ACRR
(ASSOCIATION OF CITIES AND REGIONS FOR RECYCLING)

ACRR is an international association with a pedagogic and scientific aim. With more than 70 Local and Regional Authorities in Europe, it promotes the exchange of information and experiences on the sustainable management of municipal waste, notably through prevention at source, reuse and recycling.

ACRR is open to political decision-makers and technical managers, who want to develop their expertise and play a proactive role in the development of policies and techniques of waste management.

ACRR organises conferences and seminars, allows its members to stay in close contact with events and discussions held at the European level, and provides them with access to an international network of actors involved in urban waste management. It also publishes reports and studies, as well as regular newsletters, and displays lots of relevant information on municipal waste management on its website **http://www.acrr.org**

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CARE ELECTRONICS

CARE Electronics means Comprehensive Approach for the Recycling and eco-efficiency of Electronics. This is a voluntary, international and environmental R&D network within the EUREKA framework, that ensures close cooperation with the electronics industry through their associations such as EACEM, EUROBIT, ECTEL and EECA.

The major objective of this network is to stimulate environmental projects throughout the electronics industry, including financial, technological and research aspects, with a view to emphasise the development of sustainable products, the sharing of environmental responsibility and the protection of limited natural resources.

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(RE-USE AND RECYCLING EUROPEAN UNION SOCIAL ENTERPRISES)

RREUSE represents and supports national networks and federations of social economy enterprises from 11 European countries, which carry out re-use and recycling activities. The aims of RREUSE are to:

- encourage and strengthen collaboration between the member organisations in order to promote good practices, research and development of activities and partnerships
- enable member organisations to exchange information concerning national and local policies, legal and fiscal frameworks in relation to reuse, waste management, import and export, social provisions
- represent and promote the sector and its activities at all relevant European and international levels.

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ACRR
ASSOCIATION OF CITIES AND REGIONS FOR RECYCLING

THE MANAGEMENT OF

WASTE ELECTRICAL & ELECTRONIC EQUIPMENT

A Guide for Local and Regional Authorities

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GRAPHIC DESIGN AND PRODUCTION:
ITEM sprl

ILLUSTRATIONS:
AMIAT TBD srl, Ecological Recycling Society, European Commission, BI-TC, GOAB, Hampshire County Council, IBGE-BIM, LIPOR, RECUPEL, Recycle-IT!, RREUSE,

PHOTOS COVER:
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TRANSLATION:
Tradas Translation and Consulting

With the funding of the European Commission - DG Environment

Printed on recycled paper
with vegetable inks, except cover

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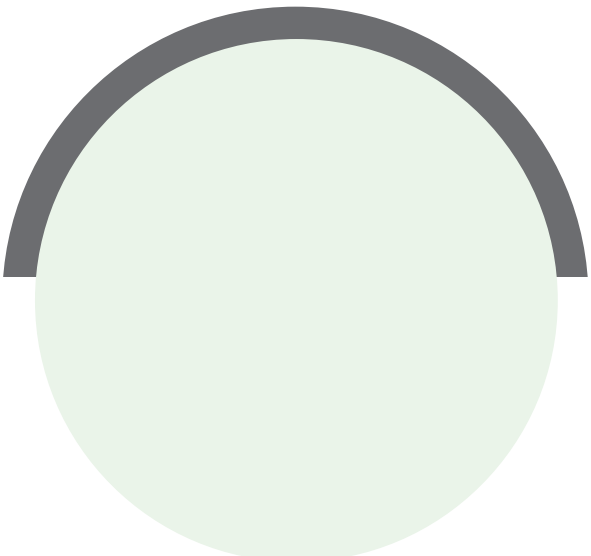

FOREWORD

ELECTRICAL AND ELECTRONIC EQUIPMENT (EEE) has infiltrated every aspect of our daily lives, providing our society with more comfort, health and security, with easy information acquisition and exchange. But the constant technological innovations, coupled with a growing consumerism, accelerate the replacement frequency of these products. Consequently the production of waste EEE (WEEE) should double in the near future to reach 12 million tonnes p.a. in 2010. This confronts us directly with the obverse aspect of our consumption patterns : waste! Today, more than 90% of WEEE are landfilled or incinerated without any kind of pre-treatment.

The new European Directive on WEEE introduces individual producer responsibility, redistributes the roles between the actors of WEEE management and sets mandatory collection and recycling objectives. Local and Regional Authorities (LRAs) will have a significant role to play in the enforcement of the regulation. As public authorities responsible for aspects of municipal waste management, they may guarantee the participation of all possible actors, provide collection facilities, ensure proper handling and collection of appliances, encourage reuse and recycling and monitor the fulfilling of the producer's duties as regards treatment prescriptions.

The management of WEEE is a complex and multi-faceted issue. From organisation to implementation, selective collection, sorting and treatment systems, local authorities face tricky technical, legal, economic and educational questions. The ACRR has been created for the purpose of providing support to LRAs. Of course, this Guide does not pretend to be exhaustive, but we hope it will provide the reader with practical insights, experiences and guidelines for the proper organisation of WEEE management.

This report has been written by ACRR, with the support of RREUSE and CARE Electronics and the financial assistance of the European Commission.

I would like in particular to thank Caroline Saintmard for her active contribution in the writing of this Guide. I also thank all the experts and representatives of Cities and Regions for their valuable input during hearings and meetings organised for the writing of this report.

Jean-Pierre Hannequart

President of the Association of Cities and Regions for Recycling

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ELECTRICAL AND ELECTRONIC EQUIPMENT occupy a steadily more important place within our daily environment, and are subject to increasing consumption demands. Their manufacture requires a huge amount of raw materials, some of them being dangerous to the environment as well as to human health.

1.1. A CONCERNING GROWTH

In 1998, six millions tons of electrical and electronic equipment (WEEE) was generated, that is equivalent to 4% of the municipal garbage flows. This volume is expected to grow from 3 to 5% per year, which means it will almost double every 12 years[1] .

Large domestic appliances (white goods like refrigerating appliances, freezers, washing machines etc…) constitute the most important fraction (about 40%) of the total products used. They are followed by office equipment (essentially IT equipment), lighting devices and audio-video equipment[2] .

1.2. A WASTE OF RESOURCES

The production of electrical and electronic equipment requires a complex mixture of components, among which are many precious metals whose extraction and transformation are a source of important pollution.

The environmental impact linked to their manufacture in terms both of energy and raw materials is therefore important. Not to mention that these products also need energy to function during their use phase.

EVERY WASTE HAS A HIDDEN SIDE !

The "ecological rucksack" (the amount of waste generated in producing one unit of a good) of a :

- a computer is nearly 1.500 kg[3]
- a laptop 400 kg[4]
- a mobile phone 75 kg[5]

According to the Worldwatch Institute, the semiconductor industry is one of the most chemically intensive ever known : a single plant may use 500-1.000 chemicals. Due to its extremely organised structure, the material intensity of a microchip is orders of magnitude higher than that of "traditional" goods[6]. Some researchers have calculated that producing and using a single 2-gram 32MB DRAM chip requires :

- 1.600 g of secondary fossil fuel
- 72 g of chemical inputs
- 32.000 g of water
- 700 g of elemental gases (mainly Nitrogen).

In 2001, there were 60 million transistors produced for every human being[7].

1.3. RISKS FOR THE ENVIRONMENT AND FOR HUMAN HEALTH

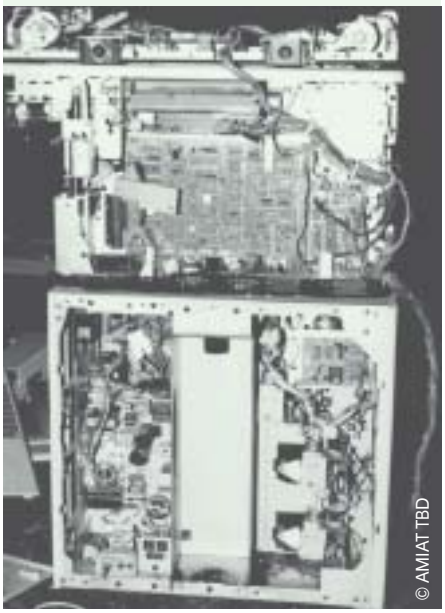
1.3.1. THE HAZARDOUS MATERIALS CONTENT OF WEEE

The production of EEE uses lots of substances like heavy metals, brominated flame retardants, halogenated substances… and few people know that the screen of a television set or a computer is functioning thanks to cathode ray tubes (CRTs) that could contain about 2 kg of lead[8]. Or that the automatic shut-off electronics of a coffee machine, or an alarm clock may contain mercury switches.

Some of the materials you can find for instance in a typical desktop computer, may jeopardize human health and most of them present potential dangers for the environment if they are not properly treated or disposed of.

The following materials are of concern with regard to environmental and health risks; their adverse impacts have been largely documented[9]:

	Potential damages for Human health	**Potential damages for the Environment**
Brominated flame retardants	Cancerogenic and neurotoxic, they may also have negative effects on reproduction	Soluble in landfill leachates, volatile to a certain extent, bioaccumulative and persistent. Their incineration may lead to the generation of dioxins and furans
Cadmium (Ca)	Can have irreversible effects on the kidneys, provoke cancers or induce skeletal demineralisation.	Bioaccumulative, persistent and toxic for the environment
Chromium VI	Can cause allergic reactions, is caustic when in contact with the skin, and genotoxic as well	Easily absorbed into cells, with toxic effects
Lead (Pb)	Can damage the nervous systems, the endocrine and cardiovascular systems, the kidneys	Accumulating in the environment, it has high toxic effects on plants, animals and micro-organisms.
Nickel (Ni)	Can affect the endocrine and immune systems, the skin, and the eyes	
Mercury (Hg)	Can cause damage to the brain and has cumulative impacts	Spread in the water, is accumulated by living organisms



[1] *Proposal for a Directive of the European Parliament and of the Council on Waste Electrical and Electronic Equipment and Proposal for a Directive of the European Parliament and of the Council on the Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment – Explanatory Memorandum, COM (2000) 347 Final, Brussels, 13 June 2000.*

[2] *ICER, 2000 (UK).*

[3] *"Internet : virtuell = umweltfreundlich", by Türk V., Ritthof M., von Geibler J. and Kuhndt M., in "Jahrbuch Ökologie 2003", Beck, München, p. 110-123.*

[4] *Digital Europe, "Making the NetWork – Steps towards a sustainable networked world", Forum for the Future, June 2003.*

[5] *"LCA of Telecommunication Systems - Material Input per Unit Service (MIPS) of the Italian Mobile Telephone Network", by .Ing. Antonio Federico, Dr. Fabio Musmeci, Dr. Daniela Proietti Mancini, ENEA, 13th Discussion Forum on Life Cycle Assessment, Lausanne, EFPL, 25 April, 2001*

[6] *The 1.7 Kilogram Microchip : Energy and Material Use in the Production of Semiconductor Devices, Environmental Science & Technology, Vol.36, N° 24, 2002, p. 5504-5510.*

[7] *Vital signs 2002, Worldwatch Institute, p. 110-111.*

[8] *Computer & Peripherals Material Project, Prepared by Meinhardt Infrastructure & Environment Group for Environment Australia October 2001 ISBN 0642547734 http://ea.gov.au/industry/waste/ieu/computer-report/material.html*

[9] *EIA 2000, EEB 2001, EPA 2000, OECD 2001*

1.

Composition of a Desktop Personal Computer based on a typical desktop computer, weighing about 30 kg[10].

Name	Content in % of total weight	Use/Location
Plastics	22.9907	Includes organics, oxides other than silica
Lead	6.2988	Metal joining, radiation shield/CRT, PWB
Aluminum	14.1723	Structural, conductivity/housing, CRT, PWB, connectors
Germanium	0.0016	Semiconductor/PWB
Gallium	0.0013	Semiconductor/PWB
Iron	20.4712	Structural, magnetivity/(steel) housing, CRT, PWB
Tin	1.0078	Metal joining/PWB, CRT
Copper	6.9287	Conductivity/CRT, PWB, connectors
Barium	0.0315	In vacuum tube/CRT
Nickel	0.8503	Structural, magnetivity/(steel) housing, CRT, PWB
Zinc	2.2046	Battery, phosphor emitter/PWB, CRT
Tantalum	0.0157	Capacitors/PWB, power supply
Indium	0.0016	Transistor, rectifiers/PWB
Vanadium	0.0002	Red phosphor emitter/CRT
Terbium	0	Green phosphor activator, dopant/CRT, PWB
Beryllium	0.0157	Thermal conductivity/PWB, connectors
Gold	0.0016	Connectivity, conductivity/PWB, connectors
Europium	0.0002	Phosphor activator/PWB
Titanium	0.0157	Pigment, alloying agent/(aluminum) housing
Ruthenium	0.0016	Resistive circuit/PWB
Cobalt	0.0157	Structural, magnetivity/(steel) housing, CRT, PWB
Palladium	0.0003	Connectivity, conductivity/PWB, connectors
Manganese	0.0315	Structural, magnetivity/(steel) housing, CRT, PWB
Silver	0.0189	Conductivity/PWB, connectors
Antinomy	0.0094	Diodes/housing, PWB, CRT
Bismuth	0.0063	Wetting agent in thick film/PWB
Chromium	0.0063	Decorative, hardener/(steel) housing
Cadmium	0.0094	Battery, glu-green phosphor emitter/housing, PWB, CRT
Selenium	0.0016	Rectifiers/PWB
Niobium	0.0002	Welding allow/housing
Yttrium	0.0002	Red phosphor emitter/CRT
Rhodium	0	Thick film conductor/PWB
Platinum	0	Thick film conductor/PWB
Mercury	0.0022	Batteries, switches/housing, PWB
Arsenic	0.0013	Doping agents in transistors/PWB
Silica	24.8803	Glass, solid state devices/CRT,PWB

Microelectronics and Computer Technology Corporation (MCC). 1996. Electronics Industry Environmental Roadmap. Austin, TX: MCC.

Note : Plastics contain polybrominated flame retardants, and hundreds of additives and stabilizers which are not listed separately here above.

1.4. THE ENVIRONMENTAL IMPACTS OF WEEE MANAGEMENT

1.4.1. THE INCINERATION OF WEEE

It is estimated that emissions from waste incineration account for 36 tonnes per year of mercury and 16 tonnes per year of cadmium in the European Community[11]. The introduction of (small) WEEE into incinerators results in high concentrations of metals, including heavy metals, in the slag, the flue gas or the filter cakes. Substantial quantities of PVC are also contained in WEEE, which is not suitable for incineration in view of the hazardous nature of the flue gas residues.

On another side, pilot tests have shown that common appliances such as TVs result in energy losses during the incineration process, due to the screen's cathode ray tubes (CRT) : the energy loss resulting from feeding glass into an incinerator is estimated at approximately 400 kJ/kg[12].

1.4.2. THE LANDFILLING OF WEEE

Of particular danger is the **leaching** of hazardous substances, as no landfill site is completely watertight : mercury from destroyed printed circuit boards, PCBs from condensers, polybrominated diphenylethers (PBDEs) and cadmium from specific plastics may leach into the soil and groundwater. Significant amounts of lead ions may also be dissolved from the cone glass of cathode ray tubes by the acidic groundwater often found in landfills.

Another concern is the **vaporisation** of mercury also found in WEEE.

In addition, **uncontrolled fires** may arise at the landfills emitting extremely toxic dioxins and furans due to the presence of a range of hazardous substances[13].

1.4.3. THE RECYCLING OF WEEE

Without proper disassembly, hazardous substances, such as PCBs contained in capacitors, may be dispersed into the recovered metals and the shredder waste. Recovery processes using incineration may also lead to hazardous emissions due to the presence of heavy metals (lead, cadmium), or halogenated substances. Due to the lack of proper identification techniques for plastic containing flame retardants for instance, most recyclers do not process any plastic from WEEE.

The recycling of WEEE calls thus at least for a proper pre-treatment stage and if possible for the substitution of some hazardous materials and substances by less polluting ones.

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RECYCLING CAN BE DANGEROUS AND POLLUTING

In February 2002, the Basel Action Network (BAN) together with the Silicon Valey Toxics Coalition (SVTC) published the report "Exporting Harm : the High-Tech Trashing of Asia"[14]. This revealed that 80% of electronic waste collected in North America for "recycling" where actually shipped to Asia, where populations make their livelihood by the sorting and recovery of these waste in the most dangerous conditions. In Guiyu and other Chinese towns, workers rip to scrapped hardware and look for every reusable part, melting sometimes components to extract precious metal. The remaining parts are burned or dumped near rice paddies and waterways[15].

[10] *Just Say No to E-Waste : Background Document on Hazards and Waste from Computers, Silicon Valley Toxic Coalition, http://www.svtc.org/cleancc/pubs/sayno.htm#etoxics.htm*
[11] *Explanatory Memorandum WEEE and ROHS Directives, COM (2000) 347 Final, Brussels, 13 June 2000, p.9.*
[12] *Ibidem, p. 10.*
[13] *Ibidem, p. 12.*
[14] *Exporting Harm: The High-Tech Trashing of Asia, http://www.svtc.org/cleancc/pubs/technotrash.pdf*
[15] *For more information : http://www.ban.org*


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2. THE EUROPEAN WEEE DIRECTIVE


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2.1. OVERALL EUROPEAN APPROACH OF THE WEEE ISSUE

The European Community policy in the environment sectors aims at a high level of protection, taking into account the diversity of situations in the various regions of the Community. It should be based on a hierarchy of four principles:

- the precautionary principle
- the principle that preventive action should be taken
- that environmental damages should as a priority be rectified at source
- and that the polluter should pay[16].

Waste Electrical and Electronic Equipment (WEEE) has been identified as a priority area to take specific measures on a European scale[17], and today the European regulation on Electrical and Electronic Equipment is going to be made up of several parts covering respectively:

- **The management of WEEE**
  through the Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on Waste Electrical and Electronic Equipment (WEEE)[18].
- **The restriction of the use of certain hazardous substances in EEE**
  with the Directive 2002/95/EC of the European Parliament and the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (ROHS)[19]. This directive is a "single market directive" based on article 95 of the EC Treaty whose scope of application is quite similar to that of the WEEE directive. It mainly entails that from 1st July 2006, four heavy metals (lead, mercury, cadmium, hexavalent chromium) and flame retardants PBB and PBDE will be banned from the manufacturing of new electrical and electronic appliances, excepted :
  - some applications defined in a comprehensive way (ex : mercury in fluorescent lamps or tubes, lead in cathode ray tubes, or alloying elements, chromium for anti-corrosion applications…);
  - spare parts for the repair or reuse of EEE put on the market before 1st July 2006. If the market for new components requires the phasing out of certain substances, the availability of old components will be limited in time and the availability of spare parts is important to stimulate the repair of equipment.

- **Ozone Depleting Substances (chlorofluorocarbures, etc…)**
  EC regulation N°2037/2000 of the European Parliament and the Council of June 29, 2000 is of direct application in national law, and requires to recover and to treat ozone depleting substances like CFC and HCFC from cooling circuits and insulating foams in refrigeration, air-conditioning and heating pumps equipments, when cleaning or before disassembling or eliminating them.
- **The ecodesign of energy-using appliances**
  The European Commission has proposed on 8th August 2003 a **framework directive**[20] **to promote the eco-design of energy-using appliances (EUP)**. This draft law aims to set a framework for general and specific design requirements for energy-using products "*with a significant volume of sales, and which represent a significant environmental impact and significant*

[16] art. 174, al 2, EC Treaty, O.J. n°C325 of 24th December 2002.
[17] Resolutions of the Council of 7th May 1990, O.J. n° C122 of 18th May 1990 and of 14 November 1996 (A4-0364/96), cited in Explanatory Memorandum on WEEE, European Commission, June 2000, p. 7.
[18] O.J. n° L37 of 13th February 2003
The text of Directive of the European Parliament and of the Council of 27 January 2003 on Waste Electrical and Electronic Equipment (WEEE) can be downloaded on the DG Environment website, at the following address : http://www.europa.eu.int/comm/environment/waste/weee_index.htm
[19] O.J. n° L37 of 13th February 2003
[20] Proposal for a Directive of the European Parliament and of the Council on Establishing a framework for the setting of Eco-design requirements for Energy-Using Products and amending Council Directive 92/42/EEC, COM(2003) 453 final.The text of the proposal can be found at : http://europa.eu.int/eur-lex/en/com/pdf/2003/com2003_0453en01.pdf

potential for improvement". Standards would be drawn up to implement the requirements, with manufacturers able to demonstrate conformity through an "internal design control" or via environmental management systems. Products in conformity with the standards would be guaranteed access to the EU market. The draft directive itself creates no legal obligations for manufacturers : these will only arise once the EU adopts separate implementing measures for different product groups.

The energy-using products (EUP) proposal of directive can be considered as the result of a merger between several proposals from the European Commission - DG Enterprises, for a law on the design of electrical and electronic equipment (EEE), and initiatives to set energy efficiency goals on end-use equipment (EUE) from DG energy. It is a first attempt to achieve environmental protection goals with a new approach based on standardisation.

Beyond the harmonization of national regulations on the management of the WEEE, the European aim seems to bring the market forces to an integrated approach, including every aspects from the design of products to the management of waste.

2.2. SCOPE OF THE DIRECTIVE

The directive applies to 10 categories of electrical and electronic appliances, without prejudice to specific Community regulation concerning health, security, or the management of waste.

Categories of Annex 1A	Products to be considered (Annex 1B)	Common Classifications
1. Large household appliances	Ex : refrigerators, freezers,… Ex : washing machines, diswashers, cookers, electric heating appliances…	Large white goods - with CFC - without CFC
2. Small household appliances	Ex : vacuum cleaners, toasters, irons…	Small white goods
3. IT and telecommunication equipment	Ex : computers, printers, fax, phones, copying equipment…	Grey goods
4. Consumer equipment	Ex : television sets Ex : radio sets, video recorders,…	Brown goods - with cathode ray tubes - without cathode ray tubes
5. Lighting equipment	Ex : fluorescent lamps, discharge lamps…	Others
6. Electrical and electronic tools (with the exception of large-scale stationery industrial tools)	Ex : drills, saws, sewing machines…	
7. Toys, leisure and sport equipment	Ex : video games, coin slot machines…	
8. Medical devices (with the exception of all implanted and infected products)	Ex : pulmonary ventilators, radiotherapy and cardiology equipment…	
9. Monitoring and control instruments	Ex : smoke detectors, thermostats,…	
10. Automatic dispensers	Ex : automatic dispensers for money, hot drinks…	

2.3. GENERAL AIMS OF THE DIRECTIVE

Based on article 174 of the EC Treaty, the WEEE Directive aims to improve the environmental performance of WEEE management and to close the « waste-ressources » loop through notably:

- **a selective collection** of WEEE by suitable systems, which preserves the integrity of the appliances and their recovery potential and ensure a free service for households
- **a collection rate** to be achieved by Member States of 4kg WEEE/inhab./year by 31st December 2006
- **an individual producer responsibility** : reuse, recycling and recovery rates ranging from 50% to 80% according to the category of equipment considered, must be achieved by producers of EEE by 31st December 2006 : these shall finance the treatment, recovery and environmentally sound disposal of their waste
- **the provision of information to end-users** (whose participation is essential for the achievement of high collection and recycling rates), through the marking of packaging notably; **and to treatment facilities** (regarding the structure and composition of EEE).

Being an environmental directive, Member States are allowed to go beyond the minimum requirements set.


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2.3.1. ECODESIGN OF PRODUCTS

There is currently a lack of financial drivers to design products with a long life span or to manufacture them in a way that takes into account, their future management as waste.

Member States are required to encourage the conception and manufacturing of EEE that facilitates their dismantling and recovery - in particular their reuse and recycling, either of the whole appliance, their components or materials.

Reuse is explicitly protected : it won't be possible to prevent products to be reused by a conception or particular manufacturing processes, except if they present decisive advantages, for example regarding environment or security and hygiene (art. 4).

[21] Source : Stena Metall Group, Presentation at the Green Week, Brussels, Tuesday 3rd June 2003. http://europa.eu.int/comm/environment/greenweek/docs/presentations/session8b.pdf
[22] Explanatory Memorandum WEEE and ROHS Directives, COM (2000) 347 Final, Brussels, 13 June 2000, p.23.
[23] Ibidem p. 34 – It corresponds to an average collection rate achieved by several countries of the European Union in the setting up of collection pilot programs, and to the results achieved when implementing the Dutch legislation. Ökopol, "Collection targets for waste from electrical and electronic products", Germany 1998, European Commission DG XI, p. 13.

2.4 COLLECTION OF WEEE

One of the present restraints to the recycling of the WEEE is insufficient quantities collected susceptible to allow large-scale recycling. Members States must therefore set up selective collection schemes, and encourage the involvement of end-users in these systems.

As many EU specific waste regulations, the WEEE Directive articulates around the two streams of waste management, that are linked with the end-users of discarded products:

- **WEEE from private households**, meaning according to article 3, k) *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***.**
- **WEEE from users other than private households**, to be considered for lack of definition, as a residual category.

2.4.1. COLLECTION RATES

The Directive aims at high selective collection rates for WEEE, though only sets a quantitative target for WEEE from private households : Member States shall ensure that by 31st December 2006 a separate collection rate of at least 4 kg on average per inhabitant per year of WEEE from private households is achieved.

The rate of 4 kg collection per capita per year would only cover, according to various evaluations, 25% of the WEEE effectively generated every year[22]. It seems obviously defined as a rough guide until precise data on WEEE generated by households are gathered[23].

4 kg of WEEE

- = **1/7 TELEVISION**
- = **1/2 PRINTER**
- = **1 VIDEO RECORDER**
- = **8 PHONES**
- = **40 CELLULAR PHONES**[21]

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2.4.2. COLLECTION SCHEMES

The setting up of efficient collection schemes is necessary to ensure the achievement of the Directive's targets. The collection and transport must be carried out in a way which optimises reuse and recycling of those components or whole appliances capable of being reused or recycled (art. 5, §4).

For clear reasons of efficiency, the examination of the reuse potential should take place as much as possible upstream, in order to send reusable appliances to the adequate reuse channels without damages.

Following the subsidiarity principle, the European directive only defines general requirements. The modalities of the logistic and the organisation of take-back schemes are left to the choice of Member States, depending on their geographical characteristics and on the different WEEE streams.

2.4.2.1. WEEE FROM PRIVATE HOUSEHOLDS

An efficient collection scheme has to motivate citizens to take part in it.

Regarding household waste, the directive does not prescribe who will manage and/or finance the first stage of the collection logistics chain, from households to "collection points" (from which producers would be required to pick up the WEEE for treatment[24].

« Collection points » will be a key element of the system, but these are not defined. From a practical point of view, the directive leaves some room for manœuvre to Member States to define the number, the capacity, the location and the organisation within management schemes of these «collection points», from which producers will bear the financing of collected WEEE. Are they recycling parks, sorting facilities, regional transfer stations… ? The notion will have to be agreed between the Industry and Local and Regional Authorities.

Collection facilities have to be (art. 5, §2, a)) :

- **adapted to the density of the population ;**
- **accessible for consumers and distributors, which should be able to return their WEEE**
- **at least free of charge.**

[24] *Directive 2002/96/EC, art. 8 §1*
[25] *Directive 2002/96/EC, art. 5, §4*

Distributors are also included in WEEE collection schemes (art. 5, §2, al. 1, a) et b)) :

1. they have to offer to consumers the possibility of returning their WEEE at least free of charge and on a « one-to-one » basis when buying new equipments of equivalent type and fulfilling the same functions ; nonetheless, Member States may depart from this provision, provided that the chosen solution does not make it more difficult for the final holders, and that the system remains free of charge for them.
2. distributors free access to collection schemes is also guaranteed.

2.4.2.2. WEEE OTHER THAN WEEE FROM PRIVATE HOUSEHOLDS

Producers or third parties acting on their behalf must provide for the collection of WEEE other than WEEE from private households (art. 5, §3).

2.5. THE TREATMENT OF WEEE

"Treatment" following the Directive is to be understood as any operation carried out for the depollution, disassembly, shredding, recovery or disposal of WEEE.

2.5.1. GENERAL PROVISIONS

Separately collected WEEE should be transported to approved treatment facilities unless appliances are reused as a whole[25].

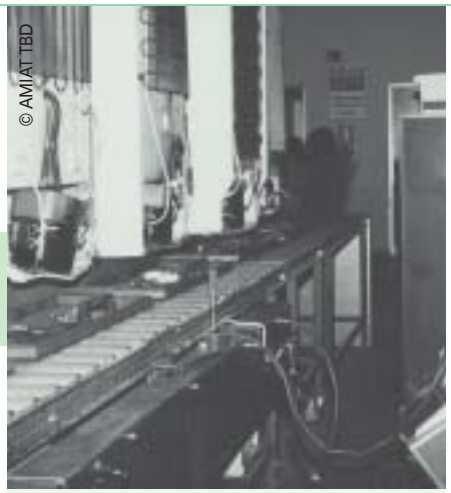
Member States shall ensure that producers organise (collectively or individually) the treatment of collected WEEE in order to achieve the directive recovery and recycling rates.

The achievement of high quality standards as regards the protection of the environment requires the setting up of modern and efficient facilities. So that :

- WEEE treatment shall as a minimum include the removal of all fluids (substances which could complicate or prevent subsequent recovery or recycling stages), and the selective treatment of some components (PCB, cathode ray tubes, batteries and capacitors, asbestos waste…) or substances (mercury, CFC, hydrocarbons,…) in accordance to the Annex II of the Directive WEEE (art. 6 §1).
- Sites for storage or treatment of WEEE must also comply with the technical requirements of the Annex III (art. 6, §3) : notably impermeable surfaces, appropriate containers for the storage of hazardous waste etc…

TIMETABLE

13 /02/2003	2003	Entry into force of the Directive
	2004	
13 /08/2004		Latest date for transposition of the Directive into national legislations
	2005	
13/08/2005		▸ Separate collection of WEEE ▸ EEE put before this date on the market will be treated at the end of life as "historical WEEE" ▸ Marking duty for EEE put on the market from this date
	2006	
01/07/2006		Phasing out of substances banned under the ROHS Directive
31/12/2006	2007	▸ 4kg WEEE/inhab./annum to be collected from private households ▸ Recycling and recovery targets to be achieved by producers
	2008	
31/12/2008	2009	New collection, recycling and recovery targets to be set by the Commission
	2010	
13 /02/ 2011	2011	Visible fee not possible anymore for most of the categories covered by the directive
	2012	
13/02/ 2013	2013	Visible fee not possible anymore for large household appliances (Category 1 of Annex 1A)
	2014	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Any establishment or enterprise carrying out treatment operations must necessarily obtain a permit (under the form of an authorisation or a registration (art. 6, §2))[26] which must not only ensure the compliance with :

- the treatment conditions
- the conditions for sites for storage or treatment
- but also the conditions necessary for the achievement of the recovery targets (art. 6 §4).

Inspections shall be carried out at least once a year in waste treatment facilities (art. 6 §2, al. 3), which should use the best available treatment, recovery and recycling techniques (art. 6§1, al. 1). Member States may also set up minimum quality standards for the treatment of collected WEEE (art. 6§1, al. 3). Establishments or enterprises which carry out treatment operations should be encouraged to introduce certified environmental management schemes (EMAS), notably through agreements with the sectors (art. 6 §6 et 17 §3).

Treatment operations may also be undertaken outside the respective Member State or the Community as far as the transport of WEEE complies with Council Regulation (EEC) N°259/93[27] applying to the shipment of waste within, into and out of the European Community, and ancillary legislation regarding the shipment of waste.

WEEE exported out of the Community will only count for the fulfilment of obligations and targets if the exporter can prove that the operations took place under equivalent conditions to the requirements of the WEEE Directive (art. 6 §5, al. 2). Member States will be responsible for the definition of the detailed technical requirements and for the proper monitoring thereof.

2.5.2. REUSE, RECYCLING AND RECOVERY TARGETS

Article 7 sets recovery rates for the different **categories of separately collected WEEE** to be achieved by **producers**, on an individual or collective basis, **by 31st December 2006 at the latest** (new objectives should be set for 31st December 2008).

Producers may off-load their responsibilities onto third parties, local authorities or private enterprises for instance. They nonetheless remain individually responsible for financing all the operations regarding the treatment of their own products when put onto the market after 13th August 2005 (see 2.7. here after).

The setting of recovery and recycling rates by categories of appliances and not by material might notably be problematic and not only for small appliances made of plastic : a microwave and a cooker are both large household appliances, one of which is mainly made of plastic and the other mainly made of metal, but both will have to be recycled at 75%.

[26] In compliance with articles 9 to 11 of Directive 75/442/CE.
[27] O.J. n° L 30 of 6th February1993.

For the purpose of calculating these targets, producers or third parties acting on their behalf are required to keep records on the mass of WEEE when entering and leaving the treatment, recovery or recycling facility (art. 7 §3).This will require the setting up of efficient logistic and track systems.

Ireland and Greece, because of their geographical particularities, a low level of equipment and a low population density may apply for an extension of the deadline to reach the targets up to 24 months (art. 17, §4, a)).

Categories of appliances	Reuse and recycling targets	Recovery targets
	(% by average weight per appliance sent for treatment)	(% by average weight per appliance sent for treatment)
Large household appliances and automatic dispensers (categories 1 and 10 of Annex 1A)	**75%**	**80%**
Small household appliances, lighting equipment, electrical and electronic tools, toys, leisure and sport equipment (categories 2, 5, 6, 7 and 9 of Annex 1A)	**50%**	**70%**
IT and telecommunications equipment, and consumer equipment (categories 3 and 4 of Annex 1A)	**65%**	**75%**
Discharge lamps	**80%**	**-**

Table : Recovery targets set by article 7 of Directive 2002/96/EC

2.5.3. REUSE

Priority is clearly given to the reuse of whole appliances (art. 7 §1) ; but this should not lead to a circumvention of the provisions relating to the treatment or recovery of WEEE (art. 5 §4).

Up to 31st December 2008, whole appliances which are reused won't be taken into account for the calculation of the recovery and recycling targets described here above (art. 7 §1). But the reuse of **components, materials and substances will be taken into account** for the achievement of these targets.
This provision does not really create a drive for producers to favour the reuse of their products, and LRA will have their role to play in paying attention to the protection of existing reuse systems, and try to direct appliances capable of being reused as a whole, to the appropriate channels, which will preserve their potential.

Reuse will be dependent on :
- sorting efforts as soon as possible at the collection stage
- and suitable logistic equipment.


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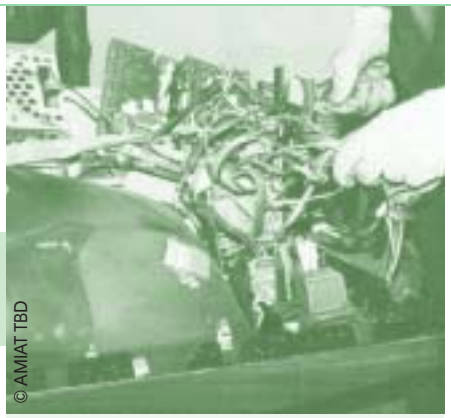
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LRA could be the adequate "go-between" to forward this information to end-users/ consumers and treatment facilities.

2.6. INFORMATION & MARKING OF PRODUCTS

2.6.1. INFORMATION FOR USERS

The active participation of users and consumers is essential for the efficiency of collection systems ; this is why they must be encouraged to participate in the collection schemes of WEEE and to facilitate their treatment, recycling and recovery process (art. 10 §2); especially, they must receive information about (art. 10 §1) :

- the requirement to sort and separately collect WEEE
- the return and collection systems available to them
- their role in contribution to reuse, recycling and other forms of recovery of WEEE
- the potential effects of WEEE on the environment and human health
- the meaning of the symbol of the wheeled bin (Annex IV), which producers are required to print on the packaging, on the instructions for use or on the warranty of the equipment (art. 10§3).

Member States may require that all or part of this information is provided by producers and/or distributors, if necessary in the scope of agreements with the sectors (art. 10 §4 et 17 §3).

2.6.2. INFORMATION FOR TREATMENT FACILITIES

Producers are required, within one year after the equipment is put on the market, to provide in the form of manuals or by means of electronic media, information susceptible of facilitating the reuse and treatment of their appliances, as for instance about the components and materials and the localisation of dangerous substances (art. 11 §1).

2.6.3. IDENTIFICATION OF THE PRODUCER

Any **producer** of an electrical or electronic appliance put on the market after 13th August 2005 shall be clearly **identifiable** on the appliance, and a **mark** on the appliance shall specify that the latter was put on the market after 13 August 2005 (art. 11 §2).

[28] *Explanatory Memorandum WEEE and ROHS Directives, COM (2000) 347 Final, Brussels, 13 June 2000, p.23.*
[29] *Directive 2002/96/EC, art. 5 §3*
[30] *Proposal for a Directive of the European Parliament and of the Council amending the Directive 2002/96/EEC on waste electrical and electronic equipment, COM(2003)219 http://europa.eu.int/eur-lex/en/com/pdf/2003/com2003_0219en01.pdf*

2.7. THE FINANCING

2.7.1. WEEE FROM PRIVATE HOUSEHOLDS

Producers have to guarantee **at least** the financing of the transport from collection points, as well as the recovery, treatment and environmentally sound disposal of WEEE from private households.

The **producers' individual financial responsibility** created by the Directive (art. 8§2) means that:

- every producer has to bear the costs related to the management of the waste from its own brand,
- but does not prevent producers cooperating within collective take-back systems.

There is a clear distinction to be made between the charging of the responsibility (which is individual) and the implementation of this responsibility, which can be either collective or individual (art. 8§2, al. 1).

As a financial responsibility for the collection of WEEE from private households is unlikely to have an impact on the ecodesign efforts, the producer responsibility implemented by the directive does not involve the financing of the collection costs – or only from "collection points[28]" . But the WEEE Directive is not a "single market" directive (Member States may adopt more stringent regulations), and producers may set up and operate individual or collective take-back schemes for WEEE from private households (art. 5§2 al. 1, c)).

The individual responsibility of producers is one application of the « polluter-pays » principle. The economic responsibility of producers is to understand as a driver to internalise the management costs of their products once they have become waste - these costs should otherwise only be born by citizens / taxpayers. The aim of this individual producer responsibility is given by Article 4, as it should lead **to efforts in the field of ecodesign**, in order to reduce the waste management costs associated with their products and indirectly to reduce their impact on the environment.
Indirectly, ecodesign could allow consumers to go for **ecoconsumption**, the supply of products also influencing the demand.

2.7.2. WEEE FROM USERS OTHER THAN PRIVATE HOUSEHOLDS

The financing of the costs for the collection, treatment, recovery and environmentally sound disposal of WEEE from users other than private households is to be provided for by producers as regards products put on the market after 13 August 2005[29] .

As regards historical waste, the Commission was submitted on 29th April 2003 a proposal of Directive of the European Parliament and the Council modifying Article 9 of the WEEE Directive[30] (see here below).

2.7.3. HISTORICAL WASTE AND ORPHANS

2.7.3.1. HISTORICAL WASTE

WEEE from private households

WEEE from products put onto the market before the 13th August 2005 is an exception to the individual responsibility of the producer : its management will be assumed collectively by the producers existing on the market when the respective costs occur for instance, and as the WEEE directive suggests it, *in proportion to their respective share of the market by type of equipment* (art. 8 §3).

WEEE other than from users other than private households

The financing of the costs for the collection, treatment, recovery and environmentally sound disposal of this WEEE is the responsibility of producers of new equipment except (proposal of Directive of 29th April 2003[31]) :

- regarding historical waste which is not replaced or orphans : the financing of these management costs will be ensured by end-users
- agreements stipulating other financing methods.


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2.7.3.2. ORPHANS

Orphans are Waste Electrical and Electronic Equipment whose producer is not capable of being identified, or does not exist anymore when waste management costs occur.
From 13th August 2005 and in order to avoid potential « free-riders » (producers who would try intentionally or not to escape their responsibilities) and the problematic financing of the management of their waste, each producer will have to :

- mark its products so that they are clearly identifiable,
- and provide a guarantee when placing a product on the market, intended to ensure the future covering of waste management costs in case he disappears from the market. The guarantee may take the form of a recycling insurance, a blocked bank account or a participation in appropriate schemes for the financing of the management of WEEE (art. 8§2, al. 2).

2.7.4. VISIBILITY OF WEEE MANAGEMENT COSTS FOR CONSUMERS

The costs of collection, treatment and environmentally sound disposal of WEEE from private households shall not be shown separately to purchasers at the time of sale of new products (art. 8§2, al. 3) : this is precisely their internalisation in the price of products which is aimed at, in order to generate efforts in the field of eco-design.
As regards the visibility of waste management costs, an exception is granted to **historical waste**: the costs linked to its management may be shown to purchasers at the time of sale of new products,

- as far as they don't exceed the actual costs incurred
- and only for a transitional period of 8 years - 10 years for large household appliances - after entry into force of the directive (art. 8 §3).

[31] *Proposal for a Directive of the European Parliament and of the Council amending the Directive 2002/96/EEC on waste electrical and electronic equipment, COM(2003)219 http://europa.eu.int/eur-lex/en/com/pdf/2003/com2003_0219en01.pdf*
[32] *Ibidem*
[33] *Ibidem*
[34] *Ibidem*

OVERVIEW OF RESPONSIBILITIES

	SUBJECT	RESPONSIBILITY	ART.
EEE ECODESIGN			
	► Design and production of EEE which facilitate the dismanling, reuse and recycling of WEEE, their components and materials	**To be encouraged by Member States**	**Art 4**
	► Unless overriding reasons to do so, producers do not prevent WEEE from being reused		
SEPARATE WEEE COLLECTION			
Management	► High level of separate collection	**Member States**	**Art 5**
	WEEE from private households		
	► Achievement of collection rates : 4kg/inhab./year	**Member States**	
	► Return of household WEEE to collection points		
	1° Final holders and distributors must have the possibility to dispose of WEEE free of charge, at available and accessible collection facilities	**Member States**	
	2° Distributors are obliged to take back WEEE when a new similar product is purchased, but Member States may deviate from this provision	**Distributors**	
	► Collection from collection points and transfer to treatment facilities in a way optimising reuse and recycling	**Member States**	
	WEEE other than from private households	**Producers**	
Financing	► Covering of collection costs of **WEEE from private households** deposited at collection facilties (individual responsibility - a collective responsibility is allowed for historical waste only).	**Producers**	**Art 8**
	► Covering of collection costs of **WEEE from users other than private households**	**Producers**	**Art 9[32]**
	Exceptions :		
	- historical waste which are replaced by new appliances	**Producers of new appliances**	
	- historical waste which are not replaced and orphans	**Final users**	
WEEE TREATMENT			
Management	► Possible minimum quality standards	**Member States**	**Art 6**
	► Targets achievement (reuse, recycling, recovery)	**Producers**	**Art 7**
	► Organisation of systems to provide for the treatment of WEEE using best available treatment, recovery and recycling techniques	**Producers** (either collectively or individually)	**Art 6** **Art 7**
	► Organisation of environmentally sound disposal of WEEE	**Producers**	**Art 8** **Art 9[33]**
Financing	**WEEE from private households**		
	► Covering of the costs of treatment, recovery and disposal (individual responsibility - a *collective* responsibility is allowed for historical waste only)	**Producers**	**Art 8**
	► Guarantee ensuring the financing of orphans products	**Producers**	**Art 8**
	WEEE other than from private households		
	► Covering of treatment, recovery and disposal costs of WEEE from users other than private households.	**Producers**	**Art 9[34]**
	Exceptions :		
	- historical waste which are replaced by new appliances	**Producers of new appliances**	
	- historical waste which are not replaced and orphans	**Final users**	
INFORMATION AND REPORTING OBLIGATIONS			
	► Register of producers	**Member States**	**Art 12**
	► Information on quantities of products sold, collected, reused, recycled, recovered within a Member State, and on collected waste exported	**Producers**	**Art 7**
	► Information to consumers	**Producers**	**Art 10**
	► Information to treatment facilities	**Producers**	**Art 11**


Greenland Sea
ICELAND
Rockall (U.K.)
North Atlantic Ocean
Dublin
IRELAND
Celtic Sea
Bay of Biscay

3. INITIATIVES ALREADY UNDERTAKEN IN SELECTED EUROPEAN COUNTRIES

A more detailed and further updated description of European WEEE management systems is available on the ACRR website:

http://www.acrr.org/resourcities/

BEFORE THE ENTRY INTO FORCE OF THE WEEE DIRECTIVE, several European countries defined national regulations and organised management schemes for WEEE. These systems respond to sometimes very different national situations and philosophies. Some will have to be adapted as European Member States must now implement the WEEE Directive into national laws.

Though, in line with the subsidiarity principle, the European Directive leaves the specific design of the WEEE management schemes to the discretion of Member States, and the national experiences under review here below illustrate a range of possibilities (regarding notably the sharing of responsibilities within the logistical organisation and the financing of WEEE).

This chapter provides short descriptions of some systems already in place in Belgium, Denmark, the Netherlands, Norway, Sweden and Switzerland. It aims at highlighting similarities and differences as regards regulations, and the distribution of responsibilities in the organisation and financing of management schemes.

3.1. COMPARATIVE OVERVIEW

3.1.1. SETTING OF TARGETS

As regards **quantitative targets**, national regulations do not set collection targets. Only in Norway, a collection target of 80% of WEEE has been set for the 1st July 2004, through a sector agreement with the Ministry of Environment. In Denmark, there is an agreement between the Ministry of Environment and Energy and the relevant associations, aiming to collect a minimum of 90% of the total amount of discarded refrigerators for environmentally sound treatment.

In Belgium, recycling rates are set by the regulation for ferrous metals, non-ferrous metals and plastics, and for four categories of appliances. In the Netherlands recycling targets have been defined by a common agreement between the Environment Ministry, local authorities and manufacturers / importers.

It must be emphasised that **"recycling"** has not the same meaning in the different countries. For instance, in Norway, recycling includes reuse and both material recycling and energy recovery. In the Netherlands, recycling rates are defined as the proportion of materials not going to landfill or incineration.

Various **qualitative provisions** are set for the management of WEEE. These include :

- "environmentally sound treatment" (Denmark)
- "proper treatment in accordance with the regulation" (Norway)
- "no landfill without previous treatment" (Sweden, Switzerland)
- the prohibition of the incineration of products which have been taken back separately (the Netherlands)
- minimum standards for treatment like separated elimination of pollutants, recovery of metal and incineration of chemicals that cannot be recovered (Switzerland)
- the separation between re-usable and non-usable equipment (Belgium)

3.1.2. STATUS OF REUSE

... within the regulations or as a result of the established systems.

Belgium	The first stage after collection is to separate reusable and non-reusable appliances, through social economy enterprises or other companies.
The Netherlands	Reuse is ruled out for refrigerating and freezing equipment containing CFCs of HCFCs.
Norway	EEE reused in its original form and for its original purpose is not to be considered as scrap, and is not embraced by the regulation.
Switzerland	The regulation defines a central role for retailers networks, which offer strong reuse possibilities.

3.1.3. ROLE OF ACTORS IN THE MANAGEMENT OF WEEE

Most countries under review have developed mixed WEEE management systems based on the existing municipal management schemes in which municipalities organise collection of WEEE from households as well as the management of container parks and other collection points, while producers recycle and treat them.

The role of retailers and of distributors can vary largely between countries. The trade chain is for example the main channel for taking back WEEE in Switzerland, where retailers are recognised as specialists to assess returned equipments regarding their repairability or recyclability. In Norway, retailers and distributors are assigned an important collection role by the regulation. Consequently El-Retur (like NVMP in the Netherlands) uses payments as an incentive for retailers but also to cover their handling costs from the taking back of WEEE.

In Belgium, 80% of collection points are points of sale, but they only capture 25% of the volume of waste collected, while municipal collection points (20%) capture 75% of WEEE. In the Netherlands, distribution channels (retailers and distribution centres) collect about 13% all the WEEE collected. In both countries, retailers have an access to recycling parks and RTS for small quantities of WEEE.

PREFERRED CHANNELS FOR COLLECTION

	Municipal recycling points	Retailers/ trade
Belgium	x	
Denmark	x	
The Netherlands	x	
Norway		x
Sweden	x	
Switzerland		x

3.1.4. FINANCING METHODS AND COSTS OF THE SYSTEMS

Except in Switzerland, these systems are financed by :

- citizens' local taxes for municipal collection infrastructures
- consumers as far as further sorting, recycling and disposal costs are concerned.

3.1.4.1. WHAT DO MUNICIPALITIES FINANCE IN THE DIFFERENT COUNTRIES ?

This table shows the sharing of responsibilities between producers and public bodies in the European Countries under review.

COUNTRIES UNDER REVIEW	COLLECTION AND SORTING UP TO "COLLECTION POINTS"		RECYCLING	
	Management	**Financing**	**Management**	**Financing**
Denmark	Municipalities	Municipalities	Municipalities	Municipalities
Belgium / The Netherlands / Sweden	Municipalities	Producers/ Municipalities	Producers	Producers
Norway	Municipalities Distribut./retailers[35]	Municipalities Distribut./retailers	Producers	Producers
Switzerland	Producers/retailers	Producers/retailers	Producers	Producers

In Belgium, Sweden and in the Netherlands, collection costs are covered to diverse extents by producers through negotiated agreements with LRAs. Producers finance part of municipal WEEE facilities (e.g. by providing specific containers), or a part of costs for transportation of WEEE from municipal collection points to Regional Transferi Stations - RTS (e.g. in the Netherlands).

3.1.4.2. RECYCLING FEES

If one considers recycling fees established by different producers' schemes, the part borne by final consumers appears to be higher in Switzerland (where producers set up their own management schemes), than in the Netherlands, where LRAs (compelled by the regulation) have put their collection facilities and RTS network at the disposal of manufacturers.

PRODUCT TYPE	BELGIUM **(RECUPEL)** Fee VAT included	THE NETHERLANDS **(NVMP)** Fee VAT included	SWEDEN **(El-Kretsen)** Fee VAT not included	SWITZERLAND **(SWICO/SENS)** Advanced Recycling Fee (VAT included)
Washing machine	10,00 €	5,00€	9,33 €	17,06 €
Coffee maker	1,00 €	1,00€	0,44 €	0,68 €
Television	11,00 €	8,00€	8,80 €	10,24 €
Refrigeration appliances	20,00 €	17,00€	26,40 €	27,30 €

Comparison between the recycling fees of 4 EEE categories in different national producers schemes (2003)

3.1.4.3. VISIBILITY OF RECYCLING FEES

Internalisation of the entire management costs into the price of products calls for an invisible recycling fee, but Sweden is the only country where the fee is completely invisible due to the regulation. In Norway where the choice is left to actors for making the fee visible or not, about 70% have adopted a visible fee. In the other management schemes under review, the fee is made visible to consumers when buying a new appliance.

3.1.4.4. FINANCING OF FUTURE WASTE

All the producers' organisations under review operate collective WEEE management schemes, which up to now have essentially established solutions in order to manage historical WEEE within the scope of a collective responsibility. ICT Milieu in the Netherlands, which originally opted for the complete "internalisation" of WEEE management costs, and thus for the invisible fee, has adopted in 2003 a collective system where WEEE treatment costs are shared between producers in accordance with their market share. So that nothing is planned until now for a collective management of individual producers responsibilities.

3.1.5. ACHIEVEMENTS

The table below presents the achievements of the selective collection schemes in five European countries in accordance with the origin of the WEEE collected. The management systems in Denmark, Norway, Sweden and Switzerland are common to all WEEE, whether they originate from private households or not.

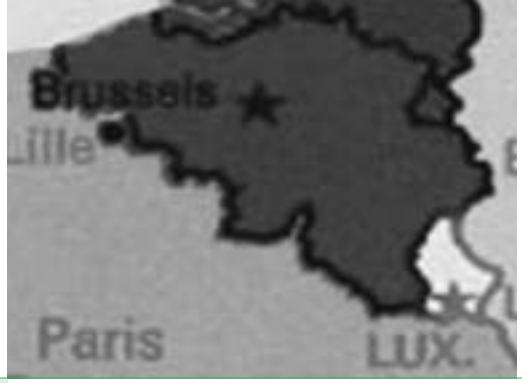
	BELGIUM	THE NETHERLANDS	NORWAY	SWEDEN	SWITZERLAND
Collection rate (in weight /inhab.)	3,5 kg (2002)	4,13 KG (2000)	7,9 KG (EL-RETUR 2001 / EURO VIRONMENT 2002)	7 KG (2001)	8 KG (2002)
Origin of WEEE collected	HH	HH	HH	HH/NH	HH/NH

HH = households / NH = non households

These data are generally communicated by the existing national schemes, and are not easy to compare as they are linked to :

- the age of the systems
- the kind of electrical and electronic appliances covered : except in Norway where the data are these of consumers goods, systems which collect both households and non households WEEE like Sweden and Switzerland easily double the rates achieved
- the logistics in place
- the geographic area covered
- the socio-economic characteristics within these areas (essentially the number of appliances put on the market)
- …

[35] *Norwegian retailers have got a more important role than in other systems, where retailers and distributors are only obliged to take-back WEEE on a 1/1 basis.*



3.2. GENERAL DESCRIPTION OF SELECTED NATIONAL WEEE MANAGEMENT SCHEMES

3.2.1. BELGIUM

REGULATION

The 3 regional regulations for the management of WEEE, were implemented through three Environmental Policy Agreements, come into force in February 2001 within whole Belgium.

SCOPE

These agreements determine 7 main categories of appliances

- freezing and refrigerating equipment
- large white goods
- small white goods
- brown goods
- small household appliances
- IT- and Telecommunication Equipment
- gardening tools

RESPONSIBILITIES

Producers

Producers bear an individual take-back duty for their own products or for similar products tendered to them.

Trade

Retailers/distributors must take-back WEEE free of charge when selling a similar product.

MANAGEMENT PRINCIPLES

Promotion of reuse : the first stage after collection is to separate reusable appliances from non reusable ones, through social enterprises or trough other companies.

RECYCLING TARGETS

	RECYCLING RATES	FERROUS METALS	NON FERROUS METALS	PLASTICS
Large white goods	90%	95%	95%	20% RECYCLING (100% RECOVERY)
Refrigerating and freezing appliances	70%			
TV and PC screens	70%			
Others	70%			

MANAGEMENT

PRODUCERS' MANAGEMENT SCHEME

Recupel Asbl [36] is an executive management scheme gathering currently 5 sector associations, covering respectively large household appliances, consumer electronics, small household appliances, IT - Telecommunication and office equipment, and electrical tools and gardening equipement.

COLLECTION INFRASTRUCTURE

Recupel collection scheme is organised through 20 social economy enterprises, 530 municipalities' containers parks and 1600 registered retailers. It will be further organised around about 30 Regional Transfer Stations (RTS) covering large collection areas, and where WEEE collected from municipal recycling facilities will be gathered and sorted.
In 2002, container parks captured 75 % of the WEEE collected, while the share of social enterprises was 10% and retailers and distributors gathered 15 % of the total amount collected[37].

Role of LRAs

LRAs leave their recycling parks and RTS at the disposal of Recupel, which provides these with collection bins. They remain the only responsible for the financial and logistic management of the collection facilities.

Role of retailers

Thanks to forthcoming agreements between RECUPEL and local authorities, retailers should benefit from an extended access to containers parks and RTS for their WEEE. Sellers of EEE may register as collection points on RECUPEL website and have their appliances directly collected by RECUPEL.

FINANCING

Financing is borne by the consumers through a visible fee which is levied on the products, worked out by sampling at recycling plants, and managed per sector to cover the take back and treatment costs of appliances : transport from the container parks, sorting, and recycling. RECUPEL is currently negociating with the distributors to remunerate the costs from the space taken up by discarded appliances.

ACHIEVEMENTS

In 2002, RECUPEL collected 35.875 tons of WEEE (= 3,5 kg per inhabitant) and achieved a global 80% recycling rate.

[36] *http://www.recupel.be*
[37] *RECUPEL Asbl, Rapport 2002, p.10*

3.2.2. THE NETHERLANDS

REGULATION

Decree of 21 April 1998, entered into force partly on 1st June 1998 and completely on 1st January 1999

SCOPE

14 categories of Electrical and Electronic Equipment, including CFC products, which were regulated in two steps (large goods from 1st January 1999, and the remaining categories one year later).

RESPONSIBILITIES

Producers

Producers/importers have to take back and recycle :

- WEEE **of their own brand** from Local Authorities' collection points
- WEEE **of their own brand** tendered to them by a repair company
- WEEE tendered to them by a retailer when supplying a new "similar" product. (From January 1, 2005, this "old for new" duty will become a "brand-related" one).

Manufacturers and importers can be exempted from their individual duties by the signature of a Covenant with the Ministry of Environment and by joining a collective scheme.

LRAs

Since July 1999, **Local Authorities** must provide for household WEEE separate collection (either kerbside collection, or collection on sites), and for the creation and maintenance of a site within the municipality or the municipalities' association they are part of, where suppliers can leave a product taken back from a private household. As a corollary of the producers' obligations, municipalities are responsible for orphan products, and have to sort WEEE by brand to leave them at manufacturers' disposal.

Trade

Retailers have to take back WEEE coming from consumers on the "old for one" basis. It is prohibited to retain for commercial purposes freezers or refrigerators discarded after use.

RECYCLING TARGETS

The decree prohibits to incinerate products that have been taken back or collected separately. Recycling rates were defined on the basis of a pilot's outcomes conducted in 1996 by the Ministry, local authorities and manufacturers/importers.

	Recycling rates
TV sets	69%
Large white goods appliances	73%
Refrigerating and freezing equipment	75%
"Small" appliances	53%

Recycling rates are measured as weight % of **material not going to landfill or incineration** (or weight % of material processed).

MANAGEMENT

PRODUCERS' MANAGEMENT SCHEME

For white goods, 5 main producers' sector organisations have joined within NVMP[39] (Netherlands Association for Disposal of "Metalelectro" Products) while V-ICT[40] (or ICT-Milieu) has been set up for the management of grey goods (IT equipment, paper printing equipment and telecommunication goods).
Both take, through official carriers, goods discarded by consumers from RTS, retailers and repair companies, to their recycling partners.

ROLE OF LRAs

Associated within the NVRD (Dutch Association for Refuse and Cleansing management) since 1996, local authorities ensure the collection and the transport of WEEE to one of the 69 Regional Transfer Stations where WEEE are sorted out and put to the disposition of manufacturers and importers of EEE. Since they provide manufacturers/importers with such a logistical structure, these have agreed that Local Authorities are neither obliged to sort WEEE by brand (unless they are paid for this service), nor to take care of orphan products.

ROLE OF RETAILERS

Like repair companies, retailers have access to the municipal facilities. Regional Transfer Stations accept also waste tendered to them directly by retailers, but may charge them for the service.

COLLECTION INFRASTRUCTURE

In 2001, 87% of the products collected by NVMP originated from Regional Transfer Stations. The role of the distribution centres has stabilised at 3-4% of the total collection, while the retail sector collected directly 10% of the total amount. This channel seemed to display particular growth.

FINANCING

LOCAL AUTHORITIES

Local authorities only bear the costs for the collection and transport of WEEE until the "municipality limit"; other transport and sorting costs are financed by the manufacturers' organisations. LRA finance WEEE separate collection by levying local taxes. Following the kind of service agreed with the Regional Transfer Station, this amounts to 0,16 € on average per inhabitant.

PRODUCERS' SCHEME

When buying an electrical or electronic equipment, consumers pay a removal contribution in addition to the purchase price.
With the removal fees, **NVMP** pays :

- the Regional Transfer Station : manufacturers/importers pay a fee per item that is transferred to them; this fee varies from 1,80 € to 3,40 €.
- the logistic and recycling partners.

Retailers receive also a proportional compensation for their take-back service (one-off 10% on the payment of removal fees).

ICT Milieu : ICT manufacturers and importers had originally opted for an individual producer responsibility and been paying for the real costs of treated grey goods of their own brand and of their share of orphans (individual responsibility, worked out by the recycling partners). But because of too many sorting constraints, and significant amounts of orphan products, a new financing scheme was introduced from 2003 based on a collective producer responsibility : producers will pay for the treatment of the effective items collected and processed in proportion of their current market share.

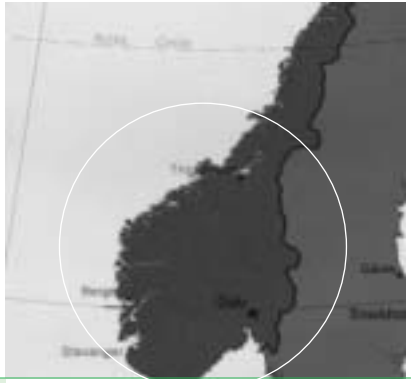
It has been estimated by the Ministry of Environmental Protection that altogether, the recovery of WEEE in the Netherlands costs about 1,00€ per inhabitant.

ACHIEVEMENTS

According to NVMP the collection results in 2001 corresponded to an amount of 4,13 kg WEEE/capita[41].

CFC-containing appliances management in The Netherlands
The decree contains a prohibition on the further sale of CFC and HCFC products. This means that product reuse is ruled out for refrigerating and freezing equipments.

[39] *http://www.nvmp.nl*
[40] *http://www.nederlandict.nl*
[41] *M. Muijser, VLEHAN, "Waste Electrical and Electronic Equipment – a Dutch success story", Jornada Internacional sobre Residuos de Equipos Eléctricos Y Electrónicos (REEE), CER, Octubre 2001.*



3.2.3. NORWAY

With a population of about 4.554.000 inhabitants and an area of 385 155 km2 (where 16% are islands and fjords), the population density in Norway is about 14 inhab. per km^2. The country is quite narrow, has a length of about 2000 km and counts 434 municipalities.

REGULATION

The Regulation regarding scrapped electrical and electronic products promulgated on 16 March 1998 entered into force on 1st July 1999.

SCOPE

No **categories** have been determined and all products containing electrical or electronic components are in principle embraced by the regulation with the exceptions of products permanently installed in means of transport or large devices (ex : lifts, escalators…) where only the components should be regarded as EE products.
The r**e-use** of the EE product in its original form for its original purpose means that the product has not to be regarded as scrap and is not covered by the regulation requirements.

RESPONSIBILITIES

Producers

Manufacturers/importers are obliged to ensure that the EEE they introduce on the Norwegian market are collected when they end up as waste, and are recycled or otherwise properly handled. They are obliged to arrange for the collection of WEEE free of charge in geographical areas corresponding to those in which the products are sold, were sold or supplied trough suitable logistic systems that do not cause "unreasonably high transport costs for any municipality". The frequency of collection points must take into account the needs of the municipality, and their capacity correspond to the share of manufacturers' sales in the area.

LRAs

Municipalities are obliged to receive all WEEE through accessible facilities (regarding number, site, opening hours…). They may demand a payment for production waste, but consumer waste have to be managed with the annual municipal tax.

Trade

All distributors/retailers in Norway are required to accept consumer WEEE free of charge. Distributors are also only obliged to accept WEEE of products belonging to the same products range they are selling at the time these discarded appliances are handed in. The "old for new" condition only applies to waste from companies.

Distributors/retailers and municipalities are responsible for a proper handling of WEEE as long as they are in their possession. This means that waste must be handled in such a way that environmentally hazardous substances can subsequently be sorted and treated, and that the opportunities for recycling are not reduced. If the municipality or the retailer does not deliver EE waste to the manufacturer/importer but forward it directly to an approved treatment facility, they are considered taking responsibility for further treatment, including the costs.

TARGETS

Collection

In 1998 a sector agreement was signed with the Ministry of Environment setting a target of 80% WEEE collection for the 1 July 2004.

MANAGEMENT

PRODUCERS' MANAGEMENT SCHEME

National suppliers have established two management enterprises for consumers' WEEE :

- Hvitevareretur AS (large and small household appliances)
- Elecktronikkretur AS (IT&T, Consumers Electronics, toys, medical…)

They have joined within El-retur in order to implement a collective logistic and recycling scheme.

In the El-retur system[42], WEEE is collected from about 4.000 collection points:

- 350 municipal collection facilities
- 3.000 retailers
- and from about 650 other sources like workshops, offices and various waste management companies.

3 Regional collection companies are responsible for all logistic tasks, including the provision of cages and containers free of charge for collection facilities included. WEEE are then delivered to nine recycling plants dedicated to specific areas of the country.

FINANCING

LRAs finance the municipal collection facilities with local taxes.

Hvitevareretur AS levies a recycling fee per unit through the Norwegian Custom and Excise System (the fee is paid with each company's monthly taxes and duties), which forwards then the recycling fees to the system. The funds allow to pay the logistic and recycling costs as well as the kick backs to retailers and distributors.

For Consumers Electronics, **Elektronikkretur AS** members (447 businesses affiliated in 2001) pay a recycling fee per unit put on the market, through their branch associations. For brown and white goods, the recycling fee is prepaid, but for IT goods, total real management costs (for collection and treatment) are subdivided onto members' market shares (net volumes in kg) within the different product groups. Funds are managed by Elektronikkretur AS to pay the logistic and recycling partners.

Making the fee visible or not at the purchase is left to the distributor's discretion.

ACHIEVEMENTS

In 2001, 7,2 kg of WEEE per capita were collected and processed by **El-retur**, which following the definition of recycling within the Norwegian regulation, achieved a recycling target of 82%[43].

Euro Vironment, an independent system, was set up by 14 IT companies (including Compac and Dell which are together 50% of the IT Norwegian market). By collecting about 3.250.000 kg IT products in 2002 they achieved a collection rate of 0,7 kg per capita[44].

Cooling and freezing equipment

The responsibility is shared between the municipalities and manufacturers : these must deal with equipment not-containing CFCs while local authorities are responsible for CFC containing equipment. This has lead to a complex and costly situation, so that Hvitevareretur AS will now ensure the collection and recycling of CFC-containing equipment through separate agreements with municipalities.

[42] *http://www.el-retur.no*
[43] *El-retur Environmental Report 2001*
[44] *SUNDSTRÖM H. (Electrolux), Implementation of the WEEE Directive in the Nordic Countries, IERC 2003, Basel January 13-15, 2003.*

3.2.4. SWEDEN

REGULATION

The Producer Responsibility for Electrical and Electronic Products Ordinance (2000:208) came into effect on 1st July 2001.

SCOPE

10 categories of products are allocated to the Producer Responsibility. Refrigerators and freezers are excluded, since there is a municipal responsibility for these products.

RESPONSIBILITIES

Producers/ Trade

Manufacturers, importers and retailers are jointly responsible. When selling a new product, they are obliged to take back at the place of supply or at another suitable designated place, a "similar" product handed to them and serving essentially the same purpose as the product sold. This obligation is related to the same number of products as the products sold. Producers may designate suitable collection points only after consultation with the municipality.

MANAGEMENT

PRODUCERS' MANAGEMENT SCHEME

To avoid collection in shops, El-Kretsen AB[45] (service provider set up by 23 trade associations in the electrical and electronic sectors) has made agreements with all 289 Swedish local authorities to use their collection schemes.

ROLE OF *LRAs*

Households who want to dispose of electrical or electronic products without buying a new one may give it to the Local Authority, which must dispose of it properly. Either they benefit from collection facilities (free of charge), either there is a collection service for bulky and heavy products, at a fee.

Retailers

The retailer has just to refer customers to the existing facilities. If it receives electronic waste, it can deposit it free of charge at a collection point (as retailers may use municipal facilities for household waste provided that they respect a limit of 1 m^3), or request El-Kretsen to collect it.

COLLECTION INFRASTRUCTURE

The collection of electric and electronic waste at recycling centres is the most common method in Sweden. It is sometimes supplemented with on-site collection at housing estates.

FINANCING

Collection stations are run at the own initiative and expense of local authorities (exception to the producer responsibility principle).
Producers (through El-Kretsen) finance the further collection and the recovery of WEEE, but historical electronic waste from households is the responsibility of the municipalities.

As the Swedish law demands products show the total price, visible fees are forbidden.

Recycling fees are very complex and depend on the return rates, weight of appliances, methods and costs of treatment, material composition.
El Kretsen uses three different financing models

- Standard : recycling fee per unit put onto the market. A preliminary cost is fixed and the accounts are settled for each product type at the end of the year.
- ICT : the real costs of collection and treatment of ICT-WEEE are charged each month to the manufacturers according to their market share.
- There exist also fixed annual fees for some products.

The funds are managed by the system to pay the different partners of the system, and the recycling costs.

On average, the costs of WEEE collected and treated are about 4,85 SEK/ kg (c.a. 0,52 €), with 74% for treatment, 14% for transport, and 12% for administration / information costs.

ACHIEVEMENTS

In 2001 during the first six months when producer responsibility applied, about 30.000 tons of WEEE were collected by El-Kretsen from households and industry, equivalent to 7kg per inhabitant.

[45] *http://el-kretsen.se*

3.2.5. SWITZERLAND

REGULATION

Ordinance on the return, the take-back and the disposal of electric and electronic appliances (OREA), in place since 1 July 1998.

SCOPE

The OREA addresses appliances which depend on electricity and specifically mentions: consumer electronics, office, information and telecommunication equipment, and household appliances.

RESPONSIBILITIES

Producers

Manufacturers or importers have to take back appliances of their own brand or of the brand they sell.

LRAs

Municipalities have no mandatory take-back obligation, and are thus not obliged to provide for separate collection or for collection points. If they are willing to, local authorities can do it on a voluntary basis, knowing that electrical or electronic appliances cannot be dealt with anymore together with bulky waste collections, and that the OREA decree states that disposal of these appliances must be financed by market actors.

Trade

Retailers must take back appliances similar to those they sell from final consumers.

MANAGEMENT

PRODUCERS' MANAGEMENT SCHEME

2 mains voluntary schemes have been set up :

- SWICO[46] has been dealing with "office equipment" and consumers electronics from 2002
- SENS deals with refrigerating and freezers.

Both have been working together from 1st January 2003 within a global solution for WEEE management.

COLLECTION INFRASTRUCTURE

In Switzerland, the retailers network is considered to offer enough taking back opportunities in itself[47], and returning equipment to the dealer or the manufacturer is strongly recommended by SWICO, as they are specialists to assess the possibility to recycle the equipment or parts of it. With this approach, 5-15% of discarded equipment can be reused. Retailers take back discarded appliances from private and business users free of charge.
Pick up services are organised on request by the manufacturers associations from private households, points of delivery or (re-)distribution centres.

ROLE OF LRAs

There are 4 possibilities for Municipalities :

1. They choose not to organise WEEE collection : end-users are informed about the possibility of bringing back their WEEE free of charge to a retailer or an official SWICO collection point.
2. Municipalities propose to organise once or twice a year a separate collection of WEEE and are therefore provided with pallets and frames. The costs of transport and recycling are borne by SWICO.
3. EE discarded appliances they not "actively collected" may be brought to official SWICO collection points : this allows small municipalities to benefit from a take-back free of charge for small quantities.
4. For municipalities which collect more than 5 tons WEEE p.a., the municipal collection point is enlarged to become an official SWICO collection point.

FINANCING

The manufacturers have set up a Convention for Recycling and Disposal, that obliges participants to impose an Advanced Recycling Fee (ARF) on the sale of new equipment. Manufacturers transfer the fees on a recycling account held by SWICO.

There are 2 different models to calculate the ARF (which includes also the Advanced Disposal Tax for batteries) :
1. IT and office products : fee conditional on the equipment value
2. consumer electronics : each piece of equipment has a specified fee.
Consumers goods which price is not higher than c.a. 35,00€ are not subjected to the ARF.

ACHIEVEMENTS

The current figure for collected WEEE in Switzerland is 8kg/ capita. More than 75% of end-of-life equipment is recycled, approximately 20% are incinerated, and 3% end up in landfills[48].

[46] *http://www.swico.ch, http://www.sens.ch*
[47] *Guidelines for the ordinance on the return, taking back and disposal of electrical and electronic appliances, SAEFL, 2000.*
[48] *The Swiss experience and the EU WEEE Directive , P. Bornand (SWICO), Waste Management World, Nov-Dec 2002.*

3.2.6. DENMARK

Generalities

The Danish waste management system is :
- a global waste management model covering the prevention, collection and treatment of all types of waste (industrial, commercial and household)
- under the responsibility of local councils
- making use of energy recovery more than other European countries.

REGULATION

Order from the Ministry of Environment and Energy, n°1067 of December 22, 1998 on Management of Waste from Electrical and Electronic products

SCOPE

The regulation essentially covers white goods, radio and television sets, IT products, office equipment and instruments of monitoring and control.

RESPONSIBILITIES
LRAs

Local councils were given until 1st June 1999 for providing regulations laying down detailed rules on the handling, assignment and collection of WEEE.

RECYCLING AMBITIONS

The regulation should lead to the diversion of 25.000 tonnes of WEEE from incineration and landfilling to recycling and so allow to recover for instance 40% of the landfilled copper.
(Source : Waste 21, Waste Management Plan 1998-2004).

MANAGEMENT

ROLE OF LRAs

Local authorities ensure that waste electrical and electronic equipment is collected and assigned to separate treatment and approved companies. About 30 SME have so developed an expertise and specialised in the processing of WEEE.

PRODUCERS

Upon request, they may be granted permits by local council to take back free of charge their own or similar products.

RETAILERS

Distributors and retailers may offer a take back service in the scope of municipal waste management schemes.

FINANCING

Costs for implementing the WEEE legislation until now have been met by local governments. The regulation in place is estimated to induce a rise in the annual tax paid by households of about 5,4 €.

[38] *WASTE 21, Waste Management Plan 1998-2004, http://www.mst.dk/udgiv/Publications/1999/87-7909-571-2/html/default_eng.htm*

CFC-containing appliances management in Denmark
The collection and management of refrigerating equipments containing CFCs are ensured by an agreement between the Danish Minister of Environment and Energy, and relevant associations on the disposal of CFC-containing equipment.

The aim of the agreement is to collect a minimum of 90% of the total amount of discarded refrigerators for environmentally sound treatment, in compliance with the requirements laid down in a circular on municipal regulations on disposal of CFC-containing refrigeration equipment. Local councils must establish assignment or collection schemes and ensure that CFC-12 is extracted at 95%, and that CFC-11 is extracted at a rate of 80%.

It is estimated that about 250.000 pieces of equipment (12.500 tons) are treated each year, and that 100 tons of CFCs are extracted thereof [38].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