ECOVITRUM PROJECT, AN INNOVATIVE SOLUTION CAPABLE OF TRANSFORMING WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT INTO MATERIALS FOR THE BUILDING SECTOR.

The Valencia Provincial Council has launched the ecovitrum project, an innovative European initiative with a capacity to recycle a total of 150,000 obsolete televisions and computer screens in 2011 for use as raw materials for the manufacture of construction materials.

Introduction

Technological changes and the reduction in the costs of new television and computer screen technologies have given rise to a rapid turnover of such devices and the consequent withdrawal of old technologies based on the Cathode Ray Tube (CRT). Following withdrawal and without proper treatment, such equipment can be harmful to our environment.

According to data from the Spanish Recovery and Recycling Federation (RES), in 2010 Spain withdrew 1 million television and computer screen units, representing 15,000 tons of equipment, for their subsequent management.

The digital switchover, which has involved the installation of flat panel displays with integrated DTT, along with the promotions undertaken by the distribution chains and the rapid technological advances that have taken place, have been the main cause behind the increasing rotation of old equipment. The massive recall of old CRT-technology units in favour of newer technologies such as plasma, LED and LCD represents an environmental challenge for the public administration.

Management of obsolete televisions and computer screens.

Citizens currently deposit obsolete CRT televisions and computer screens in recycling centres or in commercial premises prior to their transfer to WEEE (Waste Electrical and Electronic Equipment) treatment plants under the co-ordination of the Integrated Management Systems (SIG). In the WEEE treatment plants, the units are subject to a number of dismantling and decontamination processes in order that their components may be reused. Metal and plastics are recovered without difficulty, as they have a significant value in the raw materials market. In the case of the glass contained in Cathode Ray Tubes (CRT), the main component of a television, recycling is more complex as these units contain substances such as barium, strontium and lead, which require special treatment.

Furthermore, it must be mentioned that there is no real market demand for the CRT glass subproducts obtained following conventional treatment processes and as such they must be stored or deposited in secure landfills by the waste managers.

One reason for the lack of market demand for glass obtained from televisions is a lack of production of new CRT technology equipment. Thus, the only, virtually testimonial, use for such glass is in the manufacture of ovens and range tops, which represents a very small demand for such a large volume of waste.

As an example of the large volume of obsolete equipment destined for waste management, it may be noted that 450,000 tonnes of glass obtained from televisions and computer screens was generated in Europe in 2011 alone.

The solution provided by the ecovitrum project.

The aim of the project is focused on implementing a comprehensive system for the treatment of obsolete televisions and computer screens, transforming waste such as television and computer screen glass into a high-quality resource – as a result of its special composition – for the manufacture of construction materials and, thus, avoiding its eventual dumping in landfills.

This project, which has a total budget of close to 2.4 million euros and a 3-year life span, has been selected for funding under the European Life+ program, with 48% of the project's implementation cost having been covered by this means.

As part of the implementation of the project, the Valencia Provincial Council has involved all those stakeholders in the waste electrical and electronic equipment management sector who are capable of providing knowledge and experience. This consortium for the management of the project consists of; the local government, foundations for the promotion of European projects, technological institutes, waste management companies, integrated WEEE management systems and construction materials manufacturers.

Ecovitrum works by analyzing all the aspects that affect the recycling of the withdrawn equipment, including the collection of TVs and computer screens, the treatment to which they are subjected in the management plants, the study of the waste's alternative uses in different construction materials and the construction of an innovative pilot plant capable of transforming such obsolete components into construction materials.

(Ecovitrum project process scheme)

Example project in Europe.

This project deals with an environmental problem common to all European Union countries: the correct management of waste electrical and electronic equipment. The project is aimed at providing solutions to fully develop the Directive 2002/96/EC, on electrical and electronic equipment and their waste management.

The solution adopted within the framework of the ecovitrum project is being analyzed throughout Europe, both by the integrated WEEE management systems and by the waste managers, as it provides a new and lasting solution for increasing the value of waste through its transformation into a resource.

In mid-2010, representatives of the WEEE Forum, a pan-European association comprising 39 integrated WEEE management systems from throughout Europe, visited the ecovitrum project. Members pertaining to the CRT Working Group, which forms part of the WEEELABEX project, were able to verify the process in which glass

obtained from televisions and computer screens can be converted into new construction products.

This association, whose mission is to optimize the cost-effectiveness of WEEE management, verified that the option proposed by the ecovitrum project is capable of providing a solution for the management of the glass obtained from thousands of obsolete units and the development of new products such as artificial marble, ceramic components and even street furniture. The question is not merely restricted to finding a solution for this matter, but to do so in a manner capable of handling a sufficient volume to absorb the amount of waste generated by televisions and computer screens at the end of their service life.

Partners

As leader of the project, the Valencia Provincial Council is responsible for the implementation, co-ordination, justification and dissemination of the project. 7 partners, holding technical and economic responsibilities, are to participate in the implementation of the project.

The participating partners are Fundación Eco-Raee, which is responsible for the coordination between manufacturers and waste managers; the company Recytech Iberia SL, which operates the first approved waste electrical and electronic equipment treatment plant in Valencia. It will be responsible for designing the prototype for obtaining glass from cathode ray tubes ready for use as raw material in the construction materials industry. And El Instituto Tecnológico de la Construcción (AIDICO), which is to be responsible for studying the possible construction materials that can be developed using the CRT glass.

The Cullera City Council, which runs an eco-park in which different measures will be studied aimed at improving this type of facilities and the subsequent recycling of televisions and computer screens in treatment plants, is also to participate. The company Esmalglass (dedicated to the manufacture and marketing of frits, enamels and ceramic colours) is undertaking tests aimed at the application on an industrial scale of glass obtained from televisions and computer screens.

The Integrated Management Systems Electro Coord (Hungary) and the Fundación Eco-Raee's (Spain) have studied the various initiatives currently under development in Europe for the management of televisions and computer screens in order to determine their possible application in their respective countries. Meanwhile, Fundación Comunidad Valenciana Región Europea is developing a European communication plan to disseminate the progress and outcome of the project from its headquarters in Brussels.

First results.

Although the project is only half-way through its development, substantial improvements have already been obtained in the management of obsolete televisions and computer screens, as well as in the complete reuse of the subproducts obtained during the treatment process.

Main points of the first results.

Improved management of recycling centres following the analysis of their operation in Spain and throughout Europe. This has allowed us to design and implement a pilot container that will optimize the storage of obsolete equipment by minimizing breakage and maximizing the recycling of components. A code of good practice for the management of CRTs in recycling centres has also been developed.

Recycling of TVs and computer screens, a total of 32,000 obsolete units have been converted into construction materials since January 2010.

Reduced consumption of raw materials, 800 tons of glass obtained from obsolete televisions and computer screens have been used as raw materials for the production of construction materials.

Dissemination of the project, the project has been presented as an example of good environmental practices in different environmental sector events in Spain, Hungary and Belgium. A project website has also been launched in order to provide updated information on the project's development.

Environmental awareness campaign, within the framework of the project, a total of 2,500 schools have received training aimed at raising awareness about the importance of recycling obsolete electrical and electronic equipment.

Environmental benefits of the project.

- Improve the operation of municipal recycling centres.

- Develop an innovative European pilot plant for the treatment of obsolete televisions and computer screens, with a capacity for treating 15,000 units per month.

- Avoid the consumption of 4,000 tons per year of raw materials, using instead the glass obtained following the treatment process of the televisions in the pilot plant.

- Develop construction materials from the glass obtained from obsolete televisions and computer screens, such as: ceramic materials, insulation materials, resin-based materials or cement-based materials.

- Reduction of 3,150,000 kilos in annual CO2 emissions into the atmosphere through the recycling and reuse of materials obtained from obsolete televisions and monitors.

- Promoting the use of green building materials made from reused products with less environmental impact.

- 100% reuse of the components obtained from obsolete televisions and computer screens.

- Compliance with the recycling rates established for electrical and electronic waste by the European legislation.

- Minimize the use of landfills as waste management system.

- Reduction of energy consumption in the manufacture of new products.

The project's key points

- The ecovitrum project has been awarded the 2011 innovation prize 2011 at the ECOFIRA International Environmental Solutions Fair.

- Thanks to the finance obtained from the European Life+ program, 2011 will see the start-up of an innovative European pilot plant in the Valencia Region for the treatment of obsolete televisions and computer screens with the capacity to transform 150,000 units per year into high quality raw materials for use as construction materials.

- The recycling and subsequent use of materials obtained from the 32,000 televisions managed by ecovitrum to date has led to a reduction of 800,000 kg of C02 emissions into the atmosphere.

- The project’s implementation has prevented the elimination of glass obtained from obsolete televisions and computer screens by means of their disposal into landfills, as well having led to the conversion of 800 tons of glass into high-quality raw materials for the development of new products.