



Countering WEEE
Illegal Trade

Recommendation paper to actors



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Recommendation paper to actors on e-waste classifications

Executive summary

There is no uniformity in scope or listing of appliances types within existing e-waste classifications. Therefore it is needed to harmonize the broad variety of appliance types in order to ensure comparability between data sources. The proposed classification, the UNU-KEYS, has been developed by the United Nations University (UNU). It clusters appliances according to functionality and end-of-life characteristics. The Countering WEEE Illegal Trade CWIT Project will use this classification system to avoid inconsistencies throughout the project. By using these codes, the following possibilities arise:

1. The UNU classification system can be connected to other classifications, such as the 10 categories in the WEEE Directive, the six categories in the recast of the WEEE Directive, the WEEE Forum Key Figures and the harmonized combined nomenclature (CN) that is used by customs organisations in Europe.
2. Harmonized aggregates can be constructed from the data from Eurostat (the 10 WEEE categories and the six WEEE II categories), and the Key Figures from the WEEE-Forum with the UNU-KEYS can be used as intermediate classification. Thus, the UNU approach leads to higher quality data, where data differences cannot be attributed to data or scope inconsistencies.
3. The UNU-KEYS can be grouped and split according to the existing data formats. This enables data that was originally structured in different ways to be comparable. Consequently, total market and WEEE systems data will be more comparable and detailed than the current available data. This will greatly improve policy analysis under the WEEE Directive.
4. The UNU-KEYS enable data collection from importers and producers using the PRODCOM and CN classifications from sources such as Eurostat, national statistical institutes or directly from importers and producers.
5. The products within a UNU category are homogeneous in weight, and they display uniform market behaviour. This allows very detailed assessments on future WEEE arising and future potential to collect and recycle WEEE.
6. The use of the UNU classification will refine the calculation of return ratios by category.

1.1 Introduction

There is no universal agreement on the definition and scope of electronic waste (e-waste). In Europe, the definitions are adopted and formulated in the Waste Electronic and Electrical Equipment (WEEE) Directive (see annexes I and III of Directive 2012/19/EU). In addition, the European Waste Catalogue¹ provides a list of codes that usually serve to identify WEEE in transfer notes and reports from collection points and recyclers to competent authorities. However, in Europe, differences in scope remain due to national implementations and individually developed product lists used by Producer Responsibility Organisations. The change in categorisation from the old WEEE Directive to the recast of the WEEE Directive may lead to additional variation in practice. In order to avoid inconsistencies in reporting, the data needs to be harmonized. By harmonizing data, national differences will not reflect inconsistencies in reporting, but instead, they will provide insight into real differences in markets' performance. This paper proposes a conceptual classification, developed by the United Nations University (UNU) that overcomes these previously mentioned issues (F. Wang et al., 2012). The proposed classification applies consistent grouping to e-waste "Functions" and "End-of-Life" characteristics and is easily harmonized with statistical classifications.

¹ Commission Decision 2000/532/EC.

1.2 Classifying e-waste

1.2.1 Criteria for selecting the classification

There is a large variety of electrical products on the market, which makes it difficult to group e-waste into sensible and practical categories. There are many criteria with which the categories should comply. In general, the categories should not be defined with too much detail. This leads to excessive codes, which imposes an unnecessary administrative burden on respondents. Moreover, there will be very little free data sources available to collect data in the desired classification. On the other hand, classification should not be too aggregated, as differences in interpretation between countries inevitably arise. Consequently, inconsistencies in reporting will affect the data quality, which hampers the usability of the results for international benchmarking and effective policymaking. In the classification developed by the UNU, the criteria are based on maximal grouping of products with similar function, comparable material composition (in terms of hazardous substances and valuable materials), sales channel and end-of-life attributes. In addition, products within the same category should preferably have identical average weight and lifespan distribution, which can simplify quantitative assessment for similar products. Finally, large, single type or environmentally-relevant WEEE products like refrigerators or mobile phones, for which much data exists, are assigned to a separate key.

In addition, the new classification should be able to be linked to other existing classifications, or it should act as an intermediary to link previously disconnected classifications. This allows for conversion and comparison of data between different organisations and WEEE systems. Such valuable data sets include the EU WEEE Directive and Recast, WEEE Forum and EU WEEE Directive Impact Assessment and Review Study of UNU (J. Huisman et al. 2008). From the legal perspective, it is essential to maintain the major 10 categories of the old WEEE Directive and the six of the recast version for compatibility and monitoring within the EU.

1.2.2 The UNU-KEYS

The combined criteria result in a minimum of 54 categories, which is shown in the first table in the ANNEX. Those 54 categories can be grouped into 10 primary categories, according to the original EU WEEE Directive (please note that the UNU categories contain additional categories previously considered “out of scope equipment”). This link is shown in the third column of table in the ANNEX and in Figure 6. The 54 categories can also be clustered into the six collection categories of the WEEE-Directive², as shown in the second column in the Table in the ANNEX and illustrated in Figure 6. Those collection categories match as closely as possible with observed e-waste collection practices and reporting for the recast of the WEEE Directive.

More specifically, the resulting UNU-KEYS comprises all possible electronic and electrical equipment (EEE) (about 900 products, clustered into 660 main product types), which closely follows the harmonized

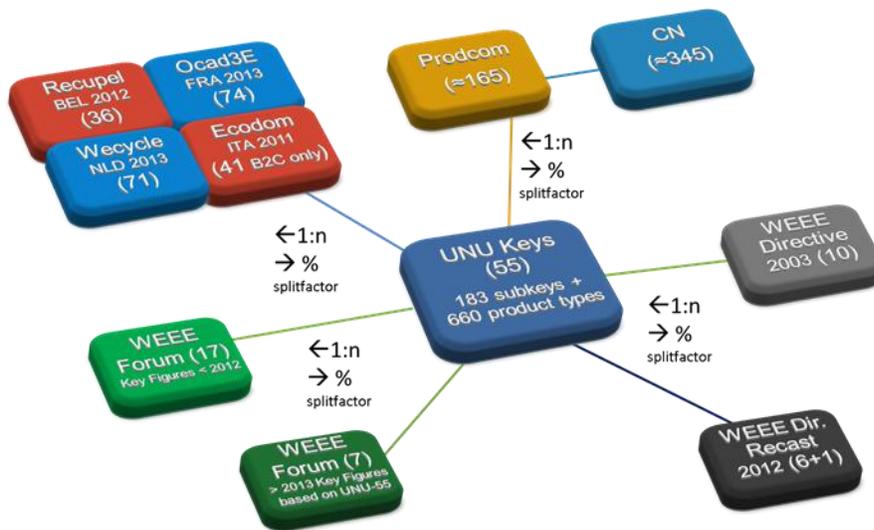


Figure 1. The relations between UNU categories to other WEEE classifications.

statistical coding of the product classification (CPC) and international trade codes (combined nomenclature CN) (Eurostat, 2013). In the ANNEX, the correspondence tables between UNU-KEYS to the statistical product classification used in the EU-28 (Prodcom) and the combined nomenclature (CN) can be found. National statistical institutes or customs organisations document all commodities and economic activities in the country using those classifications. Independent of current WEEE registers, this data can provide consistent and harmonized historical sales figures for all products, which can serve as an alternative data source for estimating WEEE generation.

The same approach is taken for various country assessments in France, Italy, the Netherlands and Belgium. For those countries, their respective national product lists as well as to the so-called 17 categories of the Key Figures classification used by the WEEE Forum and the 2007 WEEE Review Study could be linked. Those could be broken down into the UNU-classification. For this first time in Europe, this will enable a consistent and comparable data structure for EEE and WEEE amounts.

UNU KEY	Description	ANNEX III of Recast WEEE Directive	Annex I of old EU-WEEE Directive
0001	Central Heating (household installed)	Large equipment	out of scope
0002	Photovoltaic Panels (incl. converters)	Large equipment	out of scope
0101	Professional Heating & Ventilation (excl. cooling equipment)	Large equipment	01
0102	Dishwashers	Large equipment	01
0103	Kitchen (f.i. large furnaces, ovens, cooking equipment)	Large equipment	01
0104	Washing Machines (incl. combined dryers)	Large equipment	01
0105	Dryers (wash dryers, centrifuges)	Large equipment	01
0106	Household Heating & Ventilation (f.i. hoods, ventilators, space heaters)	Large equipment	01
0108	Fridges (incl. combi-fridges)	Cooling and Freezing	01

0109	Freezers	Cooling and Freezing	01
0111	Air Conditioners (household installed and portable)	Cooling and Freezing	01
0112	Other Cooling (f.i. dehumidifiers, heat pump dryers)	Cooling and Freezing	01
0113	Professional Cooling (f.i. large air conditioners, cooling displays)	Cooling and Freezing	01
0114	Microwaves (incl. combined, excl. grills)	Small equipment	01
0201	Other Small Household (f.i. small ventilators, irons, clocks, adapters)	Small equipment	02
0202	Food (f.i. toaster, grills, food processing, frying pans)	Small equipment	02
0203	Hot Water (f.i. coffee, tea, water cookers)	Small equipment	02
0204	Vacuum Cleaners (excl. professional)	Small equipment	02
0205	Personal Care (f.i. tooth brushes, hair dryers, razors)	Small equipment	02
0301	Small IT (f.i. routers, mice, keyboards, external drives & accessoires)	Small IT	03
0302	Desktop PCs (excl. monitors, accessoires)	Small IT	03
0303	Laptops (incl. tablets)	Screens	03
0304	Printers (f.i. scanners, multi functionals, faxes)	Small IT	03
0305	Telecom (f.i. (cordless) phones, answering machines)	Small IT	03
0306	Mobile Phones (incl. smartphones, pagers)	Small IT	03
0307	Professional IT (f.i. servers, routers, data storage, copiers)	Large equipment	03
0308	Cathode Ray Tube Monitors	Screens	03
0309	Flat Display Panel Monitors (LCD, LED)	Screens	03
0401	Small Consumer Electronics (f.i. headphones, remote controls)	Small equipment	04
0402	Portable Audio & Video (f.i. MP3, e-readers, car navigation)	Small equipment	04
0403	Music Instruments, Radio, HiFi (incl. audio sets)	Small equipment	04
0404	Video (f.i. Video recorders, DVD, Blue Ray, set-top boxes)	Small equipment	04
0405	Speakers	Small equipment	04
0406	Cameras (f.i. camcorders, foto & digital still cameras)	Small equipment	04
0407	Cathode Ray Tube TVs	Screens	04
0408	Flat Display Panel TVs (LCD, LED, Plasma)	Screens	04
0501	Lamps (f.i. pocket, christmas, excl. LED & incandescent)	Lamps	05
0502	Compact Fluorescent Lamps (incl. retrofit & non-retrofit)	Lamps	05
0503	Straight Tube Fluorescent Lamps	Lamps	05
0504	Special Lamps (f.i. professional mercury, high & low pressure sodium)	Lamps	05
0505	LED Lamps (incl. retrofit LED lamps & household LED luminaires)	Lamps	05
0506	Household Luminaires (incl. household incandescent fittings)	Small equipment	05
0507	Professional Luminaires (offices, public space, industry)	Small equipment	05
0601	Household Tools (f.i. drills, saws, high pressure cleaners, lawn mowers)	Small equipment	06
0602	Professional Tools (f.i. for welding, soldering, milling)	Large equipment	06
0701	Toys (f.i. car racing sets, electric trains, music toys, biking computers)	Small equipment	07
0702	Game Consoles	Small IT	07
0703	Leisure (f.i. large exercise, sports equipment)	Small equipment	07
0801	Household Medical (f.i. thermometers, blood pressure meters)	Small equipment	08
0802	Professional Medical (f.i. hospital, dentist, diagnostics)	Large equipment	08
0901	Household Monitoring & Control (alarm, heat, smoke, excl. screens)	Small equipment	09
0902	Professional Monitoring & Control (f.i. laboratory, control panels)	Large equipment	09
1001	Non Cooled Dispensers (f.i. for vending, hot drinks, tickets, money)	Large equipment	10
1002	Cooled Dispensers (f.i. for vending, cold drinks)	Cooling and Freezing	10

Table 1. Detailed description of the relations of the UNU categories to other WEEE classifications

1.2.3 Previous versions, publications and future use of the UNU-KEYS

The UNU classification system has been used for the first time in the Netherlands. Initially, the product classification system was comprised of 58 products. This was the basis for the calculations performed in the Netherlands (J. Huisman et al, 2012) and in Italy (F. Magalini et al, 2012), and it has been the basis of the first publication of the UNU-codes (F. Wang et al, 2012). These were the first-of-their-kind of detailed country assessments in which a large amount of previously undocumented e-waste flows were identified. Due to the first practical use of the codes, and the experience gained, the categories have been revised to 54 codes. The code changes involved grouping of sun beds to 0703 with other leisure equipment, grouping refrigerators and combination-refrigerators to 0108 and restructuring of some lamp codes. This was the basis for the detailed case study in Belgium in 2012 and the first peer-reviewed academic publication using the codes (J. Huisman et al, 2013) (F. Wang et al, 2013). The codes have now being used in four countries in the European Union, covering a quarter of the population of the EU. For those countries, detailed assessments on future WEEE arising and future potential to collect and recycle WEEE were realized. The classification system and framework are also currently being considered for use in the Partnership on IT statistics for development, a task group that measures e-waste statistics.

For the Countering WEEE Illegal Trade (CWIT) Project, the codes were further improved. This process reduced number of codes and created a new code for photovoltaic panels (0002), which are new in the WEEE Recast Directive's scope. The changes involved grouping of sunbeds and large toys to code 0703. Also, the refrigerators and combination-refrigerators are combined into 0108. Due to these changes, the codes 0107 and 0110 are now deliberately left empty and can be used in the future when new products enter the market.

1.3 Conclusion

The proposed UNU classification for e-waste uses both function and end-of-life characteristics to comprise a minimum set of 54 categories. Those 54 categories can be linked to existing WEEE categories, such as those used in the old version and recast of the WEEE-Directive, the Key Figures from the WEEE-Forum and the classification used for the WEEE-review study. The UNU categories can also be used to link those WEEE categories to one another, which were previously impossible to link. The system also links to harmonized statistical classifications and data sources such as production and international trade statistics. Therefore, it has a huge potential to create harmonized e-waste statistics, which allows the consortium members of the CWIT project to improve the assessment of environmental policies and research legal and illegal e-waste flows from the EU-28. Moreover, harmonizing e-waste statistics also has a great potential to compile more comparable WEEE data. This is of interest to the WEEE-industry and environmental agencies, as it will enhance the traceability of WEEE. The codes have currently been used in four countries in the EU, covering a quarter of the EU's population, where detailed assessments on future WEEE arising and future potential to collect and recycle WEEE were realized. In those countries, the UNU-codes aided calculation of detailed return ratios and helped assess the collection targets. Moreover, the classification is currently being considered to be used as a basis for measuring framework in the Partnership on measuring ICT for development in a taskforce on measuring e-waste statistics.