



# ReWeee

*The development of WEEE Sorting Centers in Greece*

*Life Networking Event*

*19/11/2020*

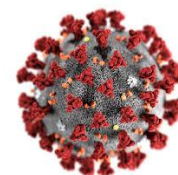


Harokopio University of  
Athens

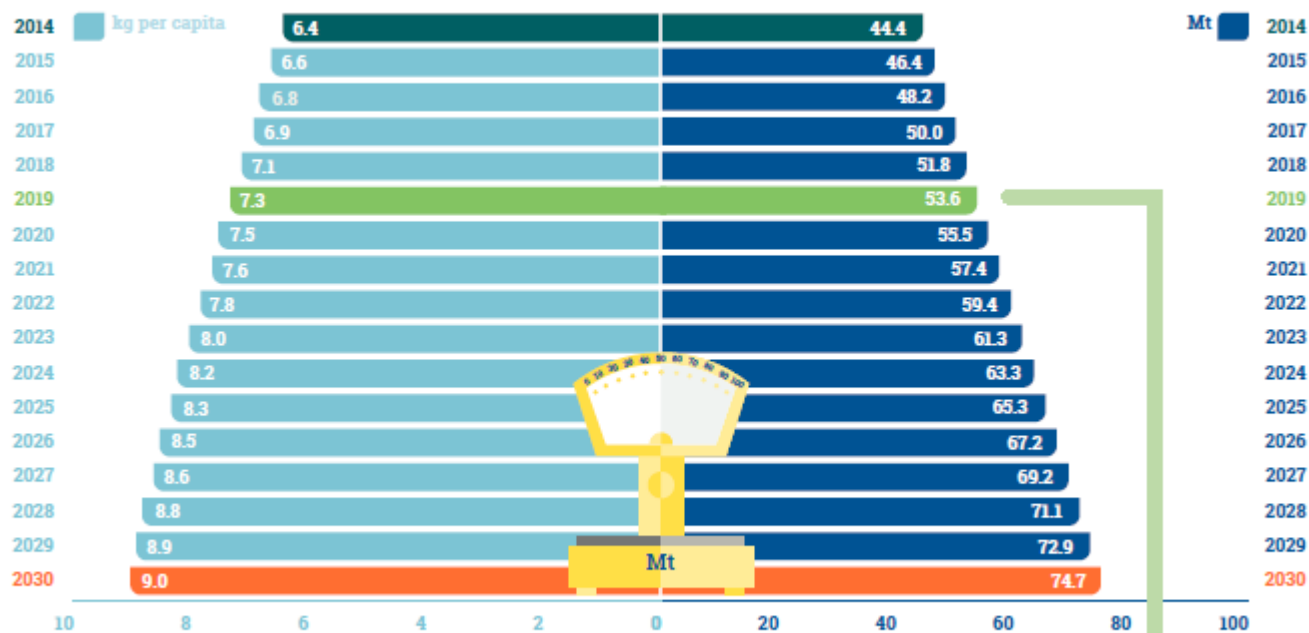


## EEE in the circular economy

### General picture:



### Global E-waste Generated by year



(Future projections do not take into account economic consequences related to the Covid-19 crisis)

## The Global E-waste Monitor 2020



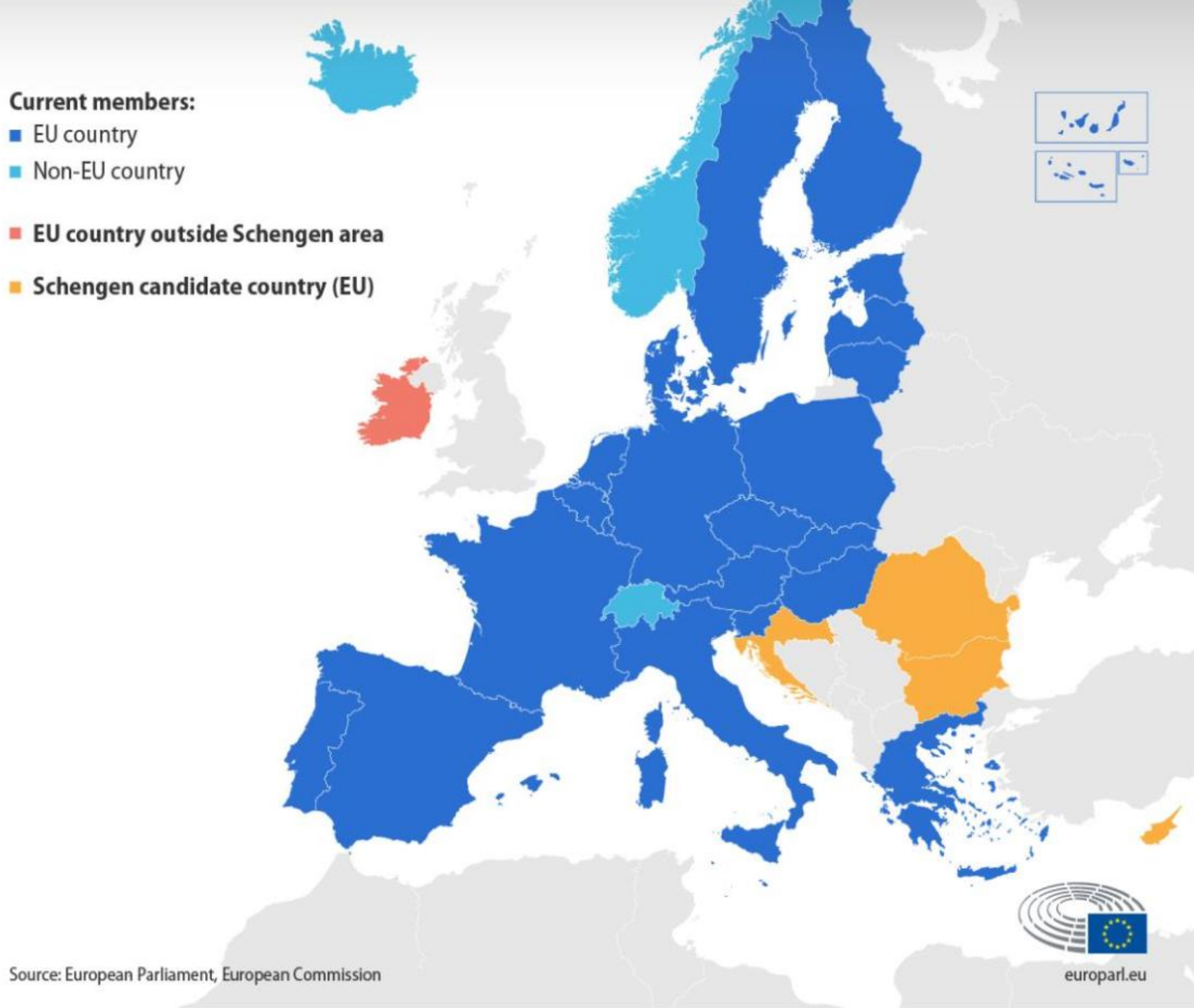
## EEE sector





**Current members:**

- EU country
- Non-EU country
- EU country outside Schengen area
- Schengen candidate country (EU)



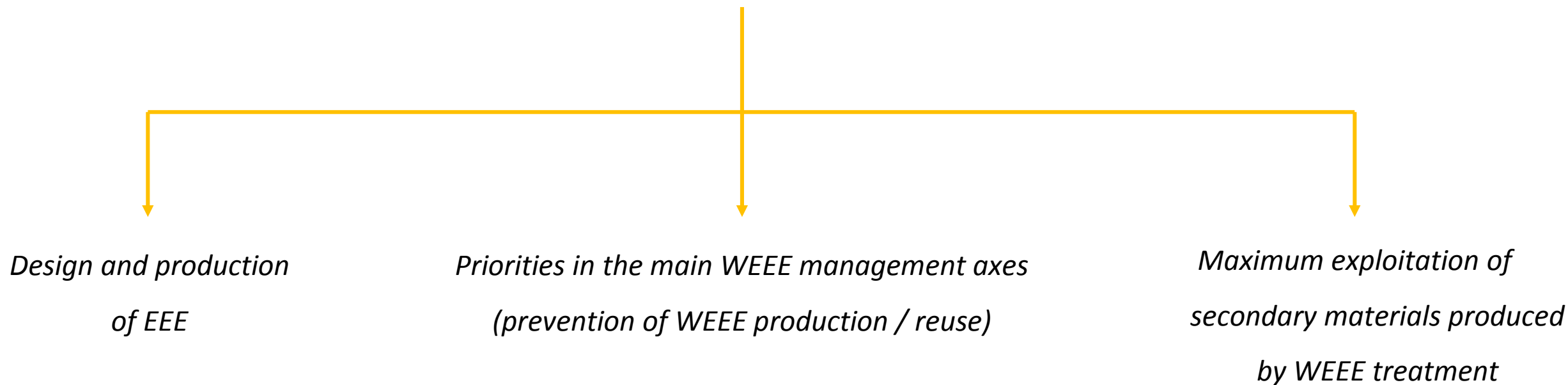
Source: European Parliament, European Commission



## "Circular Economy" Strategy Implementation on EEE



## Strategy and "Circular Economy" Implementation on EEE





European Commission - Press release

**New rules make household appliances more sustainable\***

Brussels, 1 October 2019

In a continued effort to reduce Europe's carbon footprint and to make energy bills cheaper for European consumers, the Commission today adopted new eco-design measures for products such as refrigerators, washing machines, dishwashers and televisions. Improving the ecodesign of products contributes to implementing the 'Energy efficiency first' principle of the [EU's Energy Union priority](#). For the first time the measures include requirements for repairability and recyclability, contributing to circular economy objectives by improving the life span, maintenance, re-use, upgrade, recyclability and waste handling of appliances.

European Commission Vice-President for Jobs, Growth, Investment and Competitiveness Jyrki **Katainen** said: "Whether it is by fostering repairability or improving water consumption, intelligent eco-design makes us use our resources more efficiently, bringing clear economic and environmental benefits. Figures speak for themselves: these measures can save European households on average €150 per year and contribute to energy savings equal to annual energy consumption of Denmark by 2030. It is with concrete steps such as these that Europe as a whole is embracing the circular economy to the benefit of citizens, our environment and European businesses."

European Commissioner for Climate Action and Energy, Miguel **Arias Cañete** said: "Together with smarter energy labels, our eco-design measures can save European consumers a lot of money, as well as help the EU reduce its greenhouse gas emissions. Eco-design is therefore a key element in the fight against climate change and a direct contribution to meeting the goals set in the Paris Agreement. As we move towards our long-term goal of a fully decarbonised EU by 2050, our energy efficiency and eco-design strategy will become ever more important".

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Design and production  
of EEE

New regulations for the manufacture of  
environmentally friendly appliances regarding energy  
consumption and the repair - re-use potential

## 2.2. Empowering consumers and public buyers

In addition, the Commission will work towards **establishing a new 'right to repair'** and consider **new horizontal material rights for consumers** for instance as regards availability of spare parts or access to repair and, in the case of ICT and electronics, to upgrading services. Regarding the role that **guarantees** can play in providing more circular products, the Commission will explore possible changes also in the context of the review of Directive 2019/771<sup>15</sup>.

## 3. KEY PRODUCT VALUE CHAINS

### 3.1. Electronics and ICT

Electrical and electronic equipment continues to be one of the fastest growing waste streams in the EU, with current annual growth rates of 2%. It is estimated that less than 40% of electronic waste is recycled in the EU<sup>20</sup>. Value is lost when fully or partially functional products are discarded because they are not reparable, the battery cannot be replaced, the software is no longer supported, or materials incorporated in devices are not recovered. About two in three Europeans would like to keep using their current digital devices for longer, provided performance is not significantly affected<sup>21</sup>.



To address these challenges, the Commission will present a **'Circular Electronics Initiative'** mobilising existing and new instruments. In line with the new sustainable products policy framework, this initiative will promote longer product lifetimes and include, among others, the following actions:

- focus on electronics and ICT as a **priority sector for implementing the 'right to repair'**, including a right to update obsolete software;
- regulatory measures on **chargers for mobile phones and similar devices**, including the **introduction of a common charger**, improving the durability of charging cables, and incentives to decouple the purchase of chargers from the purchase of new devices;
- improving the collection and treatment of waste electrical and electronic equipment<sup>22</sup> including by exploring options for **an EU-wide take back scheme to return or sell back old mobile phones, tablets and chargers**;



## National Strategy and "Circular Economy" Implementation on EEE

*Design and production  
of EEE*

*Priorities in the main WEEE management axes  
(prevention of WEEE production / reuse)*

*Maximum exploitation of  
secondary materials produced  
by WEEE*

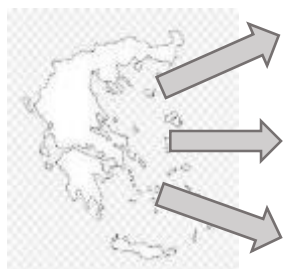


ανακύκλωση  
συσκευών Α.Ε.



*Maximum exploitation of  
secondary materials produced  
by WEEE*

Transboundary shipment



Shipment of **23%**  
total produced  
fractions outside EU

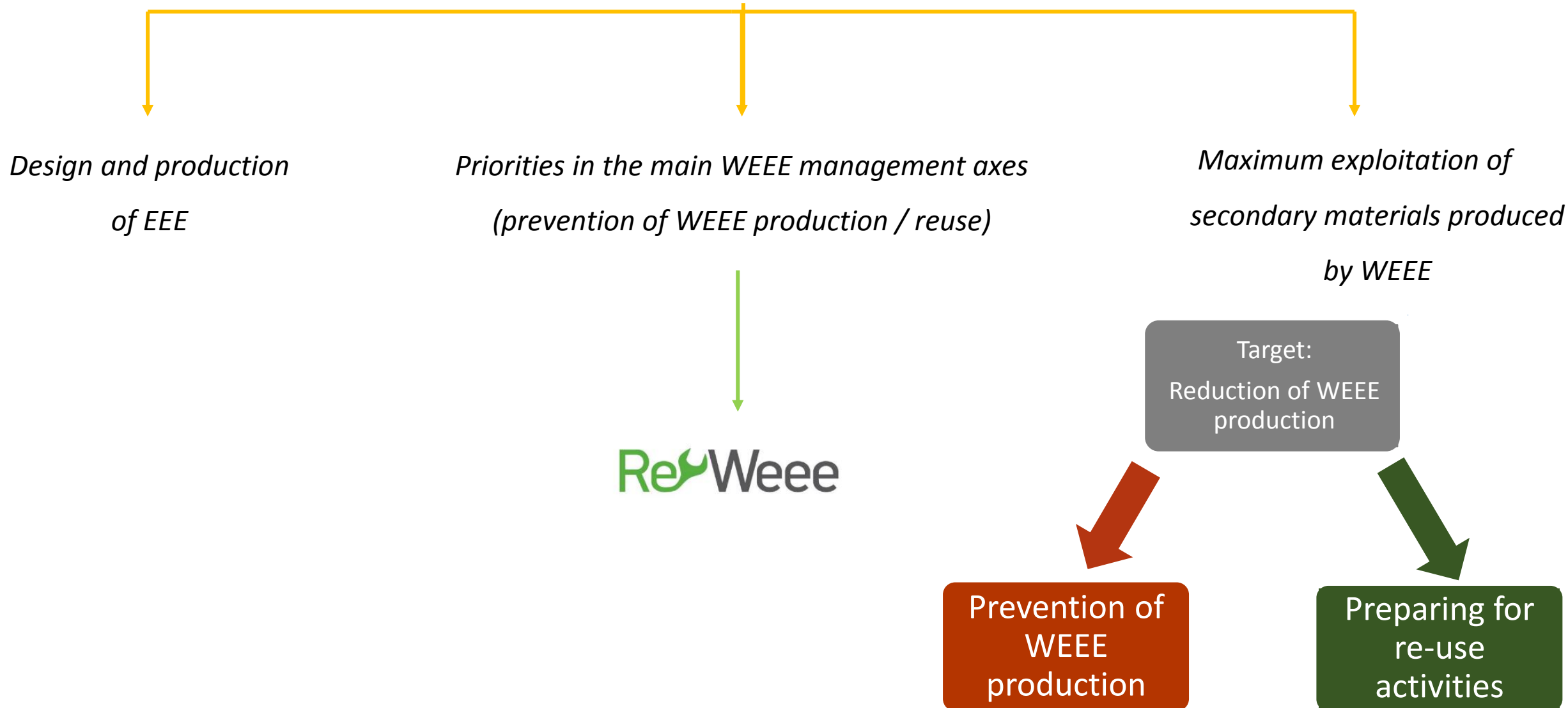
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**60000 tn / year total  
production of  
fractions (metals  
,plastic, others)**



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συσκευών α.ε.

## National Strategy and "Circular Economy" Implementation on EEE



**Project Title**

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

**Implementation Duration**

**January 2016 – November 2020**

**Project Objective**

**WEEE reduction and reuse strategy  
implementation**

**Total Budget**

**2.161.405 €**

**EC contribution 60%**

**LIFE+ Environment**

**Action Areas**

- **Greece**
- **Belgium**

**Coordinator Beneficiary**



**Co-Beneficiaries**



Harokopio University of Athens





## Targets of LIFE RE-WEEE project

### ➤ Prevention and reduction of WEEE production

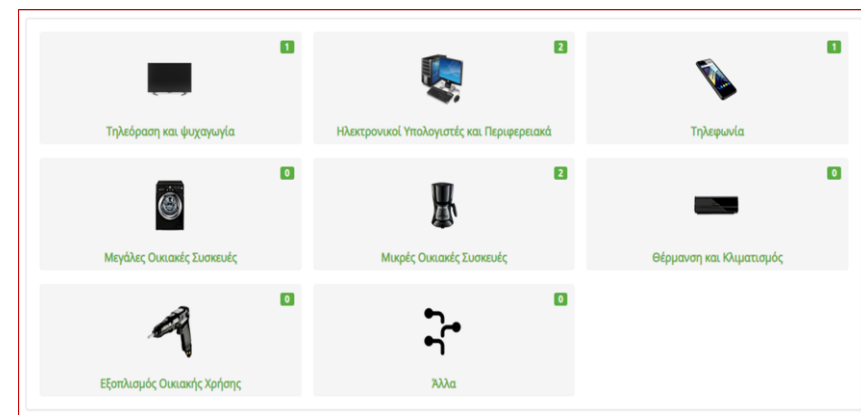
Development of an exchange / donation platform of WEEE

<https://reweee.hua.gr/en/>

Organization of Repair Cafe



Development of guides for repair and with practices for prevention of WEEE production



## Targets of LIFE RE-WEEE project

### ➤ Priority in reuse and ensuring of sound practices for WEEE management



#### Development of the SCs infrastructures



#### Development of technical requirements for the SCs operation and proposal for definition of Legislative framework

#### Development of a measurement tool of reuse

Target: to be widely implemented by other EU member states

Deliverable 04.1-2  
LIFE Project Number  
LIFE14 ENV/GR/000858  
Date  
30/10/2017

«Τεύχος γενικών προδιαγραφών διαχείρισης της δραστηριότητας  
Προετοιμασία για Επαναχρησιμοποίηση ΑΠΗΕ»

Project location	Greece, Peloponnese
Project start date	01/06/2016
Project end date	30/06/2020
Total budget	2 100 000 €
EC contribution	1 047 300 €
(%) of eligible costs	50 %
Name Beneficiary	Delta Deliverable Management
Deliverable 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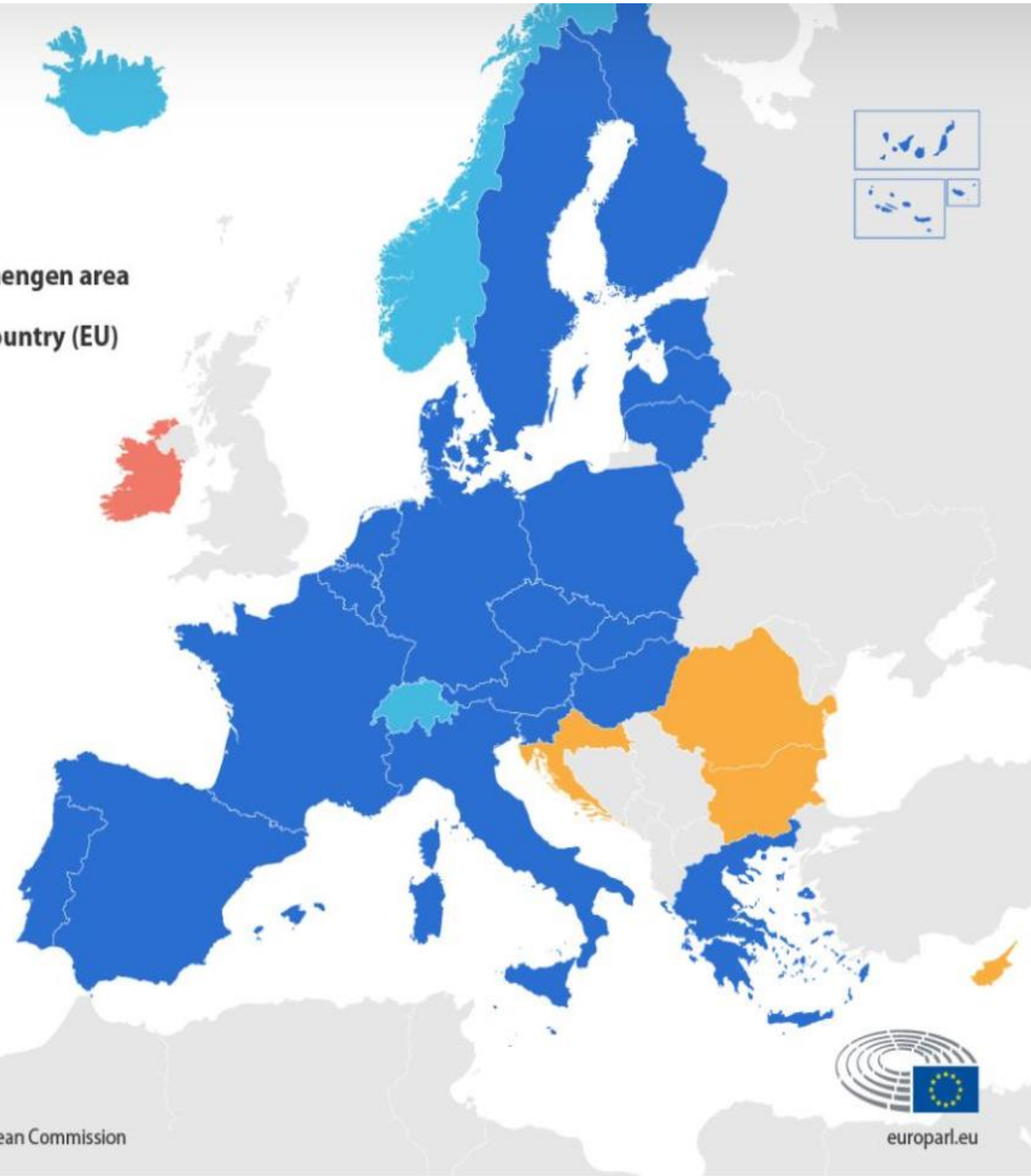
- ✓ Design, development & operation of WEEE sorting centers  
Infrastructures for sorting and preparing for re-use activities
- ✓ Adapt the operation of these infrastructures in the context of the WEEE management Policy in Greece in a feasible way
- ✓ Ensure the sustainability of these infrastructures
- ✓ Make improvements on the operation of the facilities at the After Life period of the Project
- ✓ Make the operation of the facilities a pilot for the implementation of such structure in other part of the country or in other countries with same features and particularities





**Current members:**

- EU country
- Non-EU country
- EU country outside Schengen area
- Schengen candidate country (EU)



DIRECTIVE 2012/19/EU OF THE EUROPEAN PARLIAMENT  
AND OF THE COUNCIL of 4 July 2012 on waste electrical  
and electronic equipment (WEEE)

Set obligations , rules and ambitious targets for the  
WEEE management

65 %



## Different approach and implementation of EPR principle in Europe

- ✓ PROs for each region of Italy. All compliance schemes active on household WEEE should register with the CdC RAEE
- ✓ 33 PROs schemes
- ✓ Registration of the WEEE producers on the corresponding Ministry of Environment
- ✓ Local Authorities WEEE collection and management of WEEE according to market share



1 or 2 PRO in the country with the scope of treatment of all the categories of WEEE and covering all the country

Greece



France



Belgium

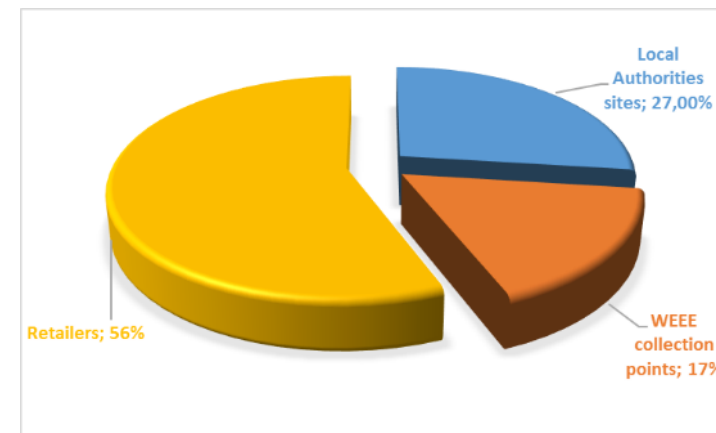


## Design, development & operation of WEEE sorting centers

### Comparison with other Counties

- ✓ Facilities for WEEE collection at Municipalities Waste Household Centers
- ✓ Accessibility of citizens
- ✓ Registration of Municipalities on the corresponding Ministry of Environment

Ireland case



Ireland



Slovenia



Slovenia case



## Design, development & operation of WEEE sorting centers

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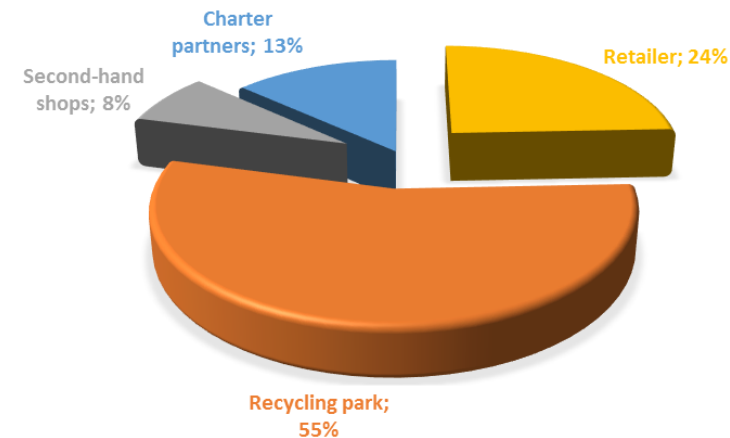




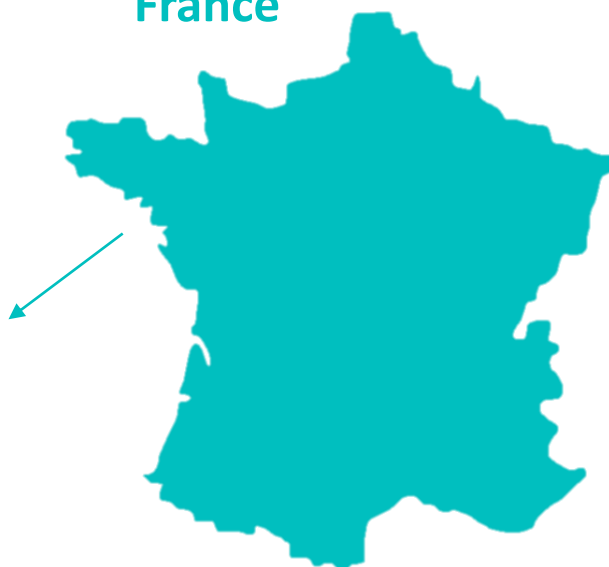
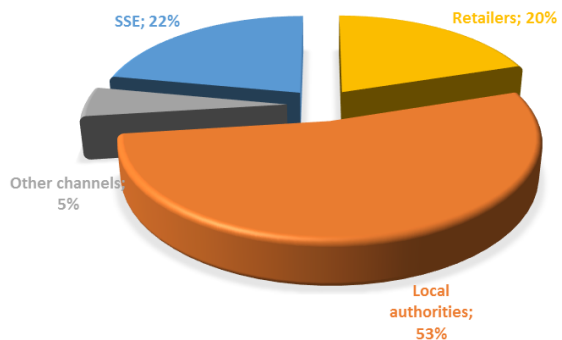
## Design, development & operation of WEEE sorting centers

### Comparison with other Counties

- ✓ Facilities for WEEE collection at Municipalities Waste Household Centers
- ✓ Accessibility of citizens



### France



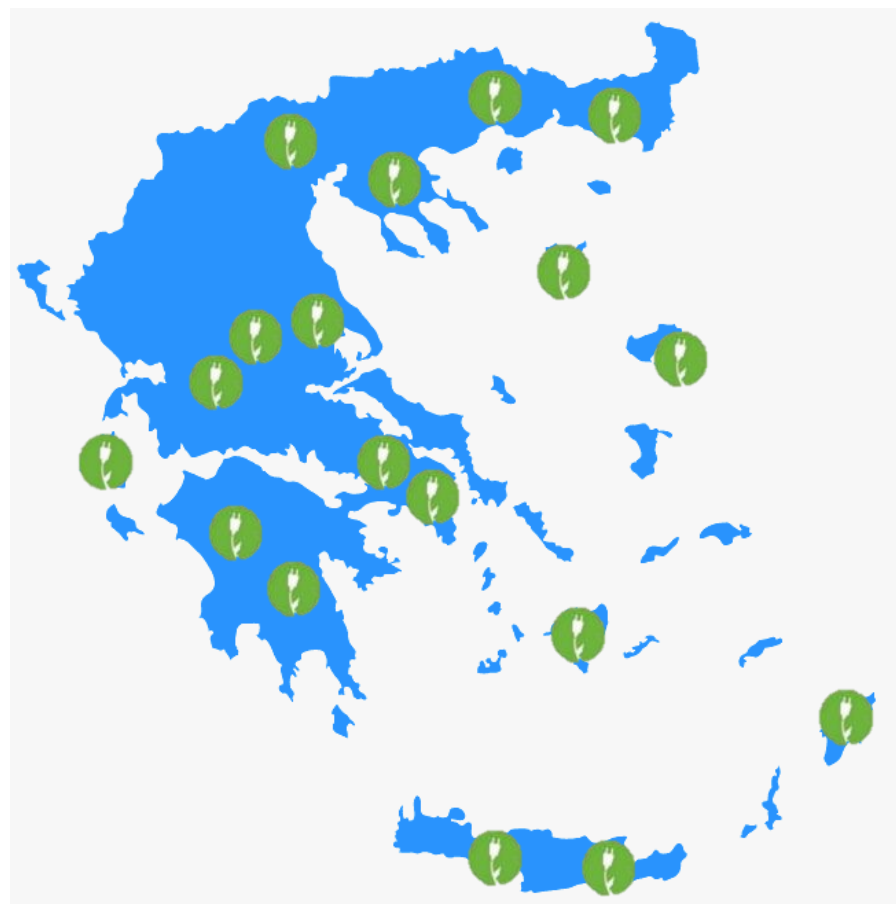
### Recycling park



### Belgium

- *PRO (Appliances Recycling SA) develops cooperation with the private sector*

> 10.000 WEEE collection points



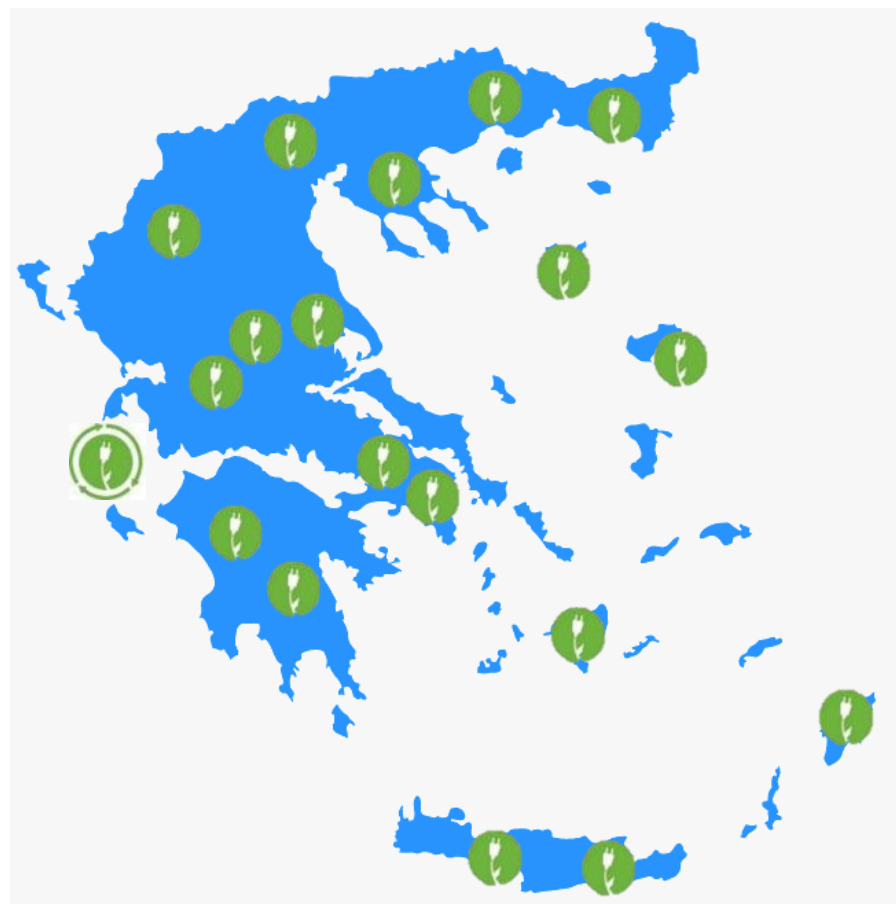
Greece

- *Private companies which are dealing with scrap metals collection (known as “scrap dealers”)*
- *Establish network of collection points in retailers and other companies*

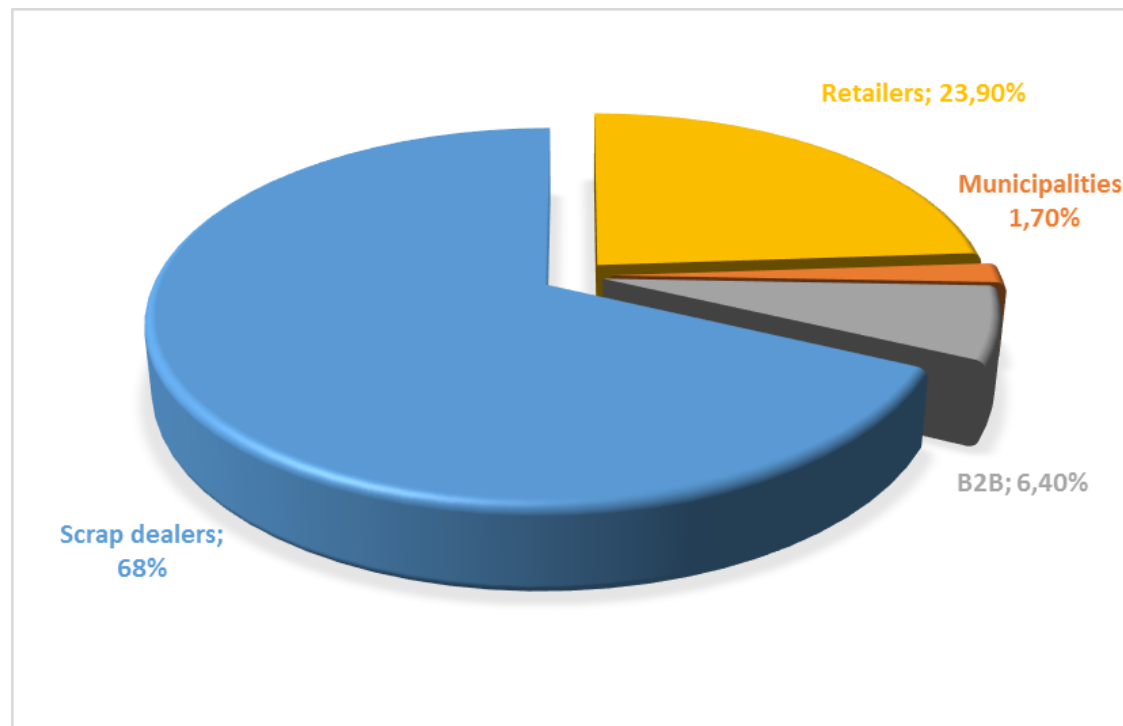


## Design, development & operation of WEEE sorting centers

> 10.000 WEEE collection points



Greece





- ✓ Country geomorphology
- ✓ More than 200 inhabited islands
- ✓ Allocation of the population in Greece divided in 2 parts (represent more than 60% of the total population)
- ✓ Allocation of the WEEE generated amounts coherent to the population allocation
- ✓ Sampling from different parts to identify different behavior



## Design, development & operation of WEEE sorting centers

### Particularities

- ✓ *The development of the SCs is based on the current WEEE management procedures in Greece*
- ✓ *All stages of WEEE management are under the umbrella of ERP schemes according to Legislation*
- ✓ *WEEE sources for SCs are exclusively the existing collection points (network) of ECYCLE as ERP scheme*

*The above particularities of Greek situation are differed from the procedures applied by other EU member states. The developed models of SCs could be implemented at countries with similar WEEE treatment procedures*

## Difficulties faced during the SCs development

- *Difficulties in the allocation of the infrastructure: Unclear provision in the Legislation framework for the development of such environmental infrastructure*
- *Inability of local authorities to provide proper infrastructures (Delays in infrastructures options, tender procedures for finding infrastructures etc.)*
- *Inability of local authorities for the exclusive operation of SC in the form in which it was developed, authorizations, required personnel, etc.*
- *Impossibility of SCs development in urban area (possibility of direct / easy access to citizens)*

Flexibility of the Project: Development of two models

**2 different models operate under the same operational plan**

**Private factor & Treatment facility**



**ATTICA SC:**

**Initiation of operation** : February 2019



**Public-Private Partnership**



**Oraiokastro SC:**

**Initiation of operation** : July 2019



## 2 different models operate under the same operational plan



- *Facilities / equipment / consumables provided by the operator*
  - *This budget is covered by the operation cost of the SC, funded by ECYCLE, according to the tender procedure for the Attica SC operator selection.*
- *Attica SC synergies with WEEE treatment facilities (recycling)*
- *100% funding by ECYCLE for the SC operation from Feb. 2020 (after 6 months of the SC operation) for the service provided by the contractor (preparing for reuse activities)*
- *Contribution of the Municipality of Oraikastro to the constructive activities at the SC facilities (funding)*
- *Equipment / consumables provided by the Municipality of Oraikastro (procurement by G.F.)*
- *100% funding by ECYCLE for the SC operation from Feb. 2020 (after 6 months of the SC operation) for the service provided by the contractor (preparing for reuse activities)*

Co funded by the LIFE financial instrument contribution of European Union for the Environment in a rate up to 60% of the eligible costs for one year of the operation of SC





Flexibility of the Project: Development of two models

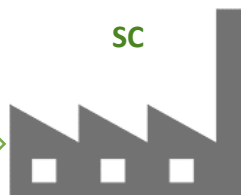
**2 different models operate under the same operational plan**

Activities		
Initial activities	Sorting:	<ul style="list-style-type: none"> <li>- WEEE Handling – Loading / Unloading</li> <li>- Load inspection</li> <li>- Categorization in the WEEE categories (according to KYA 23615/651/E.103/2014)</li> <li>- Weighting</li> </ul>
Preparing for reuse activities	Preparing for re-use:	<ul style="list-style-type: none"> <li>- Sorting of WEEE driven for treatment or preparing for re-use activities – visual inspection</li> <li>- Initial Inspection</li> <li>- Functional tests</li> <li>- Data erasing</li> <li>- Software removal / installation</li> <li>- Repair</li> <li>- Repeat tests</li> <li>- Cleaning</li> </ul>
	Put on the market / donation	<ul style="list-style-type: none"> <li>- Packaging</li> <li>- Product guarantee</li> </ul>

## SC activities flow chart (same for the 2 models)

Watch here how : <https://www.youtube.com/watch?v=Zj7lilbw1U>

Mixed WEEE to be sorted to  
Categories set by WEEE Legislation



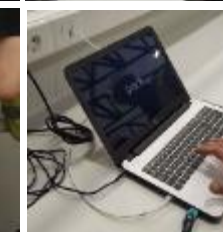
WEEE sorting to  
Categories set by  
WEEE Legislation

Sorting



Initial inspection  
to all appliances

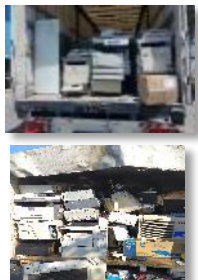
WEEE of categories of  
interest /  
WEEE of categories out of  
interest (pilot)



REEE

Collection

Mixed WEEE from collection points of



### Sources

Retailers / Private Organizations  
Municipalities / Public bodies



WEEE of categories out  
of interest

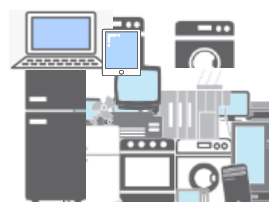


WEEE failed from preparing  
for re-use



Treatment  
Facilities

Final  
Disposal



2,350 tn imposed to visual inspection



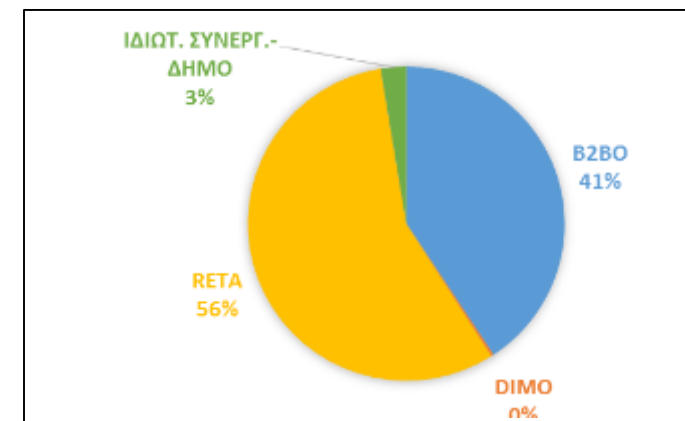
1,180 tn driven for further prepared for reuse activities



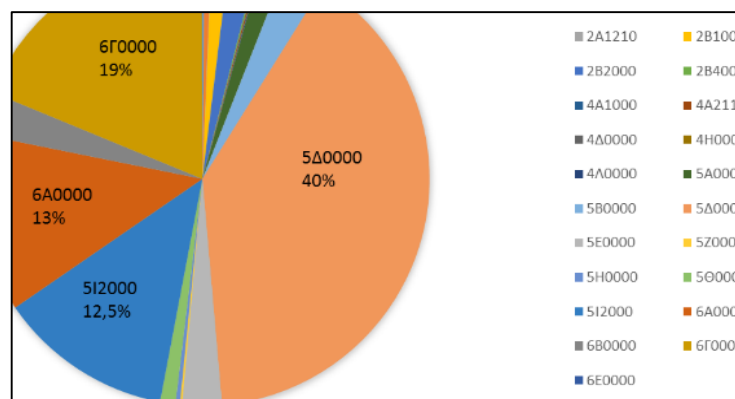
9 tn Reused Electrical and Electronic Equipment (REEE)



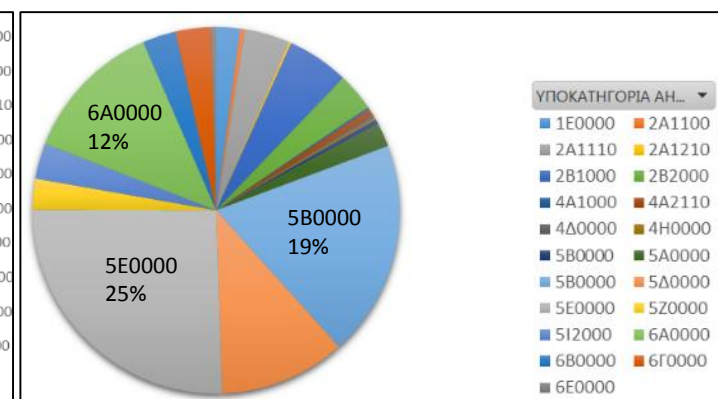
2 tn have been sold



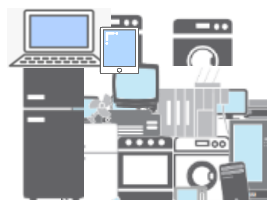
REEE (Reused Electrical and Electronic Equipment) by items



REEE sold by items







740 tn imposed to visual inspection



406 tn driven for further prepared for reuse activities



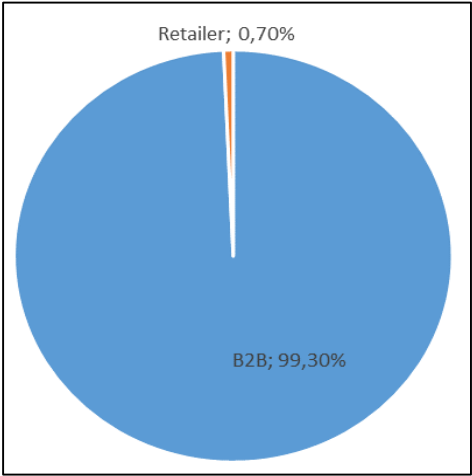
338 tn Reused Electrical and Electronic Equipment (REEE)



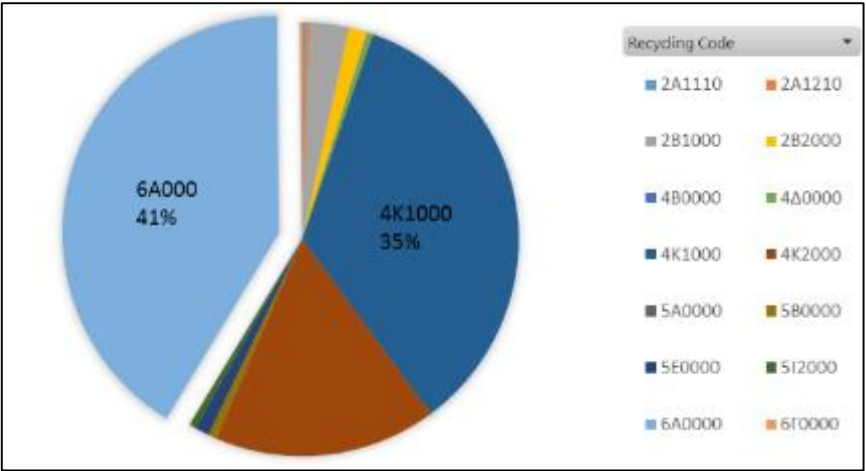
102 tn have been sold



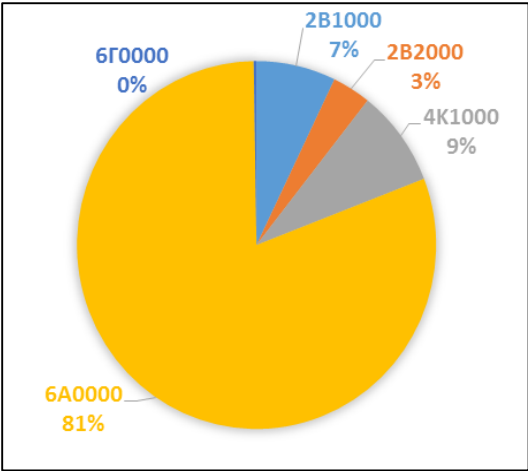
Sources of REEE



REEE (Reused Electrical and Electronic Equipment) by items



REEE sold by items



## Results

- ❖ The reference period of the data is **one year** of each Sorting Center operation

**Reference period**  
7/2019 – 7/2020  
2/2019 – 2/2020

SCs	QUANTITIES (Kg)				
	TOTAL INPUT (MIXED WEEE TO BE SORTED TO CATEGORIES SET BY WEEE LEGISLATION)	PREPARING FOR REUSE ACTIVITIES			SALES/ DONATION
		INITIAL INSPECTION		FURTHER INSPECTION	
		SORTED CATEGORIES OF LEGISLATION (CATEGORIES INSPECTED VISUALLY)	SECOND PHASE OF VISUAL INSPECTION/ PASS TO FURTHER INSPECTION	REEE	
XERMES	822.284,00	737.058,00	406.092,00	337.394,32	101.739,52
ECORESET	4.617.931,00	2.347.747,00	1.176.621,00	8.874,78	1.763,70
TOTAL	5.440.215,00	3.084.805,00	1.582.713,00	346.269,10	103.503,22
PERCENTAGE		OF TOTAL INPUT	OF VISUAL INSPECTED CATEGORIES	OF VISUAL INSPECTED CATEGORIES	
XERMES		90%	55%	46%	
ECORESET		51%	50%	0,4%	
TOTAL		57%	51%	11%	

- Target of 1.000 tn and 500 tn respectively to be visually inspected ✓

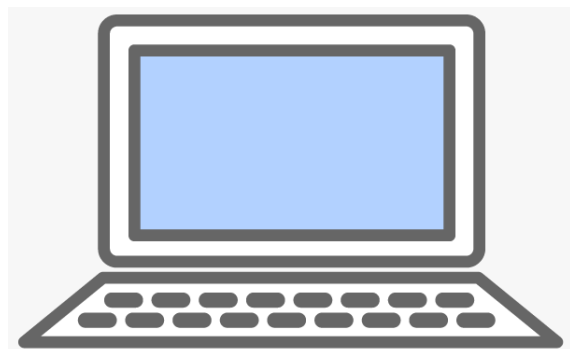
Production of REEE

- Target of 310tn of WEEE to be REEE in one year of SCs operation ✓

## Results

- ❖ High reusability of IT equipment

More specifically:



**Pass successfully visual inspection: 1.615 items**



**Sold: 323 items**

**19%  
success**



## Results

- ❖ High reusability of special equipment

More specifically:



Pass successfully visual inspection: 525 items ATMs -  
1612 items POS

Sold: 169 items ATMs - 1500 items POS

32%  
success  
ATMs

93%  
success  
POS

## Social contribution of the project during COVID situation



### Donations:



ACCEPTOR	TYPE OF REEE	ITEMS
9 <sup>th</sup> Kindergarten of N. Philadelphia	Desktop	2
	Monitor	2
	Laptop	1
8 <sup>th</sup> Elementary School of N. Philadelphia	Desktop	3
	Monitor	5
	Laptop	1
General Hospital of Didimotiho	Laptop	2
	Desktop	2
	Monitor	2
NGO "The Wall of Kindness"	Desktop	17
	Monitor	17
	Keyboard	17
	Mouse	17
	Notebooks	3
<b>Total</b>		<b>91</b>

ACCEPTOR	TYPE OF REEE	ITEMS
Municipality of Aspropyrgos	Camera	3
	Cordless phone	4
	Keyboard	3
	Mouse	5
	Monitor	1
NGO ANIMAID	Camera	2
	Recorder system	1
	Recorder cameras	4
	Photocell light sensors	5
8 <sup>th</sup> Elementary School of N. Philadelphia	Desktop	6
	Monitor	6
	Keyboard	6
	Mouse	6
<b>Total</b>		<b>52</b>

**Donated equipment constitutes the 5% of the total pieces of the equipment sold till today**

## Lessons learnt from the technical side:

- *WEEE from Retailers and Companies (properties) have high potential of reuse*
- *IT equipment have high potential of reuse → i.e. 19% of the tablets and laptops passed from visual have been put on the market as REEE*
- *Special equipment has high potential for reuse (ATMs, POS)*
- *High potential for special equipment sales abroad*
- *Implementation of most LIFE RE-WEEE technical specifications with no difficulties (corresponding deliverable of Action B.4) (the CEN-CENELEC specifications were finalized on February 2020)*

## Lessons learnt as general:

- *Full operation of two infrastructures in the form of provision of facilities and services in cooperation with local authorities and exclusively by Private initiative as well*
- *Low rates of devices with features that allow the complete process of “preparing for reuse” and the sale of devices*
- *Non-assimilation of the possibility of “preparing for reuse” of WEEE by companies and consumers who use the network of “Appliances Recycling SA” as well*
- *Difficulties in the final phase of REEE sales due to non-adaptation of the market (consumer culture, high recommended price compared to new devices*

*Lessons learnt in order to improve and facilitate the sustainability of the SCs*

*Proposals for increasing REEE*

- *Measures for tools development for a more efficient collection network :*

*Targeted loads with high potential for reuse to be transported to the SCs*

- *sorting at source*
  - *Installation of special collection bins*
  - *Development of an automatic procedure for tracing loads ideal for the SCs*
  - *Synergies with Producers/Retailers of IT equipment for WEEE collection*
- 
- *Flexibility in sales abroad*
  - *Flexibility in the market demand (i.e. spare parts sales)*
  - *Synergy with treatment facilities*



- 
- *Availability of the prevention and repair guides by the LIFE RE-WEEE project to the EU citizens*
  - *Facilitating SCs authorization Implementation of a Public–private partnership model (with the contribution of Local Authorities) for the operation of the Sorting Centers infrastructures for the prevention of WEEE production and WEEE potential reuse*
  - *Flexibility to the EU member stated to adjust the technical specifications for preparing for reuse activities to their situation*
  - *Financial incentives for companies selling REEE (reduced taxation) /// Lower VAT at the REEE products  
VAT facilitation for reuse and repair activities*



# ReWeee

*Thank you for your attention*



appliances  
recycling s.a.



Ε.Ο.Α.Β.  
ΕΛΛΗΝΙΚΗ ΟΡΓΑΝΩΣΗ ΑΝΑΚΥΚΛΩΣΗΣ  
National Recycling Agency (NOA)



Ecological Recycling Society



GREEN FUND



Harokopio University of  
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