Targets and Themes of FYDP-II that are relevant to e-waste management

SDGs Goal	SDGs Targets	FYDP II Themes
	Target 3.9 refers to the reduction of the number of deaths and illnesses caused by hazardous chemicals and air, water, and soil pollution and contamination.	Theme 3: Human Development
	Target 6.1 seeks to achieve universal and equitable access to safe and affordable drinking water for all; and Target 6.3 aims at reducing pollution, eliminate dumping, and minimize release of hazardous chemicals and materials.	Theme 3: Human Development
	Target 8.3 aims to promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity, and innovation, and to encourage the formalization and growth of micro, small, and medium-sized enterprises. Target 8.8 calls for the protection of labour rights and promotes safe and secure working environments for all workers, including migrant workers, particularly women migrants, and those in precarious employment. *The sound management of e-waste can create new employment and contribute to economic growth in the recycling and refurbishing 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 regulation (Brett et al. 2009; Leung, et al. 2008).* *It is therefore necessary to formalize the environmentally sound management of e-waste and to take advantage of the business opportunities it offers.*	Theme 1: Improving Macroeconomic stability & performance
	Target 11.6 aims to reduce the adverse per capita environmental impact of cities, by paying special attention to air quality and to municipal and other waste management. *Since over half of the world's population lives in cities, rapid urbanization requires new solutions to address rising environmental and human health risks, especially in densely populated areas. Most e-waste will be generated in cities and it is particularly important to properly manage e-waste in urban areas,*	Theme I: Industrialization and Economic Transformation Theme II: Human Development

SDGs Goal	SDGs Targets	FYDP II Themes
	improve collection and recycling rates, and to reduce the amount of e-waste that ends up in dumpsites. The move towards smart cities and the use of ICTs for waste management offer new and exciting opportunities.	
	Target 12.4 aims to achieve the environmentally sound management of chemicals and all waste throughout the life cycle, in accordance with agreed international frameworks, and to significantly reduce their release into air, water, and soil in order to minimize their adverse impacts on human health and the environment. Target 12.5 aims to substantially reduce waste generation through prevention, reduction, repair, recycling, and reuse. An increasing number of people on the planet are consuming growing amounts of goods, and it is critical to make production and consumption more sustainable by raising awareness levels of producers and consumers, specifically in the area of electrical and electronic Equipments .	Theme 3: Human Development
	Target 14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution. Target 14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans.	Theme 3: Human Development

Chapter Two

Methodology

2.1 E-waste classification

2.1.1 Criteria for e-waste classifications

There are many types of Electrical and Electronic Equipments (EEE) products on the market, which makes it important to group them into sensible and practically useful categories. A classification system for e-waste statistics should categorise EEE by similar function, comparable material composition (in terms of hazardous substances and valuable materials) and related end-of-life attributes. In addition, products within the same category should have a homogeneous average weight and life-time distribution, which can simplify quantitative assessment for similar products. Finally, large or environmentally-relevant e-waste products, for which a lot of data is potentially available, should be assigned separately. Currently, there is only one classification system that fulfils those criteria, namely the UNU-KEYS classification developed by the United Nations University (UNU) (Wang et al., 2012).

2.2 Statistical use of the UNU-KEYS

The UNU-KEYS can be used in several ways statistically. First of all, the UNU-KEYS has high correlation to other e-waste classifications, for instance, it can be used to convert the 6 and 10 EEE categories of the European Union (EU) WEEE Directives. Secondly, it can be used to collect statistical data on Put on Market; link product classifications such as the Harmonized Commodity Description and Coding System (HS coding) and convert the unit to weight by applying average weights. The life-times of the UNU-KEYS are also homogeneous, which enables the system to be used to determine e-waste generated. **E-waste generation is based on a time-series of Put on Market and the average life-time of a product.** Since the product composition of the products within a UNU-KEYS is homogeneous, the classification is also suitable for material flow analysis of the raw material components in EEE and WEEE.

This publication, the National E-Waste Statistics, 2019 (NEWSR, 2019) uses UNU-KEYS and the results are presented using the six EEE categories of the European Union (EU) WEEE Directives as shown in Table 2.1:-

Table 2. 1: Categories of EEE According to European Union (EU) WEEE Directives

(i) Temperature exchange Equipments : These are more commonly referred to as cooling and freezing Equipments . Typical Equipments includes refrigerators, freezers, air conditioners, heat pumps.	

(ii) Screens, monitors: Typical Equipments includes televisions, monitors, laptops, notebooks, and tablets.	 
(iii) Lamps: Typical Equipments includes fluorescent lamps, high intensity discharge lamps, and LED lamps.	
(iv) Large Equipments : Typical Equipments includes washing machines, clothes dryers, dish-washing machines, electric stoves, large printing machines, copying Equipments , and photovoltaic panels.	
(v) Small Equipments Typical Equipments includes vacuum cleaners, microwaves, ventilation Equipments , toasters, electric kettles, electric shavers, scales, calculators, radio sets, video cameras, electrical and electronic toys, small electrical and electronic tools, small medical devices, small monitoring and control instruments.	
(vi) Small IT and telecommunication Equipments: Typical Equipments includes mobile phones, Global Positioning Systems (GPS), pocket calculators, routers, personal computers, printers, telephones.	 

Each product of the six e-waste categories has a different lifetime profile, which means that each category has different waste quantities, economic values, as well as potential environmental and health impacts, if recycled inappropriately. Consequently, the collection and logistical processes and recycling technology differ for each category, in the same way as the consumers' attitudes when disposing of the electrical and electronic Equipments also vary.

2.3 Measurement framework for e-waste statistics and data sources at International Level

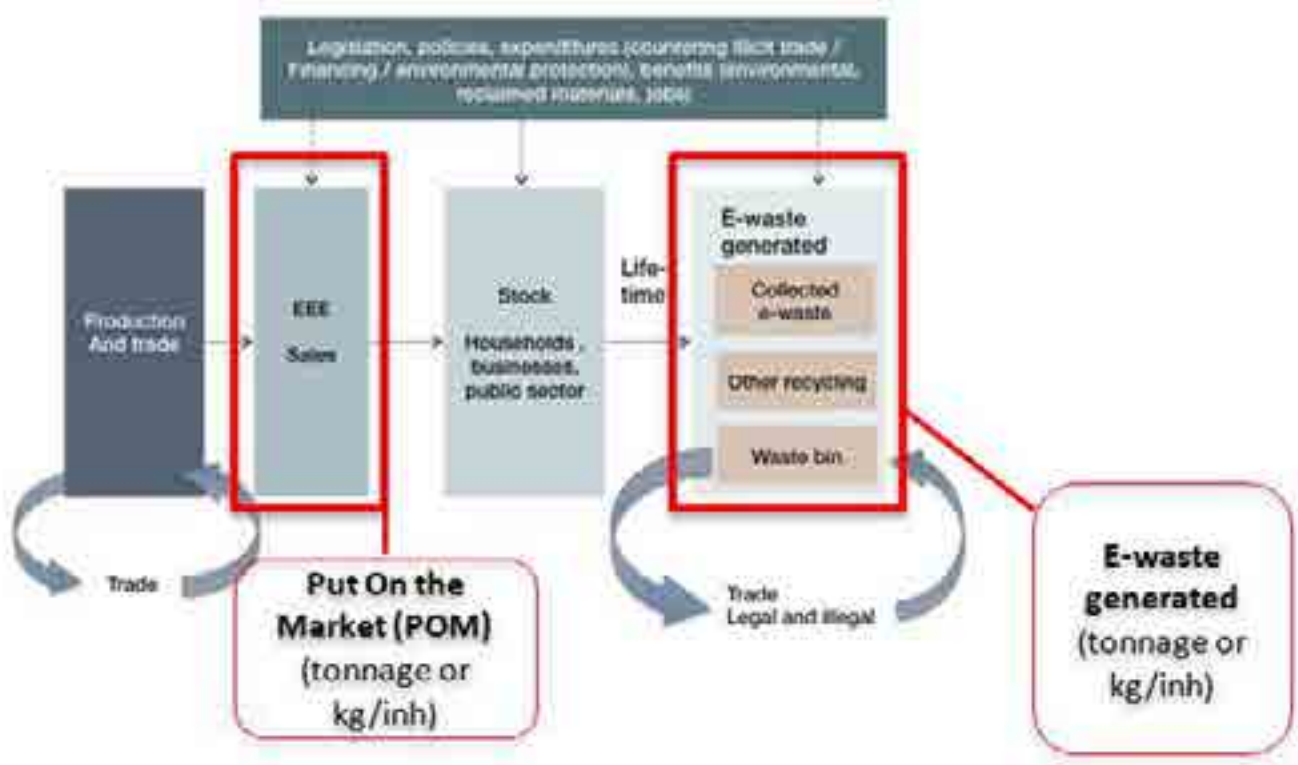
In many countries, there are existing datasets such as trade statistics or use of ICT Equipments that strongly relate to e-waste. In order to improve comparability between countries, it is highly desirable to have a sound measurement framework that can integrate the harmonized existing data and can serve as the basis for e-waste statistics and e-waste indicators as shown in **Figure 1.1**. The framework is based on flows and stocks of e-goods and e-waste.

The framework is constructed in such a way that the stocks and flows relate to one another. For example, in a certain country, there could be data available on the possession of cell phones and time-series for Put on Market, while in another country, only data on the disposal of cell phones is known. The proposed measurement framework integrates those parameters, such that directly comparable indicators could be constructed in order to allow further cross-country comparison.

The measurement framework starts with tracking the "production and trade" of EEE. There is a strong link between trade statistics and national production statistics. In this stage, the data is collected and published by custom organizations and/or national statistical institutes.

After the Equipments has been sold, it stays in households or businesses for some time until it is disposed of. This period is called "life-time". The Equipments in households, businesses and public sector, is referred to as the "stock". This is destined to become e-waste in the future and is also called the "urban mine". The "life-time" includes the dormant time in sheds and exchange of second-hand Equipments between households and businesses within the country.

Figure 1. 1: Measurement framework for e-waste statistics at International Level



Potential Data sources

As outlined in the UNU guidelines, potential data sources for compilation of e-waste statistics are: - Trade statistics; Household and establishment based surveys; Registers; Questionnaire to e-waste treatment facilities; GPS and Other data sources such as registers from waste companies, reports from Non-Governmental Organisations (NGOs), or other environmental surveys in the country.

International indicators on e-waste

Internationally, the following indicators are defined (REFER TO E-WASTE STATS):

1) Total EEE Put on Market (unit kg/inh); this represents the size of the national e-goods market.

2) Total E-waste generated (unit kg/inh); this represents the size of the national e-waste market.

3) E-waste formally collected (unit kg/inh); this represents the amount of e-waste that is collected as such by the formal take-back system.

4) E-waste collection rate = e-waste collected / e-waste generated [25] 100 per cent; this indicator represents the performance of the formal collection systems.

For SDG 12.5.1 statistics, e-waste generated and the formal collection of e-waste are most important.

Figure 1.1: Measurement framework and data sources for e-waste statistics at National Level

The measurement framework for e-waste statistics in the country followed the recommended international framework. However, slight modifications were made to the international framework to suite the national context and most importantly the availability of data. In this report, time series of data on trade from Tanzania Revenue Authority was used to estimate the quantity of EEE put on the market and the e-waste generated over the period of about 20 years from 1998 to 2017. There were no data for domestic production of EEE; exports of EEE; imports and exports of e-waste; and e-waste collected and recycled. Lack of these data limited computation of some key e-waste indicators such as e-waste formally collected; recycled; imported and exported and the e-waste collection rate.

This report also features data on mobile phone subscriptions from Tanzania Communication Regulatory Authority (TCRA) and the selected stock data of EEE from Household Budget Surveys conducted by the National Bureau of Statistics

2.4 Data Processing

Data processing is a series of actions or operations that convert data into useful information. This report uses combination of validation techniques basing on the experience and knowledge of trends of EEE in Tanzania, and UNU methodology on Put on Market (POM), lifetime and e-waste generation techniques. In this context raw data from Tanzania Revenue Authority (TRA) were harmonized as EEE datasets according to HS codes as per the UNU guidelines stipulated in the manual for EEE Put on Market Tool and the WEEE Calculation Tool. The UNU Calculation Tool is an integral part of the methodologies for the calculation of the weight of electrical and electronic Equipments (EEE) placed on the market, imported, exported, collected and recycled. Data processing of EEE datasets used in this report was done in four steps as illustrated below:-

i. Sorting the data on importation of EEE using the relevant codes that describe EEE in the Harmonized Commodity Description and Coding System (HS code) and UNU codes. The data on importation of EEE was in a time series format, covering the period of 1998-2017;

ii. Undertake data validation by adjusting for outliers using statistical techniques like median, average and imputing missing data using statistical functions;

iii. Converting the units to weight using the average weight data per appliance type using EEE Put on Market Tool; and

iv. Computation of e-waste statistics in the country using WEEE Calculation Tool; basically using the sales and lifespan distributions.

2.5 Limitations in compilation of e-waste statistics

The following are the key limitations that were faced in compilation of the NEWSR, 2019:-

i. Administrative data on importation of EEE was aggregated for both new and used EEE. Thus, it was not possible to disaggregate data between new and second hand EEE;

ii. Lack of data from other potential sources of e-waste data, such as importation of Waste Electrical and Electronic Equipments (WEEE), exportation of WEEE, WEEE Collected, WEEE Recycled and domestic production of EEE limited computation of e-waste statistics.

iii. The parameters of the products lifespan *(Weibull distribution)* used in the UNU WEEE calculation tool are based on European Countries which **might not be the same in Tanzania for some EEE POM;**

   a. Parameters for life span are based on **new items** while large proportion of EEE importation in Tanzania **are second hand goods**

   b. **The tool does not adjust the quality for new items**; eg. Some of the imported Electrical and Electronic Equipments in Tanzania are of low quality and have shorter life span;

   c. **Tanzanians' repair** their Electrical and Electronic Equipments good several times before they became waste which affects the life time;

iv. There is no flexibility for National clustering of the Electrical and Electronic Equipments; all of them should be mapped to either of the three predefined classifications which are:- European Union Classification with six or ten categories; and the UNU classifications with 54 categories;

v. Illegal trade is not measured which may lead to underestimation of the real quantities of Electrical and Electronic Equipment Put on the Market;

vi. Misreported shipments are not taken into account

2.6 Recommendations to Address Limitations in compilation e-waste statistics

In order to address these challenges and to enrich future reports on e-waste statistics, the National Bureau of Statistics as the national coordinator for production and dissemination of official statistics, will continue to strengthen collaborations with stakeholders within and outside the country to:-

i. Improve on E-waste compilation methodology, particularly on development of life span for EEE with greater relevance to Tanzanian environment;

ii. Improve data capture tools for Electrical and Electronic Equipments (EEE) Put on the Market to facilitate data disaggregation for new and used EEE;

iii. Design module of EEE and E-waste questions which will be embedded in household and establishment based surveys to improve the scope of data sources;

iv. Development of data collection tools by Local Government Authorities (LGAs) at point of waste disposal and recycling centers to enable sorting of E-waste from other solid waste; and

v. Strengthening collaboration with stakeholders to minimize underreporting of misreported EEE and illegal EEE transactions.

Chapter Three

Results

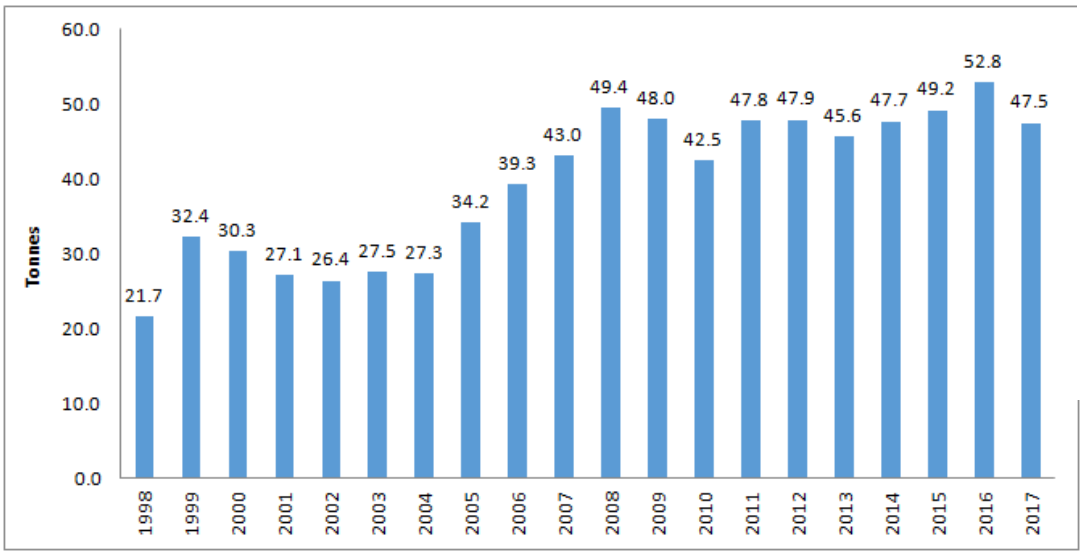
2.1 Introduction

The results for e waste statistics in this section are presented with regard to the following indicators:- EEE Put on Market (POM); E waste generated; Penetration rates for Internet users; stock of some Electrical and Electronics Equipments such as computers; mobile phones; Televisions; washing machines and Air conditioners.

2.2 Electrical and Electronics Equipments (EEE) Put On Market (POM)

Put on Market (POM) data for Electrical and Electronics Equipments (EEE) refers to the total amount (in tonnes) of all EEE placed on market for sale. Since amount of domestic production and exportation is negligible, it can be reasonably assumed that, all EEE put on market end up being used in the country and become e- waste after some time. For this reason, analysis of POM data for EEE provides an important basis for understanding trends of e-waste generated.

Figure 3. 1: Electrical and Electronics Equipments Put on Market (in "000" Tonnes) in Tanzania Mainland, 1998-2017



In 1998, about **21,692 tonnes** of EEE were placed on the Market.

In 2017, the amount increased for more than two times to **47,504 tonnes.**

Figure 3.1 indicates a general increase in amount of EEE put on the market over the period of 20 years from about 22,000 tonnes in 1998 to 48,000 tonnes in 2017. It is observed that, within the time span considered, the smallest amount of EEE put on the market was in 1998 (22,000 Tonnes) and peaked in 2016 (53,000 tonnes). A steeper increase in amount of EEE put on market were between 2004 and 2008 with 27,000 tonnes and 49,000 tonnes respectively; this can be attributed by several factors such as favorable economic growth and the general technological advancement in the society. From 2009 onwards, trends of EEE put on market have been more or less stagnant, with small annual variations.

3.2.1 Electrical and Electronics Equipments (EEE) Put on Market per Inhabitant (Kilogram/ Inhabitant)

Figure 3. 2: Electrical and Electronics Equipments Put on Market per Inhabitant (Kg/ Inhabitant) in Tanzania Mainland, 1998-2017

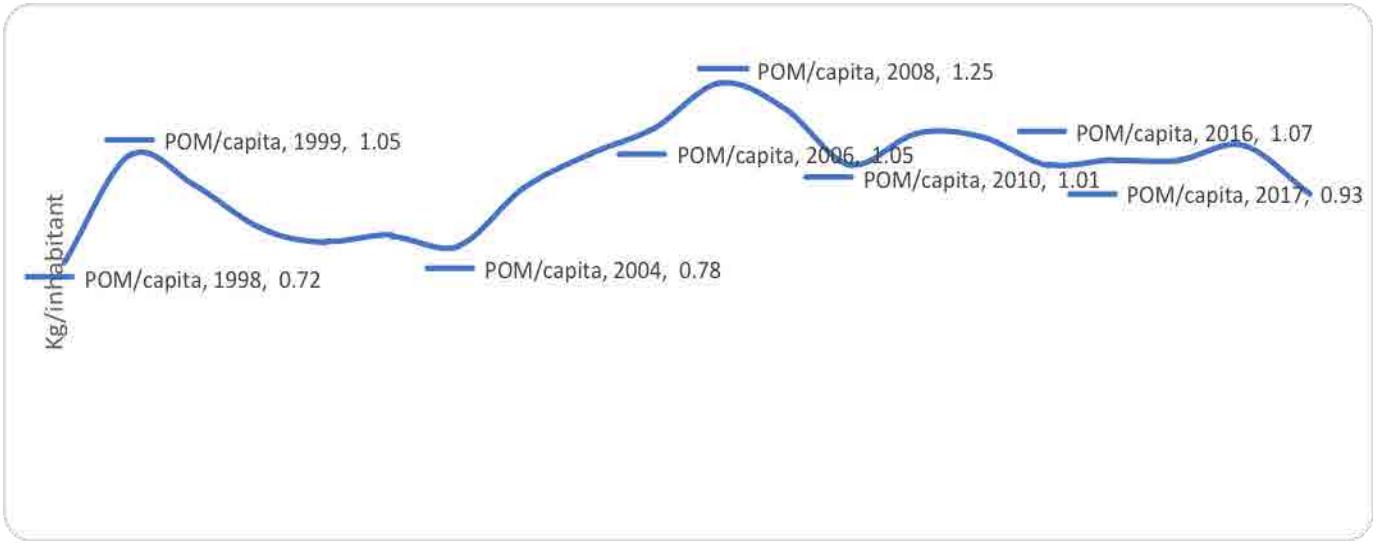


Figure 3.2 indicates trend of Electrical and Electronics Equipments **(**EEE) put on the market per inhabitant over the period, from 1998 to 2017. This indicator seeks to reveal the average share of EEE put on the market by country's inhabitants. It is synonymous with consumption of EEE per inhabitant. The indicator is computed by dividing total mass of EEE put on market (in kilogram) by population size from year to year. Figure 3.2 indicates that from 1998 to 2017, EEE put on market per inhabitant has averaged around 0.93 kilogram/ inhabitant, with highest values of 1.25 kg/inhabitant in 2008. The lower value for this indicator generally reflects low usage of EEE in the economy.

3.2.2 Composition of Electrical and Electronics Equipments put on market by Categories

For each electrical or electronic product, its original function, environmental relevancy, weight, size, and material composition differ considerably. Taking these differences into account, the categorization of Electrical and Electronics Equipments **(**EEE), and thus e-waste, can be grouped into roughly 54 homogeneous product types, referred to as the UNU-KEYS. Each UNU-KEY corresponds to one or more codes in the Harmonized Commodity Description and Coding System (HS). The 54 UNU-KEYS can be further grouped into six and ten categories. This publication uses the six categories of EEE as follows:-

i. Temperature exchange Equipments

ii. Screens, monitors

iii. Lamps

iv. Large Equipments

v. Small Equipments

vi. Small IT and telecommunication Equipments

Figure 3. 3: Composition of EEE put on market by Categories, Tanzania Mainland, 1998 - 2017

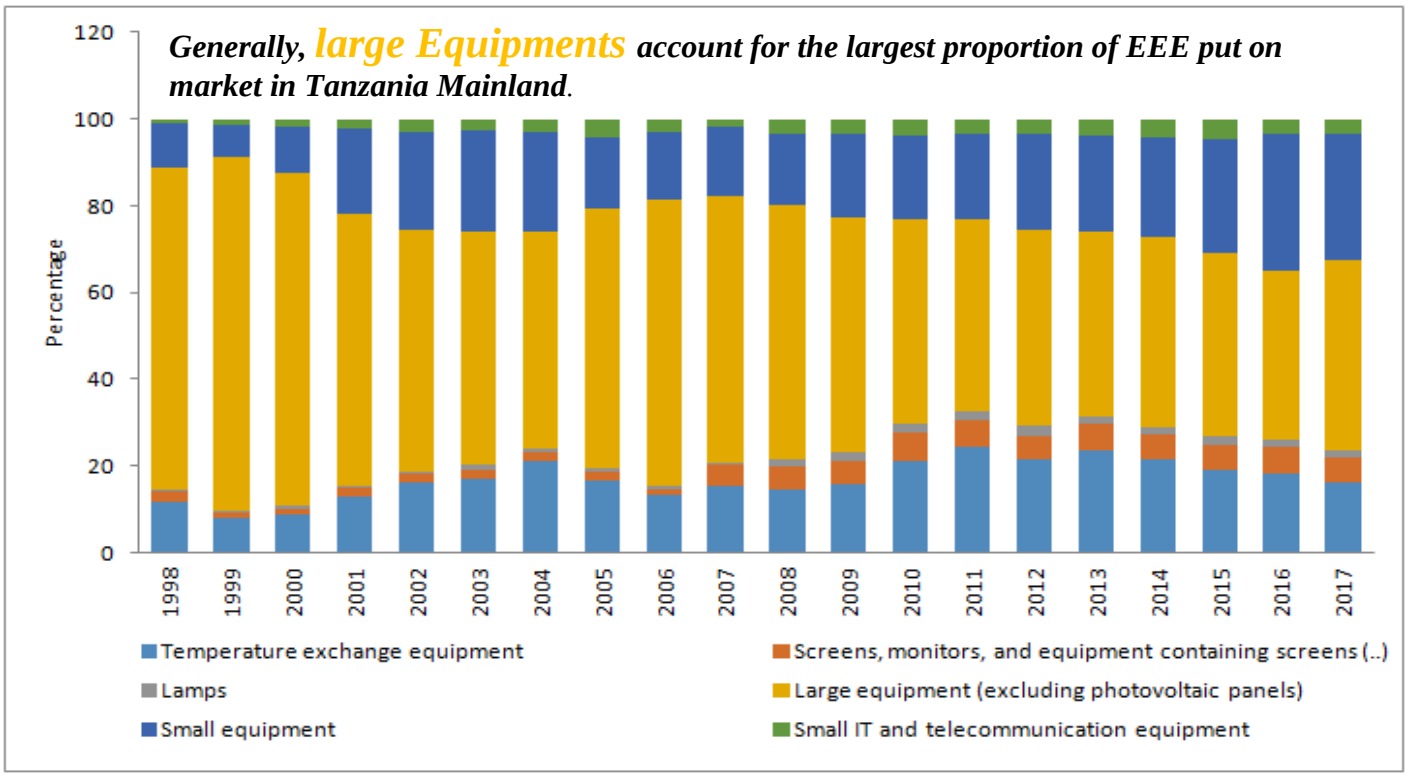
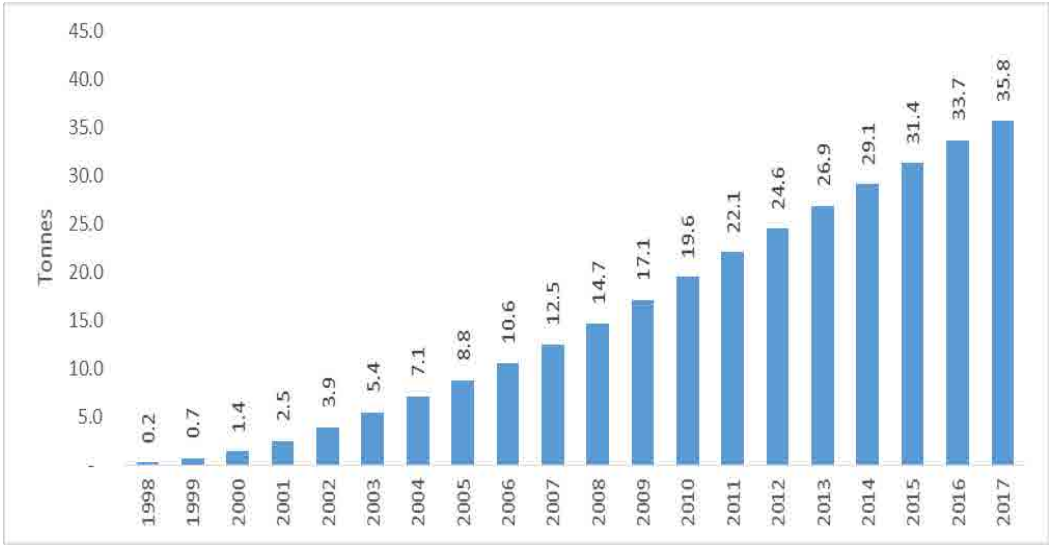


Chart 3.13 indicates composition of Electrical and Electronics Equipments (EEE) put on market by six major categories. It is observed that, generally, large Equipments such as electric cookers, photocopiers and washing machines account for the largest proportion of EEE put on market in Tanzania Mainland. However, this proportion has been declining from about 74 percent in 1998 to 44 percent in 2017. On the other hand, proportion of small Equipments such as fans, electric kettles, vacuum cleaners and microwave in EEE put on market has been increasing from about 10 percent in 1998 to 29 percent in 2017 as more and more people own these Equipments. It is further indicated that temperature exchange Equipments (refrigerators, freezers, air conditioners) also do account for an important share in the total EEE put on the market in the country.

3.3 Electronic Waste (e-waste) Generation in Tanzania

This section presents estimates of e-waste generation in Tanzania from 1998 to 2021. E-waste is generated after Electrical and Electronics Equipments (EEE) reach the end of useful cycle and hence discarded as waste without the intent of re-use. It is the annual supply of domestically generated e-waste prior to collection, without imports of externally generated EEE waste. The outcomes of e-waste generated are an important indicator for e-waste statistics. For instance, management of e-waste is closely linked to Sustainable Development Goals (SDGs) under the following goals:- Goal 3 (Good health and Well-being), Goal 6 (Clean water and Sanitation), Goal 11 (Sustainable Cities and Communities), Goal 12 (Responsible Consumption and Production), Goal 14 (Life Below Water), and Goal 8 (Decent Work and Economic Growth) and the Five Year Development Plan 2016/17 – 2020/21 themes .

Figure 3. 4: E-waste Generation for Tanzania Mainland ('000' Tonnes), 1998-2017

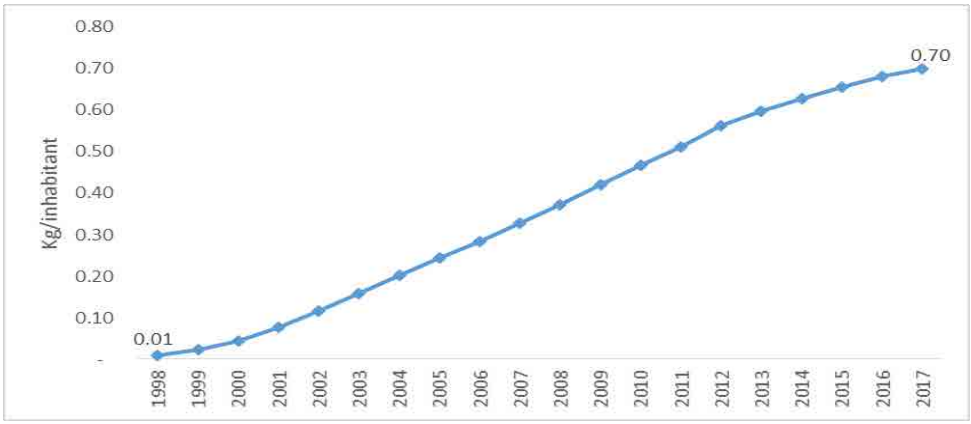


The e-waste generated increased steadily from about **2,000 tonnes** in 1998 to **35,755 tonnes** in 2017;

Figure 3.4 indicates general increase of e-waste generated over the years, from about 2,000 tonnes in 1998 to 35,800 tonnes in 2017. Trend of e-waste generated from Figure 3.4 depicts two characteristic cycles: 1998-2007; and 2008-2017. E-waste generated increased rather slowly from 1998 to 2007, with average annual increments of 1.37 tonnes, and gathered greater pace from 2008 to 2017 with average annual increments of 2.32 tonnes. These cycles are consistent with trends of EEE Put on Market indicated in Figure 3.1.

3.3.1 E-Waste Generated per Inhabitant

Figure 3. 5: E-Waste Generated per Inhabitant (Kg/ Inhabitant) in Tanzania Mainland, 1998-2017



E-waste generation per inhabitant has steadily increased from **0.01 Kilogram/inhabitant** in 1998 to a maximum of **0.70 kg/ inhabitant** in 2017.

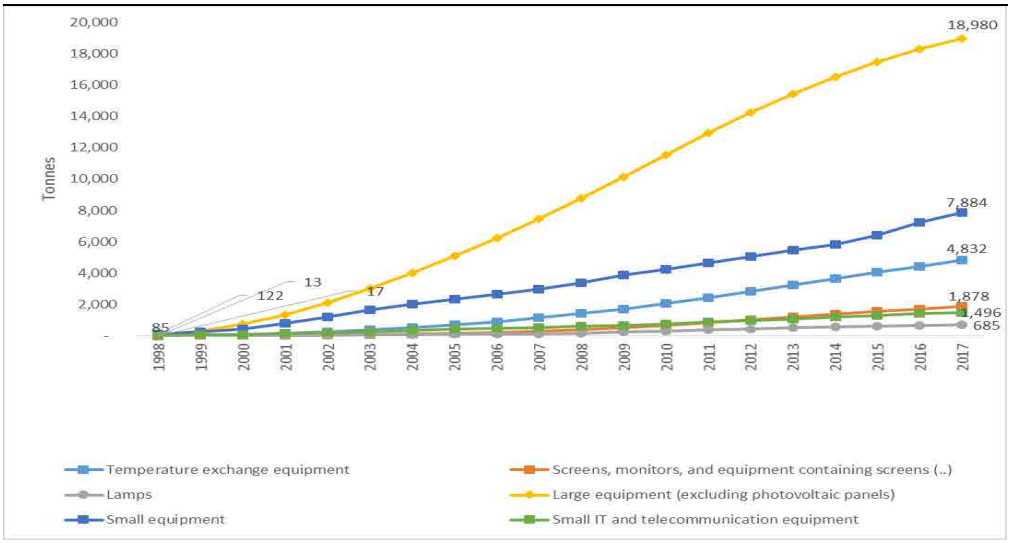
Chart 3.5 indicates that on average, e-waste generated per inhabitant has steadily increased from 0.01 kilogram/inhabitant in 1998 to a maximum of 0.70 kg/ inhabitant in 2017. The values for e-waste generated per inhabitant in Tanzania Mainland are smaller compared to the regional average of 1.9 kilogram of e-waste per inhabitant for the Africa[1] continent. The low values for e-waste generated per inhabitant in the country

[1] **The Global E-waste Monitor 2017**

explains that, either there is an improvement in the quality of the imported EEE over time; improvement in the repair of EEE or it is a result of high population used as a factor in computation of the indicator.

3.3.2 Trends of E-waste Generation by Categories of Electrical and Electronic Equipments (EEE)

Figure 3. 6: Trends of E-waste Generation by Categories of Electrical and Electronic Equipments (EEE) in Tanzania Mainland, 1998-2021



E-waste generated from large Equipments had the highest growth rate compared to other categories of E-waste in the country.

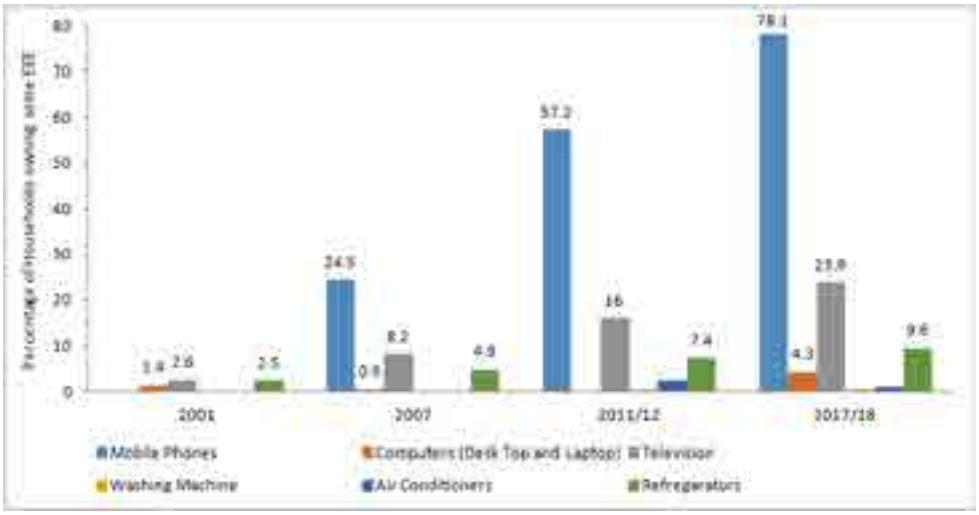
E-waste generated from large Equipments has increased from 85 tonnes in 1998 to 18,980 tonnes in 2017.

Chart 3.6 presents trends of e-waste generated by categories of Electrical and Electronic Equipments (EEE). It is indicated that, e-waste generated from large Equipments such as electric cookers, photocopiers and washing machines has had the highest growth rate compared to other categories of E-waste. E-waste generated from large Equipments has increased from 85 tonnes in 1998 to 18,980 tonnes in 2017. E-waste generated from small Equipments such as fans, electric kettles, vacuum cleaners and microwave has had the second highest growth rate, increasing from 122 tonnes in 1998 to 7,884 tonnes in 2017. E- Waste generated from other categories of EEE has not increased significantly over the period under study.

The Stock of Electrical and Electronic Equipments in Households

According to United Nations University (UNU) Guidelines on Classification Reporting and Indicators, 2015, the Electrical and Electronic Equipments (EEE) in households, businesses and public sector, is referred to as the "stock". This is destined to become e-waste in the future and is also called the "urban mine". In this section, data on possessions of EEE from Household Budget Surveys (HBS) conducted by the National Bureau of Statists have been used as proxy indicator for the stock of EEE in households in the country.

Figure 3. 7: Percentage of households that own some of Electric and Electrical Equipments; 2001 - 2017



Mobile phones are the common EEE owned by households.

The trend has been increasing from 24.5 percent in 2007 to 78.1 percent in 2017/18

Figure 3.7: reveals that, mobile phones are the common EEE owned by households. Proportion of households owned mobile phones have increased significantly, from nearly three in ten households (24.5 percent) in 2007 to nearly in 8 in ten households (78.1 percent) in 2017/18. On the other hand, possession of televisions at households has also shown an increase trend from 2.6 percent in 2001 to 23.9 percent in 2017/18.

3.4 Information and Communication Technology (ICT) and EEE Consumption Trends

The impact of Information and Communication Technology (ICT) is increasingly been observed in many developing countries. Use of ICT has resulted into creation of many new applications and enabled delivery of services at increasingly high speeds. For the case of Tanzania, many systems in government operations have been transformed from analogue into digital formats. This has brought about new opportunities to many sectors, and significantly impacted on service delivery in the areas of communication, health, education, governance, and commerce. The country's economic growth which also translates into higher disposable incomes may intensify the demand for electrical and electronic Equipments in the foreseeable future, which consequently is likely to lead into higher e-waste generation.

This section presents trends of use of telecommunication services, mobile cellular and internet and their penetration. Penetration rate is defined as the number of subscriptions per total population in a given reference period.

Figure 3. 8: Trends of Mobile Phones Subscriptions (Million) and Penetration (%) in Tanzania Mainland, 2008-2018

Mobile phones subscriptions have increased drastically from 13.1 million in 2008 to 43.6 million in 2018

The Mobile phones penetration rate has also increased tremendously, from 32 percent in 2008 to 81 percent in 2018.

Chart 3.8 indicates an increase in the number of subscriptions and penetration of mobile phones in Tanzania Mainland. The number of mobile phones subscriptions has increased drastically from 13.1 million in 2008 to 43.6 million in 2018. On the other hand, penetration rate of mobile-cellular services has also been on the rise, from 32 percent in 2008 to 81 percent in 2018.

Number of Interment Users in Tanzania Mainland

Figure 3. 9: Number of Interment Users (million) 2011-2018 in Tanzania Mainland

There has been an increase in the number of internet users from 5.3 million in 2011 to 23.1 million in 2018.

Rate of penetration has also increased from 5.3 percent in 2011 to 43 percent in 2018

Internet services have expanded rapidly in Tanzania. Figure 3.9 indicates that there has been an increase in the number of internet users from 5.3 million in 2011 to 23.1 million in 2018. Internet penetration has also increased from 12 percent in 2011 to 43 percent in 2018. These trends have an important bearing to generation of e-waste.

Chapter Four

CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

This section presents the main conclusions basing on the experience and challenges faced during the compilation of this report. Some key recommendations have also been suggested as a way to improve compilation of e-waste statistics in Tanzania. Some of the key conclusions are as follows:-

i. The data analyzed covering the period of 1998 to 2017 shows a steady increase of e-waste generated in Tanzania Mainland, with steeper increase noted from 1998 to 2017. Electric and Electrical Equipments (EEE) put on the market per inhabitant is still low in Tanzania Mainland but it is growing at a fast pace. Tanzania's economic growth in the last decade has improved personal disposable income which in turn, has resulted in many people owning EEE devices. Global technological advancement have also played a part in enhancing the use of EEE in Tanzania Mainland;

ii. Methodology for compilation of E-waste statistics proposed by the UNU makes assumptions of life span of EEE based on values from developed countries. This calls for efforts to develop country specific life span of EEE to inform the E-waste calculation tool.

iii. There is inadequate e-waste management infrastructure in Tanzania Mainland. This has resulted into limited amount of data on e-waste. Despite numerous efforts by the Government and environmental stakeholders to address this problem, data on e-waste are still scanty and sporadic; and

iv. Tanzania does not have a specific policy or legislation for e-waste management. Issues relevant to e-waste are addressed in a number of policies or legislations that are in existence which aim at protecting the environment and human health.

4.2 Recommendations

It is the right time for Tanzania to engage in addressing e-waste volumes. Laxity in addressing the growing e-waste volumes bears the risk of a developing informal sector, with all its public health and environmental drawbacks. The following are the key recommendations for addressing the problem of E-waste in the country: -

i. **Enhancing data availability:** Availability of data is important for e-waste management programs. Collection and management of data systems need to be improved by, among others, establishing a data acquisition systems which allows for design, monitoring, sharing and control of e-waste data; setting up a mechanism for continuous update of the data and metadata; and by using data for transparent decision making and system improvement. For instance, data for domestic production of EEE; exports of EEE; imports and exports of e-waste; and e-waste formally collected and recycled are of paramount important in computation of key e-waste indicators;

ii. **Capacity Building:** The existing institutional arrangement for **Environment Management** can support e-waste management. However, there is need to strengthen this arrangement in terms of technical, human and financial capacities to enhance its effectiveness in handling e-waste management;

iii. **Awareness creation**: Awareness on the effects of e-waste to the environment and human health should be created at all levels of governance and the general public by making information available through appropriate means (e.g. websites, workshops/seminars, campaigns, etc.); and by identifying target groups (schools, universities, vocational institutions, informal sector, government, retailers, etc.);

iv. **Development of specific Policy and legislation for e-waste management:** Issues related to e-waste management are addressed in a number of policies and legislations, including the National Environment Policy (1997) and the Environmental Management Act (2004). Development of a specific policy and legislation for e-waste management would be desirable as it would kick start many actions in the e-waste landscape;

v. **Refinement of Methodologies fore-waste compilation to suit national circumstances:** The methodology for compiling the E-waste statistics proposed by the UNU makes assumptions of

life span of EEE based on values from developed countries. This calls for efforts particularly higher learning institutions to develop country specific life span of EEE to inform the E-waste calculation tool.

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ANNEXES

Annex 1.a Electrical and Electronics Equipments (EEE) Put On Market (POM) (Tonnes)

EU-6		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1	Temperature exchange Equipments	2,533.0	2,552.5	2,681.8	3,516.8	4,236.3	4,719.2	5,732.7	5,682.3	5,189.5	6,657.6
2	Screens, monitors, and Equipments containing screens (..)	517.6	474.7	413.1	483.4	542.7	578.3	574.1	679.7	563.9	2,036.5
3	Lamps	113.4	90.9	163.7	132.8	121.6	315.7	287.7	248.9	316.8	261.7
4a	Large Equipments (excluding photovoltaic panels)	16,099.7	26,459.6	23,239.4	17,011.5	14,804.3	14,718.4	13,623.1	20,544.3	25,919.7	26,437.0
5	Small Equipments	2,173.9	2,357.9	3,317.3	5,355.8	5,939.3	6,451.2	6,248.5	5,552.4	6,166.6	6,791.7
6	Small IT and telecommunication Equipments	254.2	416.4	512.8	599.0	796.5	741.3	869.6	1,499.9	1,130.8	862.1
		21,691.9	32,352.0	30,328.1	27,099.3	26,440.7	27,524.1	27,335.8	34,207.4	39,287.1	43,046.5

Annex 1.b Electrical and Electronics Equipments (EEE) Put On Market (POM) (Tonnes)

EU-6		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	Temperature exchange Equipments	7,283.7	7,506.8	8,963.3	11,725.8	10,379.4	10,762.4	10,247.7	9,454.6	9,606.8	7,727.3
2	Screens, monitors, and Equipments containing screens (..)	2,463.3	2,683.0	2,801.9	2,965.8	2,533.8	2,747.8	2,794.1	2,832.0	3,383.2	2,612.1
3	Lamps	837.5	851.5	827.1	975.1	1,095.1	827.2	804.8	892.2	765.3	793.9
4a	Large Equipments (excluding photovoltaic panels)	28,961.8	26,020.6	20,140.7	21,033.3	21,724.6	19,422.7	20,778.3	20,710.8	20,503.0	20,865.5
5	Small Equipments	8,114.3	9,389.3	8,073.6	9,372.9	10,615.4	10,105.8	11,005.6	13,010.9	16,785.9	13,893.3
6	Small IT and telecommunication Equipments	1,778.8	1,582.5	1,695.2	1,728.2	1,560.7	1,778.0	2,068.6	2,299.8	1,788.8	1,612.1
		49,439.3	48,033.7	42,501.8	47,801.0	47,909.0	45,643.9	47,699.0	49,200.3	52,833.0	47,504.1

Annex 2a. Electrical and Electronic Waste (e-waste) Generation in Tanzania (Tonnes)

EU-6	Full name	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	Temperature exchange Equipments	13.2	42.7	94.5	162.2	254.2	371.7	522.8	703.7	907.6	1,144.1	1,414.2	1,715.8
2	Screens, monitors, and Equipments containing screens (..)	1.5	7.3	18.2	34.8	58.0	88.8	125.3	168.5	216.5	283.0	380.7	508.4
3	Lamps	5.1	11.7	21.7	31.9	41.6	59.4	79.4	97.8	118.3	136.7	180.7	238.4
4a	Large Equipments (excluding photovoltaic panels)	85.3	319.7	741.3	1,338.9	2,105.5	3,012.2	4,018.8	5,085.4	6,235.0	7,458.2	8,761.1	10,130.7
5	Small Equipments	121.7	255.6	441.9	814.5	1,209.4	1,637.5	2,038.4	2,346.1	2,649.1	2,979.4	3,372.0	3,856.8
6	Small IT and telecommunication Equipments	16.9	51.4	91.5	141.0	211.7	275.4	346.9	420.5	480.4	532.9	601.0	684.0

Annex 2b. Electrical and Electronic Waste (e-waste) Generation in Tanzania (Tonnes)

EU-6	Full name	2010	2011	2012	2013	2014	2015	2016	2017
1	Temperature exchange Equipments	2,048.2	2,419.5	2,822.4	3,231.1	3,642.4	4,047.7	4,444.0	4,832.3
2	Screens, monitors, and Equipments containing screens (..)	661.5	835.4	1,017.5	1,200.5	1,380.0	1,551.9	1,721.1	1,878.2
3	Lamps	299.4	367.8	444.9	510.1	564.7	614.7	653.5	685.1
4a	Large Equipments (excluding photovoltaic panels)	11,554.1	12,946.1	14,239.6	15,432.7	16,499.0	17,448.8	18,280.0	18,980.1
5	Small Equipments	4,233.4	4,626.9	5,066.2	5,449.5	5,843.6	6,398.4	7,215.4	7,883.7
6	Small IT and telecommunication Equipments	772.9	870.8	973.3	1,079.6	1,196.8	1,308.1	1,411.2	1,495.7