

**ASSESSMENT OF WASTE STREAMS
OF ELECTRICAL AND ELECTRONIC
EQUIPMENT (EEE) IN ESTONIA**



SUMMARY

The aim of the study was to approximate annual electrical and electronic waste (WEEE) volumes in Estonia. The data used in this study was collected from different statistics and by interviewing electrical and electronic equipment retailers and authorities. Another source of data was Estonian customs statistics and Statistical Office of Estonia.

In the study two methods for estimating the amount of WEEE were used. First method estimates volumes linearly from another country and another method is based on penetration of some common household appliances.

The following conclusions can be drawn:

- According to the linear estimation method, the total WEEE volumes in Estonia are **20 000 – 25 000** tons per year (compared to Finland). The amount doesn't take into consideration the differences in purchasing power of households in Estonia and Finland and therefore leads to an exaggerated result.
- The method based on the penetration of household appliances (i.e. white goods) gives an amount of **9 000 – 13 000** tons per year depending on the average use period of equipment. This method is assumed to give a better estimate of the WEEE volumes.
- Imports of some most common electrical and electronic equipment have grown in past 5 years. The (weighted) average growth of imports has been about 4,8 percent. The amount of WEEE is estimated to grow 3 – 5 percent annually, and the imports figures in Estonia seem to be in line with this estimation.
- Used electrical and electronic equipment play a little role in total imports of EEE. However in some product group about 10 percent of the total imports consists of used equipment. Second hand imports consists mostly of large household equipment, such as refrigerators.
- The general awareness of new legislation and the EU directives is not so high. Roughly 50 percent of the retailers are not aware of new waste legislation and up to 75 percent are not aware of the WEEE and RoHS directives.
- According to the interviews environmental aspects play a minor role among the EEE importers in Estonia. Only few companies have a certain environmental manager and in some companies these tasks are allocated to other managers.
- The most important importers of EEE from period 1998 until 2002 were identified

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1 INTRODUCTION

1.1 What is electrical and electronic waste?

Electrical and electronic waste, referred in this document, as WEEE or waste from EEE is one of the fastest growing type of waste in the industrialized world. The growing concern of governments of the western world of the electrical and electronic waste volumes is due to:

- The **rapid growth** of electrical and electronic waste. In 1998, 6 million tonnes of waste electrical and electronic equipment were generated (4% of the municipal waste stream). The volume of electrical and electronic waste is expected to increase by at least 3-5% per annum. This means that in five years 16-28% more WEEE will be generated and in 12 years the amount will have doubled. The growth of WEEE is about three times higher than the growth of the average municipal waste.
- Because of their **hazardous content**, electrical and electronic equipment cause major environmental problems during the waste management phase if not properly pre-treated. As more than 90% of waste from EEE is landfilled, incinerated or recovered without any pre-treatment, a large proportion of various pollutants found in the municipal waste stream comes from WEEE.

- The environmental burden due to the production of electrical and electronic products **ecological baggage** exceeds by far the environmental burden due to the production of materials constituting the other sub-streams of the municipal waste stream. As a consequence, enhanced recycling of WEEE should be a major factor in preserving resources, in particular energy.

According to the WEEE-Directive¹ electrical and electronic equipment can be categorized in the following ten groups:

Large household appliances

Small household appliances

IT & Telecommunication equipment

Consumer equipment

Lightning equipment

Electrical and electronic tools

Toys

Medical equipment systems

Monitoring and control instruments

Automatic dispensers

However, different categorization can also be made.

¹ Proposal for a directive of the European Parliament and of the Council on waste electrical and electronic equipment, 2000, Brussels

1.2 EU-legislation

There are three different directives, which deal with electrical and electronic waste. The directives are WEEE, EEE (will be replaced by EuE Directive) and RoHS. A short summary of each directive is provided at the end of this document, in annex I, II and III.

The Directive on Waste Electrical and Electronic Equipment (WEEE) will contribute to the protection of human health and the environment as required by Article 174 of the Treaty. The principal objectives of this Proposal are to protect soil, water and air from pollution caused by current management of waste from EEE, to avoid the generation of waste, which has to be disposed of and to reduce the harmfulness of WEEE. It seeks to preserve valuable resources, in particular energy. Another objective of the proposed Directive is the harmonisation of national measures on the management of Waste from EEE.

The objectives are to be achieved by means of a wide range of measures, including measures on the separate collection of WEEE, the treatment of WEEE and the recovery of such waste.

The RoHS Directive is complimentary to the WEEE Directive and applies to the same equipment categories plus electric light bulbs, and luminaries in households. The Directive requires hazardous substance 'substitutions' (i.e. phase out) of the following by July 1st 2006:

- Lead
- Mercury
- Cadmium
- Hexavalent chromium
- 2 Brominated flame retardants (PBBs and PBDEs)

The directive does not apply to spare parts for the repair, or to the reuse of electrical and electronic equipment put on the market before July 1, 2006. Medical devices and monitoring & control instruments are exempt. There are also some specific, conditional exemptions for mercury in compact fluorescent lamps, and lead in glass of cathode ray tubes and certain solders.

Future changes may be introduced providing exemptions where no practical substitute exists or where substitution is worse for the environment or health; maximum 'tolerable' concentration values may be set for the presence of banned substances in specific materials/components.

An EU commission working paper has been issued containing initial draft text for a proposed EuP directive *which "harmonises requirements concerning the design of end use equipment to ensure free movement of these products within the internal market, aiming to improve their overall impact on the environment, and thus providing an efficient use of resources and a high level of environmental protection compatible with sustainable development"*

The intention is to create one framework directive by merging two existing EU policy initiatives- 'EEE'(impact on environment of electrical and electronic equipment) and 'EER' (energy efficiency requirements).

The proposed directive aims to ensure the free movement of end use equipment within the internal market through the creation of a framework for the integration of environmental aspects in the design and development and for setting eco-design requirements for this equipment.

It also establishes the conditions for setting specific eco-design requirements, as well as the methodology through which the level of these requirements is determined.

The EC consultation period for the EuP directive comes to an end at the start of May 2003, and it is expected that there will be a parliamentary first reading in December 2003, with implementation of the directive happening in 2005.

1.3 The objective of the study

The main objective of the study is performing a mapping and performing a research a general level market of waste that originates from electrical and electronic equipment. The study consists of following sections.

- Estimation of the electrical and electronic waste volumes and the most important sources of the WEEE in Estonia.
- Estimation the export volumes of second hand EEE
- Estimation the general awareness of the EU legislation among the EEE importers and retailers.

Another objective of the study is to estimate the general awareness of the EU-legislation among the EEE importers, authorities and retailers. Also the retailers' and manufacturers' attitude towards recycling of electrical and electronic waste is to be estimated.

2 RESEARCH METHODS

2.1 Statistical methods

Statistics with export and import figures of EEE in period 1998 – 2002 were ordered from the Customs Board and Statistical Office of Estonia. Statistics are used to estimate the import volumes of the electrical and electronic equipment to Estonia.

Statistics on standard of living in Estonia from Statistical Office Estonia were used to calculate the amount of households and penetration of some electrical and electronic appliances.

Statistics from Environmental Information Centre of Estonia were used to introduce the present situation of WEEE treatment in Estonia.

In the study two different methods were used to estimate the total WEEE volumes.

1. Method

Linear assumption between country1 and country2 when WEEE volumes in country2 are known. This method assumes that WEEE volumes per person per year in two countries are equal.

$VOLUME(Country1)$:

$$\Rightarrow \frac{POPULATION(Country1)}{POPULATION(Country2)} * VOLUME(Country2)$$

2. Method

The method based on the penetration of white goods. The total amount of each goods in households can be calculated when the penetration percentage and the amount of households is known. The average annual WEEE amount can be calculated by dividing the total amount of equipment by the average use period of equipment. We also know that white goods covers 2/3¹ of the total volumes of WEEE.

$VOLUME(E1...En)$:

$$\Rightarrow \frac{PENETRATION(E1...En) * AMOUNT(Households)}{AvgUsePeriod(E1...En)}$$

$VOLUME(WhiteGoods)$:

$$\Rightarrow VOLUME(E1) + ... + VOLUME(En)$$

$VOLUME(Total)$:

$$\Rightarrow \frac{VOLUME(WhiteGoods)}{2/3}$$

¹ WEEE recycling and automated above/below ground waste/recycling collection systems in the Netherlands. 2001. Robert Long Consulting.

2.2 Interviews

The objective of the interviews was to collect the data about

- Awareness of European and local legislation
- Attitude towards environmental protection and sustainable development
- Role in distribution and sales chain of EEE

Target group:

- The most important importers of EEE, selection is based on handling of import statistics from period 1998 - 2002

Table 1 shows the amount of questionnaires sent out and the number of answers received.

Table 1. The hit rate of the interviews.

Type of target group	Sent	Received	Hit rate
Importers	123	32	26%

3 RESULTS

3.1 Results of the statistical research by product groups

The figures 1 and 2 show that the penetration percentage has grown in every category in the past few years. The average growth in penetration percentages in part of consumer electronics (figure 1) is two times bigger (22%) compared to so called *white goods* (figure 2) part with much more stabile growth (10%).

That fact can be taken also as an input in assessment future amounts of WEEE.

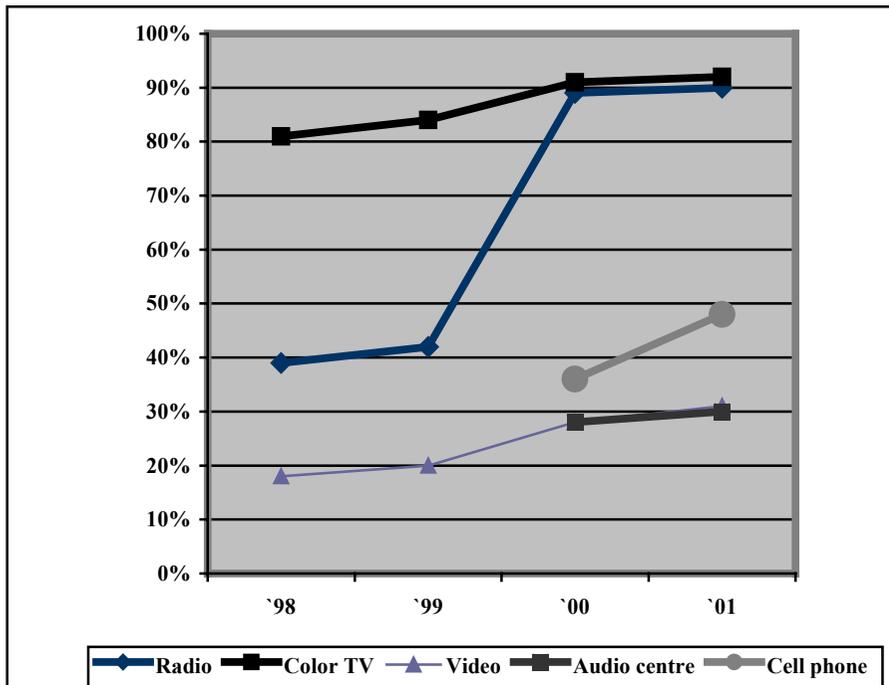


Figure 1. Penetration of common consumer electronics in Estonia

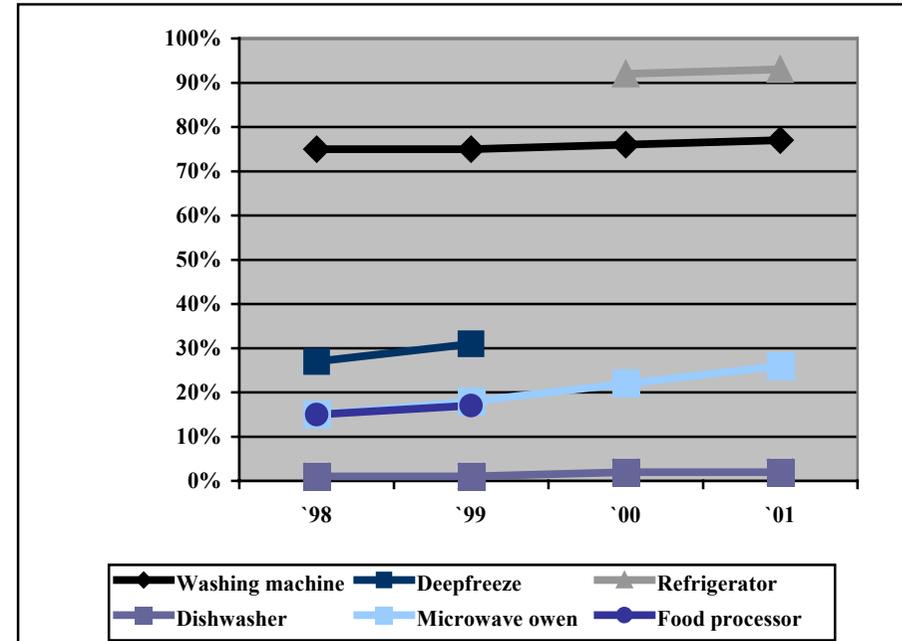


Figure 2. Penetration of some household appliances in Estonia

For some equipment data has been available only since 2000. And data about deepfreeze and food processors is not available since 2000 anymore. However the statistics indicate some trends, such as high growth of mobile phones and microwave ovens.

Despite of changes in penetration percentage and lack of some data from some periods the figures are valuable in assessment of total amounts of WEEE arising from household sector.

In period 1998 until 2001 the average number of households in Estonia was about 600 000¹. Table 2 shows the total number of some consumer electronics and household appliances based on the penetration percentages. The table 2 also shows the average unit mass of each equipment and the total mass of equipments in households. The data presents average values between 1998 and 2001. According to these statistics the average amount of consumer electronics and household appliances used by households in Estonia is about 88 500 tons.

Table 2. WEEE potential of Estonian households in 1998 - 2001¹

Equipment	Tot. amount	Unit mass (kg)	Tot. mass (tons)
Colour TV	522 000	24	1253
Radio	390 000	-	-
Video	145 500	2,5	364
Cell phone	252 000	1	252
Audio centre	174 000	-	-
Washing machine	454 500	85	38 632
Deepfreeze	180 000	60	10800
Refrigerator	558 000	60	33480
Dishwasher	12 000	52	624
Microwave oven	121 500	25	3037
Food processor	102 000	1	102
Total			88544

Table 3 shows the imports of most important categories of new electrical and electronic equipment. The figures are based on the customs statistics. The last column shows the average annual growth of import in each category in 1999 - 2002. The import figures can be used to estimate the annual growth of the WEEE volumes. As can be seen from the growth figures, the annual imports growth of some equipment is significant. In consumer electronics and electrical and electronic tools groups however there is a decline in year 2000 compared to year before.

Table 3. Imports of the most important new EEE by category in 1999 – 2002 (1000 Units, exception lightning equipments, in tons).²

Product Category	1999	2000	2001	2002	Ann. Growth
Large household appliances	480	480	581	561	4,0 %
Small household appliances	228	202	228	240	1,3 %
IT & Telecommunication equipment	491	474	470	588	4,6 %
Consumer electronics	192	145	148	149	- 6 %
Lightning equipment Group 1(tons)	1714	2050	2484	2733	12,5 %
Lightning equipment Group 2	168	166	150	198	4,0 %
Electrical and electronic tools	75	12	143	185	25,4 %

¹ Household Living Niveau 2000, Statistical Office of Estonia & Household's Income and Expenditure 1998 - 1999, Statistical Office of Estonia

² Estonian Customs Statistics.

3.2 Second hand imports

Customs statistics provide some data on imports of used electrical and electronic equipment. Figures 3 – 9 show the imports of new and used equipment in relation to the total imports. As can be seen in the figures 3 – 9 the imports of used equipment has decreased in every category in years 1999 – 2002, except in computers, which has been grown 1999-2001 but then declined. Also in large household appliances the second hand imports have been significant, but have declined in 2001 and 2002. Figure 9 also shows the amount of total imports of computers in to Estonia.

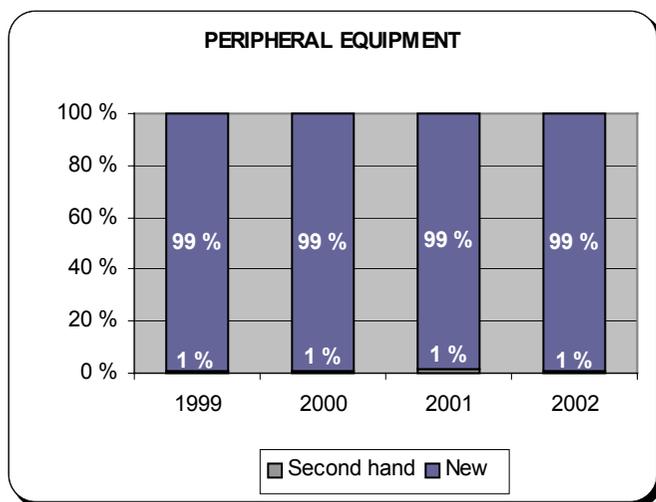


Figure 3 . Distribution of old and new peripheral equipment.

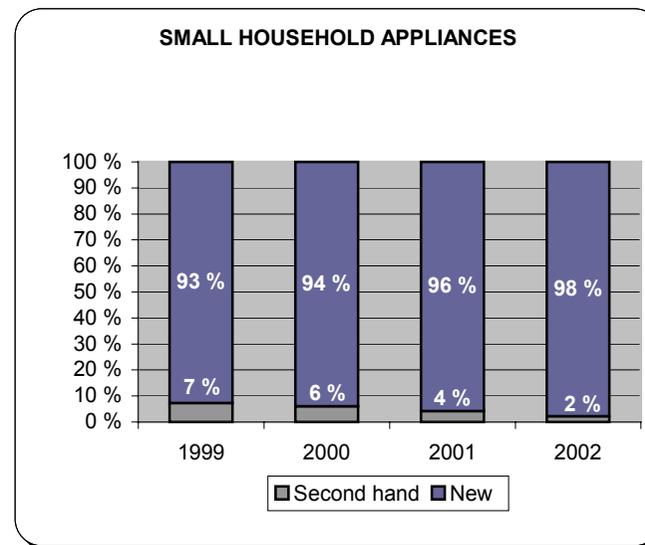


Figure 4 . Distribution of old and new small household appliances.

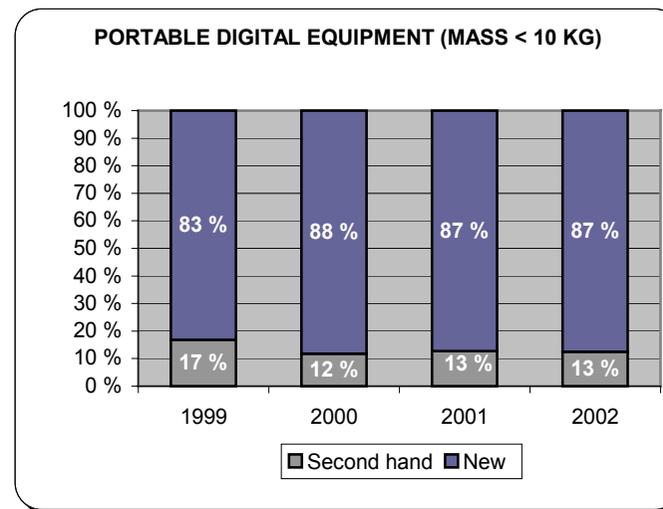


Figure 5 . Distribution of old and new portable digital equipment.

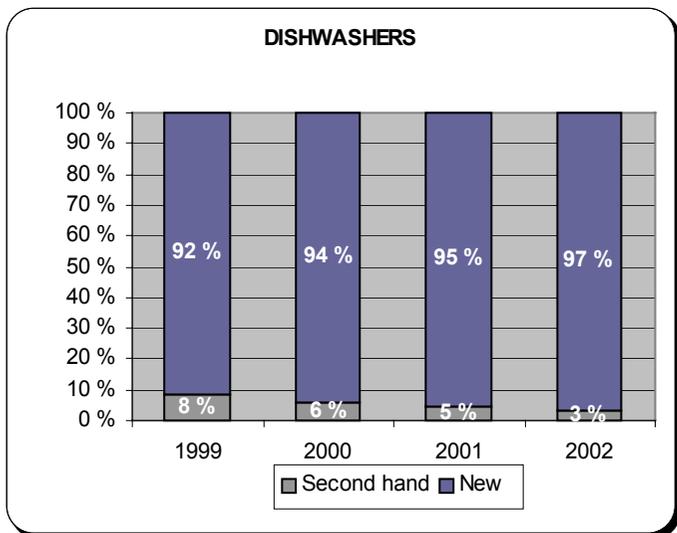


Figure 6. Distribution of old and new dishwashers.

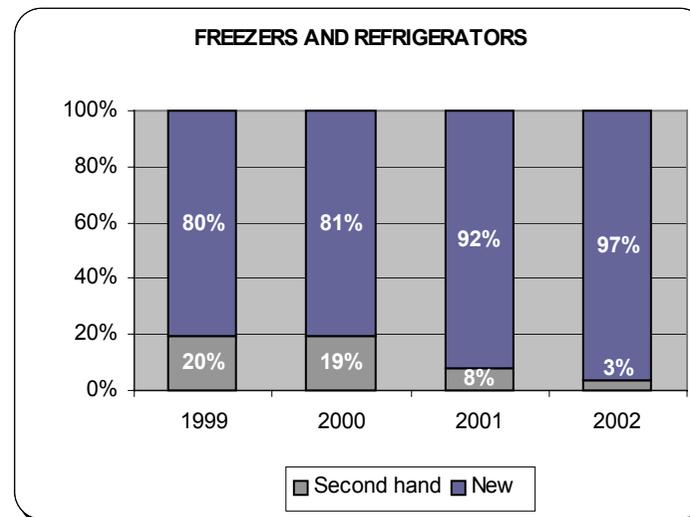


Figure 8. Distribution of old and new freezers and refrigerators.

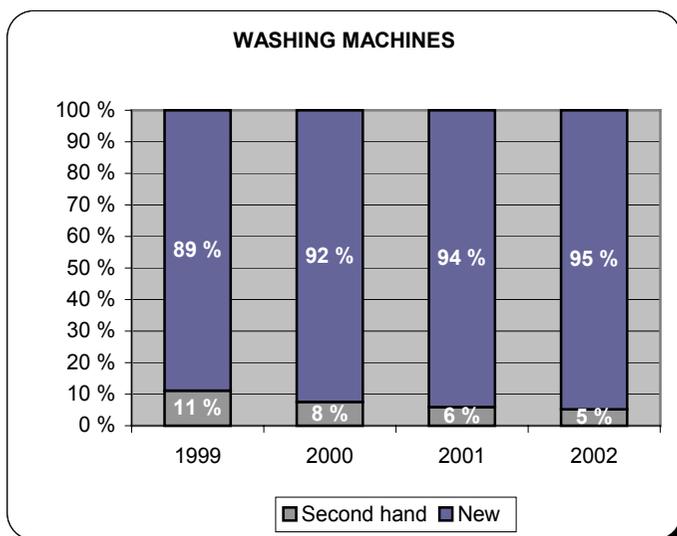


Figure 7. Distribution of old and new washing machines.

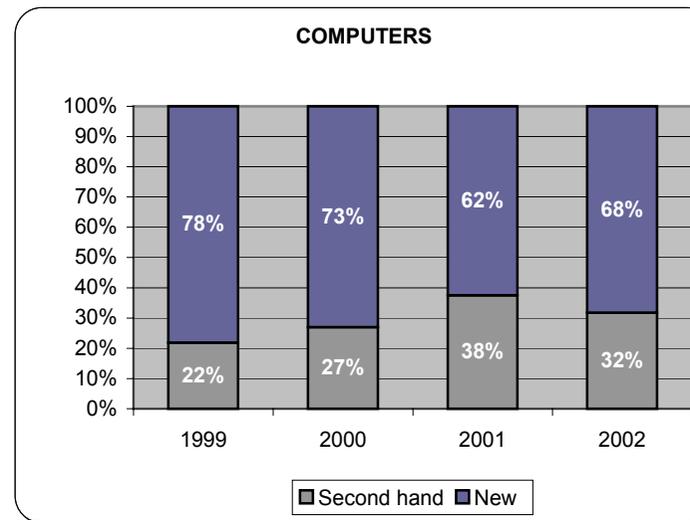


Figure 9. Distribution of old and new computers and the total imports in units

3.3 Results of the interviews

Tables 4 - 11 present a summary of the interviews conducted with electrical and electronic equipment importers. The questions are presented below. In some cases there is a space for comments, which represent the attitudes and opinions of interviewed individuals.

Table 4. Question 1.

Question 1: Which role-playing your company in manufacturing-import-wholesale-retail-end use-service/repair- waste treatment chain of electrical and electronic equipments?	Answer	%
import/wholesale/retail/service	11	34
import/wholesale/service	2	6
import/retail	5	16
import/wholesale	9	28
import/wholesale/retail	3	9
manufact. / import / wholesale	1	3
import/retail/service	1	3

Table 5. Question 2.

Question 2: Companies' relation with environmental management systems?	Answer	%
not planned to bring in EMS	19	66
planned to start bringing in process	7	24
EMS brought in and certified more than 1 year ago	2	7
EMS brought in and certified less than 1 year ago	0	0
EMS bringing in is under construction	1	3

Table 6. Question 3.

Question 3: Awareness with new waste law draft act of Estonia?	Answer	%
completely aware	1	3
universally aware, not with details	15	47
not aware	16	50

Table 7. Question 4.

Question 4: Awareness with directives 2002/95/EC and 2002/96/EC of European Un-ion?	Answer	%
completely aware	0	0
universally aware, not with details	8	26
not aware	23	74

Table 8. Question 5.

Question 5: Have your company made some arrangements according to new waste law draft act of Estonia and before mentioned directives of EU?	Answer	%
yes	3	10
no	28	90

Table 9. Question 6.

Question 6: Is the environmental manager working in your company?	Answer	%
yes, with specialised education	0	0
yes, without specialised education	1	3
not environmental manager, but principal is		
CEO	3	9
marketing director	0	0
sales director	1	3
manufacturing director	1	3
service director	0	0
if somebody else, please specify	5	16
no	21	66
Comments: if "somebody else" then service manager and administrative manager		

Table 10. Question 7.

Question 7: Is there any brand your company is representing with specific requirements from environmental point of view?	Answer	%
yes	3	11
no	24	89
Comments: Canon (recycling system for used toner cassettes within EU), Xerox (take back of old inkjet cassettes), Ricoh (extract: at a press conference in Munich on May 19th, Ökom Research AG - a German environmental rating agency - ranked Ricoh as number 1 in the environmental assessment of 39 international IT and Electronics Industry companies.)		

Table 11. Question 8.

Question 8: Destiny of old equipments) Has your company conducted campaigns a la "old for us, new for you" with objective to protect environment?	Answer	%
yes, on regular basis	0	0
yes, but not on regular basis	7	25
no	21	75
Comments: If that kind of campaigns are conducted, the main practices to get rid of old equipments are the following: delivered to metal scrap treatment enterprise, sented back to manufacturer (in case of campaigns conducted by manufacturer or brand owner), disassembly, renovation, reuse of components		

4 CONCLUSIONS

4.1 Sources and volumes of WEEE in Estonia

According to studies on WEEE in Europe large and small household appliances, consumer electronics, IT and telecommunication equipment form a vast majority of the total waste volumes, approximately 70 – 75 percent¹. It is estimated that in Finland, for example, 80 percent of the total WEEE volumes consists of large and small household appliances, consumer electronics and IT and telecommunication equipment.²

The first method for estimating WEEE volumes presented in section 2.1 assumes, that WEEE volumes grow linearly with population. The WEEE streams in Finland were approximately 70 000 – 100 000³ tons per year in 1996. Another research gives more accurate estimates: 70 000 – 75 000⁴ tons per year. Based on the fact that the population of Finland is 5.1 million people and the population of Estonia approximately 1.4 million.

This kind of linear assumption is often inaccurate, but it provides a rough estimate. The use period of electrical and electronic equipment differs from country to country. The factors that should be taken into consideration are for example GDP per capita and purchasing power of households in these countries. Variations are also to be expected between urban and rural areas and between agricultural, heavily industrialized, or more service-oriented regional economics. The table 8 shows estimated WEEE volumes, population and GDP per capita of

Estonia and Finland. The linear method gives an estimated WEEE volume of 20 000 – 25 000 tons per year.

Table 8. Linearly estimated WEEE volumes in Estonia

	Estonia	Finland
Population	1.3 Million	5.2 Million
GDP per capita	5010 €	27 000 €
Estimated WEEE volumes	20000 – 25000 t	70000 – 100000 t

Second method (see section 2.1) for estimating total volumes states, that 2/3 of the total WEEE volumes come from the household equipment or from groups large household appliances and small household appliances.

The table 2 in section 3.1 shows the estimated amount of household appliances and consumer electronics in use. According to the table household appliances both large and small without consumer electronics form a volume of about 87 000 tons. Dividing WEEE the volume by the average use period of equipment gives the annual volume. Total WEEE volumes can now be calculated dividing the annual volumes from household appliances by the constant 2/3.

Use period of electrical and electronic equipment varies significantly. Different estimates have been presented in various studies⁵. For household equipment the estimates vary from 7 years up to 30 years. In this study we assume, that the use period is roughly between 10 and 15 years. Figure 8 shows the estimated WEEE volumes, when the average use period ranges from 10 to 15 years.

¹ Elektronikschrött in der Schweiz 2001. KB&P. Switzerland. (In German)

² Sähkö- ja elektroniikkakierrätyksen toteuttaminen – SER mallit- hanke. 1999. SET. (In Finnish)

³ Sähkö- ja elektroniikkakierrätyksen toteuttaminen – SER mallit- hanke. 1999. SET. (In Finnish)

⁴ Sähkö- ja elektroniikkalaitteiden kierrätyskokeilun raportti. 1998. Nurmela et al. (In Finnish)

⁵ Collection targets for Waste from Electrical and Electronic Equipment (WEEE). 1998. Lochse et al.

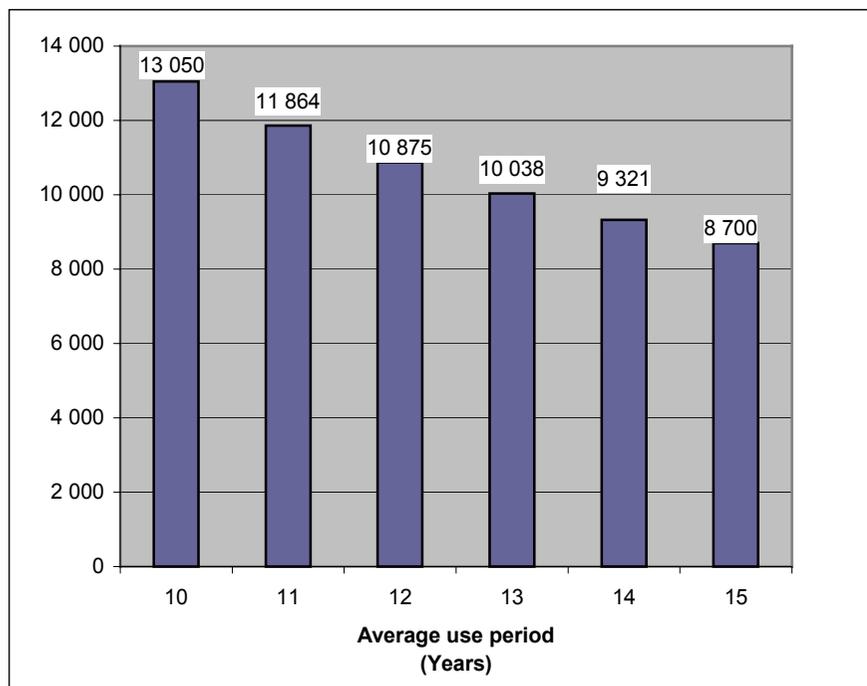


Figure 10. Estimated total WEEE volumes the average use period of equipment ranging from 10 to 15 years.

Total WEEE volumes as presented in figure 8 ranges from near 9 000 to 13 000 tons per year. Compared to the results with the linear method this method gives significantly smaller estimates. The method based on the penetration percentages is likely to give more accurate figures. Linear estimation doesn't take into account any socio-economic factors, which have an effect on the results. The annual WEEE volume is 9000 – 13 000 tons per year.

The WEEE volumes are growing in Estonia. It is estimated, that in EU the WEEE volumes increase annually at the rate of 3 – 5 percent. Estonian economy, however, grows faster than the EU. The figures indicating imports and penetration of some electrical and electronic equipment give some hints of the future waste volumes. The exact numbers can't be given, because it depends also on the average use period of equipment, which is likely to decline as the purchasing power increases.

Imports statistics (see table 3) show, that imports are growing. In for example large household goods, which make up a significant amount of WEEE, has grown 4 percent a year in 1999 – 2002. Weighted¹ average growth is about 5 percent. It can be assumed that the annual growth of the WEEE in Estonia is about 5 percent.

¹ Imports of large and small household appliances represent 2/3 total growth and the rest of the groups represent 1/3 of the growth.

4.2 Present situation in WEEE collection, treatment and accounting

Based on statistics ordered from Environmental Information Centre of Estonia (Figure 11) may insist that officially registered amounts of WEEE is very small, specially in comparison to estimated total WEEE volumes in Estonia (see chapter 4.1) and EU rate of separate collection (4 kg per inhabitant).

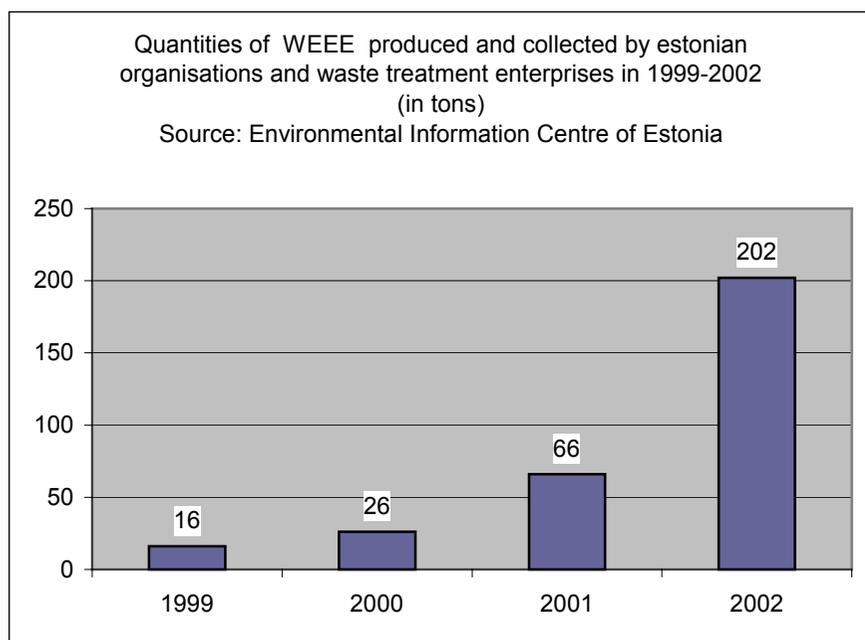


Figure 11. Quantities of WEEE produced and collected in 1999-2002 in Estonia (in tons)

4.3 The second hand imports of EEE

Due to the different legislation some countries export used electrical and electronic equipment to Estonia. The second hand exports are difficult to estimate. The figures 3 – 8 show, that second hand imports play a small role in total imports. The percentage of second hand imports has steadily declined past four years, only computers and portable digital equipment being an exception.

In the future it seems, that only imports of used computers have a significant effect on WEEE volumes. In other groups the second hand imports are relatively small.

4.4 General awareness of new legislation

According to the interviews the almost 50 percent of the recipients were aware of the forthcoming new waste law whereas only 25 percent were generally aware of the RoHS and WEEE Directives. Only one of the recipients was completely aware of either the directives or the new waste legislation in Estonia.

10 percent told they had already made arrangements according to the new waste legislation and EU regulations. This is a smaller number than abovementioned awareness of the legislation. However, to meet the requirements of the EU directives and waste legislation, certain actions are necessary.

4.5 General attitude toward integrated environmental management system (EMS)

The results of the interviews indicate the general attitude towards integrated environmental management system (ISO 14001 or equal) . 25 percent of the recipients say that an EMS is in use or planned to be brought in the near future. Individual comments on each interview questions reflect the attitude.

In the recipients' organisations two thirds do not have an environmental managers hired. One third say, that environmental managers exists, but only few with a specialized education. In most cases the tasks of environmental manager is done by another managers.

5 GLOSSARY

Some common definitions associated with electrical and electronic waste legislation:

Dangerous substance or preparation means any substance or preparation, which has to be considered dangerous under Council Directive 67/548/EEC or Directive 1999/45/EC of the European Parliament and of the Council.

Disposal means any of the applicable operations provided in Directive 75/442/EEC.

Electrical and electronic equipment means equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields falling under the categories set out on page 4 and designed for use with a voltage rating not exceeding 1000 Volt for alternating current and 1500 Volt for direct current;

Energy recovery means the use of combustible waste as a means of generating energy through direct incineration with or without other waste but with recovery of the heat.

Prevention means measures aimed at reducing the quantity and the harmfulness to the environment of WEEE and materials and substances contained therein.

Producer means any person who:

(i) manufactures and sells electrical and electronic equipment under his own brand, irrespective of the selling technique used, including distance and electronic selling,

(ii) resells under his own brand equipment produced by other suppliers, irrespective of the selling technique used, including distance and electronic selling, or

(iii) imports electrical and electronic equipment on a professional basis into a Member State.

Recovery means any of the applicable operations provided in Directive 75/442/EEC.

Recycling means the reprocessing in a production process of the waste materials for the original purpose or for other purposes, but excluding energy recovery.

Re-use means any operation by which WEEE is used for the same purpose for which it was conceived, including the continued use of WEEE which is returned to collection points, distributors, recyclers or manufacturers.

Treatment means any activity after the WEEE has been handed over to a facility for de-pollution, disassembly, shredding, recovery or

disposal and any other operation carried out for the recovery and/or the disposal of the WEEE.

Waste electrical and electronic equipment or “**WEEE**” means electrical or electronic equipment which is waste within the meaning of Article 1(a) of Directive 75/442/EEC, including all components, sub-assemblies and consumables, which are part of the product at the time of discarding.

WEEE from private households means WEEE, which comes from private households and from commercial, industrial, institutional and other sources, which, because of its nature and quantity, is similar to that from private households.

ANNEX I

COMPANIES RESPONDING TO THE SURVEY

We wish to thank the companies responding to our survey.

They are:

AM Kodumasinat Balti AS, Anava Eesti AS, Anttila,
BAKTKaubanduse AS, GNT Eesti AS, Infotark AS, DMC Direct
OÜ, Hantarexi Valduse AS, Kristjuhan AS, Kulbert AS, AS Kungla
Dialog, Leventa AS, MicroLinki Arvutite AS, Sandmani Grupi AS,
Stockmann AS / Hobby Hall, Zebra Infosüsteemid AS
ATBM OÜ, Elko Reval , KTK Overall, Electrolux Eesti AS,
AS Elmaksi Hulgikaubandus, AS Mecro, ONOFF Eesti AS,
AS PCT Arvutid, Tech Data Eesti AS, RTT, Reveko, OÜ Kliko,
EMT, Lander, Fujitsu Invia, Whirlpool Eesti OÜ

ANNEX II WEEE DIRECTIVE (Press Release)

IP/00/602

Brussels, 13 June 2000²⁽¹⁾

Commission tackles growing problem of electrical and electronic waste

The European Commission has adopted a proposal for a Directive on Waste Electrical and Electronic Equipment (WEEE) and a proposal for a Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment. The proposed Directives are designed to tackle the fast increasing waste stream of electrical and electronic equipment and complements European Union measures on landfill and incineration of waste. Increased recycling of electrical and electronic equipment, in accordance with the requirements of the proposal for a WEEE Directive, will limit the total quantity of waste going to final disposal. Producers will be responsible for taking back and recycling electrical and electronic equipment. This will provide incentives to design electrical and electronic equipment in an environmentally more efficient way, which takes waste management aspects fully into account. Consumers will be able to return their equipment free of charge. In order to prevent the generation of hazardous waste, the proposal for a Directive on the restriction of the use of certain hazardous substances requires the substitution of various heavy metals and brominated flame-retardants in new electrical and electronic equipment from 1 January 2008 onwards.

Welcoming the adoption by the Commission of the draft Directive, Environment Commissioner Margot Wallström declared: "This is a major step towards the objective of sustainable production and consumption. I am pleased that the Commission has been able to agree on a balanced initiative, which the Environment, consumers and industry all stand to gain from". She added: "Due to the fast pace of technological innovation, electrical and electronic equipment constitute one of the fastest growing waste streams in the EU. It is therefore particularly important to implement the key principles of EU waste management policy, especially the prevention and the recycling of waste, in this area."

In order to reduce the amount of electrical and electronic waste disposed of in landfills and incinerators the proposed weee directive seeks to establish separate collection and recycling systems for such waste. It also implements the principle of producer responsibility to provide incentives for producers to take into account, already

at the product design stage, the need to reduce the use of hazardous substances and to improve the recyclability of these products.

The weee directive, based on article 175 of the treaty, will address all electrical and electronic equipment used by consumers and currently not treated before going to incinerators or landfills. It also covers a wide range of professionally used electrical and electronic equipment, such as information technology (it) and telecommunication equipment, which is not sufficiently recycled today.

The waste stream of electrical and electronic equipment has been identified as one of the fastest growing waste streams in the European Union constituting 4% of the municipal waste today, increasing by 16-28% every five years - three times as fast as the growth of average municipal waste. Furthermore, it is one of the largest known sources of heavy metals and organic pollutants in the municipal waste. With a view to the resource intensive production of electrical and electronic equipment, the requirement to recycle these wastes will lead to significant resource savings. Thus, the new proposal fulfils a key objective of the fifth environmental action programme - the reduction in wasteful consumption of natural resources and the prevention of pollution.

The directive on electronic waste complements EC legislation on waste disposal, including the directives on landfills and incineration of waste, and follows the example set by other waste stream specific directives, such as the recently adopted end-of-life vehicles directive. Given that today more than 90% of electronic waste ends up in disposal or shredding facilities without any pre-treatment, depollution and proper recycling of this waste constitute the main objectives of the proposal. Proper pre-treatment and recycling can, however, only be achieved through separate collection of electronic waste. Accordingly, member states will have to organise this collection from private households. Producers will then take over the waste from designated collection facilities. From there the waste needs to be channelled to certified treatment facilities, where further treatment according to the standards set out in the directive can be ensured. The treatment standards contain minimum percentages for the recovery of this waste. These would come into force no later than 2006, and would range between 60 and 80%, depending on the product category.

In line with the polluter pays principle producers need to organise and finance the treatment, recovery and disposal of waste. The entry into force of the financing obligation will be delayed by five years to minimise the impact on producers of the financing requirement regarding waste from products put on the market before entry into force of the legislation ("historical waste").

The proposed directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment, based on article 95 of the treaty, introduces a substitution requirement for those substances in electrical and electronic equipment, which pose the main environmental problems during disposal and recycling of such waste. This requirement will support ongoing efforts to substitute these substances by less harmful substances. In line with the directive on end-of-life vehicles the targeted substances include the heavy metals, lead, mercury, cadmium and hexavalent chromium. In addition, two types of brominated flame retardants, pbb and pbde, are required to be substituted by 1 January 2008. The substitution of pbb and pbde must not lead to a lowering of the fire safety standards. Accordingly, the directive provides for exemptions from the substitution requirement if such substitution is not possible.

⁽¹⁾² Such as large electric and electronic household items (fridges, washing machines.), small household appliances (toasters, hairdriers.), toys, TV- and video sets...

ANNEX III EUE DIRECTIVE

Proposal for a
DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
on establishing a framework for Eco-design of End Use Equipment

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 95 thereof,
 Having regard to the proposal from the Commission¹,
 Having regard to the opinion of the Economic and Social Committee²,
 Having regard to the opinion of the Committee of the Regions³,
 Acting in accordance with the procedure laid down in Article 251 of the Treaty⁴,
 Whereas:

HAVE ADOPTED THIS DIRECTIVE:

Article 1 Objectives and scope

1. This Directive aims to ensure the free movement of end use equipment within the internal market through the creation of a framework for the integration of environmental aspects in the design and development and for setting eco-design requirements for this equipment.
2. It also establishes the conditions for the setting of specific eco-design requirements, as well as the methodology through which the level of these requirements is determined.
3. This Directive shall not apply to motor vehicles, excluding installed equipment that does not assist in their propulsion.

Article 2: Definitions for the purposes of this Directive:

- a) "End-use Equipment (EuE)" means equipment which is dependent on energy input (electricity, fossil and renewable fuels) to work as intended and equipment for the generation, transfer and measurement of such energy. It also means parts which are intended to be incorporated into EuE, and which are placed on the market as individual parts for end-users.
- b) "Components and sub-assemblies" means parts intended to be incorporated into EUE, and which are not placed on the market as individual parts for end users.
- c) "Manufacturer" means any natural or legal person responsible for the conformity of the equipment with this Directive in view of its placing on the market under his own name or trademark or for his own use
- d) "Authorised representative" means any natural or legal person established in the Community who, explicitly designated by the manufacturer, acts on his/her behalf and may be addressed by authorities and bodies in the Community instead of the manufacturer with regard to the latter's delegated obligations under this Directive.
- e) "Materials" means raw materials, intermediates, auxiliary materials and chemicals
- f) "Product design" means the set of processes that transforms requirements into the specification of a product.
- g) "Environmental aspect" means an element or function of a product that can interact with the environment.
- h) "Environmental impact" or "impact on the environment" means any change to the environment, whether adverse or beneficial, wholly or partially resulting from products

- i) "Life cycle" means the consecutive and interlinked stages, of the product from design to the final disposal.
- j) "End of life" means state of a product when it is finally removed from use.
- k) "Re-use" means any operation by which EUE or its components, having reached their end of first use, are used for the same purpose for which they were conceived. "Re-use" includes the continued use of EUE, which is returned to collection points, distributors, recyclers or manufacturers, as well as re-use of equipment following refurbishment.
- l) "Recycling" means the reprocessing in a production process of the waste materials for the original purpose or for other purposes but excluding energy recovery. Energy recovery means the use of combustible waste as a means to generate energy through direct incineration with or without other waste but with recovery of the heat.
- m) "Recovery" means any of the applicable operations provided for in Annex III.B to Directive 75/442/EEC as amended.
- n) "Waste" means any substance or object in the categories set out in Annex I to Directive 75/442/EEC as amended which the holder discards or intends or is required to discard.
- o) "Ecological profile" means a description of the magnitude and significance of the environmentally relevant inputs and outputs (including, as appropriate, raw materials, intermediate products, emissions and waste) associated with a product throughout its lifecycle
- p) "environmental performance" of the product means the results of the manufacturer's management of the environmental aspects of the product, as reflected in the ecological profile of the product
- q) "improvement of the environmental performance" shall mean the process of enhancing over successive generations of a product its overall environmental performance; the enhancing of the results need not take place in all environmental aspects of the product simultaneously
- r) "eco-design" shall mean the systematic integration of environmental aspects into product design with the aim to reduce the overall environmental impact of the product throughout its whole life cycle
- s) "eco-design requirement" shall mean any requirement in relationship to the product or its design with a view to improving its environmental performance
- t) "specific eco-design requirement" shall mean a quantified and measurable requirement on a selected environmental aspect of the product (such as energy consumption during use) calculated for a given unit of output performance of the product
- u) « harmonised standard » means a technical specification adopted by a recognised standards body under a mandate from the Commission in conformity with the procedures laid down in Directive 98/34/EC for the purpose of establishing a European requirement, compliance with which is not compulsory

Article 3: Eco-design requirements

EUE covered by implementing measures referred to in Article 14 shall be designed and manufactured applying the relevant requirements set out in the implementing measure.

Article 4: Placing on the market and putting into service

Member States shall take all appropriate measures to ensure that EUE covered by implementing measures may be placed on the market and/or put into service only if they comply with the provisions of the implementing measure.

Article 5: Free movement

1. Member States shall not create any obstacle to the placing on the market and/or putting into service within their territories on grounds of eco-design requirements of EUE that conform to the provisions of the implementing measure applicable to it and bear the CE marking according to Article 10.
2. At trade fairs, exhibitions, demonstrations, etc., Member States shall not prevent the showing of end-use equipment as defined in Article 1 not in conformity with the provisions of the applicable implementing measure, provided that a visible sign clearly indicates their non-conformity and their non-availability for sale until brought into conformity.

Article 6: Conformity assessment

1. Before placing EUE on the market, the manufacturer shall perform a conformity assessment of the EUE with the relevant requirements of the applicable implementing measure.
2. The appropriate conformity assessment procedures will be specified by the implementing measures and shall be chosen among those in Annexes IV and V or, when duly justified and proportionate to the risk, among modules B,C,D,E as described in Council Decision 93/465/EEC. In the case where EUE is designed by an organisation registered according to the Community eco-management and audit scheme⁵ and the design function is included within the scope of the registration it shall be presumed that the environmental management scheme of this organisation complies with the requirements of Annex V. Environmental management systems for which provisions have been applied in accordance with harmonised standards, the reference numbers of which have been published in the Official Journal of the European Communities, shall be presumed to conform to the corresponding requirements of Annex V.
3. After placing EUE on the market, the manufacturer or their authorised representative shall keep relevant documents relating to the conformity assessment performed and declarations of conformity issued, available for inspection by Member States for a period of 10 years after the last EUE has been manufactured. The relevant documents will be made available within [10] days of receipt of a request by the competent authority of a Member State. Where the manufacturer is not established within the Community and in the absence of an authorised representative, the obligation to make available upon request conformity documentation shall lie with the person designated by the manufacturer as responsible for placing the equipment on the Community market.
4. Documents relating to the conformity assessment and declaration of conformity shall be drawn up in one of the official languages of the Community.

Article 7: Presumption of conformity

1. Member States shall regard EUE, bearing the CE marking provided for in Article 10 as conforming to the relevant provisions of the applicable implementing measure.
2. EUE, for which provisions have been applied in accordance with harmonised standards, the reference numbers of which have been published in the Official Journal of the European Communities, shall be presumed to conform to any corresponding requirements referred to in the applicable implementing measure.
3. EUE which have been awarded the Eco-label⁶, shall be presumed to comply with the corresponding implementing measure.

Article 8: Harmonised Standards

1. Member States shall ensure that appropriate measures are taken to enable interested parties to be consulted at national level on the process of preparing and monitoring the harmonised standards.

2. Where a Member State or the Commission considers that the harmonised standards for which application is deemed to satisfy specific provisions of the implementing measure do not entirely meet the above-mentioned provisions, the Member State concerned or the Commission shall inform the Standing Committee set up by Article 5 of Directive 98/34/EC giving the reasons therefore. The Committee shall issue an opinion as a matter of urgency.
3. In the light of the Committee's opinion, the Commission shall decide to publish, not to publish, to publish with restriction, to maintain or withdraw the references to the harmonised standards concerned in the Official Journal of the European Communities.
4. The Commission shall inform the European Standardisation body concerned and, if necessary, issue a new request.

Article 9: Restriction of placing on the market

1. Where a Member State ascertains that end use equipment bearing the CE marking and used in accordance with their intended use, does not comply with the applicable implementing measure, and/or that the CE marking referred to in Article 10 has been fixed unduly, the manufacturer or their authorised representative shall be obliged to make the EUE comply as regards the provisions of this Directive and/or the CE marking and to end the infringement under conditions imposed by the Member State.
2. Where non-compliance continues, the Member State must take all appropriate measures to restrict or prohibit the placing on the market of the product in question or to ensure that it is withdrawn from the market. The Member State shall immediately inform the Commission and the other Member States of any such measure, indicating the reasons for its decision and, in particular, whether nonconformity is due to: (a) failure to satisfy the requirements of the applicable implementing measure; (b) incorrect application of the harmonised standards referred to in Article 8(2); (c) shortcomings in the harmonised standards referred to in Article 8(2).
3. The Commission shall enter into consultation with the parties concerned without delay and may draw upon technical advice from independent external experts. Where the Commission considers, after this consultation, that the measure is justified, it shall immediately so inform the Member State which took the initiative and the other Member States.
4. Where the Commission considers, after this consultation, that the measure is unjustified, it shall immediately so inform the Member State which took the initiative and the manufacturer, or his authorised representative established within the Community. Where the decision referred to in paragraph 1 is based on a shortcoming in the standards the Commission shall immediately inform the Committee referred to in Article 8(2) in order to initiate the procedure referred to in Article 8(2). Furthermore the Commission shall at the same time inform the Committee referred to in Article 18.
5. Where end use equipment which does not comply bears the CE marking, the competent Member State shall take appropriate action against the person(s) having affixed the CE marking and shall so inform the Commission and the other Member States.
6. The Commission shall ensure that the Member States are kept informed of the progress and outcome of this procedure.
7. The Member States and the Commission shall take the necessary measures to guarantee confidentiality with regard to the above-mentioned information, where appropriate.

Article 10: Marking/Declaration of conformity

1. Before being placed on the market, the EUE must have affixed to them the CE marking of conformity and a declaration of conformity must have been issued, by which the manufacturer or their authorised representative ensures and declares that the EUE comply with all relevant provisions of this Directive.
2. The CE conformity marking consists of the initials "CE" as shown in Annex III.
3. The Declaration of conformity shall contain the elements specified in Annex VI.

4. The affixing of markings on EUE which are likely to mislead users as to the meaning and/or form of the CE marking shall be prohibited.

5. Member States may require the information to be supplied pursuant to Annex I, 1 part 3, to be in their official language(s) when equipment reaches the final user. Member States may also authorise this to be provided in one or more other official Community language(s). In the application of this provision, Member States shall take into account the principle of proportionality and, in particular: (a) whether the information can be supplied by harmonised symbols or recognised codes or other measures; (b) the type of user anticipated for the equipment and the nature of the information which is to be provided.

Article 11: Requirements for components and sub-assemblies

1. Member States shall ensure that manufacturers of components or sub-assemblies of EUE shall provide all necessary information to enable other manufacturers making use of the component or sub-assembly in EUE to establish the ecological profile of such equipment.

2. In particular, manufacturers of these components or sub-assemblies will provide information on the material composition and the consumption of energy and/or resources of their components or sub-assemblies, and where available, the results of environmental assessments and/or case reference studies which concern the use and end-of-life management of the component or sub-assembly.

Article 12: Decisions entailing refusal or restriction

Any decision taken pursuant to this Directive which restricts the placing on the market and/or the putting into service of EUE shall state the exact grounds on which it is based. Such decision shall be notified forthwith to the party concerned, who shall at the same time be informed of the legal remedies available to him under the laws in force in the Member State concerned and of the time limits to which such remedies are subject.

Article 13: Enforcement and administrative co-operation

Member States shall take appropriate measures in order to encourage the authorities responsible for implementing this Directive to co-operate with each other and provide each other with information in order to assist the functioning of this Directive. The administrative co-operation and exchange of information should take utmost advantage of electronic means of communication and may be supported by relevant Community programmes. Specifications and structure of the information exchange between the Commission and Member States will be decided in accordance with procedure laid down in Article 18.

Article 14: Implementing measures

1. The Commission in accordance with the procedure laid down in Article 18 may adopt implementing measures in order to set eco-design requirements for defined categories of EUE or for environmental aspects thereof.

2. The implementing measures will introduce a) eco-design requirements, on the basis of Annex I and/or b) specific eco-design requirements in accordance with Annexes II and VII. Specific eco-design requirements shall be introduced for selected environmental aspects which have a significant adverse impact on the environment.

3. The following criteria shall be applied for adopting the implementing measures:

- 3.1 The product shall represent a significant volume of sales and trade in the internal market;
- 3.2 The product shall involve a significant environmental impact at European level;
- 3.3 The entire life cycle of the product shall be considered
- 3.4 The priorities established in the Community environment action programme are

taken into account

3.5 The product shall present a significant potential for improvement in relationship to this impact

3.6 The performance of the product shall not be significantly affected

3.7 Health and safety shall not be adversely affected

3.8 The impact on consumers is taken into account and in particular on lower income groups

3.9 The impact on manufacturers' competitiveness is taken into account, including on non-EU markets. When adopting eco-design requirements, market distortions shall not be created among equipment performing the same function but using different energy sources.

Article 15 Specific measures: existing Directives

Directives 92/42/EEC, 96/57/EC and 2000/55/EC covering energy efficiency requirement for domestic hot-water boilers, domestic refrigeration appliances and ballast's for fluorescent lighting shall be considered as specific eco-design requirements.

Article 16 Amendment

Directive 92/42/EEC is amended as follows:

- a) Article 6 is deleted;
- b) Annex I, section 2, is deleted.

Article 17 Abrogation

Directive 78/170/EC is hereby repealed.

Article 18: Committee Procedure

1. The Commission shall be assisted by a committee, hereinafter referred to as the "Committee", composed of representatives of the Member States and chaired by the representative of the Commission.
2. Where reference is made to this paragraph, Articles 5 and 7 of Decision 1999/468/EC shall apply, having regard to the provisions of Article 8 thereof.
3. The period referred to in Article 5(6) of Decision 1999/468/EC shall be set at three months.

Article 19: Transposition and transitional provisions

1. Before7 Member States shall adopt and publish the laws, regulations and administrative provisions necessary to comply with this Directive. They shall forthwith inform the Commission thereof.
2. When Member States adopt the measures referred to in the first subparagraph, they shall contain a reference to this Directive or shall be accompanied by such reference on the occasion of their official publication. The methods of making such reference shall be laid down by Member States. Member States shall apply such provisions as from8 Member States shall communicate to the Commission the texts of the provisions of national law which they adopt in the field governed by this Directive

Article 20: Penalties

Member States shall determine the penalties applicable to breaches of the national provisions adopted pursuant to this Directive. The penalties shall be effective, proportionate and dissuasive. Member States shall notify those provisions to the Commission by the date specified in the first subparagraph of Article

19(2) at the latest, and shall notify it without delay of any subsequent amendment affecting the provisions.

Article 21: Addressees of the Directive

This Directive is addressed to the Member States.

Article 22: Entry into force

This Directive shall enter into force on the day of its publication in the *Official Journal of the European Communities*.

Done at Brussels,
For the European Parliament For the Council
The President The President

ANNEX I:

Further to the adoption of implementing measures laying down eco-design requirements pursuant to Article 14.2, Member States shall ensure that manufacturers of end use equipment shall comply with the following provisions

1 GENERAL PROVISIONS

1. Manufacturers of end use equipment shall perform an assessment of the environmental aspects of a product throughout its lifecycle, based upon the assumption that it is used under the conditions and for the purposes intended. This assessment shall be used for the establishment of the ecological profile of the product. It shall be based on environmentally relevant product characteristics and inputs/outputs occurring throughout the product life cycle expressed in physical quantities that can be measured. The depth of the analysis shall reflect the overall environmental influence of the product, and the expected number of products to be manufactured. It shall concentrate on and prioritise those factors, which are capable of being influenced in a substantial manner through product design.

2. The manufacturer shall make use of this assessment to evaluate alternative design solutions with the aim of achieving an improvement of the environmental performance of their product over successive generations of products and taking into account the state of the art in environmentally friendly design. The choice of a specific design solution shall achieve a reasonable balance between the various environmental aspects and between environmental aspects and other relevant considerations, such as safety and health, technical requirements for functionality, quality, and performance, and economic aspects, including manufacturing costs and marketability, while complying with all relevant legislation. The design process for EUE shall include, in particular, the elements set out under part 2 of this annex. The manufacturer shall document the specific design choices and the reasons behind them so as to permit the product to be manufactured, used, and treated at end of life in accordance with its environmental design. The information provided by the manufacturer on the environmental design characteristics for EUE shall contain, in particular, the elements described in part 3 of this annex.

3. Where there are changes to the legal, organisational, economic, or other requirements relating to a product which lead to a review of product design, the manufacturer shall also review the environmental aspects of the product design. In particular, the manufacturer shall identify and implement opportunities for improving environmental performance through the application of new knowledge or scientific findings and developments in the state of the art in environmentally friendly design.

2 ECO-DESIGN PARAMETERS FOR EUE

The aforementioned assessment shall address the following phases of the lifecycle of the product:

- raw material acquisition
- manufacturing
- packaging, transport, and distribution
- installation and maintenance
- use
- end-of-life.

For each phase, the following environmental aspects shall be assessed where relevant

- predicted consumption of materials, energy and other resources such as fresh water
- anticipated emissions to air, water or soil
- anticipated pollution through physical effects such as noise, vibration, radiation, electromagnetic fields.
- expected generation of waste material
- possibilities for reuse, recycling and recovery of materials, taking into account Directive 2002/.../EC on WEEE In particular, the following parameters shall be used, as appropriate, for evaluating improvement on the aforementioned environmental aspects:
 - Weight and volume of the product
 - use of materials issued from recycling activities
 - energy consumption throughout the life cycle
 - use of substances which are hazardous or otherwise of interest in view of their potential adverse effects on human health and the environment, taking into account Directive 2002/.../EC on RoHS
 - quantity and nature of consumables needed for proper use and maintenance
 - Ease for reuse and recycling as expressed through: number of materials and components used, use of standard components, time necessary for disassembly, complexity of tools necessary for disassembly, use of component and material coding standards for the identification of components and materials suitable for re-use and recycling (including marking of plastic parts according to ISO), use of easily recyclable materials, easy access to valuable and other recyclable components and materials; easy access to components and materials containing hazardous substances
 - Incorporation of used components
 - Avoidance of technical solutions detrimental to reuse and recycling of components and whole appliances
 - Extension of lifetime as expressed through: minimum guaranteed lifetime, minimum time for availability of spare parts, modularity, upgradeability
 - Amounts of waste generated and amounts of hazardous waste generated
 - Emissions to air (acidifying agents, volatile organic compounds, ozone depleting substances persistent organic pollutants, heavy metals, fine particulate and suspended particulate matter)⁹
 - Emissions to water (heavy metals, substances with an adverse effect on the oxygen balance)¹⁰

3 REQUIREMENTS FOR INFORMATION CONCERNING THE ENVIRONMENTAL DESIGN ASPECTS

The manufacturer shall ensure that relevant information concerning the environmental design aspects of the product is provided to those who are responsible for the product following the design phase, where applicable:-

- Instructions relating to the manufacturing process.
- Information for consumers on the significant environmental characteristics and performance of a product, accompanying the product when it is placed on the market to allow the consumer to compare these aspects of the products- Instructions for consumers/users on how to install, use and maintain the

product in order to minimise its impact on the environment and to ensure optimal life-expectancy, as well as how to return the product at the end of life.

– Information for treatment facilities concerning disassembly, recycling, or disposal at end-of-life. Basic information shall be found on the product itself wherever possible. This information shall take into account obligations under other Community legislation, such as Directive 2002/.../EC on WEEE

9 Taking into account Directives 1999/13/EC (on emissions of volatile organic compounds due to the use of organic solvents), 96/62/EC (on ambient air quality assessment and management)

10 Taking into account Directives 2000/60/EC (water framework Directive), 91/271/EEC (concerning urban waste water treatment), 76/464/EC (on pollution of the aquatic environment by certain dangerous substances)

ANNEX II Method for Setting the level of Specific Eco Design Requirements

1 METHOD FOR SETTING THE LEVEL OF SPECIFIC ECO-DESIGN REQUIREMENTS

Specific eco design requirements aim at improving a selected environmental aspect of the equipment. They may take the form of requirements for reduced consumption of a given resource, such as limits for the use of this resource in the various stages of the life cycle, as appropriate (e.g. limits in the water consumption in the use phase or in the quantities of a given material incorporated in the equipment or minimum required quantities of recycled material). The level of a specific eco-design requirement for given EUE equipment shall be set as follows:

1. A technical-economical analysis considers the various types (brands, models) of the equipment in question on the market and identifies the technical options for improving the environmental performance of the equipment. On the basis of this analysis and taking into account economic and technical feasibility as well as potential for improvement, concrete measures are taken with a view to reducing the environmental impact of the equipment. Concerning energy consumption in use, the level of energy efficiency or consumption shall be set aiming at the life cycle cost minimum to final users (LLCC for Least Life Cycle Cost), using a real discount rate of [5]% and a realistic lifetime for the EUE. The life cycle cost (LCC) of the EUE is defined as the sum of the purchase price and of the operating expenses discounted over the lifetime of the EUE. The operating expenses cover primarily energy consumption and, where significant, additional expenses in other resources (such as water, detergent...). The real discount rate is defined as the difference between the interest rate and the expected average annual inflation. A sensitivity analysis covering the relevant elements (e.g. price of energy or other resource, cost of raw material or production cost...) shall be carried out to check if there are significant changes and if the overall conclusions are robust. The requirement shall be adapted accordingly. The same methodology could be applied to other resources, such as water.

2. The level of the specific eco-design requirement can be set by using evidence available in the framework of other Community activities including regulation No1980/2000 on an EU Eco-label, the thematic strategies on sustainable use of resources and recycling, Directive 92/75/EEC on energy labelling and Decision No 2001/469/EC on Energy Star labelling. Evidence available from existing programs applied in other parts of the world can be used for setting the specific eco-design requirement of EUE traded with the EU's main economic partners.

3. In principle, the setting of specific eco-design requirements shall not have as a consequence that a proprietary technology is imposed to manufacturers or that a significant proportion of models currently produced are removed from the market. In the last case, the date by which the minimum requirement needs to be achieved shall be set taking into account the redesign cycle for the product.

Annex III

The CE marking shall be at least 5 mm high and must appear in a visible, legible and indelible form on the EUE, where practicable and appropriate, and on the instructions for use. The CE marking must also appear on the sales packaging.

ANNEX IV

Internal design control

1. This module describes the procedure whereby the manufacturer or their authorized representative who carries out the obligations laid down in section 2 of this Annex ensures and declares that EUE satisfies the relevant provisions of the applicable implementing measure. The manufacturer, or their authorised representative, must affix the CE marking provided for in Article 10 to each item of EUE and draw up a written declaration of conformity. The declaration of conformity may cover one or more products and must be kept by the manufacturer.

2. The documentation must enable an assessment to be made of the conformity of the EUE with the requirements of the applicable implementing measure. The documentation shall specify, in particular:

- a general description of the EUE and of its intended use,
 - the results of relevant environmental assessment studies carried out by the manufacturer, and/or references to environmental assessment literature or case studies, which are used by the manufacturer in determining product design solutions,
 - the ecological profile of the product
 - elements of the product design specification relating to environmental design aspects of the product,
 - a list of the appropriate documents referred to in Article 8, applied in full or in part, and a description of the solutions adopted to meet the requirements of the applicable implementing measure where the documents referred to in Article 8 have not been applied or where these documents do not cover entirely the requirements of the applicable implementing measure
 - a copy of the information concerning the environmental design aspects of the product which is provided in accordance with the requirements specified in Annex I, part 3.
3. The manufacturer must take all measures necessary to ensure that the equipment will be manufactured in compliance with the design specifications referred to in section 2 and with the requirements of the measure, which apply to it.

ANNEX V ENVIRONMENTAL MANAGEMENT SYSTEM

1. This module describes the procedure whereby the manufacturer who satisfies the obligations of section 2 of this Annex ensures and declares that the EUE satisfies the requirements of the applicable implementing measure. The manufacturer, or their authorised representative, must affix the CE marking provided for in Article 10 to each item of EUE and draw up a written declaration of conformity. The declaration of conformity may cover one or more products and must be kept by the manufacturer.

2. The manufacturer must implement the environmental management system specified in section 3 of this Annex.

3. Environmental management system (EMS) The EMS shall define the manufacturer's environmental product performance policy and how the implementation of this policy improves the environmental performance of products in order to ensure compliance of the EUE with the requirements of the applicable implementing measure.

3.1. The environmental product performance policy The manufacturer shall be committed to achieving improvement in overall environmental product performance and providing a framework for setting and reviewing environmental product performance objectives and indicators, taking into account the requirements of the implementing measure. All the provisions adopted by the manufacturer to establish and improve the ecological profile of the product through design and manufacturing must be documented in a systematic and orderly manner in the form of written procedures and instructions. They must contain in particular an adequate description of:

- the environmental product performance objectives and indicators and the organisational structure, responsibilities and powers of the management with regard to their implementation and maintenance,
- the checks and tests to be carried out after manufacture to verify product performance against environmental performance indicators,
- procedures for controlling documents required to ensure that they are periodically reviewed,

– the method of verifying the effective operation of the environmental management system.

3.2. Planning

The manufacturer shall establish and maintain a) procedures for the establishment of the ecological profile of the product b) environmental product performance objectives and indicators, which consider technological options taking into account technical and economic requirements c) a programme for achieving these objectives

3.3 Implementation

a) responsibilities and authorities shall be defined and documented in order to ensure effective environmental product performance and reporting on its operation for review and improvement b) documents shall be established indicating the design control and verification techniques implemented and processes and systematic measures used when designing equipment c) the manufacturer shall establish specifications indicating, in particular, standards which have been applied and, where standards referred to in Article 8 are not applied or where they do not cover entirely the essential requirements, the means used to ensure compliance with the relevant requirements d) the manufacturer shall establish and maintain information to describe the core elements of the environmental management system and procedures for controlling all documents required

3.4 Checking and corrective action

a) the manufacturer shall establish and maintain procedures to investigate and handle non conformance, and implement changes in the documented procedures resulting from corrective action b) the manufacturer shall carry out periodically an internal environmental management system audit

ANNEX VI: DECLARATION OF CONFORMITY THE EC DECLARATION OF CONFORMITY MUST CONTAIN THE FOLLOWING PARTICULARS:

1. The name and address of the manufacturer or of its authorized representative established within the Community;
2. A description of the model sufficient for unambiguous identification;
3. The operating instructions;
4. The results of measurements on the eco-design requirements carried out including details of the conformity of these measurements as compared with the eco-design requirements set out in the applicable implementing Measure;
5. Where appropriate, the references of the harmonized standards applied;
6. Where appropriate, the other technical standards and specifications used;
7. Where appropriate, the reference of other Community legislation providing for the affixing of the CE mark that is applied.

ANNEX VII THE IMPLEMENTING MEASURE SHALL SPECIFY , IN PARTICULAR:

- The exact definition of the type of EUE covered
- The requirements on installation of the EUE where it has a direct relevance to the environmental performance considered
- The level(s) of the specific eco-design requirement and associated date(s) for implementation
- The measurement standards and/or measurement methods to be used.
- The details for conformity assessment under Decision 93/465/EEC
 - where the module(s) to be applied is (are) different from Module A; the factors leading to the selection of that specific procedure;
 - where relevant the criteria for approval and/or certification of the third parties. Where different modules are laid down in other CE requirements for the same EUE, the module defined in the implementing measure shall prevail for the requirement concerned.

- Requirements on data to be provided by manufacturers to the authorities for enhanced monitoring of compliance.
- The duration of the transitional period during which Member States must permit the placing on the market of EUE which comply with the regulations in force in their territory at the date of adoption of the implementing directive.

ANNEX III ROHS DIRECTIVE

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 95 thereof,

Having regard to the proposal from the Commission ¹

Having regard to the opinion of the Economic and Social Committee ²,

Having regard to the opinion of the Committee of Regions ³,

Acting in accordance with the procedure laid down in Article 251 of the Treaty in the light of the joint text approved by the Conciliation Committee on 8 November 2002 ⁴,

Whereas:

- (1) The disparities between the laws or administrative measures adopted by the Member States as regards the restriction of the use of hazardous substances in electrical and electronic equipment could create barriers to trade and distort competition in the Community and may thereby have a direct impact on the establishment and functioning of the internal market. It therefore appears necessary to approximate the laws of the Member States in this field and to contribute to the protection of human health and the environmentally sound recovery and disposal of waste electrical and electronic equipment.
- (2) The European Council at its meeting in Nice on 7, 8 and 9 December 2000 endorsed the Council Resolution of 4 December 2000 on the precautionary principle.

- (3) The Commission Communication of 30 July 1996 on the review of the Community strategy for waste management stresses the need to reduce the content of hazardous substances in waste and points out the potential benefits of Community-wide rules limiting the presence of such substances in products and in production processes.
- (4) The Council Resolution of 25 January 1988 on a Community action programme to combat environmental pollution by cadmium invites the Commission to pursue without delay the development of specific measures for such a programme. Human health also has to be protected and an overall strategy that in particular restricts the use of cadmium ⁵ and stimulates research into substitutes should therefore be implemented. The Resolution stresses that the use of cadmium should be limited to cases where suitable and safer alternatives do not exist.
- (5) The available evidence indicates that measures on the collection, treatment, recycling and disposal of waste electrical and electronic equipment (WEEE) as set out in Directive 2002/96/EC of 27 January 2003 of the European Parliament and of the Council on waste electrical and electronic equipment ⁶ are necessary to reduce the waste management problems linked to the heavy metals concerned and the flame retardants concerned. In spite of those measures, however, significant parts of WEEE will continue to be found in the current disposal routes. Even if WEEE were collected separately and submitted to recycling processes, its content of mercury, cadmium, lead, chromium VI, PBB and PBDE would be likely to pose risks to health or the environment.
- (6) Taking into account technical and economic feasibility, the most effective way of ensuring the significant reduction of risks to health and the environment relating to those substances which can achieve the chosen level of protection in the Community is the substitution of those substances in electrical and electronic equipment by safe or safer materials. Restricting the use of these hazardous substances is likely to enhance

¹ OJ C 365 E, 19.12.2000, p. 195 and OJ C 240 E, 28.8.2001, p. 303.

² OJ C 116, 20.4.2001, p. 38.

³ OJ C 148, 18.5.2001, p. 1.

⁴ Opinion of the European Parliament of 15 May 2001 (OJ C 34 E, 7.2.2002, p. 109), Council Common Position of 4 December 2001 (OJ C 90 E, 16.4.2002, p. 12) and Decision of the European Parliament of 10 April 2002 (not yet published in the Official Journal). Decision of the European Parliament of 18 December 2002 and Decision of the Council of 16 December 2002.

⁵ OJ C 30, 4.2.1988, p. 1.

- the possibilities and economic profitability of recycling of WEEE and decrease the negative health impact on workers in recycling plants.
- (7) The substances covered by this Directive are scientifically well researched and evaluated and have been subject to different measures both at Community and at national level.
 - (8) The measures provided for in this Directive take into account existing international guidelines and recommendations and are based on an assessment of available scientific and technical information. The measures are necessary to achieve the chosen level of protection of human and animal health and the environment, having regard to the risks, which the absence of measures would be likely to create in the Community. The measures should be kept under review and, if necessary, adjusted to take account of available technical and scientific information.
 - (9) This Directive should apply without prejudice to Community legislation on safety and health requirements and specific Community waste management legislation, in particular Council Directive 91/157/EEC of 18 March 1991 on batteries and accumulators containing certain dangerous substances ¹.
 - (10) The technical development of electrical and electronic equipment without heavy metals, PBDE and PBB should be taken into account. As soon as scientific evidence is available and taking into account the precautionary principle, the prohibition of other hazardous substances and their substitution by more environmentally friendly alternatives which ensure at least the same level of protection of consumers should be examined.
 - (11) Exemptions from the substitution requirement should be permitted if substitution is not possible from the scientific and technical point of view or if the negative environmental or health impacts caused by substitution are likely to outweigh the human and environmental benefits of the substitution. Substitution of the hazardous substances in electrical and electronic equipment should also be carried out in a way so as to

be compatible with the health and safety of users of electrical and electronic equipment (EEE).

- (12) As product reuse, refurbishment and extension of lifetime are beneficial, spare parts need to be available.
- (13) The adaptation to scientific and technical progress of the exemptions from the requirements concerning phasing out and prohibition of hazardous substances should be effected by the Commission under a committee procedure.
- (14) The measures necessary for the implementation of this Directive should be adopted in accordance with Council Decision 1999/468/EC of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission ²,

HAVE ADOPTED THIS DIRECTIVE:

Article 1

Objectives

The purpose of this Directive is to approximate the laws of the Member States on the restrictions of the use of hazardous substances in electrical and electronic equipment and to contribute to the protection of human health and the environmentally sound recovery and disposal of waste electrical and electronic equipment.

Article 2

Scope

1. Without prejudice to Article 6, this Directive shall apply to electrical and electronic equipment falling under the categories 1, 2, 3, 4, 5, 6, 7 and 10 set out in Annex IA to Directive No 2002/96/EC (WEEE) and to electric light bulbs, and luminaires in households.
2. This Directive shall apply without prejudice to Community legislation on safety and health requirements and specific Community waste management legislation.
3. This Directive does not apply to spare parts for the repair, or to the reuse, of electrical and electronic equipment put on the market before 1 July 2006.

Article 3

¹ OJ L 78, 26.3.1991, p. 38. Directive as amended by Commission Directive 98/101/EC (OJ L 1, 5.1.1999, p. 1).

² OJ L 184, 17.7.1999, p. 23.

Definitions

For the purposes of this Directive, the following definitions shall apply:

- (a) 'electrical and electronic equipment' or 'EEE' means equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields falling under the categories set out in Annex IA to Directive 2002/96/EC (WEEE) and designed for use with a voltage rating not exceeding 1 000 volts for alternating current and 1 500 volts for direct current;
- (b) 'producer' means any person who, irrespective of the selling technique used, including by means of distance communication according to Directive 97/7/EC of the European Parliament and of the Council of 20 May 1997 on the protection of consumers in respect of distance contracts¹:
 - (i) manufactures and sells electrical and electronic equipment under his own brand;
 - (ii) (ii) resells under his own brand equipment produced by other suppliers, a reseller not being regarded as the 'producer' if the brand of the producer appears on the equipment, as provided for in subpoint (i); or
 - (iii) (iii) imports or exports electrical and electronic equipment on a professional basis into a Member State.

Whoever exclusively provides financing under or pursuant to any finance agreement shall not be deemed a 'producer' unless he also acts as a producer within the meaning of subpoints (i) to (iii).

Article 4

Prevention

1. Member States shall ensure that, from 1 July 2006, new electrical and electronic equipment put on the market does not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE). National measures restricting or prohibiting the use of these substances in electrical and electronic equipment which were adopted in line with Community legislation before the adoption of this Directive may be maintained until 1 July 2006.

2. Paragraph 1 shall not apply to the applications listed in the Annex.
3. On the basis of a proposal from the Commission, the European Parliament and the Council shall decide, as soon as scientific evidence is available, and in accordance with the principles on chemicals policy as laid down in the Sixth Community Environment Action Programme, on the prohibition of other hazardous substances and the substitution thereof by more environment-friendly alternatives which ensure at least the same level of protection for consumers.

Article 5

Adaptation to scientific and technical progress

1. Any amendments which are necessary in order to adapt the Annex to scientific and technical progress for the following purposes shall be adopted in accordance with the procedure referred to in Article 7(2): (a) establishing, as necessary, maximum concentration values up to which the presence of the substances referred to in Article 4(1) in specific materials and components of electrical and electronic equipment shall be tolerated; (b) exempting materials and components of electrical and electronic equipment from Article 4(1) if their elimination or substitution via design changes or materials and components which do not require any of the materials or substances referred to therein is technically or scientifically impracticable, or where the negative environmental, health and/or consumer safety impacts caused by substitution are likely to outweigh the environmental, health and/or consumer safety benefits thereof; (c) carrying out a review of each exemption in the Annex at least every four years or four years after an item is added to the list with the aim of considering deletion of materials and components of electrical and electronic equipment from the Annex if their elimination or substitution via design changes or materials and components which do not require any of the materials or substances referred to in Article 4(1) is technically or scientifically possible, provided that the negative environmental, health and/or consumer safety impacts caused by substitution do not outweigh the possible environmental, health and/or consumer safety benefits thereof.
2. Before the Annex is amended pursuant to paragraph 1, the Commission shall *inter alia* consult producers of electrical and electronic equipment, recyclers, treatment operators, environmental organisations and employee and consumer associations. Comments shall be forwarded to the Commit-

¹ OJ L 144, 4.6.1997, p. 19. Directive as amended by Directive 2002/65/EC (L 271, 9.10.2002, p. 16).

tee referred to in Article 7(1). The Commission shall provide an account of the information it receives.

Article 6

Review

Before 13 February 2005, the Commission shall review the measures provided for in this Directive to take into account, as necessary, new scientific evidence. In particular the Commission shall, by that date, present proposals for including in the scope of this Directive equipment, which falls under categories 8 and 9 set out in Annex IA to Directive 2002/96/EC (WEEE). The Commission shall also study the need to adapt the list of substances of Article 4(1), on the basis of scientific facts and taking the precautionary principle into account, and present proposals to the European Parliament and Council for such adaptations, if appropriate. Particular attention shall be paid during the review to the impact on the environment and on human health of other hazardous substances and materials used in electrical and electronic equipment. The Commission shall examine the feasibility of replacing such substances and materials and shall present proposals to the European Parliament and to the Council in order to extend the scope of Article 4, as appropriate.

Article 7

Committee

1. The Commission shall be assisted by the Committee set up by Article 18 of Council Directive 75/442/EEC¹.
2. Where reference is made to this paragraph, Articles 5 and 7 of Decision 1999/468/EC shall apply, having regard to Article 8 thereof. The period provided for in Article 5(6) of Decision 1999/468/EC shall be set at three months.
3. The Committee shall adopt its rules of procedure.

Article 8

Penalties

Member States shall determine penalties applicable to breaches of the national provisions adopted pursuant to this Directive. The penalties thus provided for shall be effective, proportionate and dissuasive.

¹ OJ L 194, 25.7.1975, p. 39.

Article 9

Transposition

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive before 13 August 2004. They shall immediately inform the Commission thereof. When Member States adopt those measures, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. The methods of making such a reference shall be laid down by the Member States.
2. Member States shall communicate to the Commission the text of all laws, regulations and administrative provisions adopted in the field covered by this Directive.

Article 10

Entry into force

This Directive shall enter into force on the day of its publication in the *Official Journal of the European Union*.

Article 11

Addressees

This Directive is addressed to the Member States. Done at Brussels, 27 January 2003.

For the European Parliament
The President
P. COX

For the Council
The President
G. DRYS