

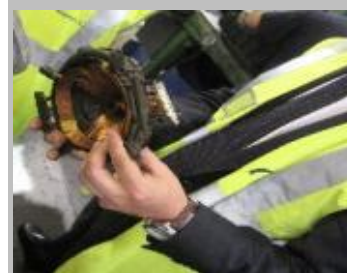


BASIC GUIDE ON WEEE FOR ENFORCEMENT AGENCIES

Introduction to Waste of Electrical and Electronic Equipment



Funded by the
European Union



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EXECUTIVE SUMMARY

Enforcement agencies are key actors in the fight against illegal trade of WEEE. It is therefore essential that they have an understanding of WEEE, its treatment, its various components and the dismantling process.

This document was prepared within the framework of the Countering WEEE Illegal Trade Project¹. It is a concise guide on WEEE primarily addressed to enforcement agencies within the European Union. It should be considered an introductory document with a layman's approach. This guide starts with the definition of WEEE, and demonstrates the complexity of the WEEE classification by describing the most relevant classification lists in force, such as the WEEE Directive, European Waste Catalogue and Basel Convention codes. This information intends to provide enforcement agencies an overview of the basic codification and the complexity and gaps of the current system in place that may come in useful for border inspections. Annex B provides as well links to more detailed guides and manuals on these types of inspections.

The next section of the guide outlines the composition of each WEEE category. This section provides information on the characteristics of the components and materials that WEEE is made up of, explaining hazardous and non-hazardous substances and their treatment needs. The different kinds of appliances have to be managed in a different way when it comes to sales, collection and their final treatment as waste. Indicative schemas showing the main treatment steps for WEEE are included in this section. This information will help enforcers understand the drivers of illegal trade, the need of proper treatment, and provide basic knowledge for site inspections.

Actors related to the WEEE trade can become a good source of information for enforcers. The guide provides a brief description of the actors participating in the WEEE value chain (producers, compliance schemes, collection points, WEEE management industry) etc. This information is followed by a basic explanation on the regulations that govern trans-boundary movements of WEEE. The guide provides some tips on the procedures (notification or general information) that actors involved in WEEE exports need to carry out. Enforcers willing to look for more information on this issue will find as well references to data sources, legislations and manuals.

Following this, the guide includes a short section showing an overview of the composition of WEEE and the different WEEE categories are compared on the basis of how much was collected of each stream in 2010 at European level. This will help understand the specific relevance of each category regarding the volume of collection in Europe.

The guide provides a few tips on the drivers of WEEE illegal trade. This topic will be further developed in work packages 4, 5 and 6 of the CWIT project. This section identifies different drivers of the illegal trade of WEEE, such as the value of certain materials composing WEEE, the costs of proper treatment and the value of the reused items beyond EU borders.

Finally, the guide lists the existing treatment standards developed especially for managing WEEE. These standards provide guidelines for the treatment operators to avoid the aforementioned negative environmental and health effects during the treatment of WEEE.

¹ <http://www.cwitproject.eu/>

1 INTRODUCTION

The illegal traffic of hazardous electronic waste – known as e-waste or WEEE (waste electrical and electronic equipment) – is a global crime that requires an international and coordinated response.

Only around 3.3 million tons of the estimated total of 9.3 million tons of e-waste was officially reported to authorities as collected and treated across Europe in 2012. E-waste contains materials such as gold, copper and palladium, which make it very valuable on the black market, attracting not just illegal single operators but organized criminal networks.

Illegal WEEE exports are a persistent problem, despite the implementation of international conventions. WEEE re-use, recycling, recovery and disposal in developing countries are undertaken under unhealthy and sometimes dangerous conditions.

Enforcement agencies are key actors in the fight against illegal trade of WEEE. It is essential then that they have an understanding of WEEE, its management and its various components.

The Countering WEEE Illegal Trade Project (CWIT)² is funded under the Seventh Framework Program (FP7/2007-2013). It aims to tackle the illegal trade of Waste of Electrical and Electric Equipment (WEEE), by developing a set of recommendations to the end user community and the European Commission.

The CWIT project envisaged a site visit to a WEEE treatment plant so project partners could get hands-on experience of the treatment of WEEE. As a result of the visit to the treatment plant, a report on WEEE components and recycling was prepared. It is conceived as a document aimed at enforcement agencies that would like to know the basics of WEEE and to provide them with more resources to improve their knowledge.

Each section of the document contains a code of colour indicating the usefulness of it:

-  General information
-  Information for inspections to producers
-  Information for site inspections (collection, logistics, recyclers)
-  Information for border inspections

² <http://www.cwitproject.eu/>

2 DEFINITION OF WASTE OF ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)

Directive 2012/19/EU of the European Parliament and of the Council, of 4 July 2012 on waste electrical and electronic equipment (WEEE) (recast) defines WEEE, as electrical or electronic equipment which is waste within the meaning of Article 3(1) of Directive 2008/98/EC, including all components, sub-assemblies and consumables which are part of the product at the time of discarding;

Article 3(1) of Directive 2008/98/EC provides a definition of the term "waste", meaning any substance or object, which the holder discards or intends or is required to discard.

It may be difficult sometimes to distinguish products or used products (EEE) from waste (WEEE). EEE would normally be considered as waste if the product is out of order or an essential part is missing. If the EEE is destined for disposal or recycling instead of re-use or destined for parts harvesting to gain spare parts it should also be considered as waste³.



Picture 1. Left: TV and monitors received at a treatment plant from a retailer facility. Right: Example of WEEE as received by a municipal collection point.

More information about this issue is available at IMPEL's website⁴.

3 CLASSIFICATION OF WEEE

3.1 WEEE Directive classification

The WEEE Directive recast⁵ provides a non-exhaustive list of products, which fall within the scope of the document. They have been grouped in 6 categories, however this classification will enter into force in 2018, until then, the previous classification of 10 categories stated in the original WEEE Directive is applicable. Both lists are included in the recast of the WEEE Directive, in annexes III-IV and I –II respectively. The figure and tables below provide an overview of the two different sets of categories and the items included in them.

³ Source: <http://impel.eu/wp-content/uploads/2013/01/2012-11-8-Waste-Sites-Manual-final.pdf>

⁴ <http://impel.eu/wp-content/uploads/2013/01/2012-11-8-Waste-Sites-Manual-final.pdf>

⁵ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:197:0038:0071:en:PDF>

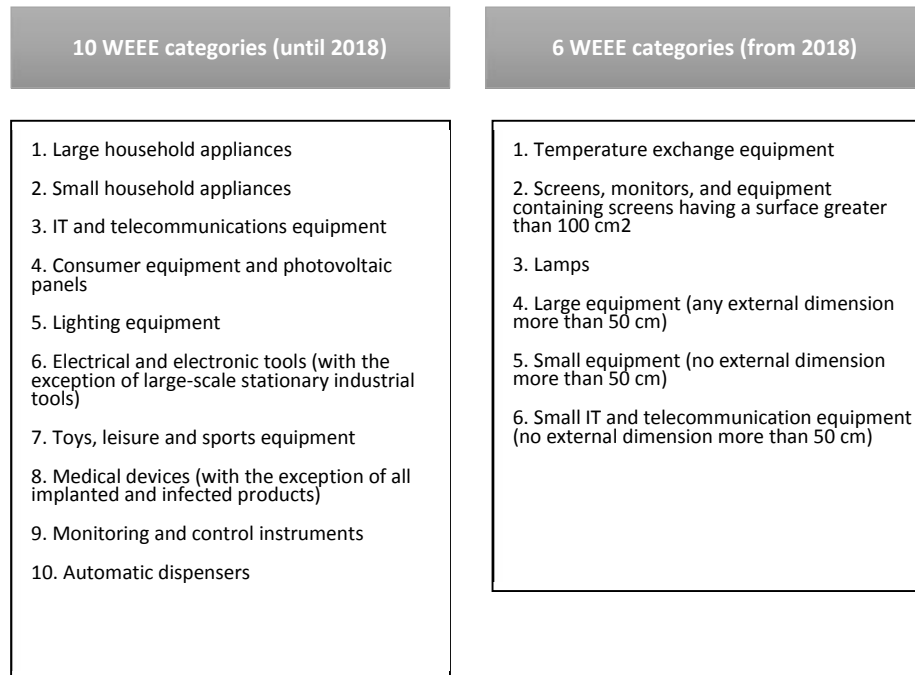


Figure 1. Set of categories defined by the WEEE Directive.

Table 1. Indicative list of EEE, which falls within the categories of Annex I and II of the WEEE Directive recast (in force until 2018).

1. LARGE HOUSEHOLD APPLIANCES
Large cooling appliances, refrigerators, freezers, other large appliances used for refrigeration, conservation and storage of food, washing machines, clothes dryers, dish washing machines, cookers, electric stoves, electric hot plates, microwaves, other large appliances used for cooking and other processing of food, electric heating appliances, electric radiators, other large appliances for heating rooms, beds, seating furniture, electric fans, air conditioner appliances, other fanning, exhaust ventilation and conditioning equipment.
2. SMALL HOUSEHOLD APPLIANCES
Vacuum cleaners, carpet sweepers, other appliances for cleaning, appliances used for sewing, knitting, weaving and other processing for textiles, irons and other appliances for ironing, mangling and other care of clothing, toasters, fryers, grinders, coffee machines and equipment for opening or sealing containers or packages, 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, scales.
3. IT AND TELECOMMUNICATIONS EQUIPMENT
Centralised data processing: mainframes, minicomputers, printer units.
Personal computing: personal computers (CPU, mouse, screen and keyboard included), laptop computers (CPU, mouse, screen and keyboard included), notebook computers, notepad computers,
Printers, copying equipment, electrical and electronic typewriters, pocket and desk calculators, and other products and equipment for the collection, storage, processing, presentation or communication of information by electronic means, user terminals and systems, facsimile machine (fax), telex, telephones, pay telephones, cordless telephones, cellular telephones, answering systems, and other products or equipment of transmitting sound, images or other information by telecommunications.
4. CONSUMER EQUIPMENT AND PHOTOVOLTAIC PANELS
Radio sets, television sets, video cameras, video recorders, hi-fi recorders, audio amplifiers, musical instruments, and other products or equipment for the purpose of recording or reproducing sound or images,

including signals or other technologies for the distribution of sound and image than by telecommunications. Photovoltaic panels.
5. LIGHTING EQUIPMENT
Luminaires for fluorescent lamps with the exception of luminaires in households, straight fluorescent lamps, compact fluorescent lamps, high intensity discharge lamps, including pressure sodium lamps and metal halide lamps, low pressure sodium lamps, other lighting or equipment for the purpose of spreading or controlling light with the exception of filament bulbs.
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 welding, soldering or similar use, equipment for spraying, spreading, dispersing or other treatment of liquid or gaseous substances by other means, tools for mowing or other gardening activities.
7. TOYS, LEISURE AND SPORTS EQUIPMENT
Electric trains or car racing sets, hand-held video game consoles, video games, computers for biking, diving, running, rowing, and etc. sports equipment with electric or electronic components, coin slot machines.
8. MEDICAL DEVICES (WITH THE EXCEPTION OF ALL IMPLANTED AND INFECTED PRODUCTS)
Radiotherapy equipment, cardiology equipment, dialysis equipment, pulmonary ventilators, nuclear medicine equipment, laboratory equipment for in vitro diagnosis, analysers, freezers, fertilization tests, 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 as laboratory equipment, other monitoring and control instruments used in industrial installations (e.g. in control panels).
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 kinds of products.

Table 2. Non-exhaustive list of EEE grouped in the 6 categories outlined by the recast of the WEEE Directive.

1. TEMPERATURE EXCHANGE EQUIPMENT
Refrigerators, Freezers, Equipment, which automatically delivers cold products, Air conditioning equipment, Dehumidifying equipment, Heat pumps, Radiators containing oil and other temperature exchange equipment using fluids other than water for the temperature exchange.
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 - including pressure sodium lamps and metal halide lamps, Low pressure sodium lamps, LED.
4. LARGE EQUIPMENT

Washing machines, Clothes dryers, Dish washing machines, Cookers, Electric stoves, Electric hot plates, Luminaires, Equipment reproducing sound or images, Musical equipment (excluding pipe organs installed in churches), Appliances for knitting and weaving, Large computer-mainframes, Large printing machines, Copying equipment, Large coin slot machines, Large medical devices, Large monitoring and control instruments, Large appliances which automatically deliver products and money, Photovoltaic panels.

5. SMALL EQUIPMENT

Vacuum cleaners, Carpet sweepers, Appliances for sewing, Luminaires, Microwaves, Ventilation equipment, Irons, Toasters, Electric knives, Electric kettles, Clocks and Watches, Electric shavers, Scales, Appliances for hair and body care, Calculators, Radio sets, Video cameras, Video recorders, Hi-fi equipment, Musical instruments, Equipment reproducing sound or images, Electrical and electronic toys, Sports equipment, Computers for biking, diving, running, rowing, etc., Smoke detectors, Heating regulators, Thermostats, Small Electrical and electronic tools, Small medical devices, Small Monitoring and control instruments, Small Appliances which automatically deliver products, Small equipment with integrated photovoltaic panels.

6. SMALL IT AND TELECOMMUNICATION EQUIPMENT (NO EXTERNAL DIMENSION MORE THAN 50 CM)

Mobile phones, GPS, Pocket calculators, Routers, Personal computers, Printers, Telephones.

Actors affected by this Directive (see section 5) may use these classifications when fulfilling their reporting obligations (see section 7.1). National transpositions and practical implementations of the Directive may have resulted in a more exhaustive list of codes to be used.

These codes may appear in transfer notes of WEEE that is transported at national/regional level.

3.2 European Waste Catalogue

Commission Decision 2000/532/EC of 3 May 2000 establishes a list of wastes and hazardous wastes (LoW). The regulation is also known as the European Waste Catalogue (EWC). The EWC defines 839 waste types, which are structured into 20 chapters, mainly according to the source of the waste. Each waste type is characterised by a six-digit code. The allocation of wastes to the defined waste types is laid down in the introduction of Decision 2000/532/EC and explained in a separate section. The codes are subdivided into hazardous and non-hazardous waste, and listed in the table below. "Mirror Entries" have the potential to be either hazardous or not, depending on whether they contain "dangerous substances". These wastes are covered by two or more linked entries, collectively called mirror entries that typically comprise: a hazardous waste entry (or entries) marked with an asterisk (*), and an alternative non-hazardous waste entry (or entries) not marked with an asterisk. Other fractions or components that can be generated during treatment of e-waste, such as metal scrap, plastics, and lead glass are not listed in this table.

Table 3. List of codes that refer to WEEE and their components. Rows in italics indicate WEEE components.

HAZARDOUS	
09 01 11*	Single-use cameras containing batteries included in 16 06 01, 16 06 02 or 16 06 03.
<i>16 02 09*</i>	<i>Transformers and capacitors containing PCBs or PCTs.</i>
16 02 10*	Discarded equipment containing or contaminated by PCBs other than those mentioned in 16 02 09
16 02 11*	Discarded equipment containing chlorofluorocarbons, HCFC, HFC.
16 02 12*	Discarded equipment containing free asbestos.
16 02 13*	Discarded equipment containing hazardous components other than those mentioned in 16 02 09 to 16 02 12.
<i>16 02 15*</i>	<i>Hazardous components removed from discarded equipment.</i>

20 01 21*	<i>Fluorescent tubes and other mercury-containing waste.</i>
20 01 23*	Discarded equipment containing chlorofluorocarbons.
20 01 35*	Discarded electrical and electronic equipment other than those mentioned in 20 01 21 and 20 01 23 containing hazardous components.
NON-HAZARDOUS	
09 01 10	Single-use cameras without batteries.
09 01 12	Single-use cameras containing batteries other than those mentioned in 09 01 11.
16 02 14	Discarded equipment other than those mentioned in 16 02 09 to 16 02 13.
16 02 16	<i>Components removed from discarded equipment other than those mentioned in 16 02 15.</i>
20 01 36	Discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35.

Those codes are useful to measure e-waste that is registered as separately collected e-waste. However, it lacks detailed information on the type of e-waste. In practice, e-waste will be collected and registered under other waste codes, such as non-separately collected domestic waste or metal scrap. In many EU countries, companies dealing with the treatment, transport and collection of WEEE are required to report the amounts of WEEE under their control to the waste competent authorities. The data is presented regularly using the EWC codes.

It should be noted that reporting obligations and document control related to collection, transport and treatment operations vary depending on the classification of the waste. Usually, hazardous waste will be subject to more requirements than non-hazardous waste. However, the classification of the waste as hazardous or non-hazardous depends on the transposition and/or local legislation.

Table 4. Relationship between WEEE II categories and EW codes

CATEGORY OF EEE	EW CODES
1. Temperature exchange equipment	160211*, 200123*
2. Screens, monitors, and equipment containing screens having a surface greater than 100 cm ²	200135*
3. Lamps	200121*
4. Large equipment (any external dimension more than 50 cm)	200136, 160214, 200135*, 160213*
5. Small equipment (< 50 cm)	200135*, 200136*
6. Small IT and telecommunication equipment (< 50cm)	200135*, 200136, 160213*, 160214

3.3 Basel Convention codes

Regulation (EC) No 1013/2006 of the European Parliament on shipments of waste classifies waste based on the lists set out in the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal⁶. The Basel Convention is the only international treaty of global scope dealing with the challenges posed by hazardous wastes, including WEEE. As at 30 April 2015, the Convention has 183 parties, including all the European Union member States and the European Union⁷.

To aid in distinguishing hazardous wastes from non-hazardous wastes, two annexes have been inserted into the Convention. Annex VIII includes wastes considered to be hazardous unless they do not exhibit Annex III hazardous characteristics, while Annex IX includes wastes that are not

⁶ For the text of the Convention, visit: <http://www.basel.int/TheConvention/Overview/TextoftheConvention/tabid/1275/Default.aspx>

⁷ See <http://www.basel.int/Countries/StatusofRatifications/PartiesSignatories/tabid/1290/Default.aspx>

considered hazardous wastes, unless they contain material to an extent causing them to exhibit hazardous characteristics (Annex III to the Convention). Both Annex VIII and Annex IX include listings for various types of e-waste (see table below, other generic codes associated to WEEE may be A1020, A1030, A2010 and A3150).

Table 5. E-waste listing in Annex VIII (List A) and Annex IX (List B) of the Basel Convention

CODE	DESCRIPTION
A1150	Precious metal ash from incineration of printed circuit boards not included on list B of the waste shipment regulation ⁸
A1180	Waste electrical and electronic assemblies or scrap ⁹ containing components such as accumulators and other batteries included on list A, mercury-switches, glass from cathode-ray tubes and other activated glass and PCB-capacitors, or contaminated with Annex I constituents (e.g., cadmium, mercury, lead, polychlorinated biphenyl) to an extent that they possess any of the characteristics contained in Annex III (note the related entry on list B B1110 below) ¹⁰
A2010	Glass waste from cathode-ray tubes and other activated glasses
B1110	Electrical and electronic assemblies: Electronic assemblies consisting only of metals or alloys Waste electrical and electronic assemblies or scrap ¹¹ (including printed circuit boards) not containing components such as accumulators and other batteries included on list A, mercury-switches, glass from cathode-ray tubes and other activated glass and PCB-capacitors, or not contaminated with Annex I constituents (e.g., cadmium, mercury, lead, polychlorinated biphenyl) or from which these have been removed, to an extent that they do not possess any of the characteristics contained in Annex III (note the related entry on list A A1180) Electrical and electronic assemblies (including printed circuit boards, electronic components and wires) destined for direct reuse, ¹² and not for recycling or final disposal ¹³

For practical reasons of control, every load of used equipment should also be accompanied by a declaration of the liable person on its responsibility and by a relevant transport document, e.g. by a waybill or a CMR (Convention on the Contract for the International Carriage of Goods by Road) document where applicable. This document contains a description of the goods transported using the Harmonized Commodity Description and Coding System (normally referred to as the “Harmonized System”) developed by the World Customs Organization (WCO).

The Secretariat of the Basel Convention has cooperated with the World Customs Organisation to establish a table providing an overview of which codes of the Harmonized System contain materials that can be found in Annexes VIII and IX to the Basel Convention¹⁴.

The table contains a correlation with goods covered by a number of international conventions, including the Basel Convention. This table can facilitate comparison of the CMR documents with the documents that should accompany the transport of e-waste.

⁸ Note that mirror entry on list B (B1160) does not specify exceptions

⁹ This entry does not include scrap assemblies from electric power generation.

¹⁰ PCBs are at a concentration level of 50 mg/kg or more.

¹¹ This entry does not include scrap from electrical power generation

¹² Reuse can include repair, refurbishment or upgrading, but not major reassembly

¹³ In some countries these materials destined for direct re-use are not considered wastes.

¹⁴ The latest version of the table can be found on the website of the WCO under: <http://www.wcoomd.org/en/topics/nomenclature/instrument-and-tools/interconnection-table.aspx>.

3.4 Other codes referring to used equipment

Harmonised system

The Harmonized Commodity Description and Coding System generally referred to as "Harmonized System" or simply "HS" is a multipurpose international product nomenclature developed and run by the World Customs Organization (WCO).

This systematic list of commodities forms the basis for international trade negotiations, and comprises about 5,000 commodity groups; each identified by a six-digit code, arranged in a legal and logical structure and is supported by well-defined rules to achieve uniform classification.

The system is used by more than 200 countries and economies as a basis for their Customs tariffs and for the collection of international trade statistics. Over 98 % of the merchandise in international trade is classified in terms of the HS.

The Harmonised System¹⁵ contributes to the harmonization of Customs and trade procedures, and the non-documentary trade data interchange in connection with such procedures.

For instance, the code 841810 is for "Combined Refrigerator-freezers, fitted With Separate External Doors". When countries carry out trading of combined refrigerator-freezers, the transaction is registered under this code. It is noted that, shipment of both new and used refrigerator-freezers is using the same code, without further specifying the condition of the shipped equipment. Therefore, it is difficult to tell directly from the codes whether the shipment is for new products or WEEE.

Work is undergoing in the WCO to improve and include HS codes for WEEE and used EEE based on submissions made since 2013 by the Secretariat of the Basel Convention. It is expected that these changes will occur in the 2022 cycle of the amendments to the WCO HS System¹⁶.

Combined nomenclature

Council Regulation (EEC) No 2658/87 of 23 July 1987, creates the goods nomenclature called the Combined Nomenclature, or in abbreviated form 'CN', established to meet, at one and the same time, the requirements both of the Common Customs Tariff and of the external trade statistics of the European Union.

When declared to customs in the Community, goods must generally be classified according to the combined nomenclature or CN. Imported and exported goods have to be declared stating under which subheading of the nomenclature they fall. This determines which rate of customs duty applies and how the goods are treated for statistical purposes.

The CN is comprised of the Harmonized System (HS) nomenclature with further Community subdivisions. Each CN subheading shall have an eight digit code number: (a) the first six digits shall be the code numbers relating to the headings and subheadings of the harmonized system nomenclature; (b) the seventh and eighth digits shall identify the CN subheadings¹⁷.

These codes are frequently used for both new and second-hand products, making distinguishing between these two virtually impossible. Recently, there are a number of pleas to allow for this relevant split.

For instance, there are two CN codes for the product category "Combined refrigerator-freezers, fitted with separate external doors" in the 2013 version: the CN code 841810 20 is for combined

¹⁵ <http://www.wcoomd.org/en/topics/nomenclature/overview/what-is-the-harmonized-system.aspx>

¹⁶

<http://www.basel.int/TheConvention/ConferenceoftheParties/Meetings/COP12/tabid/4248/mctl/ViewDetails/EventModID/8051/EventID/542/xmid/13027/Default.aspx>

¹⁷(See more: http://ec.europa.eu/taxation_customs/customs/customs_duties/tariff_aspects/combined_nomenclature/index_en.htm)

refrigerator-freezers with a capacity exceeding 340 litres, while the CN code 841810 80 is for other types of refrigerator-freezers.

It is noted that the first six digits of these two CN codes are the same with the corresponding HS code 841810 (Combined refrigerator-freezers, fitted with separate external doors). The last two digits of the CN codes further specific the product types by capacity.

TARIC codes

The TARIC code (Integrated Tariff of the European Communities) is designed to show the various rules applying to specific products when imported into the EU. This includes the provisions of the harmonised system and the combined nomenclature but also additional provisions specified in Community legislation such as tariff suspensions, tariff quotas and tariff preferences, which exist for the majority of the Community's trading partners. In trade with third countries, the 10-digit TARIC code must be used in customs and statistical declarations. TARIC builds upon the international harmonised system.

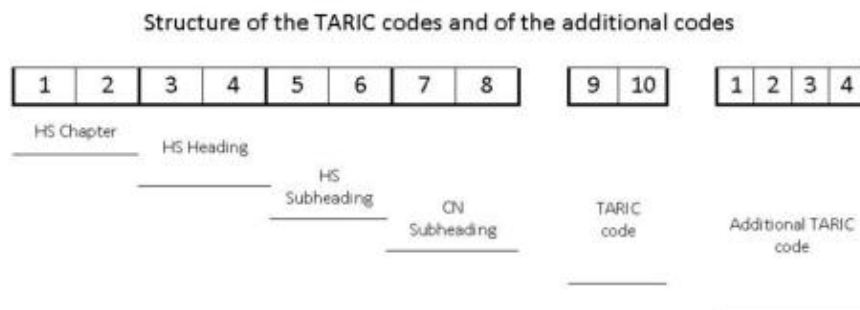


Figure 2. Structure of TARIC codes¹⁸.

The legal base of the TARIC is Council Regulation (EEC) No 2658/87 of 23 July 1987 on the tariff and statistical nomenclature and on the Common Customs Tariff¹⁹.

For instance, there are four TARIC codes related to “Combined refrigerator-freezers, fitted with separate external doors”. The TARIC 841810 20 10 is for combined refrigerator-freezers with a capacity exceeding 340 litres used in civil aircraft; 841810 20 90 is for combined refrigerator-freezers with a capacity exceeding 340 litres used in other occasions; 841810 80 10 is for combined refrigerator-freezers with a capacity under 340 litres used in civil aircraft; 841810 80 90 is for combined refrigerator-freezers with a capacity under 340 litres used in other occasions.

It is noted that the first six digits of the TARIC codes are the same with the corresponding HS code 841810 (Combined refrigerator-freezers, fitted with separate external doors). The next two digits are the same with the corresponding CN codes: 841810 20 (combined refrigerator-freezers with a capacity exceeding 340 litres) and 841810 80 (Combined refrigerator-freezers, fitted with separate external doors). The last two digits further specify whether it is for civil aircraft or other uses.

¹⁸ Source: http://upload.wikimedia.org/wikipedia/en/5/54/TARIC_code_structure.JPG ; more information at http://ec.europa.eu/taxation_customs/dds2/taric/taric_consultation.jsp

¹⁹ http://ec.europa.eu/taxation_customs/customs/customs_duties/tariff_aspects/customs_tariff/index_en.htm

Table 6. Summary of codes, potential users and processes related.

Code	Potential Users	Process/documents related	Useful for
WEEE directive (6/10 categories)	EEE Producers	Reporting obligation (of market sales and waste collection ²⁰).	Inspections of EEE producers and WEEE compliance schemes
	WEEE compliance schemes	Reporting obligation (of market sales and waste collection).	
	WEEE collection, logistic and treatment companies	May appear in transfer notes (for national/regional transports) and reporting obligation (activity records).	Inspections of EEE producers and WEEE compliance schemes. Sites inspections.
European Waste Code	WEEE compliance schemes and EEE producers	Reporting obligation (of market sales and waste collection).	Inspections of EEE producers and WEEE compliance schemes. Sites inspections.
	WEEE collection, logistic and treatment companies	Transfer notes (for national/regional transports). Reporting obligation (activity records).	
Basel Convention (BC) codes	Shipment companies	BC notification document BC movement document Waybills, TFS forms Customs declarations	Inspections of EEE producers and WEEE compliance schemes exporting waste or used goods. Inspections of sites exporting/importing waste or used goods. Border inspections
Harmonised System, Combined nomenclature, TARIC codes	Generator		
	Disposer		
	Importers		
	Exporters		
	State of import		
	State of transit		
	State of export		
ADR²¹ codes	Logistic companies	e.g. ADR dangerous goods note	Inspections of road transports

²⁰ Please note that the WEEE Directive sets the responsibility of reporting with the EU Member States. This may have been delegated to producers, to national registers, to take back systems, to regions, to treatment operators, etc. or to a random combination of these parties.

²¹ European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)

4 MATERIALS COMPOSING WEEE AND TREATMENT OF WEEE

Many items in WEEE contain hazardous substances that can be released during²² collection, storage, handling or treatment.

During normal use of electrical and electronic equipment there is no risk to human health or the environment because “nearly all the substances of concern are in a solid, non-dispersible form” (OECD, 2003b). However, they do pose a concern once they become WEEE (especially if they are damaged) and are either treated or disposed of.

The potential for hazardous substances to leach from landfill and contaminate soil and groundwater with consequent negative impacts on the environment and human health and animal health was the main cause of the European Commission’s concerns about the historic means of disposal of WEEE outlined in its Explanatory Memorandum to the WEEE Directive²³

Most common hazardous substances in WEEE are mentioned in the following lines²⁴:

Fluids - these are typically found in heating and cooling appliances, such as fridges and freezers (coolant circuit) and oil-filled radiators. The WEEE Directive requires the removal of all fluids from WEEE. Fluids must be safely removed prior to crushing or shredding operations. (...) Old cooling appliances containing refrigerants (fridges and freezers) – may contain Ozone Depleting Substances (ODS) (e.g. CFCs and HCFCs) (...)

Fridges and freezers identified as containing ammonia must have their ammonia extracted and transferred to a suitable container pending disposal. As well as presenting a fire and explosion risk, ammonia is potentially hazardous to both the environment and human health.

Capacitors containing polychlorinated biphenyls (PCBs) - Historically PCBs were used extensively in electrical equipment such as capacitors and transformers. However, their use in open applications was widely banned in 1972 and they have not been used in the manufacture of new equipment since 1986. () Thus it should be assumed that capacitors manufactured before 1976 contain PCBs. (...) All uses of PCBs were to be phased out by the year 2000.

Mercury containing components such as switches or back-lighting - Mercury is used in fluorescent lamps, medical equipment, data transmission, telecommunications and mobile phones. Its use in electrical and electronic equipment has declined significantly in recent years and its use is banned (save certain exempt uses) from 2006. Apart from batteries, most other mercury containing items are likely to be found on a circuit board. Thus removing the circuit board would result in removal of most mercury containing competent such as switches.

Increasing numbers of non-CRT flat panel screens (such as liquid crystal display (LCD), laptop and desk top monitors and plasma screens) are entering the waste stream and requiring specialist treatment. (...) evidence suggests that since the mid-2009 there is a switch to LED backlit screens (...) One of the main issues surrounding the treatment and recovery of flat panels at end of life is the presence of mercury containing fluorescent backlights required in particular to illuminate the LCD, laptop and desk top monitor screens from behind (NB: plasma screens do not present the same hazard).

Toner cartridges, liquid and paste, as well as colour toner – commonly found in printers, fax machines and photocopiers.

²²Source: <https://www.mfe.govt.nz/issues/waste/weee-guidelines/recycling-waste-electrical/hazardous-substances.html>

²³ <http://www.weeebrokers.com/pdfs/weee-cons-pt3.pdf>

²⁴ Source: <http://www.hse.gov.uk/waste/waste-electrical.htm#further>

Asbestos waste and components which contain asbestos – asbestos has been used in older appliances such as electric coffee pots, toasters and irons. Asbestos was also a component of some electric heaters and other items that benefited from the heat resistant properties of the material. Modern appliances are not permitted to contain asbestos; however, operators of treatment facilities need to be vigilant for items which might contain asbestos. Appliances that are over 20 years old might contain asbestos and therefore should be examined carefully and treated accordingly.

Lead and other substances including phosphorous pentachloride in CRTs – lead and other substances hazardous to health such as phosphorous pentachloride can be liberated during the processing of the glass to remove the fluorescent coating. Lead is also present in old printed circuit boards for example.

Components containing refractory ceramic fibres (RCFs) – mainly used in furnace/heater/kiln linings. Respirable RCFs are classified as category 2 carcinogen. Although RCFs may be used in both domestic appliances and building heating appliances, the insulation material used in domestic electrical appliances are more likely to contain components based on mineral wools rather than RCFs.

Components containing radioactive substances – can be found in a variety of equipment in many commercial settings (e.g. fill level detectors, static eliminators, radium luminised dials, old trim phones) as well as smoke detectors.

The European Union restriction on the use of certain hazardous substances in new electrical and electronic equipment (known as the RoHS directive, 2011/65/EU²⁵) has banned the use of six hazardous substances from manufacturing processes. The current list of restricted substances is found in Annex II of the Directive and includes four heavy metals (lead, mercury, cadmium, and hexavalent chromium) and two brominated flame retardants (polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE)).

The original RoHS Directive was adopted on January 27, 2003. It was recast by the European Parliament and Council on June 8, 2011 and is often referred to as “RoHS II”. RoHS II is transitioning to an “open scope” Directive. This means that the Directive will apply to EEE products that are “dependent on electric current or electromagnetic fields for *at least one intended function*”. The transition will be completed in 2019.

Many manufacturers and component suppliers, even outside of the European Union, now require RoHS compliance for all products. However, this is not necessarily the case for items illegally traded to poor countries.

Annex A provides a set of charts showing the material composition and environmental weight per type of appliance.

Article 8 of the WEEE Directive states:

“(…) Article 8 Proper treatment

- 1. Member States shall ensure that all separately collected WEEE undergoes proper treatment.*
- 2. Proper treatment, other than preparing for re-use, and recovery or recycling operations shall, as a minimum, include the removal of all fluids and a selective treatment in accordance with Annex VII²⁶.*
- 3. Member States shall ensure that producers or third parties acting on their behalf set up systems to provide for the recovery of WEEE using best available techniques. Producers may set up the systems individually or collectively. Member States shall ensure that any establishment or undertaking carrying out collection or treatment operations stores and treats WEEE in compliance with the technical requirements set out in Annex VIII.(…)”*

²⁵ Directive 2011/65/UE (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32002L0095:EN:HTML>) is the recast of Directive 2002/95/UE.

²⁶ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:197:0038:0071:en:PDF>

In some EU countries, specific treatment requirements beyond the ones stated in the Directive have been included in the national transposition of the EU legislation, and some of them refer to specific treatment standards (see point 9 of this document about treatment standards).

There are different types of technologies and treatment processes available for the treatment of WEEE. Usually WEEE received at collection facilities are grouped according to their specific depollution and treatment requirements, they are then delivered to WEEE treatment plants equipped with the technology that provides such treatment.

The most common treatment grouping of WEEE includes:

- Cooling and freezing equipment.
- Large household appliances (excluding cooling and freezing equipment)
- Small household appliances
- IT equipment
- Screens
- Lamps

The following subsections provide generic information on the groups above and illustrative treatment schemas. There are many different types of compliant recycling, with different combinations and degrees of manual and mechanical treatment and different depollution and sorting technologies. It is advisable to contact experts in the field and have specific training before inspecting treatment facilities (see CWIT recommendations deliverables) in order to be able to identify non-compliant practices.



Picture 2. Left: detail of insulating foam in a fridge. Right: Location of a compressor in a fridge.

4.1 Cooling and freezing equipment

This category includes refrigerators and air conditioning equipment. This particular group of appliances may contain chlorofluorocarbons (CFC) and hydrochlorofluorocarbons (HCFC) that according to the Montreal Protocol shall be removed because of their ozone depleting effects²⁷. They are classified as hazardous waste.

Some cooling and freezing appliances are related to the EC Regulation 2037/2000²⁸. This means that appliances containing ozone depleting substances (ODS) must be sent to a specialist reprocessing plant for disposal, where these substances can be removed under safe conditions.

Ozone depleting substances may be found in the cooling circuit or in the insulating foam of the cabinet in fridges. Although labelling of refrigerators in order to identify the refrigerant type has

²⁷ Montreal Protocol: http://ozone.unep.org/new_site/en/Treaties/treaties_decisions-hb.php?sec_id=5

²⁸ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2000:244:0001:0024:EN:PDF>

been widely practiced to allow for ease of servicing (usually listed on the “appliance rating plate”) there has been no such practice historically for the insulation foam²⁹.

CFC and HCFC are the cooling gases with highest ozone depleting potential. The most common CFCs are CFC-11 (R-11), CFC-12 (R-12), CFC-113 ((R-113), CFC-114 (R-114), and CFC-115 (R-115). R-22 and R-141 are the most frequent HCFC present in some cooling and freezing appliances.



Picture 3. Compressors and refrigerant circuit. Note the labelling of compressors (white and orange labels)

The schema above shows the most common steps in the proper treatment of cooling and freezing appliances.

A crucial part of this treatment process is the removal of gas and oil from the cooling circuit, and the gas (blowing agent) from the insulating foam in the cabinet. These two steps require a high investment in treatment technologies, therefore only a few sites per EU country provide this type of

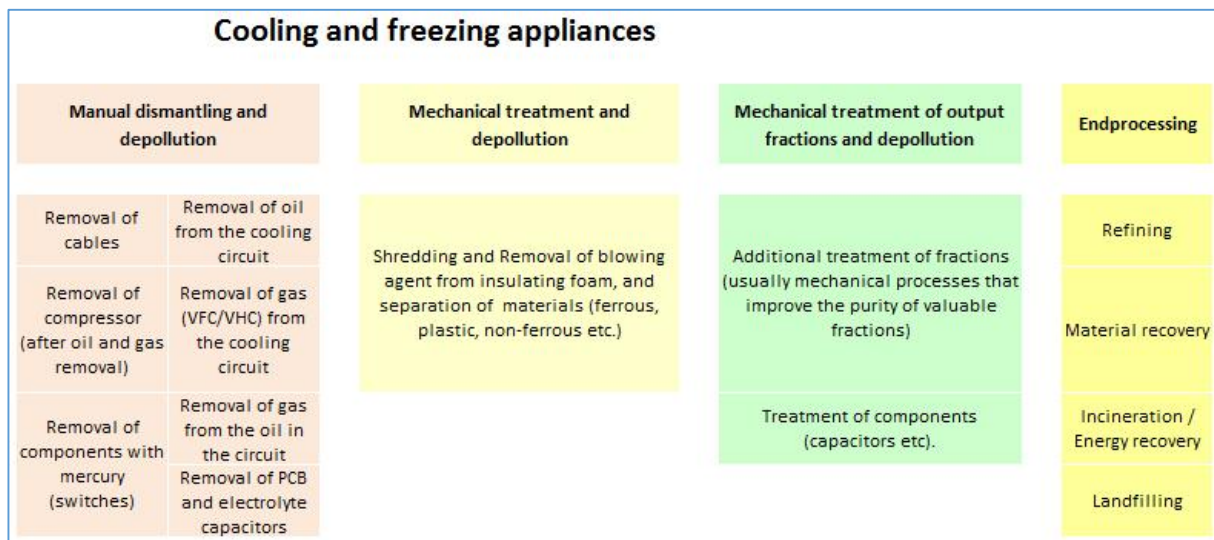


Figure 3. Treatment steps for cooling appliances

treatment. Some illegal practices identified relating to this type of appliances are:

- Shredding or smelting of whole appliances, avoiding the removal of OD substances and subsequent release of OD substances to the environment.
- Removal of components, such as the compressor and circuit, before the gas and oil have been properly removed (usually at collection points).
- Transfer of ODS containing appliances as non ODS containing appliances.
- Illegal export of these appliances.



Picture 4. Fraction of shredded plastic from refrigerators. Pieces of insulating foam are visible in beige colour in the picture.

²⁹Source: <http://archive.defra.gov.uk/environment/waste/producer/electrical/documents/weee-batrtr-guidance.pdf>

More information about this issue is available on the website of the European Commission³⁰ and the



Picture 5. Left: removal of oil and gas from the cooling circuit. Right: detail of the removal of oil and gas from the cooling circuit.

United States Environmental Protection Agency³¹ as well as the Montreal Protocol³².



Picture 6. Water boiler (arrow pointing at insulation foam).

4.2 Large household appliances (excluding cooling and freezing)

The schema shows the most common steps included in the treatment of these appliances³³.

Appliances in this category typically can contain an electric motor, a circuit board, a transformer, capacitors (PCB containing and electrolytic), some form of thermal insulation, switches and wiring. Some components may have plastic casings that contain flame retardants. Radiators may contain oil that needs to be removed. Ozone depleting substances may be found in insulation foams of water heaters, dehumidifiers or pump dryers. This particular fraction is commonly known as “white goods”, and is usually treated in a separate stream because of the high value of the output fractions (mainly metals and plastic).

Some informal practices identified relating to this type of appliances are:

- Treatment in non-regulated shredding facilities without performing any WEEE Directive depollution.
- Theft of material at collection points (see pictures).
- Transfer of WEEE as metal scrap to non WEEE authorised facilities.

³⁰ http://ec.europa.eu/clima/policies/f-gas/index_en.htm

³¹ <http://www.epa.gov/ozone/defns.html>

³² http://ozone.unep.org/new_site/en/Treaties/treaties_decisions-hb.php?sec_id=5

³³ Please note that the Directive does not consider a requisite to remove cables manually prior to mechanical treatment. The definition in the WEEE Directive of removal should be followed.

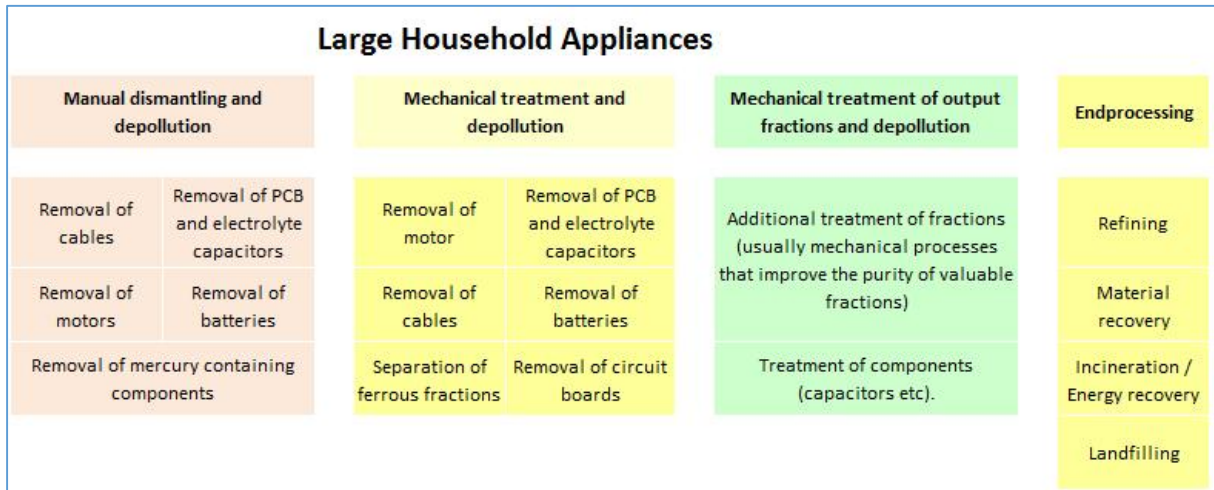


Figure 4. Treatment steps for large household appliances

4.3 Small household appliances

The main types of equipment under this group are appliances from categories 2, 4, 5, 6, 7 and 8 of the WEEE Directive; this includes toys, tools, luminaires, consumer electronics etc.³⁴.

Appliances from category 2 of the WEEE Directive may contain vacuum cleaners, irons and kitchen appliances such as toasters, fryers and kettles. Metal casings and parts have tended to give way to the use of plastics, largely because of cost and flexibility in design. (...) insulation materials may contain, but rarely, refractory ceramic fibers. Batteries, external cables, plastics containing certain types of brominated flame retardants and LCD are some of the most frequent components of concern in these types of appliances.

Components in consumer electronics (category 4 of WEEE Directive) usually include plastic cases, circuit boards, display panels (LCD / LED), motor drives (CD / DVD / VCRs and occasionally in some radio tuners), external electrical cabling (...) and large electrolytic capacitors (probably those used as smoothing capacitors in older hi-fi equipment).



Picture 7. Left: Robbery of WEEE at a collection facility; Right: Robbery of WEEE from a municipal collection point (indicated by the red arrow) in Chiclana, Cádiz (Spain)

³⁴ Source: <http://archive.defra.gov.uk/environment/waste/producer/electrical/documents/weee-hazwaste.pdf>



Picture 8. Left: different types of batteries removed from small household appliances. Right: Small household appliances collected at a civic amenity.

Recent years have seen an increase in the use of ‘cord-less’ equipment in tools (category 6 of WEEE Directive) power being supplied by rechargeable batteries (usually Ni-Cd). These ‘cord-less’ devices offer the advantages of convenience and flexibility. Earlier cord-less items sometimes had built-in rechargeable batteries (...)

Toys can contain an electric motor, circuit boards, a transformer, LCD, fluorescent lamps, wiring, batteries and external electric cables.

4.4 IT equipment

IT equipment, such as phones, cell phones, keyboards, printers, desktops and laptops etc. may contain printed circuit boards, batteries, LCD, fluorescent lamps, toner cartridges, motors, plastics containing brominated flame retardants, transformers and external electrical cabling.



Picture 9. Left: Fluorescent lamp containing mercury from a flat screen; Right: batteries from IT equipment.

Printed circuit boards from IT equipment may contain precious metals such as gold or silver. A specific treatment in dedicated smelters (end-processors) is needed to remove these types of high value metals.

The schema in the next figure outlines the main steps in the treatment of small household appliances and IT equipment. It should be noted that manual treatment is less and less often practiced for SHA given the complexity of the waste collected and labor costs.

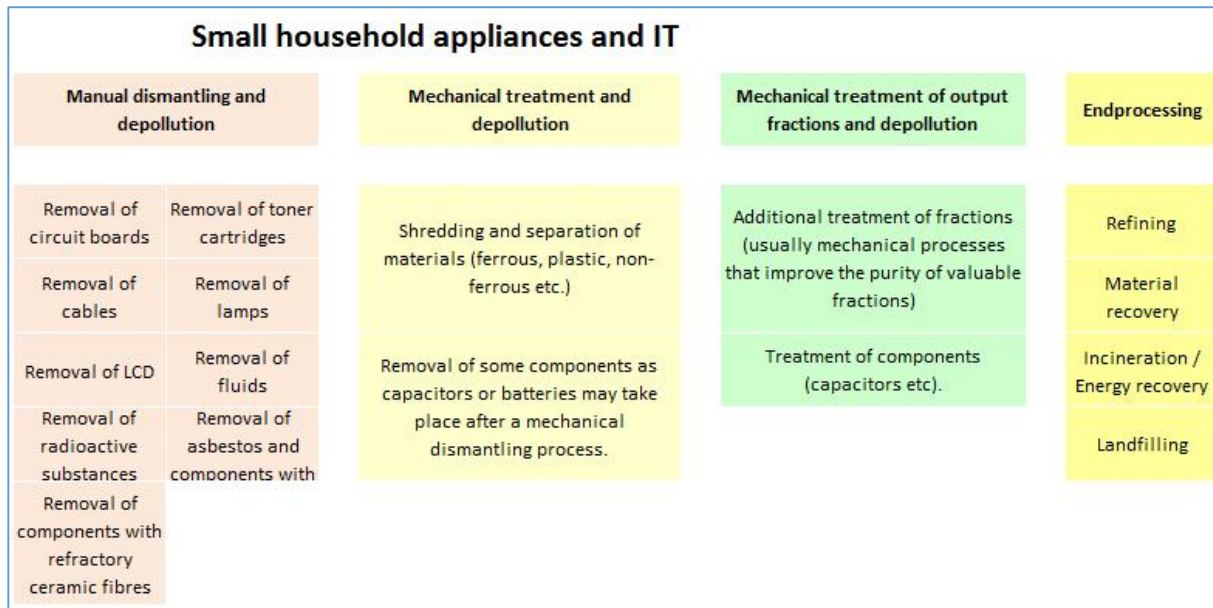


Figure 5. Schema showing treatment steps of small household appliances and IT.

4.5 Screens

These types of appliances are classified as hazardous waste (e.g Cathode Ray Tube glass is more than 50% of the total weight of a TV and is coded as 10 11 11* hazardous). Computers, computer monitors, and other electronics that contain CRTs, and separated computer circuit boards contain materials such as lead, cadmium and mercury. These materials pose an environmental risk when disposed. The manufacture of plastic housing materials of monitors and TVs has moved away from the use of certain brominated flame retardants (such as Octa and Penta PBDE's), but the appliances currently collected were manufactured before this change.



Picture 10. Detail: CRT tube inside a television.

Lead can be found in the funnel (back glass) and panel glass is bound up in the glass matrix and does not leach very readily. The lead in the frit, which joins or welds the face plate glass to the funnel glass is in the form of a lead oxide paste. The lead in the frit does leach quite readily when subjected to the Toxicity Characteristic Leaching Procedure (TCLP) test³⁵.

More than half of the weight of a CRT television or CRT monitor is glass. A low diversity of material recovery destinations to support the high amount of glass generated through the treatment of CRT appliances and the high cost of CRT recycling may become drivers of illegal exports.

The WEEE Directive states that the fluorescent coating in the panel glass should be removed (according to the definition of "removal" from the WEEE Directive); therefore treatment processes have to take this requirement into consideration.

Informal practices identified relating to screens:

³⁵ Research carried at the University of Florida showed that CRTs usually test to be a hazardous waste when subjected to the TCLP test. Source: <http://archive.defra.gov.uk/environment/waste/producer/electrical/documents/weee-hazwa>

- Removal of components (usually the deflection or copper coil), before the appliance reaches the treatment site. This practice damages the appliance, and hinders the subsequent proper depollution in a legal facility.
- Improper treatment of CRT tubes (by avoiding the removal of the fluorescent coating or unauthorised disposal of leaded glass).
- Illegal export of CRT appliances.



Picture 11. Left: Deflection coil from a CRT tube, the copper content of this component is highly appreciated by illegal collectors. Middle: uncleaned panel glass; right: cleaned panel glass.

With regard to personal computers and television a trend towards the use of LCD/LED flat screens from CRT (cathode ray tubes) monitors has taken place.

There are different types of flat panel displays (e.g. LED, LCD, TFT, OLED etc.). FPD usually contain printed circuit boards, cables, and for certain technologies (LCD, TFT) they include mercury containing lamps as a source of light. The weight of flat screens collected still represent a smaller amount of the total screens collected compared to CRT. However, it is expected an increase of the

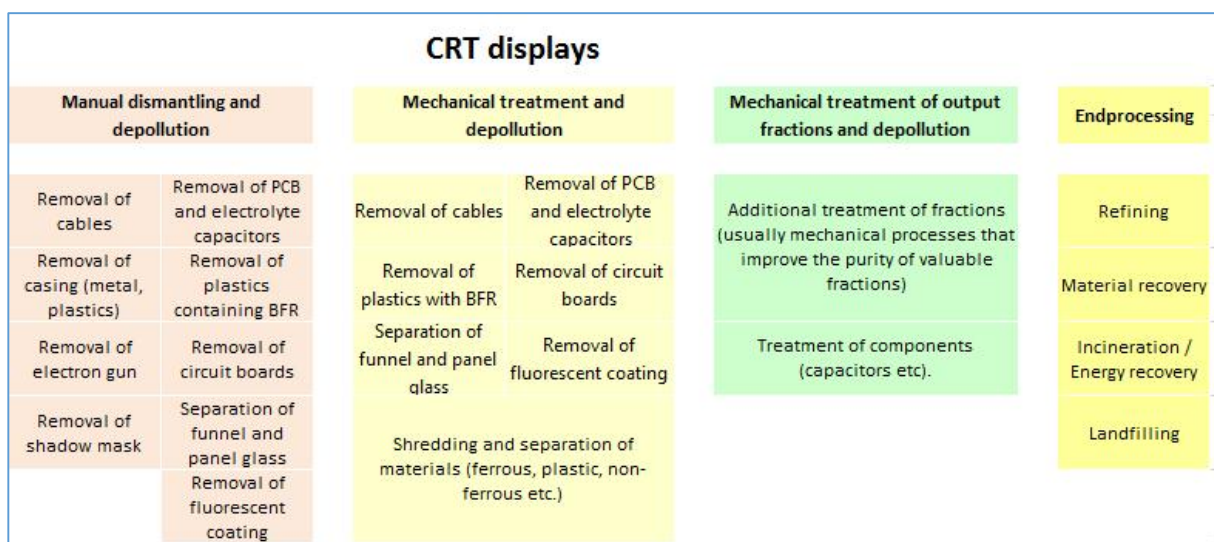


Figure 6. Schema representing an illustrative list of the treatment steps for CRT displays

amounts of flat screens collected, as they have been replacing old CRT appliances for years now.

New treatment technologies that will allow mechanical treatment of flat screens are currently under development with some of them being already in use. Figure 6 below outlines the main steps in the treatment of CRT screens.

4.6 Lamps

Lamps under the scope of the WEEE Directive are gas discharge lamps, fluorescent lamps and low pressure sodium lamps (see annex II and IV of the WEEE Directive II). Because of its content in mercury, and fragility, the management of this type of appliances is always carried out in a different stream (or flow), separately from other types of WEEE.

Mercury is an essential constituent in a fluorescent lamp. Lamps are mainly composed of glass and metal.



Picture 12. Energy saving lamps.

Specific technology and working conditions are required to treat this type of appliances. The levels of mercury in the working area and staff have to be measured and monitored

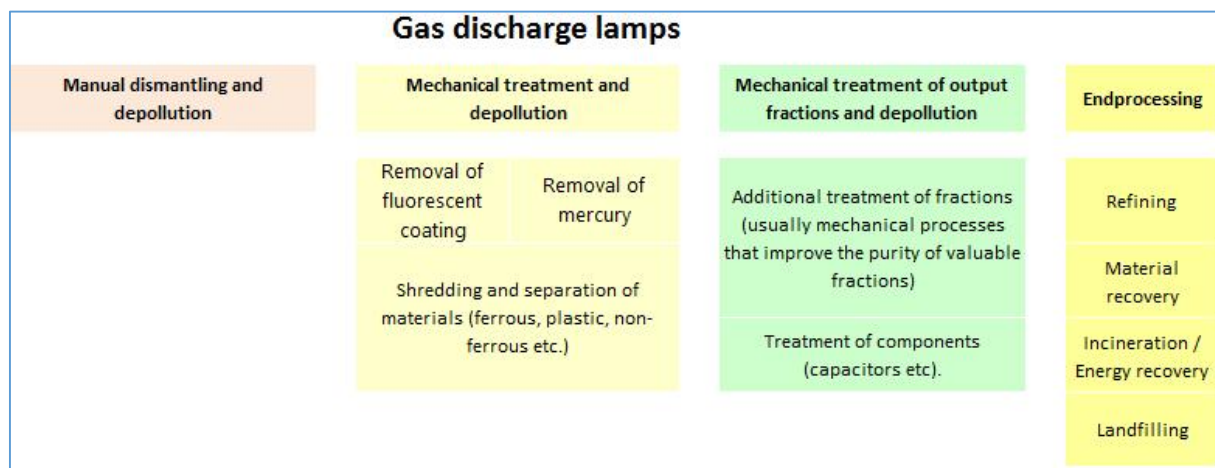


Figure 7. Schema representing the treatment steps for gas discharge lamps

5 MAIN ACTORS INVOLVED IN THE WEEE VALUE CHAIN

An inventory of publicly available registers of some WEEE actors has been prepared by the CWIT Consortium and posted on the project website³⁶.

This section illustrates some of the most common actor's typologies in the WEEE value chain, starting with consumers who discard appliances at the end of their life cycle.

The names and profiles of the actors may vary in EU countries, therefore it is advisable to study the national situation in each country for enforcement purposes.

5.1 Producers of Electrical and Electronic Equipment (EEE)

Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE Directive) places the financing responsibility for the proposed treatment of WEEE in the hands of the producers³⁷.

³⁶ <http://www.cwitproject.eu/reports-downloads/database-ewaste-stakeholders/>

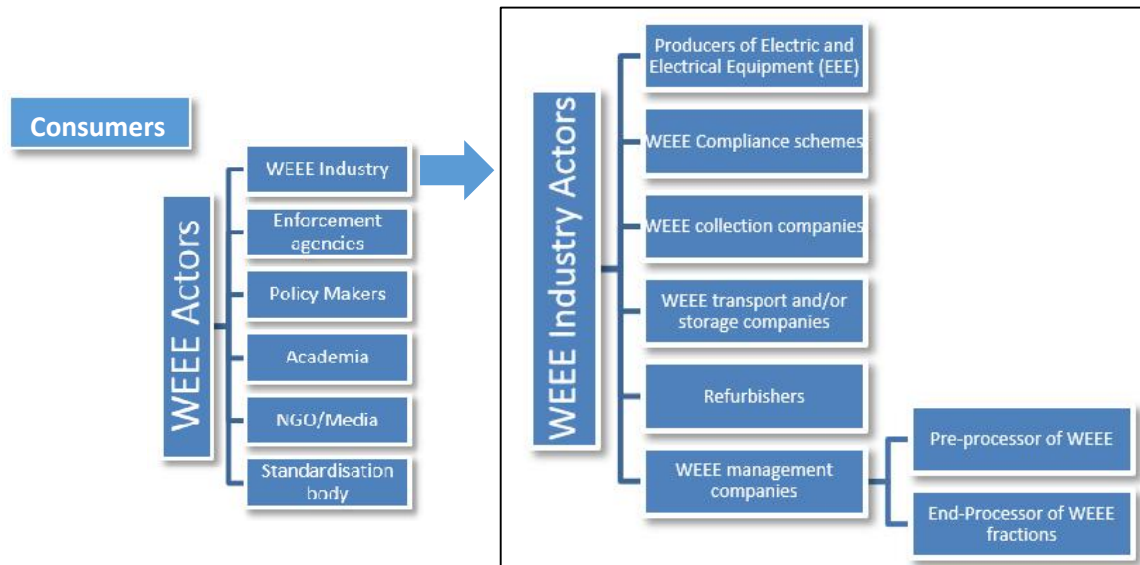


Figure 8. Schema showing the different typologies of WEEE actors outlined by CWIT project

The European producers are required to set up systems to provide for the treatment of WEEE using best available treatment, recovery and recycling techniques. They are responsible, through their compliance schemes, to achieve the recycling and recovery targets. In some countries waste management companies and/or recyclers manage the responsibility on behalf of the producers. The producer is the most important player in the field of WEEE management as it is the electronics industry that produces the electrical appliances that at the end of their life cycle need to be prepared for reuse, recycled, recovered, or disposed of in an appropriate way.

With the implementation of the WEEE regulations, National Registers for producers have been set in many European countries that have transposed the Directive. Producers are required to inscribe their companies in the register. As an example, the Spanish National WEEE Register for producers holds more than 2400 companies, and the UK register over 6000 companies.

5.2 WEEE Compliance Schemes

Producer Compliance Schemes are organisations, usually founded by producers of electrical and electronic appliances to help order to comply with the legal obligations imposed by the WEEE Directive. Schemes contract the treatment and recycling of WEEE from authorised collection points, on behalf of its producer members. Therefore, Compliance Schemes may monitor and/or collect information about the WEEE flows: they hold and report data about the WEEE collected, from collection point to the treatment facility.

³⁷ Producers are defined in the WEEE Directive as any natural or legal person who, irrespective of the selling technique used, including distance communication within the meaning of Directive 97/7/EC of the European Parliament and of the Council of 20 May 1997 on the protection of consumers in respect of distance contracts:

- is established in a Member State and manufactures EEE under his own name or trademark, or has EEE designed or manufactured and markets it under his name or trademark within the territory of that Member State;
- is established in a Member State and resells within the territory of that Member State, under his own name or trademark, equipment produced by other suppliers, a reseller not being regarded as the "producer" if the brand of the producer appears on the equipment, as provided for in point (i);
- is established in a Member State and places on the market of that Member State, on a professional basis, EEE from a third country or from another Member State; or
- sells EEE by means of distance communication directly to private households or to users other than private households in a Member State, and is established in another Member State or in a third country.

Schemes are required to regularly report to the authorities the amounts of WEEE collected and the origin and destination of it. However, recent studies³⁸ proved that Compliance Schemes only monitor and control a part of the WEEE collected and treated, showing that there is a large amount of WEEE that is being collected and treated but unreported to WEEE competent authorities, hence the amount, destination and treatment of such material is not recorded and in many instances unknown. Studies performed in several EU countries come to the conclusion that 1/3 is recycled by Schemes, 1/3 by recyclers and 1/3 is unknown (or unreported).

5.3 Refurbishers

Refurbishers are defined as organisations that prepare WEEE in order to be re-used. "Re-use" means any operation by which products or components that are not waste are used again for the same purpose for which they were conceived. Re-use organisations may carry out complementary or parallel activities, such as the marketing of second hand goods or components thereof.

5.4 WEEE collection companies

According to the WEEE Directive, WEEE is required to be collected from users in a separate flow (i.e. not mixed with other types of waste). Collection points are considered the first step of the value chain. The destination of the waste and the subsequent actors that will handle it are decided in this step. When the waste is delivered to an unauthorised actor, the flow becomes "invisible", i.e. transfers are not reported to authorities and the waste becomes untraceable; therefore it is impossible to determine the destination or type of treatment this waste has followed. This should be considered as the first step in the value chain that may lead to illegal trade of WEEE.

The different and most common typologies of collection points in Europe are the following:

- Municipal or local collection points, typically managed by municipalities or local consortia,
- Retailers. The WEEE Directive, allows users that buy new equipment, to hand in the old item ("old for new" or "1X1") to the retailer from which they have bought the new equipment,
- Other collection points can be considered refurbishing/ charity organisations, technical services that repair damaged items, WEEE recyclers and metal scrap dealers, among others.

It is worth mentioning that Door-to-Door collection is sometimes implemented in European municipalities.

The WEEE Directive states that, for WEEE from private households, Member States shall ensure that distributors provide for the collection, at retail shops with sales areas relating to EEE of at least 400 m², or in their immediate proximity, of very small WEEE (no external dimension more than 25 cm) free of charge to end-users and with no obligation to buy EEE of an equivalent type, unless an assessment shows that alternative existing collection schemes are likely to be at least as effective.

³⁸ see "The Dutch WEEE flows" as an example, <http://www.vie.unu.edu/file/get/9654>.



Picture 13. Picture showing unreported trade of WEEE collected from a retailer.

CWIT deliverable 4.1 (Typology of companies involved in the export market) states that collection points are the first step of the WEEE value chain. It is well known the high amount and frequency of non-regulated activities that take place in these facilities, such as thefts of e-waste and components thereof, informal buyers of WEEE etc. A consequence of this situation is the generation of WEEE flows that are not reported nor monitored. Therefore this waste does not account for the fulfilment of national collection targets and it may be subjected to illegal trade and/or export.



Picture 14. Non - regulated curb side disposal (see detail: the compressor was removed from the fridge).

5.5 WEEE transport companies

Transport companies of WEEE can be grouped according to the following figure:

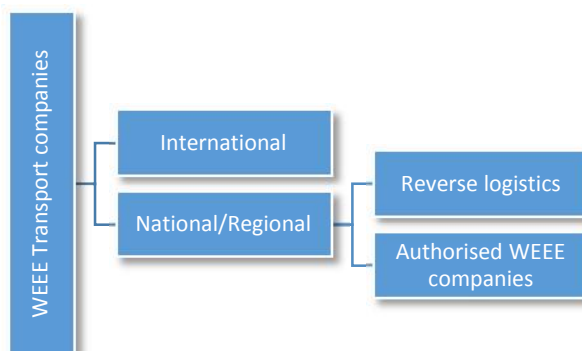


Figure 9. Typologies of transport companies

National WEEE transport companies are regulated by national laws, including the transposition of the WEEE Directive and the Waste Framework Directive (Directive 2008/98/EU). Transport companies

dealing with hazardous waste in Europe are required to keep a register of their activities and have it available for inspection, according to the legislation in force. In some countries this requirement has been extended to non-hazardous waste, and in some cases logistics companies are mandated to report regularly to the competent authorities.

Reverse logistics for WEEE is an activity carried out habitually because it allows an efficient use of the resources in place. Reverse logistics can be defined as an activity associated with a product/service after the point of sale, the ultimate goal is to optimize or make more efficient aftermarket activity, thus saving money and environmental resources. The transportation means and resources to deliver the new product are used to take back the old equipment replaced.

The WEEE Directive establishes that treatment operations may also be undertaken outside the respective Member State or the Union provided that the shipment of WEEE is in compliance with Regulation 2006/1013/EC³⁹ and Commission Regulation 2007/1418/EC⁴⁰ concerning the export for recovery of certain waste.

Transport companies play an important role in the trade of WEEE. Customs agencies monitor and check that these activities and the goods transported meet the regulations in force. Comments about the performance of enforcement agencies and points of improvement appear in CWIT WP6 deliverables.

5.6 WEEE management companies

WEEE management companies include those organisations that perform recycling and recovery activities. Two different categories have been outlined within this group:

- Pre-processor of WEEE (e.g., manual dismantling, previous depollution, includes shredding of whole or incomplete appliances); and
- End-processor (processor of WEEE fractions e.g., printed circuit boards, plastic or metal fractions from WEEE).

National recyclers, consisting of metal shredders and specialists (in recycling of special often hazardous WEEE, for example cooling appliances and screens with cathode ray tubes); receive sorted appliances, mono-flows and 'pre-shredder' material. Mono-flows are sorted materials that consist of one or two categories of WEEE e.g., professional appliances, IT desktops and cooling and freezing appliances. The 'pre-shredder' materials are bought from regional metal scrap processors and consist of a metal mix with a certain percentage of WEEE (parts from professional and large household appliances, small household appliances, Central Heating and IT appliances). Furthermore, these companies may import WEEE for recycling purposes⁴¹.

The WEEE treatment and waste management industry plays a significant role in countering the illegal trafficking and treatment of WEEE. CWIT Deliverable 6.3 compiles a set of recommendations to tackle illegal trade of WEEE addressed to the WEEE industry.

³⁹ Regulation 2006/1013/EC of the European Parliament and of the Council of 14 June 2006 on shipments of waste.

⁴⁰ Regulation 2007/1418/EC of 29 November 2007 concerning the export for recovery of certain waste listed in Annex III or IIIA to Regulation (EC) No 1013/2006 of the European Parliament and of the Council to certain countries to which the OECD Decision on the control of transboundary movements of wastes does not apply.

⁴¹ Huisman, J., van der Maesen, M., Eijsbouts, R.J.J., Wang, F., Baldé, C.P., Wielenga, C.A., (2012), The Dutch WEEE Flows. United Nations University, ISP – SCYCLE, Bonn, Germany, March 15, 2012.



Picture 15. Left picture: pre-shredded material; Right picture: mono-flow

Article 9 of the WEEE Directive refers to the permits of these types of activities:

" (...) Article 9. Permits

- 1. Member States shall ensure that any establishment or undertaking carrying out treatment operations obtains a permit from the competent authorities in compliance with Article 23 of Directive 2008/98/EC.*
- 2. Exemptions from permit requirements, conditions for exemptions and registration shall be in compliance, respectively, with Articles 24, 25 and 26 of Directive 2008/98/EC.*
- 3. Member States shall ensure that the permit or the registration referred to in paragraphs 1 and 2 includes all the conditions that are necessary for compliance with the requirements of Article 8(2), (3) and (5) and for the achievement of the recovery targets set out in Article 11.(...)"*

Many of these activities are regulated by the IPPC Directive⁴² that establishes particular permit conditions in which WEEE treatment processes need to be carried out.

5.7 Matrix of actors and crime typologies

One of the CWIT project tasks was aimed at creating an evaluation matrix to link WEEE crimes with WEEE operators.

The results are based on 49 cases that were reported to the INTERPOL General Secretariat, these cases can include multiple offences. Reported figures are based on cases that were reported to the INTERPOL General Secretariat, thus they give only a snapshot of WEEE offences in global supply chains. However, we believe that the presented crime evaluation matrix and data analyses graphics are valuable tools to map offences in WEEE supply chains. It is very important to map these offences, in order for law enforcement authorities can allocate their resources efficiently.

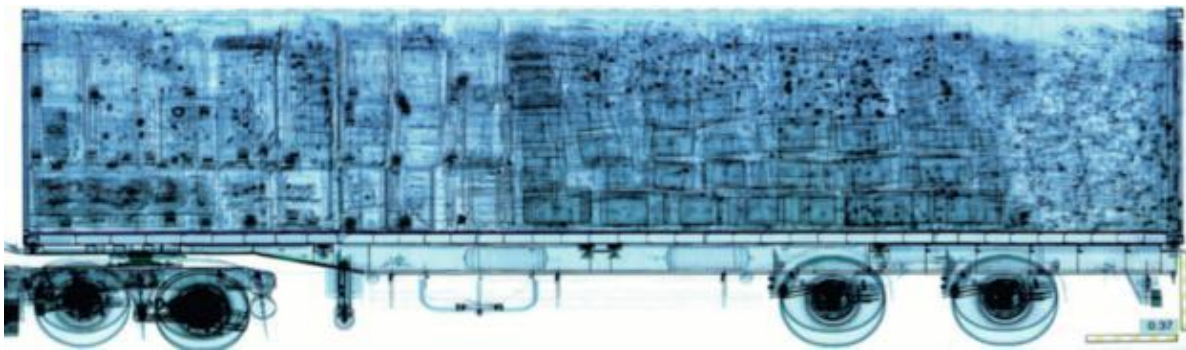
The cases include WEEE offences that were detected in Europe. The main destination was West Africa, there were also exports to North Africa, Central Africa and East Africa. There were also three cases of export to the Middle East and 15 cases of WEEE intended to be exported to Asia. In addition there were nine cases in which WEEE was transported from West Europe to East Europe.

Based on the cases we created an evaluation matrix that combines crime typology and actors. Actors were also grouped in five categories: Collection, Consolidation, Brokering, Treatment, and Transport. The following crime types related to international shipments were identified: false declaration of load, smuggling, missing notification of the shipment and incorrect notification of the shipment. The following violations were detected in inland transportation: the use of false documents, fraud, theft,

⁴² <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32010L0075> ; see also IMPEL projects related to this piece of legislation: <http://impel.eu/tag/ippc-directive/>.

and a lack of a required license/permit. Treatment of WEEE included two types of offences: the inappropriate treatment of WEEE, and violations of regulations on the trade of WEEE. WEEE offences were intertwined with money laundering and tax evasion in some cases. There was one case involving the threat of violence with firearms.

The most common offence identified was the false declaration of goods, most of the time considered as an administrative violation. Law enforcement efforts focus mostly on operators such as exporters



Picture 16. Example of a scanned cargo containing waste TV sets concealed between other types of goods

and freight forwarding companies, however these are not the only actors involved. Further examination into the actions of individuals further back in the supply chain could further elucidate the sources and illicit flow of WEEE.

The most common detections focus on transport sector such as exporters and freight forwarding companies, who are implying that several operators involved in WEEE crimes remain undetected in the whole supply chain network. Therefore it was concluded crime investigations should be extended to front end of WEEE supply chains meaning inland and European networks. CWIT WP5 deliverables provide more information on the analysis of crime related to the illegal trade of WEEE.

TYPE OF OFFENCE	ACTORS												
	Informal collectors/metal scrap collectors	Municipal employees	Producer responsibility organization	Preparation for re-use/refurbisher	Sorting/consolidation sites	WEEE brokers	Internet traders	Waste tourists	Recyclers/end processors	Importer	Exporter	Non-governmental organization	Freight forwarder/logistics operator
false declaration of load													
fraud													
smuggling													
theft													
tax evasion													
false documents													
missing notification													
missing license/permit													
incorrect notification													
violated ODS regulations													
money laundering													
threat of violence with firearms													
inappropriate treatment													
	COLLECTION			CONSOLIDATION		BROKERING		TREATMENT		TRANSPORT			

Figure 10. Crime matrix showing actors and types of offences.

6 TRANSBOUNDARY MOVEMENTS OF WEEE

Regulation (EC) No 1013/2006⁴³ of the European Parliament on shipments of waste, establishes procedures and control regimes for the shipment of waste. The Regulation includes a ban on the export of hazardous wastes to non-OECD countries ("Basel ban") as well as a ban on the export of waste for disposal⁴⁴.

This regulation classifies waste in two different lists: green list (Annex III and IIIB) and amber list (Annex IV), and establishes two different control and traceability procedures for transboundary shipments:

- Prior written notification and consent, or
- General information requirement.

In order to determine the procedure applicable to each transboundary shipment, it is necessary to know the category of the waste (green or amber list) and the intended treatment at the country of destination (recovery or disposal). For instance, refrigeration appliances containing ozone-depleting substances (CFCs or HCFCs) may not be exported outside the EU. This applies regardless of whether the device is new or old. It is also prohibited to export devices that rely on CFCs or HCFCs for their functioning. Even if the refrigerant has been emptied from the device, the export is prohibited in this case⁴⁵.

More information about this topic is available for example on the websites of the European Commission⁴⁶, IMPEL⁴⁷, Montreal Protocol⁴⁸ and the Basel Convention⁴⁹.

A failure in the distinction between waste and used goods is identified as a recurring cause that allows the illegal trade of e-waste. At the global level, Parties to the Basel Convention are developing technical guidelines to overcome this challenge⁵⁰. The "absence of clarity in the definition of waste" has also been pointed out in the EUROJUST's Strategic Project on Environmental crime report⁵¹ as "a major obstacle in the prosecution of cases of illegal waste trafficking". Here again, the parties to the Basel Convention are working on clarifying, at the global level, the distinction between "wastes" and "non-wastes"⁵². A usual modus operandi in these situations is that the holder of goods notifies traded materials as used goods, when it is actually waste, in order to obtain a shipment permit. In many instances used goods are mixed with e-waste in illegal shipments to increase confusion during inspections.

The recast Directive (and the Revised Correspondent's Guidelines #1⁵³) addresses this issue in its Annex VI (Minimum requirements for shipments), in which a functionality test is (although not always) required to prove that the goods shipped are used EEE and not waste. The Directive also refers to several records that the holder of the traded goods must have available in order to clearly identify them either as waste or used EEE.

⁴³ <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02006R1013-20130410&rid=1>

⁴⁵ Source: <http://impel.eu/wp-content/uploads/2013/01/2012-11-8-Waste-Sites-Manual-final.pdf>

⁴⁶ <http://ec.europa.eu/environment/waste/shipments/index.htm>

⁴⁷ <http://impel.eu/cluster-2>

⁴⁸ http://ozone.unep.org/new_site/en/Treaties/treaties_decisions-hb.php?sec_id=5

⁴⁹ <http://www.basel.int/>

⁵⁰ For more information on the development of Technical guidelines on transboundary movements of electronic and electrical waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention, see: <http://www.basel.int/Implementation/Ewaste/TechnicalGuidelines/DevelopmentofTGs/tabid/2377/Default.aspx>

⁵¹ EUROJUST. Strategic Project on Environmental crime report. November 2014. p.17. Available online at: <http://www.eurojust.europa.eu/press/PressReleases/Pages/2014/2014-11-21.aspx>

⁵² See <http://www.basel.int/Implementation/LegalMatters/LegalClarity/tabid/3621/Default.aspx>

⁵³ http://ec.europa.eu/environment/waste/shipments/pdf/correspondents_guidelines_en.pdf



Picture 17. Poorly packaged WEEE for transportation

The type of packaging⁵⁴ used in the transported goods is usually a good indicator of the nature of the goods. Annex VI of the WEEE Directive states that the holder of the goods should have available “(...) *appropriate protection against damage during transportation, loading and unloading in particular through sufficient packaging and appropriate stacking of the load*”. The European Agreement concerning the International Carriage of Dangerous Goods by Road – ADR is also applicable. Especially the packaging requirement on Lithium batteries has implications for the packaging and transport of WEEE.

Several guides (see Annex B) for enforcement agencies list tips and evidences that help inspectors identify suspicious merchandises.



Picture 18. Left: Fridges loaded in a truck for export for reuse to Africa 2009, Right: Fridges, CRT's and compressors not approved by the VROM Inspectorate for export for reuse to Africa 2009, source: VROM Inspectorate

7 APPLIANCES COMPOSING WEEE AND REPORTING

The WEEE Directive establishes a reporting obligation for Members States. Every 3 years, Member States should report to the EU Commission the quantities of appliances put on the market and WEEE collected among other information (see art. 16 of the WEEE II Directive for more information).

Many Member States have drawn up national registers of producers that serve to monitor compliance with the requirements of the Directive. The information collected in these registers is reported by Member States to the European Commission, and it is presented in the 10 WEEE categories outlined by the WEEE Directive (see European database “Eurostat”).

⁵⁴ Source of Picture 17: Source: http://www.env.go.jp/recycle/yugai/reg/nigeria_20130419_2.pdf

The table and chart below summarize the amounts collected and reported by Member States for 2010. It should be noted that the amounts in these reports do not include “invisible flows” (not reported to authorities⁵⁵ or reported in registers that have not been taken into account) of WEEE, which have been estimated in some EU countries as 2/3 of the total WEEE generated.

More information about this topic is available at the Eurostat website⁵⁶.

Table 7. Composition of WEEE collected and reported to Eurostat⁵⁷ (European Union, 2010).

WASTE	WEIGHT (T)	%
1. Large household appliances	1,556,134.00	50.3%
2. Small household appliances	813.28	0.0%
3. IT and telecommunications equipment	714,716	23.1%
4. Consumer equipment and photovoltaic panels	640,976	20.7%
5. Lighting equipment (excl. lamps)	25,704	0.8%
5. Lamps	35,344	1.1%
6. Electrical and electronic tools (with the exception of large-scale stationary industrial tools)	74,542	2.4%
7. Toys, leisure and sports equipment	14,172	0.5%
8. Medical devices (with the exception of all implanted and infected products)	9,145	0.3%
9. Monitoring and control instruments	9,798	0.3%
10. Automatic dispensers	12,534	0.4%
Total	3,093,878	100%

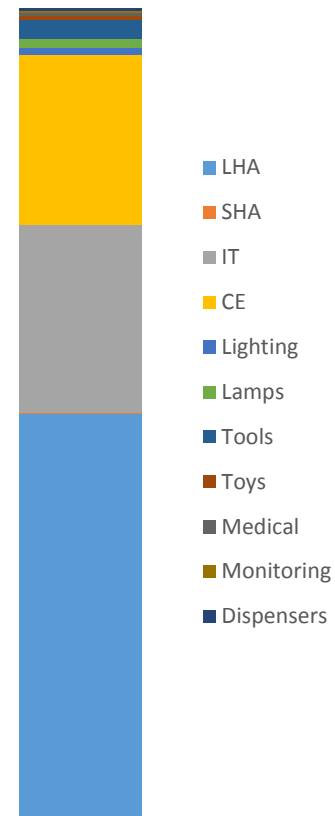


Figure 11. Composition (in weight) of WEEE collected and reported in 2010 (UE-28, 2010).

7.1 Reporting obligations for actors

There are a number of legal requirements dealing with WEEE traceability and reporting, the waste framework directive for instance in its article 35, states the following:

“ (...) Article 35. Record keeping

1. The establishments or undertakings referred to in Article 23(1)⁵⁸, the producers of hazardous waste and the establishments and undertakings which collect or transport hazardous waste on a professional basis, or act as dealers and brokers of hazardous waste, shall keep a chronological record of the quantity, nature and origin of the waste, and, where relevant, the destination, frequency of collection, mode of transport and treatment method foreseen in

⁵⁵ See country WEEE flows studies: http://www.ademe.fr/sites/default/files/assets/documents/91257_report-weee-arising-france.pdf; http://isp.unu.edu/publications/scycle/files/Ecodom_WEEE.pdf; <http://i.unu.edu/media/unu.edu/news/39523/Recupel-Report-FINAL.pdf>; <http://www.vie.unu.edu/file/get/9654>

⁵⁶ http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/key_waste_streams/waste_electrical_electronic_equipment_weee

⁵⁷ Source: http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/key_waste_streams/waste_electrical_electronic_equipment_weee

⁵⁸ Meaning any establishment or undertaking intending to carry out waste treatment to obtain a permit from the competent authority.

respect of the waste, and shall make that information available, on request, to the competent authorities.

2. *For hazardous waste, the records shall be preserved for at least three years except in the case of establishments and undertakings transporting hazardous waste, which must keep such records for at least 12 months.*

Documentary evidence that the management operations have been carried out shall be supplied at the request of the competent authorities or of a previous holder.

3. *Member States may require the producers of non-hazardous waste to comply with paragraphs 1 and 2. (...)*

In addition to this, article 16 of the WEEE Directive sets a reporting and register requirement for producers:

" (...) Article 16. Registration, information and reporting

1. *Member States shall, in accordance with paragraph 2, draw up a register of producers⁵⁹, including producers supplying EEE by means of distance communication. That register shall serve to monitor compliance with the requirements of this Directive.*

Producers supplying EEE by means of distance communication as defined in Article 3(1)(f)(iv) shall be registered in the Member State that they sell to. Where such producers are not registered in the Member State that they are selling to, they shall be registered through their authorised representatives as referred to in Article 17(2) (...)

It should be noted that national and local regulations may set specific requirements that go beyond the ones stated in the Directive.

8 DRIVERS OF ILLEGAL TRADE OF WEEE



Picture 19. Left: Copper tubes removed from refrigerators; right: ferrous fraction from WEEE shredding.

Some types of WEEE have a high content of metals and other valuable materials. As an example, fridges and white goods may contain an average of 60% of weight in metals (ferrous and non-ferrous). Printed circuit boards may contain precious metals such as gold or silver. These

⁵⁹ Find the list of national WEEE registers at <https://www.ewrn.org/national-registers/>

factors are considered drivers of WEEE illegal trade. Other drivers identified are low enforcement activities and low fines applicable to the theft, export and/or unauthorised treatment of WEEE. See section 5 for more information about actors involved in the business of the WEEE value chain.

The main driver behind exports is the reuse value combined with the avoided costs of sorting, testing and packaging. The economic values of the exports cannot be quantified in detail because there is no clear information. The exports involve too many individual appliance types and different price levels in the receiving countries. The Environment Agency in the UK provides an example of a typical profit value of £8,000 for a container of mixed, unsorted and untested equipment sent to Africa. This indicates that the magnitude of the reuse value is multiple times the material value of the contents.

A different environmental dimension and concern is the avoidance of compliance costs mainly related to de-pollution and other costs in order to operate up-to-standard. CWIT WP6 deliverables and Deliverable 4.3 provide figures and more information on the economic drivers related to WEEE illegal trade. The table below provides an idea of the value of metal prices (London metal exchange settlements (26 February 2014)).

Metal	Price
Copper	7.149 US\$/t
Aluminium	1.735 US\$/t
Lead	2.110 US\$/t
Zinc	2.077 US\$/t
Nickel	14.285 US\$/t
Ferrous scrap ⁶⁰	365 US\$/t

Table 8. London metal exchange settlements (26 February 2014).

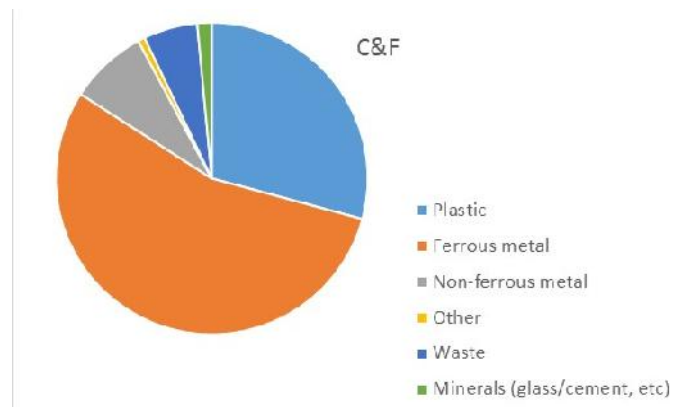


Figure 12. Chart showing material composition of cooling and freezing appliances.

9 STANDARDS RELATED TO THE TREATMENT OF WEEE

9.1 CENELEC standards

Article 8.5 of the WEEE Directive, states:

“5. For the purposes of environmental protection, Member States may set up minimum quality standards for the treatment of the WEEE that has been collected.

Member States, which opt for such quality standards shall inform the Commission thereof, which shall publish these standards.

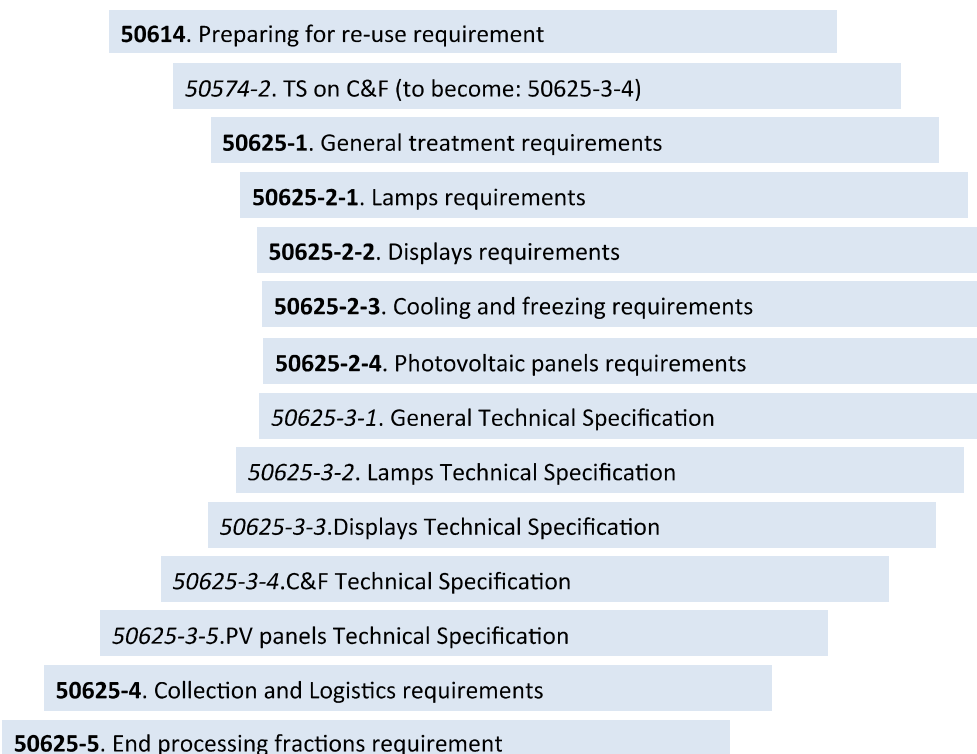
The Commission shall, not later than 14 February 2013, request the European standardisation organisations to develop European standards for the treatment, including recovery, recycling and preparing for re-use, of WEEE. Those standards shall reflect the state of the art.

In order to ensure uniform conditions for the implementation of this Article, the Commission may adopt implementing acts laying down minimum quality standards based in particular on the

⁶⁰ Reference date: 3 December 2013

standards developed by the European standardisation organisations. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 21(2). A reference to the standards adopted by the Commission shall be published (...)"

In order to address Art. 8.5 of the WEEE Directive, the European electrotechnical standardisation body, CENELEC, under the environmental standardisation Working Group "TC111X/WG6 treatment of WEEE standards" is currently preparing deliverables based on the industry standards (such as WEEELABEX) to support the mandate of the European Commission. In particular, these deliverables deal with the treatment of WEEE and its metal fractions, and the collection and logistic activities related to them. The standards published and/or under development are the following:



3

Figure 13. List of CENELEC standards related to WEEE.

It should be noted that CENELEC Standards have become mandatory in some EU Member States.

9.2 EPEAT

The Electronic Product Environmental Assessment Tool (EPEAT) is a method for consumers to evaluate the effect of a product on the environment. It is assessing lifecycle environmental standards and ranks products as gold, silver or bronze based on a set of environmental performance criteria.

It is managed by the Green Electronics Council, itself a programme of the International Sustainability Development Foundation (ISDF) which 'envision a world where commerce, communities and nature thrive in harmony'. To qualify products to the IEEE 1680 family of 'green electronics' standards and identify products as EPEAT Bronze, Silver or Gold the organisation has signed an MOU (Memorandum of Understanding) with a group of technical and environmental assessment organisations.

The Council evaluates computing equipment on 51 criteria - 23 required and 28 optional — that measure a product's efficiency and sustainability attributes. Products are rated Gold, Silver, or

Bronze, depending on how many optional criteria they meet. On January 24, 2007, President George W. Bush issued Executive Order 13423, which requires all United States Federal agencies to use EPEAT when purchasing computer systems.

The international expert organisation Dekra provides a network of local EPEAT experts in Europe, China, and South America to help in training electronics manufacturers and suppliers, purchasers and other interested parties since May 2011 (more information available at EPEAT website⁶¹).

9.3 R2

Recognizing the need for a comprehensive certification program that captured the operational and environmental concerns of the industry, the US EPA convened a multi-stakeholder process to develop the *“Responsible Recycling practices for Use in Accredited Certifications Programs”* (R2). The goal was to create a voluntary, market-based mechanism for ensuring best practices, which would also provide essential information/assurances to prospective customers.

R2 Solutions (R2S) is the non-profit organisation established to house the R2 Practices. They conduct educational and outreach services and provide administrative support for the multi-stakeholder R2 Technical Advisory Committee (more information available at R2 website⁶²).

9.4 E-Stewards

The e-Stewards Standard for Responsible Recycling and Reuse of Electronic Equipment is owned by the Basel Action Network (BAN), a non-profit organization working globally to prevent the toxic trade and promote a toxics free future. The Standard is comprehensive, covering data security, worker safety, downstream due diligence etc. It is also wholly consistent with the definitions and trade rules of the illegal trafficking of hazardous waste, based on the United Nations’ Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. Certification to the standard is achieved via third party audits conducted by approved and accredited Certifying Bodies operating under International Accreditation Forum (IAF) rules. The standard is integrated with the ISO 14001 environmental management system and those Certified to e-Stewards thus get two Certifications at the same time (e-Stewards and ISO14001) (BAN, 2015) (more information available at e-Stewards website⁶³).

9.5 WEEELABEX

On 28 July 2008, the LIFE committee, an EU panel composed of representatives of the member states and of the European Commission, approved the WEEE Forum's "WEEELABEX" project proposal (LIFE07 ENV/B/000041). WEEELABEX was a four-year, multi-stakeholder project aimed at laying down a set of European standards with respect to collection, handling, storage, recycling, preparation for re-use and disposal of WEEE and monitoring the processing companies through audits conducted by auditors trained by the WEEELABEX Office. All WEEELABEX auditors use the same audit process documents, apply the same set of standards and report their findings to the WEEELABEX Office, which list the processes that have successfully undergone conformity verification.

The WEEELABEX organisation was set up in Prague on 17 April 2013. If proved equivalent to the WEEELABEX standard, the CENELEC standards on WEEE treatment will replace then the WEEELABEX standard in the auditing performances carried out by the WEEELABEX auditors (more information

⁶¹ <http://www.epeat.net/>

⁶² <http://www.sustainableelectronics.org/>

⁶³ <http://www.e-stewards.org/>

available at WEEELABEX website⁶⁴). Treatment facilities that have passed the conformity verification process are listed on the WEEELABEX Organisation website⁶⁵.

⁶⁴ <http://www.weeelabex.org>

⁶⁵ <http://www.weeelabex.org/#!operators/c5oj>

Annex A Environmental Weight of WEEE

The following charts show the average material composition of cooling appliances and televisions and its corresponding environmental weight. The environmental weight of each substance or material provides an indication of the adverse environmental impact related to this particular substance or material, for instance, hazardous substances (pollutants), ozone depleting substances and scarce materials will show a high environmental weight.

Similar charts can be found on the UNU report⁶⁶.

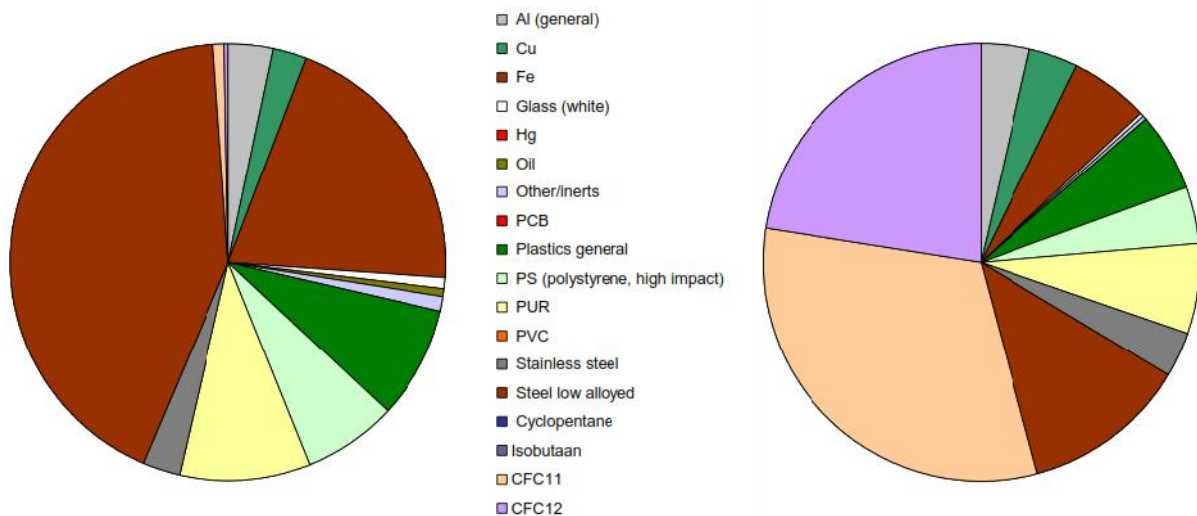


Figure 14. Cooling appliances (only CFC fridges) - Weight vs environmental weight

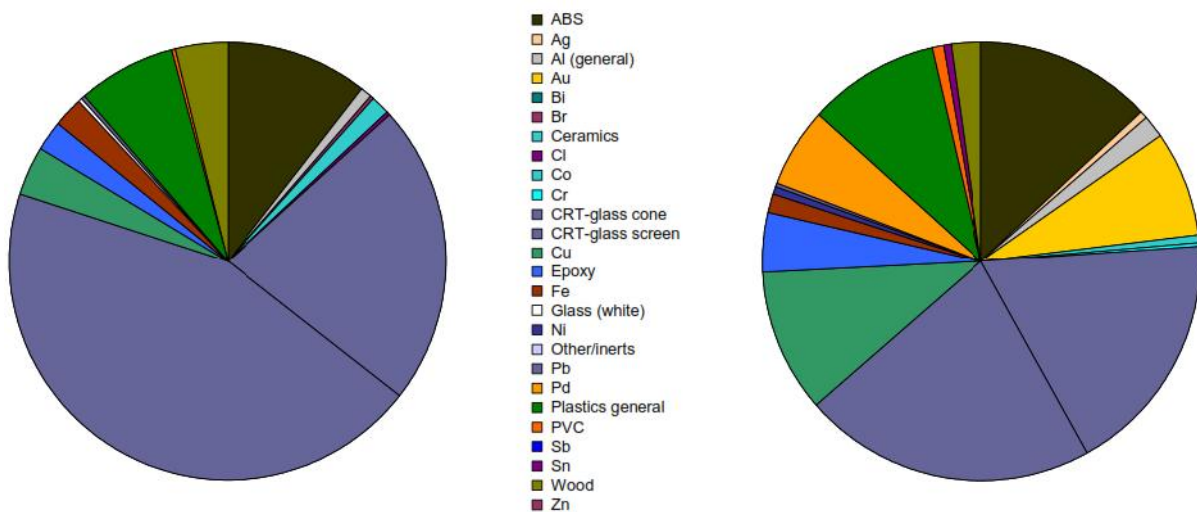


Figure 15. Appliances with cathode ray tubes (televisions) - Weight vs environmental weight

⁶⁶ http://ec.europa.eu/environment/waste/weee/pdf/final_rep_unu.pdf

Annex B

Other manuals and training material for enforcement agencies

EC Correspondents' Guidelines and other guidance documents

<http://ec.europa.eu/environment/waste/shipments/guidance.htm>

Waste sites manual. Identification and control of “upstream” storage and treatment facilities used for problematic waste exports (IMPEL, 2012)

<http://impel.eu/wp-content/uploads/2013/01/2012-11-8-Waste-Sites-Manual-final.pdf>

Waste transport checks manual. AUGIAS, developed by the Belgian Federal Police with financial support from the EU Commission DG Home Affairs. INTERPOL has also supported the initiative.

<http://impel.eu/wp-content/uploads/2014/06/Waste-Transport-Checks-Manual.pdf>

Manual on the return of illegal shipments of waste (IMPEL, 2008)

<http://impel.eu/projects/manual-on-the-return-of-illegal-shipments-of-waste/>

Transfrontier Shipment of Waste: Inspection and sampling procedures (IMPEL, 2012)

<http://impel.eu/wp-content/uploads/2012/02/Transfrontier-Shipment-of-Waste-Inspection-and-sampling-procedures.pdf>

Practical manual on permitting and inspection of waste management operations (EC, 2011)

<http://ec.europa.eu/environment/waste/framework/pdf/Practical%20manual%20on%20permitting%20and%20inspection.pdf>

Toolkit on E-waste Inspection and Enforcement (BASEL Convention)

Includes: legislation, guidelines, tools, brochures videos etc.

<http://www.basel.int/Implementation/TechnicalAssistance/EWaste/EwasteAfricaProject/ToolkitonEwasteInspectionandEnforcement/tabid/3160/Default.aspx>

Basel Convention Training Manual on Illegal Traffic for Customs and Enforcement Agencies

<http://www.basel.int/Implementation/LegalMatters/IllegalTraffic/Guidance/tabid/3423/Default.aspx>

Draft technical guidelines on transboundary movements of electronic and electrical waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention (under development, 2015).

<http://www.basel.int/Implementation/Ewaste/TechnicalGuidelines/DevelopmentofTGs/tabid/2377/Default.aspx>

Interactive Manual for Customs on hazardous chemicals and wastes under the Basel, Rotterdam and Stockholm conventions, and

E-learning module for law enforcement officers on hazardous chemicals and wastes under the Basel, Rotterdam and Stockholm Conventions

<http://synergies.pops.int/Implementation/TechnicalAssistance/ToolsandMethodologies/ManualforCustomsOfficers/tabid/4457/language/en-US/Default.aspx>

Guidelines on Environmentally Sound Testing, Refurbishment and Repair of Used Computing Equipment (Basel Convention)

Includes: Guidance for the marketing, donation and redeployment of repaired and refurbished computing equipment and components

<http://www.basel.int/Implementation/TechnicalAssistance/Partnerships/PACE/PACEGuidelinesandGlossaryofTerms/tabid/3247/Default.aspx>

Training Manual for Customs Officers: Saving the Ozone Layer (UNEP Ozone Action)

<http://www.unep.fr/ozonaction/topics/customs.htm>

Electronic Waste and Organized Crime: Assessing the Links (INTERPOL, 2009)

Interpol Pollution Crimes Working Group: Assessing the Links between Organised Crime and Pollution Crimes (2006)

Ozone Depleting Substances Case Study Handbook (2013)

The Waste Transport Checks Manual – AUGIAS (2011)

<http://www.interpol.int/Crime-areas/Environmental-crime/Resources>

Countering WEEE Illegal Trade



More information about the project at:

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