

The stunning growth of e-waste volume and its global implications

By Vanessa Forti ¹

Electric and electronic products and how they become e-waste

Electrical and electronic equipment (EEE) refers to a wide range of products with circuitry or electrical components with power or battery supply (Step Initiative, 2014). It is in most households or businesses, and includes products from basic kitchen appliances to information and communication technology (ICT) items such as mobile phones and laptops. Besides everyday household use,

e-products are also becoming increasingly used in the context of smart houses and smart cities, such as the use of digital locks to access homes, electronic bus tickets, and the onset of smart traffic lights that prioritize public transportation in bus lanes. There are also applications in energy supply, health and security systems.

The e-waste statistics guidelines (Forti, Baldé & Kuehr, 2018) provide an international classification of electric and electronic items. Overall, EEE is classified in 54 different products (called UNU_KEYS). These products are in turn grouped into six categories² (see box).

¹ Programme Associate at Sustainable Cycles (SCYCLE), a joint undertaking being gradually transferred from the United Nations University Vice-Rectorate in Europe (UNU-ViE) to the United Nations Institute for Training and Research (UNITAR).

² This classification is in line with the revision of the WEEE directive adopted by European Member States (European Parliament, 2012), establishing protective measures for the environment and human health. Its objective is to prevent or reduce the impacts from the generation and management of EEE waste, as well as the use of resources, improving the efficiency of this use.

/Internet Sectoral Overview



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Temperature exchange equipment

More commonly referred to as cooling and freezing equipment. Typical equipment includes refrigerators, freezers, air conditioners, and heat pumps.



Screens, monitors

Typical equipment includes televisions, monitors, laptops notebooks, and tablets.



Lamps

Typical equipment includes fluorescent lamps, high-intensity discharge lamps, and LED lamps.



Large equipment

Typical equipment includes washing machines, clothes dryers, dishwashers, electric stoves, large printing machines, copying equipment, and photovoltaic panels.



Small equipment

Typical equipment includes vacuum cleaners, microwaves, toasters, electric shavers, calculators, radio sets, video cameras, electrical and electronic toys, small electrical and electronic tools, small medical devices, and small monitoring and control instruments.



Small IT and telecommunication equipment

Typical equipment includes mobile phones, global positioning systems (GPS), pocket calculators, routers, personal computers, printers, telephones.

Each product has a different lifetime profile, which means that each category has different waste quantities, economic values, and potential environmental and health impacts if recycled inappropriately. Consequently, collection and logistical processes and recycling technology differ for each category, just as consumers' attitudes when disposing of electrical and electronic equipment also vary.

After electric and electronic products are sold, they are used for some time in households, enterprises, or institutions. This period is called "the stock phase," and it includes dormant time in storage facilities and exchange of second-hand equipment between households and businesses in the country.

Nevertheless, the lifetime of all electric and electronic appliances comes to an end. When the product stops functioning it will be disposed of, and at this time it becomes e-waste (alternatively called waste electrical and electronic equipment – WEEE). The term electronic waste, or e-waste, refers to all of this equipment and its parts that have been discarded by its owners as waste without the intent of reuse.

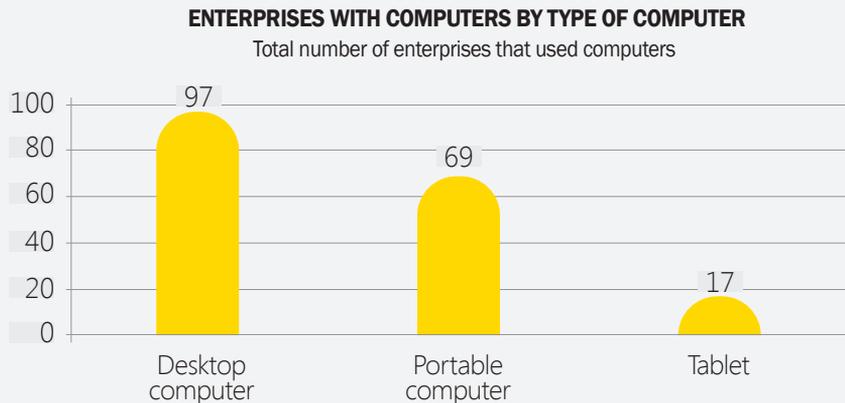
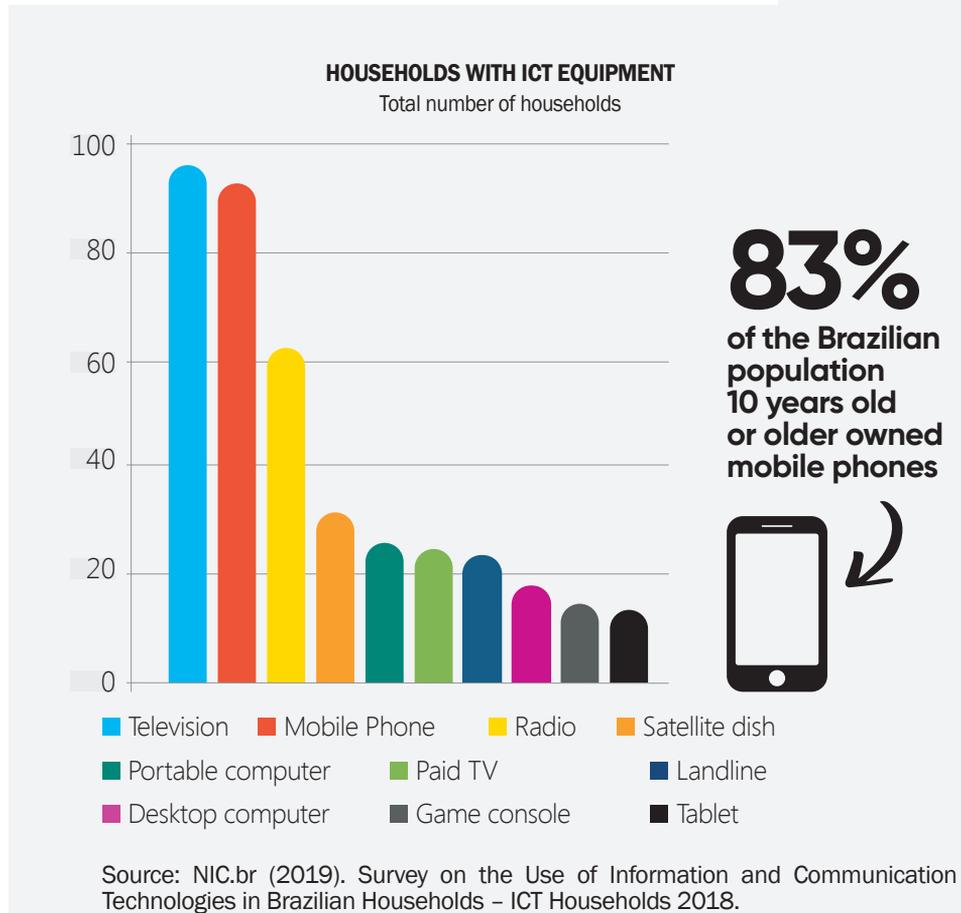
The consumption of EEE is growing at high speed

UNU estimates (Baldé et al., 2017) show that consumption of EEE has increased rapidly in recent years. In particular, it grows at higher speed (up to 23% growth rate per year) in lower and upper-income countries rather than in those with higher income. This phenomenon is explained by the fact that the global information society is growing at a high rate:

- Mobile-cellular and broadband networks and services have expanded rapidly, allowing more people, especially in rural areas, to have access to the Internet. The world now counts more than 7.7 billion mobile-cellular subscriptions, which is as much as the current world population. More than 54% of households have Internet access at home. The increasing availability of Internet connection inevitably leads to a higher demand for EEE products that can connect to the Internet. In addition, EEE is currently being used in high-tech applications pertaining to the concept of smart homes and smart cities. While these innovative concepts are crucial to improve living standards and aim at creating a clean and sustainable environment, they require efficient and high-tech digital and information technologies.
- The EEE industry is becoming more competitive every day. This phenomenon has led to a fall in the prices of products; therefore, technology is becoming more affordable around the globe. Another result of competition between manufacturers of EEE is that technology is advancing at an incredible rate in terms of computing power and resolution quality for screens, televisions, mobile phones, etc. This is one of the main drivers for users to buy new products and dispose of old ones, even if they are still functioning properly.
- To benefit from the latest upgrades, higher speeds, and latest technologies, consumers and businesses regularly change their laptops, PCs, routers, TV sets, and other devices. Users also tend to own multiple devices, including mobile phones, tablets, and e-readers. Evidence shows that between 2012 and 2015, the number of Americans who owned a smartphone, a computer, and a tablet doubled to 36% of adults (Anderson, 2015).

Each product has a different lifetime profile, which means that each category has different waste quantities, economic values, and potential environmental and health impacts.

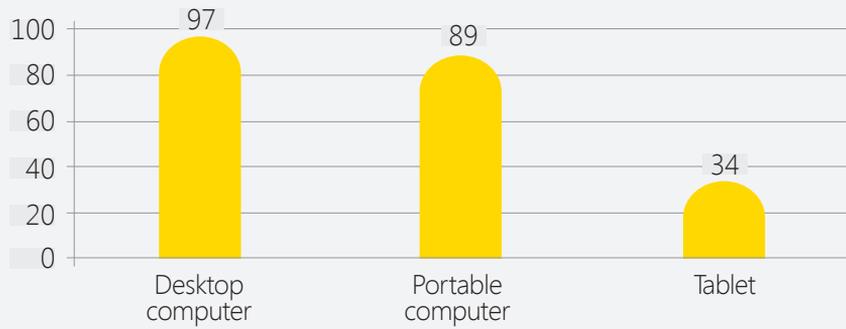
ICT Equipment in Brazil:



Source: NIC.br (2019). Survey on the Use of Information and Communication Technologies in Brazilian Enterprises – ICT Enterprises 2017.

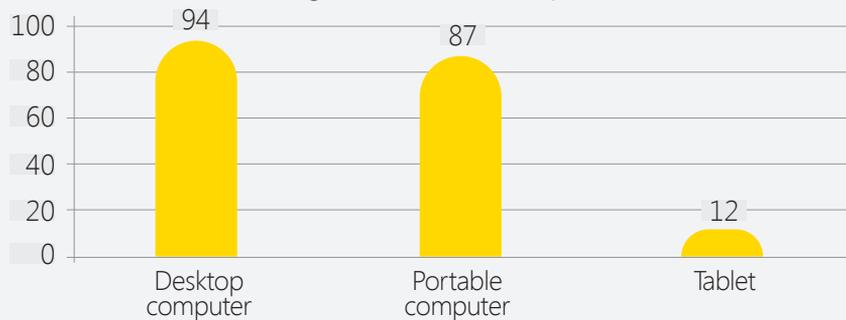
FEDERAL AND STATE GOVERNMENT ORGANIZATIONS WITH COMPUTERS BY TYPE OF COMPUTER

Federal and state government organizations that used computers



LOCAL GOVERNMENTS WITH COMPUTERS BY TYPE OF COMPUTER

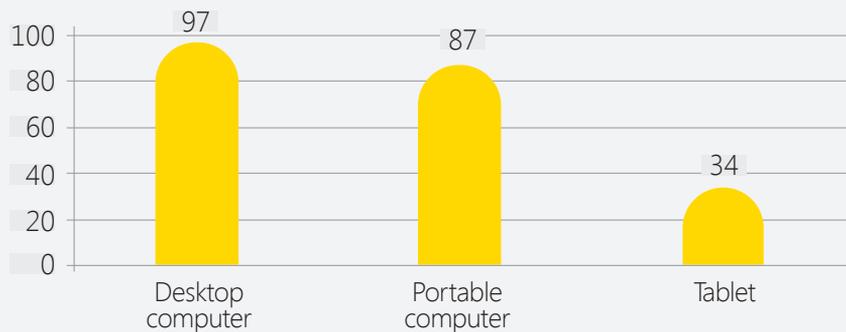
Local governments that used computers



Source: NIC.br (2018). Survey on the Use of Information and Communication Technologies in the Brazilian Public Sector – ICT Electronic Government 2017.

URBAN SCHOOLS WITH COMPUTERS BY TYPE OF COMPUTER

Total number of schools located in urban areas



Source: NIC.br (2019). Survey on the Use of Information and Communication Technologies in Brazilian Schools – ICT In Education 2018.

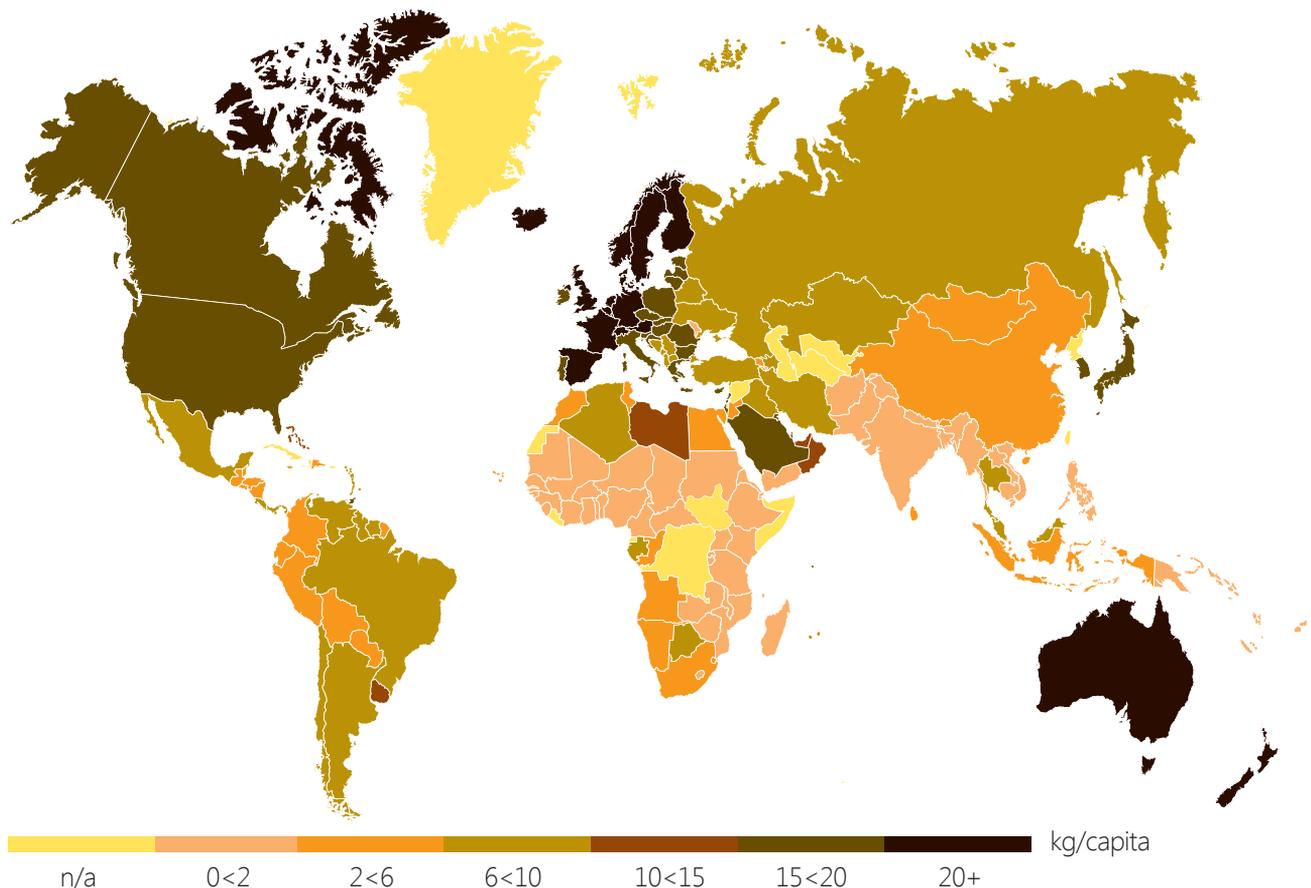
High-income countries generate more e-waste. European countries generate an annual average of 16.6 kilograms per inhabitant (kg/inh), while African countries generate less than 2 kg/inh.

A stunning amount of e-waste to deal with

The latest report from UNU shows that the global quantity e-waste generated in 2016 was 44.7 Million tonnes (Mt), which is the equivalent of almost 4,500 Eiffel towers (Baldé et al., 2017). Estimates showed that by 2020, the amount of e-waste will exceed 50 Mt, with an annual growth rate of 3% to 4%.

Not surprisingly, the distribution is uneven: High-income countries generate more e-waste. European countries generate an annual average of 16.6 kilograms per inhabitant (kg/inh), while African countries generate less than 2 kg/inh (Baldé et al., 2017).

A more recent study published by the Step Initiative³ (Parajuly et al., 2019), based on estimates and methodology conducted by the UNU (Baldé et al.; 2017), maps several dimensions of the e-waste problem and provides a snapshot of future challenges. In particular, the study shows that, considering a scenario of business as usual⁴, e-waste will hit 110 Mt in 2050.



Source: globalewaste.org/map

³ Linked to the United Nations University (UNU-VIE), the Solving the E-waste Problem (StEP) Initiative is a collaborative, global effort to dramatically reduce e-waste through policy change, product re-design, re-use, recycling and capacity building.

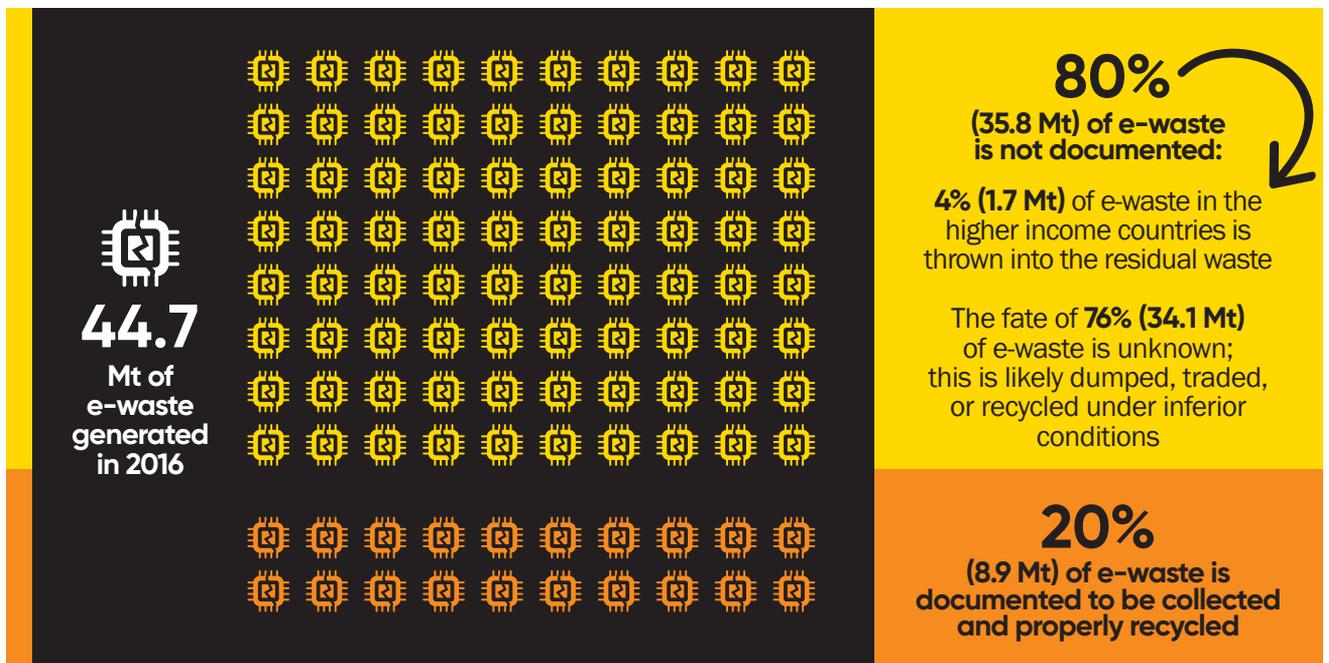
⁴ In a business-as-usual scenario, a standard growth-based economic agendas is the priority, continues, resulting in a Linear Growth scenario.

Challenges related to e-waste management

In general, the regions where e-waste legislation is most developed are found in Europe, where the amounts of collected and recycled e-waste are also the highest. Other regions with developed e-waste recycling and collection are in North America, East Asia, and Southeast Asia. In several countries, national e-waste legislation is completely absent, such as in large parts of Africa, the Caribbean, Central and Eastern Asia, and Melanesia, Polynesia, and Micronesia (Baldé et al., 2017). However, national legislation does not always translate into concrete action. In addition, the scope of the products covered and targeted by e-waste laws may differ from the more comprehensive scope of the international list of products (Forti, Baldé, and Kuehr 2018).

Concrete actions are needed to change the direction of policy measures toward reusing, refurbishing and remanufacturing at the end of life of EEE. Legislation on e-waste should encourage better product design in the production stage. This is the key to facilitating recycling and to producing products that are easier to repair or more durable. In addition, policies should point toward both more efficient use of resources to improve production processes and toward the recovery of valuable materials incorporated in EEE, such as gold, silver, copper, palladium, iron and aluminum.

In 2016, at least 8.9 Mt of e-waste was reported as formally collected and recycled by official take-back systems (Baldé et al., 2017), which corresponds to only 20% of the e-waste generated that year. The collection rate that is formally reported is still very low in several regions of the world, such as Africa, Oceania, South America, and South and West Asia.



Source: The Global E-waste Monitor (2017).

Discarded equipment, such as fridges, phones, laptops, washing machines, sensors, TVs, and lamps, contain hazardous substances, especially if treated inadequately.

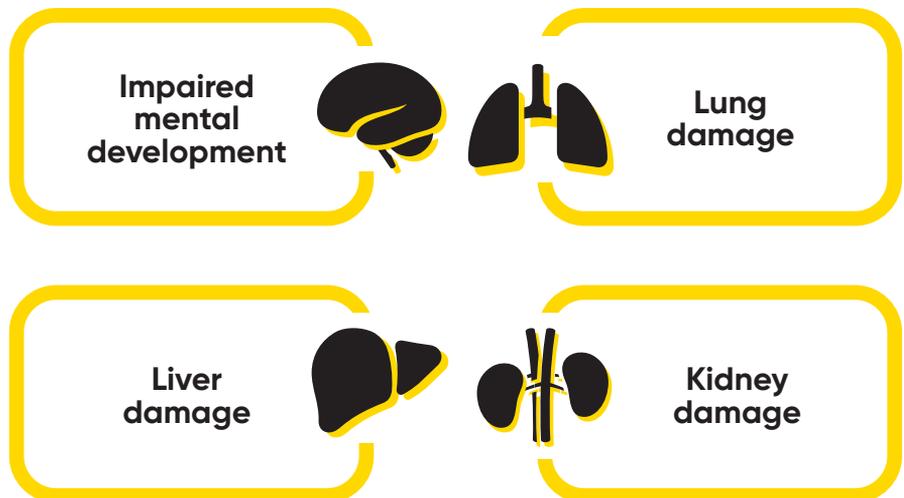
It is estimated that more than 1 Mt of e-waste ends up in the garbage in the richest countries in the world. Most e-waste is managed outside official take-back systems. Those flows are not documented in a consistent and systematic manner. This, together with unreported data for the transboundary movement of e-waste – mostly from developed to developing countries – are likely to be the source of the gap between generated e-waste that's officially collected and e-waste in the garbage. It is estimated that approximately 34 Mt of e-waste generated worldwide in 2016 was untraced and unreported.

The figures show that the current e-waste collection rate is still low and needs to be improved. However, it is important to highlight that the amounts of e-waste collected refer to quantities that are officially gathered by governments. E-waste collection rates might be higher in some countries where e-waste is managed and recycled by the informal sector. In these cases, data are usually not reported to governments because of the informal nature of recycling practices.

The severe impacts of e-waste on human health and the environment

Increasing levels of e-waste, and its improper and unsafe treatment and disposal, pose significant challenges to the environment and human health.

Discarded equipment, such as fridges, phones, laptops, washing machines, sensors, TVs, and lamps, contain hazardous substances, especially if treated inadequately. Common hazardous materials found in e-waste are heavy metals (such as mercury, lead and cadmium) and chemicals (such as chlorofluorocarbon – CFC – and various flame retardants). Most e-waste is not properly disposed of or treated, and much of it ends up in dumpsites.



When e-waste is put in landfills or incinerated, it poses significant contamination problems. The hazardous materials in e-waste are volatile and not biologically biodegradable, and through leaking, chemical reactions and vaporization, they contaminate soil and groundwater and can enter the food chain. Heavy metals are toxic to plants, animals and microorganisms. In humans, heavy metals can affect the organs, especially the brain, causing persistent effects on the nervous system. Chemicals such as some flame retardants can form corrosive or toxic gases and toxic decomposition products if burned. Release of CFCs in the environment affects the central nervous system in humans, and contributes greatly to loss of the protective ozone layer.

The advantages of measuring e-waste

In light of the above, collecting data on e-waste and improving e-waste statistics is an important step toward addressing the e-waste challenge. Statistics help to evaluate development over time, set and assess targets, and identify best practices for policies. In this way, better e-waste data will eventually contribute to minimizing e-waste generation, preventing illegal dumping and improper treatment of e-waste, promoting recycling, and creating jobs in the sector.

Better e-waste data will contribute to the achievement of the Sustainable Development Goals (SDGs), in particular SDG 12⁵, to “ensure sustainable consumption and production patterns.” E-waste has been officially included in the work plan for the 12.5 SDG indicator and in the documentation around the indicator. The importance of considering e-waste is also mentioned in SDG indicator 12.4.2 on hazardous waste.

$$\text{SDG 12.5.1 Sub indicator on e-waste} = \frac{\text{Total e-waste recycled}}{\text{Total e-waste generated}}$$

To address these challenges, in 2017, the UNU, the International Solid Waste Association (ISWA), and the International Telecommunication Union (ITU) joined forces to create the Global E-waste Statistics Partnership. It aims to collect data from countries and build a global e-waste database to track development over time. The initiative recently set up a website that provides the most comprehensive overview of e-waste quantities in the world: <https://globalewaste.org/>

Furthermore, the initiative conducts capacity-building workshops to help countries build capacity on e-waste statistics. The partnership also aims to inform policymakers, industries, and businesses to enhance the understanding and interpretation of global e-waste data, communicating the data to the general public and relevant stakeholders.

It further aims to map recycling opportunities from e-waste, pollutants, and health effects related to e-waste, along with monitoring relevant waste streams and tracking the achievement of targets set by the United Nations, such as the Sustainable Development Goals. SDGs 11.6 and 12.5 stand out, since they focus on reduction of the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management; and substantially reducing waste generation through prevention, reduction, recycling, and reuse.

Better e-waste data will eventually contribute to minimizing e-waste generation, preventing illegal dumping and improper treatment of e-waste, promoting recycling, and creating jobs in the sector.

⁵ To find out more, go to: <https://sustainabledevelopment.un.org/sdg12>



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Interview I

I.S.O._ What is the situation with e-waste in Brazil in terms of the amount produced, collection and recycling?

M.P._ Brazil still does not have official information and statistics on the volume of waste generated from electrical and electronic products (e-waste) or on the amount collected and its proper disposal for recycling. Studies conducted in 2018, based on the volume of electro-electronic products put on the market and the useful life of each item, estimated that Brazil produces 1.5 Mt of e-waste per year. The National Solid Waste Policy (PNRS, by its Portuguese acronym) created the National Solid Waste Management Information System (SINIR, by its Portuguese acronym), which will collect consolidated data in the future regarding solid waste management services, including the e-waste reverse logistics system. As the system is currently not regulated, it is difficult to estimate collection volume and proper disposal of e-waste in Brazil, since the activities in operation are individualized initiatives where it is difficult to obtain consolidated data.

I.S.O._ Who are the main stakeholders involved in the issue of e-waste in Brazil?

M.P._ According to the PNRS, the responsibility for e-waste reverse logistics in Brazil lies with businesses, which must collect the waste and deliver it to the manufacturers. The latter, in turn, must process (recycle) it and properly dispose of the material. Therefore, the main stakeholders are the government, the commercial sector and the electronics industry. It is important to note that consumers play an essential role in this process. Awareness needs to be raised among them so that they will proactively collaborate by regularly and correctly disposing of their waste.

According to the Sectoral Agreement⁶, other actors will be directly involved in the Brazilian reverse logistics process. These include companies representing manufacturers and importers, which will be responsible for structuring, implementing and operationalizing the e-waste reverse logistics system, as well as service providers involved in the logistics, storage and reverse manufacturing of waste.

I.S.O._ What is the status of the legislation on the topic in Brazil?

M.P._ The PNRS (Law No. 12305/2010) and Decree No. 7404, which regulate the policy, were approved in 2010. In 2013, a call for proposals was issued to establish the Sectoral Agreement between the government and private sector and implement e-waste reverse logistics. In August 2019, the Sectoral Agreement was submitted to public consultation. It is expected to be approved in the next few months, effectively initiating the implementation and operation of the e-waste reverse logistics system throughout the country.



Marcos Pimentel

Coordinator of the Ambientronic program of the Renato Archer Center for Information Technology (CTI) / Ministry of Science, Technology, Innovation and Communication (MCTIC).

⁶ Editor's note: The Sectoral Agreement is an act of a contractual nature signed between the government and manufacturers, importers, distributors and merchants, aimed at implementation of shared responsibility for the life cycle of products.

"The main stakeholders are the government, the commercial sector and the electronics industry. It is important to note that consumers play an essential role in this process. Awareness needs to be raised among them so that they will proactively collaborate by regularly and correctly disposing of their waste."

I.S.O._ What are the Ambientronic program and the Rematronic project?

M.P._ Coordinated by the Renato Archer Center for Information Technology (CTI), the objective of the Ambientronic program – with support from the Ministry of Science, Technology, Innovation and Communication (MCTIC), Ministry of the Environment (MMA), and former Ministry of Industry and Trade (MDIC) – is to develop sustainable technologies to reduce the impact of electro-electronic products and their waste on the environment and public health. The program also seeks to contribute to the creation of a circular economy, which will involve the entire life cycle of electro-electronic products and promote economic and social development in the reverse logistics chain.

The Rematronic project, coordinated by CTI in cooperation with GRI/Solvi and with financing from the Brazilian Development Bank, created an innovative technology for recovering precious metals – copper, silver and gold – from printed circuit boards. Developed on a technical laboratory scale, the process was patented and will now be scaled to a pilot industrial process. Training was also given to a specialized team and an e-waste recycling laboratory was set up, which will enable developing new technologies for recycling other products, such as batteries, television and monitor flat screens, light bulbs and photovoltaic panels.

I.S.O._ What are the main challenges for recycling e-waste in Brazil?

M.P._ In the political sphere, the main challenge is signing the Sectoral Agreement between the government, represented by the Ministry of the Environment, and the private sector, specifically companies in the commercial sector and the electronics industry.

Once the document is signed, another challenge is the scope of the national reverse logistics system. According to the Sectoral Agreement, in five years, the system is expected to be collecting and disposing in an environmentally safe way of 17% of the volume of products put on the market. Reverse logistics are expected to serve the 400 largest Brazilian cities throughout the country, corresponding to a combined population of 126 million people – in other words, approximately 60% of the Brazilian population.

In addition, two other aspects need to be considered in order not to impair the system's efficiency. First, it is necessary to increase waste processing capacity (reverse manufacturing process). Even though there are various electronic recycling initiatives by public and private companies in Brazil, there is still a shortage of recyclers, especially those that comply with the quality level recommended by the standard ABNT NBR 16156.

The second, and perhaps most critical, challenge is calculating the cost of transporting waste from collection points to recyclers, and then reusing it in a new production cycle. In view of the size of the country, the system must look for solutions so that this cost does not make e-waste reverse logistics economically unfeasible.

Despite these challenges, the main stakeholders of the Sectoral Agreement are optimistic. Once it is signed, Brazil will move to a new level of maturity in the collection and proper disposal of e-waste.

Interview II

I.S.O. *Is e-waste management an issue in Tanzania? Why is it relevant for the country to produce and report data on this matter?*

R.M. E-waste has become an important environmental and public health issue, not only on a global scale, but also in developing countries such as Tanzania. A lot of electrical and electronic equipment (EEE) contains hazardous chemicals and materials. For this reason, inadequacies in recycling and disposing of e-waste can cause serious 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, including Tanzania, have embarked on programs for e-waste management. These programs are implemented through existing institutional and legal frameworks in these countries. Availability of data on e-waste is therefore of paramount importance in these endeavors for informed decision-making.

I.S.O. *How does the National Bureau of Statistics (NBS) currently measure e-waste in Tanzania? What are the main challenges faced in this regard and how are they overcome?*

R.M. The measurement framework for e-waste statistics in the country followed the recommended international framework as outlined in the United Nations University manuals for the EEE Put on Market tool and E-waste calculation tool. However, slight modifications were made to the international framework to fit the national context and, most importantly, the availability of data.

Time series of data on trade from the Tanzania Revenue Authority was used to estimate the quantity of EEE put on the market and the e-waste generated from 1998 to 2017. There was no data for domestic production and exports of EEE; imports and exports of e-waste; or e-waste collected and recycled. Lack of these data limited computation of some key e-waste indicators, such as e-waste formally collected. The current report also features data on mobile phone subscriptions from the Tanzania Communication Regulatory Authority (TCRA) and the selected stock data for EEE from Household Budget Surveys conducted by the NBS.

Broadly speaking, the key limitations that were faced in the compilation of the National E-Waste Statistics Report (NEWSR) 2019 were: the impossibility of disaggregating some administrative data into more detailed categories; the lack of data from other potential sources, such as importation and exportation of e-waste, and collected and recycled e-waste; the lack of flexible and context-sensitive parameters for Tanzania, which have specificities in relation to the European countries used as a basis for the UNU tools – e.g., large proportion of EEE importation in Tanzania is second-hand and/or of low-quality goods, with shorter life spans, or even the Tanzanians' habit of repairing their EEE several times before it becomes waste; and the fact that illegal trade and misreported shipments are not measured, which may lead to underestimation of the real quantities of EEE put on the market.



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of Statistics (NBS).

"In recognition of the potential environmental and health impact of e-waste, many countries, including Tanzania, have embarked on programs for e-waste management."

In order to address these challenges and to enrich future reports on e-waste statistics, the NBS, as the national coordinator for production and dissemination of official statistics, will continue to strengthen collaboration with stakeholders within and outside the country. The goal is to improve the compilation methodology, the data capture tools, and the scope of data sources, facilitating the collection of disaggregated data for new and used EEE, as well as information on life spans and illegal EEE transactions.

I.S.O. Which stakeholders are involved in measuring and reporting e-waste in Tanzania?

R.M. Measuring e-waste in Tanzania, which resulted in the production of the NEWSR 2019, was a collaborative effort between the NBS and the National Technical Committee, composed of ministries, departments and agencies working on environment-related functions. The key institutions and their engagement in the process of producing the NEWSR 2019 were the Vice President's Office, responsible for coordinating environmental issues in Tanzania; the Tanzania Revenue Authority, responsible for the provision of data used in the report; the National Environmental Management Council, which is the law-enforcing Agent for environmental issues; and institutions of higher learning, which contributed to a literature and methodology review on waste.

I.S.O. Has Tanzania implemented any initiatives in terms of e-waste for achieving the Sustainable Development Goals? Please specify.

R.M. The production of the NEWSR 2019 is the first comprehensive initiative for measuring e-waste in Tanzania. All prior attempts to measure e-waste were limited in scope. They either focused on e-waste generated from a few types of EEE (like computers), or were aimed at addressing gaps in environmental legislation. The NEWSR 2019 provides data on programs developed for monitoring the implementation of SDGs, particularly Targets 6.3, 12.4 and 12.5.

Domain Report

The dynamics of the registration of domains in Brazil and the world

The Regional Center for Studies on the Development of the Information Society (Cetic.br) carries out monthly monitoring of the number of domain names registered in the 16 largest country code Top-Level Domains (ccTLDs) in the world. Combined, they exceed 100 million registrations.

In November 2019, the domains registered under .tk (Tokelau) reached 25.83 million, followed by Germany (.de), China (.cn) and the United Kingdom (.uk), with 16.29 million, 14.27 million and 9.55 million records, respectively⁷. Brazil had 4.11 million registrations under .br, occupying the seventh place on the list. With 1.91 million registrations, Spain (.es) ranked 15th, as can be seen in Table 1.

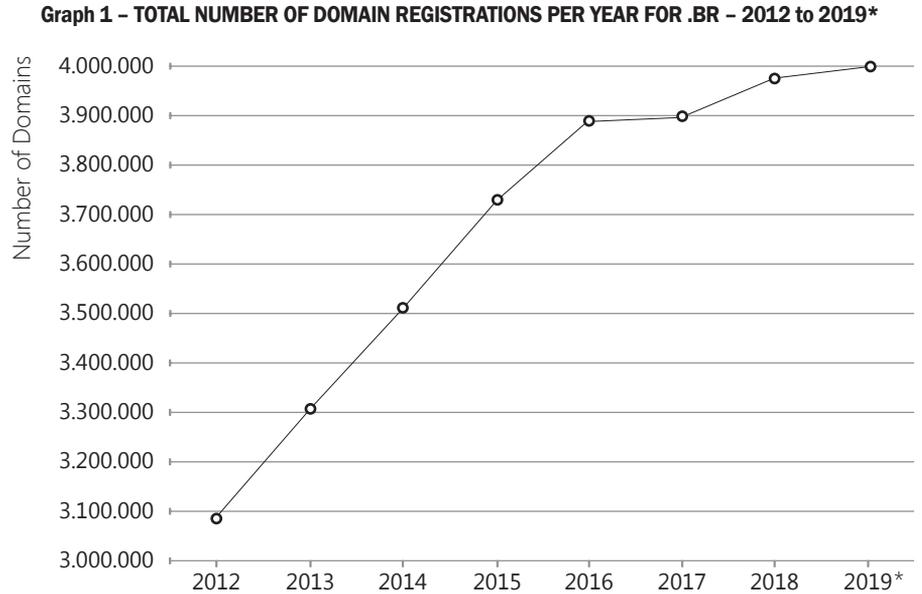
Table 1 – REGISTRATION OF DOMAIN NAMES IN THE WORLD – NOVEMBER/2019

Position	ccTLD	Domains	Ref.	Source
1	Tokelau (.tk)	25.830.619	Nov-19	research.domaintools.com/statistics/tld-counts
2	Germany (.de)	16.287.785	Nov-19	www.denic.de
3	China (.cn)	14.269.880	Nov-19	research.domaintools.com/statistics/tld-counts
4	United Kingdom (.uk)	9.555.260	Sep-19	www.nominet.uk/uk-register-statistics-2019
5	Netherlands (.nl)	5.897.818	Nov-19	www.sidn.nl
6	Russia (.ru)	4.963.521	Nov-19	www.cctld.ru
7	Brazil (.br)	4.111.858	Nov-19	registro.br/estatisticas.html
8	European Union (.eu)	3.557.288	Nov-19	research.domaintools.com/statistics/tld-counts
9	France (.fr)	3.409.087	Nov-19	www.afnic.fr/en/resources/statistics/detailed-data-on-domain-names
10	Italy (.it)	3.239.295	Nov-19	www.nic.it
11	Australia (.au)	3.193.765	Nov-19	www.auda.org.au
12	Canada (.ca)	2.834.145	Nov-19	www.cira.ca
13	Poland (.pl)	2.540.682	Nov-19	www.dns.pl/english/zonestats.html
14	Switzerland (.ch)	2.245.738	Oct-19	www.nic.ch/statistics/domains/
15	Spain (.es)	1.915.573	Nov-19	www.dominios.es

⁷ It is important to note that variations exist among ccTLD reference periods, although it is always the most updated one for each country that is used.

/Internet Sectoral Overview

Graph 1 shows the performance of .br since 2012.



*Data in reference to November 2019.

Source: Registro.br

In November 2019, the five generic Top-Level Domains (gTLD) totaled more than 173 million registrations. With 144.34 million registrations, o.com ranked first, as shown in Table 2.

Table 2 – MAIN GTLDS – NOVEMBER/2019

Position	gTLD	Domains
1	.com	144.337.964
2	.net	13.233.249
3	.org	10.083.500
4	.info	4.682.230
5	.biz	1.621.637

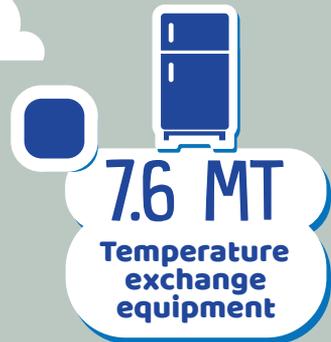
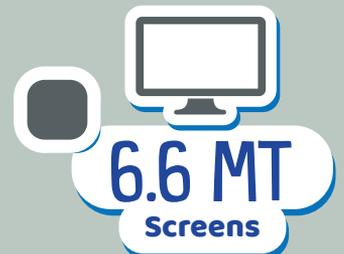
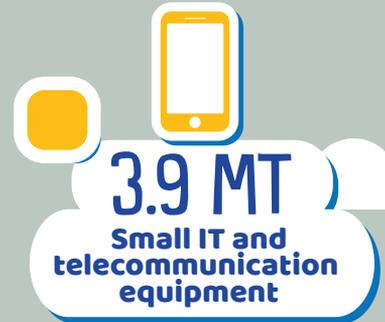
Source: DomainTools.com

Retrieved from: research.domaintools.com/statistics/tld-counts

/Answers to your questions

E-waste FACTS & FIGURES⁸

Estimates of e-waste totals per category in 2016.



⁸ Adapted from: https://collections.unu.edu/eserv/UNU:6341/Global-E-waste_Monitor_2017__electronic_single_pages_.pdf

/Answers to your questions

FROM EEE INTO E-WASTE

Life cycle and the most common e-waste management scenarios.

Delivery & Sales

Business or Private use:
Residence time

E-waste generation

Official take-back system

Mixed residual waste

'Collection' outside of official take-back system

Incinerator or landfill

Trade

E-waste management system

Missing an e-waste management system

Companies/dealers collect the e-waste for recycling or sell for recycling.

Individuals collect it door to door. There may be recycling of valuable materials, but non-valuable parts are improperly treated.



/Credits

TEXT

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