



Operational energy Efficiency for Users (OEU); Waste management of ICT equipment

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Foreword

This Group Specification (GS) has been produced by ETSI Industry Specification Group (ISG) Operational energy Efficiency for Users (OEU).

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

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Introduction

Waste of electrical and electronic equipment (WEEE) such as computers, TV-sets, fridges and cell phones but also professional equipment's coming from ICT (fixed and mobile networks, servers, transmission equipment's) is one the fastest growing waste streams in the EU, with some 9 million tonnes generated in 2005, and expected to grow to more than 12 million tonnes by 2020.

Further to the 1997 Kyoto protocol the European Commission has issued, and will issue, Directives and Regulations in order to improve e-waste processing of whole industry sectors.

Therefore suppliers and users of information and communication technology (ICT) equipment are obliged to implement "Green" tools (indicators, recognized Green levels) to monitor waste processing of ICT equipment.

The present document has been developed by ISG OEU members (ICT world Users) in order to define the most efficient tools, recommendations and best practices to help ICT sector to manage the e-waste. It includes also some reminders of the regulatory frame in European Union regarding e-waste collection and treatment.

The present document presents the waste processing in a simple format. It is expected that the present document will influence the development of a new ETSI standard under the responsibility of ETSI Technical Committee Access, Terminals, Transmission and Multiplexing (ATTM) and ETSI Technical Committee Environmental Engineering (EE).

1 Scope

The present document defines the current position of the ISG OEU members in relation to management of ICT equipment as WEEE.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] EU Directive 2012/19/UE of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) Text with EEA relevance. .
- [i.2] EU Directive 2011/65/UE of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment Text with EEA relevance (RoHS).
- [i.3] EU Regulation (EC) 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste.
- [i.4] Council Decision 93/98/EEC of 1 February 1993 on the conclusion, on behalf of the Community, of the Convention on the control of transboundary movements of hazardous wastes and their disposal (Basel Convention).
- [i.5] EC Regulation No 1907/2006 of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and establishing a European Chemicals Agency.
- [i.6] EU Directive 2006/66/CE for batteries and accumulators, complementary to WEEE Directive.
- [i.7] EU Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (WEEE Directive).

[i.8] Frequently Asked Questions on Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE).

NOTE: Available at <http://ec.europa.eu/environment/waste/weee/pdf/faq.pdf>.

[i.9] EU Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste (Waste Framework Directive).

[i.10] EU Directive 2006/66/CE of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC.

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

CE marking: indicates a product's compliance with EU legislation and so enables the free movement of products within the European market

NOTE: States that the product has been assessed before being placed on the market and thus satisfies the applicable legislative requirements (e.g. health and safety or environmental requirements).

collection: gathering of waste, including the preliminary sorting and preliminary storage of waste for the purposes of transport to a waste treatment facility

disposal: any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances, materials or products or energy

End of Life (EoL): any chosen option to reuse, recycle or dispose a product after the period of primary use

recycling: any recovery operation by which waste materials are reprocessed into substances, materials or products for their original purpose or for other purposes

NOTE: E.g. recovery of electronic cards, processing of plastics or metals contained in WEEE collected by ICT users are recycling operations.

recovery: any operation whose principal result is waste serving a useful purpose in replacing other substances, materials or products that have been used for a particular purpose, or waste being prepared to be used for this purpose, including the waste producer

reuse: any operation by which products or components that are not waste are used again for the same purpose for which they were conceived

treatment: recovery or disposal operations, including preparation prior to recovery or disposal

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AMEA	Africa and Middle East Area
BAS	Broadband Access System
BTS	Base Transceiver Station
CPU	Central Processing Unit
CSR	Corporate Social Responsibility
CWIT	Countering Weee Illegal Trade
DSLAM	Digital Subscriber Line Access Multiplexer
EC	European Community
EEE	Electric and Electronic Equipment
EEE	Electrical Electronic Equipment
EFTA	European Free Trade Association
EoL	End of Life

EPR	Extended Producer Responsibility
FAQ	Frequently Asked Questions
GPS	Global Positioning System
HD	High Definition
ICT	Information and Communication Technology
IP	Internet Protocol
IT	Information and Telecommunication
LCD	Liquid Crystal Display
MSC	Mobile services Switching Center
NAS	Network Access Server
NGO	Non-Governmental Organization
OECD	Organisation for Economic Co-operation and Development,
PABX	Private Automatic Branch eXchange
PBB	PolyBrominated Biphenyls
PBDE	PolyBrominated Diphenyl Ether
PC	Personal Computer
PCB	PolyChloroBiphenyles
PSTN	Public Switch Telephony Network
REACH	Registration, Evaluation, Authorization and restriction of Chemicals
RoHS	Restriction of Hazardous Substances
SSD	Solid-State Drive
SVHC	Substances of Very High Concern
UE	Union Européenne
UNU	United Nations University
UPS	Uninterrupted Power Supply
WEEE	Waste of Electrical and Electronic Equipment's
WLAN	Wireless Local Area Network

4 European Regulation

4.1 Waste management of EEE in Europe

WEEE is a complex mixture of materials and components that, because of their hazardous content, and if not properly managed, can cause major environmental and health problems. Moreover, the production of electronics devices requires the use of scarce and expensive resources. To improve the environmental management of WEEE and to contribute to a circular economy and enhance resource efficiency the improvement of collection, treatment and recycling of electronics at the end of their life is essential.

The Waste management of EEE relies in Europe on two main pillars, WEEE and RoHS Directives, completed by REACH Regulation, of a wider scope, to regulate the use of most concerning and hazardous substances (for all industries) and regulation regarding transboundary movements of e-waste.

Directive 2012/19/EC, known as the "WEEE Directive" [i.1], and Directive 2011/65/EC, known as the "RoHS Directive" [i.2], set up the European regulatory framework for the separate collection and treatment of electrical and electronic equipment waste in each Member State.

The collection and recycling of WEEE presents a unique and complex set of challenges. These factors include:

- The heterogeneity of the devices in terms of dimensions, materials, weight, and functionality/application (e.g. refrigerators, tablets, process control devices in production companies).
- The continuous introduction of new products and new applications of devices that all have different compositions and characteristics.
- The presence of hazardous components and substances in some devices (e.g. substances that damage the ozone layer, mercury and other heavy metals) that should be processed correctly.

- The possibility of recovering valuable resources such as metals and plastics, but also a number of rare natural resources that are of critical importance due to their limited availability and strategic application (e.g. ruthenium, indium, platinum and rare earth elements), and of which, EEE contains a significant share of the world's supply.
- The large number and diversity of actors and industry sectors involved throughout the life cycle of EEE, from design to reprocessing, and their respective roles, interests and responsibilities.
- Developments in the recycling of WEEE and the addition of a specialized WEEE sector that can recycle these devices.

4.2 WEEE Directive

4.2.1 General

The objective of this Directive is, 'as a first priority, the prevention of waste electrical and electronic equipment (WEEE), and in addition, the reuse, recycling and other forms of recovery of such wastes so as to reduce the disposal of waste'.

NOTE: Some information is provided by the EU Directive 2012/19/UE FAQ [i.8].

4.2.2 Reminder on WEEE Directive

4.2.2.1 General principles

- "Waste electrical and electronic equipment" or "**WEEE**" refers to electrical or electronic equipment which has been discarded by its end-user. "Electrical and Electronic equipment" or "EEE" means equipment which is designed for use with a voltage rating not exceeding 1 000 Volt for alternating current and 1 500 Volt for direct current.
- Directive 2012/19/EU, "WEEE Directive" [i.1], and Directive 2011/65/EU, "RoHS Directive" [i.2], set up the European regulatory framework for the separate collection and treatment of electrical and electronic equipment waste in each Member State.
- The new WEEE Directive 2012/19/EU [i.1] entered into force on 13 August 2012 and became effective on February 2014 in EU State members.

4.2.2.2 WEEE Directive specific requirements

- EEE eco-design in order to facilitate WEEE reuse and treatment;
- separate collection of WEEE;
- systematic treatment of specific components (such as PCB condensers, printed circuit boards) and of substances classified as dangerous (such as mercury, CFCs) to prevent pollution;
- reuse, recycling and recovery of collected WEEE with high recycling and recovery targets, with the reuse of whole devices being identified as the priority.

4.2.3 Extended Producer Responsibility Principles

4.2.3.1 REP/EPR Extended Producer Responsibility

Originally formulated by the OECD, the fundamental principle of EPR is to involve the manufacturer in support of its product impacts on the environment, including the end of life, and do act to reduce these impacts and therefore in the public interest.

WEEE, batteries, old cars, paper are under EPR Principle in the main European countries. The European WEEE Directive [i.1] relies on Extended Producer Responsibility principle.

EEE producer is the entity which puts the equipment on Europe State Member market. (EU country by country: not possible for whole EU).

4.2.3.2 WEEE Producer categories

According to that definition, there are five types of producers.

Producers are responsible for organizing and financing the collection and treatment of WEEE.

NOTE: As EEE Users, one can be Producer for some equipment but not for others depending on how the equipment has been put on the market and what has been specified with the devices suppliers.

Table 1

Type of EEE Producer	Description
Manufacturer	Sells under its own brand products manufactured in member state
Importer	Imports from a country outside the EU
Introducer	Imports from an EU Member State
Reseller under its own brand	Resells products under its own brand
Distant seller of household equipment	Direct seller of household EEE from abroad by post or Internet communication

4.2.3.3 EPR Compliance

According to EU member state regulations, EEE Producer have two main ways to comply to their obligations in most of EU members states.

a) Individual collection and treatment scheme

Producer first option is to implement an individual collection and treatment scheme subject to approval by public authorities. Allow to keep the value of recovery but implies a full involvement in the collection and treatment scheme.

b) Producer Responsibility Organisation

Other option for producer is to join an approved Producer Responsibility Organisation (PRO) responsible for the collection and treatment of household equipment (called Eco-organism in some countries). More easy to manage and more comfortable (the eco-organism endorse the legal responsibility), but no visibility on treatment and potential recovery.

In some countries (France, UK, Spain, Poland, etc.) the producer can delegate this responsibility to a **State Agreed Structure: "Eco-organisms"**.

4.2.4 WEEE treatment

Five types of WEEE treatment can be identified. They are ranked in table 2 according to the degree of priority given to them by the regulation.

Table 2

WEEE treatment hierarchy	Type of treatment
Reuse	reuse of complete device
Component reuse	reuse of device components
Recycling	material recycling (plastics, metals)
Energy recovery	energy recovery
Disposal	disposal of material without energy recovery



Figure 1

4.3 WEEE categories

4.3.1 Current WEEE classification in ten categories

All EEE devices, whether household or professional, are classified into one of the following ten categories.

The 11 current categories of equipment until now are:

- 1) Large household appliances.
- 2) Small household appliances.
- 3) **IT and telecommunications equipment (most represented category for ICT).**
- 4) Consumer equipment.
- 5) Lighting equipment.
- 6) Electrical and electronic tools.
- 7) Toys, leisure and sports equipment.
- 8) Medical devices.
- 9) Monitoring and control instruments.
- 10) Automatic dispensers.
- 11) Photovoltaic panels.

4.3.2 New categories from 2018

The 7 new categories from 2014 (coming from WEEE recast) - applicable progressively starting 2018, are:

- 1) Temperature exchange equipment: Refrigerators, Freezers, Air conditioning equipment, Radiators.
- 2) Screens, monitors, and equipment containing screens having a surface greater than 100 cm²: Screens, televisions, LCD photo frames, monitors, laptops, notebooks.
- 3) Lamps: straight fluorescent lamps, compact fluorescent lamps, fluorescent lamps, high intensity discharge lamps.
- 4) Large equipment (any external dimension greater than 50 cm) including:
 - Household appliances: IT and telecommunication equipment; equipment reproducing sound or images, musical equipment; electrical and electronic, automatic dispensers;

- Washing machines, dish washing machines, cookers, electric stoves, electric hot plates, equipment reproducing sound or images, large computer-mainframes, large printing machines, copying equipment, large medical devices, photovoltaic panels.
- 5) Small equipment (no external dimension more than 50 cm) including:
- Household appliances; equipment reproducing sound or images, musical equipment; toys, leisure and sports equipment; medical devices; monitoring and control instruments; automatic dispensers; vacuum cleaners, luminaires, microwaves, irons, calculators, radio sets, video cameras, video recorders, hi-fi equipment, equipment reproducing sound or images.
- 6) Small IT and Telecommunication equipment (no external dimension more than 50 cm):
- Mobile phones, GPS, pocket calculators, routers, personal computers, printers, telephones.
- 7) Photovoltaic panels.

4.4 RoHS Directive

The RoHS Directive [i.2] lists substances whose use in the manufacturing of equipment is banned or strictly controlled.

This list is the following:

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent chromium (Cr⁶⁺)
- Polybrominated biphenyls (PBB)
- Polybrominated diphenyl ether (PBDE)

Most EEE devices are affected by this list. Directive 2011/65/EU [i.2], published on 1 July 2011, is a revision of the RoHS Directive and have been transposed by the Member States before 1 January 2013.

The regulatory framework will evolve again in the coming years, following the publication on 4 July 2012 of Directive 2012/19/EU (recast WEEE Directive) applicable in EU countries from beginning 2014 [i.1].

The RoHS Recast include especially:

- progressive harmonization with REACH SVHC candidate list;
- scientific research results about substances;
- inclusion of RoHS compliancy in CE Marking and labelling.

4.5 Main challenges for collection and treatment

In the coming years, the main challenge regarding WEEE will be the increasing of collection rate.

- New ambitious collection targets for EU Member State for both household and business WEEE:
 - 45 % in 2016 and 65 % in 2019 (put on the market); or
 - 85 % of waste generated in 2019 (according to a calculation mode under discussion)
- Seven new categories of WEEE with wider scope.
- Strengthening controls to struggle against illegal exports outside UE.
- Clear distinction criteria between used EEE and WEEE.
- Free take back of small WEEE by distributors (more for households WEEE).

- Possibility for producer to appoint an authorized representative to endorse Producer responsibility.

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020
Target	Min 4 kg/inhabitant or average kg/inhabitant collected annually over the previous 3 years (whichever is greater)				45% PoM (annual average from 3 preceding years)			65% PoM (annual average from 3 preceding years) or 85% WG	

Figure 2

Other challenges are the followings:

- Manage waste impacts of WEEE coming from ICT on environment and answer stakeholders (customers, employees, NGO, public authorities, suppliers, etc.) requirements.
- Manage the whole channel of all ICT waste categories by sharing between actors involved an adapted strategy based on best practices and innovations:
 - Provide analysis of related and specific obligations for each kind of waste, and provide guidance to choose between collective and individual compliance scheme.
 - Work with reliable, agreed, trace-able partners for collection, transport, treatment with priority to equipment reuse and material recovery.
 - Develop re-use of equipment to keep value, reduce CO2 emission, use of rare resources and hazardous substances.
- Increase awareness and train employees in companies using ICT equipment about waste management best practices.
- Be involved in socio-economic development through Waste Management.
 - Job creations in insertion.
- Be exemplar on regulation compliancy related to waste collection, storage, transportation, treatment and valorisation, in Europe and AMEA footprints.
 - Directive 2008/98/EC on waste (Waste Frame Directive) [i.9], RoHS Directive [i.2] and REACH Regulation [i.5].
 - WEEE Directive [i.1] and Extended Producer Responsibility principle.
 - Countries specific waste regulations.
 - Basel Convention [i.4] and EU Regulation 1013/2006 [i.3] for transboundary movements of waste.
 - Anticipate impacts of coming Regulations and mitigate the risks.
- Provide complete, reliable and auditable reporting on all activities footprint to report on waste treatment for each main categories.
- Work closely with suppliers to:
 - Be clear on waste treatment responsibility - EPR Principle.
 - Reduce or avoid the use of hazardous substances and conflict minerals and encourage their substitution.
 - Care about impacts on rare resources and biodiversity.
 - Encourage eco-conception to facilitate waste treatment.
- Propose to households and business customers valuable process for waste management that answers their own requirements for collection and recycling.

- Be strongly involved in less structured countries to enhance waste management.
 - Support local initiatives to improve waste treatment channels and select relevant treatment partners.

5 Stakes for ICT Domain Users regarding WEEE management

5.1 Main categories of WEEE for ICT domain

Professional ICT WEEE have specificities such as:

- Very diverse volume flow and very punctual collection.
- A wide variety of materials type including electronic cards poor to rich, cabinets, etc.
- On the ground problems of storage and disposal (place and time).
- Requires adapted and specific means: building works, civil engineering, lifting, multi-disassembly, etc.
- Various agreements (electric, work at height, asbestos, masonry, enabled gear, lifting, crane, etc.).
- Large capacity to respond to different and unexpected situations.

Here are listed for information main categories of WEEE for ICT domain (not exhaustive):

- WEEE coming from fixed (PSTN, fibre, HD, internet) and mobile networks (2G/3G/4G).
 - Access Networks (BTS, DSLAM, routers, microwaves, BAS, NAS, electronic cards), core network (commutator, MSC, servers, etc.).
 - transmission equipment's.
 - WLAN equipment.
- Internal WEEE:
 - Fixed PC and laptops of employees, screens, printers, accessories, routers, CPEs, fixed and mobile phones, other peripherals.
- B2B and B2C customers WEEE:
 - Mobiles et internet routers.
 - Internet and telephony equipment's (PABX, screens, camera etc.).
- IT domain:
 - Servers, PCs, hard drives, SSD memories.
- WEEE of buildings and technical environment:
 - Motors, cooling systems, security systems, energy distribution systems.

NOTE: Batteries and cables are treated under Directive 2006/66/CE [i.10] (very similar to WEEE for batteries).



Figure 3

5.2 Recommendations for e-waste management

The following are recommendations proposals for managing e-waste.

- Identify the type of WEEE concerned: old servers and storage equipment, PABX, old PCs, other WEEE, etc.
- Make an estimation of the weight of waste categories.
- If possible make an estimation of the recovery potential value of the WEEE (especially regarding rare resources):
 - but be careful the evaluate the global financial balance (including revenues from recovery but also costs from transport, depollution of hazardous and less valuable parts);
 - value can come from gold, silver, platinum, palladium or rare-earths, in e-waste.

NOTE 1: Regarding rare earths the following have been identified as the most critical for European industry:

- indium (In),
- germanium (Ge),
- gallium (Ga),
- neodymium (Nd),
- dysprosium (Dy) with very low recycling rate and high dependence from imports.
- Encourage refurbishment and second life of equipment when possible (with erasure of personal data):
 - in case of resale of second hand equipment's: be careful with the brokers (risk of lack of traceability);
 - ask for precise tests and procedures to identify properly working equipment;
 - be careful in case of transboundary movements of waste / get the relevant authorizations;
 - ensure that with collection and treatment partners that WEEE or second EEE are not discarded without control in emerging countries.

- Check who holds the Producer role: not always easy especially for old equipment:

NOTE 2: Before August 2005 (Historical WEEE), the user/owner of WEEE had always the role of Producer.

- check the information with sourcing department for instance.

- For new equipment put on the market, ensure proper declaration to public environment authorities Registry (like ADEME in France, directly or through agrees structures) and reporting of WEEE collected.
- Find the relevant and traceable collection/transport/treatment:
 - Scheme different actors like state agreed ECO-ORGANISMS (in some European countries).
 - Be careful on traceability after collection (bill of materials, transport certificates, etc.).
 - All WEEE collected are transported to authorized treatment facilities unless the appliances are reused as a whole. Treatment facilities are obliged to obtain a permit in compliance with European and countries regulation.
 - Treatment operation may also be processed outside the respective EU Member State or the EU provided that the shipment of WEEE complies with 1013 and Basel Convention , and that the exporter can prove that the recovery, reuse and/or recycling operation takes place under conditions that are equivalent to the EU requirements.
 - For the purpose of monitoring these targets, producers, or third parties acting on their behalf, are keeping records on the mass of WEEE and the equipment components, materials or substances entering and leaving the treatment facility and/or entering the recovery or recycling facility.
 - Be aware that decommissioning of some WEEE may include complex operations in buildings and generate extra costs.
- On the ground collaborative work / best practices and experience sharing with CSR, sourcing, IT, legal, logistics in ICT companies to:
 - estimate the level of conformity of WEEE treatment regarding the local regulations and the processes;
 - check the management of WEEE and other hazardous wastes (batteries (under a specific regulation in EU(2006/66/CE [i.6]), cables, etc.);
 - know the wastes channels;
 - check the contracts with recycling companies and suppliers;
 - perform regular audits of waste treatment partners;
 - take into account the procedures and the wastes channels through visits of recycling companies and warehouses;
 - ensure auditable and reliable reporting.
- Ensure RoHS and REACH compliancy with suppliers, ensure that e-waste transport and treatment partners are compliant with regulations for transboundary waste shipment (European Regulation 1013 CE 1013/2006 [i.3] and Basel Convention [i.4]).
- Take into account e-waste management in big network transformation process:
 - renewal of data centre;
 - renewal/upgrades of companies IT network and infrastructures (internal telephony/internet networks, etc.);
 - all IP process (progressive decommissioning of PSTN network, ATM/ADSL equipment, etc.);
 - virtualization, RAN/FAN renewal, etc.;
 - anticipate decommissioning of old equipment's in case of network upgrades;
 - evolutions of transmission network, etc. (fibre or microwaves deployment).
- Be also informed about materials resources recovery opportunities in some WEEE: precious metals in PCB cards, rare earths, etc.
- Waste Management is one important part of Corporate Social Responsibility (CSR).



Figure 4

5.3 Stakes in Africa and Middle East for WEEE

5.3.1 General context in emerging countries

The business of electronic products is fast growing in Africa and thus e-waste generated.

- 2 billions of computer are used in the world.
- Within 10 years in Africa.
- Number of PC used: should multiply by 10.
- Number of mobile subscribers: should multiply by 100.

5.3.2 E-waste treatment context

Some WEEE like regulations exist in some countries but enforcement is limited for the time being.

There is a high market share and demand for second hand and low cost products, by 2017, Africa might generate more e-waste than EU, mainly due to the increasing use of mobile phones and computer, the scheduled obsolescence and the short lifecycle of EEE in Developed countries feed the second-hand equipment's movements to emerging countries.

Informal activities in the e-waste recycling chain are present in all countries and include collection, manual dismantling, open-burning to recover metals and open dumping of residual fractions. The collection is mainly performed by the informal sector (scrap metal workers).

An important recommendation is to avoid the import of e-waste and near-end-of-life equipment but the import of second-hand EEE provides also development opportunities:

- Contribute to reduce the "numeric gap" with positive socio-economic aspects.
- Refurbishing of EEE and the sales of used EEE is an important economic sector in some countries of West Africa (e.g. Ghana and Nigeria).
- Well-organized and a dynamic sector that holds the potential for further industrial development: allow low and middle income households with affordable ICT equipment and other EEE.
- Both valuable (cards, cables and circuit boards, etc.) and non-valuable waste fractions (like some batteries and brominated plastics, etc.) have to be treated properly.
- Connecting informal collectors to a formal recycling structure is key when possible.

5.3.3 EU 1013/2006 Regulation about transboundary movements of waste

5.3.3.1 Summary

The European Union (EU) has set up a system for the supervision and control of shipments of waste within its borders and with the countries of the European Free Trade Association (EFTA), the Organization for Economic Cooperation and Development (OECD) and third countries which are party to the Basel Convention.

This is Regulation (EC) No 1013/2006 [i.3].

Regulation (EC) No 1013/2006 [i.3] aims at strengthening, simplifying and specifying the procedures for controlling waste shipments to improve environmental protection. It thus reduces the risk of waste shipments not being controlled. It also seeks to include into Community legislation the provisions of the Basel Convention [i.4] as well as the revision of the Decision on the control of transboundary movements of wastes destined for recovery operations, adopted by the OECD in 2001.

5.3.3.2 Scope

This Regulation applies to shipments of waste:

- between Member States, within the European Union (EU) or with transit through third countries;
- imported into the EU from third countries;
- exported from the EU to third countries;
- in transit through the EU, on the way from and to third countries.

The Regulation involves almost all types of waste shipped. Only radioactive waste and a few other types of waste do not fall within its application, insofar as they are subject to separate control regimes.

5.3.3.3 List of wastes

The Regulation also reduces the number of lists of wastes whose shipment is authorised from three to two:

- Wastes subject to notification are set out in the "Amber List" (Annex IV) [i.3], while wastes subject only to information requirements are set out in the "Green List" (Annex III) [i.3].
- Wastes for which export is prohibited are listed separately.

5.3.4 Basel Convention (UN)

5.3.4.1 Control of Transboundary Movements of Hazardous Wastes

Basel Convention has been agreed in order to control transboundary movements of Hazardous Wastes and their Disposal [i.4]. It has been adopted in 1989 and entered into force in 1992.

5.3.4.2 Prevent and organize transfer of hazardous wastes

Prevent and organize transfer of hazardous waste from developed (OECD) to less developed countries.

- Based on "prior informed consent" principle.
- Shipment without parties consent and to and from non-Parties are illegal.
- Each parties have to ensure that hazardous and other waste are managed and treated in an environmentally sound manner.
- Of the 175 parties to the Convention, only Afghanistan, Haiti, and the United States have signed the Convention but not yet ratified it.

6 Recommendation to improve WEEE collection rate

6.1 Work on WEEE deposit to improve WEEE collection

6.1.1 Generalities

To reduce theft in waste disposal facilities (one of the first source of illegal treatment) it is recommended to deploy on the ground operational measures (video surveillance / closed-circuit television systems, WEEE tracking, etc.).

A complementary action plan concerns the frequency of removal of WEEE in some big cities where collection rates are particularly low in waste disposal.

6.1.2 Improving the sorting of WEEE in waste collection facilities

Beyond greater awareness of guards and employees in Waste collection facilities, a more precise characterization of scrap bins could be an interesting line of action to limit the impacts of errors in sorting waste disposal.

6.1.3 Reduce the "leaks" in distributors collection channel

The introduction of a computerized system for better tracking WEEE stream taken in store, and especially delivery since they are dealing with the largest volumes, would better track the flows involved.

Faced with the rise of "pure players" among the distribution channels, it is necessary to ensure that they meet their obligation to return "1 1" (consequence of WEEE Directive in Europe and 1 for 0 soon from small WEEE), with the implementation of effective solutions for the recovery, whether the delivery or recovery of small appliances (free postal return, etc.).

6.1.4 Improve WEEE sorting in households

It has to be noted that significant part of the deposit still remains poorly sorted by households. This mainly small WEEE are sometimes discarded with household waste. These quantities can certainly be further reduced through awareness and education of households to new practices .

6.2 Improvements to be performed by collection and treatment actors

In view of WEEE tonnages recovered by metal recyclers and waste treatment facilities (mills, grinders, smelters), it seems essential to ensure that WEEE concerned are properly treated for depollution and that origin and final destination are known.

Include these actors as collection points to include the volume of WEEE to take into account the non-selective collection part (direct collection from owners by artisans / installers not working on behalf of a distributor, for private collection services "scrap" that collect such WEEE from private individuals, etc.).

In return, create a more strict control of illegal diversion of contributions from legal collection scheme (theft in waste disposal, transfer by delivery personnel installers working on behalf of distributors under the obligation to take back "1 for 1", etc.).

Require proofs of a recycling rate consistent with the objectives and implementation of depollution necessary, in accordance with the requirements of the Directive 2012/19/UE [i.1].

6.3 Involvement of EEE producers

EEE, producers are currently trying to develop new manners to manage produced equipment and devices, especially by appropriating the principles of circular economy.

Develop sales of services rather than goods (which consequence may be to extend the duration life of some equipment's) , eco-design products, incorporating materials from recycling: producers identify economic and social positive impacts of these new approaches, transforming their obligations to producers in development opportunities.

6.4 Improve the measurement of quantities of EEE placed on the market and generated WEEE

6.4.1 Making studies on national statistics for bridging the gap

Making consumer surveys would improve the representativeness of the total detention times used. These investigations would aim to obtain quantified data on the behaviour of households towards the EEE (evolution, age and average weight of the park, age devices at different their disposal or re-use, according to the categories of devices), and to have more information about the park and holding periods of EEE secondary residence.

Indeed, the level of the park (including equipment used and unused devices present in the household), the entire perimeter (household and assimilated, including photovoltaic panels) is about 240 kg/capita 2012. A consumer survey would characterize it more finely park, distinguishing from EEE in use of the WEEE, but remaining within households.

6.4.2 Adjust the data statements to the needs of estimated WEEE field

WEEE Registry, performed according to the nomenclature SH4 (Harmonized system), have an insufficient level of accuracy to be directly related to the types of equipment considered for the evaluation of the deposit. For this study, it has been necessary to rely on the statements of a French Eco-organism, more accurate (in HS8) to ventilate statements Registry according to the type of equipment UNU model.

6.5 Highlight the e-waste stream which are not well documented

6.5.1 Update knowledge on refurbishment and export market

It would be interesting to obtain more information about volumes that pass through the 'broker' market, their final destinations and how the equipment is transported.

6.5.2 Get reliable data on exports of used second-hand EEE

It would be necessary to more clearly identify the destinations of exports of used EEE from Developed countries. Exports are, to date, poorly documented.

To identify these data, it should strengthen cooperation with the competent authorities in the fight against illegal sectors (Ministry of Interior, Customs, Department of Ecology). To strengthen customs action, it could be considered systematic transmission of information from eco-organizations, such information back to the Department of Ecology, such as:

- Companies having practices that do not conform to national regulations.
- Suspicion of illegal exports documented (WEEE exported under cover of used EEE exported for reuse).

Annex A (informative): e-waste treatment

A.1 Used ICT goods collection

Collectors should ensure equipment is handled, packaged and stored in such a way as to avoid damage during transit. This may include the following concerns:

- Packaging fragile equipment to avoid damage during collection and transport.
- Separating equipment to be assessed for reuse from waste to prevent contamination or damage of the reusable equipment.
- Pack heavier items so that they do not move or fall on and damage lighter items.
- Avoiding leakage from used printer toner.
- Uninterrupted Power Supply (UPS) containing residual electrical charge and other batteries at risk for unintentional discharge.

A.2 Collection systems

ICT equipment's should not be deposited into regular household waste, which would result in the equipment being disposed of in landfill or incinerated.

ICT equipment's should be collected separately by the municipal waste collection system or an alternative waste collection system and Telecom operators and distributors can make a proportional contribution to raise users' awareness by informing and educating customers about potential eco-environmental impacts of equipment

A used ICT goods collection system should have collection points conveniently located for users so that they can bring their ICT equipment to such collection points. In addition, the collection system should be free of charge for users.

Collection of used ICT equipment through telecom operators', retailers' or manufacturers' distribution channels should be a key element of the collection system.

Collection systems for used ICT equipment should be accountable in a way that is practical and transparent to audit. This may require keeping a written record of the actual number of used WEEE received, currently in storage, and shipped. Information about the reuse, recycling and final disposal of used ICT equipment and accessories is usually obtained directly from recycling and refurbishment companies.

A.3 Organization of collection points

Collection points should be an initial part of the collection system, which should also include appropriate facilities where evaluation and/or testing and labelling can be carried out to decide whether used ICT equipment destined for reuse are in working order and can be directly reused, or require repair, refurbishment or upgrading prior to reuse, or are to be sent for eco-environmentally sound material recovery and recycling.

In addition to collection points for consumers, it is important to consider collection from the repair sector, both formal and informal, to ensure that parts and ICT goods scrap do not end up in landfills.

Depending on the capacity available in particular countries and the logistics involved in managing used ICT equipment, the separate collection of used ICT equipment is recommended in order to preserve the working characteristics and resale value of those collected.

A collection point should ensure the security of the ICT goods collected. Where the collection point conducts a preliminary evaluation of potential for reuse, appropriate packaging material should be used to separate used ICT equipment from each another while in storage and during transportation to protect them from damage and to preserve their operational capability and market value for possible reuse. The type of material would depend on the availability of space at the point of sale.

A.4 Handling at the collection points

After preliminary evaluation, used ICT equipment which is destined for reuse should be packaged in such a way as to protect their integrity.

Whenever possible, used ICT equipment should be collected with their batteries, chargers and accessories. However, it should be noted that in some markets, phones, batteries and other accessories may be returned separately.

It should be assumed that every battery retains some degree of electrical charge. If the batteries are removed, they should be packaged in such a way as to avoid contact with their terminals, to avoid short-circuits and fires. Batteries should be sent only to facilities that are specially qualified to recycle or process batteries for materials recovery, and should be protected against extremes of temperature. Care should be taken to ensure that the transportation of batteries complies with all applicable regulations or courier requirements.

The collected used ICT equipment should be sent only to eco-environmentally sound facilities, having the relevant agreements for such activities, whether for intermediate accumulation, refurbishment and repair or for materials recovery and recycling.

A.5 Incentives for setting up collection systems

Consideration should be given to providing incentives to users to participate in a used ICT equipment collection system.

Sellers of new ICT equipment's should consider offering appropriate incentives for the collection of used ICT equipment's when needed.

Manufacturers, telecom operators and ICT equipment ICT goods distributors should consider the possibility of sharing, as part of EPR systems, the physical and/or financial obligations entailed by the collection and management of used ICT equipment's. This is particularly necessary and should be implemented as soon as possible in countries where the legislation and infrastructure for the collection of used ICT equipment's is lacking.

A.6 Optimizing capture of WEEE by existing collection points

To reduce theft in waste disposal facilities it is first of all to pursue financial operational measures (video surveillance / closed-circuit television systems, WEEE tracking, etc.).

A complementary action plan concerns the frequency of removal of WEEE in some big cities where collection rates are particularly low in waste disposal.

a) Improving the sorting of WEEE in waste collection facilities:

Beyond greater awareness of guards and employees in waste collection facilities, a more precise characterization of scrap bins could be an interesting line of action to limit the impacts of errors in sorting waste disposal.

b) Reduce the "leaks" in distributor's collection channel:

The introduction of a computerized system for better tracking WEEE stream taken in store, and especially delivery since they are dealing with the largest volumes, would better track the flows involved.

Faced with the rise of "pure players" among the distribution channels, it is necessary to ensure that they meet their obligation to return "1 to 1", with the implementation of effective solutions for the recovery, whether the delivery or recovery of small appliances (free postal return, etc.).

c) Improve the WEEE sorting in households:

Finally, a significant part of the deposit still remains poorly sorted by households. This mainly small WEEE are sometimes discarded with household waste. These quantities can certainly be further reduced through awareness and education of households to new practices (to be effective, communication should be based on specificity of the collection scheme).

A.7 Processing and management of Equipment and Components destined for re-use

The best possible outcome for any device accepted by a refurbisher is for that equipment to be reused.

When used ICT goods are refurbished or repaired, any hazardous substances, or parts containing hazardous substances that are being replaced, consideration should be given to replace them with readily available parts containing benign substitutes (non-hazardous) and in line with national legislations, and regional and international conventions prescribing phase out strategies.

Batteries

It is important to note that there are a wide variety of battery sizes, capacities and technologies currently in use in computing equipment, although almost all new laptop batteries are of lithium-ion type with some older laptops based on nickel metal hydride or occasionally nickel cadmium (Ni Cd). While this clause is concerned with the assessment of laptop batteries, it is worth noting that there are also other multiple uses for batteries in computing equipment, such as small button cell batteries that are attached to circuit boards, and additional batteries that are used in wireless keyboards and mice. There are also battery back-up systems in use in some countries to provide an uninterrupted power supply, and which provide emergency power to desktop computers when the principal power source fails. In contrast to the batteries used in the actual computing equipment, these electricity supply back-up system batteries are typically lead-acid.

A.8 Labelling/documentation for refurbished and repaired computing equipment

In addition to keeping on-site records of the diagnostic testing results, repairs and upgrades completed and final test results, there are additional types of documentation that refurbishers should provide. Information should clearly inform the subsequent purchaser/recipient of used equipment ICT goods that the products goods are used and/or refurbished/repared.

Refurbishers should provide detailed documentation of each device or components going for reuse (directly or indirectly from the refurbisher). It is intended that these labelling and/or documentation provisions will provide the subsequent purchaser/recipient with the contact and product information necessary in the case of a faulty product. This information can be communicated to subsequent purchasers by way of a label placed on the product or on an invoice. Additional information can be provided on the product packaging, or through a product information insert.

A.9 Repair and Refurbishing

Recommendation for proper refurbishing process details, such as: erasing of personal data, software licenses issues End-of-Life Treatment (EoLT) of replaced components, substances used for cleaning and polishing, etc., guidance applicable to refurbishment and repair facilities.

A.10 Repair

Given the complexity and specificity of personal computer components, repair requires a high level of skill and training. On-line manuals and tools exist to assist with some of the techniques involved. Most often personal computing equipment is returned to functionality by replacing non-working components with tested, working components. Once a component has been determined to be faulty, care should be taken to have it repaired or properly recover the materials.

Disposal is a last resort. Where replacement components are required to replace a missing or faulty component to enable the equipment to be reused, the reuse organization should ensure that the use of such replacement components does not impair product safety.

Particular care should be taken with the removal of potentially hazardous or dangerous components such as the fluorescent lights used for backlighting Liquid Crystal Displays (LCDs), batteries, capacitors or sharp components or parts in order to avoid risk of damaging worker safety and health or damage to the environment.

Removal of faulty mercury lamps from LCDs is a particularly specialized activity, and given the hazardous and fragile nature of this component, should only be undertaken by facilities with the necessary knowledge, expertise and authorizations required for their eco-environmentally sound management of mercury-containing wastes.

Where such lamps are removed, stored or transported, extreme care should be taken not to break the lamps, which contain mercury vapour and fine powder contaminated with small amounts of mercury. Such fluorescent discharge lamps should be managed by a specialized and appropriately authorized facility.

Where batteries are removed, the electrical contacts should be sealed with insulating tape and/or wax, or otherwise insulated from each other, in order to prevent unintentional discharge, short circuits or fires.

Repair operations involving the soldering of printed circuit boards or replacement of faulty capacitors should be undertaken only by workers with the necessary knowledge, experience and training. Additional requirements may exist.

A.11 E-waste quantification, disassembling, separation and final treatment

Improvements to be performed by treatment actors

In view of WEEE tonnages recovered by metal recyclers and waste treatment facilities (mills, grinders, smelters), it seems essential to ensure that WEEE concerned are properly treated for depollution and that origin and final destination are known.

There is need to involve these actors as collection points to include the volume of WEEE to take into account the non-selective collection part (direct collection from owners by artisans / installers. They are not working on behalf of a distributor or for private collection services/"scrap" that collect such WEEE from private individuals, etc.).

- a) Improving the measurement of quantities of EEE placed on the market and generated WEEE.
- b) Making studies national statistics for bridging the gaps in knowledge.

Making consumer surveys would improve the representativeness of the total detention times used. These investigations would aim to obtain quantified data on the behaviour of households towards the EEE (evolution, age and average weight of the park, age devices at different their disposal or re-use, according to the categories of devices), and to have more information about the park and holding periods of EEE secondary residence.

Indeed, the level of the park (including equipment used and unused devices present in the household), the entire perimeter (household and assimilated, including photovoltaic panels) is about 240 kg/capita 2012. A consumer survey would characterize it more finely park, distinguishing from EEE in use of the WEEE, but remaining within households.

- c) Adjust the data statements to the needs of estimated field.

WEEE Registry, performed according to the nomenclature SH4 (Harmonized system), have an insufficient level of accuracy to be directly related to the types of equipment considered for the evaluation of the deposit. For this study, it has been necessary to rely on the statements of a French Eco-organism, more accurate (in HS8) to ventilate statements Registry according to the type of equipment UNU model.

- d) Update knowledge market refurbishment and export of computer equipment and office.

It would be interesting to obtain more information about: volumes that pass through the 'broker' market, their final destinations and how the equipment is transported.

- e) Get reliable data on exports used EEE.

It would be necessary to more clearly identify the destinations of exports of used EEE from developed countries. Exports are, to date, poorly documented.

- To identify these data, there is need to strengthen cooperation with the competent authorities in the fight against illegal sectors (Ministry of Interior, Customs, Department of Ecology). To strengthen customs action, there is need to consider systematic transmission of information from eco-organizations, such information will be centred at the Department of Ecology, such as companies having practices that do not conform to national regulations.

- Suspicion of illegal exports documented (WEEE exported under cover of used EEE exported for reuse).

Annex B (informative): WEEE some figures for France in 2013

B.1 WEEE generated in France in 2014

- 633 millions of EEE put in the market in 2014, representing 1,55 million tons of EEE.
- 1,6 million tons = 160 Eiffel Tower.
- In the European Union: 9 million tons of EEE put on the market on average each year.
- Distinction made between Household and Professional EEE (in some countries like France);
- Equipment is considered to be professional if its use is exclusively professional, or if the devices are distributed exclusively via professional distribution channels: the case for ICT/Data Centre EEE.
- "Mixed WEEE" are considered as household.
- Households EEE: 559 millions of households EEE put on the market in 2013.
- 8,5 EEE on average per inhabitant.
- Cat 3 (IT/Telecom): around 22 % of the EEE put on the market in units and around 7 % in tonnage.
- Professionals EEE represent 62,8 millions of tons (+11 % in comparison to 2012) cat 3: 40 % in tonnage and 30 % in units;

B.2 WEEE collection in France, some figures

B.2.1 WEEE Collection figures for France

- 527 kTons of WEEE collected in France in 2014 (around 30 % of the average amount put on the market last 3 years, etc.) that is means an encouraging increase of around 10 % in reference to 2013.
 - 495 kTons of Households WEEE: an increase of 9 % in reference to 2013 among them 68 % are coming from waste recycling centre, 23 % from shops collection point or 1:1 free take back.
 - 32 kTons of Professionals WEEE among which cat 3 (IT/telecom) represents 63 % of tonnage.

B.2.2 WEEE Treatment figures for France

- 522 Ktons of collected WEEE have been declared treated (78 % recycled) in 2014. The other processing modes are elimination (10 %), Energy recovery (9 %), preparation for the reuse (2 %) and spare parts (1 %).

Annex C (informative): European WEEE benchmark

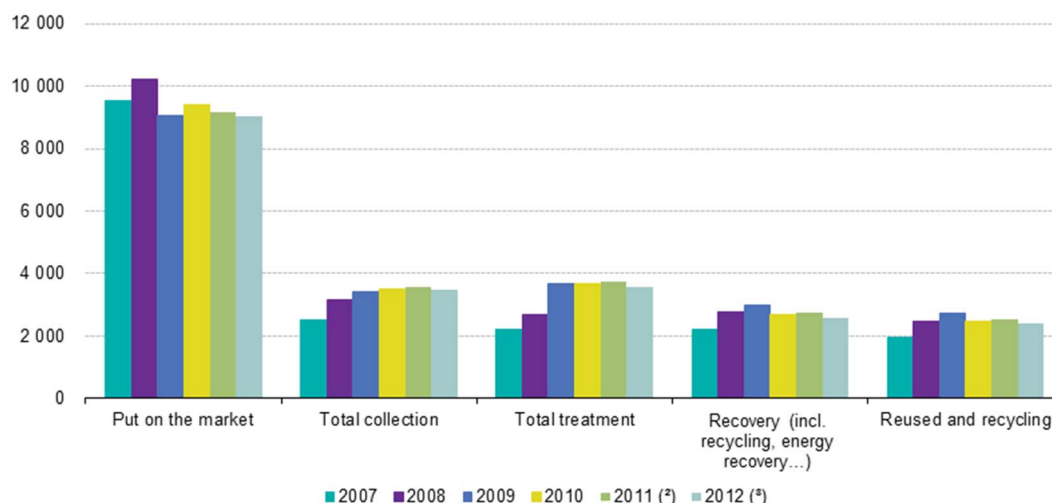
C.1 WEEE figures in Europe

- An inhabitant of the EU has generated on average 19,2 kg of WEEE in 2013) towards 7 kg on average in the world.
- Biggest WEEE producers are Germany (23,2 kg), UK (21,9 kg) and France (21 kg). Italy (17,8 kg) and Spain (18 kg) are under the European average.
- Most of the countries reach the collection objective set by the first release of WEEE Directive [i.7] of 4 kg per inhabitant per year.
- but recent WEEE recast [i.1] set more ambitious collection targets (global for all WEEE):
 - objective for 2016: 45 % of the average tonnage put on the market the last 3 years and 65 % in 2019;

EXAMPLE 6,9 kg per inhabitant in France in 2013: should be 9,5 kg per inhabitant in 2016.

- strengthening controls to struggle against illegal exports outside UE with clear distinction criteria between used EEE and WEEE;
- free take back of small WEEE (1:0).
- Warning: A recent study done by CWIT (Countering Weee Illegal trade) shows that only 35 % of WEEE generated in the EU in 2012, or 3,3 million tons, were treated by agreed and controlled recycling channels for collection and recycling. The remaining 65 % or 6,15 million tons were recycled in Europe in non-compliant and improper structures (3,15 million tons), exports (1,5 million tons), sorted to recover valuable materials (0,75 million tons) or discarded in the environment (0,75 million tons). Moreover, the study highlights significant disparities in the level of knowledge of the WEEE destinations by country.
- ICT domain will have to contribute.

C.2 European figures for WEEE

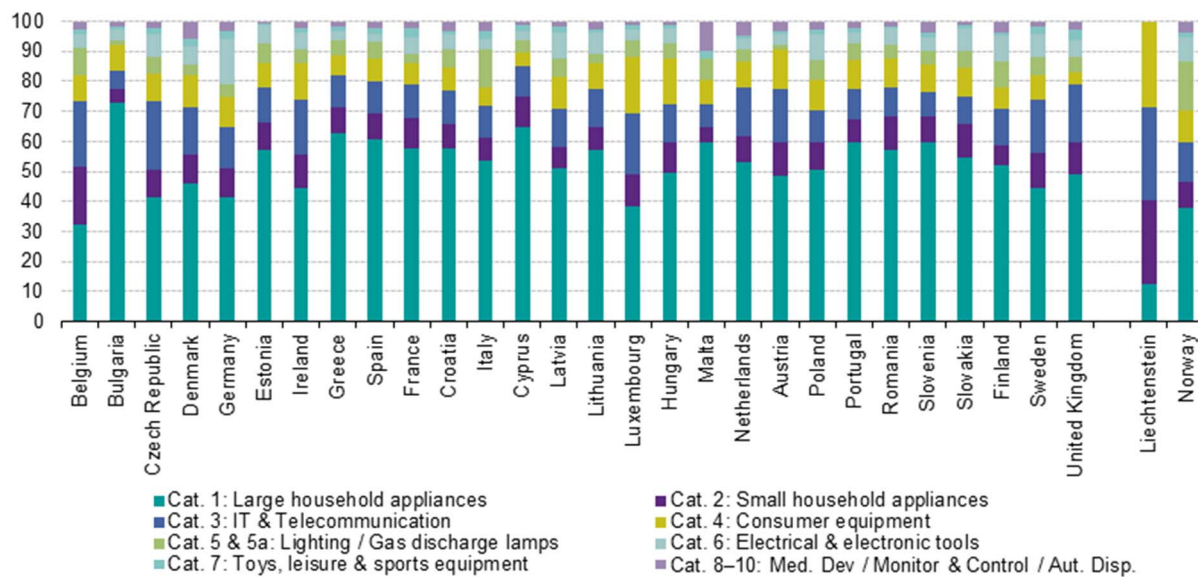


(*) Includes Eurostat estimates due to missing data for several EU Member States.

(*) Does not include data for Croatia on reuse and recovery.

(*) Includes data for EU-28.

Figure C.1: Electrical and electronic equipment (EEE) put on the market and waste EEE collected and treated



(*) Definition differs, see metadata.

Figure C.2: Electrical and electronic equipment put on the market by country

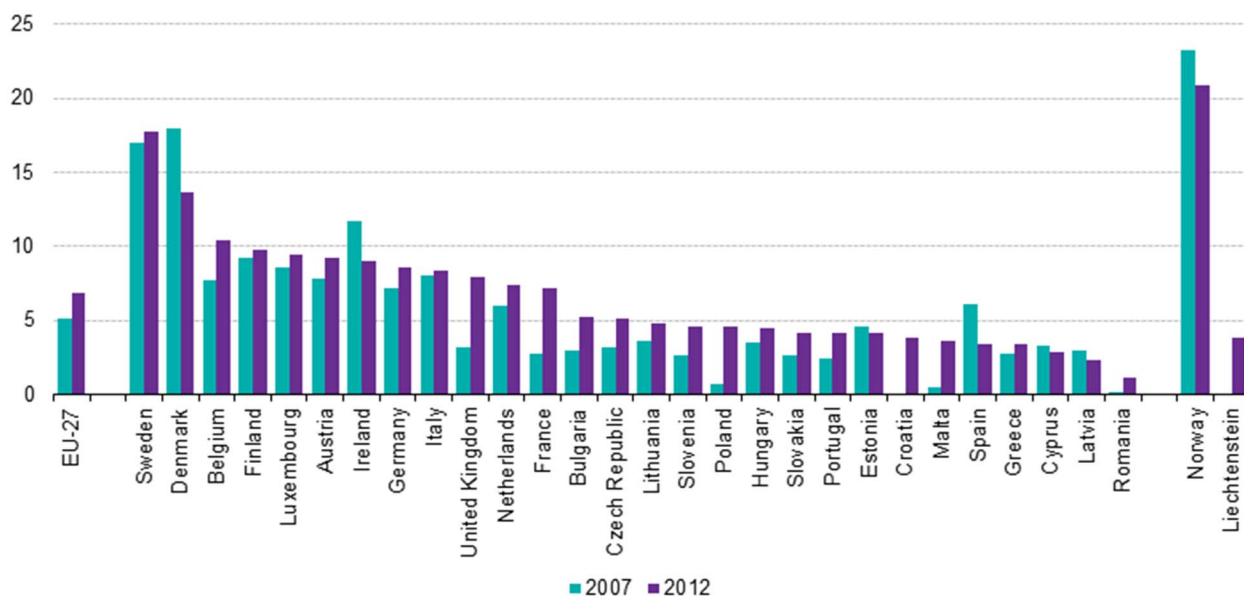


Figure C.3: Waste electrical and electronic equipment (WEEE) collected, by country, 2007 and 2012

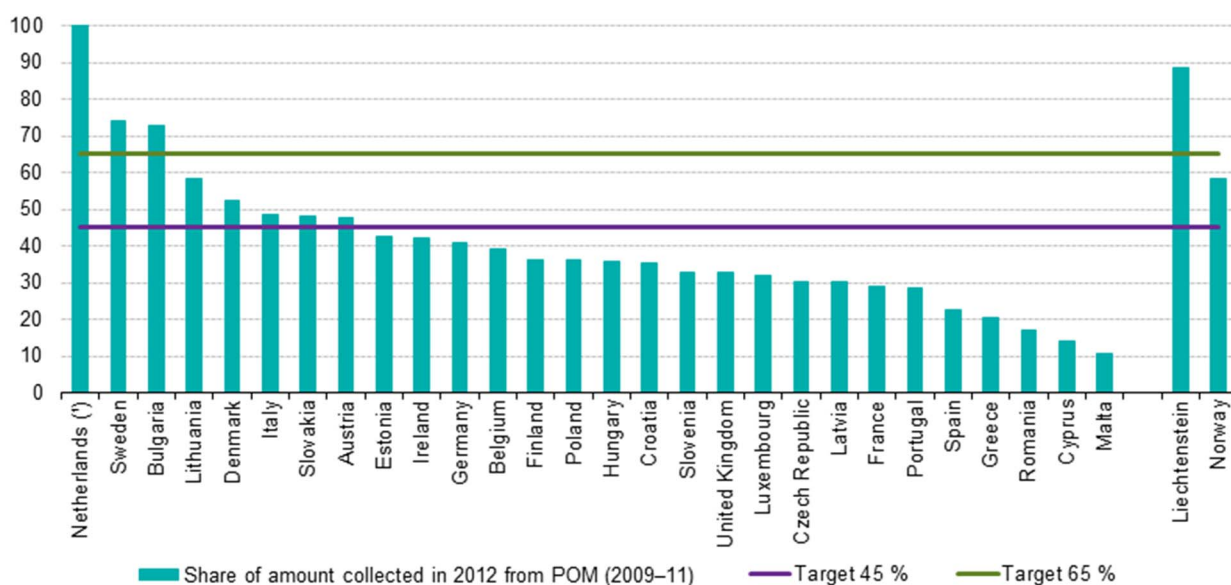
Table C.1: Waste electrical and electronic equipment (WEEE) collected, by EEE category, 2012

	Total waste	Large household appliances	Small household appliances	IT and telecommunications equipment	Consumer equipment	Other
EU-28	3 474 177	1 494 954	224 280 (*)	615 119 (*)	572 253 (*)	187 194 (*)
Belgium	116 458	50 711	11 792	19 290	26 322	8 343
Bulgaria	38 431	28 043	2 423	3 158	2 014	2 792
Czech Republic	53 685 ^p	24 303 ^p	2 994 ^p	10 047 ^p	13 877 ^p	2 463 ^p
Denmark	76 200	32 121	5 019	13 520	22 881	2 659
Germany	690 711	235 666	77 149	160 125	171 354	46 416
Estonia	5 465	1 797	346	1 463	1 608	251
Ireland	41 177	22 348	2 204	6 809	7 868	1 948
Greece	37 235 ^p	20 018 ^p	2 638 ^p	5 047 ^p	7 577 ^p	1 956 ^p
Spain	157 994	90 594	7 050	20 679	23 876	15 794
France	470 556	256 560	27 021	66 229	104 342	16 405
Croatia	16 187	6 620	373	2 929	5 223	1 040
Italy	497 378 ^d	117 004	:	:	:	:
Cyprus	2 514	1 403	132	529	344	106
Latvia	4 694	2 150	356	502	610	1 078
Lithuania	14 259	7 927	880	1 844	1 687	1 920
Luxembourg	5 010	2 073	456	762	1 299	418
Hungary	44 262	23 685	4 356	8 961	4 964	2 295
Malta	1 506	859	6	332	273	36
Netherlands	123 684	59 590	7 067	17 625	29 869	9 533
Austria	77 402	31 326	7 431	17 632	16 160	4 854
Poland	175 295	82 246	16 946	27 154	25 746	23 203
Portugal	43 695	25 268	4 355	7 062	5 425	1 585
Romania	23 083	11 399	864	4 976	3 514	2 331
Slovenia	9 430	4 097	1 016	1 782	1 513	1 022
Slovakia	22 671	11 372	2 071	2 835	3 222	3 171
Finland	52 972	26 803	1 912	7 640	14 214	2 404
Sweden	168 612	78 084	4 991	32 467	44 310	8 760
United Kingdom	503 611 ^p	240 887 ^p	32 432 ^p	173 720 ^p	32 161 ^p	24 411 ^p
Liechtenstein	140 ^p	17 ^p	39 ^p	43 ^p	40 ^p	1 ^p
Norway	104 905	43 795	5 141	16 668	17 556	21 745

(*) Does not include Italy (breakdown not available).

(d) Definition differs.

(p) Provisional.



(*) Data for the Netherlands collected in number until 2011.

Figure C.4: Collection rate for WEEE in 2012 as a percentage of the average weight of EEE put on the market in the three preceding years (2009-11)

Annex D (informative): Examples of WEEE categories

D.1 Current Directive WEEE categories

- 1) Large household appliances:
 - Refrigerators, freezers, washing machines, dish washing machines, electric stoves, microwaves, cooking appliances, electric radiators, air conditioning appliances, etc.
- 2) Small household appliances:
 - Vacuum cleaners, appliances used for sewing, knitting, weaving and other processing for textiles, irons, toasters, coffee machines, electric knives, appliances for hair-cutting, hair drying, tooth brushing, shaving, massage and other body care appliances, clocks, watches and equipment for the purpose of measuring, indicating or registering time, etc.
- 3) IT and telecommunications equipment:
 - Centralised data processing, mainframes, printers units, personal computers (CPU, mouse, screen and keyboard included), copying equipment, pocket and desk calculators, facsimile, telex, telephones, cordless telephones, cellular telephones, answering systems, etc.
- 4) Consumer equipment:
 - Radio sets, television sets, video cameras, video recorders, hi-fi recorders, audio amplifiers, musical instruments, etc.
- 5) Lighting equipment:
 - Luminaires for fluorescent lamps with the exception of luminaires in households, straight fluorescent lamps, compact fluorescent lamps, etc.
- 6) Electrical and electronic tools (with the exception of large-scale stationary industrial tools):
 - Drills, saws, sewing machines, equipment for turning, milling, sanding, grinding, sawing, cutting, shearing, drilling, making holes, punching, folding, bending or similar processing of wood, metal and other materials, tools for riveting, nailing or screwing or removing rivets, nails, screws or similar uses, tools for mowing or other gardening activities.
- 7) Toys, leisure and sports equipment:
 - Electric trains or car racing sets, hand-held video game consoles, computers for biking, diving, running and rowing, sports equipment with electric or electronic components, coin slot machines, etc.
- 8) Medical devices (with the exception of all implanted and infected products):
 - Radiotherapy equipment, cardiology, dialysis, pulmonary ventilators, analysers, freezers, other appliances for detecting, preventing, monitoring, treating, alleviating illness, injury or disability.
- 9) Monitoring and control instruments:
 - Smoke detector, heating regulators, thermostats, measuring, weighing or adjusting appliances for household or laboratory equipment.
- 10) Automatic dispensers:
 - Automatic dispensers for hot drinks, automatic dispensers for hot or cold bottles or cans, automatic dispensers for solid products, automatic dispensers for money, all appliances which deliver automatically all kind of products.

D.2 Examples of Equipment in WEEE Categories by 2018

- 1) Temperature exchange equipment.
- 2) Screens, monitors, and equipment containing screens having a surface greater than 100 cm².
- 3) Lamps.
- 4) Large equipment (any external dimension more than 50 cm) including, but not limited to:
 - Household appliances, IT and telecommunication equipment, consumer equipment; luminaires, equipment reproducing sound or images, musical equipment, electrical and electronic tools; toys, leisure and sports equipment, medical devices, monitoring and control instruments, automatic dispensers, equipment for the generation of electric currents.

This category does not include equipment included in categories 1 to 3.

- 5) Small equipment (no external dimension more than 50 cm) including, but not limited to:
 - Household appliances, consumer equipment, luminaires, equipment reproducing sound or images, musical equipment, electrical and electronic tools; toys, leisure and sports equipment, medical devices; monitoring and control instruments, automatic dispensers, equipment for the generation of electric currents.

This category does not include equipment included in categories 1 to 3 and 6.

- 6) Small IT and telecommunication equipment (no external dimension more than 50 cm).

Annex E (informative): Bibliography

- Recommendation ITU-T L.1400 (2011): "Overview and general principles of methodologies for assessing the environmental impact of information and communication technologies".
- Recommendation ITU-T L.1410 (2014): "Methodology for environmental Life Cycle Assessment (LCA) of information and communication technology (ICT) goods, networks and services".

History

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