



## Considerations about implementation of the Waste Electric and Electronic Equipment Directive in Romania

*Considerații asupra implementării Directivei Europene  
privind Deșeurile de Echipamente Electrice  
și Electronice în România*

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### **Abstract**

*Electric and Electronic Equipment Waste Management has become in the last years one of the most important concerns all over the world regarding environmental protection. For Romania, as for the other countries, members of the European Union, this concern has been intensified by the necessity of alignment to the European directives regarding electric and electronic equipment waste management, especially to the Directive 2002/96/CE. Although the waste quantities collected until now are far away from the goal proposed by EU, progresses have been made in what regards the implementation of an appropriate management system in Romania. This study presents the principal aspects with which European countries confront in implementing this directive and analyses the situation of Romania regarding the stage reached until now but also the main problems appeared during the last years. The paper is the result of the research in project “Modeling the Waste Management System for Electrical and Electronic Equipment in Romania in Order to Optimize the Environmental Impact of the Digital Economy”, code ID\_1834, director Nadia Ciocoiu..*

**Keywords:** *Waste Electrical and Electronic Equipment (WEEE), Directive 2002/96/CE, consumer behavior, collecting, recycling*

### **Rezumat**

*Managementul deșeurilor de echipamente electrice și electronice a devenit în ultimii ani una dintre cele mai importante preocupări la nivel mondial în ceea ce privește protecția mediului înconjurător. Pentru România, ca și pentru celelalte țări membre ale Uniunii Europene, această preocupare a fost intensificată de necesitatea alinierii la directivele europene privind managementul deșeurilor de echipamente electrice și electronice, în special la Directiva 2002/96/CE. Deși cantitățile de deșeuri colectate până*

*în prezent sunt îndepărtate de ținta propusă de UE, au fost făcute progrese în ceea ce privește implementarea unui sistem de gestiune corespunzător în România. Lucrarea prezintă principalele aspecte cu care se confruntă statele europene în implementarea directivei și analizează situația României atât din punct de vedere al stadiului atins cât și al principalelor probleme apărute. Lucrarea este rezultatul activității de cercetare în cadrul proiectului PNCD\_IDEI Modelarea sistemului de gestiune a deșeurilor de echipamente electrice și electronice din România în vederea optimizării impactului economiei digitale asupra mediului”, cod ID\_1834, director Nadia Ciocoiu*

**Cuvinte-cheie:** *Deșeuri de echipamente electrice și electronice (DEEE), Directiva 2002/96/CE, comportamentul consumatorilor, colectare, reciclare*

**JEL Classification:** Q53, Q58

## Introduction

The development of the digital economy generates countless effects on society and on the environment. The creation of the new business models via the Internet and the large scale employment of the information technology, which guarantees the economic growth in conditions of increased environmental protection, decreasing the consumption of materials in favor of capitalizing information and knowledge. On the other hand, the digital economy generates growth in the number of electric and electronic equipments possessed by the consumers, with a fast rate of moral wear, thus transforming in waste.

Electrical and Electronic Equipment (EEE) is developing fast and spreading over every part of modern life. This equipment includes diverse substances that may cause serious damage to the environment and have adverse effects on human health so it is essential to manage the waste resulting from EEE in a proper way.

Electronic waste represent at this time the waste category with the most rapid rhythm of increase in quantity and one of the greatest challenge of the XXI century.

In the developed countries these are equal to 1% of the total solid waste and it is estimated that the number will reach 2% by 2010. The intensification of the rhythm of market penetration by the EEE in the developing countries, the development of the “replacement markets” in the developed countries and the high rate of moral wear makes the electronic waste one of the categories of waste with the most rapid evolution in quantity. Thus, in EU, the quantity of Electronic Waste increases every 5 years by 16-28% (United Nations Environment Programme 2007). Electronic waste have a growing rate four times bigger than the municipal waste, but they are ten times more harmful.

## Electronic waste - definition

Globally, Waste Electrical and Electronic Equipment (WEEE/ E-waste) are most commonly used terms for electronic waste. There is no standard definition of WEEE/ E-waste. A number of countries have come out with their own definitions, interpretations and usage of the term “E-waste/WEEE”.

The composition of Waste Electrical and Electronic Equipment is very diverse and differs in products across different categories. It contains more than a 1000 different substances, which fall under “hazardous” and “non-hazardous” categories. Waste Electrical and Electronic Equipment dismantling or incineration is considered toxic, therefore, they are targeted for reuse, recovery or hazardous waste disposal. The recovery of metals is a profitable business, which results in different forms of trade.

Environmental issues and trade associated with WEEE/ E-waste has driven the definition of WEEE/ E-waste both at national and international level.

The most widely accepted definition of WEEE/ E-waste is as per Directive 2002/96/EC on WEEE, and this is followed in member countries of European Union and other countries of Europe.

According to Directive 2002/96/EC on WEEE: “*Electrical or electronic equipment which is waste including all components, subassemblies and consumables, which are part of the product at the time of discarding.*”

### **WEEE Directive – State of Implementation in European Union**

WEEE has been identified as a priority area to take specific measures on a European scale. The Directive 2002/96/EC on WEEE along with the complementary Directive 2002/95/EC on the restriction of the use of certain hazardous substances in Electrical and Electronic Equipment (EEE) seeks to reduce the environmental impacts of WEEE (*The purpose of Directive 2002/95/CE (RoHS) is to harmonize the legislation of the countries members regarding limitation of using dangerous substances in EEE and their contribution to health protection and ecological recovering and elimination of electric and electronic waste. Practically, there is a very tight bound between the two normative documents, the one influencing the other. It can not be realised an adequate treatment and recycling of the products if this, constructively speaking, do not comply with precise standards which refer at the substances and components from which they are fabricated*)

EU Directives regarding WEEE management have as main objectives the following:

- Preventing WEEE apparition, as well as reutilization, recycling and other forms of recovery waste to reduce more and more the quantity of the waste eliminated;
- Improving environment performance of all operators involved in life cycle of EEE (producers, distributors, consumers) and especially economic agents directly involved in treating WEEE;
- Creating systems which can allow the final holders and distributors to give WEEE for free to the collecting points;
- Ensuring the collection by the distributors of EEE for WEEE of the same type and in the same quantity with the equipments supplied;
- Ensuring availability and accessibility of the collecting points needed, especially taking into account the population density;
- Ensuring a rate of the selective collection of *4 kg/inhabitant/year*, starting with 2008, with two intermediary objectives - of *2 kg/inhabitant/year* in 2006, respectively of *3 kg/inhabitant/year* in 2007;.

- Reaching the objectives of recovery reported to the average weight per equipment, depending on the type of that equipment.

The objectives of reuse, recycling and recovery of WEEE are established starting with 2006. WEEE valuation is done giving priority to re-utilization of the whole equipments.

The environmental benefits and economic costs of recycling WEEE under the European Union legislation depend very much on how the system is implemented. Recycling managed by a monopolist concern, whose main interest is meeting simple recycling targets for a fixed fee, could result in an expensive system with relatively small environmental benefit. A multilateral concern aimed at maximizing profit and reuse across the life cycle presents a more promising picture.

For several EU Member States the transposition of the Directive into national law, and the setting up of take-back schemes and development of recycling infrastructure was relatively easy, as they already had legislation and recycling infrastructure in place.

The changes needed are generally of a complementary nature and regard issues like individual producer responsibility, labelling of products, financial guarantees needed in order to place a product on the market and collection and recycling targets (United Nations University 2008).

The situation is very different for other countries, which do not have a WEEE culture. Some Member States already had some recycling infrastructure but no legislation present and in others, the legislation was in place, but infrastructure was yet to be developed. In other Member States, in particular in Central and Eastern Europe, both aspects were less developed than in Western Europe. They have faced significantly greater problems in developing the required legal and operational infrastructure. Different systems have been developed, trying to apply more market based approaches with multiple providers of take back services, apart from the collective single compliance scheme models being used in the already existing systems.

Difficulties with the implementation arose as a result of the complexity of involving all relevant stakeholders actively and agreeing on responsibilities. These difficulties have contributed to delays in the legal transposition and practical implementation of the Directive.

The interaction and overlap with other areas of legislation (e.g. hazardous waste regulations, transfrontier shipment regulations, health and safety related marking etc.) may have delayed the process of transposition and development of national legislation.

In addition, where countries experience significant cross-border trade and imports, the efforts devoted to coordinate the implementation of the legislation between neighboring countries and the tendency to resist first-mover disadvantage, have caused further delay.

Lately, European Commission proposed the revision of Directive 2002/95/CE (RoHS) regarding the limitation in use of some dangerous substances in electric and electronic equipments (transposed in Romania by HG nr. 992/2005), as well as Directive 2002/96/CE (WEEE) regarding electric and electronic equipments waste (transposed in Romania by HG nr. 448/2005).

European Commission proposed the revision of this directives, reckoning on the fact that their efficiency is still influenced by factors which can not be controlled and influenced totally by the Member States, and so not being able to sustain reaching the objectives of durable development of the Union, limiting as much as possible the negative

impact on the environment. The studies made all around the Community show that, in spite of the existing legislation from 2002, from the 24 kg WEEE which generate annually in EU per inhabitant, only 33% from them are reported as being collected and treated. 13% still go directly to the cesspits, and the rest of 54% of the waste is treated below standards inside and outside the EU (United Nations University 2008). The impact of this situation, which has dramatically accents in some Member States, generated big concern and preoccupation to find viable solutions.

Regarding the WEEE collecting goal of 4 kg per inhabitant, the practice in the last years showed that assigning a unique and equal value to all the Member States is disproportionate and inadequate because of the national specific elements like: economical development degree, the incomes per inhabitant, collecting infrastructure, consuming habits of the population, educations and responsibility degree etc (Savage, et al. 2006). The new collecting target proposed in the modification project of Directive 2002/96/CE aims reaching a percent of 65% of the EEE quantity on the market in the previous year of the one taken as reference. This measure is also an unrealistic one because, nowadays, in Romania historical waste is still collected and their volume can not equate the volume of the waste generated by a mature consuming company. In our country, according to the official statistics, for example, only 70% of the households have a clothing washing machine, and the age of the equipments park still used is in some areas even of 15 years. More than this, this proposal of EC doesn't take into account the national specific indicators: population incomes, collecting rate, market structure, products life etc.

### **Implementation of the European Directive regarding WEEE in Romania**

As we mentioned, in Romania Directive 2002/96/EC has been transposed by HG 448/2005 regarding electric and electronic equipments waste and by a series of orders of the minister.

According to this decision, the significance of the terms and expressions below is as follows:

a) *electrical and electronic equipment* or *EEE* – equipments which function based on electrical power or electromagnetically fields and the equipments for generation, transport and measure the power and the fields (included in the classes foreseen in annex no.1 at HG 448) and addressed for the use at a voltage smaller or equal to 1.000 volts for alternative electric power and 1.500 volts for continuous electric power;

b) *waste electrical and electronic equipment* or *WEEE* – electric and electronic equipments which are waste according to OUG (Government Urgency Decree) no. 78/2000 regarding waste system, approved with modifications and completions by Law no. 426/2001, including all components, sub-assemblies and expendable products, part and parcel of the equipments in moment it becomes waste;

According to HG 448/2005, the responsibilities for WEEE management fall back on the producers and the importers of electric and electronic equipments.

*The producers* have the role to ensure EEE design so that it fosters the dismantling and recovery operations of the components; to foresee the possibilities of re-using and recycling of WEEE, of their components and materials; to finance and organize the collecting, treatment, recovery and elimination system of WEEE.

To fulfill their obligations, Romanian equipment producers have organized themselves in collective associations.

ECO TIC producers organization of IT&C equipments and electronics, is a non-profit-making association set up in April 2006 (which received on the 2nd of April 2007 the operating license in WEEE management), gathers 107 companies from IT&C and electronics area, to whom it took their responsibilities regarding fulfilling the annual collecting, re-usage, recycling and recovering objectives of electrical and electronic waste.

In the electro-housekeeping area, the Romanian Association for Recycling - RoRec set up as a non-profit-making collective association having as founders 10 of the most important European producers of home appliances which develop their activity in Romania. The role of RoRec is to take over from producers the responsibility regarding the achievement of annual objectives for collection, re-usage, recycling and recovering of WEEE, including reporting the way of WEEE management to the responsible authorities.

Recolamp is the only organization authorized to manage light sources waste and to ensure their recycling. Recolamp is a non-profit-making association set up in September 2007 by Philips Romania, Osram Romania, GE Hungary ZRT and Narva S.R.L.

In November 2007, was created Environ Association at the initiative of some well known companies: S.C. Domo Retail S.A., S.C. Asesoft Distributon S.R.L., S.C. Singer Appliances S.R.L. and S.C. ABN Systems S.R.L. Nowadays, this association has a bigger number of members.

The adhesion to a collective association simplifies the producer's duties in what regards WEEE collection, but this thing is not compulsory.

*To the consumers* comes the role to prolong as much as possible the life cycle of this products and get rid of this type of waste by special organized systems.

Starting with 30th of April 2007, when purchasing IT&C equipments and electronics, Romanian consumers pay a contribution ("green stamp") which represent the costs for collecting and recycling the electric and electronic equipment waste (WEEE). The Green Stamp is a tax applied to electric, electronic and home appliances equipments, which represents the costs for recycling the electric and electronic equipment waste. The values of the Green Stamp ensure in this way the financing of the entire recycling process, as well as fulfilling the environment objectives provided by the European and Romanian legislation. This tax is not imposed by the state and is not compulsory but for those who have chosen it, respectively the members of a collective organization or even producers who have chosen to manage themselves WEEE. They establish themselves their recycling costs and add to the costs of the products this „green tax”/”green stamp”.

According to the legislation, WEEE holders will be able to hand over for free at the municipal collecting points or to the stores when they would like to buy new equipment from the same category of products.

Besides producers and consumers, a very important role has the *Local Public Administration* which should ensure separated collection of WEEE from private households, pulling out to EEE producer's necessary spaces to establish collecting points and ensuring the functionality of the collecting points. The measure in which the local administration manages to realize these things defers very much from one region to another and from one city to another.

In what concerns implementing the waste management system, Romania benefits of a MATRA project with Netherland technical assistance named „WEEE Management in Romania”. Netherland is a state with big experience in WEEE waste management, and the history proves the fact that „the Netherland model” underlined the specific European legislation. The business environment in this country, still from the beginning of the

specific legislation outlining (1989), referred to the opportunities given by the management of this type of waste, creating a real market of WEEE, where the motto „nothing is lost” gained monetary value.

Besides the actions of the local administrations and of the collective associations, private initiatives didn't delay to appear also in Romania, most of them from the big electrical and electronic equipments producers. So, Sony Electronics established recycling kiosks in more than 80 retailers, the objective being that of accepting one kilogram of electronics for each kilogram it produces. Recycling GreenFill service from Sony is an extent of its program of take-back and has been conceived for smaller electronic waste as photo cameras, rechargeable batteries, digital photo frames, GPS navigation systems, small lap-tops, mobile phones and portable electronic games. Sony accepts any kind of brands in its recycling kiosks. From the beginning of the take-back recycling program, Sony collected over 7.000 tons of electronic waste. Similar initiatives have also other big producers.

In what regards recycling, in April 2009 the biggest recycling factory from the south-east of Europe has started to operate. It is called GreenWEEE International and is situated in Frasinu, near Buzau. The investment rose at 10 mil. Euro and consists of ground acquisition, building the factory and endowment it with last generation equipments from Germany, Sweden and Taiwan. The group of investors consists of SC Romcarbon SA Buzau (72%), two investment funds from Switzerland (18%) and one private investor (10%). With an area of 10.000 square meters, the huge unit has five treatment and dismembering lines, endowed with last generation equipments, on which can be recycled about 50.000 tons of WEEE per year, three times more than has been collected in 2008 in Romania.

Excepting the light source equipments, which will enter „in line” from 2010, the factory recycles 9 from the 10 WEEE mentioned by the legislation, amongst which are small and big house appliances, IT equipments, medical equipments or automatic distributors. The factory will manage this year 10.000 tons of WEEE, following to reach its high capacity in 2013. In the case in which there won't be sufficient waste capacities in Romania, it is intended to bring waste from the European Union area. The percent of recovery is of 95% from the recyclable materials, and the waste come from direct collection from the population, authorized collectors, buy-back system of big retailers, but also from campaigns like „The Big Disembarrassment”. Secondary raw materials which result are: metal, which goes foundries; plastic, intended to producers of plastic materials; glass, for fabrication of cathode tubes, and polyurethane foams.

According to the European Union, in Romania, nowadays, should be collected about 4 kg of WEEE per year per inhabitant, which represent 80.000 tons each year nationally. For example, with the occasion of the campaign „The Big Disembarrassment” from the 19th of April 2008 (the second one, the first one took place in 2007, and the third one on the 14th of March 2009) which took place all over the country and included 193 towns were collected 646 tons of WEEE. If at the first edition of this campaign, deployed in 2007, were gathered 576,26 tons of electric and electronic waste; in 2008 were collected 646,54 tons, with 70,2834 tons more. In the lump, in 2008 were collected about 2.500 tons waste from which was recycled about 80%. Recolamp collected 158 tons of waste which come from lighting sources in 2008; from this, over 85% are historical waste. With all of this the objective of 4 kg/inhabitant is far away to be reached (in 2008 were collected about 0,5 kg), Romania making efforts to implement this system of WEEE management, but the main problem remain the population behavior.

Elements very interesting regarding the consumers behavior are presented in the first market research regarding WEEE in Romania, a study realized by Daedalus Millward Brown, at the request of Eco Tic.

The study represents a radiogram of the present regarding population endowment with electric and electronic equipments, estimated duration of use of this and the informing degree of the citizens in what regards electric and electronic waste. According to the Daedalus Millward Brown (2008), more than a quarter of the urban population from Romania has in their households electric and electronic equipments which don't function, the majority of 68%, because they don't know what to do with it, and the rest of 32% because they intend to it. In the opinion of the citizens in the urban area, the institutions responsible for the selective collection and recycling of the electronic waste are the healthiness companies, 46,5%, local authorities and organizations, 21,5%, and the public institutions, 13,2%. Also, over 78% of the population doesn't know to give examples of specialized organizations in recycling and don't know about the existence of the fines applied in the case of throwing away electric and electronic waste in other places than the special arranged ones.

According to the study, there is a category of activities with big degree of social availability regarding recycling and re-usage of the resources. Romanian population is willing to save utilities, the main reason being the costs reduction, and secondary protecting the environment. According to the research, the intended duration of use for the majority of electronic equipments extends until technical exhaustion.

Most influential buying criterions for electric and electronic equipments are the products brand and the existence of a fast service for that product. The same time, the Green Stamp is considered the less important buying criterion, from the ones evaluated.

### Conclusion

The main problems regarding the implementation of Directive 2002/96/EC in Romania are: organizing market control, finding alternatives for those materials which can not be introduced on the market, small number of collecting points, differences between the level of development of the European regions, from Romania, low awareness degree (local public administration and population), population outlook regarding waste.

The main strengths are represented by the existence of the private initiatives for WEEE collections and installations for WEEE recycling, the strategy and action plan for consciousness-raising campaign, and some financed projects for implementation of WEEE management system.

### Bibliography

Daedalus Millward Brown (2008), "*Dotările gospodăriilor din mediul urban. Comportamentele de achiziție. Gradul de cunoaștere a legislației DEEE*", a study realized by Daedalus Millward Brown, at the request of EcoTic, Retrieved November, 2008 from <http://www.ecotic.ro/studii.php>

Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, *Official Journal of the European Union*, L 37, Volume 46, 13 February 2003, 19-23, Retrieved 2003 from <http://eur-lex.europa.eu/JOHtml.do?uri=OJ:L:2003:037:SOM:EN:HTML>

- Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE), Official Journal of the European Union, L 37, Volume 46, 13 February 2003, 24-38, Retrieved 2003 from <http://eur-lex.europa.eu/JOHtml.do?uri=OJ:L:2003:037:SOM:EN:HTML>
- EICTA 2007: “Joint Industry Position Paper” on the Review of *Directive 2002/96/EC* (WEEE Directive), Brussels, 28 May 2007
- Savage, M. Ogilvie, S., Slezak, J., Artim, E., Lindblom, J. & Delgado L. (2006), *EUR 22231 EN – DG Joint Research Centre, Institute for Prospective Technological Studies: Implementation of Waste Electric and Electronic Equipment Directive in EU 25*, Luxembourg: Office for Official Publications of the European Communities
- United Nations Environment Programme, 2007, E-waste - Volume I: Inventory Assessment Manual, Retrieved 2007 from [http://www.unep.or.jp/ietc/Publications/spc/EWasteManual\\_Vol1.pdf](http://www.unep.or.jp/ietc/Publications/spc/EWasteManual_Vol1.pdf)
- United Nations University (2008) *Review of Directive 2002/96 on Waste Electrical and Electronic Equipment – Study No. 07010401/2006/442493/ETU/G4*, United Nations University, Bonn, GERMANY. AEA Technology, Didcot, UNITED KINGDOM GAIKER, Bilbao, SPAIN. Regional Environmental Center for Central and Eastern Europe, Szentendre, HUNGARY, TU Delft - Design for Sustainability, Delft, THE NETHERLANDS
- HOTĂRÂRE nr. 448 din 19 mai 2005 privind deșeurile de echipamente electrice și electronice (published in Monitorul Oficial no. 491 from 10 June 2005)