Development and Demonstration of Waste Electrical & Electronic Equipment (WEEE) Prevention and Reuse Paradigms

Action B.1 – Design and Development of Methodologies and Tools for Measuring Preparation for Re-Use

Deliverable B1.2 - Comparative Analysis Report of Existing Measures Used in the European Union

LIFE Environment and Resource Efficiency – LIFE14 ENV/GR/000858

Ecological Recycling Society

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Abbreviations

CAS:	Civic Amenity Sites
D2DC:	Door-to-Door Collection
D2DD:	Door-to-Door Donation
D2I:	Delivery to Intermediates
DIYD:	Do-It-Yourself Delivery
DP:	Donation Points
DTR:	Dealers, Traders & Retailers
EEE:	Electrical and Electronic Equipment
EPR:	Extended Producer's Responsibility
EU:	European Union
IT:	Information Technology
MSW:	Municipal Solid Waste
PL:	Puntos Limpios
PRO:	Pruducer Responsibility Organization
PRSE:	Private Sector Entities
PSP:	Preliminary Storage Point
PUSE:	Public Sector Entities
ReEEE:	Re-used Electrical and Electronic Equipment
ReWEEE:	Re-used Waste Electrical and Electronic Equipment
SA:	Société Anonyme
WCP:	Waste Collection Points
WEEE:	Waste Electrical and Electronic Equipment

Abstract

The scope of the Deliverable titled 'Comparative analysis report of existing measures used in the European Union' (Deliverable B1.2), as part of the Action B.1: 'Design and Development of Methodologies and Tools for Measuring Preparation for Re-Use', aims at comparing and evaluating the existing methodologies that are applied by EU Member States to monitor the re-use of (Waste) Electrical and Electronic Equipment ((W)EEE) both as waste (WEEE) and as a non-waste (EEE). In particular, Deliverable B1.2 aims to:

- Identify and evaluate (W)EEE re-use and preparing for re-use process chains ranging from the initial collection of (W)EEE to the final marketing of the refurbished appliances (hereafter referred to as 'ReWEEE')
- Identify and evaluate existing methodologies for measuring preparation for re-use rates in a selection of Member States and regions

In order to address the aforementioned aims, the content of Deliverable B1.2 will be based on primary data collected through questionnaires. This data will be processed in order to create a baseline for a comparative evaluation of the preparing for re-use process chain by means of identifying common procedures as well as differences. The comparative evaluation will highlight the best available and applied techniques for (W)EEE preparation for re-use and re-use and, at a later phase, will help form guidelines for developing an integrated methodology for (W)EEE re-use and preparation for re-use rates as part of the Deliverable B1.3 titled 'Integrated Methodology'. Key factors taken into account in this evaluation include both the size and nature of the preparing for re-use facility as well as statutory legal reporting requirements at local, regional or national level.

Firstly, based on the data that has been retrieved from the questionnaires, expert feedback, as well as through internet research, the methodologies that were identified at EU level will be studied as for their regulatory environment (organizational structure) and their operational structure in order to form alternative pathways of their implementation as parts of common patterns. In particular, the 'regulatory environment' will be examined in relation with the entities that are involved in all four (4) stages of (W)EEE management.

These stages are:

1) collection (e.g. source separation schemes and/or donations etc.),
2) temporary storage prior to processing,
3) processing (preparation for re-use, recycling etc.), and
4) temporary storage prior to trading and trading (re-used final products to be sold, donated and/or reserved).

For each methodology, the comparative analysis of the (W)EEE management chain will be based upon the differentiated regulatory frameworks (alternative pathways) of the involved entities at each (W)EEE management stage. In addition, the structure of each methodology will be examined in relation with the means and equipment (alternative pathways) that are used in order to implement certain procedures (e.g. delivery of (W)EEE in storage facilities) and activities (e.g. sorting and/or

weighting of (W)EEE) that are forming each (W)EEE management stage. The (W)EEE management chain and the structure of each methodology will be expressed through separate tables and in accordance with the Member State in which they are applied, taking into account the regulatory environment under which they are operated (re-use centres networks, individual re-use centres, Producer Responsibility Organizations – PROs, Local Authorities and/or Waste Agencies). The respective processed data will be based upon the results of the collected questionnaires.

The outputs regarding the investigation of the (W)EEE re-use and preparing fro re-use applied methodologies will be subject to comparative analysis in order to indicate the procedures that are common among different methodologies. In particular, and according to the regulatory environment under which they operate, the methodologies will compared taking into account their similarities and differences, based on the list of procedures that forms each stage of the (W)EEE management chain. It has to be noted that the full list of (W)EEE management procedures is common for all the methodologies at all stages as a prerequisite for implementing the evaluation procedure. Differences and similarities are monitored taking into account the alternative pathways which are forming the activities necessary for the completion of the respective procedures. The alternation of means and equipment between the different methodologies that are used for realizing a certain – common procedure will be also identified in order to set the baseline for the evaluation procedure. Furthermore, for the entire management chain and based on data that was retrieved from the questionnaires' respondents, a common base of performance indicators including both quantitative and qualitative data will be created. The breaking down of each methodology in certain procedures aims at the identification of common procedures and finally at the extraction of Likert Items that are expressed as the alternative pathways (means and equipment) for the completion of a common procedure. For a certain procedure, common for all methodologies, Likert Items will be scored with discrete integer numerical values in order to express the supremacy and/or preference of an alternative pathway against another. Finnaly, each Likert Item will be scored with a weighting factor in order to express its importance as for the completion of the procedure.

The results of the comparative analysis will set the baseline for the evaluation procedure which will be completed through the use of a 3rd degree Likert Scale as an evaluation technique. In particular, each alternative pathway – activity will form a certain Likert Item which will be scored from 1 to 5. Given the fact that each procedure consists in different groups of activities, the procedures will form certain features that will get weighting factors in order to express their importance as for the completion of a certain management stage. These factors will be diversified in accordance with each criterion of evaluation. To evaluate (W)EEE re-use methodologies, four (4) pre-defined criteria were selected: Job Creation, Investment & Operational Cost of Implementation, Social Sensitivity / Environmental Awareness and Re-Use Effectiveness – Re-Use Orientation.

Overall, the mapping, analysis and evaluation of the applied (W)EEE re-use methodologies at EU level will set the baseline for the formation of an integrated methodology that will be the content of the Deliverable B1.3 titled 'Integrated Methodology'. This methodology will incorporate the strengths and opportunities of the currently applied methodologies and also, will counterbalance their weaknesses and threats. To this end, certain procedures will be re-designed in order to empower the effectiveness and efficiency of (W)EEE re-use by means of collecting, preparing for re-use and trading more (W)EEE quantities with high re-usability potential. Furthermore, the integrated methodology will be structured in order to provide adequate and continuously updated data regarding the

performance of the whole management chain so as to extract, in real time, conclusions that will lead to certain modifications towards optimization. To this end, the methodology will be formed in order to be user friendly with IT softwares that can be easily developed, replicated, monitored and maintained.

1. (W)EEE Re-Use Methodologies & Involved Entities

In order to extract the similarities and differences among the methodologies that are applied in the EU Member States, the involved entities that are implementing (W)EEE re-use and preparation for re-use schemes must be identified. To this end, the entities which filled in the questionnaires are divided in groups related to their role in the (W)EEE management chain. These discrete groups are including:

- Re-Use Centres and Re-Use Centres Networks: An organisation or network of organisations where used goods are either re-used and/or prepared for re-use. The term 'network' refers to a number of enterprises working together along the re-use/ preparation for re-use process chain, dividing the tasks where necessary according to their specialization. Re-Use Centres Networks are also representing their members in their advocacy work towards their national, regional or local public authorities, promoting the beneficial impacts of re-use activities on the environment.

- Producer's Responsibility Organizations (PRO): Producer's Responsibility Organizations are entities representing the producers of a variety of specific waste streams such as WEEE, packaging waste, waste furniture, etc. PROs are dealing with issues regarding the monitoring of environmental policies, the organisation of the represented producers, collectors, processors, etc. as well as for regulating financial issues related to economic transactions. Furthermore, PROs are responsible for applying informative – awareness campaigns regarding the environmental and sustainable management of the specific waste stream that they are dealing with.

- Local authorities: Local authorities at a decentralized and/or regional level are responsible for the environmental and operational licensing, as well as for inspecting private sector entities such as WEEE producers, WEEE collectors – transporters and WEEE processing facilities, within their territories.

- Waste agencies: Waste agencies are entities responsible for the design, implementation and monitoring of waste management activities and their results. In some cases, waste agencies are responsible for licensing and inspecting Producer's Responsibility Organizations – PRO's and for controlling the progress of waste management targets within their territories.

In this section, every answer received through the questionnaire developed in the framework of this study will be analysed. They will be classified according to their name, their nature (Re-Use Centres and Re-Use Centres Networks, PROs, Local authorities and Waste agencies) and their country. The objective is to set a common baseline between all the respondents in order to point out the similarities and the differences between all of them and use these results to carry out the comparative analysis of the applied (W)EEE Re-Use Methodologies.

1.1 Austria

For the case of Austria, the respondent was a Waste Agency named "Umbrella Organization of all Styrian Waste Management Associations".

1.1.1 Waste Agency / Local Authority

Table 1: Questionnaires Results for Waste Agency / Local Authority – AUSTRIA

Question	Umbrella Organization of all Styrian Waste Management Associations
Number of Represented Structures	Lack of data
Collected material	Only WEEE
Collected (W)EEE Tonnage in 2015 (in tn)	11.905,00
Collected (W)EEE Items in 2015	Lack of data
Re-Used – Repaired EEE Tonnage in 2015 (in tn)	595,25
Re-Used – Repaired EEE Items in 2015	Lack of data
Applied Delivery – Collection Scheme	Civic Amenity Sites
(W)EEE origination	Mixed origination
(W)EEE Types Covered	Non-identified WEEE
Weighting Technique	Lack of data
Point of ReWEEE calculation	When made available on the market

In 2012, at national level, the quantities of total WEEE generated, total WEEE collected and the quantities of REWEEE that were reported as re-used and subjected to preparation for re-use were the following[1],[2]:

- Estimation on Total WEEE generated: 184.290tn
- Total WEEE collected: 77.402tn
- REWEEE available in trading stores: 1.248tn
- **Re-Use and Preparation for Re-Use Rate on the basis of WEEE collected: 1,61%**.

[1] Seyring N., Kling M., Weißenbacher J. (BiPRO), Hestin M., Lecerf L. (BIO by DELOITTE), Magalini F., Khetriwal D.S., Kuehr R. (United Nations University), (2015), 'Study on WEEE Recovery Targets, Preparation for Re-Use Targets and on the Method for Calculation of the Recovery Targets', Final Report, European Commission

[2] Magalini F., Wang F., Huisman J., Kuehr R. (United Nations University), Baldé K., Van Straalen V. (Statistics Netherlands), Hestin M., Lecerf L. (BIO by DELOITTE), Sayman U., Akpulat O. (Regional Environmental Center), (2014), 'Study on Collection Rates of WEEE', Final Report, European Commission

On the basis of WEEE generated, the annual (W)EEE re-use and preparation for re-use ratio at national level is proposed to be calculated as follows:

$$RPR = \frac{\mathrm{Re}(W)EEE}{WEEE} \cdot 100\%$$, where

$\mathrm{Re}(W)EEE$ - Annually produced quantities of repaired (W)EEE coming from preparation for re-use facilities, that are available in trading stores, measured in $\frac{tn}{y}$. A 'preparation for re-use' facility is considered any re-use centre which has as an input fraction WEEE quantities coming from the waste stream.

$WEEE$ - Annually produced WEEE quantities, considered as a waste stream, at national level, measured in $\frac{tn}{y}$. The formula for the calculation of the total WEEE quantities generated in a Member State is described in detail at the Annex II of the Commission Implementing Regulation 2017/699/EU.

Based on the above and for the year 2012, the estimated annual (W)EEE re-use and preparation for re-use ratio at national level on the basis of WEEE generated was 0,68%.

1.1.1.1 Umbrella Organization of all Styrian Waste Management Associations

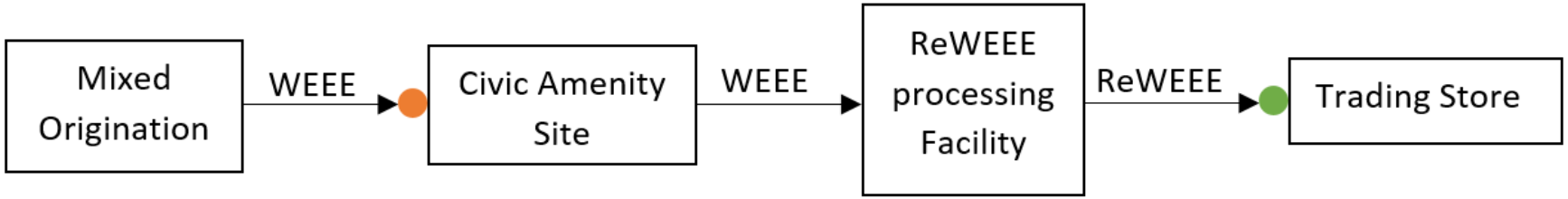
In 1999, the 17 Austrian waste management associations founded their umbrella organisation. Since 2004, it has the legal status of a voluntary association. It acts as a bridge between the Province of Styria and the waste management associations and is responsible for the supra-regional handling (coordination) of their tasks. In particular, the umbrella association is entrusted with processing and forwarding information regarding the implementation of the sustainable waste and material flow management targets at a regional level. According to the statutes of the association, the implementation of those targets is performed by the elected organs in close collaboration with representatives of the waste management associations.

The main responsibilities of the umbrella association are to[3]:

[3] Das Land Steiermark, (2005), 'Provincial Waste Management Plan', Province of Styria, Styrian Provincial Government, Specialized Division 19D, Waste and Material Flow Management, http://www.abfallwirtschaft.steiermark.at/cms/dokumente/10166362_46541/634541a0/062a-4_L-AWPl_2005_1_ENGLISH.pdf [Accessed 13-09-2017]

- Represent the Styrian waste management associations' interests and provision of technical assistance within the interest groups Gemeindebund (Union of Municipalities) and Städtebund (Union of Cities),
- Coordinate the transactions among its members and the private sector waste disposal industries,
- Cooperate with ARGE ÖWAV (Consortium of Austrian Waste Management Associations) and
- Perform other services for the Styrian waste management associations.

Flow Chart 1: Applied (W)EEE Re-Use Methodology from Waste Agency – AUSTRIA



Point of calculation for collected (W)EEE

Point of calculation for ReWEEE

Table 2: Applied (W)EEE Re-Use Methodology from Waste Agency – AUSTRIA

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites	√	11.905tn
		(W)EEE Door to Door Collection		
		(W)EEE Collection Points		
		Do-It-Yourself Delivery		
	(W)EEE Discarders Targeted	Private Sector Entities		
		Public Sector Entities		
		Households		
		All of the Above (mixed origination)	√	11.905tn
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only	√	
		EEE Only		
		WEEE and EEE		
	Traceability of (W)EEE	Recording (W)EEE Discarding Sources	√	
		Absence of Recording (W)EEE Discarding Sources		
	Qualitative	Sorting and Identification of (W)EEE		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Assessment of (W)EEE	Non-Identification of (W)EEE	√	
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance		
		Counting of (W)EEE Accumulatively		
		Absence of (W)EEE Counting	√	
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale	Lack of data	11.905tn
		Weighting of (W)EEE per Type Through Proxy Data		
		Weighting of (W)EEE Accumulatively Through Physical Scale		
		Weighting of (W)EEE Accumulatively Through Proxy Data		
		Combination of the Above		
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation		
		Assessment of Re-use Jobs Creation		
		Assessment of both accumulatively		
		No assessment of jobs creation	√	

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
REWEEE Trading Stores	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance		
		Counting of REWEEE Accumulatively		
		Absence of REWEEE Counting	√	
	Quantitative Assessment of REWEEE	Weighting of REWEEE per Type Through Physical Scale	Lack of data	595,25tn
		Weighting of REWEEE per Type Through Proxy Data		
		Weighting of REWEEE Accumulatively Through Physical Scale		
		Weighting of REWEEE Accumulatively Through Proxy Data		
		Combination of the Above		
	Point of Calculation for REWEEE	Available in Trading Store	√	
		Sold or Donated		
	Trading of REWEEE	Bought by customer	Lack of data	
		Received by customer as donation		
		Combination of the Above		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Performance Indicators	Collected (W)EEE			11.905tn
	REWEEE			595,25tn
	Accumulative (W)EEE Re-Use Ratio			5.00%
	(W)EEE Re-Use Ratio per Type			Lack of data
	Number of EEE Types Covered			Lack of data
	Interconnection with Producer Responsibility Organization			Yes

1.2 Belgium

For the case of Belgium, the questionnaires respondents were 2 Re-use Centres Network, 1 Re-use Centre and 1 Producer Responsibility Organization.

As for the re-use regulation on the Belgian territory, it must be noted that the southern Belgian province of Wallonia is the latest region to introduce a separate target for the preparation for re-use of waste electrical items following a pioneering move from Spain in 2015. The Walloon Government Decree requires 2% of WEEE to be 'prepared for re-use' from January 2020. The target covers six categories of waste appliances, making it wider in scope than the Spanish measures[4].

Furthermore, the Belgian province of Flanders implemented a 5kg/capita target for re-use to be reached by 2015, all products and waste streams mixed. The target is based on the output of re-use centres. It has now increased this target to 7kg / capita by 2020. The target has been be raised by 7kg/capita in 2020[5].

[4] http://www.rreuse.org/belgian-region-sets-re-use-target-for-electricals/ [Accessed 14-09-2017]

[5] OVAM, Implementation plan for household waste and comparable industrial waste – summary, 2017, p.8

1.2.1 Re-Use Centres and Re-Use Centres Networks

Table 2: Questionnaires Results of Re-Use Centres Networks – BELGIUM

Question	Answer		
	Komosie	Ressources	CF2D/CF2M
Number of Represented Structures	29	22	1
Collected material	Only WEEE	Only WEEE	Only WEEE
Collected (W)EEE Tonnage in 2015 (in tn)	17.834,00	19.097,00	115,00
Collected WEEE Items in 2015	2.485.976	Lack of data	Lack of data
Re-Used – Repaired EEE Tonnage in 2015 (in tn)	1.814	1.097	21
Re-Used – Repaired EEE Items in 2015	304.198	Lack of data	7122
Applied Delivery – Collection Scheme	Civic Amenity Sites (W)EEE Door to Door Collection (W)EEE Collection Points Do-It-Yourself Delivery	Civic Amenity Sites (W)EEE Door to Door Collection (W)EEE Collection Points Do-It-Yourself Delivery	(W)EEE Door to Door Collection Do-It-Yourself Delivery
(W)EEE origination	Households Mixed Origination	Households Mixed Origination Private Sector Entities	Households Private Sector Entities Public Sector Entities

Question	Answer		
(W)EEE Types Covered	Small Electronic Appliances Screens Large Household Appliances Temperature exchange equipment	Temperature Exchange Equipment Large Household Appliances Screens Small Electronic Appliances	Small Electronic Appliances Screens Information Technology (IT) and telecommunication equipment Non-identified WEEE
Weighting Technique	Proxy weight data	Both physical scale and proxy weight data	Physical scale
Point of ReWEEE calculation	When sold or donated	When sold or donated	When sold or donated

In 2012, at national level, the quantities of total WEEE generated and total WEEE collected, as well as the quantities of REWEEE that were reported as being re-used or prepared for re-use were[6],[7]:

- Estimation on Total WEEE generated: 219.732tn
- Total WEEE collected: 116.458tn

[6] Seyring N., Kling M., Weißenbacher J. (BiPRO), Hestin M., Lecerf L. (BIO by DELOITTE), Magalini F., Khetriwal D.S., Kuehr R. (United Nations University), (2015), 'Study on WEEE Recovery Targets, Preparation for Re-Use Targets and on the Method for Calculation of the Recovery Targets', Final Report, European Commission

[7] Magalini F., Wang F., Huisman J., Kuehr R. (United Nations University), Baldé K., Van Straalen V. (Statistics Netherlands), Hestin M., Lecerf L. (BIO by DELOITTE), Sayman U., Akpulat O. (Regional Environmental Center), (2014), 'Study on Collection Rates of WEEE', Final Report, European Commission

- REWEEE sold or donated: 4.068tn
- **Re-Use and Preparation for Re-Use Rate on the basis of WEEE collected: 3,49%**.

On the basis of WEEE generated, the annual (W)EEE re-use and preparation for re-use ratio at national level is proposed to be calculated as follows:

$$RPR = \frac{\mathrm{Re}(W)EEE}{WEEE} \cdot 100\%, \text{ where}$$

$\mathrm{Re}(W)EEE$ - Annually produced quantities of repaired (W)EEE coming from preparation for re-use facilities, that are sold or donated, measured in $\frac{tn}{y}$. A 'preparation for re-use' facility is considered any re-use centre which has as an input fraction WEEE quantities coming from the waste stream.

$WEEE$ - Annually produced WEEE quantities, considered as a waste stream, at national level, measured in $\frac{tn}{y}$. The formula for the calculation of the total WEEE quantities generated in a Member State is described in detail at the Annex II of the Commission Implementing Regulation 2017/699/EU.

Based on the above and for the year 2012, the estimated annual (W)EEE re-use and preparation for re-use ratio at national level on the basis of WEEE generated was 1,85%.

1.2.1.1 Komosie

KOMOSIE (Koepel van Milieuondernemers in de Sociale Economie), the Flemish umbrella organisation for environmental entrepreneurs in the social economy, grew out of the former umbrella organisation KVK (Koepel van Vlaamse Kringloopcentra – Umbrella for Flemish kringloop centres) that was established in 1994. The range of its activities is covering the Flanders region and is standing as a network of non-profit organisations involved in recovery and energy-cutting activities in Flanders[8].

Its activities are not limited to (W)EEE management. In particular, KOMOSIE is an expertise centre and contact point on 'being/becoming a social innovative actor around food surplus' in Flanders. For this activity, supported by the Flemish government, the targeted groups are including social organisations, municipalities and social economy companies in Flanders. KOMOSIE's ambition is to develop and support a network of businesses and organizations that deal with the supply, storage, processing and distribution of food surpluses through various channels, in a nutritionally safe and financially feasible manner, while creating sustainable jobs in the social economy, with added value for people living in poverty and a basis for all relevant players[9].

KOMOSIE pioneered policy advocacy on reuse, waste reduction and social employment at the European level. It is a founding member of RREUSE, the European network of social enterprises active in repair, re-use and recycling. One of their important achievements, and the main reason why the umbrella was founded, was to integrate references to reuse in the European WEEE directive[10].

KOMOSIE benefits from a partnership with OVAM, the waste management authority in Flanders, which approves every re-use centre. The region is divided in 31 areas, each with its own re-use centre required by the law VLAREMA[11]. These centres collect WEEE from households through voluntary drop-off or thanks to their collection services but also from companies and municipalities.

[8] http://www.komosie.be/ko/themas/english_61.aspx [Accessed 14-09-2017].

[9] https://www.eu-fusions.org/index.php/belgium-retail/374-komosie-belgium-retail [Accessed 14-09-2017].

[10] Pieter Cools & Stijn Oosterlynck, (2015), 'De Kringwinkel: A symbiosis between jobs for the long term unemployed and waste reduction?', Case Study for OaSeS – University of Antwerp,

[11] Seyring N., Kling M., Weißenbacher J. (BiPRO), Hestin M., Lecerf L. (BIO by DELOITTE), Magalini F., Khetriwal D.S., Kuehr R. (United Nations University), (2015), 'Study on WEEE Recovery Targets, Preparation for Re-Use Targets and on the Method for Calculation of the Recovery Targets', Final Report, European Commission

Flow Chart 2: Applied (W)EEE Re-Use Methodology from KOMOSIE – BELGIUM

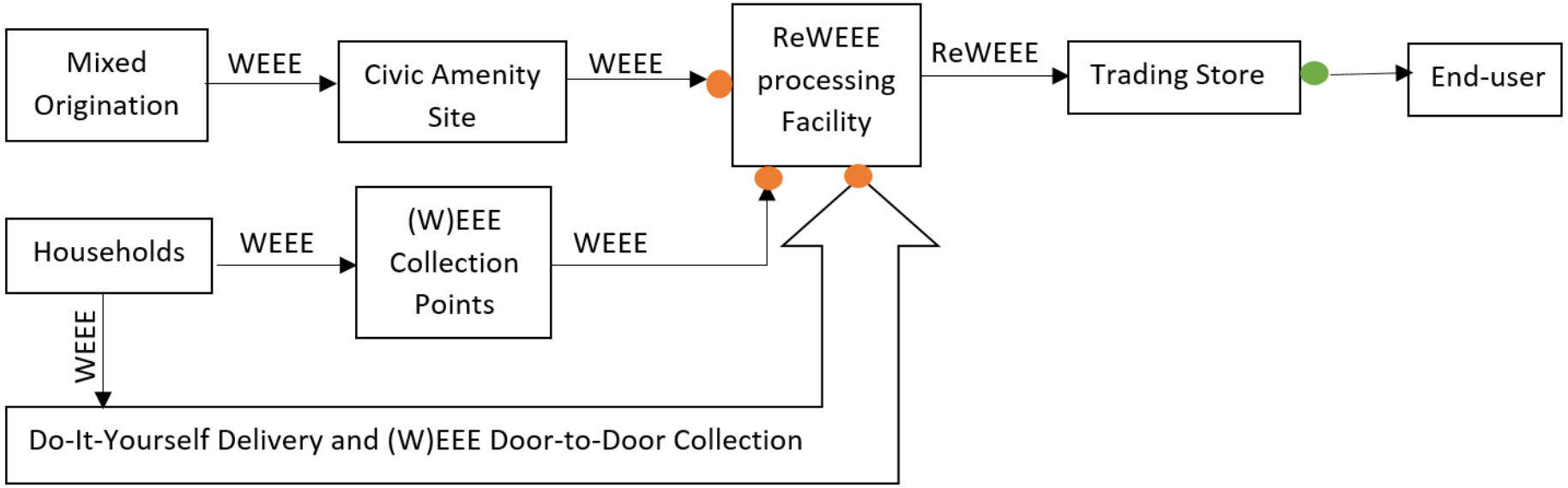


Table 3: Applied (W)EEE Re-Use Methodology from KOMOSIE – BELGIUM

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites	√	7.960,02tn
		(W)EEE Door to Door Collection	√	Part of 5.877,33tn
		(W)EEE Collection Points	√	3.997,04tn
		Do-It-Yourself Delivery	√	Part of 5.877,33tn
	(W)EEE Discarders Targeted	Private Sector Entities		
		Public Sector Entities		
		Households	√	9.874,37tn
		All of the Above (mixed origination)	√	7.960,02tn
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only	√	
		EEE Only		
		WEEE and EEE		
	Traceability of (W)EEE	Recording (W)EEE Discarding Sources	√	
		Absence of Recording (W)EEE Discarding Sources		
	Qualitative	Sorting and Identification of (W)EEE	√	

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Assessment of (W)EEE	Non-Identification of (W)EEE		
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance	√	2.155.148 Small Electronic appliances 199.299 Screens 72.379 Large Household Appliances 59.150 Temperature exchange equipment
		Counting of (W)EEE Accumulatively		
		Absence of (W)EEE Counting		
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale		
		Weighting of (W)EEE per Type Through Proxy Data	√	8.011,48tn Small Electronic Appliances 3.248,31tn Screens 3.874,19tn Large Household Appliances 2.700,42tn Temperature Exchange

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
				Equipment
		Weighting of (W)EEE Accumulatively Through Physical Scale		
		Weighting of (W)EEE Accumulatively Through Proxy Data		
		Combination of the Above		
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation	√	250
		Assessment of Re-use Jobs Creation		
		Assessment of Both Accumulatively		
		No assessment of Jobs Creation		
REWEEE Trading Stores	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance	√	283.053 Small Electronic Appliances 6.672 Screens 9.923 Large Household Appliances 4.550 Temperature Exchange Equipment
		Counting of REWEEE Accumulatively		
		Absence of REWEEE Counting		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Quantitative Assessment of REWEEE	Weighting of REWEEE per Type Through Physical Scale		
		Weighting of REWEEE per Type Through Proxy Data	√	978,86tn Small Electronic Appliances 101,04tn Screens 530,08tn Large Household Appliances 207,65tn Temperature Exchange Equipment
		Weighting of REWEEE Accumulatively Through Physical Scale		
		Weighting of REWEEE Accumulatively Through Proxy Data		
		Combination of the Above		
	Point of Calculation for REWEEE	Available in Trading Store		
		Sold or Donated	√	
	Trading of REWEEE	Bought by customer		
		Received by customer as donation		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
		Combination of the Above	√	
Performance Indicators	Collected (W)EEE			17.834,39tn
	REWEEE			1.817,63tn
	Accumulative (W)EEE Re-Use Ratio			10,19%
	(W)EEE Re-Use Ratio per Type			12,22% Small Electronic Appliances 3,11% Screens 13,68% Large Household Appliances 7,70% Temperature Exchange Equipment
	Number of EEE Types Covered			4
	Interconnection with Producer Responsibility Organization			Yes

1.2.1.2 Ressources

Ressources is the federation of the social economy enterprises active in waste reduction through re-use, preparing for re-use, valorisation and recycling of resources in a circular economy.

The network represents and defends its members towards different stakeholders of the Wallonia and Brussels-Capital regions. It acts to assure the promotion, the professionalisation and the development of the sector. It encourages different types of cooperation and mobilise its members around projects creating environmental, social and economic added value.

Ressources includes 60 members active in Wallonia and the Brussels-Capital regions who receive, collect, sort, repair, recycle and resale products and give them back a second life. The network is active in the classic sector (textiles, bulky waste, WEEE) and the emerging sector (wood, bikes, construction waste, green waste, industrial services and printers' cartridges). Primordial actor in environmental prevention, the re-use activities conducted by its members contribute to reduce the production of waste. Those activities are also encouraging local development, creating social links and sustainable proximity jobs.

Ressources counts 63 members, 151 shops, 7 000 people and 150 000 tonnes of goods treated and 50 000 tonnes re-used annually.

Flow Chart 3: Applied (W)EEE Re-Use Methodology from RESSOURCES – BELGIUM

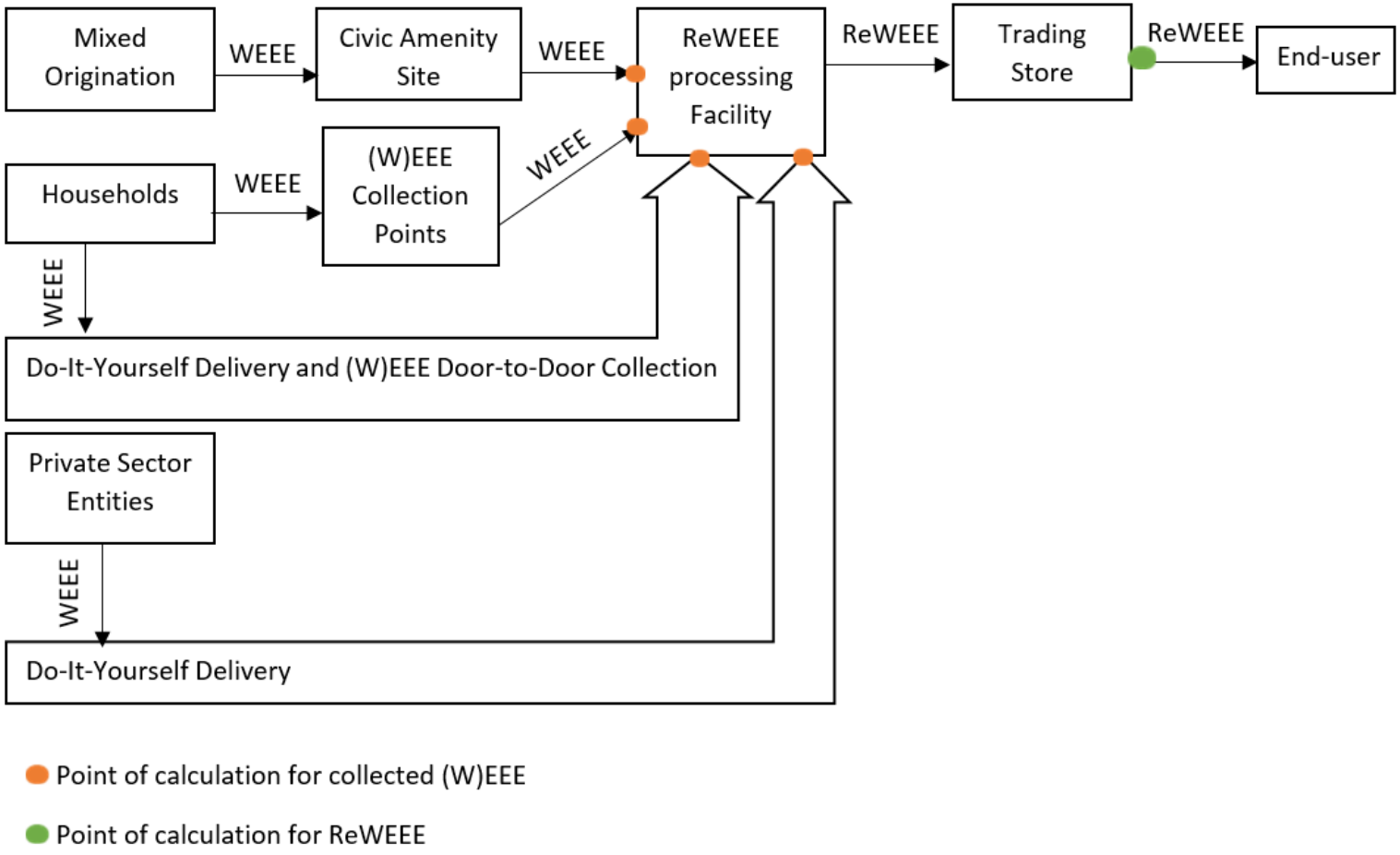


Table 4: Applied (W)EEE Re-Use Methodology from RESSOURCES – BELGIUM

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites	√	13.151,15tn
		(W)EEE Door to Door Collection	√	2.094,40tn
		(W)EEE Collection Points	√	2.342,30tn
		Do-It-Yourself Delivery	√	1.509,00tn
	(W)EEE Discarders Targeted	Private Sector Entities	√	683,00tn
		Public Sector Entities		
		Households	√	5.262,84tn
		All of the Above (mixed origination)	√	13.151,15tn
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only	√	
		EEE Only		
		WEEE and EEE		
	Traceability of (W)EEE	Recording (W)EEE Discarding Sources	√	
		Absence of Recording (W)EEE Discarding Sources		
	Qualitative	Sorting and Identification of (W)EEE	√	

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Assessment of (W)EEE	Non-Identification of (W)EEE		
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance		
		Counting of (W)EEE Accumulatively		
		Absence of (W)EEE Counting	√	
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale		
		Weighting of (W)EEE per Type Through Proxy Data		
		Weighting of (W)EEE Accumulatively Through Physical Scale		
		Weighting of (W)EEE Accumulatively Through Proxy Data		
		Combination of the Above	√	10.029tn Small Electronic Appliances 3.274tn Screens 3.314tn Large Household Appliances 2.481tn Temperature Exchange Equipment

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation	√	327
		Assessment of Re-use Jobs Creation		
		Assessment of Both Accumulatively		
		No assessment of Jobs Creation		
REWEEE Trading Stores	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance		
		Counting of REWEEE Accumulatively		
		Absence of REWEEE Counting	√	
	Quantitative Assessment of REWEEE	Weighting of REWEEE per Type Through Physical Scale		
		Weighting of REWEEE per Type Through Proxy Data		
		Weighting of REWEEE Accumulatively Through Physical Scale		
		Weighting of REWEEE Accumulatively Through Proxy Data		
		Combination of the Above	√	753,54tn Small Electronic Appliances 10,76tn Screens 264,23tn Large Household

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
				Appliances 68,46tn Temperature Exchange Equipment
	Point of Calculation for REWEEE	Available in Trading Store		
		Sold or Donated	√	
	Trading of REWEEE	Bought by customer		
		Received by customer as donation		
		Combination of the Above	√	
Performance Indicators	Collected (W)EEE			19.097tn
	REWEEE			1.097tn
	Accumulative (W)EEE Re-Use Ratio			5,74%
	(W)EEE Re-Use Ratio per Type			7,52% Small Electronic Appliances 0,4% Screens 8% Large Household Appliances 2,7% Temperature exchange equipment

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Number of EEE Types Covered			4
	Interconnection with Producer Responsibility Organization			Yes

1.2.1.3 CF2D

CF2D has activities covering the Brussels-Capital Region. It is a social cooperative enterprise specialized in (W)EEE management.

CF2D was established in 2004 in Brussels. It employs 18 people, all working in the environmental sector. Its parent company, CF2M – Centre de Formation 2 Mille (Training Centre 2000) is active in training and socio-professional reintegration. CF2D is both a social economy enterprise and a sustainable development research company. Its activities are focused on three main areas which are including:

- The recovery of waste electrical and electronic equipment (WEEE),
- Research & development and
- The establishment of North/South socio-economic links.

CF2D offers its customers a complete WEEE management and collection service. Its customers are involved in various sectors of the economy and include individuals, companies, associations, etc. Useable equipment is collected directly at companies. Any WEEE which can be reused is reconditioned and redistributed, mainly in the socio-educational sector. CF2D provides traceability for all its refurbished equipment. Non-reusable WEEE is dismantled in their own facilities if possible or at least in Brussels.

In parallel with this work, CF2D conducts studies on dismantling activities with its partners in the South. The company also offers training and develops teaching tools in this area[12].

[12] http://www.greentechbrussels.be/en/component/sobipro/?sid=466:cf2d [Accessed 13-09-2017].

Flow Chart 4: Applied (W)EEE Re-Use Methodology from CF2D/CF2M – BELGIUM

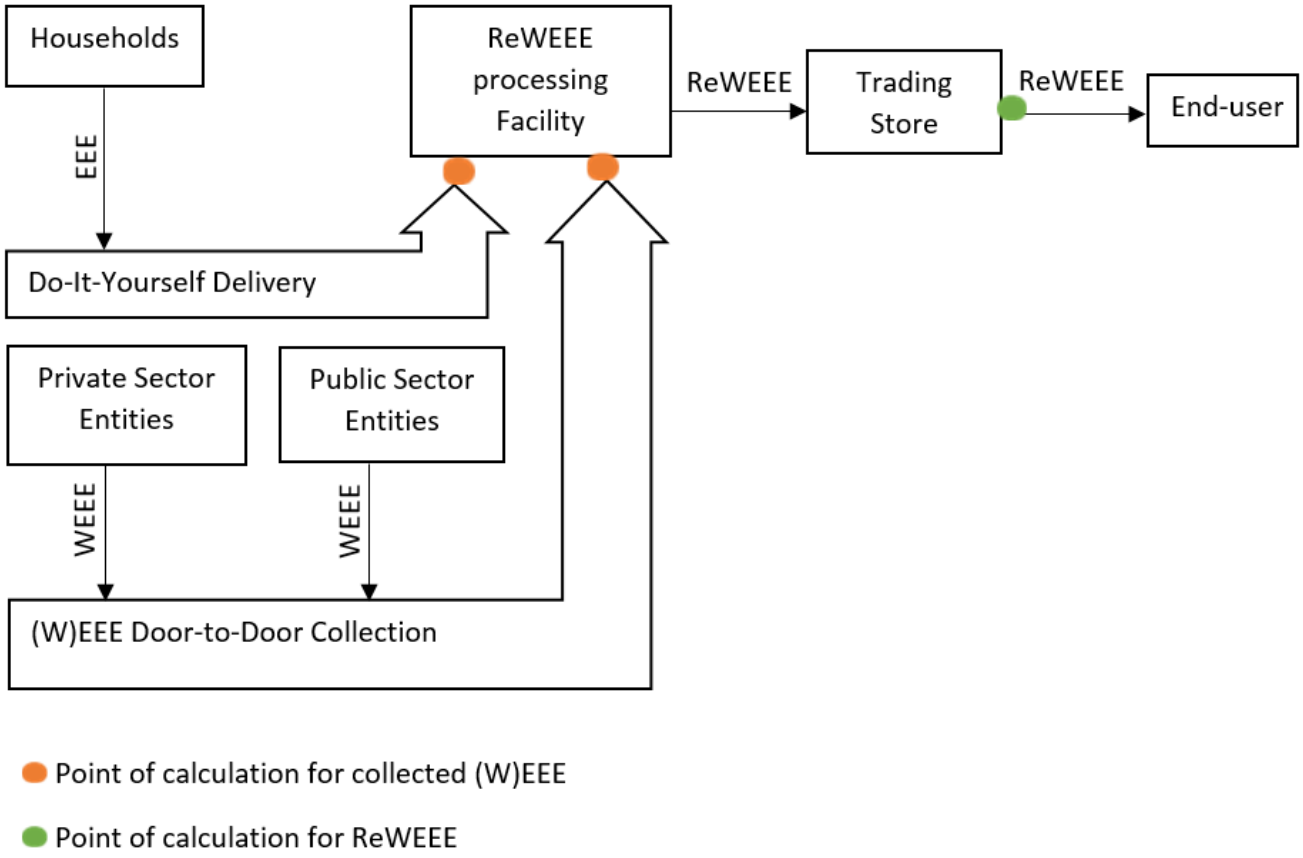


Table 5: Applied (W)EEE Re-Use Methodology from CF2D/CF2M – BELGIUM

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites		
		(W)EEE Door to Door Collection	√	115tn
		(W)EEE Collection Points		
		Do-It-Yourself Delivery	√	Lack of data
	(W)EEE Discarders Targeted	Private Sector Entities	√	Part of 115tn
		Public Sector Entities	√	Part of 115tn
		Households	√	Lack of data
		All of the Above (mixed origination)		
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only	√	
		EEE Only		
		WEEE and EEE		
	Traceability of (W)EEE	Recording (W)EEE Discarding Sources	√	
		Absence of Recording (W)EEE Discarding Sources		
	Qualitative	Sorting and Identification of (W)EEE	√	Small Electronic Appliances

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Assessment of (W)EEE			Screens Information Technology (IT) and telecommunication Equipment Non-identified WEEE
		Non-Identification of (W)EEE		
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance		
		Counting of (W)EEE Accumulatively		
		Absence of (W)EEE Counting	√	
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale		
		Weighting of (W)EEE per Type Through Proxy Data		
		Weighting of (W)EEE Accumulatively Through Physical Scale	√	115tn
		Weighting of (W)EEE Accumulatively Through Proxy Data		
		Combination of the Above		
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation	√	3

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
		Assessment of Re-use Jobs Creation	√	10
		Assessment of Both Accumulatively		
		No assessment of Jobs Creation		
REWEEE Trading Stores	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance		
		Counting of REWEEE Accumulatively	√	7.122
		Absence of REWEEE Counting		
	Quantitative Assessment of REWEEE	Weighting of REWEEE per Type Through Physical Scale		
		Weighting of REWEEE per Type Through Proxy Data		
		Weighting of REWEEE Accumulatively Through Physical Scale	√	21tn
		Weighting of REWEEE Accumulatively Through Proxy Data		
		Combination of the Above		
		None of the Above		
	Point of	Available in Trading Store		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Calculation for REWEEE	Sold or Donated	√	
	Trading of REWEEE	Bought by customer		
		Received by customer as donation		
		Combination of the Above	√	
Performance Indicators	Collected (W)EEE			115tn
	REWEEE			21tn
	Accumulative (W)EEE Re-Use Ratio			18,26%
	(WE)EE Re-Use Ratio per Type			Lack of data
	Number of WEEE Types Covered			4
	Interconnection with Producer Responsibility Organization			No

1.2.2 Producer Responsibility Organization

Table 6: Questionnaires Results for Producer Responsibility Organization – BELGIUM

Questions	Answers from Recupel
Number of Represented Structures	Lack of data
Collected material	Only WEEE
Collected (W)EEE Tonnage in 2015 (in tn)	108.368
Collected (W)EEE Items in 2015	27.195.399
Re-Used – Repaired EEE Tonnage in 2015 (in tn)	3.538
Re-Used – Repaired EEE Items in 2015	788.278
Applied Delivery – Collection Scheme	(W)EEE Collection Points
(W)EEE origination	Households
(W)EEE Types Covered	Small Electronic Appliances Large Household Appliances Temperature Exchange Equipment Information Technology (IT) and telecommunication equipment Consumer Equipment
Weighting Technique	Physical scale
Point of ReWEEE calculation	When made available on the market

1.2.2.1 Recupel

For the Belgian case, the producer responsibility organization responsible for the management of (W)EEE is named 'RECUPEL VZW'. It was founded in 2001 at the initiative of the EEE manufacturers and is managed by them. It is a Belgian non-profit association responsible for organising the collection and processing of discarded electric and electronic appliances and gas discharge lamps and LED.

RECUPEL VZW comprises seven management bodies (one for each (W)EEE types)[13]:

- BW-Rec – Large household appliances, professional large and small white goods and dispensers
- Recupel AV – Household and professional audio-video equipment
- Recupel SDA – Small household appliances
- Recupel ICT - Informatics, telecommunications and office equipment, professional ICT equipment and dispensers
- Recupel ET&G – Household and professional electric and electronic (garden) tools
- LightRec – Lighting equipment and corona discharge bulbs
- MeLaRec – Household and professional medical appliances, lab equipment, sports equipment, thermostats, testing and measuring equipment, blood glucose metres and smoke detectors

The above-mentioned non-profit organisations, together with the professional federations which are active in the electro-appliances sector, are the founders of the executing organisation, RECUPEL VZW. These professional federations have also helped establish the seven sectors:

- Agoria- the multi-sector federation of the technological industries, founded the Recupel AV, Recupel ICT, Recupel SDA, LightRec and MeLaRec sectors.
- FEE - Federation of Electricity and Electronics founded the BW-Rec and LightRec sectors.
- Fedagrim and Imcobel form the foundation of the Recupel ET&G sector.
- Unamec and Udias form the foundation of the MeLaRec sector.

Importers and manufacturers of electro-appliances are members of one or more of these management bodies, according to the sectors in which they are active.

RECUPEL VZW is implementing the 'take – back obligation' system, meaning that manufacturers and importers are setting up a collection and processing system for discarded WEEE. it also means that every business which puts an EEE on the Belgian market is also responsible for its collection and its end-of-life management, regardless if they sold it themselves or not. Recupel is also making sure that, from the financing to the execution, the WEEE management operated is durable and cost-

[13] http://www.recupel.be/en/about-recupel/about-the-organisation/#/ [Accessed 18-09-2017]

efficient. Recupel also works on raising awareness towards the consumers about the sound treatment of WEEE. They are in close collaboration with retailers, communes, re-use shops, regional governments, approved Recyclers and intercommunals[14].

Depending on the product's condition, there are several possible solutions for the consumer to discard its product in the Recupel model[15]:

1. If the product can be reused, it may be entrusted to a social economy organisation. The product will then be cleaned up and sold second-hand at a reduced price
2. Products that no longer work can be disposed of in a container park
3. Consumers can bring their used appliances to retailers whenever they purchase new items. The appliances will then be picked up by Recupel at a later date

Data collected on Recupel through this study concerns only the two latter options.

[14] Anneke Leysen & Nicolas Preillon, (2014), 'Belgian Recycling Waste & Solutions', Belgian Foreign Trade Agency http://www.abh-ace.be/sites/default/files/downloads/20140822_ace_brochure_waste_BD.pdf [Accessed 18-09-2017].

[15] Peter Sabbe, (2010), 'Recupel – Belgian system for collection and recycling of Waste Electrical and Electronic Equipment (WEEE)' http://www.eeas.europa.eu/archives/delegations/india/documents/eu_india/environment_forum_2010/sabbe.pdf [Accessed 18-09-2017]

Flow Chart 5: Applied (W)EEE Re-Use Methodology from Producer Responsibility Organization – BELGIUM

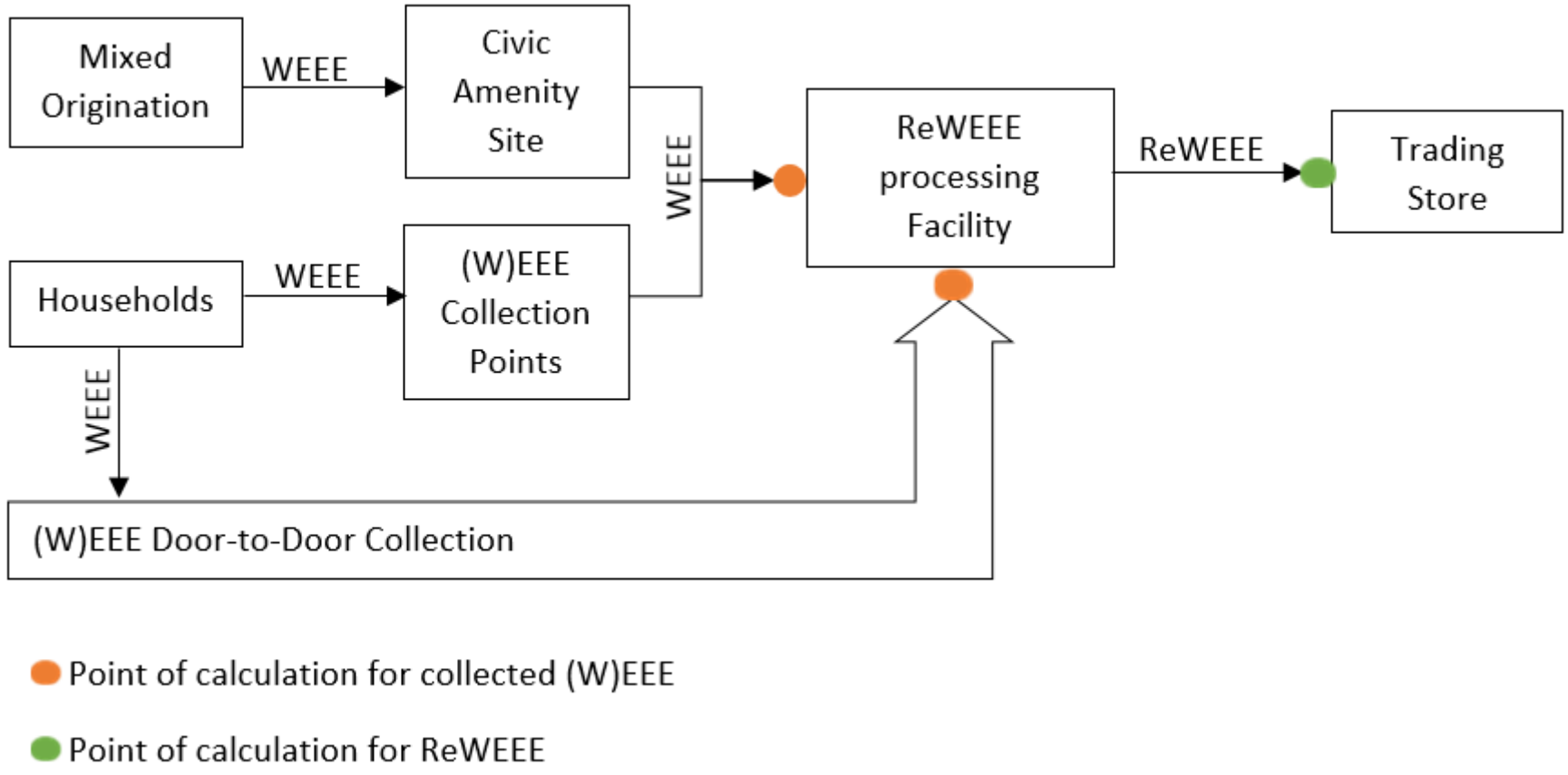


Table 7: Applied (W)EEE Re-Use Methodology from a Producer Responsibility Organization – BELGIUM

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites	√	Part of 108.368tn
		(W)EEE Door to Door Collection	√	Part of 108.368tn
		(W)EEE Collection Points	√	Part of 108.368tn
		Do-It-Yourself Delivery		
	(W)EEE Discarders Targeted	Private Sector Entities		
		Public Sector Entities		
		Households	√	108.368tn
		All of the Above (mixed origination)		
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only	√	
		EEE Only		
		WEEE and EEE		
	Traceability of (W)EEE	Recording (W)EEE Discarding Sources	√	
		Absence of Recording (W)EEE Discarding Sources		
	Qualitative	Sorting and Identification of (W)EEE	√	Small Electronic Appliances

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Assessment of (W)EEE			Large Household Appliances Temperature Exchange Equipment Information Technology (IT) and Telecommunication Equipment Consumer Equipment
		Non-Identification of (W)EEE		
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance		
		Counting of (W)EEE Accumulatively	√	27.195.399
		Absence of (W)EEE Counting		
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale		
		Weighting of (W)EEE per Type Through Proxy Data		
		Weighting of (W)EEE Accumulatively Through Physical Scale	√	108.368tn
		Weighting of (W)EEE Accumulatively Through Proxy Data		
		Combination of the Above		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation		
		Assessment of Re-use Jobs Creation		
		Assessment of Both Accumulatively		
		No assessment of Jobs Creation		
REWEEE Trading Stores	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance	√	227.812,34 Small Electronic Appliances 194.704,67 Large Household Appliances 106.417,53 Temperature Exchange Equipment 234.118,57 Information Technology (IT) and Telecommunication Equipment 25.224,90 Consumer Equipment
		Counting of REWEEE Accumulatively		
		Absence of REWEEE Counting		
	Quantitative Assessment of	Weighting of REWEEE per Type Through Physical Scale	√	1.022,48tn Small Electronic Appliances

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	REWEEE			873,89tn Large Household Appliances 477,63tn Temperature Exchange Equipment 1050,79tn Information Technology (IT) and Telecommunication Equipment 113,22tn Consumer Equipment
		Weighting of REWEEE per Type Through Proxy Data		
		Weighting of REWEEE Accumulatively Through Physical Scale		
		Weighting of REWEEE Accumulatively Through Proxy Data		
		Combination of the Above		
	Point of Calculation for REWEEE	Available in Trading Store	√	
		Sold or Donated		
	Trading of	Bought by customer		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	REWEEE	Received by customer as donation		
		Combination of the Above	√	
Performance Indicators	Collected (W)EEE			108.368tn
	REWEEE			3.538tn
	Accumulative (W)EEE Re-Use Ratio			3,26%
	(W)EEE Re-Use Ratio per Type			Lack of data
	Number of EEE Types Covered			5
	Interconnection with Producer Responsibility Organization			Yes

1.3 Cyprus

For the case of Cyprus, the questionnaires respondents were two entities considered as re-use centres networks and a Producer Responsibility Organization, responsible for WEEE management in Cyprus. The re-use centres networks were the 'Cyprus Environmental Scientist and Engineers Union' and the 'Institute of Environmental Technology and Sustainable Development (IETSD)'. Only data collected from the Cypriot Producer Responsibility Organisation (WEEE Electrocyclosis Cyprus LMD) will be studied since not enough data on re-use or preparing for re-use were collected from the IETSD.

1.3.1 Producer Responsibility Organization

Table 8: Questionnaires Results for Producer Responsibility Organization – CYPRUS

Questions	Answers from WEEE Electrocyclosis Cyprus LMD
Number of Represented Structures	1
Collected material	Both EEE and WEEE
Collected (W)EEE Tonnage in 2015 (in tn)	1.970,00tn WEEE 230,41tn EEE
Collected (W)EEE Items in 2015	Lack of data
Re-Used – Repaired EEE Tonnage in 2015 (in tn)	191,35tn
Re-Used – Repaired EEE Items in 2015	Lack of data
Applied Delivery – Collection Scheme	Civic Amenity Sites (W)EEE Collection Points

Questions	Answers from WEEE Electrocyclosis Cyprus LMD
(W)EEE origination	Households Mixed origination
(W)EEE Types Covered	Information Technology (IT) and Telecommunication Equipment Non-Identified WEEE
Weighting Technique	Proxy weight data
Point of ReWEEE calculation	When sold or donated

1.3.1.1 WEEE Electrocyclosis Cyprus LTD

WEEE Electrocyclosis Cyprus LTD organization was created by the Cyprus Chamber of Commerce and Industry (CCCI) on June 1st 2008 as a non-profit organization in accordance with the provisions of the Regulation 668/2004 of the Solid and Hazardous Waste Law (N.215 (I)/2002). The Law (N.215 (I)/2002), defines the responsibilities and obligations of the producers of Electrical and Electronic Equipment (EEE), which in Cyprus are mostly companies importing Electrical and Electronic Equipment in the Republic[16].

[16] http://www.electrocyclosis.com.cy/en/index.php [Accessed 19-09-2017]

WEEE Electrocyclosis Cyprus LTD was formed in order to organize the first Collective Compliance System for WEEE management in Cyprus. The signing of contracts with Members or Shareholders is supervised by Electrocyclosis and it is expected that a significant number of companies will gradually join the Collective System[17].

The System is accredited by the authorities as of June 1st 2008 and in that respect, it is the first and only licensed WEEE Management System in Cyprus representing 178 companies from the private sector.

The System cooperates with the organization Green Dot (Cyprus) Public Co Ltd for the organization and management of the Collective System for the management of WEEE. The Organisation also cooperates with an equivalent System in Austria, the organisation ERA GmbH.

As for the management of the collected WEEE, the organization is contracted with the following sub-contractors[18]:

- WEEE Cyprus Recycling SA who is responsible for the collection and transportation of WEEE to the sorting and temporary storage facilities, as well as for the management (dismantling and decontamination towards recycling) of small electric household appliances (consumer equipment), screens and refrigerators.
- Economides Metal Recycling Ltd who is responsible for the sorting and temporary storage operations, as well as the management (dismantling and decontamination towards recycling) of large household appliances and temperature exchange equipment.
- Advance MWM Ltd who is responsible for collection, transportation and management (dismantling and decontamination towards recycling) of lamps and leds.

In 2012, at national level, the quantities of total WEEE generated and total WEEE collected, as well as the quantities of REWEEE that were reported as being re-used or prepared for re-use were[19],[20]:

[17] http://www.electrocyclosis.com.cy/en/company.php [Accessed 19-09-2017]

[18] WEEE Electrocyclosis Cyprus LMD, (2009), Proceedings of Informative Meeting, http://www.electrocyclosis.com.cy/en/informative-material.php [Accessed 19-09-2017].

[19] Seyring N., Kling M., Weißenbacher J. (BiPRO), Hestin M., Lecerf L. (BIO by DELOITTE), Magalini F., Khetriwal D.S., Kuehr R. (United Nations University), (2015), 'Study on WEEE Recovery Targets, Preparation for Re-Use Targets and on the Method for Calculation of the Recovery Targets', Final Report, European Commission

- Estimation on Total WEEE generated: 11.971tn
- Total (W)EEE collected: 2.514tn
- REWEEE sold or donated: 42tn
- **Re-Use and Preparation for Re-Use Rate on the basis of WEEE collected: 1,67%**.

On the basis of WEEE generated, the annual (W)EEE re-use and preparation for re-use ratio at national level is proposed to be calculated as follows:

$$RPR = \frac{[\mathrm{Re}(W)EEE + \mathrm{Re}\ EEE]}{WEEE} \cdot 100\%$$, where

$\mathrm{Re}(W)EEE$ - Annually produced quantities of repaired (W)EEE coming from preparation for re-use facilities, that available in trading stores, measured in $\frac{tn}{y}$. A 'preparation for re-use' facility is considered any re-use centre which has as an input fraction WEEE quantities coming from the waste stream and also, EEE fraction quantities coming from the non-waste stream.

$\mathrm{Re}\ EEE$ - Annually produced quantities of repaired EEE from re-use facilities, that are available in trading stores, measured in $\frac{tn}{y}$. The repaired fraction is considered to have originated exclusively from EEE (non-waste stream). As 're-use' facility is considered any recognized operator of EEE (non-waste stream) that has an agreement with a PRO scheme or a public body for the reporting of data and/or at traceability and reporting system in place.

[20] Magalini F., Wang F., Huisman J., Kuehr R. (United Nations University), Baldé K., Van Straalen V. (Statistics Netherlands), Hestin M., Lecerf L. (BIO by DELOITTE), Sayman U., Akpulat O. (Regional Environmental Center), (2014), 'Study on Collection Rates of WEEE', Final Report, European Commission

$WEEE$ - Annually produced WEEE quantities, considered as a waste stream, at national level, measured in $\frac{tn}{y}$. The formula for the calculation of the total WEEE quantities generated in a Member State is described in detail at the Annex II of the Commission Implementing Regulation 2017/699/EU.

Based on the above and for the year 2012, the estimated annual (W)EEE re-use and preparation for re-use ratio at national level on the basis of WEEE generated was 0,35%.

Flow Chart 6: Applied (W)EEE Re-Use Methodology from Producer Responsibility Organization – CYPRUS

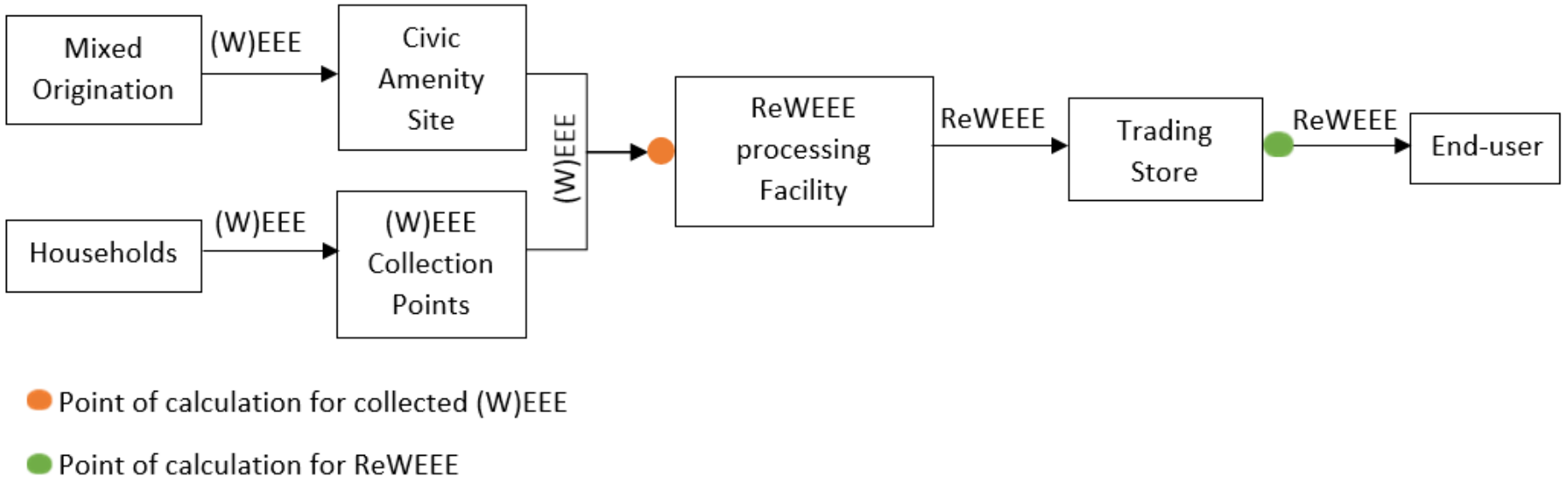


Table 9: Applied (W)EEE Re-Use Methodology from Producer Responsibility Organization – CYPRUS

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites	√	1.540,29tn (WEEE and EEE)
		(W)EEE Door to Door Collection		
		(W)EEE Collection Points	√	660,12tn (WEEE and EEE)
		Do-It-Yourself Delivery		
	(W)EEE Discarders Targeted	Private Sector Entities		
		Public Sector Entities		
		Households	√	660,12tn (WEEE and EEE)
		All of the Above (mixed origination)	√	1.540,29tn (WEEE and EEE)
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only		
		EEE Only		
		WEEE and EEE	√	
	Traceability of (W)EEE	Recording (W)EEE Discarding Sources	√	
		Absence of Recording (W)EEE Discarding Sources		
	Qualitative	Sorting and Identification of (W)EEE		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Assessment of (W)EEE	Non-Identification of (W)EEE	√	
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance		
		Counting of (W)EEE Accumulatively		
		Absence of (W)EEE Counting	√	
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale		
		Weighting of (W)EEE per Type Through Proxy Data		
		Weighting of (W)EEE Accumulatively Through Physical Scale		
		Weighting of (W)EEE Accumulatively Through Proxy Data	√	2.200,41tn
		Combination of the Above		
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation		
		Assessment of Re-use Jobs Creation		
		Assessment of Both Accumulatively	√	12
		No assessment of jobs creation		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
REWEEE Trading Stores	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance		
		Counting of REWEEE Accumulatively		
		Absence of REWEEE Counting	√	
	Quantitative Assessment of REWEEE	Weighting of REWEEE per Type Through Physical Scale		
		Weighting of REWEEE per Type Through Proxy Data		
		Weighting of REWEEE Accumulatively Through Physical Scale		
		Weighting of REWEEE Accumulatively Through Proxy Data	√	191,35tn
		Combination of the Above		
	Point of Calculation for REWEEE	Available in Trading Store		
		Sold or Donated	√	
	Trading of REWEEE	Bought by customer	√	
		Received by customer as donation		
		Combination of the Above		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Performance Indicators	Collected (W)EEE			1.970tn (WEEE) 230,41tn (EEE)
	REWEEE			191,35
	Accumulative (W)EEE Re-Use Ratio			8,70%
	(W)EEE Re-Use Ratio per Type			Lack of data
	Number of EEE Types Covered			Lack of data
	Interconnection with Re-use centres			Yes

1.4 France

The questionnaires' respondents for the case of France were three re-use centres networks titled 'Emmaüs France', 'Envie' and 'SIRRMIET' and a producer responsibility organization titled 'Eco-Systèmes'.

Emmaüs France and Envie are involved in the social economy sector. The French social economy sector plays a very important social role and also stands out thanks to its significant network of non-profit organisations and charities. The reuse sector is mainly dominated by three networks: Emmaüs, the ENVIE Federation and the Réseau des Ressourceries, plus other re-use charities and enterprises which promote the integration of unemployed people and of those subject to exclusion from the labour market (almost 2.000 actors according to ADEME, the French Environmental Agency) [21]. Independent actors, which are not part of a network (specialized or not), represent around 22% of the social and solidarity sector. Those who benefit from a contract with the PRO Eco-systèmes (Emmaüs, the ENVIE Federation and the Réseau des Ressourceries) get access to the WEEE collected through municipalities and distributors, and report on the quantities of WEEE they actually repair and make available on the market. Eco-systèmes estimated that around 20% of what is collected today is given for preparation for re-use, and 20% of it is actually re-used[22].

In the social and solidarity field, Emmaüs performs mainly reuse activities, while the ENVIE Federation and the Réseau des Ressourceries perform both reuse and preparation for reuse and recycling. The social and solidarity economy actors represent 6% of the total WEEE collected by Eco-systèmes in 2012.

[21] Véronique Monier, Mathieu Hestin, Augustin Chanoine, François Witte and Sarah Guilcher, (2013), Study on the Quantification of Waste of Electrical and Electronic Equipment (WEEE) in France, Agence de l'Environnement et la Maitrice de l'Energie https://www.ecotic.ro/wp-content/uploads/2015/07/ac72eb1f9189c770c25fe353d99387c3d9477580.pdf [Accessed 20-09-2017]

[22] Seyring N., Kling M., Weißenbacher J. (BiPRO), Hestin M., Lecerf L. (BIO by DELOITTE), Magalini F., Khetriwal D.S., Kuehr R. (United Nations University), (2015), 'Study on WEEE Recovery Targets, Preparation for Re-Use Targets and on the Method for Calculation of the Recovery Targets', Final Report, European Commission

1.4.1 Re-Use Centres and Re-Use Networks

Table 11: Questionnaires Results of Re-Use Centres Networks – FRANCE

Question	Answer		
	Emmaüs	Envie	Sirrmiet
Number of Represented Structures	155	25	15
Collected material	Both EEE and WEEE	Both EEE and WEEE	Only EEE
Collected (W)EEE Tonnage in 2015 (in tn)	1.382,00tn (WEEE) 23.493,00tn (EEE)	19.311,00tn (WEEE) 1.060,00tn (EEE) estimated	20.000tn (EEE)
Collected (W)EEE Items in 2015	Lack of data	371.365 (WEEE) 20.352 (EEE) estimated	Lack of data
Re-Used – Repaired (W)EEE Tonnage in 2015 (in tn)	4.803,00tn (WEEE and EEE)	3.395,00tn (WEEE) 582,00tn (EEE)	9.000tn (EEE)
Re-Used – Repaired (W)EEE Items in 2015	Lack of data	65.288 (WEEE) 11.194 (EEE)	Lack of data
Applied Delivery – Collection Scheme	(W)EEE Collection Points Do-It-Yourself Delivery	(W)EEE Collection Points (W)EEE Door to Door Collection Do-It-Yourself Delivery	(W)EEE Door to Door Collection (W)EEE Collection Points

Question	Answer		
			Do-It-Yourself Delivery
(W)EEE origination	Households	Private Sector Entities Households	Private Sector Entities Households
(W)EEE Types Covered	Lack of data	Small Electronic Appliances Large Household Appliances Consumer Equipment Information Technology (IT) and Telecommunication Equipment	Screens Information Technology (IT) and Telecommunication Equipment Non-Identified WEEE
Weighting Technique	Physical scale	Proxy weight data	Physical scale
Point of ReWEEE calculation	When made available on the market	When sold or donated	When sold or donated

In 2012, at national level, the quantities of total WEEE generated and total WEEE collected, as well as the quantities of REWEEE that were reported as being re-used or prepared for re-use were[23],[24]:

[23] Seyring N., Kling M., Weißenbacher J. (BiPRO), Hestin M., Lecerf L. (BIO by DELOITTE), Magalini F., Khetriwal D.S., Kuehr R. (United Nations University), (2015), 'Study on WEEE Recovery Targets, Preparation for Re-Use Targets and on the Method for Calculation of the Recovery Targets', Final Report, European Commission

[24] Magalini F., Wang F., Huisman J., Kuehr R. (United Nations University), Baldé K., Van Straalen V. (Statistics Netherlands), Hestin M., Lecerf L. (BIO by DELOITTE), Sayman U., Akpulat O. (Regional Environmental Center), (2014), 'Study on Collection Rates of WEEE', Final Report, European Commission

- Estimation on Total WEEE generated: 1.383.988tn
- Total (W)EEE collected: 470.556tn
- REWEEE sold or donated: 9.568tn
- **Re-Use and Preparation for Re-Use Rate on the basis of WEEE collected: 2,03%**.

On the basis of WEEE generated, the annual (W)EEE re-use and preparation for re-use ratio at national level is proposed to be calculated as follows:

$$RPR = \frac{[\mathrm{Re}(W)EEE + \mathrm{Re}\ EEE]}{WEEE} \cdot 100\%$$, where

$\mathrm{Re}(W)EEE$ - Annually produced quantities of repaired (W)EEE coming from preparation for re-use facilities, that are available in trading stores (for ENVIE and SIRRMIET) measured in $\frac{tn}{y}$. A 'preparation for re-use' facility is considered any re-use centre which has as an input fraction WEEE quantities coming from the waste stream and also, EEE fraction quantities coming from the non-waste stream.

$\mathrm{Re}\ EEE$ - Annually produced quantities of repaired EEE from re-use facilities, that are sold or donated (for Emmaüs France), measured in $\frac{tn}{y}$. The repaired fraction is considered to have originated exclusively from EEE (non-waste stream). As 're-use' facility is considered any recognized operator of EEE (non-waste stream) that has an agreement with a PRO scheme or a public body for the reporting of data and/or at traceability and reporting system in place.

$WEEE$ - Annually produced WEEE quantities, considered as a waste stream, at national level, measured in $\frac{tn}{y}$. The formula for the calculation of the total WEEE quantities generated in a Member State is described in detail at the Annex II of the Commission Implementing Regulation 2017/699/EU.

Based on the above and for the year 2012, the estimated annual (W)EEE re-use and preparation for re-use ratio at national level on the basis of WEEE generated was 0,69%.

1.4.1.1 Emmaüs

Emmaüs is an international solidarity movement founded in Paris in 1949 by the Catholic priest and Capuchin friar Abbé Pierre to combat poverty and homelessness. Since 1971 regional and national initiatives have been grouped under a parent organization, Emmaüs International, representing 350 groups in 37 countries, offering a range of charitable services.

Emmaüs France is a member of the Emmaüs Europe Group and is actively involved in re-use related activities. Emmaüs Europe, in its current form, was created on 21st May 2005 in France as a not-for-profit organisation that brings together all the Emmaüs structures in Europe and is one of the four continental regions of the Emmaüs Movement (Africa, America, Asia and Europe). Today, 309 groups in 17 European countries are members of Emmaüs Europe[25].

Emmaüs France stands as a network of 284 Emmaüs groups that are selling second-hand items at low price[26]. In this framework, Emmaüs France repairs mainly EEE which is considered as a non-waste stream. Emmaüs France's main objective is to re-use discarded items and use the economical profits of this activity to help people at risk of socioeconomic exclusion. The Emmaüs shops in France contain a wide range of different types of products such as furniture, bric-a-brac, records, books, clothes, cookers, fridges, French antiques and bicycles. The valuable ones are sold to help provide for those who need it in the form of housing, employment and financial aid.

[25] http://emmaus-europe.org/675-welcome-to-the-section-emmaus-europe/70-1-who-are-we [Accessed 20-09-2017]

[26] https://www.thegoodlifefrance.com/emmaus-shops-in-france-great-for-second-hand-bargains/ [Accessed 20-09-2017]

Flow Chart 7: Applied (W)EEE Re-Use Methodology from Emmaüs France – FRANCE

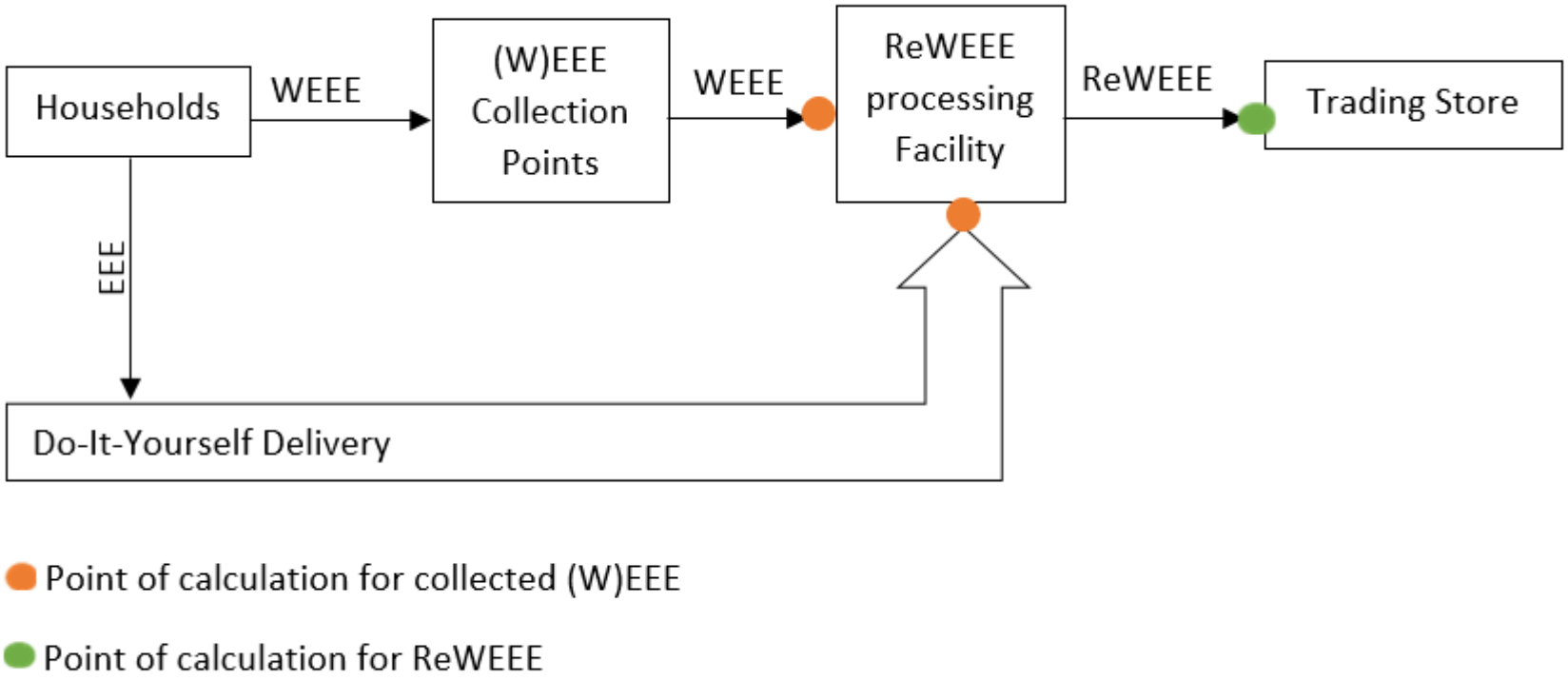


Table 12: Applied (W)EEE Re-Use Methodology from Emmaüs France – FRANCE

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites		
		(W)EEE Door to Door Collection		
		(W)EEE Collection Points	√	1.382,00tn (WEEE)
		Do-It-Yourself Delivery	√	23.493,00tn (EEE)
	(W)EEE Discarders Targeted	Private Sector Entities		
		Public Sector Entities		
		Households	√	1.382,00tn (WEEE) 23.493,00tn (EEE)
		All of the Above (mixed origination)		
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only		
		EEE Only		
		WEEE and EEE	√	
	Traceability of (W)EEE	Recording (W)EEE Discarding Sources	√	
		Absence of Recording (W)EEE Discarding Sources		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Qualitative Assessment of (W)EEE	Sorting and Identification of (W)EEE		
		Non-Identification of (W)EEE	√	
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance		
		Counting of (W)EEE Accumulatively		
		Absence of (W)EEE Counting	√	
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale		
		Weighting of (W)EEE per Type Through Proxy Data		
		Weighting of (W)EEE Accumulatively Through Physical Scale	√	24.875,00tn
		Weighting of (W)EEE Accumulatively Through Proxy Data		
		Combination of the Above		
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation		
		Assessment of Re-use Jobs Creation		
		Assessment of both accumulatively	√	1.220

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
		No assessment of jobs creation		
REWEEE Trading Stores	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance		
		Counting of REWEEE Accumulatively		
		Absence of REWEEE Counting	√	
	Quantitative Assessment of REWEEE	Weighting of REWEEE per Type Through Physical Scale		
		Weighting of REWEEE per Type Through Proxy Data		
		Weighting of REWEEE Accumulatively Through Physical Scale	√	4.803,00tn
		Weighting of REWEEE Accumulatively Through Proxy Data		
		Combination of the Above		
	Point of Calculation for REWEEE	Available in Trading Store	√	
		Sold or Donated		
	Trading of REWEEE	Bought by customer		
		Received by customer as donation		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
		Combination of the Above	√	4.803,00tn
Performance Indicators	Collected (W)EEE			1.382tn (WEEE) 23.493tn (EEE)
	REWEEE			4.803
	Accumulative (W)EEE Re-Use Ratio			19,31%
	(W)EEE Re-Use Ratio per Type			Lack of data
	Number of EEE Types Covered			Lack of data
	Interconnection with Producer Responsibility Organization			Yes

1.4.1.2 Envie

Envie is born in 1984 in Strasbourg. Their core activity is the renovation of home appliances by people having difficulties finding employment and the resale of this equipment at low price. The network has now diversified and is recognized as a leader of Social and Solidarity Economy, as well as Sustainable Development, and was awarded in September 2015 by the City of Paris and the French Institute of Circular Economy for its commitment in this direction. Today, and after several years of development all over France, the Envie network counts 50 enterprises including 30 renovation workshops and 45 specialised shops.

Envie is currently employing 2500 people, including 2000 vocational integration contracts. They collect 1/3 of French Waste Electrical and Electronic Equipment, treated 150.000 tonnes of waste and renovated 80.000 appliances, corresponding to a 4.000 tonnes waste decrease. Envie has a turnover of 73 million Euros and they still exist after more than 30 years.

Flow Chart 8: Applied (W)EEE Re-Use Methodology from ENVIE – FRANCE

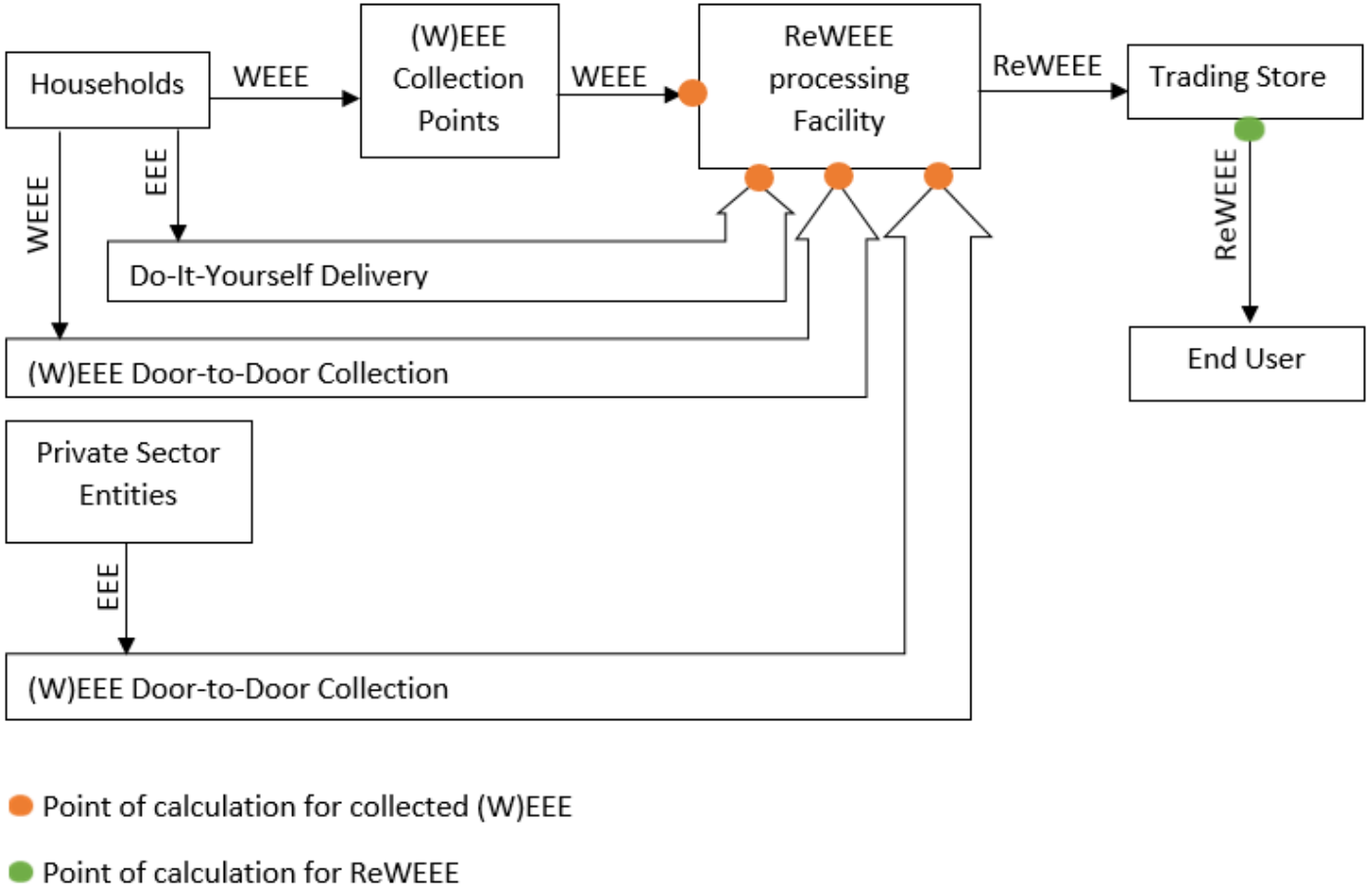


Table 13: Applied (W)EEE Re-Use Methodology from ENVIE – FRANCE

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites		
		(W)EEE Door to Door Collection	√	Part of 19.311,00tn (WEEE)
		(W)EEE Collection Points	√	Part of 19.311,00tn (WEEE)
		Do-It-Yourself Delivery	√	
	(W)EEE Discarders Targeted	Private Sector Entities	√	
		Public Sector Entities		
		Households	√	19.311,00tn (WEEE)
		All of the Above (mixed origination)		
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only		
		EEE Only		
		WEEE and EEE	√	
	Traceability of (W)EEE	Recording (W)EEE Discarding Sources	√	
		Absence of Recording (W)EEE Discarding Sources		
	Qualitative	Sorting and Identification of (W)EEE		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Assessment of (W)EEE	Non-Identification of (W)EEE	√	
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance		
		Counting of (W)EEE Accumulatively	√	371.365 (WEEE)
		Absence of (W)EEE Counting		
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale		
		Weighting of (W)EEE per Type Through Proxy Data		
		Weighting of (W)EEE Accumulatively Through Physical Scale	√	19.311,00tn (WEEE)
		Weighting of (W)EEE Accumulatively Through Proxy Data		
		Combination of the Above		
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation		
		Assessment of Re-use Jobs Creation		
		Assessment of both accumulatively	√	1.220
		No assessment of jobs creation		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
REWEEE Trading Stores	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance	√	WEEE 61.371 Large Household Appliances 1.959 Consumer Equipment 1.306 Small Electronic Appliances 653 Information Technology (IT) and Telecommunications Equipment EEE 9.515 Large Household Appliances 672 Consumer Equipment 672 Small Electronic Appliances 336 Information Technology (IT) and Telecommunications Equipment
		Counting of REWEEE Accumulatively		
		Absence of REWEEE Counting		
	Quantitative Assessment of	Weighting of REWEEE per Type Through Physical Scale		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	REWEEE	Weighting of REWEEE per Type Through Proxy Data	√	WEEE 3.191,30tn Large Household Appliances 101,85tn Consumer Equipment 67,90tn Small Electronic Appliances 33,95tn Information Technology (IT) and Telecommunications Equipment EEE 494,70tn Large Household Appliances 34,92tn Consumer Equipment 34,92tn Small Electronic Appliances 17,46tn Information Technology (IT) and Telecommunications Equipment
		Weighting of REWEEE Accumulatively Through Physical Scale		
		Weighting of REWEEE Accumulatively Through Proxy Data		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
		Combination of the Above		
	Point of Calculation for REWEEE	Available in Trading Store		
		Sold or Donated	√	
	Trading of REWEEE	Bought by customer	√	3.395,00tn
		Received by customer as donation		
		Combination of the Above		
Performance Indicators	Collected (W)EEE			19.311,00tn (WEEE)
	REWEEE			3.395,00tn (WEEE) 582,00tn (EEE)
	Accumulative (W)EEE Re-Use Ratio			17,58%
	(W)EEE Re-Use Ratio per Type			Lack of data
	Number of EEE Types Covered			4
	Interconnection with Producer Responsibility Organization			Yes

1.4.1.3 Sirrmiet

SIRRMIET (Syndicat Interprofessionnel du Reconditionnement et de la Régénération des Matériels Informatiques, Electroniques et Télécoms) stands as a trade union for the ICT equipment refurbishers including Bak2Group, Bisrepetita and Infonegoce, specialized in the reconditioning and regeneration of computer, electronic and telecom equipment,[27]. Among others, SIRRMIET objectives include:

- Informing its members on the regulatory and legislative constraints applicable to the profession and promote any training or good practice.
- Performing all acts, carrying out all operations, completing all activities to which the trade unions are authorised by law.

[27] http://www.sirrmiet.fr/WD190AWP/WD190Awp.exe/CTX_1700-6-BXbUEFvvYo-EFB8920C/PAGE_INDEX/SYNC_1288127908?WD_ACTION_=MENU&ID=M8 [Accessed 27-09-2017]

Flow Chart 9: Applied (W)EEE Re-Use Methodology from SIRRMIET – FRANCE

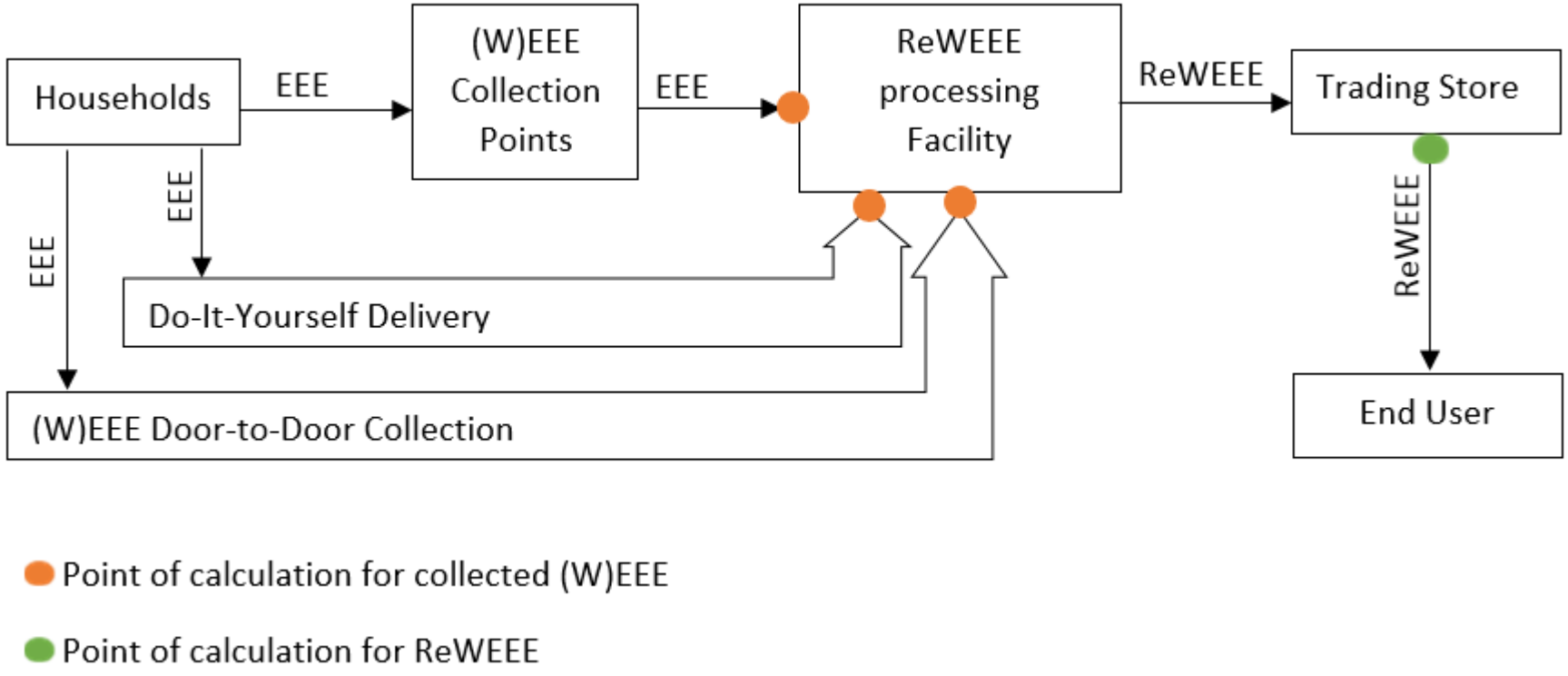


Table 14: Applied (W)EEE Re-Use Methodology from SIRRMIET – FRANCE

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites		
		(W)EEE Door to Door Collection	√	Part of 20.000,00tn (EEE)
		(W)EEE Collection Points	√	Part of 20.000,00tn (EEE)
		Do-It-Yourself Delivery	√	Part of 20.000,00tn (EEE)
	(W)EEE Discarders Targeted	Private Sector Entities		
		Public Sector Entities		
		Households	√	20.000,00tn (EEE)
		All of the Above (mixed origination)		
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only		
		EEE Only	√	
		WEEE and EEE		
	Traceability of (W)EEE	Recording (W)EEE Discarding Sources	√	
		Absence of Recording (W)EEE Discarding Sources		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Qualitative Assessment of (W)EEE	Sorting and Identification of (W)EEE	√	Screens Information Technology (IT) and telecommunication equipment Non-identified WEEE
		Non-Identification of (W)EEE		
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance		
		Counting of (W)EEE Accumulatively		
		Absence of (W)EEE Counting	√	
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale		
		Weighting of (W)EEE per Type Through Proxy Data		
		Weighting of (W)EEE Accumulatively Through Physical Scale	√	20.000,00tn (EEE)
		Weighting of (W)EEE Accumulatively Through Proxy Data		
		Combination of the Above		
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
		Assessment of Re-use Jobs Creation		
		Assessment of both accumulatively		
		No assessment of jobs creation	√	
REWEEE Trading Stores	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance		
		Counting of REWEEE Accumulatively		
		Absence of REWEEE Counting	√	
	Quantitative Assessment of REWEEE	Weighting of REWEEE per Type Through Physical Scale		
		Weighting of REWEEE per Type Through Proxy Data		
		Weighting of REWEEE Accumulatively Through Physical Scale	√	9.000tn
		Weighting of REWEEE Accumulatively Through Proxy Data		
		Combination of the Above		
	Point of Calculation for REWEEE	Available in Trading Store		
		Sold or Donated	√	

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Trading of REWEEE	Bought by customer	√	
		Received by customer as donation		
		Combination of the Above		
Performance Indicators	Collected (W)EEE			20.000tn
	REWEEE			9.000tn
	Accumulative (W)EEE Re-Use Ratio			45%
	(W)EEE Re-Use Ratio per Type			Lack of data
	Number of EEE Types Covered			3
	Interconnection with Producer Responsibility Organization			No

1.4.2 Producer Responsibility Organization

For the French case, the producer responsibility organization responsible for the management of (W)EEE is 'Eco-Systèmes' and stands as the French 'take – back obligation scheme' / compliance system.

Table 15: Questionnaires Results for Producer Responsibility Organization ECO-SYSTEMES – FRANCE

Question	Answer
Number of Represented Structures	Lack of data
Collected material	Both EEE and WEEE
Collected (W)EEE Tonnage in 2015 (in tn)	22.123,00tn WEEE 23.787,00tn EEE
Collected (W)EEE Items in 2015	Lack of data
Re-Used – Repaired EEE Tonnage in 2015 (in tn)	3.849,00tn WEEE 4.803,00tn EEE
Re-Used – Repaired EEE Items in 2015	70.808 WEEE 331.000 EEE
Applied Delivery – Collection Scheme	(W)EEE Collection Points
(W)EEE origination	Households
(W)EEE Types Covered	Non-identified WEEE
Weighting Technique	Physical scale
Point of ReWEEE calculation	When sold or donated

1.4.2.1 Eco-systèmes

Eco-Systèmes is a non-profit organisation accredited by the French Authorities since 9 August 2006 and has been created by 35 producers and retailers. In accordance with French and European regulations, Eco-Systèmes carries out a mission of public interest which is the deployment throughout France of collection, decontamination and recycling scheme for WEEE, excluding lamps and leds. Eco-Systèmes manages, coordinates and organises all those involved in the WEEE industry in order to develop efficient collection and treatment systems in France. The number of used appliances collected by Eco-Systèmes has risen from 350,000 in 2006 to 48,8 million items in 2016. With more than 1.960 producer members in 2016, Eco-Systèmes covers more than 78% of companies introducing electrical and electronic household appliances onto the market in France.

They also provide legal services to their members in order to help them comply with the French regulation[28].

According to 'Eco-systèmes', there is a need to clarify first the difference between re-use and preparation for re-use and define a way to report on these activities to be sure that Member States count the same flows. A target would also raise economic questions as a large amount of what is collected today is not reusable due to the damages during handling (except for WEEE collected by distributors)[29].

Since the birth of the industry, Eco-Systèmes advocates for a high value-added environmental, technological and social model. This vision contributes to the development of a particularly efficient, innovative and job-creating French recycling industry. Eco-Systèmes is strongly committed to help develop the WEEE preparation for re-use activities provided by the social and solidarity economy enterprises (Emmaüs France and ENVIE). In 2016, Eco-systèmes' overall collection rate was 49% for more than 517.000 tonnes of WEEE collected. This corresponds largely to the efforts made by consumers to deposit even more used appliances at collection points. Eco-Systèmes also assists its producer members in their "end-of-life" eco-design process. The tools and services offered by Eco-Systèmes aim at better measuring the environmental impact of the end-of-life of appliances, at evaluating and improving equipment recyclability as well as integrating recycled materials in new products[30].

As a result of the European WEEE Directive[31], Eco-Systèmes and 8 European take-back operators decided to create a joint company in October 2013 called WEEE Europe based in Munich. They help their members to report the placement of their products on the European Union market properly. WEEE Europe simplifies processes and proposes effective solutions to meet the various national declarations and reporting obligations[32].

[28] https://www.eco-systemes.fr/en/all-about-eco-systemes [Accessed 25-09-2017]

[29] Seyring N., Kling M., Weißenbacher J. (BiPRO), Hestin M., Lecerf L. (BIO by DELOITTE), Magalini F., Khetriwal D.S., Kuehr R. (United Nations University), (2015), 'Study on WEEE Recovery Targets, Preparation for Re-Use Targets and on the Method for Calculation of the Recovery Targets', Final Report, European Commission

[30] https://www.eco-systemes.fr/en/services [Accessed 25-09-2017]

[31] Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE)

[32] https://www.eco-systemes.fr/en/weee-europe [Accessed 25-09-2017]

Flow Chart 10: Applied (W)EEE Re-Use Methodology from Producer Responsibility Organization – FRANCE

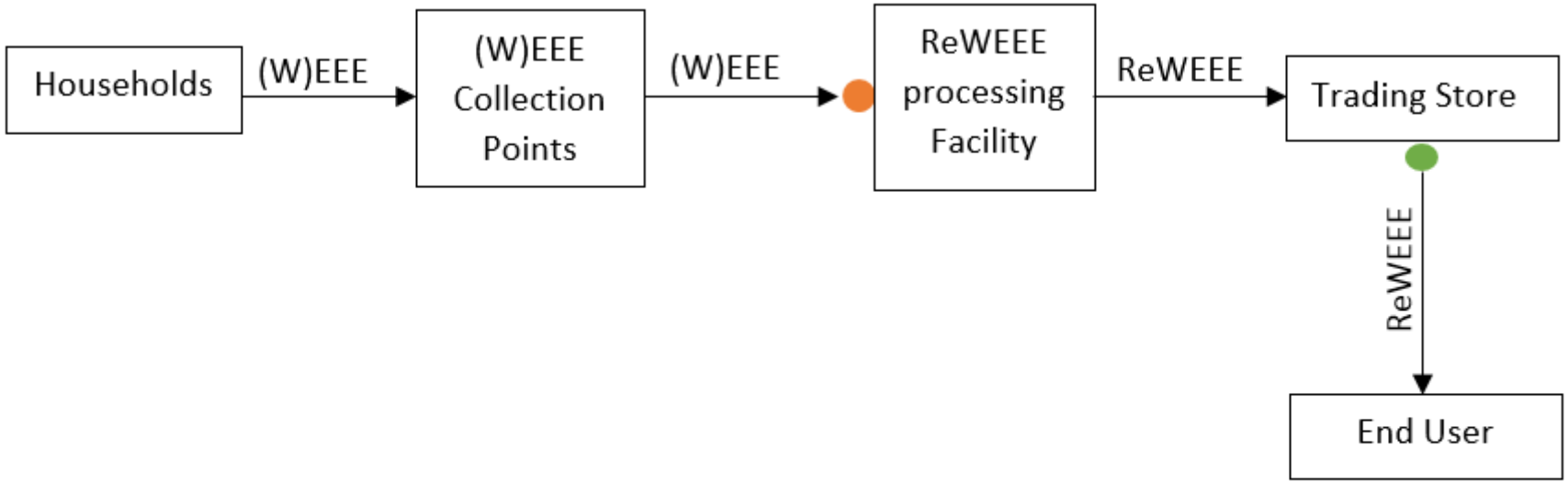


Table 16: Applied (W)EEE Re-Use Methodology from Producer Responsibility Organization – FRANCE

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites		
		(W)EEE Door to Door Collection		
		(W)EEE Collection Points	√	22.123,00tn WEEE 23.787,00tn EEE
		Do-It-Yourself Delivery		
	(W)EEE Discarders Targeted	Private Sector Entities		
		Public Sector Entities		
		Households	√	22.123,00tn WEEE 23.787,00tn EEE
		All of the Above (mixed origination)		
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only		
		EEE Only		
		WEEE and EEE	√	
	Traceability of	Recording (W)EEE Discarding Sources	√	

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	(W)EEE	Absence of Recording (W)EEE Discarding Sources		
	Qualitative Assessment of (W)EEE	Sorting and Identification of (W)EEE		
		Non-Identification of (W)EEE	√	
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance		
		Counting of (W)EEE Accumulatively		
		Absence of (W)EEE Counting	√	
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale		
		Weighting of (W)EEE per Type Through Proxy Data		
		Weighting of (W)EEE Accumulatively Through Physical Scale	√	22.123,00tn WEEE 23.787,00tn EEE
		Weighting of (W)EEE Accumulatively Through Proxy Data		
		Combination of the Above		
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation		
		Assessment of Re-use Jobs Creation		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
		Assessment of both accumulatively		
		No assessment of jobs creation	√	
REWEEE Trading Stores	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance		
		Counting of REWEEE Accumulatively	√	70.808 WEEE 331.000 EEE
		Absence of REWEEE Counting		
	Quantitative Assessment of REWEEE	Weighting of REWEEE per Type Through Physical Scale		
		Weighting of REWEEE per Type Through Proxy Data		
		Weighting of REWEEE Accumulatively Through Physical Scale		
		Weighting of REWEEE Accumulatively Through Proxy Data		
		Combination of the Above[33]	√	3.849,00tn WEEE

[33] Eco-systèmes collects data on re-use and preparing for re-use from what is reported from re-use networks such as Emmaüs and Envie. The latter is using a combination of physical weighting and proxy data calculating (see the section on Envie).

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
				4.803,00tn EEE
	Point of Calculation for REWEEE	Available in Trading Store		
		Sold or Donated[34]	√	
	Trading of REWEEE	Bought by customer		
		Received by customer as donation		
		Combination of the Above	√	
Performance Indicators	Collected (W)EEE			22.123,00tn WEEE 23.787,00tn EEE
	REWEEE			3.849,00tn WEEE 4.803,00tn EEE
	Accumulative (W)EEE Re-Use Ratio			17,40% WEEE 20,19% EEE
	(W)EEE Re-Use Ratio per Type			Lack of data

[34] Eco-systèmes is applying targets on re-use and preparing for re-use to itself voluntarily. The reporting done by the re-use centres networks (principally Emmaüs and Envie) is not set by law and is therefore possibly different from a re-use network to another. In this case, Emmaüs reports what is made available on the market while Envie is reporting what is sold or donated. However, Eco-systèmes would rather collect data on what is sold or donated.

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Number of EEE Types Covered			Lack of data
	Interconnection with Re-use centres			Yes

1.5 Ireland

The questionnaire respondent for the case of Ireland was a re-use centre network named 'Rehab Recycle'.

The re-use of EEE is done mostly by re-use centres in the B2B business. They buy materials (mostly IT equipment) from companies and refurbish it. Some charity shops and re-use centres also rely on donations but to a lesser extent. They do not have access to the WEEE stream[35].

The Irish Ministry of the Environment has defined criteria for the approval of re-use centres. The latter will have to comply with quality standards and have reporting obligations. Some re-use centres specialised in the re-use of IT equipment from the B2B business are likely to be interested in being approved for the re-use of other type of equipment.

In 2013, a study was conducted to investigate how preparation for re-use could work in practice. 'Rehab Recycle', a company specialised in recycling services with a branch specialised in the re-use of equipment from the B2B sector, partnered with a compliance scheme, and conducted a trial to assess the reusability of WEEE collected through municipalities, retailers and voluntary drop-off. At the end of the trial, the collective scheme gave 'Rebab Recycle' a month to sell the equipment. The re-use organisation refused to sign the contract with such a condition; therefore, the refurbished machines still belong to the collective scheme and the equipment hasn't been put back on the market yet.

1.5.1 Re-Use Centres Networks

Table 17: Questionnaires Results of Re-Use Centres Networks – IRELAND

Question	Answer
Number of Represented Structures	1
Collected material	Both EEE and WEEE
Collected (W)EEE Tonnage in 2015 (in tn)	1.040,00tn WEEE 893,00tn EEE
Collected (W)EEE Items in 2015	Lack of data
Re-Used – Repaired EEE Tonnage in 2015 (in tn)	20,00tn WEEE 180,00tn EEE
Re-Used – Repaired EEE Items in 2015	Lack of data

[35] Seyring N., Kling M., Weißenbacher J. (BiPRO), Hestin M., Lecerf L. (BIO by DELOITTE), Magalini F., Khetriwal D.S., Kuehr R. (United Nations University), (2015), 'Study on WEEE Recovery Targets, Preparation for Re-Use Targets and on the Method for Calculation of the Recovery Targets', Final Report, European Commission

Question	Answer
Applied Delivery – Collection Scheme	Civic Amenity Sites (W)EEE Door to Door Collection (W)EEE Collection Points
(W)EEE origination	Private Sector Entities Households
(W)EEE Types Covered	Information Technology (IT) and Telecommunication Equipment
Weighting Technique	Proxy weight data
Point of ReWEEE calculation	When sold or donated

In 2012, at national level, the quantities of total WEEE generated and total WEEE collected, as well as the quantities of REWEEE that were reported as being re-used or prepared for re-use were[36],[37]:

- Estimation on Total WEEE generated: 87.611tn
- Total (W)EEE collected: 41.177tn
- REWEEE sold or donated: 360tn
- **Re-Use and Preparation for Re-Use Rate on the basis of WEEE collected: 0,87%**.

On the basis of WEEE generated, the annual (W)EEE re-use and preparation for re-use ratio at national level is proposed to be calculated as follows:

$$RPR = \frac{[\mathrm{Re}(W)EEE + \mathrm{Re}\ EEE]}{WEEE} \cdot 100\%$$, where

[36] Seyring N., Kling M., Weißenbacher J. (BiPRO), Hestin M., Lecerf L. (BIO by DELOITTE), Magalini F., Khetriwal D.S., Kuehr R. (United Nations University), (2015), 'Study on WEEE Recovery Targets, Preparation for Re-Use Targets and on the Method for Calculation of the Recovery Targets', Final Report, European Commission

[37] Magalini F., Wang F., Huisman J., Kuehr R. (United Nations University), Baldé K., Van Straalen V. (Statistics Netherlands), Hestin M., Lecerf L. (BIO by DELOITTE), Sayman U., Akpulat O. (Regional Environmental Center), (2014), 'Study on Collection Rates of WEEE', Final Report, European Commission

$\mathrm{Re}(W)EEE$ - Annually produced quantities of repaired (W)EEE coming from preparation for re-use facilities, that are sold or donated measured in $\frac{tn}{y}$. A 'preparation for re-use' facility is considered any re-use centre which has as an input fraction WEEE quantities coming from the waste stream and also, EEE fraction quantities coming from the non-waste stream.

$\mathrm{Re}\ EEE$ - Annually produced quantities of repaired EEE from re-use facilities, that are sold or donated, measured in $\frac{tn}{y}$. The repaired fraction is considered to have originated exclusively from EEE (non-waste stream). As 're-use' facility is considered any recognized operator of EEE (non-waste stream) that has an agreement with a PRO scheme or a public body for the reporting of data and/or at traceability and reporting system in place.

$WEEE$ - Annually produced WEEE quantities, considered as a waste stream, at national level, measured in $\frac{tn}{y}$. The formula for the calculation of the total WEEE quantities generated in a Member State is described in detail at the Annex II of the Commission Implementing Regulation 2017/699/EU.

Based on the above and for the year 2012, the estimated annual (W)EEE re-use and preparation for re-use ratio at national level on the basis of WEEE generated was 0,41%.

1.5.1.1 Rehab Recycle

Rehab Recycle, established in 1984, has developed into a successful multi-national company providing a range of innovative recycling solutions, information security management services and asset recovery services for businesses across four main European locations – Ireland, the United Kingdom, The Netherlands and Poland. In Ireland, Rehab Recycle has a nationwide presence, with bases in Dublin, Cork, Limerick, Galway and Naas[38].

Concerning (W)EEE management, Rehab Recycle offers a comprehensive electrical and electronic waste recycling service to large and small commercial customers alike and can facilitate business collections as well as drop-offs to permitted recycling facilities[39]. In particular, as for the re-use of (W)EEE, Rehab Recycle processes and remarkets thousands of assets across Europe on a weekly basis. The remarketed equipment includes computers, laptops, servers, networking equipment, TFT

[38] http://www.rehabrecycle.ie/about-us/about-rehab-recycle [Accessed 25-09-2017]

[39] http://www.rehabrecycle.ie/recycling-services/weee-recycling [Accessed 25-09-2017]

screens, communications systems, etc[40]. The re-use process for (W)EEE and especially, for IT and telecommunication equipment is divided in 3 discrete stages:

- Door to door collection of (W)EEE.
- Reception of (W)EEE at the temporary storage / processing facility.
- Inspection of (W)EEE as for their re-usability.

Rehab Recycle has been recently selected to be the first authorised refurbisher of Large Household Appliances in the island of Ireland. They offer quality reconditioned large household appliances such as washing machines and dryers at a very low price.

Finally, Rehab Recycle has initiate the Promise IT project which is a corporate donation programme which helps companies in the secure donation of IT equipment to schools, charities and community groups. Data contained in the IT products is certifiably erased. The equipment is then rebuilt and passed on. Promise IT not only helps charities, schools and community groups but also supports the sustainability of employment for people with disabilities[41].

[40] http://www.rehabrecycle.ie/asset-recovery [Accessed 25-09-2017]

[41] http://www.promiseit.ie/ [Accessed 25-09-2017]

Flow Chart 11: Applied (W)EEE Re-Use Methodology from Rehab Recycle – IRELAND

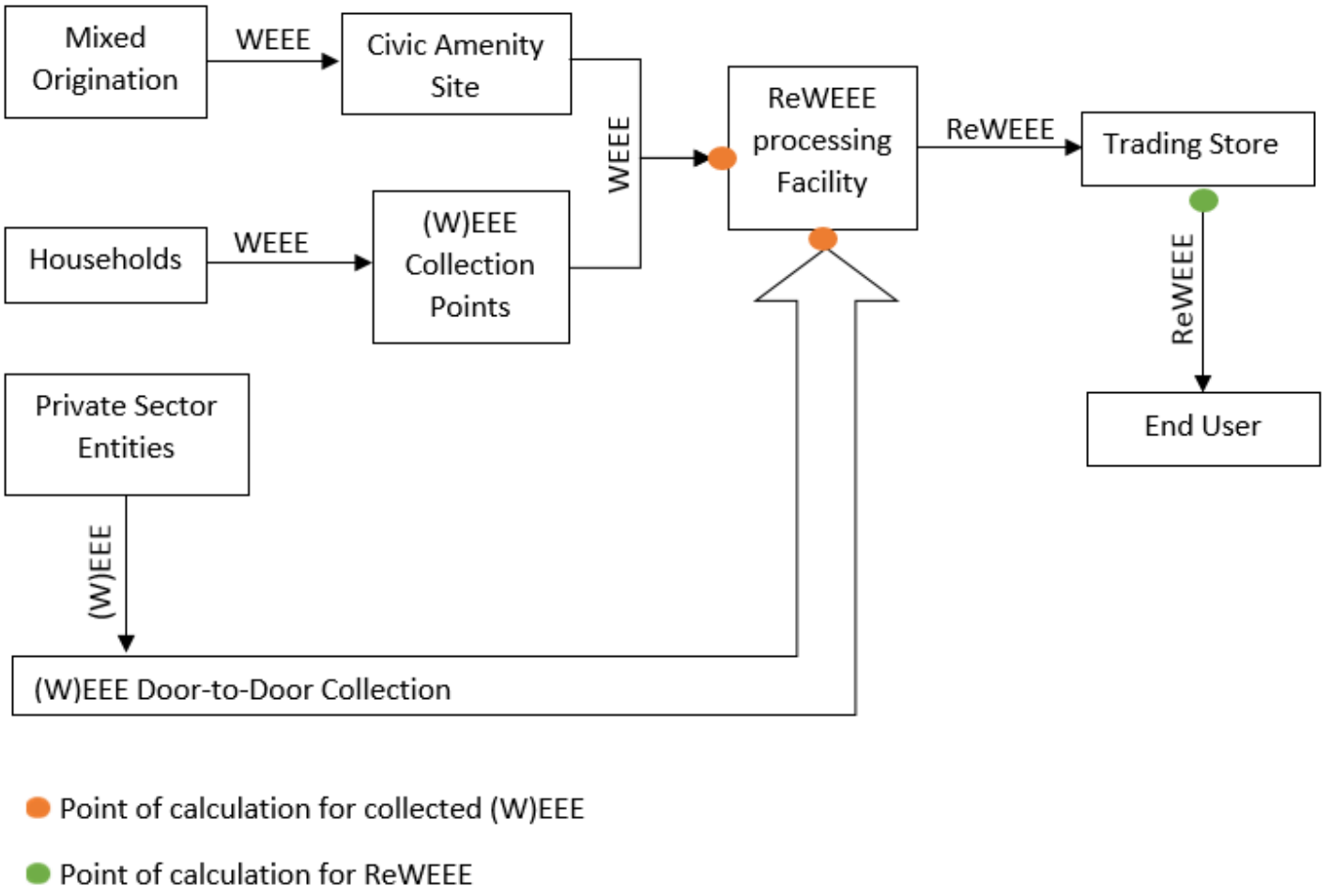


Table 18: Applied (W)EEE Re-Use Methodology from Rehab Recycle – IRELAND

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites	√	Part of 9.700,00tn WEEE
		(W)EEE Door to Door Collection	√	340,00tn + Part of 9.700,00tn WEEE 893,00tn EEE
		(W)EEE Collection Points	√	Part of 9.700,00tn WEEE
		Do-It-Yourself Delivery		
	(W)EEE Discarders Targeted	Private Sector Entities	√	340,00tn + Part of 9.700,00tn WEEE 893,00tn EEE
		Public Sector Entities		
		Households	√	Part of 9.700,00tn WEEE
		All of the Above (mixed origination)	√	Part of 9.700,00tn WEEE
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only		
		EEE Only		
		WEEE and EEE	√	
	Traceability of	Recording (W)EEE Discarding Sources	√	

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	(W)EEE	Absence of Recording (W)EEE Discarding Sources		
	Qualitative Assessment of (W)EEE	Sorting and Identification of (W)EEE	√	
		Non-Identification of (W)EEE		
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance		
		Counting of (W)EEE Accumulatively		
		Absence of (W)EEE Counting	√	
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale		
		Weighting of (W)EEE per Type Through Proxy Data	√	1.040,00tn Information Technology (IT) and Telecommunication Equipment (WEEE) 893,00tn Information Technology (IT) and Telecommunication Equipment (EEE)
		Weighting of (W)EEE Accumulatively Through Physical Scale		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
		Weighting of (W)EEE Accumulatively Through Proxy Data		
		Combination of the Above		
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation		
		Assessment of Re-use Jobs Creation		
		Assessment of both accumulatively	√	40
		No assessment of jobs creation		
REWEEE Trading Stores	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance		
		Counting of REWEEE Accumulatively		
		Absence of REWEEE Counting	√	
	Quantitative Assessment of REWEEE	Weighting of REWEEE per Type Through Physical Scale		
		Weighting of REWEEE per Type Through Proxy Data	√	20,00tn Information Technology (IT) and Telecommunication Equipment (WEEE) 180,00tn Information Technology (IT) and Telecommunication Equipment (EEE)

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
		Weighting of REWEEE Accumulatively Through Physical Scale		
		Weighting of REWEEE Accumulatively Through Proxy Data		
		Combination of the Above		
	Point of Calculation for REWEEE	Available in Trading Store		
		Sold or Donated	√	
	Trading of REWEEE	Bought by customer		
		Received by customer as donation		
		Combination of the Above	√	
Performance Indicators	Collected (W)EEE			10.040,00tn WEEE 893,00tn EEE
	REWEEE			20,00tn WEEE 180,00tn EEE
	Accumulative (W)EEE Re-Use Ratio			1,92% WEEE 20,16% EEE

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	(W)EEE Re-Use Ratio per Type			1,92% Information Technology (IT) and Telecommunication Equipment (WEEE) 20,16% Information Technology (IT) and Telecommunication Equipment (EEE)
	Number of EEE Types Covered			1
	Interconnection with Producer Responsibility Organization			No

1.6 Portugal

For the case of Portugal, the questionnaire's respondent was a Producer Responsibility Organization, namely, 'Amb3E' responsible for WEEE management.

1.6.1 Producer Responsibility Organization

Table 19: Questionnaires Results for Producer Responsibility Organization – PORTUGAL

Question	Answer
Number of Represented Structures	Lack of data
Collected material	Only WEEE
Collected (W)EEE Tonnage in 2015 (in tn)	36.845,20tn WEEE
Collected (W)EEE Items in 2015	Lack of data
Re-Used – Repaired EEE Tonnage in 2015 (in tn)	12,70tn WEEE
Re-Used – Repaired EEE Items in 2015	Lack of data
Applied Delivery – Collection Scheme	Do-It-Yourself Delivery
(W)EEE origination	Households
(W)EEE Types Covered	Small Electronic Appliances Screens
Weighting Technique	Physical scale
Point of ReWEEE calculation	When sold or donated

In 2012, at national level, the quantities of total WEEE generated and total WEEE collected, as well as the quantities of REWEEE that were reported as being re-used or prepared for re-use were[42],[43]:

- Estimation on Total WEEE generated: 189.978tn
- Total (W)EEE collected: 43.695tn
- REWEEE sold or donated: 33tn

[42] Seyring N., Kling M., Weißenbacher J. (BiPRO), Hestin M., Lecerf L. (BIO by DELOITTE), Magalini F., Khetriwal D.S., Kuehr R. (United Nations University), (2015), 'Study on WEEE Recovery Targets, Preparation for Re-Use Targets and on the Method for Calculation of the Recovery Targets', Final Report, European Commission

[43] Magalini F., Wang F., Huisman J., Kuehr R. (United Nations University), Baldé K., Van Straalen V. (Statistics Netherlands), Hestin M., Lecerf L. (BIO by DELOITTE), Sayman U., Akpulat O. (Regional Environmental Center), (2014), 'Study on Collection Rates of WEEE', Final Report, European Commission

- **Re-Use and Preparation for Re-Use Rate on the basis of WEEE collected: 0,08%**.

On the basis of WEEE generated, the annual (W)EEE re-use and preparation for re-use ratio at national level is proposed to be calculated as follows:

$$RPR = \frac{\mathrm{Re}(W)EEE}{WEEE} \cdot 100\%$$, where

$\mathrm{Re}(W)EEE$ - Annually produced quantities of repaired (W)EEE coming from preparation for re-use facilities, measured in $\frac{tn}{y}$. A 'preparation for re-use' facility is considered any re-use centre which has as an input fraction WEEE quantities coming from the waste stream.

$WEEE$ - Annually produced WEEE quantities, considered as a waste stream, at national level, measured in $\frac{tn}{y}$. The formula for the calculation of the total WEEE quantities generated in a Member State is described in detail at the Annex II of the Commission Implementing Regulation 2017/699/EU.

Based on the above and for the year 2012, the estimated annual (W)EEE re-use and preparation for re-use ratio at national level on the basis of WEEE generated was 0,02%.

1.6.1.1 AMb3E

'Amb3E – Associação Portuguesa de Gestão de Resíduos' is a non-profit organisation. It was formally founded by EEE Producers on the 27th April 2005. It was the first Portuguese Entity created in Portugal to manage WEEE. Amb3E got its License from the National Waste Institute on March 13th 2006 signed by the Ministers of the Environment and of the Economy as it must be done by law[44].

Based on its legal background, Amb3E's first priority is to prevent WEEE production and subsequently promote its reuse, recycling and other forms of recovery, so as to reduce the quantity and the harmfulness of its disposal, thus contributing to improve the environmental performance of all the stakeholders involved in the life cycle of EEE. Amb3E takes care of the extended responsibility of producers through five-year contracts. Amb3E activities are the following[45]:

[44] http://www.amb3e.pt/ [Accessed 27-09-2017]

[45] http://www.amb3e.pt/aderir/quero-aderir/ [Accessed 27-09-2017]

- Make contracts with the appropriate waste management operators for the development of the logistic operations.
- Implement the collection scheme, make contracts with private entities, Municipalities and multi-municipal systems that will operate as Collection centres, organizing the separate collection of WEEE.
- Make contracts with producers and other entities operating in the area of WEEE reuse.
- Manage the integrated system by monitoring and controlling the material and financial flows, using a dedicated information system.
- Promote public awareness and information on the procedures to be applied in WEEE management.
- Encourage the research and development of new dismantling and material separation methods and of recycling solutions for WEEE components.

Amb3E covers all the EEE range falling under the categories set out in Annex I of the WEEE directive. Producers may join Amb3E either as an Associate or as a User. Associates may attend Amb3E general meetings and Amb3E 'Fileira' Meetings (related to EEE categories), therefore helping to create the internal rules and policy. Users only request Amb3E take back services. The system is financed by the ECOREEE which is a fee per unit, collected from the producers for every product put onto the market[46]. The income raised is used to finance the operating costs linked to WEEE management. Any surplus must be re-invested into the activities of the take bake system.

Amb3E collection network is based on municipalities, private waste management companies and retailers. It also has special collection circuits from Fire Departments and Pontos Electrão (containers designed by Amb3E for collecting WEEE in large commercial areas such as shopping centres). Currently Amb3E has over 600 collection points in Portugal mainland and Islands.

[46] http://www.amb3e.pt/reciclar/reee/ [Accessed 27-09-2017]

Flow Chart 12: Applied (W)EEE Re-Use Methodology from Producer Responsibility Organization – PORTUGAL

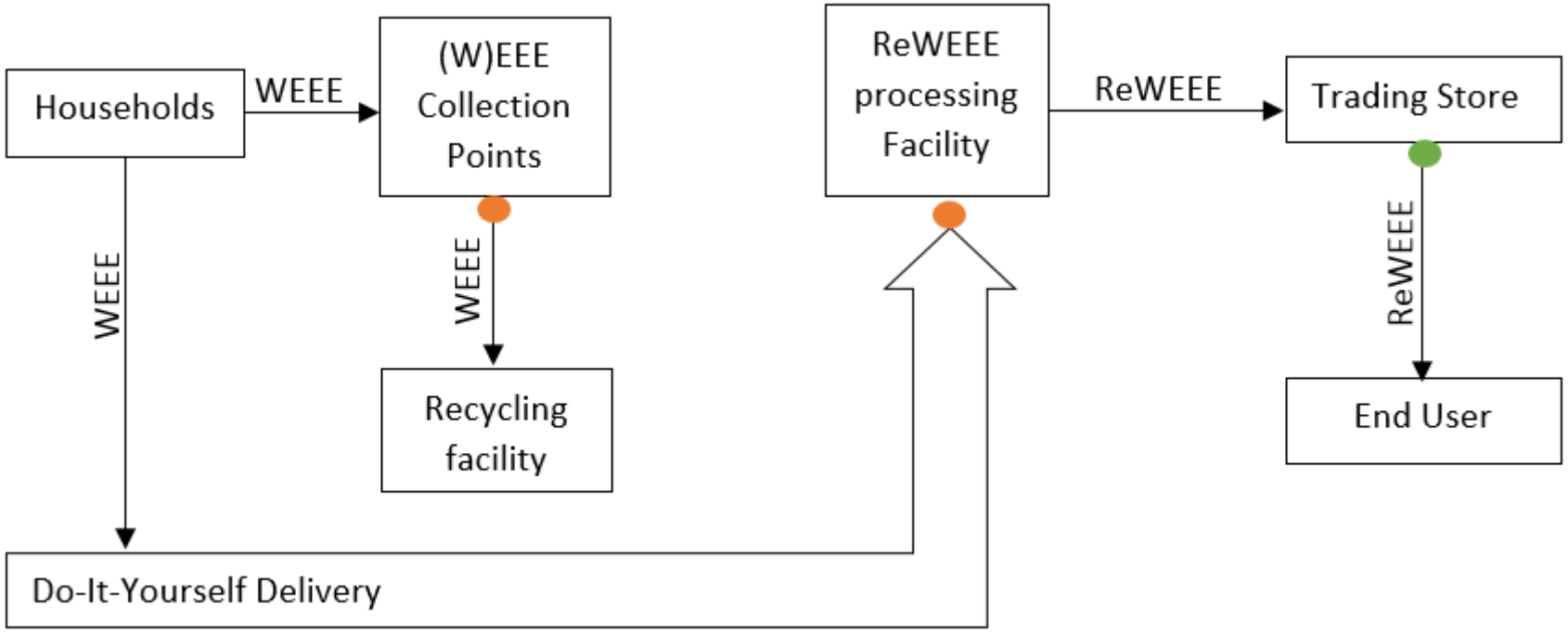


Table 20: Applied (W)EEE Re-Use Methodology from Producer Responsibility Organization – PORTUGAL

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites		
		(W)EEE Door to Door Collection		
		(W)EEE Collection Points	√	Part of 36.845,20tn
		Do-It-Yourself Delivery	√	Part of 36.845,20tn
	(W)EEE Discarders Targeted	Private Sector Entities		
		Public Sector Entities		
		Households	√	36.845,20tn
		All of the Above (mixed origination)		
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only	√	
		EEE Only		
		WEEE and EEE		
	Traceability of (W)EEE	Recording (W)EEE Discarding Sources	√	
		Absence of Recording (W)EEE Discarding Sources		
	Qualitative	Sorting and Identification of (W)EEE	√	

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Assessment of (W)EEE	Non-Identification of (W)EEE		
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance		
		Counting of (W)EEE Accumulatively		
		Absence of (W)EEE Counting	√	
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale	√	17.317,24tn Large Household Appliances 4.421,42tn Temperature Exchange Equipment 11.422,01tn Small Electronic Appliances 368,45tn Lamps and Leds 3.316,07tn Screens
		Weighting of (W)EEE per Type Through Proxy Data		
		Weighting of (W)EEE Accumulatively Through Physical Scale		
		Weighting of (W)EEE Accumulatively Through Proxy Data		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
		Combination of the Above		
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation	1	2 (estimated)
		Assessment of Re-use Jobs Creation		
		Assessment of both accumulatively		
		No assessment of jobs creation		
REWEEE Temporary Storage	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance		
		Counting of REWEEE Accumulatively		
		Absence of REWEEE Counting	√	
	Quantitative Assessment of REWEEE	Weighting of REWEEE per Type Through Physical Scale	√	7,49tn Small Electronic Appliances 5,21tn Screens
		Weighting of REWEEE per Type Through Proxy Data		
		Weighting of REWEEE Accumulatively Through Physical Scale		
		Weighting of REWEEE Accumulatively Through Proxy Data		
		Combination of the Above		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
REWEEE Trading Stores	REWEEE Reception	REWEEE Reception per WEEE Type	√	
		REWEEE Reception per WEEE Group (electrical or electronic equipment)		
		None of the Above		
	Point of Calculation for REWEEE	Available in Trading Store		
		Sold or Donated	√	
	Trading of REWEEE	Bought by customer		
		Received by customer as donation	√	
		Combination of the Above		
Performance Indicators	Collected (W)EEE			36.845,20tn
	REWEEE			12,70tn
	Accumulative (W)EEE Re-Use Ratio			0,03%
	(W)EEE Re-Use Ratio per Type			0,07% Small Electronic Appliances 0,16% Screens
	Number of EEE Types Covered			2

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Interconnection with Re-use centres			Yes

1.7 Romania

The questionnaires' respondent for the case of Romania was a re-use centre network titled 'Ateliere Fara Frontiere'.

1.7.1 Re-Use Centres Networks

Table 21: Questionnaires Results of Re-Use Centres Networks – ROMANIA

Questions	Answers from Ateliere Fara Frontiere
Number of Represented Structures	1
Collected material	Only WEEE
Collected (W)EEE Tonnage in 2015 (in tn)	103,19tn
Collected (W)EEE Items in 2015	19.373
Re-Used – Repaired EEE Tonnage in 2015 (in tn)	39,54tn
Re-Used – Repaired EEE Items in 2015	7.600
Applied Delivery – Collection Scheme	(W)EEE Door to Door Collection
(W)EEE origination	Private Sector Entities Public Sector Entities Households
(W)EEE Types Covered	Information Technology (IT) and Telecommunication Equipment Non-identified (W)EEE
Weighting Technique	Proxy weight data
Point of ReWEEE calculation	When made available on the market

In 2012, at national level, the quantities of total WEEE generated and total WEEE collected, as well as the quantities of REWEEE that were reported as being re-used or prepared for re-use were[47],[48]:

[47] Seyring N., Kling M., Weißenbacher J. (BiPRO), Hestin M., Lecerf L. (BIO by DELOITTE), Magalini F., Khetriwal D.S., Kuehr R. (United Nations University), (2015), 'Study on WEEE Recovery Targets, Preparation for Re-Use Targets and on the Method for Calculation of the Recovery Targets', Final Report, European Commission

- Estimation on Total WEEE generated: 153.887tn
- Total (W)EEE collected: 23.083tn
- REWEEE sold or donated: 0tn
- **Re-Use and Preparation for Re-Use Rate on the basis of WEEE collected: 0%**.

On the basis of WEEE generated, the annual (W)EEE re-use and preparation for re-use ratio at national level is proposed to be calculated as follows:

$$RPR = \frac{\mathrm{Re}(W)EEE}{WEEE} \cdot 100\%$$, where

$\mathrm{Re}(W)EEE$ - Annually produced quantities of repaired (W)EEE coming from preparation for re-use facilities, that are available in trading stores measured in $\frac{tn}{y}$. A 'preparation for re-use' facility is considered any re-use centre which has as an input fraction WEEE quantities coming from the waste stream.

$WEEE$ - Annually produced WEEE quantities, considered as a waste stream, at national level, measured in $\frac{tn}{y}$. The formula for the calculation of the total WEEE quantities generated in a Member State is described in detail at the Annex II of the Commission Implementing Regulation 2017/699/EU.

Based on the above and for the year 2012, the estimated annual (W)EEE re-use and preparation for re-use ratio at national level on the basis of WEEE generated was 0%.

1.7.1.1 Ateliere Fara Frontiere

Ateliere Fara Frontiere (AFF) is a Romanian non-profit association, Work Integration Social Enterprise creating jobs for disadvantaged people in social and solidarity workshops in order to prepare them for complete social and professional reintegration on the labour market. The missions of Ateliere Fara Frontiere are[49]:

- Fight against exclusion

[48] Magalini F., Wang F., Huisman J., Kuehr R. (United Nations University), Baldé K., Van Straalen V. (Statistics Netherlands), Hestin M., Lecerf L. (BIO by DELOITTE), Sayman U., Akpulat O. (Regional Environmental Center), (2014), 'Study on Collection Rates of WEEE', Final Report, European Commission

[49] http://atelierefarafrontiere.ro/who-we-are/ [Accessed 27-09-2017]

- Environmental protection
- Solidarity with education and community development

In May 2009, Ateliere Fara Frontiere has launched Bucharest's work integration workshop, which provides to people in great difficulty who are employed there:

- An employment contract – maximum 24 months
- A productive work experience, in one of the following activities: recycling, refurbishing, logistics, packing, merchandise handling, cleaning, transport, sewing
- An individual follows up: counselling, orientation, training, job placement – in partnership with Non-profits, institutions and companies

Designed as a training period with the prospect of a career at the end, the social and professional program has the following objectives:

- (re)building self-confidence and confidence in others
- (re)gaining autonomy
- (re)building lasting employability
- (re)building and consolidating social and family ties
- (re)integration on the labour market and society as citizens with full rights

By collecting, reusing and recycling waste from companies, Non-profits and institutions, Ateliere Fara Frontiere takes part in waste reduction and implements a sustainable waste management option.

Flow Chart 13: Applied (W)EEE Re-Use Methodology from Ateliere Fara Frontiere – ROMANIA

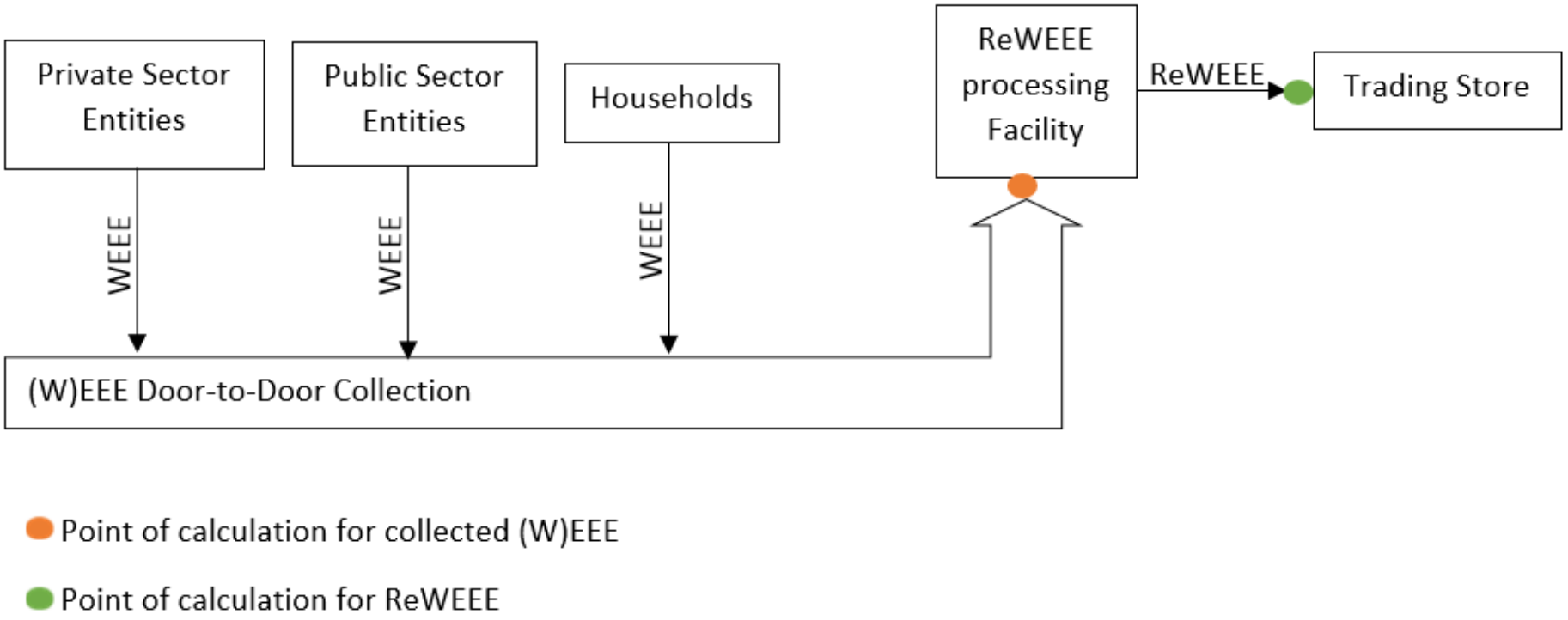


Table 22: Applied (W)EEE Re-Use Methodology from Ateliere Fara Frontiere – ROMANIA

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites		
		(W)EEE Door to Door Collection	√	103,19tn
		(W)EEE Collection Points		
		Do-It-Yourself Delivery		
	(W)EEE Discarders Targeted	Private Sector Entities	√	99,58tn
		Public Sector Entities	√	2,58tn
		Households	√	1,03tn
		All of the Above (mixed origination)		
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only	√	
		EEE Only		
		WEEE and EEE		
	Traceability of (W)EEE	Recording (W)EEE Discarding Sources	√	
		Absence of Recording (W)EEE Discarding Sources		
	Qualitative	Sorting and Identification of (W)EEE	√	Information Technology (IT) and

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Assessment of (W)EEE			Telecommunication Equipment Non-Identified (W)EEE
		Non-Identification of (W)EEE		
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance		
		Counting of (W)EEE Accumulatively	√	19.373
		Absence of (W)EEE Counting		
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale		
		Weighting of (W)EEE per Type Through Proxy Data		
		Weighting of (W)EEE Accumulatively Through Physical Scale		
		Weighting of (W)EEE Accumulatively Through Proxy Data	√	103,19tn
		Combination of the Above		
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation	√	7
		Assessment of Re-use Jobs Creation		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
		Assessment of both accumulatively		
		No assessment of jobs creation		
REWEEE Trading Stores	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance		
		Counting of REWEEE Accumulatively	√	7.600
		Absence of REWEEE Counting		
	Quantitative Assessment of REWEEE	Weighting of REWEEE per Type Through Physical Scale		
		Weighting of REWEEE per Type Through Proxy Data		
		Weighting of REWEEE Accumulatively Through Physical Scale		
		Weighting of REWEEE Accumulatively Through Proxy Data	√	39,54tn
		Combination of the Above		
	Point of Calculation for REWEEE	Available in Trading Store	√	
		Sold or Donated		
	Trading of	Bought by customer		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	REWEEE	Received by customer as donation		
		Combination of the Above	√	26,33tn donated 13,21 sold
Performance Indicators	Collected (W)EEE			103,19tn
	REWEEE			39,54tn
	Accumulative (W)EEE Re-Use Ratio			38,32
	(W)EEE Re-Use Ratio per Type			Lack of data
	Number of EEE Types Covered			2
	Interconnection with Producer Responsibility Organization			No

1.8 Spain

The questionnaires' respondents for the case of Spain were four re-use centres networks titled 'TIV Menorca', 'Traperos de Emaús de Murcia', 'Traperos de Emaús de Navarra' (members of the re-use network AERESS: Asociación Española de Recuperadores de Economía Social y Solidaria), 'Revertia', and a producer responsibility organization titled 'Fundacion Ecotic'.

In Spain, a network of re-use centres is well implemented and has been operating for 20 years (some of their members for more than 45 years). AERESS re-uses and prepares for re-use 5 to 6% of the (W)EEE it collects every year. No distinction is made between what is re-used directly and what is prepared for re-use (waste and non-waste).

All the members of AERESS belong to the social economy. They collect WEEE from municipalities, households and distributors and some have contracts with collective schemes. The 5 to 6% of re-use and preparation for re-use rate achieved therefore corresponds to the quantities of EEE re-used and WEEE prepared for re-use from all these sources[50].

As for the re-use regulation in Spanish territory, it must be noted that Spain is the first European country to require a proportion of some types of WEEE to be prepared for re-use rather than recycled or burned. The introduction of separate national quantitative target for re-use, comes in addition to Spain's implementation of new EU-mandated waste targets introduced as part of the 2012/19/EU WEEE Directive. The new Spanish Royal Decree requires 2% of large household appliances and 3% of IT equipment to be prepared for re-use from 2017. The targets will rise to 3% and 4% respectively from 2018[51].

[50] Seyring N., Kling M., Weißenbacher J. (BiPRO), Hestin M., Lecerf L. (BIO by DELOITTE), Magalini F., Khetriwal D.S., Kuehr R. (United Nations University), (2015), 'Study on WEEE Recovery Targets, Preparation for Re-Use Targets and on the Method for Calculation of the Recovery Targets', Final Report, European Commission

[51] http://www.rreuse.org/spain-first-eu-country-to-mandate-reuse-of-electrical-goods/ [Accessed 28-09-2017]

1.8.1 Re-Use Centres Networks

Table 23: Questionnaires Results of Re-Use Centres Networks – SPAIN

Question	Answer			
	Revertia	TIV Menorca	Traperos de Emaus de Murcia	Traperos de Emaus de Navarra
Number of Represented Structures	1	1	2	1
Collected material	Only WEEE	Only WEEE	Only WEEE	Only WEEE
Collected (W)EEE Tonnage in 2015 (in tn)	140,00tn	1.032,24tn	189,77tn	2.311,15tn
Collected WEEE Items in 2015	Lack of data	Lack of data	Lack of data	Lack of data
Re-Used – Repaired EEE Tonnage in 2015 (in tn)	28,00tn	23,29tn	6,05tn	80, 77tn
Re-Used – Repaired EEE Items in 2015	Lack of data	Lack of data	Lack of data	Lack of data
Applied Delivery – Collection Scheme	(W)EEE Door to Door Collection Do-It-Yourself Delivery	(W)EEE Door to Door Collection (W)EEE Collection Points Do-It-Yourself Delivery	Civic Amenity Sites (W)EEE Door to Door Collection (W)EEE Collection Points Do-It-Yourself Delivery	(W)EEE Door to Door Collection (W)EEE Collection Points

Question	Answer			
(W)EEE origination	Private Sector Entities Public Sector Entities Households	Households Mixed origination	Private Sector Entities Households Mixed origination	Households
(W)EEE Types Covered	Large Household Appliances Information Technology (IT) and Telecommunication Equipment	Small electronic appliances Screens Large Household Appliances Temperature Exchange Equipment Lamps and Led Information Technology (IT) and Telecommunication Equipment	Small electronic appliances Screens Large Household Appliances Temperature Exchange Equipment Lamps and Led Information Technology (IT) and Telecommunication Equipment	Small Electronic Appliances Screens Large Household Appliances Temperature Exchange Equipment Lamps and Led Information Technology (IT) and Telecommunication Equipment
Weighting Technique	Proxy weight data	Physical scale	Physical scale	Both physical scale and proxy weight data
Point of ReWEEE calculation	When made available on	When made available on the	When made available on	When made available

Question	Answer			
	the market	market	the market	on the market

In 2012, at national level, the quantities of total WEEE generated and total WEEE collected, as well as the quantities of REWEEE that were reported as being re-used or prepared for re-use were[52],[53]:

- Estimation on Total WEEE generated: 752.352tn
- Total (W)EEE collected: 157.994tn
- REWEEE sold or donated: 351tn
- **Re-Use and Preparation for Re-Use Rate on the basis of WEEE collected: 0,22%**.

On the basis of WEEE generated, the annual (W)EEE re-use and preparation for re-use ratio at national level is proposed to be calculated as follows:

$$RPR = \frac{\mathrm{Re}(W)EEE}{WEEE} \cdot 100\%$$, where

$\mathrm{Re}(W)EEE$ - Annually produced quantities of repaired (W)EEE coming from preparation for re-use facilities, that are available in trading stores measured in $\frac{tn}{y}$. A 'preparation for re-use' facility is considered any re-use centre which has as an input fraction WEEE quantities coming from the waste stream.

$WEEE$ - Annually produced WEEE quantities, considered as a waste stream, at national level, measured in $\frac{tn}{y}$. The formula for the calculation of the total WEEE quantities generated in a Member State is described in detail at the Annex II of the Commission Implementing Regulation 2017/699/EU.

Based on the above and for the year 2012, the estimated annual (W)EEE re-use and preparation for re-use ratio at national level on the basis of WEEE generated was 0,05%.

[52] Seyring N., Kling M., Weißenbacher J. (BiPRO), Hestin M., Lecerf L. (BIO by DELOITTE), Magalini F., Khetriwal D.S., Kuehr R. (United Nations University), (2015), 'Study on WEEE Recovery Targets, Preparation for Re-Use Targets and on the Method for Calculation of the Recovery Targets', Final Report, European Commission

[53] Magalini F., Wang F., Huisman J., Kuehr R. (United Nations University), Baldé K., Van Straalen V. (Statistics Netherlands), Hestin M., Lecerf L. (BIO by DELOITTE), Sayman U., Akpulat O. (Regional Environmental Center), (2014), 'Study on Collection Rates of WEEE', Final Report, European Commission

1.8.1.1 Revertia

Revertia is providing a comprehensive waste management service to prepare for re-use and / or recycle WEEE generated in companies and public institutions[54]. In accordance with the principles of the waste hierarchy, Revertia gives a priority to the preparation for re-use of the material that it collects. Dismantling, recovering and recycling are considered only when the products cannot be prepared for re-use.

Revertia's mission is also to help companies respect their obligations arising from the WEEE legislation. Companies can also respect the requirements implied by the Corporate Social Responsibility by giving their products to Revertia. They are also promoting the implementation of active Corporate Social Responsibility policies[55]. Revertia is based in Vigo and Madrid and has a technical team composed of experts in the re-use of ICT. Their collection scheme is based on collection and transport of the ICT products from their clients to the Revertia's closest treatment centre[56].

[54] https://revertia.com/en/ [Accessed 28-09-2017]

[55] https://revertia.com/en/quienes-somos-empresa-especializada-en-residuos-electronicos/ [Accessed 28-09-2017]

[56] https://revertia.com/en/gestion-de-residuos/servicios-recogida-de-residuos-y-tratamiento/ [Accessed 28-09-2017]

Flow Chart 14: Applied (W)EEE Re-Use Methodology from Revertia – SPAIN

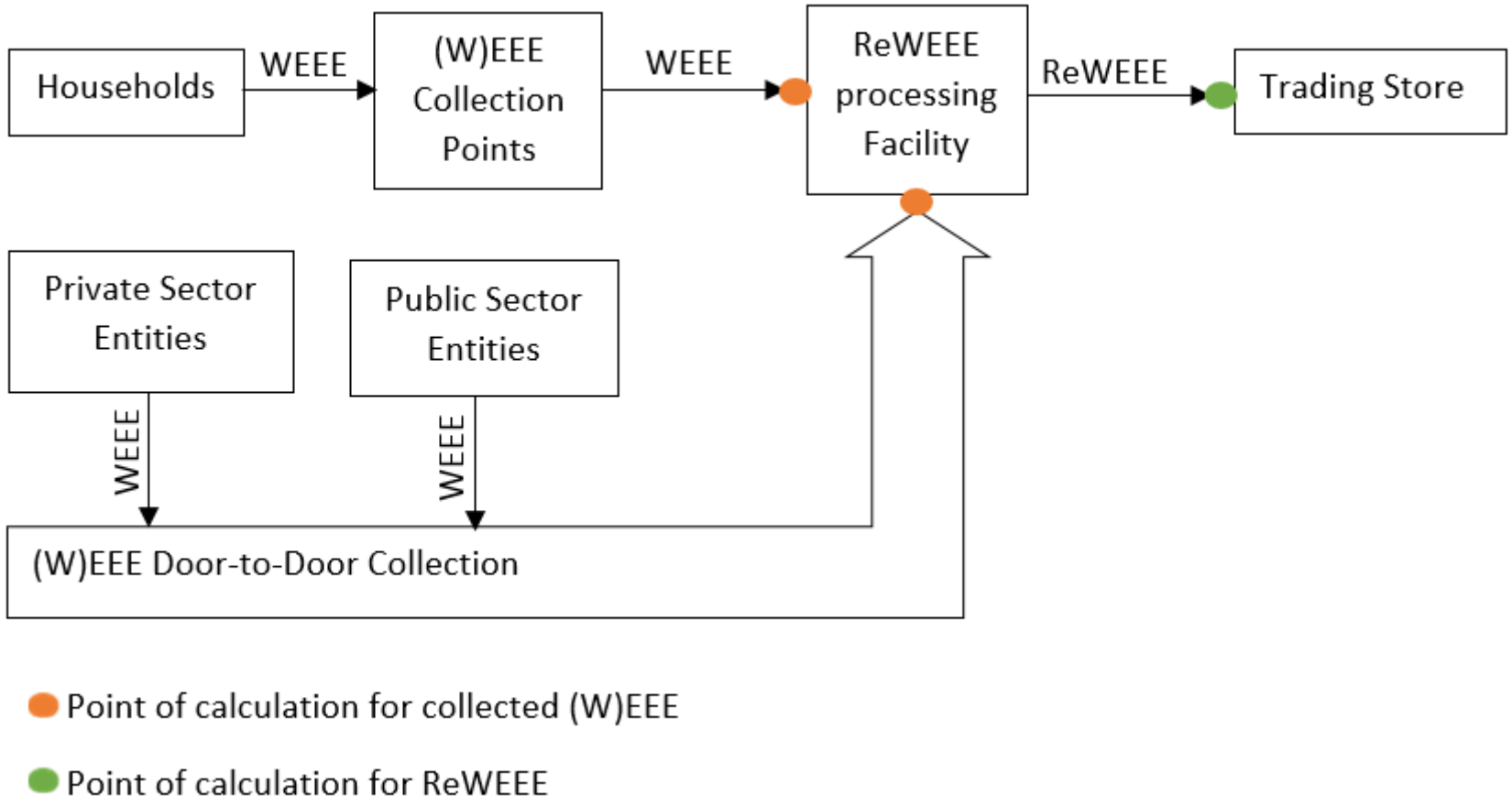


Table 24: Applied (W)EEE Re-Use Methodology from Revertia – SPAIN

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites		
		(W)EEE Door to Door Collection	√	138,60tn
		(W)EEE Collection Points	√	1,4tn
		Do-It-Yourself Delivery		
	(W)EEE Discarders Targeted	Private Sector Entities	√	117,60tn
		Public Sector Entities	√	21,00tn
		Households	√	1,4tn
		All of the Above (mixed origination)		
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only	√	
		EEE Only		
		WEEE and EEE		
	Traceability of (W)EEE	Recording (W)EEE Discarding Sources	√	
		Absence of Recording (W)EEE Discarding Sources		
	Qualitative	Sorting and Identification of (W)EEE	√	

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Assessment of (W)EEE	Non-Identification of (W)EEE		
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance		
		Counting of (W)EEE Accumulatively		
		Absence of (W)EEE Counting		
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale		
		Weighting of (W)EEE per Type Through Proxy Data	√	133,00tn Information Technology (IT) and Telecomunication Equipment 7,00tn Large Household Appliances
		Weighting of (W)EEE Accumulatively Through Physical Scale		
		Weighting of (W)EEE Accumulatively Through Proxy Data		
		Combination of the Above		
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation	√	3
		Assessment of Re-use Jobs Creation		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
		Assessment of both accumulatively		
		No assessment of jobs creation		
REWEEE Trading Stores	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance		
		Counting of REWEEE Accumulatively		
		Absence of REWEEE Counting	√	
	Quantitative Assessment of REWEEE	Weighting of REWEEE per Type Through Physical Scale		
		Weighting of REWEEE per Type Through Proxy Data		
		Weighting of REWEEE Accumulatively Through Physical Scale		
		Weighting of REWEEE Accumulatively Through Proxy Data	√	28tn
		Combination of the Above		
	Point of Calculation for REWEEE	Available in Trading Store	√	
		Sold or Donated		
	Trading of	Bought by customer		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	REWEEE	Received by customer as donation		
		Combination of the Above	√	
Performance Indicators	Collected (W)EEE			140,00tn
	REWEEE			28,00tn
	Accumulative (W)EEE Re-Use Ratio			39,20%
	(W)EEE Re-Use Ratio per Type			Lack of data
	Number of EEE Types Covered			2
	Interconnection with Producer Responsibility Organization			No

1.8.1.2 TIV Menorca

TIV Menorca SLU is an employment company created to manage bulky waste collected in the treatment plant of Menorca, in accordance with the provisions of the Sectoral Master Plan for non-hazardous waste management in Menorca[57]. TIV Menosca SLU, as an employment company, works for the integration of people at risk of socioeconomic exclusion, through supported employment in the waste sector. As a result, TIV Menorca has a triple purpose:

- Environmental through the re-use of bulky waste and WEEE.
- Social through their employment policy.
- Societal through their awareness raising campaign towards the Spanish citizens concerning environmental and social related topics linked to their activities.

TIV Menorca SLU is authorized by the Ministry of Environment of the Government of the Balearic Islands as Manager of Hazardous Waste, to collect, treat and store waste. After a selection and classification process, all bulky waste, such as furniture, appliances or industrial packaging, is recycled and valorised at the plant[58].

[57] http://www.tivmenorca.com/es/quienes-somos [Accessed 28-09-2017]

[58] http://www.tivmenorca.com/es/servicios [Accessed 28-09-2017]

Flow Chart 15: Applied (W)EEE Re-Use Methodology from TIV Menorca – SPAIN

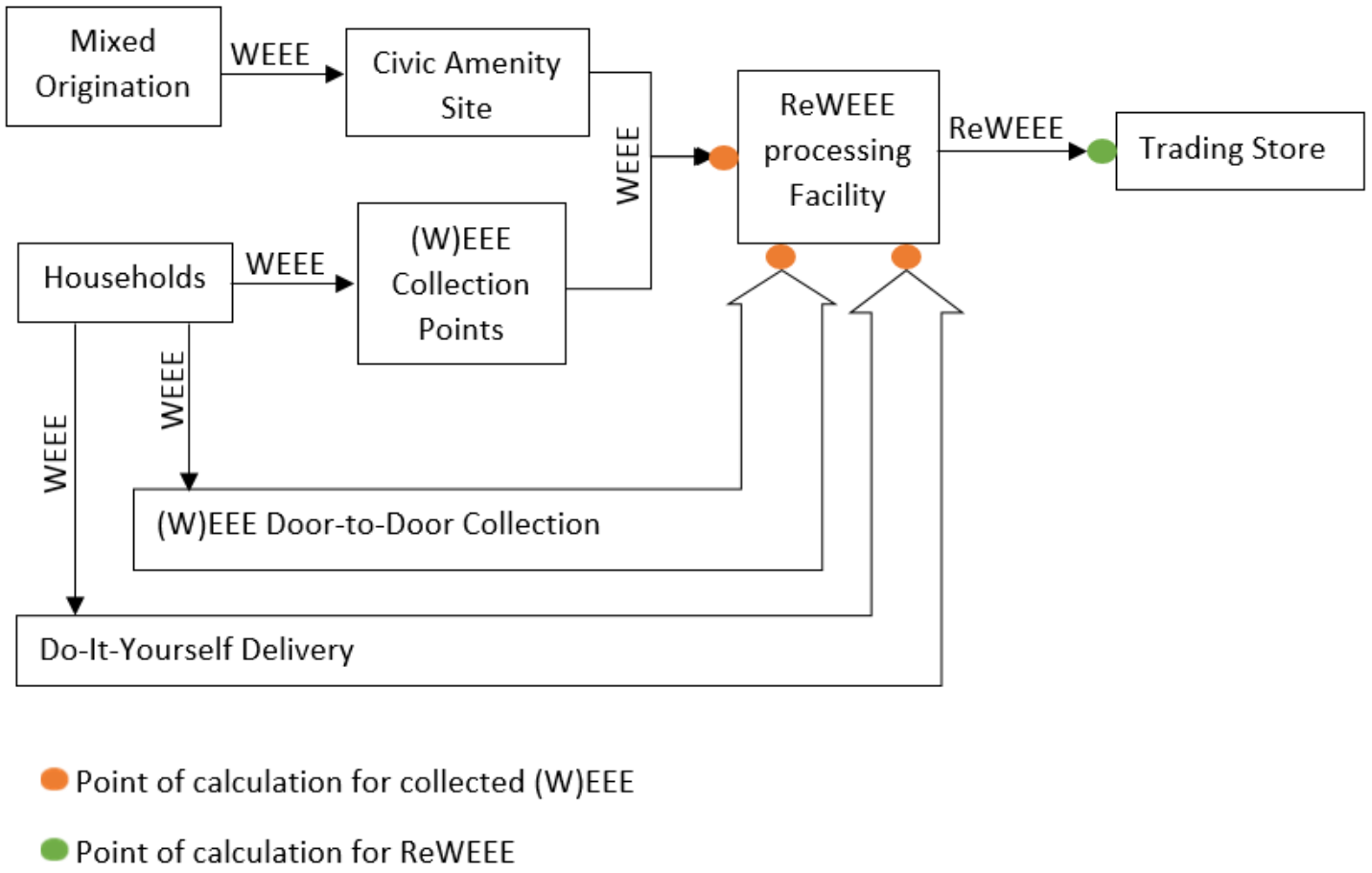


Table 25: Applied (W)EEE Re-Use Methodology from TIV Menorca – SPAIN

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites	√	99,20tn
		(W)EEE Door to Door Collection	√	15,38tn
		(W)EEE Collection Points	√	909,09tn
		Do-It-Yourself Delivery	√	8,46tn
	(W)EEE Discarders Targeted	Private Sector Entities		
		Public Sector Entities		
		Households	√	933,04tn
		All of the Above (mixed origination)	√	99,20tn
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only	√	
		EEE Only		
		WEEE and EEE		
	Traceability of (W)EEE	Recording (W)EEE Discarding Sources	√	
		Absence of Recording (W)EEE Discarding Sources		
	Qualitative	Sorting and Identification of (W)EEE	√	Small Electronic Appliances

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Assessment of (W)EEE			Screens Large Household Appliances Temperature Exchange Equipment Lamps and Led Information Technology (IT) and Telecommunication Equipment
		Non-Identification of (W)EEE		
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance		
		Counting of (W)EEE Accumulatively		
		Absence of (W)EEE Counting	√	
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale		
		Weighting of (W)EEE per Type Through Proxy Data		
		Weighting of (W)EEE Accumulatively Through Physical Scale	√	1.032,24tn
		Weighting of (W)EEE Accumulatively Through Proxy Data		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
		Combination of the Above		
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation	√	1,5
		Assessment of Re-use Jobs Creation		
		Assessment of both accumulatively		
		No assessment of jobs creation		
REWEEE Trading Stores	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance		
		Counting of REWEEE Accumulatively		
		Absence of REWEEE Counting	√	
	Quantitative Assessment of REWEEE	Weighting of REWEEE per Type Through Physical Scale		
		Weighting of REWEEE per Type Through Proxy Data		
		Weighting of REWEEE Accumulatively Through Physical Scale	√	23,29tn
		Weighting of REWEEE Accumulatively Through Proxy Data		
		Combination of the Above		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Point of Calculation for REWEEE	Available in Trading Store	√	
		Sold or Donated		
	Trading of REWEEE	Bought by customer		
		Received by customer as donation		
		Combination of the Above	√	
Performance Indicators	Collected (W)EEE			1.032,24tn
	REWEEE			23,29tn
	Accumulative (W)EEE Re-Use Ratio			2,26%
	(W)EEE Re-Use Ratio per Type			Lack of data
	Number of EEE Types Covered			6
	Interconnection with Producer Responsibility Organization			Yes

1.8.1.3 Traperos de Emaus de Murcia

Traperos de Emaus de Murcia is a non-profit association, established in Murcia since 1995 and is actively involved in developing alternative labour, economic and social relations. The association began its operations as a cooperation of individuals collecting and recycling paper from the municipal solid waste stream. Traperos de Emaus de Murcia's main objective is to participate in the construction of a fairer society, contributing with its commitment in personal, social and labour growth. Traperos de Emaus de Murcia's purpose is the integration of people at risk of socioeconomic exclusion on the job market through the recovery of second-hand objects, materials and waste.

In 2008, the association formed the social company Traperos Recicla S.L., which is the first employment company of the Region of Murcia. In the following years, Traperos de Emaus de Murcia has started a WEEE collection service.

Traperos de Emaus de Murcia is also conducting waste paper collection activities via a contract with Molina de Segura[59].

[59] https://emausmurcia.wordpress.com/traperos-de-emaus/historia-de-traperos-de-emaus-murcia/ [Accessed 28-09-2017]

Flow Chart 16: Applied (W)EEE Re-Use Methodology from Traperos de Emaus de Murcia – SPAIN

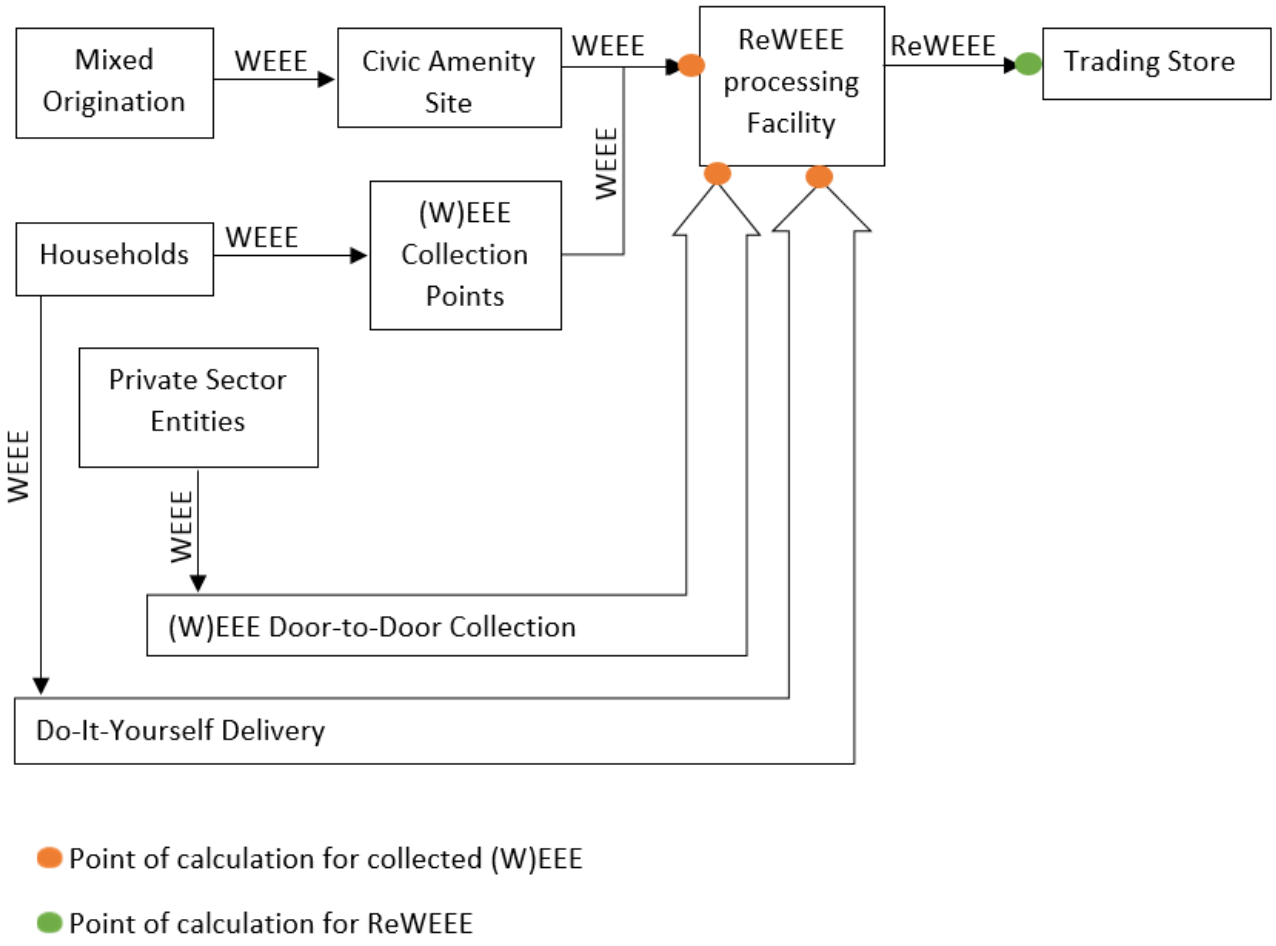


Table 26: Applied (W)EEE Re-Use Methodology from Traperos de Emaus de Murcia – SPAIN

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites	√	89,19tn
		(W)EEE Door to Door Collection	√	47,44tn + Part of 49,34tn
		(W)EEE Collection Points	√	Part of 49,34tn
		Do-It-Yourself Delivery	√	3,80tn
	(W)EEE Discarders Targeted	Private Sector Entities	√	Part of 49,34tn
		Public Sector Entities		
		Households	√	51,24tn + Part of 49,34tn
		All of the Above (mixed origination)	√	89,19tn
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only	√	
		EEE Only		
		WEEE and EEE		
	Traceability of (W)EEE	Recording (W)EEE Discarding Sources	√	
		Absence of Recording (W)EEE Discarding Sources		
	Qualitative	Sorting and Identification of (W)EEE	√	

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Assessment of (W)EEE	Non-Identification of (W)EEE		
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance		
		Counting of (W)EEE Accumulatively		
		Absence of (W)EEE Counting	√	
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale	√	23,91tn Temperature Exchange Equipment 50,86tn Screens 5,31tn Lamps and Led 56,36tn Large Household Appliances 46,11tn Small Electronic Appliances 7,21tn Information Technology (IT) and Telecommunication Equipment
		Weighting of (W)EEE per Type Through Proxy Data		
		Weighting of (W)EEE Accumulatively Through Physical Scale		
		Weighting of (W)EEE Accumulatively Through Proxy		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
		Data		
		Combination of the Above		
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation	√	9
		Assessment of Re-use Jobs Creation		
		Assessment of both accumulatively		
		No assessment of jobs creation		
REWEEE Trading Stores	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance		
		Counting of REWEEE Accumulatively		
		Absence of REWEEE Counting	√	
	Quantitative Assessment of REWEEE	Weighting of REWEEE per Type Through Physical Scale	√	0,99tn Temperature Exchange Equipment 0,45tn Screens 3,35tn Large Household Appliances 1,06tn Small Electronic Appliances 0,19tn Information Technology (IT) and Telecommunication Equipment

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
		Weighting of REWEEE per Type Through Proxy Data		
		Weighting of REWEEE Accumulatively Through Physical Scale		
		Weighting of REWEEE Accumulatively Through Proxy Data		
		Combination of the Above		
	Point of Calculation for REWEEE	Available in Trading Store	√	
		Sold or Donated		
	Trading of REWEEE	Bought by customer		
		Received by customer as donation		
		Combination of the Above	√	
Performance Indicators	Collected (W)EEE			189,77tn
	REWEEE			6,05tn
	Accumulative (W)EEE Re-Use Ratio			3,18%
	(W)EEE Re-Use Ratio per Type			4,14% Temperature Exchange Equipment

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
				0,88% Screens 0% Lamps and Led 5,94% Large Household Appliances 2,30% Small Electronic Appliances 2,64tn Information Technology (IT) and Telecommunication Equipment
	Number of EEE Types Covered			6
	Interconnection with Producer Responsibility Organization			Yes

1.8.1.4 Traperos de Emaus de Navarra

Traperos de Emaus de Navarra is a non-for-profit foundation whose main purpose is to create a space of coexistence and integral development for people with various difficulties, and for those who believe that another world is possible[60]. Traperos de Emaus de Navarra is active in the selective collection, re-use and recycling in Navarra. Their services include collection services in seven communities of the Navarra Jurisdiction and provide stable jobs to 79 people at risk of socioeconomic exclusion. Traperos de Emaus de Navarra's personnel is conducting a door to door collection for waste furniture, EEE and textiles. A portion of the collected items is repaired and sold second-hand in Traperos de Emaus de Navarra's stores. The remaining portion that cannot be re-used is dismantled, decontaminated and recycled[61].

This social enterprise represents a model of social and labour integration in the traditional recovering activity (rag-pickers, junk-picker, small wholesalers) within a new and higher-level of operation, taking on board organisational, technical and social criteria, allowing conformity with the new requirements attached to the sustainable management of WEEE[62].

Together, the 190 companions of Fundación Traperos of Emaus Navarra recover and sell second-hand goods in 6 re-use shops located in Pamplona and its surrounding. To this end, the group is carrying out a major recovery work, in partnership with the municipalities of Navarre and the WEEE collection centres[63]. The group is self-sufficient (93% own income and 7% public subsidies) and all its employees receive the same salary.

[60] http://emausnavarra.org/index.php/es/somos [Accessed 28-09-2017]

[61] http://emausnavarra.org/index.php/es/nuestros-rastros [Accessed 28-09-2017]

[62] https://www.epa.gov/sites/production/files/documents/municipal-guide-ewaste-2012-02-english.pdf [Accessed 28-09-2017]

[63] https://www.emmaus-international.org/fr/qui-sommes-nous/emmaus-dans-le-monde/europe/espagne/navarra.html [Accessed 28-09-2017]

Flow Chart 17: Applied (W)EEE Re-Use Methodology from Traperos de Emaus de Navarra – SPAIN

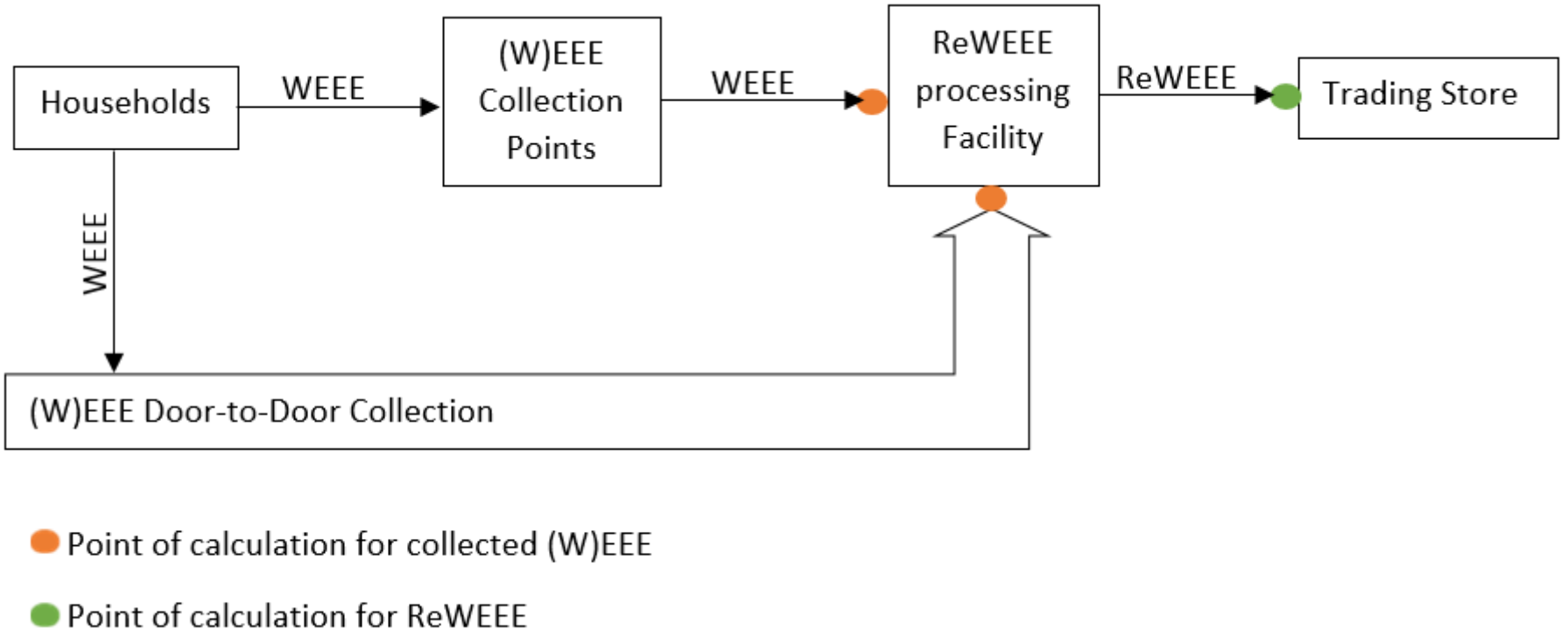


Table 27: Applied (W)EEE Re-Use Methodology from Traperos de Emaus de Navarra – SPAIN

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites		
		(W)EEE Door to Door Collection	√	1687,14tn
		(W)EEE Collection Points	√	624,01tn
		Do-It-Yourself Delivery		
	(W)EEE Discarders Targeted	Private Sector Entities		
		Public Sector Entities		
		Households	√	2311,15tn
		All of the Above (mixed origination)		
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only	√	
		EEE Only		
		WEEE and EEE		
	Traceability of (W)EEE	Recording (W)EEE Discarding Sources	√	
		Absence of Recording (W)EEE Discarding Sources		
	Qualitative	Sorting and Identification of (W)EEE		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Assessment of (W)EEE	Non-Identification of (W)EEE	√	
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance		
		Counting of (W)EEE Accumulatively		
		Absence of (W)EEE Counting	√	
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale		
		Weighting of (W)EEE per Type Through Proxy Data		
		Weighting of (W)EEE Accumulatively Through Physical Scale		
		Weighting of (W)EEE Accumulatively Through Proxy Data		
		Combination of the Above	√	2.311,15tn
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation	√	10
		Assessment of Re-use Jobs Creation		
		Assessment of both accumulatively		
		No assessment of jobs creation		

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
REWEEE Trading Stores	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance		
		Counting of REWEEE Accumulatively		
		Absence of REWEEE Counting	√	
	Quantitative Assessment of REWEEE	Weighting of REWEEE per Type Through Physical Scale		
		Weighting of REWEEE per Type Through Proxy Data		
		Weighting of REWEEE Accumulatively Through Physical Scale		
		Weighting of REWEEE Accumulatively Through Proxy Data		
		Combination of the Above	√	80,77tn
	Point of Calculation for REWEEE	Available in Trading Store	√	
		Sold or Donated		
	Trading of REWEEE	Bought by customer		
		Received by customer as donation		
		Combination of the Above	√	

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Performance Indicators	Collected (W)EEE			2.311,15tn
	REWEEE			80,77tn
	Accumulative (W)EEE Re-Use Ratio			3,49%
	(W)EEE Re-Use Ratio per Type			Lack of data
	Number of EEE Types Covered			6
	Interconnection with Producer Responsibility Organization			Yes

1.8.2 Producer Responsibility Organization

Table 28: Questionnaires Results for Producer Responsibility Organization – SPAIN

Question	Answers from Fundacion Ecotic
Number of Represented Structures	12
Collected material	Only WEEE
Collected (W)EEE Tonnage in 2015 (in tn)	78.361,00tn
Collected (W)EEE Items in 2015	Lack of data
Re-Used – Repaired EEE Tonnage in 2015 (in tn)	159,00tn
Re-Used – Repaired EEE Items in 2015	Lack of data
Applied Delivery – Collection Scheme	(W)EEE Collection Points
(W)EEE origination	Households
(W)EEE Types Covered	Small Electronic Appliances Screens Large Household Appliances Temperature Exchange Equipment Toys
Weighting Technique	Physical scale
Point of ReWEEE calculation	When made available on the market

1.8.2.1 Fundacion Ecotic

Fundacion Ecotic is a private organisation and a not-for-profit foundation set up at the initiative of the main actors of the household appliances industry. Created in 7 March 2005, Fundacion Ecotic works to defend the environment and promote sustainable development by raising awareness and by training manufacturers, distributors and EEE users[64]. Fundacion Ecotic's main area of work is the proper management of WEEE for companies and organisations that are under the Extended Producer Responsibility Scheme as a result of the legal requirements on EEE producers and distributors. With authorisation to manage the 6 categories of WEEE at national level, working with a wide network of

[64] http://www.ecotic.es/en/252114/Ecotic.htm [Accessed 28-09-2017]

authorised recyclers and with more than 7.700 collection points spread around Spain, ECOTIC has today consolidated its position as the leading producer responsibility organisation in Spain. Fundacion Ecotic's main objectives are to protect the environment and promote sustainable development towards goals using numerous initiatives such as:

- Establishing, developing and managing the collection, treatment and management of WEEE.
- Conducting studies and research into the collection, treatment and management of WEEE.
- Disseminating information about the collection, treatment and management of WEEE - both among professionals and within society as a whole.
- Carrying out scientific and technology activities for discussion and training on WEEE.
- Promoting a culture of sustainable development with regard to electrical and electronic equipment and appliances.

WEEE discarders may dispose of waste products free of charge by depositing them at Recycling Points or other areas designated for this purpose, or in shops that sell equipment when purchasing a new device. Businesses must also accept small appliances of less than 20 cm size brought in by users, regardless of whether or not they purchase a new one. The collection of WEEE is built around three basic collection and storage points which are[65]:

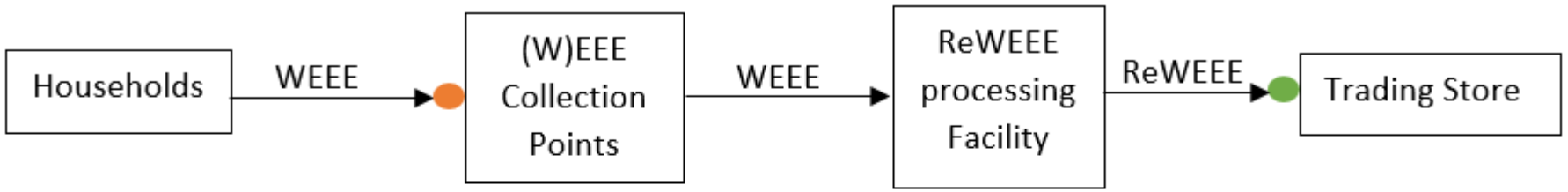
- Recycling Points and other municipal points, where private users can bring their household waste.
- Distribution company's warehouses, where waste generated by those distributors and brought by customers is stored.
- Load Grouping Centres fitted out by ECOTIC that accept WEEE from Recycling Points and distributors, before being transported to recycling centres.

From Recycling Points, distributors' warehouses and Load Grouping Centres, WEEE is transported to recycling companies that have suitable resources for treating it, depending on the specific characteristics of the different types of waste. Once collected, WEEE is channelled to different treatment plants depending on their specific needs. In general, they go through similar component-separation processes.

- Collection and transportation to the treatment plant.
- Receipt and storage.
- Classification of equipment.
- Manual disassembly and separating out of hazardous components.
- Breaking down of recoverable materials.
- Separation of materials and shipping for external recovery

[65] http://www.ecotic.es/en/252116/Waste.htm [Accessed 28-09-2017]

Flow Chart 18: Applied (W)EEE Re-Use Methodology from Producer Responsibility Organization – SPAIN



● Point of calculation for collected (W)EEE

● Point of calculation for ReWEEE

Table 29: Applied (W)EEE Re-Use Methodology from Producer Responsibility Organization – SPAIN

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
Delivery – Collection	Applied Scheme	Civic Amenity Sites		
		(W)EEE Door to Door Collection		
		(W)EEE Collection Points	√	78.361tn
		Do-It-Yourself Delivery		
	(W)EEE Discarders Targeted	Private Sector Entities		
		Public Sector Entities		
		Households	√	78.361tn
		All of the Above (mixed origination)		
(W)EEE Temporary Storage	Categorization of (W)EEE	WEEE Only	√	
		EEE Only		
		WEEE and EEE		
	Traceability of (W)EEE	Recording (W)EEE Discarding Sources	√	
		Absence of Recording (W)EEE Discarding Sources		
	Qualitative	Sorting and Identification of (W)EEE	√	

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Assessment of (W)EEE	Non-Identification of (W)EEE		
	Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance		
		Counting of (W)EEE Accumulatively		
		Absence of (W)EEE Counting	√	
	Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale		
		Weighting of (W)EEE per Type Through Proxy Data		
		Weighting of (W)EEE Accumulatively Through Physical Scale	√	78.361tn
		Weighting of (W)EEE Accumulatively Through Proxy Data		
		Combination of the Above		
(W)EEE processing	Job creation	Assessment of Preparing for Re-use Jobs Creation		
		Assessment of Re-use Jobs Creation		
		Assessment of both accumulatively		
		No assessment of jobs creation	√	

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
REWEEE Trading Stores	Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance		
		Counting of REWEEE Accumulatively		
		Absence of REWEEE Counting	√	
	Quantitative Assessment of REWEEE	Weighting of REWEEE per Type Through Physical Scale	√	11,13tn Small Electronic Appliances 4,77tn Screens 108,12tn Large Household Appliances 22,26tn Temperature Exchange Equipment 12,72tn Toys
		Weighting of REWEEE per Type Through Proxy Data		
		Weighting of REWEEE Accumulatively Through Physical Scale		
		Weighting of REWEEE Accumulatively Through Proxy Data		
		Combination of the Above		
	Point of	Available in Trading Store	√	

(W)EEE Re-Use Managerial Chain	Procedures / Entities Involved	Alternative Pathways	Methodology Path	Quantitative / Qualitative Data
	Calculation for REWEEE	Sold or Donated		
	Trading of REWEEE	Bought by customer		
		Received by customer as donation		
		Combination of the Above	√	
Performance Indicators	Collected (W)EEE			78.361,00tn
	REWEEE			159,00tn
	Accumulative (W)EEE Re-Use Ratio			0,20%
	(W)EEE Re-Use Ratio per Type			Lack of data
	Number of EEE Types Covered			5
	Interconnection with Re-use Centres			Yes

1.9 Non-selected respondents

It is important to note that it has been decided by the research team to focus on the respondents who do conduct (W)EEE re-use or preparing for re-use activities in order to study data consistent with the objective of this comparative analysis. This is why some answers collected through the questionnaire did not appear until now. However, some interesting data can be extracted from their answers:

1.9.1 Appliances Recycling SA (Greece, PRO)

Questions	Answers
Number of Represented Structures	8
Collected material	Only WEEE
Collected (W)EEE Tonnage in 2015 (in tn)	9.512
Collected (W)EEE Items in 2015	Lack of data
Applied Delivery – Collection Scheme	(W)EEE Collection Points
(W)EEE origination	Households
(W)EEE Types Covered	Small Electronic Appliances Large Household Appliances Temperature Exchange Equipment Toys Information Technology (IT) and Telecommunication Equipment Consumer Equipment
Weighting Technique	Physical Scale
Opinion on what the point of ReWEEE calculation should be	When made available on the market

1.9.2 BKN (Netherlands, Re-use Centres Networks)

Questions	Answers
Number of Represented Structures	65
Collected material	Both WEEE and EEE

Questions	Answers
Collected (W)EEE Tonnage in 2015 (in tn)	20.000 of WEEE (also including EEE but everything is treated as being WEEE)
Collected (W)EEE Items in 2015	Lack of data
Applied Delivery – Collection Scheme	Door to door collection (WEEE) Waste Collection Points (WEEE) Do-It-Yourself Delivery (WEEE)
(W)EEE origination	Households Mixed Origination
(W)EEE Types Covered	Small Electronic Appliances Large Household Appliances Temperature Exchange Equipment Toys Information Technology (IT) and Telecommunication Equipment Consumer Equipment
Weighting Technique	Combination of Physical Scale and Proxy Data
Opinion on what the point of ReWEEE calculation should be	Sold or Donated

1.9.3 Cyprus Environmental Scientist

Questions	Answers
Number of Represented Structures	1
Collected material	Lack of Data
Collected (W)EEE Tonnage in 2015 (in tn)	Lack of Data
Collected (W)EEE Items in 2015	Lack of data

Questions	Answers
Applied Delivery – Collection Scheme	Lack of data
(W)EEE origination	Lack of data
(W)EEE Types Covered	Lack of data
Weighting Technique	Physical scales
Opinion on what the point of ReWEEE calculation should be	When made available on the market

1.9.4 Ecodom (Italy, PRO)

Questions	Answers
Number of Represented Structures	31
Collected material	Only WEEE
Collected (W)EEE Tonnage in 2015 (in tn)	78.265
Collected (W)EEE Items in 2015	Lack of data
Applied Delivery – Collection Scheme	Waste Collection Points (WEEE)
(W)EEE origination	Mixed Origination
(W)EEE Types Covered	Small Electronic Appliances Large Household Appliances Temperature Exchange Equipment Information Technology (IT) and Telecommunication Equipment Consumer Equipment
Weighting Technique	Lack of Data
Opinion on what the point of ReWEEE calculation should be	Lack of Data

1.9.5 Ekon (Poland, Re-use Centres)

Questions	Answers

Questions	Answers
Number of Represented Structures	1
Collected material	Only WEEE
Collected (W)EEE Tonnage in 2015 (in tn)	743
Collected (W)EEE Items in 2015	Lack of Data
Applied Delivery – Collection Scheme	Door to Door Collection
(W)EEE origination	Private Sector Entities Households
(W)EEE Types Covered	Small Electronic Appliances Screens Large Household Appliances Temperature Exchange Equipment Toys Lamps and Leds Information Technology (IT) and Telecommunication Equipment Consumer Equipment
Weighting Technique	Physical Scale
Opinion on what the point of ReWEEE calculation should be	Sold or Donated

1.9.6 ElektroEko (Poland, PRO)

Questions	Answers
Number of Represented Structures	Lack of data
Collected material	Only WEEE
Collected (W)EEE Tonnage in 2015 (in tn)	58.240
Collected (W)EEE Items in 2015	11.564.820
Applied Delivery – Collection Scheme	Waste Collection Points

Questions	Answers
	Door to Door Collection
(W)EEE origination	Private Sector Entities Households Mixed Origination
(W)EEE Types Covered	Small Electronic Appliances Screens Large Household Appliances Temperature Exchange Equipment Toys Lamps and Leds Information Technology (IT) and Telecommunication Equipment Consumer Equipment
Weighting Technique	Lack of Data
Opinion on what the point of ReWEEE calculation should be	Lack of Data

1.9.7 Enna Euno S.p.A (Italy, Waste Agency)

Questions	Answers
Number of Represented Structures	Lack of Data
Collected material	Only WEEE
Collected (W)EEE Tonnage in 2015 (in tn)	210
Collected (W)EEE Items in 2015	Lack of data
Applied Delivery – Collection Scheme	Waste Collection Points Door to Door Collection
(W)EEE origination	Private Sector Entities Households

Questions	Answers
	Mixed Origination
(W)EEE Types Covered	Small Electronic Appliances Screens Large Household Appliances Temperature Exchange Equipment Lamps and Leds
Weighting Technique	Lack of Data
Opinion on what the point of ReWEEE calculation should be	Available in Traiding Store

1.9.8 IETS (Cyprus, Re-use Centre)

Questions	Answers
Number of Represented Structures	1
Collected material	Both EEE and WEEE
Collected (W)EEE Tonnage in 2015 (in tn)	6 EEE
Collected (W)EEE Items in 2015	4 EEE 3 WEEE
Applied Delivery – Collection Scheme	Lack of data
(W)EEE origination	Lack of data
(W)EEE Types Covered	Lack of data
Weighting Technique	Physical Scale
Opinion on what the point of ReWEEE calculation should be	Made available on the market

1.9.9 Rorec (Romania, PRO)

Questions	Answers
Number of Represented Structures	Lack of Data
Collected material	Lack of data

Questions	Answers
Collected (W)EEE Tonnage in 2015 (in tn)	Lack of data
Collected (W)EEE Items in 2015	Lack of data
Applied Delivery – Collection Scheme	Lack of data
(W)EEE origination	Lack of data
(W)EEE Types Covered	Lack of data
Weighting Technique	Lack of data
Opinion on what the point of ReWEEE calculation should be	Sold or Donated

1.9.10 Perth (United Kingdom, Re-use Centre)

Questions	Answers
Number of Represented Structures	1
Collected material	Lack of Data
Collected (W)EEE Tonnage in 2015 (in tn)	Lack of Data
Collected (W)EEE Items in 2015	Lack of data
Applied Delivery – Collection Scheme	Civic Amenity Site Do-it-Yourself Delivery Waste Collection Points
(W)EEE origination	Households Private Entities Mixed Origination
(W)EEE Types Covered	Lack of Data
Weighting Technique	Physical Scale
Opinion on what the point of ReWEEE calculation should be	Sold or Donated

2. Comparative Analysis of Applied (W)EEE Re-Use Methodologies

In the previous chapter, the results of the questionnaires were analysed in order to set a common baseline for all the applied methodologies regardless of their organisational structure (applied by re-use centres networks, producer responsibility organizations, local authorities and/or waste agencies). The main objective of this exercise was to investigate on the alternative pathways for each stage of the (W)EEE re-use/preparing for re-use chain. In this framework, the present chapter deals with the identification of the differences and similarities among the applied (W)EEE re-use methodologies by conducting a comparative analysis upon a common baseline.

In the 28 answers to the B.1 questionnaire received, 10 have been excluded from the scope of this chapter. The reason why those answers have been excluded was that the respondents did not conduct any re-use or preparing for re-use activities or did not assess those activities yet (those answers are compiled in the previous section 2. 9).

The comparative analysis is applied onto the subsequent managerial phases which are forming each applied methodology as a whole. For the case of (W)EEE management towards re-use and/or preparation for re-use, the managerial phases are including:

- The phase of 'Delivery - Collection' which is the stage where (W)EEE are discarded, collected and transported to certain facilities for temporary storage and/or directly for preparation for re-use ((W)EEE processing).
- The phase of '(W)EEE Temporary Storage' which is the stage where collected (W)EEE is recorded as for its quantitative and/or qualitative characteristics and also stored prior to further treatment, after its collection and transportation from (W)EEE discarders.
- The phase of '(W)EEE Processing' which is the stage where (W)EEE is subjected to repair in order to be re-inserted in the economic life-cycle as readily available end-products.
- The phase of '(W)EEE Trading' which is the stage where the repaired (W)EEE is either sold or donated to customers as second-hand EEE.

The abovementioned phases are accompanied by 'Performance Indicators' regarding the efficiency and effectiveness of each applied methodology by means of (W)EEE re-use and preparation for re-use.

In the following Tables and as part of the comparative analysis, each alternative pathway of each methodology's process chain is marked with the symbol 'V'. Symbol 'V' indicates that a methodology applies a certain procedure and/or is applied by a certain entity by implementing a certain activity. The abbreviation 'ND' indicates that no data has been collected for this particular stage of the (W)EEE re-use/preparing for re-use chain.

For comparability reasons, the analysis regarding large scale re-use centres networks is presented separately from individual and/or small-scale re-use centres networks. It is underlined that a re-use centre network is characterized as large scaled when the annual collected (W)EEE quantities towards

re-use are way more than 2.000tn. In addition, small scale re-use centre networks as well as individual re-use centres, for year 2015, had collected less than 1.000tn of (W)EEE (except from Traperos de Emaus de Navarra where the annual collected (W)EEE quantities were slightly above 2.000tn).

Furthermore, due to the fact that only one Waste Agency (1) answered to the questionnaire (the 'Umbrella Organization of all Styrian Waste Management Associations'), it will be compared along with the Producer Responsibility Organizations in the same Table for all the different managerial phases.

2.1 Delivery – Collection

Concerning the stage of (W)EEE management that refers to the Delivery – Collection of (W)EEE, the alternative pathways regarding the implementation of (W)EEE re-use methodologies as they were applied by re-use centres networks and/or individual re-use centres, Producer Responsibility Organizations and Waste Agencies are summarized in the following Tables. The alternative pathways which have been identified for this stage are the following:

- Discarding WEEE in Civic Amenity Sites (CAS).
- Collecting (W)EEE by performing a door-to-door collection scheme (D2DC).
- Discarding (W)EEE in (W)EEE Collection Points (WCP).
- Collecting (W)EEE through a Do-It-Yourself-Delivery scheme (DIYD).

Furthermore, concerning the entities which are involved in Delivery – Collection and are identified as (W)EEE discarders, there can be one or more of the following types of discarders:

- Private Sector Entities (PRSE).
- Public Sector Entities (PUSE).
- Households (HAB).
- All of the above mentioned (W)EEE discarders (referred as "mixed origination" in the "Applied (W)EEE Re-Use Methodology" tables of the section 2).

In the following Tables, the applied methodologies from 1. Large Scale Re-Use Centres Networks, 2. Small Scale Re-use Centres Networks/Individual Re-Use Centres and 3. Producer Responsibility Organizations/Waste Agencies are analysed separately for comparability reasons.

Table 10: Implementation of Delivery – Collection Managerial Phase regarding Applied (W)EEE Re-Use Methodologies from Large Scale Re-Use Centres Networks

EU Member State	Large Scale Re-Use Centres Network's Methodology	Procedures / Entities Involved							
		Applied Scheme				(W)EEE Discarders Targeted			
		Civic Amenity Sites	(W)EEE Door to Door Collection	(W)EEE Collection Points	Do-It-Yourself Delivery	Private Sector Entities	Public Sector Entities	Households	All of the Above (mixed origination)
Belgium	KOMOSIE	√	√	√	√			√	√
	RES-SOURCES	√	√	√	√	√		√	√
France	Emmaüs France			√	√			√	
	ENVIE		√	√	√	√		√	
	SIRRMIET		√	√	√			√	
Ireland	Rehab Recycle	√	√	√		√		√	√

Table 11: Implementation of Delivery – Collection Managerial Phase regarding Applied (W)EEE Re-Use Methodologies from Small Scale Re-Use Centres Networks and Individual Re-Use Centres

EU Member State	Small Scale Re-Use Centres Network's Methodology	Procedures / Entities Involved							
		Applied Scheme				(W)EEE Discarders Targeted			
		Civic Amenity Sites	(W)EEE Door to Door Collection	(W)EEE Collection Points	Do-It-Yourself Delivery	Private Sector Entities	Public Sector Entities	Households	All of the Above (mixed origination)
Belgium	CF2D/CF2M		√		√	√	√	√	
Romania	Ateliere Fara Frontiere		√			√	√	√	
Spain	Revertia		√		√	√	√	√	
	TIV Menorca	√	√	√	√			√	√
	Traperos de Emaus de Murcia	√	√	√	√	√		√	√
	Traperos de Emaus de Navarra		√	√				√	

Table 12: Implementation of Delivery – Collection Managerial Phase regarding Applied (W)EEE Re-Use Methodologies from Producer Responsibility Organizations/Waste Agencies

EU Member State	Producer Responsibility Organization's Methodology	Procedures / Entities Involved							
		Applied Scheme				(W)EEE Discarders Targeted			
		Civic Amenity Sites	(W)EEE Door to Door Collection	(W)EEE Collection Points	Do-It-Yourself Delivery	Private Sector Entities	Public Sector Entities	Households	All of the Above (mixed origination)
Belgium	RECUPEL VZW			√				√	
Cyprus	WEEE Electrocyclosis Cyprus LMD	√		√				√	√
France	Eco-Systèmes			√				√	
Portugal	Amb3E			√	√			√	
Spain	Fundacion Ecotic			√				√	
Austria (Waste Agency)	Umbrella Organization of all Styrian Waste Management Associations	√							√

Based on the alternative pathways regarding the implementation of Applied Delivery – Collection schemes for the applied (W)EEE re-use methodologies where the questionnaires respondents were re-use centres networks and/or individual re-use centres, as well as Producer Responsibility Organizations (including Waste Agencies) and according to the above-mentioned Tables, the following information was extracted:

- Large scale re-use centres networks, due to their cooperation with the national compliance systems, are having access to both CAS and (W)EEE collection points in order to collect major quantities of (W)EEE, mainly originating from households. Their feedstock is also supported by DIYD schemes. Additionally, they are implementing door-to-door collection schemes in order to collect (W)EEE quantities that are mostly derived from private sector entities.
- Small scale re-use centres networks and individual re-use centres are practicing mainly a combination of D2DC along with a DIYD which is directed towards private sector entities and households respectively. Furthermore, they are having local (but not necessarily limited)

access at (W)EEE collection points and in some cases (part of the Spanish re-use networks) at CAS.

- PROs are collecting (W)EEE mainly form (W)EEE Collection Points and CAS in order to collect (W)EEE mainly from Households.
- The two (2) French re-use centres networks from the social economy (ENVIE and Emmaüs France) are closely cooperating with the French PRO (Eco-Systèmes) which gives them access to a fraction of the WEEE through (W)EEE Collection Points. This case also applies in Belgium and Ireland where the difference lies in the fact that KOMOSIE, RES-SOURCES and Rehab Recycle are collecting fractions of (W)EEE also from CAS.

The conclusions that derived from the comparative analysis of the applied (W)EEE re-use methodologies regarding Delivery – Collection and in correlation with the amount of the collected (W)EEE are including:

- The cooperation between the re-use centres networks and the PROs (cases of Belgium and France) benefits re-use centres networks by means of increasing the amounts of collected (W)EEE towards re-use through the direct and/or indirect exploitation of the existing collection equipment. The term 'cooperation' implies the transactions between re-use centres networks and PROs through the exploitation of existing schemes (direct collection of (W)EEE from (W)EEE Collection Points) or through the delivery of potentially re-usable fractions of (W)EEE from PRO contracted facilities to re-use centres networks (indirect collection where the re-use centre is the receiver of the potentially re-usable fraction of (W)EEE from the contracted PRO facility). Furthermore, the cooperation between re-use centres networks and the respective PROs stands as a prerequisite for the expansion of the re-use centre networks and ensures an efficient collection from the primary (W)EEE producers. Taking into account their re-use ration, their performance is considered satisfactory.
- Individual re-use centres and/or small re-use centres networks are acting locally or at most regionally (cases of Spain and Romania). The interconnection with the respective PROs does not seem to have a positive effect on the (W)EEE re-use ratio since CF2D/CF2M (for Belgium), Ateliere Fara Frontiere (for Romania) and Revertia (for Spain) are relatively more effective in re-use of (W)EEE instead of other small-scale re-use centre networks which are cooperating with their respective PROs (TIV Menorca, Traperos de Emaus de Murcia and Traperos de Emaus de Navarra).
- The collection rate of Individual re-use centres and/or small re-use centres networks centres depends on the effectiveness of the Do-It-Yourself Delivery scheme.

2.2 (W)EEE Temporary Storage

As for the stage of (W)EEE management that refers to the temporary storage of (W)EEE, the alternative pathways regarding the implementation of (W)EEE re-use methodologies as they were applied by re-use centres networks and/or individual re-use centres, Producer Responsibility Organizations and Waste Agencies are summarized in the following Tables.

In particular, the procedures which are related to the (W)EEE Temporary Storage and their respective alternative pathways are the following:

- For the procedure regarding 'Categorization of (W)EEE', the alternative pathways are:
    - WEEE only, where the collected quantities are considered exclusively as being waste.
    - EEE only, where the collected quantities are considered exclusively as being products.
    - WEEE and EEE, where under certain circumstances, a part of the collected quantities is considered as a non-waste stream.
- For the procedure regarding 'Traceability of (W)EEE', the alternative pathways are:
    - Recording (W)EEE Discarding Sources, where the discarders (PRSE, PUSE and HAB) are identified and recorded.
    - Absence of Recording (W)EEE Discarding Sources, where the discarders (PRSE, PUSE and HAB) are not identified.
- For the procedure regarding 'Qualitative Assessment of (W)EEE', the alternative pathways are:
    - Sorting and Identification of (W)EEE, where the collected quantities are sorted and identified as for their appliances' type (large 'white' appliances, IT equipment, small appliances, etc.).
    - Non-Identification of (W)EEE, where the collected quantities are not sorted or identified as for their appliances' type.
- For the procedure regarding 'Numerical Assessment of (W)EEE', the alternative pathways are:
    - Counting of (W)EEE per Type of Appliance, where the collected quantities are counted in items in accordance with their appliances' type (large 'white' appliances, IT equipment, small appliances, etc.).
    - Counting of (W)EEE Accumulatively, where the collected quantities are counted in items regardless of their appliances' type.
    - Absence of (W)EEE Counting, where the collected quantities are not counted in items.
- For the procedure regarding 'Quantitative Assessment of (W)EEE', the alternative pathways are:
    - Weighting of (W)EEE per Type Through Physical Scale, where the collected quantities are weighted per type of appliance (large 'white' appliances, IT equipment, small appliances, etc.) by using weighting equipment (weighbridge or smaller scale).

- Weighting of (W)EEE per Type Through Proxy Data, where the collected quantities are weighted per type of appliance through weight estimations that are based on periodically updated recorded data (proxy data, e.g. average weight of certain appliance's type).
- Weighting of (W)EEE Accumulatively Through Physical Scale, where the collected quantities are weighted as a pile regardless of their appliance type by using weighting equipment.
- Weighting of (W)EEE Accumulatively Through Proxy Data, where the collected quantities are weighted as a pile regardless of their appliance type through weight estimations that are based on periodically updated recorded data (proxy data).
- Combination of the Above, where a part of the collected quantities is weighted through physical scale (e.g. high numbered items of small appliances) while another part of the collected quantities is weighted through proxy data (e.g. large appliances).

In the following Tables, the applied methodologies from large scale re-use centres networks, small scale re-use centres networks – individual re-use centres and Producer Responsibility Organizations are analysed separately for comparability reasons.

Table 13: Implementation of (W)EEE Temporary Storage Managerial Phase regarding Applied (W)EEE Re-Use Methodologies from Large Scale Re-Use Centres Networks

EU Member State	Large Scale Re-Use Centres Network's Methodology	Procedures / Entities Involved														
		Categorization of (W)EEE			Traceability of (W)EEE		Qualitative Assessment of (W)EEE		Numerical Assessment of (W)EEE			Quantitative Assessment of (W)EEE				
		WEEE Only	EEE Only	WEEE and EEE	Recording (W)EEE Discarding Sources	Absence of Recording (W)EEE Discarding Sources	Sorting and Identification of (W)EEE	Non-Identification of (W)EEE	Counting of (W)EEE per Type of Appliance	Counting of (W)EEE Accumulatively	Absence of (W)EEE Counting	Weighting of (W)EEE per Type Through Physical Scale	Weighting of (W)EEE per Type Through Proxy Data	Weighting of (W)EEE Accumulatively Through Physical Scale	Weighting of (W)EEE Accumulatively Through Proxy Data	Combination of the Above
Belgium	KOMOSIE	√			√		√		√				√			
	RES-SOURCES	√			√		√				√					√
France	Emmaüs France			√	√			√			√			√		
	ENVIE			√	√			√		√				√		
	SIRRMIET		√		√		√				√			√		
Ireland	Rehab Recycle			√	√		√				√		√			

Table 14: Implementation of (W)EEE Temporary Storage Managerial Phase regarding Applied (W)EEE Re-Use Methodologies from Small Scale Re-Use Centres Networks and Individual Re-Use Centres

EU Member State	Small Scale Re-Use Centres Network's Methodology	Procedures / Entities Involved														
		Categorization of (W)EEE			Traceability of (W)EEE		Qualitative Assessment of (W)EEE		Numerical Assessment of (W)EEE			Quantitative Assessment of (W)EEE				
		WEEE Only	EEE Only	WEEE and EEE	Recording (W)EEE Discarding Sources	Absence of Recording (W)EEE Discarding Sources	Sorting and Identification of (W)EEE	Non-Identification of (W)EEE	Counting of (W)EEE per Type of Appliance	Counting of (W)EEE Accumulatively	Absence of (W)EEE Counting	Weighting of (W)EEE per Type Through Physical Scale	Weighting of (W)EEE per Type Through Proxy Data	Weighting of (W)EEE Accumulatively Through Physical Scale	Weighting of (W)EEE Accumulatively Through Proxy Data	Combination of the Above
Belgium	CF2D/CF2M	√			√		√				√			√		
Romania	Ateliere Fara Frontiere	√			√		√			√					√	
Spain	Revertia	√			√		√				√		√			
	TIV Menorca	√			√		√				√			√		
	Traperos de Emaus de Murcia	√			√		√				√	√				
	Traperos de Emaus de Navarra	√			√			√			√					√

Table 15: Implementation of (W)EEE Temporary Storage Managerial Phase regarding Applied (W)EEE Re-Use Methodologies from Producer Responsibility Organizations and Waste Agencies

EU Member State	Producer Responsibility Organization's Methodology	Procedures / Entities Involved														
		Categorization of (W)EEE			Traceability of (W)EEE		Qualitative Assessment of (W)EEE		Numerical Assessment of (W)EEE			Quantitative Assessment of (W)EEE				
		WEEE Only	EEE Only	WEEE and EEE	Recording (W)EEE Discarding Sources	Absence of Recording (W)EEE Discarding Sources	Sorting and Identification of (W)EEE	Non-Identification of (W)EEE	Counting of (W)EEE per Type of Appliance	Counting of (W)EEE Accumulatively	Absence of (W)EEE Counting	Weighting of (W)EEE per Type Through Physical Scale	Weighting of (W)EEE per Type Through Proxy Data	Weighting of (W)EEE Accumulatively Through Physical Scale	Weighting of (W)EEE Accumulatively Through Proxy Data	Combination of the Above
Belgium	RECUPEL VZW	√			√		√			√				√		
Cyprus	WEEE Electrocyclosis Cyprus LMD			√	√			√			√				√	
France	Eco-Systèmes			√	√			√			√			√		
Portugal	Amb3E	√			√		√				√	√				
Spain	Fundacion Ecotic	√			√		√				√			√		
Austria (Waste Agency)	Umbrella Organization of all Styrian Waste Management Associations	√			√			√			√	ND				

Based on the alternative pathways regarding the implementation of (W)EEE temporary storage for the applied (W)EEE re-use methodologies where the questionnaires respondents were re-use centres networks and/or individual re-use centres, as well as Producer Responsibility Organizations (including Waste Agencies) and according to the above-mentioned Tables, the following findings were extracted:

- In all the methodologies, the collected (W)EEE are considered as waste, except in France, Ireland and Cyprus where a fraction of the respective quantities is considered as a non-waste stream which is collected as such or donated.
- Generally, small scale re-use centres networks are sorting the respective quantities by separating (W)EEE items according to their types.
- Most of the large-scale re-use centres networks as well as the PROs are weighting (W)EEE quantities accumulatively through physical scale.
- Re-use centres networks and PROs which are collecting less than 8 (W)EEE types (all Belgian respondents, Spanish, Portuguese and Cypriot PRO) are sorting the respective quantities according to (W)EEE types.
- (W)EEE are counted only by Belgian respondents (except RES-SOURCES), Ateliere Fara Frontiere from Romania and the re-use centres network ENVIE.

The conclusions that derived from the comparative analysis of the applied (W)EEE re-use methodologies regarding (W)EEE temporary storage and in correlation with the amount of the collected (W)EEE are the following:

- All the questionnaires respondents are recording the weight of the (W)EEE quantities that they are collecting.
- The French, Irish and Cypriot respondents are considering a fraction of the collected (W)EEE as a non-waste stream of which the refurbishment is considered as a waste prevention activity.
- PROs which are collecting large amounts of (W)EEE are utilising physical scales for the weighting of (W)EEE while the re-use centres networks weighting procedure is based on proxy data or a combination of proxy data and physical scales.
- Most of the PROs as well as re-use centres networks which are collecting less than 8 types of (W)EEE are sorting the respective quantities in accordance with their (W)EEE types.
- The alternative pathways regarding the qualitative assessment of (W)EEE (sorting or no sorting) from both re-use centres networks and PROs does not seems to affect the re-use ratio.
- For most of the re-use centres networks, when the collection is covering all 8 (W)EEE types, the respective quantities are not sorted and identified.

- The alternative pathways regarding the quantitative assessment of (W)EEE (weighting technique) done by the PROs are indicating that (W)EEE are sorted and weighted through physical scale.
- The alternative pathways regarding the quantitative assessment of (W)EEE (weighting technique) and for the case of re-use centres networks are indicating that sorting and weighting procedures does not seem to be correlated.
- (W)EEE are counted only in some cases where the respective quantities are covering less than 8 types of (W)EEE.

2.3 (W)EEE Processing

As for the stage of (W)EEE management that refers to the processing (preparation for re-use) of (W)EEE, the alternative pathways regarding the implementation of (W)EEE re-use methodologies as they were applied by re-use centres networks and/or individual re-use centres, Producer Responsibility Organizations and Waste Agencies are summarized in the following Tables.

In particular, as for the procedures which are related to Job Creation, the alternative pathways are the following:

- Assessment of Preparing for Re-use Jobs Creation, where the number of people employed thanks to the preparation for re-use of waste is monitored.
- Assessment of Re-use Jobs Creation, where the number of people employed thanks to the re-use of products is monitored .
- Assessment of both accumulatively, where it is not possible for an operator conducting both re-use and preparing for re-use activities to distinguish between the job creation resulting from the refurbishment of products and the preparing for re-use of waste.
- No assessment of jobs creation, where the information about the number of jobs created thanks to the re-use and preparing for re-use activities of the respondent has not been shared.

In the following Tables, the applied methodologies from large scale re-use centres networks, small scale re-use centres networks – individual re-use centres and Producer Responsibility Organizations are analysed separately for comparability reasons.

Table 16: Implementation of (W)EEE Processing Managerial Phase regarding Applied (W)EEE Re-Use Methodologies from Large Scale Re-Use Centres Networks

EU Member State	Large Scale Re-Use Centres Network's Methodology	Procedures / Entities Involved			
		Job creation			
		Assessment of Preparing for Re-use Jobs Creation	Assessment of Re-use Jobs Creation	Assessment of both accumulatively	No assessment of jobs creation
Belgium	KOMOSIE	√			
	RES-SOURCES	√			
France	Emmaüs France			√	
	ENVIE			√	
	SIRRMIET				√
Ireland	Rehab Recycle			√	

Table 17: Implementation of (W)EEE Processing Managerial Phase regarding Applied (W)EEE Re-Use Methodologies from Small Scale Re-Use Centres Networks and Individual Re-Use Centres

EU Member State	Small Scale Re-Use Centres Network's Methodology	Procedures / Entities Involved			
		Job creation			
		Assessment of Preparing for Re-use Jobs Creation	Assessment of Re-use Jobs Creation	Assessment of both accumulatively	No assessment of jobs creation
Belgium	CF2D/CF2M	√	√		
Romania	Ateliere Fara Frontiere	√			
Spain	Revertia	√			
	TIV Menorca	√			
	Traperos de Emaus de Murcia	√			
	Traperos de Emaus de Navarra	√			

Table 18: Implementation of (W)EEE Processing Managerial Phase regarding Applied (W)EEE Re-Use Methodologies from Producer Responsibility Organizations and Waste Agencies

EU Member State	Producer Responsibility Organization's Methodology	Procedures / Entities Involved			
		Job creation			
		Assessment of Preparing for Re-use Jobs Creation	Assessment of Re-use Jobs Creation	Assessment of both accumulatively	No assessment of jobs creation
Belgium	RECUPEL VZW				√
Cyprus	WEEE Electrocyclosis Cyprus LMD			√	
France	Eco-Systèmes				√
Portugal	Amb3E	√			
Spain	Fundacion Ecotic				√
Austria (Waste Agency)	Umbrella Organization of all Styrian Waste Management Associations				√

Based on the alternative pathways regarding the implementation of (W)EEE processing for the applied (W)EEE re-use methodologies where the questionnaires respondents were re-use centres networks and/or individual re-use centres, as well as Producer Responsibility Organizations (including Waste Agencies) and according to the above-mentioned Tables, the following conclusions were extracted:

- Appart from the individual re-use centre CF2C in Belgium, all the respondents which are conducting or monitoring both re-use and preparing for re-use activities cannot give separate data for the number of jobs created through the refurbishment of products and for the preparing for re-use of waste.
- Appart from Amb3E (Portugal) and WEEE Electrocyclosis Cyprus LMD (Cyprus), PROs do not monitor the number of jobs created through the re-use and preparing for re-use activities on which they are collecting data.

2.4 ReWEEE Trading

As for the stage of (W)EEE management that refers to the trading of REWEEE, the alternative pathways regarding the implementation of (W)EEE re-use methodologies as they were applied by re-use centres networks and/or individual re-use centres, Producer Responsibility Organizations and Waste Agencies are summarized in the following Tables.

The procedures which are related to the ReWEEE Trading and their respective alternative pathways are the following:

- For the procedure regarding the 'Numerical Assessment of REWEEE', the alternative pathways are:
    - The counting of REWEEE per Type of Appliance, where the refurbished items are counted in accordance with their appliances' type (large 'white' appliances, IT equipment, small appliances etc.).
    - The counting of REWEEE Accumulatively, where the refurbished items are counted regardless of their appliances' type.
    - The absence of REWEEE Counting, where the repaired items are not counted.
- For the procedure regarding the 'Quantitative Assessment of REWEEE', the alternative pathways are:
    - Weighting of REWEEE per Type Through Physical Scale, where the repaired items are weighted per type of appliance (large 'white' appliances, IT equipment, small appliances etc.) by using weighting equipment (weighbridge or smaller scale).
    - Weighting of REWEEE per Type Through Proxy Data, where the repaired items are weighted per type of appliance through weight estimations that are based on periodically updated recorded data (proxy data, e.g. average weight of certain appliance's type).
    - Weighting of REWEEE Accumulatively Through Physical Scale, where the repaired items are weighted as a pile regardless of their appliance type by using weighting equipment.
    - Weighting of REWEEE Accumulatively Through Proxy Data, where the repaired items are weighted as a pile regardless of their appliance type through weight estimations that are based on periodically updated recorded data (proxy data).
    - Combination of the Above, where a part of the repaired items is weighted through physical scale (e.g. high numbered items of small appliances) while another part of the repaired items is weighted through proxy data (e.g. large appliances).
- For the procedure regarding the 'Point of Calculation for REWEEE', the alternative pathways are:

- Available in Trading Store, where the refurbished items are considered as readily available end-products when they are stored or commercially exposed prior their trading at stores.
- Sold or Donated, where the refurbished items are considered as readily available end-products when they are sold or donated to customers.

- For the procedure regarding 'Trading of REWEEE', the alternative pathways are:
  - Sold, where the end-user needs to pay to own the refurbished product.
  - Donated, where the end-user are given away the refurbished products for free.
  - Combination of the Above, where a part of the refurbished items is donated while another part is sold to customers.

In the following Tables, the applied methodologies from large scale re-use centres networks, small scale re-use centres networks – individual re-use centres and Producer Responsibility Organizations are analysed separately for comparability reasons.

Table 19: Implementation of REWEEE Trading Managerial Phase regarding Applied (W)EEE Re-Use Methodologies from Large Scale Re-Use Centres Networks

EU Member State	Large Scale Re-Use Centres Network's Methodology	Procedures / Entities Involved												
		Numerical Assessment of REWEEE			Quantitative Assessment of REWEEE					Point of Calculation for REWEEE		Trading of REWEEE		
		Counting of REWEEE per Type of Appliance	Counting of REWEEE Accumulatively	Absence of REWEEE Counting	Weighting of REWEEE per Type Through Physical Scale	Weighting of REWEEE per Type Through Proxy Data	Weighting of REWEEE Accumulatively Through Physical Scale	Weighting of REWEEE Accumulatively Through Proxy Data	Combination of the Above	Available in Trading Store	Sold or Donated	Bought by customer	Received by customer as donation	Combination of the Above
Belgium	KOMOSIE	√				√					√			√
	RES-SOURCES			√					√		√			√
France	Emmaüs France			√			√			√				√
	ENVIE	√				√				√		√		
	SIRRMIET			√			√				√	√		
Ireland	Rehab Recycle			√		√					√			√

Table 20: Implementation of REWEEE Trading Managerial Phase regarding Applied (W)EEE Re-Use Methodologies from Small Scale Re-Use Centres Networks and Individual Re-Use Centres

EU Member State	Small Scale Re-Use Centres Network's Methodology	Procedures / Entities Involved												
		Numerical Assessment of REWEEE			Quantitative Assessment of REWEEE					Point of Calculation for REWEEE		Trading of REWEEE		
		Counting of REWEEE per Type of Appliance	Counting of REWEEE Accumulatively	Absence of REWEEE Counting	Weighting of REWEEE per Type Through Physical Scale	Weighting of REWEEE per Type Through Proxy Data	Weighting of REWEEE Accumulatively Through Physical Scale	Weighting of REWEEE Accumulatively Through Proxy Data	Combination of the Above	Available in Trading Store	Sold or Donated	Bought by customer	Received by customer as donation	Combination of the Above
Belgium	CF2D/CF2M		√				√				√			√
Romania	Ateliere Fara Frontiere		√					√		√				√
Spain	Revertia			√				√		√				√
	TIV Menorca			√			√			√				√
	Traperos de Emaus de Murcia			√	√					√				√
	Traperos de Emaus de Navarra			√					√	√				√

Table 21: Implementation of REWEEE Trading Managerial Phase regarding Applied (W)EEE Re-Use Methodologies from Producer Responsibility Organizations and Waste Agencies

EU Member State	Producer Responsibility Organization's Methodology	Procedures / Entities Involved												
		Numerical Assessment of REWEEE			Quantitative Assessment of REWEEE					Point of Calculation for REWEEE		Trading of REWEEE		
		Counting of REWEEE per Type of Appliance	Counting of REWEEE Accumulatively	Absence of REWEEE Counting	Weighting of REWEEE per Type Through Physical Scale	Weighting of REWEEE per Type Through Proxy Data	Weighting of REWEEE Accumulatively Through Physical Scale	Weighting of REWEEE Accumulatively Through Proxy Data	Combination of the Above	Available in Trading Store	Sold or Donated	Bought by customer	Received by customer as donation	Combination of the Above
Belgium	RECUPEL VZW	√			√					√				√
Cyprus	WEEE Electrocyclosis Cyprus LMD			√				√			√	√		
France	Eco-Systèmes		√						√		√			√
Portugal	Amb3E			√	√						√		√	
Spain	Fundacion Ecotic			√	√					√				√
Austria (Waste Agency)	Umbrella Organization of all Styrian Waste Management Associations			√	ND					√		ND		

Based on the alternative pathways regarding the implementation of the REWEEE trading for the applied (W)EEE re-use methodologies where the questionnaires respondents were re-use centres networks and/or individual re-use centres, as well as Producer Responsibility Organizations (including Waste Agencies) and according to the above-mentioned Tables, they following findings were extracted:

- After the preparation for re-use procedure, REWEEE items are generally not counted per type of appliance. Exceptions from this fact are the Belgian (KOMOSIE, CF2D/CF2M and RECUPEL VZW. For the Romanian case (Ateliere Fara Frontiere) and for the French PRO (Eco-Systèmes), REWEEE are counted accumulatively regardless of their appliance type.
- Most of the re-use centres networks, regardless of their expansion scale, are weighting REWEEE accumulatively thanks to physical scales or proxy data.
- As for the consideration of REWEEE items as EEE products (Point of Calculation for REWEEE), most of the small-scale re-use centres networks are considering REWEEE as an end-product when the respective quantities are available for sale and/or donation to customers. On the contrary, most of the large-scale re-use centres networks as well as the PROs, are considering REWEEEs as end-products when the respective quantities were already sold or donated.
- Approximately all questionnaires respondents are practicing a combination of donating and selling REWEEE to customers which is based on their responsibilities as social cooperative enterprises.

2.5 Performance Indicators

The performance indicators regarding the implementation of (W)EEE re-use methodologies as they were assessed by re-use centres networks and/or individual re-use centres, Producer Responsibility Organizations and Waste Agencies are summarized in the following Tables.

The performance indicators regarding the effectiveness and efficiency of each one of the 18 (W)EEE re-use methodologies are including:

- Collected (W)EEE in tonnes per year, which is expressing the annually collected and recorder (W)EEE quantities for the year 2015.
- REWEEE in tonnes per year, which is expressing the annually refurbished REWEEE quantities for the year 2015.
- Accumulative (W)EEE Re-Use Ratio in %, which is expressing the fraction of the annually collected (W)EEE which had been refurbished and then put on the market or sold.
- (W)EEE Re-Use Ratio per Type in %, which is expressing the fraction of the annually collected (W)EEE which had been repaired in accordance with the type of appliance.
- Number of EEE Types Covered, which is expressing the number of EEE types that were collected as (W)EEE, ranges in integer values from one (1 appliance type) to eight (all appliance's types).
- Interconnection with Producer Responsibility Organization, which is expressing the cooperation status (cooperation or non-cooperation) between re-use centres networks and the respective national Producer Responsibility Organizations.

In the following Tables, the applied methodologies from large scale re-use centres networks, small scale re-use centres networks – individual re-use centres and Producer Responsibility Organizations are analysed separately for comparability reasons.

Table 22: Performance Indicators regarding Applied (W)EEE Re-Use Methodologies from Large Scale Re-Use Centres Networks

EU Member State	Large Scale Re-Use Centres Network's Methodology	Performance Indicators																		
		Collected (W)EEE			REWEEE			Accumulative (W)EEE Re-Use Ratio			Number of WEEE Types Covered								Inter-connection with PRO	
		Less than 500tn/y	Among 500 and 2.000tn/y	More than 2.000tn/y	Less than 50tn/y	Among 50 and 200tn/y	More than 200tn/y	Less than 5%	Among 5 and 15%	More than 15%	Small Electronic Appliances	Screens	Large Household Appliances	Temperature Exchange Equipment	Toys	Lamps and Leds	IT and Telecommunication Equipment	Consumer Equipment	Yes	No
Belgium	KOMOSIE			√			√		√		√	√	√	√					√	
	RES-SOURCES			√			√		√		√	√	√	√					√	
France	Emmaüs France			√			√			√	ND								√	
	ENVIE			√			√			√	√		√				√	√	√	
	SIRRMIET			√			√			√	√	√					√			√
Ireland	Rehab Recycle			√			√			√							√			√

Table 23: Performance Indicators regarding Applied (W)EEE Re-Use Methodologies from Small Scale Re-Use Centres Networks and Individual Re-Use Centres

EU Member State	Small Scale Re-Use Centres Network's Methodology	Performance Indicators																		
		Collected (W)EEE			REWEEE			Accumulative (W)EEE Re-Use Ratio			Number of WEEE Types Covered								Inter-connection with PRO	
		Less than 500tn/y	Among 500 and 2.000tn/y	More than 2.000tn/y	Less than 50tn/y	Among 50 and 200tn/y	More than 200tn/y	Less than 5%	Among 5 and 15%	More than 15%	Small Electronic Appliances	Screens	Large Household Appliances	Temperature Exchange Equipment	Toys	Lamps and Leds	IT and Telecommunication Equipment	Consumer Equipment	Yes	No
Belgium	CF2D/CF2M	√			√					√	√	√					√			√
Romania	Ateliere Fara Frontiere	√			√					√							√			√
Spain	Revertia	√			√					√			√				√			√
	TIV Menorca		√		√			√			√	√	√	√		√	√		√	
	Traperos de Emaus de Murcia	√			√			√			√	√	√	√		√	√		√	
	Traperos de Emaus de Navarra			√		√		√			ND								√	

Table 24: Performance Indicators regarding Applied (W)EEE Re-Use Methodologies from Producer Responsibility Organizations and Waste Agencies

EU Member State	Producer Responsibility Organization's Methodology	Performance Indicators																	
		Collected (W)EEE			REWEEE			Accumulative (W)EEE Re-Use Ratio			Number of WEEE Types Covered								Inter-connection with Re-Use Networks	
		Less than 500tn/y	Among 500 and 2.000tn/y	More than 2.000tn/y	Less than 50tn/y	Among 50 and 200tn/y	More than 200tn/y	Less than 5%	Among 5 and 15%	More than 15%	Small Electronic Appliances	Screens	Large Household Appliances	Temperature Exchange Equipment	Toys	Lamps and Leds	IT and Telecommunication Equipment	Consumer Equipment	Yes	No
Belgium	RECUPEL VZW			√			√	√			√		√	√			√	√	√	
Cyprus	WEEE Electrocyclosis Cyprus LMD			√		√			√		ND								√	
France	Eco-Systèmes			√			√			√	ND								√	
Portugal	Amb3E			√	√			√			√	√							√	
Spain	Fundacion Ecotic			√		√		√			√	√	√	√	√				√	
Austria (Waste Agency)	Umbrella Organization of all Styrian Waste Management Associations			√			√	√			ND								√	

Based on the results regarding the performance indicators of the applied (W)EEE re-use methodologies where the questionnaires respondents were re-use centres networks and/or individual re-use centres, as well as Producer Responsibility Organizations (including Waste Agencies) and according to the above-mentioned Tables, the following findings were extracted:

- As it was expected, the cooperation between PROs and large-scale re-use centres networks is leading to the collection of more than 2.000tn of (W)EEE per year (in some cases more than 15.000tn) indicating that these networks are expanded at interregional and/or national level. Proportionally, for these networks, the fraction of (W)EEE that is repaired is more than 200tn per year with re-use ratios that are exceeding 10%.
- Despite of their collected (W)EEE quantities, large scale re-use centres networks are generally not covering the whole range of (W)EEE types. For example, the Belgian and French (except Emmaüs France and ENVIE) respondents are dealing with the management of certain (W)EEE types which are small electronic appliances, large household appliances, temperature exchange equipment and screens. On the contrary, small scale networks and/or individual re-use centres are implemented locally and most of them are covering the whole range of (W)EEE types.
- The entities that are actively involved in (W)EEE management can be categorized into three (3) main groups which are including:
    - Large scale re-use centres networks which are collecting more than 2.000tn of (W)EEE on an annual basis and are acting at interregional and/or national level. These networks are cooperating with their respective PROs of each EU Member State and their range of activities is also including other specific waste streams with considerable potential for re-use.
    - Localized small scale re-use centres networks and individual re-use centres which are collecting less than 2.000tn of (W)EEE per year (in some cases less than 500tn/y) and are acting at a local or at a regional level. Besides the Spanish case, these networks are not cooperating with PROs.
    - PROs which are standing as the national compliance systems (one for each EU Member State). National compliance systems, as it was expected, are collecting large amounts of (W)EEE (more than 2.000tn annually). However, since they are recycling oriented, they have relatively low re-use ratios (less than 5%). PROs are implementing their network onto a wide range of at least five (5) (W)EEE types with the exception of Amb3E from Portugal which is specialised in the management of small appliances and screens.
- The cooperation between national compliance systems (PROs) supports the re-use centres networks to grow and expand at interregional and/or national level. The transactions between PROs and re-use centres networks include the access to large amounts of (W)EEE, directly through establishing a collecting network from (W)EEE Collection Points and in some cases from CAS, or indirectly through receiving fractions of (W)EEE with relatively high re-use potential.

3. Comparative Evaluation of Applied (W)EEE Re-Use Methodologies

The comparative evaluation of the applied (W)EEE re-use methodologies will be based on the utilisation of a technique titled 'Likert Scale'. This technic is widely applied for the extraction of comparative results that are derived from both quantitative and qualitative parameters. As it was indicated in the 1st and the 2nd of this report, the re-use methodologies are having similarities and differences that are applied to each one of the five basic phases of (W)EEE management, namely at the Delivery – Collection, the transportation of the collected (W)EEE, the procedures that occurred during the temporary storage and processing (preparation for re-use) of (W)EEE, as well as at the procedures that occurred during the temporary storage and trading of the repaired EEE. The differences and similarities can be expressed by certain features (e.g. weighting technique, Delivery – Collection scheme etc.) in which the alternative pathways for the completion of the respective procedures are forming the preference level in accordance with pre-defined criteria.

3.1 Evaluation Technique

Likert Scale is a wide spread evaluation technique used by researchers in surveys based on questionnaires. The aim of these surveys is to itemise the writer's opinions in matters related to sociological and/or psychological thematic fields[66]. The basic fundamental in Likert Scale evaluation is the selection of Likert Items. A Likert Item refers to a trend or a certain feature and/or characteristic and/or opinion that a respondent is asked to evaluate according to predefined objective or subjective criteria. The evaluated options are expressed by a scale that indicates the level of agreement or disagreement for a Likert Item regarding a certain criterion. Each level is scored with integer values ranged from one (1) to 'D', where 'D' defines the degree of the Likert Scale[67]. As for their degree, there are several Likert Scales. However, for the cases where the alternative pathways that are forming the levels of preferences are limited in number (for example less than 4), the most applicable is the one with a 3-degree level scoring. According to this scoring, a Likert Item is evaluated as for a predefined criterion in the following levels [68]:

- Absolute Disagreement or Disagreement by means of strongly unfavourable or somewhat unfavourable, respectively, to a certain concept: 1
- Neutrality by means of undecided to a certain concept: 2 and
- Absolute Agreement or Agreement by means of strongly favourable or somewhat favourable to a certain concept: 3.

[66] Wuensch K.L., (2005), 'What is a Likert Scale? and How Do You Pronounce Likert?' East Carolina University. http://core.ecu.edu/psyc/wuenschk/StatHelp/Likert.htm. [Accessed 29-09-2017]

[67] Likert R., (1932), 'A Technique for the Measurement of Attitudes', Archives of Psychology 140: 1–55

[68] Trochim W.M., (2006), 'Likert Scaling', Research Methods Knowledge Base, 2nd Edition, http://www.socialresearchmethods.net/kb/scallik.php. [Accessed 29-09-2017]

The evaluation's results as for a certain criterion will come up from the aggregation of the scores for each one of the Likert Items. These results are usually presented in column diagrams.

The purpose of selecting a 3-degree Likert Scale is based on the quantification of the performance regarding each one of the previously mentioned and applied (W)EEE re-use methodologies. By using this evaluation technique, both quantitative and qualitative characteristics can be scored in order to rank them. Each scoring level indicates the presence of a certain feature that differentiates one re-use methodology from another as for a discrete Likert Item. Adding up the scores for all the Likert Items will depict the total score as for a certain criterion.

3.2 Features – Likert Items

For the case of evaluating the (W)EEE re-use methodologies, the Likert Items can be expressed as the alternative pathways where a certain feature (procedure, opinion, characteristic and/or technique) can be accomplished in the framework of (W)EEE management. The features are divided in accordance with the discrete stage of (W)EEE management to which they belong.

3.2.1 Delivery – Collection

As for the stage of (W)EEE management that is related to the Delivery – Collection of (W)EEE, the features and the respective Likert Items are summarized in the following Table.

Table 25: Features & Likert Items for (W)EEE Delivery – Collection

Features	Likert Items
Applied Scheme	Civic amenity sites
	(W)EEE Door to Door Collection
	(W)EEE Collection Points
	Do-It-Yourself Delivery
(W)EEE Discarders Targeted	Private Sector Entities
	Public Sector Entities
	Households
	All of the Above (mixed origination)

3.2.2 (W)EEE Temporary Storage

As for the stage of (W)EEE management that is related to the (W)EEE temporary storage, the features and the respective Likert Items are summarized in the following Table.

Table 26: Features & Likert Items for (W)EEE Temporary Storage

Features	Likert Items
Categorization of (W)EEE	WEEE Only
	EEE Only
	WEEE and EEE
Traceability of (W)EEE	Recording (W)EEE Discarding Sources
	Absence of Recording (W)EEE Discarding Sources
Qualitative Assessment of (W)EEE	Sorting and Identification of (W)EEE
	Non-Identification of (W)EEE
Numerical Assessment of (W)EEE	Counting of (W)EEE per Type of Appliance
	Counting of (W)EEE Accumulatively
	Absence of (W)EEE Counting
Quantitative Assessment of (W)EEE	Weighting of (W)EEE per Type Through Physical Scale
	Weighting of (W)EEE per Type Through Proxy Data
	Weighting of (W)EEE Accumulatively Through Physical Scale
	Weighting of (W)EEE Accumulatively Through Proxy Data
	Combination of the Above

3.2.3 (W)EEE Processing

As for the stage of (W)EEE management that is related to the (W)EEE processing by means of preparation for re-use, the features and the respective Likert Items are summarized in the following Table.

Table 27: Features & Likert Items for (W)EEE Processing (Preparation for Re-Use)

Features	Likert Items
Job creation	Assessment of Preparing for Re-use Jobs Creation
	Assessment of Re-use Jobs Creation
	Assessment of both accumulatively

Features	Likert Items
	No assessment of jobs creation

3.2.4 REWEEE Trading

As for the stage of (W)EEE management that is related to the trading of the repaired EEE (REWEEE Temporary Storage), the features and the respective Likert Items are summarized in the following Table.

Table 28: Features & Likert Items for REWEEE Trading

Features	Likert Items
Numerical Assessment of REWEEE	Counting of REWEEE per Type of Appliance
	Counting of REWEEE Accumulatively
	Absence of REWEEE Counting
Quantitative Assessment of REWEEE	Weighting of REWEEE per Type Through Physical Scale
	Weighting of REWEEE per Type Through Proxy Data
	Weighting of REWEEE Accumulatively Through Physical Scale
	Weighting of REWEEE Accumulatively Through Proxy Data
	Combination of the Above
Point of Calculation for REWEEE	Available in Trading Store
	Sold or Donated
Trading of REWEEE	Bought by customer
	Received by customer as donation
	Combination of the Above

3.2.5 Performance Indicators

Finally, as for the performance indicators that are related to the entire logistic of (W)EEE management, the features and the respective Likert Items are summarized in the following Table.

Table 29: Features & Likert Items for (W)EEE Management Performance Indicators

Features	Likert Items
Collected (W)EEE	Less than 500tn/y
	Among 500 and 2.000tn/y
	More than 2.000tn/y
REWEEE	Less than 50tn/y
	Among 50 and 200tn/y
	More than 200tn/y
Accumulative (W)EEE Re-Use Ratio	Less than 5%
	Among 5 and 15%
	More than 15%
Number of WEEE Types Covered	No (W)EEE types identification
	1
	2
	3
	4
	5
	6
	7
	8
Interconnection with Re-Use Centres Networks / Producer Responsibility Organizations	Yes
	No

3.3 Criteria Formation & Levels of Preferences

The evaluation procedure will be based on certain criteria that will form the levels of preferences of the previously mentioned Likert Items and the respective features. In particular, the criteria under which the applied (W)EEE re-use methodologies will be evaluated are including:

- Job Creation
- Investment & Operational Cost of Implementation

- Social Sensitivity / Environmental Awareness
- Re-Use Effectiveness & Re-Use Orientation

Each one of the above-mentioned criteria is related to certain features. In addition, for each feature, the levels of preferences are differentiated in accordance with the criteria to which they are related. The scoring of the levels of preferences is based on the 3rd degree Likert Scale. Alongside with the selected features are placed the weighting factors indicating the level of significance regarding a certain criterion.

3.3.1 Job Creation

The 'Job Creation' criterion implies the growth of employment's potential onto all the stages of (W)EEE management towards re-use. To this end, the scoring of levels of preferences will be done as follows:

- Absolute Disagreement or Disagreement by means of limited potential for job creation: 1
- Neutrality by means of moderate potential for job creation: 2 and
- Absolute Agreement or Agreement by means of high potential for job creation: 3.

The features that are related to the 'Job Creation' criterion, as well as to the respective levels of preferences between the different Likert Items are described in the following Table. The Likert Items that are not scored as for their levels of preferences and, subsequentely, their respective features are considered as irrelevant with that criterion.

Table 30: Likert Items Levels of Preferences for Job Creation

Features	Weighting Factor	Likert Items	Levels of Preference
Applied Scheme	9%	Civic amenity sites	1
		(W)EEE Door to Door Collection	3
		(W)EEE Collection Points	2
		Do-It-Yourself Delivery	1
Qualitative Assessment of (W)EEE	19%	Sorting and Identification of (W)EEE	3
		Non-Identification of (W)EEE	1
Quantitative Assessment of (W)EEE	6%	Weighting of (W)EEE per Type Through Physical Scale	3
		Weighting of (W)EEE per Type Through Proxy Data	3
		Weighting of (W)EEE Accumulatively	2

Features	Weighting Factor	Likert Items	Levels of Preference
		Through Physical Scale	
		Weighting of (W)EEE Accumulatively Through Proxy Data	2
		Combination of the Above	1
Numerical Assessment of (W)EEE	6%	Counting of (W)EEE per Type of Appliance	3
		Counting of (W)EEE Accumulatively	2
		Absence of (W)EEE Counting	1
Numerical Assessment of REWEEE	6%	Counting of REWEEE per Type of Appliance	3
		Counting of REWEEE Accumulatively	2
		Absence of REWEEE Counting	1
Trading of REWEEE	9%	bought by customer	3
		received as donation by customer	1
		Combination of the Above	2
Accumulative (W)EEE Re-Use Ratio	18%	Less than 5%	1
		Among 5 and 15%	2
		More than 15%	3
Interconnection with Re-Use Centres Networks / PROs	14%	Yes	3
		No	1
Number of WEEE Types Covered	13%	No (W)EEE types identification	1
		1	1
		2	1
		3	2
		4	2
		5	2
		6	3
		7	3
		8	3

For the selection of the levels of preference, the following assumptions were made:

- Regarding the collection, CASs, WCPs and D2DC were assumed to create more jobs than DIYD because of the transportation needed between the collection points and the (W)EEE Processing facilities.
- The manpower needed for:
    - The Qualitative Assessment of (W)EEE through Sorting and Identification,

- The Quantitative Assessment of (W)EEE through Weighting per Type of Appliance, and
- The Numerical Assessment of (W)EEE / REWEEE through Counting of (W)EEE per Type of Appliance

makes these alternative pathways (Likert items) more preferable options by means of creating more jobs, because supposing a careful reporting of data.

- When REWEEE items are sold instead of donated, a re-use centre can employ and need to employ probable more personnel thanks to the resulting income and because of the need to have a staff dedicated to the sale of these items.
- The interconnection with a PRO enhances the expansion of a re-use centres network.
- Higher accumulative re-use ratios can be achieved through the employment of an adequate personnel for the repairing of (W)EEE.
- The more (W)EEE is handled towards re-use, the more people are needed to be employed.
- When the different types of (W)EEE are not identified, less personnel is needed to be employed.

As for the rating of the weighting factors, the most important features for Job Creation are:

- Qualitative Assessment of (W)EEE and
- Accumulative (W)EEE Re-Use Ratio,

while the less important features are:

- Quantitative Assessment of (W)EEE and
- Numerical Assessment of (W)EEE / REWEEE.

3.3.2 Investment & Operational Cost of Implementation

The 'Investment & Operational Cost of Implementation' criterion is related to the cost of investing in equipment for (W)EEE management towards re-use as well as the operational cost of an applied re-use methodology taking into account all the different managerial stages. To this end, the scoring of the levels of preferences is related with:

- Absolute Disagreement or Disagreement by means of high investment and operational cost for the implementation of a (W)EEE re-use methodology: 1
- Neutrality by means of moderate investment and operational cost for the implementation of a (W)EEE re-use methodology: 2 and
- Absolute Agreement or Agreement by means of low investment and operational cost for the implementation of a (W)EEE re-use methodology: 3.

The features that are related to the 'Investment & Operational Cost of Implementation' criterion, as well as to the respective levels of preferences between the different Likert Items are described in the following Table. The Likert Items that are not scored as for their levels of preferences and, subsequentely, their respective features are considered as irrelevant with that criterion.

Table 31: Likert Items Levels of Preferences for Investment & Operational Cost of Implementation

Features	Weighting Factor	Likert Items	Levels of Preference
Applied Scheme	23%	Civic amenity sites	2
		(W)EEE Door to Door Collection	1
		(W)EEE Collection Points	2
		Do-It-Yourself Delivery	3
Qualitative Assessment of (W)EEE	13%	Sorting and Identification of (W)EEE	1
		Non-Identification of (W)EEE	3
Quantitative Assessment of (W)EEE	12%	Weighting of (W)EEE per Type Through Physical Scale	1
		Weighting of (W)EEE per Type Through Proxy Data	2
		Weighting of (W)EEE Accumulatively Through Physical Scale	2
		Weighting of (W)EEE Accumulatively Through Proxy Data	3
		Combination of the Above	1
Quantitative Assessment of REWEEE	12%	Weighting of REWEEE per Type Through Physical Scale	1
		Weighting of REWEEE per Type Through Proxy Data	2
		Weighting of REWEEE Accumulatively Through Physical Scale	2
		Weighting of REWEEE Accumulatively Through Proxy Data	3
		Combination of the Above	1
Interconnection with Re-Use Centres Networks / Producer Responsibility Organizations	16%	Yes	3
		No	1
Trading of REWEEE	10%	Bought by customer	3

Features	Weighting Factor	Likert Items	Levels of Preference
		Received as donation by customer	1
		Combination of the Above	3
Number of WEEE Types Covered	14%	1	3
		2	3
		3	3
		4	2
		5	2
		6	1
		7	1
		8	1

For the selection of the levels of preference, the following assumptions were made:

- As for the Applied Scheme, Do-It-Yourself Delivery is considered to have the lowest cost since there is no equipment needed (waste bins and/or transportation vehicles). On the contrary, Door-to-Door collection schemes imply a major investment (purchase of transportation vehicles) and operational (involved personnel) cost.
- The Sorting and Identification of (W)EEE requires an operational cost which is related to the personnel involved in the completion of this procedure.
- As for the weighting technique, it is assumed that the weighting of (W)EEE / REWEEE accumulatively through proxy data requires minimum investment cost (no use of physical scale) and minimum operational cost (no need of weighting per (W)EEE / REWEEE type after sorting).
- A cooperation with a PRO means that investments and operational costs from the preparing for re-use operators are needed to transport WEEE from the CAS and WCP to the (W)EEE Processing facilities. However, a part of the costs related to the preparing for re-use of WEEE will be covered by the EPR fees (in general, the collection costs). In the long run, the cooperation between a preparing for re-use centre and a PRO is considered as lowering the costs for the preparing for re-use centre.
- The operational cost of any (W)EEE re-use managerial chain can be re-balanced through selling second-hand end-products.
- The number of (W)EEE types covered is inversely proportional with the investment and operational costs needed due to the fact that a facility which deals with the re-use of

relatively low numbers of different (W)EEE types can be more cost-effective through their specialisation[69].

- When the different types of (W)EEE are not identified, less operational costs are implied.

As for the rating of the weighting factors, the most important features for the 'Investment & Operational Cost of Implementation' criterion are:

- Applied Scheme and
- Interconnection with Re-Use Centres Networks / Producer Responsibility Organizations,

while the less important features are:

- Quantitative Assessment of (W)EEE / REWEEE and
- Trading of REWEEE.

3.3.3 Social Sensitivity / Environmental Awareness

The 'Social Sensitivity / Environmental Awareness' criterion implies:

- The social sensitivity of the entities that are involved at certain stages of the (W)EEE re-use managerial chain by means of employing socially vulnerable groups and/or promoting the concept of re-using (W)EEE against recycling,
- Or the environmental awareness of both (W)EEE re-use operators and the public by means of promoting and participating in (W)EEE re-use schemes as an act of waste prevention.

To this end, the scoring of the levels of preferences will be made as follows:

- Absolute Disagreement or Disagreement by means of low Social Sensitivity / Environmental Awareness of a (W)EEE re-use methodology: 1
- Neutrality by means of moderate Social Sensitivity / Environmental Awareness of a (W)EEE re-use methodology: 2 and
- Absolute Agreement or Agreement by means of high Social Sensitivity / Environmental Awareness of a (W)EEE re-use methodology: 3.

The features that are related to the 'Social Sensitivity / Environmental Awareness' criterion, as well as to the respective levels of preferences between the different Likert Items are described in the following Table. The Likert Items that are not scored as for their levels of preferences and, subsequently, their respective features are considered as irrelevant with that criterion.

[69] It needs to be noted that some of the re-use operators dealing with all the different types of (W)EEE do not invest in repairing equipement or in repair training and limit their activities to the testing and cleaning of the products collected, and therefore require less investment and operational costs. Keeping the comparability of the models in mind, it has been decided that every different (W)EEE type covered requires more investment and operational costs.

Table 32: Likert Items Levels of Preferences for Social Sensitivity / Environmental Awareness

Features	Weighting Factor	Likert Items	Levels of Preference
Applied Scheme	27%	Civic amenity sites	1
		(W)EEE Door to Door Collection	2
		(W)EEE Collection Points	2
		Do-It-Yourself Delivery	3
REWEEE Consideration as an EEE Product	17%	Available in Trading Store	2
		Sold or Donated	3
Trading of REWEEE	17%	Bought by customer	1
		Received as donation by customer	3
		Combination of the Above	2
Accumulative (W)EEE Re-Use Ratio	27%	Less than 5%	1
		Among 5 and 15%	2
		More than 15%	3
Number of WEEE Types Covered	12%	1	1
		2	1
		3	2
		4	2
		5	2
		6	3
		7	3
		8	3

For the selection of the levels of preferences, the following assumptions were made:

- As for the Applied Scheme, the implementation of Do-It-Yourself-Delivery and Door-to-Door Collection schemes implies that waste producers are more environmentally aware of the positive environmental or social impact of a proper management of (W)EEE. On the contrary, the delivery of (W)EEE at CAS and (W)EEE Collection Points are less favourable options than the aforementioned schemes regarding social sensitivity and environmental awareness.
- Relatively high Accumulative (W)EEE Re-Use Ratios are indicating a well-established and effective network regardless of their expansion range.
- The presence of REWEEE trading stores where REWEEE items are sold at low prices to disadvantaged socioeconomic groups indicates a social sensitivity. The donation of REWEEE items is considered as being even more valuable in terms of social sensitivity.

- The implementation of a methodology onto the 8 types of (W)EEE implies that the re-use operator is aware about the potential for re-usability of all the different types of (W)EEE or is at least willing to provide a collection service to the discarders, even though not being able to re-use everything, which means a certain level of awareness about the social and environmental impact of collecting and managing all the different types of (W)EEE.
- When the different types of (W)EEE are not identified, it proves a lack of commitment to provide the best repair or refurbishing service. It also very probably impacts negatively the re-use rate and, icenditely, the environment.

As for the rating of the weighting factors, the most important features for Social Sensitivity / Environmental Awareness are:

- The Applied Scheme and
- The Accumulative (W)EEE Re-Use Ratio,

while the less important feature is the Number of WEEE Types Covered.

3.3.4 Re-Use Effectiveness

The 'Re-Use Effectiveness' criterion implies the effectiveness of an applied methodology by means of separate collection of (W)EEE as well as by means of producing second hand EEE readily available to third parties. In addition, re-use orientation implies the prioritization of re-use against recycling as a fundamental for the implementation of a certain methodology. To this end, the scoring of the levels of preferences is related with:

- Absolute Disagreement or Disagreement by means of low Re-Use Effectiveness and Re-Use Orientation of a (W)EEE re-use methodology: 1
- Neutrality by means of moderate Re-Use Effectiveness and Re-Use Orientation of a (W)EEE re-use methodology: 2 and
- Absolute Agreement or Agreement by means of high Re-Use Effectiveness and Re-Use Orientation of a (W)EEE re-use methodology: 3.

The features that are related to the 'Re-Use Effectiveness' criterion, as well as to the respective levels of preferences between the different Likert Items are described in the following Table. The Likert Items that are not scored as for their levels of preferences and, subsequently, their respective features are considered as irrelevant with that criterion.

Table 33: Likert Items Levels of Preferences for Re-Use Effectiveness

Features	Weighting Factor	Likert Items	Levels of Preference
Applied Scheme	23%	Civic amenity sites	1

Features	Weighting Factor	Likert Items	Levels of Preference
		(W)EEE Door to Door Collection	3
		(W)EEE Collection Points	2
		Do-It-Yourself Delivery	3
Traceability of (W)EEE	11%	Recording (W)EEE Discarding Sources	3
		Absence of Recording (W)EEE Discarding Sources	1
Trading of REWEEE	18%	Bought by customer	1
		Received as donation by customer	3
		Combination of the Above	2
Point of Calculation for REWEEE	5%	Available in Trading Store	2
		Sold or Donated	3
Interconnection with Re-Use Centres Networks / Producer Responsibility Organizations	24%	Yes	3
		No	1
Accumulative (W)EEE Re-Use Ratio	19%	Less than 5%	1
		Among 5 and 15%	2
		More than 15%	3

For the selection of the levels of preference, the following assumptions were made:

- As for the Applied Scheme, the effectiveness of a (W)EEE re-use methodology is closely related to the condition in which the (W)EEE items are collected. To this end, it is assumed that the applied collection schemes which are based on Do-It-Yourself Delivery (at least for light (W)EEE items) and on Door-to-Door Collection schemes are expected to be more effective as for the re-usability potential of the collected (W)EEE compared to the collection from Civic Amenity Sites and/or (W)EEE Collection Points.
- In the case of a Civic Amenity Site or a (W)EEE Collection Point, it is supposed that the collection is done in a way which does not safeguard the re-usability of the (W)EEE collected. This is due to the fact that these Applied Schemes are oriented more towards recycling than towards re-use.
- A (W)EEE re-use methodology is more effective when:
    - The incoming quantities are recorded as for the origination of the discarding sources.
    - The repaired items are delivered to customers as donations because this implies that the re-use rate of the operator is high enough to afford giving away a part if its REWEEE items .

- The repaired items are considered as end-products when they are sold or donated because this implies that the point of calculation is closer to the real re-use of the material.

- The collaboration between reuse centres and PROs does improve the re-use effectiveness.
- Re-use effectiveness is reflected by the annual Accumulative (W)EEE Re-Use Ratios.

As for the rating of the weighting factors, the most important features for Re-Use Effectiveness are:

- Interconnection with Re-Use Centres Networks / Producer Responsibility Organizations and
- Applied Schemes

while the less important features are

- Traceability of (W)EEE and
- Point of Calculation for REWEEE.

3.4 Evaluation Results

Below are described the results that derived from the evaluation of the applied (W)EEE re-use methodologies. The results are presented separately for each one of the ten (10) pre-selected criteria.

For each methodology, the overall scoring for a certain criterion is derived from the following formula:

$$R_{C,M} = \sum_{n=1}^{m} f_n \cdot \left(\sum_{i=1}^{j} \frac{L_i}{j} \right), \text{ where}$$

L - Numerical value from 1 to 3 expressing the levels of preferences for an i-Likert Item.

i - Number of Likert Items (alternative pathways) where they are applied for the implementation of a certain Feature.

f - Weighting Factor (in %) expressing the importance of a n-feature as for a certain criterion.

n - Number of features where they are correlated with a certain criterion.

$R_{C,M}$ - Total score of a M-methodology according to a C-criterion.

It is noted that, one methodology gets a total score only if all the features that are related to a certain criterion are valued. For the cases where there is a 'Lack of Data' (ND) value and therefore

the respective feature cannot be scored as for their Likert Items' levels of preferences, the methodology cannot get a partial and total score as for its performance against a certain criterion.

For those methodologies where all features are valued, the total score is expressing the performance of a methodology as for a certain criterion where the total score will be a number at the range $1 \leq R_{C,M} \leq 3$. Thus, according to the 3-degree Likert Scale, each (W)EEE re-use methodology will be evaluated as having:

- Excellent performance when $2{,}5 \leq R_{C,M} \leq 3$,
- High performance when $2 \leq R_{C,M} < 2{,}5$,
- Moderate performance when $1{,}5 \leq R_{C,M} < 2$ and
- Poor performance when $1 \leq R_{C,M} < 1{,}5$.

3.4.1 Job Creation

The evaluation's results concerning the criterion 'Job creation' are presented in the following Tables separately for 'large scale re-use centres networks', 'small scale re-use centres networks and individual re-use centres' and 'Producer Responsibility Organizations including Waste Agencies'.

It is underlined that a re-use centre network is characterized as large scaled when the annual collected (W)EEE quantities towards re-use are way more than 2.000tn. Small scale re-use centre networks as well as individual re-use centres, for year 2015, collected less than 1.000tn of (W)EEE.

The results of the comparative evaluation of the applied (W)EEE re-use methodologies and, in particular, the partial and overall scoring for implementing each managerial stage according to 'Job Creation' are including:

- Concerning the applied collection schemes, the methodologies which are incorporating D2DC schemes (alone or in combination with (W)EEE collection points) have an excellent performance (more than 0,225 with optimum partial scoring 0,27).
- Concerning the procedures regarding (W)EEE temporary storage, the methodologies which are employing personnel for conducting sorting and counting of the collected (W)EEE along with the use of physical scale for weighting the incoming quantities have an excellent performance (more than 0,775 with optimum partial scoring 0,93).
- Concerning the procedures regarding REWEEE trading, the methodologies which are employing personnel for conducting counting of the REWEEE along with a combination of selling and/or donation of second-hand products to customers have a high performance (among 0,3 and 0,375 with optimum partial scoring 0,45).
- Concerning the performance indicators of the entire (W)EEE re-use managerial chain, the methodologies where there isa cooperation between the re-use operators and their respective PROs and have an accumulative (W)EEE re-use ratio above 15% by covering the

processing of all eight (8) types of (W)EEE have an excellent performance (more than 1,125 with optimum partial scoring 1,35).

Finally, and only for the methodologies where enough data were collected to provide a total score and under the criterion 'Jobs Creation', the following results as for the entire (W)EEE re-use managerial chain were extracted:

- High to Excellent performance for the Belgian re-use centre network KOMOSIE (scoring slightly below 2,50).
- High performance for all the methodologies (scoring among 2,00 and 2,50) except the ones that are applied by Traperos de Emaus de Navarra (Spanish small scale re-use centre network), Emmaus and Eco-systeme for the French case, Cypriot PRO WEEE Electrocyclosis Cyprus LMD and Amb3E (Portuguese PRO) which have a moderate performance (scoring among 1,50 and 2,00).

Table 34: Comparative Evaluation Results for (W)EEE Re-Use Methodologies Applied by Large Scale Re-Use Centres Networks as for the 'Job Creation'

Features	Weighting Factor	Likert Items	Levels of Preference & Optimum Scoring	KOMOSIE	RES-SOURCES	Emmaüs France	ENVIE	SIRRMIET	Rehab Recycle
Applied Scheme	9%	Civic amenity sites	1	1	1				1
		(W)EEE Door to Door Collection	3	3	3		3	3	3
		(W)EEE Collection Points	2	2	2	2	2	2	2
		Do-It-Yourself Delivery	1	1	1	1	1	1	
Partial Score			**0,27**	**0,16**	**0,16**	**0,14**	**0,18**	**0,18**	**0,18**
Qualitative Assessment of (W)EEE	19%	Sorting and Identification of (W)EEE	3	3	3			3	3
		Non-Identification of (W)EEE	1			1	1		
Quantitative Assessment of (W)EEE	6%	Weighting of (W)EEE per Type Through Physical Scale	3						
		Weighting of (W)EEE per Type Through Proxy Data	3	3					3
		Weighting of (W)EEE Accumulatively Through Physical Scale	2			2	2	2	
		Weighting of (W)EEE Accumulatively Through Proxy Data	2						
		Combination of the Above	1		1				
Numerical Assessment of (W)EEE	6%	Counting of (W)EEE per Type of Appliance	3	3					
		Counting of (W)EEE Accumulatively	2				2		
		Absence of (W)EEE Counting	1		1	1		1	1
Partial Score			**0,93**	**0,93**	**0,69**	**0,37**	**0,43**	**0,75**	**0,81**
Numerical Assessment of REWEEE	6%	Counting of REWEEE per Type of Appliance	3	3			3		
		Counting of REWEEE Accumulatively	2						

Features	Weighting Factor	Likert Items	Levels of Preference & Optimum Scoring	KOMOSIE	RES-SOURCES	Emmaüs France	ENVIE	SIRRMIET	Rehab Recycle
		Absence of REWEEE Counting	1		1	1		1	1
Trading of REWEEE	9%	Bought by customer	3				3	3	
		Received as donation by customer	1						
		Combination of the Above	2	2	2	2			2
Partial Score			**0,45**	**0,36**	**0,24**	**0,24**	**0,45**	**0,33**	**0,24**
Accumulative (W)EEE Re-Use Ratio	18%	Less than 5%	1						
		Among 5 and 15%	2	2	2				
		More than 15%	3			3	3	3	3
Interconnection with Re-Use Centres Networks / PROs	14%	Yes	3	3	3	3	3		
		No	1					1	1
Number of (W)EEE Types Covered	13%	No (W)EEE types identification	1			1			
		1	1						1
		2	1						
		3	2					2	
		4	2	2	2		2		
		5	2						
		6	3						
		7	3						
		8	3						
Partial Score			**1,35**	**1,04**	**1,04**	**1,09**	**1,22**	**0,94**	**0,81**

Features	Weighting Factor	Likert Items	Levels of Preference & Optimum Scoring	KOMOSIE	RES-SOURCES	Emmaüs France	ENVIE	SIRRMIET	Rehab Recycle
Total Score			3,00	2,49	2,13	1,84	2,28	2,20	2,04

Table 35: Comparative Evaluation Results for (W)EEE Re-Use Methodologies Applied by Small Scale Re-Use Centres Networks and Individual Re-Use Centres as for the 'Job Creation'

Features	Weighting Factor	Likert Items	Levels of Preference & Optimum Scoring	CF2D/CF2M	Ateliere Fara Frontiere	Revertia	TIV Menorca	Traperos de Emaus de Murcia	Traperos de Emaus de Navarra
Applied Scheme	9%	Civic amenity sites	1				1	1	
		(W)EEE Door to Door Collection	3	3	3	3	3	3	3
		(W)EEE Collection Points	2			2	2	2	2
		Do-It-Yourself Delivery	1	1			1	1	
Partial Score			**0,27**	**0,18**	**0,27**	**0,23**	**0,16**	**0,16**	**0,23**
Qualitative Assessment of (W)EEE	19%	Sorting and Identification of (W)EEE	3	3	3	3	3	3	
		Non-Identification of (W)EEE	1						1
Quantitative Assessment of (W)EEE	6%	Weighting of (W)EEE per Type Through Physical Scale	3					3	
		Weighting of (W)EEE per Type Through Proxy Data	3			3			
		Weighting of (W)EEE Accumulatively Through Physical Scale	2	2			2		
		Weighting of (W)EEE Accumulatively Through Proxy Data	2		2				
		Combination of the Above	1						1
Numerical Assessment of	6%	Counting of (W)EEE per Type of Appliance	3						
		Counting of (W)EEE Accumulatively	2		2				

Features	Weighting Factor	Likert Items	Levels of Preference & Optimum Scoring	CF2D/CF2M	Ateliere Fara Frontiere	Revertia	TIV Menorca	Traperos de Emaus de Murcia	Traperos de Emaus de Navarra
(W)EEE		Absence of (W)EEE Counting	1	1		1	1	1	1
Partial Score			**0,93**	**0,75**	**0,81**	**0,81**	**0,75**	**0,81**	**0,31**
Numerical Assessment of REWEEE	6%	Counting of REWEEE per Type of Appliance	3						
		Counting of REWEEE Accumulatively	2	2	2				
		Absence of REWEEE Counting	1			1	1	1	1
Trading of REWEEE	9%	Bought by customer	3						
		Received as donation by customer	1						
		Combination of the Above	2	2	2	2	2	2	2
Partial Score			**0,45**	**0,30**	**0,30**	**0,24**	**0,24**	**0,24**	**0,24**
Accumulative (W)EEE Re-Use Ratio	18%	Less than 5%	1				1	1	1
		Among 5 and 15%	2						
		More than 15%	3	3	3	3			
Interconnection with Re-Use Centres Networks / PROs	14%	Yes	3				3	3	3
		No	1	1	1	1			
Number of (W)EEE Types Covered	13%	No (W)EEE types identification	1						
		1	1						
		2	1		1	1			
		3	2						

Features	Weighting Factor	Likert Items	Levels of Preference & Optimum Scoring	CF2D/CF2M	Ateliere Fara Frontiere	Revertia	TIV Menorca	Traperos de Emaus de Murcia	Traperos de Emaus de Navarra
		4	2	2					
		5	2						
		6	3				3	3	3
		7	3						
		8	3						
Partial Score			**1,35**	**0,94**	**0,81**	**0,81**	**0,99**	**0,99**	**0,99**
Total Score			**3,00**	**2,17**	**2,19**	**2,09**	**2,14**	**2,20**	**1,77**

Table 36: Comparative Evaluation Results for (W)EEE Re-Use Methodologies Applied by Producer Responsibility Organisations as for the 'Job Creation'

Features	Weighting Factor	Likert Items	Levels of Preference & Optimum Scoring	RECUPEL VZW	WEEE Electrocyclosis Cyprus LMD	Eco-Systèmes	Amb3E	Fundacion Ecotic	Umbrella Organization of all Styrian Waste Management Associations
Applied Scheme	9%	Civic amenity sites	1	1	1				1
		(W)EEE Door to Door Collection	3	3					
		(W)EEE Collection Points	2	2	2	2	2	2	
		Do-It-Yourself Delivery	1				1		
Partial Score			**0,27**	**0,18**	**0,14**	**0,18**	**0,14**	**0,18**	**0,09**
Qualitative Assessment of (W)EEE	19%	Sorting and Identification of (W)EEE	3	3			3	3	
		Non-Identification of (W)EEE	1		1	1			1
Quantitative Assessment of (W)EEE	6%	Weighting of (W)EEE per Type Through Physical Scale	3				3		ND
		Weighting of (W)EEE per Type Through Proxy Data	3						
		Weighting of (W)EEE Accumulatively Through Physical Scale	2	2		2		2	
		Weighting of (W)EEE Accumulatively Through Proxy Data	2		2				
		Combination of the Above	1						
Numerical Assessment of (W)EEE	6%	Counting of (W)EEE per Type of Appliance	3						
		Counting of (W)EEE Accumulatively	2	2					
		Absence of (W)EEE Counting	1		1	1	1	1	1

Features	Weighting Factor	Likert Items	Levels of Preference & Optimum Scoring	RECUPEL VZW	WEEE Electrocyclosis Cyprus LMD	Eco-Systèmes	Amb3E	Fundacion Ecotic	Umbrella Organization of all Styrian Waste Management Associations
Partial Score			**0,93**	**0,81**	**0,37**	**0,37**	**0,81**	**0,75**	**ND**
Numerical Assessment of REWEEE	6%	Counting of REWEEE per Type of Appliance	3	3					
		Counting of REWEEE Accumulatively	2			2			
		Absence of REWEEE Counting	1		1		1	1	1
Trading of REWEEE	9%	Bought by customer	3		3				ND
		Received as donation by customer	1				1		
		Combination of the Above	2	2		2		2	
Partial Score			**0,45**	**0,36**	**0,33**	**0,30**	**0,15**	**0,24**	**ND**
Accumulative (W)EEE Re-Use Ratio	18%	Less than 5%	1	1			1	1	
		Among 5 and 15%	2		2				2
		More than 15%	3			3			
Interconnection with Re-Use Centres Networks / PROs	14%	Yes	3	3	3	3	3	3	3
		No	1						
Number of (W)EEE Types Covered	13%	No (W)EEE types identification	1		1	1			1
		1	1						
		2	1				1		
		3	2						

Features	Weighting Factor	Likert Items	Levels of Preference & Optimum Scoring	RECUPEL VZW	WEEE Electrocyclosis Cyprus LMD	Eco-Systèmes	Amb3E	Fundacion Ecotic	Umbrella Organization of all Styrian Waste Management Associations
		4	2						
		5	2	2				2	
		6	3						
		7	3						
		8	3						
Partial Score			**1,35**	**0,86**	**0,91**	**1,09**	**0,73**	**0,86**	**0,91**
Total Score			**3,00**	**2,21**	**1,75**	**1,94**	**1,83**	**2,03**	**ND**

3.4.2 Investment & Operational Cost of Implementation

The evaluation's results concerning the criterion 'Investment & Operational Cost of Implementation' are presented in the following Tables separately for 'large scale re-use centres networks', 'small scale re-use centres networks and individual re-use centres' and 'Producer Responsibility Organizations including Waste Agencies'.

It is underlined that a re-use centre network is characterized as large scaled when the annual collected (W)EEE quantities towards re-use are way more than 2.000tn. Small scale re-use centre networks as well as individual re-use centres, for year 2015, collected less than 1.000tn of (W)EEE.

The results of the comparative evaluation of the applied (W)EEE re-use methodologies and, in particular, the partial and overall scoring for implementing each managerial stage according to 'Investment & Operational Cost of Implementation' are including:

- Concerning the Applied Collection Schemes, the methodologies which are receiving fractions of (W)EEE quantities from Do-It-Yourself Delivery schemes have an excellent performance (more than 0,575 with optimum partial scoring 0,69).
- Concerning the procedures regarding (W)EEE temporary storage, the methodologies which are using proxy data for the weighting of (W)EEE quantities without sorting the incoming (W)EEE as for their appliances' types have an excellent performance (more than 0,625 with optimum partial scoring 0,75).
- Concerning the procedures regarding REWEEE trading, the methodologies which are using proxy data for the weighting of REWEEE quantities and are selling second-hand products to customers have an excellent performance (more than 0,55 with optimum partial scoring 0,66).
- Concerning the performance indicators of the entire (W)EEE re-use managerial chain, the methodologies which imply the collection by the re-use operators of certain types of (W)EEE in cooperation with their respective PROs have an excellent performance (more than 0,75 with optimum partial scoring 0,90).

Finally, and only for the methodologies where enough data were collected to provide a total score and under the criterion 'Investment & Operational Cost of Implementation', the following results as for the entire (W)EEE re-use managerial chain were extracted:

- Excellent performance for the French large-scale re-use centres network Emmaüs France and for the Cypriot PRO WEEE Electrocyclosis Cyprus LMD (scoring above 2,50).
- High to Excellent performance for the French large-scale re-use centres network ENVIE and for the French PRO Eco-Systèmes (scoring slightly below 2,50).
- High performance for KOMOSIE (scoring among 2,00 and 2,25).

Table 37: Comparative Evaluation Results for (W)EEE Re-Use Methodologies Applied by Large Scale Re-Use Centres Networks as for the 'Investment & Operational Cost of Implementation'

Features	Weighting Factor	Likert Items	Levels of Preference	KOMOSIE	RES-SOURCES	Emmaüs France	ENVIE	SIRRMIET	Rehab Recycle
Applied Scheme	23%	Civic amenity sites	2	2	2				2
		(W)EEE Door to Door Collection	1	1	1		1	1	1
		(W)EEE Collection Points	2	2	2	2	2	2	2
		Do-It-Yourself Delivery	3	3	3	3	3	3	
Partial Score			**0,69**	**0,46**	**0,46**	**0,58**	**0,46**	**0,46**	**0,38**
Qualitative Assessment of (W)EEE	13%	Sorting and Identification of (W)EEE	1	1	1			1	1
		Non-Identification of (W)EEE	3			3	3		
Quantitative Assessment of (W)EEE	12%	Weighting of (W)EEE per Type Through Physical Scale	1						
		Weighting of (W)EEE per Type Through Proxy Data	2	2					2
		Weighting of (W)EEE Accumulatively Through Physical Scale	2			2	2	2	
		Weighting of (W)EEE Accumulatively Through Proxy Data	3						
		Combination of the Above	1		1				
Partial Score			**0,75**	**0,37**	**0,25**	**0,63**	**0,63**	**0,37**	**0,37**
Quantitative Assessment of REWEEE	12%	Weighting of REWEEE per Type Through Physical Scale	1						
		Weighting of REWEEE per Type Through Proxy Data	2	2			2		2
		Weighting of REWEEE Accumulatively Through Physical Scale	2			2		2	

Features	Weighting Factor	Likert Items	Levels of Preference	KOMOSIE	RES-SOURCES	Emmaüs France	ENVIE	SIRRMIET	Rehab Recycle
		Weighting of REWEEE Accumulatively Through Proxy Data	3						
		Combination of the Above	1		1				
Trading of REWEEE	10%	Bought by customer	3				3	3	
		Received as donation by customer	1						
		Combination of the Above	3	3	3	3			3
Partial Score			**0,66**	**0,54**	**0,42**	**0,54**	**0,54**	**0,54**	**0,54**
Interconnection with Re-Use Centres Networks / PROs	16%	Yes	3	3	3	3	3		
		No	1					1	1
Number of (W)EEE Types Covered	14%	No (W)EEE types identification	3			3			
		1	3						3
		2	3						
		3	3					3	
		4	2	2	2		2		
		5	2						
		6	1						
		7	1						
		8	1						
Partial Score			**0,90**	**0,76**	**0,76**	**0,90**	**0,76**	**0,58**	**0,58**

Features	Weighting Factor	Likert Items	Levels of Preference	KOMOSIE	RES-SOURCES	Emmaüs France	ENVIE	SIRRMIET	Rehab Recycle
Total Score			3,00	2,13	1,89	2,65	2,39	1,95	1,87

Table 38: Comparative Evaluation Results for (W)EEE Re-Use Methodologies Applied by Small Scale Re-Use Centres Networks and Individual Re-Use Centres as for the 'Investment & Operational Cost of Implementation'

Features	Weighting Factor	Likert Items	Levels of Preference	CF2D/CF2M	Ateliere Fara Frontiere	Revertia	TIV Menorca	Traperos de Emaus de Murcia	Traperos de Emaus de Navarra
Applied Scheme	23%	Civic amenity sites	2				2	2	
		(W)EEE Door to Door Collection	1	1	1	1	1	1	1
		(W)EEE Collection Points	2			2	2	2	2
		Do-It-Yourself Delivery	3	3			3	3	
Partial Score			**0,69**	**0,46**	**0,23**	**0,35**	**0,46**	**0,46**	**0,35**
Qualitative Assessment of (W)EEE	13%	Sorting and Identification of (W)EEE	1	1	1	1	1	1	
		Non-Identification of (W)EEE	3						3
Quantitative Assessment of (W)EEE	12%	Weighting of (W)EEE per Type Through Physical Scale	1					1	
		Weighting of (W)EEE per Type Through Proxy Data	2			2			
		Weighting of (W)EEE Accumulatively Through Physical Scale	2	2			2		
		Weighting of (W)EEE Accumulatively Through Proxy Data	3		3				
		Combination of the Above	1						1
Partial Score			**0,75**	**0,37**	**0,49**	**0,37**	**0,37**	**0,25**	**0,51**
Quantitative Assessment of REWEEE	12%	Weighting of REWEEE per Type Through Physical Scale	1					1	
		Weighting of REWEEE per Type Through Proxy Data	2						
		Weighting of REWEEE Accumulatively Through Physical Scale	2	2			2		

Features	Weighting Factor	Likert Items	Levels of Preference	CF2D/CF2M	Ateliere Fara Frontiere	Revertia	TIV Menorca	Traperos de Emaus de Murcia	Traperos de Emaus de Navarra
		Weighting of REWEEE Accumulatively Through Proxy Data	3		3	3			
		Combination of the Above	1						1
Trading of REWEEE	10%	Bought by customer	3						
		Received as donation by customer	1						
		Combination of the Above	3	3	3	3	3	3	3
Partial Score			**0,66**	**0,54**	**0,66**	**0,66**	**0,54**	**0,42**	**0,42**
Interconnection with Re-Use Centres Networks / PROs	16%	Yes	3				3	3	3
		No	1	1	1	1			
Number of (W)EEE Types Covered	14%	No (W)EEE types identification	3						
		1	3						
		2	3		3	3			
		3	3						
		4	2	2					
		5	2						
		6	1				1	1	1
		7	1						
		8	1						

Features	Weighting Factor	Likert Items	Levels of Preference	CF2D/CF2M	Ateliere Fara Frontiere	Revertia	TIV Menorca	Traperos de Emaus de Murcia	Traperos de Emaus de Navarra
Partial Score			0,90	0,44	0,58	0,58	0,62	0,62	0,62
Total Score			3,00	1,81	1,96	1,96	1,99	1,75	1,90

Table 39: Comparative Evaluation Results for (W)EEE Re-Use Methodologies Applied by Producer Responsibility Organizations as for the 'Investment & Operational Cost of Implementation'

Features	Weighting Factor	Likert Items	Levels of Preference	RECUPEL VZW	WEEE Electrocyclosis Cyprus LMD	Eco-Systèmes	Amb3E	Fundacion Ecotic	Umbrella Organization of all Styrian Waste Management Associations
Applied Scheme	23%	Civic amenity sites	2	2	2				2
		(W)EEE Door to Door Collection	1	1					
		(W)EEE Collection Points	2	2	2	2	2	2	
		Do-It-Yourself Delivery	3				3		
Partial Score			**0,69**	**0,38**	**0,46**	**0,46**	**0,58**	**0,46**	**0,46**
Qualitative Assessment of (W)EEE	13%	Sorting and Identification of (W)EEE	1	1			1	1	
		Non-Identification of (W)EEE	3		3	3			3
Quantitative Assessment of (W)EEE	12%	Weighting of (W)EEE per Type Through Physical Scale	1				1		ND
		Weighting of (W)EEE per Type Through Proxy Data	2						
		Weighting of (W)EEE Accumulatively Through Physical Scale	2	2		2		2	
		Weighting of (W)EEE Accumulatively Through Proxy Data	3		3				
		Combination of the Above	1						
Partial Score			**0,75**	**0,37**	**0,75**	**0,63**	**0,25**	**0,37**	**ND**
Quantitative	12%	Weighting of REWEEE per Type Through Physical Scale	1	1			1	1	ND

Features	Weighting Factor	Likert Items	Levels of Preference	RECUPEL VZW	WEEE Electrocyclosis Cyprus LMD	Eco-Systèmes	Amb3E	Fundacion Ecotic	Umbrella Organization of all Styrian Waste Management Associations
Assessment of REWEEE		Weighting of REWEEE per Type Through Proxy Data	2						
		Weighting of REWEEE Accumulatively Through Physical Scale	2						
		Weighting of REWEEE Accumulatively Through Proxy Data	3		3				
		Combination of the Above	1			1			
Trading of REWEEE	10%	Bought by customer	3		3				ND
		Received as donation by customer	1				1		
		Combination of the Above	3	3		3		3	
Partial Score			**0,66**	**0,42**	**0,66**	**0,42**	**0,22**	**0,42**	**ND**
Interconnection with Re-Use Centres Networks / PROs	16%	Yes	3	3	3	3	3	3	3
		No	1						
Number of (W)EEE Types Covered	14%	No (W)EEE types identification	3		3	3			3
		1	3						
		2	3				3		

Features	Weighting Factor	Likert Items	Levels of Preference	RECUPEL VZW	WEEE Electrocyclosis Cyprus LMD	Eco-Systèmes	Amb3E	Fundacion Ecotic	Umbrella Organization of all Styrian Waste Management Associations
		3	3						
		4	2						
		5	2	2				2	
		6	1						
		7	1						
		8	1						
Partial Score			**0,90**	**0,76**	**0,90**	**0,90**	**0,90**	**0,76**	**0,90**
Total Score			**3,00**	**1,93**	**2,77**	**2,41**	**1,95**	**2,01**	**ND**

3.4.3 Social Sensitivity / Environmental Awareness

The evaluation's results concerning the criterion 'Social Sensitivity / Environmental Awareness' are presented in the following Tables separately for 'large scale re-use centres networks', 'small scale re-use centres networks and individual re-use centres' and 'Producer Responsibility Organizations including Waste Agencies'.

It is underlined that a re-use centre network is characterized as large scaled when the annual collected (W)EEE quantities towards re-use are way more than 2.000tn. Small scale re-use centre networks as well as individual re-use centres, for year 2015, collected less than 1.000tn of (W)EEE.

The results of the comparative evaluation of the applied (W)EEE re-use methodologies and, in particular, the partial and overall scoring for implementing each managerial stage according to 'Social Sensitivity / Environmental Awareness' are including:

- Concerning the applied collection schemes, the methodologies which are based on DIYD collection schemes are applied to more environmental sensitive social groups and thus have an excellent performance (more than 0,675 with optimum partial scoring 0,81).
- Concerning the REWEEE trading procedures, the methodologies which imply the donation or the sale of REWEEE items and which imply that a REWEEE item becomes an end-product only when it is sold or donated have a high to excellent performance (0,85 with optimum partial scoring 1,02).
- Concerning the performance indicators of the entire (W)EEE re-use managerial chain, methodologies which are achieving more than 15% re-use ratios and are dealing with the re-use of all 8 (W)EEE types have an excellent performance (more than 0,975 with optimum partial scoring 1,17).

Finally, and only for the methodologies where enough data were collected to provide a total score and under the criterion 'Social Sensitivity / Environmental Awareness', the following results as for the entire (W)EEE re-use managerial chain were extracted:

- Excellent performance for the individual re-use centre CF2D/CF2M (scoring among 2,50 and 3,00).
- High performance (scoring among 2,00 and 2,50) for the French large-scale re-use centres networks ENVIE, Sirrmiet and Emmaüs France, for the French PRO Eco-Systèmes, for the Spanish re-use centre network Revertia, for the Romanian re-use centre network Ateliere Fara Frontiere, for the Irish large-scale re-use centres network Rehab Recycle and for all the Belgian large-scale re-use centres networks (KOMOSIE and RES-SOURCES).
- Moderate performance (scoring among 1,50 and 2,00) for the Spanish re-use centre networks TIV Menorca, Traperos de Emaus de Murcia and Traperos de Emaus de Navarra, as well as for all PROs except Amb3E (Portuguese PRO) and Eco-Systèmes (French PRO) which are evaluated as having a high performance.

Table 40: Comparative Evaluation Results for (W)EEE Re-Use Methodologies Applied by Large Scale Re-Use Centres Networks as for the 'Social Sensitivity / Environmental Awareness'

Features	Weighting Factor	Likert Items	Levels of Preference	KOMOSIE	RES-SOURCES	Emmaüs France	ENVIE	SIRRMIET	Rehab Recycle
Applied Scheme	27%	Civic amenity sites	1	1	1				1
		(W)EEE Door to Door Collection	2	2	2		2	2	2
		(W)EEE Collection Points	2	2	2	2	2	2	2
		Do-It-Yourself Delivery	3	3	3	3	3	3	
Partial Score			**0,81**	**0,54**	**0,54**	**0,68**	**0,63**	**0,63**	**0,45**
Point of Calculation for REWEEE	17%	Available in Trading Store	2			2			
		Sold or Donated	3	3	3		3	3	3
Trading of REWEEE	17%	Bought by customer	1				1	1	
		Received as donation by customer	3						
		Combination of the Above	2	2	2	2			2
Partial Score			**1,02**	**0,85**	**0,85**	**0,68**	**0,68**	**0,68**	**0,85**
Accumulative (W)EEE Re-Use Ratio	27%	Less than 5%	1						
		Among 5 and 15%	2	2	2				
		More than 15%	3			3	3	3	3
Number of (W)EEE Types Covered	12%	No (W)EEE types identification	1			1			
		1	1						1
		2	1						

Features	Weighting Factor	Likert Items	Levels of Preference	KOMOSIE	RES-SOURCES	Emmaüs France	ENVIE	SIRRMIET	Rehab Recycle
		3	2					2	
		4	2	2	2		2		
		5	2						
		6	3						
		7	3						
		8	3						
Partial Score			**1,17**	**0,78**	**0,78**	**0,93**	**1,05**	**1,05**	**0,93**
Total Score			**3,00**	**2,17**	**2,17**	**2,29**	**2,36**	**2,36**	**2,23**

Table 41: Comparative Evaluation Results for (W)EEE Re-Use Methodologies Applied by Small Scale Re-Use Centres Networks and Individual Re-Use Centres as for the 'Social Sensitivity / Environmental Awareness'

Features	Weighting Factor	Likert Items	Levels of Preference	CF2D/CF2M	Ateliere Fara Frontiere	Revertia	TIV Menorca	Traperos de Emaus de Murcia	Traperos de Emaus de Navarra
Applied Scheme	27%	Civic amenity sites	1				1	1	
		(W)EEE Door to Door Collection	2	2	2	2	2	2	2
		(W)EEE Collection Points	2			2	2	2	2
		Do-It-Yourself Delivery	3	3			3	3	
Partial Score			**0,81**	**0,68**	**0,54**	**0,54**	**0,54**	**0,54**	**0,54**
Point of Calculation for REWEEE	17%	Available in Trading Store	2		2	2	2	2	2
		Sold or Donated	3	3					
Trading of REWEEE	17%	Bought by customer	1						
		Received as donation by customer	3						
		Combination of the Above	2	2	2	2	2	2	2
Partial Score			**1,02**	**0,85**	**0,68**	**0,68**	**0,68**	**0,68**	**0,68**
Accumulative (W)EEE Re-Use Ratio	27%	Less than 5%	1				1	1	1
		Among 5 and 15%	2						
		More than 15%	3	3	3	3			
Number of (W)EEE Types Covered	12%	No (W)EEE types identification	1						
		1	1						

Features	Weighting Factor	Likert Items	Levels of Preference	CF2D/CF2M	Ateliere Fara Frontiere	Revertia	TIV Menorca	Traperos de Emaus de Murcia	Traperos de Emaus de Navarra
		2	1		1	1			
		3	2						
		4	2	2					
		5	2						
		6	3				3	3	3
		7	3						
		8	3						
Partial Score			**1,17**	**1,05**	**0,93**	**0,93**	**0,63**	**0,63**	**0,63**
Total Score			**3,00**	**2,58**	**2,15**	**2,15**	**1,85**	**1,85**	**1,85**

Table 42: Comparative Evaluation Results for (W)EEE Re-Use Methodologies Applied by Producer Responsibility Organizations as for the 'Social Sensitivity / Environmental Awareness'

Features	Weighting Factor	Likert Items	Levels of Preference	RECUPEL VZW	WEEE Electrocyclosis Cyprus LMD	Eco-Systèmes	Amb3E	Fundacion Ecotic	Umbrella Organization of all Styrian Waste Management Associations
Applied Scheme	27%	Civic amenity sites	1	1	1				1
		(W)EEE Door to Door Collection	2	2					
		(W)EEE Collection Points	2	2	2	2	2	2	
		Do-It-Yourself Delivery	3				3		
Partial Score			**0,81**	**0,45**	**0,41**	**0,54**	**0,68**	**0,54**	**0,27**
Point of Calculation for REWEEE	17%	Available in Trading Store	2	2				2	2
		Sold or Donated	3		3	3	3		
Trading of REWEEE	17%	Bought by customer	1		1				ND
		Received as donation by customer	3				3		
		Combination of the Above	2	2		2		2	
Partial Score			**1,02**	**0,68**	**0,68**	**0,85**	**1,02**	**0,68**	**ND**
Accumulative (W)EEE Re-Use Ratio	27%	Less than 5%	1	1			1	1	
		Among 5 and 15%	2		2				2
		More than 15%	3			3			
Number of (W)EEE Types Covered	12%	No (W)EEE types identification	1		1	1			1

Features	Weighting Factor	Likert Items	Levels of Preference	RECUPEL VZW	WEEE Electrocyclosis Cyprus LMD	Eco-Systèmes	Amb3E	Fundacion Ecotic	Umbrella Organization of all Styrian Waste Management Associations
		1	1						
		2	1				1		
		3	2						
		4	2						
		5	2	2				2	
		6	3						
		7	3						
		8	3						
Partial Score			**1,17**	**0,51**	**0,66**	**0,93**	**0,39**	**0,51**	**0,66**
Total Score			**3,00**	**1,64**	**1,75**	**2,32**	**2,09**	**1,73**	**ND**

3.4.4 Re-Use Effectiveness & Re-Use Orientation

The evaluation's results concerning the criterion 'Re-Use Effectiveness & Re-Use Orientation' are presented in the following Tables separately for 'large scale re-use centres networks', 'small scale re-use centres networks and individual re-use centres' and 'Producer Responsibility Organizations including Waste Agencies'.

It is underlined that a re-use centre network is characterized as large scaled when the annual collected (W)EEE quantities towards re-use are way more than 2.000tn. Small scale re-use centre networks as well as individual re-use centres, for year 2015, collected less than 1.000tn of (W)EEE.

The results of the comparative evaluation of the applied (W)EEE re-use methodologies and, in particular, the partial and overall scoring for implementing each managerial stage according to 'Re-Use Effectiveness & Re-Use Orientation' are including:

- Concerning the applied collection schemes, the methodologies which are partially based on DIYD collection schemes have an excellent performance (more than 0,575 with optimum partial scoring 0,69).
- Concerning the (W)EEE temporary storage procedures, the methodologies where traceability is taking place in order to identify (W)EEE discarding sources have an excellent performance (0,33 with optimum partial scoring 0,33).
- Concerning the procedures regarding (W)EEE trading, the methodologies implying the donation or the sale of REWEEE items and considering REWEEE as an end-product only when it is sold or donated have a high performance (among 0,46 and 0,575 with optimum partial scoring 0,69)
- Concerning the performance indicators of the entire (W)EEE re-use managerial chain, the methodologies where re-use centres networks are cooperating with the respective PROs and are achieving accumulative (W)EEE re-use ratios above 15% have an excellent performance (more than 1,075 with optimum partial scoring 1,29).

Finally, and only for the methodologies where enough data were collected to provide a total score and under the criterion 'Re-Use Effectiveness & Re-Use Orientation', the following results as for the entire (W)EEE re-use managerial chain were extracted:

- Excellent performance for the French respondents Emmaüs France, ENVIE and their PRO (Eco-Systèmes) and for the Portuguese PRO Amb3E (scoring among 2,50 and 3,00).
- Excellent to High performance for the large-scale re-use centres networks KOMOSIE and RES-SOURCES and for the individual re-use centre network CF2D/CF2M (scoring slightly below 2,50).
- High performance for all the other respondents (scoring among 2,00 and 2,30).

Table 43: Comparative Evaluation Results for (W)EEE Re-Use Methodologies Applied by Large Scale Re-Use Centres Networks as for the 'Re-Use Effectiveness & Re-Use Orientation'

Features	Weighting Factor	Likert Items	Levels of Preference	KOMOSIE	RES-SOURCES	Emmaüs France	ENVIE	SIRRMIET	Rehab Recycle
Applied Scheme	23%	Civic amenity sites	1	1	1				1
		(W)EEE Door to Door Collection	3	3	3		3	3	3
		(W)EEE Collection Points	2	2	2	2	2	2	2
		Do-It-Yourself Delivery	3	3	3	3	3	3	
Partial Score			**0,69**	**0,52**	**0,52**	**0,58**	**0,61**	**0,61**	**0,46**
Traceability of (W)EEE	11%	Recording (W)EEE Production Sources	3	3	3	3	3	3	3
		Absence of Recording (W)EEE Production Sources	1						
Partial Score			**0,33**	**0,33**	**0,33**	**0,33**	**0,33**	**0,33**	**0,33**
Point of Calculation for REWEEE	5%	Available in Trading Store	2			2			
		Sold or Donated	3	3	3		3	3	3
Trading of REWEEE	18%	Bought by customer	1				1	1	
		Received as donation by customer	3						
		Combination of the Above	2	2	2	2			2
Partial Score			**0,69**	**0,51**	**0,51**	**0,46**	**0,33**	**0,33**	**0,51**
Interconnection with Re-Use Centres Networks / PROs	24%	Yes	3	3	3	3	3		
		No	1					1	1
Accumulative (W)EEE Re-Use Ratio	19%	Less than 5%	1						
		Among 5 and 15%	2	2	2				

Features	Weighting Factor	Likert Items	Levels of Preference	KOMOSIE	RES-SOURCES	Emmaüs France	ENVIE	SIRRMIET	Rehab Recycle
		More than 15%	3			3	3	3	3
Partial Score			**1,29**	**1,10**	**1,10**	**1,29**	**1,29**	**0,81**	**0,81**
Total Score			**3,00**	**2,46**	**2,46**	**2,66**	**2,56**	**2,08**	**2,11**

Table 44: Comparative Evaluation Results for (W)EEE Re-Use Methodologies Applied by Small Scale Re-Use Centres Networks and Individual Re-Use Centres as for the 'Re-Use Effectiveness & Re-Use Orientation'

Features	Weighting Factor	Likert Items	Levels of Preference	CF2D/CF2M	Ateliere Fara Frontiere	Revertia	TIV Menorca	Traperos de Emaus de Murcia	Traperos de Emaus de Navarra
Applied Scheme	23%	Civic amenity sites	1				1	1	
		(W)EEE Door to Door Collection	3	3	3	3	3	3	3
		(W)EEE Collection Points	2			2	2	2	2
		Do-It-Yourself Delivery	3	3			3	3	
Partial Score			**0,69**	**0,69**	**0,69**	**0,58**	**0,52**	**0,52**	**0,58**
Traceability of (W)EEE	11%	Recording (W)EEE Production Sources	3	3	3	3	3	3	3
		Absence of Recording (W)EEE Production Sources	1						
Partial Score			**0,33**	**0,33**	**0,33**	**0,33**	**0,33**	**0,33**	**0,33**
Point of Calculation for REWEEE	5%	Available in Trading Store	2		2	2	2	2	2
		Sold or Donated	3	3					
Trading of REWEEE	18%	Bought by customer	1						
		Received as donation by customer	3						
		Combination of the Above	2	2	2	2	2	2	2
Partial Score			**0,69**	**0,51**	**0,46**	**0,46**	**0,46**	**0,46**	**0,46**
Interconnection with Re-Use Centres Networks / PROs	24%	Yes	3				3	3	3
		No	1	1	1	1			

Features	Weighting Factor	Likert Items	Levels of Preference	CF2D/CF2M	Ateliere Fara Frontiere	Revertia	TIV Menorca	Traperos de Emaus de Murcia	Traperos de Emaus de Navarra
Accumulative (W)EEE Re-Use Ratio	19%	Less than 5%	1				1	1	1
		Among 5 and 15%	2						
		More than 15%	3	3	3	3			
Partial Score			**1,29**	**0,81**	**0,81**	**0,81**	**0,91**	**0,91**	**0,91**
Total Score			**3,00**	**2,34**	**2,29**	**2,18**	**2,22**	**2,22**	**2,28**

Table 45: Comparative Evaluation Results for (W)EEE Re-Use Methodologies Applied by Producer Responsibility Organizations as for the 'Re-Use Effectiveness & Re-Use Orientation'

Features	Weighting Factor	Likert Items	Levels of Preference	RECUPEL VZW	WEEE Electrocyclosis Cyprus LMD	Eco-Systèmes	Amb3E	Fundacion Ecotic	Umbrella Organization of all Styrian Waste Management Associations
Applied Scheme	23%	Civic amenity sites	1	1	1				1
		(W)EEE Door to Door Collection	3	3					
		(W)EEE Collection Points	2	2	2	2	2	2	
		Do-It-Yourself Delivery	3				3		
Partial Score			**0,69**	**0,46**	**0,35**	**0,46**	**0,58**	**0,46**	**0,23**
Traceability of (W)EEE	11%	Recording (W)EEE Production Sources	3	3	3	3	3	3	3
		Absence of Recording (W)EEE Production Sources	1						
Partial Score			**0,33**	**0,33**	**0,33**	**0,33**	**0,33**	**0,33**	**0,33**
Point of Calculation for REWEEE	5%	Available in Trading Store	2	2				2	2
		Sold or Donated	3		3	3	3		
Trading of REWEEE	18%	Bought by customer	1		1				ND
		Received as donation by customer	3				3		
		Combination of the Above	2	2		2		2	
Partial Score			**0,69**	**0,46**	**0,33**	**0,51**	**0,69**	**0,46**	**ND**
Interconnection with Re-Use	24%	Yes	3	3	3	3	3	3	3

Features	Weighting Factor	Likert Items	Levels of Preference	RECUPEL VZW	WEEE Electrocyclosis Cyprus LMD	Eco-Systèmes	Amb3E	Fundacion Ecotic	Umbrella Organization of all Styrian Waste Management Associations
Centres Networks / PROs		No	1						
Accumulative (W)EEE Re-Use Ratio	19%	Less than 5%	1	1			1	1	
		Among 5 and 15%	2		2				2
		More than 15%	3			3			
Partial Score			**1,29**	**0,91**	**1,10**	**1,29**	**0,91**	**0,91**	**1,10**
Total Score			**3,00**	**2,16**	**2,11**	**2,59**	**2,51**	**2,16**	**ND**

4. Conclusions

The conclusions of the present study are differentiated according to the chapters to which they are referring to. Firstly, the conclusions that derived from the comparative analysis are clarifying the framework in which re-use managerial chains are applied in the EU Member States, stemming from the results of the 18 entities which collected data on re-use and preparing for re-use. Secondly, as part of the evaluation procedure, the derived conclusions are highlighting the assets of each calculation methodology identified in this study.

4.1 Conclusions from the Comparative Analysis

In correlation with the amount of (W)EEE collected, the conclusions which resulted from the comparative analysis of the applied (W)EEE re-use methodologies regarding the Delivery – Collection phase are the following:

- The cooperation between re-use centres networks and PROs (cases of Belgium and France) benefits re-use centres networks by means of increasing the amount of collected (W)EEE towards re-use through the direct and/or indirect use of their existing collection equipment (mainly Civic Amenity Sites and (W)EEE Collection Points). The term 'cooperation' implies the transactions between re-use centres networks and PROs through the use of existing schemes (direct collection of (W)EEE from (W)EEE Collection Points) or through the delivery of potentially re-usable fractions of (W)EEE from PRO contracted facilities to re-use centres networks (indirect collection where the re-use centre is the receiver of the potentially re-usable fraction of (W)EEE collected through the 1 for 1 take back scheme[70]). Furthermore, the cooperation between the re-use centres networks and the PROs stands as a prerequisite for the expansion of the re-use centre networks and ensures access to a wider source of materials. Their re-use ratio is satisfactory but reduced compared to the other entities who do not have access to Civic Amenity Sites and (W)EEE Collection Points and keep Do-It-Yourself Delivery and Door-To-Door Collection as the base of their model.
- Individual re-use centres and/or small re-use centre networks are acting locally or regionally (cases of Spain and Romania). For them, the interconnection with the PROs does not seem to have a positive effect on the (W)EEE re-use ratio since the Belgian, Romanian and Spanish re-use social enterprises analysed in this study are relatively more effective in re-use of (W)EEE compared to other small-scale re-use centre networks which are cooperating with their respective PROs. However, the reduced re-use ratio should not be seen as negative consequence of the partnership with PROs, but as a consequence of a more significant amount of potentially less reusable materials to prepare for re-use.

[70] A "1 for 1" take back sheme means that EEE retailers delivering new products to a consumer have the obligation to collect back the replaced item. The French and Belgium PROs (Eco-Systèmes and Recupel) apply this method and give the collected material to the Re-use centre networks (Envie, Emmaüs in France and Ressources and Komosie in Belgium)

- The re-use rate achieved by small scale re-use centre networks as well as individual re-use centres depends on the amount of (W)EEE items collected through Do-It-Yourself Deliveries.

The conclusions which resulted from the comparative analysis of the applied (W)EEE re-use methodologies regarding the (W)EEE Temporary Storage phase, in correlation with the amount of the collected (W)EEE, are the following:

- All the 18 studied respondents are recording the (W)EEE quantities which are collected. It means that the traceability of the source of the collected (W)EEE items is very satisfactory in the (W)EEE re-use and preparing for re-use sector.
- The French respondents as well as the respondents from Cyprus and Ireland collect EEE as a non-waste stream and therefore also conduct WEEE prevention activities.
- All the re-use centres networks and re-use centres from the social economy sector work with both WEEE and EEE (or only WEEE in the case of Belgium and Spain) while the only re-use centres network which is not from the social economy sector is only working with EEE
- PROs which are collecting large amounts of (W)EEE are using physical scales for the weighing of (W)EEE while the re-use centres networks weighing procedure is based on proxy data or a combination of proxy data and physical scales. However, it was not very clear at which stage proxy data were used and it seems that the amount of (W)EEE collected is in general weighed thanks to physical scales while the amount of ReWEEE is monitored thanks to proxy data to facilitate the calculation at the level of the Trading Store
- Making a distinction between different EEE types during the collection of (W)EEE does not seems to affect the re-use ratio. This is true for both Re-use centres and PROs.
- (W)EEE are counted per items and not per weight only in some cases where proxy data are used to monitor the quantity of ReWEEE.

The conclusions that derived from the comparative analysis of the applied (W)EEE re-use methodologies regarding the (W)EEE processing phase, in correlation with the amount of (W)EEE collected, are the following:

- Concerning large-scale re-use centres networks and PROs, the Belgian respondents are hiring personnel for preparing for re-use (W)EEE activities, while the French large-scale re-use centres networks and Rehab Recycle in Ireland are also employing personnel for EEE prevention activities.
- When an operator conducts both re-use and preparing for re-use operations, there tends to be no distinction between the staff working with waste and the staff working on products. That makes the monitoring of the employment rate of each activity difficult to monitor, resulting on the measurement of an overall re-use/preparing for re-use employment rate.

The conclusions which resulted from the comparative analysis of the applied (W)EEE re-use methodologies regarding the REWEEE trading phase, in correlation with the amount of REWEEE calculated, are the following:

- After the preparation for re-use procedure, REWEEE items are generally not counted per type of appliance. Exceptions to this rule are found in Belgium in collaboration between preparation for re-use centres and the PROs. For the Romanian case and for the French PRO, REWEEE is assessed accumulatively regardless of their appliance type. However, it needs to be noted that the questionnaire enquired for a distinction between the different types of (W)EEE only at the collection phase. Data collected from Belgium on the proportion of the different types of (W)EEE prepared for re-use were given spontaneously by the Belgian respondants.

- The ReWEEE calculation methods used by the re-use centres and re-use centres networks are very diverse. It is difficult to assess what weighing method (physical scales or proxy data) is used the most, especially since it is quite complicated to know when exactly the weighting occurred. It is very probable that the input collected to be potentially re-used is weighed via physical scales while the ReWEEE items are calculated via proxy data. It needs to be clarified here that the use of proxy data is mainly used to facilitate the calculation of the weight of what is leaving the trading stores. Indeed, the personnel of the trading stores, in general, do not have the possibility to weight the output physically.

- Concerning the Point of Calculation for REWEEE, most of the small-scale re-use centres networks are considering REWEEE items as end-products when they are available for sale and/or donation to customers. On the contrary, most large-scale re-use centre networks, as well as PROs, are consider REWEEE items as end-products when they are sold or donated.

- Most of the respondents are conducting both donation and sales.

The conclusions which resulted from the performance indicators of the applied (W)EEE re-use methodologies are the following:

- As it was expected, the cooperation between PROs and large-scale re-use centres networks is leading to the collection of more than 2.000tn of (W)EEE per year (in some cases more than 15.000tn) indicating that these networks are expanding at an interregional and/or national level. For these networks, the fraction of (W)EEE that is re-used is more than 200tn per year with re-use ratios exceeding 10%.

- Despite their high quantities of (W)EEE collected, large scale re-use centres networks are generally not covering the whole range of (W)EEE types. For example, the Belgian and French (except Emmaus France) respondents are dealing with the management of certain (W)EEE types which are small electronic appliances, large household appliances, temperature exchange equipment and screens. On the contrary, small scale networks and/or individual re-use centres are covering a wider range of EEE types, which is also the case of the PROs which answered to the questionnaire.

- The entities which are actively involved in (W)EEE management can be categorised into three (3) main groups which are including:

    - Large scale re-use centres networks which are collecting more than 2.000tn of (W)EEE at an annual basis and are acting at interregional and/or national level. These

networks are cooperating with their respective PROs and their range of activities is also including other specific waste streams with considerable potential for re-use.

- Local small scale re-use centres networks and individual re-use centres which are collecting less than 2.000tn of (W)EEE per year (at some cases less than 500tn/y) and are acting at local or regional level. Besides the Spanish case, these networks are not cooperating with PROs.
- PROs, as it was expected, are collecting large amounts of (W)EEE (more than 2.000tn annually) but since they are oriented towards recycling, they have relatively low re-use ratios (less than 5%). This is also due to the fact that PROs reported the collection of all the (W)EEE fraction of which they are responsible through their contracting members while re-use centres tend to report a fraction which is already selected by them for their re-usability.

Concerning the whole process chain of the re-use related (W)EEE management, there are three (3) main variations concerning the applied methodologies which include:

- Methodologies which are based mainly on the preliminary storage points:

  For these cases, the annually collected quantities are more than 2.000tn and they are covering all, or at least more than four, (W)EEE types. These methodologies are applied mostly by the PROs for which the main priorit is recycling rather than re-use. When the PROs are cooperating with re-use centre networks, or alternatively, when re-use centres networks are well established, a fraction of the collected (W)EEE is delivered – donated directly to the re-use centres by the PROs. Otherwise, re-use activities do not occur or is rather limited and result in a cumulative re-use ratio below 5%.

- Methodologies which are composed of a combination of applied schemes for the collection of (W)EEE which include access to CAS and/or (W)EEE collection points, door-to-door collection of (W)EEE from targeted producers and also, access to facilities which are contracted with the PROs.

  For all cases, the door-to-door collection schemes are applied to targeted (W)EEE producers which are mainly private sector entities due to the fact that the collected (W)EEE are expected to have a relatively higher potential for re-use when compared to what is originating from households. It is also easier, in terms of logisitic, to collect large amounts of (W)EEE at one private sector entity than to collect small amounts of (W)EEE at several households. For the cases where there is no access to the facilities which are under the responsibility of PROs, the respective methodologies are applied by small scale and locally oriented re-use centres networks which are collecting (W)EEE quantities of a wide range of EEE types through door-to-door collection schemes and in some cases from (W)EEE collection points (cases of Spain and Romania). In addition, for the cases where there is access to the collection facilities under the responsibility of the PROs, the respective methodologies are applied by large scale and well established re-use centres networks which are also collecting selected (W)EEE types through door-to-door collection schemes and from CAS and/or (W)EEE collection points (cases of Belgium and France). For these cases, the

collected quantities are more than 2.000tn per year and the accumulative re-use ratio is above 5%.

- Methodologies which are implementing door-to-door collection schemes as their main collection source and are also depending on do-it-yourself delivery from (W)EEE discarders.

  These actors are not collecting (W)EEE from CAS and/or (W)EEE collection points and are also, in general, not cooperating with the PROs. These methodologies are applied by individual re-use centres (case of CF2D/CF2M), or by small scale re-use centres networks (cases of Ateliere Fara Frontiere in Romania and Revertia in Spain). The annually collected (W)EEE quantities are less than 500tn but the accumulative re-use ratios are above 10%.

4.2 Conclusions from the Comparative Evaluation

Concerning the comparative evaluation of the applied (W)EEE re-use methodologies and, in particular, the most preferable pathways for implementing each managerial stage according to certain and pre-defined criteria, the following conclusions were made:

- According to the criterion 'Job Creation' and considering the applied collection schemes, approximately all the re-use related methodologies are implementing D2DC schemes, which is the most preferable option by means of creating more jobs than DIYD and collecting (W)EEE from CAS and/or (W)EEE collection points. Regardless of their expansion range (large or small scale re-use centres, or re-use networks), the methodologies where D2DC schemes are implemented are targeted at certain (W)EEE producers, namely, entities from the private sector including dealers, traders and retailers of (W)EEE due to the fact that the respective quantities are expected to have relatively greater re-use potential. The implementation of D2DC schemes which are targeted towards the collection of (W)EEE from households is highly dependent on the number and the dispersion of re-use centres and is accomplished mainly by large scale re-use centres networks. On the contrary, methodologies which are applied by PROs are not implementing D2DC mostly because of the relatively high cost for maintaining such collection schemes at interregional and/or national level (except in the cases of France and Belgium where the PROs are applying 1 for 1 take back schemes which can be related to a D2DC scheme).

  Concerning the (W)EEE temporary storage and processing (preparation for re-use) facilities, sorting the (W)EEE items according to their type and monitoring both their weight in tonnes and their number in terms of collected items is a preferable option when the primary purpose of the re-use centres (or networks) is the creation of jobs. Given the fact that approximately all the re-use centres (networks) (apart from SIRRMIET) are managed by social enterprises for which job creation is the main purpose, the employment of personnel for the aforementioned procedures (sorting and counting) will be beneficial for the networks' efficiency by increasing their (W)EEE re-use ratio.

- According to the 'Investment & Operational Cost of Implementation', opposed to "job creation", the implementation of a D2DC scheme is a relatively more expensive option compared to the collection schemes which are based on CAS and/or on (W)EEE collection points (except in the case of a 1 for 1 taking back scheme where the transportation cost is reduced because coupled with the delivery of a new product). In addition, the most preferable option, which is implemented mainly by small scale and locally oriented re-use centres networks, is the dependence on discarders through the DIYD schemes. These schemes are free from investment costs regarding the purchase of preliminary storage equipment and mainly, the purchase of transportation vehicles as well as operational costs related to the hiring of a staff to transport and collect the (W)EEE items.

  Concerning the (W)EEE temporary storage and processing (preparation for re-use) facilities, the minimization of investment costs requires no sorting of (W)EEE as well as the use of proxy data regarding the weighting of REWEEE. Furthermore, the selection of limited – certain (W)EEE types to be managed towards re-use is considered as a cost-effective option.

The comparison between the different methodologies indicates that small scale re-use centres networks, probably because of their limited access to large (W)EEE quantities, are receiving a wider range of different EEE types. In order to keep their operational costs at low levels, they are also using proxy data for weighting the (W)EEE items and they are not counting the (W)EEE items taking their type into account.

- According to the criterion 'Social Sensitivity / Environmental Awareness' and considering the most preferable applied collection scheme, the high level of citizen's environmental awareness is reflected in the DIYD scheme where the (W)EEE items are directly delivered at the closest re-use centre. In addition, when the activity of a re-use centre is based on (W)EEE items which are directly delivered by the discarders, the collection method is applied in a socially sensitive and environmentally conscious framework.

  Concerning the REWEEE trading stores, the procedures regarding the consideration of REWEEE items as end-products when sold or donated as well as the donation of REWEEE to third parties, are most preferable options. Small scale re-use centres networks are applying a combination of selling the repaired items at low prices along with donationd to disadvantaged groups.

  Social Sensitivity / Environmental Awareness regarding a (W)EEE re-use methodology is proportional with the (W)EEE types that are managed towards re-use. From this point of view, small scale re-use centres networks which are receiving a wider range of EEE types are more environmentally sensitive than networks which are selecting certain (W)EEE types based on their re-usability. Methodologies which are combined with high (W)EEE re-use ratios and the handling of a wider range of EEE types can be characterized as the most successful ones based on their Social Sensitivity / Environmental Awareness.

- According to the criterion 'Re-Use Effectiveness and Re-Use Orientation' and considering the applied collection scheme, the implementation of DIYD along with D2DC schemes are the most preferable options for collecting (W)EEE due to the fact that the respective quantities are expected to have a relatively high potential for re-use. It must be mentioned that all the identified methodologies (except those which are applied by PROs) are implementing at least one of these schemes in order to collect (W)EEE quantities towards re-use.

  Concerning the (W)EEE temporary storage and processing (preparation for re-use) facilities, re-use effectiveness requires the recording of the (W)EEE discarding sources. Furthermore, the cooperation between re-use centres networks and the PROs is expected to increase re-use efficiency by means of accessing a wider range of (W)EEE sources.

Overall, based on the above mentioned pre-selected criteria and the described levels of preferences, the evaluation's results for the applied (W)EEE re-use methodologies which were scored as having a high to excellent performance are presented in the following Table. It is underlined that, this table contains only data given by the respondents who conduct re-use or preparing for re-use activities. To this end, the respective results are strictly indicative and accumulative. Furthermore, it is reminded that when a methodology is evaluated as having a excellent performance as for a certain criterion, the overall scoring ranges between 2,50 and 3,00, while when a methodology is evaluated as having a high performance as for a certain criterion, the overall scoring ranges between 2,00 and 2,50. In

addition, the methodologies are presented regardless of the entities that applied each methodology (large of small scale re-use centres networks, individual re-use centres, Producer Responsibility Organizations and Waste Agencies). It is also important to stress out the fact that a lack of data from certain respondents resulted in an incomplete evaluation of their performances.

Table 46: Accumulative Evaluation Results for Applied (W)EEE Re-Use Methodologies

Criterion	Excellent Performance		High Performance	
	Methodology	Total Score	Methodology	Total Score
Job Creation			KOMOSIE	2,49
			ENVIE	2,28
			RECUPEL VZW	2,21
			SIRRMIET	2,20
			Traperos de Emaus de Murcia	2,20
			Ateliere Fara Frontiere	2,19
			CF2D/CF2M	2,17
			TIV Menorca	2,14
			RES-SOURCES	2,13
			Revertia	2,09
			Rehab Recycle	2,04
			Fundacion Ecotic	2,03
Investment & Operational Cost of Implementation	WEEE Electrocyclosis Cyprus LMD	2,77	Eco-Systèmes	2,41
	Emmaus France	2,65	ENVIE	2,39
			KOMOSIE	2,13
			Fundacion Ecotic	2,01
Social Sensitivity / Environmental Awareness	CF2D/CF2M	2,58	ENVIE	2,36
			SIRRMIET	2,36
			Eco-Systèmes	2,32
			Emmaus France	2,29
			Rehab Recycle	2,23
			KOMOSIE	2,17
			RES-SOURCES	2,17
			Ateliere Fara Frontiere	2,15
			Revertia	2,15
			Amb3E	2,09
Re-Use Effectiveness & Re-Use Orientation	Emmaus France	2,66	KOMOSIE	2,46
	Eco-Systèmes	2,59	RES-SOURCES	2,46
	ENVIE	2,56	CF2D/CF2M	2,34

Criterion	Excellent Performance		High Performance	
	Methodology	Total Score	Methodology	Total Score
	Amb3E	2,51	Ateliere Ateliere Fara Frontiere	2,29
			Traperos de Emaus de Navarra	2,28
			TIV Menorca	2,22
			Traperos de Emaus de Murcia	2,22
			Revertia	2,18
			RECUPEL VZW	2,16
			Fundacion Ecotic	2,16
			Rehab Recycle	2,11
			WEEE Electrocyclosis Cyprus LMD	2,11
			SIRRMIET	2,08

Based on the results of the evaluation procedure as well as the results concerning the comparative analysis of 18 applied (W)EEE re-use methodologies from 8 EU Member States, the key parameters for the successful and effective implementation of a methodology regarding the re-use and preparation for re-use of separately collected (W)EEE quantities are the following:

- Cooperation between re-use centre networks and PROs. The interconnection between these two entities is at the benefit of the re-use centres concerning their expansion, either indirectly through the access to (W)EEE quantities which had been previously collected by the PROs or directly through the access to existing discarding equipment (e.g. Civic amenity sites and/or (W)EEE collection points).
- Combination of the existing and applied collection schemes in order to collect considerable amounts of (W)EEE with high re-use potential. It is assumed that by combining the collection from (W)EEE Collection Points along with the implementation of Door-To-Door collection schemes targeted at (W)EEE discarders which are involved in EEE trading (dealers, traders and retailers), re-use centres will process relatively high (W)EEE quantities with high re-use potential.
- Sorting (W)EEE is a key parameter for re-use efficiency.
    - In particular, through sorting, (W)EEE quantities will be divided in accordance with their potentiality to be re-used while the non-re-usable fraction will be sent for recycling. For the case where (W)EEE quantities are not collected by re-use-oriented entities, sorting can also be performed by recycle oriented temporary storage facilities which are under the responsibility of PROs. It must be underlined that the (W)EEE fractions sent for recycling are considered as non-reusable either because

they are misused and/or damaged (resembling scrap) or because of their obsolescence.

- Furthermore, the sorting of (W)EEE items according to their types will facilitate the REWEEE temporary storage as part of the logistics' chain towards the trading of the re-usable items. Furthermore, the sorting procedure enhanced the application of proxy data per appliances' type leading to more accurate weighting without using physical scale and thus, lowering investment costs.

- The consideration of REWEEE as a re-usable item is a critical parameter for re-use effectiveness. To this end, it is preferable for REWEEE quantities to be considered as re-usable items when they are available at trading stores (made available on the market) rather than when they are sold and/or donated to third parties. More precisely, what should be measured is the output of the (W)EEE Processing facilities (which is the same quantity as the input to the REWEEE Trading facilities). This suggestion does not necessarily stems from these conclusions, but is recommanded to take into account other parameters which were not considered in this study but discussed during working groups organised by the RREUSE network (partner of REWEEE project):

    - In the cases where the (W)EEE Processing facilities are separated from the REWEEE Trading facilities, there is a need to declare end-of-waste and measure preparing for re-use before the REWEEE items are entering the shops in order to make sure that REWEEE Trading facilities do not have to comply with the regulation applied to facilities managing waste (which can be quite burdensome and unnecessary for these types of facilities). It is also easier for these (W)EEE Processing facilities to report this data since they are controlling their output and cannotnecessarily measure the output of the REWEEE Trading facilities with which they are working.

    - It is assumed that it will be easier for the preparing for re-use and re-use operators which are measuring what is sold and donated to report the output of the preparing for re-use facilities since they are, in general, well established and more likely to modify or extend their reporting methodologies.

    - This point of measurement is closer to the definition of preparing for re-use present in the recently updated Waste Framework Directive: 'The weight of the municipal waste prepared for re-use shall be calculated as the weight of products or components of products that have become municipal waste and have undergone all necessary checking, cleaning or repairing operations to enable re-use without further sorting or pre-processing'[71]

[71] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1536750488448&uri=CELEX:02008L0098-20180705

Annex 1 : Re-use and Preparing for re-use of (W)EEE in Europe: State -of-play questionnaire

Re-use and Preparing for re-use of (W)EEE in Europe: State-of-play questionnaire

LIFE – REWEEE Project

This questionnaire[1] is designed to:

- **asses the Waste Electrical and Electronic Equipment (WEEE) re-use and preparing for re-use at EU level**, and

- **identify existing assessment methods** of WEEE re-use and preparing for re-use in order to develop a report outlining the different tools and assessment methodologies that exist today in the EU

To enable an accurate assessment, it is important that all information requested should be provided as completely and accurately as possible. Wherever you cannot answer a question we would appreciate a short justification e.g. 'lack of data'

Please note that no company-specific / individual–information will be released. All information provided is strictly confidential and will be aggregated to provide an overall view of the (W)EEE re-use sector in EU.

I have been informed about the purpose of this study, which is conducted within the framework of LIFE – REWEEE project, and I participate voluntarily ☐

Please send your responses and any questions to Mathieu Rama (mathieu.rama@rreuse.org) and Christina Chroni (chroni@hua.gr) until the 9th of December.

[1] This questionnaire was elaborated within the framework of the EU LIFE–REWEE project (LIFE 14 ENV/GR/000858), which aims to reduce WEEE through the implementation of prevention and preparation for re-use actions. For further information on the LIFE- REWEEE project, please refer to the project website http://reweee.gr

Basic Information:

Name – Surname	
Region – Country	
Organisation / company name	
Role in the Organisation /company (optional)	

Questions[2]:

1.
Please indicate the amount of appliances in total your organisation, or organisations working on your behalf, both collected and re-used/prepared for re-use in 2015:

2015	**Tonnage collected**	Number of items collected	**Tonnage re-used**	Number of items re-used
EEE (non-waste)				
WEEE (waste)				

2.
How many people are employed by your organisation / company in activities of:

Re-use of EEE	
Preparation for re-use of WEEE	
Both Re-use and preparation for re-use (if not possible to distinguish)	

3.
When do you consider an item as being reused / prepared for re-use?

A. **When made available in your shop**	☐
B. **When sold or donated**	☐

4.
How do you measure the amount of WEEE prepared for re-use?

A. **Physical scales**	☐

[2] *Questions 1, 3, 4, 5 and 11 concern the implementation of Action B1, and questions 2, 6, 7, 8, 9 and 10 concern the implementation of Action A1 of the LIFE REWEEE project.*

B. **Proxy weight data** ☐

If you have ticked **proxy data**, is authorisation needed from a competent authority to use such data and how often is it updated?

5.
Source of your appliances

From where do you source your appliances (e.g. waste collection points, direct donation, household collection etc.) and what proportion does those sources represent in your total collection? Please also indicate for each source if the appliances are considered as EEE (non-waste) or WEEE (waste).		
Source	**Proportion**	**WEEE or EEE**

If you do not calculate the amount of appliances collected by source, is it possible to estimate where the majority of appliances you collect originate from?

6.
If you had the possibility to source more appliances from a particular source, where would you like to get them from?

7.
What are, in your point of view, the product categories[3] which have the higher re-use/preparing for re-use potential?

8.
What is for you the main obstacle to preparing for re-use of WEEE?

A. **Misuse by consumers (e.g. poor maintenance)**	☐
B. **Design of the product (planned obsolescence)**	☐
C. **Poor collection system**	☐
D. **Other (describe):**	

9.
What are the criteria which lead you to exclude an appliance from the re-use/preparing for re-use process?

A. **Technical impossibility to repair**	☐
B. **Obsolescence of the WEEE/EEE (out of fashion, impossible to use because of technological advancement, etc.)**	☐
C. **Other (describe):**	

10.
From a policy perspective, what in your view could increase the re-use of EEE and/or the preparing for re-use of WEEE?

11.
Any other comments or feedback

Thank you for participating!

Annex 2: Re-use and Preparing for re-use of (W)EEE in Europe – legal aspects, methodologies and statistics

Re-use and Preparing for re-use of (W)EEE in Europe – legal aspects, methodologies and statistics

LIFE – REWEEE Project

This questionnaire is designed to identify existing assessment methods of WEEE re-use and preparing for re-use in order to develop a report outlining the different tools and assessment methodologies that exist today in the EU.

To enable an accurate assessment, it is important that all information requested should be provided as completely and accurately as possible. Wherever you cannot answer a question we would appreciate a short justification e.g. 'lack of data'.

Please note that no company-specific / individual–information will be released. All information provided is strictly confidential and will be aggregated to provide an overall view of the (W)EEE re-use sector in EU.

This questionnaire was elaborated within the framework the EU LIFE–REWEE project (LIFE 14 ENV/GR/000858), which aims to reduce WEEE through the implementation of prevention and preparation for re-use actions. For further information on the LIFE-REWEEE project, please refer to the project website: http://reweee.gr

I have been informed about the purpose of this study, which is conducted within the framework of LIFE – REWEEE project, and I participate voluntarily	☐

Please send your responses and any questions to Mathieu Rama (mathieu.rama@rreuse.org) and Christina Chroni (chroni@hua.gr) until the 12th of May.

Basic Information:

Name – Surname	
Region – Country	
Organisation / company name	
Role in the Organisation /company (optional)	
If you represent a network, a producer responsibility organisation or a public institution, please indicate the number of structures from which you collect data on WEEE/EEE preparing for re-use and re-use.	

Questions[1]:

1.
Does your structure or your members collect statistics from its partners on re-use and/or preparing for re-use activities of (W)EEE?

☐ Yes
☐ No (If no, please go to question 7)

2.
Please indicate the amount of appliances in total your entity, or the structures from which you collect data, both collected and re-used/prepared for re-use in 2015:

2015	**Tonnage collected**	Number of items collected	**Tonnage re-used / prepared for re-use**	Number of items re-used
EEE (non-waste)				
WEEE (waste)				

3.
When do you consider an item as being reused / prepared for re-use?

☐ **When collected by your facility**
☐ **When made available on the market**
☐ **When sold or donated to a third party**

4.
How do you (or the structures from which you collect data) measure the amount of (W)EEE re-used/prepared for re-use?

A. **Physical scales**	☐
B. **Proxy weight data**	☐

If you have ticked **proxy data**, is authorisation needed from a competent authority to use such data and how often is it updated?

5.
Do you account separately for the different WEEE/EEE categories?

A. **Yes**	☐
B. **No**	☐

If yes, would it be possible to write down the list that you use to differentiate the WEEE/EEE categories, and which proportion (in weight) those categories represents in your re-used/prepared for re-use items?

WEEE/EEE category	Proportion
Large household appliances	25%

6.
Source of your appliances

a. **From where do you (or your partners) source their appliances for re-use and/or preparing for re-use? (e.g. waste collection points, direct donation, household collection etc.)**
b. **what proportion do those sources represent in your total collection?**
c. **Please indicate for each source if the appliances are considered as EEE (non-waste) or WEEE (waste).**

Source	Proportion	WEEE or EEE
Waste collection points	25%	WEEE

If you do not have statistics concerning the source of appliances, is it possible to name what are the main sources from which you collect your appliances?

7.
Any other comments or feedback

Thank you for participating!