



Rifiuti di apparecchiature
elettriche ed
elettroniche (RAEE):
tesori da recuperare!

Waste Electrical
and Electronic
Equipment (WEEE):
treasures to recover!

LAYMAN'S REPORT

WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT: TREASURES TO RECOVER!

LIFE WEEE - LIFE 16 GIE/IT/000645
2017 - 2021

PROJECT SUMMARY

Project Title:

Waste Electrical and Electronic Equipment: Treasures to recover!

Project Acronym:

LIFE WEEE - LIFE16 GIE/IT/000645

Coordinating Beneficiary:

ANCI Tuscany

Associated Beneficiaries

Tuscany Region

Chamber of Commerce of Florence

Chamber of Commerce of Seville

Department of Industrial Engineering, University of Florence

Department of Industrial Engineering, University of Florence, UNIFI- DINFO

ECOCERVED limited liability consortium company

Project duration

45 months

Start date

01/09/2017

End date

31/05/2021

Project Budget

1,850,602 €

EC Contribution

1,101,604 €

Beneficiaries' contribution

748,998 €

Website

<https://www.lifeweee.eu>

Facebook page

<https://www.facebook.com/LifeWeee>

Instagram page

<https://www.instagram.com/lifeweee/>

INTRODUCTION

This report was produced as a part of the LIFE WEEE project (LIFE16 GIE / IT / 000645) - Waste Electrical and Electronic Equipment: Treasures to recover!, co-financed by the LIFE Program of the European Community, and aims to demonstrate, in addition to the objectives and results of the project, how the integrated governance model that has been developed can lead to long-term environmental benefits.



PROJECT AIMS AND OBJECTIVES

Waste Electrical and Electronic Equipment (WEEE), such as computers, televisions, refrigerators and mobile phones, makes up one of the fastest growing waste streams in the EU. WEEE consists of a collection of diverse materials whose components can cause major environmental and health problems if not managed correctly. To improve the environmental management of WEEE, contribute to a circular economy and improve resource efficiency, it is essential to improve the collection, treatment and recycling of this waste at the end of its life cycle.

WEEE represents a key source of **raw materials**, which can be **reclaimed if managed correctly**. WEEE recovery targets are far from being achieved in Italy and in the rest of the European Union, although Tuscany is one of the best performing areas in Italy in terms of separate waste collection. The culture of waste separation is widespread and represents an appropriate framework in which new and more extensive methodologies and governance models can be tested in order to improve the WEEE collection system.



The analysis of the Tuscan regional context, which was carried out prior to the project, made clear the need to address some key issues in order to achieve the objectives set by Directive 2012/19/EU and highlighted the principle targets of these measures:

- **Citizens**/consumers lack sufficient knowledge about the handling and disposal of WEEE;
- **Businesses** involved in the installation or distribution of electrical and electronic equipment are not very involved in its collection and encounter difficulties in fulfilling the bureaucratic and administrative procedures required by the legislation for the management of WEEE;
- The lack of educational and publicity activities about WEEE on the parts of institutions and other relevant actors undermines the participation of consumers in the collection, re-use, treatment and recovery of WEEE.



The project's activities aimed to provide tools that facilitate and incentivize behavioural change. In summary, the project had the following objectives

- To improve the regional governance model with the aim of encouraging citizens and businesses to manage WEEE collection more carefully and to promote collaboration and information exchange between institutions, as required by Article 18 of Directive 2012/19/EU;
- To support local administrations with training and outreach activities for institutional actors in order to improve services for citizens;
- To develop a system of **services and incentives for SMEs**, with the creation of a green network of SMEs as a widespread system of collection points;
- To develop IT tools for businesses and citizens: **software** and **guidelines** for simplifying the administrative and bureaucratic processes that businesses must carry out to enable the collection of WEEE on their premises and an **app** that will allow users to easily identify the nearest collection sites;
- To conduct an **awareness-raising campaign** to increase public understanding of the issue and provide adequate information to citizens and businesses;
- To test the **replicability and transferability** of the project's results through the implementation of measures in Andalusia.

WHY A WEEE PROJECT: ENVIRONMENTAL AND ECONOMIC DAMAGE DUE TO IMPROPER DISPOSAL OF WEEE

It is called WEEE (Waste Electrical and Electronic Equipment). It is what remains of household appliances, both large and small, and objects that accompany us in our daily life, such as PCs and mobile phones, after they stop working.



As a result of rapid technological innovations, WEEE is growing at a worrying rate: on average three times faster than that of the normal municipal solid waste we produce every day. The risk is that these often-hazardous waste products will end up dispersed in the environment or not properly dealt with. This would lead to the pollution of our habitat and to missing out on the retrieval of important materials, including precious metals, which are reusable in production processes. The production of electrical and electronic equipment requires a complex mixture of components, including many precious metals, the extraction and processing of which is a major source of pollution. The environmental impact of their production, both in terms of energy and raw materials, is therefore considerable. Furthermore, the main problem with WEEE is the high number of substances and components which are hazardous to the environment and to human health. There is a definite need for the careful management of this class of waste, an approach which simultaneously seeks to maximize the recovery of components and the safe disposal of the non-recoverable portion, while meeting environmental protection targets, saving energy and natural resources and reducing the amount of waste to be disposed of citizens who decide to get rid of an electronic device can dispose of it at municipal collection points or at distribution outlets, either when purchasing new equipment, or even without making a new purchase (EEE with max size < 25 cm).



A modern electronic device can contain over 60 elements and therefore these types of waste, in addition to containing material that can be recovered as raw materials or energy sources, contain dangerous substances that must be treated and disposed of safely.

Every year in Italy, 421,344 tons of WEEE — i.e. waste electrical and electronic equipment — are processed, three quarters of which is household waste and one quarter of which is professional waste. However, a significant part of this amount is cannibalized: it is estimated that over 19 thousand tons of components are stolen every year, often disappearing from collection centres and illegally resold on the market.

The damage is considerable, both economically and environmentally, and undermines the achievement of recycling targets. As for the economic damage, at the European level the total general losses from cannibalization actually amount to about 170 million euros per year, while in Italy, according to the Assoraee study, they exceed 14 million euros.

Then there is the environmental impact of cannibalization, which manifests itself in many ways. The removal of compressors from refrigerators and freezers causes the most damage, as the gases used in the refrigeration circuits are released into the atmosphere, particularly those containing ozone-depleting substances, such as CFCs and HFCs. In terms of total number of refrigerators and freezers bought in 2018, the ozone-depleting substances they contain amount to more than half a million tons of CO₂, equivalent to the emissions of over 300,000 small cars. Another hazard is the dispersion of mercury, due to the cannibalization of flat screens. Furthermore, there is a real risk of dissipation when it comes to the CRM (Critical Raw Materials) contained in batteries, electronic circuit boards and other components.

A large proportion of electronic waste is illegally exported, mainly to developing countries. According to the UN report, it can be assumed that the volume of cross-border movements of electronic waste varies between 7% and 20% of the total amount of electronic waste generated. In this sector, there are all different kinds of criminality: from occasional polluters, such as basement cleaners who gather everything up and then dump waste on the street or in the landfill, through mafia-type organized crime, up to more purely entrepreneurial crime. The main routes highlighted in the investigations conducted by the Carabinieri per la tutela ambientale lead to sub-Saharan Africa, in particular Kenya, Senegal and Burkina Faso. Other destination countries are those of the Maghreb, along with some routes through the east to Turkey and Pakistan.



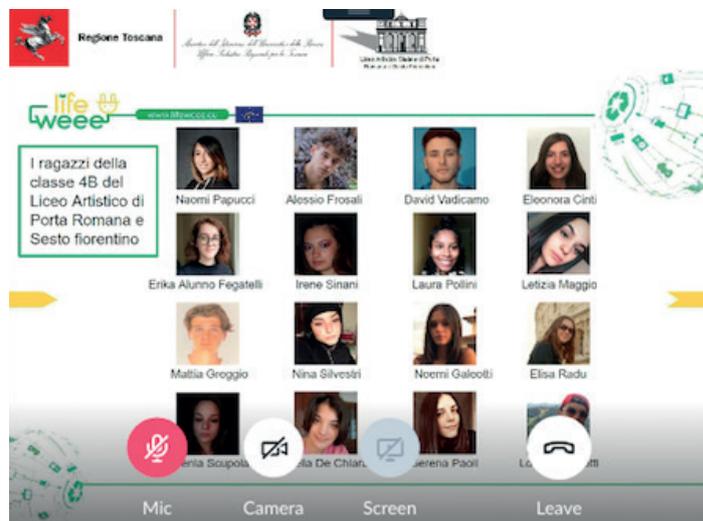
WHAT WE HAVE DONE: THE INTEGRATED GOVERNANCE MODEL PROPOSED BY THE PROJECT

Beginning from the realisation that not only most citizens, but also most institutions, pay little attention to the issue of electronic waste, the project partners have implemented a series of activities to increase awareness on the proper disposal of WEEE. At the beginning of the project, surveys were carried out to assess the levels of knowledge citizens had on the proper practices for disposal of WEEE. Businesses were also assessed on electronic waste management. In both cases, a lack of adequate knowledge was observed, partly due to limited communication efforts by institutions and private entities operating in various capacities in the WEEE management chain.

The project was therefore an opportunity to trial an integrated governance model to increase the collection of electronic waste in the two target areas, the Tuscany Region and Andalusia. By governance model, we mean an integrated set of activities carried out simultaneously and addressed to all project target groups (citizens, schools, businesses, institutions, control bodies), i.e. those whose behaviour we want to change in order to achieve results at the level of the entire system.

Activities have therefore been planned and implemented:

- TRAINING;
- FACILITATION;
- INFORMATION;
- COMMUNICATION.



ACTIVITIES	TARGET	OBJECTIVES
TRAINING	BUSINESSES	<ul style="list-style-type: none"> How the collection and transport of WEEE is managed What are the compulsory bureaucratic and administrative requirements
	CIVIL SERVANTS	<ul style="list-style-type: none"> How to become an opinion leader to raise awareness among the public Strategies for improving communication with the public
	CONTROL BODIES (MUNICIPAL POLICE)	<ul style="list-style-type: none"> What are the environmental crimes related to WEEE and how should they be dealt with
INFORMATION	CITIZENS	<ul style="list-style-type: none"> Raising awareness on how to dispose of WEEE through press, radio and social media campaigns
	BUSINESSES	<ul style="list-style-type: none"> Awareness-raising on proper WEEE management through information brochures
	SCHOOLS	<ul style="list-style-type: none"> Production and distribution of a kit for primary schools featuring fun activities to help educate children about recycling Organization of workshops on the reuse of electronic devices for high school students
FACILITATION	CITIZENS	<ul style="list-style-type: none"> Locate the nearest WEEE collection point thanks to the LIFE WEEE APP which also allows you to quantify the environmental benefit generated by your behaviour
	BUSINESSES	<ul style="list-style-type: none"> Facilitate the management of compulsory documents for WEEE collection through the CircolaRAEE software
COMMUNICATION	INSTITUTIONS	<ul style="list-style-type: none"> Ensure dialogue between institutions by means of technical committees and also continuous discussions geared towards optimizing the collection network

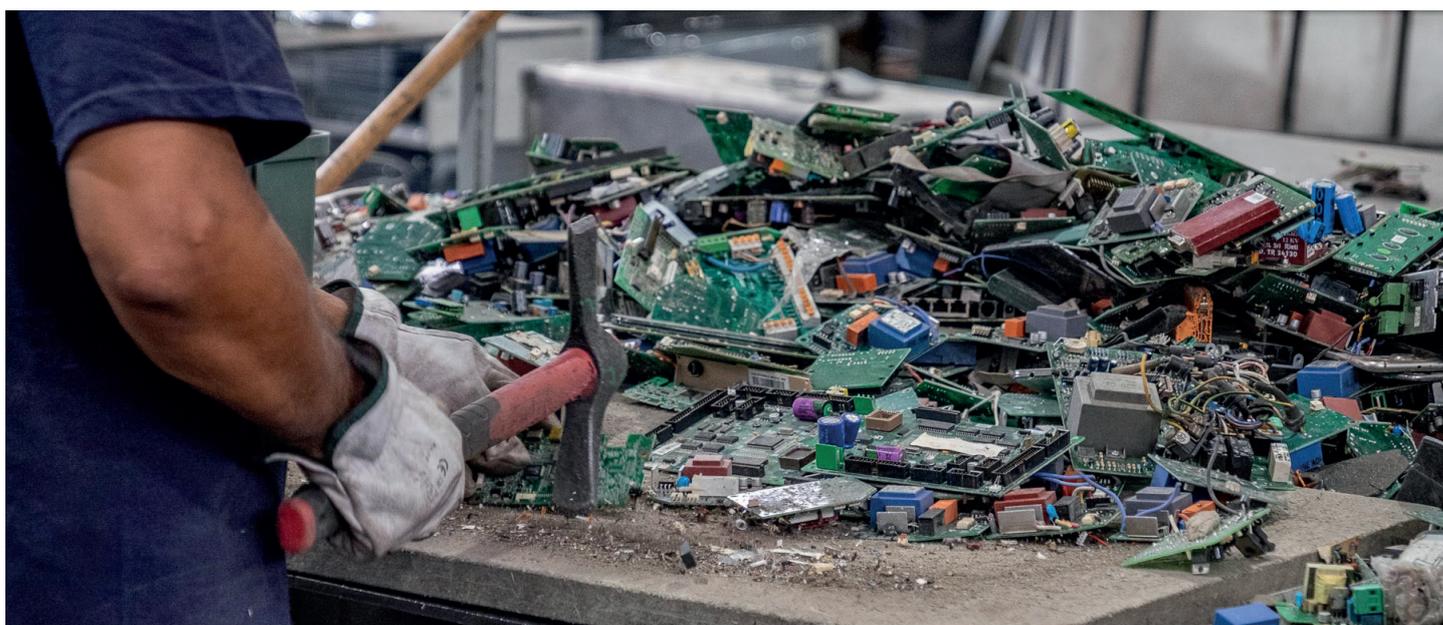


WHERE WE OPERATED: TUSCANY AND ANDALUSIA

The project's activities covered the Tuscany region in Italy and the region of Andalusia in Spain, covering an area of approximately 12,000,000 inhabitants.

The initial context in Tuscany

In 2016, Tuscany had a per capita collection rate higher than the national average (in Italy), but was still far from the collection targets established by EU Directive 2012/19 (WEEE Directive). The aim of this project was to increase this collection rate by at least 30%. In order to achieve this increase, the intention was to work on the one hand with citizens to inform them about the disposal of WEEE and on the other hand with companies operating in the distribution, installation and repair of electrical and electronic equipment to increase knowledge about the bureaucratic obligations related to the management of electronic waste, reaching at least 50% of businesses in the area.



Overview of the Andalusian Context at the Beginning of the Project

According to data compiled by Spanish Extended Producer Responsibility Collective Systems (SCRAP) the region of Andalusia collected a total of 43 million kilograms of WEEE in 2017, only 5,12 kg per capita. In Andalusia the municipal authorities are responsible for WEEE collection and disposal, as for other urban waste. Consumers may donate EEE for re-use or second-hand establishments; or dispose of it as WEEE in appropriate collection facilities set up by Local Authorities, distributors, registered waste management operators or the collection networks of EEE producers.

Furthermore, at the beginning of the project in 2017, there were 224 “Clean collection points” for WEEE in Andalusia established by the Local Authorities, in addition to the private distributors who were obliged to collect the WEEE. However, it was estimated that around 80 % of WEEE was not collected or properly recycled, due to the following obstacles:

- Low awareness among the general public, a lack of awareness as to the existence of collection points or their locations;
- An insufficient amount of collection points: being a large rural territory, collection in Andalusia is more difficult and expensive due to the distances and scale;
- Collection points in shops were not effective enough due to lack of adequate information and small and medium EEE were rarely collected, because people tend to buy new equipment without taking in their old EEE;

- Incidences in the WEEE chain between collection points and recyclers where parts of WEEE are lost due to “cannibalisation” or shipped to developing countries, due to a lack of transparency and controls;
- The complexity and diversity of the sectors involved in WEEE management: these include the producers of very different products, the different types of waste collection operators and the multiple actors involved in WEEE storage and treatment;
- Inaccuracies or omissions in the previous legislation leading to different interpretations and implementations, as well as to a marked lack of precision in the basic applicable criteria;
- Difficulties experienced by competent authorities in obtaining and controlling complete data on WEEE, partly due to the lack of a consistent national accounting and traceability system.



Levels of Awareness Among Citizens, SMEs and Institutions

In 2018, a survey was conducted by the Chamber of Commerce of Seville across Andalusia in order to ascertain the extent to which Andalusians recycle and if they are aware of the existence of Waste Electrical and Electronic Equipment (WEEE).

The surveys showed that the topic of WEEE was not familiar to most Andalusians, largely due to the lack of information provided by both authorities and distributors. Andalusians were not familiar either with the meaning of the acronym WEEE and the relevant legislation or with the existence of collection points. However, there was a general desire to change these perceptions, as Andalusians reacted quite positively to the idea of creating websites or smartphone apps containing information on recycling and collection points.

Examining the data, Almería was the Andalusian province in which people were the most aware (2.95/5) of the importance of recycling and of disposing of WEEE in a responsible manner. On the other hand, the lowest awareness rates were registered in the province of Cádiz (1.82/5). In terms of age, people between 45 and 55 years old were the most sensitive on the importance of recycling (2.79/5). Surprisingly, however, people under 25 years old came second (2.72/5), so there were reasons to hope for positive change in the future.

During the year in question, WEEE collection rates in Andalusia were still far from meeting the objectives set by the EU. However, results showed that Andalusians were willing to get involved and make contributions towards change, and that positive attitudes, along with the cooperation and exchange of best practices with other European regions, will doubtlessly have a significant impact on WEEE recycling in the future.

At the same time another study was conducted in order to find out the level of legal awareness by the business community involved in dealing with EEE. This survey was distributed amongst the specialised network formed by the Andalusian Federation of Electronic and Electrical Equipment.

One of the most remarkable results was that 25% of these businesses were not aware of the specific regulations although they regularly managed EEE. Over a quarter of the companies that did know about the legislation considered it hard to follow and apply. The difficulties encountered in this context were to do with the number of documents it is necessary to collect and conserve, together with the excessive bureaucratic requirements.

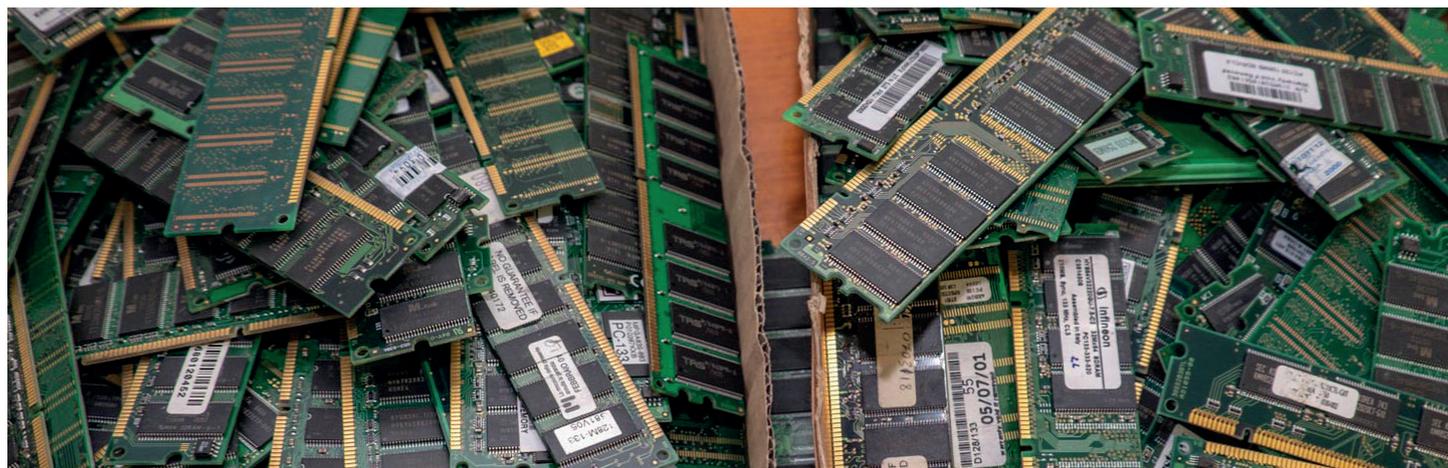
Another topic to emphasise is the place of WEEE collection by these appliance shops. Collection mostly occurs at the customers' address, followed by the option of the shop floor.

Distribution of WEEE Collection Points Across the Region

According to the database of the Regional Ministry for the Environment of Andalusia, there were a total of 637 SMEs involved in WEEE collection in 2018. The Northwest of Andalusia represented 75% of the total of small and medium-sized enterprises involved in WEEE management. The province at the top of the list was Seville with 314 SMEs, followed by Córdoba, Huelva, Cádiz and Málaga with a total of 111, 51, 47 and 47 SMEs, respectively. The Eastern Provinces of Andalusia had 67 SMEs in total, made up of 42 in Granada, 16 in Jaén and 9 in Almería.

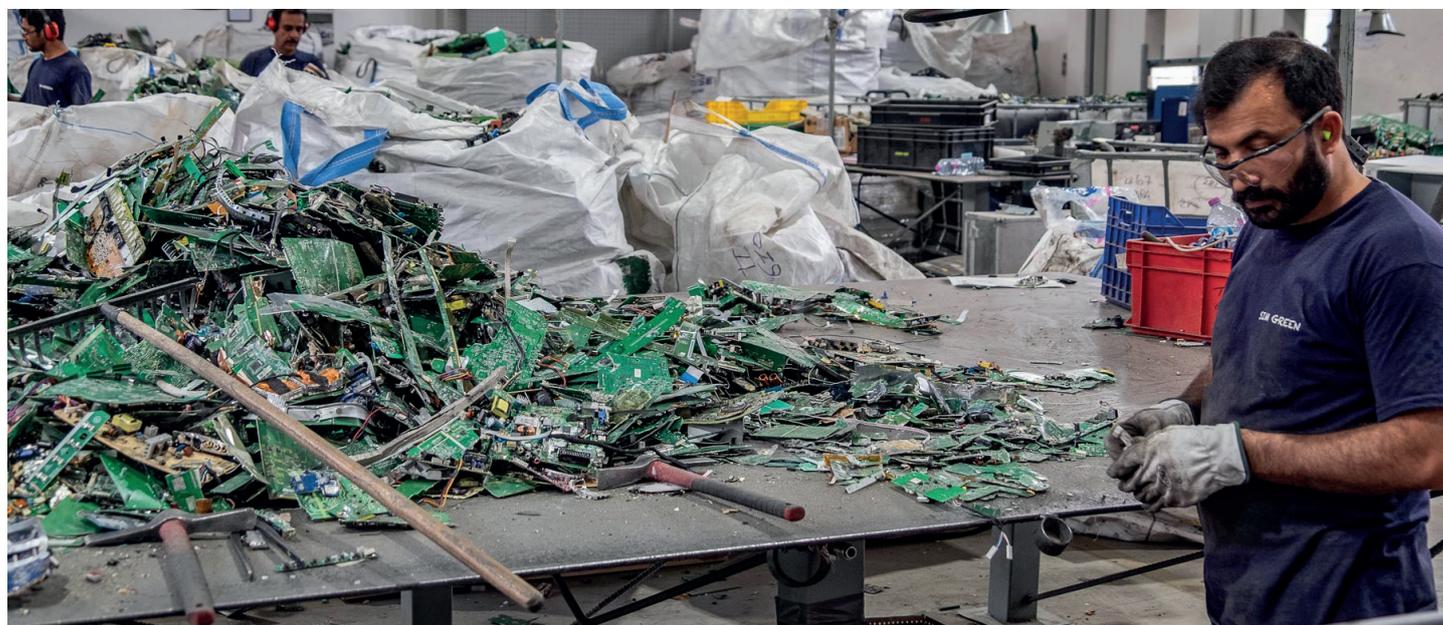


2016	Toscana Tuscany	Andalusia Andalucía
Totale RAEE raccolti (kg) Total WEEE collected (kg)	23,955,070	56,186,176
Media Pro Capite (kg/ab) Average per capita (kg/inh)	6.4	4.5
Variazione 2015 Vs 2016 Variation 2015 Vs 2016	12.64 %	38.7%
Popolazione totale Total population	5,744,598	8,588,107
Centri di raccolta Collection centers	209	224
Altri centri Other centers	41	8
Centri di conferimento per 100.000 ab Conferment centers/100,000 inh	6	1



WHAT IT HAS LED TO: MAIN PROJECT RESULTS AND OUTCOMES

- Implementation of a regional governance model based on an ecosystem of information, training and communication activities aimed at citizens, businesses and local administrators to encourage the correct disposal of WEEE;
- Establishment of a permanent technical committee to promote collaboration and information exchange between institutions;
- Provision of training and information courses aimed at Public Administrations to provide guidance on strategies to promote responsible and environmentally aware behaviour on the part of citizens;
- Provision of training courses for businesses to improve their knowledge of the regulatory obligations related to the collection and transport of WEEE;
- Organization of environmental education campaigns for primary and secondary schools;
- Creation of a Green Network of companies that are engaged in and informed about the correct management of WEEE;
- Development of the CircolaRAEE software for businesses to help simplify the administrative tasks related to the management of WEEE thanks to the automatic digital generation of the compulsory documentation for the collection and transport of electronic waste;
- Development and dissemination of the LIFE WEEE App for citizens to locate their nearest WEEE collection point (Municipal Collection Centres, one-against-one points, one-against-zero points);
- Implementation of awareness-raising campaigns involving new media (social networks) and traditional media (television, posts, information brochures) aimed at citizens and businesses in order to increase the profile of the issue;
- Participation in events at a national and international level to disseminate the project's objectives and to broaden the scope of the communication campaign outside the regional context (Ecomondo, Didacta, ...);
- Validation of the replicability and transferability of project results through the implementation of actions in Andalusia.

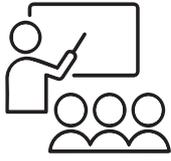


FOR CITIZENS

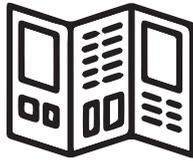
Information campaigns on where and how to dispose of weee

App to find the nearest collection point

FOR BUSINESSES



Training courses to learn about regulatory obligations for the collection and transport of weee



Brochures and information guides on what it takes to be compliant



Software for the simplified management of weee collection and transport documentation

FOR PUBLIC ADMINISTRATION



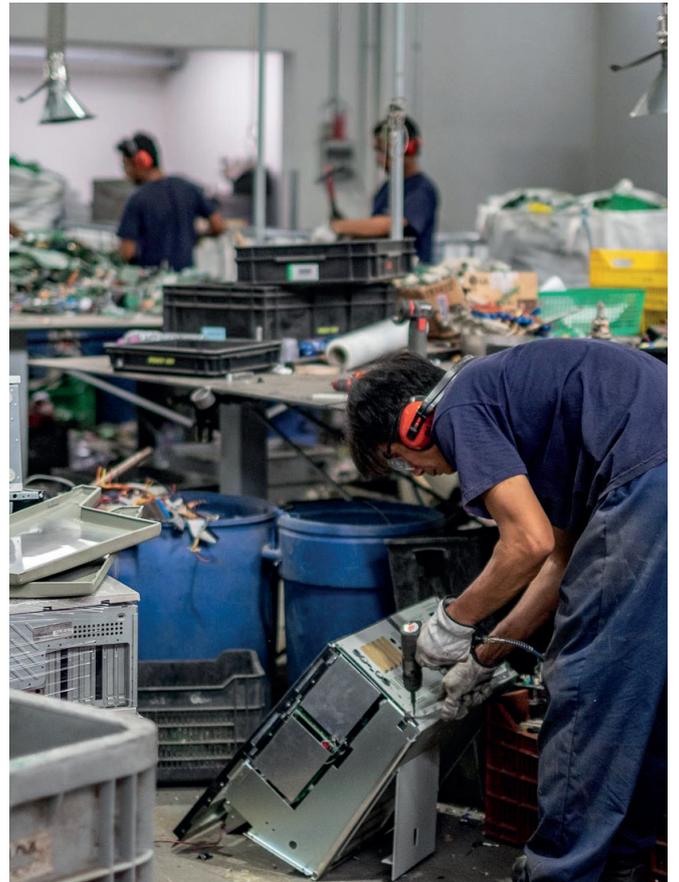
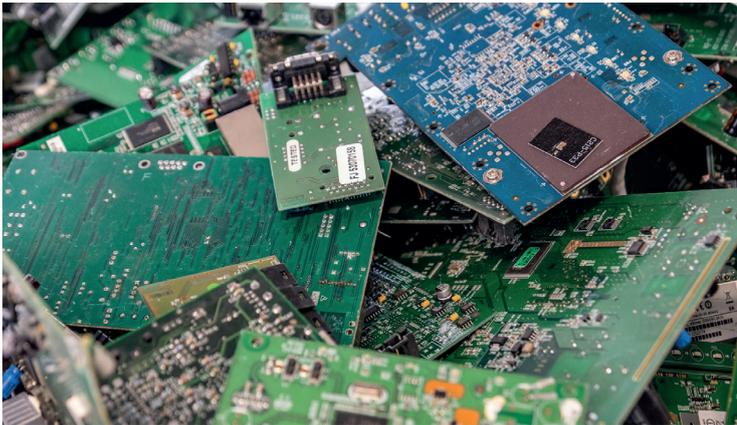
Awareness-raising courses to improve communication with citizens concerning the proper disposal of weee



Technical committee of institutions to facilitate dialogue and improve the quality of services offered to citizens



Material to facilitate awareness-raising initiatives for citizens on the theme of weee



WHY WE DID IT:

ENVIRONMENTAL BENEFITS AND SOCIAL IMPACT IN THE MEDIUM AND LONG TERM

ENVIRONMENTAL BENEFITS OVER THE 3 YEARS OF THE PROJECT

+ 39% WEEE collected and sent for treatment and recovery, equivalent to 88,000 tons, equal to 2.4 times the weight of the Dome of the Florence Cathedral

Recovered

42.000 tons of metals

18.000 tons of plastic

6.200 tons of copper

4.800 tons of glass

4.000 tons of aluminium

2.700 tons of printed circuits

Savings

880.000 tons of CO₂

1.320.000 m³ of water

SOCIAL IMPACTS OVER THE 3 YEARS OF THE PROJECT

+ **5.000.000** citizens informed about the correct disposal of electronic waste

+ **40.000** companies made aware of incorrect behaviours in terms of non-compliant WEEE management

+ **2.000** primary school students educated on separate collection and the proper disposal of WEEE

+ **400** secondary school children trained in green jobs

+ **200** Municipal Administrations will enhance their communication initiatives and the quality of services provided to citizens



life weee



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Governance and Information,
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