

**Establishing Effective Extended Producer Responsibility Legislation:  
A checklist for decision-makers, zero waste advocates and waste  
managers prepared by Clean Production Action, 2003.**

This **checklist** gives guidance on what we consider to be important elements of a good EPR program with particular reference to European EPR legislation for end of life autos, e-waste and the German Green Dot packaging system.

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## 1. Establish your goal of sustainable product design and waste prevention.

A clear goal allows you to assess if all the elements of your program will contribute to what you want to accomplish. Is the goal of your program to promote sustainable product design and waste prevention? Or is your goal to simply establish a better waste management systems that allows consumers to dump their products in an easier fashion and maybe even save you some money? A good EPR programme should be a stimulus for more sustainable product redesign and safer use of materials to enable better recycling and reuse of the materials.

“The aim of this legislation is to reduce and ultimately do away with the contents of hazardous substances; make products easier to dismantle; reduce the waste of resources and increase longevity of components and materials.”

-Mans Lonnroth, state secretary Swedish Ministry of Environment. <sup>1</sup>

### Key terms to include in your legislation:

- Sustainable product design;
- improved environmental performance throughout the product lifecycle
- waste prevention;
- the use of non toxic materials and processes;

### Examples from the European Union, Germany, and Canada

**1. The goals of the European Union’s Directives on autos and waste from electrical and electronic equipment waste both advocate prevention of waste and improvements in product design throughout the life cycle of the products.**

Goals of EU Directive on Waste from Electrical & Electronic Equipment (WEEE)<sup>2</sup>

The purpose of this Directive is, as a first priority, the prevention of waste from electrical and electronic equipment (WEEE), and in addition, the reuse, recycling and other forms of recovery of such wastes so as to reduce the disposal of waste. It also seeks to improve the environmental performance of all operators involved in the life cycle of electrical and electronic equipment, e.g. producers, distributors and consumers and in particular those operators directly involved in the treatment of waste electrical and electronic equipment.

Some environmental groups in Europe lobbied to have sustainable product design and waste prevention more explicit in the WEEE Directive. They argued that the plans could include substitution targets; inventories of usage of

substances, the development of manuals/guidelines on EEE design for durability, reuse, reparability, dismantling and recycling and the promotion of the development of second-hand markets.<sup>3</sup>

The design criteria were not included in the final WEEE Directive. Instead, the European Union has proposed legislation **on Eco-design of Energy using Products (EuP)** It requires the use of eco-design tools and documented evidence that they have been included into the company's management systems. This Directive is scheduled for 2006.

#### **Goals of EU Directive on End-of-Life Vehicles<sup>4</sup>**

This Directive lays down measures which aim, as a first priority, at the **prevention of waste from vehicles** and, in addition, at the reuse, recycling and other forms of recovery of end-of life vehicles and their components so as to reduce the disposal of waste, as well as at the improvement in the environmental performance of all of the economic operators involved in the life cycle of vehicles and especially the operators directly involved in the treatment of end-of life vehicles. The directive devotes a section to prevention, encouraging design for dismantling, re-use and recovery, in particular the recycling, of end-of-life vehicles, their components and materials. Finally it 'encourages' use of recycled materials and mandates the phase out of certain hazardous substances.

#### **2. The German Packaging Ordinance<sup>5</sup> advocates waste prevention via mandatory quotas on refillable beverage containers and reduction of packaging in general:**

Waste from packaging is to be avoided. Packaging should be:

- ⇒ reduced to that volume and weight necessary to protect the contents and to market the product;
- ⇒ produced so as to be refillable, insofar as it is technically possible and feasible; and
- ⇒ recycled when refill is not possible.

#### **3. Ottawa's 'Take It Back' programme for household hazardous waste provides free service to consumers but no feedback to the producer.**

The goal of the 'Take It Back!' programme for a range of household hazardous products in the Ottawa region in Canada is to increase the capture rate of the hazardous materials in the municipal waste stream and to reduce the collection and disposal costs of the municipality. The voluntary program makes retailers pay the disposal costs of hazardous products brought back to them by consumers while the municipality foots the bill for public outreach and publicity of

the scheme. Retailers joined the scheme to attract more consumers to their store and to demonstrate their willingness to be conscientious community players. In this scheme there is no requirement for the producers to be involved. "Industry won't move without legislation" said one city official. Some retailers are now realizing it is difficult to find recycling centers that will accept bulk waste and are now questioning the benefits of joining the scheme. This scheme provides no feedback to the producer and therefore no incentive to phase out hazardous chemicals or redesign products to facilitate reuse and recycling.

## **2. Establish a comprehensive scope of the legislation**

The scope must be comprehensive and not confuse consumers regarding which products they can and can not bring back.

The European legislation for electrical and electronic waste is extensive and covers all products that can be plugged into a wall, eg TV, stereos, dishwashers shavers, cell phones, stoves, fridges, computers, etc.

In Japan, EPR for electrical waste initially covered only large TV sets, washing machines, air conditioners and refrigerators. As of October 1, 2003 producers are now be required to take back computers from households. The government settled on this list because the products met the following four criteria: 1) difficult to be recycled under existing facilities and technologies used by local governments; 2) containing valuable resources that can be recycled and the cost for recycling is economically feasible; 3) the design or selection of raw materials or components by the manufacturers exerts a great influence on the recyclability; and 4) delivered mostly by retailers so that smooth take back by retailers could be secured.<sup>6</sup>

Many of the state bills in the USA for e-waste only cover cathode ray tubes and displays; not computer housings or any other electronic equipment. Why is this not more comprehensive?

The packaging ordinance in Germany covers all packaging regardless of brand name or type.

## **3. Make sure your program is mandatory, not voluntary.**

Industry may argue for a voluntary approach to EPR. However experience from countries who have tried voluntary programs demonstrates these are generally ineffective. For example, voluntary EPR for packaging was attempted in France and Germany; both countries were dissatisfied with the results and ultimately passed legislation. Switzerland rejected a voluntary EPR approach to electric and electronic equipment because of concern about 'free riders'. Voluntary battery collection in Sweden was rejected in favor of mandatory scheme.

Mandatory legislation ensures a level playing field and solves the problem of free riders ie. those companies that do not contribute to the funding of EPR programs yet still benefit from them.

During the negotiations of the WEEE Directive Electrolux<sup>7</sup> endorsed the need for industry wide standards:

*“We believe the WEEE Directive can create a **level playing field** in which manufacturers will seek competitive advantages through design-for-recycling programs and investments in efficient handling systems for waste appliances.”*

Germany had attempted to encourage packaging reduction and recycling through voluntary measures. When industry failed to respond, mandatory measures were introduced with the passage of the German Packaging Ordinance in June 1991.

Since the introduction of the Ordinance, the DSD - the Producer Responsibility Organisation - has had problems with “free riders” – companies who do not pay their Green Dot licence fees. This had contributed to the financial crises of DSD in the early years of implementation. (See Checklist number 6 for summary of Germany’s Packaging Ordinance)

In 1997 amendments to the Packaging Ordinance proposed that producers not participating in the Green Dot system would be required to report amounts of packaging generated and to verify (using independent auditors) that packaging waste has been managed in compliance with the Ordinance.

Under the Ordinance, DSD has the powers to tackle the free-rider problem by taking companies to court for using the Green Dot, a licensed trademark, without permission. Despite their length and expense, by 1998 DSD has taken legal actions against 750 licensees in Germany and abroad which had breached their contract with DSD. DSD pursues foreign firms even when the cost is likely to exceed the anticipated income, to avoid German licensees being placed at a competitive disadvantage.

Only legislation can ensure that any goals and timelines for collection, sorting, re-use and recycling are legally binding.

**CASE STUDY: Voluntary initiatives on Batteries fail to deliver original collection targets.**

**The Rechargeable Battery Recycling Corporation (RBRC)** is the only nationwide and industry wide EPR program in the **USA**. Industry launched this ‘voluntary’ initiative after eight states mandated take back of Nickel-cadmium batteries (Ni-Cds). It was launched to pre-empt future legislation in other states

and can be seen as a defensive response to proposals in Europe to ban cadmium.

The RBRC initially set a goal of 70% Ni-Cd battery collection by 2001. The program is funded by licensing fees based on battery weight and licensees display the RBRC logo on their batteries or products that contain them. A high percentage of battery producers (80 percent) have become licensees but this still allows 20% of producers to free-ride the system. Collection is done via retailers, communities and businesses and public agencies. RBRC pays all recycling costs and it pays shipping costs for retailers and communities.

In 1998 RBRC moved the 70% target back to 2004 and stopped reporting collection percentage rates and only reported pounds collected. By 2000 it was apparent that RBRC could not meet its original recycling target. The RBRC has reported a 2 percent recycling rate in 1997.<sup>8</sup> The low rate may be because consumers cannot differentiate Ni-Cds from other batteries they own and do not know of the program. Also the lack of an enforceable collection rate has allowed lower rates than anticipated to occur without penalty of any kind.

Similarly in **Sweden** a voluntary take back scheme of Ni-Cd batteries started in 1993. However despite the initial commitment of collecting 90% of Ni-Cds, by the summer of 1995 the actual collection rate was only 35% leading to the re-introduction of the previous mandatory system of battery collection based on advance disposal fees.<sup>9</sup>

Countries that have mandated EPR for batteries have set collection targets, eg Switzerland set a collection target of 80%, Belgium 75%, Austria 65% and the Netherlands 80% by 1994 and 90% by 1998. This has resulted in higher collection rates compared to previous efforts. Manufacturers and importers are responsible for collection rates and collection points were set up at retailers or both retailers and by local governments. In Austria, plastic bags for battery collection are provided to 2 million households twice a year since 1995.<sup>10</sup>

The EU is currently drafting a new Battery Directive<sup>11</sup>, which embraces strong producer responsibility requirements.

The Battery Directive proposals include:

- \* Ban on landfilling or incineration of 100% of automotive and industrial batteries.
- \* National collection systems set up by Member States to allow free take-back for consumers.
- \* Collection target for consumer batteries of 160g per inhabitant each year (roughly four to five portable batteries per person per year).
- \* Additional collection target of 80% for nickel-cadmium consumer batteries.
- \* Recycling target of 65% by weight for lead-acid batteries collected, including all the lead within those batteries.
- \* Recycling target of 75% for nickel-cadmium batteries collected, including all the cadmium within those batteries.
- \* Recycling target of 55% for all other batteries.
- \* Producers made responsible for costs related to collection, treatment and recycling.
- \* Collection costs for consumer batteries to be shared with national, regional or local authorities.
- \* Producers allowed to use a "visible fee" on new battery sales for maximum of four years after the directive's implementation.

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**Mandatory standards stop trade distortion and harmonize efforts at state and national level**

In the EU, **EPR legislation was introduced to harmonise various national EPR laws of Member States**, which were distorting the functioning of the EU's single market. For example the preamble to the WEEE Directive<sup>12</sup> justifies EU standards because

different national applications of the producer responsibility principle may lead to substantial disparities in the financial burden on economic operators. Having different national policies on the management of WEEE hampers the effectiveness of recycling policies.

Similarly the preamble of the RoHS directive<sup>13</sup> points out that disparities in different countries

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.

**Voluntary agreements tied to mandatory regulations**

The Netherlands is seen as the country that has successfully implemented industry-led voluntary 'covenants' with the government. The Netherlands Packaging Covenant (Stichting Verpakking en Milieu, 1991) aimed to recycle a minimum of 60% of used packaging and up to 75% plastic packaging. The covenant places a priority on refillable containers. The use of asbestos and PVC in packaging is banned. Bans exist on landfill disposal, for over 30 types of waste, including household, building and demolition waste and contaminated soil. However, the Dutch covenants are backed by the inevitable use of mandatory regulations if industry does not act voluntarily. Also because voluntary agreements do not ensure a level playing field, government regulations are often seen as essential. For instance, at the request of the Dutch car industry, the government introduced a fee to finance mandatory end-of-life vehicle recycling to avoid free riders taking advantage of the system.

#### 4. Establish the phase out of certain hazardous materials and a process to review and add further materials

" In short, the product developers of electronic products are introducing chemicals on a scale which is totally incompatible with the scant knowledge of their environmental or biological characteristics. This is, simply put, the reason why my government is introducing compulsory product responsibility legislation for electric and electronic products. "

Mans Lonnroth, state secretary Swedish Ministry of Environment.  
Speaking at the Takeback Conference, November 25-26, 1997  
US Embassy, London, UK.

Toxic materials pose health threats to workers, consumers and recyclers; they are dispersed into the environment throughout the product chain and they directly inhibit the ability to recycle materials in the product safely.

The EU's packaging Directive<sup>14</sup> mandated the reduction of concentrations of lead, cadmium, mercury and hexavalent chromium in packaging from 600 ppm (parts per million) by weight from 30 June 1998 to 100 ppm by weight from 30 June 2001.

Both the ELV and the WEEE's sister Directive on Restriction of Hazardous Substances (RoHS)<sup>15</sup> mandate the phase out of certain hazardous substances in new products and allow for further restrictions taking into account scientific evidence based within the precautionary principle.

The ELV Directive requires that components of vehicles placed on the market after 1 July 2003 do not contain mercury, hexavalent chromium, cadmium or lead, with some exemptions. These are to be reviewed in the light of scientific and technical progress.

The RoHS Directive requires hazardous substance 'substitution' (phase-out) of lead, mercury, cadmium, hexavalent chromium and 2 brominated flame retardants (PBBs and PBDEs) by 1 July 2006. As in the ELV Directive, exemptions apply. The European Commission is to review the provisions of the Directive by 13 February 2005, taking into account new scientific evidence. During the review, proposals can be submitted for adding to the list of banned substances, taking into account the precautionary principle.

The rationale given by the European Commission<sup>16</sup> for the phase outs is:

- **to reduce waste management problems** linked to the heavy metals and the flame retardants concerned; 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;
- Taking into account technical and economic feasibility, the most effective way of ensuring the significant reduction of risks to health and the environment 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 the possibilities and economic profitability of recycling** of WEEE and **decrease the negative health impact on workers in recycling plants**
- **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

**It is important to be able to introduce further restrictions. For example, the use of all brominated flame retardants and halogenated materials are examples of the types of materials that should be prioritised for safer substitution in future products.**

***Brominated Flame Retardants – ‘the PCBs of the 21<sup>st</sup> century’***

“...It has been suggested by producers of brominated flame retardants that the health risks related to the extrusion of plastics containing PBB and PBDE could be avoided by strengthened worker protection measures in the recycling installations. As an example it was recommended that workers carry protection masks.... Clearly, the substitution of the concerned substances would provide the best protection of the concerned workers.”  
European Parliament, 2000<sup>17</sup>

Brominated flame retardants are of particular concern since the revelation in the late 1990s that these chemicals were rapidly increasing in breast milk, and blood serum of workers in electronics recycling plants. Sweden banned the use of PBDEs, a class of brominated flame retardants, and subsequently saw a reduction in levels in breast milk. The members of the German Association of Chemical Industries voluntarily stopped the production of PBDEs and PBBs as early as 1986, while leading European companies in the electric and electronic industry have proclaimed an official policy of avoiding PBDEs and PBBs in their products. Along these lines the last European manufacturer of PBB stopped its production in the year 2000.

**North America, however, has no current controls on BFRs even though body burdens are now reported to be 40 to 100 times higher than European levels. The state of California recently passed legislation banning two types of brominated flame retardants by 2008.**

**Brominated flame retardants lead to the generation of dioxins during the recycling of electronic waste and are a major reason why recyclers will not handle plastic e-waste.**

The European Union in drawing up the RoHS Directive has confirmed that:

Both dioxins and furans are generated as a consequence of recycling the metal content of WEEE, which also contain halogenated plastics.<sup>18</sup> Halogenated substances contained in WEEE, in particular brominated flame retardants, are also of concern during the extrusion of plastics, which is part of the plastic recycling.<sup>19</sup> Due to the risk of generating dioxins and furans, recyclers usually abstain from recycling flame retarded plastics from WEEE.<sup>20</sup> In view of the lack of proper identification of plastic containing flame retardants and the inherent difficulty in distinguishing flame retardant plastic from ordinary plastic, most recyclers do not process any plastic from WEEE.<sup>21</sup>

The RoHS Directive in Europe has become the de facto hazardous material phase out list for the global electronic industry. Certainly, Japanese companies aggressively researched and have implemented safer substitutes often before European companies themselves did. It is notable that the California legislation on take back for cathode ray tubes and displays will comply with the RoHS directive phase outs.

It is imperative that the whole class of BFRs be phased out and some manufacturers are now successfully moving to non bromine compounds anticipating future legislation.<sup>22</sup>

***Polyvinyl Chloride***

PVC or polyvinyl chloride (vinyl) is the second most popular plastic in use worldwide but the most hazardous in terms of ingredients and manufacturing processes. Evidence on the lifecycle hazards of PVC presented by Greenpeace allowed them in 1994 to win a lawsuit in the Supreme Court of Vienna, Austria, brought against them by the Vinyl Institute, that "PVC is an environmental poison." Evidence shows that PVC is one of the most significant contributors of dioxin in combustion, eg open burning, incinerators, and house fires due to its chlorine content. (will add refs)

**The EU also considered banning PVC in packaging, electrical and electronic products as well as new cars but met fierce resistance from the Vinyl Industry.**

" PVC is a major problem in car recycling. PVC in cars is not able to be dismantled nor is it recyclable and will therefore undermine recycling efforts to reduce the final disposal of waste. "  
Auto Recycling Nederland. 1998.

In early drafts of the WEEE Directive the European Parliament and the Council emphasized that all halogenated substances, PVC and brominated flame retardants should be included. In particular they pointed out that incineration of PVC materials posed particular concerns:

"Significant quantities of PVC are contained in WEEE.<sup>23</sup> There is substantial evidence supporting the view that PVC is not suitable for incineration, particularly in view of the quantity and the hazardous nature of the flue gas residues resulting from incineration.<sup>24</sup> In addition, losses of plasticizers, especially phthalates, from the landfilling of PVC are widely recognised and can have potential adverse effects on human health and the environment.<sup>25</sup> It should also be noted that very little PVC waste, in particular in WEEE, is currently recycled."<sup>26</sup>

The Commission also argued in earlier drafts of the ELV directive for a PVC phase out in cars put on the market after 2002. Indeed some automobile recyclers lobbied for the PVC phase out. The Dutch auto recyclers pointed out that most of the PVC was in large applications of complex composite materials which were not recyclable and that the inherent chemical properties of PVC hindered recycling. They pointed out that complete removal of PVC from shredder waste was impossible and created the potential for dioxin formation in incinerators. Furthermore substitute materials were readily available.<sup>27</sup>

However the Vinyl Industry claimed that PVC could be technically recycled but that it was costly to do so. They argued the cost factor was insufficient grounds to mandate a phase out in cars which in effect prejudiced the auto industry.

The European Commission subsequently examined the challenges posed in waste management of PVC from all uses and in 2000 published a Green Paper on the environmental impacts of PVC.<sup>28</sup> The study confirmed the low rate of PVC recycling (less than 5%) and the particular hazards posed by additives and stabilisers in PVC which could leak from landfills and form dioxins in incineration processes. They projected the increase of PVC waste about to hit the waste stream as of 2010 and noted how PVC inhibits the recycling of other plastics. In short, the conclusion of the report was not favourable to the PVC industry and raised further alarms about the life cycle problems with this plastic.

PVC was dropped from the final lists of substances to be phased out in both the WEEE and the ELV Directives. **However the fact that PVC is a significant source of global dioxin and is extremely difficult and costly to recycle means this material should be ripe for Producer Responsibility legislation in the future.** The impending PVC waste crisis about to hit should not be the responsibility of local authorities to deal with, particularly as the logistics, costs and environmental threats are considerable.<sup>29</sup>

#### **Case Study: Lack of information on hazardous substances hampers phase-out**

*"No lessons have been learned from the fridge fiasco and EU legislation to phase out polychlorinated biphenyls (PCBs). No one knows which products contain PCBs – especially old end-of-life products which were produced perhaps 10-20 years ago. In Germany and France, WEEE operations remove all capacitors and dispose of them separately. But, in the UK, PCBs in WEEE are ignored."* - John Redmayne, UK recycling NGO CREATE<sup>30</sup>

This example illustrates the problems in implementing EU legislation on recovering ozone-depleting substances e.g. CFCs from old fridges and PCBs from the waste stream, because there is no information about which appliances contain these banned substances. This example also shows the divergent implementation policies in EU Member States.

New refrigeration appliances now clearly state the composition of the insulation foam as well as the refrigerant gas used in their manufacture. The lack of information on the composition of old appliances was illustrated during **the implementation of the ODS (Ozone-depleting substances) regulations in the UK. No record had been kept by the manufacturers as to which gases were phased out and when; nor were the appliances labelled accordingly.**

**EU legislation to recover PCBs from the waste stream<sup>31</sup> has been even more difficult to implement.** No one knows which appliances contain PCB capacitors which were phased out in appliances 20-30 years ago and attempts to produce accurate lists of PCB capacitors to allow hand sorting have proved futile. **In Germany, WEEE operations remove all capacitors and dispose of them separately as hazardous waste but in the UK, PCBs in WEEE are ignored.**

Germany adopted a precautionary approach in that they remove all capacitors over 5mm in height and, in the absence of being able to identify which ones contain PCBs, they **dispose of all capacitors as if they contain PCBs.** At some point they will be bearing a very high cost for this - eventually PCB capacitors will be less than 1% of all those removed. Although no PCBs have been used in German-produced capacitors since around 1982, it is impossible to know if components used for repair or imported components contained PCBs. **In Germany, capacitors collected from WEEE are stored in steel barrels and transported as hazardous material to be dumped in an old salt mine near Frankfurt am Main.**

### **Anticipate Industry Opposition to further material phase outs**

Industry's initial reaction to the proposed phase outs in draft European EPR legislation was hostile. Hazardous material phase outs in the ELV Directive proved contentious with the German car lobby and the American Electronics Association threatened a WTO challenge of the WEEE directive.

The German car lobby and German members of parliament advocated a delay on the control of hazardous substances by requiring further risk assessment on substances already well studied (eg. lead, cadmium) as well as extensive derogations.

To counter this opposition European Environment groups and some European governments berated the German politicians for siding with the car industry. The feasibility of phasing out heavy metals in cars was subsequently proven in a study which demonstrated the feasibility of phasing out heavy metals such as lead in motor vehicles. The study concluded exemptions were not necessary for lead in wheel balancing weights or in concentrations of 1-4% in aluminium alloy for engines, both of which had been demanded by the parliament. Alternatives for the weights were available, and "technically possible" The importance of the study was underlined by a US study which had found up to 20 kg of dislodged weights over a four-mile stretch of road which had contributed to lead in groundwater exceeding safe drinking water levels by 10,000 times. (REF)

### **EXAMPLE: US Government threatens WTO challenge**

“The US Trade Representative has no right to lobby on behalf of corporations against the interests of the American public. We are offended to learn that the USTR and the American Electronics Association are using the World Trade Organization to undermine important and beneficial environmental initiatives.”  
- Coalition Letter to Vice President Gore, May 12, 1999. Campaign for Responsible Technology. San Jose, California.

The US Trade representative to Brussels actively campaigned against the hazardous material bans in both the ELV and draft WEEE directives. In 1999 the American Electronics Association outlined in a memo to the European Commission the two main elements within the draft WEEE directive which they believed would conflict with trade rules under the World Trade Organization. In particular they claimed the substance bans would be a technical barrier to trade; the requirement that treatment facilities outside of the EU would have to comply with certain standards would violate articles within the General Agreement on Tariffs and Trade (GATT); and that design and material choice rules in the draft directive would be an invitation to future trade disputes.<sup>32</sup>

The Commission held firm on the hazardous material phase outs after legal consultation with their own advisors but did drop the requirement for 5% recycled plastic in new products, whose purpose was to stimulate the market for secondary plastics. Meanwhile a coalition of various American NGOs lobbied in support of the draft Directive and called on Vice President Gore to “reign in USTR’s interference in the legitimate environmental decisions of the European Commission.”<sup>33</sup>

**The Restriction on Hazardous Substances Directive and the substance bans in the End of Life Vehicles Directive were successfully passed into law and now apply to all producers and importers into the European market.**

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## **5. Ensure the producer is clearly defined.**

The assignment of responsible parties in an EPR system should reflect who has the most influence over the product’s design decisions so the focus needs to be clear. The producer does not necessarily mean the brand owner as demonstrated in the German packaging ordinance.

**The German Packaging Ordinance of 1990** was the first national implementation of EPR. Under the Ordinance, producers and distributors are the responsible parties for compliance. The “producer” is defined as one who produces packaging or packaging material. The term “distributor” is defined as any individual who places on the market packaging, packaging materials or goods contained in packaging. Distributors include not only large retailers, but also small businesses, such as bakeries, butchers, which introduce “non-shelf” packaging in the form of paper or plastic wrapping.

The distributor (retailer) has the initial responsibility for the take-back of packaging from the consumer. Distributors must also provide containers for customers to deposit the unwanted secondary packaging.

Distributors and producers must then ensure that the material is recycled or re-used in accordance with the requirements of the Packaging Ordinance. The distributor may be released from the initial responsibility for take-back of sales packaging through participation in a producer responsibility organization (PRO) scheme. The PRO established in Germany was the Duales System Deutschland (DSD).

Identifying a final producer is complicated by the fact that packaging is a product sold with a product. Ultimately, **the filler, or the brand name owner, is the last point of production before retailers, and is the most accessible party. Thus fillers are financially responsible and have assumed the role of final producer in the implementation of the legislation, even though the filler is not a packaging producer.**

Therefore, Coca Cola will be the ultimate party responsible for complying with the refillable goals within the packaging ordinance, or Proctor and Gamble, will be responsible for ensuring compliance with the recycling targets for its detergent packaging. In this case the individual fillers joined forces to form a Producer Responsibility Organization, or PRO, to ensure the refillable and recycling targets are met. The retailers, on the other hand, are legally responsible for packaging take back and this has allowed them to exert considerable pressure on packaging producers to reduce the amount of packaging on their shelves.

#### **The EU Directives on WEEE and ELV define producer as the brand owner or importer**

The **ELV Directive** defines: "producer "as the vehicle manufacturer or the professional importer of a vehicle into a Member State.

The **WEEE directive** defines producer and distributor as:

"producer" means any person who manufactures and sells electrical and electronic equipment under his own brand, or resells under his own brand equipment produced by other suppliers; or imports or exports electrical and electronic equipment on a professional basis into a Member State

"distributor" means any person who provides electrical or electronic equipment on a commercial basis to the party who is going to use it

Similarly the government in **British Columbia** defines producer as either a brand-owner of a product or package located in the province, or the first importer into the province.

**6. Is responsibility allocated collectively or individually? Design the system to allow as much feedback to the producer as possible.**

**"A producer, as well as an importer, should assume financial responsibility for the recycling of the products intended for households. This will encourage design for the environment in product development, as well as competition in the waste/recycling industry."**

- Electrolux, HP, Ericsson, ICL, Nokia, IBM, Gillette, Sun Microsystems, Intel and Agilent Technologies. May 23, 2001

Individual responsibility is practiced when a producer takes responsibility for the end-of-life management of his/her own products; whereas collective responsibility involves producers of the same product group fulfilling their responsibility for end-of-life management regardless of the brand name. In general, individual responsibility is favoured by industry leaders; collective responsibility, by the laggards.

Progressive companies that have redesigned their products to facilitate durability, repair, re-use, disassembly or recycling want to reap the benefits of this redesign through **individual** responsibility, by taking back for recycling only their own products.

When the WEEE Directive was being drafted a variety of companies lobbied extensively for individual responsibility including The American Electronics Association (Europe) along with Apple Europe, HP, Intel, Nokia, Sanyo, Sony.

Since the passage of the WEEE Directive Electrolux, Braun (Gillette), Hewlett-Packard and Sony - announced in December 2002 that they intend to keep their compliance costs down by establishing a joint procurement initiative for WEEE recycling known as the "European Recycling Platform".

These companies want the freedom in the future to collect and recycle just their own appliances. In particular, the group wants to avoid systems in which producers have to belong to a single compliance scheme and pay a mandatory visible fee on new products to pay for the recycling of "historic" waste. Such systems operate in countries which have already introduced take-back legislation - Belgium, the Netherlands, Sweden, Norway and Switzerland. The group hopes that each of the remaining Member States will adopt its model and allow producers to establish clearing houses which give them control over the take-back chain.<sup>34</sup>

One of the concerns about collective systems is that they provide no feedback loop to individual producers to design better products. However, individual

responsibility is impractical for some waste streams, such as those containing orphan products or packaging, which is highly mixed, disposed of in high volumes, by many actors within a short time. In the case of the PRO established for managing packaging carrying the Green Dot symbol, the differentiated fees that producers must pay do influence the choice of materials and this has been a major impetus for less packaging and change to more recyclable materials in packaging.

In the case of historic waste the potential for design changes are irrelevant – which is why the WEEE Directive allows collective responsibility with a visible fee for a period of 8 to 10 years.

However the operational ease of a collective system is tempting. The question remains:

if end of life products are collected together and then **sorted by brand**, would this provide sufficient feedback to individual producers? In fact sorting does occur in some collective programs already. In the Dutch EPR system for WEEE sorting by brand is coordinated by the PRO.

Under the Japanese EPR programs for four large appliances (TVs, washing machines, air conditioners and refrigerators) the prominent producers formed two groups, each of which established separate collection points. Discarded products are sorted by brand and sent to the respective regional collection stations. From there the companies have two systems. One group tends to use existing recycling plans and aim to achieve the recycling level stipulated by the law, while companies in the other group aim to establish their own recycling plants, carry out recycling themselves and strive to achieve higher recycling rates. One rationale given is that they anticipate higher mandatory recycling rates in the future. It is interesting to note that all the prominent manufacturers in both groups established and managed at least one recycling plant themselves to facilitate communication between the upstream and downstream and to grasp the actual recycling costs.<sup>35</sup>

In the Swiss EPR program for WEEE, sorting of products by specific brand has been done upon request of these brand owners. The sorted products are sent back to producers, instead of being sent to recyclers.<sup>36</sup> It remains to be seen how the companies within the newly formed 'European Recycling Forum' will in the months ahead work out the logistics of their individual responsibility.

### **The potential problem of monopolies under collective responsibility**

Some governments may feel that a single PRO is dangerous in that it could lead to a monopoly situation with no accountability. It is important that government oversight be maintained and that full accountability be transparent.

Research<sup>37</sup> reveals that collective systems are vulnerable to becoming a monopoly, as the strong negotiation power of the collective body often makes it difficult for producers to establish an alternative solution. For example, a company that provides services related to the collection and recycling of used IT in Sweden, wishing to establish an alternative collection system, requested consultations with municipalities. However the consultations were refused, on the ground that a PRO that represents the majority of EEE producers had already established collection depots. After 9 months of strenuous communication efforts to the municipalities, as well as consultation with the national environmental agency, some of the municipalities finally started to respond and came to an agreement with the company. The company has now established 100 collection points where the products of their members can be returned separately from the rest of the WEEE.

The DSD, the PRO established in Germany to handle the Green Dot system has been challenged as a monopoly as well. However the power of the DSD was limited by powers of the States and municipalities. The requirement for co-ordinating with existing waste handling systems weakened the position of the DSD in negotiations with local and municipal waste managers, since the latter set standards and prices for waste contracts.

Critics argue that the DSD has created profitable waste management monopolies for private waste managers and municipalities, at the expense of consumers. The EU filed a cartel complaint against the DSD, for providing sorted material to recyclers at no costs. As a result, recyclers now have to pay for materials with a positive market value and the DSD requires rebates from waste managers for materials sold.

## **7. Ensure the producer is financially and/or physically responsible for recycling costs**

In most EPR programs the producers pay for the costs of transportation of end-of-life products from municipal collection points to recycling facilities as well as the actual costs of recycling and treatment. The producers 'pay', either by absorbing the costs and distributing the costs throughout the product chain or by placing the cost onto the product price through a visible or invisible fee.

In the **WEEE Directive**, producers are responsible for the costs of collecting WEEE from collection facilities and for sorting waste products for reuse or for recycling and recovery.

For new products (i.e. those put on the market after 13 August 2005), producers have "**individual responsibility**" i.e. they must pay the cost of managing their own products. They can do this through programs set up by individual companies

or through participation in collective schemes. No visible fees are permitted to fund the management of waste from new electrical and electronic products.

When producers put a new product on the market, they must provide a financial “guarantee” that waste management of the product will be paid for. Producers can make good this guarantee by participating in a PRO, paying recycling insurance, or setting up a special bank account for this purpose.<sup>38</sup>

In the **German Packaging Ordinance**, the costs of collecting and sorting, of packaging waste is covered by the licensees (mainly fillers) through the Green Dot fee paid to DSD. Some of the DSD revenues are used to subsidize the recycling of plastics. This license fee is passed on to the consumer in the product cost. However, to reduce the Green Dot fees and remain competitive, fillers have sought to reduce the amount of packaging and to change the packaging material. Since composites and plastics carry a higher Green Dot fee, fillers have an incentive to move away from these materials.

The costs of recycling packaging waste is borne by the material industries, e.g. glass, paper etc. Consumers are required to dispose of Green Dot waste in special yellow bins, provided by DSD.<sup>39</sup>

### **Examples of different Fee systems**

In the **Swiss national EPR system for office equipment and consumer electronics**, consumers pay a **visible** advance recycling fee (ARF) which is levied on new products and paid for at the point of purchase. The fees are collected by retailers and are forwarded to the OEMs which use the revenues to pay SWICO, the PRO, for recycling of end-of-life products. The fee covers the costs of collection, transport, recycling and administration of all end-of-life products, including historical and orphan products. The ARF differs depending on the product price e.g. a PC and monitor costs around US\$7; the ARF for TVs is US\$12-42. Since the EPR program was introduced, the ARFs have been reduced twice. Consumers are required by law to return end-of-life products for free..

In the **Norwegian EPR programme for WEEE**, adopted in March 1998, the producers and importers pay fees to the PRO, Elektronikkretur, based on the current market share. These fees are internalised in the product price and are invisible to the consumer. The fee covers the costs of collection, transport and recycling. Consumers are able to return WEEE free of charge.

In the **Swedish national EPR programme for WEEE**, which came into force in July 2001, the consumer pays a fee at the point of purchase. For example, the fee on TVs is US\$ 3-8. The fees are used by the PRO, EI-Kretsen to cover the costs of collection, transport and recycling. Consumers can return WEEE free of

charge to the retailer when purchasing new products or local government collects from those not buying new products.

In **Japan** producers have the responsibility to recycle their electronic products either themselves or delegate their responsibility to the third party. Consumers pay the recycling fee by purchasing a recycling ticket either at the retailers or at post offices. These fees are then transferred on a monthly basis to the producers. The fee is standard for the type of product. Air conditioners are between 24 -31 euros; TV sets 19 – 25 euros; refrigerators 32 – 39 euros and washing machines 17 – 23 euros (one euro is about 1.13 USD). However **the level of the fee is considerably lower than recycling costs and manufacturers absorb the difference in received versus actual costs of recycling.**<sup>40</sup> **This is important to note for municipalities who may be considering simply placing an advanced recycling fee on products and bypassing the responsibilities of the producers. Not only does this totally absolve companies of any responsibility but the municipality may end up picking up the tab for costs not covered by the fee. Moreover, absence of feedback to the producers will not spur product redesign to facilitate reuse and recycling.**

To ensure future waste management costs will be paid even if a company goes bankrupt, **the auto industry** must pay into an insurance fund or provide a guarantee that these payments are ensured.

Under the **Swedish** program, manufacturers and importers of cars established individual internal funds that are set aside for future recycling. One car producer sets aside USD 121 when selling a new car to cover the recycling costs when the recycling target is increased to 95%. In Sweden fees for the future recycling costs of new cars are managed independently by each manufacturer, whereas the recycling costs for existing cars are paid for by the common car scrapping funds collected from the sale of new cars. Thus, the price of a new car in Sweden will bear both the recycling costs for an old car which is deposited in a common car scrapping funds plus the recycling costs of its own fund.

## **8. Ensure producers are responsible for historic waste**

Most EPR legislation around the world makes producers retroactively responsible for historic waste, including orphan products, whose producers have gone out of business. This issue applies only to EPR programmes for long-lived products, like WEEE and end-of-life vehicles, and not to short-lived products like packaging.

**The Swiss EPR programme for WEEE** uses advanced recycling fees paid by customers when purchasing new products to cover the costs of historical and orphan products. **The Norwegian EPR law for WEEE** requires retailers to

accept on an old-for-new basis, including orphan products. Producers and importers pay fees to the PRO, Elektronikkretur, based on their current market share. These costs are internalised into the cost of the product and passed onto consumers. Revenues to Elektronikkretur are used to cover transport and recycling of historical and orphan products.

The **ELV Directive** makes no reference to historical waste, except in relation to vintage cars which are excluded from the scope of the Directive. This is because all cars on the market bear the name of the producer and all will need to comply with the provisions of the Directive. Thus, it requires car makers to pay the costs of recycling both existing and new cars.

Retroactive responsibility for ELV faced heavy opposition both from the car industry and the European Parliament, during negotiations on the ELV Directive. Ultimately, it was agreed that manufacturers will pay "all or a significant part" of the costs of a free take-back and recycling scheme for "new" cars put on the market from 2001, rather than enjoying the eighteen-month delay that parliament had wanted to introduce. Carmakers will have the same responsibility for "existing" cars put on the market before 2001. It is this provision which had become the central point of dispute in talks over the directive, with Europe's car industry protesting that any retroactive responsibility would be illegal and financially crippling.<sup>41</sup>

**The WEEE Directive** distinguishes between "historical" waste i.e. products put on the market before 13 August 2005 and "new" WEEE i.e. products put on the market after 13 August 2005. It makes producers retroactively responsible for historical waste.

For 'historical products', the costs of waste management are to be shared collectively by all producers in existence at the time those costs are incurred.

The responsibility for the financing of the costs of the management of WEEE from products put on the market before the date referred to in paragraph 1 (historical waste) shall be provided by one or more systems to which all producers, existing on the market when the respective costs occur, contribute proportionately, e.g. in proportion to their respective share of the market by type of equipment.<sup>42</sup>

With collective responsibility, companies share the costs of managing WEEE based on market share, and therefore, do not benefit from any design changes that facilitate reuse or recycling. Current producers will be able to recoup some of this cost through a visible fee on new products at the point of sale for up to eight years, and for up to ten years for large household items such as fridges.

However no visible fees are permitted to fund the management of waste from new electrical and electronic products.

There is an overlap period during which producers must provide a financial guarantee that the waste management costs of new products put on the market will be paid for, while they may also impose a “visible fee” (one that is explicitly designated, perhaps on the price tag) to cover the waste management costs of historical products. Some products may therefore bear a double financial burden for waste management during this period. The visible fee will phase out in 2013 for large appliances and in 2011 for all other electrical and electronic equipment.

Industry fought the provisions of the WEEE Directive which make current producers responsible for historical waste, including orphan WEEE, whose producers have gone out of business.

The European Association of Consumer Electronics Manufacturers claimed that the decision to make producers responsible for historic waste “highly disappointing and unfair because it will oblige responsible producers to pay for cleaning up the waste of free-riders and competitors that have gone out of business.”<sup>43</sup>

However other countries who had EPR programs established before the WEEE directive was being negotiated had already dealt with this issue.

For example in **Belgium**, national EPR legislation for WEEE was introduced in 2001. It allows for the use of a visible fee of some €20 for a fridge, €16 for a TV and €3-4 for a PC (fee on PC is lower because of high inherent value of precious metals). Revenues from the visible fees go to the producers. Some of these revenues are used to pay local authorities and transporters to bring WEEE to recycling facilities. The remainder of revenues from visible fees are used by producers to build up funds for future WEEE obligations and to pay for treating historical waste.

In **the Netherlands** a law requiring EPR for WEEE has been in effect since 1 January 1999. All white and brown goods and grey goods (IT equipment) have to be taken back and from 1 January 2000 this applied also to all small appliances. The law bans land-filling and incineration for WEEE and includes historical waste.

The municipality has to collect all WEEE from the end user, even orphan products. The take-back scheme is funded by an up-front product fee, paid by the first owners of a product.

Revenues from the fees flow to a foundation and have been used for setting up and running the take-back system and to cover costs of transport, sorting,

processing of WEEE, overheads, promotion and provision of a buffer for unexpected costs. For example, the Dutch have found some 25% of IT equipment collected to be orphan products. The extra costs of processing historical and orphan IT products are charged to the OEMs by the processor/recycler.

Product fees vary by product and in the case of IT equipment are based on actual recycling costs. For example, the product fee for a PC (30kg) is around US\$14; for fridges around US\$15 and for TVs some US\$12.50.

The computer industry in The Netherlands opposed the collective or pool system and product fees. According to Hewlett Packard in the Netherlands, manufacturers of PCs wanted a direct link to end-users. HP sees it as a disadvantage in the Dutch system that producers have taken on responsibility for orphan products.<sup>44</sup>

This issue of who pays for historic waste is in the end a political decision. One could argue that producers have reaped profits from previous sales and this is simply a retroactive cost internalization. One could also question if it is fair for present day consumers to pay a fee for handling historic waste. However the question is, if not consumers, who? Taxpayers? One could argue that placing the fee on today's products will spur even more efficiencies in recycling systems set up by producers.

## **9. Make sure the role of the central Government, local authorities, retailers and consumers is clearly defined. In particular who collects? And who pays for collection?**

The responsibility of government and local authorities within an EPR program is generally to oversee the system, ensure consumers are able to return their products in an easy manner and enforce the recycling and recovery targets. This is sometimes referred to as 'shared product responsibility'. The issue of collection has been a contentious one in some countries and generally the physical responsibility for picking up end of life products from households is covered by municipalities. The revenue needed for the collection system can either be paid by taxpayers, industry or a combination of the two.

Retailers are usually an integral part of the take back system for consumers accepting 'old for new' equipment. They may be reimbursed by producers for their services, or not, depending on their bargaining power.

The responsibility of the consumer is to comply with the take back requirements, eg not to throw out targeted end of life products into the general municipal waste collection. It can also mean taking end of life products to established collection points. Finally, of course, the consumer usually ends up paying the recycling

costs either through a visible fee or fee hidden within the product price. In most countries consumer take back is free of charge, but consumers in Japan pay the recycling fee when they deliver their old product for recycling.

The **German Packaging Ordinance** makes producers viz. fillers and retailers financially responsible for paying for management (collection, sorting and recycling) of packaging waste. However, it is the retailers and the DSD which are physically responsible for collecting sales packaging: retailers take back secondary packaging at the point of sale and DSD collects packaging waste from yellow bins provided to households to deposit their packaging waste marked with the Green Dot. Under the Ordinance, the licence holders (fillers) pay for collection and sorting while the material industries (e.g. glass, paper) pay for recycling, with the exception of plastics, whose recycling costs have been included in the fees.<sup>45</sup>

The EU's EPR Directives as framework laws do not allocate any responsibilities specifically to local authorities or consumers, but are addressed to Member States and producers. The **WEEE directive** requires Member State to provide for collection of WEEE free of charge from households and to inform consumers on the correct disposal of end-of-life products. How Member States then dispense this obligation is left to them. However, in negotiations on the WEEE Directive, producers and recyclers lobbied aggressively to be absolved of responsibility for collection of WEEE from households.

The European consumer electronics manufacturers argued in a press release June 7, 2001:

« The text [of the draft WEEE directive] regulating producers' financial obligations leaves many loopholes and uncertainties and will inevitably lead to a fragmented Internal Market. Most worryingly, Member States will be free to oblige producers to fund the collection of waste electrical equipment from private households. **"This decision is completely inconsistent with the original aim of this directive, which is to give producers an incentive to improve the eco-design of electrical equipment in the future »**

In practice, most EPR programs require local authorities to physically collect waste products from households. As to who pays is another matter.

### **Who pays for the collection of packaging waste in Europe?**

In Europe **industry pays** for collection of packaging waste in Austria, Belgium, Germany, France, Portugal, Spain and Italy. In Sweden industry both pays for and collects all packaging waste. Only in Denmark and the Netherlands do local authorities both pay for and collect packaging waste.

The European WEEE directive requires that by August 13, 2005, member states must ensure that there are systems in place, financed by producers, to separately collect waste electrical and electronic equipment from end users. By December 31, 2006, this equipment must be separately collected from private households at an average rate of at least 4 kg (8.8 lbs) per person per year. The EU will set a new target by December 31, 2008. Convenient collection points must be set up where municipalities can deposit waste equipment collected from households or consumers can return their waste equipment free of charge.

### **It's Chaos if you don't plan well!**

What the WEEE directive does not clarify is who pays for collection. Therefore there will be a variety of systems established and already there is contention between industry and municipalities already strapped for cash. Some municipalities are arguing that the producers should pay part or all of this cost. The UK is a case in point where the government has failed to adequately plan for the upcoming directive on WEEE and this has created concern and chaos among local authorities, retailers and industry representatives.

“ All the civic amenity sites in Lancashire are bursting at the seams, the council tax has just gone up by 20% to fund curb side recycling schemes, and most councils are nowhere near meeting their statutory recycling targets for household waste.” - Representative of Lancashire County Council in the UK at WEEE conference, quoted in ENDS June 2003.

Whereas Sweden, Switzerland the Netherlands, Belgium and other EU countries took proactive steps to deal with e-waste, the UK is now scrambling to implement the directive. As one committee observed:

Negotiating and implementing EU legislation seems to be viewed ...as a painful chore rather than as a positive opportunity for change, with the Department adopting a least short-term cost attitude.<sup>46</sup>

Local authorities in the UK argue it is unfair their council tax payers should pay, rather than manufacturers and consumers. However the electrical goods industry is determined it should not pick up the bill. As well as cost concerns, local authorities in the UK are worried about the practical implications of the directive, in part because many civic amenity sites are too small to serve as suitable collection points and they are too dispersed or not numerous enough in high density population areas. Also staff at these sites may need to be trained to assist the public in recycling WEEE since throwing equipment into a skip will break possibly valuable components which could be reused and recycled.

The councils have stated that "administratively, it is going to be a nightmare," and have called for "urgent, serious, detailed discussions with government" to thrash out the details of the directive's implementation. They warn that if the government is slow to provide guidance on the implementation, it will jeopardize the recycling industry's ability to expand its capacity on time.

A lack of confidence in information about the current infrastructure and recycling rates for ELVs and WEEE and about the treatment standards that will be needed is discouraging investment in critical parts of the infrastructure. Strong concerns are expressed by retailers about in store take back of old appliances and the problems this will cause. The government should either make a more convincing case on the issue or do more to help retailers develop alternatives. --Task Force on UK Governments' Better Regulation.<sup>47</sup>

Retailers in the UK are also concerned about their likely role in collecting waste and claim this will be burdensome. The directive says customers can return old products to retailers if they are buying the same type of item - although member states are allowed to opt out of this provision provided that the return of appliances is not thereby made harder for householders and that alternative routes, such as kerbside collections or pre paid envelopes for small items, are also free of charge.

Previous lack of planning for adequate recycling of old refrigerators cost local authorities, and ultimately central government, 40 million pounds (64 million dollars) in storage costs due to the delay in the construction of recycling plants and they do not want to see the same fiasco occur for e-waste.

**However, other countries have got it right.**

In all existing European national EPR programmes, local authorities play a role in the collection of product waste from households<sup>48</sup>

In the **Swiss EPR programme for waste office equipment and electronic products**, collection from households is shared between retailers, producers (OEMs) and local government.

**Norway's implementation of its EPR law for WEEE** adopted in March 1998 has collection from the consumer shared between retailers, OEMs, local government and waste management companies. The proportion of WEEE being retrieved by retailers has risen from 25% to around 50% as retailers have become happier with their take back obligations.

In the **Dutch EPR law for ICT equipment** (grey goods), introduced in 1999, some 95% of waste ICT equipment is collected by retailers, when customers return old equipment when purchasing replacements (old for new). The remainder is collected by municipalities. However, implementation of the Dutch

EPR law for appliances, TVs and stereos (white/brown goods) has resulted in retailers collecting just 10% old for new, with the remaining 90% left for municipalities to collect.

In the **Swedish EPR system for WEEE** (except fridges and freezers), retailers & OEMs collect WEEE when consumers buy new products and local government collects for those not purchasing new products. Also the PRO, El-Kretsen may organize collection, but local government still pays for collection.

In **Japan**, implementation of the Specified Home Appliance Recycling Law, has resulted in retailers collecting 80% of large electrical appliances; municipalities collect the remainder.

## **10. Ensure the producer supplies adequate information to workers, recyclers and consumers.**

EPR will require better information flow between all the stakeholders: producers, suppliers, consumers and regulatory authorities.

Information flow between producers, suppliers and recyclers up and down the supply chain will need to be improved to enable the recycling targets set down in EPR laws to be met. For producers, this means finding out from suppliers about what substances/materials they are using to enable producers to label the materials used in components and products e.g. the type of plastics, which will in turn facilitate the work of recyclers. Good information flow within the supply chain will be **essential to ensure that substances banned in EPR legislation are not being used in components, sub-assemblies and products.**

Outreach will also be required to consumers, to ensure that they dispose of the end-of-life equipment in the appropriate manner to enable the collection targets set down in some EPR legislation to be met.

Other types of Information will need to be provided to regulatory authorities to enable them to monitor compliance with the collection, re-use/recycling targets stipulated in EPR laws. Producers and recyclers will need to provide authorities with data on the amounts of end-of-life products collected and re-used/ recycled.

The **WEEE directive** requires Member States to provide households with information about the requirement not to dispose of WEEE as unsorted municipal waste and to collect WEEE separately, and about the collection systems and their role in the management of WEEE. This requires that “new” products bear a label that

- (1) verifies that it was put on the market after 13 August 2005;
- (2) verifies that it will be separately collected, and
- (3) bears the name of the producer.

Producers have to provide information to consumers on the collection systems available and on the environmental and health impacts of hazardous substances contained in WEEE. They must also provide information to recyclers to facilitate the environmentally sound reuse, recycling and treatment of WEEE. Such information includes the identity of components and materials and the location of dangerous substances inside a product.

As for how the take back scheme is to be publicized to consumers, the EU allows member states to sort this out between local authorities and industry.

In **Japan**, producers must announce the location of the regional collection points by putting the names of the company and address on daily newspapers. They are also found on the homepage of the industry association's website.

In the **Netherlands** information responsibilities are shared by municipalities and the PROs. Information tools include leaflets, TV commercials, websites, posters at bus stops and free telephone service. The PRO provides leaflets and newsletters to the retailers. 10% of the recycling fee is used to pay for this information service.

**The ELV Directive** requires that producers provide coding standards and dismantling information as well as recycling information.

To enable record-keeping and reporting to the European Commission, Member States must ensure that the car industry publishes information on:

- the design of vehicles and their components with a view to their recoverability and recyclability,
- the environmentally sound treatment of end-of life vehicles, in particular the removal of all fluids and dismantling,
- the development and optimisation of ways to reuse, recycle and recover end-of life vehicles and their components,
- the progress achieved with regard to recovery and recycling to reduce the waste to be disposed of and to increase the recovery and recycling rates.

The producer must make this information accessible to the prospective buyers of vehicles, which needs to be included in promotional literature used in the marketing of the new vehicle.

Ford has taken advantage of its information responsibility in Europe through aggressive advertising<sup>49</sup>

Motor manufacturer Ford has launched an environment and safety labelling scheme for new cars sold in Europe giving consumers information on fuel economy, recyclability and emissions of carbon dioxide (CO<sub>2</sub>) and other pollutants. The company claims to be the first to take such an initiative voluntarily. It hopes its label will become a "template" for other firms.

Under an EU directive agreed late last year, new cars sold from next January will have to display fuel economy and CO<sub>2</sub> emissions information. Ford's initiative anticipates these rules, but also goes beyond them.

Ford labels will indicate **percentage recyclability of cars**. Under the draft end-of-life vehicles directive, the EU is due to legislate for an increase in actual recycling from 75% currently to 85% by 2015.

Introducing its plan in Brussels, Ford said it was hoping to contribute to harmonisation of labelling standards across Europe.

## **11. Mandate clear collection targets with deadlines**

The establishment of a successful collection system is the prerequisite for a successful EPR program.<sup>50</sup>

EPR programs with goals or mandates set by government for collection are able to produce higher results than those without such goals unless there are other significant incentives for consumers to participate.

Collection targets are typically set to increase the separate collection of the targeted waste stream or to reduce littering problems. Collection targets ensure that old end of life products such as defunct electrical and electronic equipment, are released from household storage, to enable maximization of the recycling infrastructure. To this end high collection rates rely on good public information campaigns. Different types of collection system can produce high collection rates as long as the resources are available to provide: 1) financial incentives to consumers, 2) convenience for consumers and/or 3) information for consumers.

Different ways of measuring collection rates exist. They can be calculated by the weight per cent of the total volume of a given material or product on the market or by a numerical weight goal per inhabitant.

### Collection Based on Percentage of Volume

**The German Packaging Ordinance sets targets for collection and sorting of packaging waste by individual packaging material** (i.e. glass, paper/carton, tin plate, aluminium, plastic and composites) Collection targets specify the weight per cent of the total volume of a given packaging material to be collected from the total amount in circulation.

To allow for start-up of collection, sorting and recycling activities, targets were phased in on a two-stage basis. Initial targets for 1993 required collection rates of 20% - 40% for all material except glass (60%). Targets for 1995 required collection of 80% by weight of packaging in circulation for all packaging material groups.

Despite the phasing in of targets, when the Packaging Ordinance was first introduced, the enthusiastic response from the public resulted in a mountain of waste, and a lack of domestic capacity to recycle it. The majority of this waste was exported and dumped abroad in France, Eastern Europe and Asia.

Domestic recycling capacity was due to come on line by 1998. However, in the interim, surplus material, especially plastics continued to be exported. For example in 1994, of the 461,000 tonnes of plastics collected, 256,000 tonnes (55%) were exported, primarily to China and European Community. After 1997, the export of packaging waste for recycling was banned.

By 1998, recycling of packaging waste had reduced the weight of waste going to landfill and incineration by some 66%.

#### Collection based on a unit of weight per person

**The WEEE Directive requires an annual waste collection target of 4kg/inhabitant to be achieved by the end of 2006.** The European Parliament had wanted a 6kg/inhabitant target to be achieved by 31 December 2005. Some critics argue that the 4kg/capita target is already being achieved by existing recycling programmes; hence, the Directive provides no incentive to increase collection and recycling rates. Others argue that using a weight based target, rather than a proportion (%) of electrical and electronic equipment on the market sends the wrong message and will not be achieved in some of the Accession countries of Central-Eastern Europe, that are due to join the EU in May 2004, because their consumption of EEE is still so low.

Another problem with weight based figures is that larger, heavier products will enter the waste stream and thereby meet the weight goal, whereas smaller EEE such as toothbrushes, drills, toys, alarm clocks and hair dryers may still be put into the municipal waste stream. This has proved to be a problem in a range of European countries.<sup>51</sup>

In May 2003, Hewlett Packard UK attempted to use the 4kg WEEE collection target as a ceiling on the amount of WEEE to be collected for recycling. They claimed "There is a danger of beating our target and it costing too much."<sup>52</sup> However this was rejected by the UK Government who ruled out any constrictions or setting ceilings on the amounts collected.<sup>53</sup>

## 12. Encourage reuse of whole appliances and components.

In the traditional waste hierarchy, reuse is seen as preferential to recycling. However, this priority is not always reflected adequately in EPR legislation. For example, both the EU's WEEE and ELV directives set no separate re-use targets.

Exceptions include Dutch national EPR legislation for WEEE which requires that reporting includes a re-use estimate as part of the notification process.

Another exception is the **German Packaging Ordinance** which sets strict re-use targets, by setting **quotas on the use of refillable beverage containers**. The Ordinance sets mandatory targets for recycling according to the waste management hierarchy, established by the Waste Act of: (1) avoidance or reduction at source, (2) re-use and (3) recycling. One of the key goals of the Ordinance is avoidance of packaging waste, which is prevented when packaging is produced so as to be refillable.

The Ordinance imposes a **minimum 72% quota for refillable bottles**. If the national market share of refillable containers falls below 72%, a mandatory deposit on beverage containers is levied. Statistics for 1998 and 1999 show that the market share for market share for all refillable drinks containers in Germany was 68.7%, down from 70.1% in 1998 and 71.3% in 1997.

Environment Minister, Mr Trittin, has reiterated the need for deposits on cans and 'one-way' glass and plastic bottles: "*If we don't put a stop to this trend at once, multi-path refillable systems will soon be relegated to niche market status, and cans and bottles will litter our countryside.*"<sup>54</sup>

Under the German packaging law, if breaches of the quota for refillables are officially recorded in two consecutive years, then mandatory deposits must be imposed on the offending one-way packaging systems.

When the market share of refillable drinks containers fell below this threshold, Germany introduced deposits from 1 January 2003 for all beer, fizzy soft drinks and mineral waters packaged in disposable cans or bottles.

This obligatory quota for refillables has been challenged by the European Commission as creating a barrier to the free movement of goods within the EU. In 1995, only 13% of drinks imported to Germany were sold in refillable containers, while 75% of drinks filled

in Germany used refillables. Germany is already facing two legal actions regarding the compatibility of its deposit and return system for one-way drinks packaging with EU law. In October 2003, the European Commission decided to start a legal infringement procedure, because it believes the system may constitute a "disproportionate barrier" to imported drinks.<sup>55</sup>

This is despite the fact that the deposit-return system has achieved its aim of boosting the market share of refillables by nine percentage points to 59% in the six months since being introduced. According to German Environment Minister Jürgen Trittin, the deposits created 14,000 new jobs connected with medium-sized, labour-intensive firms in brewing, specialised retail and wholesale. He believes that without the deposits, the refillables market would collapse, resulting in an extra 1.2m tonnes of waste per year. Even if current recycling rates were maintained there would still be 200,000 tonnes more waste.<sup>56</sup>

The **ELV Directive provides joint re-use and recovery targets**, linked to timelines, even though the preamble of the Directive states that preference be given to reuse and recycling. The proportion of end-of-life vehicles that, on average, is reused or recycled is estimated to be between 72% and 80%. The ELV Directive requires car manufacturers and importers to increase this to 80% by January 2006 and 85% by January 2015. It also sets recovery targets of 85% and 95%, respectively. Since recovery can mean waste to energy incineration, the directive fudges the re-use issue.

Likewise, the **WEEE Directive** although giving priority to reuse over recycling (in the preamble), sets **no separate targets for re-use of whole appliances**. It provides joint reuse and recycling targets. Initial drafts of the WEEE Directive actually discriminated against re-use.

Environmental organisations and community-based recycling groups across Europe lobbied for re-use and refurbishment of whole appliances to be given priority over recycling.

They pointed out that up to 90% of personal computers in the UK were being reused/refurbished, including whole appliances being resold or components being reused.<sup>57</sup>

To achieve a high rate of reuse, collection systems will have to be designed which avoid breaking up end of life products when delivered by the consumers.

### **13. Clarify what is meant by recycling and ensure the program has clear recycling targets with deadlines**

#### **Define recycling!**

Perhaps no word has been as abused and misused as "recycling". To recycle – to use again and again – is understandably popular; when properly done, it

reduces demand for raw materials, reduces pollution and waste and saves money. It holds an important place in the movement for environmental awareness since it is often the single easiest thing the average person can do to avoid creating environmental problems.

**Mechanical recycling** is the reprocessing of a waste material for the original purpose without changing the chemical structure of the processed material;

**Downcycling** reprocesses material from one product into another of inferior quality e.g. mixed plastic products into park furniture. There is no closed loop to the original product and the inferior recycled material often displaces more sustainable materials e.g. plastic posts replacing wooden ones.

**Chemical Recycling** means the reprocessing, other than organic recycling, of waste material for the original purpose by changing the chemical structure of the waste material and recycling the chemical constituents into the original material of the waste.

**Feedstock Recycling** means the same as chemical recycling but the chemical constituents are turned into materials other than the original material of the waste.

**Energy recycling, also called energy recovery or waste-to-energy recycling** although promoted as recycling is tantamount to incineration and only differs in that the heat energy is captured. For EPR programmes to be effective in stimulating product re-design, **it is important that all the low-cost escape routes for waste, including landfilling, waste exports and incineration – with and without energy recovery – are banned.**

The Dutch national law requiring EPR for WEEE bans land-filling and incineration for WEEE. Likewise, the original German Packaging Ordinance stated that **incineration with energy recovery does not count towards the recycling targets**. Later amendments permitted incineration under certain conditions, but also set a **minimum mechanical recycling target of 36%** (as opposed to feedstock recycling) **for plastics**.

**The European Commission outlines the problems of incineration and combustion of WEEE in smelters and steelworks and its rationale for banning certain hazardous substances in WEEE.<sup>58</sup>**

*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 Community.<sup>59</sup> Furthermore, the incineration of non-hazardous wastes has been identified as the largest source of emissions of dioxins and furans to air in Europe.<sup>60</sup>*

*The WEEE stream contributes significantly to the heavy metals and halogenated substances contained in the municipal waste stream. In addition, specific adverse effects could occur during incineration due to the variety of different substances found together in WEEE. Copper works like a catalyst, thereby increasing the risk of formation of dioxins when flame retardants are incinerated. This is of particular concern as the incineration of brominated flame retardants at a low temperature (600-800°C) may lead to the generation of extremely toxic polybrominated dibenzo dioxins (PBDDs) and polybrominated dibenzo furans (PBDFs)<sup>61</sup>*

*However, for a number of reasons end-of-pipe technology could not be considered as the only method to avoid emissions from waste management operations. Separate collection and treatment of waste streams, such as WEEE, contributes to a cleaner municipal waste stream and thereby a reduction in the emissions caused by the incineration or the smelting of WEEE containing heavy metals and halogenated substances. This is of particular importance in cases where the respective stringent emission standards are not implemented or are not applicable as in the case of metal smelters.*

*Hazardous emissions to the air result from the recycling of WEEE containing heavy metals, such as lead, mercury and cadmium, in steelworks and lead-copper smelters. Contaminated metal scrap increases significantly the emissions of these heavy metals, in particular mercury and cadmium, which are highly volatile. Filters, which might prevent such emissions are not technologically the state of the art, in particular as regards steelworks.*

### **Recycling of plastics and other materials containing banned substances**

A major problem with recycling many of today's discarded products is their hazardous material content and their content of mixed substances and materials. This is no where more apparent than in the problems with recycling WEEE plastics:<sup>62</sup>

- At least 10 basic polymers used in electrical and electronic equipment
- Use of blends such as ABS/PC
- Use of additives, fillers and fire retardants
- Use of adhesives and heat staking to join non-compatible polymers

Many plastic materials are impregnated with hazardous materials such as brominated flame retardants, organotins or endocrine disrupting phthalates. To perpetuate their reuse would extend their life throughout other product chains and lead to ongoing hazardous emissions. This problem has been addressed by the EU's EPR directives by requiring the phase-out of certain hazardous substances in products, to facilitate their safe recycling.

However, the problem of what to do with secondary materials recovered from ELVs (after 1<sup>st</sup> July 2003) and WEEE (after 1<sup>st</sup> July 2006) containing banned substances has still to be resolved.

**Develop a plan to handle hazardous materials and avoid their reuse.**

This is a difficult dilemma and one which has not been sufficiently researched.

What options are available to deal with the retired mercury, lead and other substances banned in cars and electrical/electronic products, under EPR laws?

The lead that is recovered from smelters after treating existing waste electric and electronic products or car scrap (containing lead) could be used in lead acid car batteries. Lead-acid batteries are currently absorbing some 60% of the total quantity of lead and are exempt from the Directive on End-of-Life Vehicles.

Sweden has a policy to phase out mercury from all products and this mercury should not be recycled but should be terminally disposed of in a safe and environmentally sound way. In May 2003, the Government proposed a legal requirement that waste containing at least 1 percent by weight of mercury should be stored permanently deep in the bedrock by 2015 at the latest.<sup>63</sup>

Brominated flame retardants banned in plastics used in electrical/electronic products from 1 July 2006 pose the biggest headache, particularly for plastics recycling.

The **Dutch** national EPR law for WEEE requires take back of white and brown goods from 1 January 1999 and all smaller appliances from 1 January 2000. Hewlett Packard tried to use plastic recyclate in new products, but the Dutch Environment Ministry (VROM) opposed this move due to the content of brominated flame retardants in old plastic.<sup>64</sup>

This echoes the concern of the European Commission and the reason why PBDEs (poly brominated diphenyl ethers) are phased out in new electrical and electronic equipment under the WEEE Directive (ref #61)

*Brominated Flame Retardants*

*Both dioxins and furans are generated as a consequence of recycling the metal content of WEEE, which also contain halogenated plastics.*

*Halogenated substances contained in WEEE, in particular brominated flame retardants, are also of concern during the extrusion of plastics, which is part of the plastic recycling. This is due to the fact that during recycling of plastics containing brominated flame retardants, brominated dibenzofurans and brominated dibenzo-p-dioxins may be formed. Various studies suggest that the risk of generation of dioxins is a reason for the*

*complete lack of recycling of plastics containing brominated flame retardants.*

*It has been demonstrated that personnel at an electronics-dismantling plant showed significantly higher levels of all PBDE congeners in their serum compared to a control group. The results of a Swedish study showed that decaBDE is bioavailable and that occupational exposure to high levels of PBDEs occurs at the electronics-dismantling plant. It could be argued that special protective measures could be implemented in order to address these occupational health problems. It is unlikely, however, that such measures sufficiently eliminate the exposure of workers. In addition, the coherent enforcement of such measures in all parts of the Community cannot be ensured.<sup>65</sup>*

In Lower Saxony, Germany, the recommended policy is that plastics containing halogenated flame retardants should not be used in other applications where such substances normally are not required. Plastics containing banned BFR are either sent for incineration or are allowed in other products where they can substitute "virgin" material. Neither is a good practice: the former can release brominated dioxins and the latter simply delays the eventual disposal problem.

The problem of BFRs in plastics has spurred industry research. In February 2003, Matsushita (Panasonic) announced a new technology for separating BFRs from plastics during recycling. The system has the potential to accelerate the recycling of end-of-life consumer electronics. The company plans to release a commercial version of the system by end of March 2004.<sup>66</sup>

#### **Once recycling is clearly defined targets must be set.**

While product design changes may be driven by the subtle shift of end-of-life responsibility to producers, the blunt instruments of recycling rate mandates and material bans that are part of certain EPR programmes account for much of the attention to product redesign.<sup>67</sup>

OECD report, 2001.

Recycling targets are typically set to ensure that collected end-of-life products are recycled and not simply disposed of in landfills and waste incinerators...or exported. In mandating recycling, EPR legislation aims to drive design changes and technical improvements leading to the reduction of environmental impacts of products.

The WEEE directive provides for joint reuse/recycling targets, based on the amounts of WEEE collected by weight. Article 3 defines "recycling" as the reprocessing in a production process of the waste materials for the original purpose or for other purposes, but **excluding energy recovery** which 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;

The WEEE Directive sets separate targets for reuse/recycling and recovery based on amounts of WEEE collected by weight. Recovery includes waste-to-energy incineration.

Member states must ensure that records are kept on the amounts of materials entering and leaving treatment, recycling and recovery facilities. The best available treatment, recycling and recovery techniques must be used. Member states must also ensure that treatment facilities obtain all relevant permits from the appropriate authorities.<sup>68</sup>

**Targets for WEEE Recovery and Reuse/Recycling, by weight to be achieved by 31 December 2006**

<b>Product Category</b>	<b>Recovery (%)</b>	<b>Reuse/Recycling (%)</b>
Large household appliances	80	75
Small household appliances	70	50
Information and telecoms	75	65
Consumer equipment	75	65
Lighting	70	50
Tools	70	50
Toys, Leisure, Sports	70	50
Medical equipment	NA *	NA*
Monitoring instruments	70	50
Dispensers	80	75

\* Target to be set by 31 December 2008

The Directive's mandated reuse/recycling and recovery targets are based on the amounts of WEEE separately collected by weight. However, there are no collection targets by product type, and it is possible that the target of 4kg per person per year will be met without some types of products being collected at all. For example, the recycling target of 65% for cell phones will be meaningless if a significant quantity of these products, which weigh relatively little, fail to be collected.

The reuse and recovery targets are to be revised in December 2008, after which they may be based on the amount of specific products on the market rather than the amount of WEEE separately collected.

**The German Packaging Ordinance sets targets for collection and sorting of packaging waste by individual packaging material** (i.e. glass, paper/carton, tin plate, aluminium, plastic and composites) Collection targets specify the weight per cent of the total volume of a given packaging material to be collected from

the total amount in circulation. Recycling targets are not set as such, but are understood to be identical to sorting quotas since all sorted materials are to be of recyclable quality and must go to recycling after sorting.

Amendments to the Packaging Ordinance proposed similar quotas as for 1995 but stated these in terms of percentage of the total packaging in circulation and **not on amounts collected as in the original Ordinance.**<sup>69</sup>

### **Recycling Targets established in the German packaging legislation**

<b>Packaging Material</b>	<b>From January 1996</b>	<b>From January 1998</b>
Glass	70%	75%
Tinplate	70%	70%
Aluminium	50%	60%
Paper/board	60%	70%
Composites	50%	60%
Plastics	50%	60%

In addition, **36% of the plastics target must be met by mechanical, as opposed to feedstock recycling.**

The original Ordinance stated that incineration with energy recovery does not count towards the recycling targets. Later amendments permitted incineration under certain conditions.

At the time the Ordinance was passed, recycling technologies and capacities were available for glass, paper/board and metal. The primary problem has been with plastics recycling. Available technologies were based on raw materials processes to convert waste plastics to new plastic products. However, to meet the plastic recycling targets, new processes had to be found for conversion of waste plastic and to create new markets for secondary materials. The emphasis in developing new technologies is on recycling to recover oils, gas and chemicals, using plastic depolymerisation processes and the use of plastics as a reducing agent in steel production.

For example, the company Klockner has developed a process which uses plastics as a reducing agent in steel production. Material is heated in a kiln to 2000°C in the presence of iron oxide. In the reducing atmosphere, polymers form gases which combine with the oxygen from the iron oxide to release elemental iron. Residual gases, like carbon oxides are recovered. Unlike incineration, reduction releases no heat but uses the energy produced within the system. Because of the molecular similarity of plastics to oils, the substitution ratio from waste plastic to oils is 1:1.<sup>70</sup>

This use of waste plastics is not true recycling, but a form of sophisticated downcycling. However, it is better than incineration, as it enables some of the constituents of plastics to be re-used.

In April 1997, the Fraunhofer Institute published an ecobalance for the various recycling routes available for waste plastics. The study was sponsored by DSD, GKV (the association of plastics converters) and VKE (the plastics producers association). The study supports the arguments put forward by the DSD and the plastics industry in favour of amending the recycling targets for plastics in the Packaging Ordinance. The study found that efficient feedstock recycling techniques and energy recovery are environmentally superior to poor quality mechanical recycling, but inferior to good mechanical recycling techniques.

A material flow analysis by DKR<sup>71</sup> shows that about one-third of the plastics channelled into mechanical recycling processes in Germany is currently used to substitute wood and concrete. The study suggests that feedstock recycling would be a better environmental option for such mixed plastics.

#### **14. Mandate the use of recycled content in new products to stimulate the market for secondary materials**

A key goal of all EPR programmes is to increase recycling rates. However, a major challenge to the achievement of this goal is the need to find markets for the recycled or secondary materials.

When the tough provisions of the **German Packaging Ordinance** first came into effect, they wrought chaos in international secondary raw materials markets, due to the massive addition of materials and subsequent drop in prices. Some of the players involved, particularly the waste management industry, saw the Ordinance as a good market opportunity and have turned it to their advantage.

In November 1992, 18 months after the adoption of the Packaging Ordinance, DSD conducted a survey of the then 8,600 Green Dot licence holders to examine the motives for optimisation of packaging. Of the 12% that responded 25% had increased the use of secondary materials, with 21% using more than 50% secondary materials. 60% of respondents showed no increase in the use of secondary materials 1990-1992, but one-third indicated plans to increase use of secondary materials during the period 1992-1994.

The EU's **ELV Directive** states that the development of markets for recycled materials should be encouraged. Article 4 (c) on Prevention requires that vehicle manufacturers, in liaison with material and equipment manufacturers, integrate an increasing quantity of recycled material in vehicles and other products, in order to develop the markets for recycled materials.

Some large companies are setting targets for plastic post-consumer content within their own products. For example, the automotive industry has introduced standards for recycled content to stimulate the market.<sup>72</sup>

Nissan recently became the first manufacturer to use the specifications, with half of its UK output now containing air cleaner housings containing recycled polypropylene retrieved from shredder waste.<sup>73</sup>

## 15. Plan for effective enforcement of the targets

A German study<sup>74</sup> outlines the three main requirements for an effective monitoring programme of take-back activities for long-lived goods:

- 1. It must provide the steering function of the take-back instrument for the (regulated) recycling and disposal of the specific waste streams.**
- 2. It must provide proof of the actual usage of recyclable materials and for the environmentally sound disposal of hazardous substances.**
- 3. It must show that producers' responsibilities for the prevention of wastes and improved design for recycling are being fulfilled.**

Take-back regulations in Member States with existing EPR laws differ from each other both in their choice of instruments and degree of specificity. Monitoring take-back of end-of-life vehicles in some European countries is based on rough estimates or extrapolations from a fairly small database causing a high margin of error. The most precise monitoring systems for take-back and recycling are the Dutch monitoring system for ELV and the German Dual System for packaging wastes (DSD). Both these systems comprise **three key elements**:

- the accounting of materials by each of the actors,
- a check through a central data bank, and
- random inspections of the facilities of the various actors.

The **WEEE Directive** requires Member States to establish a register of producers and collect annual information on the amounts (weights or numbers of items) of electrical and electronic equipment that are put on the market, collected, reused, recycled and recovered.

Member States must transmit this information to the EU Commission every three years. The EU will establish a standard format for this reporting. The first three-year report will cover the years 2004 to 2006.

On enforcement, the WEEE Directive requires that Member States establish inspection and monitoring systems and impose effective penalties for lack of compliance.

**The German Packaging Ordinance** provides for State control of implementation, reporting and compliance. The area for compliance is defined as the state in which packaging entered into commerce. The Ordinance requires that the mandated systems for sorting, separate collection and recycling of packaging waste be set up on the State level and demonstrate their capacity to meet the provisions of the Ordinance through reporting to State officials.

The provision allowing for PRO schemes, like DSD, requires that they be established and approved at the State level and provide “area coverage” or full services State-wide for regular and adequate collection, sorting and recycling. The system must demonstrate to the competent State authority, the capability to provide collection, sorting and recycling services in compliance with the Ordinance. A State’s failure to demonstrate compliance on a State-wide basis results in the withdrawal of the producers’ exemption from the obligation to take back packaging at the point of sale of the material in question.

To monitor achievement of the collection and sorting/recycling targets, data for amounts collected and sorted is recorded at the sorter. Collected material brought to the sorter is weighed on an incoming (collection) and outgoing (sorted for recycling) basis. Weights collected and sorted are recorded in the “quality stream document” which follows material to the recycler and is also provided to State authorities.

The data is reported annually to Federal Authorities to provide verification at the Federal level that States are complying with mandated quotas. Weight of packaging in circulation on a per capita basis, is reported in Germany every three years. Since initial material is initially separated into three waste fractions (glass, paper and light material), information on amounts of individual packaging material in the partially separated light fraction is based on local surveys of municipal waste bins, to provide statistical distribution profiles for the percentage of a given material relative to the overall volume of packaging.

Following the 1993 financial crisis of the DSD, efforts to control free riders and encourage the use of the Green Dot system were intensified under the consolidating plan. The DSD was given authority to require verification (by an independent accounting firm through examination of records) that amounts of packaging certified by licence holders as carrying the Green Dot were not exceeded. The DSD was also given authority to levy fines on companies using the Green Dot symbol on their packaging with paying DSD the licence fee. These efforts have eliminated most fraudulent free riding resulting from illegal use of the Green Dot symbol.

**The ELV Directive outlines a detailed reporting and implementation system.**

Member States have to report every three years to the Commission on the implementation of the Directive. The report needs to provide information on possible changes in the structure of the auto trade and of the collection, dismantling, shredding, recovery and recycling industries. This information will be used by the Commission to establish databases on end-of life vehicles and their treatment and to publish reports on the implementation of the Directive. The first report is to cover the 3-year period from 21 April 2002.

Member States need to ensure that the car industry publishes information on:

- the design of vehicles and their components with a view to their recoverability and recyclability,
- the environmentally sound treatment of end-of life vehicles, in particular the removal of all fluids and dismantling,
- the development and optimisation of ways to reuse, recycle and recover end-of life vehicles and their components,
- the progress achieved with regard to recovery and recycling to reduce the waste to be disposed of and to increase the recovery and recycling rates.

Member states must implement the Directive through agreements with the industry which:

- meet the objectives of the Directive
- are enforceable;
- specify objectives with the corresponding deadlines;
- are accessible to the public;
- ensure that the results achieved under an agreement are monitored regularly, reported to the competent authorities and made available to the public;
- enable the competent authorities to examine the progress reached under an agreement;

In case of non-compliance with an agreement Member States are required to implement the provisions of the ELV Directive by legislative, regulatory or administrative measures.

The **Netherlands** uses a direct link between on-line deregistration and the road tax which allows a precise counting of all cars accepted for final disposal as well as all exported cars. The materials extracted from ELV cars are reported to a central organisation, where they are checked for plausibility not only against the number of cars accepted for dismantling, but also against the quantities of materials that finally arrive at the recycling companies.

Additionally, regular inspections of dismantling and shredder operations and quality control of incoming materials at the recycling companies ensure that the reported data do actually reflect the real situation, and that fraud and misuse are rendered as difficult as possible.

With these features, the Dutch monitoring system has some similarity with the monitoring under the German System for packaging wastes (DSD) which also consists of the **three elements**:

- the accounting of materials by each of the actors,
- a check through a central data bank, and
- random inspections of the facilities of the various actors.

In the Netherlands, some materials are considered to be fully recycled once they are delivered to a recycling company (e.g. large plastic parts or coolant), while on the other hand in other countries only the metal content of the heavy fraction from shredding is considered as recycled. Still another concept is used in the German DSD where the recycling quota is defined as the mathematical product of collection quota and sorting quota (with subsequent delivery to a recycling company), while no proof of the actual quantity of recycled material is required.

## **16. Establish responsible and safe standards of recycling for workers and communities.**

Recycling provides a means of closing material cycles and managing increasing amounts of post-consumer waste. If the EU EPR directives are effective, increasing amounts of waste will undergo recycling, resulting in potential problems of polluting and unregulated recycling plants, often close to residential neighbourhoods,

One of the goals of both EU EPR directives is to ensure high environmental standards at facilities re-using, recycling or recovering end-of-life vehicles and WEEE. As mentioned halogenated substances contained in WEEE, in particular brominated flame retardants, can generate brominated dibenzofurans and brominated dibenzo-p-dioxins during the extrusion of plastics. Various studies suggest that the risk of generation of dioxins is a reason for the complete lack of recycling of plastics from electroscrap, due to the potential presence of BFRs.

It has also been demonstrated that personnel at an electronics-dismantling plant showed significantly higher levels of all PBDE congeners in their serum compared to a control group. The results of a Swedish study showed that decaBDE is bioavailable and that occupational exposure to high levels of PBDEs occurs at the electronics-dismantling plant. (ref)

Given the problems of recycling post-consumer products comprising hazardous constituents, the EU EPR directives bans some of the most dangerous substances used in cars and electronic products. Another of their aims is to professionalise and improve the standards of recycling operations, given that these are likely to grow as recycling targets are achieved.

**Both the ELV and WEEE Directives set out detailed and minimum treatment standards.**<sup>75</sup>

These cover everything from site setup to removal of a comprehensive list of components prior to treatment which must be treated in accordance with other previous Directives on hazardous waste handling. As with treatment of WEEE, member states shall ensure that best available treatment, recovery and recycling techniques are used. Treatment operations must obtain a permit from the competent authorities and be regularly inspected.

In the UK, community-based re-use organisations acknowledge that the WEEE directive will require that they professionalise their operations.

**Encourage community based recycling groups to get involved in the EPR program.**

Community based recycling schemes may see EPR as a threat to their livelihood. A similar concern was initially felt by groups in the UK but they soon realized that EPR programs can provide increased job potential for their group.

The WEEE legislation states that appliances collected from householders must be assessed for re-usability as a whole appliance and measures must be in place to test and refurbish appliances deemed for re-use. All organisations refurbishing appliances will be under strict regulatory scrutiny and will be accountable and audited for all WEEE operations.

In the UK, community-based re-use organisations acknowledge that the WEEE directive will require that they professionalize their operations. In 2001, the Furniture Recycling Network, which is an umbrella organisation for UK community based groups that refurbish furniture and WEEE, published a guide on the repair, refurbishment and re-use of electrical domestic appliances, entitled "*Fit for Re-use*".

As part of FRN's capacity building for community-based recycling groups, in 2001 they also published the Appliance Re-use and Recycling in the Community (ARRC) strategy to design and create the local and regional service infrastructure, required by the WEEE Directive to be in place by 2004. The prime concern for re-use organisations is that if they do not improve their operations, they will lose their supply of appliances, as they will no longer be permitted to handle and reuse WEEE.

There are currently over 300 community organisations across the UK which supply household appliances to people in need. Many of them also offer training, work experience and other opportunities to counteract social exclusion. About half of these organisations find that electrical appliances are top of the list when it comes to what customers want. Members of FRN currently recondition around 100,000 domestic appliances each year. Members of the public donate the

majority of appliances. With a direct supply from industry and local authority bulky household waste streams, this figure is set to treble.

Re-use organisations within the community sector need to improve data collection and the management of operations for the re-use of whole equipment and components and any other activities they undertake. Work carried out on each appliance must be recorded, reported and traceable. Testing and safety procedures must be standardised and the quality of the repaired and tested product and after sales service must conform to all consumer protection regulations.

A manual given to all members outlines the relevant health & safety and/or consumer protection regulations and/or technical standards which re-use and refurbishing operations need to meet.

By using FRN's procedural guidelines, the "fit for re-use" manual and the cross-sectoral partnerships already established, FRN intends to develop an infrastructure of accredited regional centres and local organisations, which will support all 300 UK organisations. As such, FRN intends to perform the role of an "audit buffer" – overseeing and administering routine audits of project and regional workshops. The inspection of the accredited organisations would allow the FRN and the regional networks to self-govern their operations.

This self-governance, competency and professionalism would result in the support of external partners such as local authorities, waste disposal and collection authorities, the waste industry, manufacturers, retailers, industry regulatory bodies, the Environment Agency and training organisations. This will enable the drawing up of "service contracts" and other forms of support and partnership with the FRN and regional networks to ensure the survival and sustainability of community-based recycling.<sup>76</sup>

### **EPR programs must encompass a living wage**

Today's penal system is becoming a massive purveyor of ultra-cheap, captive labor to large corporations and government entities.

The US Computer Take Back campaign, 2002<sup>77</sup>

Nationwide, more than 413,000 convicts now work in a variety of public and private enterprises, generating sales of nearly \$1 billion. Prison workers receive as little as 26 cents an hour. Federal prisons are recycling electronic products at prisons in Florida, New Jersey, Ohio, Texas and California.

Successful campaigning secured a commitment by Dell, the country's largest computer maker, and the State of California to stop using prison labor to dismantle e-waste. The Computer take-back campaign highlighted the difference

between Hewlett Packard's use of union labor versus Dell's use of prison labor at far less than the minimum wage. The campaign pointed out that prison labor undercuts the efforts of other companies that pay a living wage. The campaign also pointed out that financial support for the prison-industrial complex steals tax dollars from public sector programs and kills private sector development in electronic recycling.

In Canada, an initiative by the Canadian Auto Workers union <sup>78</sup> is pushing EPR because of the job creation potential. The union is advocating the setting up of disassembly plants next to assembly plants and run by union workers. They ask "who knows better how to disassemble a car than the workers who assembled it in the first place?" The initiative for the campaign was to both reduce hazards in the product as well as reverse the job losses in the industry.

## **17. Ensure that waste trade is banned for recycling materials**

*"I think the economic logic behind dumping a load of toxic waste in the lowest wage country is impeccable and we should face up to that....underpopulated countries such as Africa are vastly under-polluted."* – Lawrence Summers, Chief Economist of the World Bank<sup>79</sup>

Exporting waste – even for recycling - perpetuates our unsustainable production and consumption patterns since waste exports generally target developing countries with no infrastructure for dealing with this waste. This is essentially dumping on the poor, which is both environmentally unjust and creates new health hazards for communities in the South.

**The Basel Convention**<sup>80</sup> is a global treaty limiting international trade in toxic waste. Its aim is to minimise international shipments of hazardous waste and to reduce hazardous waste generation. The Convention supports countries banning imports of hazardous waste. It can control international waste shipments when a waste falls into one of 47 categories of waste and is toxic, eco-toxic, flammable, explosive, corrosive or infectious. The 47 categories of waste include clinical waste, waste containing a range of metals or their compounds, waste pharmaceuticals and waste from chemical and other production processes.

In March 1994, Parties to the Basel Convention agreed by consensus to ban all exports of hazardous waste from OECD to non-OECD countries by 1998 – the so-called Ban Amendment.<sup>81</sup>

The Basel ban is significantly weakened by the fact that key waste exporting countries, such as the US and Canada are not parties to the Convention, although the US is a signatory.<sup>82</sup>

**All Western European countries are parties to the Basel Convention** and most have ratified the Ban amendment. However the USA is NOT a signatory. In effect this allows countries who have ratified the Basel Convention to export WEEE to OECD countries, such as Poland, Czech Republic, Hungary, Slovakia, Turkey, Korea and Mexico and possibly also non-OECD countries. However, the exporter must prove that the recovery, reuse and/or recycling operations comply with the requirements of the WEEE Directive. Exported waste will not count toward the reuse/recycling and recovery targets unless the exporter can prove that the waste treatment methods used meet the requirements of the Directive.

When the **German Packaging Ordinance** was first introduced, the enthusiastic response from the public resulted in a mountain of waste, and a lack of domestic capacity to recycle it. The majority of this waste was exported and dumped abroad in France, Eastern Europe and Asia. Domestic recycling capacity was due to come on line by 1998. However, in the interim, surplus material, especially plastics continued to be exported. For example in 1994, of the 461,000 tonnes of plastics collected, 256,000 tonnes (55%) were exported, primarily to China and European Community. **After 1997, the export of packaging waste for recycling was banned.**

“Rather than sweeping our E-waste crisis out the backdoor by exporting it to the poor of the world, we have got to address it square in the face and solve it at home, in this country, at its manufacturing source.” - Ted Smith, Executive Director of SVTC.

#### **WEEE dumping in China**

“They call this recycling, but it’s really dumping by another name. Yet to our horror, we further discovered that rather than banning it, the United States government is actually encouraging this ugly trade in order to avoid finding real solutions to the massive tide of obsolete computer waste generated in the US daily.” -- Jim Puckett, coordinator of BAN

In February 2002, two US NGOs, Basel Action Network (BAN) and Silicon Valley Toxics Coalition (SVTC) exposed the dumping of North American WEEE in China,<sup>83</sup> where scrapped computers and monitors are being dismantled manually by women and children. The two NGOs highlighted the problem through a video made in China called “Exporting Harm”. Most of the waste originated from the US, which has not ratified the Basel Convention.

The investigation uncovered an entire area known as Guiyu in Guangdong Province, just 4 hours drive northeast of Hong Kong where about 100,000 poor migrant workers are employed breaking apart and processing obsolete

computers imported primarily from North America. The workers were found to be using 19th century technologies to clean up the wastes from the 21st century.

The operations involve men, women and children toiling under primitive conditions, often unaware of the health and environmental hazards involved in operations which include open burning of plastics and wires, riverbank acid works to extract gold, melting and burning of toxic soldered circuit boards and the cracking and dumping of toxic lead laden cathode ray tubes. Already the pollution in Guiyu has become so devastating that well water is no longer drinkable and thus water has to be trucked in from 30 kilometers away for the entire population.

As a result of the publicity surrounding "Exporting Harm," a number of US recyclers approached BAN and SVTC asking how their recycling operations could be accredited. In response, BAN and SVTC developed a **recyclers' pledge** that lays out a framework for basic minimum standards of recycling. The pledge states that the recyclers will not send the discarded electronic products to a landfill or incinerator, or to a developing country for disposal. It also states that the waste will not be sent to prisons, where a great deal of electronics recycling is done in the US, unless the workers are paid at least minimum wage and are protected by state and federal workplace safety regulations.<sup>84</sup>

The passing of the California Bill on recycling monitors and displays has not succeeded in plugging the loophole in exports of e-waste. Currently about 80% of electronic waste is leaving the USA to a range of destinations in Asia. According to the Basel Action Network the California recycling bill will allow waste brokers/recyclers to be paid by the Advanced Recycling Fee but provides no requirements for them to actually recycle the material. Hence, they can simply sell it offshore. Furthermore, all restraints listed in the bill regarding export can be circumvented by claiming that the recycled electronic waste will be recovered for use in new electronic components. All waste currently recycled in Asia, such as gold, lead, plastics etc. even under the most dangerous conditions will likely find its way back into the Asian electronics industry and thus this claim will be very easy to make, but impossible to prove. Finally the bill allows exporters to exploit weaker economies simply with assurances that they will be meeting certain minimum technological guidelines. These guidelines are not accompanied by workers' rights such as access to information, a living wage, health benefits and other social values attached to a socially just form of work.

It is essential that companies themselves prohibit this e-waste export trade. Hewlett Packard has a policy not to have its e-waste exported abroad but the passing of SB20 will preclude efforts by HP to try to prevent its end of life products being dumped in China or elsewhere in Asia.

It is also essential that governments and the general public know where all collected waste sent for recycling ends up. A significant amount of plastic waste collected in the USA ends up in China for processing.

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14 Directive 94/62/EC on Packaging and Packaging Waste

15 Restriction of Hazardous Substances Directive at [http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l\\_037/l\\_03720030213en00190023.pdf](http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l_037/l_03720030213en00190023.pdf)

<sup>16</sup> Ibid

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